Optocoupler—SMD, SOP and SSOP Packages
OPIA400 through OPIA414

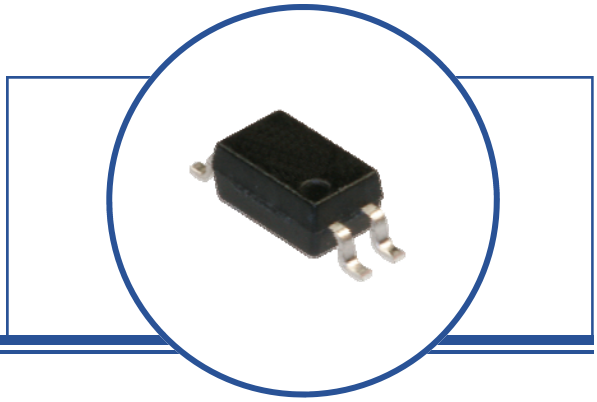
TT electronics
OPTEK Technology

Features:

- 2,500 to 5,000 Vrms electrical isolation
- Choice of a Single and Dual LED
- Phototransistor or Photodarlington Sensor
- Low-cost plastic Dual-In-Line (DIP) package

Agency Approvals:

- ML Certification No: E58730
- VDE pending



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 5,000 Volts RMS, these products meet typical power system isolation requirements.

Theory of operation: The LED transmitter is used to illuminate the Photosensor 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 5,000 volts RMS. A variety of LED and photosensor configurations are available depending on the system requirements.

The ratio Current Transfer Ratio (CTR) is identified between the output current and input current for analog photosensors. CTR ratios can range from as low as 5 to over 9,000 depending on the device.

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

All SMD products are shipped in a shipping tube with “TR” identified on the end of the part number.
Example: OPI400ATR is a 4-Pin SMD shipped in tape and reel (TR)

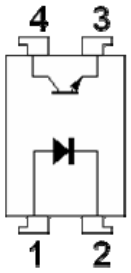
Applications:

- High voltage isolation, up to 5,000 Volts RMS
- PCBoard power system isolation
- Industrial equipment power isolation
- Medical equipment power isolation
- Office equipment

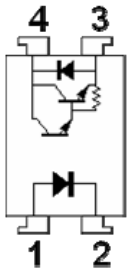
Pb
RoHS

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

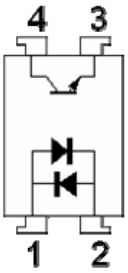
Package Outline Dimensions and Schematics: Top-View



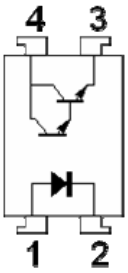
OPIA400



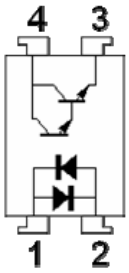
OPIA401



OPIA402



OPIA403

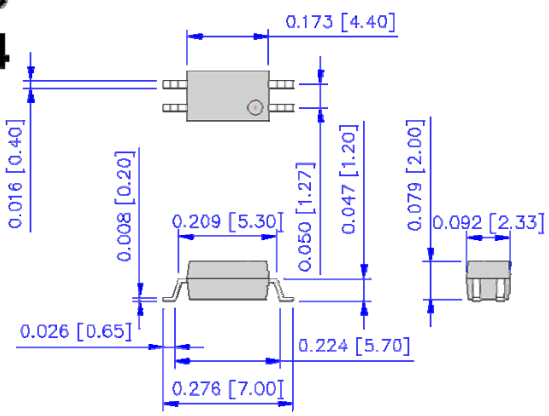


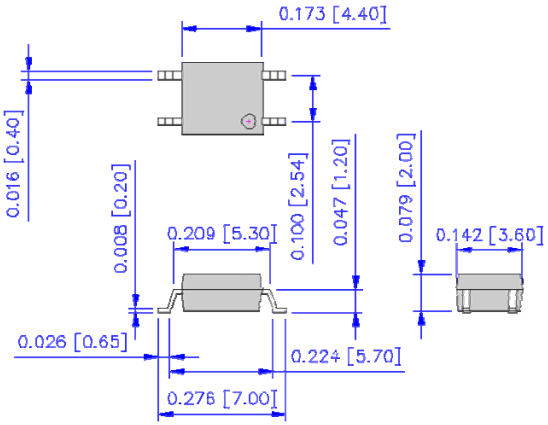
OPIA408

OPIA404
OPIA409
OPIA407
OPIA406
OPIA405
OPIA412
OPIA410
OPIA411
OPIA413
OPIA414

Package Style B
(SOP)

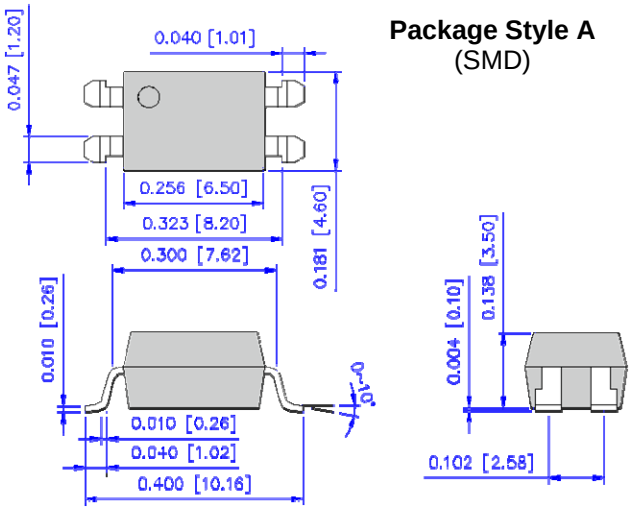
Package Style C
(SSOP)





Part Number	Pin #			
	1	2	3	4
OPIA400A	A	K	E	C
OPIA401B	A	K	E	C
OPIA402B	A-K	K-A	E	C
OPIA403B	A	K	E	C
OPIA404B	A	K	E	C
OPIA405C	A	K	E	C
OPIA406C	A	K	E	C
OPIA407C	A-K	K-A	E	C
OPIA408C	A	K	E	C
OPIA409C	A	K	E	C
OPIA410A	A-K	K-A	E	C
OPIA411A	A	K	E	C
OPIA412A	A	K	E	C
OPIA413A	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**
OPIA400A	5,000	50 / - / 600	4 / 3	4-Pin SMD	A K—C E
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
OPIA405C	2,500	80 / - / 600	3 / 5	4-Pin SSOP	A K—C E
OPIA406C	2,500	200 / 2,000 / -	200 / 200	4-Pin SSOP	A K—C E (Dar)
OPIA407C	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)
OPIA410A	5,000	60 / - / 600	5 / 4	4-Pin SMD	A K, K A—C E
OPIA411A	5,000	70 / - / -	80 / 72	4-Pin SMD	A K—C E (Dar)
OPIA412A	5,000	600 / - / 9,000	60 / 50	4-Pin SMD	A K—C E (Dar)
OPIA413A	5,000	50 / - / 600	2 / 3	4-Pin SMD	A K—C E
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	Example: OPIA400DTU

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

Storage Temperature	
OPIA400, OPIA404, OPIA410, OPIA411, OPIA412, OPIA413, 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, OPIA410, OPIA411, OPIA412, OPIA413	5,000 Vrms
OPIA401, OPIA402, OPIA403, OPIA404, OPIA414	3,750 Vrms
OPIA405, OPIA406, OPIA407, OPIA408, OPIA409	2,500 Vrms
Total Package Power Dissipation	
OPIA400, OPIA410, OPIA411, OPIA412, OPIA413	200 mW
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	
OPIA400, OPIA401, OPIA403, OPIA404, OPIA405, OPIA406, OPIA409, OPIA411, OPIA412, OPIA413, OPI414	6 V
OPIA402, OPIA407, OPIA408, OPIA409, OPIA410, OPIA412	-
Power Dissipation	
OPIA400, OPIA401, OPIA402, OPIA403, OPIA404, OPIA410, OPIA412, OPIA413, OPIA411	70 mW
OPIA405, OPIA406, OPIA407, OPIA408, OPIA409	60 mW
OPIA414	15 mW

Output Phototransistor

Collector-Emitter Voltage	
OPIA400, OPIA402, OPIA404, OPIA410	60 V
OPIA401, OPIA409, OPIA412	300 V
OPIA403, OPIA411	35 V
OPIA406, OPIA408	40 V
OPIA413	350 V
OPIA405, OPIA407, OPIA414	80 V
Emitter-Collector Voltage	
OPIA400, OPIA405, OPIA406, OPIA407, OPIA408, OPIA410, OPIA411	6 V
OPIA401, OPIA412	0.1 V
OPIA402, OPIA403, OPIA404	5 V
OPIA409	0.3 V
OPIA413, OPIA414	7 V
Collector Current	
OPIA400, OPIA402, OPIA404, OPIA405, OPIA407, OPIA410, OPIA413, OPIA414	50 mA
OPIA401, OPIA403, OPIA412	150 mA
OPIA406, OPIA408	90 mA
OPIA409	60 mA
OPIA411	80 mA
Power Dissipation	
All except the part numbers noted below	150 mW
OPIA405, OPIA406, OPIA407, OPIA408, OPI409	120 mW
OPIA412	200 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	-	1.2	1.4	V	I_F = 20 mA
	OPIA404	-	1.6	1.75		I_F = 10 mA
	OPIA405, OPIA406, OPIA407, OPIA408	-	1.1	1.4		I_F = 5 mA
	OPIA401, OPIA409, OPIA414	-	1.2	1.4		I_F = 10 mA
	OPIA413	1.0	1.2	1.3		I_F = 10 mA
V_{FM}	Peek Forward Voltage					
	OPIA403, OPIA410, OPIA412	-	-	3.5	V	I_{FM} = 500 mA
	OPIA400, OPIA405, OPIA411, OPIA413	-	-	3.0		
	OPI401, OPIA404, OPIA414, OPIA406, OPIA407, OPIA408, OPIA409	-	-	-		
I_R	Reverse Current					
	All except those noted below	-	-	10	µA	V_R = 4 V
	OPIA404, OPIA407, OPIA408, OPIA410, OPIA414	-	-	-		-
	OPIA405, OPIA406, OPIA409	-	-	5		V_R = 5 V
	OPIA413	-	-	10		V_R = 5 V
C_t	Terminal Capacitance					
	All except those noted below	-	30	-	pf	V = 0.0 V, f = 1K Hz
	OPIA402, OPIA404, OPIA411, OPIA414	-	30	250		V = 0.0 V, f = 1K Hz
	OPIA408, OPIA409	-	60	-		V = 0.0 V, f = 1M Hz
Output Phototransistor						
I_{CEO}	Collector dark Current					
	OPIA400, OPIA402, OPIA404, OPIA410	-	-	100	nA	I_F = 0 mA, V_{CE} = 20 V
	OPIA405, OPIA407	-	-	100		I_F = 0 mA, V_{CE} = 80 V
	OPIA413	-	10	200		I_F = 0 mA, V_{CE} = 300 V
	OPIA414	-	-	100		I_F = 0 mA, V_{CE} = 50 V
$V_{CE(SAT)}$	Collector-emitter Saturation Voltage					
	OPIA400	-	0.1	0.2	V	I_F = 20 mA, I_C = 1 mA
	OPIA405, OPIA407	-	0.1	0.3		I_F = 10 mA, I_C = 2 mA
	OPIA402, OPIA404, OPIA410	-	0.1	0.3		I_F = 20 mA, I_C = 1 mA
	OPIA413	-	-	0.4		I_F = 8 mA, I_C = 2.4 mA
	OPIA414	-	0.1	0.2		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
	OPIA400, OPIA410, OPIA413	-	80	-		
t_R	Rise Time					
	OPIA400, OPIA402, OPIA414	-	4	18	µs	V_{CC} = 2 V, I_C = 2 mA, R_L = 100 Ω
	OPIA405, OPIA407	-	3	18		V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω
	OPIA404, OPIA410	-	5	20		V_{CC} = 2 V, I_C = 2 mA, R_L = 100 Ω
	OPIA413	-	2	-		V_{CC} = 10 V, I_C = 2 mA, R_L = 100 Ω
t_F	Fall Time					
	OPIA400D, OPIA402, OPIA414	-	3	18	µs	V_{CC} = 2 V, I_C = 2 mA, R_L = 100 Ω
	OPIA405, OPIA407	-	5	18		V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω
	OPIA404, OPIA410	-	4	20		V_{CC} = 2 V, I_C = 2 mA, R_L = 100 Ω
	OPIA413	-	3	-		V_{CC} = 10 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, OPIA412	-	-	1.0	µA	I_F = 0 mA, V_{CE} = 200 V
	OPIA403, OPIA411	-	-	1.0		I_F = 0 mA, V_{CE} = 10 V
	OPIA406, OPIA408	-	-	0.4		I_F = 0 mA, V_{CE} = 40 V
	OPIA409	-	-	0.4		I_F = 0 mA, V_{CE} = 300 V
$V_{CE(SAT)}$	Collector-emitter Saturation Voltage					
	OPIA403	-	-	1.0	V	I_F = 20 mA, I_C = 1 mA
	OPIA406, OPIA408, OPIA409	-	-	1.0		I_F = 1 mA, I_C = 2 mA
	OPIA411	-	0.8	1.0		I_F = 20 mA, I_C = 5 mA
	OPIA412	-	-	1.5		I_F = 20 mA, I_C = 5 mA
	OPIA401	-	-	1.5		I_F = 20 mA, I_C = 100 mA
f_C	Cut-Off frequency					
	OPIA401, OPIA406, OPIA408, OPIA409	-	-	-	K Hz	-
	OPIA411	1.0	6.0	-		V_{CC} = 2 V, I_C = 20 mA, R_L = 100 Ω
	OPIA403, OPIA412	-	7.0	-		V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω
t_R	Rise Time					
	OPIA401	-	100	300	µs	V_{CC} = 2 V, I_C = 20 mA, R_L = 100 Ω
	OPIA403	-	60	300		V_{CC} = 2 V, I_C = 2 mA, R_L = 100 Ω
	OPIA406, OPIA408	-	200	-		V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω
	OPIA409	-	40	-		V_{CC} = 5 V, I_C = 10 mA, R_L = 100 Ω
	OPIA411	-	80	300		V_{CC} = 2 V, I_C = 20 mA, R_L = 100 Ω
	OPIA412	-	60	300		V_{CC} = 2 V, I_C = 20 mA, R_L = 100 Ω
t_F	Fall Time					
	OPIA401	-	20	100	µs	V_{CC} = 2 V, I_C = 20 mA, R_L = 100 Ω
	OPIA403	-	53	250		V_{CC} = 2 V, I_C = 2 mA, R_L = 100 Ω
	OPIA406, OPIA408	-	200	-		V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω
	OPIA409	-	10	-		V_{CC} = 5 V, I_C = 10 mA, R_L = 100 Ω
	OPIA411	-	72	250		V_{CC} = 2 V, I_C = 20 mA, R_L = 100 Ω
	OPIA412	-	50	250		V_{CC} = 2 V, I_C = 20 mA, R_L = 100 Ω
Coupled Characteristics						
CTR	Current Transfer Ratio				%	
	OPIA400, OPIA404, OPIA413	50	-	600		I_F = 5.00 mA, V_{CE} = 5.0 V
	OPIA401	1,000	-	-		I_F = 1.00 mA, V_{CE} = 2.0 V
	OPIA402	20	-	400		I_F = 1.00 mA, V_{CE} = 5.0 V
	OPIA403	600	-	7,500		I_F = 1.00 mA, V_{CE} = 2.0 V
	OPIA405	80	-	600		I_F = 5.00 mA, V_{CE} = 5.0 V
	OPIA406, OPIA408	20	2,000	-		I_F = 1.00 mA, V_{CE} = 2.0 V
	OPIA407	0.3	1.0	3.0		I_F = 5.00 mA, V_{CE} = 5.0 V
	OPIA409	400	2,000	-		I_F = 1.00 mA, V_{CE} = 2.0 V
	OPIA410	60	-	600		I_F = 1.00 mA, V_{CE} = 2.0 V
	OPIA411	70	-	-		I_F = 0.05 mA, V_{CE} = 3.3 V
	OPIA412	600	-	9,000		I_F = 1.00 mA, V_{CE} = 2.0 V
	OPIA414	100	-	600		I_F = 1.00 mA, V_{CE} = 5.0 V
C_f	Floating Capacitance				pF	
	OPIA405, OPIA406, OPIA407, OPIA408, OPIA409	-	0.6	1.0		V = 0.0 V, f = 1M Hz
		-	0.4	-		
R_{ISO}	Isolation resistance	$5X10^{10}$	10^{11}	-	ohm	C500V, 40% to 60%RH

