



# BRIGHTTEK

BRIGHTTEK (EUROPE) LIMITED

*Brighten up The World With LED!*



ISO/TS 16949:2009



BS EN ISO 14001:2004



QC 90000 IECQ HS1901

## PRODUCT DATASHEET



- ▶ DC Input Photo Coupler
- ▶ SMD6
- ▶ Random-Phase TRIAC

# TD301X(S)(T1)-GV



Release Date: 26 June 2025 Version: A00



## TD301X(S) Series

### DESCRIPTION:



The TD301X(S) series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a monolithic silicon random-phase photo TRIAC in a plastic DIP6 package with SMD6 lead forming option.

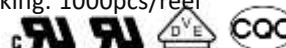
With the robust coplanar double mold structure, TD301X(S) series provide the most stable isolation feature.

### FEATURES:

### APPLICATIONS:

- Solenoid/valve controls
- Lighting controls
- Motor controls
- Temperature controls
- Static AC power switches
- Solid state relays
- Interfacing microprocessors to 115 to 240VAC peripherals

- High isolation 5000Vrms
- DC input with random-phase photo TRIAC output
- Operating temperature range -40°C to +100°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
- Packing: 1000pcs/reel



Partner with: LIGHTNING

## NAMING & ORDERING INFORMATION:

### Naming Information:

<b>TD301 X (S) (T1) - G V</b>	
<b>TD301X</b>	Part Number
<b>X</b>	Selection: LED Trigger Current (X=0~2)
<b>S</b>	Lead Form Option: SMD6
<b>T1</b>	Selection: Tape and Reel Option (T1(default)/T2)
<b>G</b>	Green Option
<b>V</b>	VDE Option

### Ordering Information:

<b>TD301X(S)(T1)-GV</b>						
<u>X</u> = Selection: LED Trigger Current (X=0~2)						
Part Number	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
TD3010(S)(T1)-GV	I <sub>FT</sub>	---	---	15	mA	I <sub>TM</sub> =100mA Terminal Voltage=3V
TD3011(S)(T1)-GV		---	---	10		
TD3012(S)(T1)-GV		---	---	5		

Version No.	Original Release Date
Rev: A00	05/09/2024

## SCHEMATIC DIAGRAM & MARKING:

Schematic Diagram:

PIN Definition	
1	Anode
2	Cathode
3	NC
4	Terminal
5	Substrate
6	Terminal

Marking Information:

Marking Definition	
TD	Manufacturer Code
301X	Part Number & Rank
V	VDE Applicable
Y	Fiscal Year
A	Manufacturing Code
WW	Work Week

Labelling Information:

 <b>BRIGHTTEK</b> BRIGHTTEK (EUROPE) LIMITED Part No.: XXXXXXXXXXXX Bin Code: X  Lot No.: XXXXXXXX Date Code: XXXX QTY: XXX PCS  MSL: 1 Made in Quanzhou Fujian     	<p>This product is manufactured, tested, and packed by</p>
	<p>for more details, please visit <a href="http://www.tdled.com">www.tdled.com</a></p>

## ABSOLUTE CHARACTERISTICS:

### Absolute Maximum Ratings:

Parameter	Symbol	Ratings	Unit
INPUT			
Forward Current	$I_F$	60	mA
Reverse Voltage	$V_R$	6	V
Junction Temperature	$T_J$	125	°C
Input Power Dissipation	$P_I$	100	mW
OUTPUT			
Off-State Output Terminal Voltage	$V_{DRM}$	250	V
Peak Repetitive Surge Current PW=100μs, 120pps	$I_{TSM}$	1	A
On-State RMS Current	$I_{T(RMS)}$	100	mA
Junction Temperature	$T_J$	125	°C
Output Power Dissipation	$P_O$	300	mW
COMMON			
Total Power Dissipation	$P_{tot}$	400	mW
Isolation Voltage	$V_{iso}$	5000 * <sup>1</sup>	Vrms
Operating Temperature	$T_{opr}$	-40~+100	°C
Storage Temperature	$T_{stg}$	-55~+125	°C
Soldering Temperature	$T_{sol}$	260 * <sup>2</sup>	°C

\*1. AC for 1 minute, R.H.=40~60%.

\*2. For 10 seconds max.

## ELECTRICAL CHARACTERISTICS:

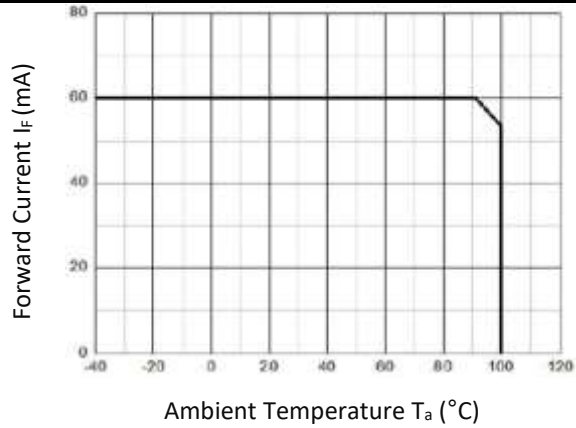
Electrical Optical Characteristics at  $T_a=25^{\circ}\text{C}$ :

