Optocoupler—SMD and SOP Types
OPIA500, OPIA600 through OPIA605

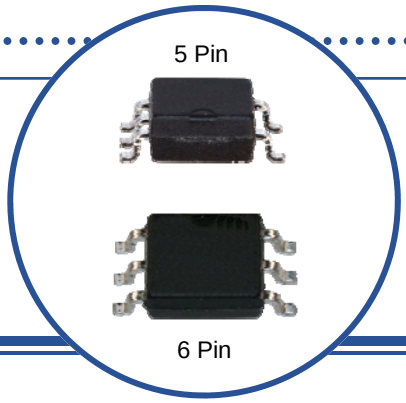
TT electronics
OPTEK Technology

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 dual-in-line package. A wide selection of configurations are available. With typical isolation voltage of 2,500 or 5,000 Volts RMS, these product 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 product is shipped in tape and reel with “TR” identified on the end of the part number.
Example: OPI600ATRis a 6-Pin SMD shipped in tape and reel (TR).

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Applications:

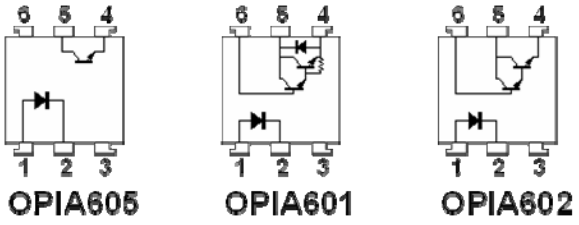
- High voltage isolation
- PCBoard power system isolation
- Industrial equipment power isolation
- Medical equipment power isolation
- Office equipment

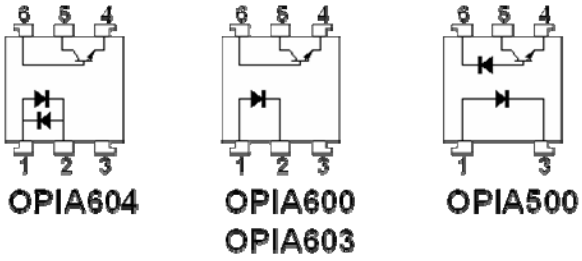
RoHS

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

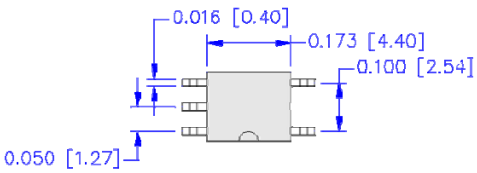
Optocoupler—SMD and SOP Types
OPIA500, OPIA600 through OPIA605

Package Outline Dimensions and Schematics: Top-View

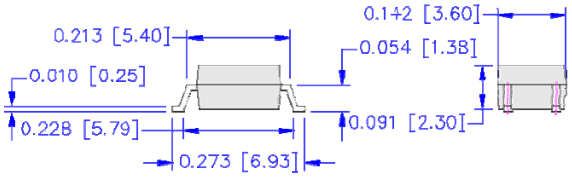




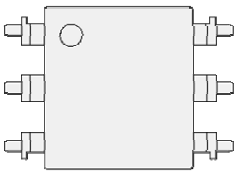
Package Style B
(SOP)



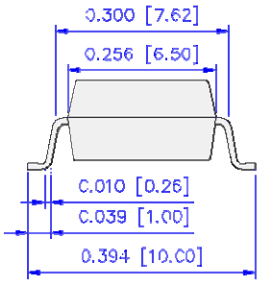
OPIA500

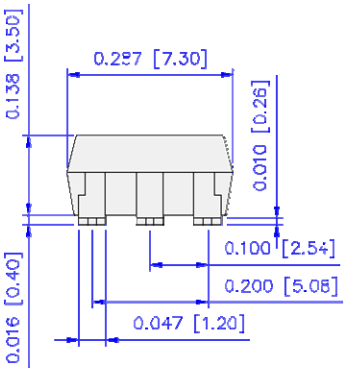


Package Style A
(SMD)



OPIA60X





Part Number	Pin #					
	1	2	3	4	5	6
OPIA500	A	K	E	C	K	
OPIA600	A	K		E	C	B
OPIA601	A	K		E	C	B
OPIA602	A	K		E	C	B
OPIA603	A	K		E	C	B
OPIA604	A-K	K-A		E	C	B
OPIA605	A	K		E	C	

Symbol	Definition	Symbol	Definition	Symbol	Definition	Symbol	Definition	Symbol	Definition
A	Anode	B	Base	C	Collector	E	Emitter	K	Cathode

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
OPIA500B	3,750	19 / - / 50	LH-HL 0.8 / 0.8 (1.9K)	5-Pin SOP	AK—KCE
OPIA600A	5,000	60 / - / 600	5 / 4	6-Pin SMD	A K—B C E
OPIA601A	5,000	600 / - / 9,000	60 / 50	6-Pin SMD	A K—B C E (Dar)
OPIA602A	5,000	500 / 4,000 / -	5 / 60	6-Pin SMD	A K—B C E (Dar)
OPIA603A	5,000	50 / - / 600	2 / 3	6-Pin SMD	A K—B C E
OPIA604A	5,000	50 / - / 600	2 / 3	6-Pin SMD	A K, K A—B C E
OPIA605A	5,000	40 / - / 400	4 / 3	6-Pin SMD	A K—C E
Configuration: Definition of Terms LED Identification—Sensor Identification					
LED	A = Anode	K = Cathode			
Sensor	B = Base	C = Collector	E = Emitter	(Dar) = Photo Darlington	
Packaging	Part Number Suffix: TU = Ship in Tubes		TR = Tape and Reel		Example: OPIA600A-TR

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

Storage Temperature	-55° C to +125° C
Operating Temperature OPIA600, OPIA601, OPIA602 OPIA500 OPIA603, OPIA604, OPIA605	 -30° C to +100° C -55° C to +85° C -55° C to +125° C
Isolation voltage (1 minute) OPIA6XX Series OPIA500	 5,000 Vrms 3,750 Vrms
Total Package Power Dissipation OPIA6 _ _ Series OPIA500	 200 mW 100 mW
Lead Soldering Temperature (1/16" (1.6 mm) from case for 5 seconds with soldering iron)	260° C

Input Diode

Continuous Forward Current OPIA6XX Series OPIA500	 50 mA 25 mA
Peak Forward current (1 µs pulse width, 300 pps) OPIA6XX Series OPIA500	 1 A 200 mA
Reverse Voltage OPIA6XX Series OPIA500	 6 V 5 V
Power Dissipation OPIA6XX Series OPIA500	 70 mW 45 mW

Output Phototransistor

Collector-Emitter Voltage OPIA600, OPIA604, OPIA605 OPIA603 OPIA601 OPIA602	 60 V 350 V 300 V 30 V
Emitter-Collector Voltage OPIA600, OPIA605 OPIA603, OPIA604 OPIA601, OPIA602	 6 V 7 V -
Collector Current OPIA600, OPIA603, OPIA604, OPIA605 OPIA601, OPIA602	 50 mA 150 mA
Power Dissipation OPIA500 OPIA600, OPIA605 OPIA601, OPIA602, OPIA603, OPIA604	 100 mW 150 mW 200 mW

Electrical Characteristics: (OPIA500D)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	V_F	I_F=16mA	• •	1.7	1.95	V
	Reverse current	I_R	VR=5V	• •	• •	10	uA
	Terminal capacitance	Ct	V=0, f=1MHz	• •	60	250	pF
Output	High level output current (1)	$I_{OH\ (1)}$	I_F=0,V_{CC}=5.5V,V_O=5.5V	-	3	500	nA
	High level output current (2)	$I_{OH\ (2)}$	I_F=0,V_{CC}=15V,V_O=15V	-	-	1.0	uA
	High level output current (3) (*6)	$I_{OH\ (3)}$		-	-	50	uA
	High level supply current (1)	$I_{CCH\ (1)}$	I_F=0,V_{CC}=15V,V_O=Open	-	0.02	1.0	uA
	High level supply current (2) (*6)	$I_{CCH\ (2)}$		-	-	2.0	uA
	Low level supply current	I_{CCL}	I_F=16mA,V_{CC}=15V,V_O=Open	-	120	-	uA
	Low level supply voltage	V_L	I_F=16mA,V_{CC}=4.5V,I_O=2.4mA	• •	-	0.4	V
Transfer charac-teristics	Current transfer ratio (1)	CTR(1)	I_F=16mA,V_{CC}=4.5V,V_O=0.4V, RL=1.9K ohm	19	• •	50	%
	Current transfer ratio (2) (*6)	CTR(2)		15	• •	-	%
	Isolation resistance	R_{ISO}	DC=500V,40 to 60%RH	$5x10^{10}$	$1x10^{11}$	-	ohm
	Floating capacitance	Cf	V=0,f=1MHZ	• •	0.6	1.0	pF
	"High-->Low" propagation delay time	t_{PHL}	I_F=16mA,V_{CC}=5V, RL=1.9K ohm	• •	0.2	0.8	us
	"High-->Low" propagation delay time	t_{PLH}		-	0.4	0.8	us
	Instantaneous common mode rejection voltage (High level output)	CMH	I_F=0,V_{CC}=5V, V_{CM}=1.0KV(p-p), RL=1.9K ohm	15	30	-	KV/us
	Instantaneous common mode rejection voltage (High level output)	CML	I_F=16mA,V_{CC}=5V, V_{CM}=1.0KV(p-p), RL=1.9K ohm	-15	-30	-	KV/us

