



BRIGHTTEK

BRIGHTTEK (EUROPE) LIMITED

Brighten up The World With LED!



ISO/TS 16949:2009



BS EN ISO 14001:2004



QC 900000 IECQ HSP01

PRODUCT DATASHEET



- ▶ DC-In Solid State Relay
- ▶ SMD7
- ▶ Random Phase TRIAC Output

TDRX223(S)(T1)-GV



Release Date: 20 July 2025 Version: A00



TDRX223(S) Series

DESCRIPTION:



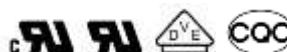
The TDRX223(S) series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a monolithic silicon random-phase photo TRIAC to drive a power TRIAC in a plastic DIP7 package with SMD7 lead forming option.

FEATURES:

- High isolation 5000Vrms
- DC input with TRIAC output
- Operating temperature range -40°C to +85°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

APPLICATIONS:

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



Partner with:  LIGHTNING

NAMING & ORDERING INFORMATION:

Naming Information:

TDR X 223 (S) (T1) - G V	
TDRX223	Part Number
X	Selection: On-State RMS Current (X=0~3)
S	Lead Form Option: SMD7
T1	Selection: Tape and Reel Option (T1(default)/T2)
G	Green Option
V	VDE Option

Ordering Information:

TDRX223(S)(T1)-GV						
<u>X</u> = Selection: On-State RMS Current (X=0~3)						
Part Number	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
TDR0223(S)(T1)-GV	IT _(RMS) *	---	---	0.3	A	IT _{SM} =3A ** P _W =100μs, 120pps
TDR1223(S)(T1)-GV		---	---	0.6		IT _{SM} =6A P _W =100μs, 120pps
TDR2223(S)(T1)-GV		---	---	0.9		IT _{SM} =9A P _W =100μs, 120pps
TDR3223(S)(T1)-GV		---	---	1.2		IT _{SM} =12A P _W =100μs, 120pps

* IT_(RMS) = On-State RMS Current

** IT_{SM} = Non-repetitive Surge Current

Version No.	Original Release Date
Rev: A00	29/08/2024

SCHEMATIC DIAGRAM & MARKING:

Schematic Diagram:

PIN Definition	
1	NC
2	Anode
3	Cathode
4	NC
5	Gate
6	Terminal
7	(Absent)
8	Terminal

Marking Information:

Marking Definition	
TD	Manufacturer Code
RX223	Part Number
V	VDE Applicable
Y	Fiscal Year
A	Manufacturing Code
WW	Work Week

Labelling Information:

 Part No.: XXXXXXXXXXXX Bin Code: X Lot No.: XXXXXXXX Date Code: XXXX QTY: XXX PCS MSL: 1 Made in Quanzhou Fujian	This product is manufactured by  for Brighttek (Europe) Limited
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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
Junction Temperature		T_j	125	°C
Input Power Dissipation		P_i	100	mW
OUTPUT				
Off-State Output Terminal Voltage		V_{DRM}	600	V
On-State RMS Current	TDR0223	$I_{T(RMS)}$	0.3	A
	TDR1223		0.6	
	TDR2223		0.9	
	TDR3223		1.2	
Non-repetitive Surge Current $P_w=100\mu s, 120pps$	TDR0223	I_{TSM}	3	A
	TDR1223		6	
	TDR2223		9	
	TDR3223		12	
Junction Temperature		T_j	125	°C
COMMON				
Total Power Dissipation		P_{tot}	400	mW
Isolation Voltage		V_{iso}	5000 *2	Vrms
Operating Temperature		T_{opr}	-40~+85	°C
Storage Temperature		T_{stg}	-40~+125	°C
Soldering Temperature		T_{sol}	260 for 10s max.	°C

*1. 100 μs pulse, 100Hz frequency.

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

ELECTRICAL CHARACTERISTICS:

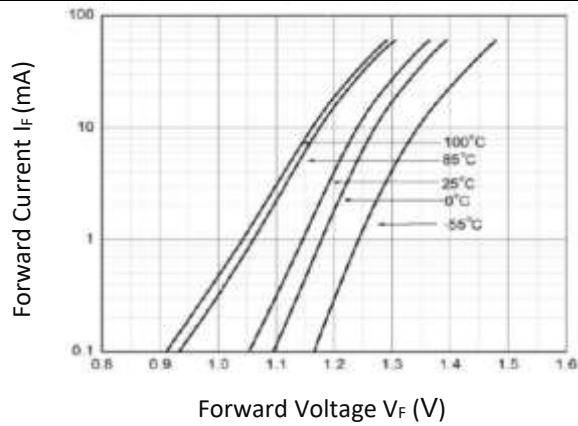
Electrical Optical Characteristics at $T_a=25^{\circ}\text{C}$:

Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
INPUT						
Forward Voltage	V _F	---	1.24	1.4	V	I _F =10mA
Reverse Current	I _R	---	---	10	μA	V _R =6V
Input Capacitance	C _{IN}	---	30	---	pF	V=0, f=1kHz
OUTPUT						
Peak Off-State Current Either Direction	I _{DRM}	---	---	100	μA	V _{DRM} =600V I _F =0
On-State Terminal Voltage	V _{TM}	---	0.8	2.5	V	I _{TM} =Rated I _{TM}
Critical Rate of Rise of Off-State Voltage - Breakdown Voltage	dV/dt	1000	---	---	V	V _{PEAK} =600V *1
TRANSFER CHARACTERISTICS						
LED Trigger Current	I _{FT}	---	---	10	mA	R _L =100Ω Terminal Voltage=6V
Holding Current	I _H	---	---	25	mA	---
Isolation Resistance	R _{ISO}	10^12	10^14	---	Ω	DC=500V, 40~60% R.H.
Floating Capacitance	C _{IO}	---	0.25	1	pF	V=0, f=1MHz

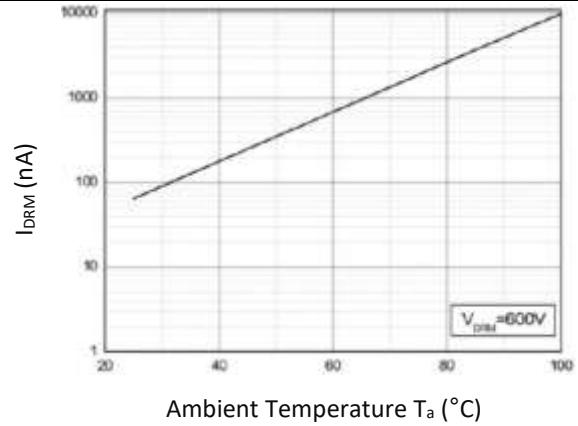
*1. Test voltage must be applied within dV/dt rating.

CHARACTERISTIC CURVES:

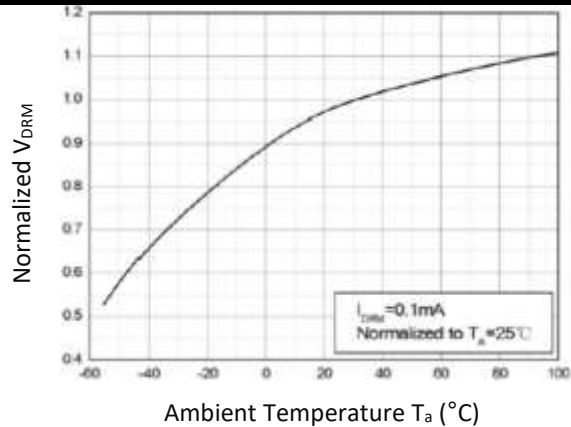
Forward Current v.s. Forward Voltage



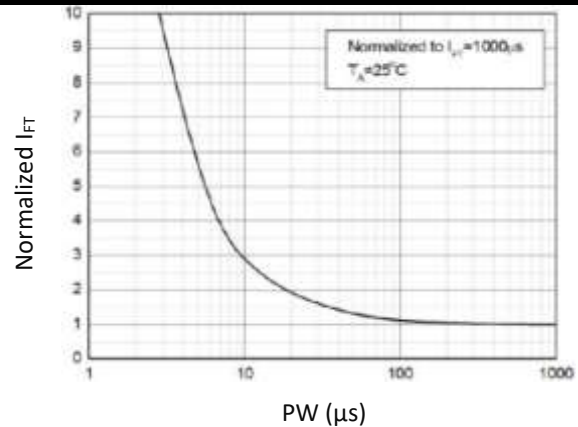
Off-State Terminal Current v.s. Ambient Temperature



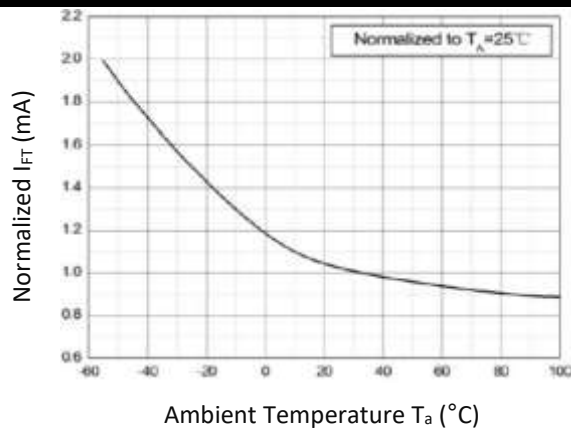
Normalized Off-State Terminal Voltage v.s. Ambient Temperature



