

**Description**

The TD354 series combine two AlGaAs infrared emitting diode as the AC input which is optically coupled to a silicon planar phototransistor detector in a plastic SOP4 package with different lead forming options.

With the robust coplanar double mold structure, TD354 series provide the most stable isolation feature.

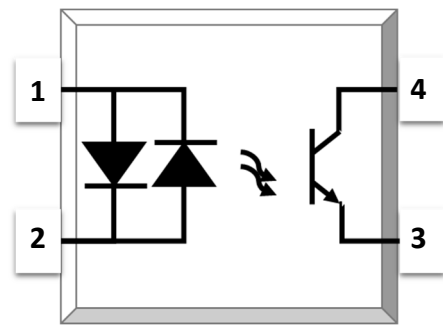
**Features**

- High isolation 3750 VRMS
- CTR flexibility available see order information
- AC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- REACH compliance
- Halogen free
- MSL class 1
- Regulatory Approvals
  - UL - UL1577(Pending Approved)
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC – GB4943.1, GB8898

**Applications**

- AC line monitor
- Programmable controller
- Telephone line interface
- System appliance
- Measurement instrument

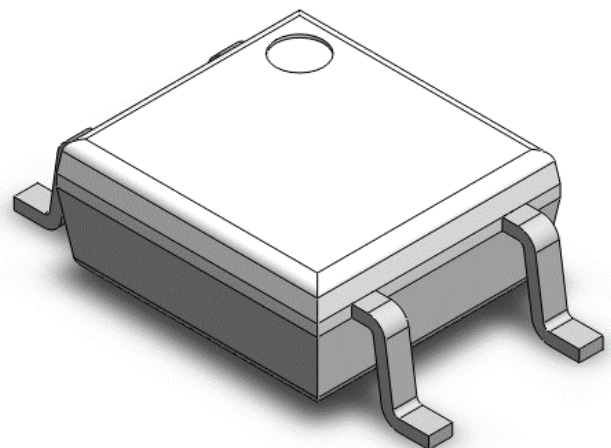
**SCHEMATIC**



**PIN DEFINITION**

1. Anode/Cathode
2. Cathode/Anode
3. Emitter
4. Collector

**PACKAGE OUTLINE**





**SOP4, AC Input, Photo Transistor Coupler**

<b>ABSOLUTE MAXIMUM RATINGS</b>				
PARAMETER	SYMBOL	VALUE	UNIT	NOTE
<b>INPUT</b>				
Forward Current	$I_F$	$\pm 60$	mA	
Peak Forward Current	$I_{FP}$	$\pm 1$	A	1
Input Power Dissipation	$P_i$	100	mW	
<b>OUTPUT</b>				
Collector - Emitter Voltage	$V_{CEO}$	80	V	
Emitter - Collector Voltage	$V_{ECO}$	7	V	
Collector Current	$I_c$	50	mA	
Output Power Dissipation	$P_o$	150	mW	
<b>COMMON</b>				
Total Power Dissipation	$P_{tot}$	200	mW	
Isolation Voltage	$V_{iso}$	5000	V <sub>rms</sub>	2
Operating Temperature	$T_{opr}$	-55~110	°C	
Storage Temperature	$T_{stg}$	-55~150	°C	
Soldering Temperature	$T_{sol}$	260	°C	

Note 1. 100μs pulse, 100Hz frequency

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



**SOP4, AC Input, Photo Transistor Coupler**

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	I <sub>F</sub> =±10mA	
Input Capacitance	C <sub>in</sub>	-	10	-	pF	V=0, f=1kHz	
OUTPUT							
Collector Dark Current	I <sub>CEO</sub>	-	-	100	nA	V <sub>CE</sub> =20V, I <sub>F</sub> =0	
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	80	-	-	V	I <sub>C</sub> =0.1mA, I <sub>F</sub> =0	
Emitter-Collector Breakdown Voltage	BV <sub>ECO</sub>	7	-	-	V	I <sub>E</sub> =0.1mA, I <sub>F</sub> =0	
TRANSFER CHARACTERISTICS							
Current Transfer Ratio	TD354	CTR	20	-	300	%	I <sub>F</sub> =±1mA, V <sub>CE</sub> =5V
	TD354A		50	-	150		
CTR Symmetry		0.7	-	1.3		I <sub>F</sub> =±1mA, V <sub>CE</sub> =5V	
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	-	0.06	0.2	V	I <sub>F</sub> =±20mA, I <sub>C</sub> =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	
Cut-off Frequency	f <sub>c</sub>	-	80	-	kHz	V <sub>CE</sub> =2V, I <sub>C</sub> =2mA R <sub>L</sub> =100Ω, -3dB	3
Response Time (Rise)	t <sub>r</sub>	-	3	18	μs	V <sub>CE</sub> =2V, I <sub>C</sub> =2mA	4
Response Time (Fall)	t <sub>f</sub>	-	4	18	μs	R <sub>L</sub> =100Ω	4