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Electrical Characteristics (OPIA600 Series)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Input Diode						
V_f	Forward Voltage OPIA600, OPIA601, OPIA602, OPI604, OPIA605 OPIA603	- 1.0	1.2 1.2	1.4 1.3	V	I_F = 20 mA I_F = 10 mA
V_{FM}	Peek Forward Voltage OPIA600, OPIA601, OPIA602, OPI604 OPIA603, OPIA605	- -	- -	3.5 3.0	V	I_{FM} = 500 mA
I_r	Reverse Current OPIA600, OPIA601, OPIA602, OPI604, OPIA605 OPIA603	- -	- -	10 10	µA	V_R = 4 V V_R = 5 V
C_t	Terminal Capacitance OPIA600, OPIA601, OPIA602, OPI604, OPIA605 OPIA603	- -	30 30	- -	pf	V = 0.0 V, f = 1K Hz V = 0.0 V, f = 1M Hz
Output Phototransistor—OPIA600D, OPIA603D, OPIA604D, OPIA605D						
I_{CEO}	Collector dark Current OPIA600, OPIA604, OPIA605 OPIA603	- -	- 10	100 200	nA	I_F = 0 mA, V_{CE} = 20 V I_F = 0 mA, V_{CE} = 300 V
V_{CEO}	Collector-emitter Saturation Voltage OPIA600, OPIA604, OPIA605 OPIA603	- -	0.1 -	0.3 0.4	V	I_F = 20 mA, I_C = 1 mA I_F = 8 mA, I_C = 2.4 mA
f_C	Cutt-Off frequency	-	80	-	K Hz	V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω
t_r	Rise Time OPIA600, OPIA604 OPIA603 OPIA605	- - -	5 2 4	20 - 20	µs	V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω V_{CC} = 10 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 OPIA600, OPIA604 OPIA603 OPIA605	- - -	4 3 3	20 - 20	µs	V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω V_{CC} = 10 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 (OPIA600 Series) - Continued from Previous Page

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Output PhotoDarlington—OPIA601D, OPIA6022D						
I_{CEO}	Collector dark Current OPIA601 OPIA602	 - -	 - -	 1.0 0.1	µA	 I_F = 0 mA, V_{CE} = 200 V I_F = 0 mA, V_{CE} = 10 V
V_{CEO}	Collector-emitter Saturation Voltage OPIA601 OPIA602	 - -	 - -	 1.5 1.0	V	 I_F = 20 mA, I_C = 5 mA I_F = 8 mA, I_C = 2 mA
f_C	Cutt-Off frequency OPIA601, OPIA602	 -	 7.0	 -	 K Hz	 V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω
t_r	Rise Time OPIA601 OPIA602	 - -	 60 5	 300 40	 µs	 V_{CC} = 2 V, I_C = 20 mA, R_L = 100 Ω V_{CC} = 10 V, I_C = 50 mA, R_L = 100 Ω
t_f	Fall Time OPIA601 OPIA602	 - -	 50 60	 250 100	 µs	 V_{CC} = 2 V, I_C = 20 mA, R_L = 100 Ω V_{CC} = 10 V, I_C = 50 mA, R_L = 100 Ω
Coupled Characteristics Phototransistor/Photodarlington						
CTR	Current Transfer Ratio OPIA600 OPIA601 OPIA602 OPIA603 OPIA604 OPIA605	 60 600 500 50 60 40	 - - 4,000 - - -	 600 9,000 - 600 600 400	 %	 I_F = 2 mA, V_{CE} = 5.0 V I_F = 2 mA, V_{CE} = 5.0 V I_F = 10 mA, V_{CE} = 10.0 V I_F = 5 mA, V_{CE} = 5.0 V I_F = 1 mA, V_{CE} = 5.0 V I_F = 10 mA, V_{CE} = 5.0 V
C_f	Floating Capacitance	-	0.6	1.0	pF	V = 0.0 V, f = 1M Hz
R_{ISO}	Isolation resistance	$5X10^{10}$	10^{11}	-	ohm	DC500V

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OPIA600

Fig.1 Current Transfer Ratio vs. Forward Current

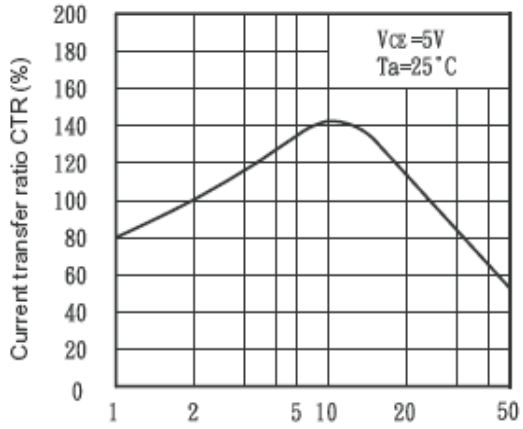


Fig.2 Collector Power Dissipation vs. Ambient Temperature

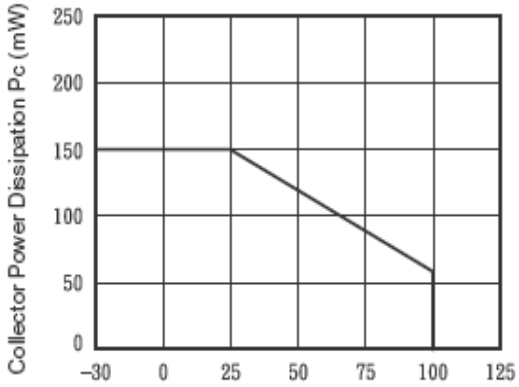


Fig.3 Collector Dark Current vs. Ambient Temperature

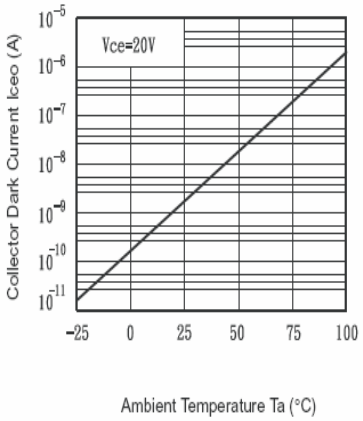


Fig.4 Forward Current vs. Ambient Temperature

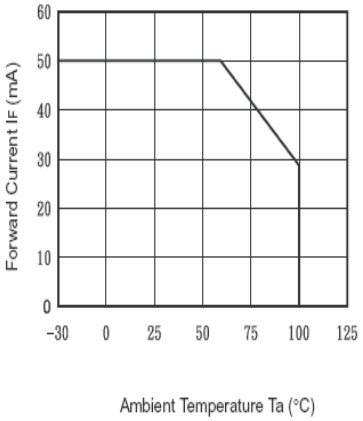
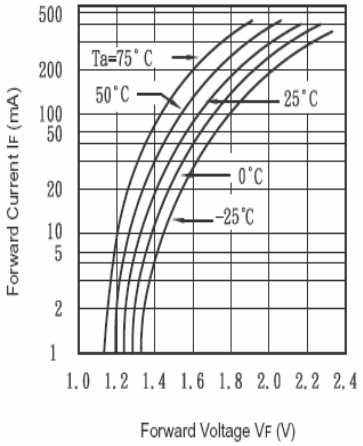


