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
- ▶ SMD4 Gullwing
- ▶ Photo Transistor

Release Date: 06 September 2024 Version: A02

TD816X1(SLM)(T1)-GV

TD816X1(SLM) Series

TD816X1(SLM) Series

RoHS Compliant

DESCRIPTION:

The TD816X1(SLM) series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic DIP4 package with SMD4 Gullwing lead forming option.

With the robust coplanar double mold structure, TD816X1 series provide the most stable isolation feature.

APPLICATIONS:

- Switch mode power supplies
- Programmable controllers
- Household appliances
- Office equipment

FEATURES:

- High isolation 5000 Vrms
- DC input with transistor output
- Operating temperature range -55°C to +110°C
- REACH & RoHS compliance
- MSL class 1
- Regulatory Approvals:
  - UL - UL1577
  - VDE - EN60747-5-5 (VDE0884-5)
  - CQC - GB4943.1, GB8898
  - cUL - CSA Component Acceptance Service Notice 5A

Partner with:

NAMING & ORDERING INFORMATION:

Naming Information:

TD816 X 1 (SLM) (T1) - G V	
TD816	Part Number
X	Selection: CTR (X=A~F)
1	Version: Black Case
SLM	Lead Form Option: SMD4 Gullwing
T1	Selection: Tape and Reel Option (T1(default)/T2)
G	Green Option
V	VDE Option

Ordering Information:

TD816X1(SLM)(T1)-GV

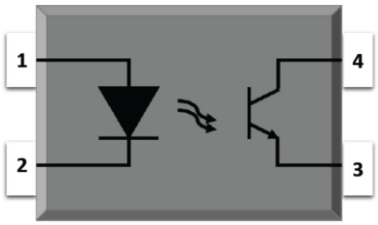
X = Selection: CTR (X=A~F)

Part Number	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
TD816A1(SLM)(T1)-GV	CTR	80	---	160	%	I_F=5mA, V_{CE}=5V
TD816B1(SLM)(T1)-GV		130	---	260		
TD816C1(SLM)(T1)-GV		200	---	400		
TD816D1(SLM)(T1)-GV		300	---	600		
TD816E1(SLM)(T1)-GV		100	---	200		
TD816F1(SLM)(T1)-GV		150	---	300		

Version No.	Original Release Date
Rev: A02	07/05/2022

SCHEMATIC DIAGRAM & MARKING:

Schematic Diagram:



PIN Definition	
1	Anode
2	Cathode
3	Emitter
4	Collector

Marking Information:

Marking Definition	
TD	Manufacturer Code
816X	Part Number & 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}	6	V
Collector Current	I_C	50	mA
Output Power Dissipation	P_O	150	mW
COMMON			
Total Power Dissipation	P_{tot}	200	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.

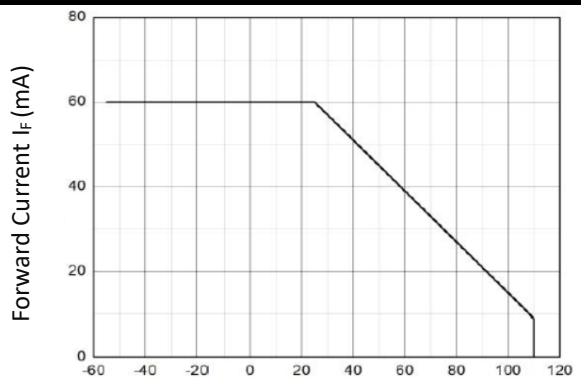
ELECTRICAL CHARACTERISTICS:

Electrical Optical Characteristics at Ta=25°C:

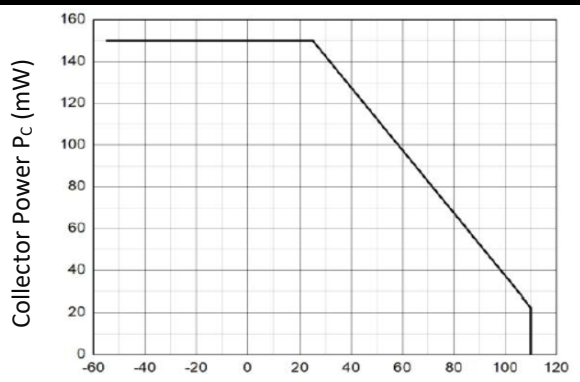
Parameter		Symbol	Values			Unit	Test Condition
			Min.	Typ.	Max.		
INPUT							
Forward Voltage		V_F	---	1.19	1.4	V	I_F=10mA
Reverse Current		I_R	---	---	10	μA	V_R=6V
Input Capacitance		C_{IN}	---	10	---	pF	V=0, f=1kHz
OUTPUT							
Collector Dark Current		I_{CEO}	---	---	100	nA	I_F=0mA, V_{CE}=20V
Collector - 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							
Turn On Threshold Current	TD816A1	CTR	80	---	160	%	I_F=5mA, V_{CE}=5V
	TD816B1		130	---	260		
	TD816C1		200	---	400		
	TD816D1		300	---	600		
	TD816E1		100	---	200		
	TD816F1		150	---	300		
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	---	0.06	0.2	V	I_F=20mA, 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	---	3	18	μs	V_{CE}=2V, I_C=2mA R_L=100Ω
Response Time (Fall)		t_f	---	4	18	μs	
Cut-off Frequency		f_c	---	80	---	kHz	V_{CE}=2V, I_C=2mA R_L=100Ω, -3dB

CHARACTERISTIC CURVES:

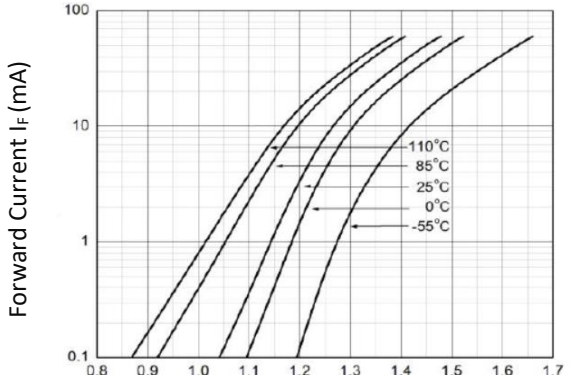
Forward Current v.s. Ambient Temperature



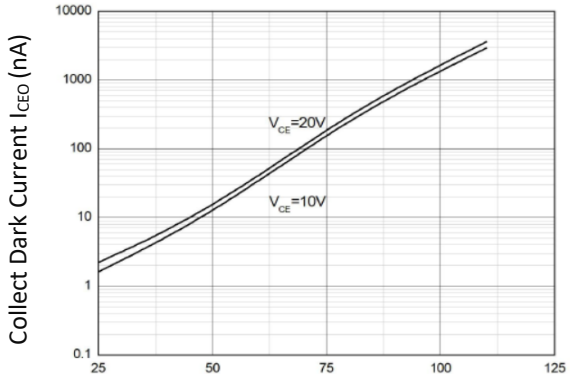
Collector Power Dissipation v.s. Ambient Temp.



