BRIGHTEK

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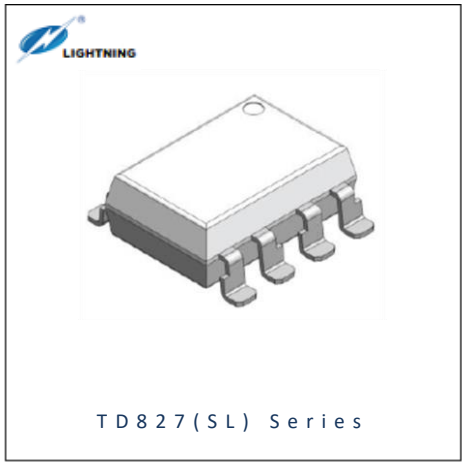
ISO/TS 16949:2009 BS EN ISO 14001:2004 QC 080000 IECQ HSPM

# PRODUCT DATASHEET


- ▶ DC Input Photo Coupler
- ▶ SMD8 Low Profile
- ▶ Photo Transistor

Release Date: 13 December 2024 Version: A00

# TD827(SL)(T1)-GV



TD827(SL) Series

## TD827(SL) Series

RoHS Compliant

### DESCRIPTION:

The TD827(SL) series provide two channel operation, and each combines an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic DIP8 package with with SMD8 Low Profile lead forming option.

With the robust coplanar double mold structure, TD827 series provide the most stable isolation feature.

### APPLICATIONS:

- Computer peripheral interface
- Microprocessor system interface

### FEATURES:

- High isolation 5000 Vrms
- DC input with transistor output
- Operating temperature range -55°C to +110°C
- 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:

| **TD827 (SL) (T1) - G V** | |
|---|---|
| **TD827** | Part Number |
| **SL** | Lead Form Option: SMD8 Low Profile |
| **T1** | Selection: Tape and Reel Option (T1(default)/T2) |
| **G** | Green Option |
| **V** | VDE Option |

Ordering Information:

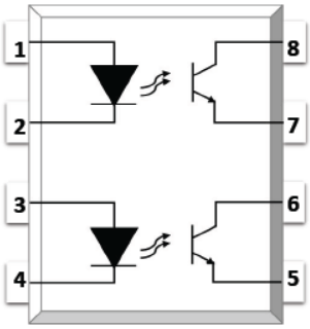
**TD827(SL)(T1)-GV**

| Part Number | Symbol | Values | | | Unit | Test Condition |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| TD827(SL)(T1)-GV | CTR | 130 | --- | 400 | % | $I_F$=5mA, $V_{CE}$=5V |

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

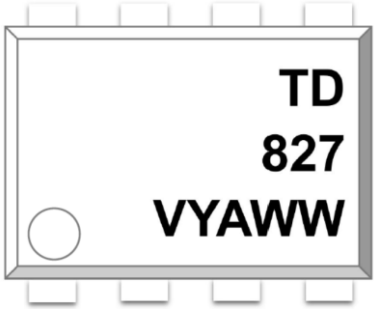
## SCHEMATIC DIAGRAM & MARKING:

Schematic Diagram:




| PIN Definition | |
|---|---|
| 1 | Anode |
| 2 | Cathode |
| 3 | Anode |
| 4 | Cathode |
| 5 | Emitter |
| 6 | Collector |
| 7 | Emitter |
| 8 | Collector |

Marking Information:




| Marking Definition | |
|---|---|
| TD | Manufacturer Code |
| 827 | Part Number |
| 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.

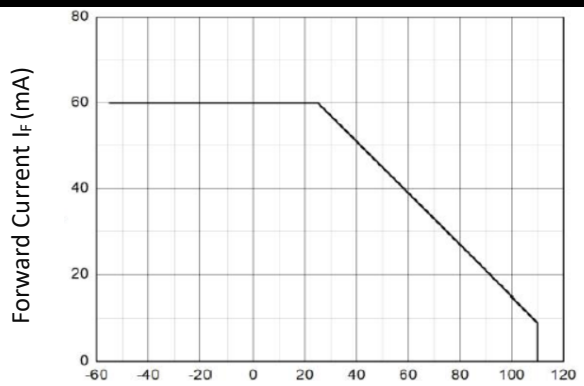
## ELECTRICAL CHARACTERISTICS:

Electrical Optical Characteristics at Ta=25°C:

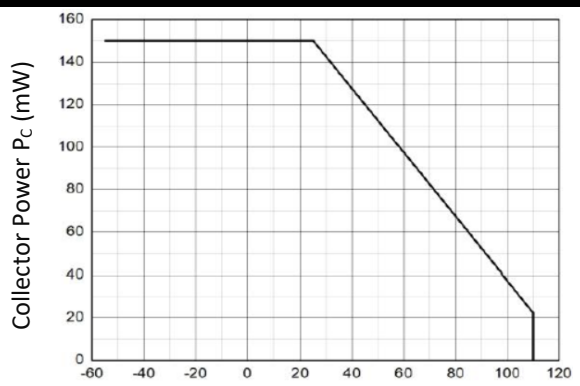
| Parameter | | Symbol | Values | | | Unit | Test Condition |
|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | | |
| INPUT | | | | | | | |
| Forward Voltage | | $V_F$ | --- | 1.24 | 1.4 | V | $I_F$=10mA |
| Reverse Current | | $I_R$ | --- | --- | 10 | μA | $V_R$=6V |
| Input Capacitance | | $C_{IN}$ | --- | 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 | | | | | | | |
| Current Transfer Rate | TD827 | CTR | 130 | --- | 400 | % | $I_F$=5mA, $V_{CE}$=5V |
| 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:

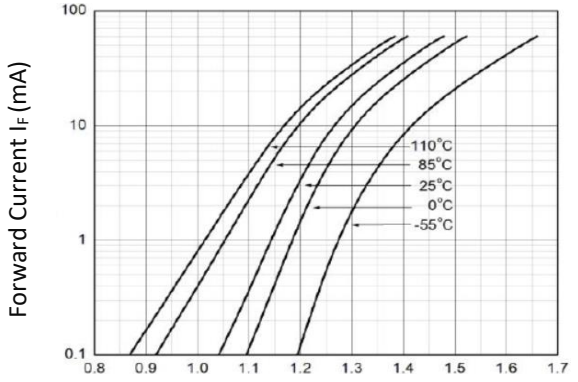
### Forward Current v.s. Ambient Temperature