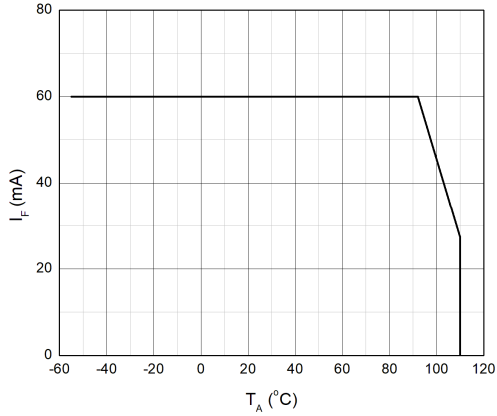
Note 3. Fig.12&13

Note 4. Fig.14

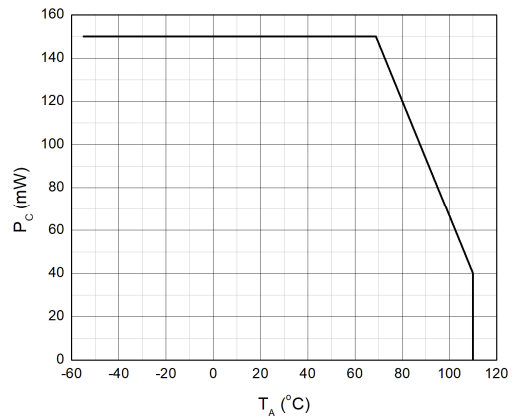


**CHARACTERISTIC CURVES**

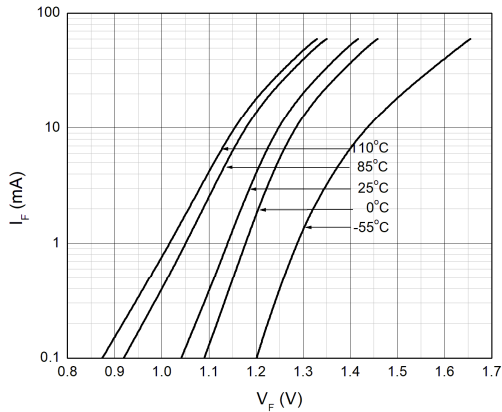
**Fig.1 Forward Current vs. Ambient Temperature**



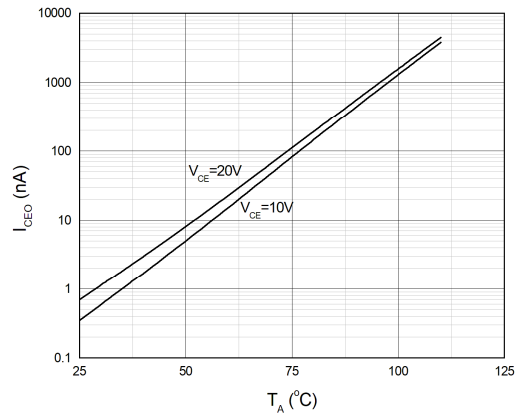
**Fig.2 Collector Power Dissipation vs. Ambient Temperature**



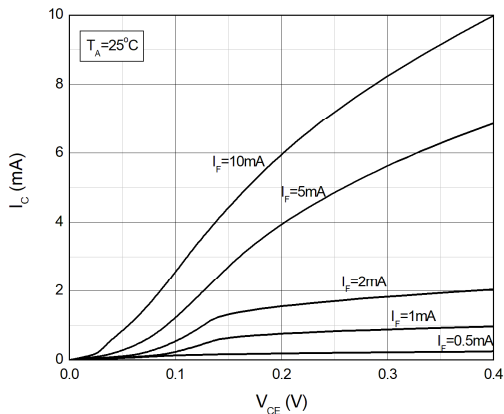
**Fig.3 Forward Current vs. Forward Voltage**