Fig.5 Forward Current vs. Forward Voltage



OPIA600

Fig.6 Collector Current vs. Collector-emitter Voltage

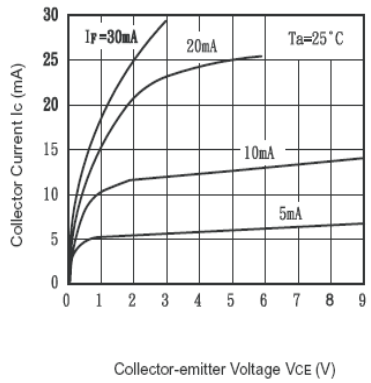


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

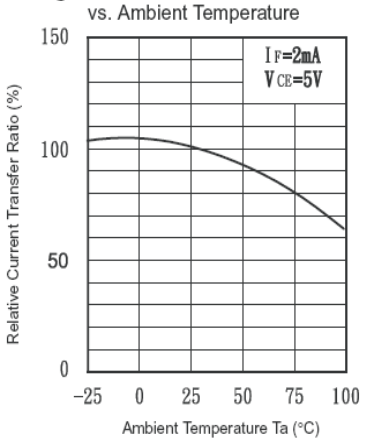


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

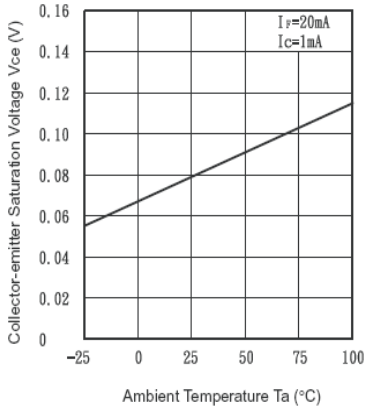


Fig.9 Collector-emitter Saturation Voltage vs. Forward Current

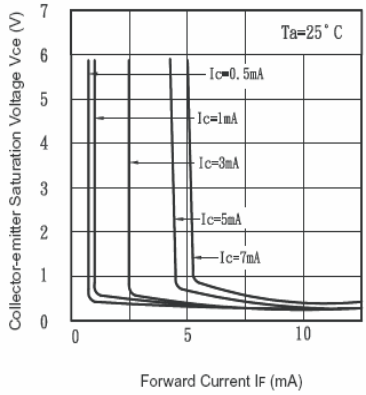


Fig.10 Response Time vs. Load Resistance

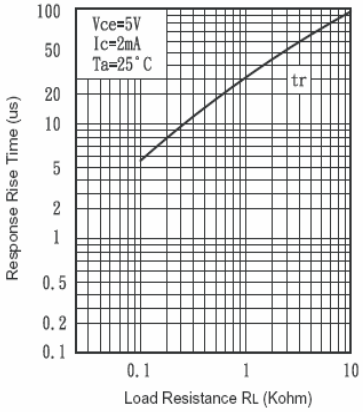
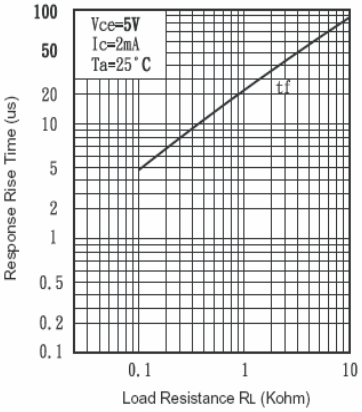


Fig.11 Response Time vs. Load Resistance



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OPIA601

Fig. 4 Forward Current vs. Ambient Temperature

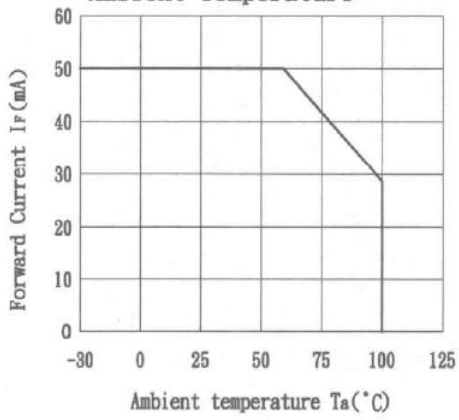


Fig. 5 Forward Current vs. Forward Voltage

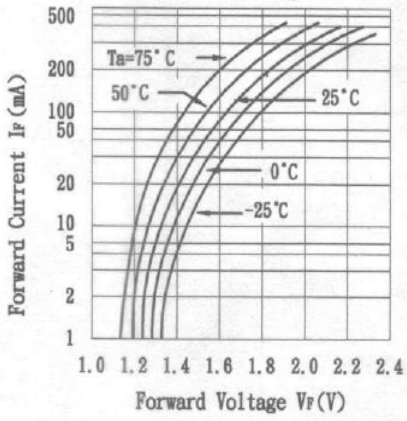


Fig. 2 Collector Power Dissipation vs. Ambient Temperature

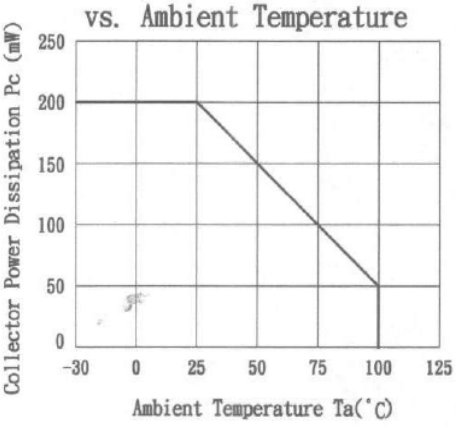


Fig. 3 Collector Dark Current vs. Ambient Temperature

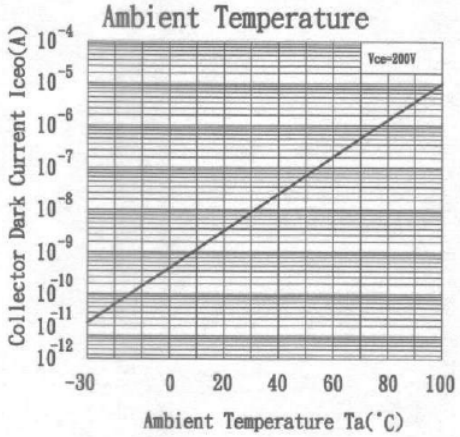


Fig. 6 Collector Current vs. Collector-emitter Voltage

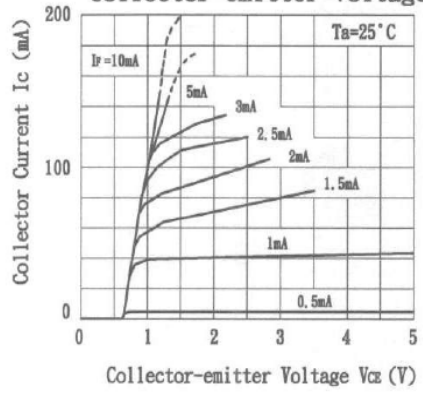
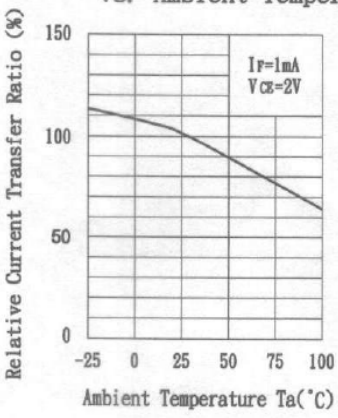


