BRIGHTEK

BRIGHTEK (EUROPE) LIMITED

Brighten Up The World With LED!

ISO/TS 16949:2009 BS EN ISO 14001:2004 QC 080000 IECQ HSPM

PRODUCT DATASHEET

- ▶ DC Input Photo Coupler
- ▶ LSOP4
- ▶ Photo Transistor

Release Date: 04 April 2025 Version: 0.3

TD101X(T1)-GV(B)

TD101X(B) Series

TD101X(B) Series

RoHS Compliant

DESCRIPTION:

The TD101X(B) series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic LSOP4 package.

With the robust coplanar double mold structure, TD101X(B) series provide the most stable isolation feature.

APPLICATIONS:

- Switch mode power supplies
- Programmable controllers
- Household appliances

FEATURES:

- High isolation 5000 Vrms
- DC input with transistor output
- Operating temperature range -55°C to +110°C
- MSL class 1
- Regulatory Approvals:
  - UL - UL1577
  - VDE - EN60747-5-5 (VDE0884-5)
  - CQC - GB4943.1, GB8898
- Packing: 3000pcs/reel

Partner with: LIGHTNING

NAMING & ORDERING INFORMATION:

Naming Information:

TD101 X (T1) - G V (B)	
TD101	Part Number
X	Selection: CTR (0~9)
T1	Selection: Tape and Reel Option (T1(default)/T2)
G	Green Option
V	VDE Option
B	Black Housing

Ordering Information:

TD101X(T1)-GV(B)

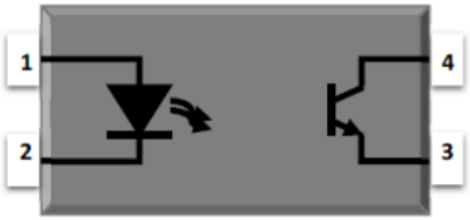
X = Selection: CTR (0~9)

Part Number	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
TD1010(T1)-GV(B)	CTR	300	---	600	%	I_F=5mA, V_{CE}=5V
TD1011(T1)-GV(B)		60	---	300	%	I_F=10mA, V_{CE}=5V
TD1012(T1)-GV(B)		63 (22)	---	125	%	I_F=10mA, V_{CE}=5V (I_F=1mA, V_{CE}=5V)
TD1013(T1)-GV(B)		100 (34)	---	200		
TD1014(T1)-GV(B)		160 (56)	---	320		
TD1015(T1)-GV(B)		50	---	150	%	I_F=5mA, V_{CE}=5V
TD1016(T1)-GV(B)		100	---	300		
TD1017(T1)-GV(B)		80	---	160		
TD1018(T1)-GV(B)		130	---	260		
TD1019(T1)-GV(B)		200	---	400		

Version No.	Original Release Date
Rev: 0.3	04/09/2020

SCHEMATIC DIAGRAM & MARKING:

Schematic Diagram:



PIN Definition	
1	Anode
2	Cathode
3	Emitter
4	Collector

Marking Information:

Marking Definition	
TD	Manufacturer Code
101	Part Number
X	CTR Rank
V	VDE Applicable
Y	Fiscal Year
A	Manufacturing Code
WW	Work Week

Labelling Information:

This product is manufactured, tested, and packed by

LIGHTNING

ABSOLUTE CHARACTERISTICS:

Absolute Maximum Ratings:

Parameter	Symbol	Ratings	Unit
INPUT			
Forward Current	I_F	60	mA
Peak Forward Current	I_{FP}	1 *1	A
Reverse Voltage	V_R	6	V
Input Power Dissipation	P_I	100	mW
OUTPUT			
Collector - Emitter Voltage	V_{CEO}	80	V
Emitter - Collector Voltage	V_{ECO}	7	V
Collector Current	I_C	50	mA
Output Power Dissipation	P_O	150	mW
COMMON			
Total Power Dissipation	P_{tot}	250	mW
Isolation Voltage	V_{iso}	5000 *2	Vrms
Operating Temperature	T_{opr}	-55~+110	°C
Storage Temperature	T_{stg}	-55~+125	°C
Soldering Temperature	T_{sol}	260 *3	°C

*1. 100μs pulse, 100Hz frequency
*2. AC for 1 minute, R.H.=40~60%
*3. For 10 seconds max.