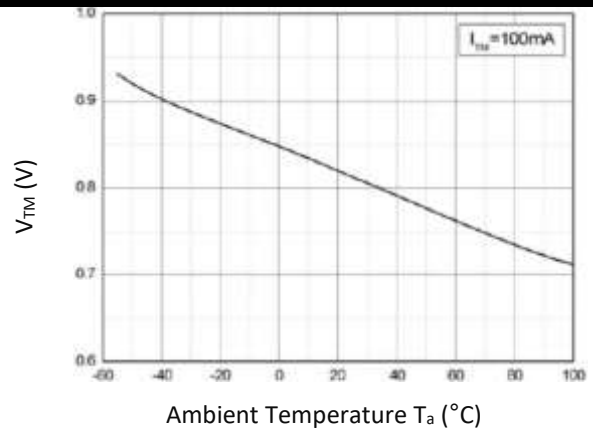
Normalized Trigger Current v.s. LED Trigger Pulse Width



Normalized Trigger Current v.s. Ambient Temperature

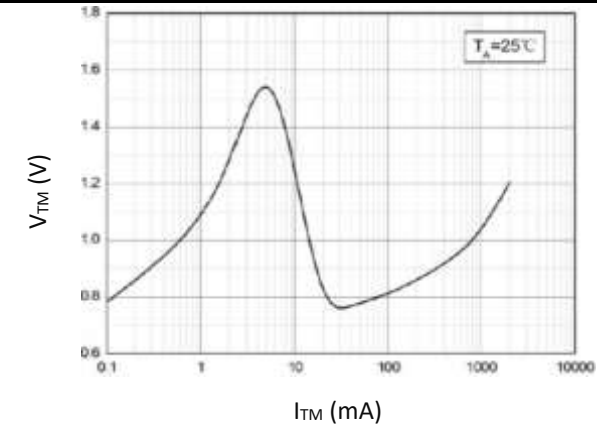


On-State Terminal Voltage v.s. Ambient Temperature

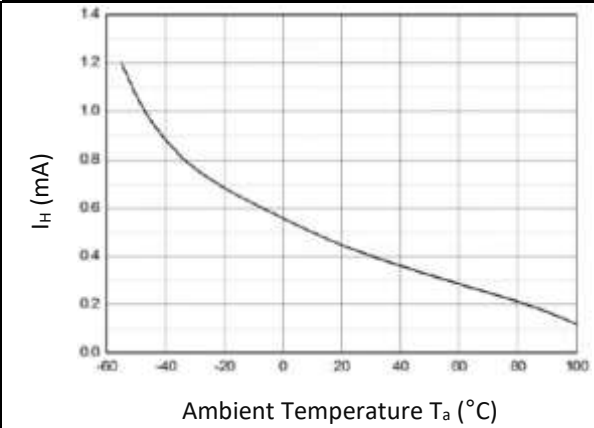


CHARACTERISTIC CURVES:

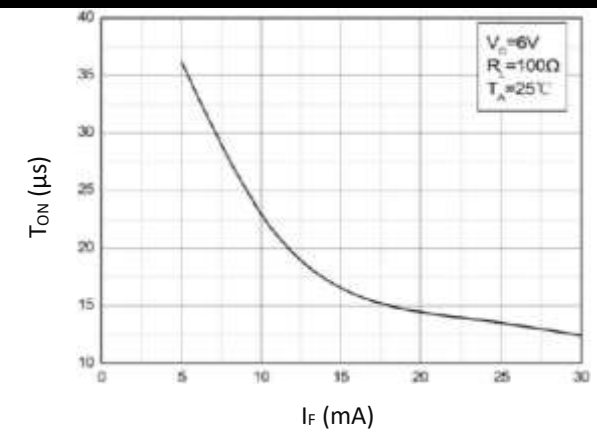
On-State Terminal Voltage v.s. On-State Terminal Current



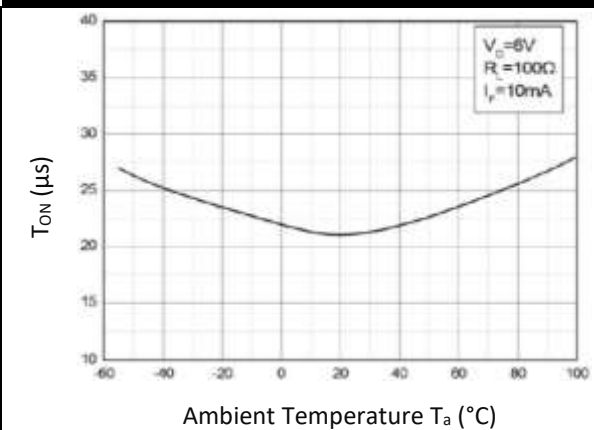
Holding Current v.s. Ambient Temperature