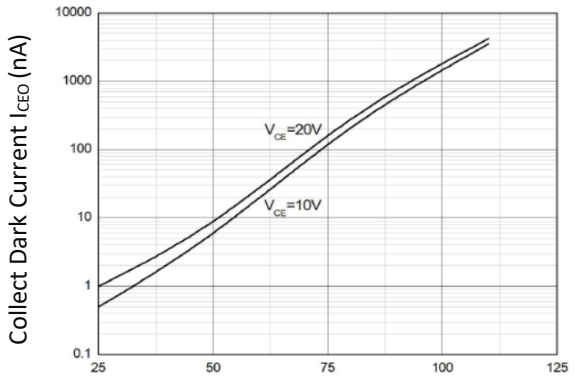

### Collector Power Dissipation v.s. Ambient Temp.



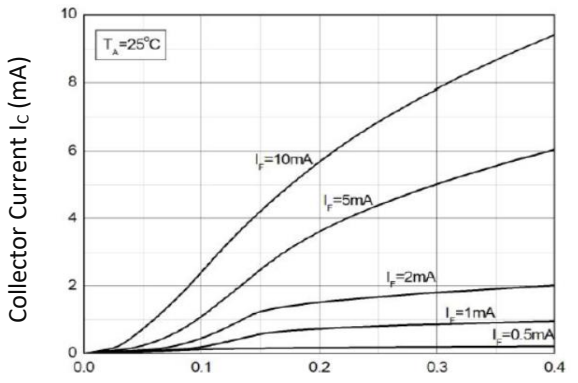

### Forward Current v.s. Forward Voltage



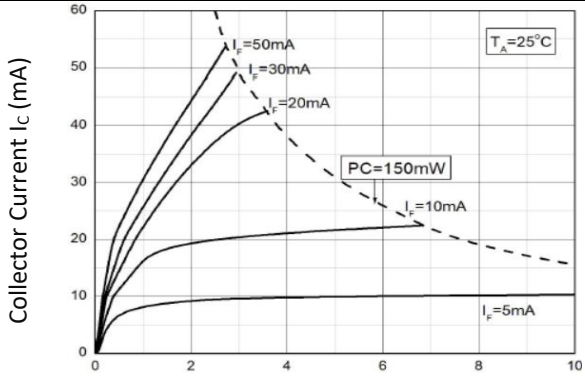

### Collector Dark Current v.s. Ambient Temperature




### Collector Current v.s. Collector-Emitter Voltage

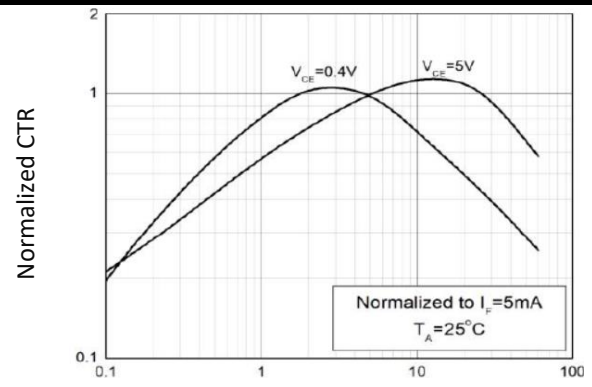



### Collector Current v.s. Collector-Emitter Voltage



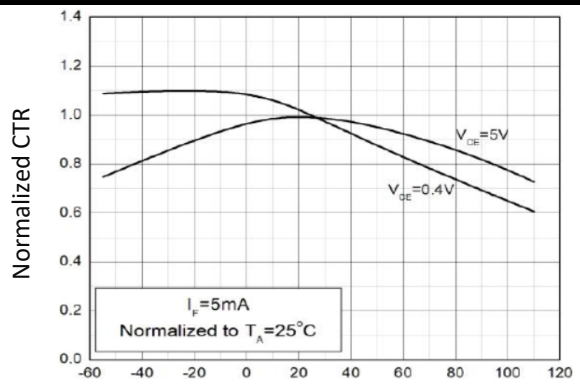
## CHARACTERISTIC CURVES:

### Normalized Current Transfer Ratio v.s. Forward Current



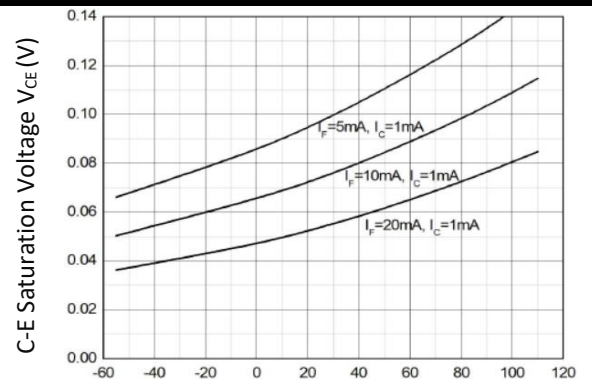

Forward Current $I_F$ (mA)

### Normalized Current Transfer Ratio v.s. Ambient Temperature



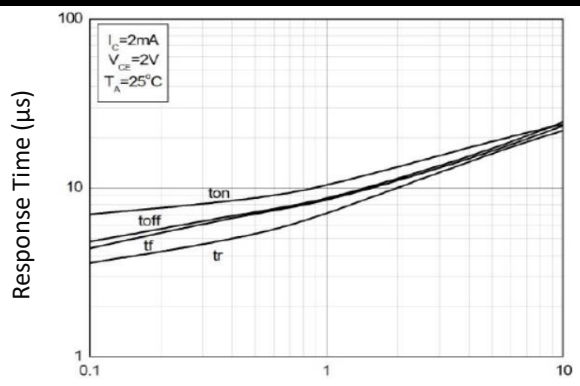

Ambient Temperature $T_a$ (°C)

### Collector-Emitter Saturation Voltage v.s. Ambient Temperature



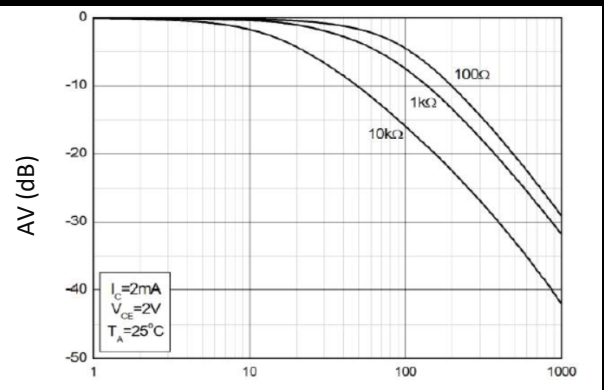

Ambient Temperature (°C)

### Switching Time v.s. Load Resistance




Load Resistance (KΩ)

