

**Description**

The TD351 series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic SOP4 package.

With the robust coplanar double mold structure, TD351 series provide the most stable isolation feature.

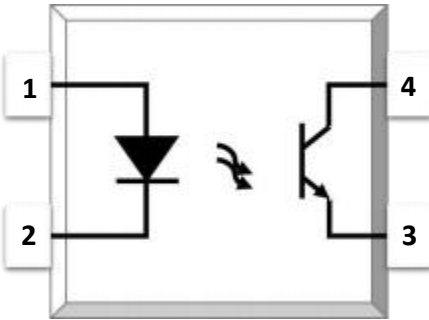
**Features**

- High isolation 3750 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- REACH 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 No. 5A

**Applications**

- Switch mode power supplies
- Programmable controllers
- Household appliances
- Office equipment

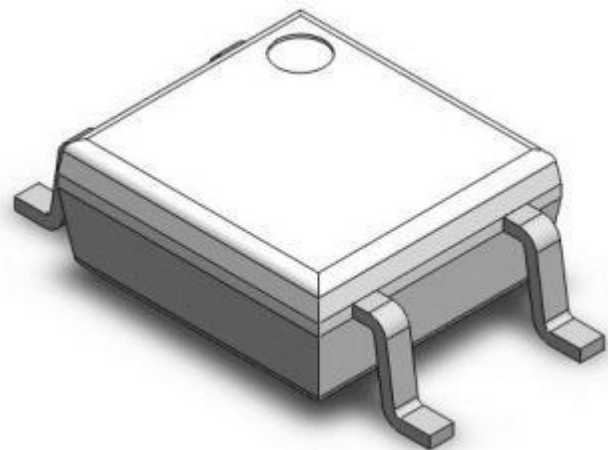
**SCHEMATIC**



**PIN DEFINITION**

- 1. Anode**
- 2. Cathode**
- 3. Emitter**
- 4. Collector**

**PACKAGE OUTLINE**





# TD351 Series

## SOP4, DC Input Photo Transistor Coupler

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT	NOTE
INPUT				
Forward Current	$I_F$	60	mA	
Peak Forward Current	$I_{FP}$	1	A	1
Reverse Voltage	$V_R$	6	V	
Input Power Dissipation	$P_i$	100	mW	
OUTPUT				
Collector - Emitter Voltage	$V_{CEO}$	350	V	
Emitter - Collector Voltage	$V_{ECO}$	7	V	
Collector Current	$I_C$	50	mA	
Output Power Dissipation	$P_o$	150	mW	
COMMON				
Total Power Dissipation	$P_{tot}$	200	mW	
Isolation Voltage	$V_{iso}$	3750	Vrms	2
Operating Temperature	$T_{opr}$	-55~110	°C	
Storage Temperature	$T_{stg}$	-55~125	°C	
Soldering Temperature	$T_{sol}$	260	°C	

Note 1. 100µs pulse, 100Hz frequency

Note 2. AC For 1 Minute, R. H. = 40 ~ 60%



ELECTRICAL OPTICAL CHARACTERISTICS at Ta= 25 °C								
PARAMETER	SYMBOL	MIN	TYP.	MAX.	UNIT	TEST CONDITION	NOTE	
INPUT								
Forward Voltage	V <sub>F</sub>	.	1.24	1.4	V	IF=10mA		
Reverse Current	I <sub>R</sub>	.	.	10	µA	VR=6V		
Input Capacitance	C <sub>in</sub>	.	10	.	PF	V=0, f=1kHz		
OUTPUT								
Collector Dark Current	I <sub>CEO</sub>	.	.	100	nA	VCE=200V, IF=0		
Collector- Emitter Breakdown Voltage	BV <sub>CEO</sub>	350	.	.	V	IC=0.1mA, IF=0		
Emitter- Collector Breakdown Voltage	BV <sub>ECO</sub>	7	.	.	V	IE=0.1mA, IF=0		
TRANSFER CHARACTERISTICS								
Current Transfer Ratio	TD351	CTR	50	-	600	%	IF=5mA, VCE=5V	
Collector- Emitter Saturation Voltage		V <sub>CE(sat)</sub>	.	0.06	0.4	V	IF=20mA, IC=1mA	
Isolation Resistance		R <sub>ISO</sub>	10 <sup>12</sup>	10 <sup>14</sup>	.	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance		C <sub>IO</sub>	.	0.4	1	PF	V=0, f=1MHz	
Response Time (Rise)		t <sub>r</sub>	.	3	18	µs	VCE=2V, IC=2mA	3
Response Time (Fall)		t <sub>f</sub>	.	4	18	µs	RL=100Ω	3
Cut-off Frequency		f <sub>c</sub>	.	80	.	kHz	VCE=2V, IC=2mA RL=100Ω, -3dB	4