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OPIA400, OPIA414

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

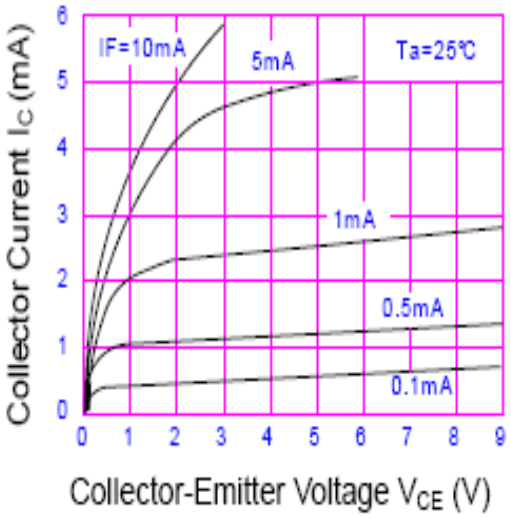


Fig.7 **Relative Current Transfer Ratio vs. Ambient Temperature**

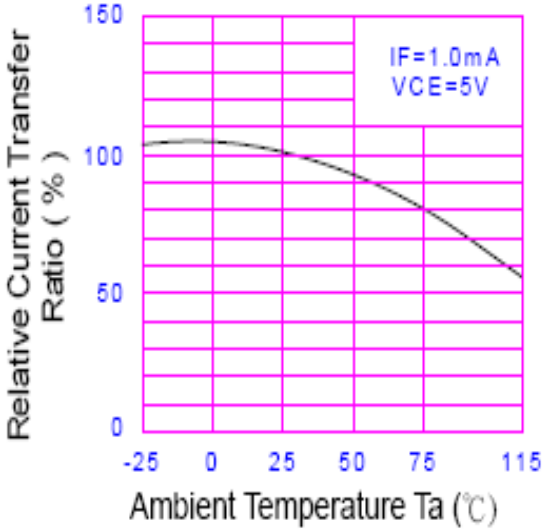


Fig.4 **Forward Current vs. Ambient Temperature**

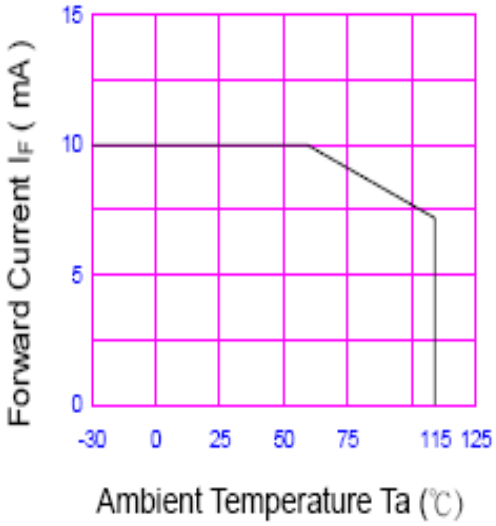
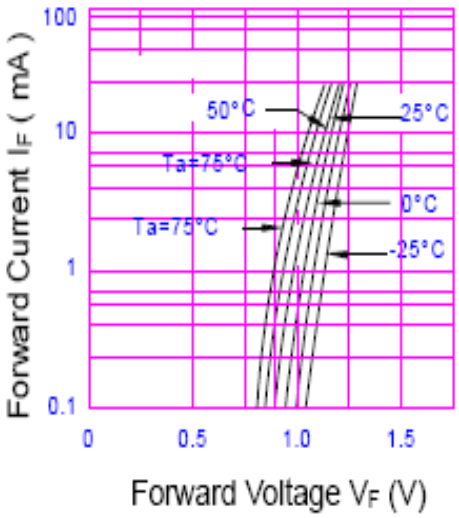


Fig.5 **Forward Current vs. Forward Voltage**



OPIA400, OPIA414

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

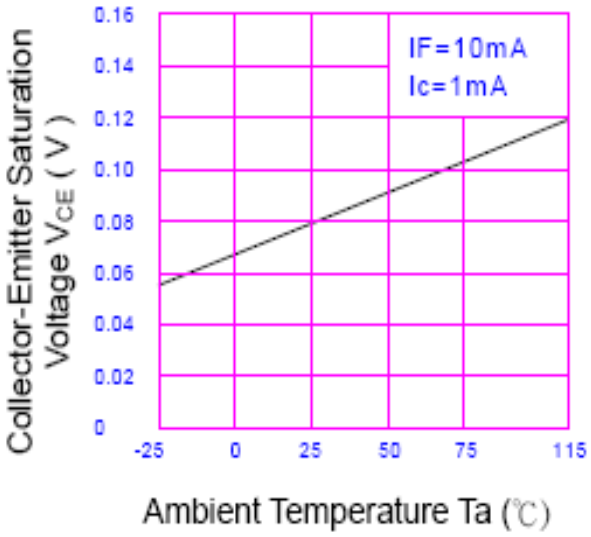


Fig.9 **Collector-Emitter Saturation Voltage vs. Forward Current**

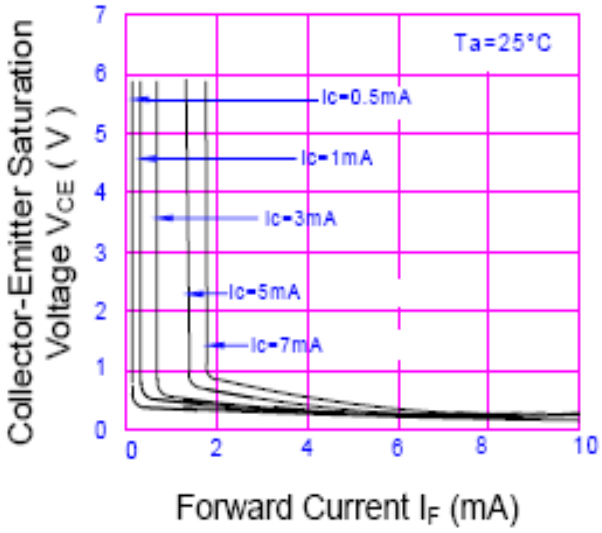


Fig.10 **Response Time vs. Load Resistance**

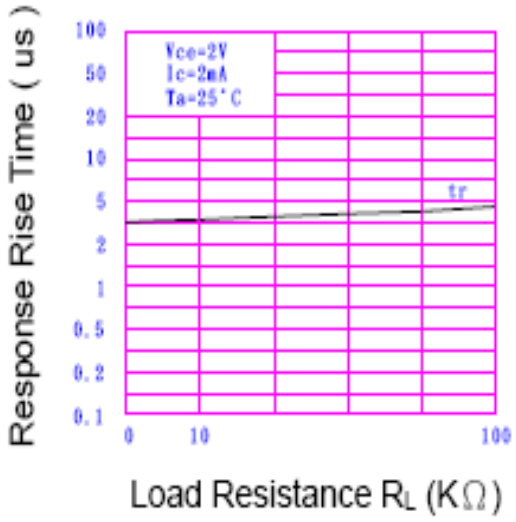
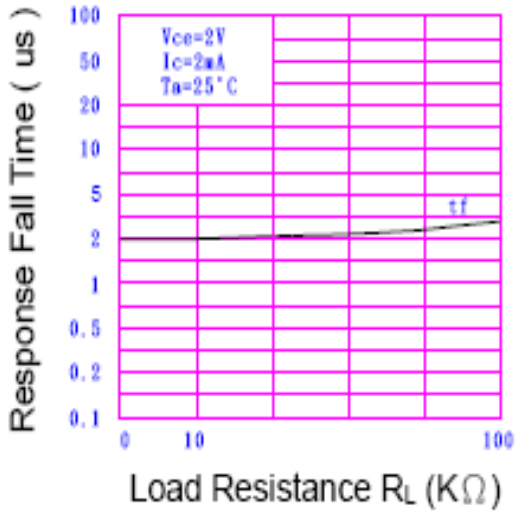


Fig.11 **Response Time vs. Load Resistance**



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OPIA401

Fig.1 Forward Current vs. Ambient Temperature

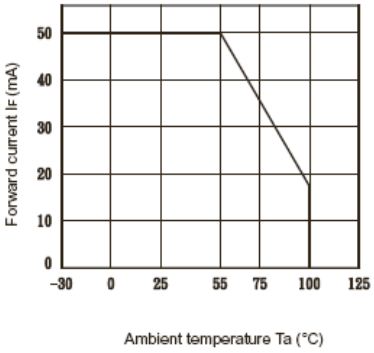

Fig.2 Collector Power Dissipation vs. Ambient Temperature

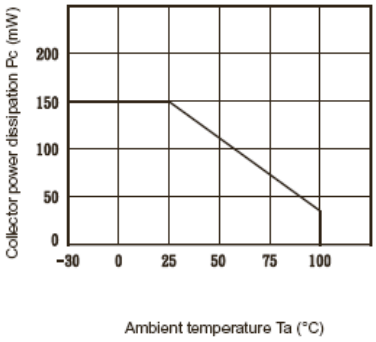

Fig.3 Peak Forward Current vs. Duty Ratio

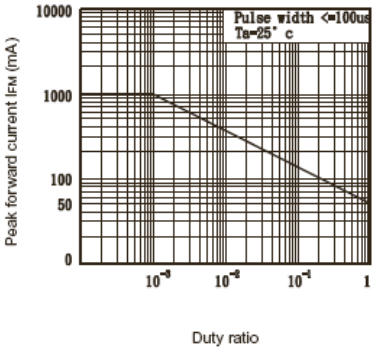

Fig.4 Forward Current vs. Forward Voltage

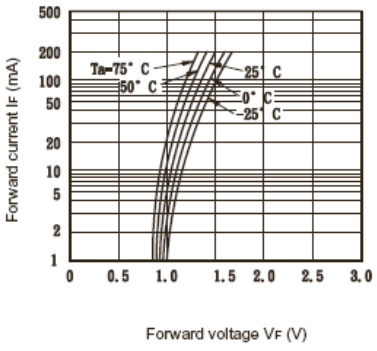

Fig.5 Current Transfer Ratio vs. Forward Current

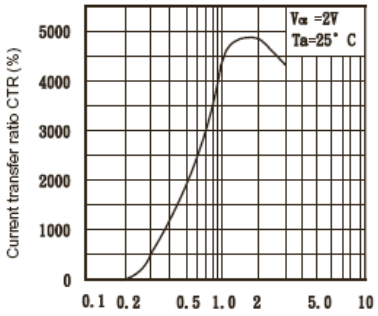

Fig.6 Collector Current vs. Collector-emitter Voltage

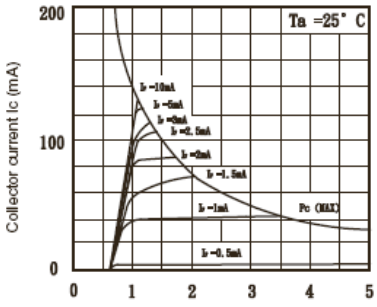

Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

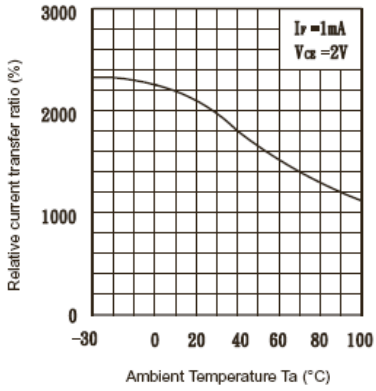

Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

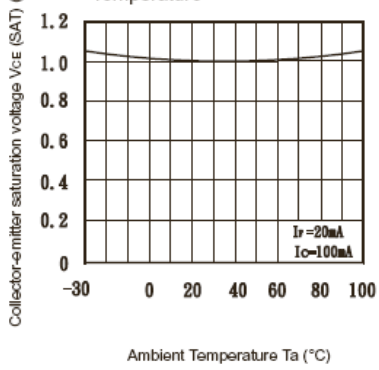

Fig.9 Collector Dark Current vs. Ambient Temperature

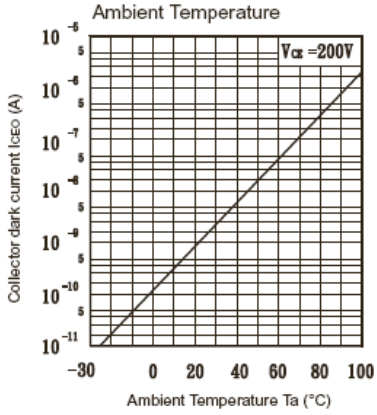

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Fig.10 Response Time vs. Load Resistance