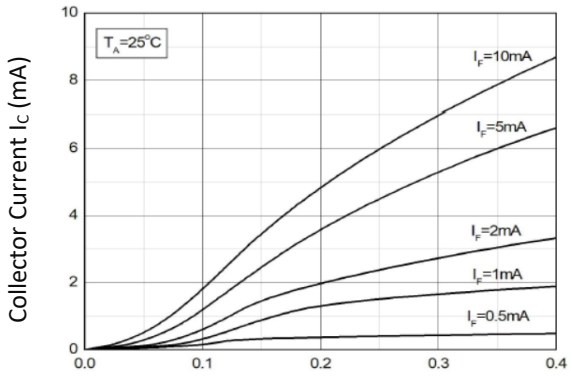
Forward Current v.s. Forward Voltage



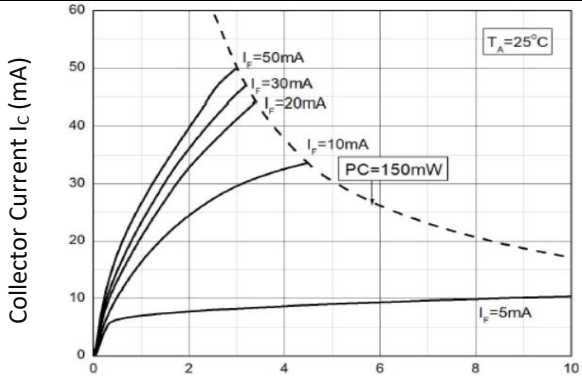
Collector Dark Current v.s. Ambient Temperature



Collector Current v.s. Collector-Emitter Voltage

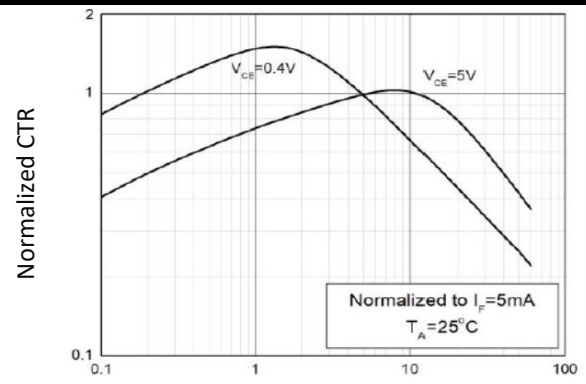


Collector Current v.s. Collector-Emitter Voltage

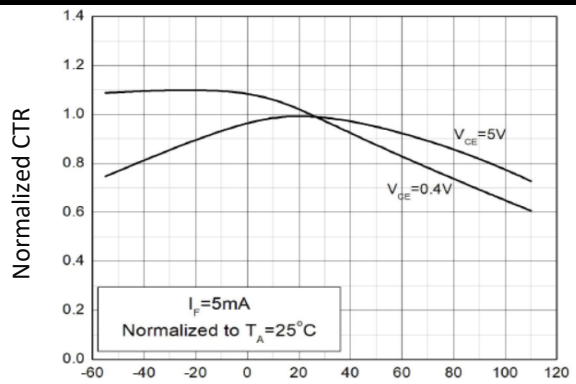


CHARACTERISTIC CURVES:

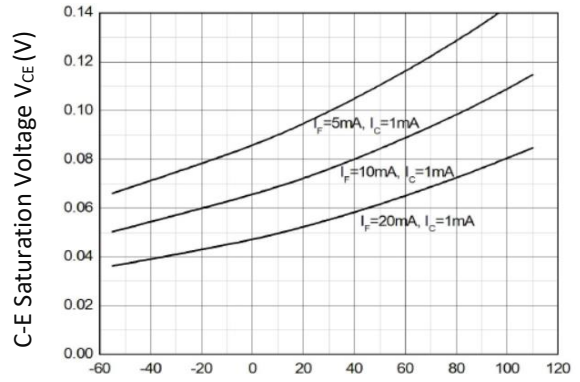
Normalized Current Transfer Ratio v.s. Forward Current



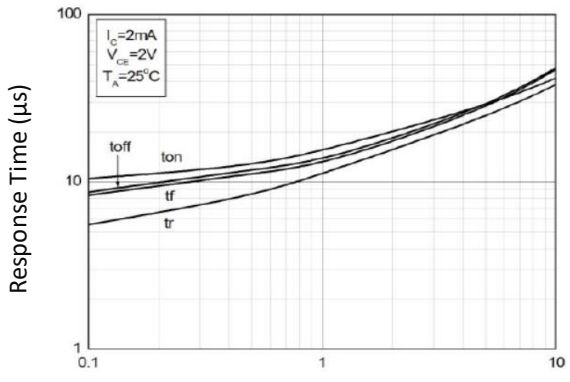
Normalized Current Transfer Ratio v.s. Ambient Tempature