Fig. 7 Relative Current Transfer Ratio vs. Ambient Temperature



OPIA601

Fig. 1 Current Transfer Ratio vs. Forward Current

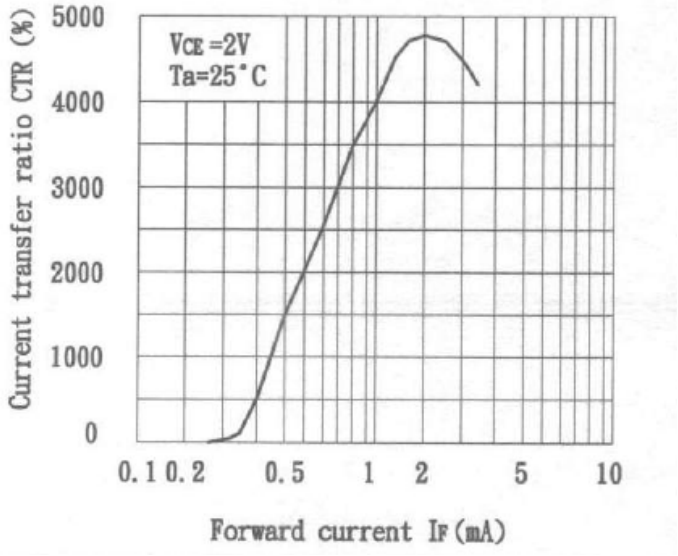


Fig. 8 Collector-emitter Saturation Voltage vs. Forward Current

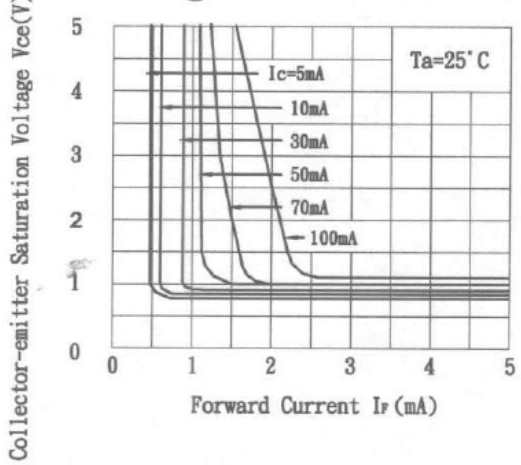
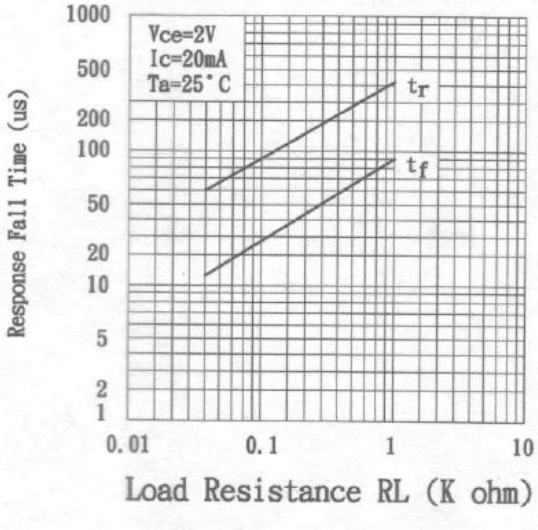


Fig. 9 Response Time vs. Load Resistance



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OPIA602

Fig. 1 Forward Current vs. Ambient Temperature

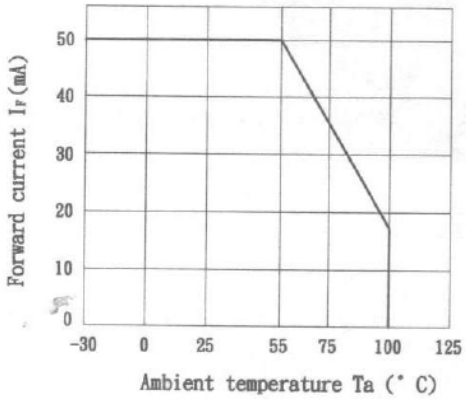

Fig. 2 Collector Power Dissipation vs. Ambient Temperature

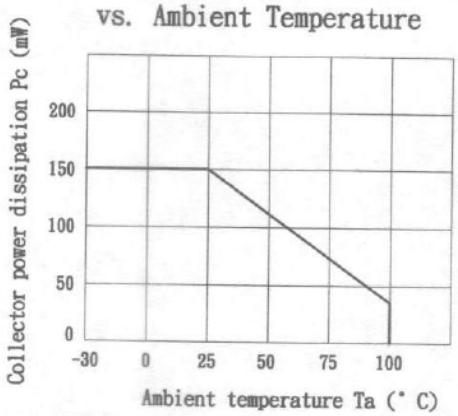

Fig. 3 Peak Forward Current vs. Duty Ratio

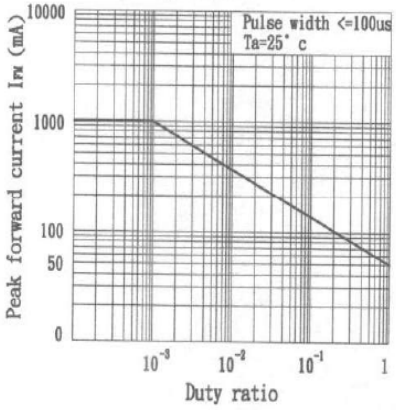

Fig. 4 Forward Current vs. Forward Voltage

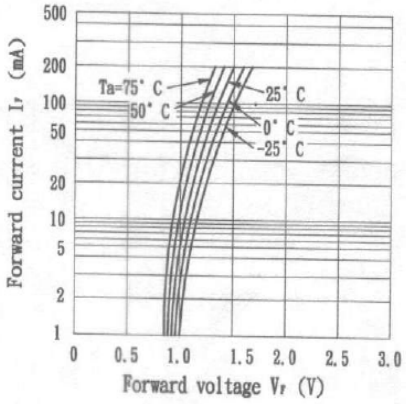

Fig. 5 Current Transfer Ratio vs. Forward Current

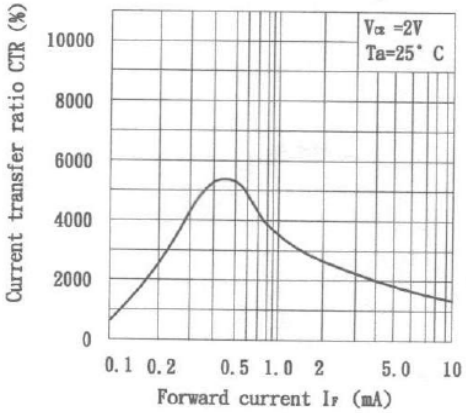

Fig. 6 Collector Current vs. Collector-emitter Voltage

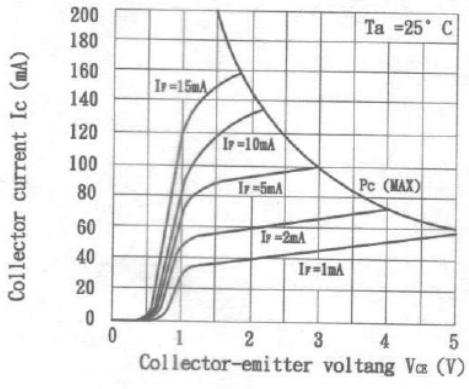

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Fig. 11 Collector-emitter Saturation Voltage vs. Forward current

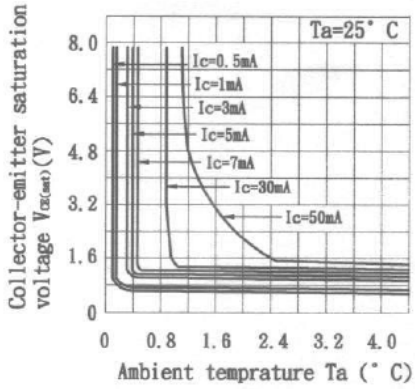


Fig. 7 Relative Current Transfer Ratio vs. Ambient Temperature

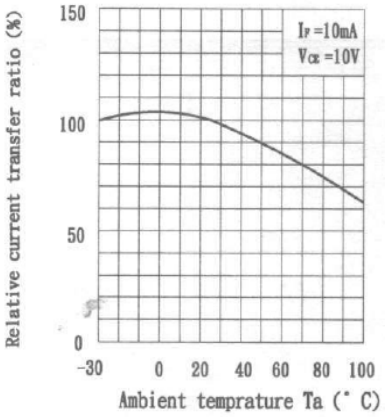


Fig. 8 Collector-emitter Saturation Voltage vs. Ambient Temperature

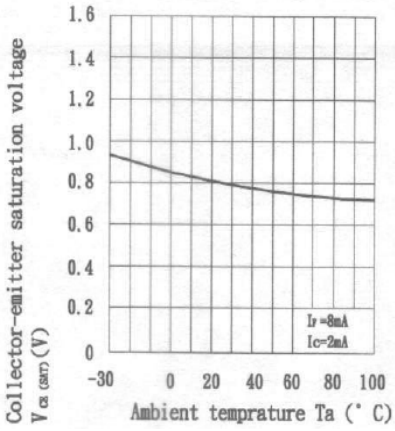


Fig. 9 Collector Dark Current vs. Ambient Temperature

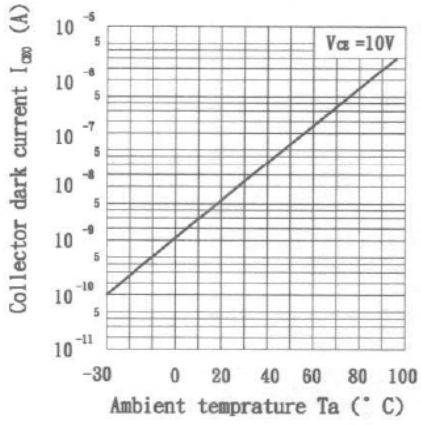
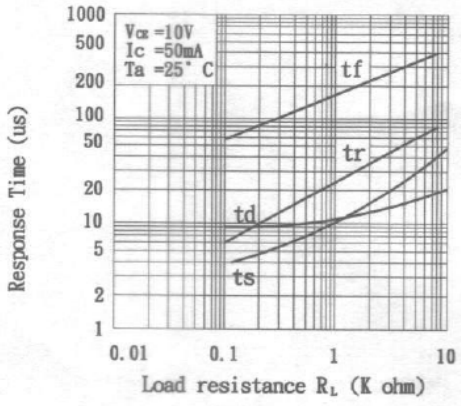