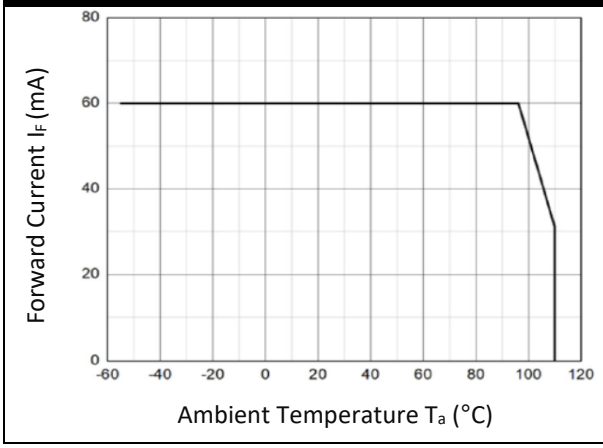
ELECTRICAL CHARACTERISTICS:

Electrical Optical Characteristics at Ta=25°C:

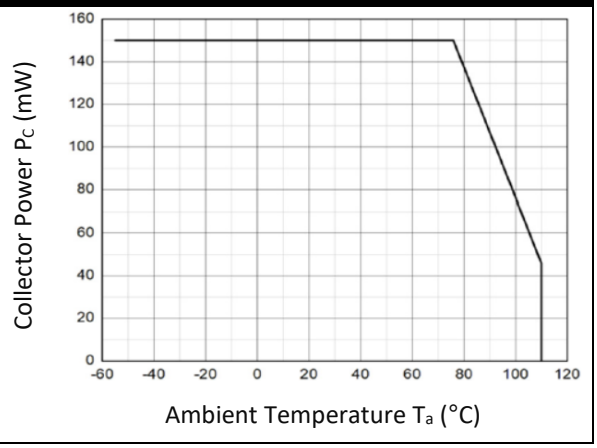
Parameter		Symbol	Values			Unit	Test Condition
			Min.	Typ.	Max.		
INPUT							
Forward Voltage		V_F	---	1.45	1.6	V	I_F=50mA
Reverse Current		I_R	---	---	10	μA	V_R=6V
Input Capacitance		C_{IN}	---	30	250	pF	V=0, f=1kHz
OUTPUT							
Collector Dark Current		I_{CEO}	---	---	100	nA	I_F=0mA, V_{CE}=20V
Collector - Emitter Breakdown Voltage		BV_{CEO}	80	---	---	V	I_C=0.1mA, I_F=0mA
Emitter - Collector Breakdown Voltage		BV_{ECO}	6	---	---	V	I_E=0.1mA, I_F=0mA
TRANSFER CHARACTERISTICS							
Current Transfer Rate	TD1010	CTR	300	---	600	%	I_F=5mA, V_{CE}=5V
	TD1011		60	---	300	%	I_F=10mA, V_{CE}=5V
	TD1012		63 (22)	---	125	%	I_F=10mA, V_{CE}=5V (I_F=1mA, V_{CE}=5V)
	TD1013		100 (34)	---	200		
	TD1014		160 (56)	---	320		
	TD1015		50	---	150	%	I_F=5mA, V_{CE}=5V
	TD1016		100	---	300		
	TD1017		80	---	160		
	TD1018		130	---	260		
	TD1019		200	---	400		
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	---	0.1	0.3	V	I_F=10mA, I_C=1mA
Isolation Resistance		R_{ISO}	10^12	10^14	---	Ω	DC=500V, 40~60% R.H.
Floating Capacitance		C_{IO}	---	0.4	1	pF	V=0, f=1MHz
Response Time (Rise)		t_r	---	6	18	μs	V_{CE}=2V, I_C=2mA R_L=100Ω
Response Time (Fall)		t_f	---	8	18	μs	
Cut-off Frequency		f_c	---	80	---	kHz	V_{CE}=2V, I_C=2mA R_L=100Ω, -3dB

CHARACTERISTIC CURVES:

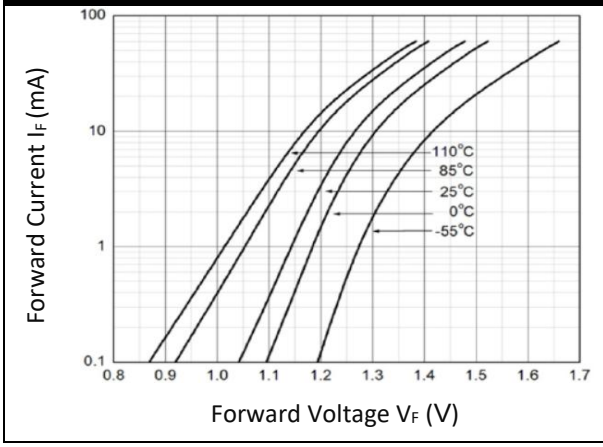
Forward Current v.s. Ambient Temperature



