



BRIGHTTEK

BRIGHTTEK (EUROPE) LIMITED

Brighten up The World With LED!



ISO/TS 16949:2009



BS EN ISO 14001:2004



QC 900000 IECQ HSP98

PRODUCT DATASHEET



- ▶ DC Input Photo Coupler
- ▶ SMD6 Low Profile
- ▶ Darlington Transistor

4N31(SL)(T1)-GV



Release Date: 06 July 2025 Version: A00



4N31(SL) Series

4N31(SL) Series

DESCRIPTION:

The 4N31(SL) series combines an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar Darlington phototransistor detector in a plastic DIP6 package with SMD6 Low Profile lead forming option.



FEATURES:

- High isolation 5000Vrms
- 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
- Packing: 16mm tape with 1000pcs/reel, ø330mm (13")

APPLICATIONS:

- Low power logic circuits
- Telecommunications equipment
- Portable electronics
- Interfacing coupling systems of different potentials and impedances



Partner with: 

NAMING & ORDERING INFORMATION:

Naming Information:

4N31 (SL) (T1) - G V	
4N31	Part Number
SL	Lead Form Option: SMD6 Low Profile
T1	Selection: Tape and Reel Option (T1(default)/T2)
G	Green Option
V	VDE Option

Ordering Information:

4N31(SL)(T1)-GV

Version No.	Original Release Date
Rev: A00	17/08/2024

SCHEMATIC DIAGRAM & MARKING:

Schematic Diagram:

PIN Definition	
1	Anode
2	Cathode
3	NC
4	Emitter
5	Collector
6	Base

Marking Information:

Marking Definition	
TD	Manufacturer Code
4N31	Part Number
V	VDE Applicable
Y	Fiscal Year
A	Manufacturing Code
WW	Work Week

Labelling Information:

 BRIGHTTEK BRIGHTTEK (EUROPE) LIMITED  LIGHTNING 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
	 LIGHTNING for Brighttek (Europe) Limited

ABSOLUTE CHARACTERISTICS:

Absolute Maximum Ratings:

Parameter	Symbol	Ratings	Unit
INPUT			
Forward Current	I_F	60	mA
Peak Forward Current	I_{FM}	1 * ¹	A
Reverse Voltage	V_R	6	V
Power Dissipation ($T_a=25^{\circ}\text{C}$)	P_D	120	mW
OUTPUT			
Collector-Emitter Voltage	V_{CEO}	55	V
Collector-Base Breakdown Voltage	V_{CBO}	55	V
Emitter-Collector Voltage	V_{ECO}	7	V
Emitter-Base Breakdown Voltage	V_{EBO}	7	V
Collector Current	I_C	150	mA
Power Dissipation ($T_a=25^{\circ}\text{C}$)	P_C	150	mW
COMMON			
Total Power Dissipation	P_{tot}	200	mW
Isolation Voltage	V_{iso}	5000 * ²	Vrms
Operating Temperature	T_{opr}	-55~+110	$^{\circ}\text{C}$
Storage Temperature	T_{stg}	-55~+110	$^{\circ}\text{C}$
Soldering Temperature	T_{sol}	260 * ³	$^{\circ}\text{C}$

*1. $t=10\mu\text{s}$

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

*3. For 10 seconds

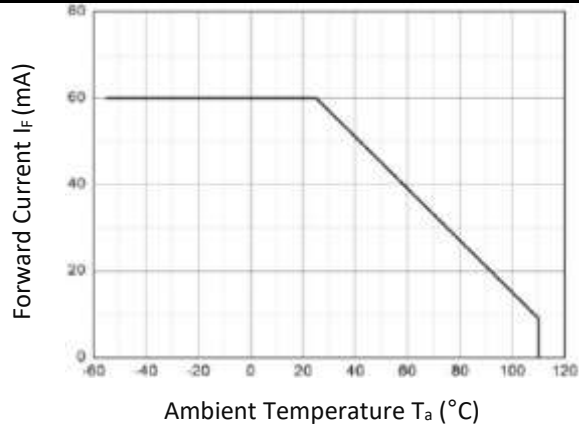
ELECTRICAL CHARACTERISTICS:

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

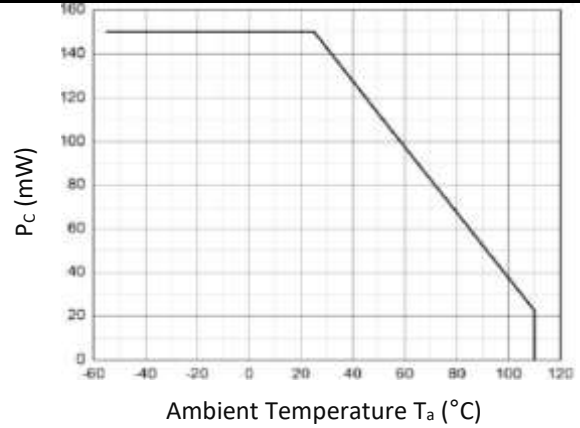
Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
INPUT						
Forward Voltage	V _F	---	1.24	1.4	V	I _F =10mA
Reverse Current	I _R	---	---	10	μA	V _R =6V
Input Capacitance	C _{IN}	---	50	---	pF	V=0, f=1kHz
OUTPUT						
Collector Dark Current	I _{CEO}	---	---	100	nA	V _{CE} =10V
Collector-Emitter Breakdown Voltage	BV _{CEO}	55	---	---	V	I _C =0.1mA
Collector-Base Breakdown Voltage	BV _{CBO}	55	---	---	V	I _C =0.1mA
Emitter-Collector Breakdown Voltage	BV _{ECO}	7	---	---	V	I _E =0.1mA
TRANSFER CHARACTERISTICS						
Current Transfer Ratio	CTR	50	---	---	%	I _F =10mA, V _{CE} =10V
Collector-Emitter Saturation Voltage	V _{CE(sat)}	---	---	1.2	V	I _F =8mA, I _C =2mA
Isolation Resistance	R _{IO}	10 ¹¹	---	---	Ω	V _{IO} =500Vdc.
Floating Capacitance	C _{IO}	---	0.8	---	pF	V=0, f=1MHz
Turn On Time	t _{on}	---	---	5	μs	I _C =10mA, V _{CC} =2V R _L =100Ω
Turn Off Time	t _{off}	---	---	40	μs	I _C =10mA, V _{CC} =2V R _L =100Ω

CHARACTERISTIC CURVES:

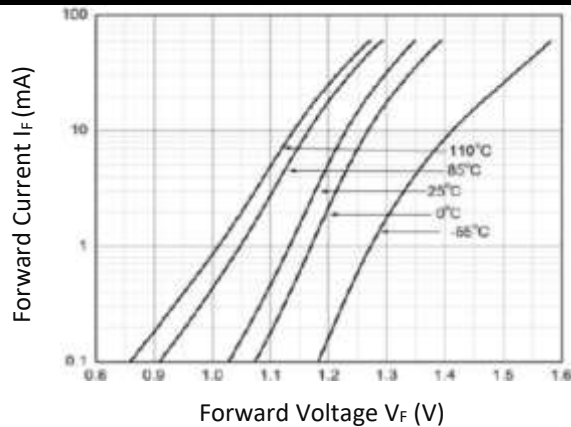
Forward Current v.s. Ambient Temperature



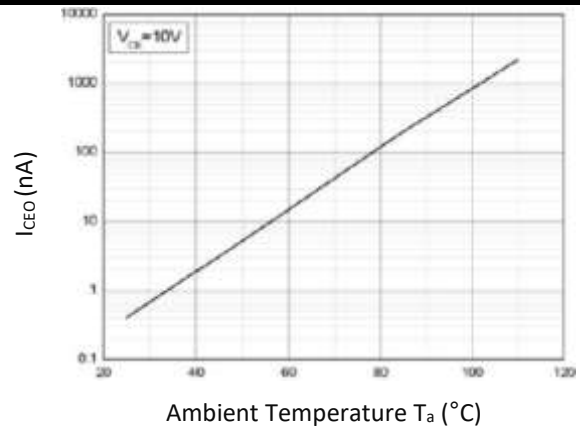
Collector Power Dissipation v.s. Ambient Temper.