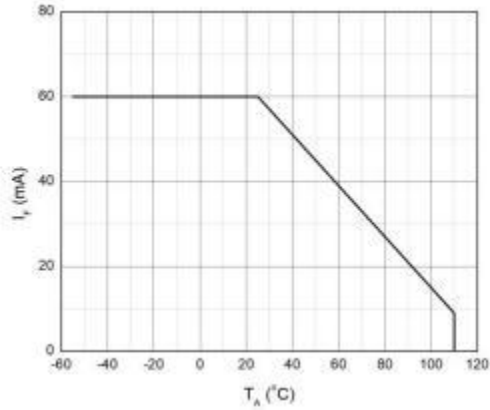
Note 3. Fig.12&13

Note 4. Fig.14

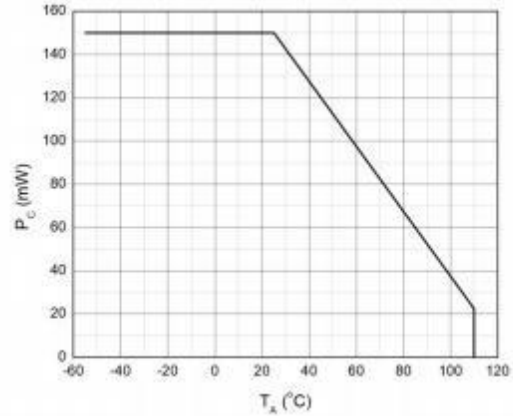


**CHARACTERISTIC CURVES**

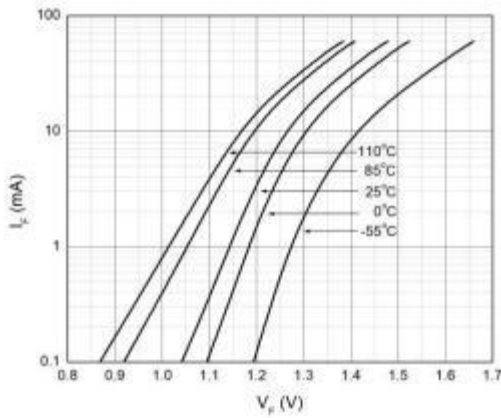
**Fig.1 Forward Current vs. Ambient Temperature**



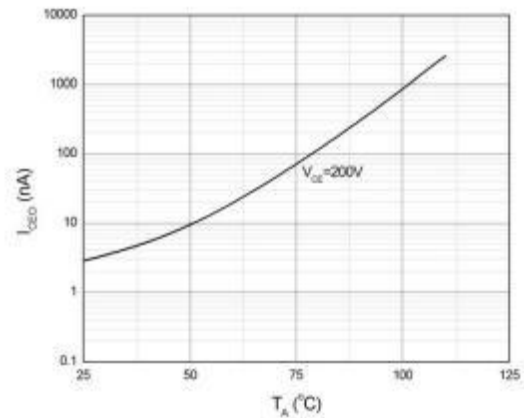
**Fig.2 Collector Power Dissipation vs. Ambient Temperature**



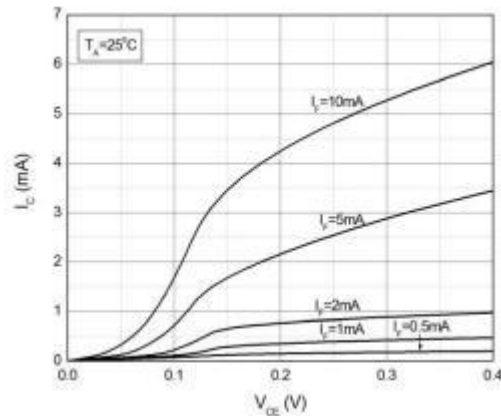
**Fig.3 Forward Current vs. Forward Voltage**



