



BRIGHTTEK

BRIGHTTEK (EUROPE) LIMITED

Brighten up The World With LED!



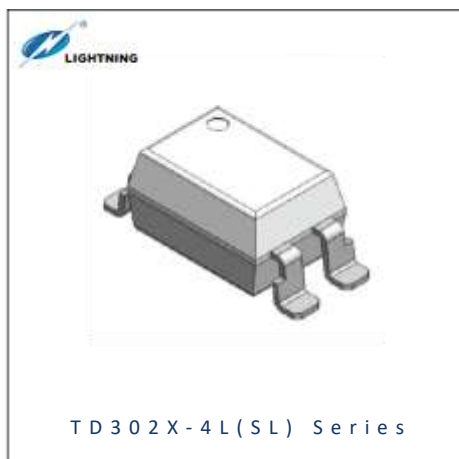
PRODUCT DATASHEET



- ▶ DC Input Photo Coupler
- ▶ SMD4 Low Profile
- ▶ Random-Phase TRIAC

Release Date: 07 July 2025 Version: A00

TD302X-4L(SL)(T1)-GV



TD302X-4L(SL) Series

DESCRIPTION:



The TD302X-4L(SL) 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 DIP4 package with SMD4 Low Profile lead forming option.

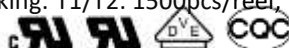
With the robust coplanar double mold structure, TD302X-4L(SL) series provide the most stable isolation feature.

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; Halogen free
- 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: T1/T2: 1500pcs/reel; T3/T4: 1000pcs/reel



Partner with:  LIGHTNING

NAMING & ORDERING INFORMATION:

Naming Information:

TD302 X - 4L (SL) (T1) - G V	
TD302X-4L	Part Number
X	Selection: LED Trigger Current (X=1~3)
4L	DIP 4 Package
SL	Lead Form Option: SMD4 Low Profile
T1	Selection: Tape and Reel Option (T1(default)/T2/T3/T4)
G	Green Option
V	VDE Option

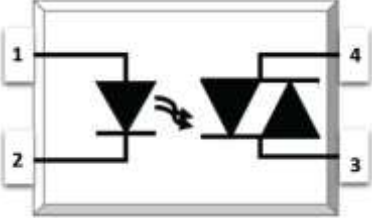
Ordering Information:

TD302X-4L(SL)(T1)-GV						
<u>X</u> = Selection: LED Trigger Current (X=1~3)						
Part Number	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
TD3021-4L(SL)(T1)-GV	I _{FT}	---	---	15	mA	I _{TM} =100mA Terminal Voltage=3V
TD3022-4L(SL)(T1)-GV		---	---	10		
TD3023-4L(SL)(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	Terminal
	4	Terminal

Marking Information:

	Marking Definition	
	TD	Manufacturer Code
	302X-4L	Part Number & Rank
	V	VDE Applicable
	Y	Fiscal Year
	A	Manufacturing Code
	WW	Work Week

Labelling Information:

	This product is manufactured, tested, and packed by	
		
	for Brighttek (Europe) Limited	

for more details, please visit www.tdled.com

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}	400	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 * ¹	Vrms
Operating Temperature	T_{opr}	-40~+100	°C
Storage Temperature	T_{stg}	-55~+125	°C
Soldering Temperature	T_{sol}	260 * ²	°C

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

*2. For 10 seconds max.

ELECTRICAL CHARACTERISTICS:

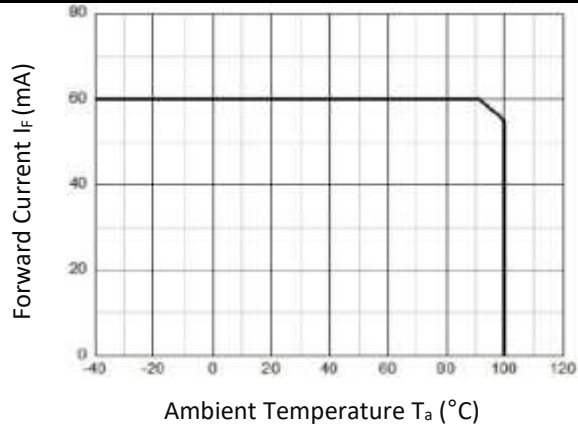
Electrical Optical Characteristics at $T_a=25^{\circ}\text{C}$:

Parameter		Symbol	Values			Unit	Test Condition
			Min.	Typ.	Max.		
INPUT							
Forward Voltage		V _F	---	1.24	1.4	V	I _F =10mA
Reverse Current		I _R	---	---	10	μA	V _R =6V
Input Capacitance		C _{IN}	---	8.5	250	pF	V=0, f=1kHz
OUTPUT							
Peak Off-State Current Either Direction		I _{DRM}	---	---	100 * ¹	nA	V _{DRM} =Rated V _{DRM} I _F =0
Peak On-State Voltage Either Direction		V _{TM}	---	1.58	2.5	V	I _{TM} =100mA
Critical Rate of Rise of Off-State Voltage		dV/dt	1000	---	---	V/μs	V _{PEAK} =400V I _F =0
TRANSFER CHARACTERISTICS							
LED Trigger Current	TD3021-4L	I _{FT}	---	---	15	mA	I _{TM} =100mA Terminal Voltage=3V
	TD3022-4L		---	---	10		
	TD3023-4L		---	---	5		
Holding Current		I _H	---	257	---	μA	---
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

