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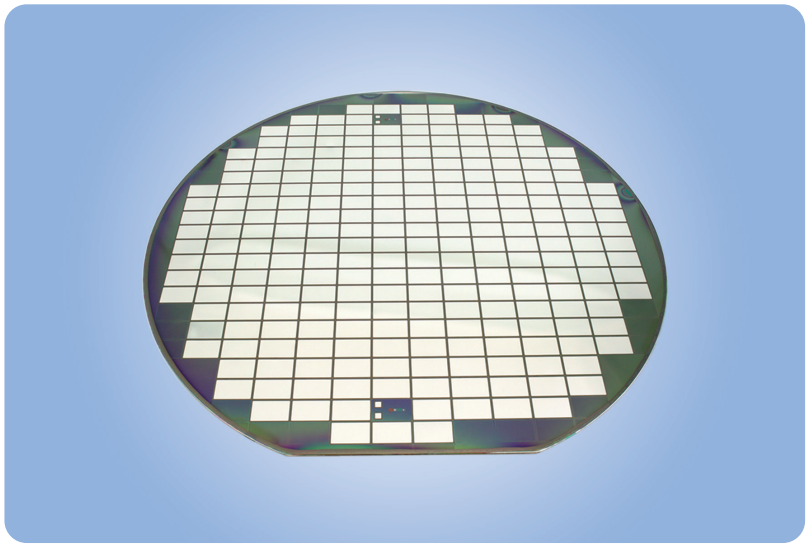
600 V and 650 V FRED Pt® Gen 4 Ultrafast Diodes Reduce Conduction Losses and Increase Efficiency



KEY BENEFITS

- FRED Pt® Gen 4 technology
- Designed for use with Vishay's trench insulated gate bipolar transistors (IGBT)
- Low I_{RRM} and reverse recovery charge
- Ultrasoft recovery in any switching conditions
- Ultra low forward voltage down to 1.4 V
- Ultrafast reverse recovery times down to 25 ns
- High operating temperature up to +175 °C

APPLICATIONS

- High frequency converters in power modules, motor drives, UPS, solar inverters, and welding machine inverters
- Single- and three-phase inverters, and full- and half-bridge DC/DC converters
- Power factor correction (PFC) circuits, boosters, choppers, and secondary-side rectification

DIODES

FRED Pt® Gen 4 Ultrafast Rectifiers

The new FRED Pt® Gen 4 ultrafast recovery diodes provide the perfect complement to Vishay's recently introduced trench insulated gate bipolar transistors (IGBT). Together, the devices provide low EMI and plug and play reliability for single- and three-phase inverters, and full- and half-bridge DC/DC converters.

They also show efficient and reliable operation with major suppliers' state of the art IGBTs. The "H" and "U" series diodes can also be used as stand-alone components for PFC circuits, boosters, choppers, and secondary-side rectification.

Designed to minimize conduction losses in medium speed circuits, "U" series diodes feature extremely low forward voltage down to 1.4 V for 600 V devices. Optimized to deliver high speeds for higher frequency applications, "H" series diodes offer reverse recovery times down to 25 ns with low typical forward voltages down to 1.65 V for 600 V devices.

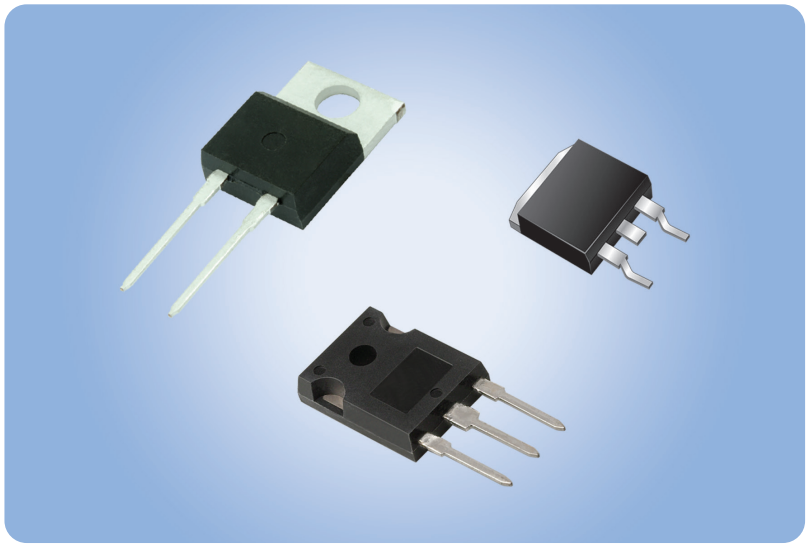
The Gen 4 diodes feature improved technologies in their active area and termination design – allowing for forward currents ranging from 12 A to 250 A in smaller die sizes than previous-generation devices – while their reduced thickness improves thermal impedance.

Part Number	Speed	V_R (V)	$I_{F(AV)}$ (A)	V_F max. at 25 °C (V)	t_{rr} typ. at 25 °C (ns)	Maximum Temperature	Die Size (mils)	Die Thickness (mils)
VS-4FD081H06A6xC	H	600	12	1.47	25	175	81 x 81	10
VS-4FD081U06A6xC	U	600	12	1.34	32	175		10
VS-4FD121H06A6xC	H	600	20	1.46	31	175	121 x 96	10
VS-4FD121H07A6xC	H	650	20	1.49	31	175		10
VS-4FD121U06A6xC	U	600	20	1.26	37	175		10
VS-4FD121U07A6xC	U	650	20	1.29	36	175		10
VS-4FD156H06A6xC	H	600	30	1.41	33	175	156 x 102	10
VS-4FD156H07A6xC	H	650	30	1.46	33	175		10
VS-4FD156U06A6xC	U	600	30	1.23	37	175		10
VS-4FD156U07A6xC	U	650	30	1.33	38	175		10
VS-4FD198H06A6xC	H	600	50	1.45	39	175	198 x 132	10
VS-4FD198H07A6xC	H	650	50	1.59	39	175		10
VS-4FD198U06A6xC	U	600	50	1.28	45	175		10
VS-4FD198U07A6xC	U	650	50	1.39	44	175		10
VS-4FD236H06A6xC	H	600	75	1.36	31	175	236 x 163	10
VS-4FD236H07A6xC	H	650	75	1.41	31	175		10
VS-4FD236U06A6xC	U	600	75	1.26	85	175		10
VS-4FD236U07A6xC	U	650	75	1.32	84	175		10
VS-4FD282H06A6xC	H	600	100	1.43	70	175	282 x 174	10
VS-4FD282H07A6xC	H	650	100	1.52	70	175		10
VS-4FD282U06A6xC	U	600	100	1.3	85	175		10
VS-4FD282U07A6xC	U	650	100	1.42	85	175		10
VS-4FD335H06A6xC	H	600	150	1.57	79	175	335 x 208	10
VS-4FD335H07A6xC	H	650	150	1.66	80	175		10
VS-4FD335U06A6xC	U	600	150	1.43	95	175		10
VS-4FD335U07A6xC	U	650	150	1.52	94	175		10
VS-4FD378H06A6xC	H	600	200	1.41	83	175	378 x 238	10
VS-4FD378H07A6xC	H	650	200	1.54	83	175		10
VS-4FD378U06A6xC	U	600	200	1.31	100	175		10
VS-4FD378U07A6xC	U	650	200	1.4	98	175		10

Note

- For V_F max. at 25 °C, typ. V_F at I_R

650 V FRED Pt® Gen 2 Ultrafast Diodes Reduce Switching Losses for Solar Inverters, UPS, Electric Vehicles, and Welding Machines



KEY BENEFITS

- Low forward voltage down to 1.38 V typical
- Fast reverse recovery times down to 30 ns at +25 °C
- Low reverse leakage current
- “H” family optimized for applications above 40 kHz
- “U” family available for applications up to 40 kHz
- Equivalent packaged bare die devices available upon request
- Wide range of rated currents from 2 A to 150 A
- Maximum operating junction temperature to +175 °C

APPLICATIONS

- Boost diodes, anti-parallel diodes to IGBTs, and output rectification in solar inverters, UPS, electric vehicles and hybrid electric vehicles, welding machines, servers, and CCM PFC

DIODES

FRED Pt® Ultrafast Diodes

The bare die devices combine their high blocking voltage capability with rated currents from 4 A to 150 A and a wide range of forward voltage vs. reverse recovery time ratios to reduce switching losses in solar inverters, UPS, electric and hybrid electric vehicles, and welding machines. The high blocking voltage capability of the Gen 2 FRED Pt® ultrafast diodes allows designers to provide additional safety margins and increase power density in end products.

PART NUMBER	DIE SIZE (mils)	CURRENT RATING (A)	VOLTAGE (V)	V_F AT RATED I [1] (V)	TYP. t_{RR} [2] (ns)	EQUIVALENT PACKAGE DEVICE AVAILABLE ON REQUEST
VS-FD111H07A6BN*	111 x 111	15 to 18	650	1.68	37	DPAK / D^2PAK / TO-220
VS-FD145H07A6xN*	145 x 145	30	650	1.7	39	D^2PAK / TO-220
VS-FD145W07A6xN*	145 x 145	30	650	2.2	26	
VS-FD184H07A6xN*	184 x 184	60	650	1.7	42	TO-247
VS-FD184W07A6xN*	184 x 184	60	650	2.3	38	
VS-FD310H07A6xN*	310 x 190	100 to 200	650	1.75	54	PowerTab®
VS-FD310W07A6xN*	310 x 190	100 to 200	650	2.2	47	
VS-FD394H07A6xN*	394 x 217	150	650	2.2	60	n/a

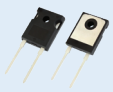
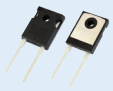
Notes

(1) Typical value at 25 °C

(2) Typical at 25 °C, 1 A, di/dt = 100 A/µs

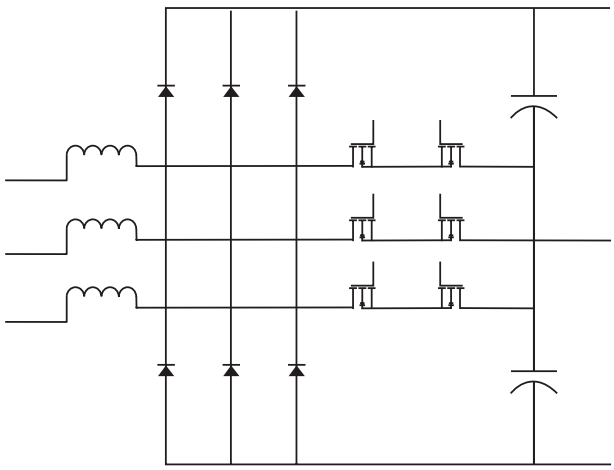
FRED Pt® GEN 5 HYPERFAST RECTIFIERS, 1200 V

Focus Products

Single Diode, 1200 V, 30 A Current Rating in TO-247AD 2L and 2L TO-220AC Packages									
Series		V_{CES} (V)	$I_{F(AV)}$ D = 0.5 (A)	At T_c (°C)	Speed Class	Typical V_F (V) T_J = 125 °C, I_F = 30 A	Typical Q_{rr} (nC) T_J = 125 °C, I_F = 20 A, V_R = 400 V, dI_F/dt = 600 A/µs	t_{rr} Class (ns) T_J = 25 °C, I_F = 1 A dI_F/dt = 100 A/µs, V_R = 30 V	Package
	VS-E5PX3012L-N3	1200	30	105	X	2.1	1550	26	TO-247AD 2L
	New FRED Pt® Gen 5 hyperfast rectifier; 1200 V; 30 A; X-type; optimized for extreme switching speed and low Q_{rr}; TO-247AD 2L package for best thermal performance								
	VS-E5TX3012-N3	1200	30	90	X	2.1	1550	26	2L TO-220AC
	New FRED Pt® Gen 5 hyperfast rectifier; 1200 V; 30 A; X-type; optimized for extreme switching speed and low Q_{rr}; TO-220 package for best value and small size								
	VS-E5PH3012L-N3	1200	30	115	H	1.7	2150	32	TO-247AD 2L
	New FRED Pt® Gen 5 hyperfast rectifier; 1200 V; 30 A; H-type; optimized for high switching speed; low V_F and low Q_{rr}; TO-247AD 2L package for best thermal performance								
	VS-E5TH3012-N3	1200	30	103	H	1.7	2150	32	2L TO-220AC
	New FRED Pt® Gen 5 hyperfast rectifier; 1200 V; 30 A; H-type; optimized for high switching speed; low V_F and low Q_{rr}; 2L TO-220AC package for best value and small size								

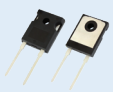
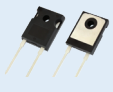
3-LEVEL T-TYPE PFC

Featuring a unique combination of low conduction and switching losses, these rectifiers are the right choice for high frequency converters, both hard switched and soft switched / resonant.



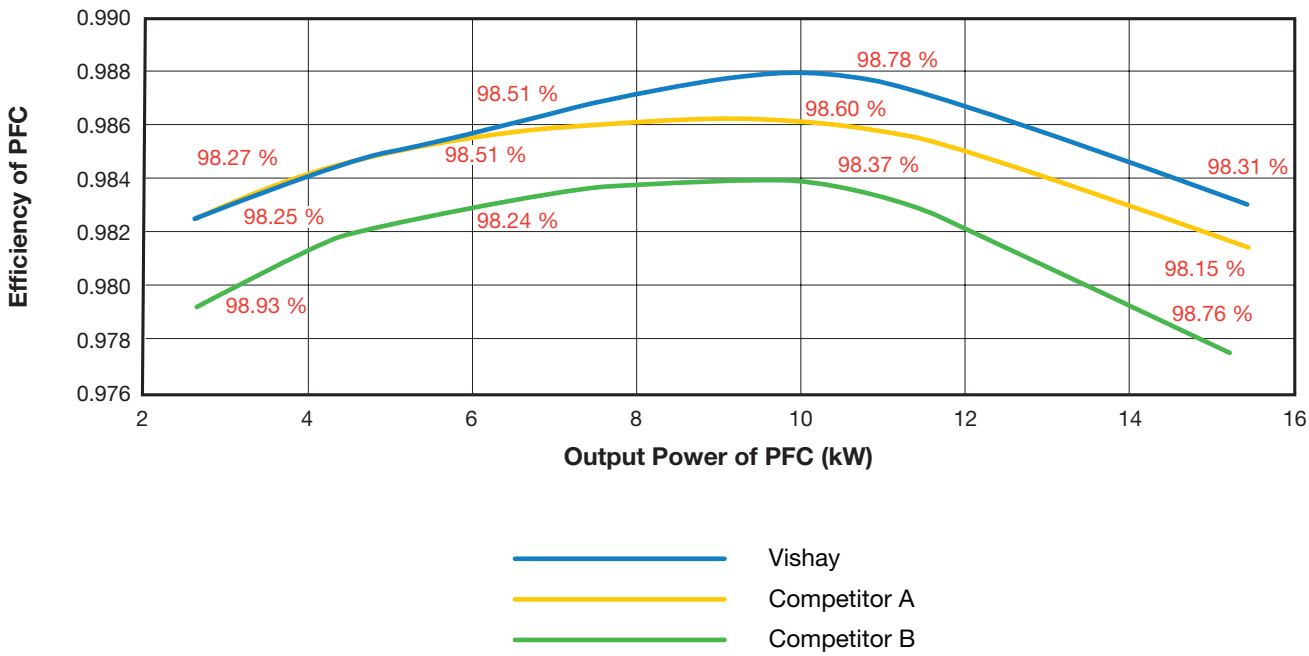
FRED Pt® GEN 5 HYPERFAST RECTIFIERS, 1200 V

Focus Products

Single Diode, 1200 V, 60 A Current Rating in TO-247AD 2L Package									
Series		V_{CES} (V)	$I_{F(AV)}$ D = 0.5 (A)	At T_c (°C)	Speed Class	Typical V_F (V) T_J = 125 °C, I_F = 60 A	Typical Q_{rr} (nC) T_J = 125 °C, I_F = 40 A, V_R = 400 V, dI_F/dt = 600 A/µs	t_{rr} Class (ns) T_J = 25 °C, I_F = 1 A dI_F/dt = 100 A/µs, V_R = 30 V	Package
	VS-E5PX6012L-N3	1200	60	105	X	2.1	2950	30	TO-247AD 2L
	New FRED Pt® Gen 5 hyperfast rectifier; 1200 V; 60 A; X-type; optimized for extreme switching speed and low Q_{rr}; TO-247AD 2L package for best thermal performance								
	VS-E5PH6012L-N3	1200	60	115	H	1.7	4080	38	TO-247AD 2L
	New FRED Pt® Gen 5 hyperfast rectifier; 1200 V; 60 A; H-type; optimized for high switching speed; low V_F and low Q_{rr}; TO-247AD 2L package for best thermal performance								

Specifically designed to improve the efficiency of PFC and output rectification stages of EV / HEV battery charging stations, the booster stage of solar inverters, and UPS applications, these devices are perfectly matched to operate with MOSFETs or high speed IGBTs.

EFFICIENCY OF PFC VS. OUTPUT POWER OF PFC AT 50 °C



DIE & WAFER - FRED PT® DIE

Part Number	Optimized For	Gen	I_F (AV) (A)	V_R (V)	V_F Max. @ 25 °C (V)	T_{rr} Typ. @ 25 °C (ns)	Die Size (mils)	Front Side Metal	Back Side Metal	T_j Max. (°C)	Die Thickness (mils)	Wafer Diameter (inches)
VS-4FD081H06A6xC	APD	4	12	600	1.47	25	81 x 81	Bondable	Solderable	175	10	6
VS-4FD081U06A6xC	APD	4	12	600	1.34	32	81 x 81	Bondable	Solderable	175	10	6
VS-4FD121H06A6xC	APD	4	20	600	1.46	31	121 x 96	Bondable	Solderable	175	10	6
VS-4FD121H07A6xC	APD	4	20	650	1.49	31	121 x 96	Bondable	Solderable	175	10	6
VS-4FD121U06A6xC	APD	4	20	600	1.26	37	121 x 96	Bondable	Solderable	175	10	6
VS-4FD121U07A6xC	APD	4	20	650	1.29	36	121 x 96	Bondable	Solderable	175	10	6
VS-4FD156H06A6xC	APD	4	30	600	1.41	33	156 x 102	Bondable	Solderable	175	10	6
VS-4FD156H07A6xC	APD	4	30	650	1.46	33	156 x 102	Bondable	Solderable	175	10	6
VS-4FD156U06A6xC	APD	4	30	600	1.23	37	156 x 102	Bondable	Solderable	175	10	6
VS-4FD156U07A6xC	APD	4	30	650	1.33	38	156 x 102	Bondable	Solderable	175	10	6
VS-4FD198H06A6xC	APD	4	50	600	1.45	39	198 x 132	Bondable	Solderable	175	10	6
VS-4FD198H07A6xC	APD	4	50	650	1.59	39	198 x 132	Bondable	Solderable	175	10	6
VS-4FD198U06A6xC	APD	4	50	600	1.28	45	198 x 132	Bondable	Solderable	175	10	6
VS-4FD198U07A6xC	APD	4	50	650	1.39	44	198 x 132	Bondable	Solderable	175	10	6
VS-4FD236H06A6xC	APD	4	75	600	1.36	31	236 x 163	Bondable	Solderable	175	10	6

Part Number	Optimized For	Gen	I_F (AV) (A)	V_R (V)	V_F Max. @ 25 °C (V)	T_{rr} Typ. @ 25 °C (ns)	Die Size (mils)	Front Side Metal	Back Side Metal	T_j Max. (°C)	Die Thickness (mils)	Wafer Diameter (inches)
VS-4FD236H07A6xC	APD	4	75	650	1.41	31	236 x 163	Bondable	Solderable	175	10	6
VS-4FD236U06A6xC	APD	4	75	600	1.26	85	236 x 163	Bondable	Solderable	175	10	6
VS-4FD236U07A6xC	APD	4	75	650	1.32	84	236 x 163	Bondable	Solderable	175	10	6
VS-4FD282H06A6xC	APD	4	100	600	1.43	70	174 x 282	Bondable	Solderable	175	10	6
VS-4FD282H07A6xC	APD	4	100	650	1.52	70	174 x 282	Bondable	Solderable	175	10	6
VS-4FD282U06A6xC	APD	4	100	600	1.3	85	174 x 282	Bondable	Solderable	175	10	6
VS-4FD282U07A6xC	APD	4	100	650	1.42	85	174 x 282	Bondable	Solderable	175	10	6
VS-4FD335H06A6xC	APD	4	150	600	1.57	79	335 x 208	Bondable	Solderable	175	10	6
VS-4FD335H07A6xC	APD	4	150	650	1.66	80	335 x 208	Bondable	Solderable	175	10	6
VS-4FD335U06A6xC	APD	4	150	600	1.43	95	335 x 208	Bondable	Solderable	175	10	6
VS-4FD335U07A6xC	APD	4	150	650	1.52	94	335 x 208	Bondable	Solderable	175	10	6
VS-4FD378H06A6xC	APD	4	200	600	1.41	83	378 x 238	Bondable	Solderable	175	10	6
VS-4FD378H07A6xC	APD	4	200	650	1.54	83	378 x 238	Bondable	Solderable	175	10	6
VS-4FD378U06A6xC	APD	4	200	600	1.31	100	378 x 238	Bondable	Solderable	175	10	6
VS-4FD378U07A6xC	APD	4	200	650	1.4	98	378 x 238	Bondable	Solderable	175	10	6
VS-5FD101H12A6BC	Resonant topology - Low Erec	5	8	1200	1.9	45	101 x 101	Bondable	Solderable	175	10	6

Part Number	Optimized For	Gen	I_F (AV) (A)	V_R (V)	V_F Max. @ 25 °C (V)	T_{rr} Typ. @ 25 °C (ns)	Die Size (mils)	Front Side Metal	Back Side Metal	T_j Max. (°C)	Die Thickness (mils)	Wafer Diameter (inches)
VS-5FD101X12A6BC	Resonant topology - Low Erec	5	8	1200	2.5	37	101 x 101	Bondable	Solderable	175	10	6
VS-5FD111H06A6BC	Resonant topology - Low Erec	5	15	600	1.3	36	111 x 111	Bondable	Solderable	175	10	6
VS-5FD111X06A6BC	Resonant topology - Low Erec	5	15	600	1.6	30	111 x 111	Bondable	Solderable	175	10	6
VS-5FD121H12A6BC	Resonant topology - Low Erec	5	15	1200	1.9	51	121 x 121	Bondable	Solderable	175	10	6
VS-5FD121X12A6BC	Resonant topology - Low Erec	5	15	1200	2.5	40	121 x 121	Bondable	Solderable	175	10	6
VS-5FD145H06A6BC	Resonant topology - Low Erec	5	30	600	1.3	42	145 x 145	Bondable	Solderable	175	10	6
VS-5FD145X06A6BC	Resonant topology - Low Erec	5	30	600	1.6	36	145 x 145	Bondable	Solderable	175	10	6
VS-5FD153H12A6BC	Resonant topology - Low Erec	5	30	1200	1.9	54	153 x 153	Bondable	Solderable	175	10	6
VS-5FD153X12A6BC	Resonant topology - Low Erec	5	30	1200	2.6	44	153 x 153	Bondable	Solderable	175	10	6
VS-5FD184H06A6BC	Resonant topology - Low Erec	5	60	600	1.4	47	184 x 184	Bondable	Solderable	175	10	6
VS-5FD184X06A6BC	Resonant topology - Low Erec	5	60	600	1.7	43	184 x 184	Bondable	Solderable	175	10	6
VS-5FD197H12A6BC	Resonant topology - Low Erec	5	60	1200	1.9	64	197 x 197	Bondable	Solderable	175	10	6

Part Number	Optimized For	Gen	I_F (AV) (A)	V_R (V)	V_F Max. @ 25 °C (V)	T_{rr} Typ. @ 25 °C (ns)	Die Size (mils)	Front Side Metal	Back Side Metal	T_j Max. (°C)	Die Thickness (mils)	Wafer Diameter (inches)
VS-5FD197X12A6BC	Resonant topology - Low Erec	5	60	1200	2.6	52	197 x 197	Bondable	Solderable	175	10	6
VS-5FD218H06A6BC	Resonant topology - Low Erec	5	75	600	1.3	63	218 x 218	Bondable	Solderable	175	10	6
VS-5FD218X06A6BC	Resonant topology - Low Erec	5	75	600	1.6	48	218 x 218	Bondable	Solderable	175	10	6
VS-FD040H02A6x	Low VF, Low Qrr	1	1	200	1	22	40 x 40	Bondable	Solderable	175	14	6
VS-FD046H02A6x	Low VF, Low Qrr	1	2 to 3	200	1	22	46 x 60	Bondable	Solderable	175	14	6
VS-FD051H06A6BN	Low Qrr	2	1 to 2	600	1.5	30	51 x 51	Bondable	Solderable	175	14	6
VS-FD056H06A6xN	Low Qrr	2	2 to 3	600	1.45	28	56 x 56	Bondable	Solderable	175	14	6
VS-FD056U06A6xN	Low VF	2	2 to 3	600	1.25	37	56 x 56	Bondable	Solderable	175	14	6
VS-FD060H02A6x	Low VF, Low Qrr	1	4	200	1	22	60 x 80	Bondable	Solderable	175	14	6
VS-FD072H06A6xN	Low VF	2	4 to 6	600	2.1	18	72 x 72	Bondable	Solderable	175	14	6
VS-FD072T06A6xN	Low VF	2	4 to 6	600	1.2	60	72 x 72	Bondable	Solderable	175	14	6
VS-FD072U06A6xN	Low VF	2	4 to 6	600	1.5	47	72 x 72	Bondable	Solderable	175	14	6
VS-FD080H02A6x	Low VF, Low Qrr	1	5	200	0.9	26	80 x 80	Bondable	Solderable	175	14	6
VS-FD083H06A6xN	Low VF	2	8	600	2.65	16	83 x 83	Bondable	Solderable	175	14	6
VS-FD083T06A6xN	Low VF	2	8	600	1.07	65	83 x 83	Bondable	Solderable	175	14	6

Part Number	Optimized For	Gen	I_F (AV) (A)	V_R (V)	V_F Max. @ 25 °C (V)	T_{rr} Typ. @ 25 °C (ns)	Die Size (mils)	Front Side Metal	Back Side Metal	T_j Max. (°C)	Die Thickness (mils)	Wafer Diameter (inches)
VS-FD083W06A6xN	Low VF	2	8	600	3.4	14	83 x 83	Bondable	Solderable	175	14	6
VS-FD087H02A6x	Low VF, Low Qrr	1	8 to 10	200	0.975	20	87 x 87	Bondable	Solderable	175	14	6
VS-FD090U4A6x	Low VF	1	8	400	1.3	43	90 x 90	Bondable	Solderable	175	14	6
VS-FD100H03A6x	Low Qrr	1	8 to 10	300	1.25	27	100 x 100	Bondable	Solderable	175	14	6
VS-FD110H03A6x	Low Qrr	1	10	300	1.25	31	110 x 110	Bondable	Solderable	175	14	6
VS-FD111H06A6xN	Low VF	2	15	600	2.45	21	111 x 111	Bondable	Solderable	175	14	6
VS-FD111H07A6BN	Low Qrr	2	15 to 18	650	1.68	37	111 x 111	Bondable	Solderable	175	14	6
VS-FD111T06A6xN	Low VF	2	15	600	1.07	60	111 x 111	Bondable	Solderable	175	14	6
VS-FD111U06A6xN	Low VF	2	15	600	1.9	24	111 x 111	Bondable	Solderable	175	14	6
VS-FD111W06A6xN	Low Qrr	2	15	600	3.4	17	111 X 111	Bondable	Solderable	175	14	6
VS-FD120H03A6x	Low Qrr	1	15 to 20	300	1.25	32	120 x 120	Bondable	Solderable	175	14	6
VS-FD120U04A6x	Low VF	1	15 to 20	400	1.25	46	120 x 120	Bondable	Solderable	175	14	6
VS-FD122H02A6x	Low VF, Low Qrr	1	15 to 20	200	1.05	22	122 x 122	Bondable	Solderable	175	14	6
VS-FD128H12A6xC	APD	2	8	1200	1.92	57	128 x 104	Bondable	Solderable	175	12	6
VS-FD145H06A6xN	Low Qrr	2	30	600	2.65	26	145 x 145	Bondable	Solderable	175	14	6
VS-FD145H07A6xN	Low Qrr	2	30	650	1.7	39	145 x 145	Bondable	Solderable	175	14	6

Part Number	Optimized For	Gen	I_F (AV) (A)	V_R (V)	V_F Max. @ 25 °C (V)	T_{rr} Typ. @ 25 °C (ns)	Die Size (mils)	Front Side Metal	Back Side Metal	T_j Max. (°C)	Die Thickness (mils)	Wafer Diameter (inches)
VS-FD145U06A6xN	Low VF	2	30	600	2	30	145 x 145	Bondable	Solderable	175	14	6
VS-FD145W07A6xN	Low Qrr	2	30	650	2.2	26	145 x 145	Bondable	Solderable	175	14	6
VS-FD151H12A6xC	APD	2	15	1200	2.1	60	151 x 112	Bondable	Solderable	175	12	6
VS-FD160H02A6x	Low VF, Low Qrr	1	30 to 35	200	1.09	26	160 x 160	Bondable	Solderable	175	14	6
VS-FD160H03A6x	Low Qrr	1	30 to 35	300	1.25	38	160 x 160	Bondable	Solderable	175	14	6
VS-FD160S04A6x	Low VF	1	30 to 40	400	1.32	72	160 x 160	Bondable	Solderable	175	14	6
VS-FD170H02A6x	Low VF, Low Qrr	1	40 to 50	200	1.02	34	170 x 170	Bondable	Solderable	175	14	6
VS-FD170H03A6x	Low Qrr	1	40 to 50	300	1.25	34	170 x 170	Bondable	Solderable	175	14	6
VS-FD184H07A6xN	Low Qrr	2	60	650	1.7	42	184 x 184	Bondable	Solderable	175	14	6
VS-FD184W07A6xN	Low Qrr	2	60	650	2.3	38	184 x 184	Bondable	Solderable	175	14	6
VS-FD200H02A6x	Low VF, Low Qrr	1	75	200	1.13	32	200 x 200	Bondable	Solderable	175	14	6
VS-FD200S04A6x	Low VF	1	75	400	1.3	87	200 x 200	Bondable	Solderable	175	14	6
VS-FD215H12A6xC	APD	2	25	1200	1.9	72	215 x 165	Bondable	Solderable	175	12	6
VS-FD310H07A6xN	Low Qrr	2	100 to 120	650	1.75	54	310 x 190	Bondable	Solderable	175	14	6
VS-FD310W07A6xN	Low Qrr	2	100 to 120	650	2.2	47	310 x 190	Bondable	Solderable	175	14	6
VS-FD334H12A6xC	APD	2	50	1200	2	81	334 x 188	Bondable	Solderable	175	12	6

Part Number	Optimized For	Gen	I_F (AV) (A)	V_R (V)	V_F Max. @ 25 °C (V)	T_{rr} Typ. @ 25 °C (ns)	Die Size (mils)	Front Side Metal	Back Side Metal	T_j Max. (°C)	Die Thickness (mils)	Wafer Diameter (inches)
VS-FD348H12A6xC	APD	2	100	1200	2.04	96	348 x 348	Bondable	Solderable	175	12	6
VS-FD394H07A6xN	Low Qrr	2	150	650	2.2	60	394 x 217	Bondable	Solderable	175	14	6
VS-FD433H12A6xC	APD	2	75	1200	2	93	433 x 228	Bondable	Solderable	175	12	6

*For VF Max @ 25 °C, Typ VF @ rated I

DIE & WAFER - HIGH VOLTAGE DIODE

Part Number	Structure	I_F (AV) (A)	V_R (V)	V_F Max. @ 25 °C (V)	Die Size (mils)	Front Side Metal	Back Side Metal	Die Thickness (mils)	Wafer Diameter (inches)
VS-VS080DM12Cx	MOAT Standard	4	1200	1.1	80 x 80	Bondable	Solderable	11.6	4
VS-VS135DM08Cx	MOAT Standard	10	800	1.1	100 x 135	Bondable	Solderable	11.6	4
VS-VS135DM10Cx	MOAT Standard	10	1000	1.1	100 x 135	Bondable	Solderable	11.6	4
VS-VS135DM12Cx	MOAT Standard	10	1200	1.1	100 x 135	Bondable	Solderable	11.6	4
VS-VS135DM16Cx	MOAT Standard	8	1600	1.1	100 x 135	Bondable	Solderable	13.4	4
VS-VS155DM16Cx	MOAT Standard	15	1600	1.1	155 x 155	Bondable	Solderable	13.4	5
VS-VS180DM12Cx	MOAT Standard	20	1200	1.1	180 x 180	Bondable	Solderable	12	5
VS-VS180DM16Cx	MOAT Standard	20	1600	1.1	180 x 180	Bondable	Solderable	13.4	5
VS-VS207DM12Cx	MOAT Standard	20	1200	1.1	157 x 207	Bondable	Solderable	12	5
VS-VS210DM12Cx	MOAT Standard	20	1200	1.15	210 x 210	Bondable	Solderable	13.4	5
VS-VS210DM16Cx	MOAT Standard	20	1600	1.15	210 x 210	Bondable	Solderable	13.4	5
VS-VS230DM12Cx	MOAT Standard	40	1200	1.1	230 x 230	Bondable	Solderable	12	5
VS-VS230DM16Cx	MOAT Standard	40	1600	1.14	230 x 230	Bondable	Solderable	13.4	5
VS-VS340DM12Cx	MOAT Standard	60	1200	1.09	350 x 230	Bondable	Solderable	12	5
VS-VS340DM16Cx	MOAT Standard	60	1600	1.09	230 x 350	Bondable	Solderable	13.4	5
VS-VS350DM16Cx	MOAT Standard	60	1600	1.07 @ 60 A	356 x 356	Bondable	Solderable	13.4	5
VS-VS390DM12Cx	MOAT Standard	80	1200	1.17	270 x 390	Bondable	Solderable	13.4	5
VS-VS480DM16Cx	MOAT Standard	100	1600	1.06 @ 60 A	480 x 480	Bondable	Solderable	13.4	5
VS-VS590DM12Cx	MOAT Standard	165	1200	1.43	590 x 590	Bondable	Solderable	13.4	5

