OPIA401 through OPIA409, OPIA414
SMD, SOP and SSOP Packages

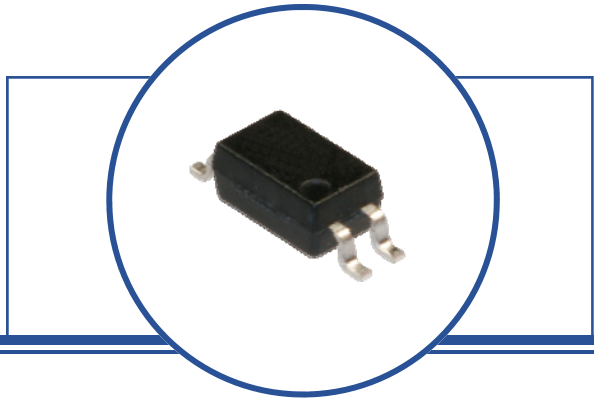
TT electronics
OPTEK Technology

Features:

- 2,500 or 3,750 Vrms electrical isolation
- Choice of a Single and Dual LED
- Phototransistor or Photo Darlington Sensor
- Low-cost plastic Dual-In-Line (DIP) package

Agency Approvals:

- UL Certification No: E58730
- VDE No: 40026577(OPIA401-404), 40026553(OPIA405-409)



Description:

The OPIA series optocouplers are designed for applications that use an analog output (Phototransistor or Photodarlington) in a surface mount package. A wide selection of configurations are available. With typical isolation voltage of 2,500 or 3,750 Volts(RMS), these products meet typical power system isolation requirements.

Theory of operation: The LED transmitter is used to illuminate the Photo sensor providing electrical isolation between two power systems while maintaining the ability to transmit information from one power system to the other. In many applications, analog signal levels may be required to be transmitted between two power systems while maintaining isolation between the power systems up to 3,750 Volts(RMS). A variety of LED and photo sensor configurations are available depending on the system requirements.

The Current Transfer Ratio (CTR) is determined using the output current and input current for analog photo sensors. CTR ratios can range from as low as 5 to over 9,000 depending on the device.

$$CTR = \frac{Photosensor - Current}{LED - Current} = \frac{20mA}{10mA} * 100 = 200$$

All SMD products are shipped in a shipping tube with “TR” identified on the end of the part number.
Example: OPI401ATRE is a 4-Pin SMD shipped in tape and reel (TR)

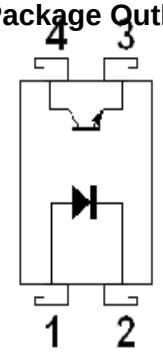
Applications:

- High voltage isolation: 2,500 or 3,750 Volts(RMS)
- PCBoard power system isolation
- Industrial equipment power isolation
- Medical equipment power isolation
- Office equipment

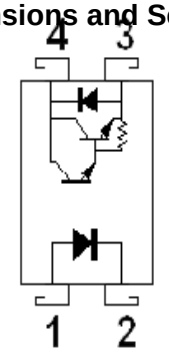
Pb
RoHS

OPTEK reserves the right to make changes at any time in order to improve design and to supply the best product possible.

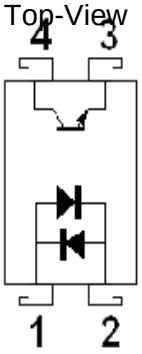
Package Outline Dimensions and Schematics: Top-View



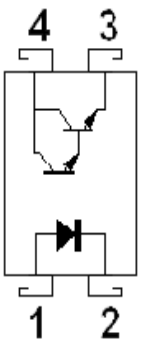
OPIA404
OPIA405



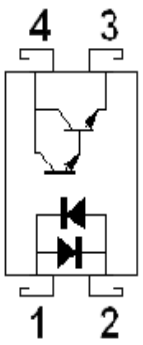
OPIA401
OPIA409



OPIA402
OPIA407



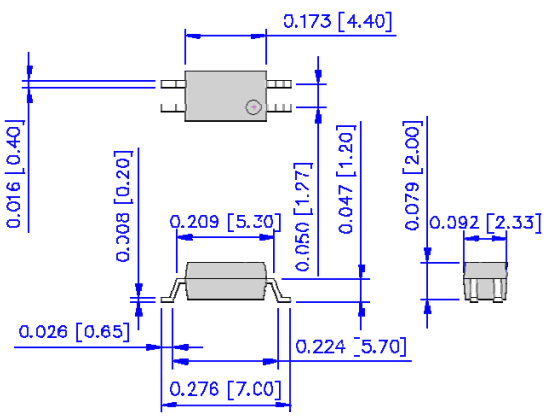
OPIA403
OPIA406



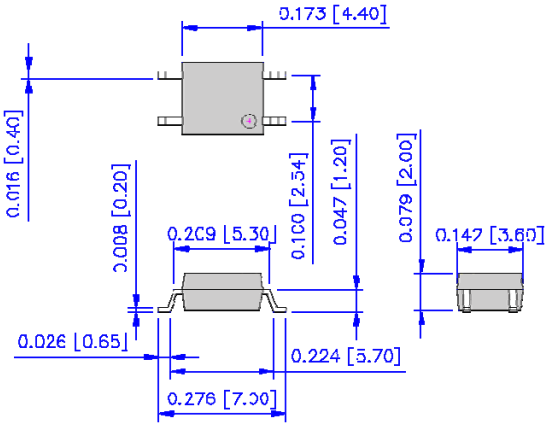
OPIA408

OPIA414

Package Style C
(SSOP)

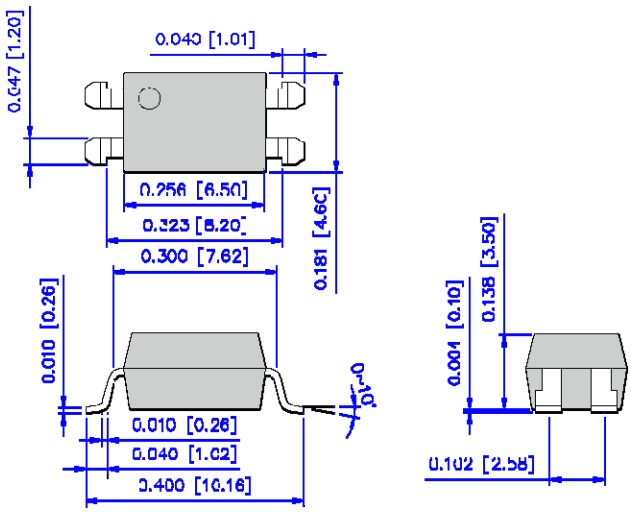


Package Style B
(SOP)



Part Number	Pin #			
	1	2	3	4
OPIA401B	A	K	E	C
OPIA402B	A-K	K-A	E	C
OPIA403B	A	K	E	C
OPIA404B	A	K	E	C
OPIA405C	A		E	C
OPIA406C	A	K	E	C
OPIA407C	A-K	K-A	E	C
OPIA408C	A	K	E	C
OPIA409C	A	K	E	C
OPIA414B	A	K	E	C

Package Style A
(SMD)



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Analog Output Devices Ordering Information

Part Number	Isolation Voltage Max. (Vrms)	CTR Min/Typ/Max	Typ. Tr / Tf (µs) R_L = 100 ohms	Package	Configuration
OPIA401B	3,750	1,000 / - / -	100 / 20	4-Pin SOP	A K—C E (Dar)
OPIA402B	3,750	20 / - 400	4 / 3	4-Pin SOP	A K, K A—C E
OPIA403B	3,750	600 / 1,600 / 7,500	60 / 53	4-Pin SOP	A K—C E (Dar)
OPIA404B	3,750	50 / - / 600	5 / 4	4-Pin SOP	A K—C E
OPIA405CxxA	2,500	80 / - / 160	3 / 5	4-Pin SSOP	A K—C E
OPIA405CxxB	2,500	130 / - / 260	3 / 5	4-Pin SSOP	A K—C E
OPIA405CxxC	2,500	200 / - / 400	3 / 5	4-Pin SSOP	A K—C E
OPIA405CxxD	2,500	300 / - / 600	3 / 5	4-Pin SSOP	A K—C E
OPIA405CxxE	2,500	50 / - / 600	3 / 5	4-Pin SSOP	AK—CE
OPIA406C	2,500	200 / 2,000 / -	200 / 200	4-Pin SSOP	A K—C E (Dar)
OPIA407CxxE	2,500	80 / - / 600	3 / 5	4-Pin SSOP	A K, K A—C E
OPIA408C	2,500	200 / 2,000 / -	200 / 200	4-Pin SSOP	A K—C E (Dar)
OPIA409C	2,500	400 / 2,000 -	40 / 10	4-Pin SSOP	A K—C E (Dar)
OPIA414B	3,750	100 / - / 600	4 / 3	4-Pin SOP	A K—C E

Configuration: Definition of Terms
LED Identification—Sensor Identification

Configuration Information	LED	A = Anode	K = Cathode		
	Sensor	B = Base	C = Collector	E = Emitter	(Dar) = Photodarlington

Packaging	Part Number Suffix: **TU** = Shipped in Tubes TR = Tape & Reel	Example: OPIA405CTUE

Absolute Maximum Ratings (T_A = 25° C unless otherwise noted)

Storage Temperature	
OPIA404, OPIA414	-55° C to +125° C
OPIA401, OPIA402, OPIA403	-40°C to +125° C
OPIA405, OPIA406, OPIA407, OPIA408, OPIA409	-55°C to +150° C
Operating Temperature	
All except the part numbers noted below	-30° C to +100° C
OPIA404	-55° C to +115° C
OPIA414	-30° C to +115° C
Isolation voltage (1 minute)	
OPIA400	5,000 Vrms
OPIA401, OPIA402, OPIA403, OPIA404, OPIA414	3,750 Vrms
OPIA405, OPIA406, OPIA407, OPIA408, OPIA409	2,500 Vrms
Total Package Power Dissipation	
OPIA401, OPIA402, OPIA403, OPIA404, OPIA414	170 mW
OPIA405	160 mW
OPIA406, OPIA407, OPIA408, OPIA409	-
Lead Soldering Temperature (1/16" (1.6 mm) from case for 5 seconds with soldering iron)	260° C

Input Diode

Continuous Forward Current	
All except the part number noted below	50 mA
OPIA414	10 mA
Peak Forward current (1 µs pulse width, 300 pps)	
All except the part number noted below	1 A
OPIA414	200 mA
Reverse Voltage	
OPIA401, OPIA403, OPIA404, OPIA405, OPIA406, OPIA409, OPIA414	6 V
OPIA402, OPIA407, OPIA408, OPIA409, OPIA410, OPIA412	-
Power Dissipation	
OPIA401, OPIA402, OPIA403, OPIA404	70 mW
OPIA405, OPIA406, OPIA407, OPIA408, OPIA409	60 mW
OPIA414	15 mW

Output Phototransistor

Collector-Emitter Voltage	
OPIA402, OPIA404	60 V
OPIA401, OPIA409	300 V
OPIA403	35 V
OPIA406, OPIA408	40 V
OPIA405, OPIA407, OPIA414	80 V
Emitter-Collector Voltage	
OPIA405, OPIA406, OPIA407, OPIA408	6 V
OPIA401	0.1 V
OPIA402, OPIA403, OPIA404	5 V
OPIA409	0.3 V
OPIA414	7 V
Collector Current	
OPIA402, OPIA404, OPIA405, OPIA407, OPIA414	50 mA
OPIA401, OPIA403	150 mA
OPIA406, OPIA408	90 mA
OPIA409	60 mA
Power Dissipation	
All except the part numbers noted below	150 mW
OPIA405, OPIA406, OPIA407, OPIA408, OPI409	120 mW

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Electrical Characteristics

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Input Diode						
V_F	Forward Voltage All except those noted below OPIA404 OPIA405, OPIA406, OPIA407, OPIA408 OPIA401, OPIA409, OPIA414	 - - - -	 1.2 1.6 1.1 1.2	 1.4 1.75 1.4 1.4	V	 I_F = 20 mA I_F = 10 mA I_F = 5 mA I_F = 10 mA I
V_{FM}	Peek Forward Voltage OPIA403 OPIA405 OPI401, OPIA404, OPIA414, OPIA406, OPIA407, OPIA408, OPIA409	 - - -	 - - -	 3.5 3.0 -	V	 I_{FM} = 500 mA
I_R	Reverse Current All except those noted below OPIA404, OPIA407, OPIA408, OPIA414 OPIA405, OPIA406, OPIA409	 - - -	 - - -	 10 - 5	µA	 V_R = 4 V - V_R = 5 V
C_t	Terminal Capacitance All except those noted below OPIA402, OPIA404, OPIA414 OPIA408, OPIA409	 - - -	 30 30 60	 - 250 -	pf	 V = 0.0 V, f = 1K Hz V = 0.0 V, f = 1K Hz V = 0.0 V, f = 1M Hz
Output Phototransistor						
I_{CEO}	Collector dark Current OPIA400, OPIA402, OPIA404 OPIA405, OPIA407 OPIA414	 - - -	 - - -	 100 100 100	nA	 I_F = 0 mA, V_{CE} = 20 V I_F = 0 mA, V_{CE} = 80 V I_F = 0 mA, V_{CE} = 50 V
$V_{CE(SAT)}$	Collector-emitter Saturation Voltage OPIA405, OPIA407 OPIA402, OPIA404, OPIA410 OPIA414	 - - -	 0.1 0.1 0.1	 0.3 0.3 0.2	V	 I_F = 10 mA, I_C = 2 mA I_F = 20 mA, I_C = 1 mA I_F = 10 mA, I_C = 1 mA
f_C	Cutt-Off frequency All except those noted below	 -	 -	 -	K Hz	 V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω
t_R	Rise Time OPIA402, OPIA414 OPIA405, OPIA407 OPIA404	 - - -	 4 3 5	 18 18 20	µs	 V_{CC} = 2 V, I_C = 2 mA, R_L = 100 Ω V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω V_{CC} = 2 V, I_C = 2 mA, R_L = 100 Ω
t_F	Fall Time OPIA402, OPIA414 OPIA405, OPIA407 OPIA404	 - - -	 3 5 4	 18 18 20	µs	 V_{CC} = 2 V, I_C = 2 mA, R_L = 100 Ω V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω V_{CC} = 2 V, I_C = 2 mA, R_L = 100 Ω