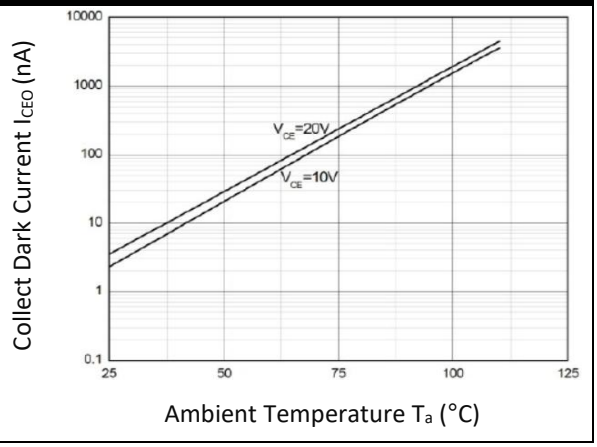
Collector Power Dissipation v.s. Ambient Temp.



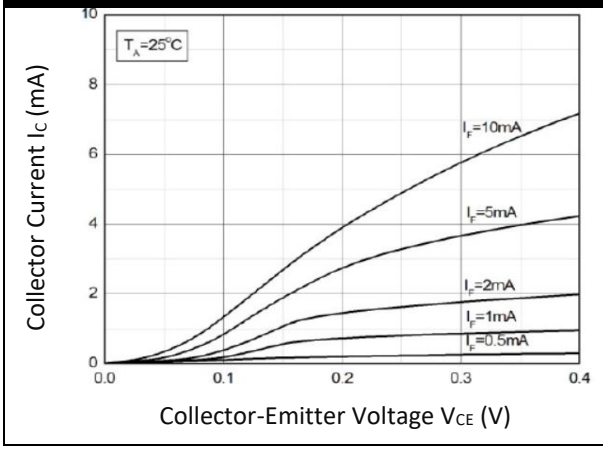
Forward Current v.s. Forward Voltage



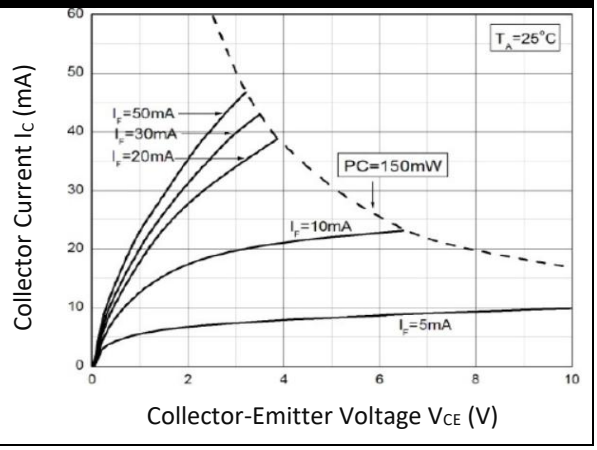
Collector Dark Current v.s. Ambient Temperature



Collector Current v.s. Collector-Emitter Voltage

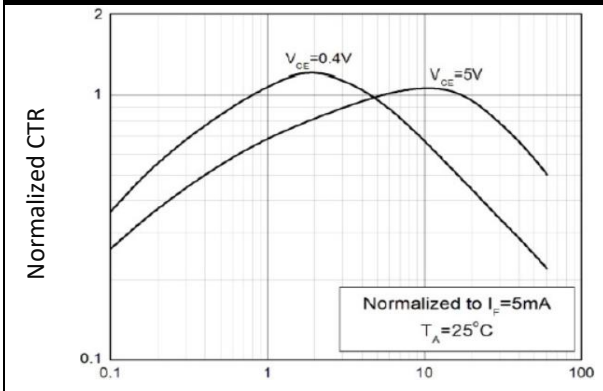


Collector Current v.s. Collector-Emitter Voltage

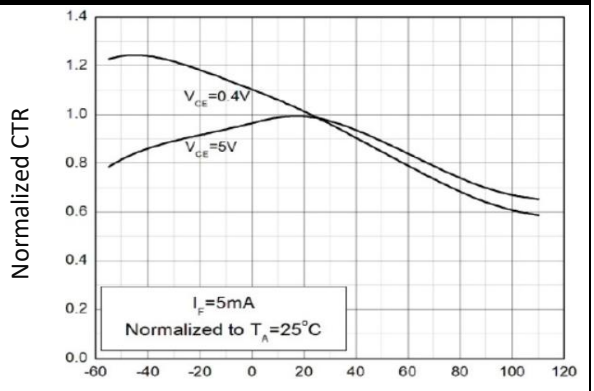


CHARACTERISTIC CURVES:

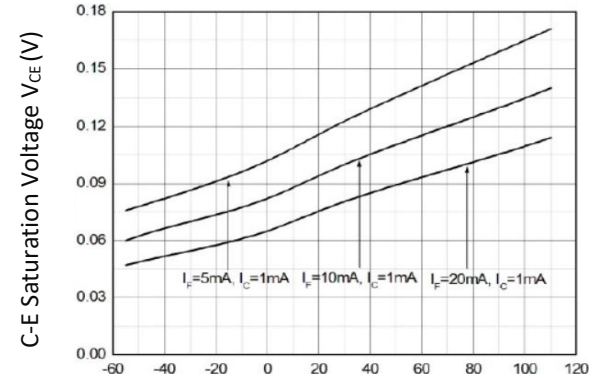
Normalized Current Transfer Ratio v.s. Forward Current



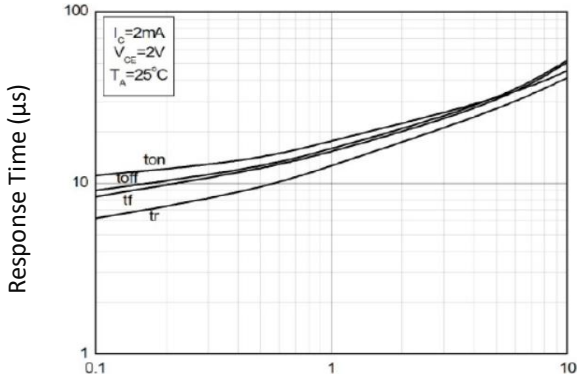
Normalized Current Transfer Ratio v.s. Ambient Temperature



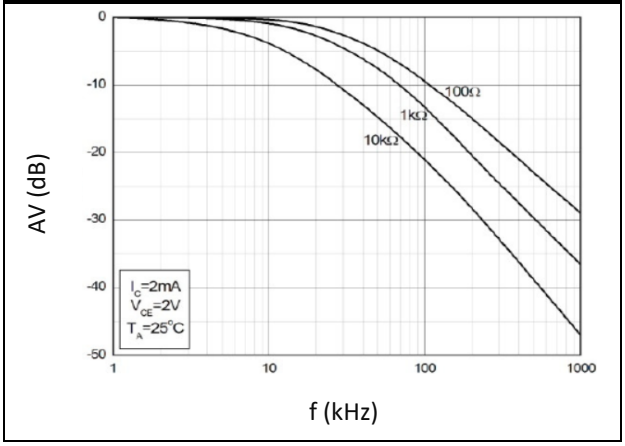
Collector-Emitter Saturation Voltage v.s. Ambient Temperature