DIE & WAFER - HIGH PERFORMANCE SCHOTTKY

Part Number	Die Size (mils)	Package	Product Family	Voltage V_{BRM} (V)	I_{RM} at V_{BRM} (µA)	Part Number	V_F Max. (V)	T_J Max. (°C)	Rated Current Per Die (A)	Package Style
SC036H100S6B	36x36	Die on Wafer	Schottky Solderable	100	100	VS-10MQ100-M3	0.78	175	1	SMA (DO-214AC)
SC036S045S6B	36x36	Die on Wafer	Schottky Solderable	45	500	VS-10MQ040-M3	0.54	150	1	SMA (DO-214AC)
SC036S060S6B	36x36	Die on Wafer	Schottky Solderable	60	500	VS-10MQ060-M3	0.63	150	1	SMA (DO-214AC)
SC046H100S6B	46x46	Die on Wafer	Schottky Solderable	60	500	VS-10BQ100-M3	0.82	175	2	SMB (DO-214AA)
SC046S060S6B	46x46	Die on Wafer	Schottky Solderable	60	100	VS-10BQ060-M3	0.6	150	2	SMB (DO-214AA)
SC060H100A6B	60x60	Die on Wafer	Schottky Bondable	100	1000	VS-30WQ10FN-M3	0.81	175	3	DPAK (TO-252AA)
SC060H100S6B	60x60	Die on Wafer	Schottky Solderable	100	500	VS-30BQ100-M3	0.79	175	3	SMC (DO-214AB)
SC060S030A6B	60x60	Die on Wafer	Schottky Bondable	30	2000	VS-30WQ03FN-M3	0.45	150	3	DPAK (TO-252AA)
SC060S045S6B	60x60	Die on Wafer	Schottky Solderable	45	500	VS-30BQ040-M3	0.57	150	3	SMC (DO-214AB)
SC060S060A6B	60x60	Die on Wafer	Schottky Bondable	60	2000	VS-30WQ06FN-M3	0.61	150	3	DPAK (TO-252AA)
SC060S060S6B	60x60	Die on Wafer	Schottky Solderable	60	500	VS-30BQ060-M3	0.58	150	3	SMC (DO-214AB)
SC070S010A6B	70x92	Die on Wafer	Schottky Bondable	60	3000	VS-12CWQ10FN-M3	0.8	175	6	DPAK (TO-252AA)
SC070S030A6B	70x92	Die on Wafer	Schottky Bondable	30	3000	VS-12CWQ03FN-M3	0.42	150	6	DPAK (TO-252AA)
SC070S045A6B	70x92	Die on Wafer	Schottky Bondable	45	3000	VS-12CWQ04FN-M3	0.53	150	6	DPAK (TO-252AA)
SC070S060A6B	70x92	Die on Wafer	Schottky Bondable	60	3000	VS-12CWQ06FN-M3	0.61	150	6	DPAK (TO-252AA)
SC105H045A6B	105x125	Die on Wafer	Schottky Bondable	45	2000	VS-30CTQ045-N3	0.62	175	15	TO-220AB
SC105H100A6B	105x125	Die on Wafer	Schottky Bondable	100	550	VS-30CTQ100-N3	0.86	175	15	TO-220AB
SC105S030A6B	105x125	Die on Wafer	Schottky Bondable	30	1750	VS-32CTQ030-N3	0.49	150	15	TO-220AB
SC105S045A6B	105x125	Die on Wafer	Schottky Bondable	45	1750	VS-30CPQ045-N3	0.54	150	15	TO-247AB
SC105S060A6B	105x125	Die on Wafer	Schottky Bondable	60	800	VS-30CTQ060-N3	0.62	150	15	TO-220AB
SC170H045A6B	115x170	Die on Wafer	Schottky Bondable	45	2500	VS-18TQ045-N3	0.6	175	18	TO-220AC
SC170H100A6B	115x170	Die on Wafer	Schottky Bondable	100	1000	VS-43CTQ100-N3	0.81	175	20	TO-220AB

Part Number	Die Size (mils)	Package	Product Family	Voltage V_{BRM} (V)	I_{RM} at V_{BRM} (µA)	Part Number	V_F Max. (V)	T_J Max. (°C)	Rated Current Per Die (A)	Package Style
SC170S030A6B	115x170	Die on Wafer	Schottky Bondable	30	3000	VS-42CTQ030-N3	0.48	150	20	TO-220AB
SC170S045A6B	115x170	Die on Wafer	Schottky Bondable	45	3000	VS-40CTQ045-N3	0.53	150	20	TO-220AB
SC170S060A6B	115x170	Die on Wafer	Schottky Bondable	60	2000	VS-48CTQ060-N3	0.61	150	20	TO-220AB
SC180H100A6B	150x180	Die on Wafer	Schottky Bondable	100	1250	VS-40CPQ100-N3	0.91	175	40	TO-247AB
SC180S045A6B	150x180	Die on Wafer	Schottky Bondable	45	2000	VS-60CTQ045-N3	0.56	150	30	TO-220AB
SC200H100A6B	200x200	Die on Wafer	Schottky Bondable	100	300	VS-63CPQ100-N3	0.92	175	60	TO-247AB
SC200S030A6B	200x200	Die on Wafer	Schottky Bondable	30	1900	VS-72CPQ030-N3	0.61	150	70	TO-247AB
SC400S030A6B	400x400	Die on Wafer	Schottky Bondable	30	20000	VS-VSKCS440/030	0.68	150	220	ADD-A-PAK
SC400S045A6B	400x400	Die on Wafer	Schottky Bondable	45	20000	VS-VSKCS400/045	0.67	150	200	ADD-A-PAK
SC420H100A6B	420x420	Die on Wafer	Schottky Bondable	100	6000	VS-VSKCS403/100	0.99	175	200	ADD-A-PAK
SX050H100S6PT	50x50	Tape & Reel	Schottky Solderable	100	1	SS1H10	0.77	175	1	DO-214AC
SX061H100S6PT	61x61	Tape & Reel	Schottky Solderable	100	10	SS2H10	0.79	175	2	DO-214AA
SX067H100S6PT	67x67	Tape & Reel	Schottky Solderable	100	2	SS8PH10	0.9	175	8	TO-277A
SX073H045S6PT	73x73	Tape & Reel	Schottky Solderable	45	50	MBRB15H45CT	0.63	175	7.5	TO-263AB
SX110H045S6PU	110x110	Tape & Reel	Schottky Solderable	45	80	MBR30H45CT	0.62	175	15	TO-220AB
SX110H060S6PU	110x110	Tape & Reel	Schottky Solderable	60	60	MBRB30H60CT	0.68	175	15	TO-263AB
SX119H100S6PU	119x119	Tape & Reel	Schottky Solderable	100	5	M30H100CT	0.82	175	15	TO-220AB
SX128H060S6OV	128x128	Tape & Reel	Schottky Solderable	60	150	MBR40H60PT	0.69	175	20	TO-247AD

DIE & WAFER - SOFT RECOVERY DIODE

Part Number	Structure	I_F (AV) (A)	V_R (V)	V_F Max. @ 25 °C (V)	Die Size (mils)	Front Side Metal	Back Side Metal	Die Thickness (mils)	Wafer Diameter (inches)
VS-VS060LM06CS02Cx	MOAT Fast	2	600	1.3	60 x 60	Bondable	Solderable	10.4	4
VS-VS135LM06CS02Cx	MOAT Fast	8	600	1.2	100 x 135	Bondable	Solderable	10.4	4
VS-VS135LM12CS05Cx	MOAT Fast	8	1200	1.3	100 x 135	Bondable	Solderable	10.4	4
VS-VS180LM06CS02Cx	MOAT Fast	20	600	1.3	180 x 180	Bondable	Solderable	10.4	5
VS-VS180LM12CS05Cx	MOAT Fast	20	1200	1.31	180 x 180	Bondable	Solderable	10.4	5
VS-VS207LM06CS02Cx	MOAT Fast	20	600	1.3	157 x 207	Bondable	Solderable	10.4	5
VS-VS230LM06CS02Cx	MOAT Fast	40	600	1.25	230 x 230	Bondable	Solderable	10.4	5
VS-VS230LM12CS05Cx	MOAT Fast	40	1200	1.4	230 x 230	Bondable	Solderable	10.4	5
VS-VS340LM06CS02Cx	MOAT Fast	60	600	1.3	230 x 350	Bondable	Solderable	10.4	5
VS-VS340LM12CS05Cx	MOAT Fast	60	1200	1.4	230 x 350	Bondable	Solderable	10.4	5
VS-VS390LM06CS02Cx	MOAT Fast	80	600	1.25	270 x 390	Bondable	Solderable	10.4	5
VS-VS390LM12CS05Cx	MOAT Fast	80	1200	1.35	270 x 390	Bondable	Solderable	10.4	5

DIE & WAFER - TMBS®

Part Number	Die Size (mils)	Package	Product Family	Voltage V_{BRM} (V)	I_{RM} at V_{BRM} (µA)	Finish Good Part Number	V_F Max. (V)	T_J Max. (°C)	Rated Current (A)	Package Style
TY045S100S6OT	45x45	TAPE & REEL	TMBS SOLDERABLE	100	150	VSSA310S	0.80	150	3	DO-214AC
TY045S200S6OT	45x45	TAPE & REEL	TMBS SOLDERABLE	200	40	VSB2200S	1.23	150	2	DO-204AL
TY054S100S6OT	54x54	TAPE & REEL	TMBS SOLDERABLE	100	250	VSSB310	0.70	150	3	DO-214AA
TY054S200S6OT	54x54	TAPE & REEL	TMBS SOLDERABLE	200	50	VSB3200S	1.40	150	3	DO-204AC
TY056S080A6OT	56x56	TAPE & REEL	TMBS BONDABLE	80	400	VT1080C	0.72	150	5	TO-220AB
TY056S150A6OT	56x56	TAPE & REEL	TMBS BONDABLE	150	100	V10150C	1.41	150	5	TO-220AB
TY056S200S6OT	56x56	TAPE & REEL	TMBS SOLDERABLE	200	60	VSB3200	1.20	150	3	DO-201AD
TY059S060A6OT	59x59	TAPE & REEL	TMBS BONDABLE	60	700	VT1060C	0.70	150	5	TO-220AB
TY066S100A6OT	66x66	TAPE & REEL	TMBS BONDABLE	100	100	MBR10100CT	0.85	150	5	TO-220AB
TY066S200A6OT	66x66	TAPE & REEL	TMBS BONDABLE	200	150	VT10200C	1.60	150	5	TO-220AB
TY073S080A6PT	73x73	TAPE & REEL	TMBS BONDABLE	80	600	VT1080S	0.81	150	10	TO-220AB
TY078S060A6PU	78x78	TAPE & REEL	TMBS BONDABLE	60	850	VT2060C	0.65	150	10	TO-220AB
TY080S100A6OU	80x80	TAPE & REEL	TMBS BONDABLE	100	800	V20100C	0.79	150	10	TO-220AB
TY080S100S6PU	80x80	TAPE & REEL	TMBS SOLDERABLE	100	70	V8P10	0.68	150	8	TO-277A
TY080S120A6OU	80x80	TAPE & REEL	TMBS BONDABLE	120	700	V20120C	0.90	150	10	TO-220AB

Part Number	Die Size (mils)	Package	Product Family	Voltage V_{BRM} (V)	I_{RM} at V_{BRM} (µA)	Finish Good Part Number	V_F Max. (V)	T_J Max. (°C)	Rated Current (A)	Package Style
TY080S120S6PU	80x80	TAPE & REEL	TMBS SOLDERABLE	120	300	V8P12	0.84	150	8	TO-277A
TY080S150A6OU	80x80	TAPE & REEL	TMBS BONDABLE	150	150	V20150C	1.20	150	10	TO-220AB
TY080S200A6OU	80x80	TAPE & REEL	TMBS BONDABLE	200	150	V20200G	1.70	150	10	TO-220AB
TY085S060A6OU	85x85	TAPE & REEL	TMBS BONDABLE	60	1200	VBT3060C	0.70	150	15	TO-220AB
TY085S080A6OU	85x85	TAPE & REEL	TMBS BONDABLE	80	700	VBT3080C	0.82	150	15	TO-263AB
TY093S100A6OU	93x93	TAPE & REEL	TMBS BONDABLE	100	800	V30100C	0.80	150	15	TO-277A
TY093S100S6PU	93x93	TAPE & REEL	TMBS SOLDERABLE	100	150	V10P10	0.68	150	10	TO-277A
TY093S120A6OU	93x93	TAPE & REEL	TMBS BONDABLE	120	800	V30120C	0.97	150	15	TO-220AB
TY093S150A6OU	93x93	TAPE & REEL	TMBS BONDABLE	150	200	V30150C	1.38	150	15	TO-263AB
TY093S200A6OU	93x93	TAPE & REEL	TMBS BONDABLE	200	150	V20200C	1.60	150	10	TO-220AB
TY102S080A6OU	102x102	TAPE & REEL	TMBS BONDABLE	80	1000	VFT3080S	0.95	150	30	ITO-220AB
TY102S100A6OU	102x102	TAPE & REEL	TMBS BONDABLE	100	500	V40100G	0.81	150	30	TO-220AB
TY102S100S6OU	102x102	TAPE & REEL	TMBS SOLDERABLE	100	500	V12P10	0.70	150	12	TO-220AB
TY102S120A6OU	102x102	TAPE & REEL	TMBS BONDABLE	120	500	V30120SG	1.28	150	15	TO-220AB
TY102S120S6PU	102x102	TAPE & REEL	TMBS SOLDERABLE	120	500	V12P12	0.80	150	12	TO-277A
TY102S150A6OU	102x102	TAPE & REEL	TMBS BONDABLE	150	250	VB40150C	1.43	150	20	TO-263AB

Part Number	Die Size (mils)	Package	Product Family	Voltage V_{BRM} (V)	I_{RM} at V_{BRM} (µA)	Finish Good Part Number	V_F Max. (V)	T_J Max. (°C)	Rated Current (A)	Package Style
TY119S100A6OV	119x119	TAPE & REEL	TMBS BONDABLE	100	250	V40100C	0.73	150	20	TO-277A
TY119S120A6OU	119x119	TAPE & REEL	TMBS BONDABLE	120	500	V30120S	1.10	150	15	TO-220AB
TY119S200A6OU	119x119	TAPE & REEL	TMBS BONDABLE	200	200	V60620PGW	1.48	150	30	TO-3PW
TY119S200A6PU	119x119	TAPE & REEL	TMBS BONDABLE	200	160	V30200C	0.95	150	15	TO-220AB
TY144S100A6OV	144x144	TAPE & REEL	TMBS BONDABLE	100	1000	V80100PW	0.78	150	40	TO-220AB

DIE & WAFER - THYRISTOR DIE LIST

Part Number	I_T (AV) (A)	V_R (V)	V_{TM} Max. @ 25 °C (V)	Die Size (mils)	Front Side Metal	Back Side Metal	Die Thickness (mils)	Wafer Diameter (inches)
VS-VS110BG12Dx	8	1200	.95 @ 6.5 A	110 x 110	Bondable	Solderable	11.8	4
VS-VS155BG12Dx	15	1200	1 @ 10 A	150 x 150	Bondable	Solderable	13.8	5
VS-VS180SG06Hx	25	600	1.00 @ 16 A	180 x 180	Solderable	Solderable	13.8	5
VS-VS180SG12Hx	25	1200	1.00 @ 16 A	180 x 180	Solderable	Solderable	13.8	5
VS-VS185BG12Dx	16	1200	1.00 @ 16 A	185 x 185	Bondable	Solderable	13.8	5
VS-VS185BG14Dx	16	1400	1.00 @ 16 A	185 x 185	Bondable	Solderable	15.9	5
VS-VS210SG06Hx	25	600	1.1 @ 25 A	210 x 210	Solderable	Solderable	14.6	5
VS-VS210SG10Hx	25	1000	1.1 @ 25 A	210 x 210	Solderable	Solderable	14.6	5
VS-VS210SG12Hx	25	1200	1.1 @ 25 A	210 x 210	Solderable	Solderable	14.6	5
VS-VS230SG06Hx	25	600	1.1 @ 25 A	230 x 230	Solderable	Solderable	14.6	5
VS-VS230SG12Hx	25	1200	1.1 @ 25 A	230 x 230	Solderable	Solderable	14.6	5
VS-VS250BG08Dx	40	800	1.1 @ 25 A	250 x 250	Bondable	Solderable	14.6	5
VS-VS250BG12Dx	40	1200	1.1 @ 25 A	250 x 250	Bondable	Solderable	14.6	5
VS-VS250BG14Dx	40	1400	1.05 @ 25 A	250 x 250	Bondable	Solderable	15.9	5
VS-VS250SG12Hx	40	1200	1.1 @ 25 A	250 x 250	Solderable	Solderable	14.6	5
VS-VS255SG06Hx	40	600	1.05 @ 25 A	250 x 250	Solderable	Solderable	13.0	5
VS-VS255SG12Hx	40	1200	1.05 @ 25 A	250 x 250	Solderable	Solderable	13.0	5
VS-VS255SG16Hx	40	1600	1.05 @ 25 A	250 x 250	Solderable	Solderable	15.9	5
VS-VS343SG12Hx	50	1200	0.9 @ 25 A	343 x 343	Solderable	Solderable	13.0	5
VS-VS350SG10Hx	50	1000	0.9 @ 25 A	350 x 350	Solderable	Solderable	14.6	5
VS-VS350SG12Hx	50	1200	0.9 @ 25 A	350 x 350	Solderable	Solderable	14.6	5

Part Number	I_T (AV) (A)	V_R (V)	V_{TM} Max. @ 25 °C (V)	Die Size (mils)	Front Side Metal	Back Side Metal	Die Thickness (mils)	Wafer Diameter (inches)
VS-VS370BG08Dx	70	800	0.91 @ 25 A	370 x 370	Bondable	Solderable	14.6	5
VS-VS370BG12Dx	70	1200	0.91 @ 25 A	370 x 370	Bondable	Solderable	14.6	5
VS-VS370SG12Hx	70	1200	0.91 @ 25 A	370 x 370	Solderable	Solderable	14.6	5
VS-VS370SG16Hx	70	1600	0.93 @ 25 A	370 x 370	Solderable	Solderable	15.9	5
VS-VS480BG12Dx	110	1200	0.95 @ 25 A	480 x 480	Bondable	Solderable	14.6	5
VS-VS480SG06Hx	110	600	0.95 @ 25 A	480 x 480	Solderable	Solderable	14.6	5
VS-VS480SG10Hx	110	1000	0.95 @ 25 A	480 x 480	Solderable	Solderable	14.6	5
VS-VS480SG12Hx	110	1200	0.95 @ 25 A	480 x 480	Solderable	Solderable	14.6	5
VS-VS480SG16Hx	110	1600	0.95 @ 25 A	480 x 480	Solderable	Solderable	15.9	5
VS-VS590SG04Hx	180	400	0.9 @ 25 A	590 x 590	Solderable	Solderable	11.8	5
VS-VS590SG06Hx	180	600	0.9 @ 25 A	590 x 590	Solderable	Solderable	11.8	5
VS-VS590SG08Hx	180	800	0.9 @ 25 A	590 x 590	Solderable	Solderable	11.8	5
VS-VS590SG10Hx	180	1000	0.9 @ 25 A	590 x 590	Solderable	Solderable	11.8	5
VS-VS590SG12Hx	180	1200	0.9 @ 25 A	590 x 590	Solderable	Solderable	14.6	5

DIE & WAFER - TVS

Part Number	Die Size (mils)	Package	Product Family	V_{BR} at I_T (V) Min.	V_{BR} at I_T (V) Max.	I_T (mA)	V_{wm} (V)	I_D (µA)	Finished Good Part Number	Power Rating (W)	T_J Max. (°C)	Package Style
TV050B010S6PT	50x50	TAPE & REEL	TVS SOLDERABLE	9.5	10.5	1	8.55	5	TMPG06-10A	400	185	MPG06
TV050B011S6PT	50x50	TAPE & REEL	TVS SOLDERABLE	10.5	11.6	1	9.4	2	TMPG06-11A	400	185	MPG06
TV050B012S6PT	50x50	TAPE & REEL	TVS SOLDERABLE	11.4	12.6	1	10.2	1	TMPG06-12A	400	185	MPG06
TV050B013S6PT	50x50	TAPE & REEL	TVS SOLDERABLE	12.4	13.7	1	11.1	1	TMPG06-13A	400	185	MPG06
TV050B015S6PT	50x50	TAPE & REEL	TVS SOLDERABLE	14.3	15.8	1	12.8	1	TMPG06-15A	400	185	MPG06
TV050B016S6PT	50x50	TAPE & REEL	TVS SOLDERABLE	15.2	16.8	1	13.6	1	TMPG06-16A	400	185	MPG06
TV050B018S6PT	50x50	TAPE & REEL	TVS SOLDERABLE	17.1	18.9	1	15.3	1	TMPG06-18A	400	185	MPG06
TV050B020S6PT	50x50	TAPE & REEL	TVS SOLDERABLE	19	21	1	17	1	TMPG06-20A	400	185	MPG06
TV050B022S6PT	50x50	TAPE & REEL	TVS SOLDERABLE	20.9	23.1	1	18.8	1	TMPG06-22A	400	185	MPG06
TV050B024S6PT	50x50	TAPE & REEL	TVS SOLDERABLE	22.8	25.2	1	20.5	1	TMPG06-24A	400	185	MPG06
TV050B027S6PT	50x50	TAPE & REEL	TVS SOLDERABLE	25.7	28.4	1	23.1	1	TMPG06-27A	400	185	MPG06
TV050B030S6PT	50x50	TAPE & REEL	TVS SOLDERABLE	28.5	31.5	1	25.6	1	TMPG06-30A	400	185	MPG06
TV050B033S6PT	50x50	TAPE & REEL	TVS SOLDERABLE	31.4	34.7	1	28.2	1	TMPG06-33A	400	185	MPG06
TV050B036S6PT	50x50	TAPE & REEL	TVS SOLDERABLE	34.2	37.8	1	30.8	1	TMPG06-36A	400	185	MPG06
TV050B039S6PT	50x50	TAPE & REEL	TVS SOLDERABLE	37.1	41	1	33.3	1	TMPG06-39A	400	185	MPG06
TV050B043S6PT	50x50	TAPE & REEL	TVS SOLDERABLE	40.9	45.2	1	36.8	1	TMPG06-43A	400	185	MPG06

Part Number	Die Size (mils)	Package	Product Family	V_{BR} at I_T (V) Min.	V_{BR} at I_T (V) Max.	I_T (mA)	V_{wm} (V)	I_D (µA)	Finished Good Part Number	Power Rating (W)	T_J Max. (°C)	Package Style
TV050B6P8S6PT	50x50	TAPE & REEL	TVS SOLDERABLE	6.45	7.14	10	5.8	300	TMPG06-6.8A	400	185	MPG06
TV050B7P5S6PT	50x50	TAPE & REEL	TVS SOLDERABLE	7.13	7.88	10	6.4	150	TMPG06-7.5A	400	185	MPG06
TV050B8P2S6PT	50x50	TAPE & REEL	TVS SOLDERABLE	7.79	8.61	10	7.02	50	TMPG06-8.2A	400	185	MPG06
TV050B9P1S6PT	50x50	TAPE & REEL	TVS SOLDERABLE	8.65	9.55	1	7.78	10	TMPG06-9.1A	400	185	MPG06
TV060B6P8S6PT	60x60	TAPE & REEL	TVS SOLDERABLE	6.45	7.14	10	5.8	300	TPSMA6.8A	400	185	DO-214AC
TV060B7P5S6PT	60x60	TAPE & REEL	TVS SOLDERABLE	7.13	7.88	10	6.4	150	TPSMA7.5A	400	185	DO-214AC
TV060B8P2S6PT	60x60	TAPE & REEL	TVS SOLDERABLE	7.79	8.61	10	7.02	50	TPSMA8.2A	400	185	DO-214AC
TV060B9P1S6PT	60x60	TAPE & REEL	TVS SOLDERABLE	8.65	9.55	1	7.78	10	TPSMA9.1A	400	185	DO-214AC
TV070B010S6PT	70x70	TAPE & REEL	TVS SOLDERABLE	9.5	10.5	1	8.55	5	TPSMA10A	400	185	DO-214AC
TV070B011S6PT	70x70	TAPE & REEL	TVS SOLDERABLE	10.5	11.6	1	9.4	2	TPSMA11A	400	185	DO-214AC
TV070B012S6PT	70x70	TAPE & REEL	TVS SOLDERABLE	11.4	12.6	1	10.2	2	TPSMA12A	400	185	DO-214AC
TV070B013S6PT	70x70	TAPE & REEL	TVS SOLDERABLE	12.4	13.7	1	11.1	2	TPSMA13A	400	185	DO-214AC
TV070B015S6PT	70x70	TAPE & REEL	TVS SOLDERABLE	14.3	15.8	1	12.8	1	TPSMA15A	400	185	DO-214AC
TV070B016S6PT	70x70	TAPE & REEL	TVS SOLDERABLE	15.2	16.8	1	13.6	1	TPSMA16A	400	185	DO-214AC
TV070B018S6PT	70x70	TAPE & REEL	TVS SOLDERABLE	17.1	18.9	1	15.3	1	TPSMA18A	400	185	DO-214AC
TV070B020S6PT	70x70	TAPE & REEL	TVS SOLDERABLE	19	21	1	17.1	1	TPSMA20A	400	185	DO-214AC
TV070B022S6PT	70x70	TAPE & REEL	TVS SOLDERABLE	20.9	23.1	1	18.8	1	TPSMA22A	400	185	DO-214AC

Part Number	Die Size (mils)	Package	Product Family	V_{BR} at I_T (V) Min.	V_{BR} at I_T (V) Max.	I_T (mA)	V_{wm} (V)	I_D (µA)	Finished Good Part Number	Power Rating (W)	T_J Max. (°C)	Package Style
TV070B024S6PT	70x70	TAPE & REEL	TVS SOLDERABLE	22.8	25.2	1	20.5	1	TPSMA24A	400	185	DO-214AC
TV070B027S6PT	70x70	TAPE & REEL	TVS SOLDERABLE	25.7	28.4	1	23.1	1	TPSMA27A	400	185	DO-214AC
TV070B030S6PT	70x70	TAPE & REEL	TVS SOLDERABLE	28.5	31.5	1	25.6	1	TPSMA30A	400	185	DO-214AC
TV070B033S6PT	70x70	TAPE & REEL	TVS SOLDERABLE	31.4	34.7	1	28.2	1	TPSMA33A	400	185	DO-214AC
TV070B036S6PT	70x70	TAPE & REEL	TVS SOLDERABLE	34.2	37.8	1	30.8	1	TPSMA36A	400	185	DO-214AC
TV070B039S6PT	70x70	TAPE & REEL	TVS SOLDERABLE	37.1	41	1	33.3	1	TPSMA39A	400	185	DO-214AC
TV070B043S6PT	70x70	TAPE & REEL	TVS SOLDERABLE	40.9	45.2	1	36.8	1	TPSMA43A	400	185	DO-214AC
TV070B6P8S6PT	70x70	TAPE & REEL	TVS SOLDERABLE	6.45	7.14	10	5.8	500	TPSMA6.8A	400	185	DO-214AC
TV070B7P5S6PT	70x70	TAPE & REEL	TVS SOLDERABLE	7.13	7.88	10	6.4	250	TPSMA7.5A	400	185	DO-214AC
TV070B8P2S6PT	70x70	TAPE & REEL	TVS SOLDERABLE	7.79	8.61	10	7.02	100	TPSMA8.2A	400	185	DO-214AC
TV070B9P1S6PT	70x70	TAPE & REEL	TVS SOLDERABLE	8.65	9.55	1	7.78	25	TPSMA9.1A	400	185	DO-214AC
TV110B010S6PU	110x110	TAPE & REEL	TVS SOLDERABLE	9.5	10.5	1	8.55	20	TPSMC10A	1500	185	DO-214AB
TV110B011S6PU	110x110	TAPE & REEL	TVS SOLDERABLE	10.5	11.6	1	9.4	5	TPSMC11A	1500	185	DO-214AB
TV110B012S6PU	110x110	TAPE & REEL	TVS SOLDERABLE	11.4	12.6	1	10.2	2	TPSMC12A	1500	185	DO-214AB
TV110B013S6PU	110x110	TAPE & REEL	TVS SOLDERABLE	12.4	13.7	1	11.1	2	TPSMC13A	1500	185	DO-214AB
TV110B015S6PU	110x110	TAPE & REEL	TVS SOLDERABLE	14.3	15.8	1	12.8	1	TPSMC15A	1500	185	DO-214AB
TV110B016S6PU	110x110	TAPE & REEL	TVS SOLDERABLE	15.2	16.8	1	13.6	1	TPSMC16A	1500	185	DO-214AB

Part Number	Die Size (mils)	Package	Product Family	V_{BR} at I_T (V) Min.	V_{BR} at I_T (V) Max.	I_T (mA)	V_{wm} (V)	I_D (µA)	Finished Good Part Number	Power Rating (W)	T_J Max. (°C)	Package Style
TV110B018S6PU	110x110	TAPE & REEL	TVS SOLDERABLE	17.1	18.9	1	15.3	1	TPSMC18A	1500	185	DO-214AB
TV110B020S6PU	110x110	TAPE & REEL	TVS SOLDERABLE	19	21	1	17.1	1	TPSMC20A	1500	185	DO-214AB
TV110B022S6PU	110x110	TAPE & REEL	TVS SOLDERABLE	20.9	23.1	1	18.8	1	TPSMC22A	1500	185	DO-214AB
TV110B024S6PU	110x110	TAPE & REEL	TVS SOLDERABLE	22.8	25.2	1	20.5	1	TPSMC24A	1500	185	DO-214AB
TV110B027S6PU	110x110	TAPE & REEL	TVS SOLDERABLE	25.7	28.4	1	23.1	1	TPSMC27A	1500	185	DO-214AB
TV110B030S6PU	110x110	TAPE & REEL	TVS SOLDERABLE	28.5	31.5	1	25.6	1	TPSMC30A	1500	185	DO-214AB
TV110B033S6PU	110x110	TAPE & REEL	TVS SOLDERABLE	31.4	34.7	1	28.2	1	TPSMC33A	1500	185	DO-214AB
TV110B036S6PU	110x110	TAPE & REEL	TVS SOLDERABLE	34.2	37.8	1	30.8	1	TPSMC36A	1500	185	DO-214AB
TV110B039S6PU	110x110	TAPE & REEL	TVS SOLDERABLE	37.1	41	1	33.3	1	TPSMC39A	1500	185	DO-214AB
TV110B043S6PU	110x110	TAPE & REEL	TVS SOLDERABLE	40.9	45.2	1	36.8	1	TPSMC43A	1500	185	DO-214AB
TV110B047S6PU	110x110	TAPE & REEL	TVS SOLDERABLE	44.7	49.4	1	40.2	1	TPSMC47A	1500	185	DO-214AB
TV110B6P8S6PU	110x110	TAPE & REEL	TVS SOLDERABLE	6.45	7.14	10	5.8	1000	TPSMC6.8A	1500	185	DO-214AB
TV110B7P4S6PU	110x110	TAPE & REEL	TVS SOLDERABLE	7.13	7.88	10	6.4	500	TPSMC7.5A	1500	185	DO-214AB
TV110B8P2S6PU	110x110	TAPE & REEL	TVS SOLDERABLE	7.79	8.61	10	7.02	200	TPSMC8.2A	1500	185	DO-214AB
TV110B9P1S6PU	110x110	TAPE & REEL	TVS SOLDERABLE	8.65	9.55	1	7.78	50	TPSMC9.1A	1500	185	DO-214AB
TV134T010S6PV	134x134	TAPE & REEL	TVS SOLDERABLE	11.1	12.3	1	10	5	3KASMC10A	3000	185	DO-214AB
TV134T011S6PV	134x134	TAPE & REEL	TVS SOLDERABLE	12.2	13.5	1	11	5	3KASMC11A	3000	185	DO-214AB