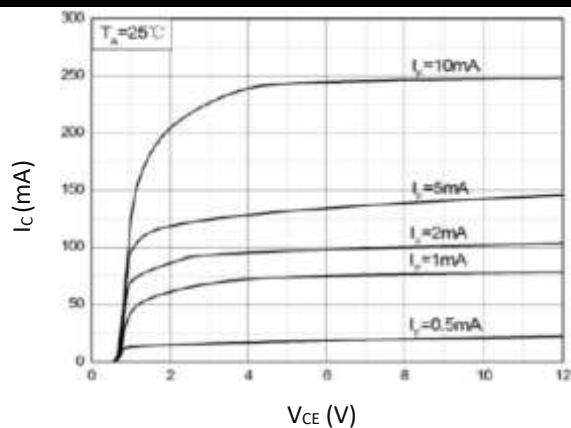
Forward Current v.s. Forward Voltage



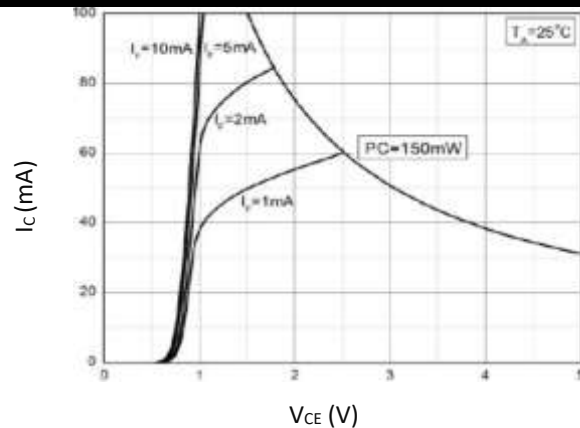
Collector Dark Current v.s. Ambient Temperature



Collector Current v.s. Collector-Emitter Voltage

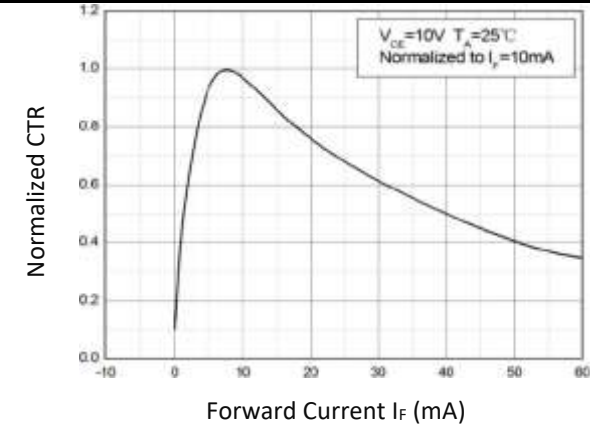


Collector Current v.s. Collector-Emitter Voltage

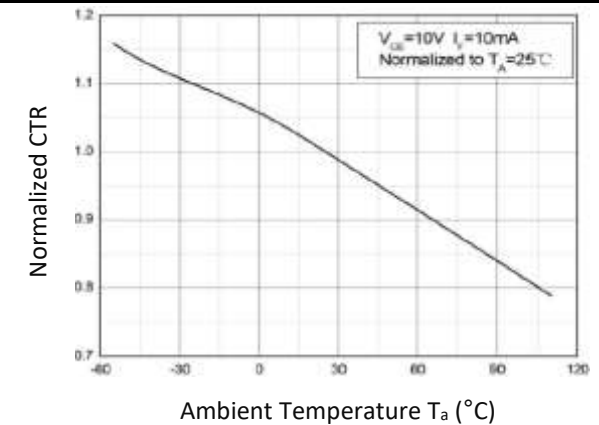


CHARACTERISTIC CURVES:

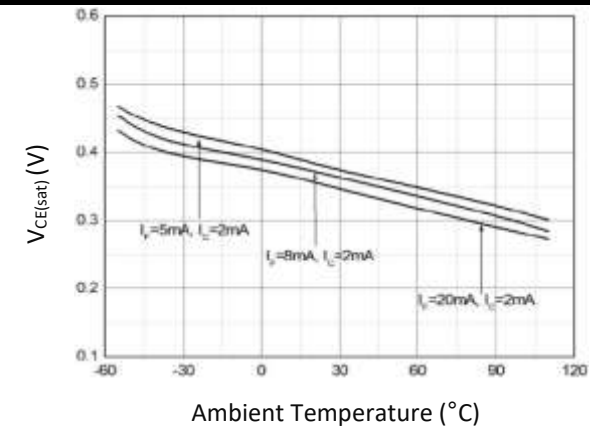
Normalized Current Transfer Ratio v.s. Forward Current



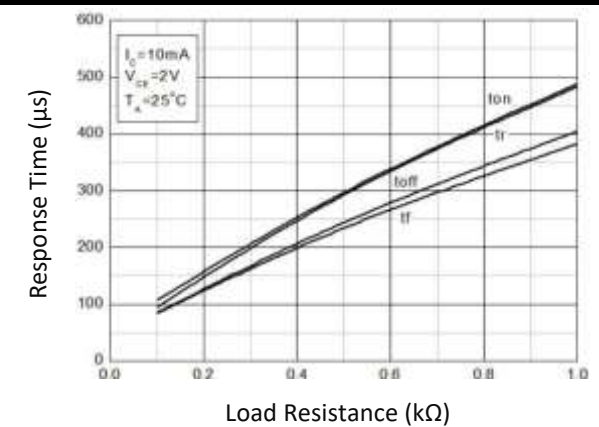
Normalized Current Transfer Ratio v.s. Ambient Temperature