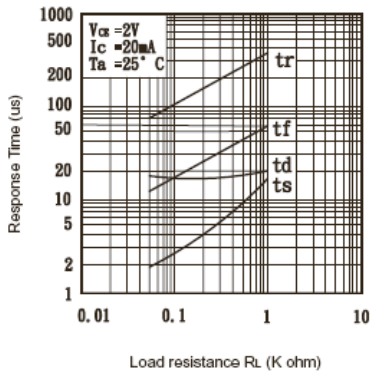

Fig.11 Frequency Response

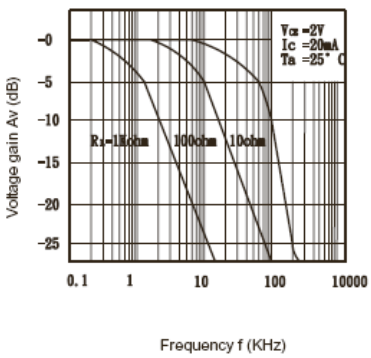

Fig.12 Collector- emitter Saturation Voltage vs. Forward current

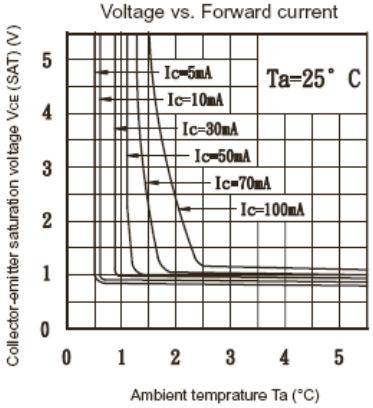

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Fig. 1 Forward Current vs. Ambient Temperature

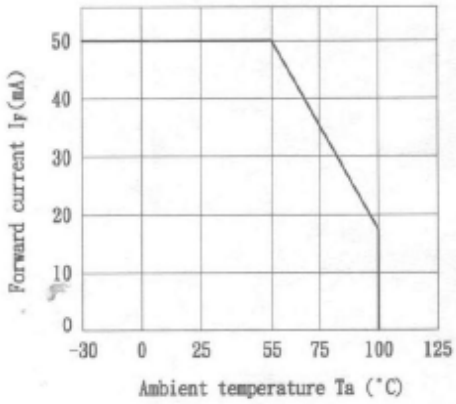

Fig. 2 Diode Power Dissipation vs. Ambient Temperature

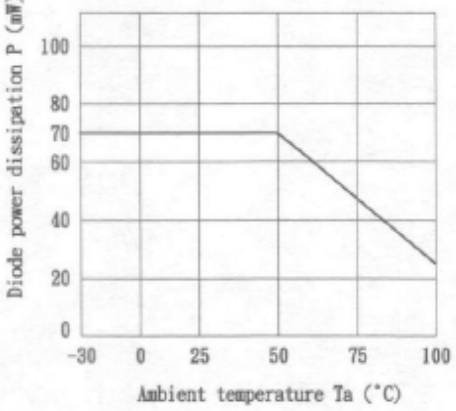

Fig. 3 Collector Power Dissipation vs. Ambient Temperature

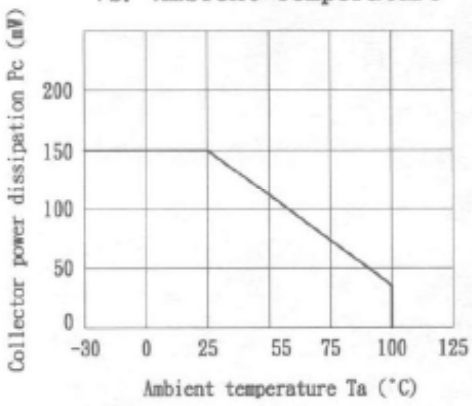

Fig. 4 Total Power Dissipation vs. Ambient Temperature

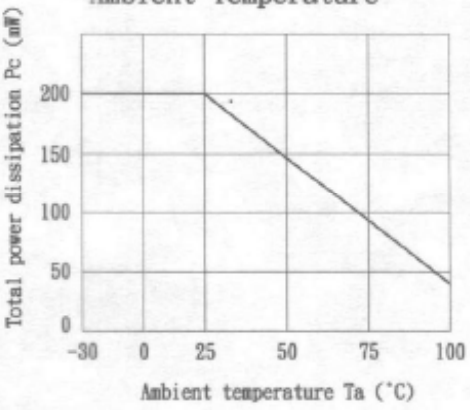

Fig. 5 Peak Forward Current vs. Duty Ratio

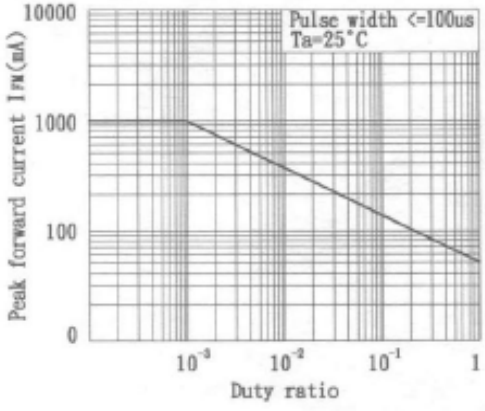

Fig. 6 Forward Current vs. Forward Voltage

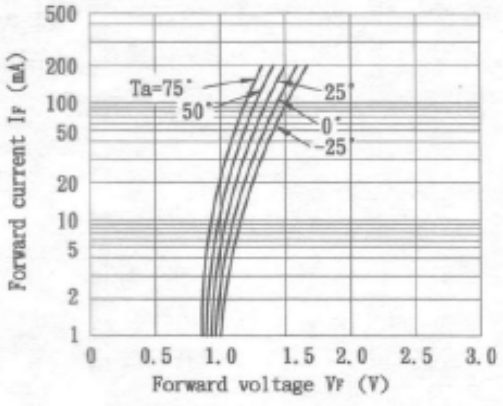

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Fig. 7 Current Transfer Ratio vs. Forward Current

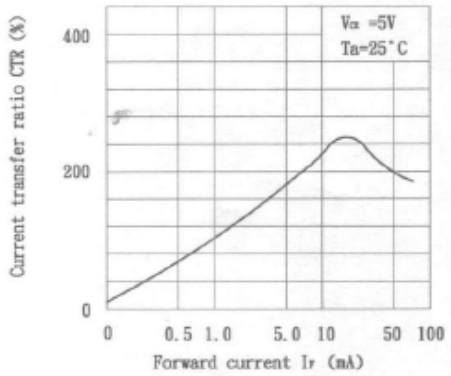

Fig. 8 Collector Current vs. Collector-emitter Voltage

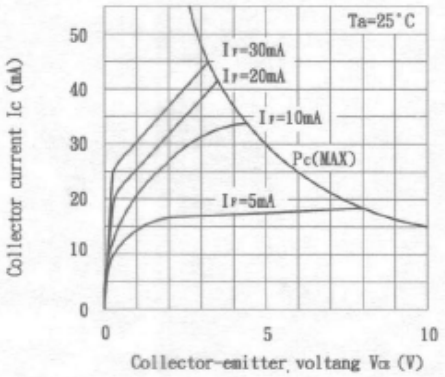

Fig. 9 Relative Current Transfer Ratio vs. Ambient Temperature

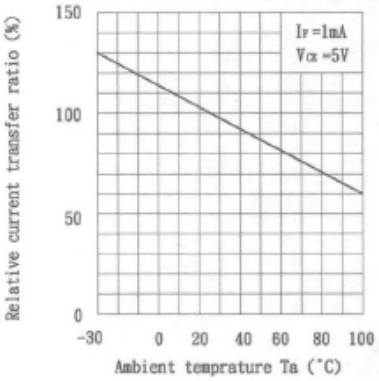

Fig. 10 Collector-emitter Saturation Voltage vs. Ambient Temperature

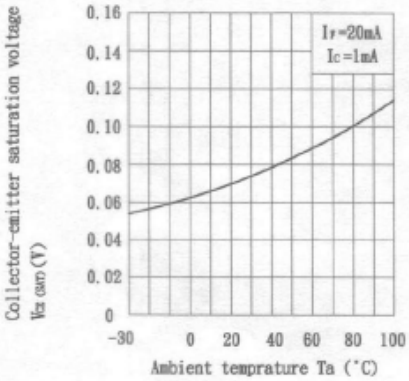

Fig. 11 Collector Dark Current vs. Ambient Temperature

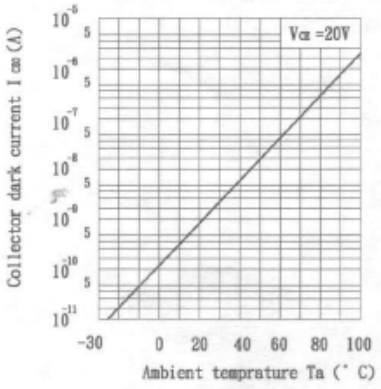

Fig. 12 Response Time vs. Load Resistance

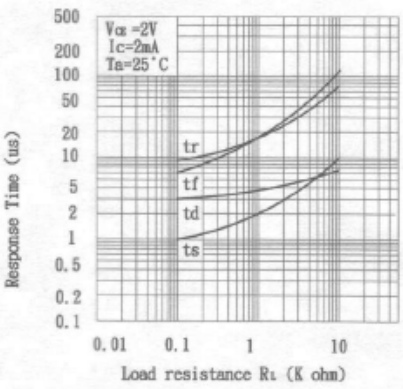

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Fig. 1 Forward Current vs. Ambient Temperature

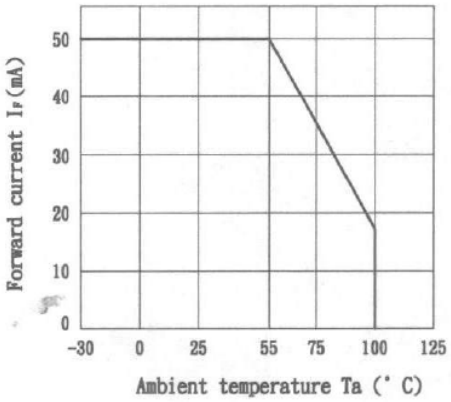

Fig. 2 Collector Power Dissipation vs. Ambient Temperature

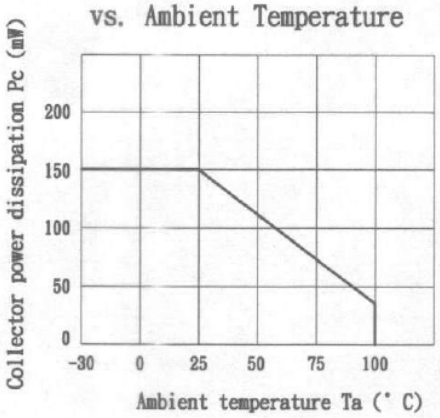

Fig. 3 Peak Forward Current vs. Duty Ratio

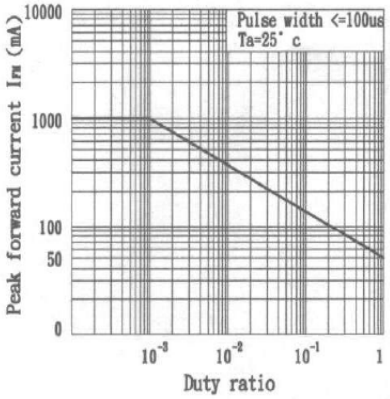

Fig. 4 Forward Current vs. Forward Voltage

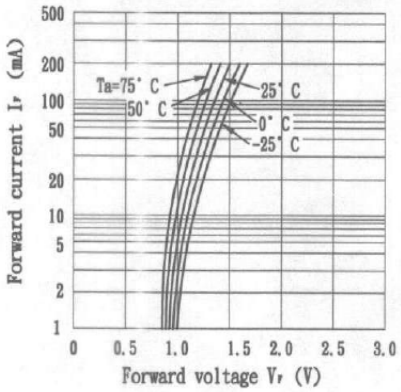

Fig. 5 Current Transfer Ratio vs. Forward Current

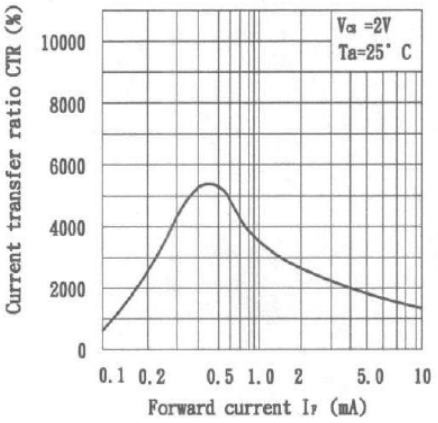

Fig. 6 Collector Current vs. Collector-emitter Voltage

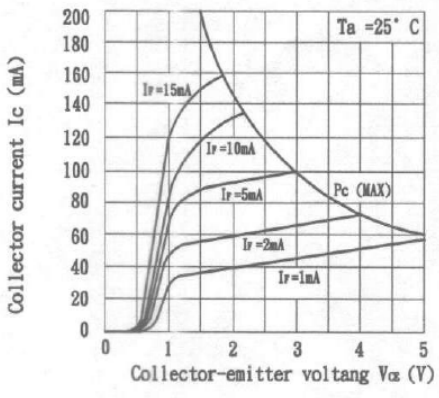

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Fig. 7 Relative Current Transfer Ratio vs. Ambient Temperature