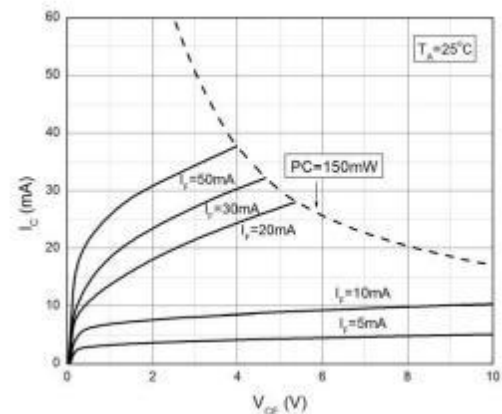
**Fig.4 Collector Dark Current vs. Ambient Temperature**



**Fig.5 Collector Current vs. Collector-emitter Voltage**

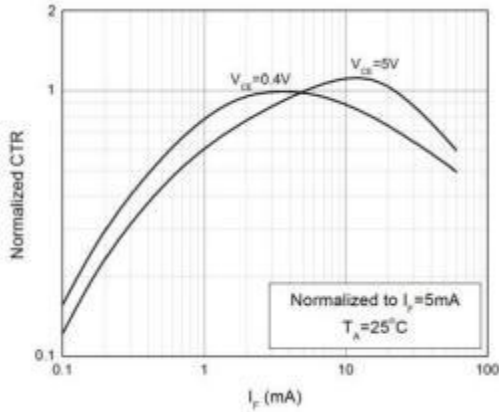


**Fig.6 Collector Current vs. Collector-emitter Voltage**

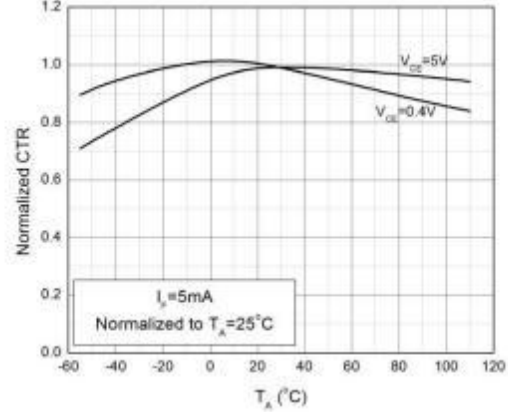


**CHARACTERISTIC CURVES**

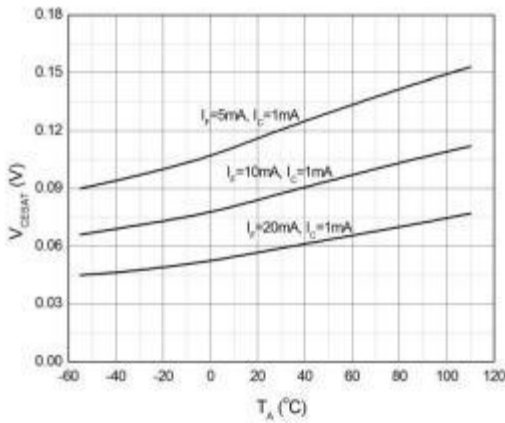
**Fig.7 Normalized Current Transfer Ratio vs. Forward Current**



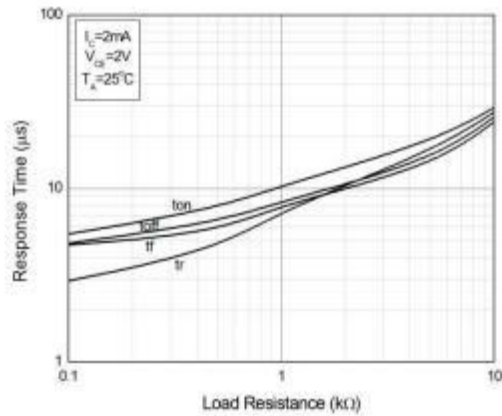
**Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature**



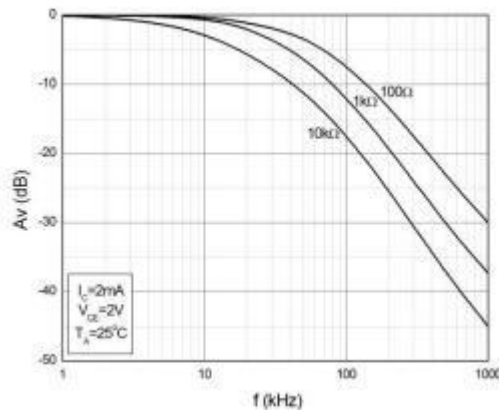
**Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature**