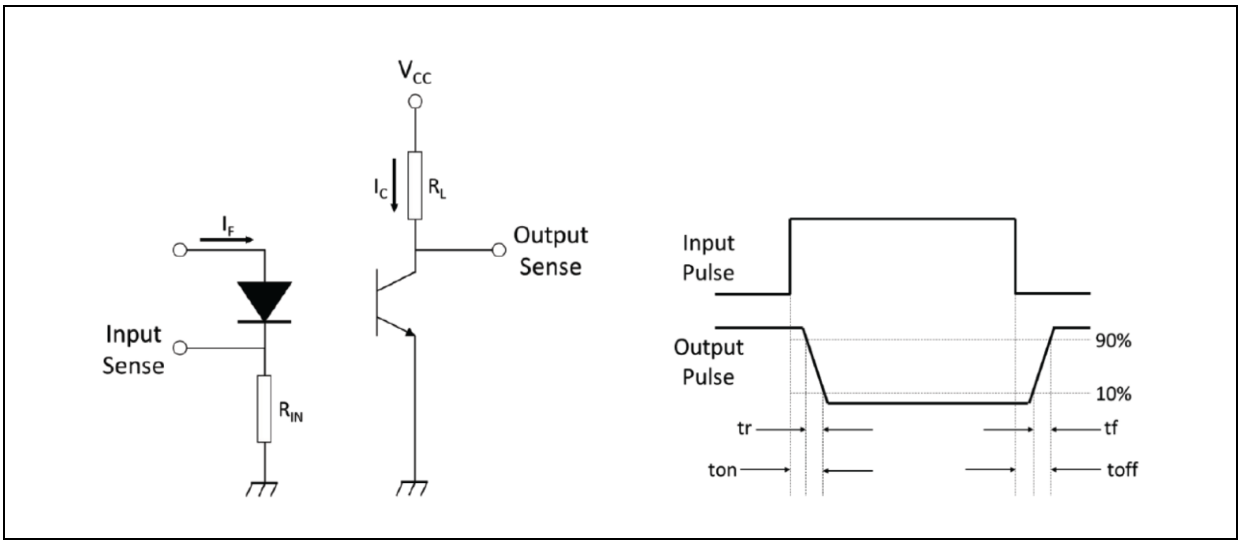
### Frequency Response



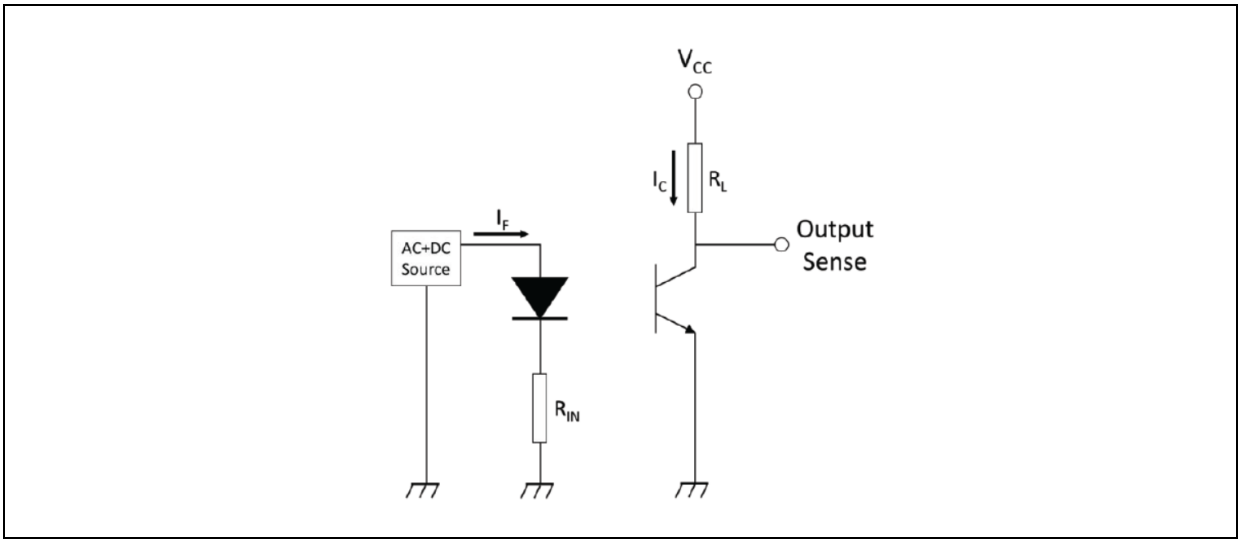

f (kHz)