Part Number	Die Size (mils)	Package	Product Family	V_{BR} at I_T (V) Min.	V_{BR} at I_T (V) Max.	I_T (mA)	V_{wm} (V)	I_D (µA)	Finished Good Part Number	Power Rating (W)	T_J Max. (°C)	Package Style
TV134T012S6PV	134x134	TAPE & REEL	TVS SOLDERABLE	13.3	14.7	1	12	5	3KASMC12A	3000	185	DO-214AB
TV134T013S6PV	134x134	TAPE & REEL	TVS SOLDERABLE	14.4	15.9	1	13	5	3KASMC13A	3000	185	DO-214AB
TV134T014S6PV	134x134	TAPE & REEL	TVS SOLDERABLE	15.6	17.2	1	14	5	3KASMC14A	3000	185	DO-214AB
TV134T015S6PV	134x134	TAPE & REEL	TVS SOLDERABLE	16.7	18.5	1	15	5	3KASMC15A	3000	185	DO-214AB
TV134T016S6PV	134x134	TAPE & REEL	TVS SOLDERABLE	17.8	19.7	1	16	5	3KASMC16A	3000	185	DO-214AB
TV134T017S6PV	134x134	TAPE & REEL	TVS SOLDERABLE	18.9	20.9	1	17	5	3KASMC17A	3000	185	DO-214AB
TV134T018S6PV	134x134	TAPE & REEL	TVS SOLDERABLE	20	22.1	1	18	5	3KASMC18A	3000	185	DO-214AB
TV134T020S6PV	134x134	TAPE & REEL	TVS SOLDERABLE	22.2	24.5	1	20	5	3KASMC20A	3000	185	DO-214AB
TV134T022S6PV	134x134	TAPE & REEL	TVS SOLDERABLE	24.4	26.9	1	22	5	3KASMC22A	3000	185	DO-214AB
TV134T024S6PV	134x134	TAPE & REEL	TVS SOLDERABLE	26.7	29.5	1	24	5	3KASMC24A	3000	185	DO-214AB
TV134T026S6PV	134x134	TAPE & REEL	TVS SOLDERABLE	28.9	31.9	1	26	5	3KASMC26A	3000	185	DO-214AB
TV134T028S6PV	134x134	TAPE & REEL	TVS SOLDERABLE	31.1	34.4	1	28	5	3KASMC28A	3000	185	DO-214AB
TV134T030S6PV	134x134	TAPE & REEL	TVS SOLDERABLE	33.3	36.8	1	30	5	3KASMC30A	3000	185	DO-214AB
TV134T033S6PV	134x134	TAPE & REEL	TVS SOLDERABLE	36.7	40.6	1	33	5	3KASMC33A	3000	185	DO-214AB
TV134T036S6PV	134x134	TAPE & REEL	TVS SOLDERABLE	40	44.2	1	36	5	3KASMC36A	3000	185	DO-214AB
TV134T040S6PV	134x134	TAPE & REEL	TVS SOLDERABLE	44.4	49.1	1	40	5	3KASMC40A	3000	185	DO-214AB
TV134T043S6PV	134x134	TAPE & REEL	TVS SOLDERABLE	47.8	52.8	1	43	5	3KASMC43A	3000	185	DO-214AB

Part Number	Die Size (mils)	Package	Product Family	V_{BR} at I_T (V) Min.	V_{BR} at I_T (V) Max.	I_T (mA)	V_{wm} (V)	I_D (µA)	Finished Good Part Number	Power Rating (W)	T_J Max. (°C)	Package Style
TV162L027S6PV	162x162	TAPE & REEL	TVS SOLDERABLE	24	30	10	22	0	SM5A27	3600	175	DO-218AB
TV162T010S6PV	162x162	TAPE & REEL	TVS SOLDERABLE	11.1	12.3	1	10	15	SM5S10A	3600	175	DO-218AB
TV162T011S6PV	162x162	TAPE & REEL	TVS SOLDERABLE	12.2	13.5	1	11	10	SM5S11A	3600	175	DO-218AB
TV162T012S6PV	162x162	TAPE & REEL	TVS SOLDERABLE	13.3	14.7	1	12	10	SM5S12A	3600	175	DO-218AB
TV162T013S6PV	162x162	TAPE & REEL	TVS SOLDERABLE	14.4	15.9	1	13	10	SM5S13A	3600	175	DO-218AB
TV162T014S6PV	162x162	TAPE & REEL	TVS SOLDERABLE	15.6	17.2	1	14	10	SM5S14A	3600	175	DO-218AB
TV162T015S6PV	162x162	TAPE & REEL	TVS SOLDERABLE	16.7	18.5	1	15	10	SM5S15A	3600	175	DO-218AB
TV162T016S6PV	162x162	TAPE & REEL	TVS SOLDERABLE	17.8	19.7	1	16	10	SM5S16A	3600	175	DO-218AB
TV162T017S6PV	162x162	TAPE & REEL	TVS SOLDERABLE	18.9	20.9	1	17	10	SM5S17A	3600	175	DO-218AB
TV162T018S6PV	162x162	TAPE & REEL	TVS SOLDERABLE	20	22.1	1	18	10	SM5S18A	3600	175	DO-218AB
TV162T020S6PV	162x162	TAPE & REEL	TVS SOLDERABLE	22.2	24.5	1	20	10	SM5S20A	3600	175	DO-218AB
TV162T022S6PV	162x162	TAPE & REEL	TVS SOLDERABLE	24.4	26.9	1	22	10	SM5S22A	3600	175	DO-218AB
TV162T024S6PV	162x162	TAPE & REEL	TVS SOLDERABLE	26.7	29.5	1	24	10	SM5S24A	3600	175	DO-218AB
TV162T026S6PV	162x162	TAPE & REEL	TVS SOLDERABLE	28.9	31.9	1	26	10	SM5S26A	3600	175	DO-218AB
TV162T028S6PV	162x162	TAPE & REEL	TVS SOLDERABLE	31.1	34.4	1	28	10	SM5S28A	3600	175	DO-218AB
TV162T030S6PV	162x162	TAPE & REEL	TVS SOLDERABLE	33.3	36.8	1	30	10	SM5S30A	3600	175	DO-218AB
TV162T033S6PV	162x162	TAPE & REEL	TVS SOLDERABLE	36.7	40.6	1	33	10	SM5S33A	3600	175	DO-218AB

Part Number	Die Size (mils)	Package	Product Family	V_{BR} at I_T (V) Min.	V_{BR} at I_T (V) Max.	I_T (mA)	V_{wm} (V)	I_D (µA)	Finished Good Part Number	Power Rating (W)	T_J Max. (°C)	Package Style
TV162T036S6PV	162x162	TAPE & REEL	TVS SOLDERABLE	40	44.2	1	36	10	SM5S36A	3600	175	DO-218AB
TV180L027S6PV	180x180	TAPE & REEL	TVS SOLDERABLE	24	30	10	22	0	SM6A27	4600	175	DO-218AB
TV180T010S6PV	180x180	TAPE & REEL	TVS SOLDERABLE	11.1	12.3	5	10	15	SM6S10A	4600	175	DO-218AB
TV180T011S6PV	180x180	TAPE & REEL	TVS SOLDERABLE	12.2	13.5	5	11	10	SM6S11A	4600	175	DO-218AB
TV180T012S6PV	180x180	TAPE & REEL	TVS SOLDERABLE	13.3	14.7	5	12	10	SM6S12A	4600	175	DO-218AB
TV180T013S6PV	180x180	TAPE & REEL	TVS SOLDERABLE	14.4	15.9	5	13	10	SM6S13A	4600	175	DO-218AB
TV180T014S6PV	180x180	TAPE & REEL	TVS SOLDERABLE	15.6	17.2	5	14	10	SM6S14A	4600	175	DO-218AB
TV180T015S6PV	180x180	TAPE & REEL	TVS SOLDERABLE	16.7	18.5	5	15	10	SM6S15A	4600	175	DO-218AB
TV180T016S6PV	180x180	TAPE & REEL	TVS SOLDERABLE	17.8	19.7	5	16	10	SM6S16A	4600	175	DO-218AB
TV180T017S6PV	180x180	TAPE & REEL	TVS SOLDERABLE	18.9	20.9	5	17	10	SM6S17A	4600	175	DO-218AB
TV180T018S6PV	180x180	TAPE & REEL	TVS SOLDERABLE	20	22.1	5	18	10	SM6S18A	4600	175	DO-218AB
TV180T020S6PV	180x180	TAPE & REEL	TVS SOLDERABLE	22.2	24.5	5	20	10	SM6S20A	4600	175	DO-218AB
TV180T022S6PV	180x180	TAPE & REEL	TVS SOLDERABLE	24.4	26.9	5	22	10	SM6S22A	4600	175	DO-218AB
TV180T024S6PV	180x180	TAPE & REEL	TVS SOLDERABLE	26.7	29.5	5	24	10	SM6S24A	4600	175	DO-218AB
TV180T026S6PV	180x180	TAPE & REEL	TVS SOLDERABLE	28.9	31.9	5	26	10	SM6S26A	4600	175	DO-218AB
TV180T028S6PV	180x180	TAPE & REEL	TVS SOLDERABLE	31.1	34.4	5	28	10	SM6S28A	4600	175	DO-218AB
TV180T030S6PV	180x180	TAPE & REEL	TVS SOLDERABLE	33.3	36.8	5	30	10	SM6S30A	4600	175	DO-218AB

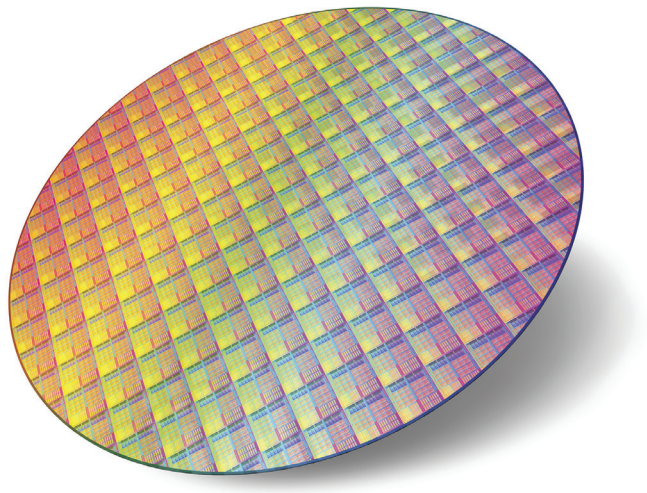
OPTOELECTRONICS

Bare Die

Introduction

Benefits of using bare die

- High design flexibility without package limitations
- High level of integration
- Temperature management with chip-on-board (COB) technology
- Highly accurate die placement
- Reduced system cost
- Customer specific design
- Possible process flow modification



Vishay service

- Design assistance
- Assembly assistance
- Die handling assistance

Wafer processing duty

- Wafer mapping/wafer inking
- Wafer thinning
- Wafer dicing
- Die sorting
- Visual inspection

Packaging and shipping methods

- Unsawn wafer: the wafers are delivered in a sealed bag and die are not singulated
- Sawn wafer on loose foil: the wafers are sawn and supplied on blue tape
- Sawn wafer on discoframe: the wafers are sawn and supplied on a blue tape in a plastic frame

OPTOELECTRONICS

Bare Die

Die Usage Basic Guidelines

Bare die products require careful handling and storage as well as optimized assembly processes and tools to avoid damage and deviations from the expected performance. The following guidelines are based on Vishay's many years of experience of manufacturing and assembling semiconductor devices.

Die Handling

To avoid contamination and damage die or wafers should never be handled by bare hands. Mechanical pressure has to be limited and special tweezers have to be used for grabbing a die from the packing.

Storage time for wafers in sealed condition shall not exceed 6 months (storage ambient conditions: T_A = 15...30 °C; relative humidity: < 60 %).

Die Attach

To assure optimal electrical conductivity between silicon and copper, Vishay wafers are coated on the back side with two or three metallic solderable layers which are suitable for a wide range of solders, ranging from solder alloys to conductive epoxies. Fluxes are not recommended for solders because residuals can contaminate the surface of the die, and cause voids under the die, thus compromising heat dissipation and electrical performance.

Vishay experts are happy to advise you on which assembly materials are best suited to your specific requirements..

Wire Bonding

Vishay does not define absolute bonding parameters, since bonding equipment and materials vary greatly. Customers are advised to optimize bonding parameters according to their specific equipment.

Upon request, Vishay is ready to assist you in optimizing your wirebonding process.

Bare Die Naming Rules for Infrared Emitters

T	B	94	14	VA	SF	F
Telefunken	**Technology**	**Wavelength**	**Chip Size**	**Internal**	**Package Form**	**Status**
(Now part of Vishay)	B: Bulk Emitter S: Surface Emitter	94: 940 nm 89: 890 nm 87: 870 nm 85: 850 nm 83: 830 nm	08: 08 mil 11: 11 mil 14: 14 mil 17: 17 mil	V: Emitter A: Version / Type	S: Sawn Wafer F: Placed on Foil	F: Finished Good

Bare Die Naming Rules for Photo Detectors

T	11	10	P6	SD	F
Telefunken	**Technology**	**Size**	**Type**	**Package Form**	**Status**
(Now part of Vishay)	11: Homogeneous 15: Epitaxial	Internal Classification	P: Photodetector 6: Internal Classification	S: Sawn Wafer D: Mounted on Discoframe	F: Finished Good

OPTOELECTRONICS

Bare Die

Infrared Emitters

Vishay offers a wide variety of high-power, high-speed infrared emitter chips for a broad range of applications. Vishay offers broad range of surface emitters that deliver the highest radiant intensities; and highly efficient bulk emitters.

All Vishay emitter chips satisfy the requirements of AEC Q101.

Portfolio

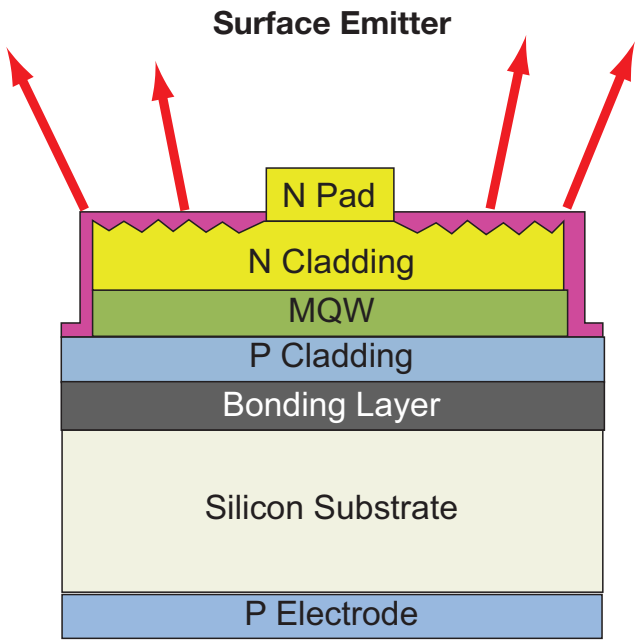
Vishay offers a wide selection of chips, emitting at 850 nm, 890 nm, 940 nm.

Typical Applications

- IR touch display based devices such as printer displays, ebook reader, smart phones, tablets, and ultrabooks
- Navigation devices
- Automotive dashboard displays
- Data communication
- Illumination for cameras

Available Technologies

- Metal Organic Vapor Phase Epitaxy (MOVPE):
  - High-power surface emitter
  - Bulk emitter



OPTOELECTRONICS

Bare Die

IR Surface Emitters

Part Number	Product Image	Type	Chip Dimensions L x W x H (mm)	Peak Wavelength (nm)	Radiant Power (mW)	Angle of Half Intensity (±°)	Surge Forward Current (A at t_p = 100 µs)	Rise Time (ns)
TS8914VA		Surface	0.355 x 0.355 x 0.17	890	40[C]	60	1	10
TS8514VB		Surface	0.355 x 0.355 x 0.17	855	38[C]	60	1	10
TS8510VB		Surface	0.260 x 0.260 x 0.17	855	18[E]	60	0.5	10
TS9414VB		Surface	0.355 × 0.355 × 0.17	940	40[C]	60	1	10
TS9410VB		Surface	0.260 x 0.260 x 0.17	940	20[E]	60	0.5	10
TB9414VA		Bulk	0.37 x 0.37 x 0.19	940	21[C]	80	1	15
TB9408VA		Bulk	0.2 x 0.2 x 0.19	940	22[C]	80	0.5	15

Note
*The measurements are based on samples of die which are mounted on TO-18 gold header without resin coating.
A I_F=1A, B I_F=250mA, C I_F=100mA, D I_F=70mA, E I_F=50mA

OPTOELECTRONICS

Bare Die

Photo Detectors

Vishay offers the broadest selection of high-speed, low dark current PIN photodiode chips. They are specially designed to achieve excellent sensitivity together with high reliability. Vishay phototransistors are extremely sensitive and fast compared to other such devices on the market.

Portfolio

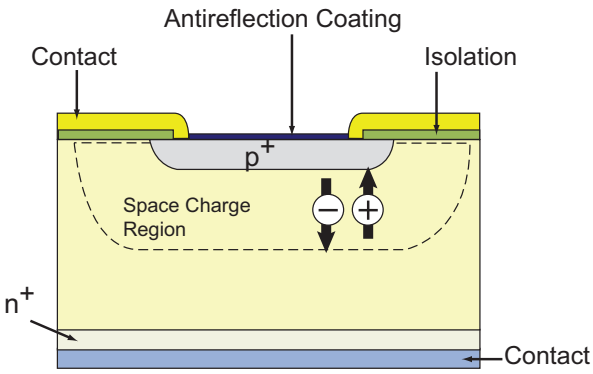
- Vishay offers the broadest selection of photo detector chips suitable for ambient light and IR detection
- Available technologies:
  - Epitaxial
  - Homogeneous

Typical Applications

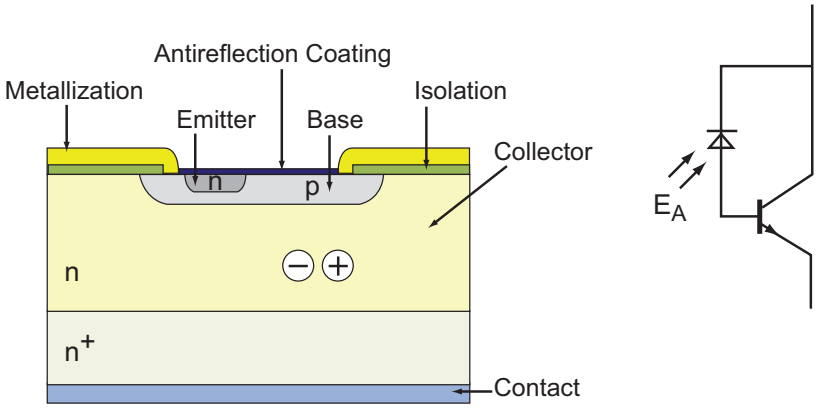
- IR touch display based devices
- High-speed data transfer
- Light barriers
- Position sensing
- Alarm and safety equipment

Cross Section of PIN Photodiode and Phototransistor

PIN Photodiode



Phototransistor



OPTOELECTRONICS

Bare Die

PIN Photodiodes

Part Number	Product Image	Chip Dimensions L x W x H (mm)	Peak Wavelength (nm)	Spectral Bandwidth (nm) (50%)	Reverse Light Current (E_A = 1 mW/cm², λ = 950 nm V_R = 5 V)	Reverse Dark Current (nA)	Angle of Half Sensitivity (± °)	Rise Time/ Fall Time (ns)	Photo Sensitive Area (mm²)
T1112P		3.05 x 2.1 x 0.28	970	640 to 1070	44 µA	0.1	60	130/130	5.5
T1113P		2.97 x 2.97 x 0.28	960	660 to 1050	55 µA	2	60	100/100	7.5
T1116P		2.97 x 2.97 x 0.28	940	500 to 1050	43 µA	2	60	40/40	7.7
T1110P6		2.97 x 2.97 x 0.28	940	600 to 1050	55 µA	2	60	100/100	7.5
T1120P		2.37 x 2.37 x 0.28	940	600 to 1050	35 µA	2	60	100/100	4.4
T1172P		1.47 x 1.07 x 0.28	960	640 to 1060	8.7 µA	< 1	60	625/670	1.06
T1170P		1.17 x 1.17 x 0.28	920	600 to 1040	7 µA	< 1	60	100/100	0.88
T330P		0.67 x 0.67 x 0.28	900	600 to 1050	2.3 µA	0.1	60	4/4	0.23
T337P		0.67 x 0.67 x 0.28	970	610 to 1080	2.3 µA	< 1	60	550/100	0.23
T1180P		0.67 x 0.3 x 0.28	810	590 to 1010	0.59 µA	< 1	60	530/170	0.055
T1187P		0.67 x 0.3 x 0.28	800	580 to 1070	0.66 µA	< 1	60	700/160	0.053

OPTOELECTRONICS

Bare Die

Phototransistors

Part Number	Product Image	Chip Dimensions L x W x H (mm)	Peak Wavelength (nm)	Spectral Bandwidth (nm) (50%)	Collector Light Current (E_e = 1 mW/cm², λ = 950 nm V_{CE} = 5V)	Collector Emitter Dark Current (nA)	Angle of Half Sensitivity (± °)	Rise Time/ Fall Time (ns)	Photo Sensitive Area (mm²)
T1090P6		0.53 x 0.53 x 0.185	840	440 to 1070	65-750 µA**	1	60	4300/7700	0.14
T5096P		0.39 x 0.39 x 0.185	910	660 to 1030	72-600 µA**	< 1	60	3800/3500	0.057

Note
*The measurements are based on samples of die which are mounted on TO- header without resin coating
**Binning is available

Ambient Light PIN Photodiodes

Part Number	Product Image	Chip Dimensions L x W x H (mm)	Peak Wavelength (nm)	Spectral Bandwidth (nm) (50%)	Reverse Light Current (E_V = 100 lx, CIE illuminant A, V_R = 5 V)	Reverse Dark Current (nA)	Angle of Half Sensitivity (± °)	Rise Time/ Fall Time (ns)	Photo Sensitive Area (mm²)
T1610P		2.97 x 2.97 x 0.28	560	390 to 800	2.9 µA	2	60	100/100	7.7
T1670P		0.72 x 0.72 x 0.28	560	390 to 800	138 nA	0.1	60	100/100	0.27
T1677P		0.72 x 0.72 x 0.28	570	430 to 700	87 nA	0.1	60	100/100	0.27
T1678P		0.72 x 0.72 x 0.2	570	440 to 700	87 nA	0.1	60	100/100	0.34

Ambient Light Phototransistors

Part Number	Product Image	Chip Dimensions L x W x H (mm)	Peak Wavelength (nm)	Spectral Bandwidth (nm) (50%)	Collector Light Current (E_V = 100 lx, CIE illuminant A, V_{CE} = 5 V)	Collector Emitter Dark Current (nA)	Angle of Half Sensitivity (± °)	Rise Time/ Fall Time (ns)	Photo Sensitive Area (mm²)
T1070P		0.72 x 0.72 x 0.22	570	440 to 800	50 µA	3	60	-	0.25

Note
*The measurements are based on samples of die which are mounted on TO- header without resin coating

OPTOELECTRONICS

Bare Die

Custom Design

Vishay offers highly flexible design and fabrication of semi- and full custom specific photodiode and emitter chips. The huge variety of applications and assembly options requires bare die that are tailored to the specific application to keep the full potential of the device. A good fit between chip, assembly, and packaging is becoming ever more important with tighter space and power requirements.

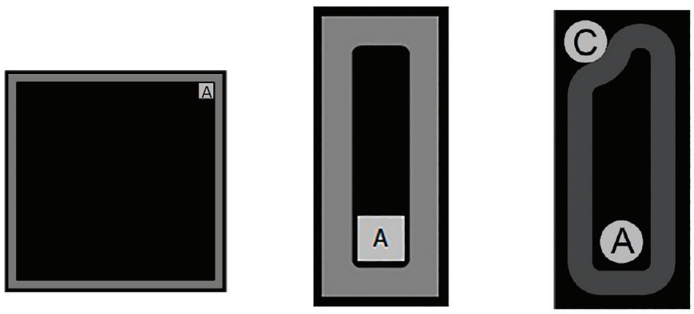
Vishay's flexible technology base allows customization for a range of parameters and features as listed below:

Emitters

- **Geometrical Design**
  Chip outside dimensions, thickness, pad size, and shape and pad positions can be adjusted according to the customer specification.
- **Pad Topology**
  Chip topology can be customized with respect to interconnect technology.

Photodetectors

- **Geometrical Design**
  Almost all geometrical parameters of a photodiode can be customized. This includes chip outside dimensions, chip thickness, pad size and shape, pad positions, photodiode position in an array, and alignment marks.
- **AR Coating / Optical Filters**
  Depending on impinging wavelength and application all photodiodes are equipped with an AR coating. Customization allows us to match the AR coating to the wavelength needed by the customer.
- **Pad Topology**
  Depending on interconnect technology pad topology can be also optimized.
- **Pitch**
  Linear or two-dimensional arrays with customizable pitch.

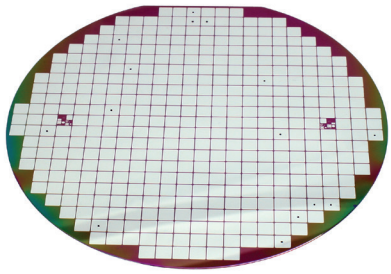


Packing Options

Vishay provides you with several packing options which can fit with virtually any assembly line. Parts are 100 % probed and inspected.

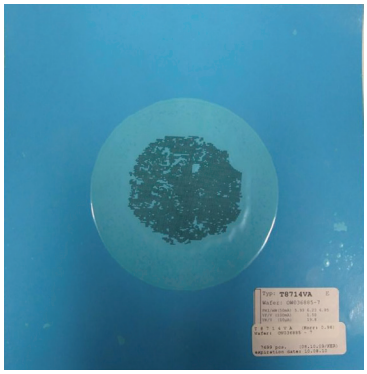
Unsawn wafer

Die are not singulated, wafers are provided in box.



Sawn wafer on loose foil

The wafer is provided on blue film where dies are singulated, ready for pick and place, bad chips are removed, and measurement data is attached.



Sawn wafer on discoframe

Wafer is provided on blue foil; probed and inked; measurement data is attached.

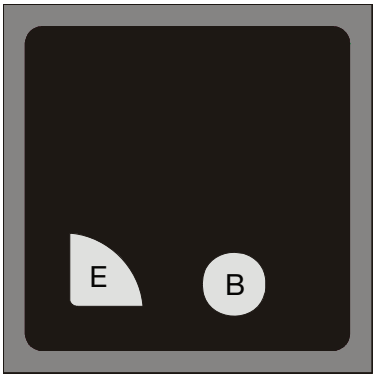
Upon request chips can also be delivered on plastic frames.

For shipment, the wafers are arranged in stacks. The stacks are hermetically sealed in plastic bags to ensure protection against environmental influence (humidity and contamination).

The following documents are available upon the request:

- Material content certificate
  - RoHS (DIN EN 62321)
- Halogen free (DIN EN 14582)
  - SGA reports
  - Failure catalogue
  - ESD test results (according to the JEDEC standards)

Silicon NPN Phototransistor



21682

FEATURES

- Package type: chip
- Package form: single chip
- Dimensions (L x W x H in mm): 0.72 x 0.72 x 0.22
- Wafer diameter (in mm): 100
- Radiant sensitive area (in mm^2): 0.25
- High photo sensitivity
- Suitable for visible light
- Fast response times
- Angle of half sensitivity: φ = ± 60°

Pb-free

e4

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

DESCRIPTION

T1070P ambient light sensor chip is a silicon NPN epitaxial planar phototransistor. It is sensitive to visible light much like the human eye and has peak sensitivity at 570 nm.

APPLICATIONS

- Ambient light sensor
- Backlight dimmer

GENERAL INFORMATION

The datasheet is based on Vishay optoelectronics sample testing under certain predetermined and assumed conditions, and is provided for illustration purpose only. Customers are encouraged to perform testing in actual proposed packaged and used conditions. Vishay optoelectronics die products are tested using Vishay optoelectronics based quality assurance procedures and are manufactured using Vishay optoelectronics established processes. Estimates such as those described and set forth in this datasheet for semiconductor die will vary depending on a number of packaging, handling, use, and other factors. Therefore sold die may not perform on an equivalent basis to standard package products.

PRODUCT SUMMARY			
COMPONENT	I_{PCE} (μA)	φ (deg)	$\lambda_{0.5}$ (nm)
T1070P	50	± 60	440 to 800

Note

- Test condition see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
T1070P-SD-F	wafer sawn on foil with disco frame	MOQ: 55 000 pcs	chip

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Collector emitter voltage		V_{CEO}	6	V
Emitter collector voltage		V_{ECO}	1.5	V
Collector current		I_C	20	mA
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	-40 to +100	°C
Storage temperature range		T_{stg1}	-40 to +100	°C
Storage temperature range on foil		T_{stg2}	-40 to +50	°C

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Collector emitter breakdown voltage	I_C = 0.1 mA	$V_{(BR)CEO}$	6			V
Collector dark current	V_{CE} = 5 V, E = 0	I_{CEO}		3	50	nA
Collector emitter capacitance	V_{CE} = 5 V, f = 1 MHz, E = 0	C_{CEO}		16		pF
Collector light current	E_V = 20 lx, CIE illuminant A, V_{CE} = 5 V	I_{PCE}		10		µA
	E_V = 100 lx, CIE illuminant A, V_{CE} = 5 V	I_{PCE}		50		µA
Temperature coefficient of I_{PCE}	CIE illuminant A	TK_{IPCE}		1.18		%/K
	LED, white	TK_{IPCE}		0.9		%/K
Angle of half sensitivity		φ		± 60		deg
Wavelength of peak sensitivity		λ_p		570		nm
Range of spectral bandwidth		$\lambda_{0.5}$		440 to 800		nm
Collector emitter saturation voltage	E_V = 20 lx, CIE illuminant A, I_{PCE} = 1.2 µA	V_{CEsat}		0.1		V

Note

- The measurements are based on samples of die which are mounted on a TO-header without resin coating

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

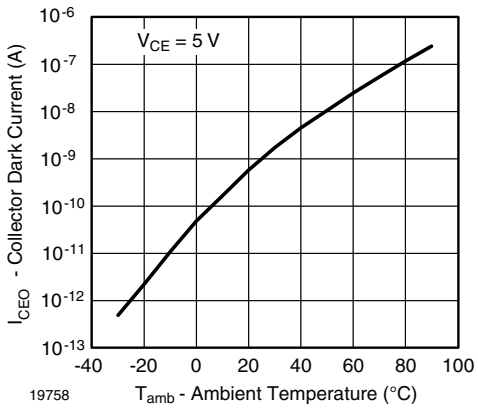


Fig. 1 - Collector Dark Current vs. Ambient Temperature

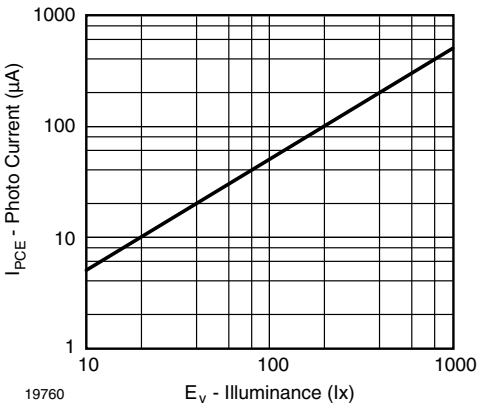


Fig. 3 - Photo Current vs. Illuminance

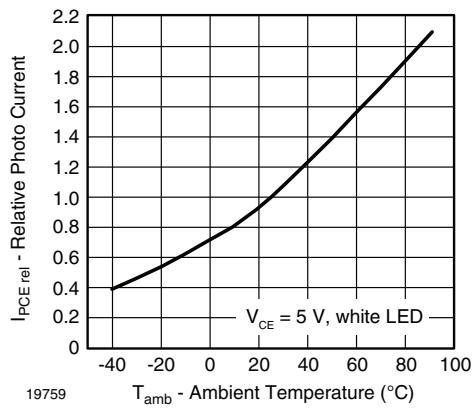


Fig. 2 - Relative Photo Current vs. Ambient Temperature

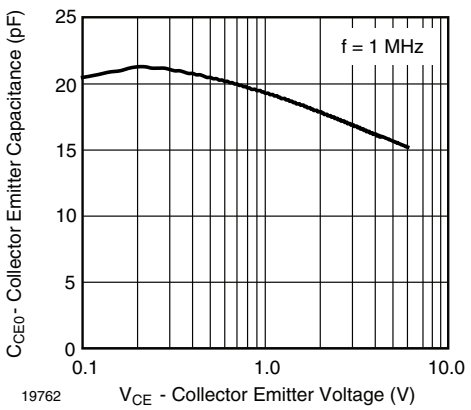


Fig. 4 - Collector Emitter Capacitance vs. Collector Emitter Voltage

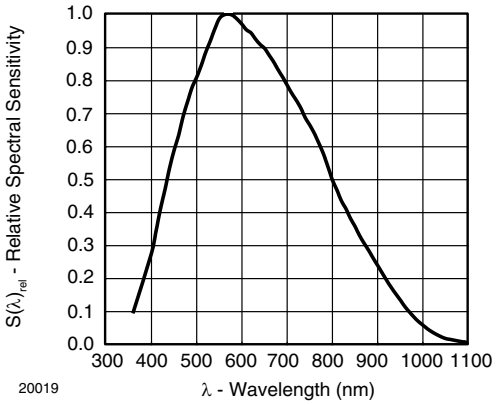


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

MECHANICAL DIMENSIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Length of chip edge (x-direction)	L_x		0.72		mm
Length of chip edge (y-direction)	L_y		0.72		mm
Sensitive area	A_S		0.5 x 0.5		mm^2
Die height	H		0.22		mm
Bond pad emitter (E)	a x b		0.1 x 0.1		mm^2

ADDITIONAL INFORMATION	
Frontside metallization, base (B), emitter (E)	aluminum
Backside metallization, collector	gold alloy
Dicing	sawing
Die bonding technology	epoxy bonding

Note

- All chips are checked in accordance with the Vishay Semiconductor, specification of visual inspection FVOV6870.
  The visual inspection shall be made in accordance with the “specification of visual inspection as referenced”. The visual inspection of chip backside is performed with stereo microscope with incident light and 40x to 80x magnification.
  The quality inspection (final visual inspection) is performed by production. An additional visual inspection step as special release procedure by QM is not installed.

HANDLING AND STORAGE CONDITIONS

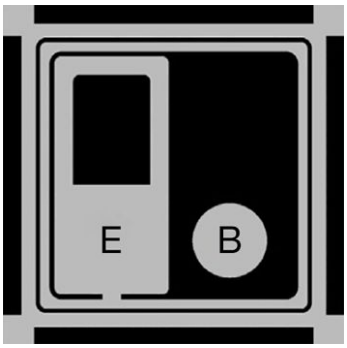
- The hermetically sealed shipment lots shall be opened in temperature and moisture controlled cleanroom environment only. It is mandatory to follow the rules for disposition of material that can be hazardous for humans and environment.
- Product must be handled only at ESD safe workstations. Standard ESD precautions and safe work environments are as defined in MIL-HDBK-263.
- Singulated die are not to be handled with tweezers. A vacuum wand with non metallic ESD protected tip should be used.