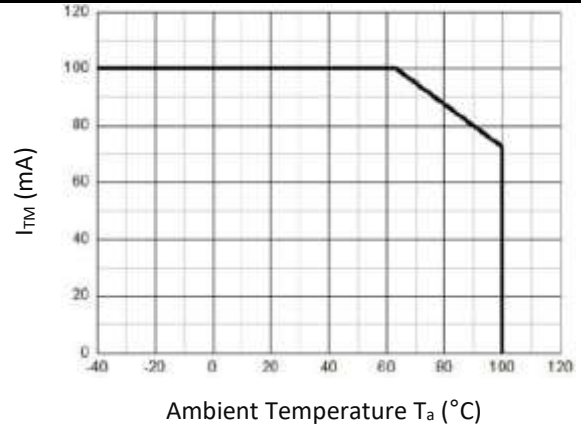
*1. Test voltage must be applied within dV/dt rating.

CHARACTERISTIC CURVES:

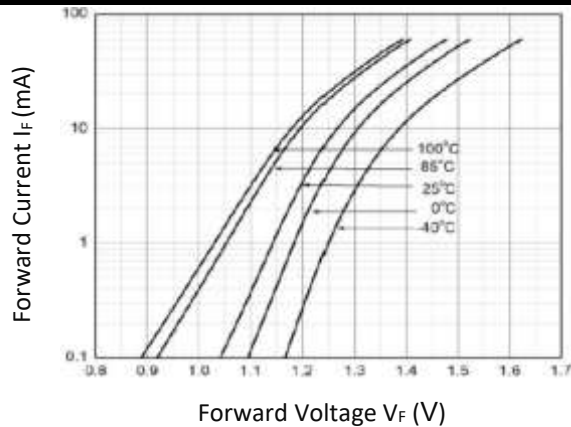
Forward Current v.s. Ambient Temperature



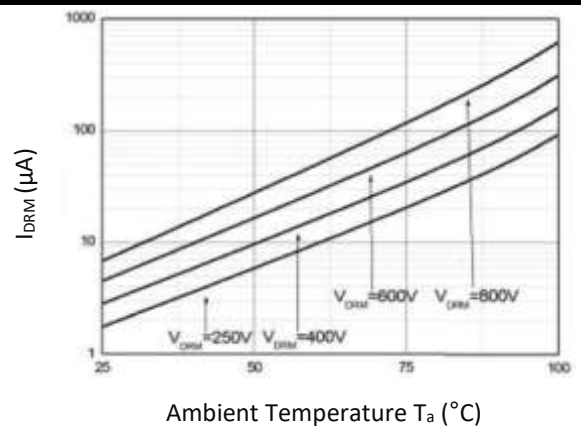
On-State Terminal Current v.s. Ambient Temp.



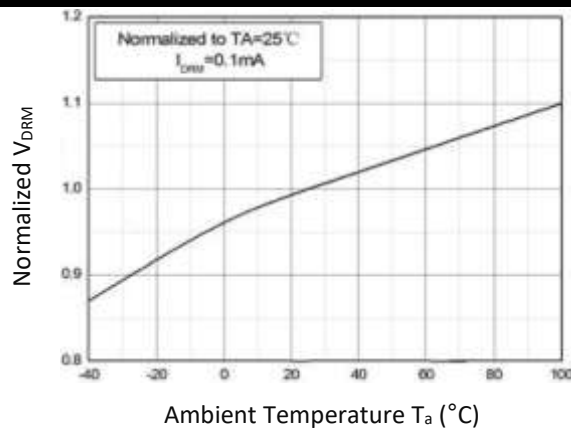
Forward Current v.s. Forward Voltage



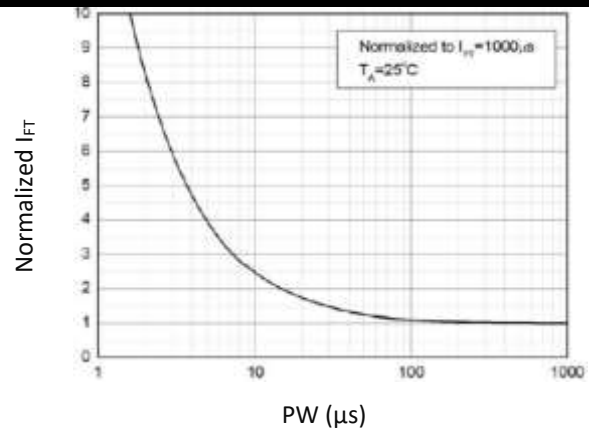
Off-State Terminal Current v.s. Ambient Temperature