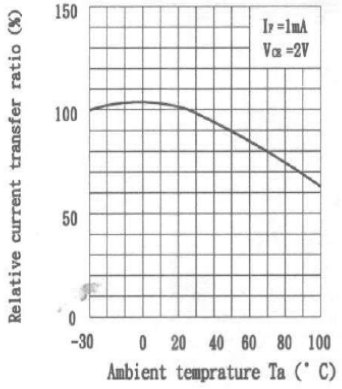

Fig. 8 Collector-emitter Saturation Voltage vs. Ambient Temperature

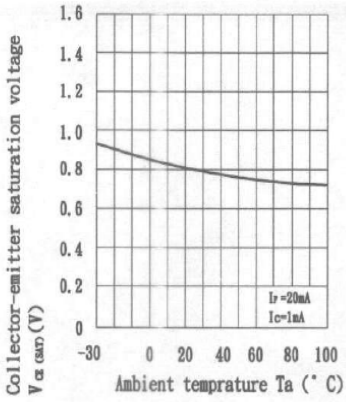

Fig. 9 Collector Dark Current vs. Ambient Temperature

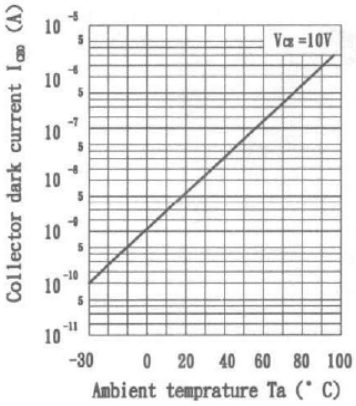

Fig. 10 Response Time vs. Load Resistance

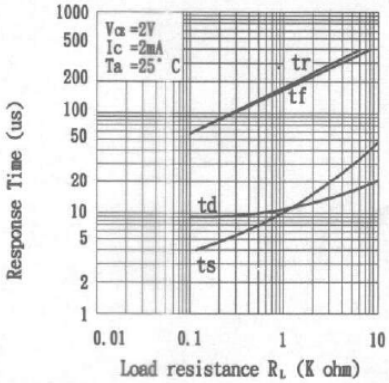

Fig. 11 Collector-emitter Saturation Voltage vs. Forward Current

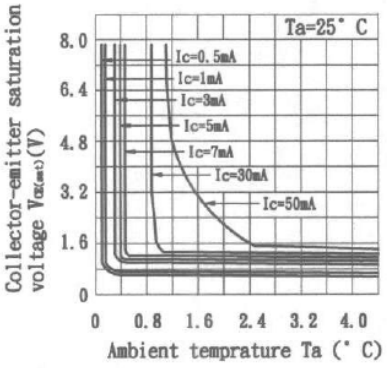

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Fig. 1 Current Transfer Ratio vs. Forward Current

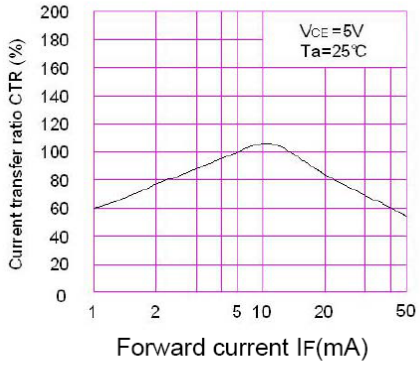

Fig.2 Collector Power Dissipation vs. Ambient Temperature

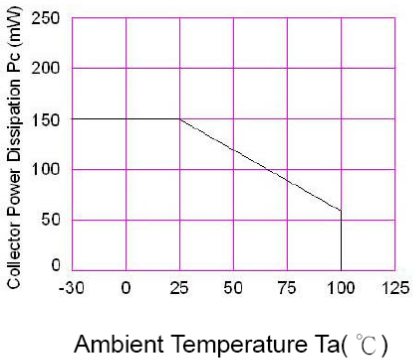

Fig.3 Collector Dark Current vs. Ambient Temperature

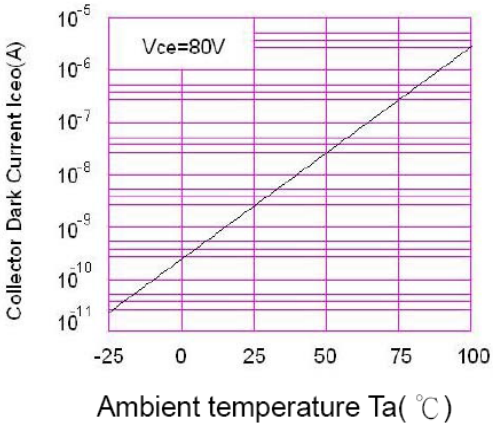

Fig.4 Forward Current vs. Ambient Temperature

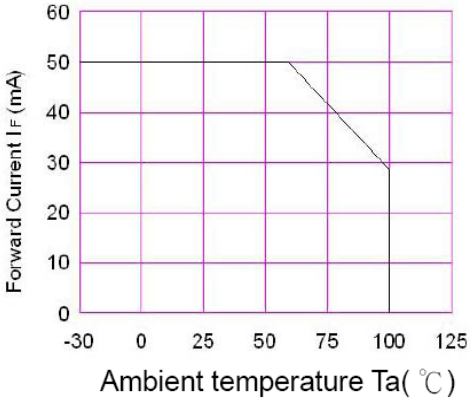

Fig.5 Forward Current vs. Forward Voltage

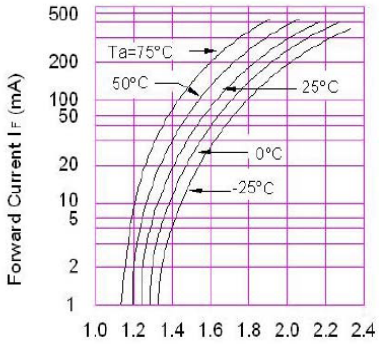

Fig.6 Collector Current vs. Collector-emitter Voltage

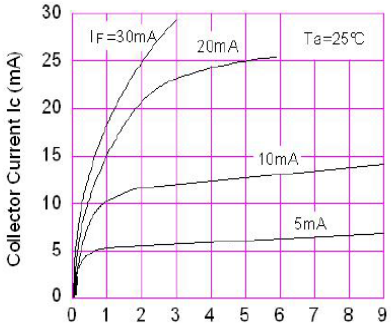

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Fig.7 Collector-emitter Saturation Voltage vs. Ambient Temperature

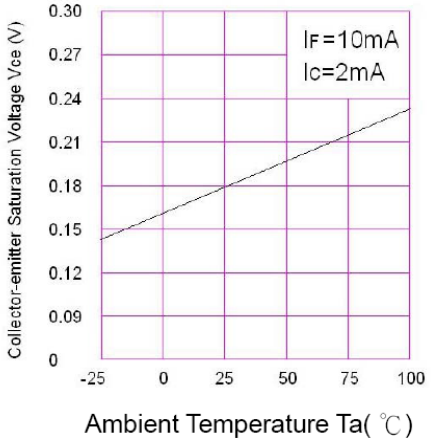

Fig.8 Collector-emitter Saturation Voltage vs. Forward Current

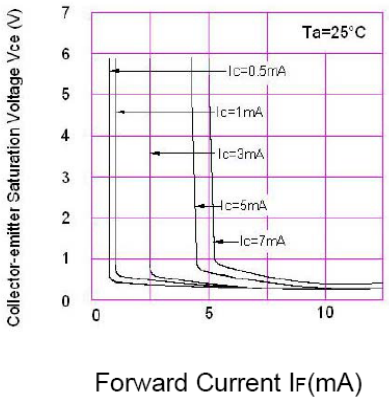

Fig.9 Response Time vs. Load Resistance

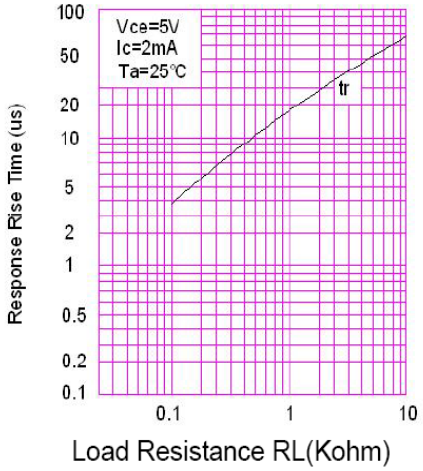

Fig.10 Response Time vs. Load Resistance

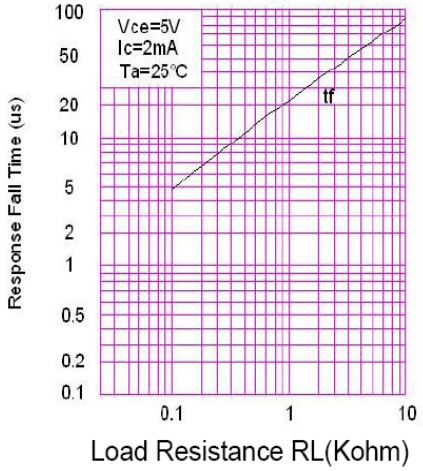

Fig.11 Relative Current Transfer Ratio vs. Ambient Temperature

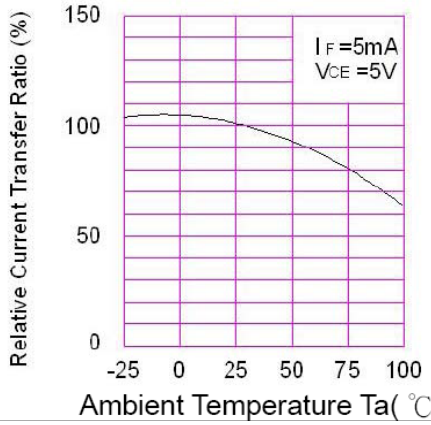

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Fig. 1 Current Transfer Ratio vs. Forward Current

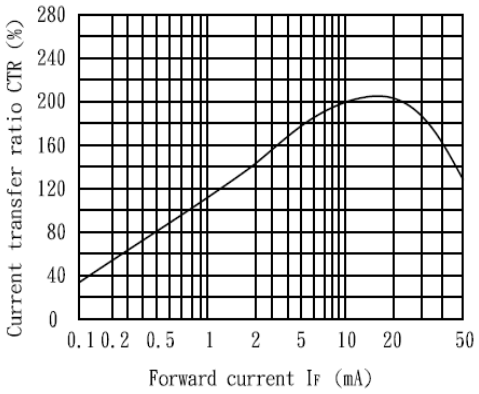

Fig. 2 Collector Power Dissipation vs. Ambient Temperature

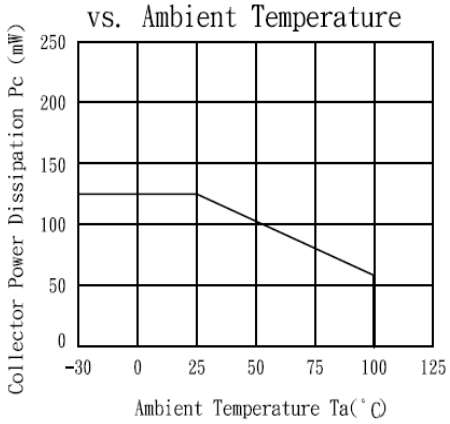

Fig. 3 Collector Dark Current vs. Ambient Temperature

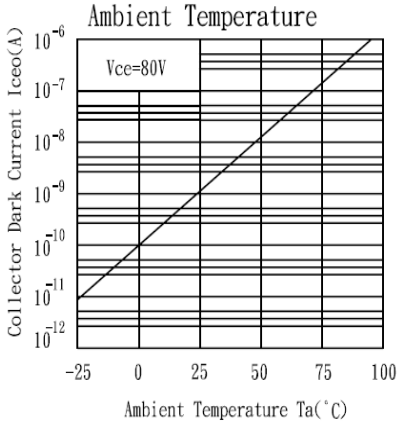

Fig. 4 Forward Current vs. Ambient Temperature

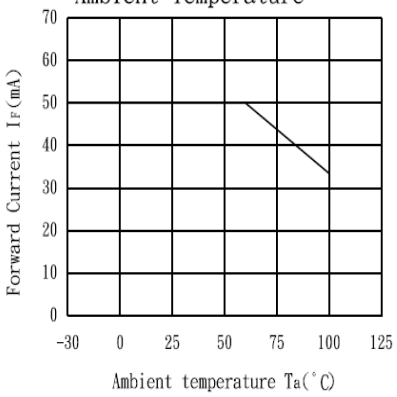

Fig. 5 Forward Current vs. Forward Voltage

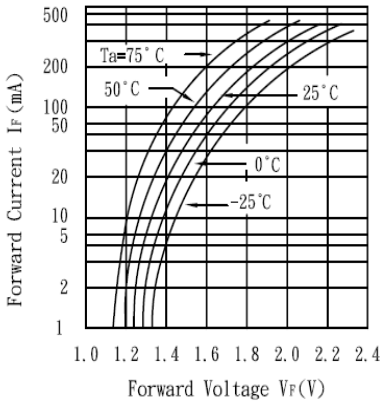

Fig. 6 Collector Current vs. Collector-emitter Voltage

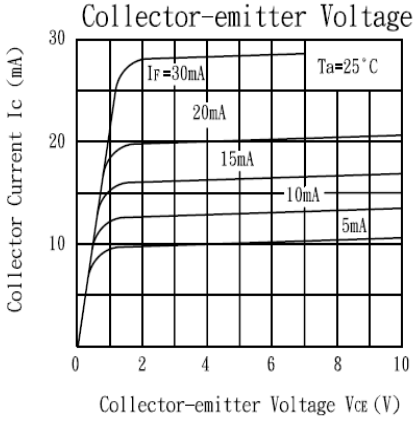

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Fig. 7 Collector-emitter Saturation Voltage vs. Ambient Temperature