PACKING

Chips are fixed on adhesive foil. Upon request the foils can be mounted on plastic frame or disco frame. For shipment, the wafers are arranged to stacks and hermetically sealed in plastic bags to ensure protection against environmental influence (humidity and contamination).

Use for recycling reliable operators only. We can help getting in touch with your nearest sales office. By agreement we will take back packing material, if it is sorted. You will have to bear the costs of transport. We will invoice you for any costs incurred for packing material that is returned unsorted or which we are not obliged to accept.

Silicon NPN Phototransistor



FEATURES

- Package type: chip
- Package form: single chip
- Dimensions (L x W x H in mm): 0.52 x 0.52 x 0.185
- High photo sensitivity
- Radiant sensitive area: 0.14 mm^2
- High radiant sensitivity
- Suitable for visible and near infrared radiation
- Fast response times

Pb-free
e4
RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

DESCRIPTION

T1090P6 is a silicon NPN phototransistor chip with high radiant sensitivity, sensitive to visible and near infrared radiation.

GENERAL INFORMATION

The datasheet is based on Vishay optoelectronics sample testing under certain predetermined and assumed conditions, and is provided for illustration purpose only. Customers are encouraged to perform testing in actual proposed packaged and used conditions. Vishay optoelectronics die products are tested using Vishay optoelectronics based quality assurance procedures and are manufactured using Vishay optoelectronics established processes. Estimates such as those described and set forth in this datasheet for semiconductor die will vary depending on a number of packaging, handling, use, and other factors. Therefore sold die may not perform on an equivalent basis to standard package products.

PRODUCT SUMMARY			
COMPONENT	I_{ca} (µA)	φ (deg)	$\lambda_{0.5}$ (nm)
T1090P6	65 to 750	± 60	620 to 1000

Note

- Test condition see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
T1090P6-SD-F	wafer sawn on foil with disco frame	MOQ: 250 000 pcs	chip

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Collector emitter voltage		V_{CEO}	80	V
Emitter collector voltage		V_{ECO}	7.8	V
Collector current		I_C	50	mA
Junction temperature		T_j	125	°C
Operating temperature range		T_{amb}	-55 to +125	°C
Storage temperature range		T_{stg1}	-55 to +150	°C
Storage temperature range on foil		T_{stg2}	-40 to +50	°C

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Collector emitter breakdown voltage	I_C = 10 µA, E = 0	$V_{(BR)CEO}$	80			V
Collector emitter dark current	V_{CE} = 50 V, E = 0	I_{CEO}		1	50	nA
Collector light current (Vishay selection type [1])	E_e = 1 mW/cm², λ = 950 nm, V_{CE} = 5 V	I_{ca}	65		750	µA
Wavelength of peak sensitivity		λ_p		840		nm
Range of spectral bandwidth		$\lambda_{0.5}$		620 to 1000		nm
Rise time	V_{CE} = 5 V, I_C = 2 mA, R_L = 100 Ω	t_r		4.3		µs
Fall time	V_{CE} = 5 V, I_C = 2 mA, R_L = 100 Ω	t_f		7.7		µs

Notes

- The measurements are based on samples of die which are mounted on a TO18-header without resin coating

(1) Specific selection types possible

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

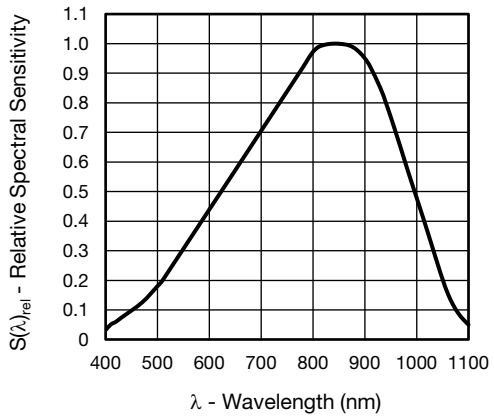


Fig. 1 - Relative Spectral Sensitivity vs. Wavelength

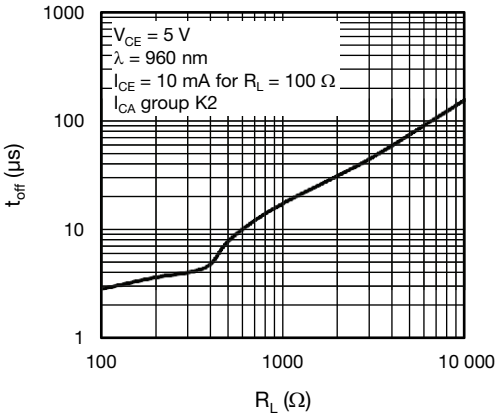


Fig. 3 - Turn-Off Time vs. Load Resistance

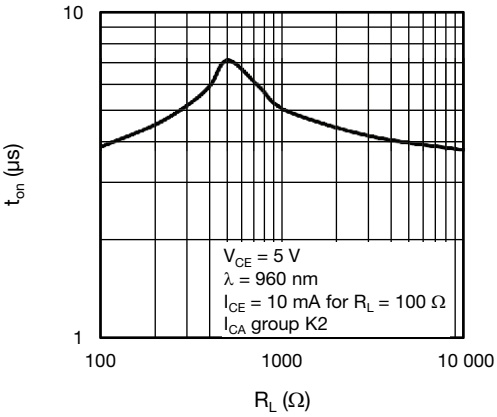


Fig. 2 - Turn-On Time vs. Load Resistance

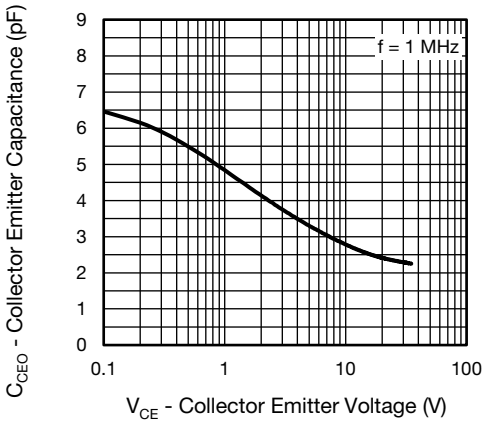
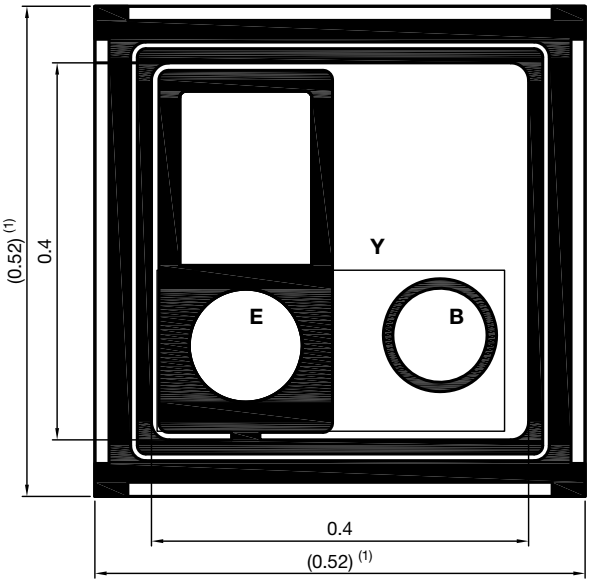


Fig. 4 - Collector Emitter Capacitance vs. Collector Emitter Voltage

DIMENSIONS in millimeters



Orientation of wafer flat

technical drawings according to DIN specifications

E: Emitter

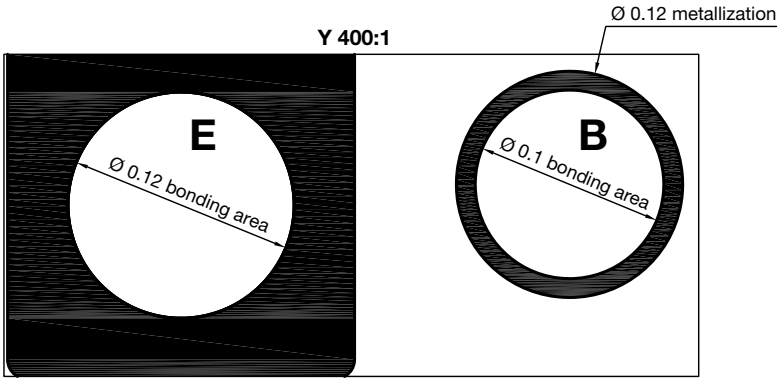
B: Base

Opt. active area: 0.135 mm^2

Bonding area: E: Ø 120 µm
B: Ø 100 µm

Bonding restricted to this area in order to avoid damage of adjacent structures

Thickness: 185 µm ± 15 µm



Drawing-No.: 9.000-5078.3-4
Issue: 3; 03.05.2011

Notes
- Not indicated tolerances: ± 0.005

(1) Only for information: dimension of sawn die under consideration of 30 µm saw kerf

MECHANICAL DIMENSIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Length of chip edge (x-direction)	L_x		0.52		mm
Length of chip edge (y-direction)	L_y		0.52		mm
Sensitive area	A_s		0.14		mm^2
Wafer diameter	D		150		mm
Die height	H	0.170	0.185	0.200	mm
Bond pad diameter emitter	d		0.120		mm
Bond pad diameter base	d		0.100		mm

ADDITIONAL INFORMATION	
Frontside metallization, base (B), emitter (E)	AlSi 1.2 µm
Backside metallization, collector	AuSb 1.2 µm
Dicing	Sawing
Die bonding technology	Epoxy bonding

Note

- All chips are checked in accordance with the Vishay Semiconductor, specification of visual inspection FVOV6870.
  The visual inspection shall be made in accordance with the “specification of visual inspection as referenced”. The visual inspection of chip backside is performed with stereo microscope with incident light and 40x to 80x magnification.
  The quality inspection (final visual inspection) is performed by production. An additional visual inspection step as special release procedure by QM is not installed.

HANDLING AND STORAGE CONDITIONS

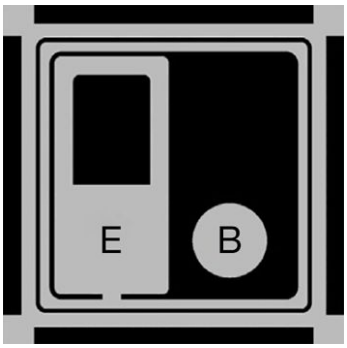
- The hermetically sealed shipment lots shall be opened in temperature and moisture controlled cleanroom environment only. It is mandatory to follow the rules for disposition of material that can be hazardous for humans and environment.
- Product must be handled only at ESD safe workstations. Standard ESD precautions and safe work environments are as defined in MIL-HDBK-263.
- Singulated die are not to be handled with tweezers. A vacuum wand with non metallic ESD protected tip should be used.

PACKING

Chips are fixed on adhesive foil. Upon request the foils can be mounted on plastic frame or disco frame. For shipment, the wafers are arranged to stacks and hermetically sealed in plastic bags to ensure protection against environmental influence (humidity and contamination).

Use for recycling reliable operators only. We can help getting in touch with your nearest sales office. By agreement we will take back packing material, if it is sorted. You will have to bear the costs of transport. We will invoice you for any costs incurred for packing material that is returned unsorted or which we are not obliged to accept.

Silicon NPN Phototransistor



FEATURES

- Package type: chip
- Package form: single chip
- Dimensions (L x W x H in mm): 0.52 x 0.52 x 0.185
- High photo sensitivity
- Radiant sensitive area: 0.14 mm^2
- High radiant sensitivity
- Suitable for visible and near infrared radiation
- Fast response times

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GREEN (5-2008)

DESCRIPTION

T1090P6 is a silicon NPN phototransistor chip with high radiant sensitivity, sensitive to visible and near infrared radiation.

GENERAL INFORMATION

The datasheet is based on Vishay optoelectronics sample testing under certain predetermined and assumed conditions, and is provided for illustration purpose only. Customers are encouraged to perform testing in actual proposed packaged and used conditions. Vishay optoelectronics die products are tested using Vishay optoelectronics based quality assurance procedures and are manufactured using Vishay optoelectronics established processes. Estimates such as those described and set forth in this datasheet for semiconductor die will vary depending on a number of packaging, handling, use, and other factors. Therefore sold die may not perform on an equivalent basis to standard package products.

PRODUCT SUMMARY			
COMPONENT	I_{ca} (µA)	φ (deg)	$\lambda_{0.5}$ (nm)
T1090P6	65 to 750	± 60	620 to 1000

Note

- Test condition see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
T1090P6-SD-F	wafer sawn on foil with disco frame	MOQ: 250 000 pcs	chip

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Collector emitter voltage		V_{CEO}	80	V
Emitter collector voltage		V_{ECO}	7.8	V
Collector current		I_C	50	mA
Junction temperature		T_j	125	°C
Operating temperature range		T_{amb}	-55 to +125	°C
Storage temperature range		T_{stg1}	-55 to +150	°C
Storage temperature range on foil		T_{stg2}	-40 to +50	°C

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Collector emitter breakdown voltage	I_C = 10 µA, E = 0	$V_{(BR)CEO}$	80			V
Collector emitter dark current	V_{CE} = 50 V, E = 0	I_{CEO}		1	50	nA
Collector light current (Vishay selection type [1])	E_e = 1 mW/cm², λ = 950 nm, V_{CE} = 5 V	I_{ca}	65		750	µA
Wavelength of peak sensitivity		λ_p		840		nm
Range of spectral bandwidth		$\lambda_{0.5}$		620 to 1000		nm
Rise time	V_{CE} = 5 V, I_C = 2 mA, R_L = 100 Ω	t_r		4.3		µs
Fall time	V_{CE} = 5 V, I_C = 2 mA, R_L = 100 Ω	t_f		7.7		µs

Notes

- The measurements are based on samples of die which are mounted on a TO18-header without resin coating

(1) Specific selection types possible

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

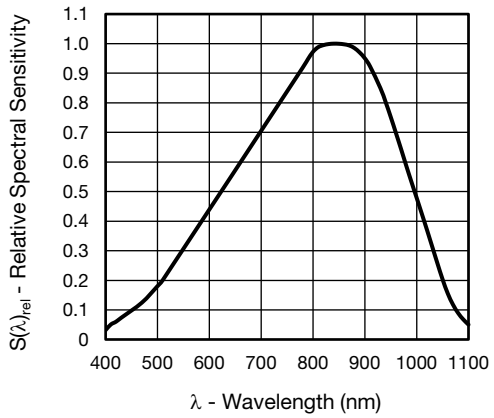


Fig. 1 - Relative Spectral Sensitivity vs. Wavelength

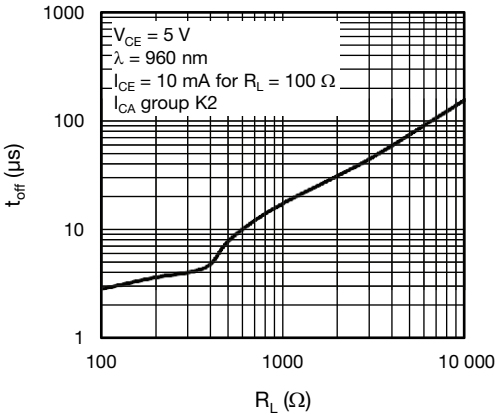


Fig. 3 - Turn-Off Time vs. Load Resistance

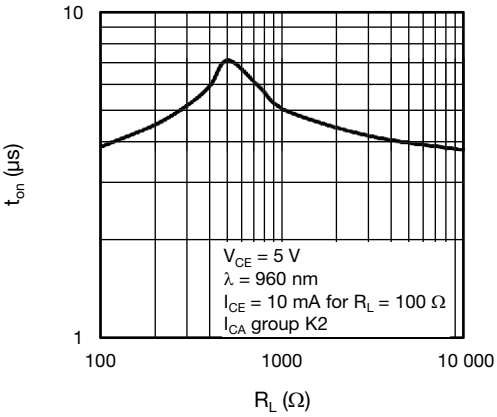


Fig. 2 - Turn-On Time vs. Load Resistance

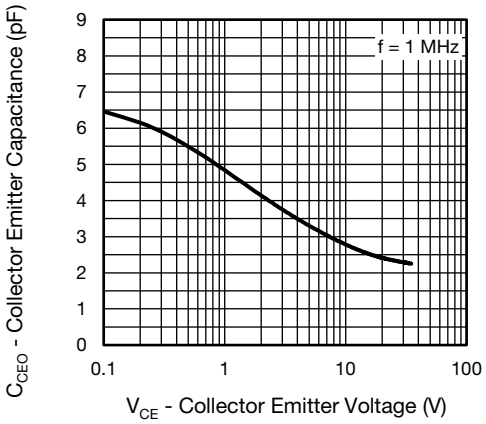
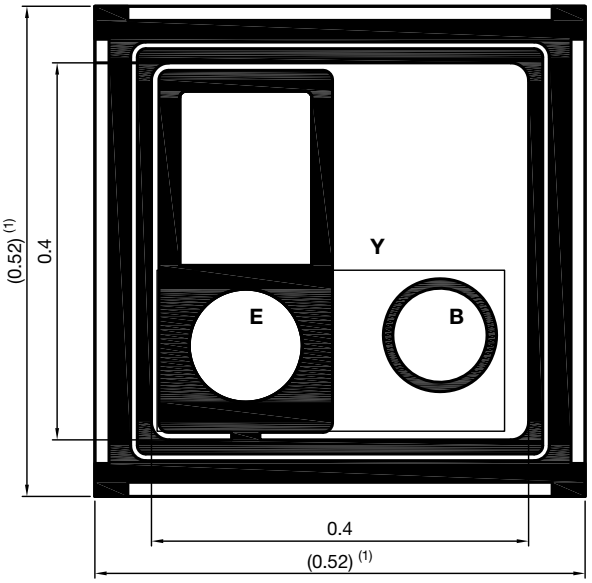


Fig. 4 - Collector Emitter Capacitance vs. Collector Emitter Voltage

DIMENSIONS in millimeters



Orientation of wafer flat

technical drawings according to DIN specifications

E: Emitter

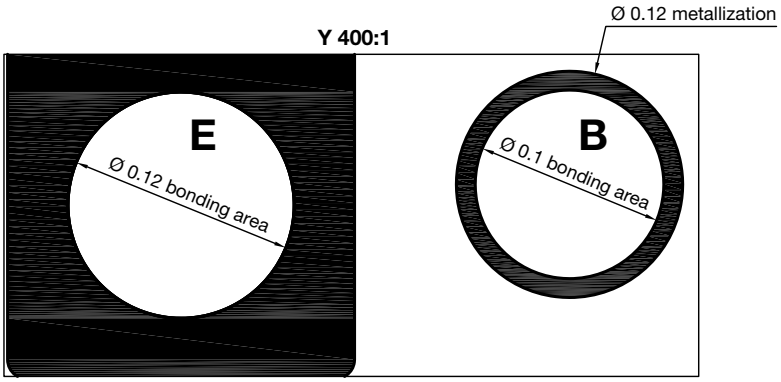
B: Base

Opt. active area: 0.135 mm^2

Bonding area: E: Ø 120 µm
B: Ø 100 µm

Bonding restricted to this area in order to avoid damage of adjacent structures

Thickness: 185 µm ± 15 µm



Drawing-No.: 9.000-5078.3-4
Issue: 3; 03.05.2011

Notes
- Not indicated tolerances: ± 0.005

(1) Only for information: dimension of sawn die under consideration of 30 µm saw kerf

MECHANICAL DIMENSIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Length of chip edge (x-direction)	L_x		0.52		mm
Length of chip edge (y-direction)	L_y		0.52		mm
Sensitive area	A_s		0.14		mm^2
Wafer diameter	D		150		mm
Die height	H	0.170	0.185	0.200	mm
Bond pad diameter emitter	d		0.120		mm
Bond pad diameter base	d		0.100		mm

ADDITIONAL INFORMATION	
Frontside metallization, base (B), emitter (E)	AlSi 1.2 µm
Backside metallization, collector	AuSb 1.2 µm
Dicing	Sawing
Die bonding technology	Epoxy bonding

Note

- All chips are checked in accordance with the Vishay Semiconductor, specification of visual inspection FVOV6870.
  The visual inspection shall be made in accordance with the “specification of visual inspection as referenced”. The visual inspection of chip backside is performed with stereo microscope with incident light and 40x to 80x magnification.
  The quality inspection (final visual inspection) is performed by production. An additional visual inspection step as special release procedure by QM is not installed.

HANDLING AND STORAGE CONDITIONS

- The hermetically sealed shipment lots shall be opened in temperature and moisture controlled cleanroom environment only. It is mandatory to follow the rules for disposition of material that can be hazardous for humans and environment.
- Product must be handled only at ESD safe workstations. Standard ESD precautions and safe work environments are as defined in MIL-HDBK-263.
- Singulated die are not to be handled with tweezers. A vacuum wand with non metallic ESD protected tip should be used.

PACKING

Chips are fixed on adhesive foil. Upon request the foils can be mounted on plastic frame or disco frame. For shipment, the wafers are arranged to stacks and hermetically sealed in plastic bags to ensure protection against environmental influence (humidity and contamination).

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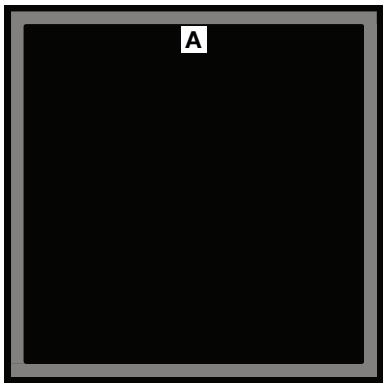
Silicon PIN Photodiode



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FEATURES

- Package type: chip
- Package form: single chip
- Dimensions (L x W x H in mm): 2.97 x 2.97 x 0.28
- Radiant sensitive area (in mm^2): 7.5
- High photo sensitivity
- High radiant sensitivity
- Suitable for visible and near infrared radiation
- Fast response times
- Angle of half sensitivity: φ = ± 60°

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DESCRIPTION

T1110P6 is a high speed and high sensitive PIN photodiode chip with 7.5 mm^2 sensitive area detecting visible and near infrared radiation. Anode is the bond pad on top.

APPLICATIONS

- High speed photo detector

GENERAL INFORMATION

The datasheet is based on Vishay optoelectronics sample testing under certain predetermined and assumed conditions, and is provided for illustration purpose only. Customers are encouraged to perform testing in actual proposed packaged and used conditions. Vishay optoelectronics die products are tested using Vishay optoelectronics based quality assurance procedures and are manufactured using Vishay optoelectronics established processes. Estimates such as those described and set forth in this datasheet for semiconductor die will vary depending on a number of packaging, handling, use, and other factors. Therefore sold die may not perform on an equivalent basis to standard package products.

PRODUCT SUMMARY			
COMPONENT	I_{ra} (μA)	φ (deg)	$\lambda_{0.1}$ (nm)
T1110P6	55	± 60	430 to 1100

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
T1110P6-SD-F	Wafer sawn on foil with disco frame	MOQ: 8000 pcs	Chip

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	60	V
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	-40 to +100	°C
Storage temperature range		T_{stg1}	-40 to +100	°C
Storage temperature range on foil		T_{stg2}	-40 to +50	°C

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Breakdown voltage	I_R = 100 µA, E = 0	$V_{(BR)}$		60		V
Forward voltage	I_F = 50 mA	V_F		1	1.3	V
Reverse dark current	V_R = 10 V, E = 0	I_{ro}		2	5	nA
Diode capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_D		70		pF
	V_R = 3 V, f = 1 MHz, E = 0	C_D		25		pF
Open circuit voltage	E_e = 1 mW/cm², λ = 950 nm	V_{OC}		350		mV
Temperature coefficient of V_{OC}	E_e = 1 mW/cm², λ = 950 nm	TK_{VOC}		- 2.6		mV/K
Short circuit current	E_e = 1 mW/cm², λ = 950 nm	I_k		50		µA
Temperature coefficient of I_k	E_e = 1 mW/cm², λ = 950 nm	TK_{Ik}		0.1		%/K
Reverse light current	E_e = 1 mW/cm², λ = 950 nm, V_R = 5 V	I_{ra}		55		µA
Angle of half sensitivity		φ		± 60		deg
Wavelength of peak sensitivity		λ_p		940		nm
Range of spectral bandwidth		$\lambda_{0.1}$		430 to 1100		nm
Noise equivalent power	V_R = 10 V, λ = 950 nm	NEP		4×10^{-14}		W/√Hz
Rise time	V_R = 10 V, R_L = 1 kΩ, λ = 820 nm	t_r		100		ns
Fall time	V_R = 10 V, R_L = 1 kΩ, λ = 820 nm	t_f		100		ns

Note

- The measurements are based on samples of die which are mounted on a TO-header without resin coating

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

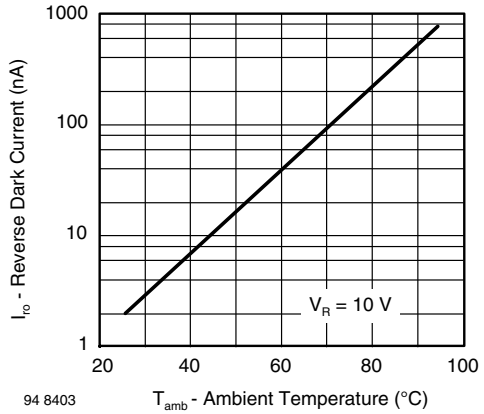

Fig. 1 - Reverse Dark Current vs. Ambient Temperature

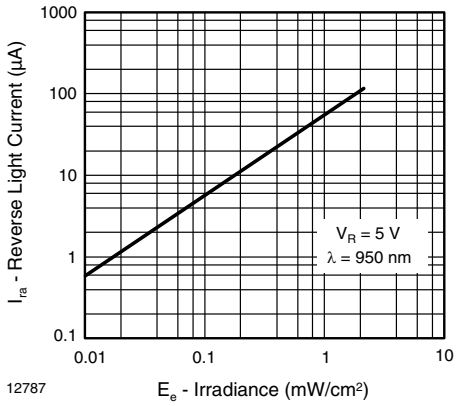

Fig. 3 - Reverse Light Current vs. Irradiance

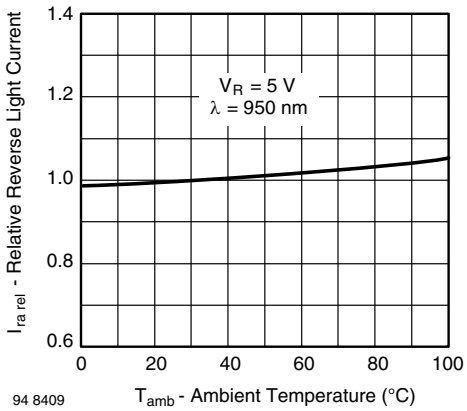

Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

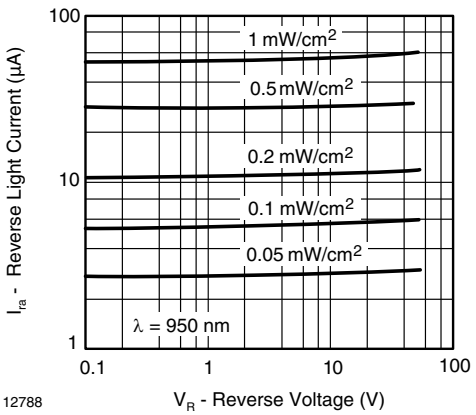

Fig. 4 - Reverse Light Current vs. Reverse Voltage

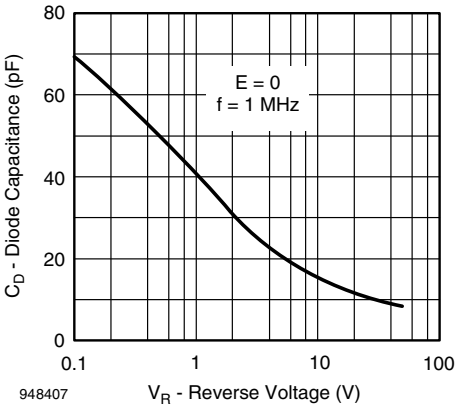

Fig. 5 - Diode Capacitance vs. Reverse Voltage

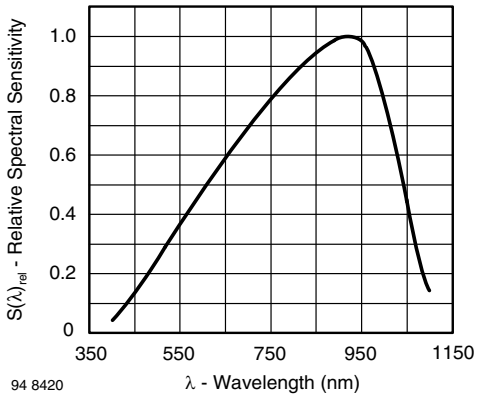

Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

MECHANICAL DIMENSIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Length of chip edge (x-direction)	L_x		2.97		mm
Length of chip edge (y-direction)	L_y		2.97		mm
Sensitive area	A_S		2.74 x 2.74		mm^2
Die height	H		0.28		mm
Bond pad anode	a x b		0.2 x 0.2		mm^2

ADDITIONAL INFORMATION	
Frontside metallization, anode	Aluminum
Backside metallization, cathode	NiV-Ag
Dicing	Sawing
Die bonding technology	Epoxy bonding

Note

- All chips are checked in accordance with the Vishay Semiconductor, specification of visual inspection FVOV6870.
  The visual inspection shall be made in accordance with the “specification of visual inspection as referenced”. The visual inspection of chip backside is performed with stereo microscope with incident light and 40x to 80x magnification.
  The quality inspection (final visual inspection) is performed by production. An additional visual inspection step as special release procedure by QM is not installed.

HANDLING AND STORAGE CONDITIONS

- The hermetically sealed shipment lots shall be opened in temperature and moisture controlled cleanroom environment only. It is mandatory to follow the rules for disposition of material that can be hazardous for humans and environment.
- Product must be handled only at ESD safe workstations. Standard ESD precautions and safe work environments are as defined in MIL-HDBK-263.
- Singulated die are not to be handled with tweezers. A vacuum wand with non metallic ESD protected tip should be used.

PACKING

Chips are fixed on adhesive foil. Upon request the foils can be mounted on plastic frame or disco frame. For shipment, the wafers are arranged to stacks and hermetically sealed in plastic bags to ensure protection against environmental influence (humidity and contamination).

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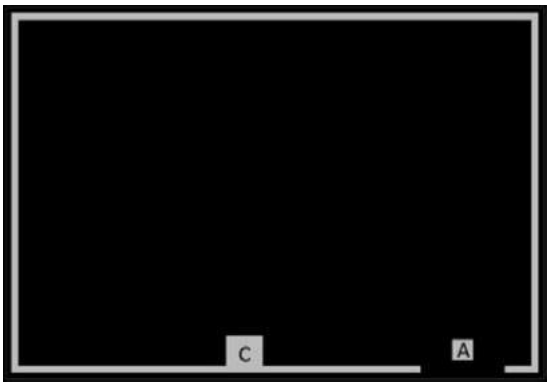
Silicon PIN Photodiode



FEATURES

- Package type: chip
- Package form: single chip
- Dimensions (L x W x H in mm): 3.05 x 2.1 x 0.28
- Radiant sensitive area (in mm^2): 5.5
- Peak sensitivity wavelength: 970 nm
- High photo sensitivity
- Suitable for visible light and near infrared radiation
- Fast response times
- Angle of half sensitivity: φ = ± 60°

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DESCRIPTION

T1112P is a high speed and high sensitive PIN photodiode chip with 5.5 mm^2 sensitive area detecting visible and near infrared radiation. Anode and cathode are the bond pads on top.

GENERAL INFORMATION

The datasheet is based on Vishay optoelectronics sample testing under certain predetermined and assumed conditions, and is provided for illustration purpose only. Customers are encouraged to perform testing in actual proposed packaged and used conditions. Vishay optoelectronics die products are tested using Vishay optoelectronics based quality assurance procedures and are manufactured using Vishay optoelectronics established processes. Estimates such as those described and set forth in this datasheet for semiconductor die will vary depending on a number of packaging, handling, use, and other factors. Therefore sold die may not perform on an equivalent basis to standard package products.