Turn On Time v.s. Forward Current

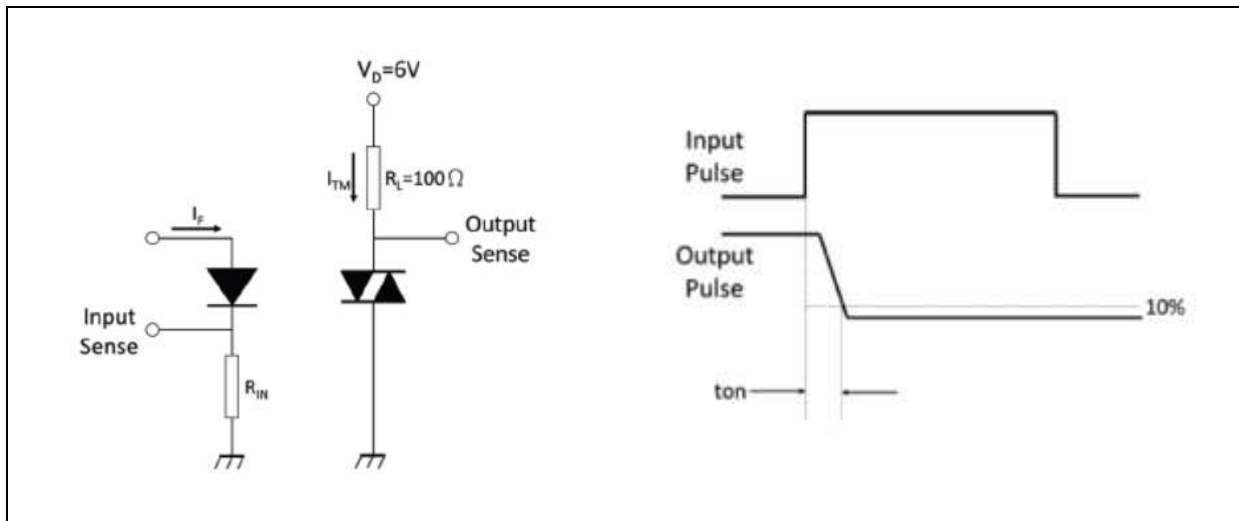


Turn On Time v.s. Ambient Temperature

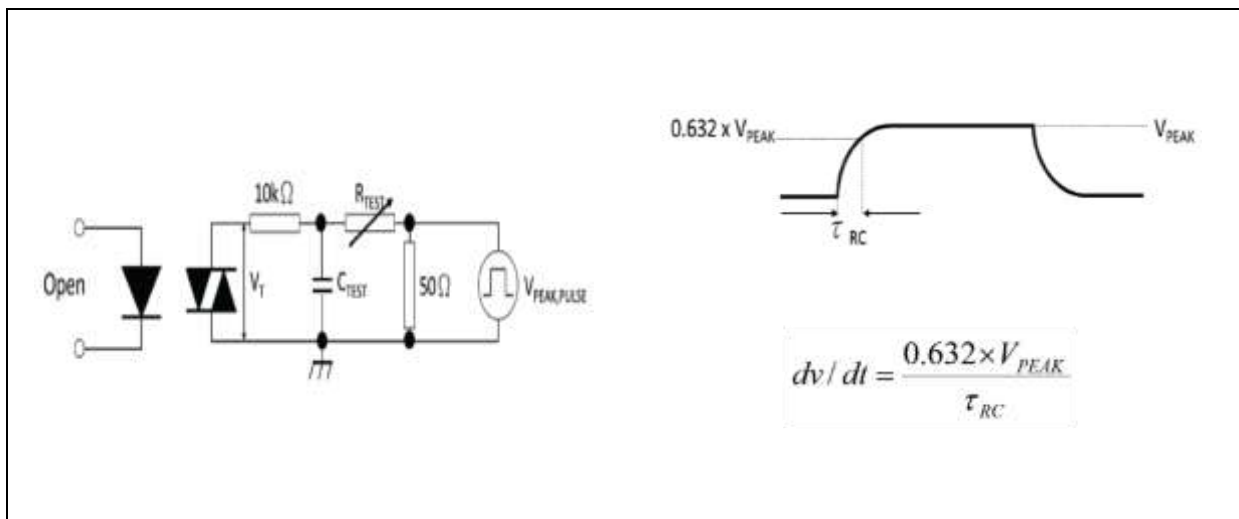


TEST CIRCUIT:

Test Circuit and Waveforms of Turn On Time:

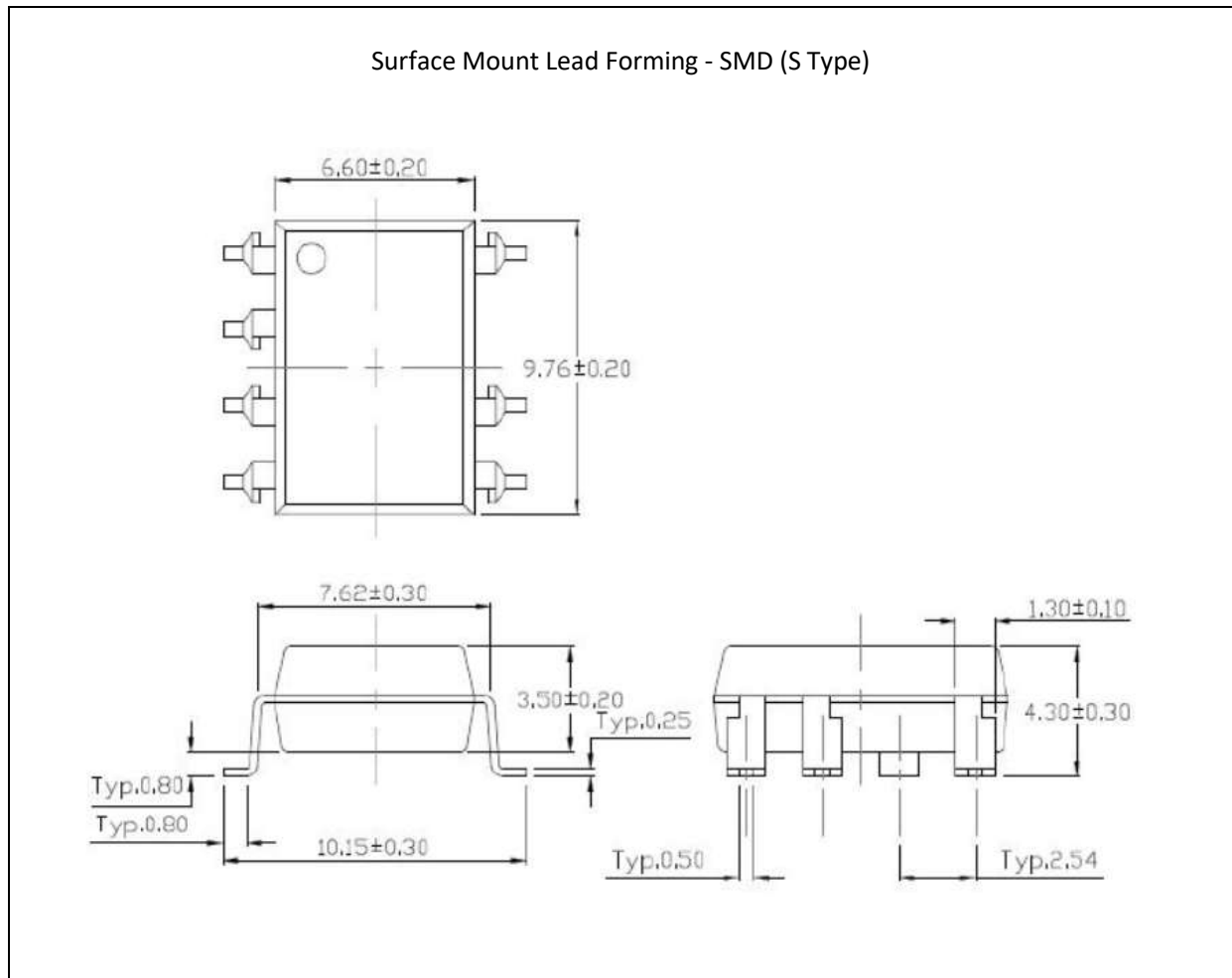


Test Circuit and Waveforms of dV/dt :