Parameter		Symbol	Values			Unit	Test Condition
			Min.	Typ.	Max.		
INPUT							
Forward Voltage		V <sub>F</sub>	---	1.24	1.4	V	I <sub>F</sub> =10mA
Reverse Current		I <sub>R</sub>	---	---	10	μA	V <sub>R</sub> =6V
Input Capacitance		C <sub>IN</sub>	---	8.5	250	pF	V=0, f=1kHz
OUTPUT							
Peak Off-State Current Either Direction		I <sub>DRM</sub>	---	---	100 * <sup>1</sup>	nA	V <sub>DRM</sub> =Rated V <sub>DRM</sub> I <sub>F</sub> =0
Peak On-State Voltage Either Direction		V <sub>TM</sub>	---	1.58	2.5	V	I <sub>TM</sub> =100mA
Critical Rate of Rise of Off-State Voltage		dV/dt	1000	---	---	V/μs	V <sub>PEAK</sub> =400V I <sub>F</sub> =0
TRANSFER CHARACTERISTICS							
LED Trigger Current	TD3010	I <sub>FT</sub>	---	---	15	mA	I <sub>TM</sub> =100mA Terminal Voltage=3V
	TD3011		---	---	10		
	TD3012		---	---	5		
Holding Current		I <sub>H</sub>	---	257	---	μA	---
Isolation Resistance		R <sub>ISO</sub>	10^12	10^14	---	Ω	DC=500V, 40~60% R.H.
Floating Capacitance		C <sub>IO</sub>	---	0.8	---	pF	V=0, f=1MHz

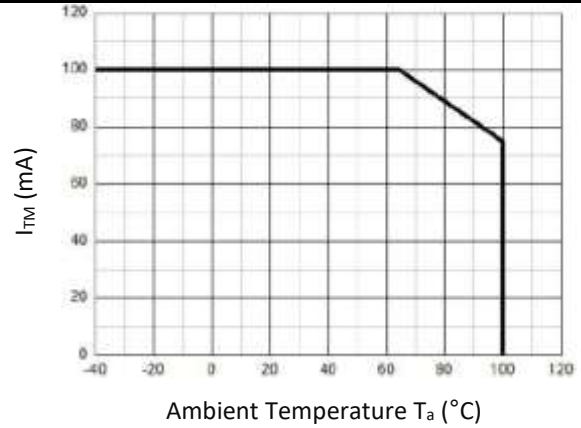
\*1. Test voltage must be applied within  $dV/dt$  rating.

## CHARACTERISTIC CURVES:

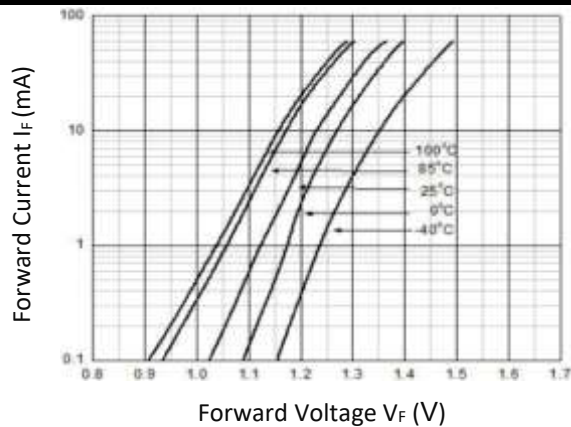
Forward Current v.s. Ambient Temperature



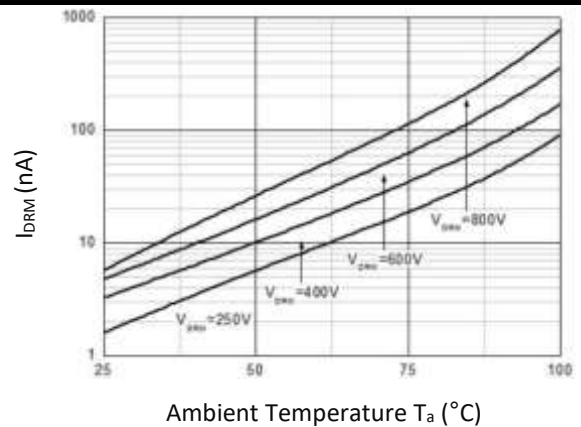
On-State Terminal Current v.s. Ambient Temp.