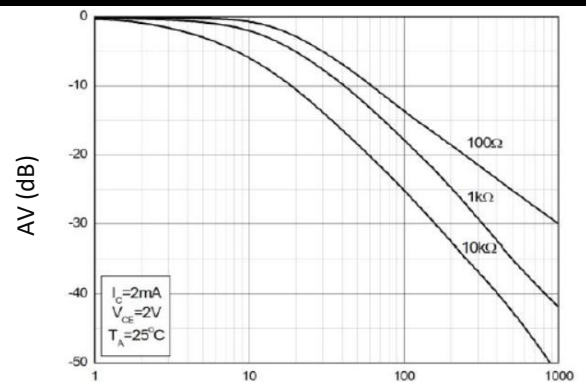
Collector-Emitter Saturation Voltage v.s. Ambient Temperature



Switching Time v.s. Load Resistance

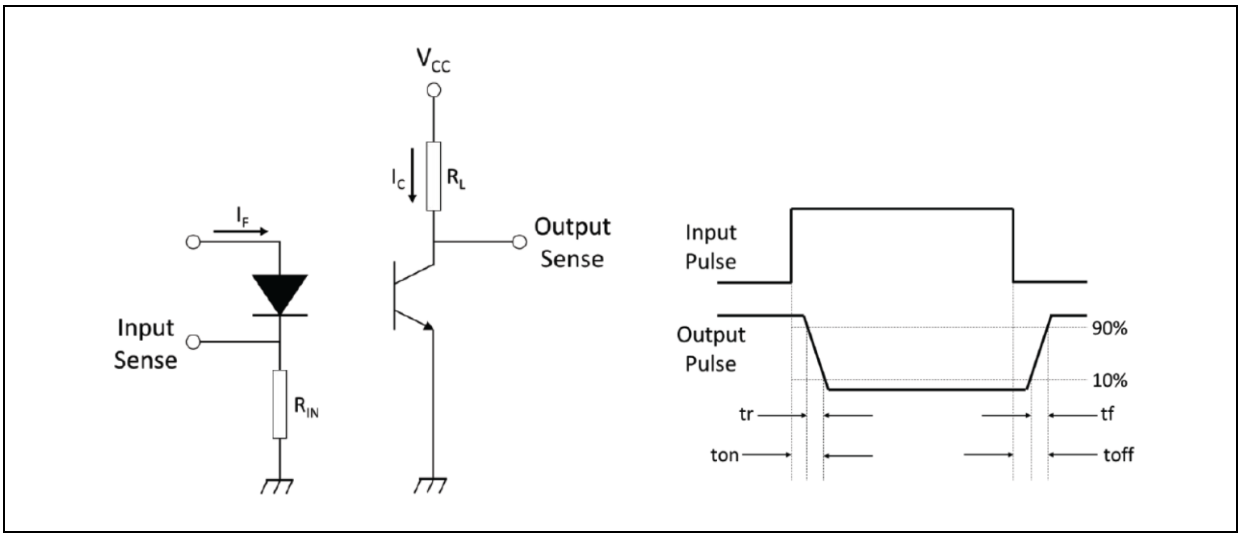