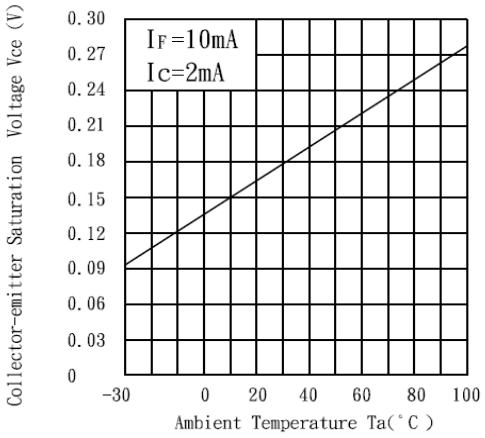


Fig. 8 Collector-emitter Saturation Voltage vs. Forward Current

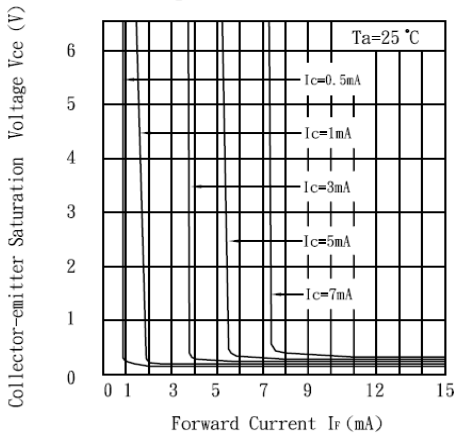


Fig. 9 Response Time vs. Load Resistance

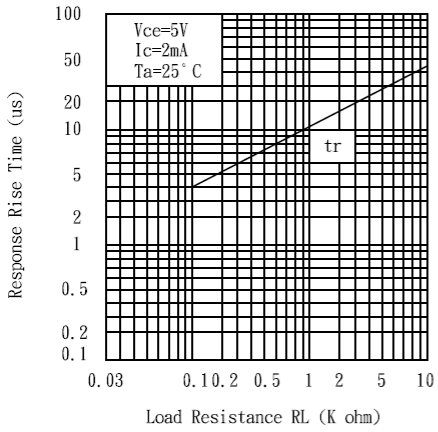


Fig. 10 Response Time vs. Load Resistance

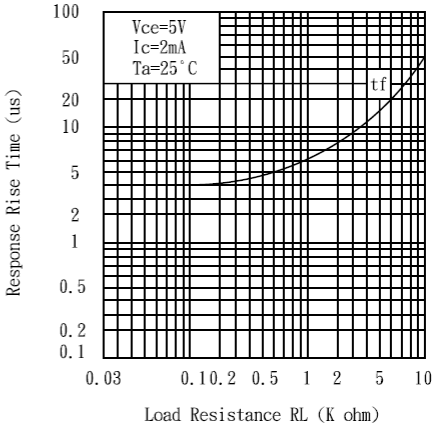
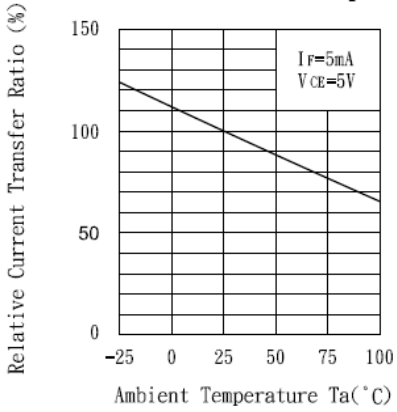


Fig. 11 Relative Current Transfer Ratio vs. Ambient Temperature



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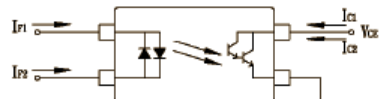
*1 CTR1=IC1 / IF1 , CTR1=IC2 / IF2



*2 Test circuit for switching time

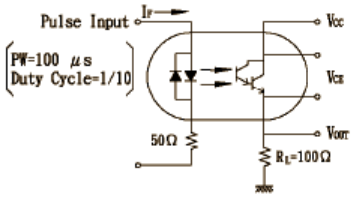


Fig.1 Forward Current vs. Ambient Temperature

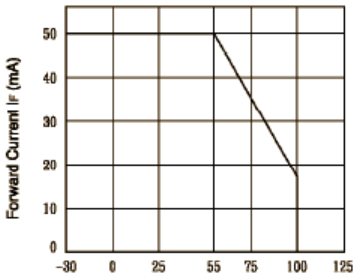


Fig.2 Collector Power Dissipation vs. Ambient Temperature

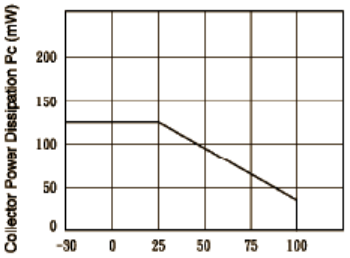


Fig.3 Peak Forward Current vs. Duty Ratio

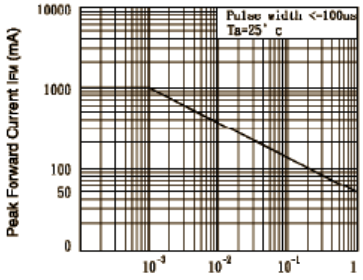


Fig.4 Forward Current vs. Forward Voltage

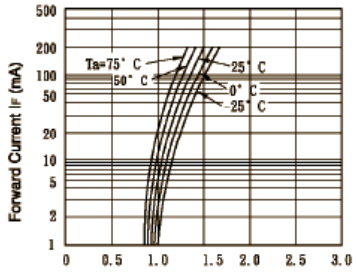


Fig.5 Current Tranfer Ratio vs. Forward Current

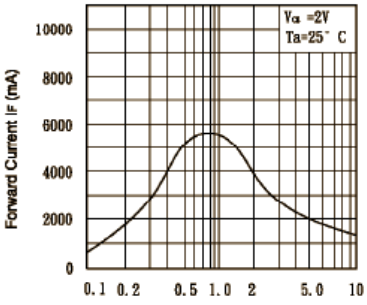


Fig.6 Collector Current vs. Collector-emitter Voltage

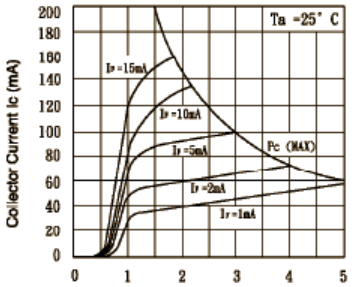


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

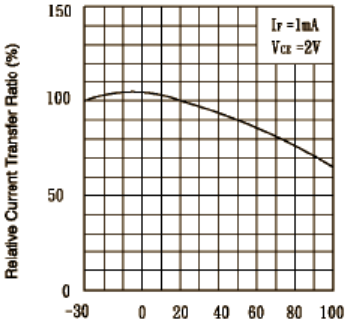


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

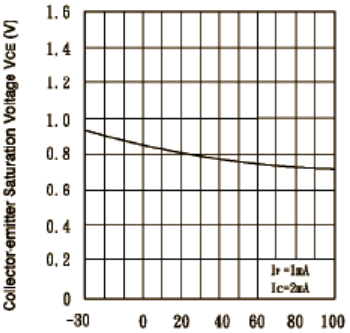


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Fig.9 Collector Dark Current vs. Ambient Temperature

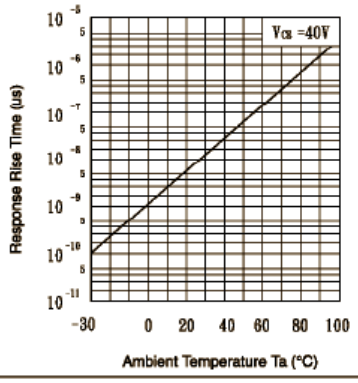


Fig.10 Response Time vs. Load Resistance

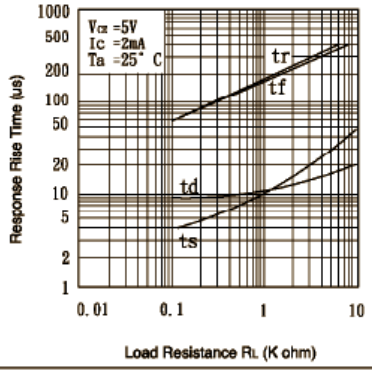
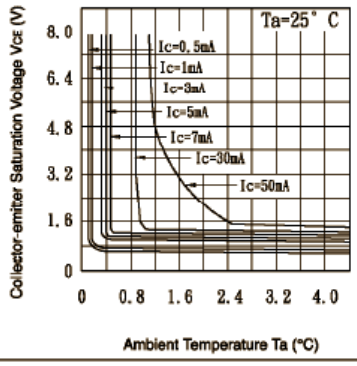


Fig.11 Collector-emitter Saturation Voltage vs. Forward Current



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*1 Test circuit for switching time

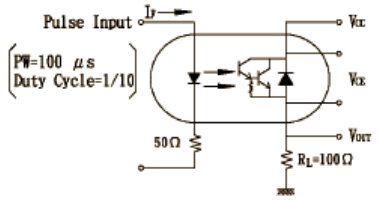


Fig.1 Current Transfer Ratio vs. Forward Current

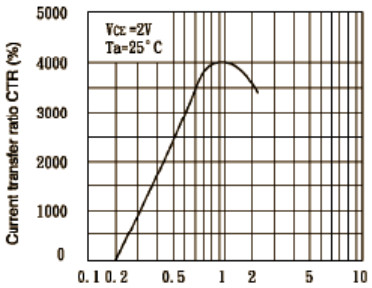


Fig.2 Collector Power Dissipation vs. Ambient Temperature

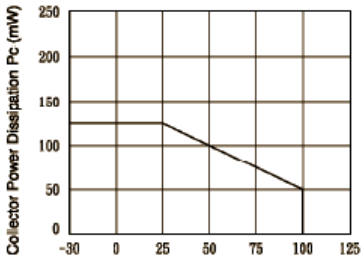


Fig.3 Collector Dark Current vs. Ambient Temperature

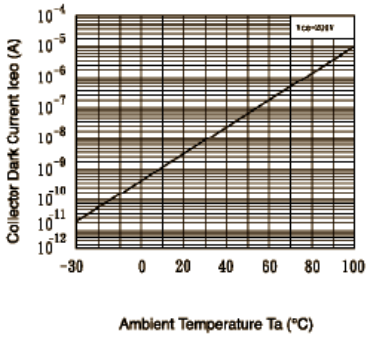


Fig.4 Forward Current vs. Ambient Temperature

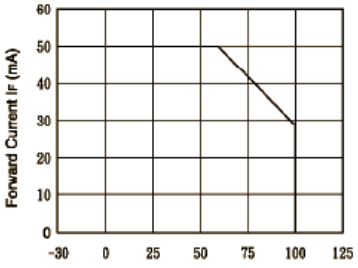


Fig.5 Forward Current vs. Forward Voltage

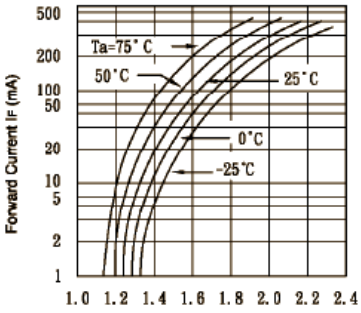


Fig.6 Collector Current vs. Collector-emitter Voltage

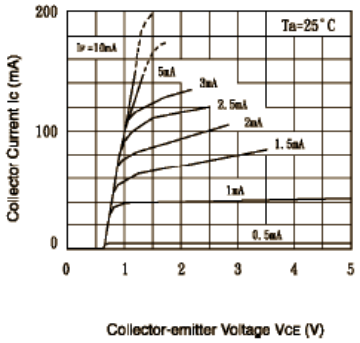


Fig.7 Collector-emitter Saturation Voltage vs. Forward Current

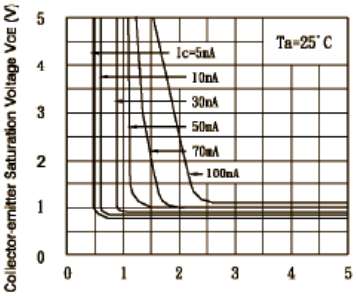
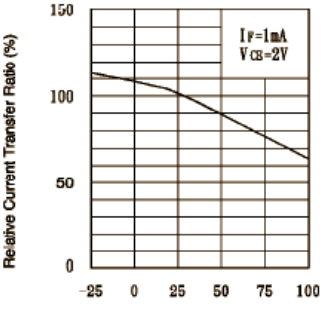