Fig. 10 Response Time vs. Load Resistance



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OPIA603

Fig. 1 Current Transfer Ratio Vs. Forward Current

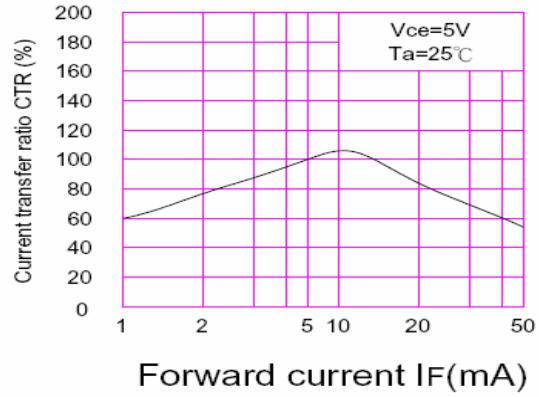

Fig.2 Collector Power Dissipation vs. Ambient Temperature

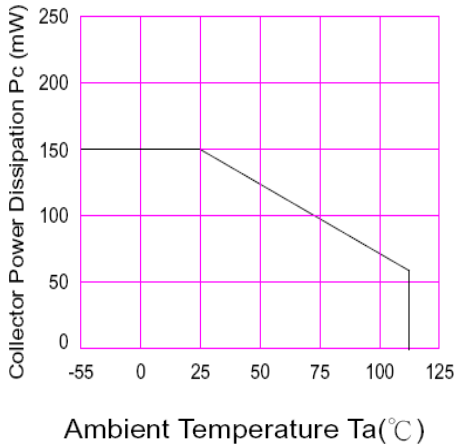

Fig.3 Collector Dark Current vs. Ambient Temperature

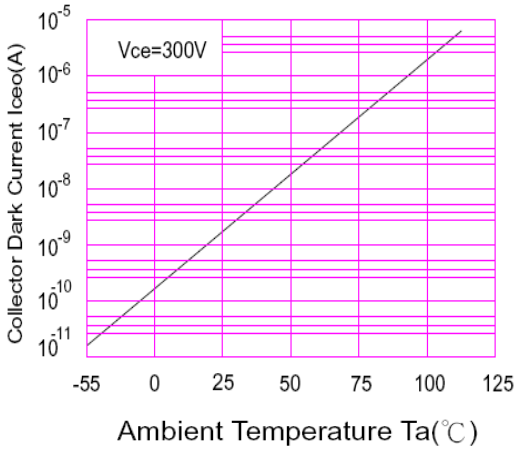

Fig.4 Forward Current vs. Ambient Temperature

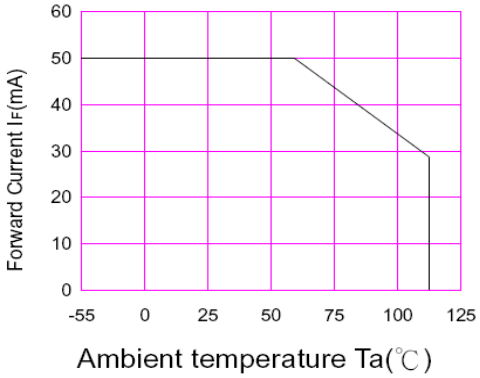

Fig.5 Forward Current vs. Forward Voltage

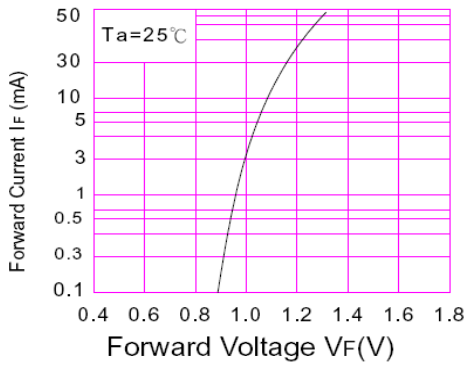

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Fig.6 Collector Current vs. Collector-emitter Voltage

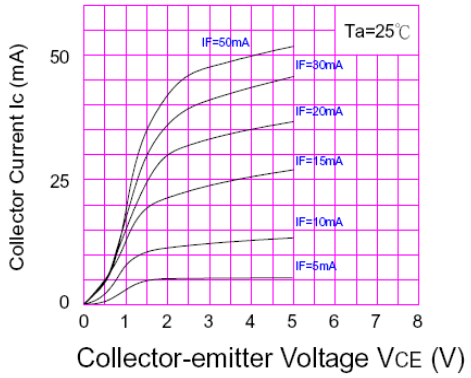


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

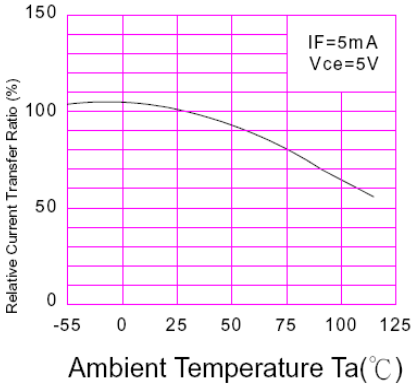


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

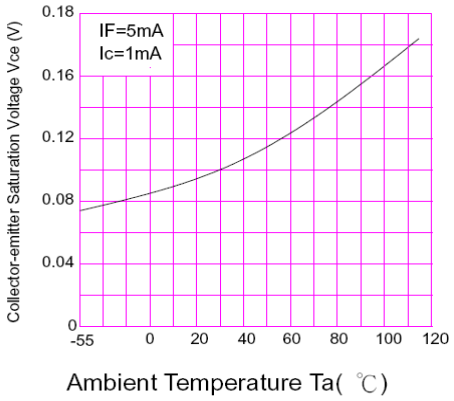


Fig.9 Collector-emitter Saturation Voltage vs. Forward Current

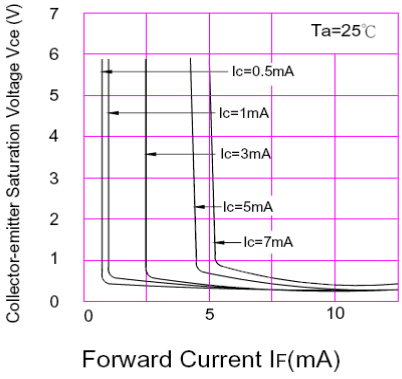


Fig.10 Response Time vs. Load Resistance

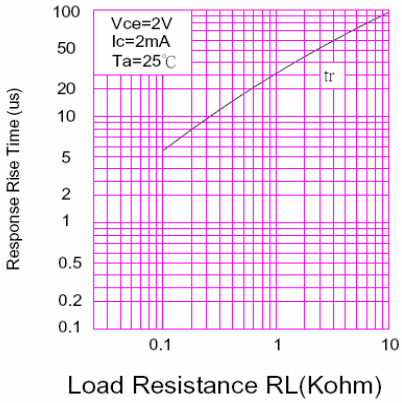
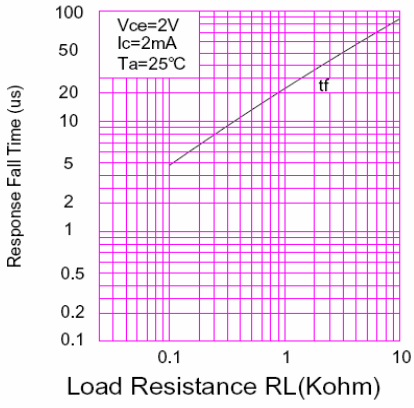