**Fig.10 Switching Time vs. Load Resistance**

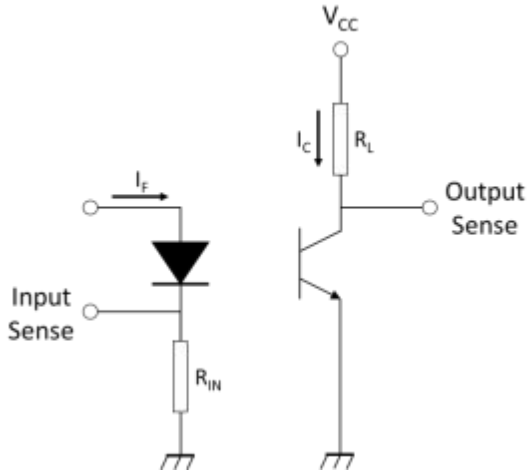


**Fig.11 Frequency Response**

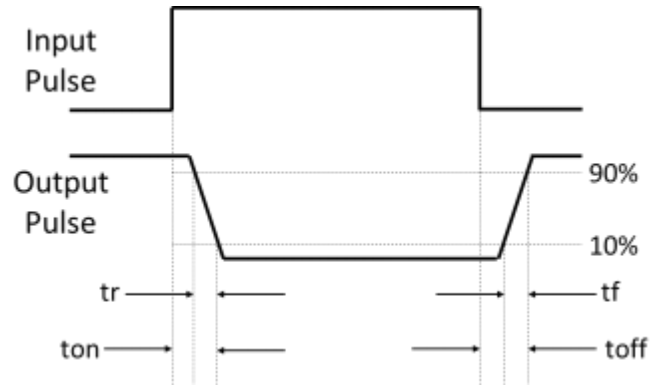


**TEST CIRCUITS**

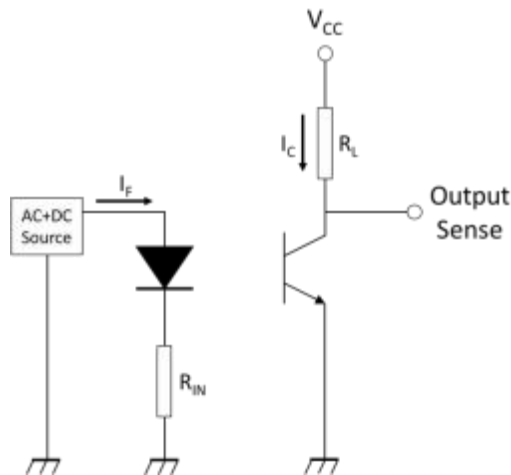
**Fig.12 Test Circuits of Response Time**