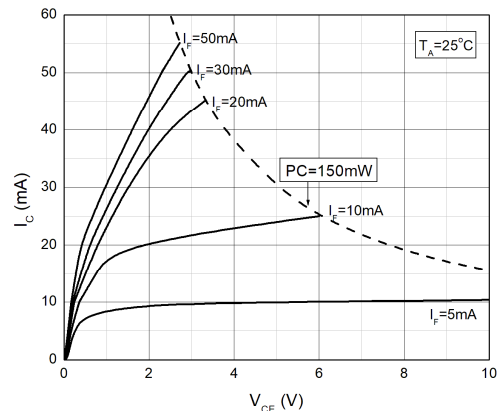
**Fig.4 Collector Dark Current vs. Ambient Temperature**



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

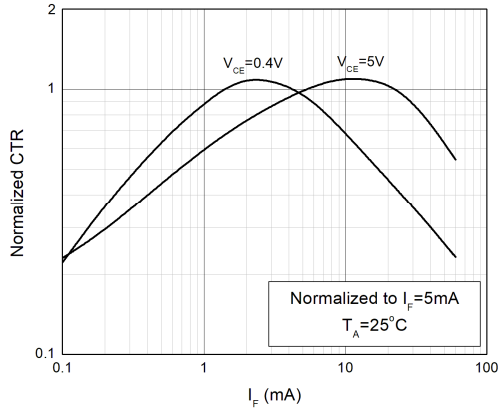


**Fig.6 Collector Current vs. Collector-emitter Voltage**

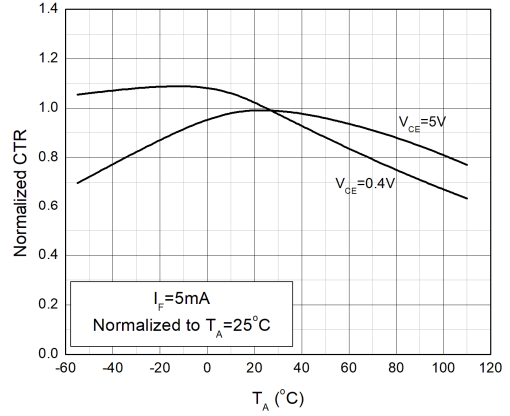


**CHARACTERISTIC CURVES**

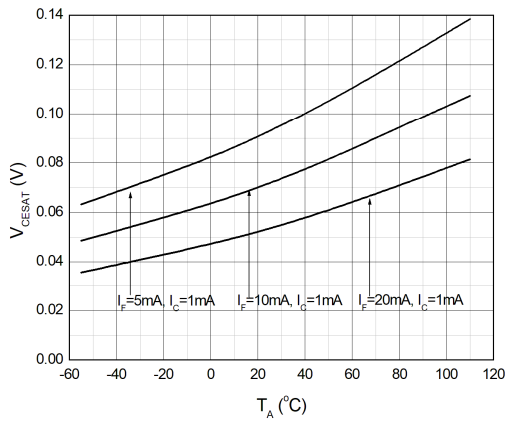
**Fig.7 Normalized Current Transfer Ratio vs. Forward Current**



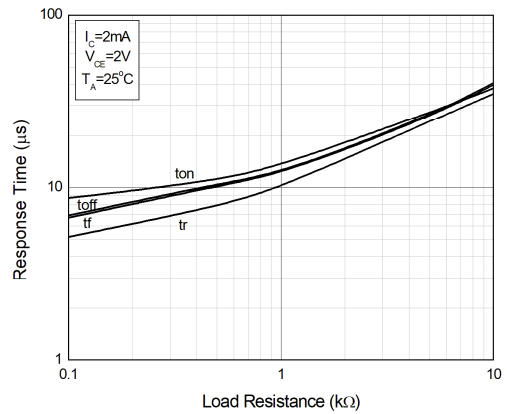
**Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature**



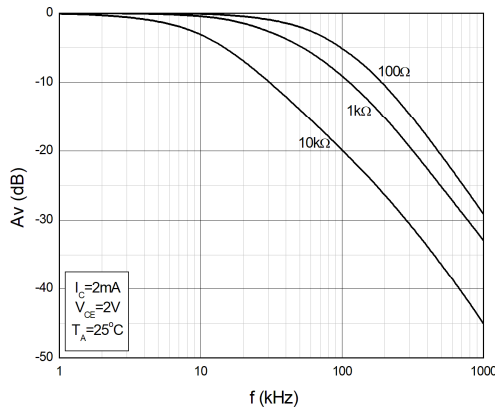
**Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature**