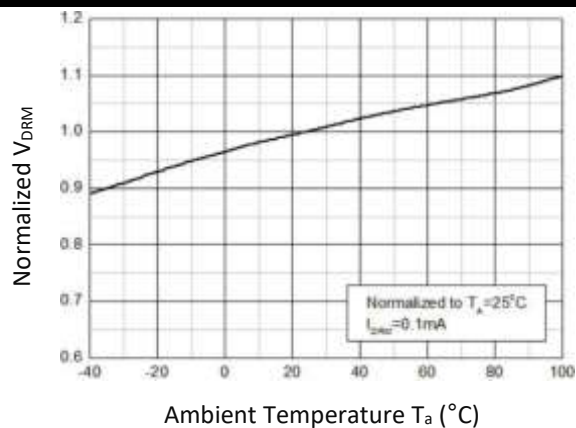
Forward Current v.s. Forward Voltage



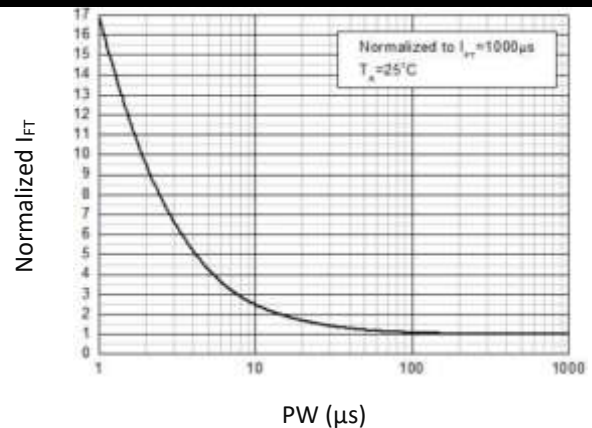
Off-State Terminal Current v.s. Ambient Temperature



Normalized Off-State Terminal Voltage v.s. Ambient Temperature

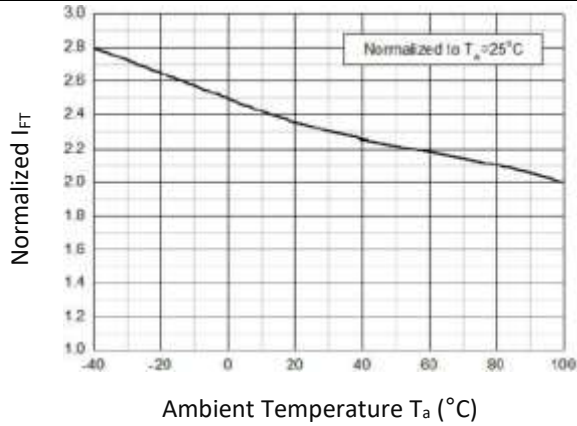


Normalized Trigger Current v.s. LED Trigger Pulse Width

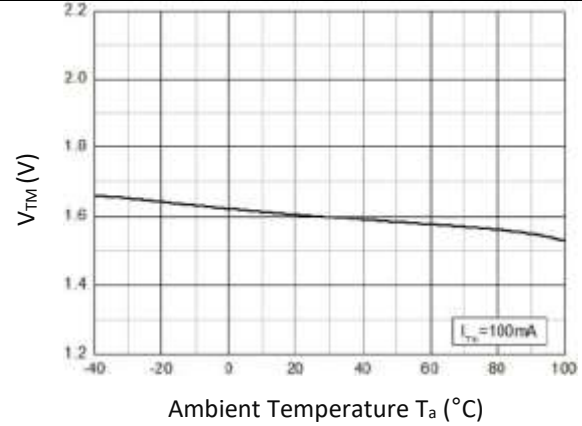


## CHARACTERISTIC CURVES:

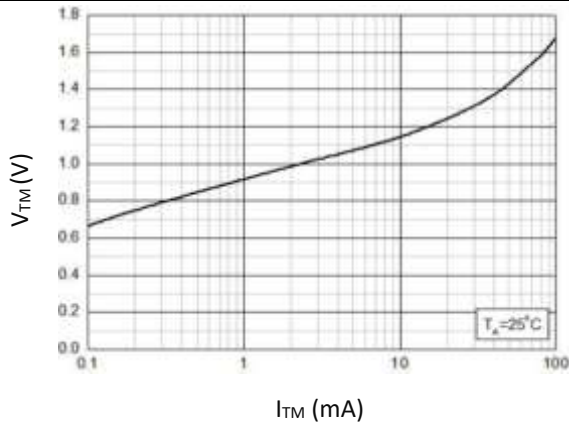
Normalized Trigger Current v.s. Ambient Temperature



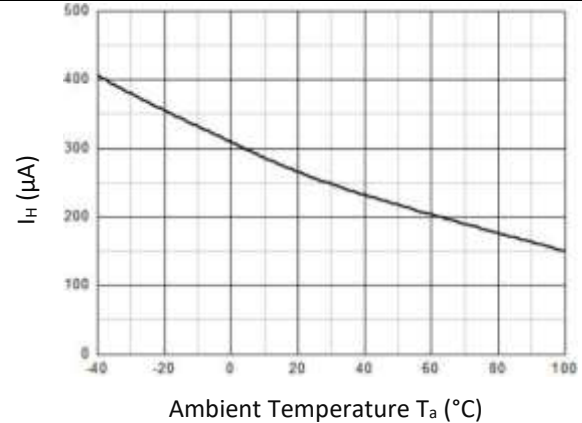
On-State Terminal Voltage v.s. Ambient Temperature