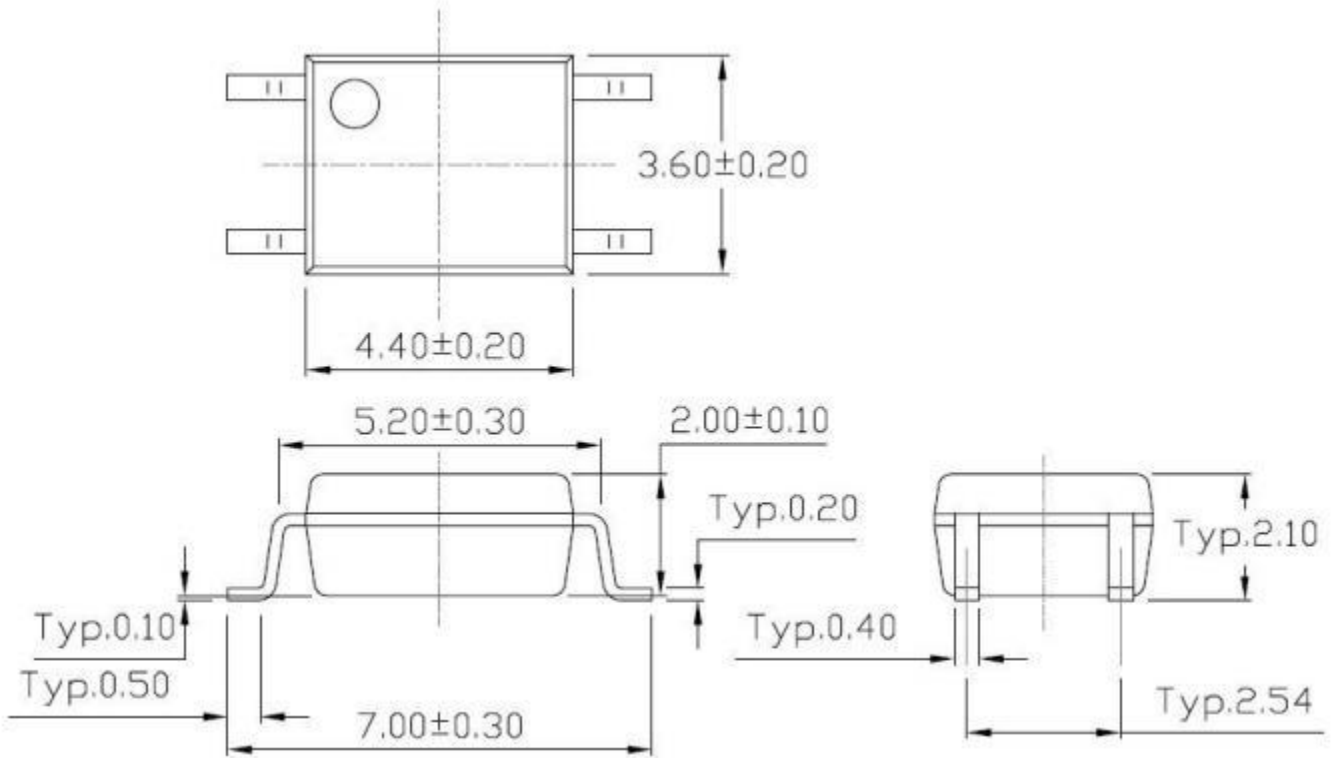
**Fig.13 Curves of Response Time**



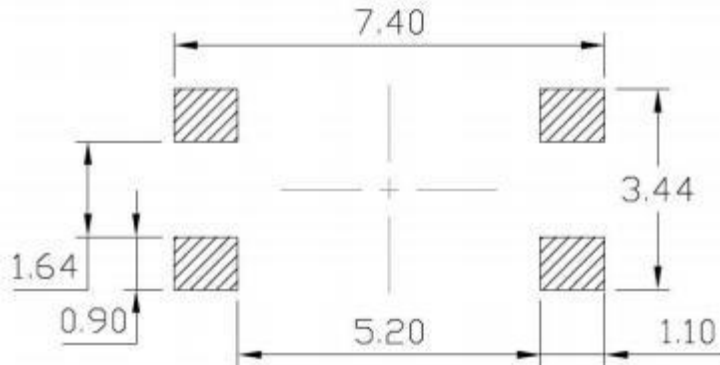
**Fig.14 Test Circuits of Frequency Response**



**PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)**

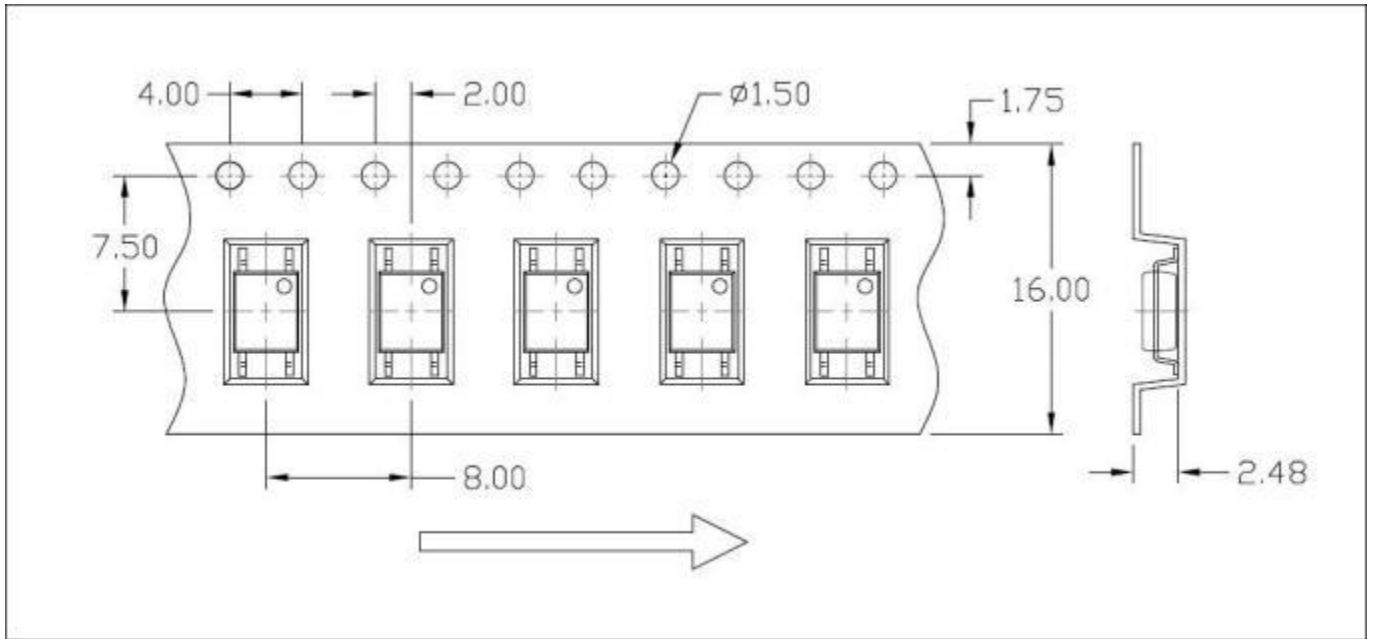


**Recommended Solder Mask (Dimensions in mm unless otherwise stated)**

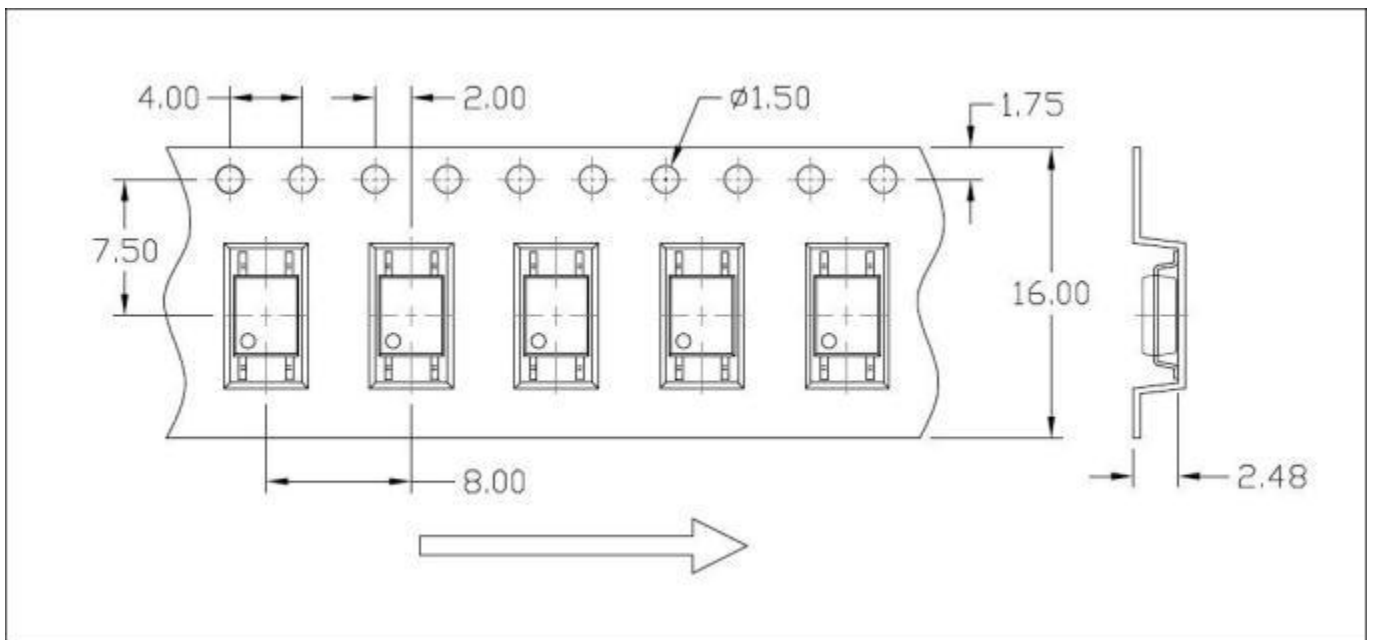


**CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

**Option T1**



**Option T2**

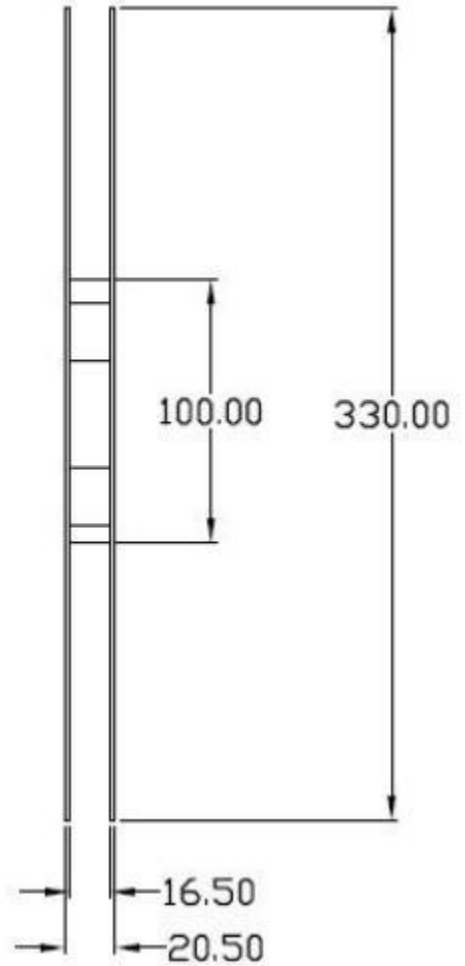






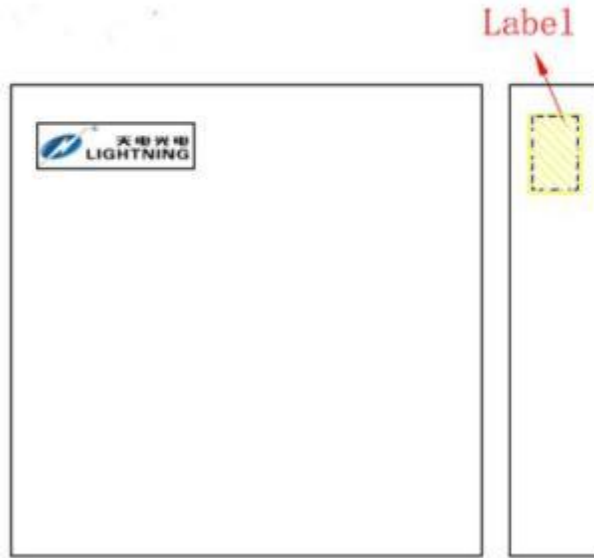
**REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

**Option T1 & T2**



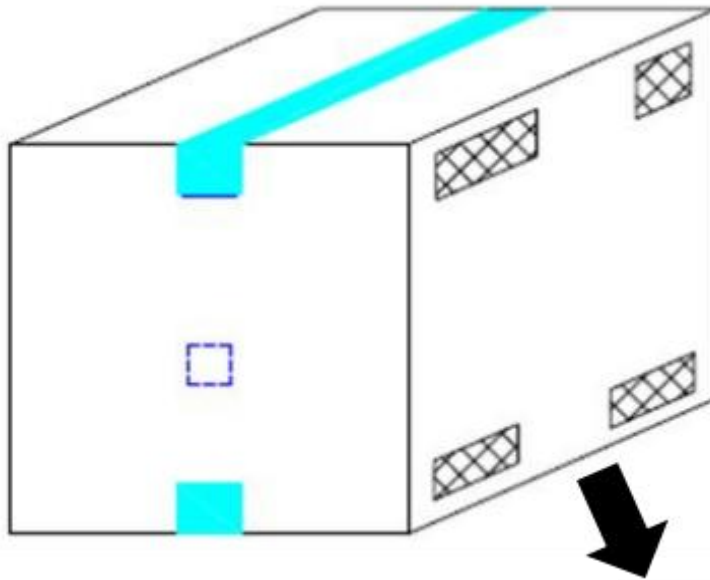
### BOX SPECIFICATIONS (Reel Type)

#### Inner Box

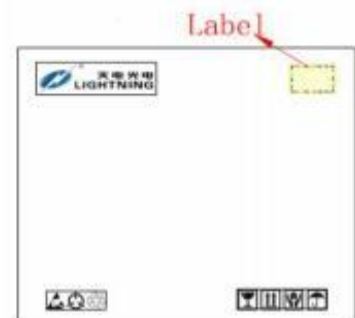


- L x W x H = 36cm x 36cm x 6.9cm

#### Outer Box



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





**ORDERING AND MARKING INFORMATION**

**MARKING INFORMATION**



TD : Company Abbr.  
 351 : Part Number  
 V : VDE Option  
 Y : Fiscal Year  
 A : Manufacturing Code  
 WW : Work Week

**ORDERING INFORMATION**

**TD351(Z)-GV**

TD – Company Abbr.  
 351 – Part Number  
 Z – Tape and Reel Option (T1/T2)  
 G – Green  
 V – VDE Option (V or None)