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

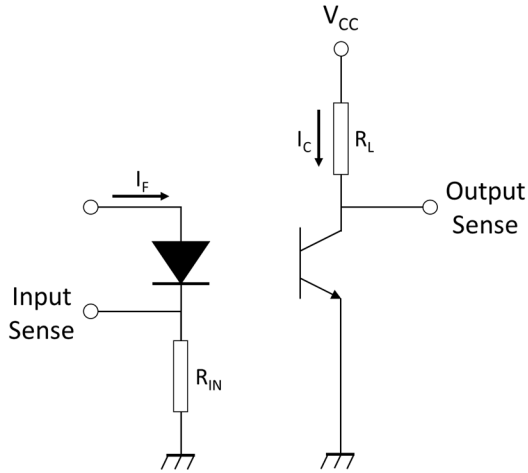


**Fig.11 Frequency Response**

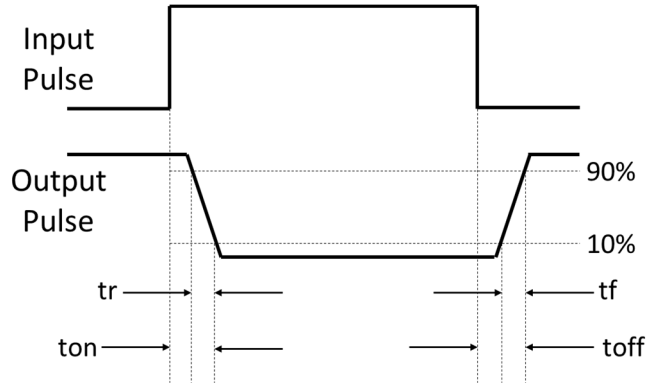


**TEST CIRCUITS**

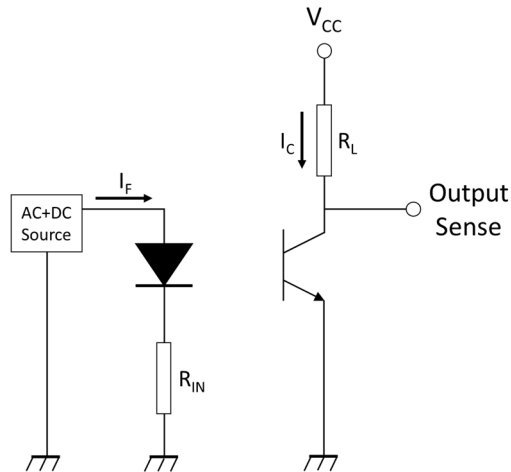
**Fig.12 Test Circuits of Response Time**