## TEST CIRCUIT:

Test Circuit of Response Time:



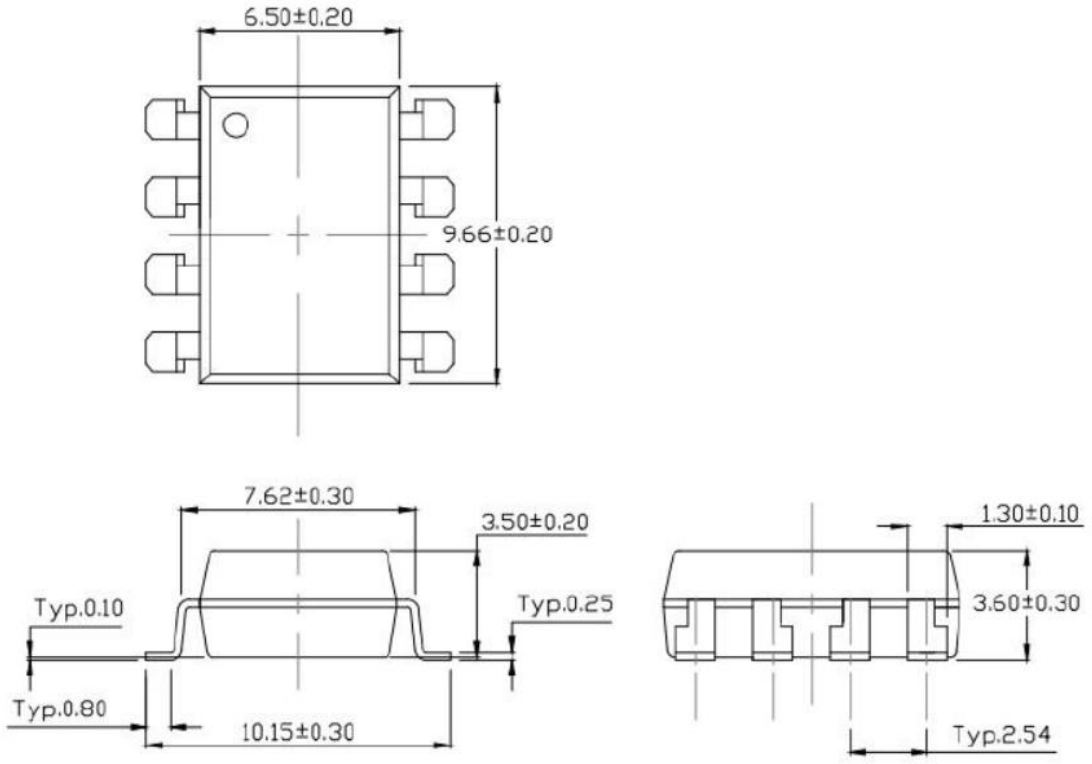

Test Circuit of Frequency Response:



## OUTLINE DIMENSION:

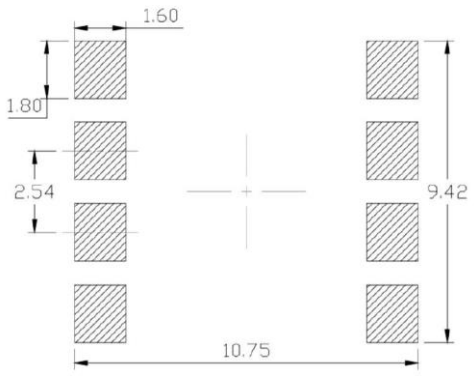
Package Dimension:

Surface Mount Low Profile Lead Forming - SMD (SL Type)




1. All dimensions are in millimetre (mm).

Recommended Soldering Mask:



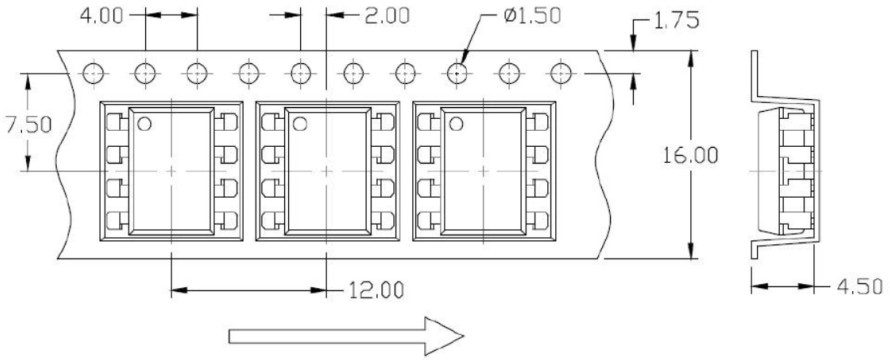

1. Dimensions are in millimetre (mm).

## PACKING SPECIFICATION:

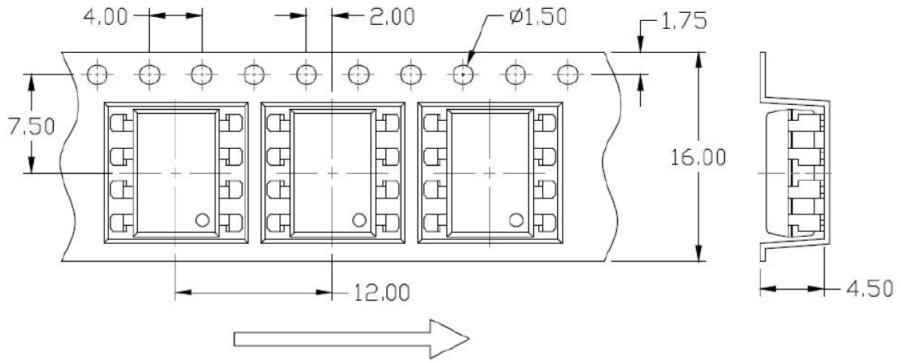
Reel Dimension:

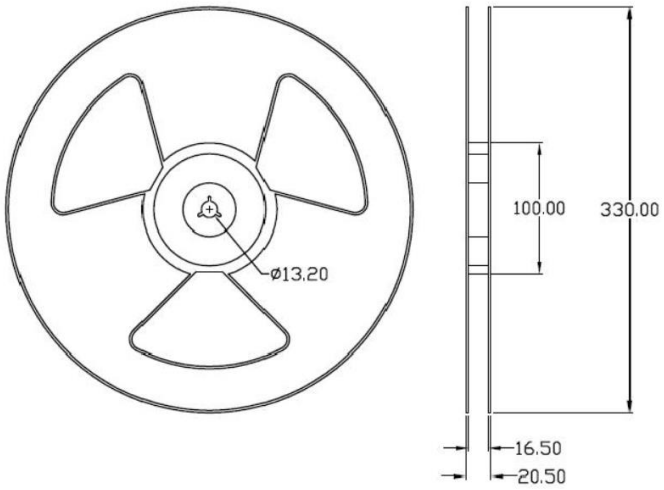
T1/T2: 1000pcs/reel

Reel Option: T1 (default)