Switching Time v.s. Load Resistance

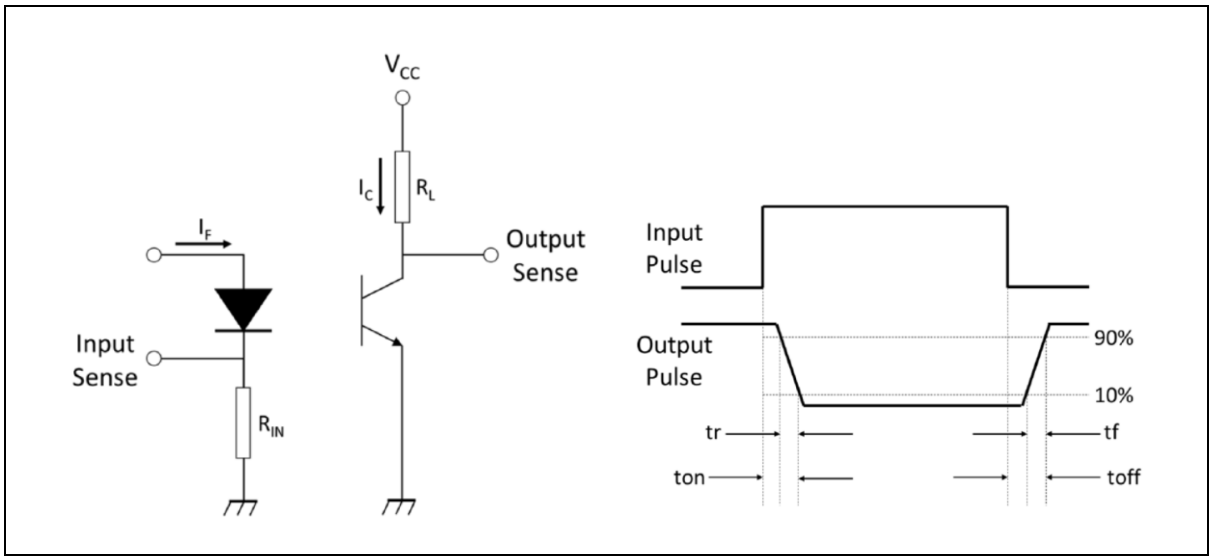


Frequency Response

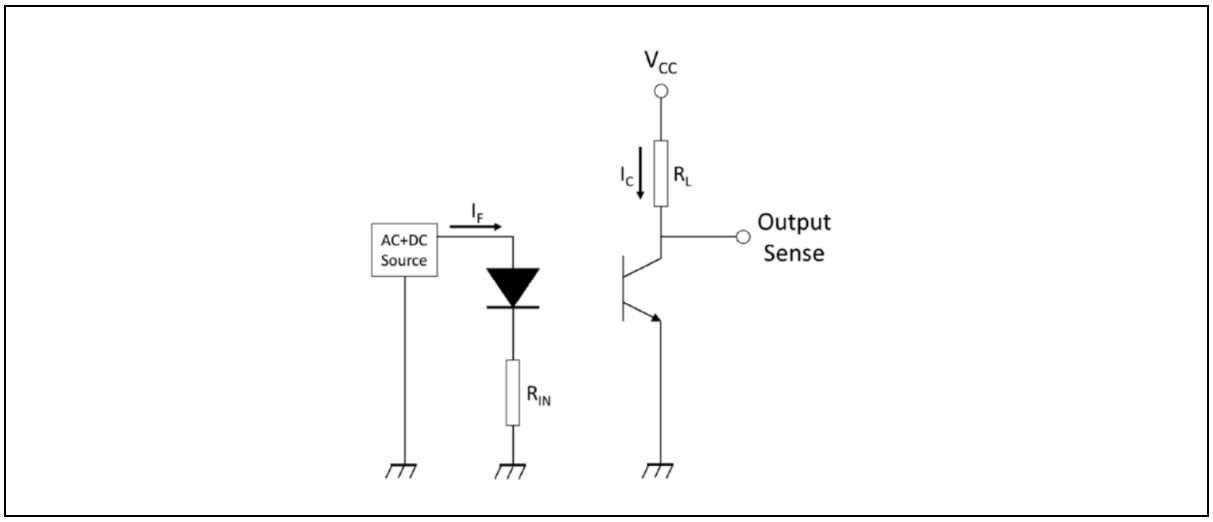


TEST CIRCUIT:

Test Circuit of Response Time:



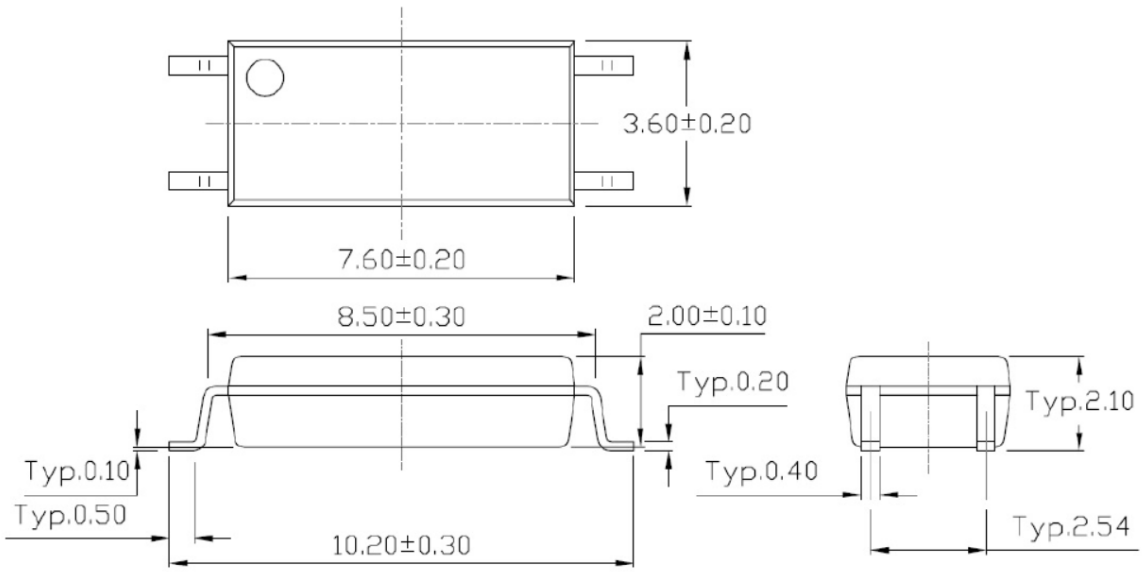
Test Circuit of Frequency Response:



OUTLINE DIMENSION:

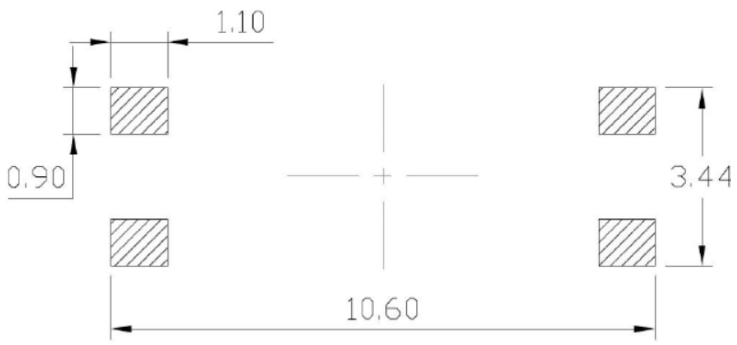
Package Dimension:

Surface Mount Lead Forming - SMD



1. All dimensions are in millimetre (mm).

Recommended Soldering Mask:



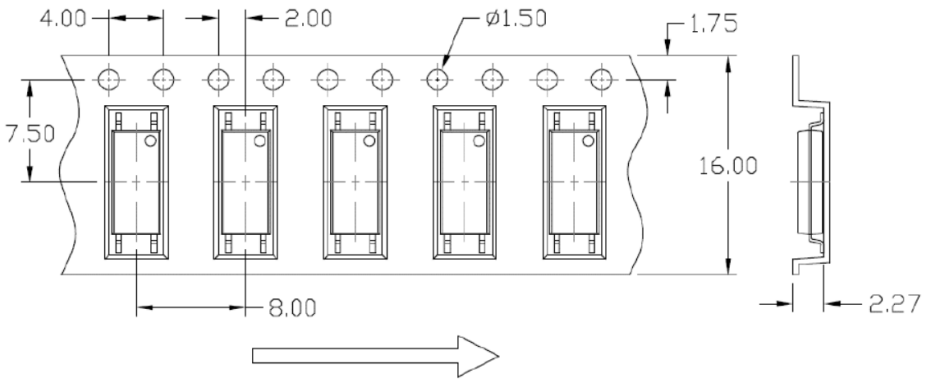
1. Dimensions are in millimetre (mm).

PACKING SPECIFICATION:

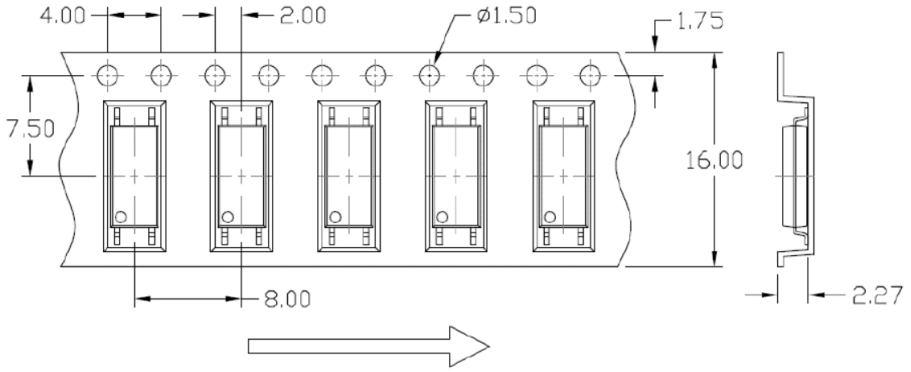
Reel Dimension:

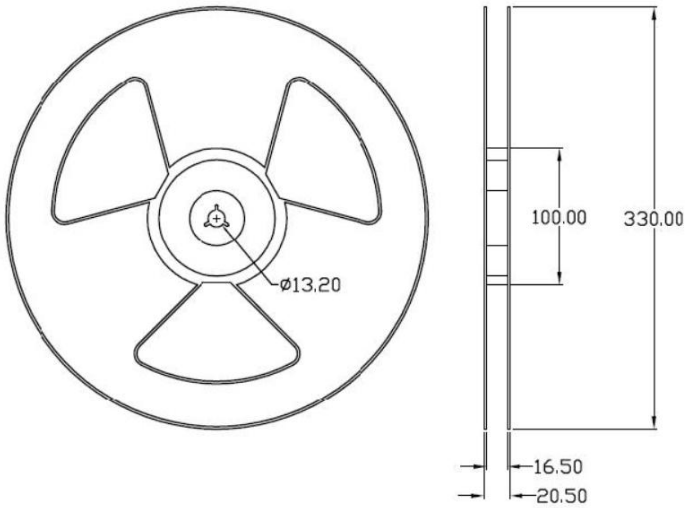
T1/T2: 3000pcs/reel

Reel Option: T1 (default)



Reel Option: T2

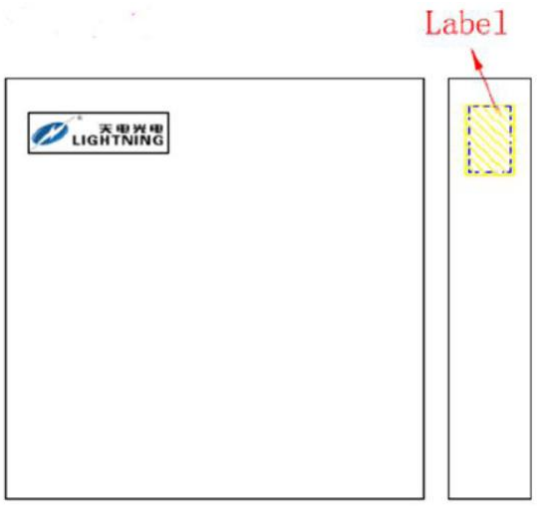




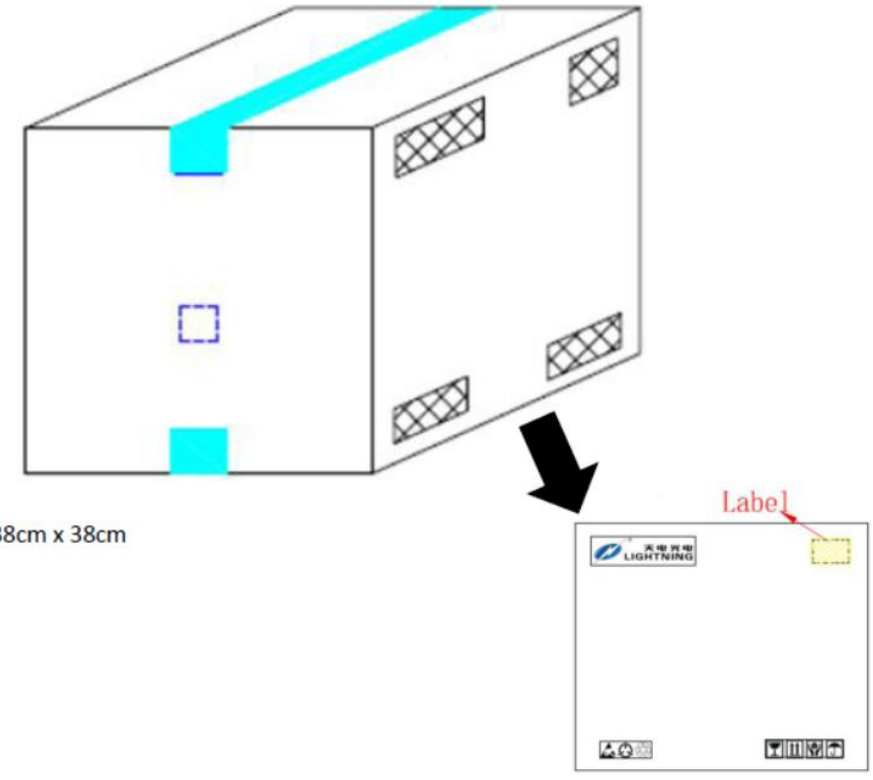
PACKING SPECIFICATION:

Box Dimension:

3 reel (9Kpcs)/inner box, 5 inner box (45Kpcs)/carton



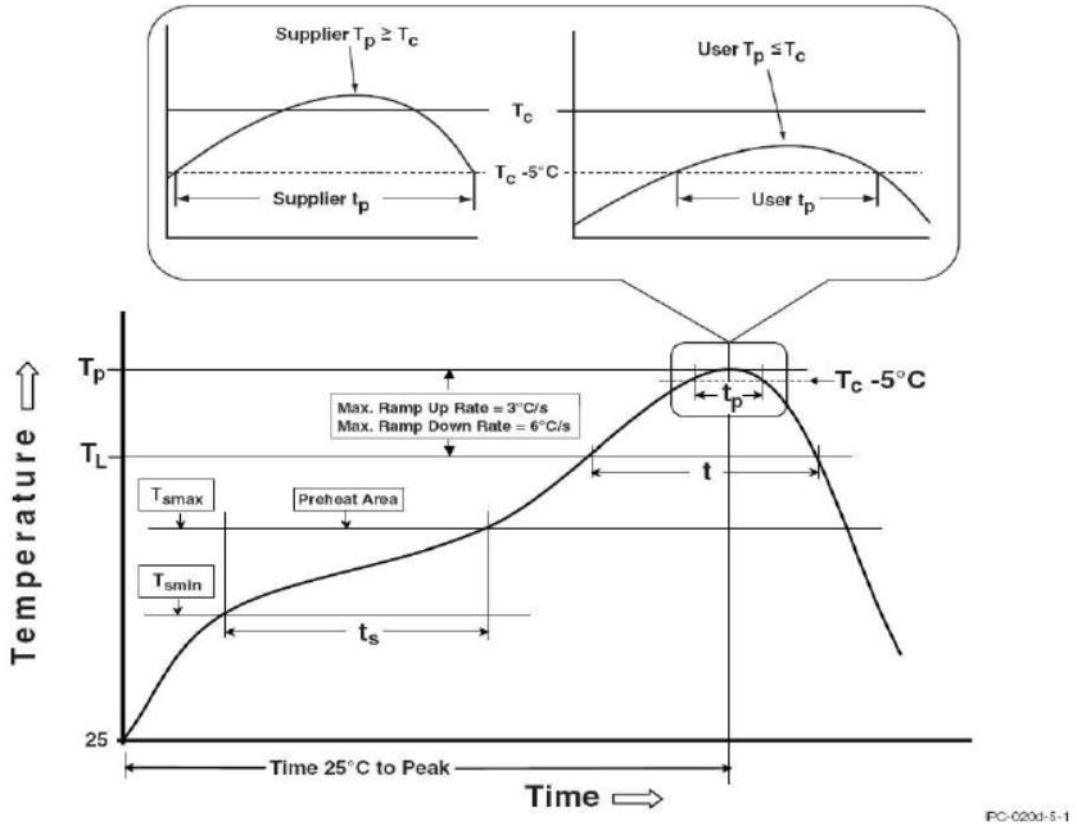
- L x W x H = 36cm x 36cm x 6.9cm



- L x W x H = 45cm x 38cm x 38cm

RECOMMENDED SOLDERING PROFILE:

Reflow Information:



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T_{smin})	100°C	150°C
Temperature Max. (T_{smax})	150°C	200°C
Time (t_s) from (T_{smin} to T_{smax})	60-120 seconds	60-120 seconds
Ramp-up Rate (t_L to t_P)	3°C/second max.	3°C/second max.
Liquidous Temperature (T_L)	183°C	217°C
Time (t_L) Maintained Above (T_L)	60-150 seconds	60-150 seconds
Peak Body Package Temperature	235°C +0°C / -5°C	260°C +0°C / -5°C
Time (t_P) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate (T_P to T_L)	6°C/second max.	6°C/second max.
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.

Wave Soldering Information (JESD22-A111 Compliant):