Fig.8 Relative Current Transfer Ratio vs. Ambient Temperature



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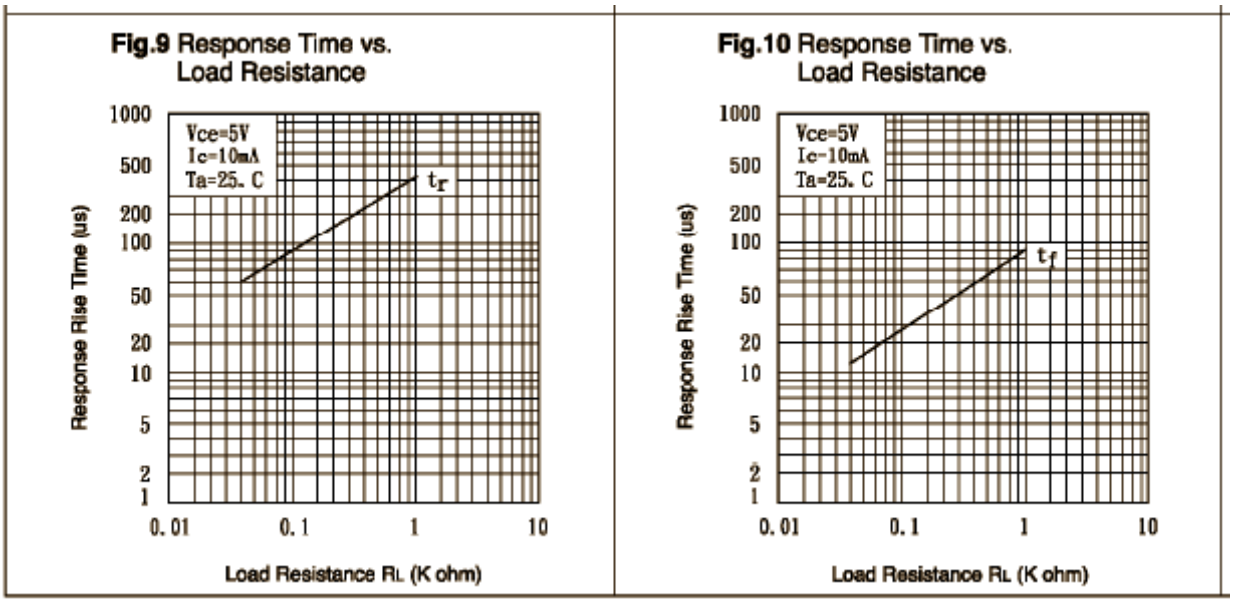

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Fig.1 Current Transfer Ratio vs. Forward Current

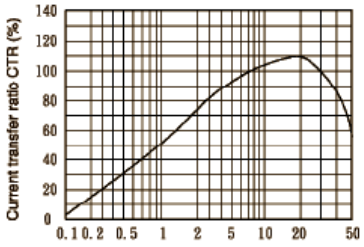

Fig.2 Collector Power Dissipation vs. Ambient Temperature

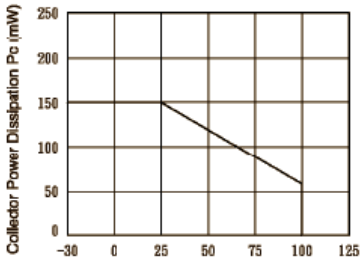

Fig.3 Collector Dark Current vs. Ambient Temperature

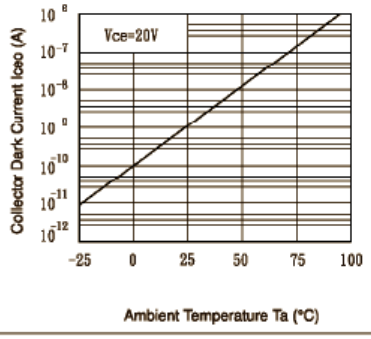

Fig.4 Forward Current vs. Ambient Temperature

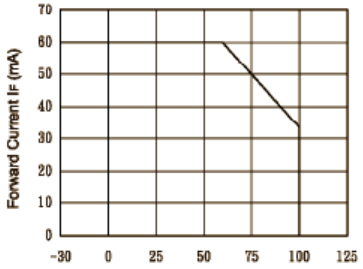

Fig.5 Forward Current vs. Forward Voltage

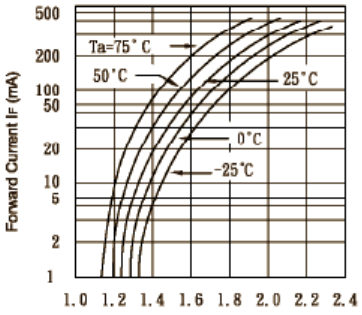

Fig.6 Collector Current vs. Collector-emitter Voltage

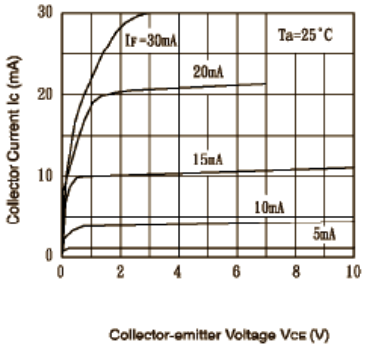

Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

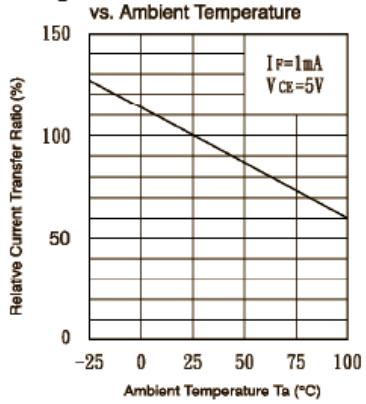

Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

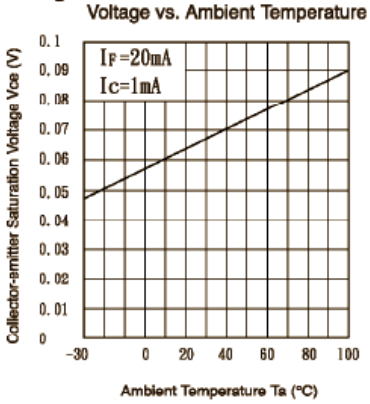

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Fig.9 Collector-emitter Saturation Voltage vs. Forward Current

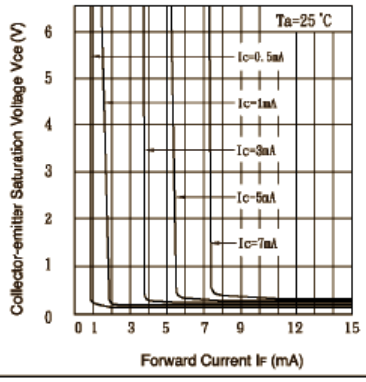

Fig.10 Response Time vs. Load Resistance

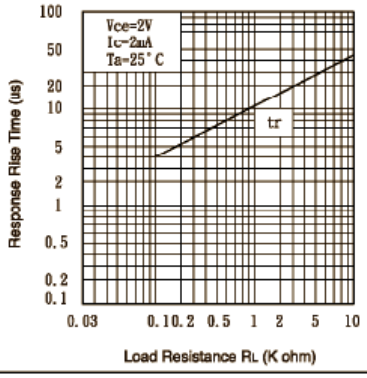

Fig.11 Response Time vs. Load Resistance

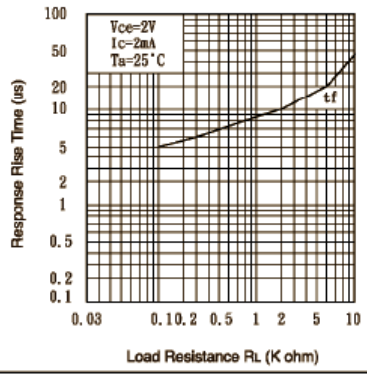

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Fig. 1 Forward Current vs. Ambient Temperature

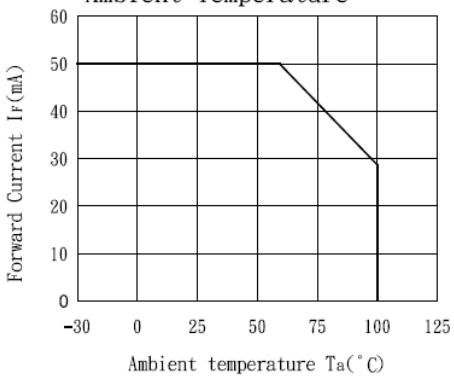

Fig. 2 Collector Power Dissipation vs. Ambient Temperature

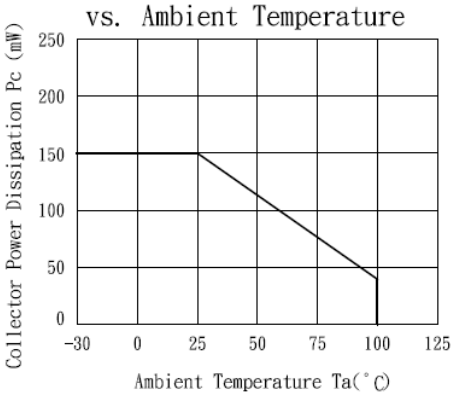

Fig. 3 Collector-emitter Saturation Voltage vs. Forward Current

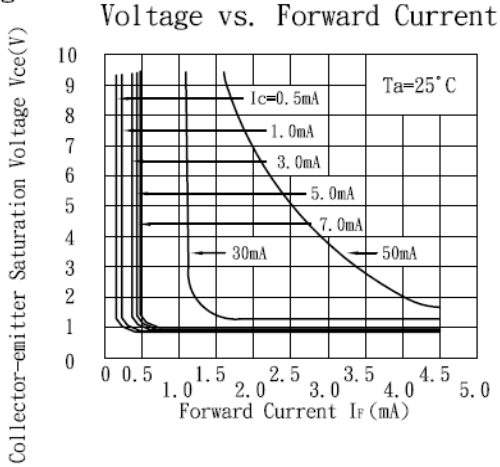

Fig. 4 Forward Current vs. Forward Voltage

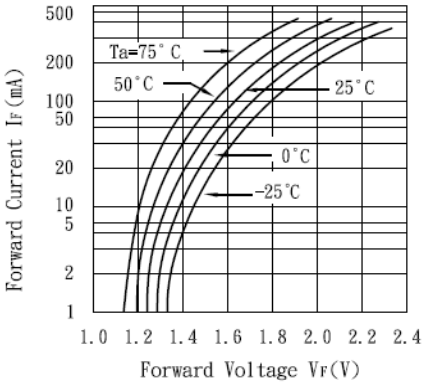

Fig. 5 Current Transfer Ratio vs. Forward Current

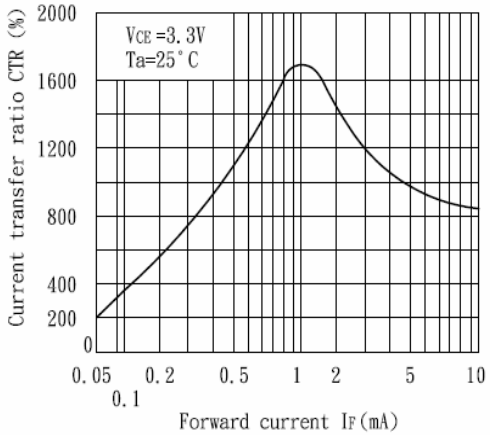

Fig. 6 Collector Current vs. Collector-emitter Voltage

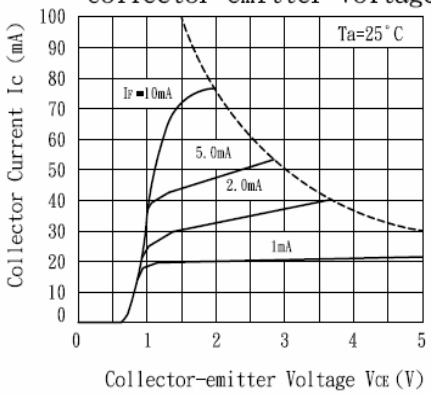

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Fig. 7 Relative Current Transfer Ratio vs. Ambient Temperature

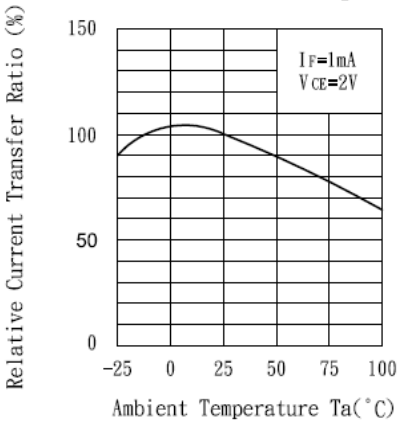

Fig. 7 Collector-emitter Saturation Voltage vs. Ambient Temperature

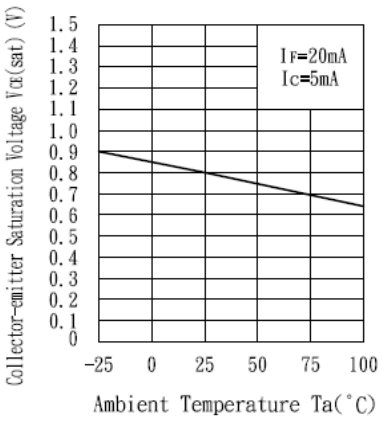

Fig. 9 Collector Dark Current vs. Ambient Temperature

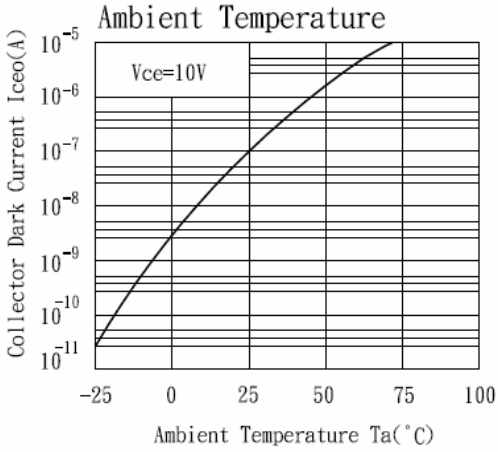

Fig. 10 Response Time vs. Load Resistance

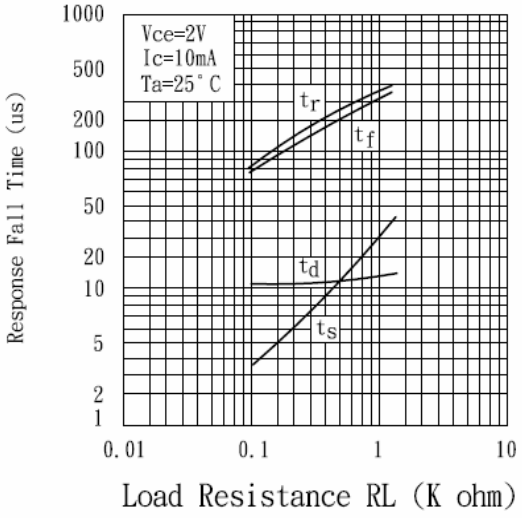

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Fig. 4 Forward Current vs. Ambient Temperature