Collector-Emitter Saturation Voltage v.s. Ambient Temperature

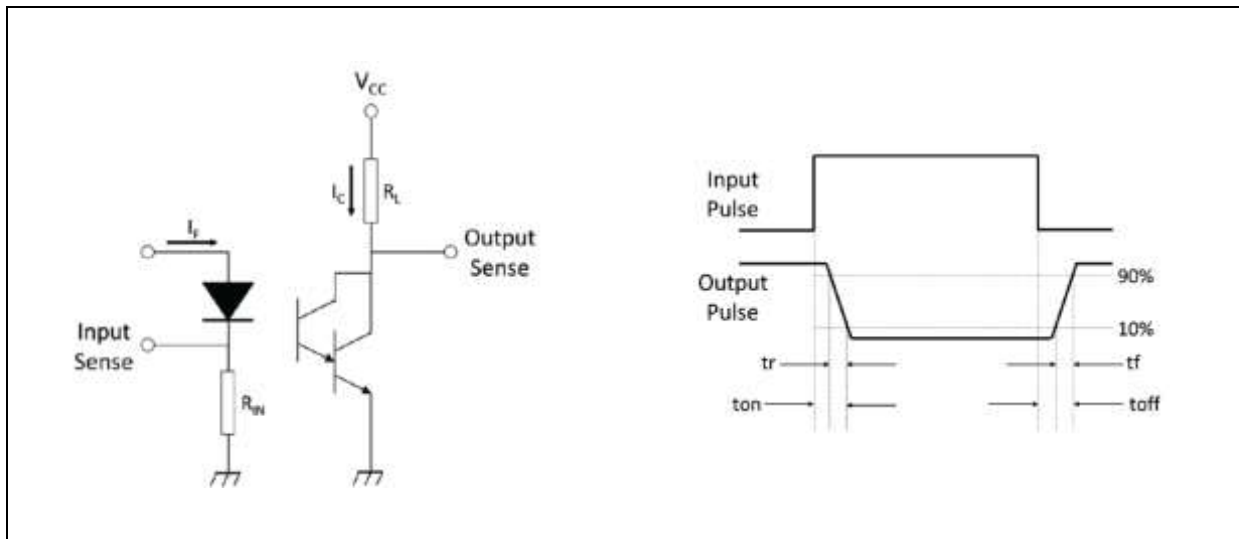


Switching Time v.s. Load Resistance

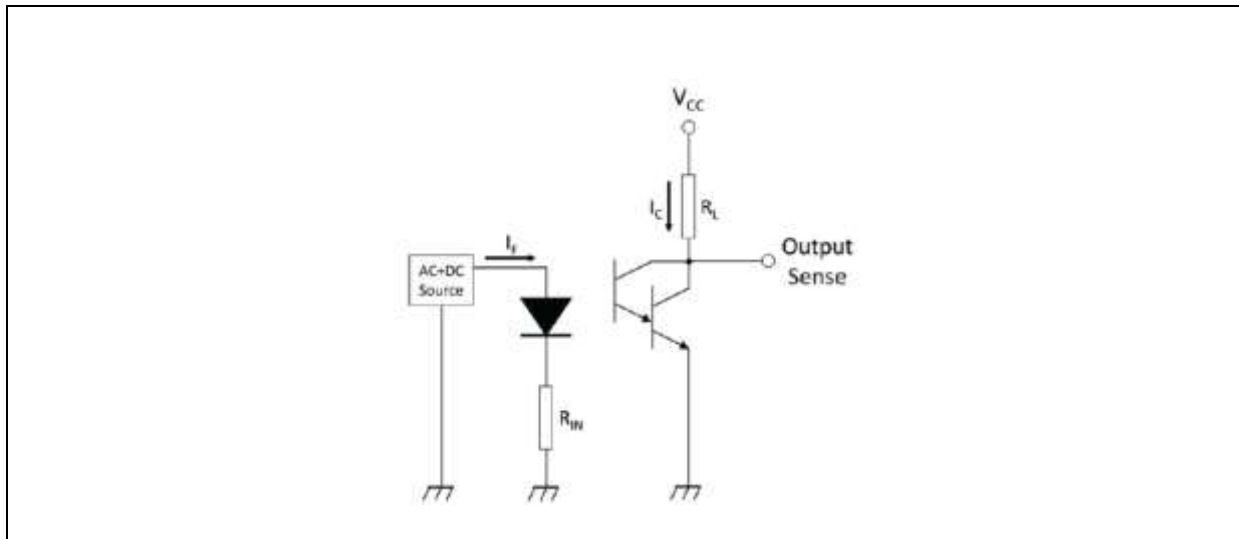


TEST CIRCUIT:

Test Circuit and Waveforms of Response Time:

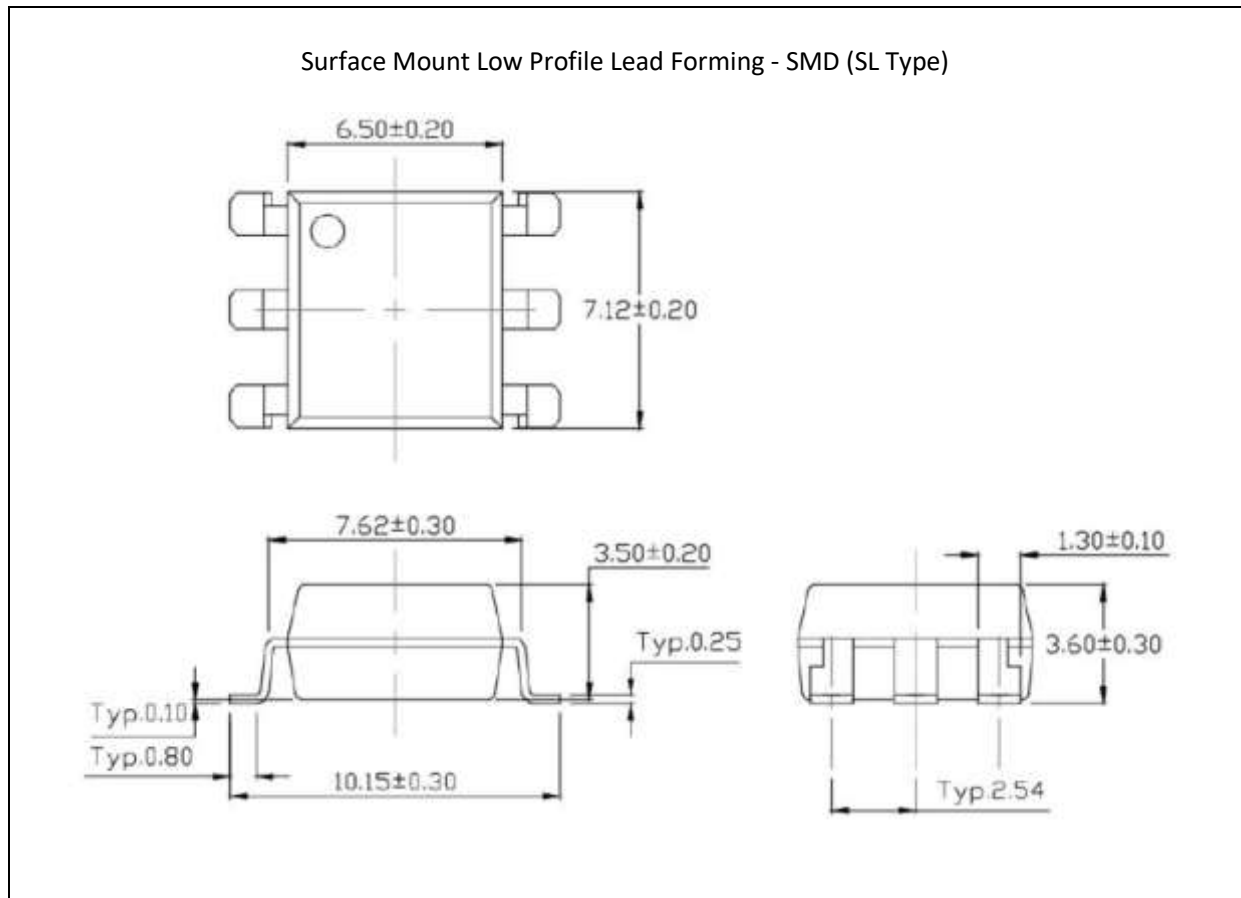


Test Circuit of Frequency Response:



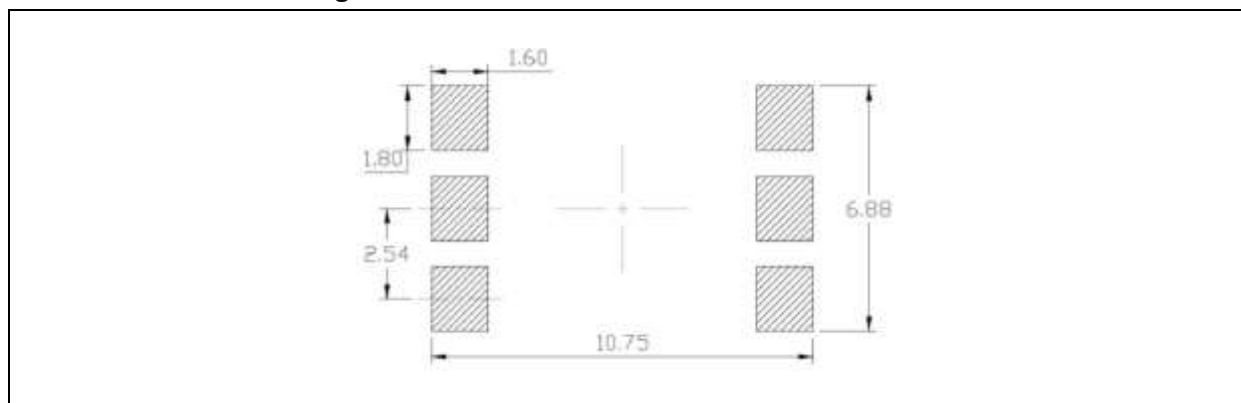
OUTLINE DIMENSION:

Package Dimension:



1. All dimensions are in millimetre (mm).

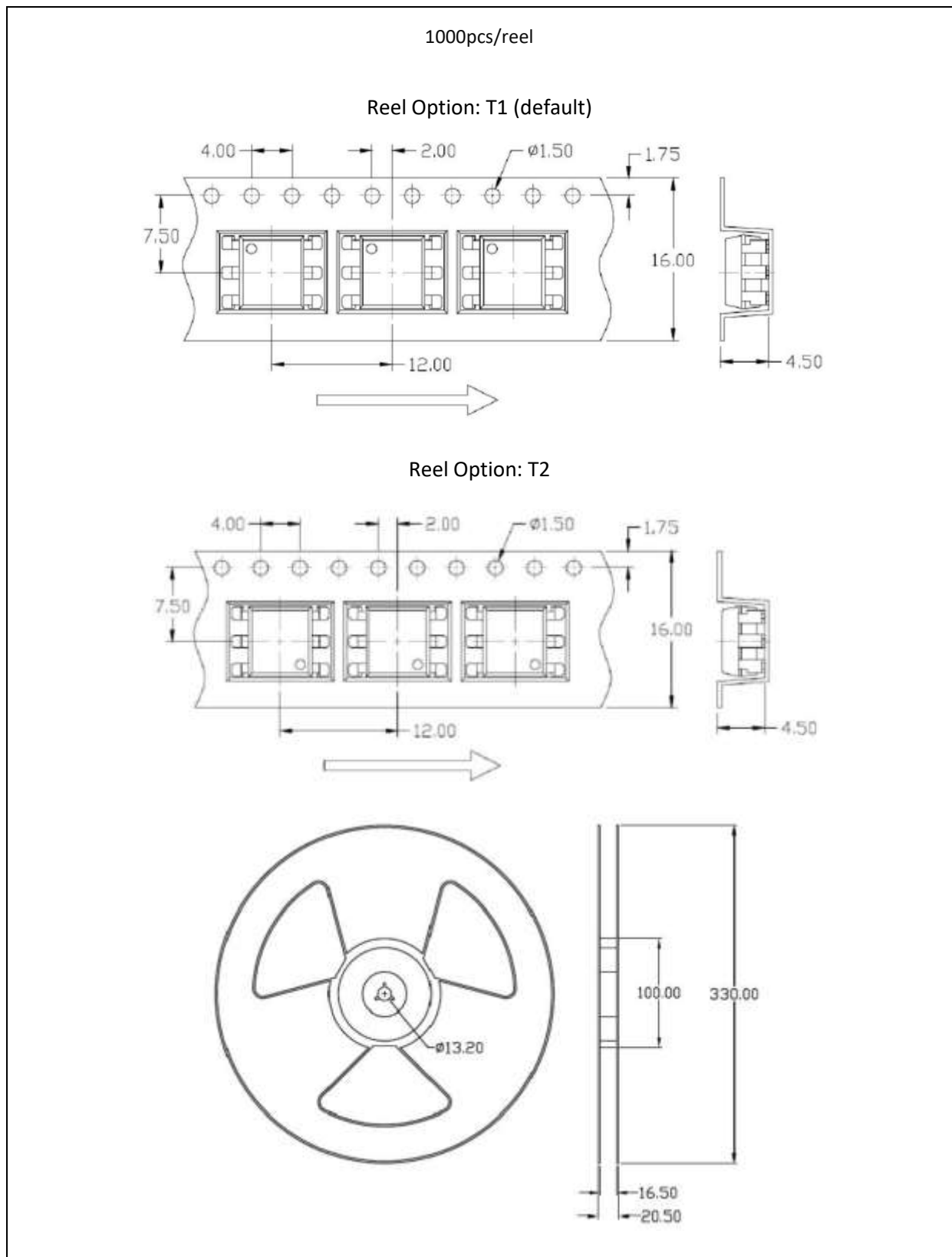
Recommended Soldering Mask:



1. Dimensions are in millimetre (mm).

PACKING SPECIFICATION:

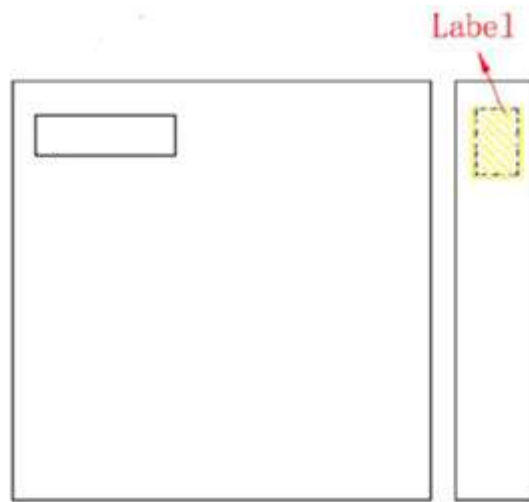
Reel Dimension:



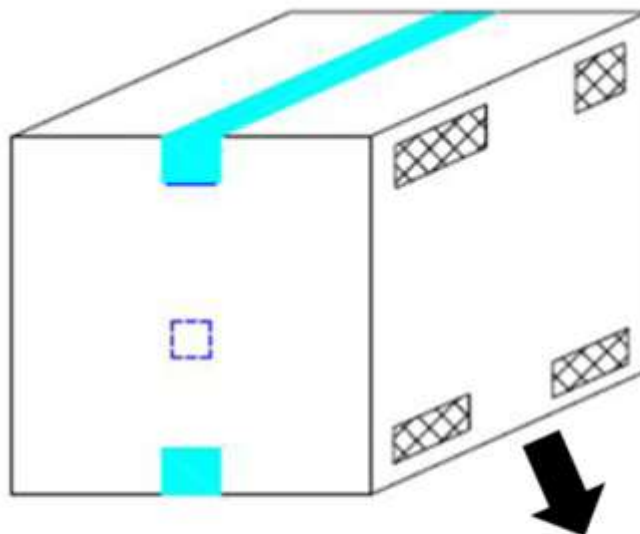
PACKING SPECIFICATION:

Box Dimension:

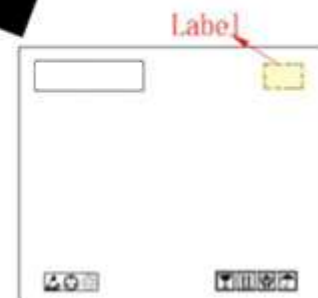
3 reel (3Kpcs)/inner box, 5 inner box (15Kpcs)/carton