Continued on Next Page

Electrical Characteristics (OPIA400 Series) **- Continued from Previous Page**

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Output PhotoDarlington						
I_{CEO}	Collector dark Current OPIA401 OPIA403 OPIA406, OPIA408 OPIA409	 - - - -	 - - - -	 1.0 1.0 0.4 0.4	µA	 I_F = 0 mA, V_{CE} = 200 V I_F = 0 mA, V_{CE} = 10 V I_F = 0 mA, V_{CE} = 40 V I_F = 0 mA, V_{CE} = 300 V
$V_{CE(SAT)}$	Collector-emitter Saturation Voltage OPIA403 OPIA406, OPIA408, OPIA409 OPIA401	 - - -	 - - 0.8	 1.0 1.0 1.5	V	 I_F = 20 mA, I_C = 1 mA I_F = 1 mA, I_C = 2 mA I_F = 20 mA, I_C = 100 mA
f_C	Cut-Off frequency OPIA401, OPIA406, OPIA408, OPIA409 OPIA403	 - 1.0	 - 7.0	 - -	K Hz	 - V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω
t_R	Rise Time OPIA401 OPIA403 OPIA406, OPIA408 OPIA409	 - - - -	 100 60 200 40	 300 300 - -	µs	 V_{CC} = 2 V, I_C = 20 mA, R_L = 100 Ω V_{CC} = 2 V, I_C = 2 mA, R_L = 100 Ω V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω V_{CC} = 5 V, I_C = 10 mA, R_L = 100 Ω
t_F	Fall Time OPIA401 OPIA403 OPIA406, OPIA408 OPIA409	 - - - -	 20 53 200 10	 100 250 - -	µs	 V_{CC} = 2 V, I_C = 20 mA, R_L = 100 Ω V_{CC} = 2 V, I_C = 2 mA, R_L = 100 Ω V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω V_{CC} = 5 V, I_C = 10 mA, R_L = 100 Ω
Coupled Characteristics						
CTR	Current Transfer Ratio OPIA404 OPIA401 OPIA402 OPIA403 OPIA405(See Table, page 3) OPIA406, OPIA408 OPIA407 OPIA409 OPIA414	 50 1,000 20 600 50 20 0.3 400 100	 - - - - - 2,000 1.0 2,000 -	 600 - 400 7,500 600 - 3.0 - 600	%	 I_F = 5.00 mA, V_{CE} = 5.0 V I_F = 1.00 mA, V_{CE} = 2.0 V I_F = 1.00 mA, V_{CE} = 5.0 V I_F = 1.00 mA, V_{CE} = 2.0 V I_F = 5.00 mA, V_{CE} = 5.0 V I_F = 1.00 mA, V_{CE} = 2.0 V I_F = 5.00 mA, V_{CE} = 5.0 V I_F = 1.00 mA, V_{CE} = 2.0 V I_F = 1.00 mA, V_{CE} = 5.0 V
C_f	Floating Capacitance OPIA405, OPIA406, OPIA407, OPIA408, OPIA409	 - -	 0.6 0.4	 1.0 -	pF	V = 0.0 V, f = 1M Hz
R_{ISO}	Isolation resistance	$5X10^{10}$	10^{11}	-	ohm	C500V, 40% to 60%RH

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OPIA401

Fig.1 Forward Current vs. Ambient Temperature

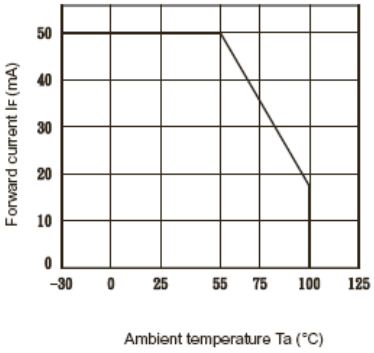


Fig.2 Collector Power Dissipation vs. Ambient Temperature

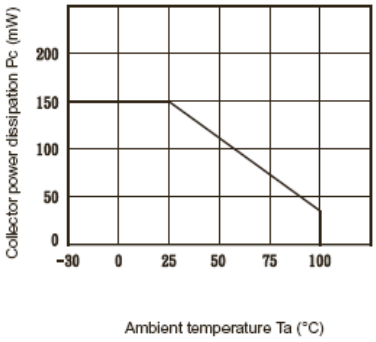


Fig.3 Peak Forward Current vs. Duty Ratio

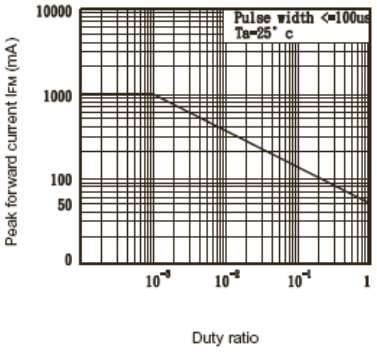


Fig.4 Forward Current vs. Forward Voltage

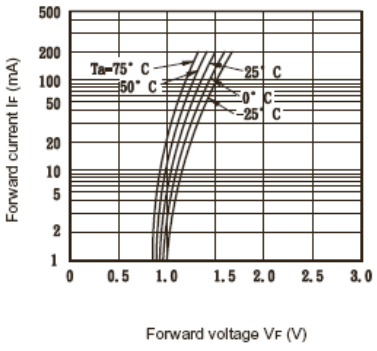


Fig.5 Current Transfer Ratio vs. Forward Current

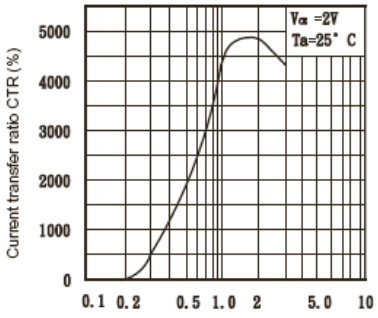


Fig.6 Collector Current vs. Collector-emitter Voltage

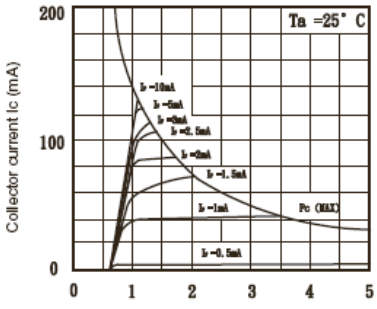


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

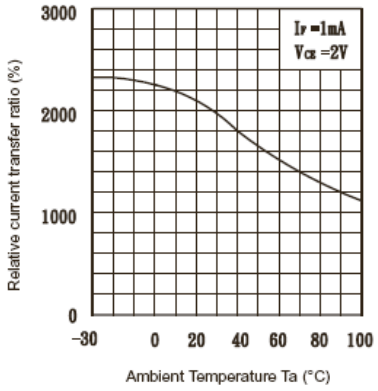


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

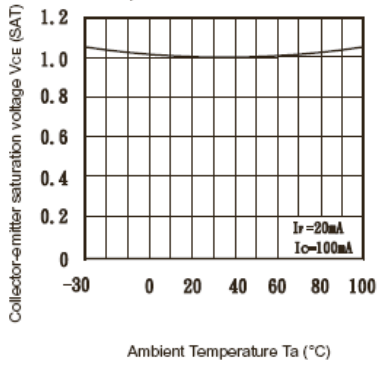
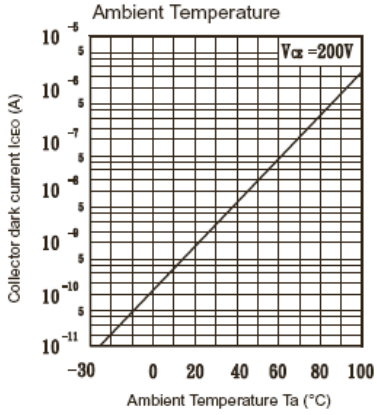


Fig.9 Collector Dark Current vs. Ambient Temperature



OPIA401

Fig.10 Response Time vs. Load Resistance

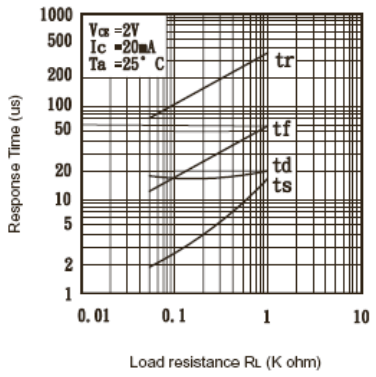


Fig.11 Frequency Response

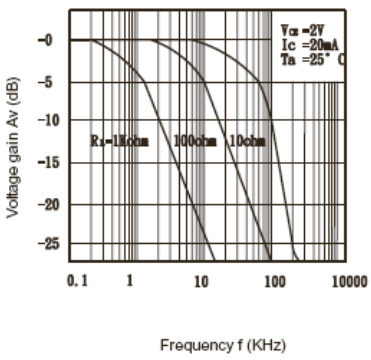
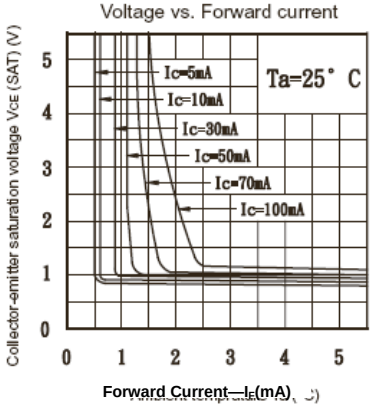


Fig.12 Collector- emitter Saturation Voltage vs. Forward current



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OPIA402

Fig. 1 Forward Current vs. Ambient Temperature

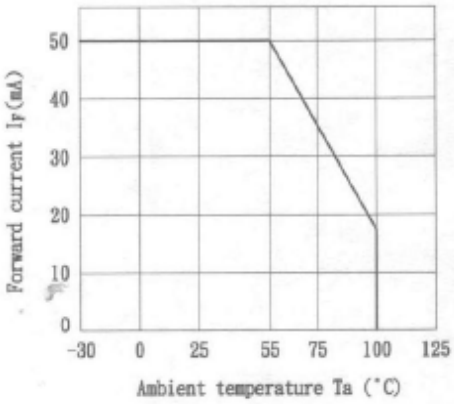


Fig. 2 Diode Power Dissipation vs. Ambient Temperature

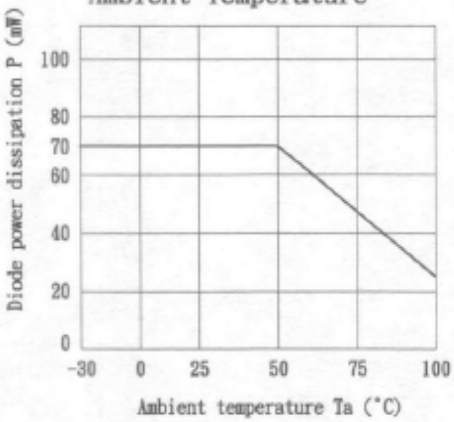


Fig. 3 Collector Power Dissipation vs. Ambient Temperature

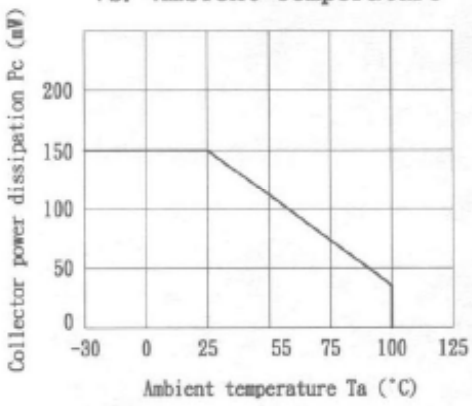


Fig. 4 Total Power Dissipation vs. Ambient Temperature

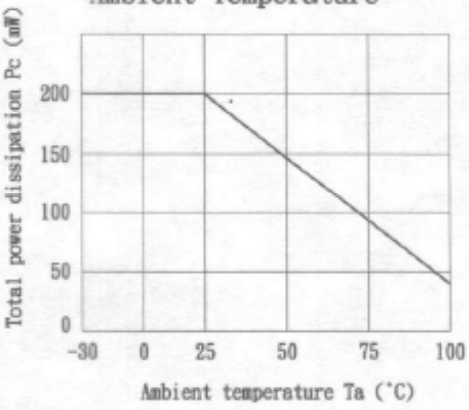


Fig. 5 Peak Forward Current vs. Duty Ratio

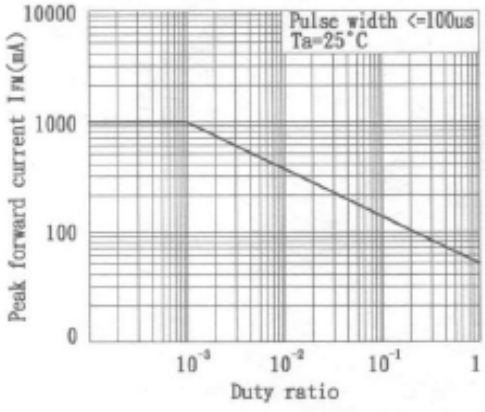
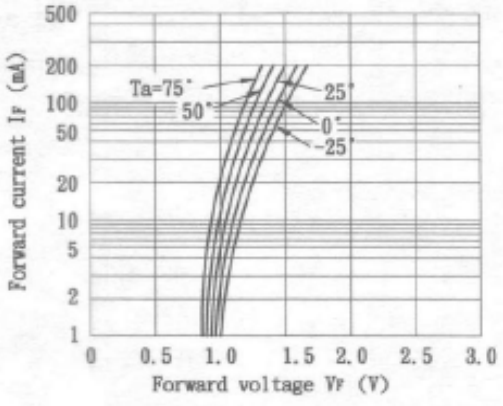