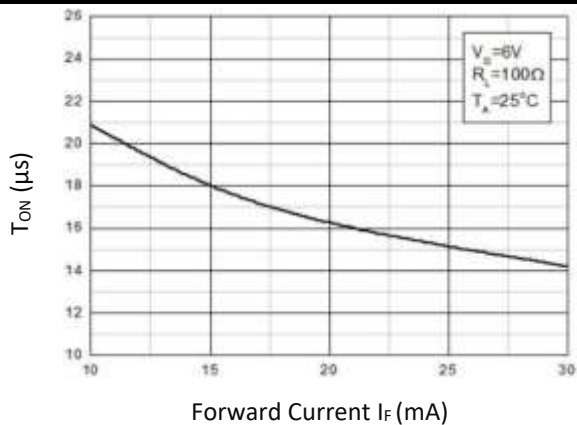
On-State Terminal Voltage v.s. On-State Terminal Current



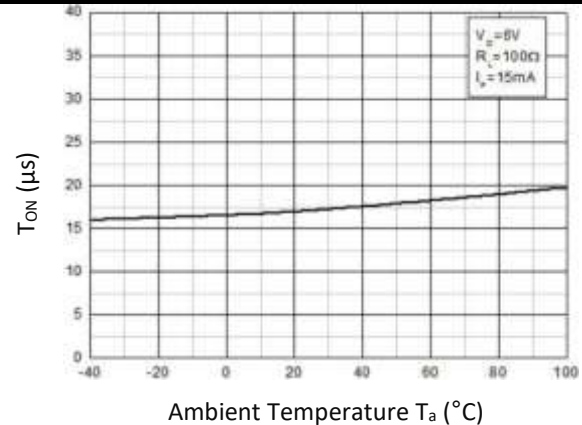
Holding Current v.s. Ambient Temperature