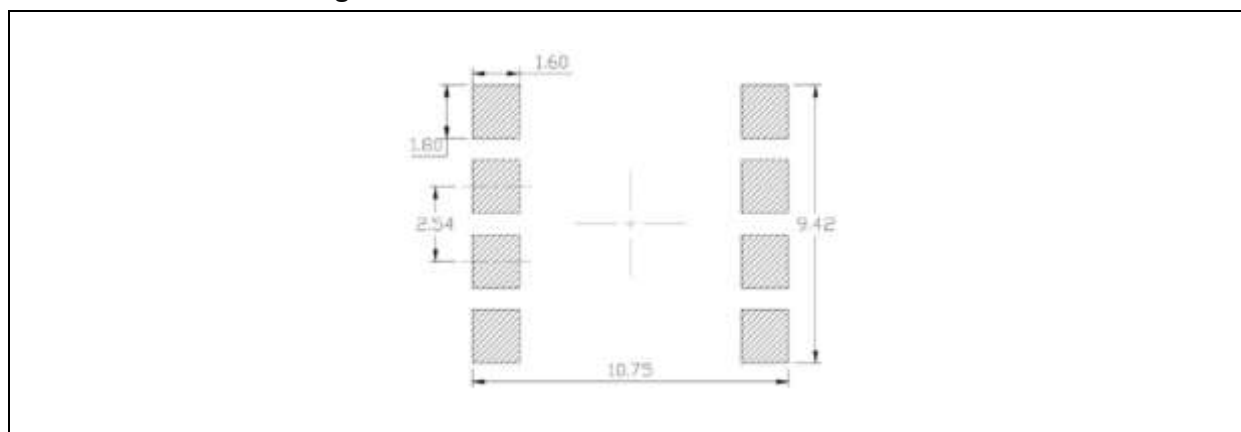
OUTLINE DIMENSION:

Package Dimension:



1. All dimensions are in millimetre (mm).

Recommended Soldering Mask:



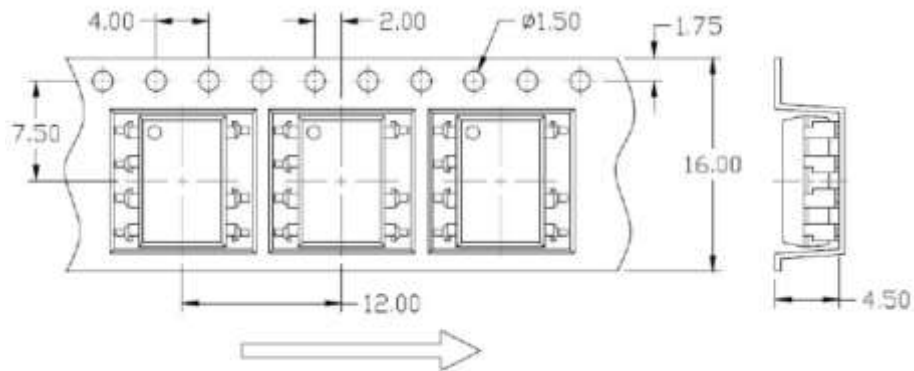
1. Dimensions are in millimetre (mm).

PACKING SPECIFICATION:

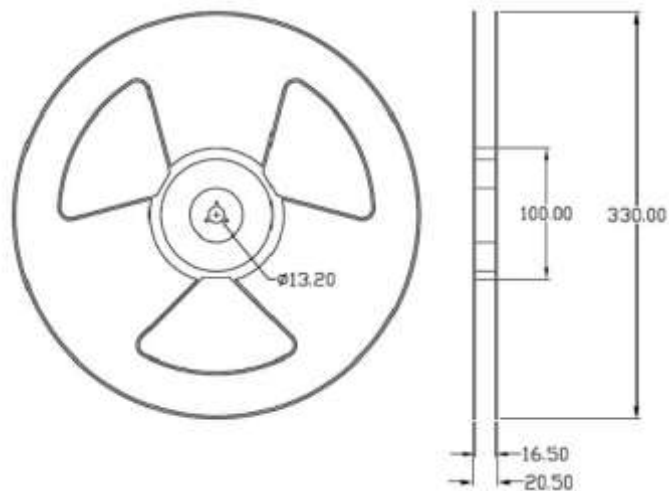
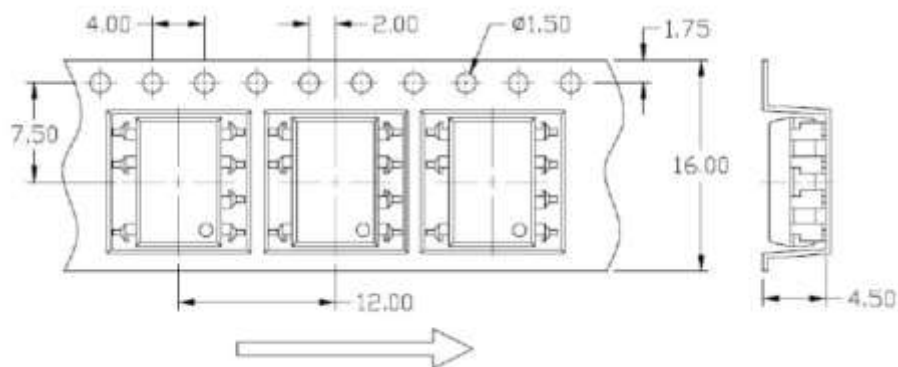
Reel Dimension:

T1/T2: 1000pcs/reel

Reel Option: T1 (default)



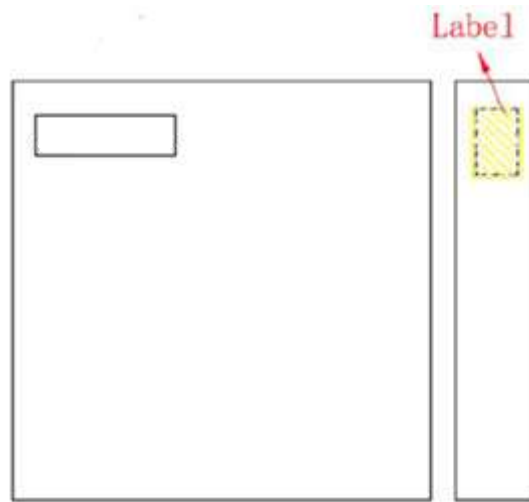
Reel Option: T2



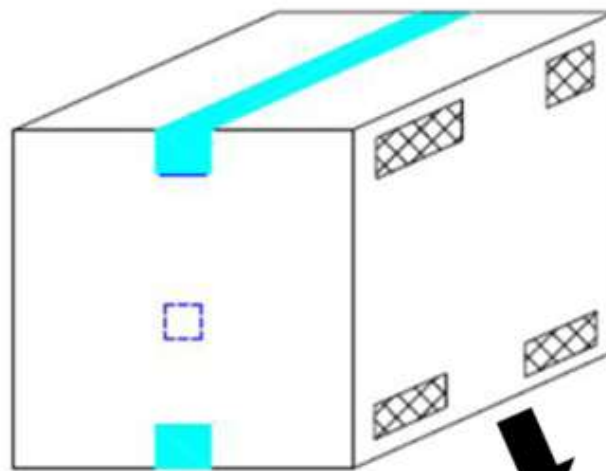
PACKING SPECIFICATION:

Box Dimension:

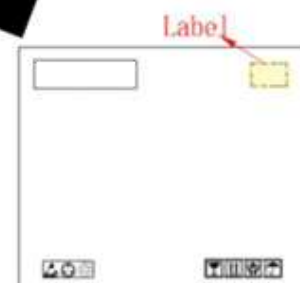
T1/T2: 3 reels (3Kpcs)/inner box, 5 inner boxes (15Kpcs)/carton