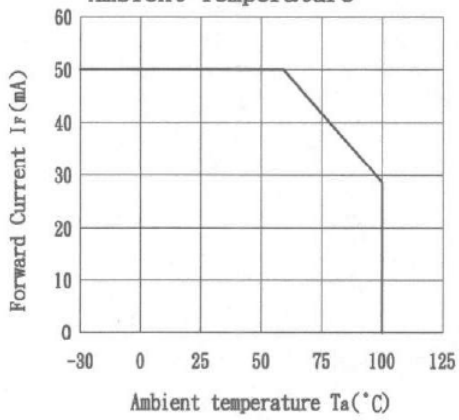

Fig. 5 Forward Current vs. Forward Voltage

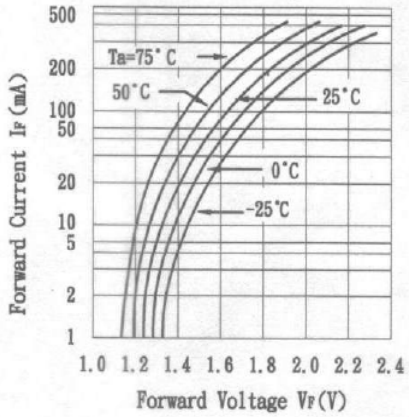

Fig. 2 Collector Power Dissipation vs. Ambient Temperature

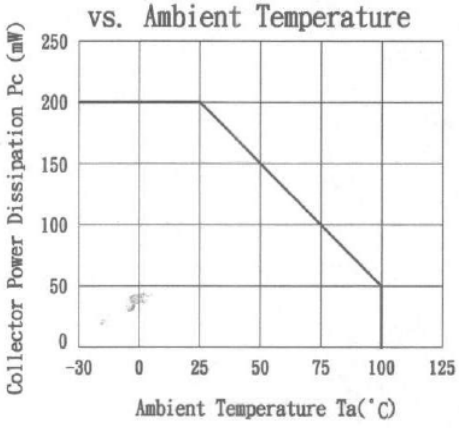

Fig. 3 Collector Dark Current vs. Ambient Temperature

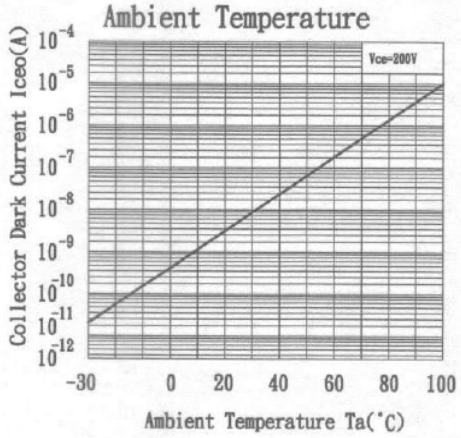

Fig. 6 Collector Current vs. Collector-emitter Voltage

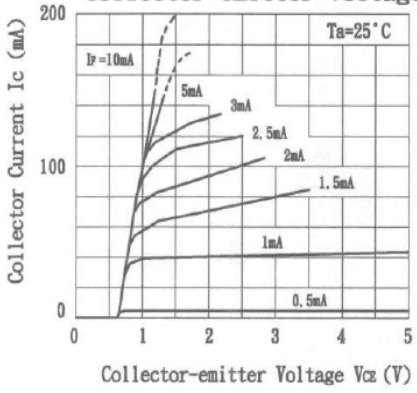

Fig. 7 Relative Current Transfer Ratio vs. Ambient Temperature

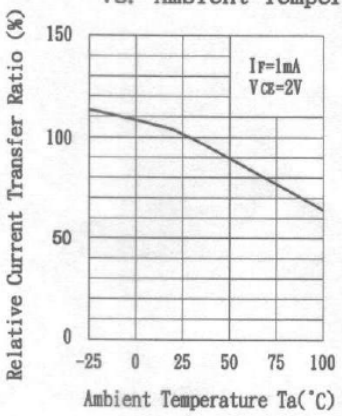

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Fig. 8 Collector-emitter Saturation Voltage vs. Forward Current

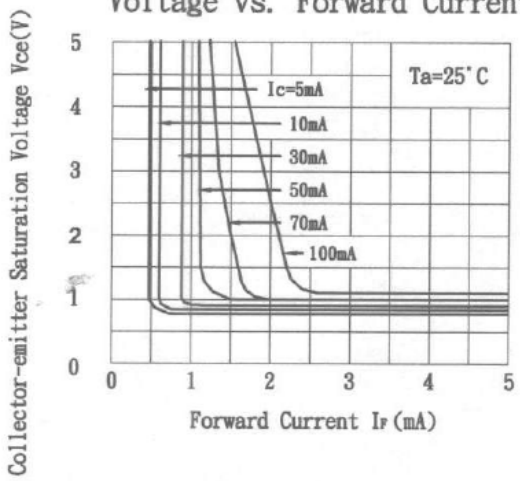

Fig. 9 Response Time vs. Load Resistance

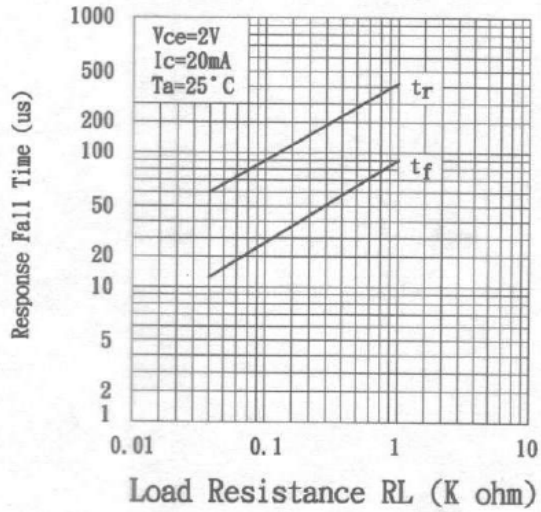

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Fig. 1 Current Transfer Ratio Vs. Forward Current

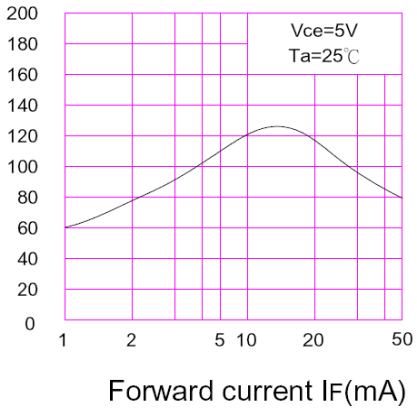

Fig.10 Response Time vs. Load Resistance

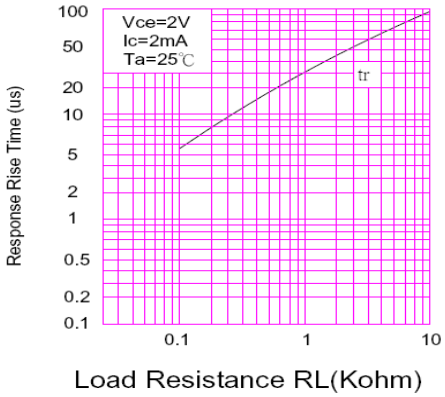

Fig.11 Response Time vs. Load Resistance

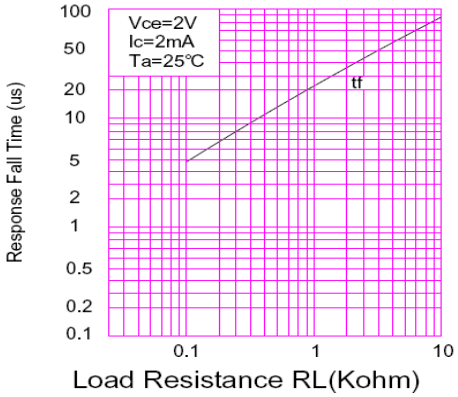

Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

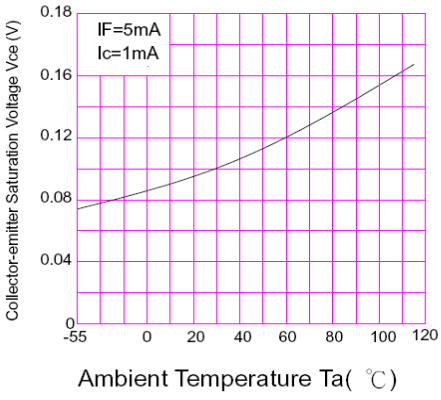

Fig.9 Collector-emitter Saturation Voltage vs. Forward Current

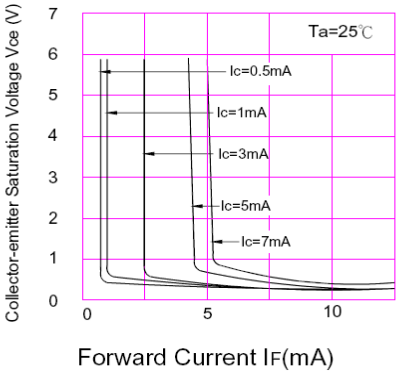

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Fig.4 Forward Current vs. Ambient Temperature

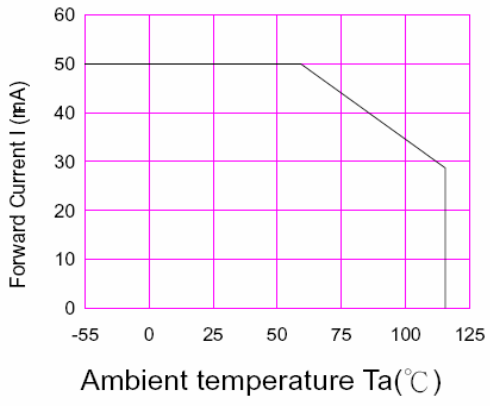


Fig.5 Forward Current vs. Forward Voltage

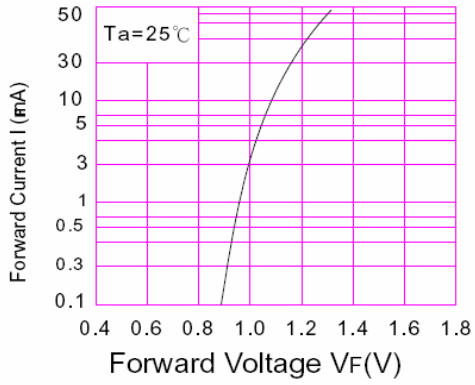


Fig.6 Collector Current vs. Collector-emitter Voltage

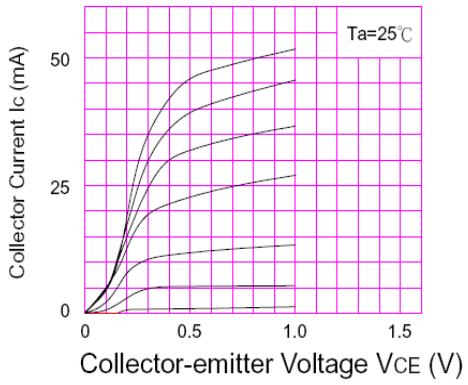


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

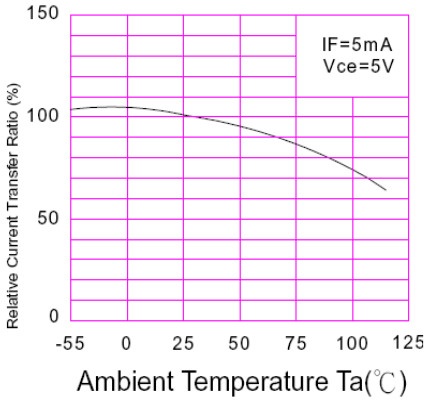


Fig.2 Collector Power Dissipation vs. Ambient Temperature

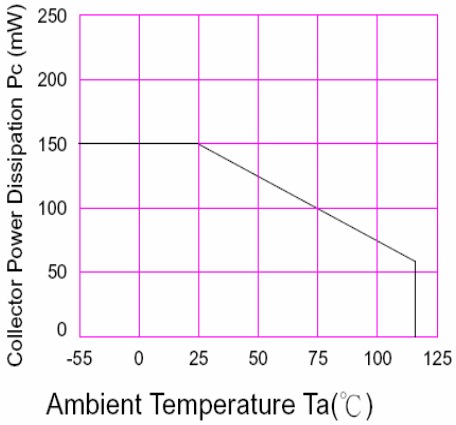
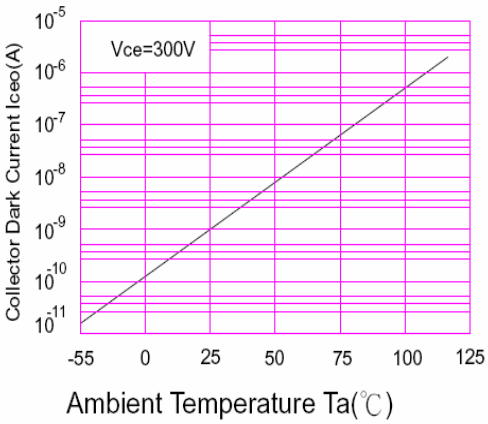


Fig.3 Collector Dark Current vs. Ambient Temperature



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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