Frequency Response

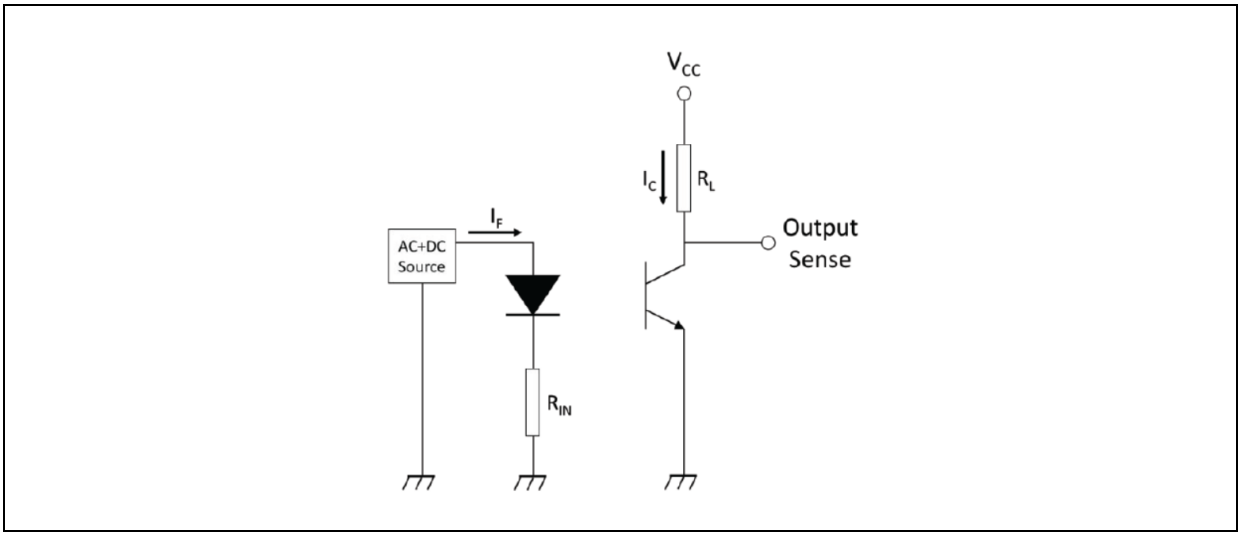


TEST CIRCUIT:

Test Circuit of Response Time:



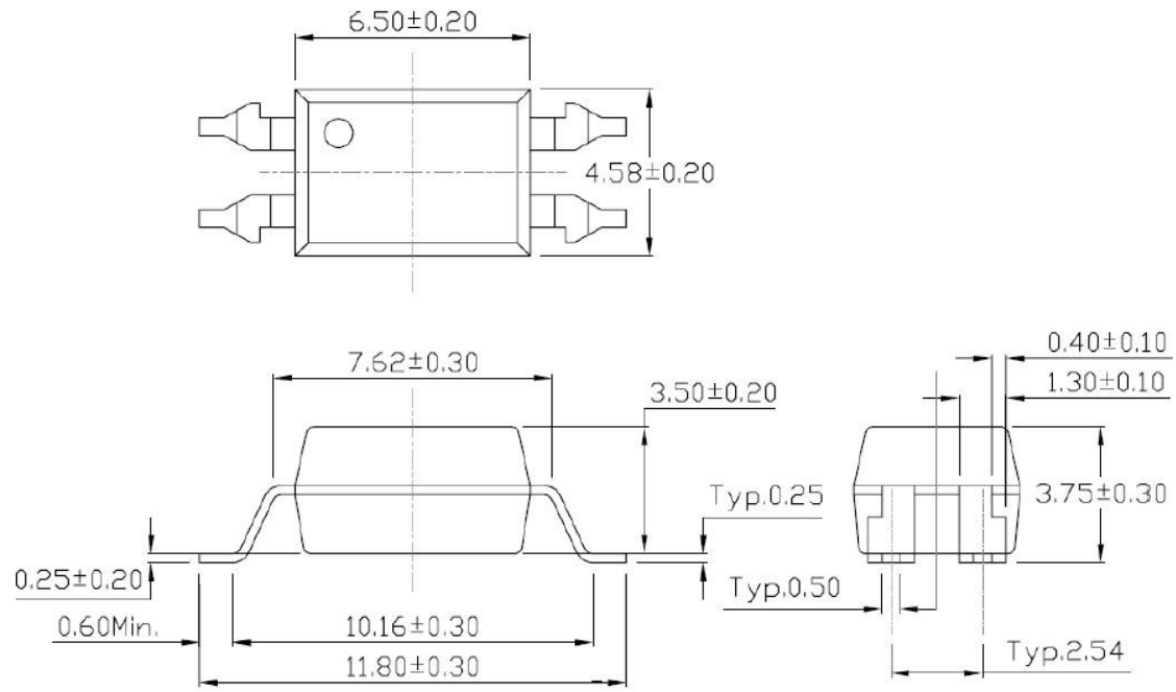
Test Circuit of Frequency Response:



OUTLINE DIMENSION:

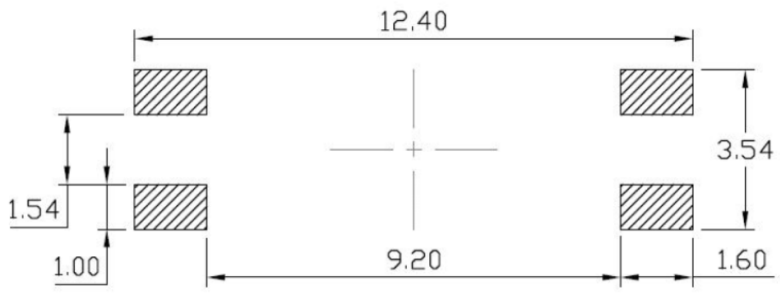
Package Dimension:

Surface Mount Gullwing Lead Forming - SMD (SLM Type)



1. All dimensions are in millimetre (mm).

Recommended Soldering Mask:



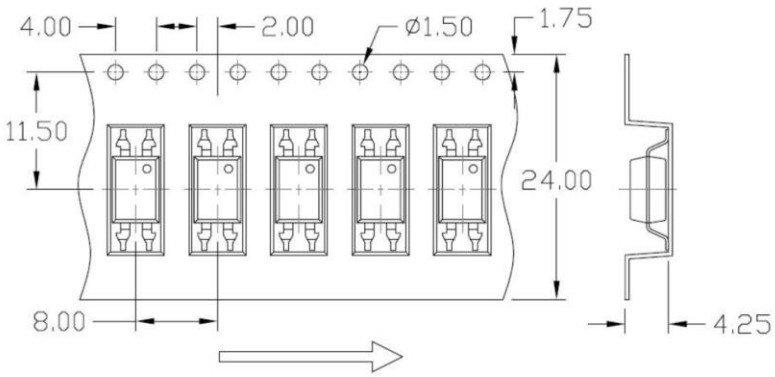
1. Dimensions are in millimetre (mm).

PACKING SPECIFICATION:

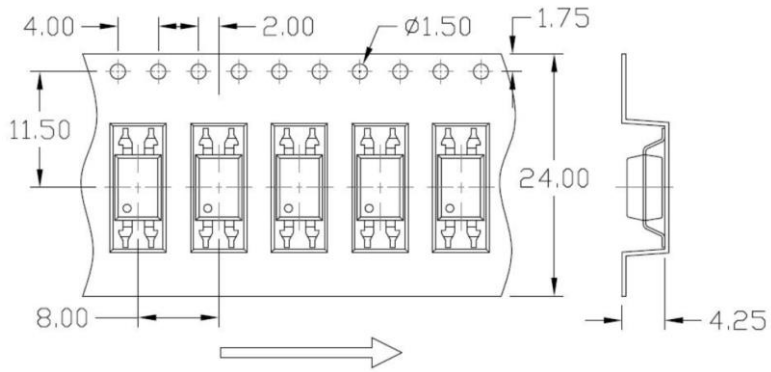
Reel Dimension:

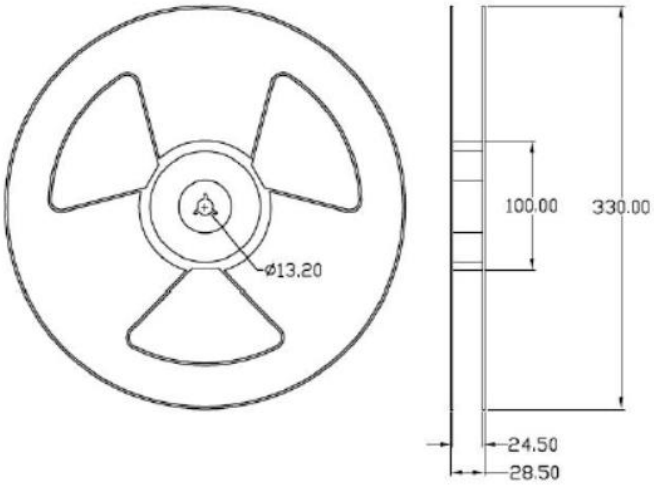
T1/T2: 1500pcs/reel

Reel Option: T1 (default)



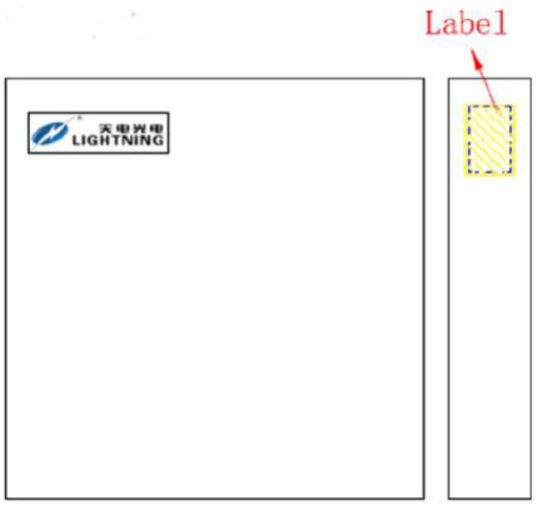
Reel Option: T2



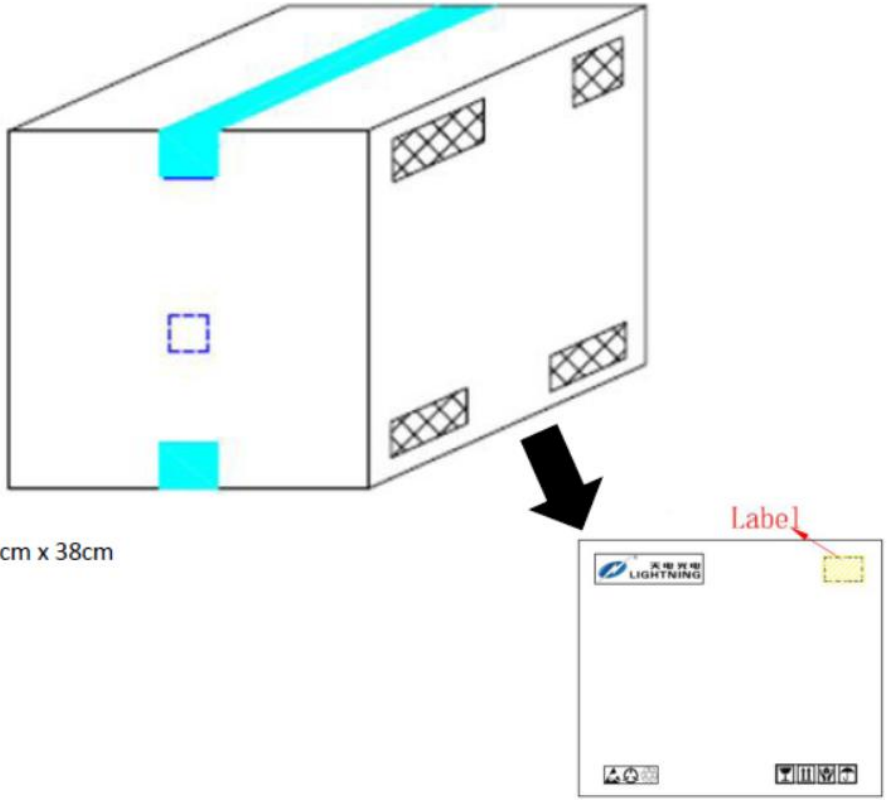


Box Dimension:

T1/T2: 3 reels (4.5Kpcs)/inner box, 5 inner boxes (22.5Kpcs)/carton



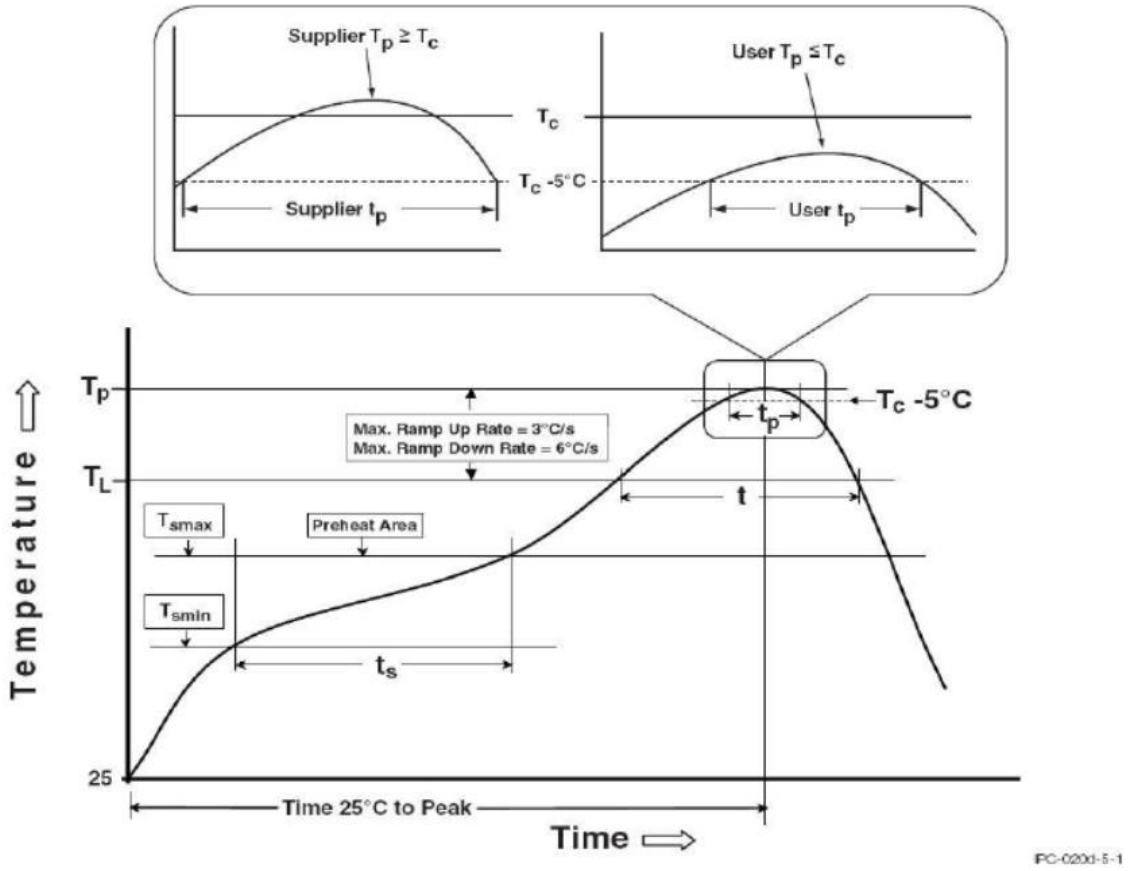
- L x W x H = 36cm x 36cm x 6.9cm



- 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.