Fig. 6 Forward Current vs. Forward Voltage



OPIA402

Fig. 7 Current Transfer Ratio vs. Forward Current

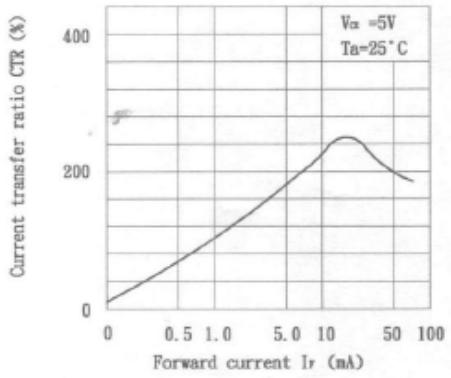


Fig. 8 Collector Current vs. Collector-emitter Voltage

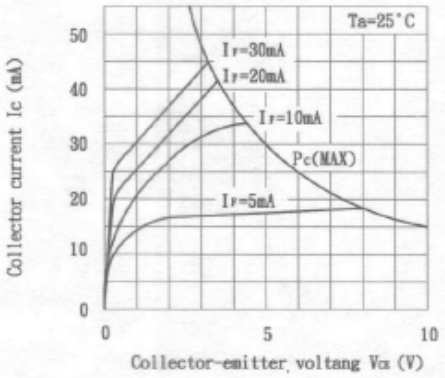


Fig. 9 Relative Current Transfer Ratio vs. Ambient Temperature

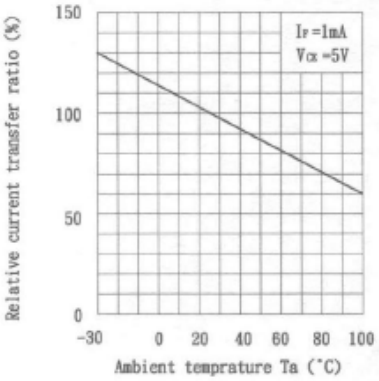


Fig. 10 Collector-emitter Saturation Voltage vs. Ambient Temperature

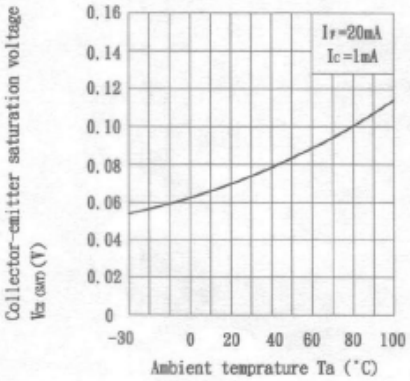


Fig. 11 Collector Dark Current vs. Ambient Temperature

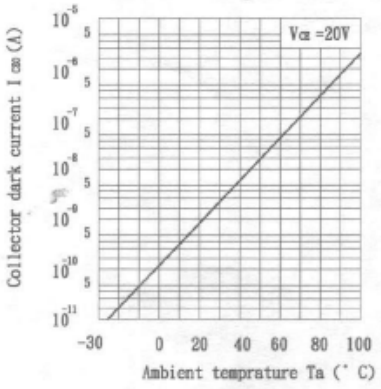


Fig. 12 Response Time vs. Load Resistance

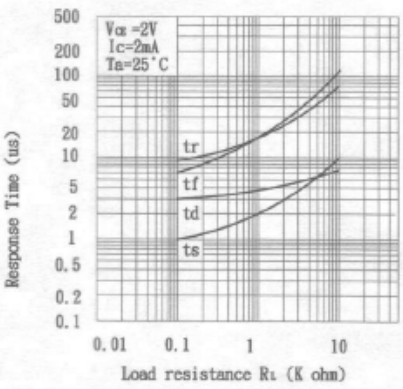


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Fig. 1 Forward Current vs. Ambient Temperature

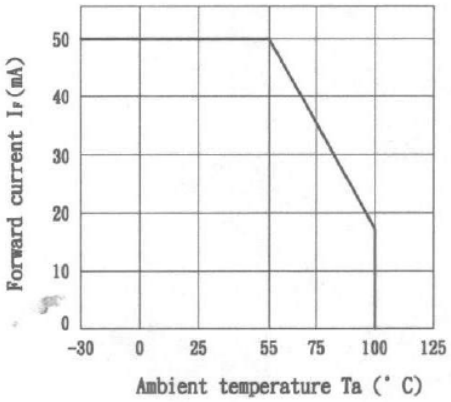

Fig. 2 Collector Power Dissipation vs. Ambient Temperature

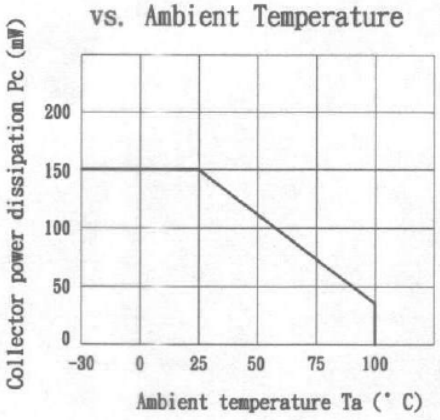

Fig. 3 Peak Forward Current vs. Duty Ratio

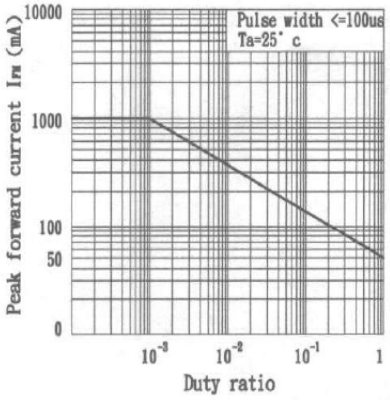

Fig. 4 Forward Current vs. Forward Voltage

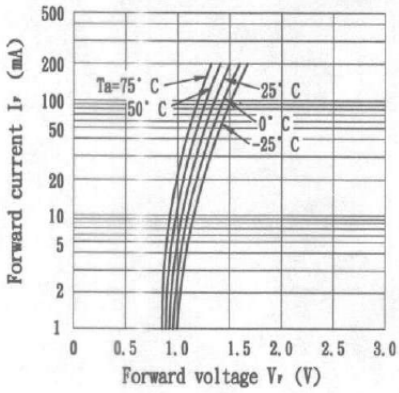

Fig. 5 Current Transfer Ratio vs. Forward Current

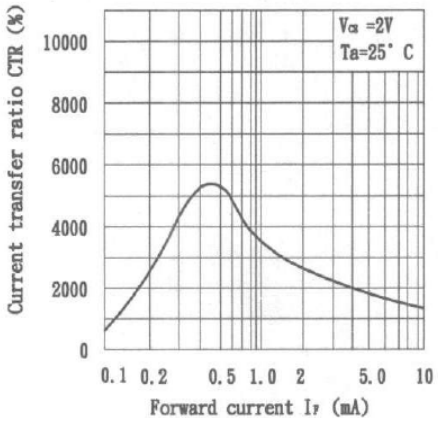

Fig. 6 Collector Current vs. Collector-emitter Voltage

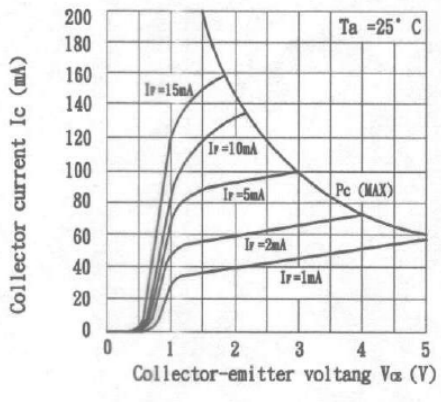

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Fig. 7 Relative Current Transfer Ratio vs. Ambient Temperature

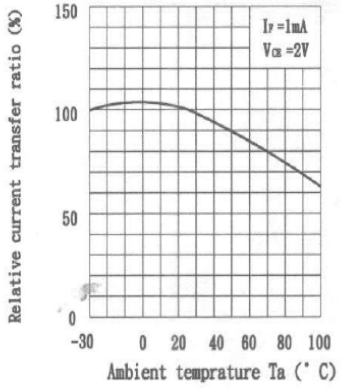

Fig. 8 Collector-emitter Saturation Voltage vs. Ambient Temperature

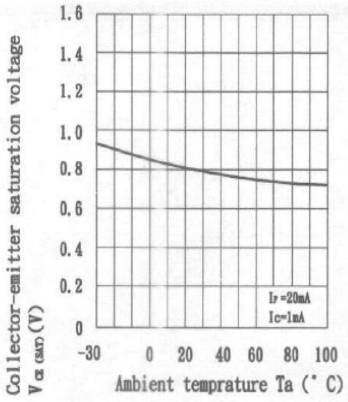

Fig. 9 Collector Dark Current vs. Ambient Temperature

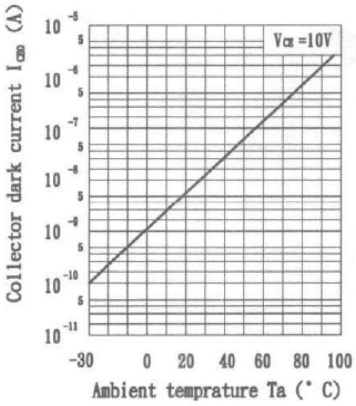

Fig. 10 Response Time vs. Load Resistance

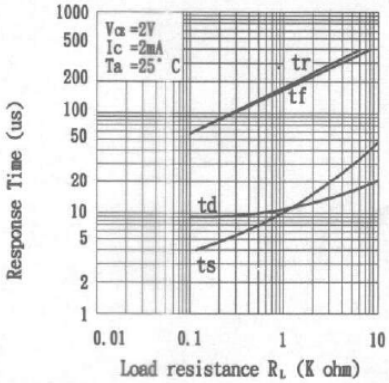

Fig. 11 Collector-emitter Satura Voltage vs. Forward curr

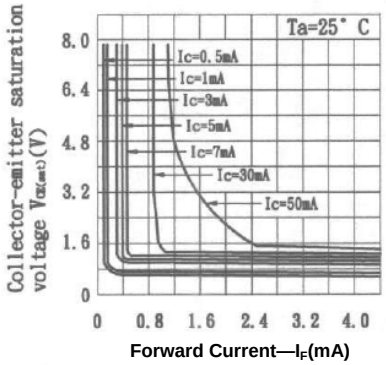

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Fig.1 Forward Current vs. Ambient Temperature