Turn On Time v.s. Forward Current

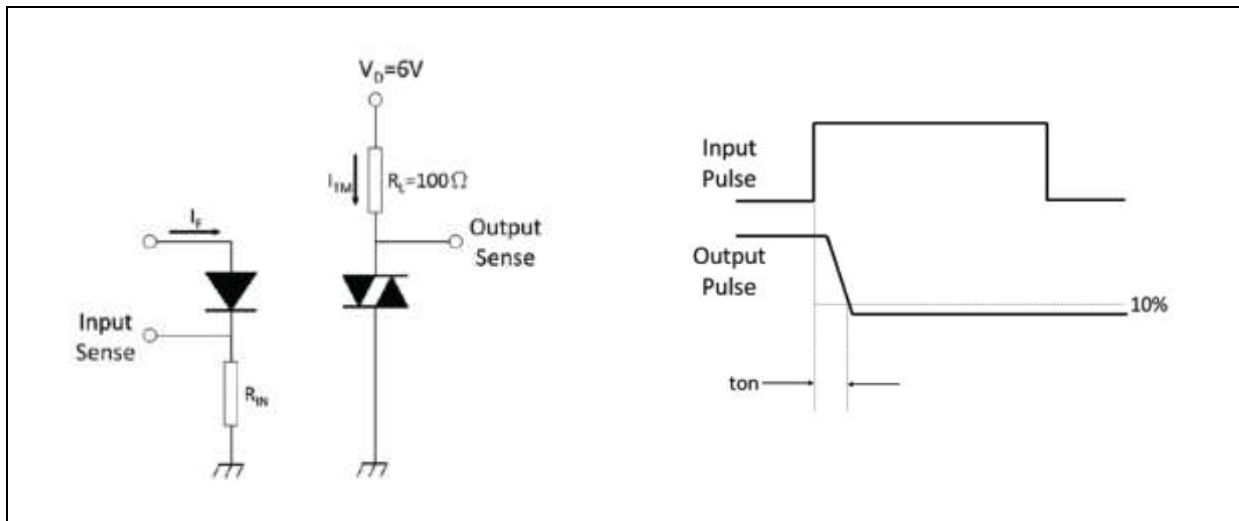


Turn On Time v.s. Ambient Temperature

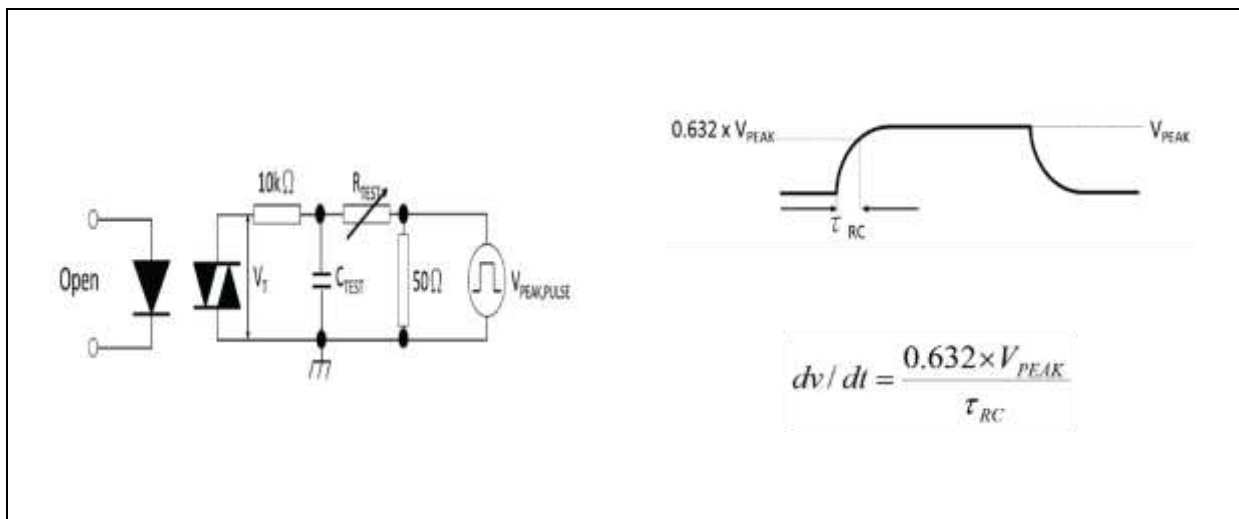


## TEST CIRCUIT:

Test Circuit and Waveforms of Turn On Time:



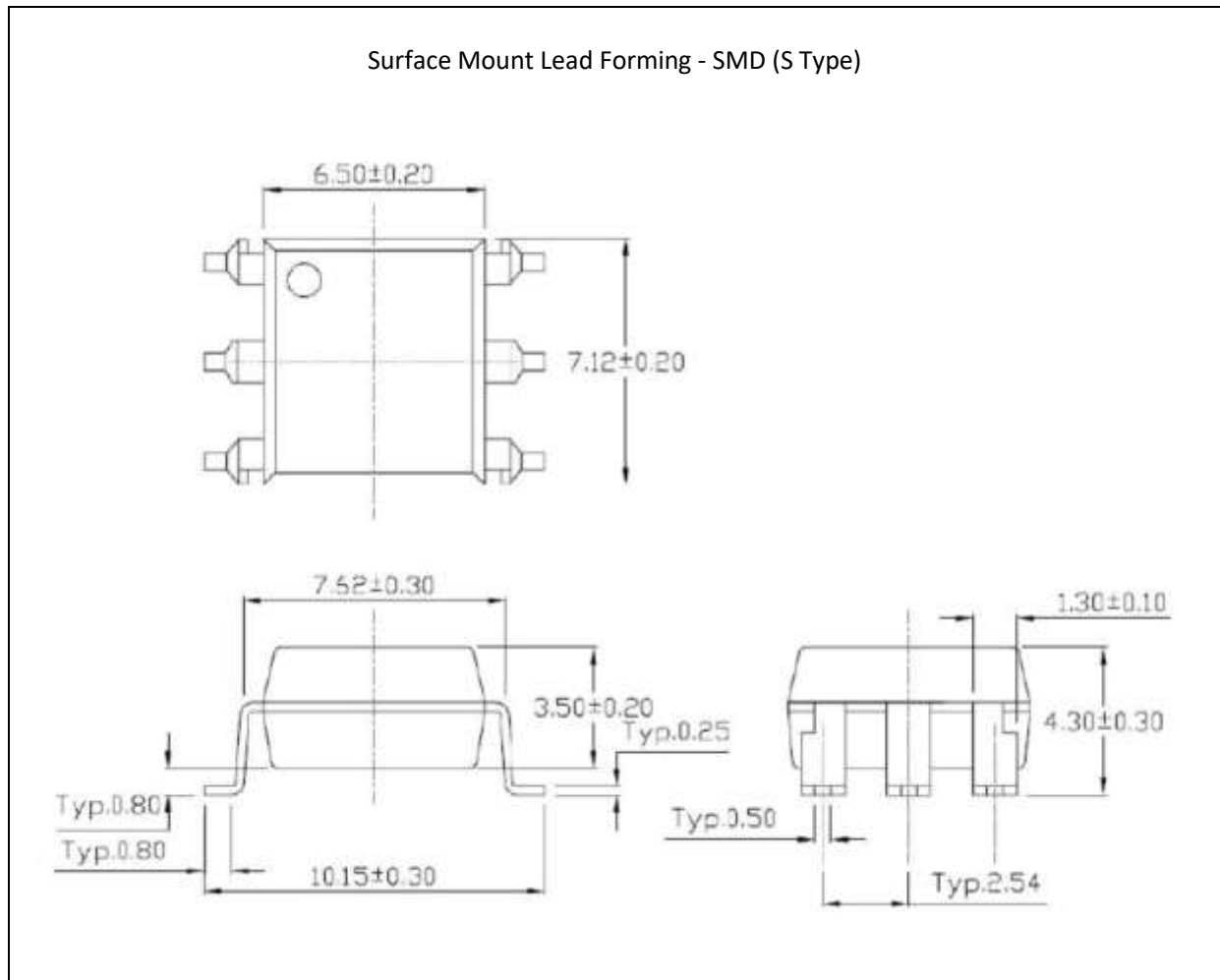
Test Circuit and Waveforms of  $dV/dt$ :