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

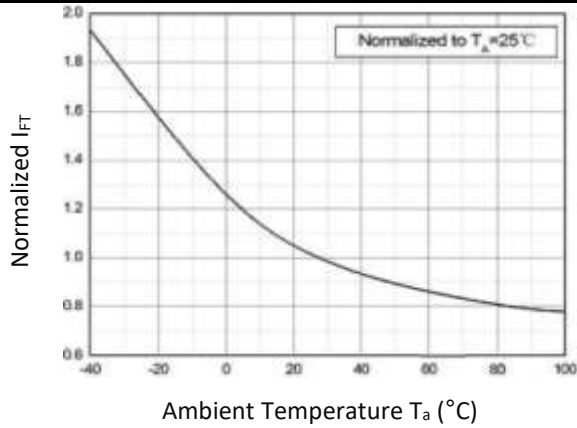


Normalized Trigger Current v.s. LED Trigger Pulse Width

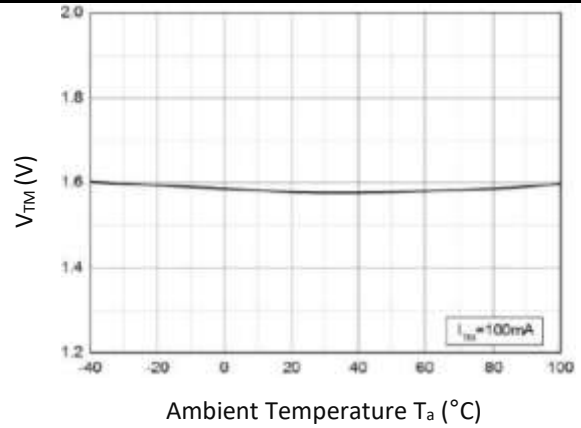


CHARACTERISTIC CURVES:

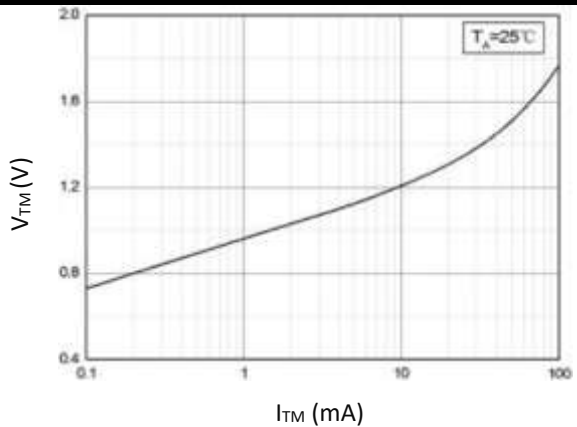
Normalized Trigger Current v.s. Ambient Temperature



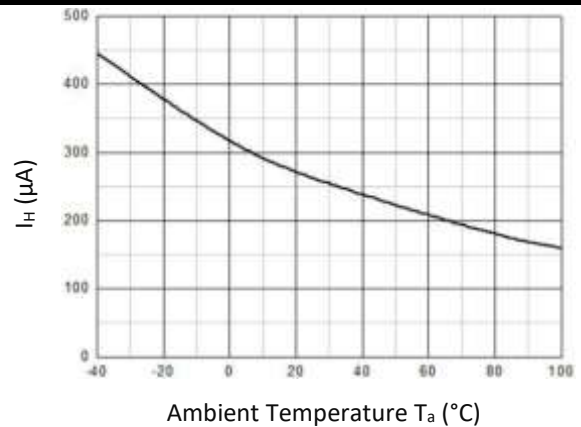
On-State Terminal Voltage v.s. Ambient Temperature



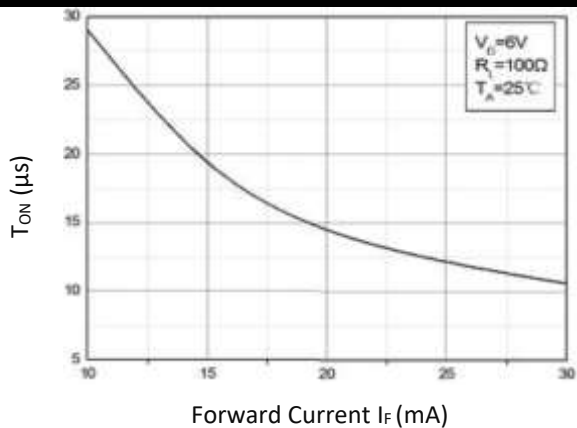
On-State Terminal Voltage v.s. On-State Terminal Current



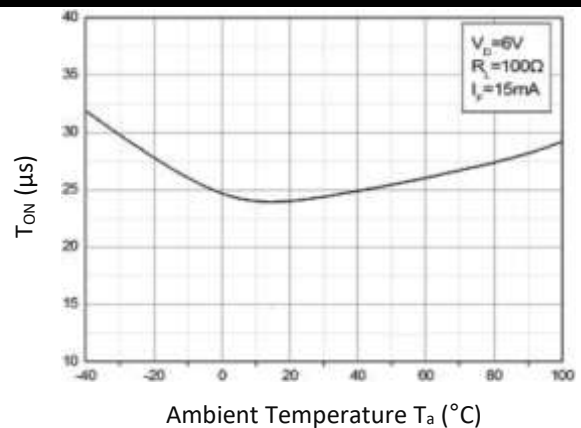
Holding Current v.s. Ambient Temperature