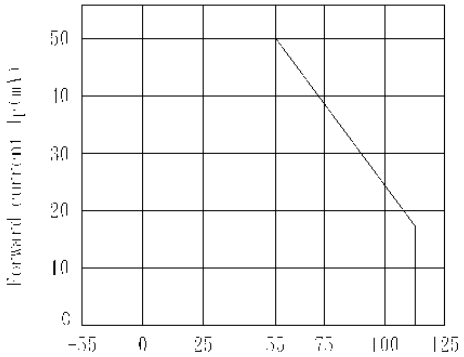

Fig.2 Diode Power Dissipation vs. Ambient Temperature

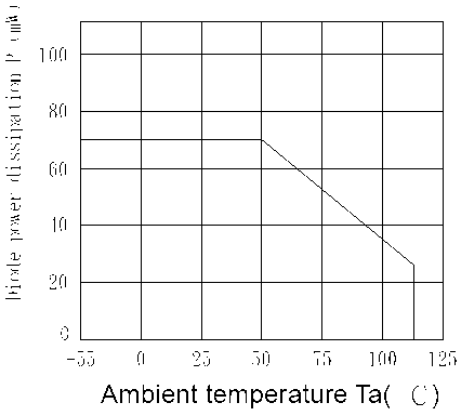

Fig.3 Collector Power Dissipation vs. Ambient Temperature

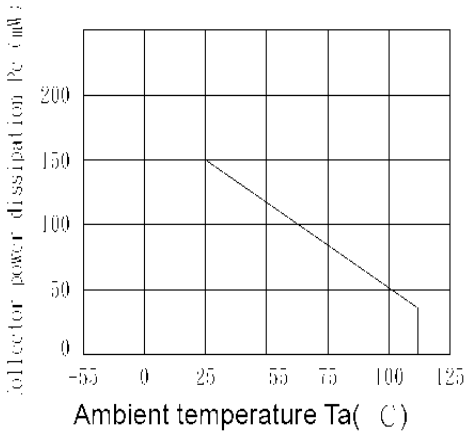

Fig4 Total Power Dissipation vs. Ambient Temperature

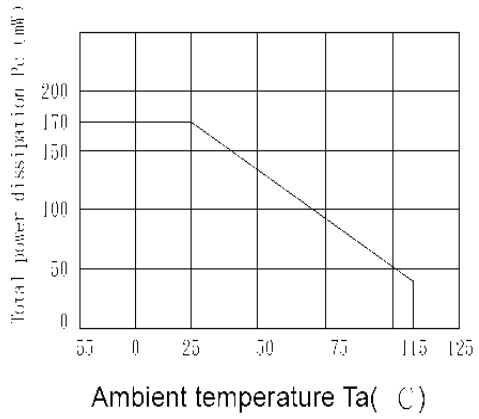

Fig.5 Peak Forward Current vs. Duty Ratio

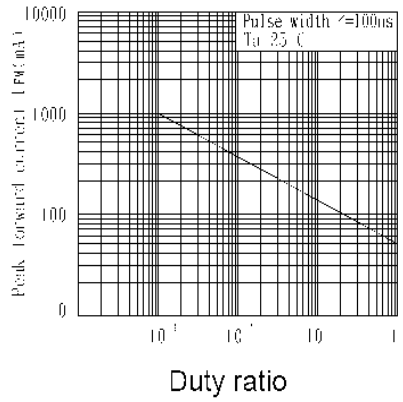

Fig.6 Forward Current vs. Forward Voltage

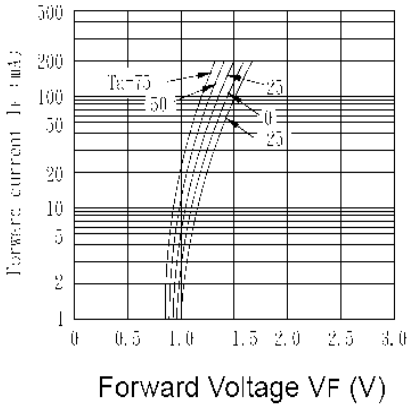

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Fig.9 Collector Current vs. Collector-Emitter Voltage

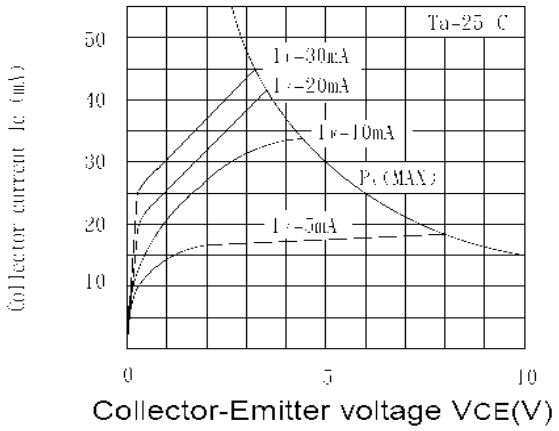

Fig.10 Relative Current Transfer Ratio vs. Ambient Temperature

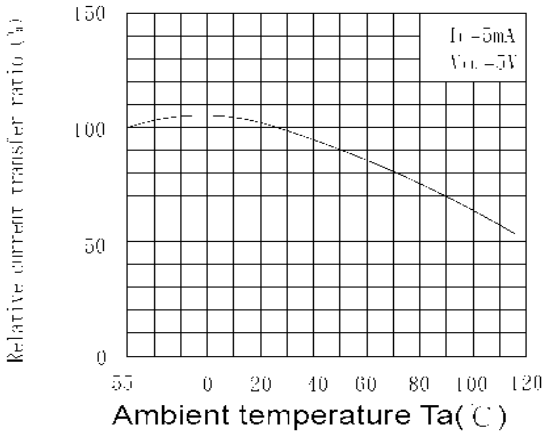

Fig.7 Forward Current vs. Forward Voltage

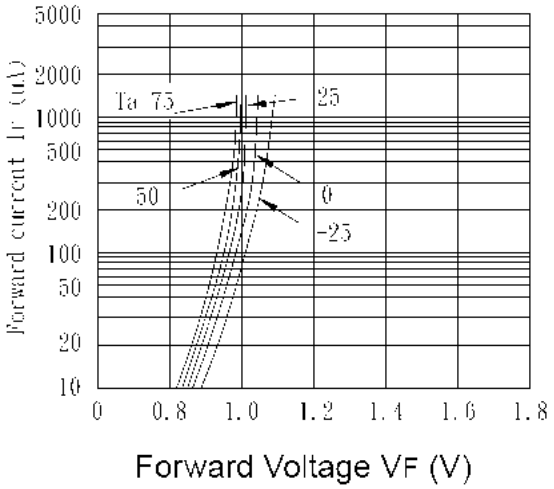

Fig.8 Current Transfer Ratio vs. Forward Current

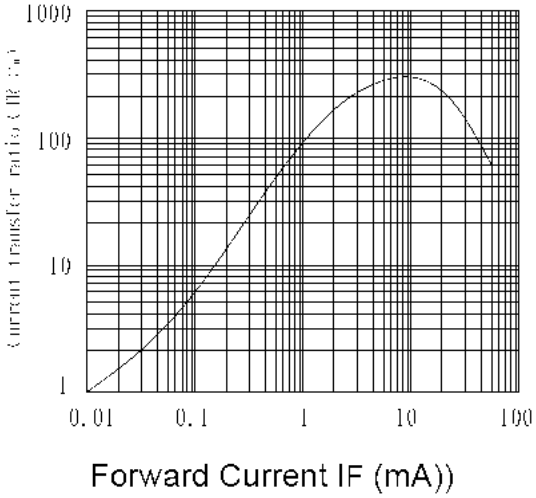

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Fig. 1 Current Transfer Ratio vs. Forward Current

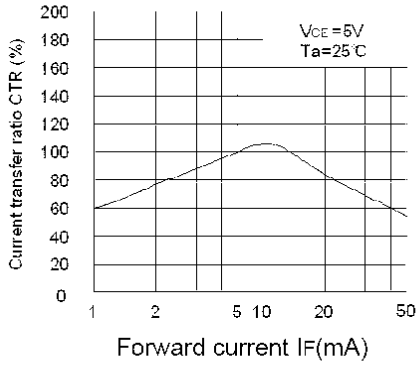

Fig.2 Collector Power Dissipation vs. Ambient Temperature

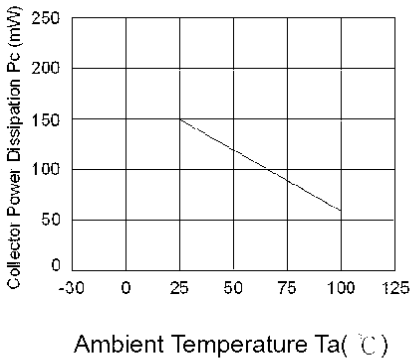

Fig.3 Collector Dark Current vs. Ambient Temperature

Fig.4 Forward Current vs. Ambient Temperature

Fig.3 Collector Dark Current vs. Ambient Temperature

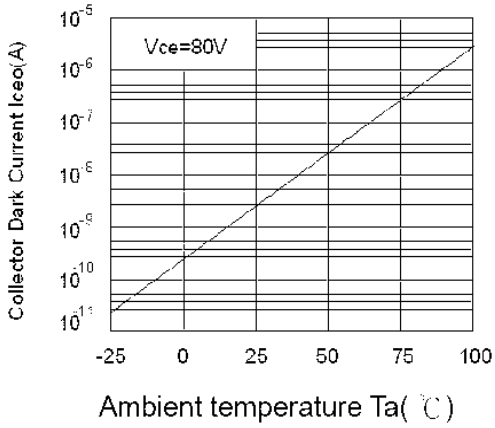

Fig.4 Forward Current vs. Ambient Temperature

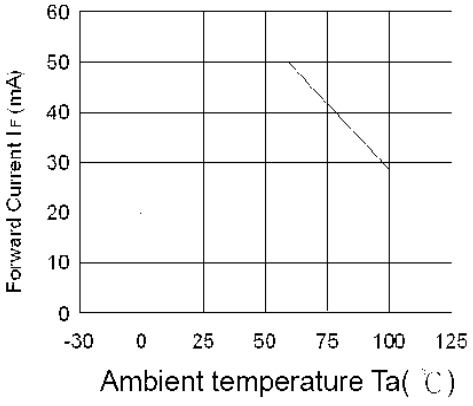

Fig.5 Forward Current vs. Forward Voltage

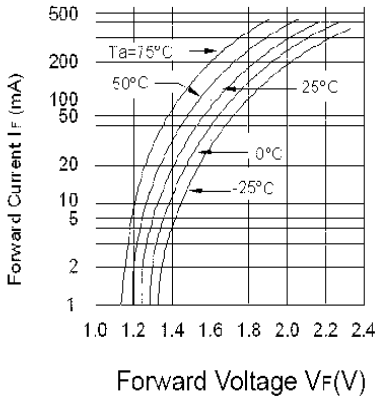

Fig.6 Collector Current vs. Collector-emitter Voltage

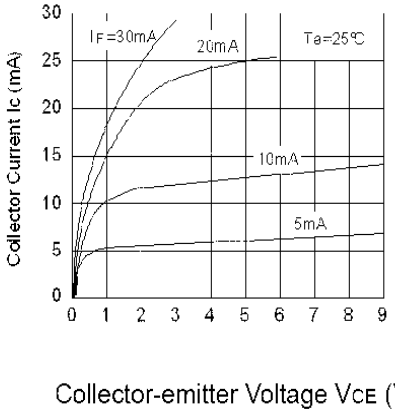

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Fig.7 Collector-emitter Saturation Voltage vs. Ambient Temperature

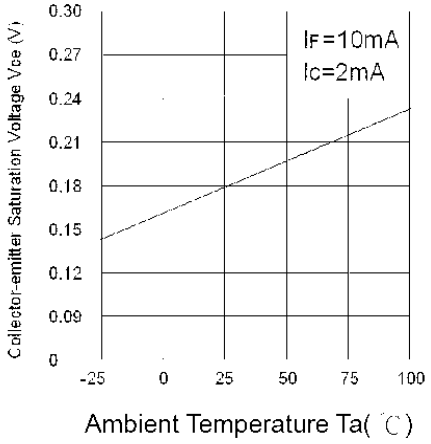

Fig.8 Collector-emitter Saturation Voltage vs. Forward Current

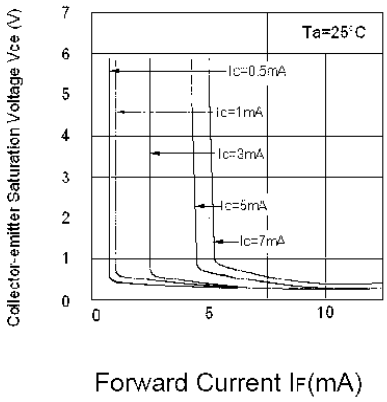

Fig.9 Response Time vs. Load Resistance

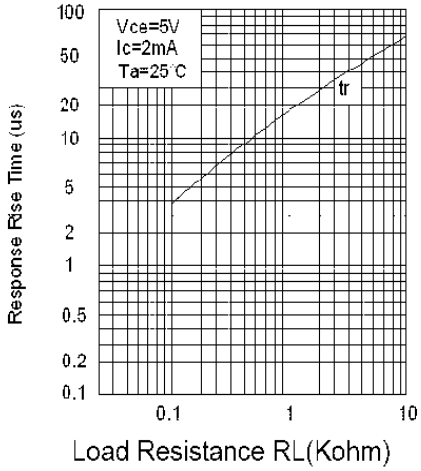

Fig.10 Response Time vs. Load Resistance

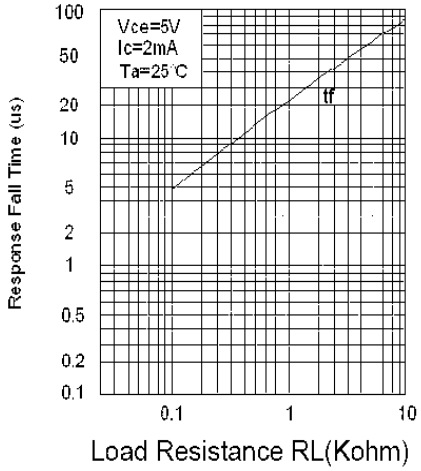

Fig.11 Relative Current Transfer Ratio vs. Ambient Temperature

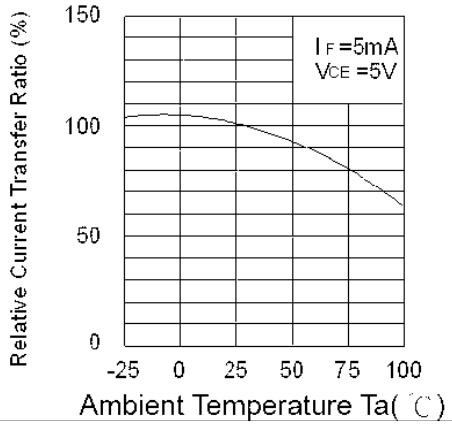

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Fig.1 Forward Current vs. Ambient Temperature