● L x W x H = 36cm x 36cm x 6.9cm

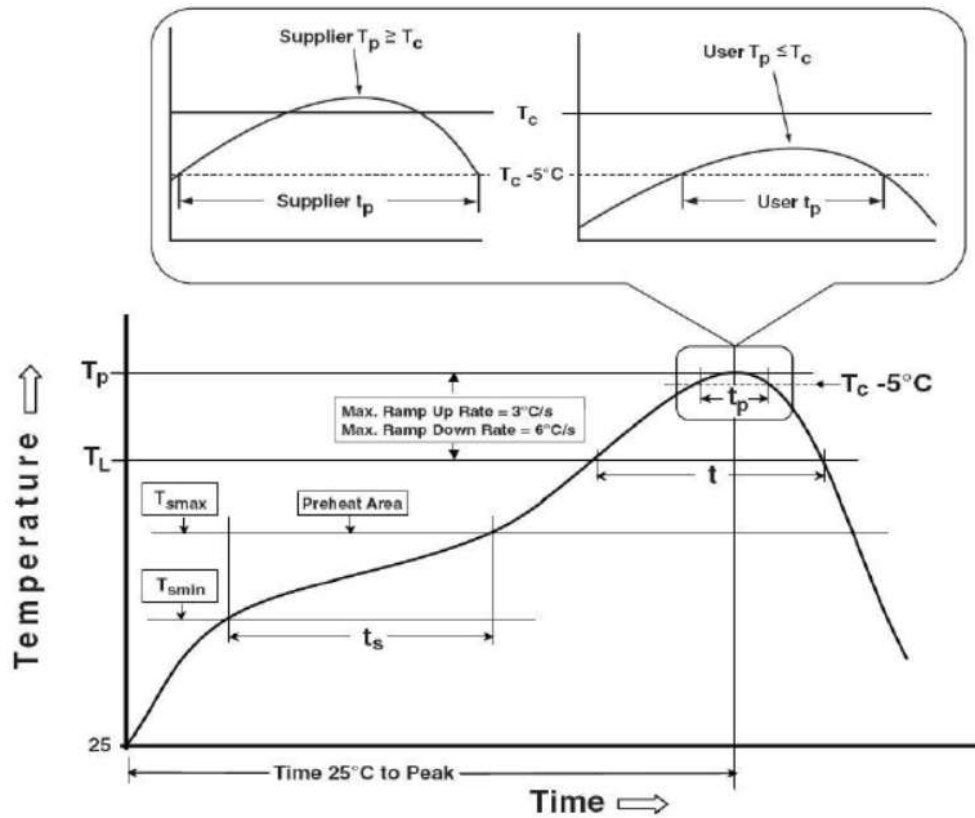


● L x W x H = 45cm x 38cm x 38cm



RECOMMENDED SOLDERING PROFILE:

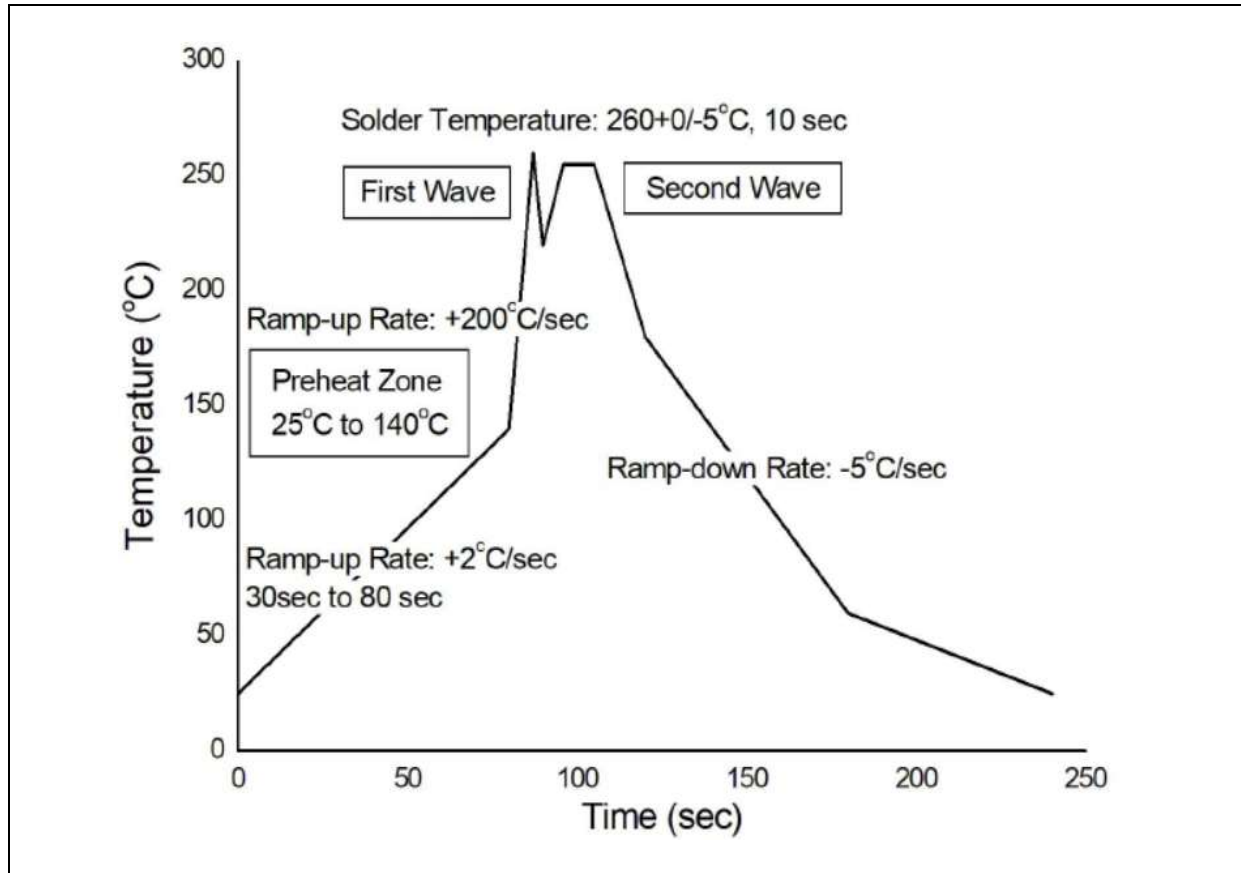
Reflow Information:



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	$380 \pm 5^{\circ}\text{C}$
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.