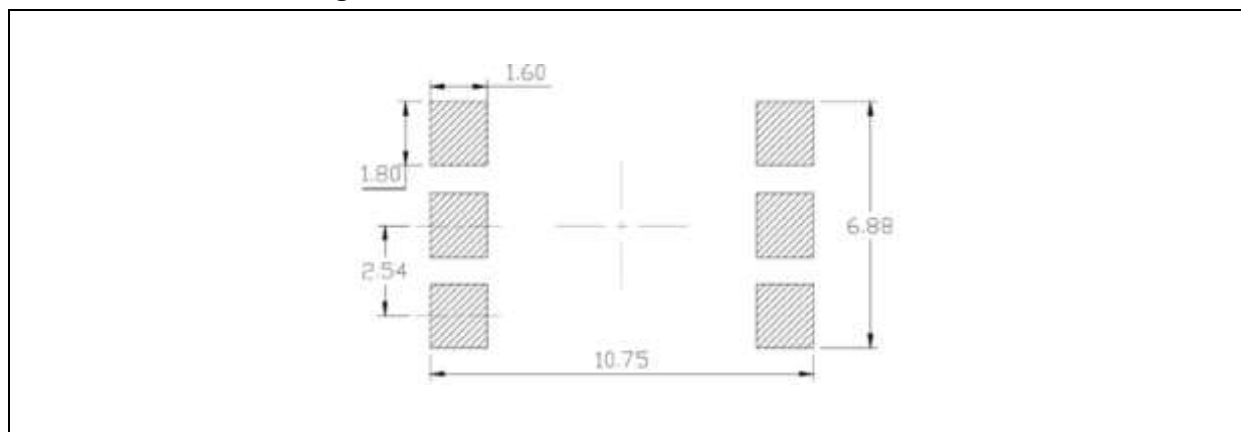
## OUTLINE DIMENSION:

Package Dimension:



1. All dimensions are in millimetre (mm).

Recommended Soldering Mask:



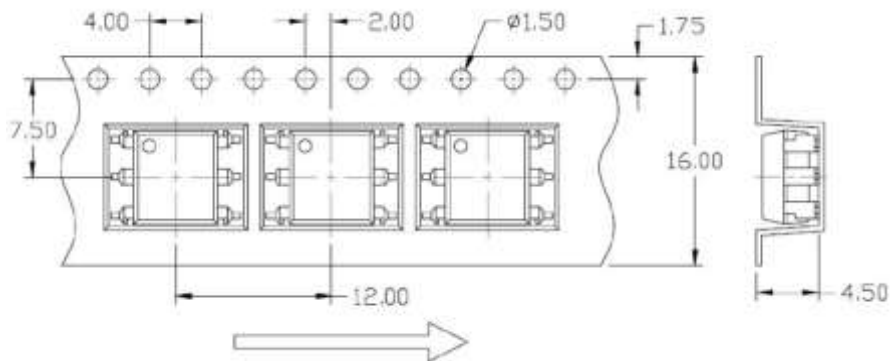
1. Dimensions are in millimetre (mm).

## PACKING SPECIFICATION:

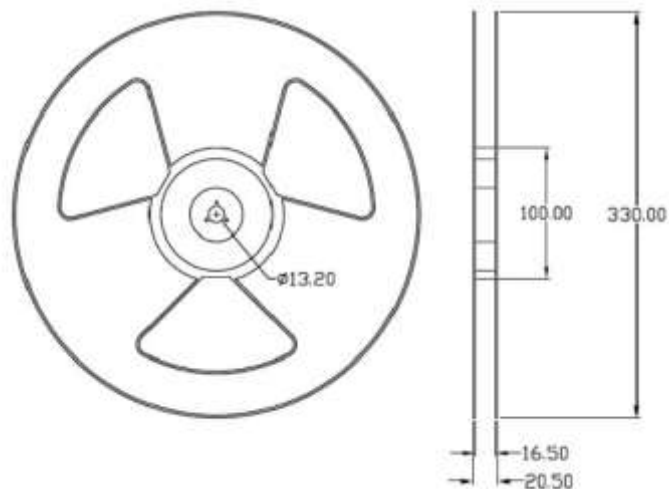
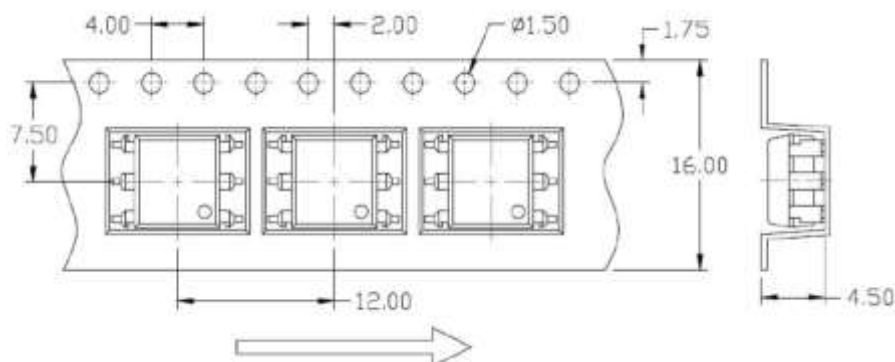
Reel Dimension:

T1/T2: 1000pcs/reel

Reel Option: T1 (default)



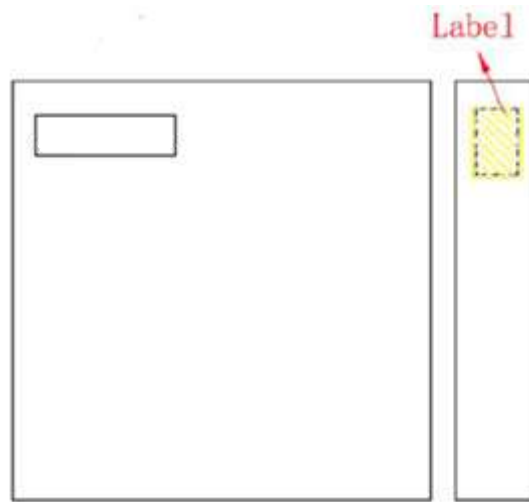
Reel Option: T2



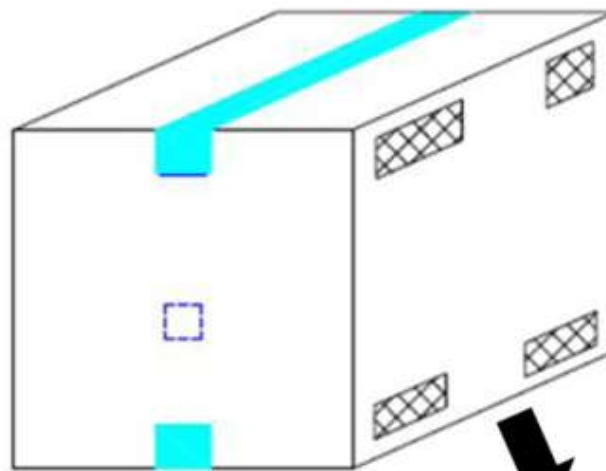
## PACKING SPECIFICATION:

Box Dimension:

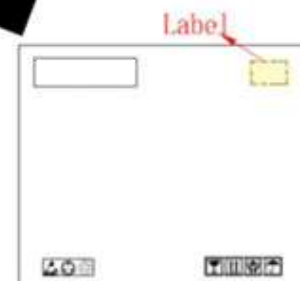
T1/T2: 3 reels (3Kpcs)/inner box, 5 inner boxes (15Kpcs)/carton