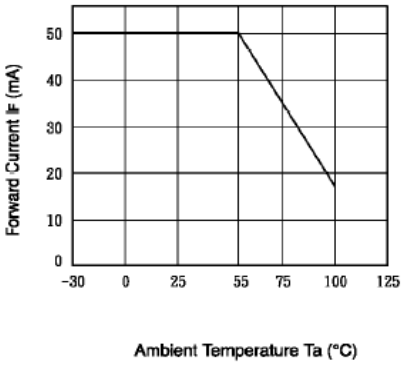

Fig.2 Collector Power Dissipation vs. Ambient Temperature

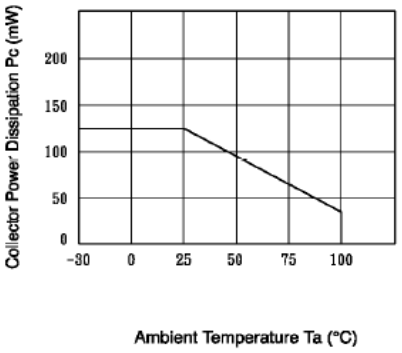

Fig.3 Peak Forward Current vs. Duty Ratio

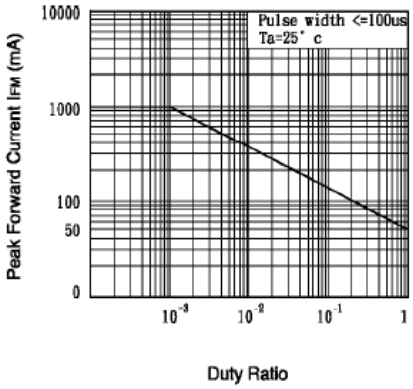

Fig.4 Forward Current vs. Ambient Temperature

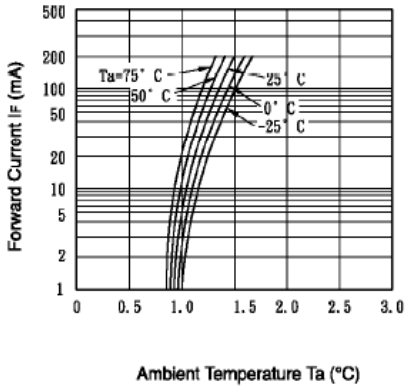

Fig.5 Current Tranfer Ratio vs. Forward Current

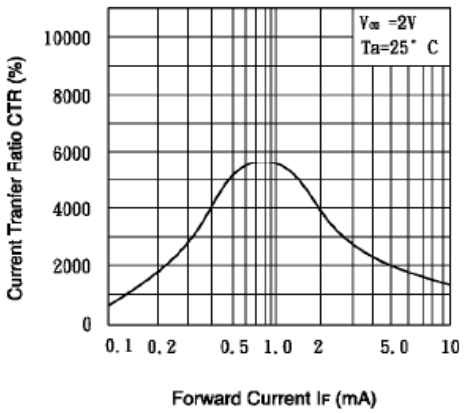

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Fig.6 Collector Current vs. Collector-emitter Voltage

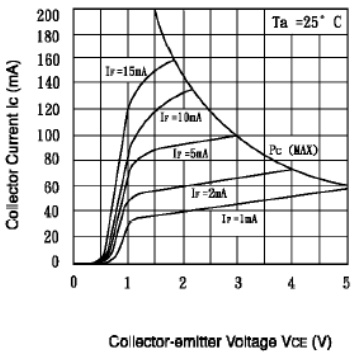

Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

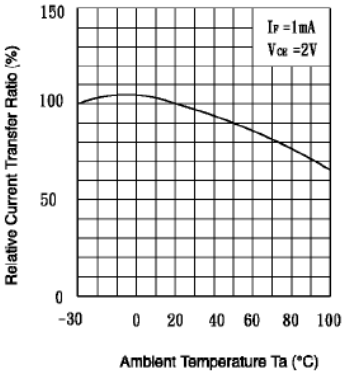

Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

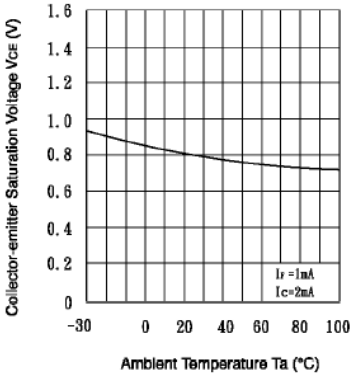

Fig.9 Collector Dark Current vs. Ambient Temperature

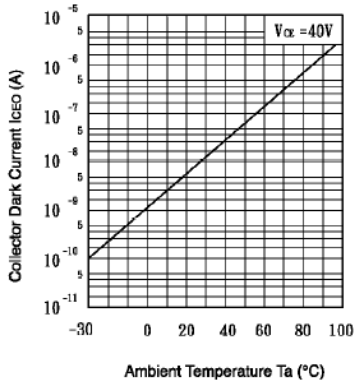

Fig.10 Response Time vs. Load Resistance

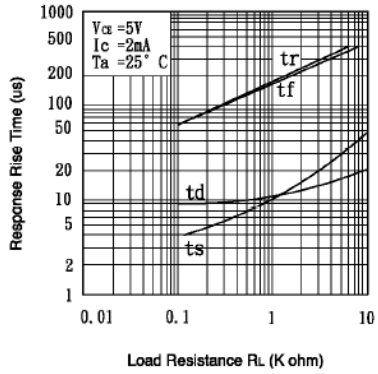

Fig.11 Collector-emitter Saturation Voltage vs. Forward Current

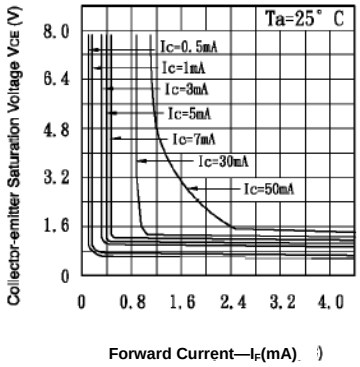

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Fig. 1 Current Transfer Ratio vs. Forward Current

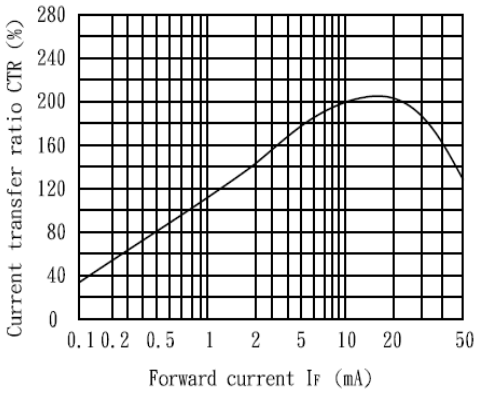

Fig. 2 Collector Power Dissipation vs. Ambient Temperature

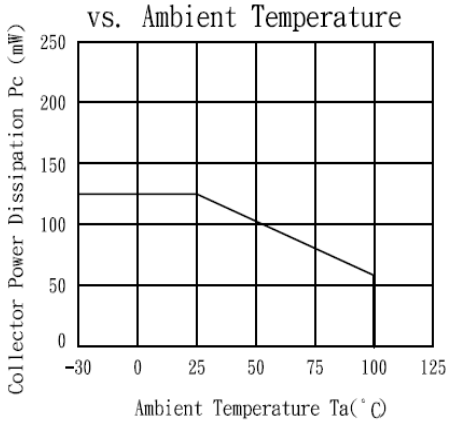

Fig. 3 Collector Dark Current vs. Ambient Temperature

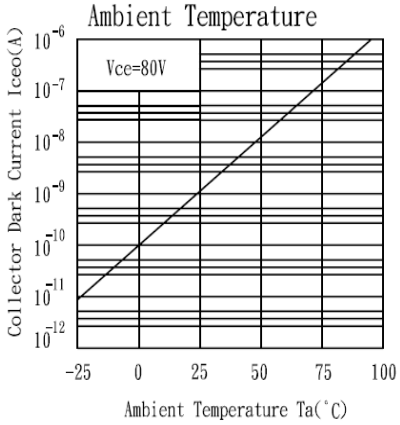

Fig. 4 Forward Current vs. Ambient Temperature

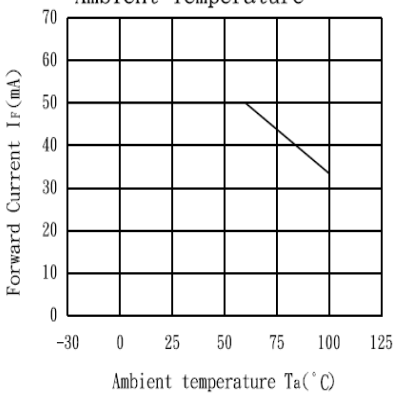

Fig. 5 Forward Current vs. Forward Voltage

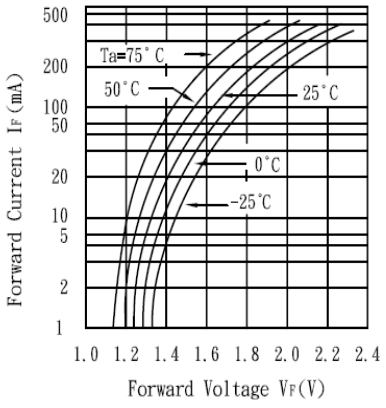

Fig. 6 Collector Current vs. Collector-emitter Voltage

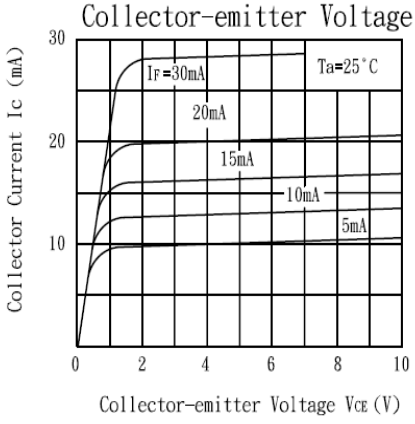

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Fig. 7 Collector-emitter Saturation Voltage vs. Ambient Temperature

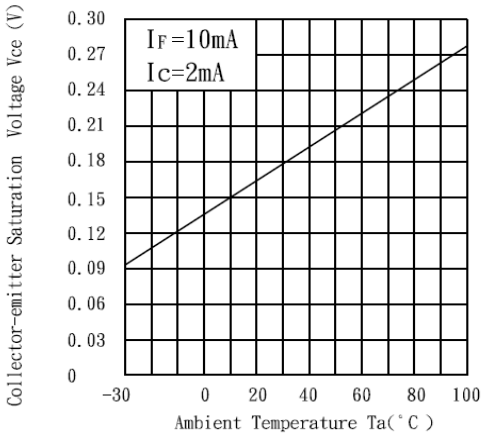


Fig. 8 Collector-emitter Saturation Voltage vs. Forward Current

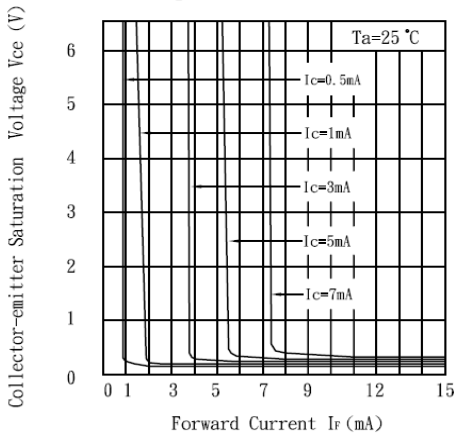


Fig. 9 Response Time vs. Load Resistance

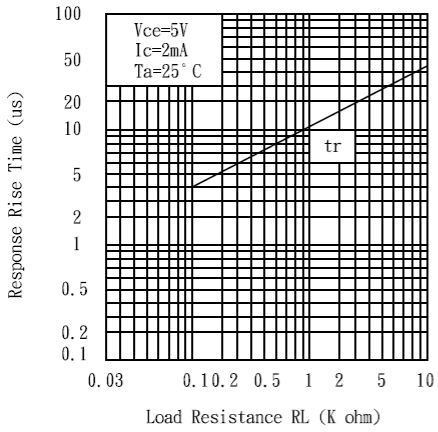


Fig. 10 Response Time vs. Load Resistance

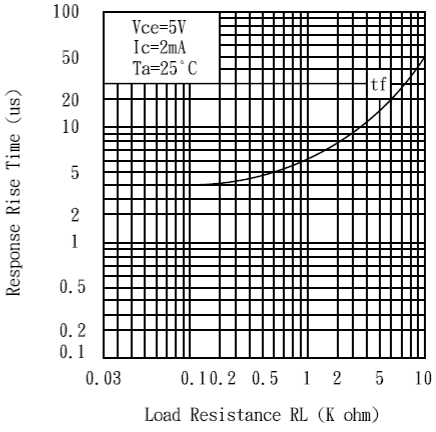
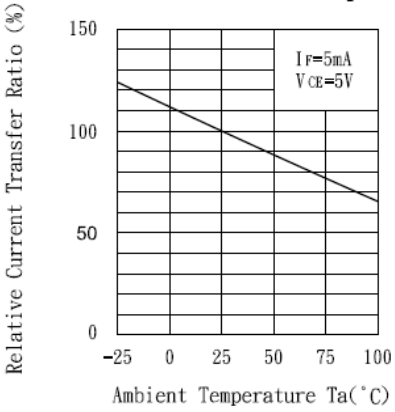