Fig.11 Response Time vs. Load Resistance



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OPIA604

Fig.1 Current Transfer Ratio vs. Forward Current

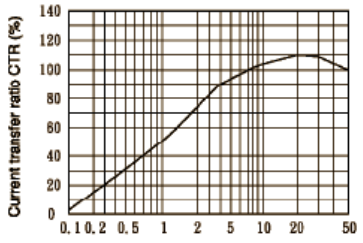

Fig.2 Collector Power Dissipation vs. Ambient Temperature

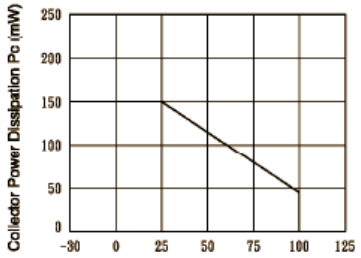

Fig.3 Collector Dark Current vs. Ambient Temperature

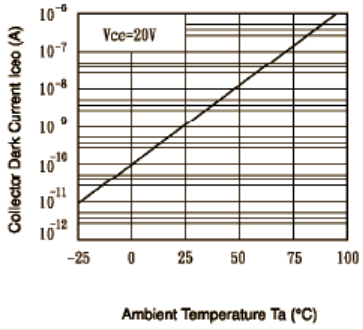

Fig.4 Forward Current vs. Ambient Temperature

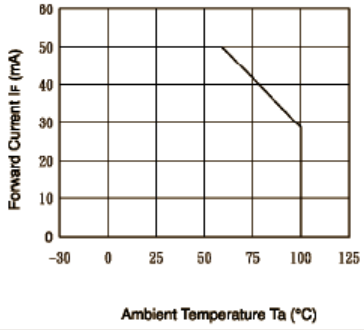

Fig.5 Forward Current vs. Forward Voltage

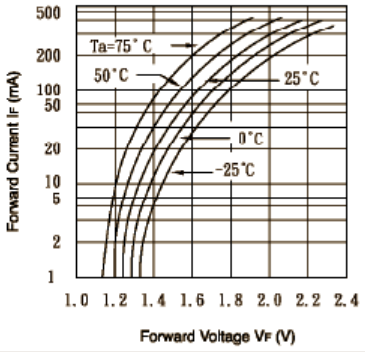

Fig.6 Collector Current vs. Collector-emitter Voltage

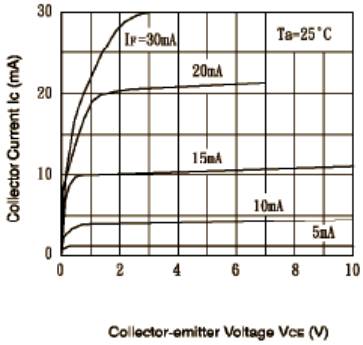

Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

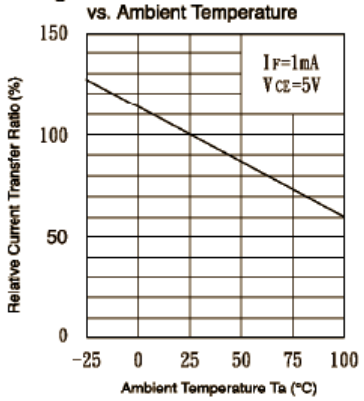

Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

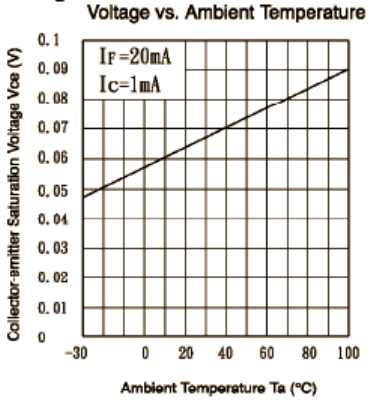

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Fig.9 Collector-emitter Saturation Voltage vs. Forward Current

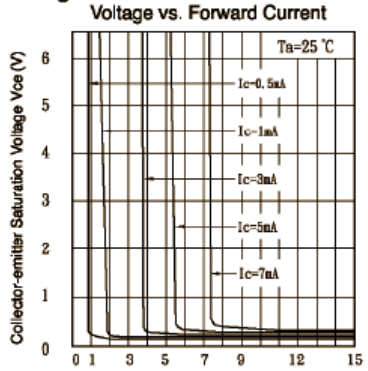


Fig.10 Response Time vs. Load Resistance

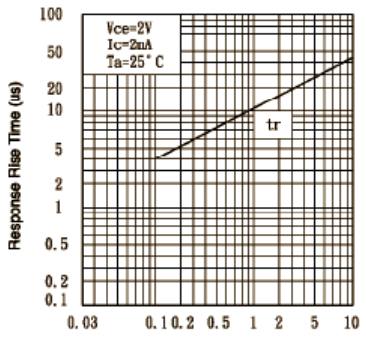
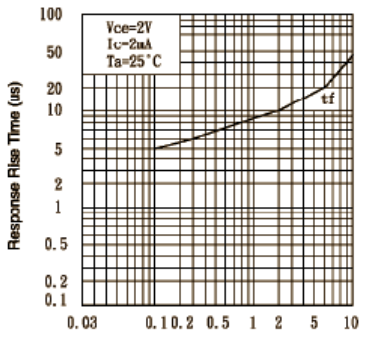


Fig.11 Response Time vs. Load Resistance



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OPIA605

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

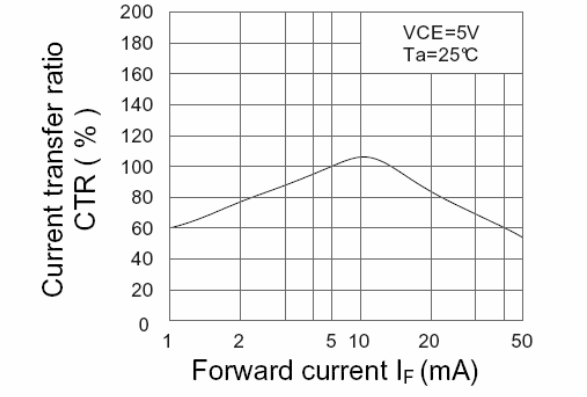

Fig.2 **Collector Power Dissipation vs. Ambient Temperature**

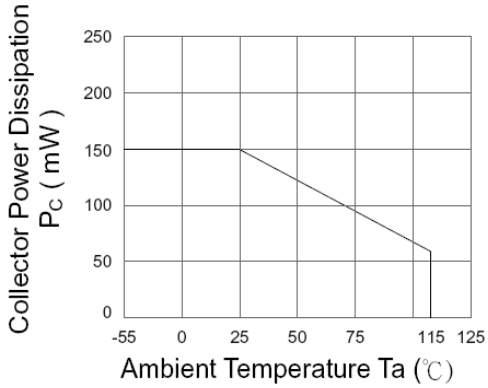

Fig.3 **Collector Dark Current vs. Ambient Temperature**

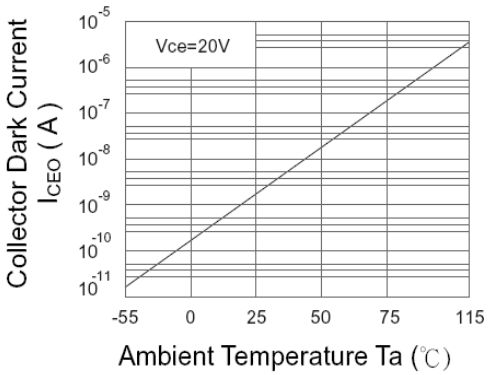

Fig.4 **Forward Current vs. Ambient Temperature**

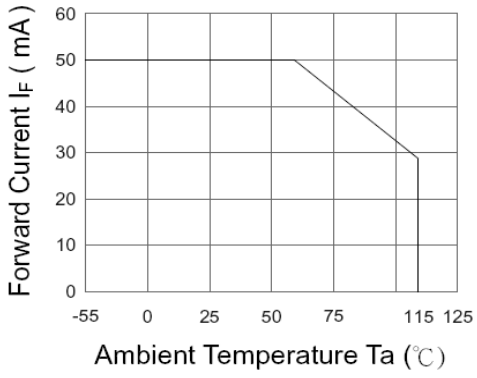

Fig.5 **Forward Current vs. Forward Voltage**

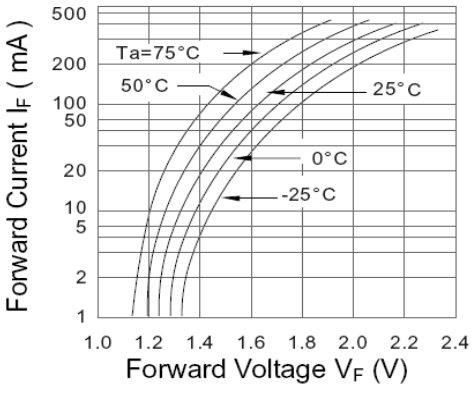

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Fig.6 **Collector Current vs. Collector-Emitter Voltage**