● L x W x H = 36cm x 36cm x 6.9cm

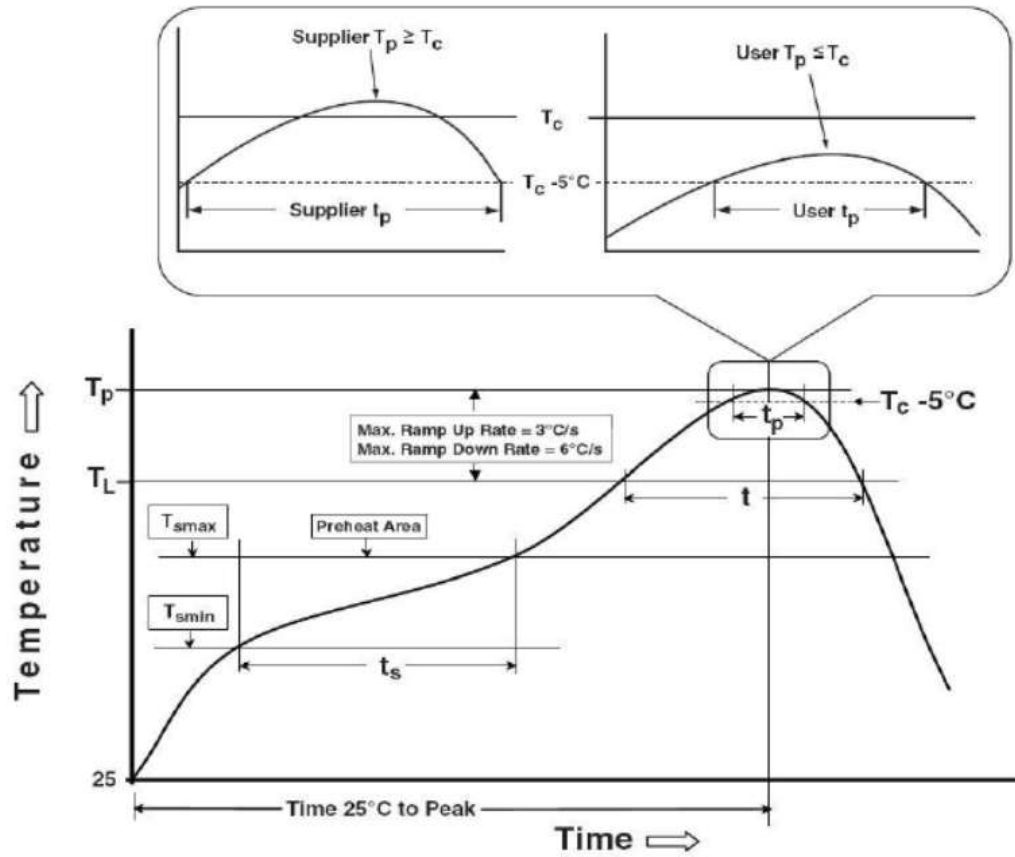


● L x W x H = 45cm x 38cm x 38cm



## RECOMMENDED SOLDERING PROFILE:

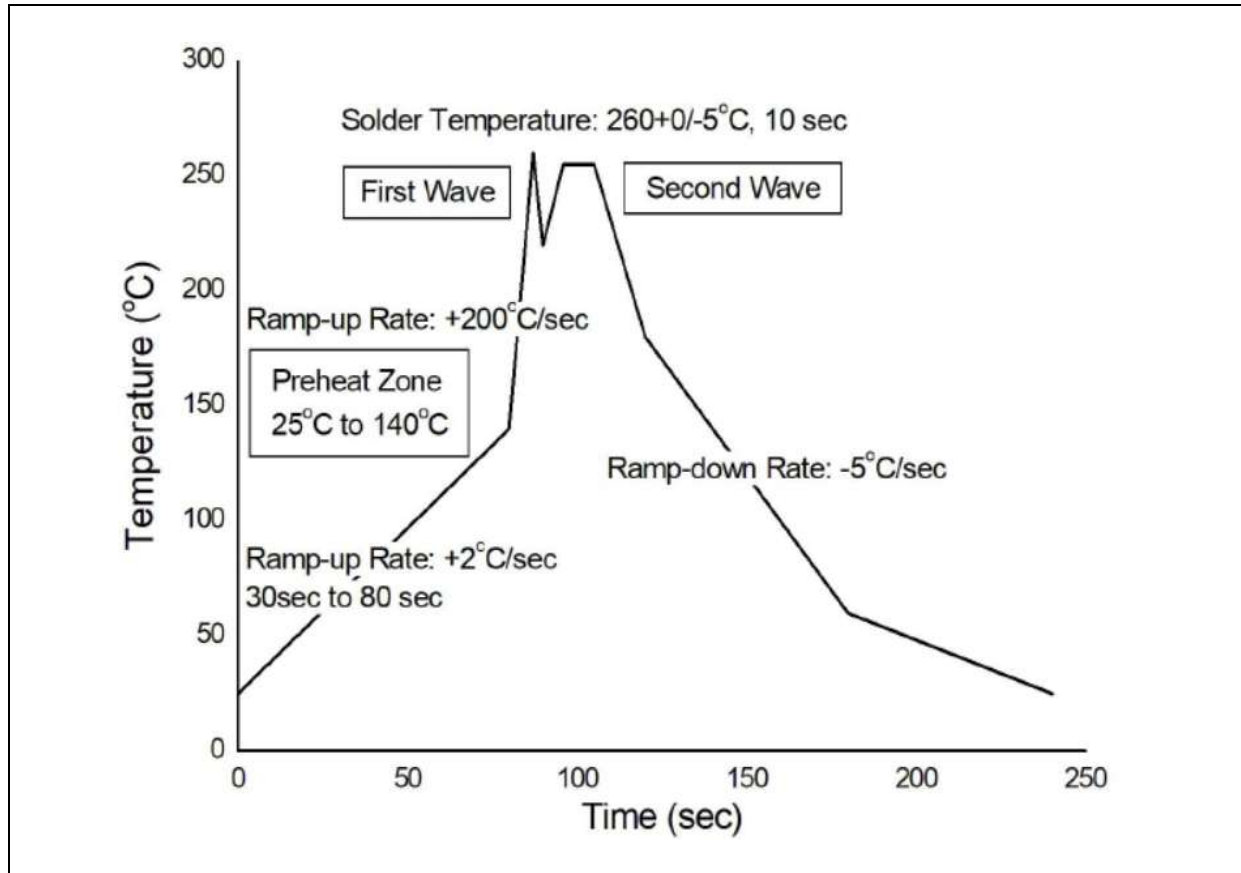
Reflow Information:



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.

## RECOMMENDED SOLDERING PROFILE:

Wave Soldering (JESD22-A111 Compliant):



Hand Soldering:

Soldering Temperature	380±5°C
Soldering Time	3 sec max.

Note:

- One time soldering is recommended for all soldering methods.
- Do not solder more than three times for IR reflow soldering.