Fig. 11 Relative Current Transfer Ratio vs. Ambient Temperature



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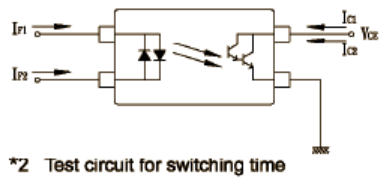
*1 CTR1=IC1 / IF1 , CTR1=IC2 / IF2



*2 Test circuit for switching time

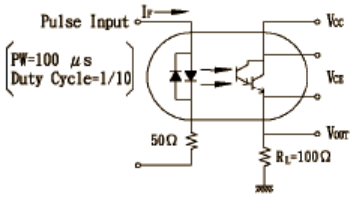


Fig.1 Forward Current vs. Ambient Temperature

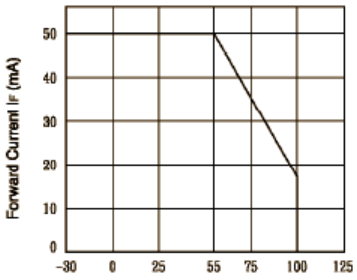


Fig.2 Collector Power Dissipation vs. Ambient Temperature

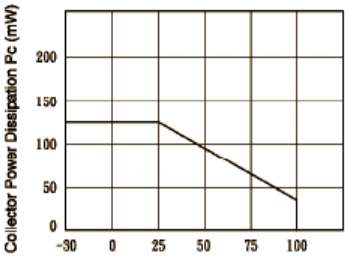


Fig.3 Peak Forward Current vs. Duty Ratio

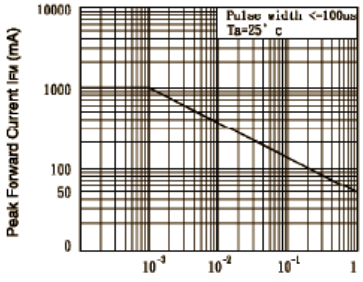


Fig.4 Forward Current vs. Forward Voltage

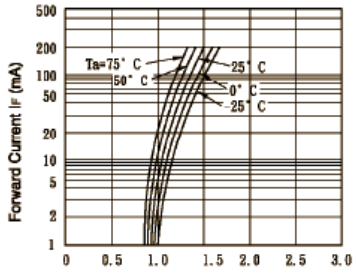


Fig.5 Current Tranfer Ratio vs. Forward Current

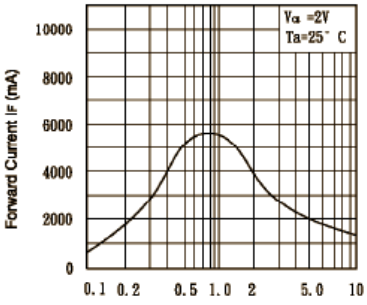


Fig.6 Collector Current vs. Collector-emitter Voltage

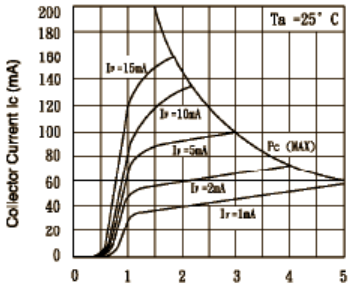


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

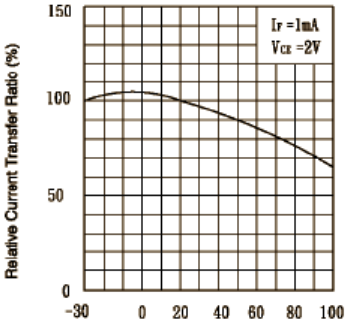


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

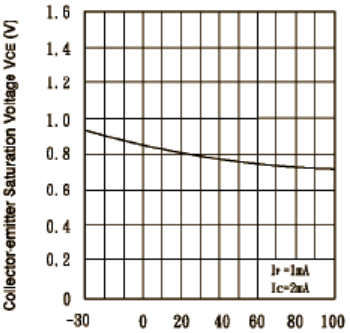


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Fig.9 Collector Dark Current vs. Ambient Temperature

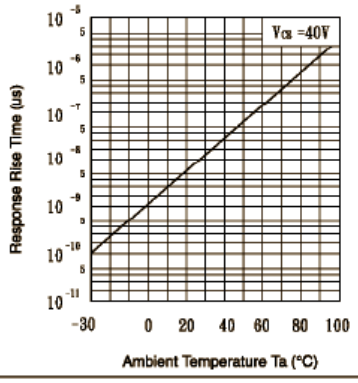


Fig.10 Response Time vs. Load Resistance

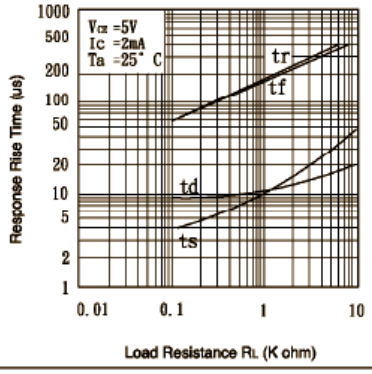
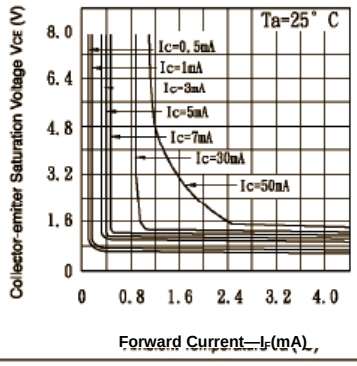


Fig.11 Collector-emitter Saturation Voltage vs. Forward Current



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*1 Test circuit for switching time

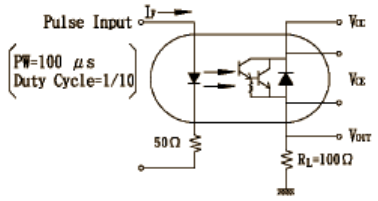


Fig.1 Current Transfer Ratio vs. Forward Current

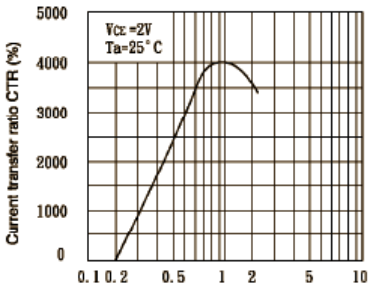


Fig.2 Collector Power Dissipation vs. Ambient Temperature

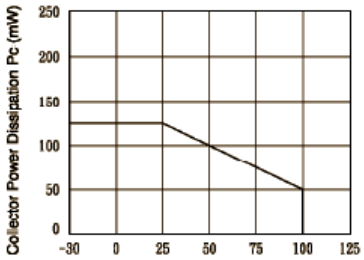


Fig.3 Collector Dark Current vs. Ambient Temperature

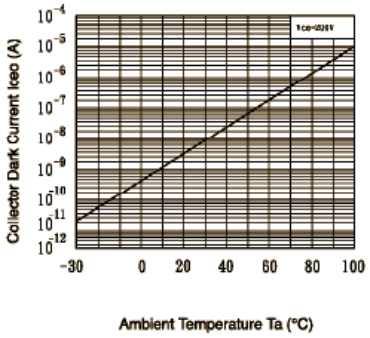


Fig.4 Forward Current vs. Ambient Temperature

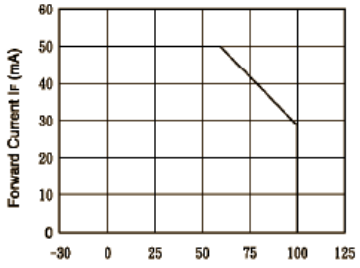


Fig.5 Forward Current vs. Forward Voltage

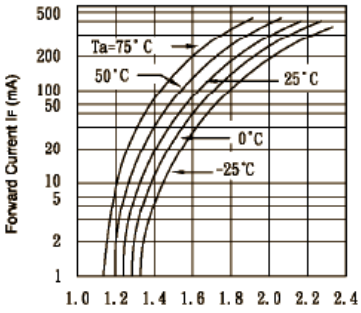


Fig.6 Collector Current vs. Collector-emitter Voltage

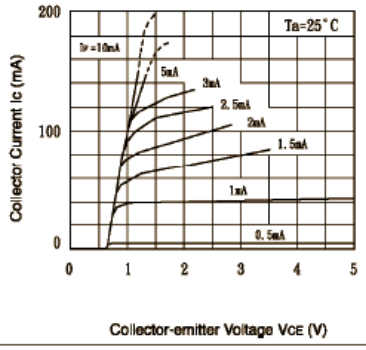


Fig.7 Collector-emitter Saturation Voltage vs. Forward Current

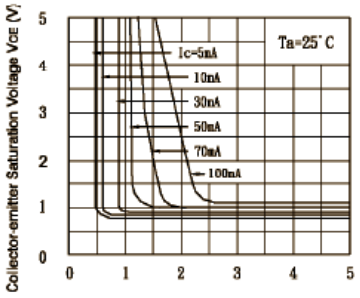
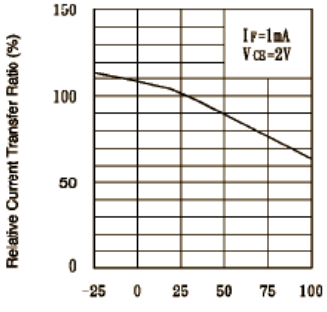


Fig.8 Relative Current Transfer Ratio vs. Ambient Temperature



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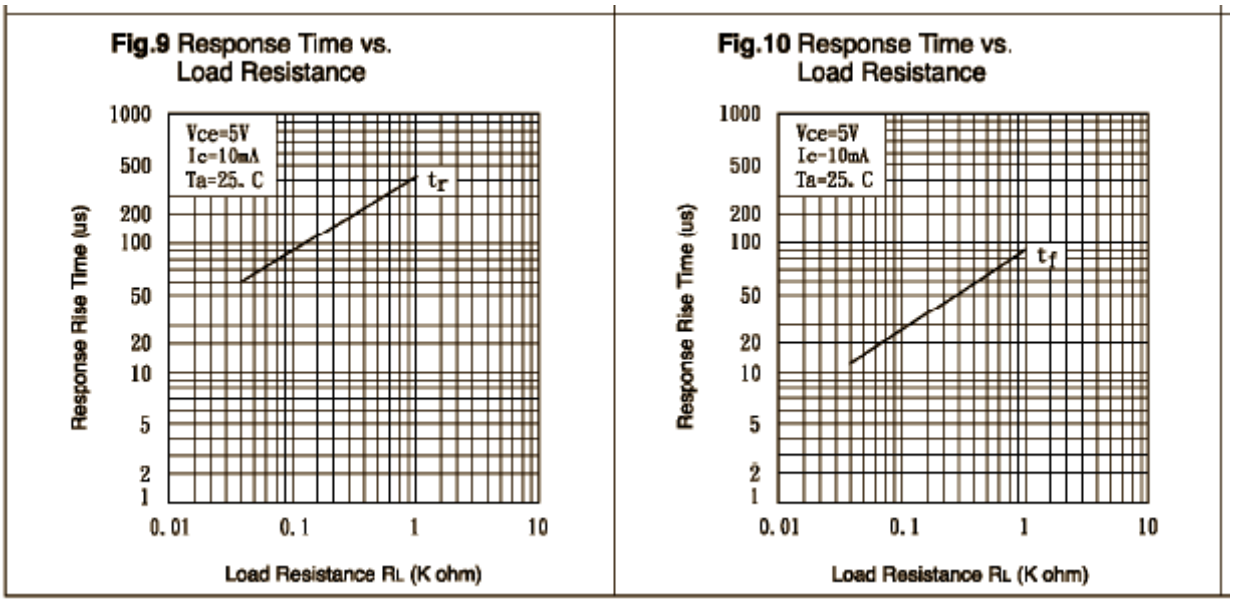

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Fig.1 **Current Transfer Ratio vs. Forward Current**