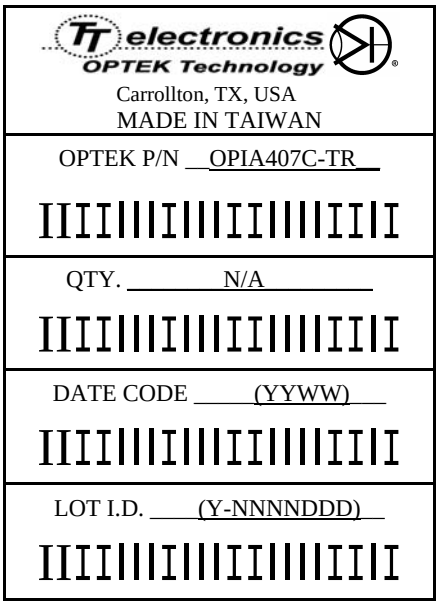
Label Identification

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 52 x 7 x 7.5 cm		Small Carton 53.5 x 16 x 17.5 cm			Medium Carton 53.5 x 30.7 x 17.5 cm			Large Carton 53.5 x 30.7 x 25 cm		
		Qty	Weight	Qty	Weight	Qty	Weight	Gross Weight	Qty	Weight	Gross Weight	Qty	Weight	Gross Weight
P/H and SMD	4-PIN OPIA400D/A, OPIA410D/A - OPIA413D/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 OPIA80XD Series and OPID804D	48	44	1,440	1.44	5,760	6.0	6.5	11,520	12.0	12.5	17,280	18.0	18.5
M/F	OPIA500B, OPIA401B - OPIA404B, OPIA414B	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	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/ 2.54 Lead-Spacing)
SSOP = Slim SOP Packages (Referred as C = 4.40mil SMD with 1.27 Lead-Spacing)

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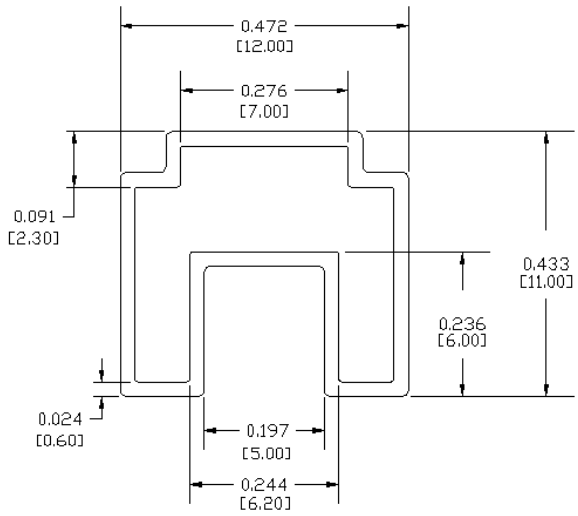
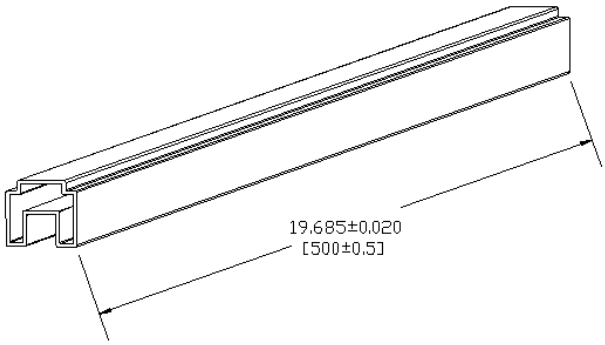
Tube Packaging Specifications—SMD— (TU):



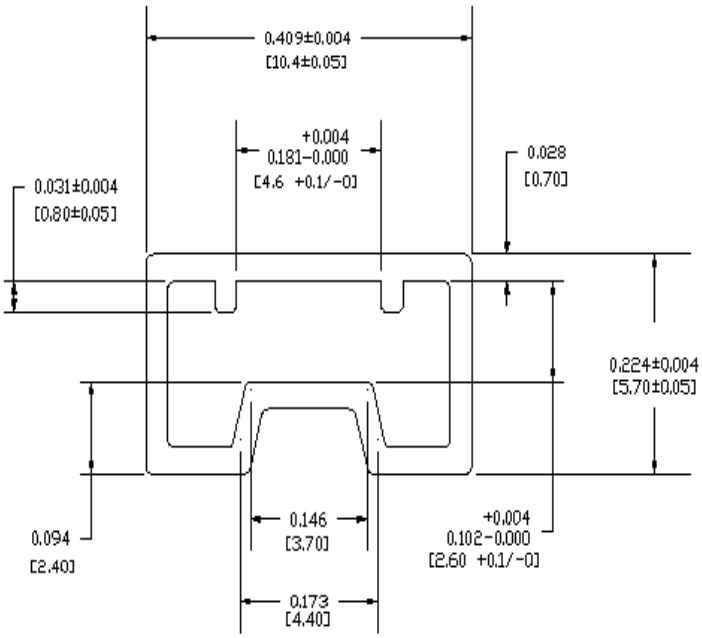


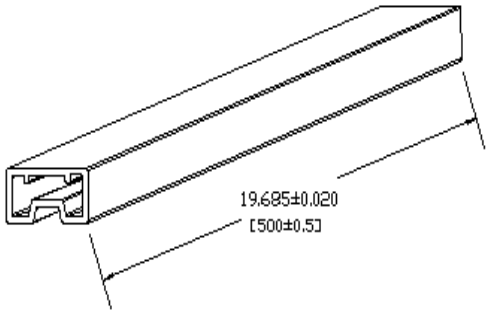
DIMENSIONS ARE IN: INCHES [MILLIMETERS]

TOLERANCE: ± 0.008 INCHES
[± 0.2 MILLIMETERS]

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

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

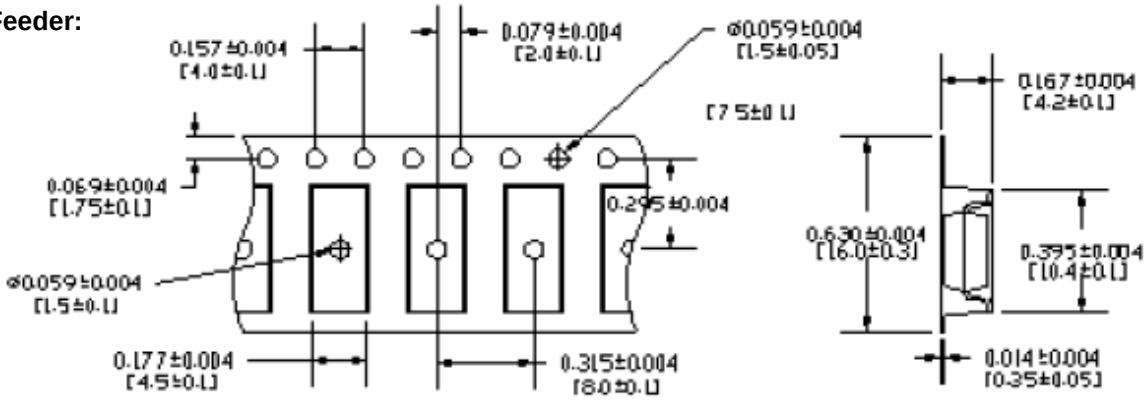




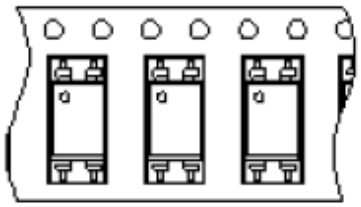
Quantity: 4-pin (SOP): 100pcs/tube
4-pin (SSOP): 170pcs/tube

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

Tape Feeder:



Direction:

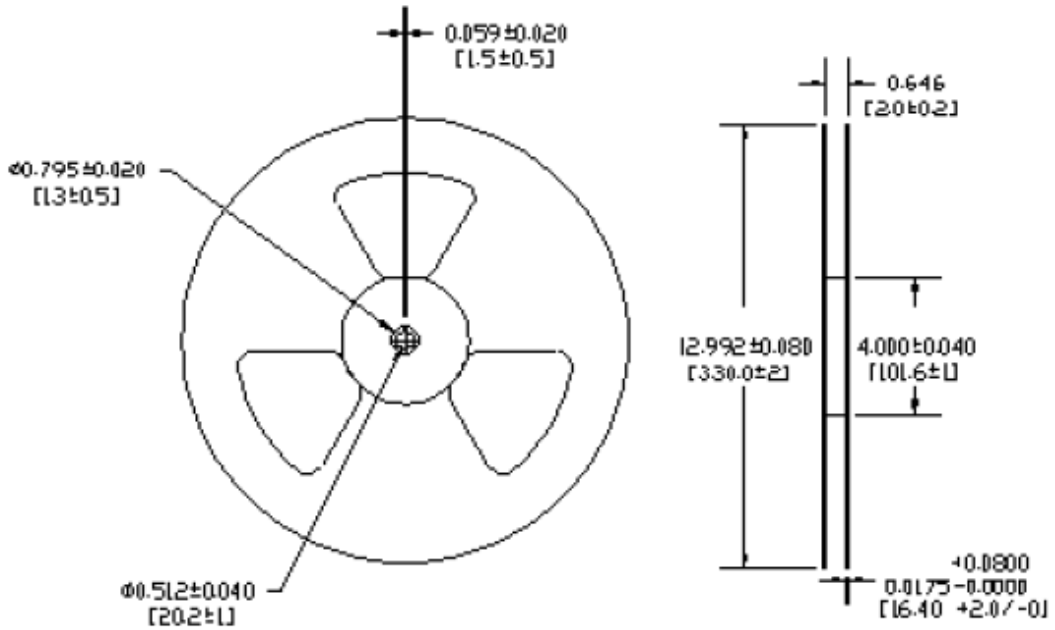


Quantity: 4-pin (SMD): 1000pcs/Reel
4-pin (SOP): 1000pcs/Reel
4-pin (SSOP): 3000pcs/Reel

DIMENSIONS ARE IN: INCHES [MILLIMETERS]

TOLERANCE: ± 0.008 INCHES
[± 0.2 MILLIMETERS]

Reel:



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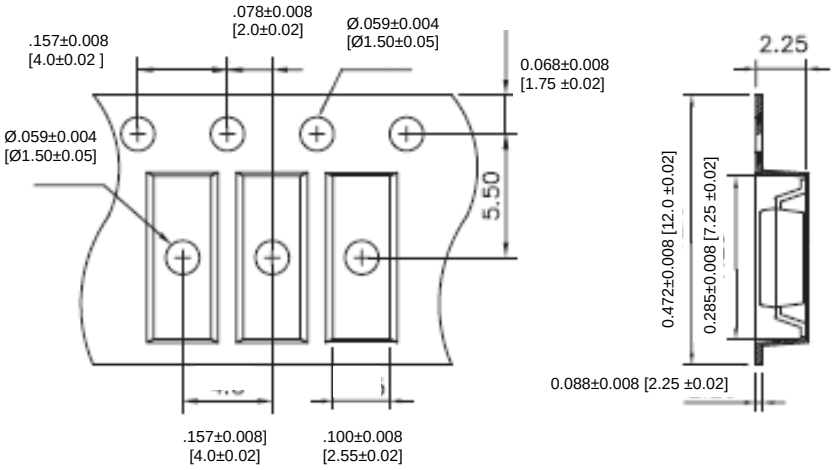
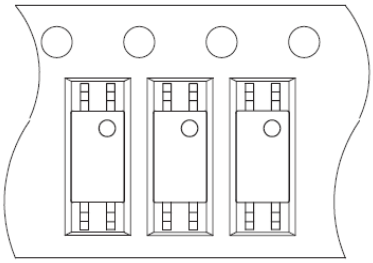
Tape and Reel Packaging Specifications— SSOP—(TR):



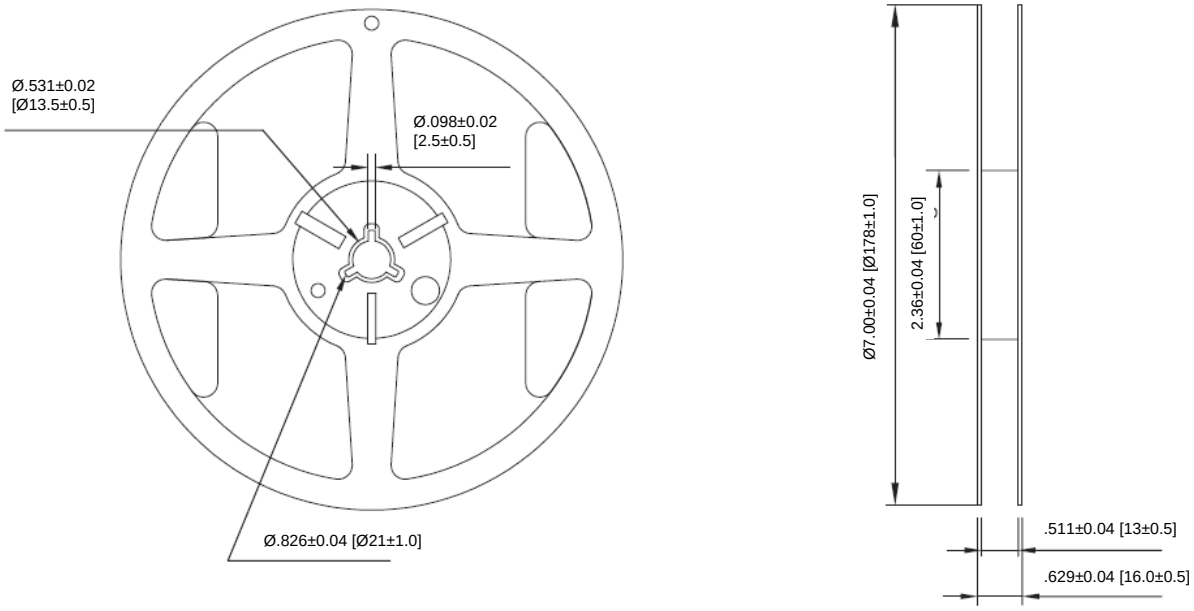
Direction:



DIMENSIONS ARE IN: INCHES [MILLIMETERS]

TOLERANCE: ± 0.008 INCHES
[± 0.2 MILLIMETERS]

Reel:



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

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