● L x W x H = 36cm x 36cm x 6.9cm

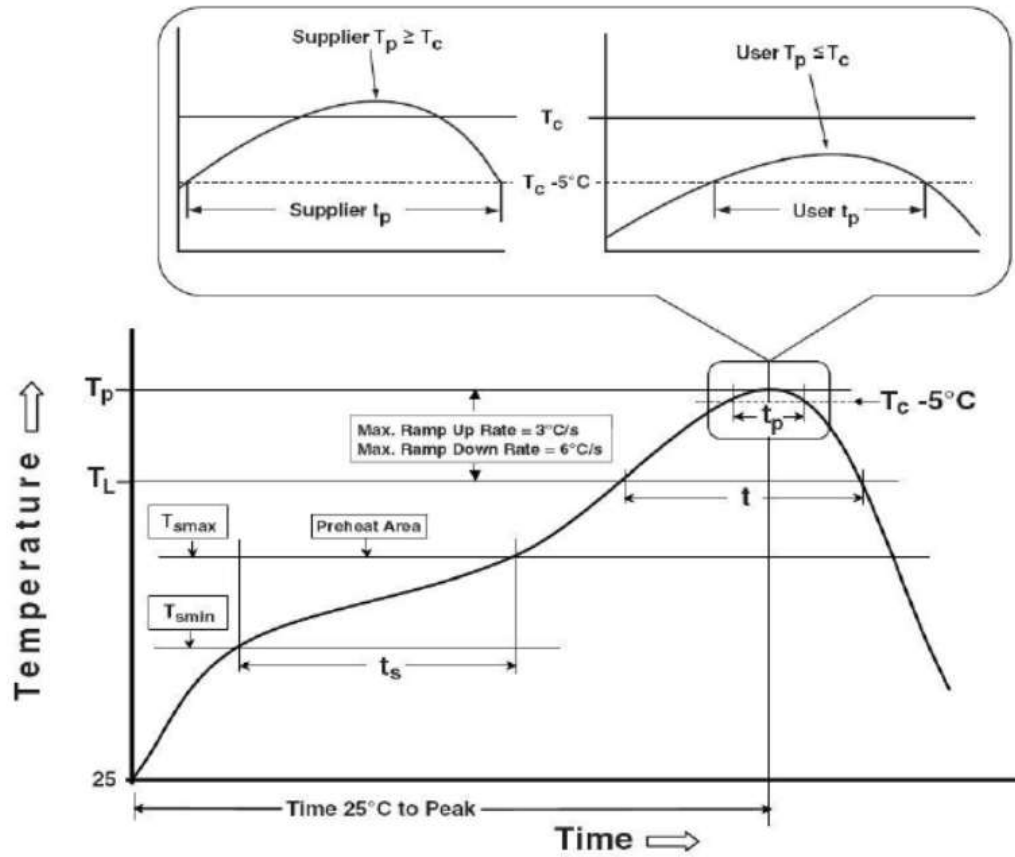


● L x W x H = 45cm x 38cm x 38cm



RECOMMENDED SOLDERING PROFILE:

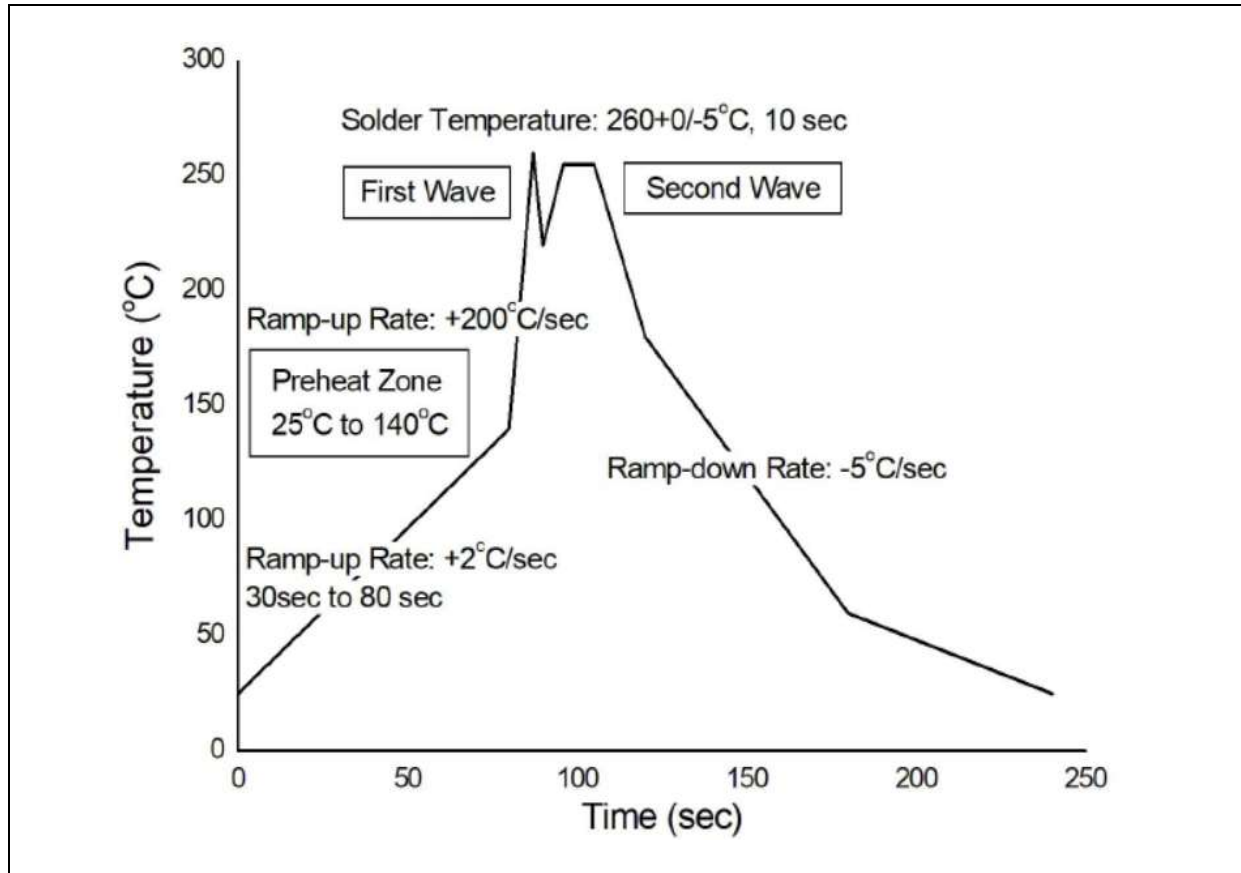
Reflow Information:



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.