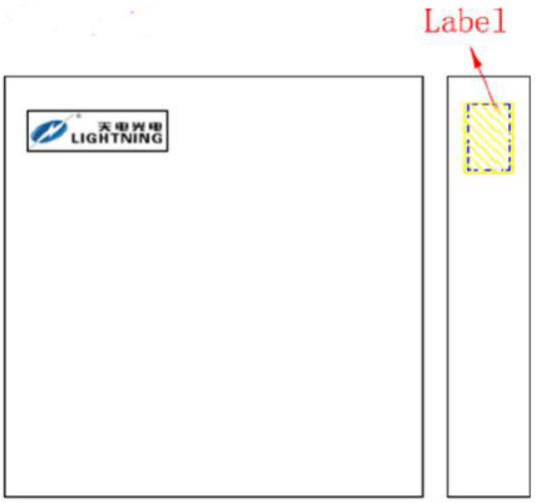

Reel Option: T2



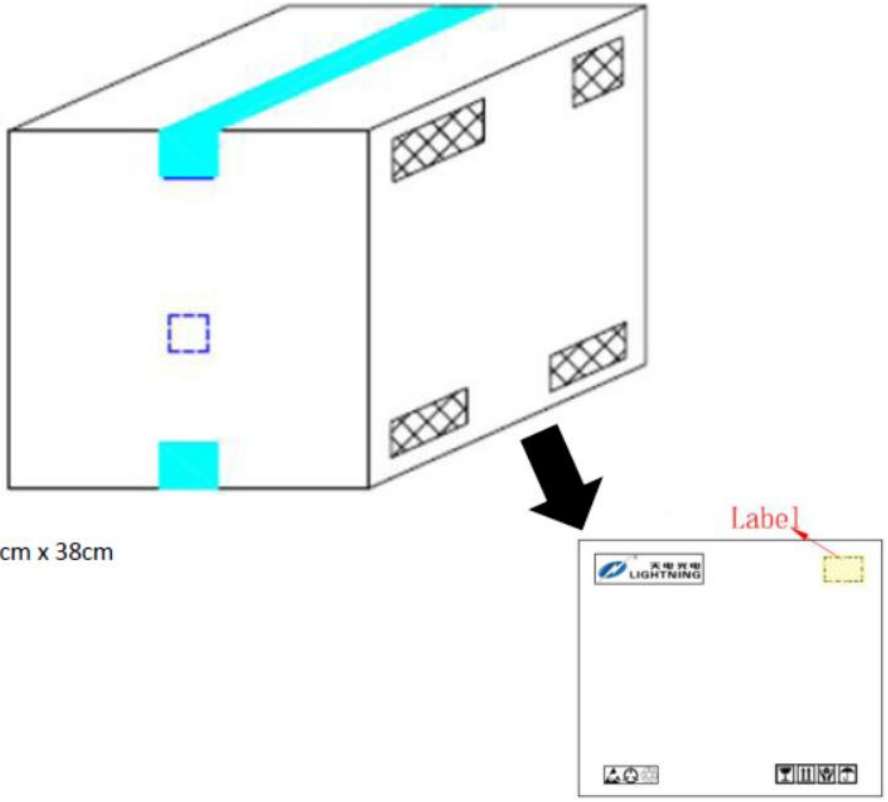



Box Dimension:

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



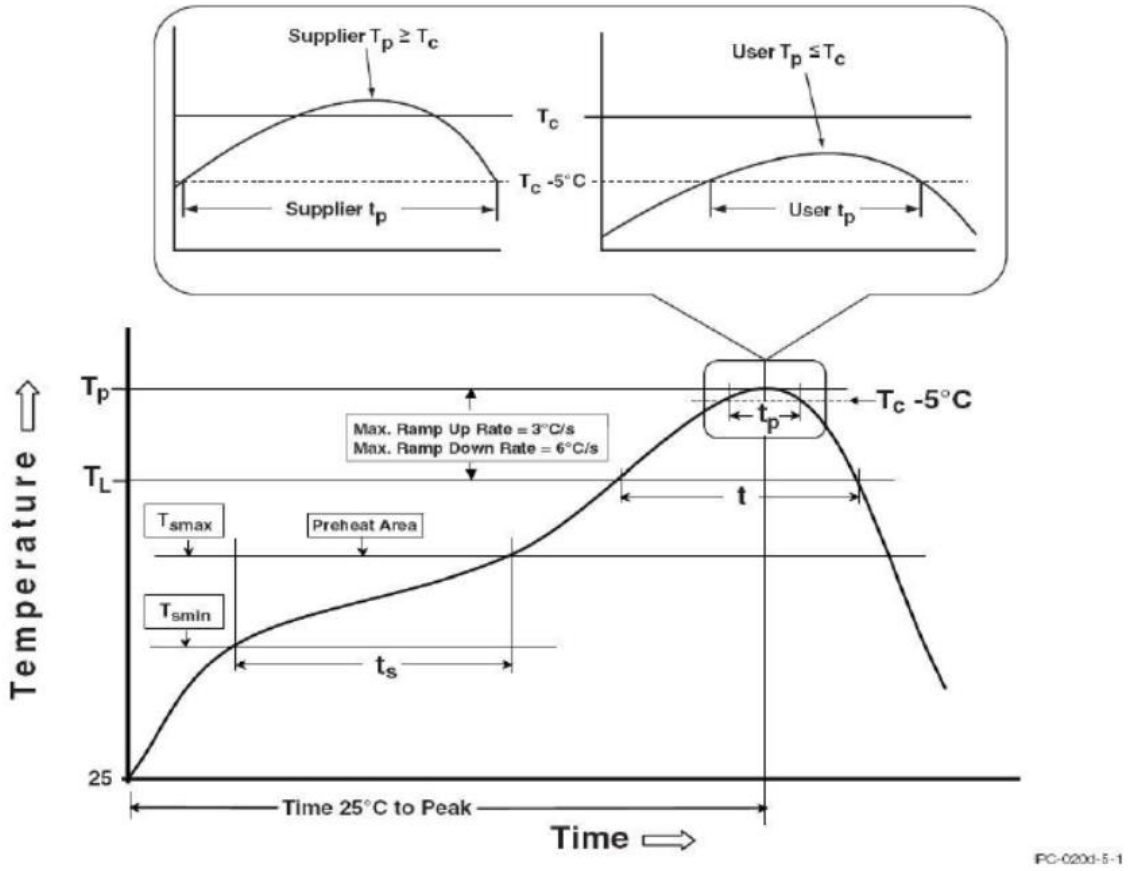

- L x W x H = 36cm x 36cm x 6.9cm




- L x W x H = 45cm x 38cm x 38cm

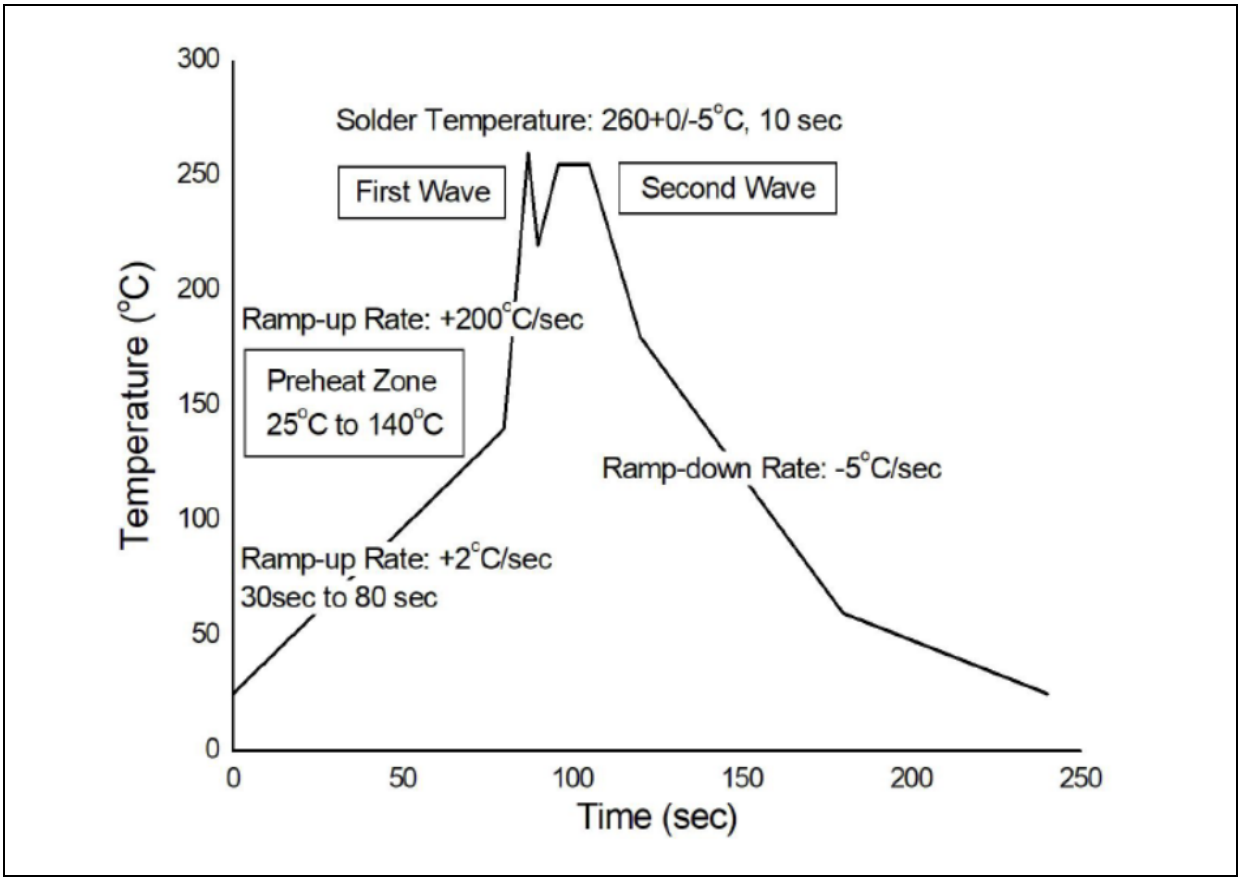
## RECOMMENDED SOLDERING PROFILE:

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. |

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.