PRODUCT SUMMARY			
COMPONENT	I_{ra} (µA)	φ (deg)	$\lambda_{0.5}$ (nm)
T1112P	44	± 60	640 to 1070

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
T1112P-SD-F	Wafer sawn on foil with disco frame	MOQ: 11 000 pcs	Chip

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	60	V
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	-40 to +100	°C
Storage temperature range		T_{stg1}	-40 to +100	°C
Storage temperature range on foil		T_{stg2}	-40 to +50	°C

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Breakdown voltage	I_R = 100 µA, E = 0	$V_{(BR)}$	60			V
Reverse dark current	V_R = 10 V, E = 0	I_{ro}		0.1	5	nA
Diode capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_D		42		pF
	V_R = 3 V, f = 1 MHz, E = 0	C_D		19		pF
Reverse light current	E_e = 1 mW/cm², λ = 890 nm, V_R = 5 V	I_{ra}		40		µA
	E_e = 1 mW/cm², λ = 950 nm, V_R = 5 V	I_{ra}		44		µA
Angle of half sensitivity		φ		± 60		deg
Wavelength of peak sensitivity		λ_p		970		nm
Range of spectral bandwidth		$\lambda_{0.5}$		640 to 1070		nm
Rise time	V_R = 5 V, R_L = 50 Ω, λ = 870 nm	t_r		130		ns
Fall time		t_f		130		ns
Rise time	V_R = 5 V, R_L = 50 Ω, λ = 950 nm	t_r		7		µs
Fall time		t_f		7		µs

Note

- The measurements are based on samples of die which are mounted on a TO18-header without resin coating

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

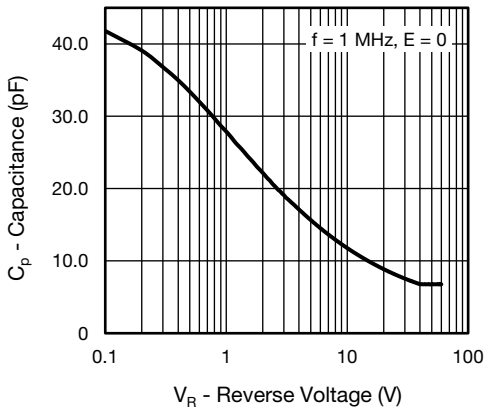


Fig. 1 - Diode Capacitance vs. Reverse Voltage

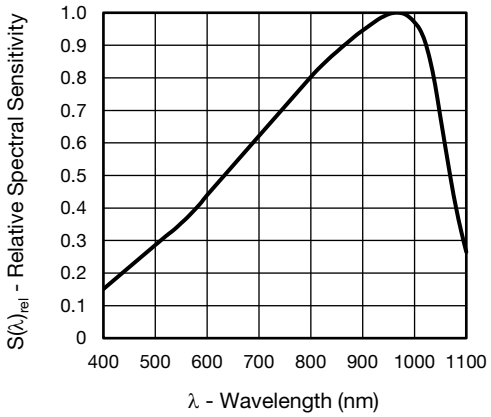
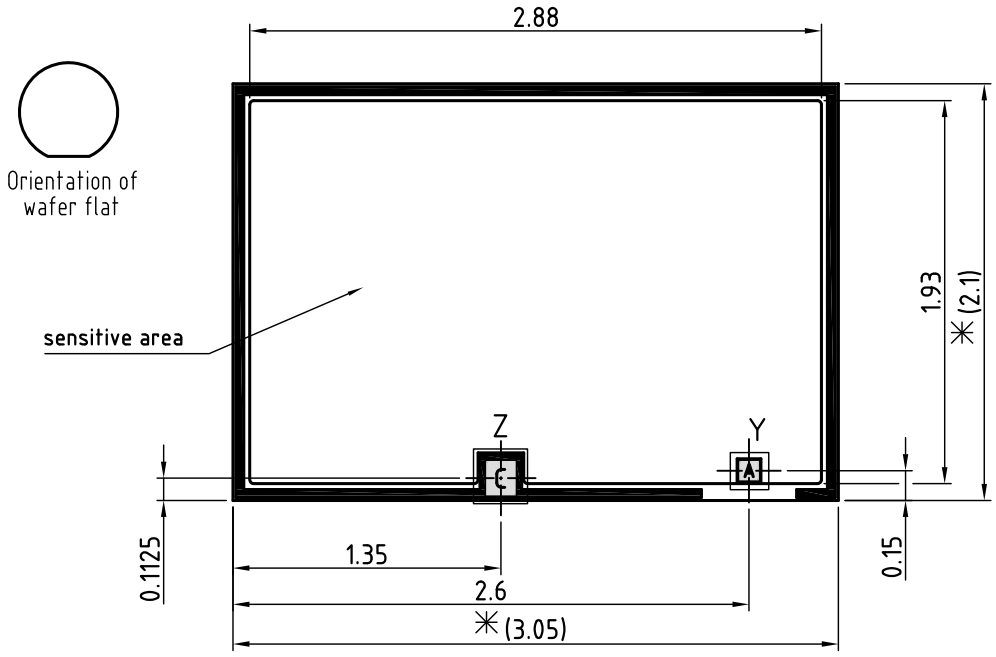
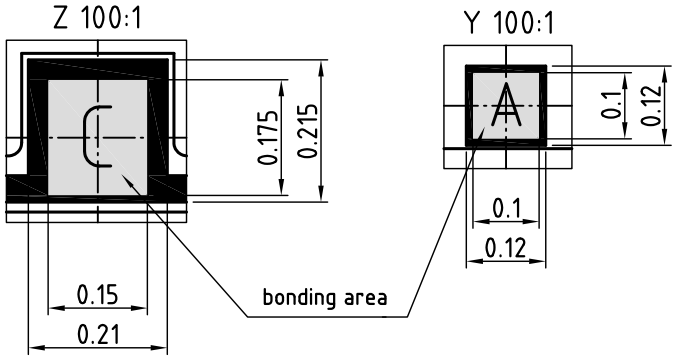


Fig. 2 - Relative Spectral Sensitivity vs. Wavelength without Epoxy Coating

DIMENSIONS in millimeters



Only for information: Dimension of sawn die under consideration of 30µm saw kerf



technical drawings according to DIN specifications

All dimensions in mm

All dimensions ±0.005

Drawing-No: 9.000-5108.01-4

Issue: 2 / 23.01.2012

A: Anode

C: Cathode

Opt. sensitive area: 5.5mm²

Thickness: 280µm±10µm

Bonding area: A: 100µm x 100µm

C: 150µm x 175µm

Bonding restricted to this area in order to avoid damage of adjacent structures

MECHANICAL DIMENSIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Length of chip edge (x-direction)	L_x		3.05		mm
Length of chip edge (y-direction)	L_y		2.1		mm
Sensitive area	A_S		5.5		mm^2
Wafer diameter	D		150		mm
Die height	H	0.27	0.28	0.29	mm
Bond pad anode			0.1 x 0.1		mm^2
Bond pad cathode			0.15 x 0.175		mm^2

ADDITIONAL INFORMATION	
Frontside metallization, anode	AlSi
Frontside metallization, cathode	AlSi
Dicing	Sawing
Die bonding technology	Epoxy bonding

Note

- All chips are checked in accordance with the Vishay Semiconductor, specification of visual inspection FVOV6870.
  The visual inspection shall be made in accordance with the “specification of visual inspection as referenced”. The visual inspection of chip backside is performed with stereo microscope with incident light and 40x to 80x magnification.
  The quality inspection (final visual inspection) is performed by production. An additional visual inspection step as special release procedure by QM is not installed.

HANDLING AND STORAGE CONDITIONS

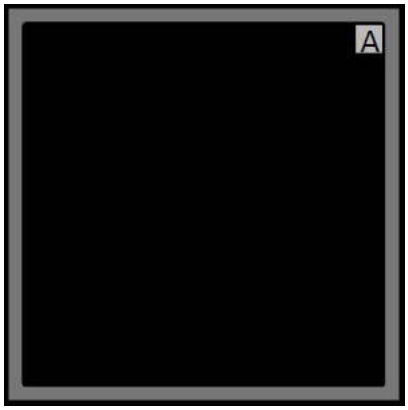
- The hermetically sealed shipment lots shall be opened in temperature and moisture controlled cleanroom environment only. It is mandatory to follow the rules for disposition of material that can be hazardous for humans and environment.
- Product must be handled only at ESD safe workstations. Standard ESD precautions and safe work environments are as defined in MIL-HDBK-263.
- Singulated die are not to be handled with tweezers. A vacuum wand with non metallic ESD protected tip should be used.

PACKING

Chips are fixed on adhesive foil. Upon request the foils can be mounted on plastic frame or disco frame. For shipment, the wafers are arranged to stacks and hermetically sealed in plastic bags to ensure protection against environmental influence (humidity and contamination).

Use for recycling reliable operators only. We can help getting in touch with your nearest sales office. By agreement we will take back packing material, if it is sorted. You will have to bear the costs of transport. We will invoice you for any costs incurred for packing material that is returned unsorted or which we are not obliged to accept.

Silicon PIN Photodiode



FEATURES

- Package type: chip
- Package form: single chip
- Dimensions (L x W x H in mm): 2.97 x 2.97 x 0.28
- Radiant sensitive area (in mm^2): 7.5
- Peak sensitivity wavelength: 960 nm
- High photo sensitivity
- Suitable for visible light and near infrared radiation
- Fast response times
- Angle of half sensitivity: $\varphi = \pm 60°$

Pb-free
e4
RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

DESCRIPTION

T1113P is a high speed and high sensitive PIN photodiode chip with 7.5 mm^2 sensitive area detecting visible and near infrared radiation. Anode is the bond pad on top.

APPLICATIONS

- High speed photo detector

GENERAL INFORMATION

The datasheet is based on Vishay optoelectronics sample testing under certain predetermined and assumed conditions, and is provided for illustration purpose only. Customers are encouraged to perform testing in actual proposed packaged and used conditions. Vishay optoelectronics die products are tested using Vishay optoelectronics based quality assurance procedures and are manufactured using Vishay optoelectronics established processes. Estimates such as those described and set forth in this datasheet for semiconductor die will vary depending on a number of packaging, handling, use, and other factors. Therefore sold die may not perform on an equivalent basis to standard package products.

PRODUCT SUMMARY			
COMPONENT	I_{ra} (µA)	φ (deg)	$\lambda_{0.5}$ (nm)
T1113P	55	± 60	660 to 1050

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
T1113P-SD-F	Wafer sawn on foil with disco frame	MOQ: 8000 pcs	Chip

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	60	V
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	-40 to +100	°C
Storage temperature range		T_{stg1}	-40 to +100	°C
Storage temperature range on foil		T_{stg2}	-40 to +50	°C

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Breakdown voltage	I_R = 40 µA, E = 0	$V_{(BR)}$	60			V
Reverse dark current	V_R = 10 V, E = 0	I_{ro}		2	5	nA
Diode capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_D		70		pF
	V_R = 3 V, f = 1 MHz, E = 0	C_D		25		pF
Reverse light current	E_e = 1 mW/cm², λ = 890 nm, V_R = 5 V	I_{ra}		51		µA
	E_e = 1 mW/cm², λ = 950 nm, V_R = 5 V	I_{ra}		55		µA
Angle of half sensitivity		φ		± 60		deg
Wavelength of peak sensitivity		λ_p		960		nm
Range of spectral bandwidth		$\lambda_{0.5}$		660 to 1050		nm
Rise time	V_R = 10 V, R_L = 1 kΩ, λ = 830 nm	t_r		100		ns
Fall time		t_f		100		ns

Note

- The measurements are based on samples of die which are mounted on a TO18-header without epoxy coating

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

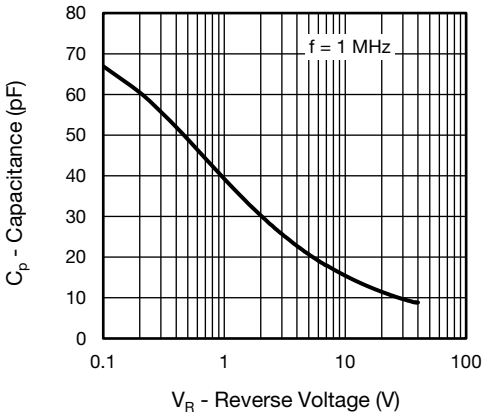


Fig. 1 - Diode Capacitance vs. Reverse Voltage

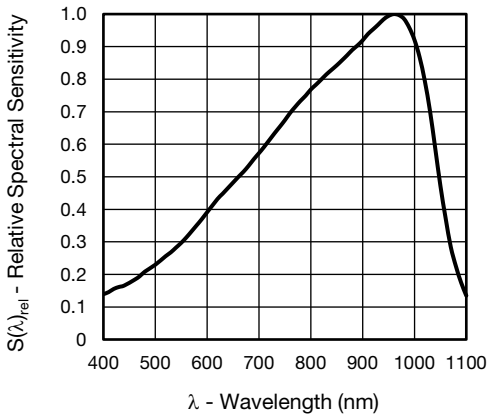
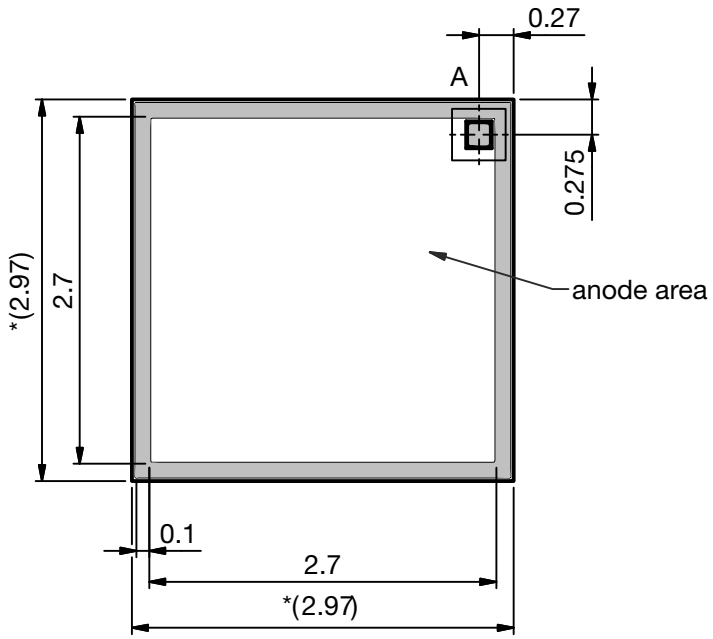
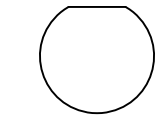


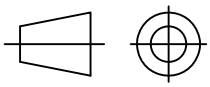
Fig. 2 - Relative Spectral Sensitivity vs. Wavelength without Epoxy Coating

DIMENSIONS in millimeters



Orientation of wafer flat

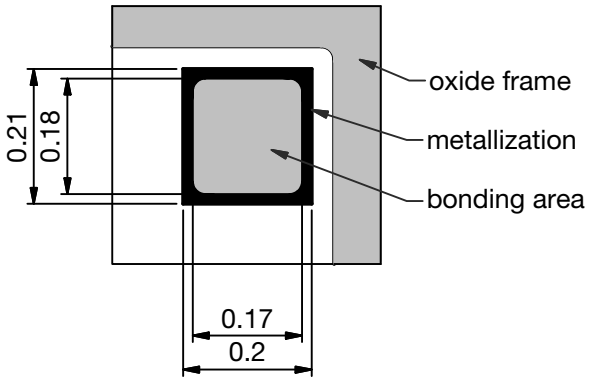




Technical drawings according to DIN specification.

*only for information:
dimension of sawn die under consideration of 30 µm saw kerf

A (100 : 1)



Opt. sensitive area: 7.5 mm²

Bonding area: 170 µm x 180 µm
Bonding restricted to this area in order to avoid damage of adjacent structures

Thickness: 280 µm ± 15 µm

Drawing-No.: 9.000-5126.01-4
Issue: 1; 25.09.2013

MECHANICAL DIMENSIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Length of chip edge (x-direction)	L_x		2.97		mm
Length of chip edge (y-direction)	L_y		2.97		mm
Sensitive area	A_S		7.5		mm^2
Wafer diameter	D		150		mm
Die height	H	0.265	0.28	0.295	mm
Bond pad anode			0.17 x 0.18		mm^2

ADDITIONAL INFORMATION	
Frontside metallization, anode	Al
Backside metallization, cathode	NiV-Ag
Dicing	Sawing
Die bonding technology	Epoxy bonding

Note

- All chips are checked in accordance with the Vishay Semiconductor, specification of visual inspection FVOV6870.
  The visual inspection shall be made in accordance with the “specification of visual inspection as referenced”. The visual inspection of chip backside is performed with stereo microscope with incident light and 40x to 80x magnification.
  The quality inspection (final visual inspection) is performed by production. An additional visual inspection step as special release procedure by QM is not installed.

HANDLING AND STORAGE CONDITIONS

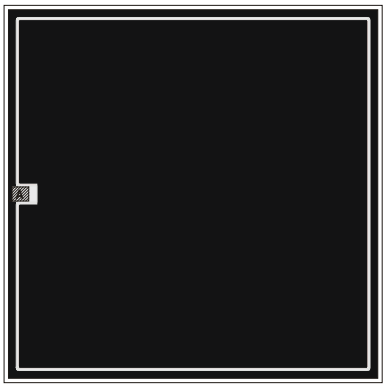
- The hermetically sealed shipment lots shall be opened in temperature and moisture controlled cleanroom environment only. It is mandatory to follow the rules for disposition of material that can be hazardous for humans and environment.
- Product must be handled only at ESD safe workstations. Standard ESD precautions and safe work environments are as defined in MIL-HDBK-263.
- Singulated die are not to be handled with tweezers. A vacuum wand with non metallic ESD protected tip should be used.

PACKING

Chips are fixed on adhesive foil. Upon request the foils can be mounted on plastic frame or disco frame. For shipment, the wafers are arranged to stacks and hermetically sealed in plastic bags to ensure protection against environmental influence (humidity and contamination).

Use for recycling reliable operators only. We can help getting in touch with your nearest sales office. By agreement we will take back packing material, if it is sorted. You will have to bear the costs of transport. We will invoice you for any costs incurred for packing material that is returned unsorted or which we are not obliged to accept.

Silicon PIN Photodiode



21887

FEATURES

- Package type: chip
- Package form: single chip
- Dimensions (L x W x H in mm): 2.97 x 2.97 x 0.28
- Radiant sensitive area (in mm^2): 7.7
- High photo sensitivity
- High radiant sensitivity
- Suitable for visible and near infrared radiation
- Fast response times
- Angle of half sensitivity: φ = ± 60°

Pb-free

e4

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

DESCRIPTION

T1116P is a PIN photodiode with blue enhanced sensitivity and a 7.7 mm^2 sensitive area.

APPLICATIONS

- Blue enhanced photodetectors

GENERAL INFORMATION

The datasheet is based on Vishay optoelectronics sample testing under certain predetermined and assumed conditions, and is provided for illustration purpose only. Customers are encouraged to perform testing in actual proposed packaged and used conditions. Vishay optoelectronics die products are tested using Vishay optoelectronics based quality assurance procedures and are manufactured using Vishay optoelectronics established processes. Estimates such as those described and set forth in this datasheet for semiconductor die will vary depending on a number of packaging, handling, use, and other factors. Therefore sold die may not perform on an equivalent basis to standard package products.

PRODUCT SUMMARY			
COMPONENT	I_{ra} (μA)	φ (deg)	$\lambda_{0.1}$ (nm)
T1116P	43	± 60	350 to 1100

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
T1116P-SD-F	Wafer sawn on foil with disco frame	MOQ: 3500 pcs	Chip

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	25	V
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	-40 to +100	°C
Storage temperature range		T_{stg1}	-40 to +100	°C
Storage temperature range on foil		T_{stg2}	-40 to +50	°C

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Breakdown voltage	I_R = 100 µA, E = 0	$V_{(BR)}$	-	25	-	V
Forward voltage	I_F = 50 mA	V_F	-	1	1.3	V
Reverse dark current	V_R = 10 V, E = 0	$I_{ro}t$	-	2	5	nA
Diode capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_D	-	90	-	pF
	V_R = 3 V, f = 1 MHz, E = 0	C_D	-	30	-	pF
Temperature coefficient of I_K	E_e = 1 mW/cm², λ = 950 nm	TK_{IK}	-	0.1	-	%/K
Reverse light current	E_e = 1 mW/cm², λ = 950 nm, V_R = 5 V	I_{ra}	-	43	-	µA
	E_e = 1 mW/cm², λ = 400 nm, V_R = 5 V	I_{ro}	-	13	-	µA
	E_V = 100 lx, CIE illuminant A, V_R = 5 V	I_{ro}	-	7.1	-	µA
Angle of half sensitivity		φ	-	± 60	-	deg
Wavelength of peak sensitivity		λ_p	-	940	-	nm
Range of spectral bandwidth		$\lambda_{0.1}$	-	350 to 1100	-	nm
Noise equivalent power	V_R = 10 V, λ = 400 nm	NEP	-	1.1×10^{-13}	-	W/√Hz
Rise time	V_R = 5 V, R_L = 500 Ω, λ = 850 nm	t_r	-	40	-	ns
Fall time	V_R = 10 V, R_L = 1 kΩ, λ = 820 nm	t_f	-	40	-	ns

Note

- The measurements are based on samples of die which are mounted on a TO-header without resin coating

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

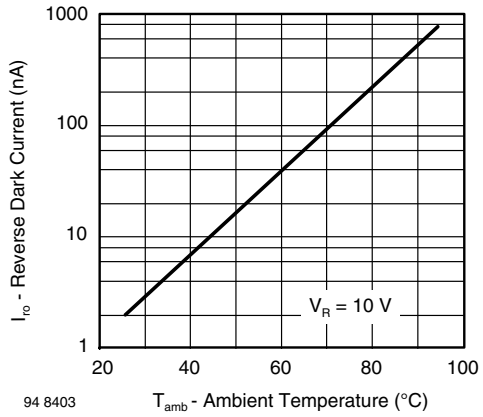


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

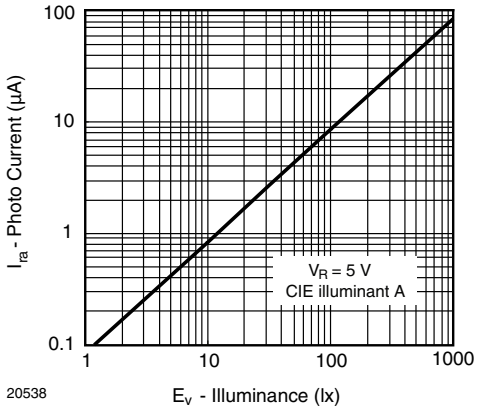


Fig. 3 - Photo Current vs. Illuminance

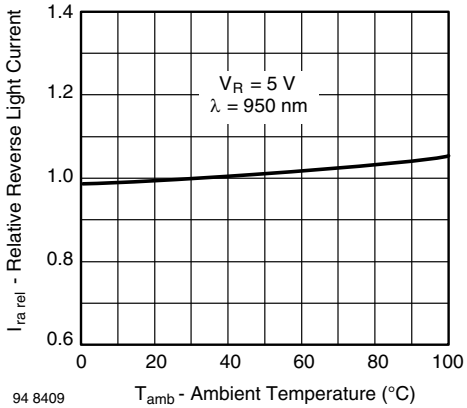


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

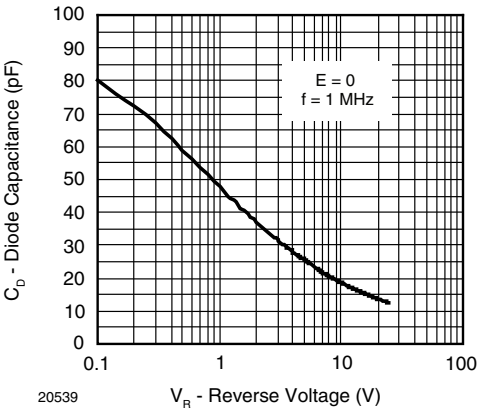


Fig. 4 - Diode Capacitance vs. Reverse Voltage

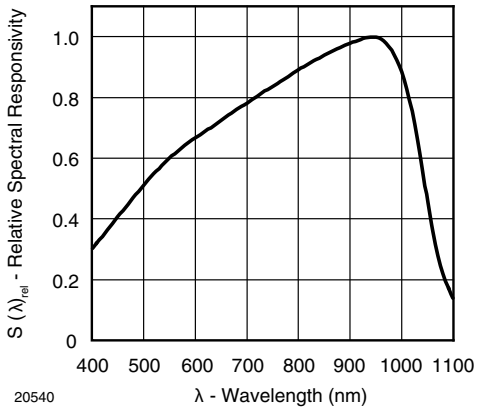


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

MECHANICAL DIMENSIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Length of chip edge (x-direction)	L_x	-	2.97	-	mm
Length of chip edge (y-direction)	L_y	-	2.97	-	mm
Sensitive area	A_S		2.77 x 2.77		mm^2
Die height	H	-	0.28	-	mm
Bond pad anode	a x b	-	0.125 x 0.110	-	mm^2

ADDITIONAL INFORMATION	
Frontside metallization, anode	Aluminum
Backside metallization, cathode	NiV-Ag
Dicing	Sawing
Die bonding technology	Epoxy bonding

Note

- All chips are checked in accordance with the Vishay Semiconductor, specification of visual inspection FVOV6870.
  The visual inspection shall be made in accordance with the “specification of visual inspection as referenced”. The visual inspection of chip backside is performed with stereo microscope with incident light and 40x to 80x magnification.
  The quality inspection (final visual inspection) is performed by production. An additional visual inspection step as special release procedure by QM is not installed.

HANDLING AND STORAGE CONDITIONS

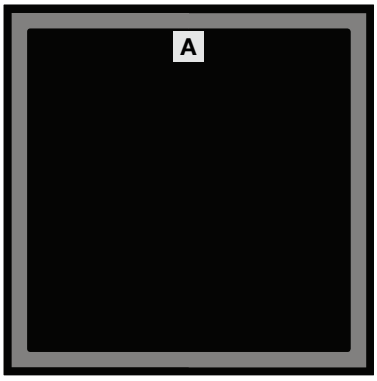
- The hermetically sealed shipment lots shall be opened in temperature and moisture controlled cleanroom environment only. It is mandatory to follow the rules for disposition of material that can be hazardous for humans and environment.
- Product must be handled only at ESD safe workstations. Standard ESD precautions and safe work environments are as defined in MIL-HDBK-263.
- Singulated die are not to be handled with tweezers. A vacuum wand with non metallic ESD protected tip should be used.

PACKING

Chips are fixed on adhesive foil. Upon request the foils can be mounted on plastic frame or disco frame. For shipment, the wafers are arranged to stacks and hermetically sealed in plastic bags to ensure protection against environmental influence (humidity and contamination).

Use for recycling reliable operators only. We can help getting in touch with your nearest sales office. By agreement we will take back packing material, if it is sorted. You will have to bear the costs of transport. We will invoice you for any costs incurred for packing material that is returned unsorted or which we are not obliged to accept.

Silicon PIN Photodiode



21678

FEATURES

- Package type: chip
- Package form: single chip
- Dimensions (L x W x H in mm): 2.37 x 2.37 x 0.28
- Radiant sensitive area (in mm^2): 4.4
- High photo sensitivity
- High radiant sensitivity
- Suitable for visible and near infrared radiation
- Fast response times
- Angle of half sensitivity: φ = ± 60°

Pb-free

e4

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

DESCRIPTION

T1120P is a high speed and high sensitive PIN photodiode chip with 4.4 mm^2 sensitive area detecting visible and near infrared radiation. Anode is the bond pad on top.

APPLICATIONS

- High speed photo detector

GENERAL INFORMATION

The datasheet is based on Vishay optoelectronics sample testing under certain predetermined and assumed conditions, and is provided for illustration purpose only. Customers are encouraged to perform testing in actual proposed packaged and used conditions. Vishay optoelectronics die products are tested using Vishay optoelectronics based quality assurance procedures and are manufactured using Vishay optoelectronics established processes. Estimates such as those described and set forth in this datasheet for semiconductor die will vary depending on a number of packaging, handling, use, and other factors. Therefore sold die may not perform on an equivalent basis to standard package products.

PRODUCT SUMMARY			
COMPONENT	I_{ra} (μA)	φ (deg)	$\lambda_{0.1}$ (nm)
T1120P	35	± 60	430 to 1100

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
T1120P-SD-F	Wafer sawn on foil with discoframe	MOQ: 5000 pcs	Chip

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	60	V
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	-40 to +100	°C
Storage temperature range		T_{stg1}	-40 to +100	°C
Storage temperature range on foil		T_{stg2}	-40 to +50	°C

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Breakdown voltage	I_R = 100 µA, E = 0	$V_{(BR)}$	-	60	-	V
Forward voltage	I_F = 50 mA	V_F	-	1	1.3	V
Reverse dark current	V_R = 10 V, E = 0	I_{ro}	-	2	5	nA
Diode capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_D	-	48	-	pF
	V_R = 3 V, f = 1 MHz, E = 0	C_D	-	17	-	pF
Open circuit voltage	E_e = 1 mW/cm², λ = 950 nm	V_{OC}	-	350	-	mV
Temperature coefficient of V_{OC}	E_e = 1 mW/cm², λ = 950 nm	TK_{VOC}	-	- 2.6	-	mV/K
Short circuit current	E_e = 1 mW/cm², λ = 950 nm	I_k	-	32	-	µA
Temperature coefficient of I_k	E_e = 1 mW/cm², λ = 950 nm	TK_{Ik}	-	0.1	-	%/K
Reverse light current	E_e = 1 mW/cm², λ = 950 nm, V_R = 5 V	I_{ra}	25	35	-	µA
Angle of half sensitivity		φ	-	± 60	-	deg
Wavelength of peak sensitivity		λ_p	-	940	-	nm
Range of spectral bandwidth		$\lambda_{0.1}$	-	430 to 1100	-	nm
Noise equivalent power	V_R = 10 V, λ = 950 nm	NEP	-	4×10^{-14}	-	W/√Hz
Rise time	V_R = 10 V, R_L = 1 kΩ, λ = 820 nm	t_r	-	100	-	ns
Fall time	V_R = 10 V, R_L = 1 kΩ, λ = 820 nm	t_f	-	100	-	ns

Note

- The measurements are based on samples of die which are mounted on a TO-header without resin coating

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

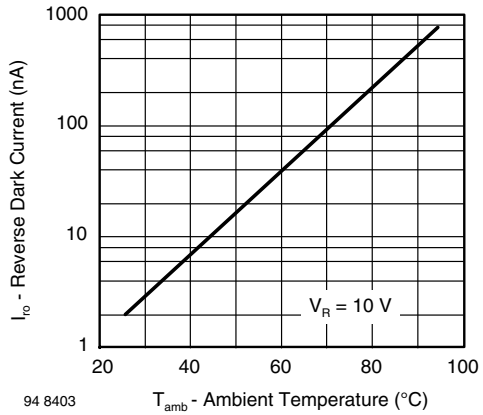


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

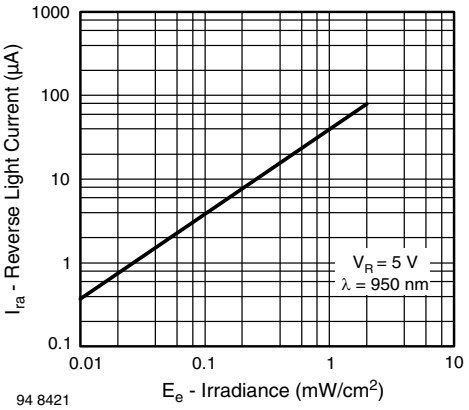


Fig. 3 - Reverse Light Current vs. Irradiance

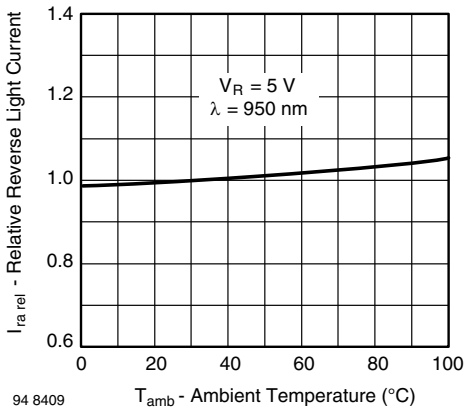


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

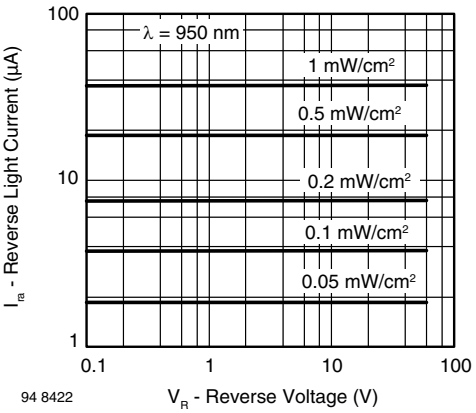


Fig. 4 - Reverse Light Current vs. Reverse Voltage

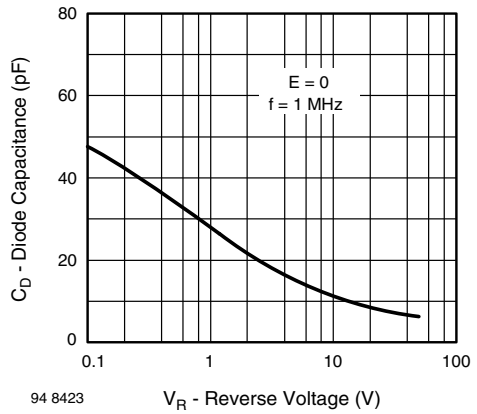


Fig. 5 - Diode Capacitance vs. Reverse Voltage

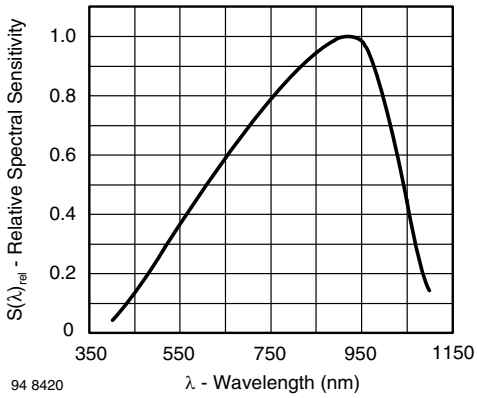


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

MECHANICAL DIMENSIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Length of chip edge (x-direction)	L_x	-	2.37	-	mm
Length of chip edge (y-direction)	L_y	-	2.37	-	mm
Sensitive area	A_S	-	4.4	-	mm^2
Die height	H	-	0.28	-	mm
Bond pad anode	a x b	-	0.2 x 0.2	-	mm^2

ADDITIONAL INFORMATION	
Frontside metallization, anode	Aluminum
Backside metallization, cathode	NiV-Ag
Dicing	Sawing
Die bonding technology	Epoxy bonding

Note

- All chips are checked in accordance with the Vishay Semiconductor, specification of visual inspection FVOV6870.
  The visual inspection shall be made in accordance with the “specification of visual inspection as referenced”. The visual inspection of chip backside is performed with stereo microscope with incident light and 40x to 80x magnification.
  The quality inspection (final visual inspection) is performed by production. An additional visual inspection step as special release procedure by QM is not installed.