Turn On Time v.s. Forward Current

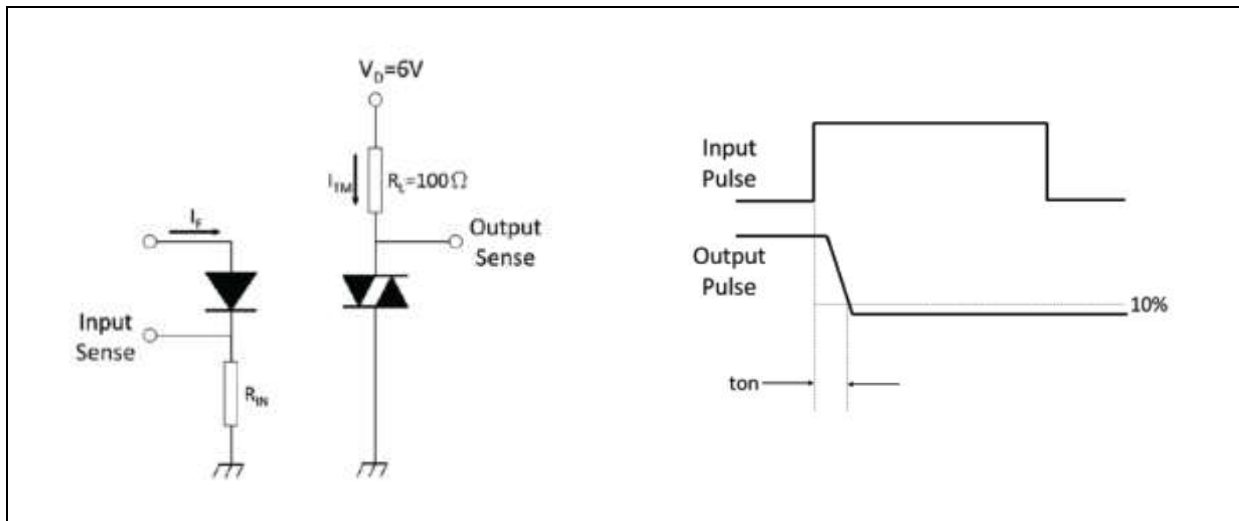


Turn On Time v.s. Ambient Temperature

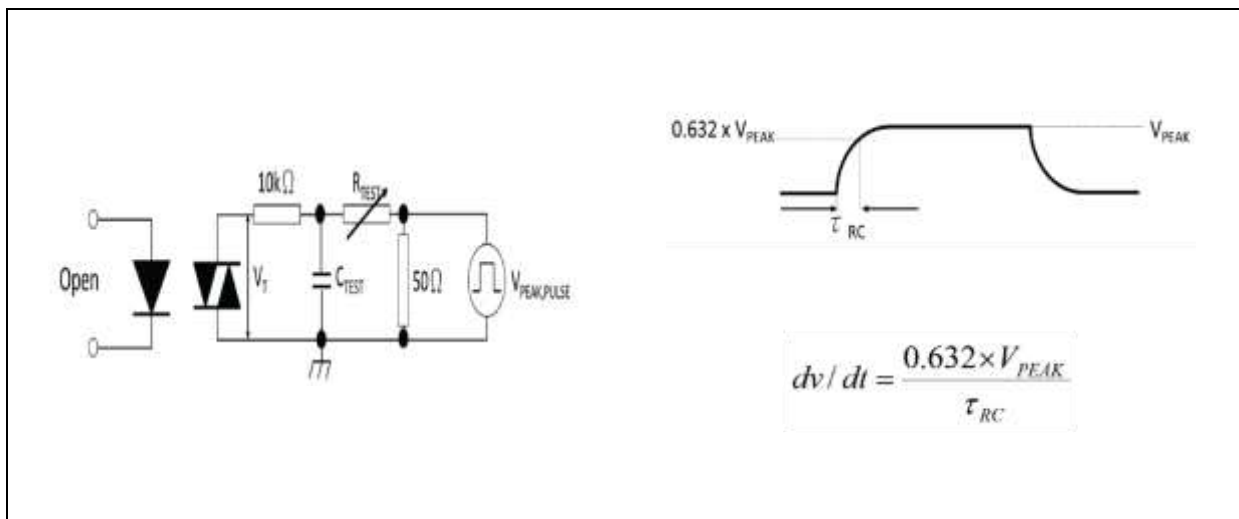


TEST CIRCUIT:

Test Circuit and Waveforms of Turn On Time:

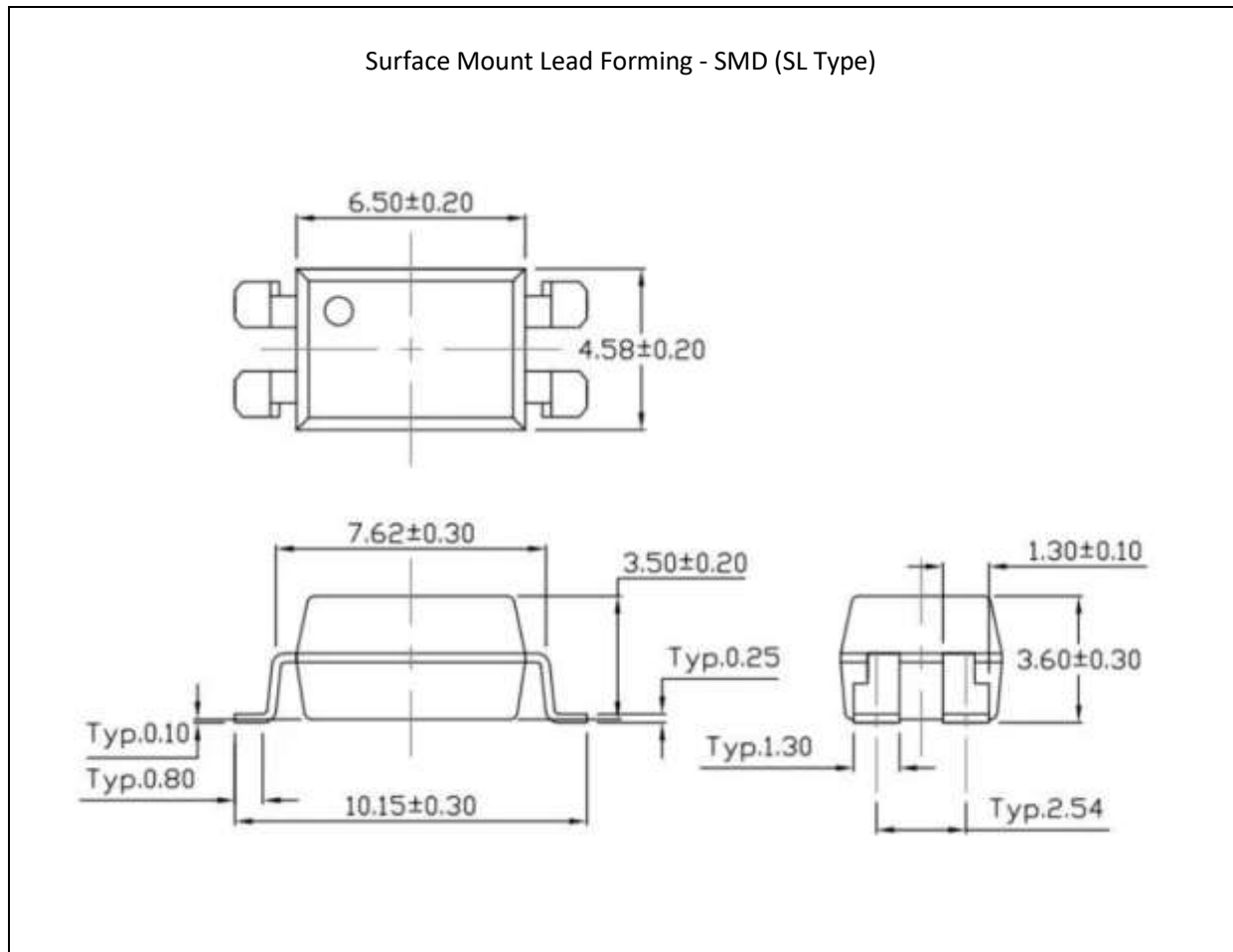


Test Circuit and Waveforms of dv/dt :



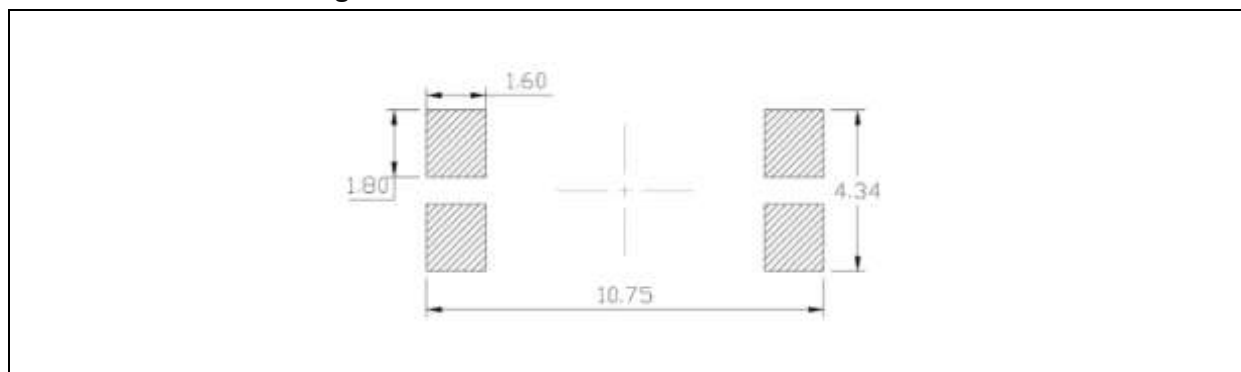
OUTLINE DIMENSION:

Package Dimension:



1. All dimensions are in millimetre (mm).

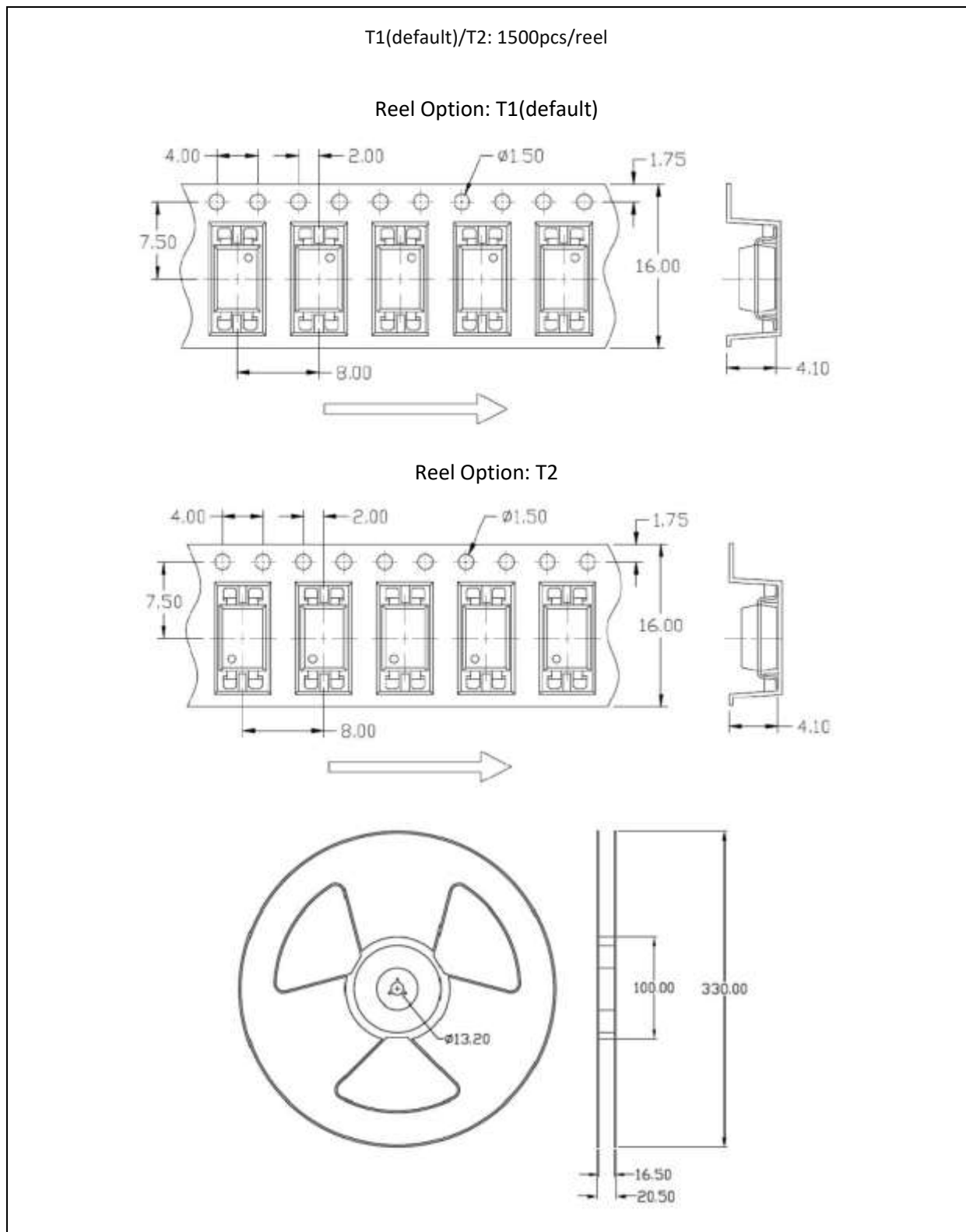
Recommended Soldering Mask:



1. Dimensions are in millimetre (mm).

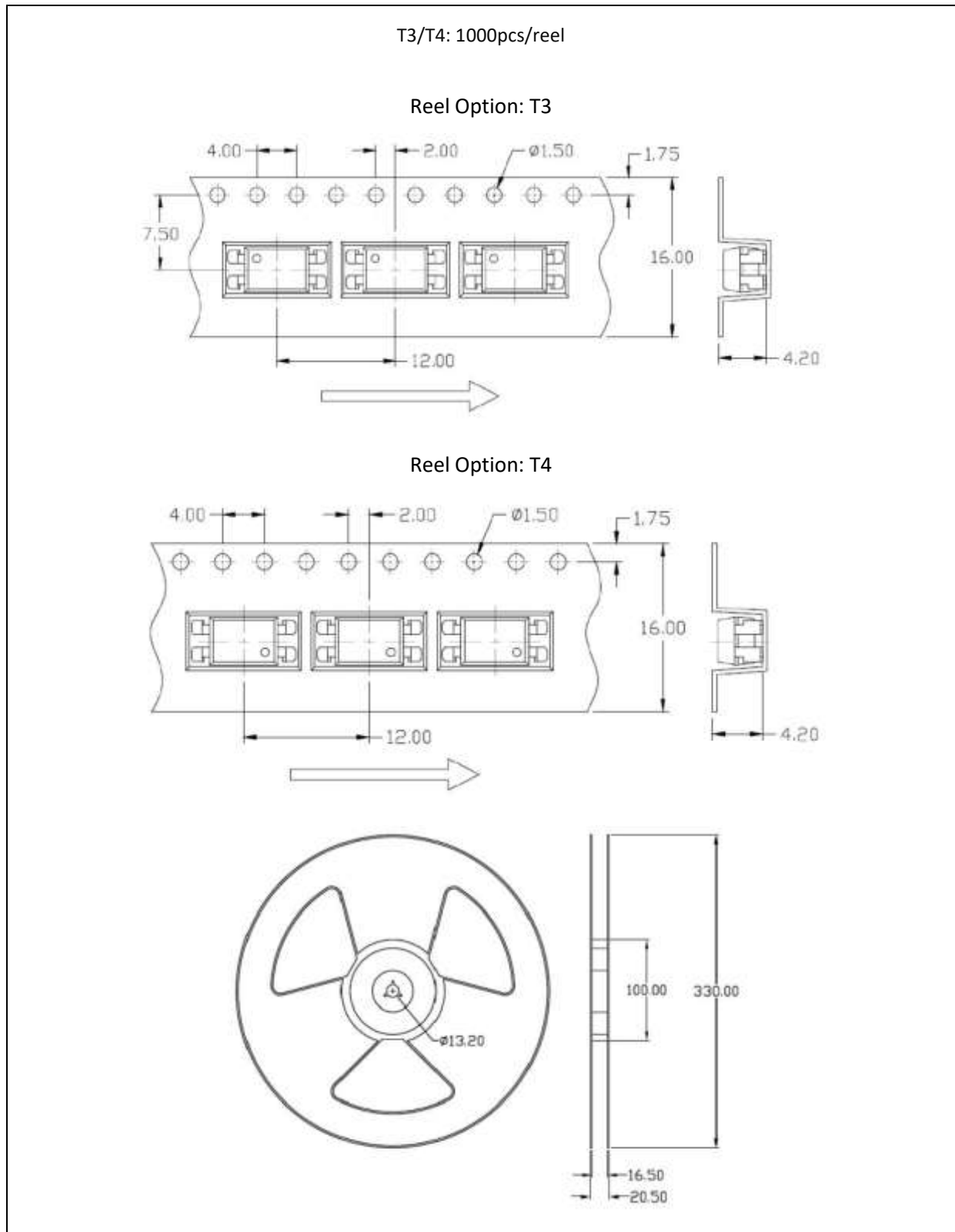
PACKING SPECIFICATION:

Reel Dimension:



PACKING SPECIFICATION:

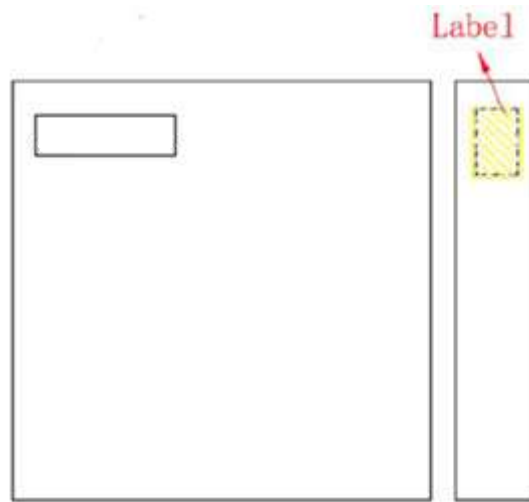
Reel Dimension:



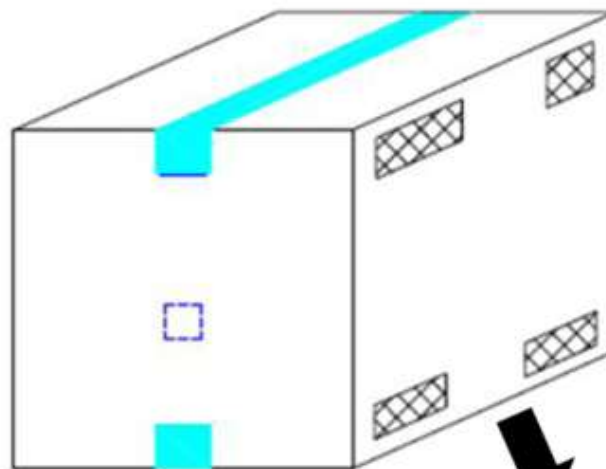
PACKING SPECIFICATION:

Box Dimension:

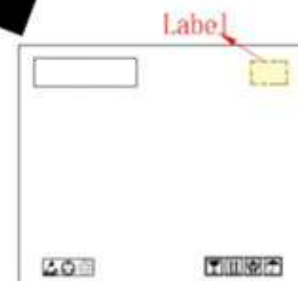
T1/T2: 3 reels (4.5Kpcs)/inner box, 5 inner boxes (22.5Kpcs)/carton
 T3/T4: 3 reels (3Kpcs)/inner box, 5 inner boxes (15Kpcs)/carton