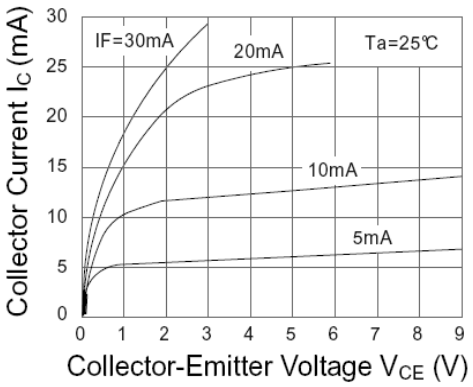


Fig.7 **Relative Current Transfer Ratio vs. Ambient Temperature**

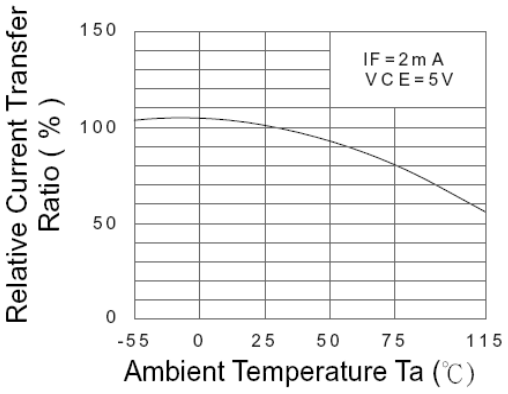


Fig.8 **Collector-Emitter Saturation Voltage vs. Ambient Temperature**

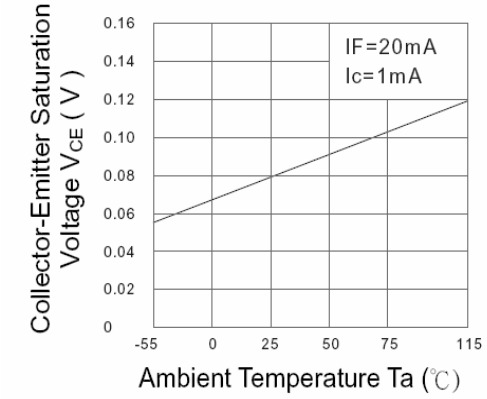


Fig.9 **Collector-Emitter Saturation Voltage vs. Forward Current**

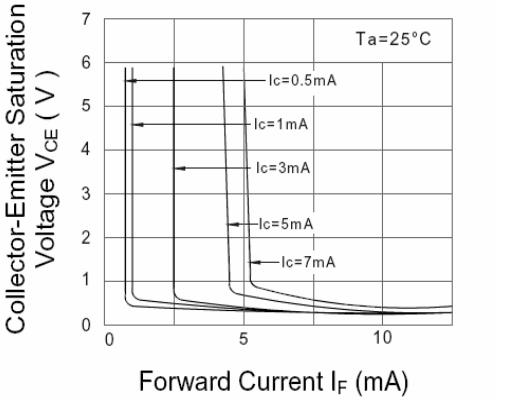


Fig.10 **Response Time vs. Load Resistance**

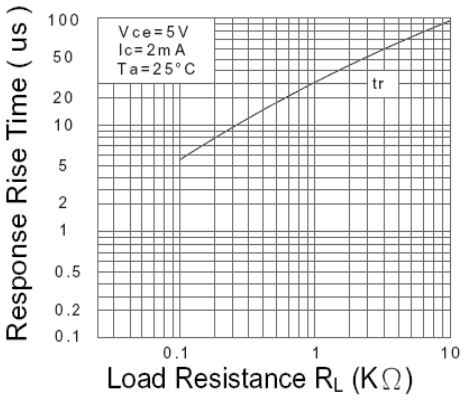
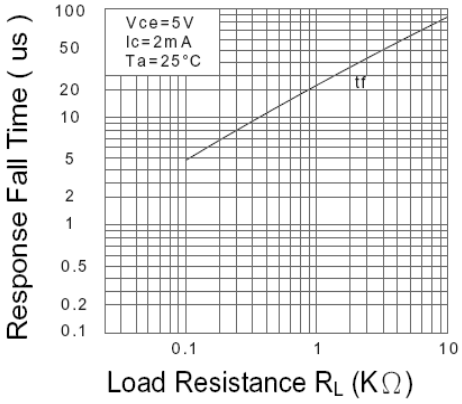


Fig.11 **Response Time vs. Load Resistance**



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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

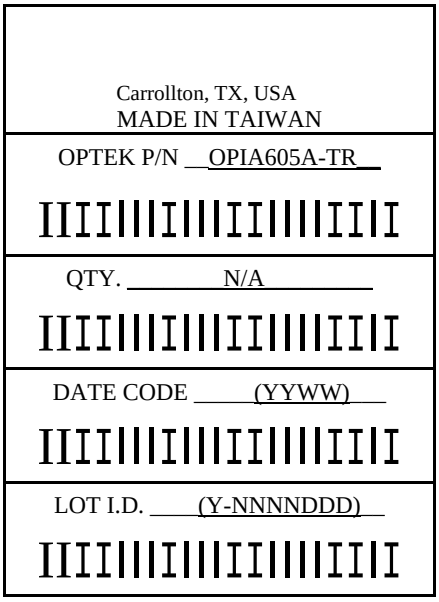
Label Identification

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.



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, 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 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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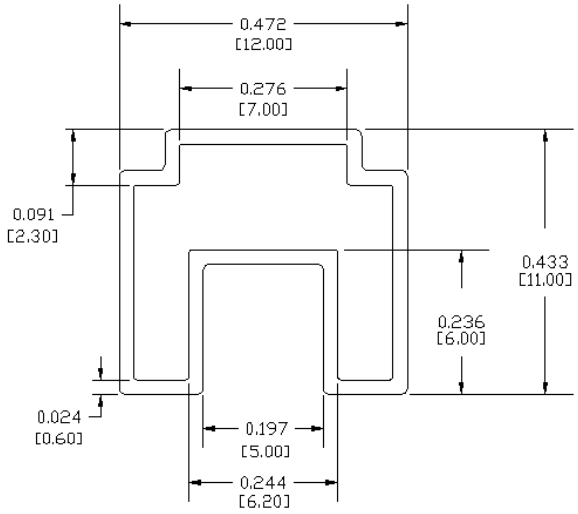
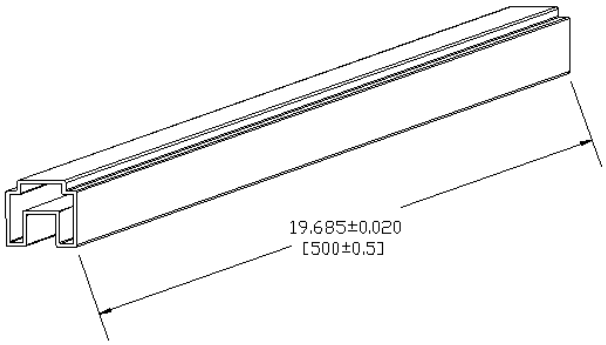
Tube Packaging Specifications—SMD (TU):





DIMENSIONS ARE IN: INCHES [MILLIMETERS]

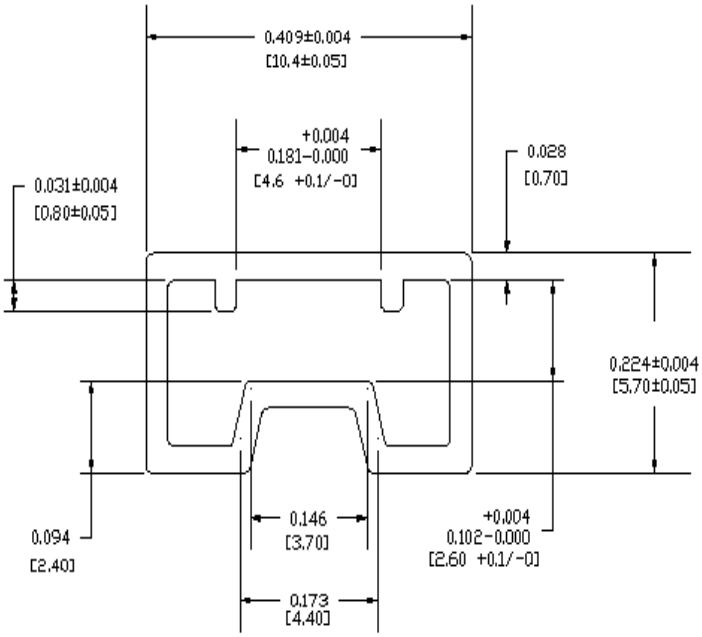
TOLERANCE: ± 0.008 INCHES
[± 0.2 MILLIMETERS]