HANDLING AND STORAGE CONDITIONS

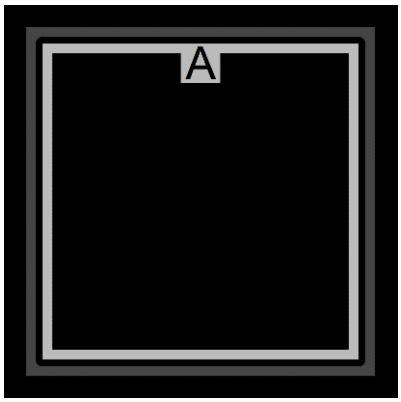
- The hermetically sealed shipment lots shall be opened in temperature and moisture controlled cleanroom environment only. It is mandatory to follow the rules for disposition of material that can be hazardous for humans and environment.
- Product must be handled only at ESD safe workstations. Standard ESD precautions and safe work environments are as defined in MIL-HDBK-263.
- Singulated die are not to be handled with tweezers. A vacuum wand with non metallic ESD protected tip should be used.

PACKING

Chips are fixed on adhesive foil. Upon request the foils can be mounted on plastic frame or disco frame. For shipment, the wafers are arranged to stacks and hermetically sealed in plastic bags to ensure protection against environmental influence (humidity and contamination).

Use for recycling reliable operators only. We can help getting in touch with your nearest sales office. By agreement we will take back packing material, if it is sorted. You will have to bear the costs of transport. We will invoice you for any costs incurred for packing material that is returned unsorted or which we are not obliged to accept.

Silicon PIN Photodiode



FEATURES

- Package type: chip
- Package form: single chip
- Dimensions (L x W x H in mm): 1.17 x 1.17 x 0.28
- Radiant sensitive area (in mm^2): 0.88
- Peak sensitivity wavelength: 920 nm
- High photo sensitivity
- Suitable for visible light and near infrared radiation
- Fast response times
- Angle of half sensitivity: φ = ± 60°

Pb-free

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RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

DESCRIPTION

T1170P is pin photodiode chip with 0.88 mm^2 sensitive area detecting visible and near infrared radiation. Anode is the bond pad on top.

APPLICATIONS

- High speed photo detector

GENERAL INFORMATION

The datasheet is based on Vishay optoelectronics sample testing under certain predetermined and assumed conditions, and is provided for illustration purpose only. Customers are encouraged to perform testing in actual proposed packaged and used conditions. Vishay optoelectronics die products are tested using Vishay optoelectronics based quality assurance procedures and are manufactured using Vishay optoelectronics established processes. Estimates such as those described and set forth in this datasheet for semiconductor die will vary depending on a number of packaging, handling, use, and other factors. Therefore sold die may not perform on an equivalent basis to standard package products.

PRODUCT SUMMARY			
COMPONENT	I_{ra} (μA)	φ (deg)	$\lambda_{0.5}$ (nm)
T1170P	7	± 60	600 to 1040

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
T1170P-SD-F	wafer sawn on foil with disco frame	MOQ: 23 500 pcs	chip

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	60	V
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	-40 to +100	°C
Storage temperature range		T_{stg1}	-40 to +100	°C
Storage temperature range on foil		T_{stg2}	-40 to +50	°C

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Breakdown voltage	I_R = 100 µA, E = 0	$V_{(BR)}$	60			V
Reverse dark current	V_R = 10 V, E = 0	I_{ro}		< 1	3	nA
Diode capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_D		12		pF
	V_R = 3 V, f = 1 MHz, E = 0	C_D		4		pF
Reverse light current	E_e = 1 mW/cm², λ = 950 nm, V_R = 5 V	I_{ra}		7		µA
Angle of half sensitivity		φ		± 60		deg
Wavelength of peak sensitivity		λ_p		920		nm
Range of spectral bandwidth		$\lambda_{0.5}$		600 to 1040		nm
Rise time	V_R = 10 V, R_L = 1 kΩ, λ = 830 nm	t_r		100		ns
Fall time	V_R = 10 V, R_L = 1 kΩ, λ = 830 nm	t_f		100		ns

Notes

- The measurements are based on samples which are mounted on TO18-header without epoxy coating

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

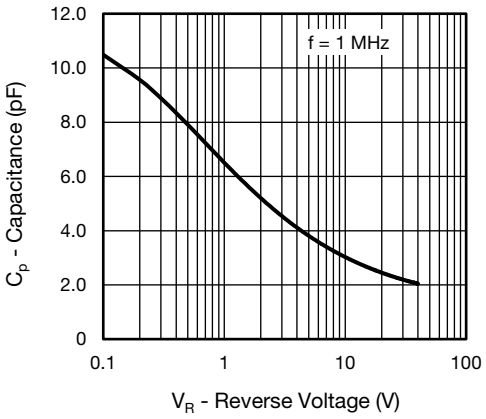


Fig. 1 - Diode Capacitance vs. Reverse Voltage

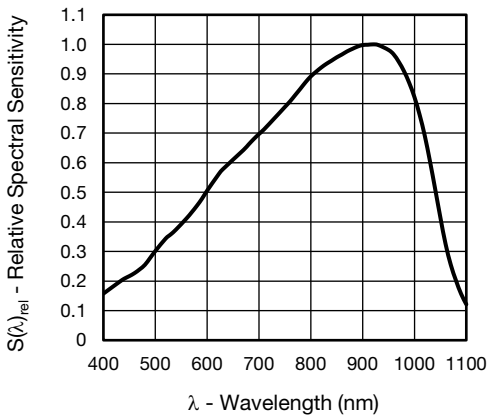
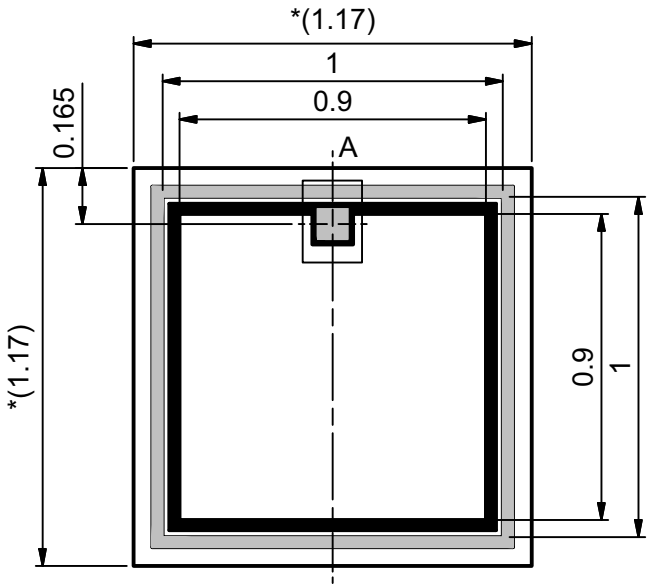
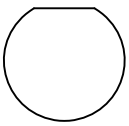


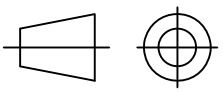
Fig. 2 - Relative Spectral Sensitivity vs. Wavelength without Epoxy Coating

DIMENSIONS in millimeters



Orientation of wafer flat

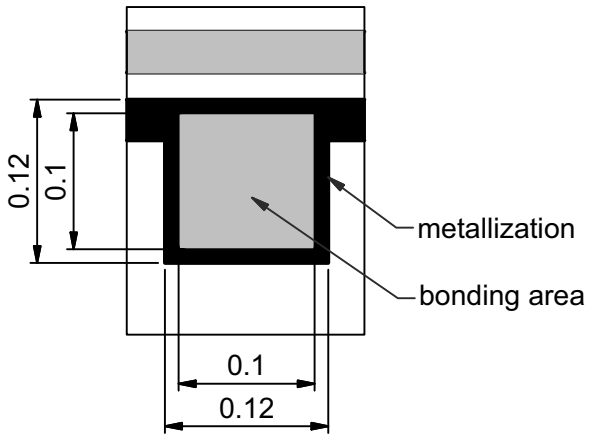




Technical drawings according to DIN specification.

*only for information:
dimension of sawn die under consideration of 30 µm saw kerf

A (200:1)



Dimensions in mm
Not indicated tolerances ± 0.005

Opt. sensitive area: 0.88 mm²

Bonding area: 100 µm x 100 µm
Bonding restricted to this area in order to avoid damage of adjacent structures

Thickness: 280 µm ± 15 µm

Drawing-No.: 9.000-5134.01-4
Issue: 1; 25.04.2014

MECHANICAL DIMENSIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Length of chip edge (x-direction)	L_x		1.17		mm
Length of chip edge (y-direction)	L_y		1.17		mm
Sensitive area	A_S		0.88		mm^2
Wafer diameter	D		100		mm
Die height	H	0.265	0.28	0.295	mm
Bond pad anode			0.1 x 0.1		mm^2

ADDITIONAL INFORMATION	
Frontside metallization, anode	Al
Backside metallization, cathode	NiV-Ag
Dicing	sawing
Die bonding technology	epoxy bonding

Note

- All chips are checked in accordance with the Vishay Semiconductor, specification of visual inspection FVOV6870.
  The visual inspection shall be made in accordance with the “specification of visual inspection as referenced”. The visual inspection of chip backside is performed with stereo microscope with incident light and 40x to 80x magnification.
  The quality inspection (final visual inspection) is performed by production. An additional visual inspection step as special release procedure by QM is not installed.

HANDLING AND STORAGE CONDITIONS

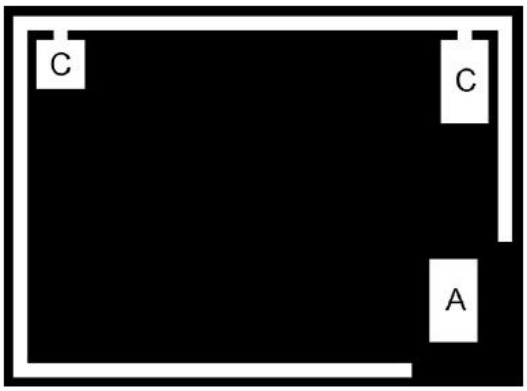
- The hermetically sealed shipment lots shall be opened in temperature and moisture controlled cleanroom environment only. It is mandatory to follow the rules for disposition of material that can be hazardous for humans and environment.
- Product must be handled only at ESD safe workstations. Standard ESD precautions and safe work environments are as defined in MIL-HDBK-263.
- Singulated die are not to be handled with tweezers. A vacuum wand with non metallic ESD protected tip should be used.

PACKING

Chips are fixed on adhesive foil. Upon request the foils can be mounted on plastic frame or disco frame. For shipment, the wafers are arranged to stacks and hermetically sealed in plastic bags to ensure protection against environmental influence (humidity and contamination).

Use for recycling reliable operators only. We can help getting in touch with your nearest sales office. By agreement we will take back packing material, if it is sorted. You will have to bear the costs of transport. We will invoice you for any costs incurred for packing material that is returned unsorted or which we are not obliged to accept.

Silicon PIN Photodiode



FEATURES

- Package type: chip
- Package form: single chip
- Dimensions (L x W x H in mm): 1.47 x 1.07 x 0.28
- Radiant sensitive area (in mm^2): 1.06
- Peak sensitivity wavelength: 960 nm
- High photo sensitivity
- Suitable for visible light and near infrared radiation
- Fast response times
- Angle of half sensitivity: φ = ± 60°

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RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

DESCRIPTION

T1172P6 is a high speed and high sensitive PIN photodiode chip with 1.06 mm^2 sensitive area detecting visible and near infrared radiation. Anode and cathode are the bond pads on top.

APPLICATIONS

- High speed photo detector

GENERAL INFORMATION

The datasheet is based on Vishay optoelectronics sample testing under certain predetermined and assumed conditions, and is provided for illustration purpose only. Customers are encouraged to perform testing in actual proposed packaged and used conditions. Vishay optoelectronics die products are tested using Vishay optoelectronics based quality assurance procedures and are manufactured using Vishay optoelectronics established processes. Estimates such as those described and set forth in this datasheet for semiconductor die will vary depending on a number of packaging, handling, use, and other factors. Therefore sold die may not perform on an equivalent basis to standard package products.

PRODUCT SUMMARY			
COMPONENT	I_{ra} (µA)	φ (deg)	$\lambda_{0.5}$ (nm)
T1172P6	8.7	± 60	640 to 1060

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
T1172P6-SD-F	Wafer sawn on foil with disco frame	MOQ: 48 000 pcs	Chip

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	60	V
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	-40 to +100	°C
Storage temperature range		T_{stg1}	-40 to +100	°C
Storage temperature range on foil		T_{stg2}	-40 to +50	°C

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Breakdown voltage	I_R = 100 µA, E = 0	$V_{(BR)}$	60	-	-	V
Reverse dark current	V_R = 10 V, E = 0	I_{ro}	-	< 1	3	nA
Diode capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_D	-	12	-	pF
	V_R = 3 V, f = 1 MHz, E = 0	C_D	-	5	-	pF
Reverse light current	E_e = 1 mW/cm², λ = 890 nm, V_R = 5 V	I_{ra}	-	8.4	-	µA
	E_e = 1 mW/cm², λ = 950 nm, V_R = 5 V	I_{ra}	-	8.7	-	µA
Angle of half sensitivity		φ	-	± 60	-	deg
Wavelength of peak sensitivity		λ_p	-	960	-	nm
Range of spectral bandwidth		$\lambda_{0.5}$	-	640 to 1060	-	nm
Rise time	V_R = 10 V, R_L = 1 kΩ, λ = 870 nm	t_r	-	625	-	ns
Fall time		t_f	-	670	-	ns

Note

- The measurements are based on samples of die which are mounted on a TO18-header without epoxy coating

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

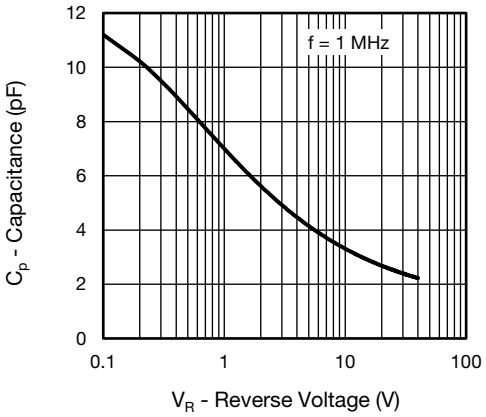


Fig. 1 - Diode Capacitance vs. Reverse Voltage

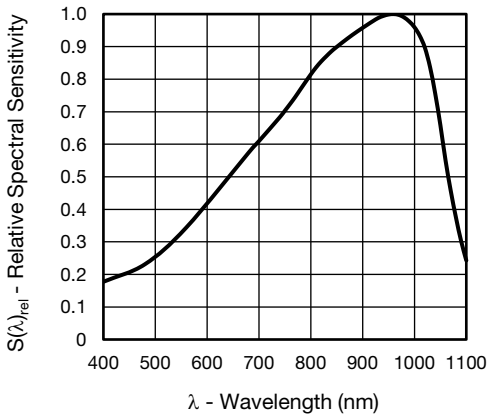
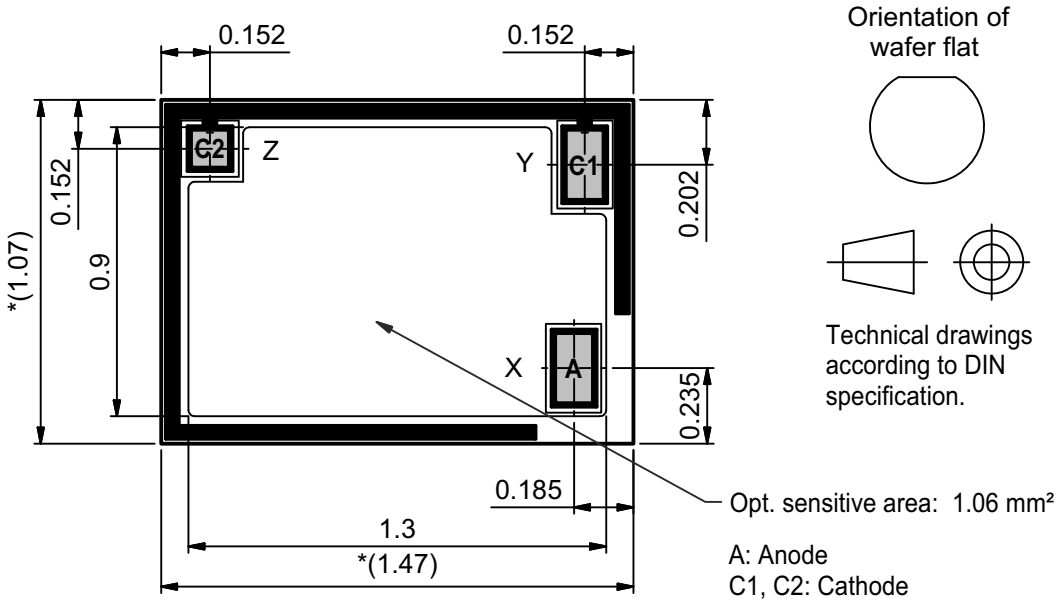


Fig. 2 - Relative Spectral Sensitivity vs. Wavelength without Epoxy Coating

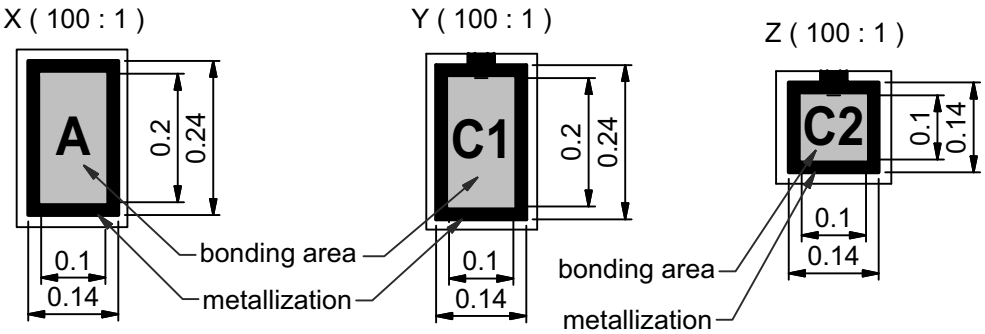
DIMENSIONS in millimeters



Orientation of wafer flat

Technical drawings according to DIN specification.

*only for information:
dimension of sawn die under consideration of 30 µm saw kerf



Bonding area: A: 100 µm x 200 µm
C1: 100 µm x 200 µm
C2: 100 µm x 100 µm

Bonding restricted to this area in order to avoid damage of adjacent structures

Thickness: 280 µm ± 15 µm

Drawing-No.: 9.000-5127.01-4
Issue: 1; 29.10.2013

MECHANICAL DIMENSIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Length of chip edge (x-direction)	L_x	-	1.47	-	mm
Length of chip edge (y-direction)	L_y	-	1.07	-	mm
Sensitive area	A_S		1.06		mm^2
Wafer diameter	D	-	150	-	mm
Die height	H	0.265	0.28	0.295	mm
Bond pad anode		-	0.1 x 0.2	-	mm^2
Bond pad cathode type 1		-	0.1 x 0.2	-	mm^2
Bond pad cathode type 2		-	0.1 x 0.1	-	mm^2

ADDITIONAL INFORMATION	
Frontside metallization, anode, cathode	AlSi
Backside	Electrically isolated
Dicing	Sawing
Die bonding technology	Epoxy bonding

Note

- All chips are checked in accordance with the Vishay Semiconductor, specification of visual inspection FVOV6870.
  The visual inspection shall be made in accordance with the “specification of visual inspection as referenced”. The visual inspection of chip backside is performed with stereo microscope with incident light and 40x to 80x magnification.
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HANDLING AND STORAGE CONDITIONS

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- Singulated die are not to be handled with tweezers. A vacuum wand with non metallic ESD protected tip should be used.

PACKING

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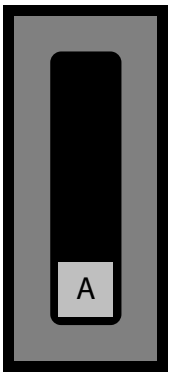
Silicon PIN Photodiode



FEATURES

- Package type: chip
- Package form: single chip
- Dimensions (L x W x H in mm): 0.67 x 0.3 x 0.28
- Radiant sensitive area (in mm^2): 0.055
- Peak sensitivity wavelength: 810 nm
- High photo sensitivity
- Suitable for visible light and near infrared radiation
- Fast response times
- Angle of half sensitivity: φ = ± 60°

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RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

DESCRIPTION

T1180P6 is a high speed and high sensitive PIN photodiode chip with 0.055 mm^2 sensitive area detecting visible and near infrared radiation. Anode is the bond pad on top.

APPLICATIONS

- High speed photo detector

GENERAL INFORMATION

The datasheet is based on Vishay optoelectronics sample testing under certain predetermined and assumed conditions, and is provided for illustration purpose only. Customers are encouraged to perform testing in actual proposed packaged and used conditions. Vishay optoelectronics die products are tested using Vishay optoelectronics based quality assurance procedures and are manufactured using Vishay optoelectronics established processes. Estimates such as those described and set forth in this datasheet for semiconductor die will vary depending on a number of packaging, handling, use, and other factors. Therefore sold die may not perform on an equivalent basis to standard package products.

PRODUCT SUMMARY			
COMPONENT	I_{ra} (μA)	φ (deg)	$\lambda_{0.5}$ (nm)
T1180P6	0.59	± 60	590 to 1010

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
T1180P6-SD-F	Wafer sawn on foil with disco frame	MOQ: 330 000 pcs	Chip

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	60	V
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	-40 to +100	°C
Storage temperature range		T_{stg1}	-40 to +100	°C
Storage temperature range on foil		T_{stg2}	-40 to +50	°C

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Breakdown voltage	I_R = 100 µA, E = 0	$V_{(BR)}$	60	-	-	V
Reverse dark current	V_R = 10 V, E = 0	I_{ro}	-	< 1	3	nA
Diode capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_D	-	1.7	-	pF
	V_R = 3 V, f = 1 MHz, E = 0	C_D	-	1.1	-	pF
Reverse light current	E_e = 1 mW/cm², λ = 890 nm, V_R = 5 V	I_{ra}	-	0.67	-	µA
	E_e = 1 mW/cm², λ = 950 nm, V_R = 5 V	I_{ra}	-	0.59	-	µA
Angle of half sensitivity		φ	-	± 60	-	deg
Wavelength of peak sensitivity		λ_p	-	810	-	nm
Range of spectral bandwidth		$\lambda_{0.5}$	-	590 to 1010	-	nm
Rise time	V_R = 5 V, R_L = 1 kΩ, λ = 830 nm	t_r	-	530	-	ns
Fall time		t_f	-	170	-	ns
Rise time	V_R = 5 V, R_L = 1 kΩ, λ = 950 nm	t_r	-	1480	-	ns
Fall time		t_f	-	590	-	ns

Note

- The measurements are based on samples of die which are mounted on a TO18-header without resin coating

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

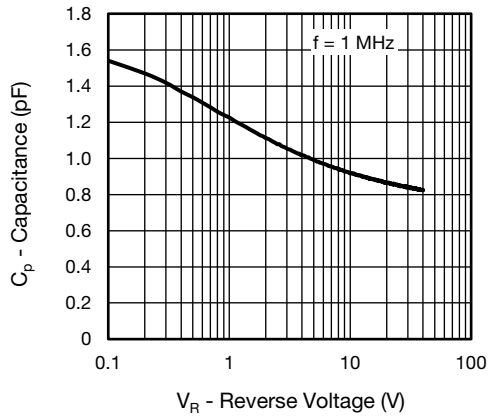


Fig. 1 - Diode Capacitance vs. Reverse Voltage

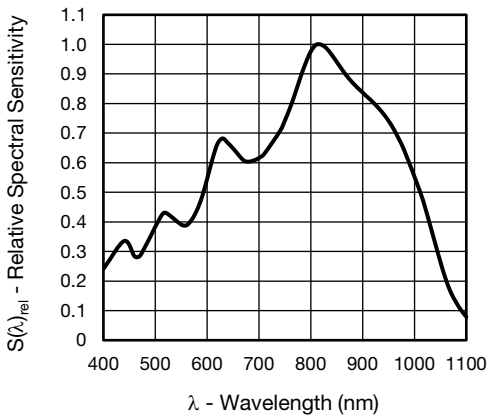
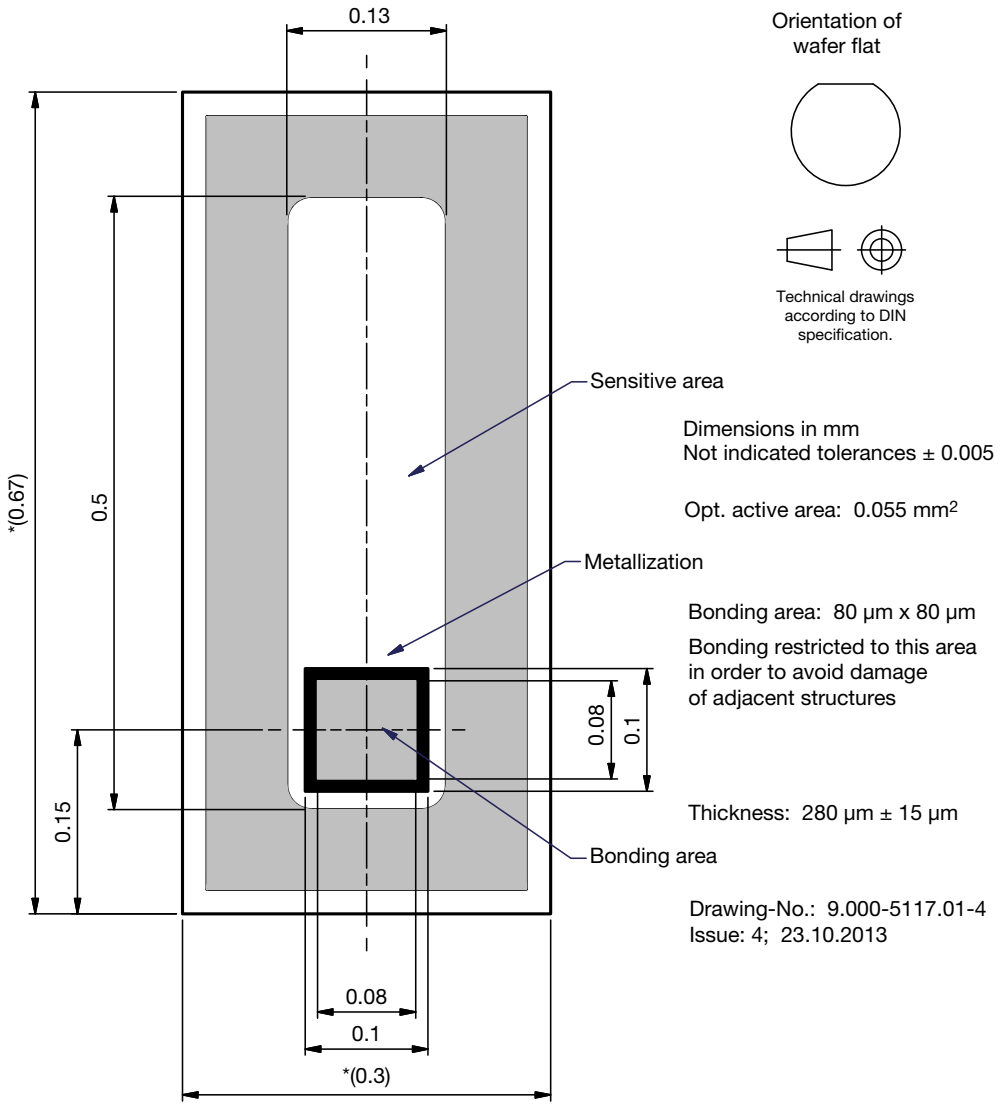


Fig. 2 - Relative Spectral Sensitivity vs. Wavelength without Resin Coating

DIMENSIONS in millimeters



* only for information:
dimension of sawn die under consideration of 30 µm saw kerf

MECHANICAL DIMENSIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Length of chip edge (x-direction)	L_x	-	0.3	-	mm
Length of chip edge (y-direction)	L_y	-	0.67	-	mm
Sensitive area	A_S		0.055		mm^2
Wafer diameter	D	-	150	-	mm
Die height	H	0.265	0.28	0.295	mm
Bond pad anode		-	0.08 x 0.08	-	mm^2

ADDITIONAL INFORMATION	
Frontside metallization, anode	AlSi
Backside metallization, cathode	NiV-Ag
Dicing	Sawing
Die bonding technology	Epoxy bonding

Note

- All chips are checked in accordance with the Vishay Semiconductor, specification of visual inspection FVOV6870.
  The visual inspection shall be made in accordance with the “specification of visual inspection as referenced”. The visual inspection of chip backside is performed with stereo microscope with incident light and 40x to 80x magnification.
  The quality inspection (final visual inspection) is performed by production. An additional visual inspection step as special release procedure by QM is not installed.

HANDLING AND STORAGE CONDITIONS

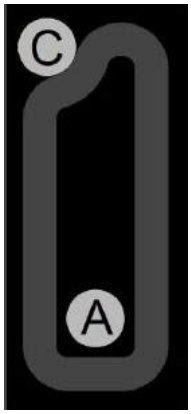
- The hermetically sealed shipment lots shall be opened in temperature and moisture controlled cleanroom environment only. It is mandatory to follow the rules for disposition of material that can be hazardous for humans and environment.
- Product must be handled only at ESD safe workstations. Standard ESD precautions and safe work environments are as defined in MIL-HDBK-263.
- Singulated die are not to be handled with tweezers. A vacuum wand with non metallic ESD protected tip should be used.

PACKING

Chips are fixed on adhesive foil. Upon request the foils can be mounted on plastic frame or disco frame. For shipment, the wafers are arranged to stacks and hermetically sealed in plastic bags to ensure protection against environmental influence (humidity and contamination).

Use for recycling reliable operators only. We can help getting in touch with your nearest sales office. By agreement we will take back packing material, if it is sorted. You will have to bear the costs of transport. We will invoice you for any costs incurred for packing material that is returned unsorted or which we are not obliged to accept.

Silicon PIN Photodiode



FEATURES

- Package type: chip
- Package form: single chip
- Dimensions (L x W x H in mm): 0.67 x 0.3 x 0.28
- Radiant sensitive area (in mm^2): 0.053
- Peak sensitivity wavelength: 800 nm
- High photo sensitivity
- Suitable for visible light and near infrared radiation
- Fast response times
- Angle of half sensitivity: φ = ± 60°

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DESCRIPTION

T1187P6 is a high speed and high sensitive PIN photodiode chip with 0.053 mm^2 sensitive area detecting visible and near infrared radiation. Anode and cathode are the bond pads on top.

APPLICATIONS

- High speed photo detector

GENERAL INFORMATION

The datasheet is based on Vishay optoelectronics sample testing under certain predetermined and assumed conditions, and is provided for illustration purpose only. Customers are encouraged to perform testing in actual proposed packaged and used conditions. Vishay optoelectronics die products are tested using Vishay optoelectronics based quality assurance procedures and are manufactured using Vishay optoelectronics established processes. Estimates such as those described and set forth in this datasheet for semiconductor die will vary depending on a number of packaging, handling, use, and other factors. Therefore sold die may not perform on an equivalent basis to standard package products.