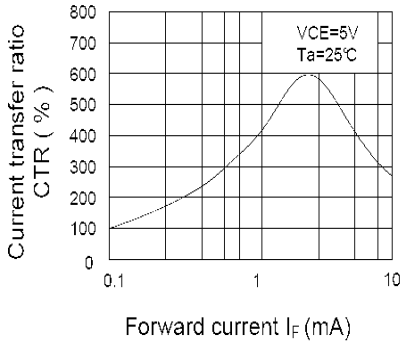

Fig.2 **Collector Power Dissipation vs. Ambient Temperature**

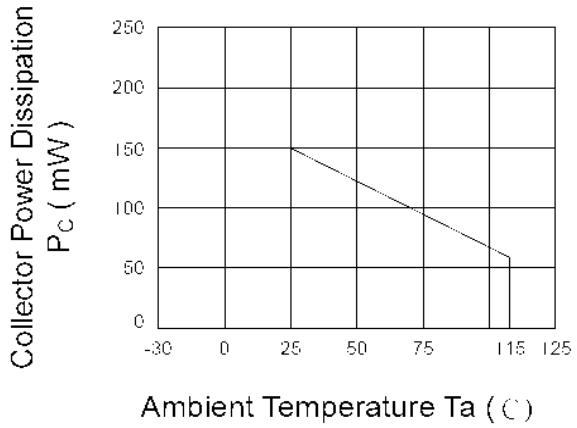

Fig.3 **Collector Dark Current vs. Ambient Temperature**

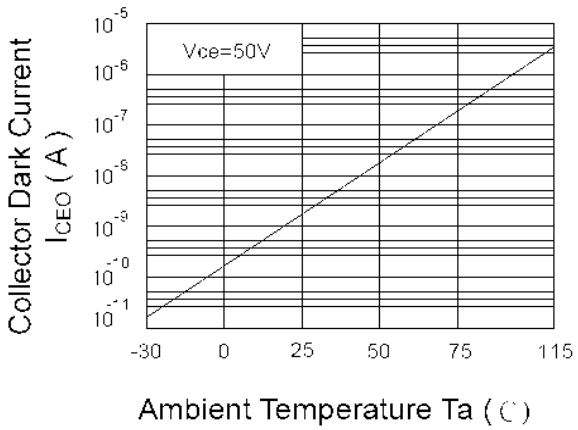

Fig.4 **Forward Current vs. Ambient Temperature**

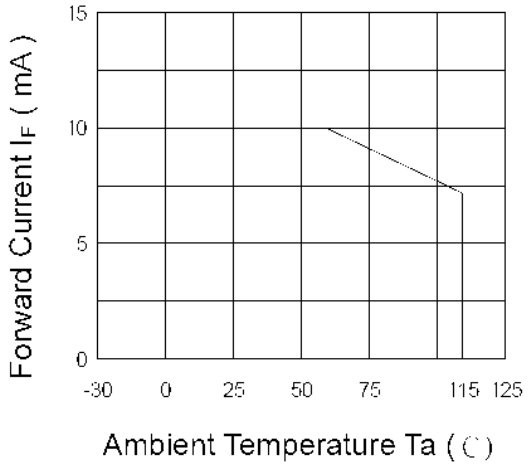

Fig.5 **Forward Current vs. Forward Voltage**

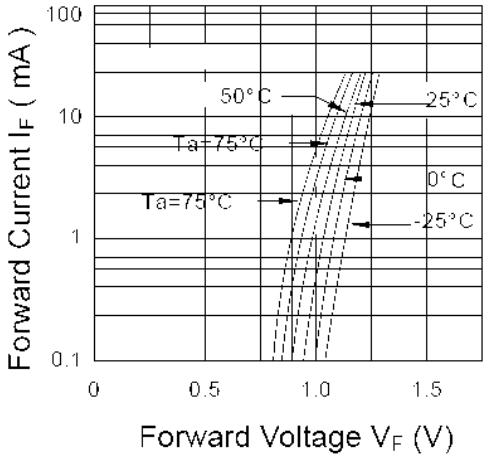

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Fig.6 **Collector Current vs. Collector-Emitter Voltage**

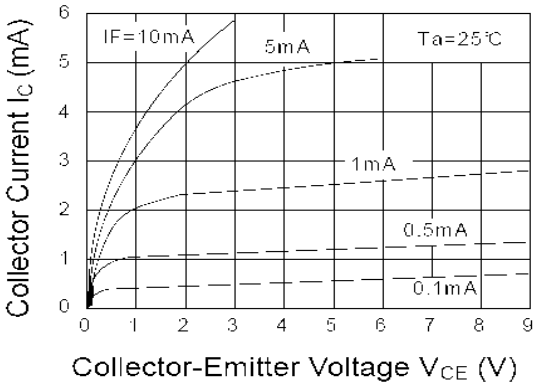


Fig.7 **Relative Current Transfer Ratio vs. Ambient Temperature**

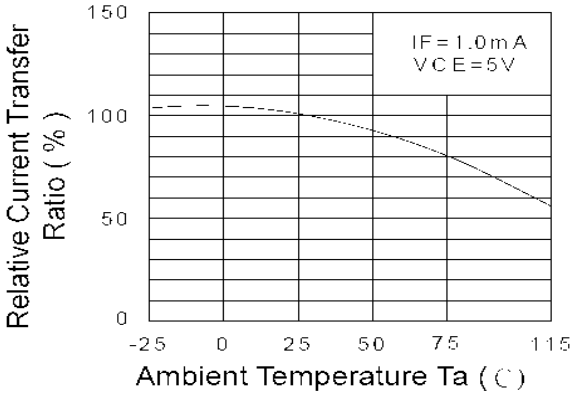


Fig.8 **Collector-Emitter Saturation Voltage vs. Ambient Temperature**

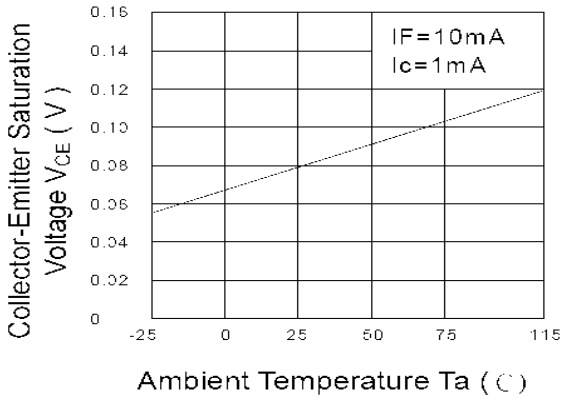


Fig.9 **Collector-Emitter Saturation Voltage vs. Forward Current**

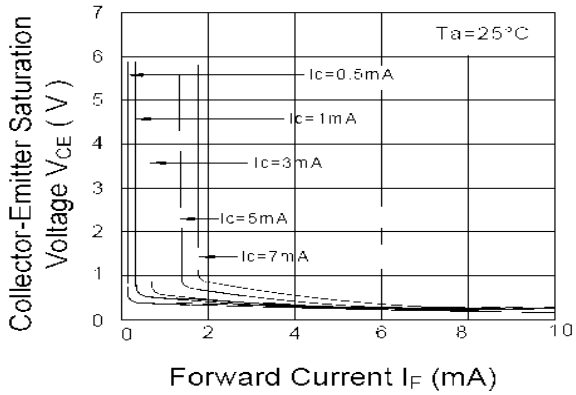


Fig.10 **Response Time vs. Load Resistance**

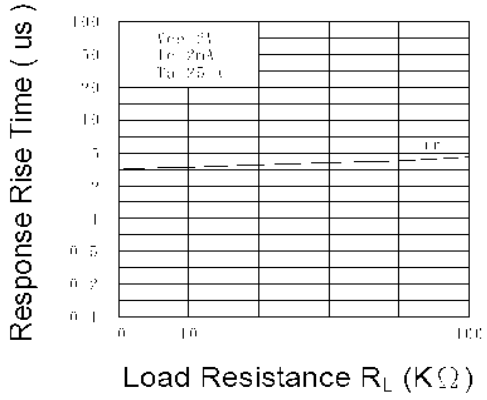
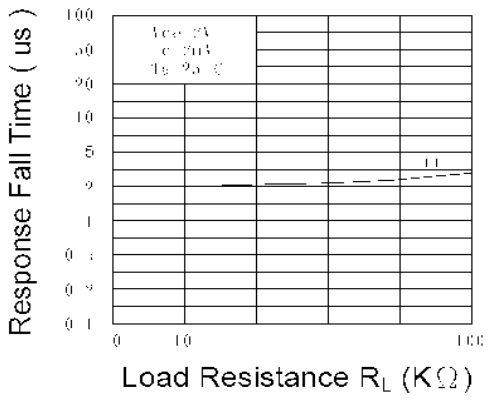


Fig.11 **Response Time vs. Load Resistance**



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Quality / Reliability Requirements

Parameter	Failure Criteria	Conditions
HTRB D $I_{C(OFF)}$	± 10%	11 samples after 500Hrs
	0 Fail	@ VCE = 5.0VDC, Ta = 70°C
HTFB D $I_{C(ON)}$	± 10%	50 samples after 96Hrs
	0 Fail	@ Max P_D, Ta = 25°C
MTTF @ 90% confidence	150,000 Min.	@ 25°C, 25mADC
Moisture Sensitivity Level	MSL 1	per JDEC stnd J-STD-020B
Lead Solderability	0 Fail	per Method 208 of MIL-STD-202.
Glass Transition of body	125°C Min.	DSC test method
Temperature Humidity-Bias	± 20%	85°C, 85%RH, 500Hrs, 80% min Iceo
Temperature Cycle	± 20%	per Method 1010.7 of MIL-STD-883E
High Temperature Storage	± 20%	85°C, 500Hrs
Autoclave	0 Fail	T_A = 121°C, Pressure = 15psi, Humidity = 100%, Time = 96Hrs

Note: This is to be performed when a change occurs to form, fit or function.

Government and Industry Standard Compliance Requirements

European Union's Reduction of Hazardous Substances (RoHS) Directive 2002/95/EC

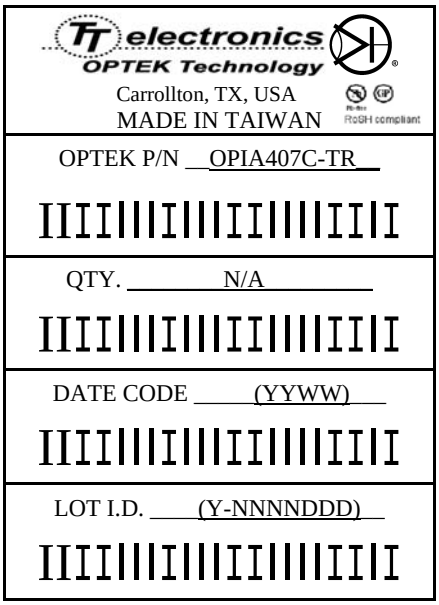
Label Identification

DESCRIPTION:

Size: 3" (7.4 cm) X 2.2" (5.5 cm)
Lettering shall be black on white background.
Format shall be as:

Notes:

1. The DATE CODE is a 4-digit code for date of manufacture where YY is the last two digits of the year, and WW is week number of manufacture.
2. The LOT I.D. is the manufacturing location lot identification where Y is the year of manufacture, NNNN is a sequential lot identifier, and DDD is the day of the year of manufacture. – or use equivalent label format.