● L x W x H = 36cm x 36cm x 6.9cm

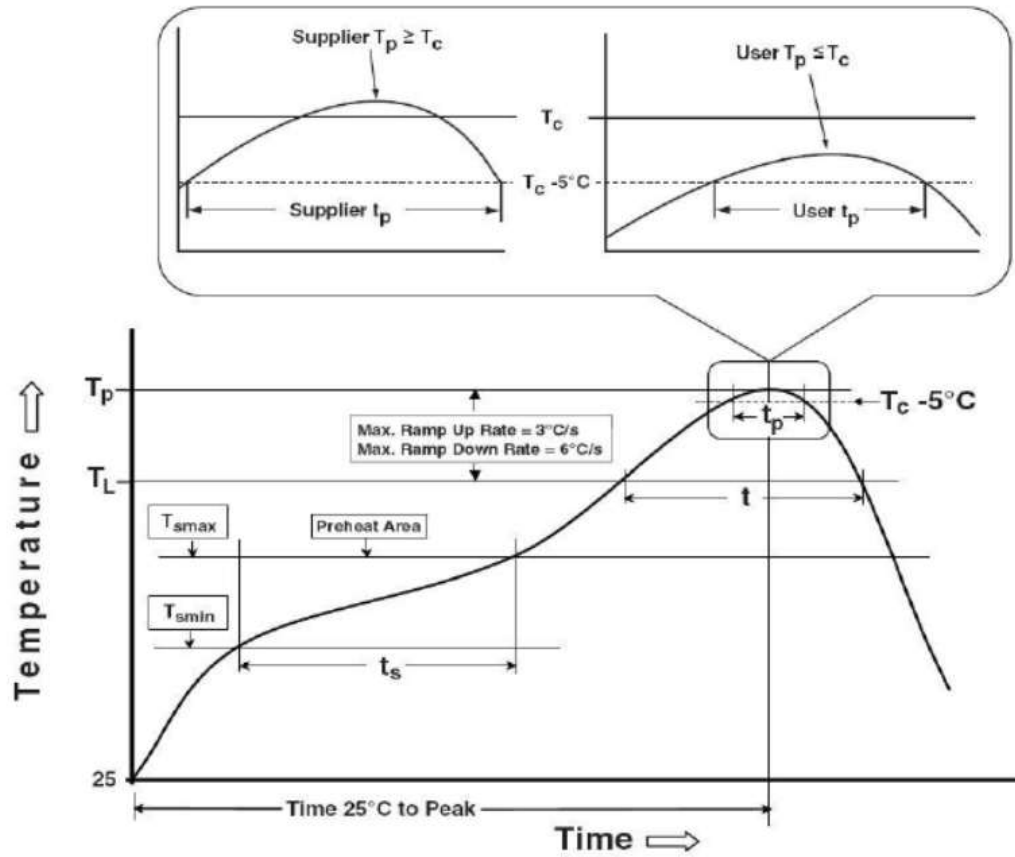


● L x W x H = 45cm x 38cm x 38cm



RECOMMENDED SOLDERING PROFILE:

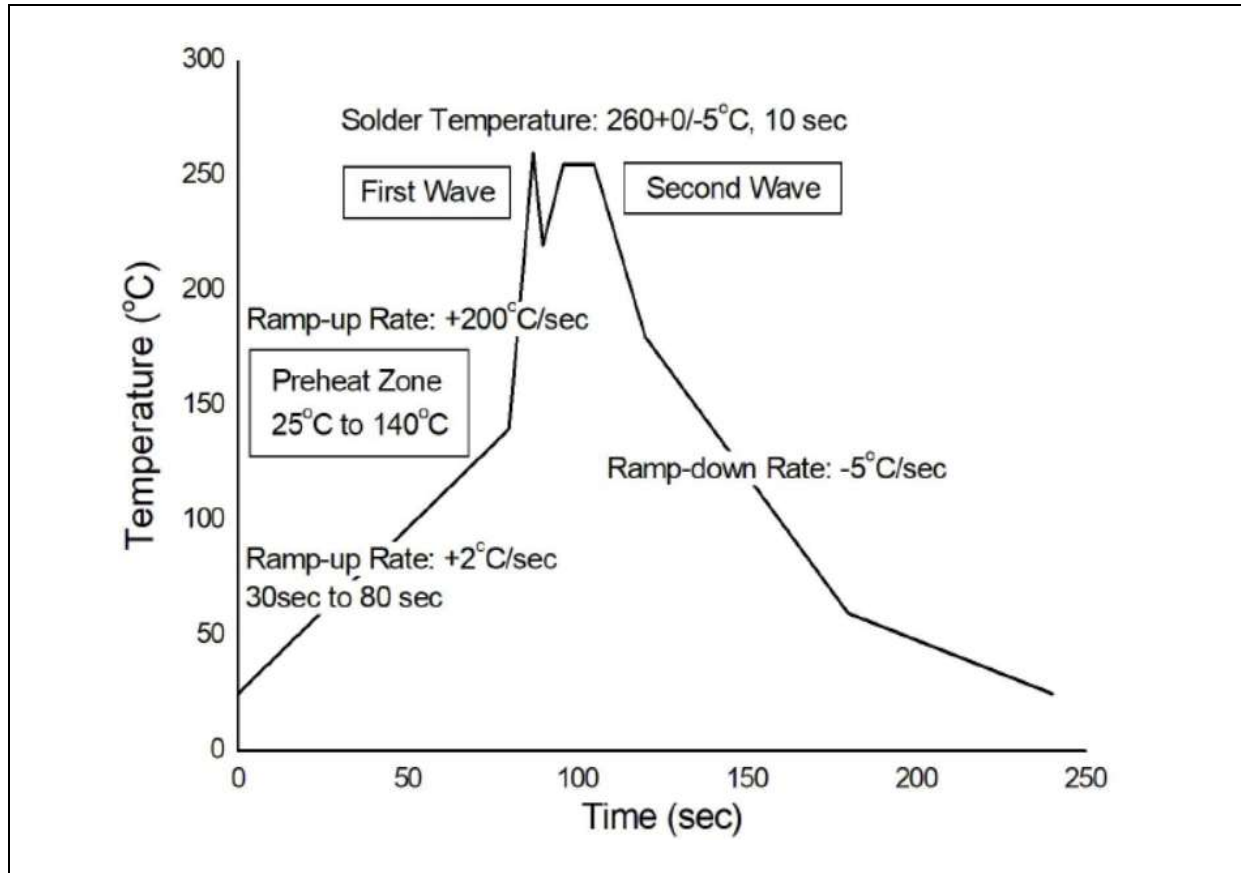
Reflow Information:



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.