PRODUCT SUMMARY			
COMPONENT	I_{ra} (μA)	φ (deg)	$\lambda_{0.5}$ (nm)
T1187P6	0.66	± 60	580 to 1070

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
T1187P6-SD-F	Wafer sawn on foil with disco frame	MOQ: 330 000 pcs	Chip

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	60	V
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	-40 to +100	°C
Storage temperature range		T_{stg1}	-40 to +100	°C
Storage temperature range on foil		T_{stg2}	-40 to +50	°C

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Breakdown voltage	I_R = 100 µA, E = 0	$V_{(BR)}$	60			V
Reverse dark current	V_R = 10 V, E = 0	I_{ro}		< 1	3	nA
Diode capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_D		1.4		pF
	V_R = 3 V, f = 1 MHz, E = 0	C_D		0.9		pF
Reverse light current	E_e = 1 mW/cm², λ = 890 nm, V_R = 5 V	I_{ra}		0.64		µA
	E_e = 1 mW/cm², λ = 950 nm, V_R = 5 V	I_{ra}		0.66		µA
Angle of half sensitivity		φ		± 60		deg
Wavelength of peak sensitivity		λ_p		800		nm
Range of spectral bandwidth		$\lambda_{0.5}$		580 to 1070		nm
Rise time	V_R = 5 V, R_L = 1 kΩ, λ = 830 nm	t_r		700		ns
Fall time		t_f		160		ns
Rise time	V_R = 5 V, R_L = 1 kΩ, λ = 950 nm	t_r		2650		ns
Fall time		t_f		1000		ns

Note

- The measurements are based on samples of die which are mounted on a TO18-header without epoxy coating

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

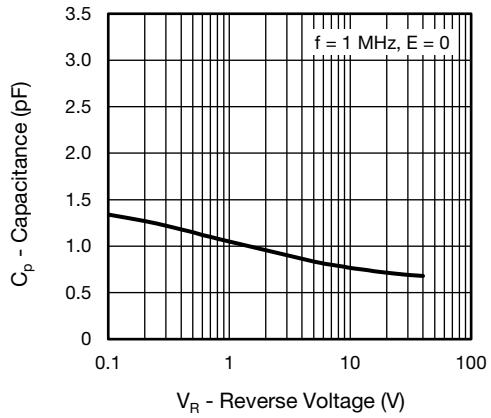


Fig. 1 - Diode Capacitance vs. Reverse Voltage

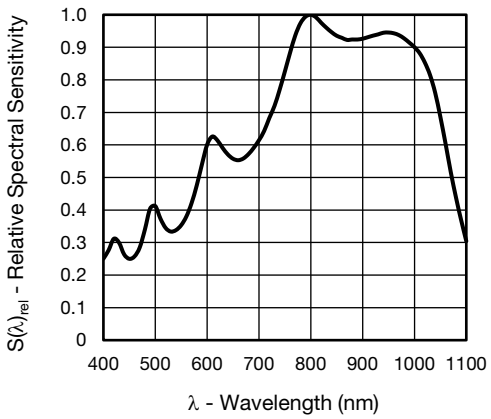
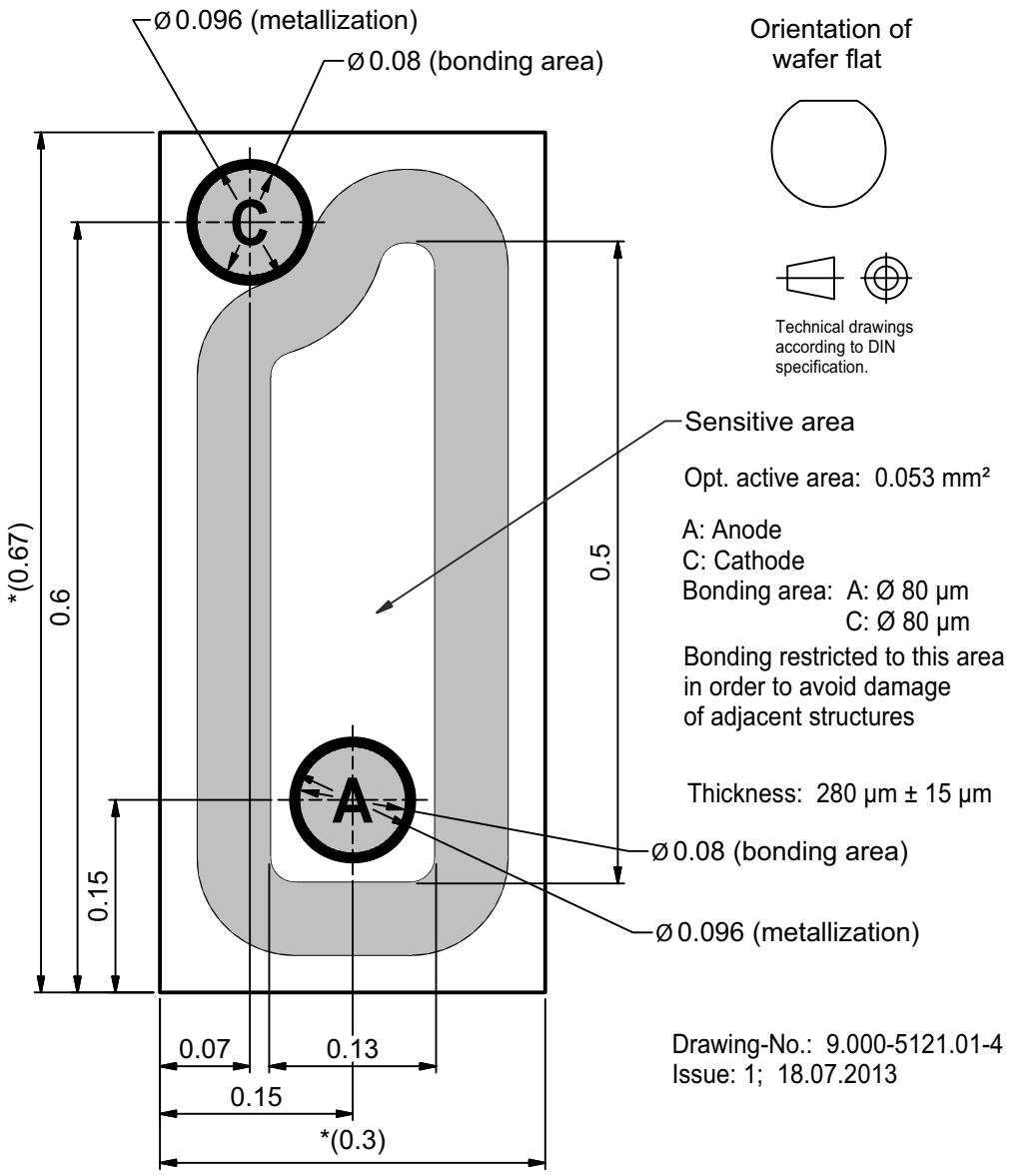


Fig. 2 - Relative Spectral Sensitivity vs. Wavelength without Epoxy Coating

DIMENSIONS in millimeters



*only for information:
dimension of sawn die under consideration of 30 µm saw kerf

MECHANICAL DIMENSIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Length of chip edge (x-direction)	L_x		0.3		mm
Length of chip edge (y-direction)	L_y		0.67		mm
Sensitive area	A_S		0.053		mm^2
Wafer diameter	D		150		mm
Die height	H	0.265	0.28	0.295	mm
Bond pad anode	Ø		0.08		mm
Bond pad cathode	Ø		0.08		mm

ADDITIONAL INFORMATION	
Frontside metallization, anode, cathode	AlSi
Backside	Electrically isolated
Dicing	Sawing
Die bonding technology	Epoxy bonding

Note

- All chips are checked in accordance with the Vishay Semiconductor, specification of visual inspection FVOV6870.
  The visual inspection shall be made in accordance with the “specification of visual inspection as referenced”. The visual inspection of chip backside is performed with stereo microscope with incident light and 40x to 80x magnification.
  The quality inspection (final visual inspection) is performed by production. An additional visual inspection step as special release procedure by QM is not installed.

HANDLING AND STORAGE CONDITIONS

- The hermetically sealed shipment lots shall be opened in temperature and moisture controlled cleanroom environment only. It is mandatory to follow the rules for disposition of material that can be hazardous for humans and environment.
- Product must be handled only at ESD safe workstations. Standard ESD precautions and safe work environments are as defined in MIL-HDBK-263.
- Singulated die are not to be handled with tweezers. A vacuum wand with non metallic ESD protected tip should be used.

PACKING

Chips are fixed on adhesive foil. Upon request the foils can be mounted on plastic frame or disco frame. For shipment, the wafers are arranged to stacks and hermetically sealed in plastic bags to ensure protection against environmental influence (humidity and contamination).

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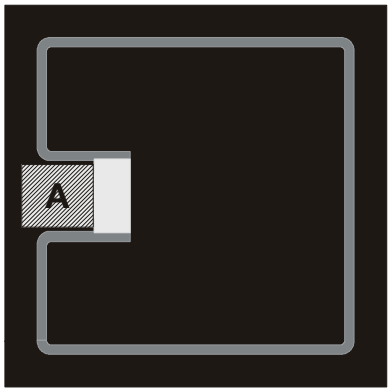
Silicon PIN Photodiode



21667

FEATURES

- Package type: chip
- Package form: single chip
- Dimensions (L x W x H in mm): 0.72 x 0.72 x 0.28
- Wafer diameter (in mm): 100
- Radiant sensitive area (in mm^2): 0.27
- Peak wavelength 560 nm
- High photo sensitivity
- High sensitivity
- Suitable for visible light
- Fast response times
- Angle of half sensitivity: $\varphi = \pm 60°$

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DESCRIPTION

T1670P6 ambient light sensor chip is a PIN photodiode with 0.27 mm^2 sensitive area, high speed and high photo sensitivity. It is sensitive to visible light much like the human eye and has peak sensitivity at 560 nm. Anode is the bond pad on top, cathode is the backside contact.

APPLICATIONS

- Ambient light sensor
- Backlight dimmer

GENERAL INFORMATION

The datasheet is based on Vishay optoelectronics sample testing under certain predetermined and assumed conditions, and is provided for illustration purpose only. Customers are encouraged to perform testing in actual proposed packaged and used conditions. Vishay optoelectronics die products are tested using Vishay optoelectronics based quality assurance procedures and are manufactured using Vishay optoelectronics established processes. Estimates such as those described and set forth in this datasheet for semiconductor die will vary depending on a number of packaging, handling, use, and other factors. Therefore sold die may not perform on an equivalent basis to standard package products.

PRODUCT SUMMARY			
COMPONENT	I_{ra} (nA)	φ (°)	$\lambda_{0.5}$ (nm)
T1670P6	138	± 60	390 to 800

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
T1670P6-SD-F	Wafer sawn on foil with disco frame	MOQ: 125 000 pcs	Chip

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	16	V
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	-40 to +100	°C
Storage temperature range		T_{stg1}	-40 to +100	°C
Storage temperature range on foil		T_{stg2}	-40 to +50	°C

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Breakdown voltage	I_R = 100 µA, E = 0	$V_{(BR)}$	16	-	-	V
Reverse dark current	V_R = 10 V, E = 0	I_{ro}	-	0.1	2	nA
Diode capacitance	V_R = 3 V, f = 1 MHz, E = 0	C_D	-	28	-	pF
Reverse light current	E_V = 100 lx, CIE illuminant A, V_R = 5 V	I_{ra}	-	138	-	nA
Angle of half sensitivity		φ	-	± 60	-	°
Wavelength of peak sensitivity		λ_p	-	560	-	nm
Range of spectral bandwidth		$\lambda_{0.5}$	-	390 to 800	-	nm
Rise time	V_R = 5 V, R_L = 50 Ω, λ = 515 nm	t_r	-	100	-	ns
Fall time	V_R = 5 V, R_L = 50 Ω, λ = 515 nm	t_f	-	100	-	ns

Note

- The measurements are based on samples of die which are mounted on a TO-header without resin coating

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

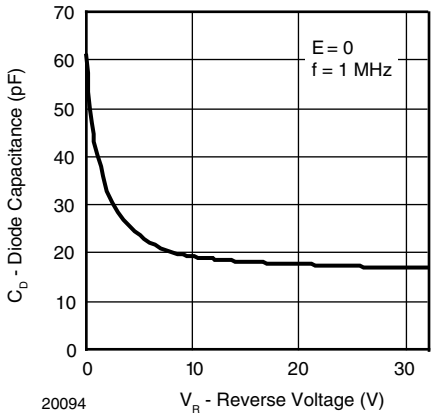

Fig. 1 - Diode Capacitance vs. Reverse Voltage

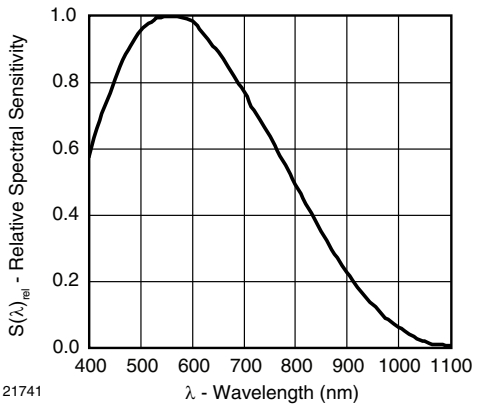

Fig. 2 - Relative Spectral Sensitivity vs. Wavelength

MECHANICAL DIMENSIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Length of chip edge (x-direction)	L_x	-	0.72	-	mm
Length of chip edge (y-direction)	L_y	-	0.72	-	mm
Sensitive area	A_S		0.27		mm^2
Wafer diameter	D	-	100	-	mm
Die height	H	0.265	0.28	0.295	mm
Bond pad anode	x * y	-	0.125 x 0.11	-	mm^2

ADDITIONAL INFORMATION	
Frontside metallization, anode	AlSi
Backside metallization, cathode	NiV-Ag
Dicing	Sawing
Die bonding technology	Epoxy bonding

Note

- All chips are checked in accordance with the Vishay Semiconductor, specification of visual inspection FVOV6870.
  The visual inspection shall be made in accordance with the “specification of visual inspection as referenced”. The visual inspection of chip backside is performed with stereo microscope with incident light and 40x to 80x magnification.
  The quality inspection (final visual inspection) is performed by production. An additional visual inspection step as special release procedure by QM is not installed

HANDLING AND STORAGE CONDITIONS

- The hermetically sealed shipment lots shall be opened in temperature and moisture controlled cleanroom environment only. It is mandatory to follow the rules for disposition of material that can be hazardous for humans and environment.
- Product must be handled only at ESD safe workstations. Standard ESD precautions and safe work environments are as defined in MIL-HDBK-263.
- Singulated die are not to be handled with tweezers. A vacuum wand with non metallic ESD protected tip should be used.

PACKING

Chips are fixed on adhesive foil. Upon request the foils can be mounted on plastic frame or disco frame. For shipment, the wafers are arranged to stacks and hermetically sealed in plastic bags to ensure protection against environmental influence (humidity and contamination).

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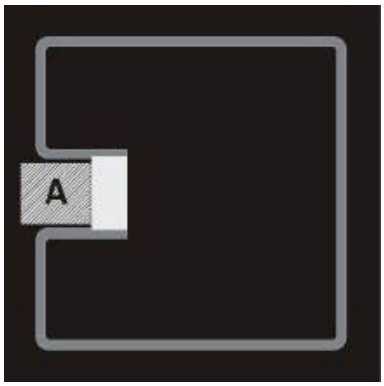
Silicon PIN Photodiode



FEATURES

- Package type: chip
- Package form: single chip
- Dimensions (L x W x H in mm): 0.72 x 0.72 x 0.28
- Radiant sensitive area (in mm^2): 0.27
- Peak sensitivity wavelength: 570 nm
- High photo sensitivity
- Fast response times
- Angle of half sensitivity: φ = ± 60°

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APPLICATIONS

- Ambient light sensor

DESCRIPTION

T1677P ambient light chip is an epitaxial photodiode with ambient light spectral characteristic.

GENERAL INFORMATION

The datasheet is based on Vishay optoelectronics sample testing under certain predetermined and assumed conditions, and is provided for illustration purpose only. Customers are encouraged to perform testing in actual proposed packaged and used conditions. Vishay optoelectronics die products are tested using Vishay optoelectronics based quality assurance procedures and are manufactured using Vishay optoelectronics established processes. Estimates such as those described and set forth in this datasheet for semiconductor die will vary depending on a number of packaging, handling, use, and other factors. Therefore sold die may not perform on an equivalent basis to standard package products.

PRODUCT SUMMARY			
COMPONENT	I_{ra} (nA)	φ (deg)	$\lambda_{0.5}$ (nm)
T1677P	15	± 60	430 to 700

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
T1677P-SD-F	Wafer sawn on foil with disco frame	MOQ: 55 000 pcs	Chip

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	16	V
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	-40 to +100	°C
Storage temperature range		T_{stg1}	-40 to +100	°C
Storage temperature range on foil		T_{stg2}	-40 to +50	°C

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Breakdown voltage	I_R = 100 µA, E = 0	$V_{(BR)}$	16	-	-	V
Reverse dark current	V_R = 10 V, E = 0	I_{ro}	-	0.1	2	nA
Diode capacitance	V_R = 3 V, f = 1 MHz, E = 0	C_D	-	28	-	pF
Reverse light current	E_e = 10 µW/cm², λ = 530 nm, V_R = 5 V	I_{ra}	-	15	-	nA
	E_V = 100 lux, CIE illuminant A, V_R = 5 V	I_{ra}	-	87	-	nA
	E_V = 100 lux, white LED 4300 K, V_R = 5 V	I_{ra}	-	43	-	nA
Angle of half sensitivity		φ	-	± 60	-	deg
Wavelength of peak sensitivity		λ_p	-	570	-	nm
Range of spectral bandwidth		$\lambda_{0.5}$	-	430 to 700	-	nm
Rise time	V_R = 5 V, R_L = 50 Ω, λ = 515 nm	t_r	-	100	-	ns
Fall time		t_f	-	100	-	ns

Note

- The measurements are based on samples of die which are mounted on a TO18-header without resin coating

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

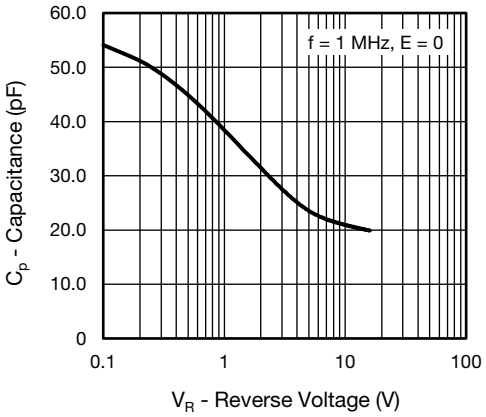


Fig. 1 - Diode Capacitance vs. Reverse Voltage

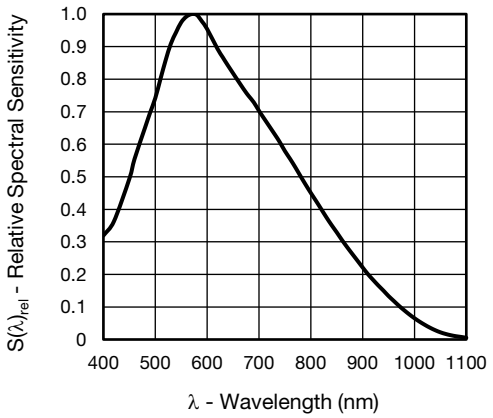


Fig. 3 - Relative Spectral Sensitivity vs. Wavelength of Epoxy Coated Die

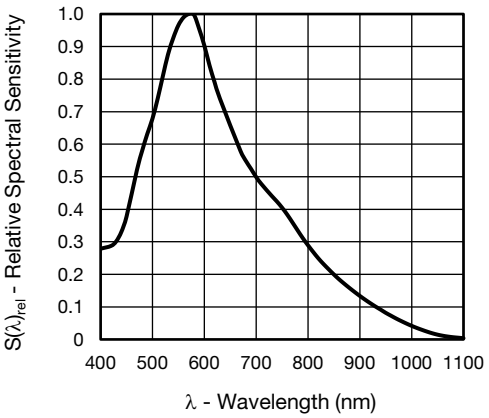
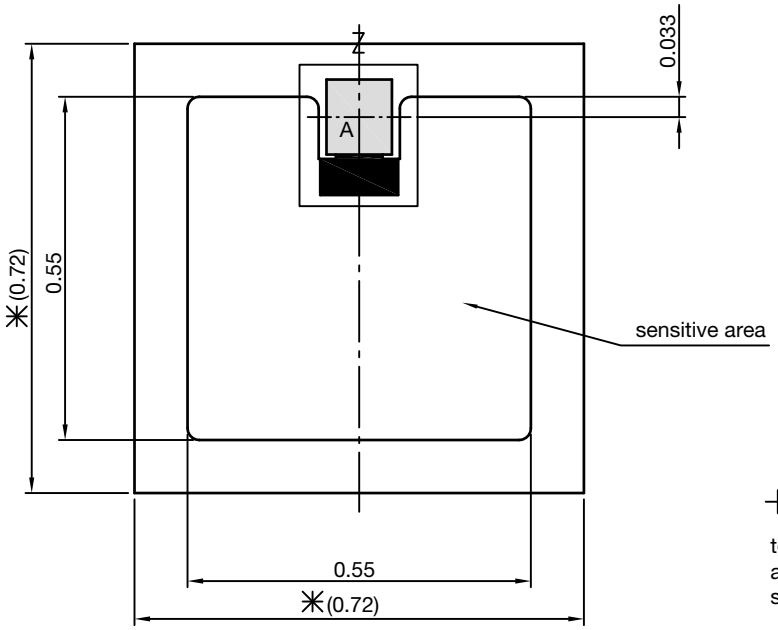
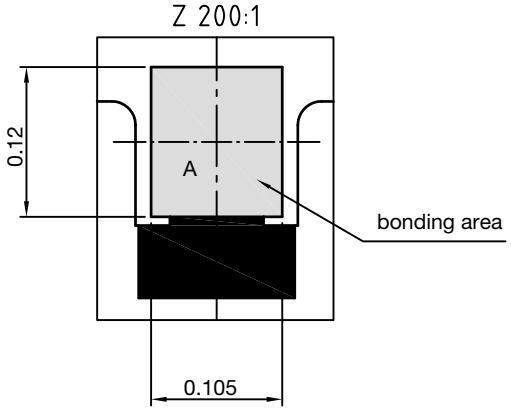


Fig. 2 - Relative Spectral Sensitivity vs. Wavelength of Bare Die

DIMENSIONS in millimeters



technical drawings
according to DIN
specifications



All dimensions ± 0.005
Drawing-No: 9.000-5105.01-4
Issue: 1 / 14.12.2010

A: Anode
Opt. sensitive area: 0.27 mm^2
Bonding area: A: 120 µm x 105 µm
Bonding restricted to this area in order to avoid damage of adjacent structures
Thickness: 280 µm ± 15 µm

✳ Only for information:
Dimension of sawn die under consideration of 30 µm saw kerf

MECHANICAL DIMENSIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Length of chip edge (x-direction)	L_x	-	0.72	-	mm
Length of chip edge (y-direction)	L_y	-	0.72	-	mm
Sensitive area	A_S		0.27		mm^2
Wafer diameter	D	-	100	-	mm
Die height	H	0.265	0.28	0.295	mm
Bond pad anode		-	0.125 x 0.11	-	mm^2

ADDITIONAL INFORMATION	
Frontside metallization, anode	AlSi
Backside metallization, cathode	NiV-Ag
Dicing	Sawing
Die bonding technology	Epoxy bonding

Note

- All chips are checked in accordance with the Vishay Semiconductor, specification of visual inspection FVOV6870.
  The visual inspection shall be made in accordance with the “specification of visual inspection as referenced”. The visual inspection of chip backside is performed with stereo microscope with incident light and 40x to 80x magnification.
  The quality inspection (final visual inspection) is performed by production. An additional visual inspection step as special release procedure by QM is not installed.

HANDLING AND STORAGE CONDITIONS

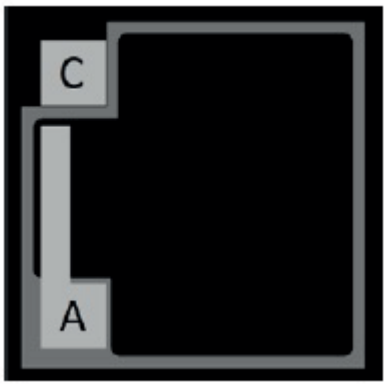
- The hermetically sealed shipment lots shall be opened in temperature and moisture controlled cleanroom environment only. It is mandatory to follow the rules for disposition of material that can be hazardous for humans and environment.
- Product must be handled only at ESD safe workstations. Standard ESD precautions and safe work environments are as defined in MIL-HDBK-263.
- Singulated die are not to be handled with tweezers. A vacuum wand with non metallic ESD protected tip should be used.

PACKING

Chips are fixed on adhesive foil. Upon request the foils can be mounted on plastic frame or disco frame. For shipment, the wafers are arranged to stacks and hermetically sealed in plastic bags to ensure protection against environmental influence (humidity and contamination).

Use for recycling reliable operators only. We can help getting in touch with your nearest sales office. By agreement we will take back packing material, if it is sorted. You will have to bear the costs of transport. We will invoice you for any costs incurred for packing material that is returned unsorted or which we are not obliged to accept.

Silicon PIN Photodiode



FEATURES

- Package type: chip
- Package form: single chip
- Dimensions (L x W x H in mm): 0.72 x 0.72 x 0.2
- Radiant sensitive area (in mm^2): 0.34
- Peak sensitivity wavelength: 570 nm
- High photo sensitivity
- Fast response times
- Angle of half sensitivity: φ = ± 60°

Pb-free

e4

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

APPLICATIONS

- Ambient light sensor

DESCRIPTION

T1678P ambient light chip is an epitaxial photodiode with ambient light spectral characteristic. Anode and cathode contact are bond pads on top of the chip.

GENERAL INFORMATION

The datasheet is based on Vishay optoelectronics sample testing under certain predetermined and assumed conditions, and is provided for illustration purpose only. Customers are encouraged to perform testing in actual proposed packaged and used conditions. Vishay optoelectronics die products are tested using Vishay optoelectronics based quality assurance procedures and are manufactured using Vishay optoelectronics established processes. Estimates such as those described and set forth in this datasheet for semiconductor die will vary depending on a number of packaging, handling, use, and other factors. Therefore sold die may not perform on an equivalent basis to standard package products.

PRODUCT SUMMARY			
COMPONENT	I_{ra} (nA)	φ (deg)	$\lambda_{0.5}$ (nm)
T1678P	15	± 60	440 to 700

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
T1678P-SD-F	Wafer sawn on foil with disco frame	MOQ: 58 000 pcs	Chip

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	16	V
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	-40 to +100	°C
Storage temperature range		T_{stg1}	-40 to +100	°C
Storage temperature range on foil		T_{stg2}	-40 to +50	°C

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Breakdown voltage	I_R = 100 µA, E = 0	$V_{(BR)}$	16			V
Reverse dark current	V_R = 10 V, E = 0	I_{ro}		0.1	2	nA
Diode capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_D		72		pF
	V_R = 3 V, f = 1 MHz, E = 0	C_D		35		pF
Reverse light current	E_e = 10 µW/cm², λ = 530 nm, V_R = 5 V	I_{ra}		15		nA
	E_V = 100 lux, white LED 4300 K, V_R = 5 V	I_{ra}		43		nA
	E_V = 100 lux, CIE illumination A, V_R = 5 V	I_{ra}		87		nA
Angle of half sensitivity		φ		± 60		deg
Wavelength of peak sensitivity		λ_p		570		nm
Range of spectral bandwidth		$\lambda_{0.5}$		440 to 700		nm
Rise time	V_R = 5 V, R_L = 50 kΩ, λ = 515 nm	t_r		100		ns
Fall time		t_f		100		ns
Rise time	V_R = 5 V, R_L = 1000 kΩ, λ = 515 nm	t_r		415		ns
Fall time		t_f		415		ns

Note

- The measurements are based on samples of die which are mounted on a TO18-header without resin coating

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

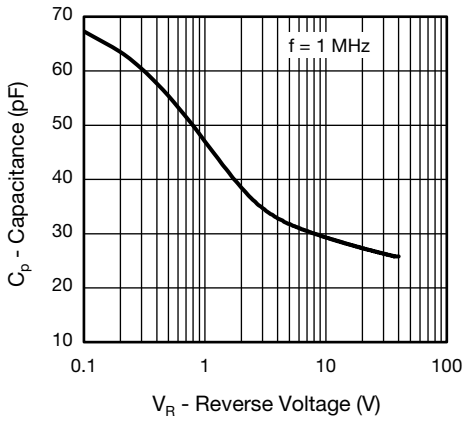


Fig. 1 - Diode Capacitance vs. Reverse Voltage

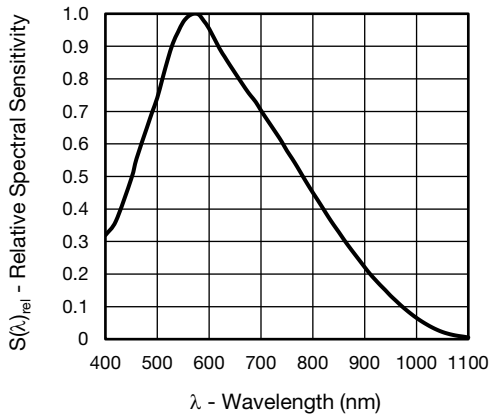


Fig. 3 - Relative Spectral Sensitivity vs. Wavelength of Epoxy Coated Die

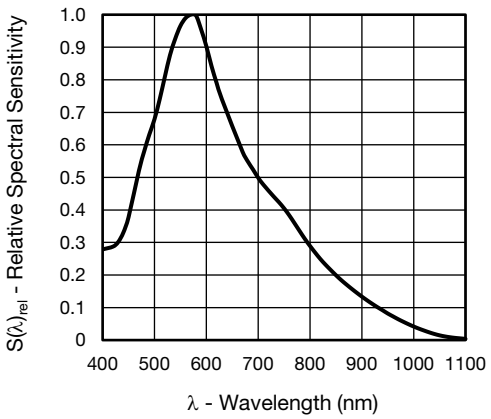
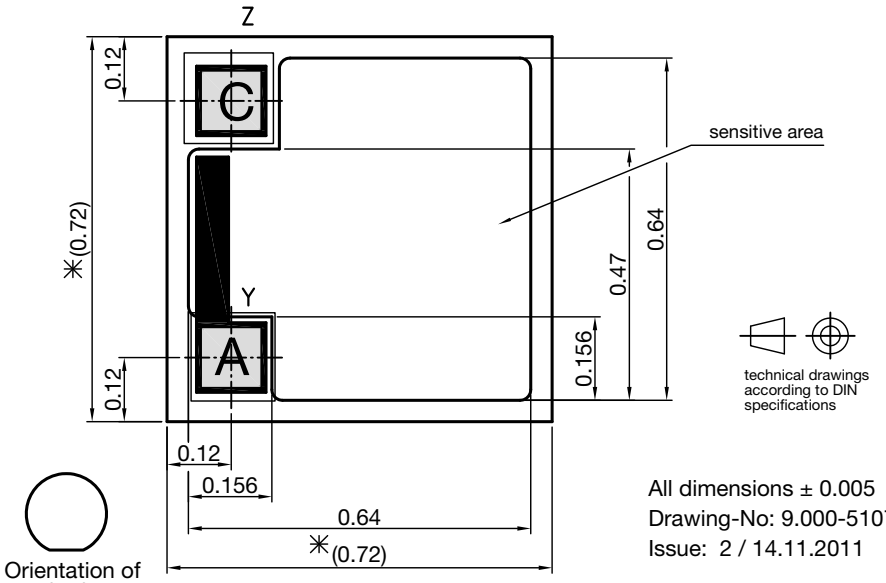


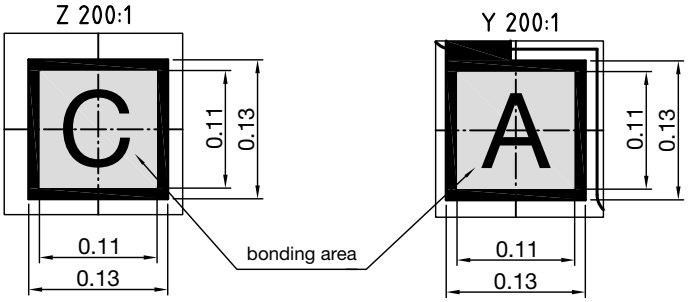
Fig. 2 - Relative Spectral Sensitivity vs. Wavelength of Bare Die

DIMENSIONS in millimeters



All dimensions ± 0.005
Drawing-No: 9.000-5107.01-4
Issue: 2 / 14.11.2011

✳ Only for information: dimension of sawn die under consideration of 30 µm saw kerf



A: Anode
C: Cathode

Opt. sensitive area: 0.34 mm²

Thickness: 200 µm ± 15 µm

Bonding area: A: 110 µm x 110 µm
C: 110 µm x 110 µm

Bonding restricted to this area in order to avoid damage of adjacent structures

MECHANICAL DIMENSIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Length of chip edge (x-direction)	L_x		0.72		mm
Length of chip edge (y-direction)	L_y		0.72		mm
Sensitive area	A_S		0.34		mm^2
Wafer diameter	D		100		mm
Die height	H	0.185	0.2	0.215	mm
Bond pad anode			0.11 x 0.11		mm^2
Bond pad cathode			0.11 x 0.11		mm^2

ADDITIONAL INFORMATION	
Frontside metallization, anode, cathode	AlSi
Backside	Electrically isolated
Dicing	Sawing
Die bonding technology	Epoxy bonding

Note

- All chips are checked in accordance with the Vishay Semiconductor, specification of visual inspection FVOV6870.
  The visual inspection shall be made in accordance with the “specification of visual inspection as referenced”. The visual inspection of chip backside is performed with stereo microscope with incident light and 40x to 80x magnification.
  The quality inspection (final visual inspection) is performed by production. An additional visual inspection step as special release procedure by QM is not installed.

HANDLING AND STORAGE CONDITIONS

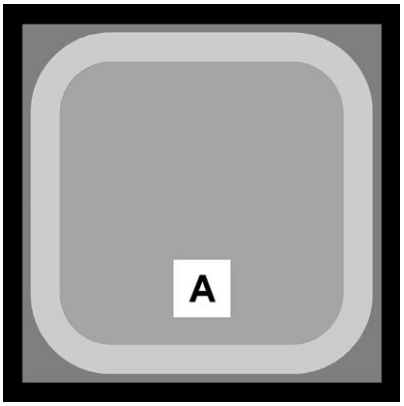
- The hermetically sealed shipment lots shall be opened in temperature and moisture controlled cleanroom environment only. It is mandatory to follow the rules for disposition of material that can be hazardous for humans and environment.
- Product must be handled only at ESD safe workstations. Standard ESD precautions and safe work environments are as defined in MIL-HDBK-263.
- Singulated die are not to be handled with tweezers. A vacuum wand with non metallic ESD protected tip should be used.

PACKING

Chips are fixed on adhesive foil. Upon request the foils can be mounted on plastic frame or disco frame. For shipment, the wafers are arranged to stacks and hermetically sealed in plastic bags to ensure protection against environmental influence (humidity and contamination).

Use for recycling reliable operators only. We can help getting in touch with your nearest sales office. By agreement we will take back packing material, if it is sorted. You will have to bear the costs of transport. We will invoice you for any costs incurred for packing material that is returned unsorted or which we are not obliged to accept.

Silicon PIN Photodiode



FEATURES

- Package type: chip
- Package form: single chip
- Dimensions (L x W x H in mm): 0.67 x 0.67 x 0.28
- Wafer diameter (in mm): 100
- Radiant sensitive area (in mm^2): 0.23
- Peak sensitivity wavelength: 900 nm
- High photo sensitivity
- High radiant sensitivity
- Suitable for visible light and near infrared radiation
- Fast response times
- Angle of half sensitivity: $\varphi = \pm 60°$

Pb-free
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RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

DESCRIPTION

T330P chip is a PIN photodiode with 0.23 mm^2 sensitive area, high speed and high photo sensitivity. It is sensitive to the visible and near infrared light spectrum with a peak sensitivity at 900 nm. Anode is the bond pad on top, cathode is the backside contact.