Tube Packaging Information:

Optek's Optocoupler Part Numbers		Packaging Quantities	Tube		Inner		Small Carton			Medium Carton			Large Carton		
			Qty	Weight	52 x 7 x 7.5 cm		53.5 x 16 x 17.5 cm			53.5 x 30.7 x 17.5 cm			53.5 x 30.7 x 25 cm		
					Qty	Weight	Qty	Weight	Gross Weight	Qty	Weight	Gross Weight	Qty	Weight	Gross Weight
P/H and SMD	**4-PIN** OPIA400D/A		100	44	3,000	1.40	12,000	6.0	6.5	24,000	12.0	12.5	36,000	18.0	18.5
	6-PIN OPIA6XXD/A Series		65	44	1,950	1.50	7,800	6.5	7.0	15,600	12.0	12.5	23,400	18.5	19.0
	8-PIN OPIA8XXD Series and OPID804D		48	44	1,440	1.44	5,760	6.0	6.5	11,520	12.0	12.5	17,290	18.0	18.5
M/F SOP	**4-PIN and 5-PIN** OPIA401B - OPIA404B, OPIA414B, OPIA500B		100	24	6,000	1.60	24,000	6.5	7.0	48,000	13.0	13.5	72,000	19.5	20.0
SSOP	**4-PIN** OPIA405C - OPIA409C		170	--	10,200	--									

P/H = Pin-Hole Packages (Referred as D = Dual-In-Line Package)

SMD = Standard Surface Mount Packages (Referred as A = 6.5mil SMD)

M/F or SOP = Mini-Flat Packages or Small Outside Packages (Referred as B = 4.40mil SMD w/ 2.54mil Lead-Spacing)

SSOP = Shrink SOP Packages (Referred as C = 3.60mil SMD with 1.27mil Lead-Spacing)

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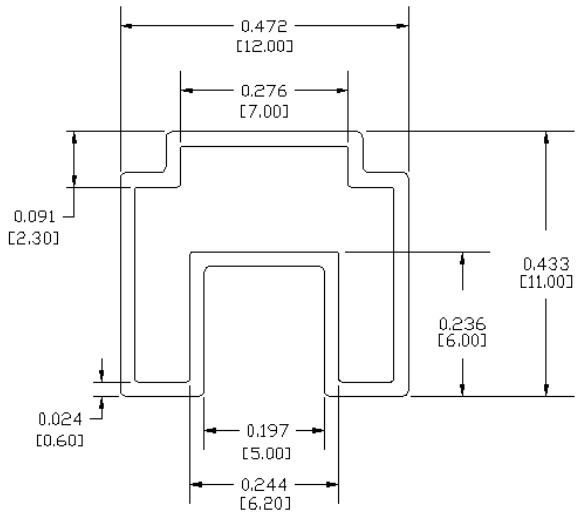
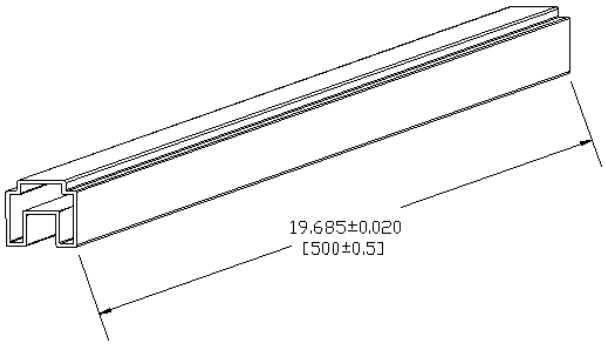
Tube Packaging Specifications—SMD— (TU):



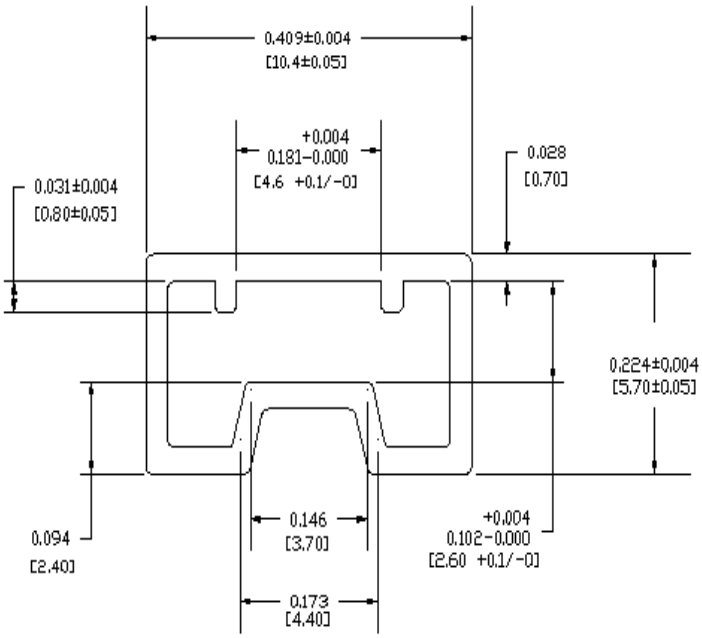


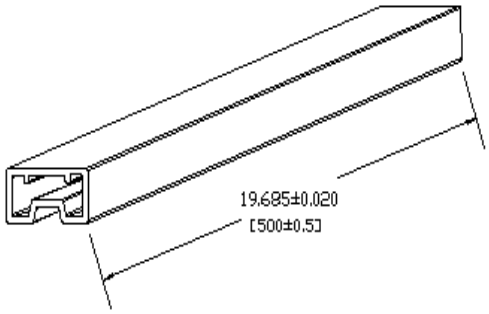
DIMENSIONS ARE IN: INCHES [MILLIMETERS]

TOLERANCE: ± 0.008 INCHES
[± 0.2 MILLIMETERS]

Quantity: 4-pin (SMD): 100pcs/tube

Tube Packaging Specifications— SOP (Mini-flats) and SSOP— (TU):

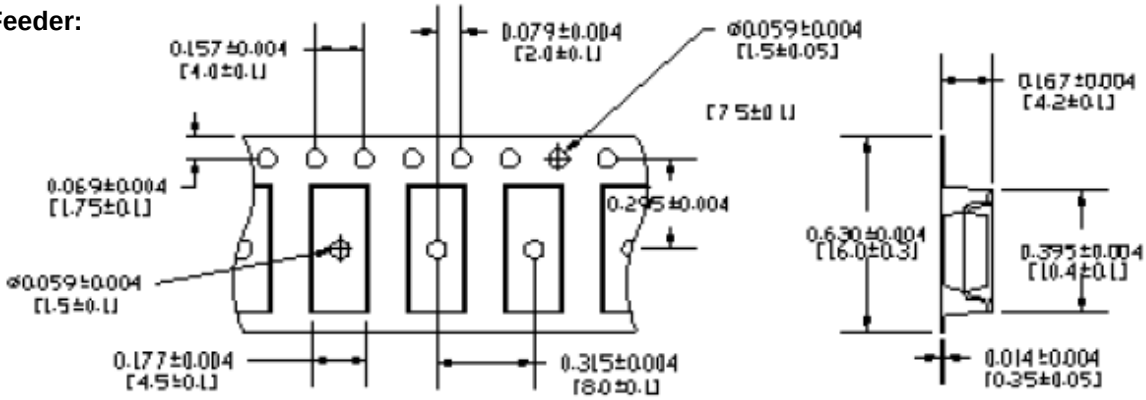




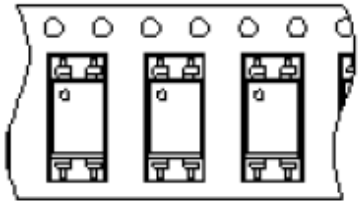
Quantity: 4-pin (SOP): 100pcs/tube
4-pin (SSOP): 170pcs/tube

Tape and Reel Packaging Specifications— SMD and SOP—(TR):

Tape Feeder:



Direction:

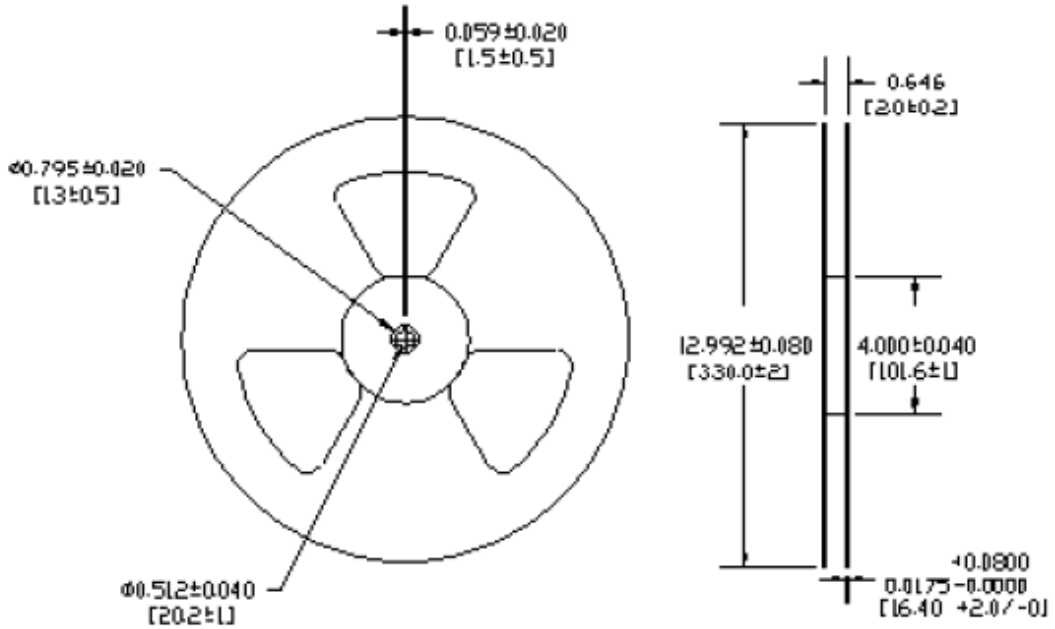


Quantity: 4-pin (SMD): 1000pcs/Reel
4-pin (SOP): 1000pcs/Reel
4-pin (SSOP): 3000pcs/Reel

DIMENSIONS ARE IN: INCHES [MILLIMETERS]

TOLERANCE: ± 0.008 INCHES
[± 0.2 MILLIMETERS]

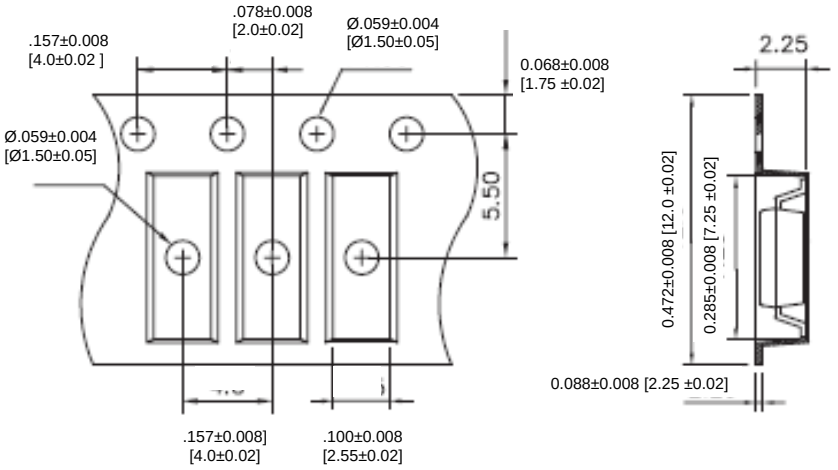
Reel:



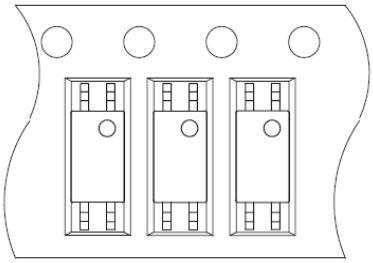
OPTEK reserves the right to make changes at any time in order to improve design and to supply the best product possible.

OPTEK Technology Inc. — 1645 Wallace Drive, Carrollton, Texas 75006
Phone: (972) 323-2200 or (800) 341-4747 FAX: (972) 323-2396 sensors@optekinc.com www.optekinc.com

Tape and Reel Packaging Specifications— SSOP—(TR):



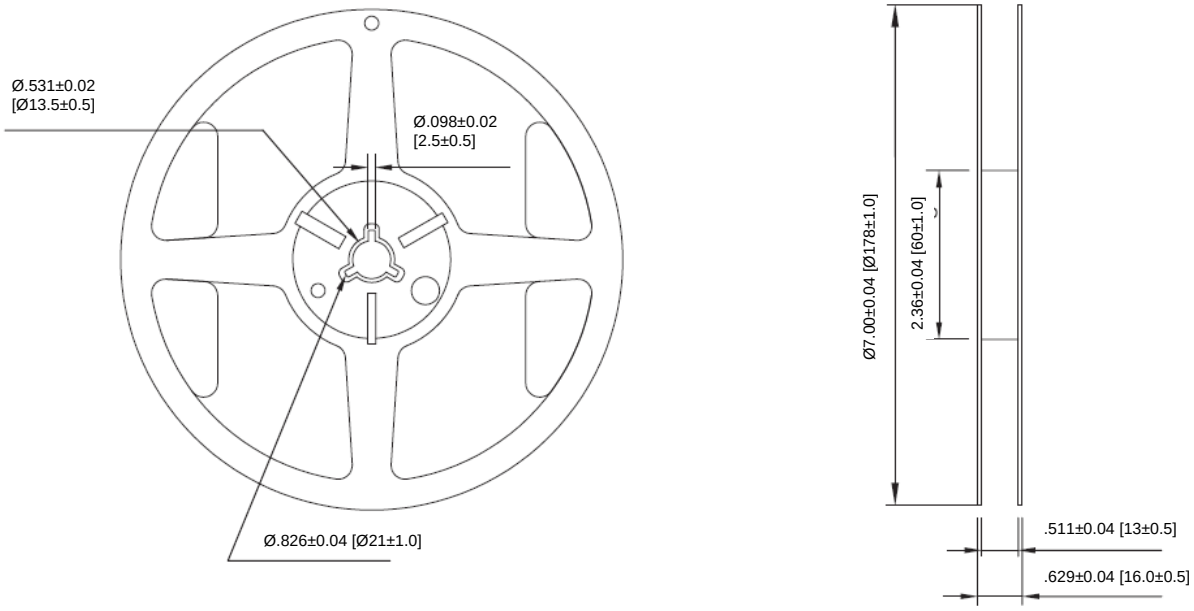
Direction:



DIMENSIONS ARE IN: INCHES [MILLIMETERS]

TOLERANCE: ± 0.008 INCHES
[± 0.2 MILLIMETERS]

Reel:



Quantity: 4-pin (SSOP): 2000pcs/Reel

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