**LABEL INFORMATION**

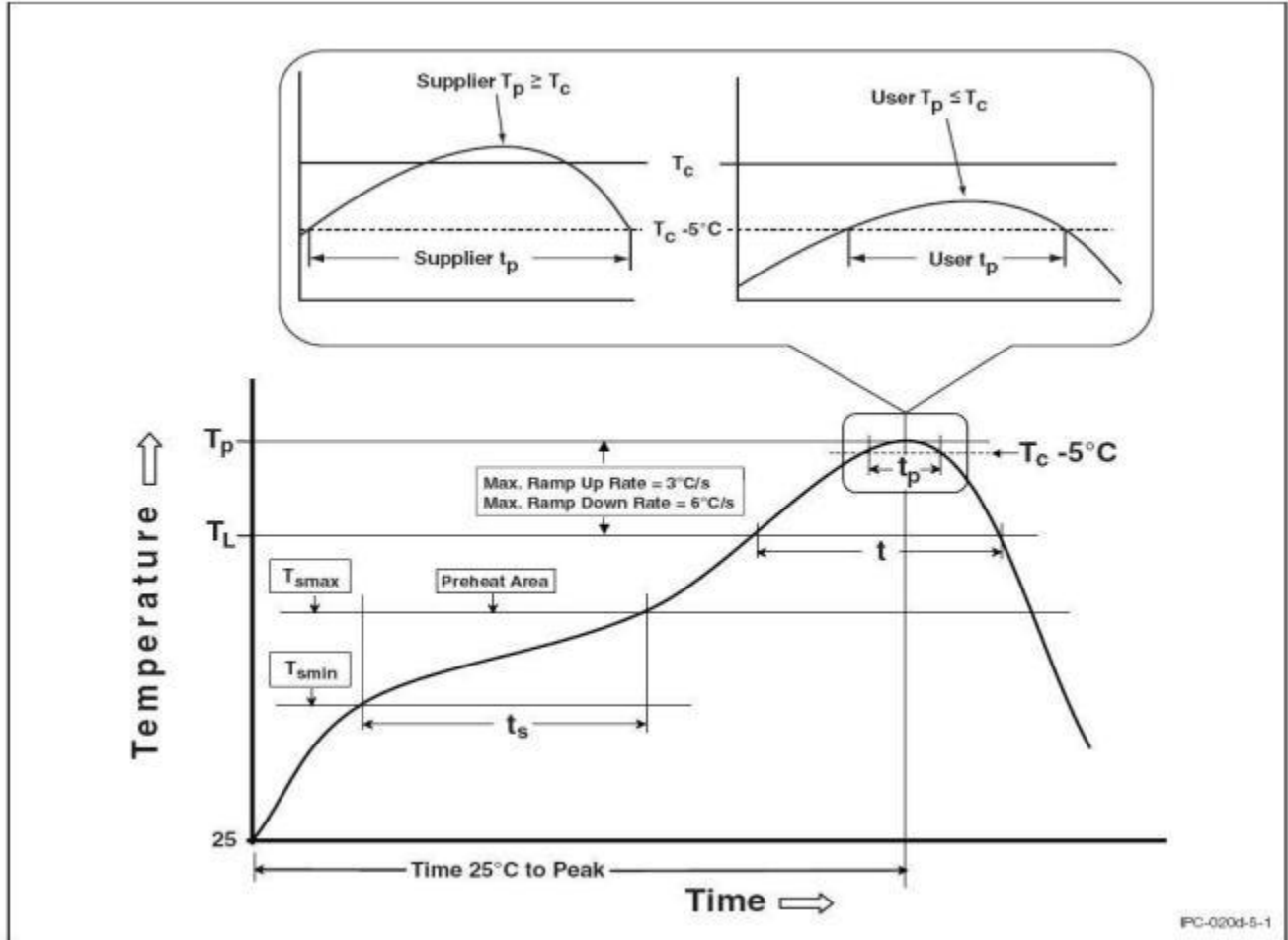


**PACKING QUANTITY**

Option	Quantity	Quantity – Inner box	Quantity – Outer box
T1	3000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 45k Units
T2	3000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 45k Units

**REFLOW INFORMATION**

**REFLOW PROFILE**



PC-020d-5-1

Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. ( $T_{smin}$ )	100	150°C
Temperature Max. ( $T_{smax}$ )	150	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.



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- This product is not intended to be used for military, aircraft, automotive, medical, life sustaining or lifesaving applications or any other application which can result in human injury or death.
- Please contact LIGHTNING sales agent for special application request.
- Immerge unit's body in solder paste is not recommended.
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