APPLICATIONS

- High speed photo detector

GENERAL INFORMATION

The datasheet is based on Vishay optoelectronics sample testing under certain predetermined and assumed conditions, and is provided for illustration purpose only. Customers are encouraged to perform testing in actual proposed packaged and used conditions. Vishay optoelectronics die products are tested using Vishay optoelectronics based quality assurance procedures and are manufactured using Vishay optoelectronics established processes. Estimates such as those described and set forth in this datasheet for semiconductor die will vary depending on a number of packaging, handling, use, and other factors. Therefore sold die may not perform on an equivalent basis to standard package products.

PRODUCT SUMMARY			
COMPONENT	I_{ra} (µA)	φ (deg)	$\lambda_{0.1}$ (nm)
T330P	2.3	± 60	430 to 1100

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
T330P-SD-F	Wafer sawn on foil with disco frame	MOQ: 55 000 pcs	Chip

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	60	V
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	-40 to +100	°C
Storage temperature range		T_{stg1}	-40 to +100	°C
Storage temperature range on foil		T_{stg2}	-40 to +50	°C

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Breakdown voltage	I_R = 100 µA, E = 0	$V_{(BR)}$	60			V
Reverse dark current	V_R = 10 V, E = 0	I_{ro}		0.1	3	nA
Diode capacitance	V_R = 5 V, f = 1 MHz, E = 0	C_D		1.3		pF
Reverse light current	E_e = 1 mW/cm², λ = 950 nm, V_R = 5 V	I_{ra}		2.3		µA
Angle of half sensitivity		φ		± 60		deg
Wavelength of peak sensitivity		λ_p		900		nm
Range of spectral bandwidth		$\lambda_{0.1}$		430 to 1100		nm
Rise time	V_R = 10 V, R_L = 50 Ω, λ = 820 nm	t_r		4		ns
Fall time	V_R = 10 V, R_L = 50 Ω, λ = 820 nm	t_f		4		ns

Note

- The measurements are based on samples of die which are mounted on a TO-header without resin coating

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

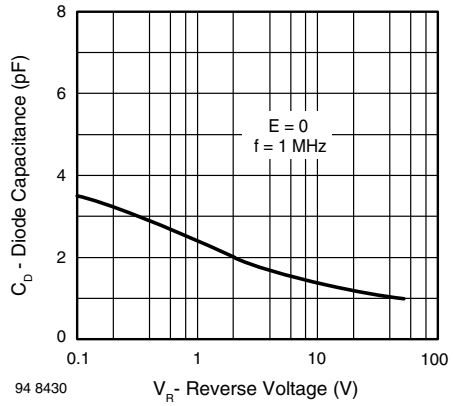

Fig. 1 - Diode Capacitance vs. Reverse Voltage

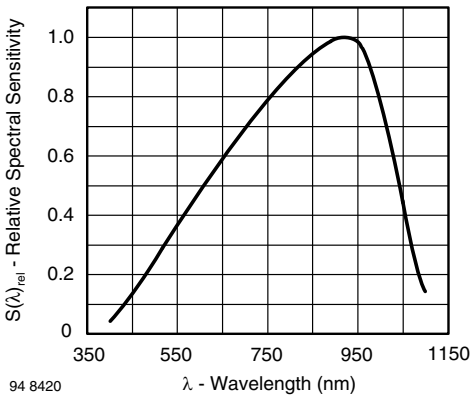

Fig. 2 - Relative Spectral Sensitivity vs. Wavelength

MECHANICAL DIMENSIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Length of chip edge (x-direction)	L_x		0.67		mm
Length of chip edge (y-direction)	L_y		0.67		mm
Sensitive area	A_S		0.23		mm²
Wafer diameter	D		100		mm
Die height	H	0.265	0.28	0.295	mm
Bond pad anode	x * y		0.1 x 0.1		mm²

ADDITIONAL INFORMATION	
Frontside metallization, anode	AlSi
Backside metallization, cathode	NiV-Ag
Dicing	Sawing
Die bonding technology	Epoxy bonding

Note

- All chips are checked in accordance with the Vishay Semiconductor, specification of visual inspection FVOV6870.
  The visual inspection shall be made in accordance with the “specification of visual inspection as referenced”. The visual inspection of chip backside is performed with stereo microscope with incident light and 40x to 80x magnification.
  The quality inspection (final visual inspection) is performed by production. An additional visual inspection step as special release procedure by QM is not installed.

HANDLING AND STORAGE CONDITIONS

- The hermetically sealed shipment lots shall be opened in temperature and moisture controlled cleanroom environment only. It is mandatory to follow the rules for disposition of material that can be hazardous for humans and environment.
- Product must be handled only at ESD safe workstations. Standard ESD precautions and safe work environments are as defined in MIL-HDBK-263.
- Singulated die are not to be handled with tweezers. A vacuum wand with non metallic ESD protected tip should be used.

PACKING

Chips are fixed on adhesive foil. Upon request the foils can be mounted on plastic frame or disco frame. For shipment, the wafers are arranged to stacks and hermetically sealed in plastic bags to ensure protection against environmental influence (humidity and contamination).

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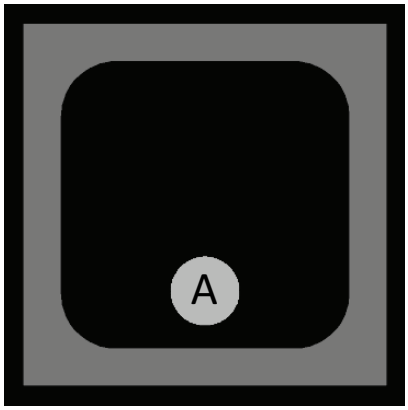
Silicon PIN Photodiode



FEATURES

- Package type: chip
- Package form: single chip
- Dimensions (L x W x H in mm): 0.67 x 0.67 x 0.28
- Wafer diameter (in mm): 150
- Sensitive area (in mm^2): 0.23
- Peak sensitivity wavelength: 900 nm
- High photo sensitivity
- High sensitivity
- Suitable for visible light and near infrared radiation
- Fast response times
- Angle of half sensitivity: φ = ± 60°

Pb-free

e4

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

DESCRIPTION

T330P6 chip is a PIN photodiode with 0.23 mm^2 sensitive area, high speed and high photo sensitivity. It is sensitive to the visible and near infrared light spectrum with a peak sensitivity at 900 nm. Anode is the bond pad on top, cathode is the backside contact.

APPLICATIONS

- High speed photo detector

GENERAL INFORMATION

The datasheet is based on Vishay optoelectronics sample testing under certain predetermined and assumed conditions, and is provided for illustration purpose only. Customers are encouraged to perform testing in actual proposed packaged and used conditions. Vishay optoelectronics die products are tested using Vishay optoelectronics based quality assurance procedures and are manufactured using Vishay optoelectronics established processes. Estimates such as those described and set forth in this datasheet for semiconductor die will vary depending on a number of packaging, handling, use, and other factors. Therefore sold die may not perform on an equivalent basis to standard package products.

PRODUCT SUMMARY			
COMPONENT	I_{ra} (µA)	φ (°)	$\lambda_{0.5}$ (nm)
T330P6	1.95	± 60	580 to 1040

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
T330P6-SD-F	Wafer sawn on foil with disco frame	MOQ: 150 000 pcs	Chip

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	60	V
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	-40 to +100	°C
Storage temperature range		T_{stg1}	-40 to +100	°C
Storage temperature range on foil		T_{stg2}	-40 to +50	°C

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Breakdown voltage	I_R = 100 µA, E = 0	$V_{(BR)}$	60	-	-	V
Reverse dark current	V_R = 10 V, E = 0	I_{ro}	-	< 1	3	nA
Diode capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_D	-	3.5	-	pF
	V_R = 3 V, f = 1 MHz, E = 0	C_D	-	1.7	-	pF
Reverse light current	E_e = 1 mW/cm², λ = 890 nm, V_R = 5 V	I_{ra}	-	1.98	-	µA
	E_e = 1 mW/cm², λ = 950 nm, V_R = 5 V	I_{ra}	-	1.95	-	µA
Angle of half sensitivity		φ	-	± 60	-	°
Wavelength of peak sensitivity		λ_p	-	900	-	nm
Range of spectral bandwidth		$\lambda_{0.5}$	-	580 to 1040	-	nm
Rise time	V_R = 5 V, R_L = 1 kΩ, λ = 830 nm	t_r	-	210	-	ns
	V_R = 5 V, R_L = 50 Ω, λ = 950 nm	t_r	-	2750	-	ns
Fall time	V_R = 5 V, R_L = 1 kΩ, λ = 830 nm	t_f	-	230	-	ns
	V_R = 5 V, R_L = 50 Ω, λ = 950 nm	t_f	-	2300	-	ns

Note

- The measurements are based on samples of die which are mounted on a TO-header without resin coating

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

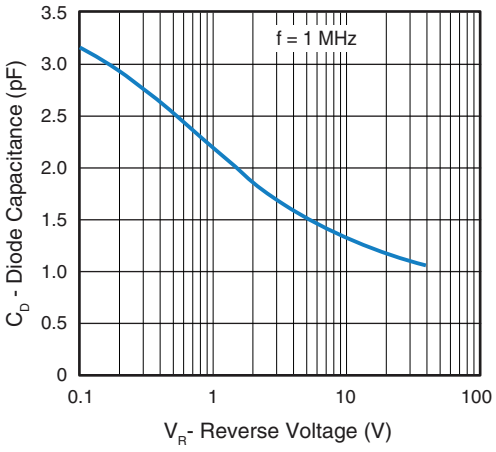


Fig. 1 - Diode Capacitance vs. Reverse Voltage

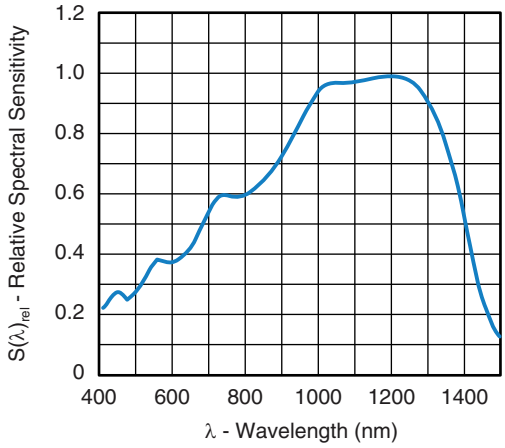


Fig. 2 - Relative Spectral Sensitivity vs. Wavelength

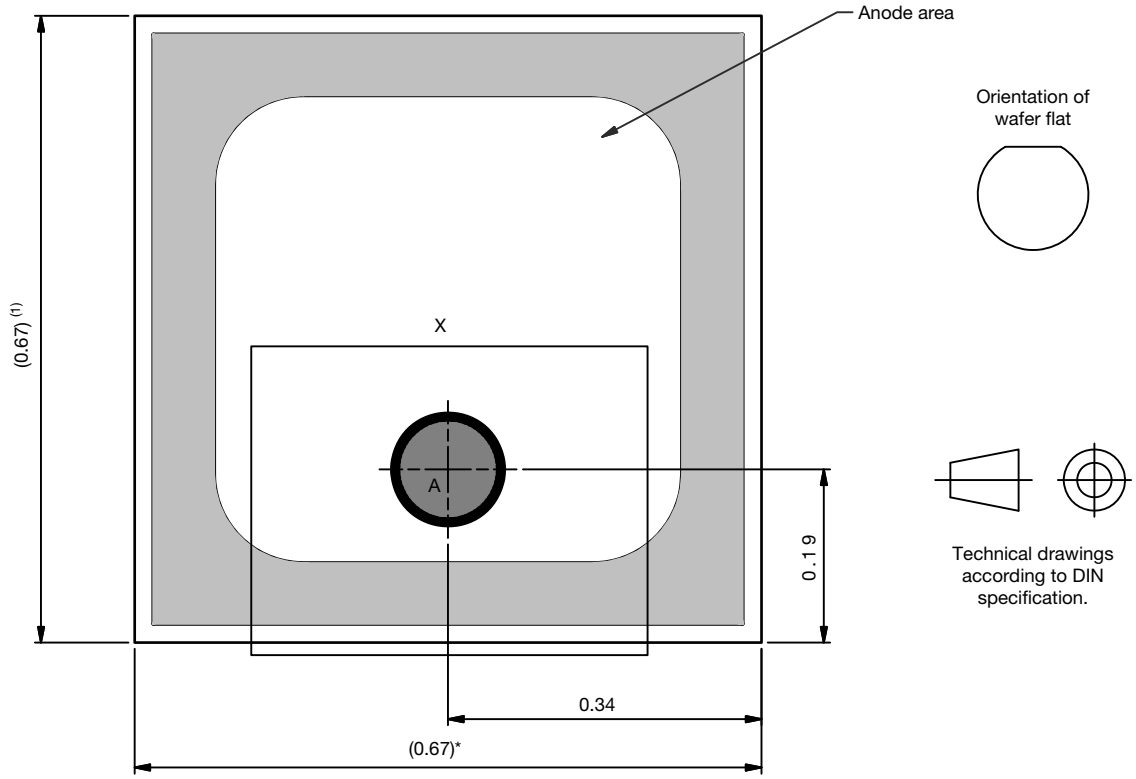
MECHANICAL DIMENSIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Length of chip edge (x-direction)	L_x		0.67		mm
Length of chip edge (y-direction)	L_y		0.67		mm
Sensitive area	A_S		0.23		mm^2
Wafer diameter	D		150		mm
Die height	H	0.265	0.28	0.295	mm
Bond pad anode	x * y		0.1 x 0.1		mm^2

ADDITIONAL INFORMATION	
Frontside metallization, anode	Al
Backside metallization, cathode	NiV-Ag
Dicing	Sawing
Die bonding technology	Epoxy bonding

Note

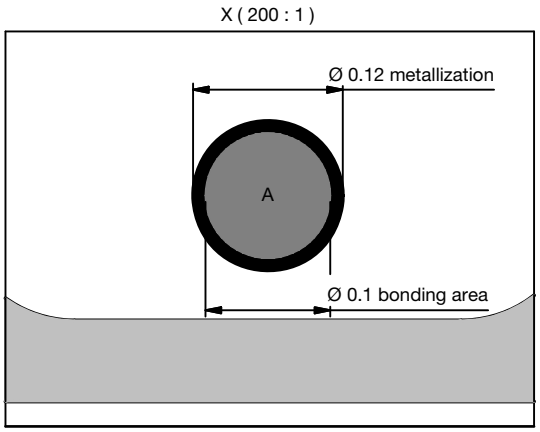
- All chips are checked in accordance with the Vishay Semiconductor, specification of visual inspection FVOV6870.
  The visual inspection shall be made in accordance with the “specification of visual inspection as referenced”. The visual inspection of chip backside is performed with stereo microscope with incident light and 40x to 80x magnification.
  The quality inspection (final visual inspection) is performed by production. An additional visual inspection step as special release procedure by QM is not installed

PACKAGE DIMENSIONS in millimeters



Note

(1) Dimension of sawn die under consideration of 30 µm saw kerf



Anode area: 0.23 mm^2

Bonding area: Ø 100 µm

Bonding restricted to this area
in order to avoid damage
of adjacent structures

Thickness: 280 µm ± 15 µm

Drawing-No.: 9.000-5163.01-4
Issue: 1; 28.11.17

HANDLING AND STORAGE CONDITIONS

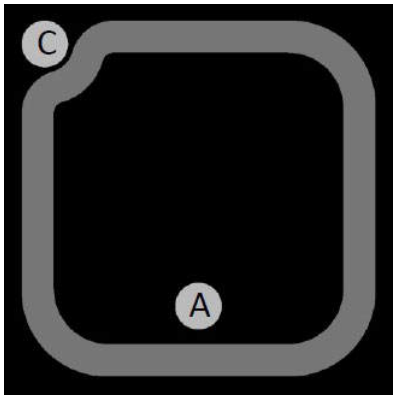
- The hermetically sealed shipment lots shall be opened in temperature and moisture controlled cleanroom environment only. It is mandatory to follow the rules for disposition of material that can be hazardous for humans and environment
- Product must be handled only at ESD safe workstations. Standard ESD precautions and safe work environments are as defined in MIL-HDBK-263
- Singulated die are not to be handled with tweezers. A vacuum wand with non metallic ESD protected tip should be used

PACKING

Chips are fixed on adhesive foil. Upon request the foils can be mounted on plastic frame or disco frame. For shipment, the wafers are arranged to stacks and hermetically sealed in plastic bags to ensure protection against environmental influence (humidity and contamination).

Use for recycling reliable operators only. We can help getting in touch with your nearest sales office. By agreement we will take back packing material, if it is sorted. You will have to bear the costs of transport. We will invoice you for any costs incurred for packing material that is returned unsorted or which we are not obliged to accept.

Silicon PIN Photodiode



FEATURES

- Package type: chip
- Package form: single chip
- Dimensions (L x W x H in mm): 0.67 x 0.67 x 0.28
- Radiant sensitive area (in mm^2): 0.23
- Peak sensitivity wavelength: 970 nm
- High photo sensitivity
- Suitable for visible light and near infrared radiation
- Fast response times
- Angle of half sensitivity: φ = ± 60°

Pb-free

e4

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

DESCRIPTION

T337P6 is pin photodiode chip with 0.23 mm^2 sensitive area detecting visible and near infrared radiation. Anode and cathode are the bond pads on top.

APPLICATIONS

- High speed photo detector

GENERAL INFORMATION

The datasheet is based on Vishay optoelectronics sample testing under certain predetermined and assumed conditions, and is provided for illustration purpose only. Customers are encouraged to perform testing in actual proposed packaged and used conditions. Vishay optoelectronics die products are tested using Vishay optoelectronics based quality assurance procedures and are manufactured using Vishay optoelectronics established processes. Estimates such as those described and set forth in this datasheet for semiconductor die will vary depending on a number of packaging, handling, use, and other factors. Therefore sold die may not perform on an equivalent basis to standard package products.

PRODUCT SUMMARY			
COMPONENT	I_{ra} (μA)	φ (deg)	$\lambda_{0.5}$ (nm)
T337P6	2.3	± 60	610 to 1080

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
T337P6-SD-F	Wafer sawn on foil with disco frame	MOQ: 150 000 pcs	Chip

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	60	V
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	-40 to +100	°C
Storage temperature range		T_{stg1}	-40 to +100	°C
Storage temperature range on foil		T_{stg2}	-40 to +50	°C

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Breakdown voltage	I_R = 100 µA, E = 0	$V_{(BR)}$	60			V
Reverse dark current	V_R = 10 V, E = 0	I_{ro}		< 1	3	nA
Diode capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_D		3.3		pF
	V_R = 3 V, f = 1 MHz, E = 0	C_D		1.5		pF
Reverse light current	E_e = 1 mW/cm², λ = 950 nm, V_R = 5 V	I_{ra}		2.3		µA
	E_e = 1 mW/cm², λ = 890 nm, V_R = 5 V	I_{ra}		2.15		µA
Angle of half sensitivity		φ		± 60		deg
Wavelength of peak sensitivity		λ_p		970		nm
Range of spectral bandwidth		$\lambda_{0.5}$		610 to 1080		nm
Rise time	V_R = 10 V, R_L = 1 kΩ, λ = 950 nm	t_r		3500		ns
Fall time	V_R = 10 V, R_L = 1 kΩ, λ = 950 nm	t_f		820		ns
Rise time	V_R = 10 V, R_L = 1 kΩ, λ = 830 nm	t_r		550		ns
Fall time	V_R = 10 V, R_L = 1 kΩ, λ = 830 nm	t_f		100		ns

Notes

- The measurements are based on samples which are mounted on TO18-header without epoxy coating

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

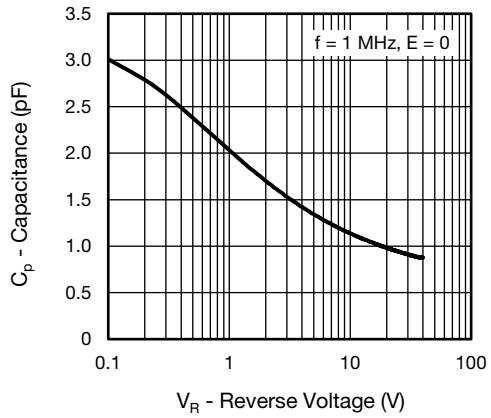


Fig. 1 - Diode Capacitance vs. Reverse Voltage

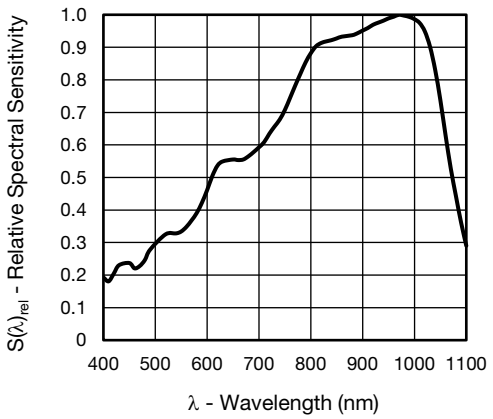
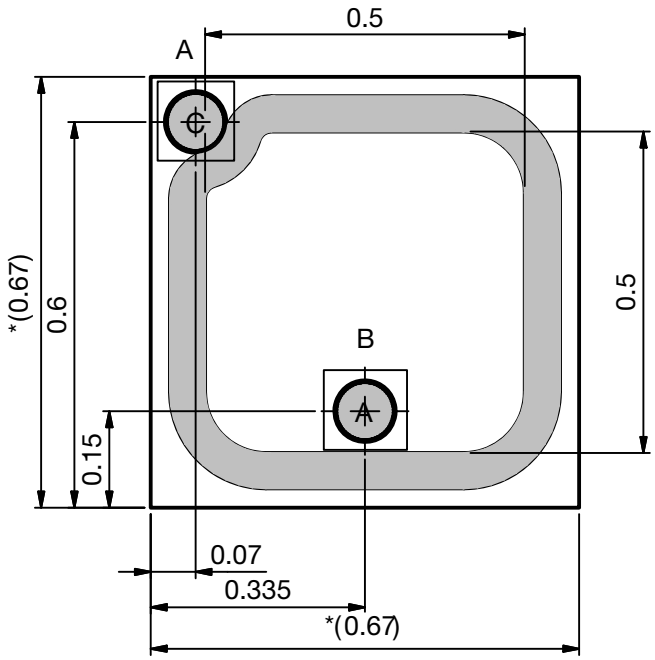
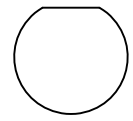


Fig. 2 - Relative Spectral Sensitivity vs. Wavelength without Epoxy Coating

DIMENSIONS in millimeters



Orientation of wafer flat



Technical drawings according to DIN specification.

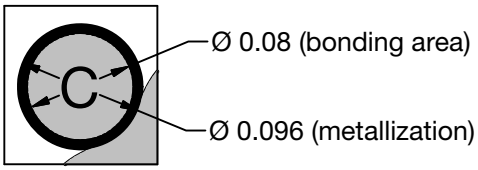
Opt. active area: 0.23 mm²

A: Anode
C: Cathode
Bonding area: A: Ø 80 µm
C: Ø 80 µm
Bonding restricted to this area in order to avoid damage of adjacent structures

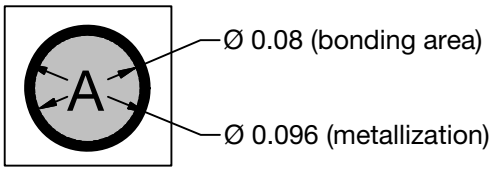
Thickness: 280 µm ± 15 µm

*only for information:
dimension of sawn die under consideration of 30 µm saw kerf

A (200 : 1)



B (200 : 1)



Drawing-No.: 9.000-5123.01-4
Issue: 1; 08.08.2013

MECHANICAL DIMENSIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Length of chip edge (x-direction)	L_x		0.67		mm
Length of chip edge (y-direction)	L_y		0.67		mm
Sensitive area	A_S		0.23		mm^2
Wafer diameter	D		150		mm
Die height	H	0.265	0.28	0.295	mm
Bond pad anode	Ø		0.08		mm
Bond pad cathode	Ø		0.08		mm

ADDITIONAL INFORMATION	
Frontside metallization, anode, cathode	AlSi
Backside	Electrically isolated
Dicing	Sawing
Die bonding technology	Epoxy bonding

Note

- All chips are checked in accordance with the Vishay Semiconductor, specification of visual inspection FVOV6870.
  The visual inspection shall be made in accordance with the “specification of visual inspection as referenced”. The visual inspection of chip backside is performed with stereo microscope with incident light and 40x to 80x magnification.
  The quality inspection (final visual inspection) is performed by production. An additional visual inspection step as special release procedure by QM is not installed.

HANDLING AND STORAGE CONDITIONS

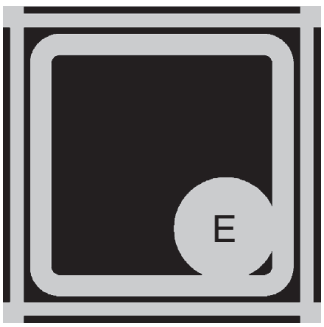
- The hermetically sealed shipment lots shall be opened in temperature and moisture controlled cleanroom environment only. It is mandatory to follow the rules for disposition of material that can be hazardous for humans and environment.
- Product must be handled only at ESD safe workstations. Standard ESD precautions and safe work environments are as defined in MIL-HDBK-263.
- Singulated die are not to be handled with tweezers. A vacuum wand with non metallic ESD protected tip should be used.

PACKING

Chips are fixed on adhesive foil. Upon request the foils can be mounted on plastic frame or disco frame. For shipment, the wafers are arranged to stacks and hermetically sealed in plastic bags to ensure protection against environmental influence (humidity and contamination).

Use for recycling reliable operators only. We can help getting in touch with your nearest sales office. By agreement we will take back packing material, if it is sorted. You will have to bear the costs of transport. We will invoice you for any costs incurred for packing material that is returned unsorted or which we are not obliged to accept.

Silicon NPN Phototransistor



FEATURES

- Package type: chip
- Package form: chip
- Dimensions (L x W x H in mm): 0.39 x 0.39 x 0.185
- High photo sensitivity
- High collector current
- Small size

Pb-free
e4
RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

DESCRIPTION

T5096P is an epitaxial phototransistor especially designed for optocoupler applications. Despite its small size it has a high sensitivity and ability to drive high currents even under saturation.

GENERAL INFORMATION

The datasheet is based on Vishay optoelectronics sample testing under certain predetermined and assumed conditions, and is provided for illustration purpose only. Customers are encouraged to perform testing in actual proposed packaged and used conditions. Vishay optoelectronics die products are tested using Vishay optoelectronics based quality assurance procedures and are manufactured using Vishay optoelectronics established processes. Estimates such as those described and set forth in this datasheet for semiconductor die will vary depending on a number of packaging, handling, use, and other factors. Therefore sold die may not perform on an equivalent basis to standard package products.

PRODUCT SUMMARY			
COMPONENT	I_{ca} (µA)	φ (deg)	$\lambda_{0.1}$ (nm)
T5096P	200 to 310	± 60	480 to 1080

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
T5096P-SD-F	Wafer sawn on foil with disco frame	MOQ: 200 000 pcs	Chip

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Collector emitter voltage		V_{CEO}	85	V
Emitter collector voltage		V_{ECO}	7.8	V
Collector current		I_C	50	mA
Junction temperature		T_j	125	°C
Operating temperature range		T_{amb}	-55 to +125	°C
Storage temperature range		T_{stg1}	-55 to +150	°C

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Collector emitter breakdown voltage	E = 0 mW/cm²; I_C = 10 µA	$V_{(BR)CEO}$	85			V
Collector emitter dark current	V_{CE} = 50 V, E = 0 lx	I_{CEO}		< 1	50	nA
Wavelength of peak sensitivity		λ_p		910		nm
Range of spectral bandwidth		$\lambda_{0.1}$		480 to 1080		nm

Note

- The measurements are based on samples of die which are mounted on a TO-header without resin coating

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

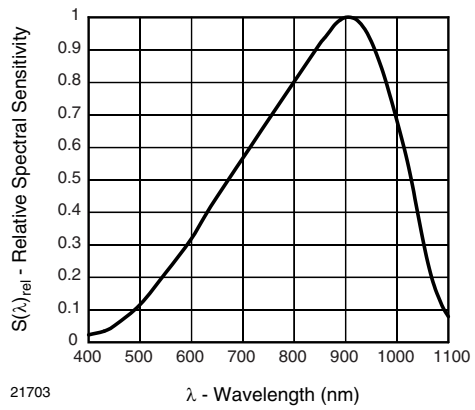


Fig. 1 - Relative Spectral Sensitivity vs. Wavelength

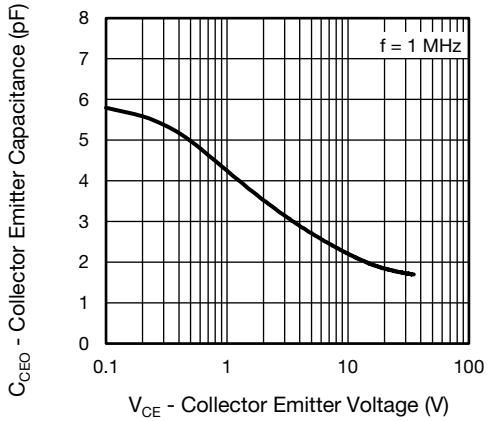


Fig. 2 - Collector Emitter Capacitance vs. Collector Emitter Voltage

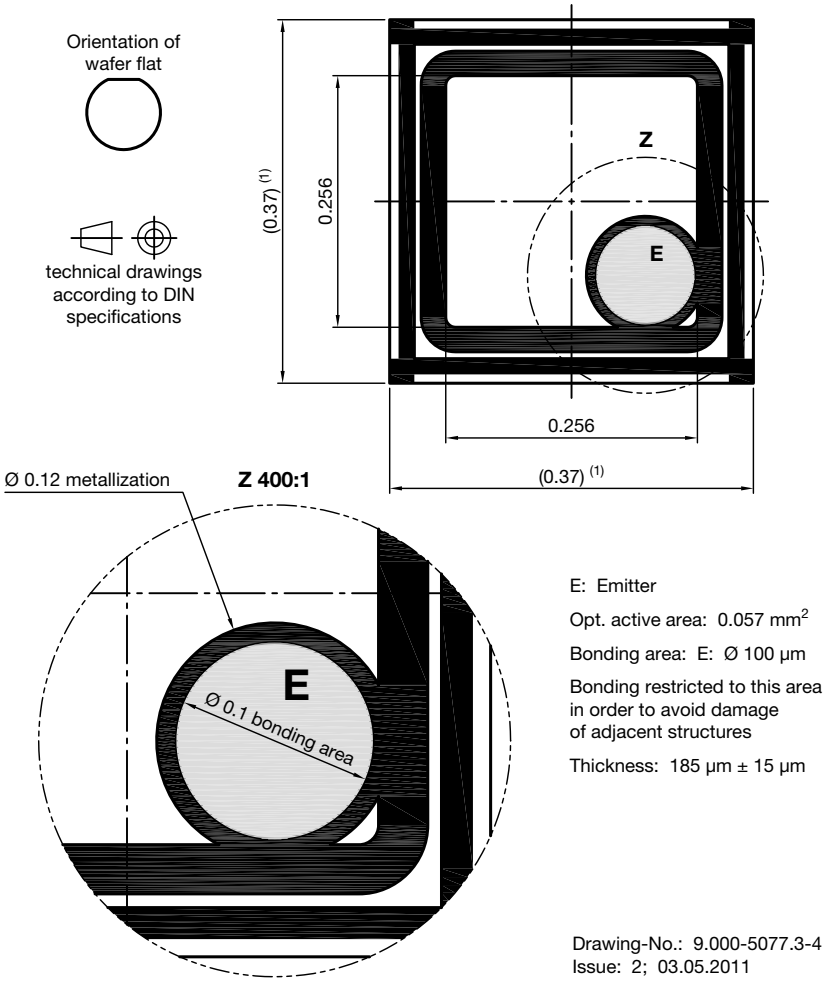
MECHANICAL DIMENSIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Length of chip edge (x-direction)	L_x		0.39		mm
Length of chip edge (y-direction)	L_y		0.39		mm
Die height	H	0.170	0.185	0.200	mm
Bond pad emitter	d		Ø 0.10 (bonding area)		mm

ADDITIONAL INFORMATION	
Frontside metallization, emitter	AlSi 1.2 µm
Backside metallization, collector	AuSb 0.4 µm
Dicing	Sawing
Die bonding technology	Epoxy bonding

Note

- All products are checked in accordance with the Vishay Semiconductor, specification of visual inspection FVOV6870.
  The visual inspection shall be made in accordance with the “specification of visual inspection as referenced”. The visual inspection of wafer backside is performed with stereo microscope with incident light and 40x to 80x magnification.
  The quality inspection (final visual inspection) is performed by production. An additional visual inspection step as special release procedure by QM is not installed.

CHIP DIMENSIONS in millimeters



E: Emitter

Opt. active area: 0.057 mm^2

Bonding area: E: Ø 100 µm

Bonding restricted to this area in order to avoid damage of adjacent structures

Thickness: 185 µm ± 15 µm

Drawing-No.: 9.000-5077.3-4
Issue: 2; 03.05.2011

Note

- Not indicated tolerances: ± 0.005

(1) Only for information: dimension of sawn die under consideration of 30 µm saw kerf

HANDLING AND STORAGE CONDITIONS

- The hermetically sealed shipment lots shall be opened in temperature and moisture controlled cleanroom environment only. It is mandatory to follow the rules for disposition of material that can be hazardous for humans and environment.
- Product must be handled only at ESD safe workstations. Standard ESD precautions and safe work environments are as defined in MIL-HDBK-263.
- Singulated die are not to be handled with tweezers. A vacuum wand with non metallic ESD protected tip should be used.

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