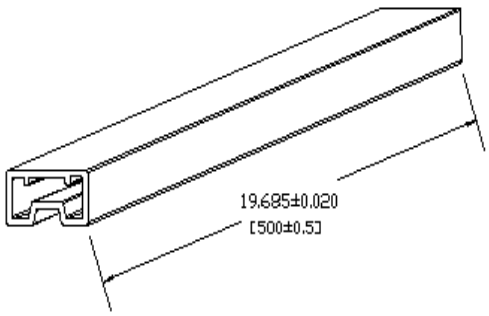
Quantity: 6-pin: 65pcs/tube

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

DIMENSIONS ARE IN: INCHES [MILLIMETERS]

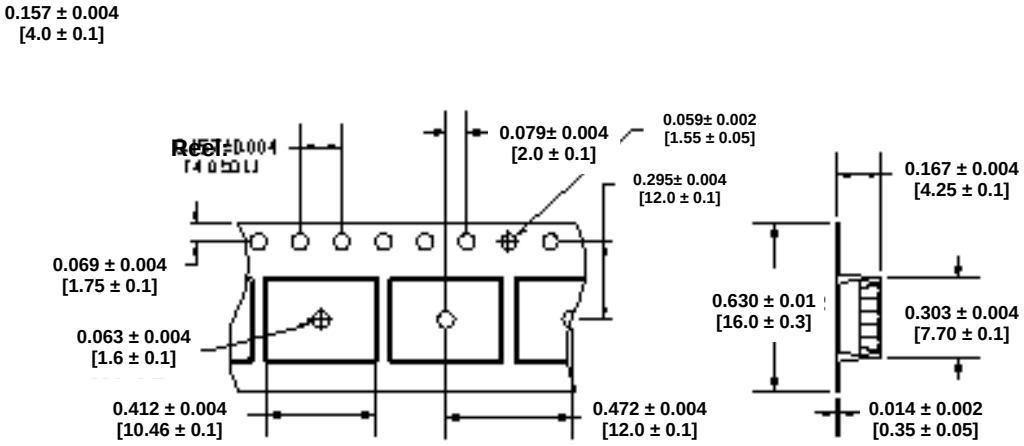
TOLERANCE: ± 0.008 INCHES
[± 0.2 MILLIMETERS]



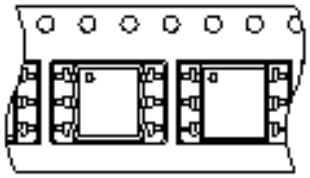


Quantity: 5-pin: 100pcs/tube

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



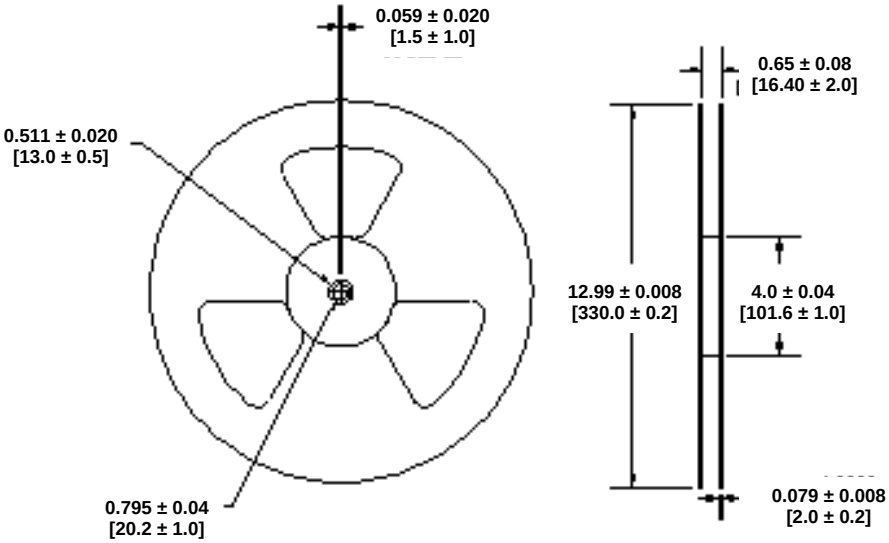
Direction:



DIMENSIONS ARE IN: INCHES [MILLIMETERS]

TOLERANCE: ± 0.008 INCHES
[± 0.2 MILLIMETERS]

Reel:



Quantity: 6-pin: 1000pcs/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
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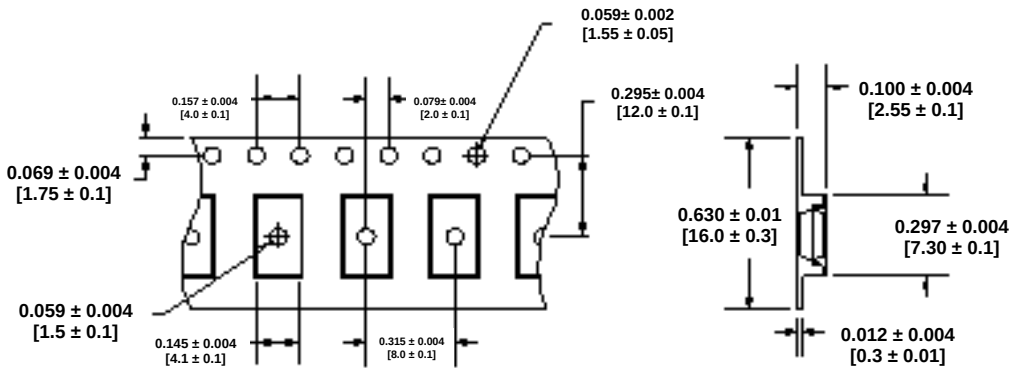
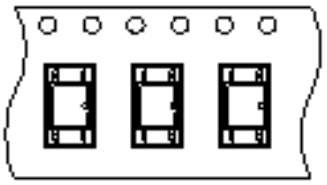
Tape and Reel Packaging Specifications—SOP (Mini-Flat) — (TR):



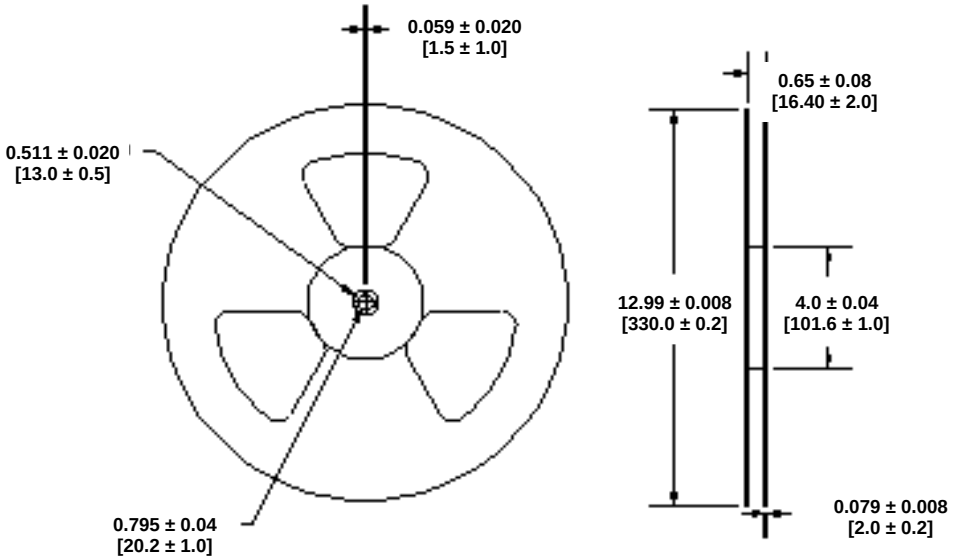
Direction:



DIMENSIONS ARE IN: INCHES [MILLIMETERS]

TOLERANCE: ± 0.008 INCHES
[± 0.2 MILLIMETERS]

Reel:



Quantity: 5-pin: 1000pcs/Reel

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

Issue	Change Description	Approval	Date
A	Initial Release—Missing 6 Pin SMD mechanical drawing	Chima Ehiem	03/20/2008
A.1	Added 6 Pin SMD package outline	Chima Ehiem	4/02/2008
A.2	Changed equation on page 1	Ramon Martinez	4/25/2008
A.3	Added ML certification no. and VDE pending (pg. 1) Updated OPIA500B Packaging Information to SOP (pg. 2) Updated rest of Packaging Info from DIP to SMD (pg. 2) Added subtitles to package outline drawings. (pg. 2) Updated MSL to 1 (pg. 19) Updated Label Identification size from 7.5” to 7.4” (pg. 19) Updated Label with TT Logo there (pg. 19) Updated Title including SOP packages also. (All Title Headers) Update Packaging Information (pg. 20) Inserted SOP Tube packaging (pg. 21)	Chima Ehiem	10/13/08

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