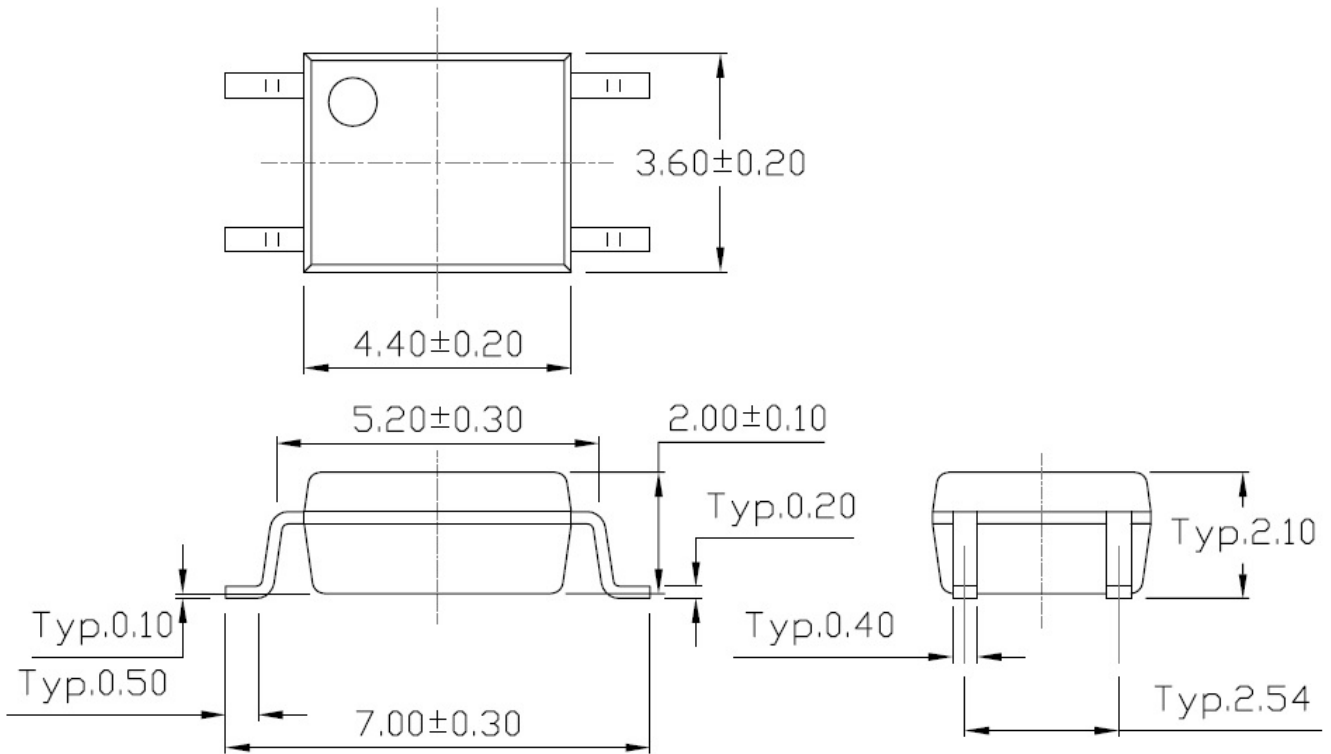
**Fig.13 Curves of Response Time**



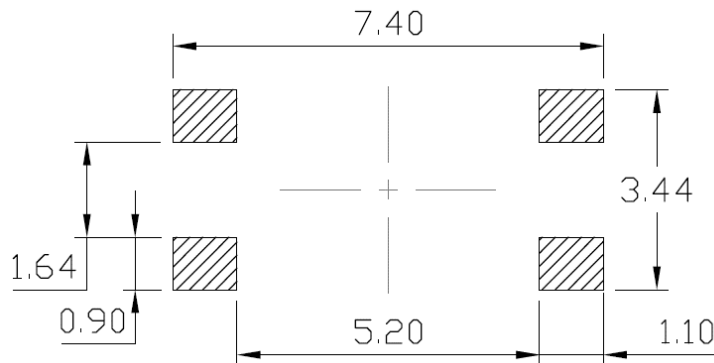
**Fig.14 Test Circuits of Frequency Response**



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

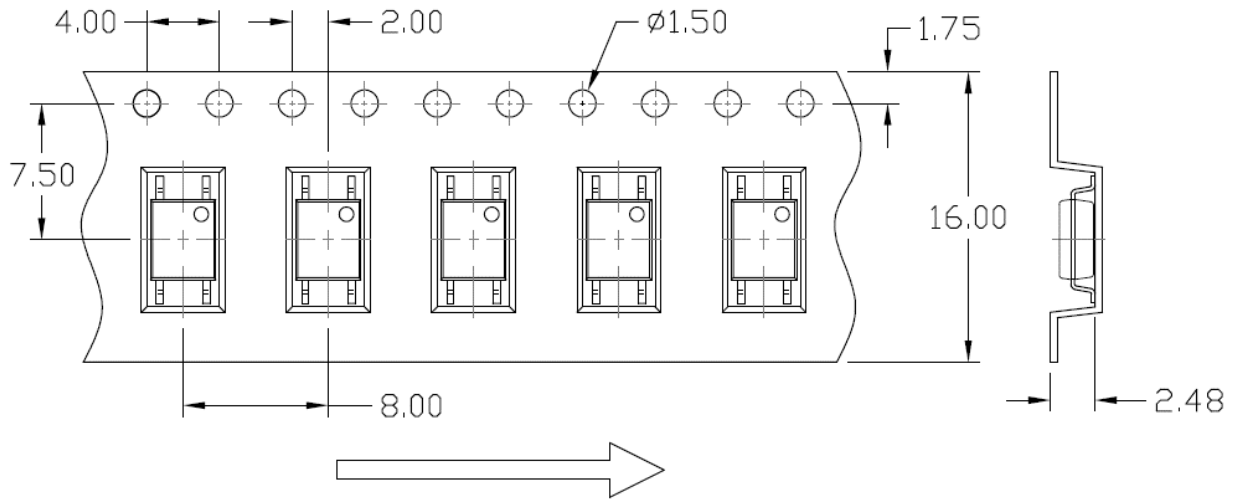


**Recommended Solder Mask (Dimensions in mm unless otherwise stated)**

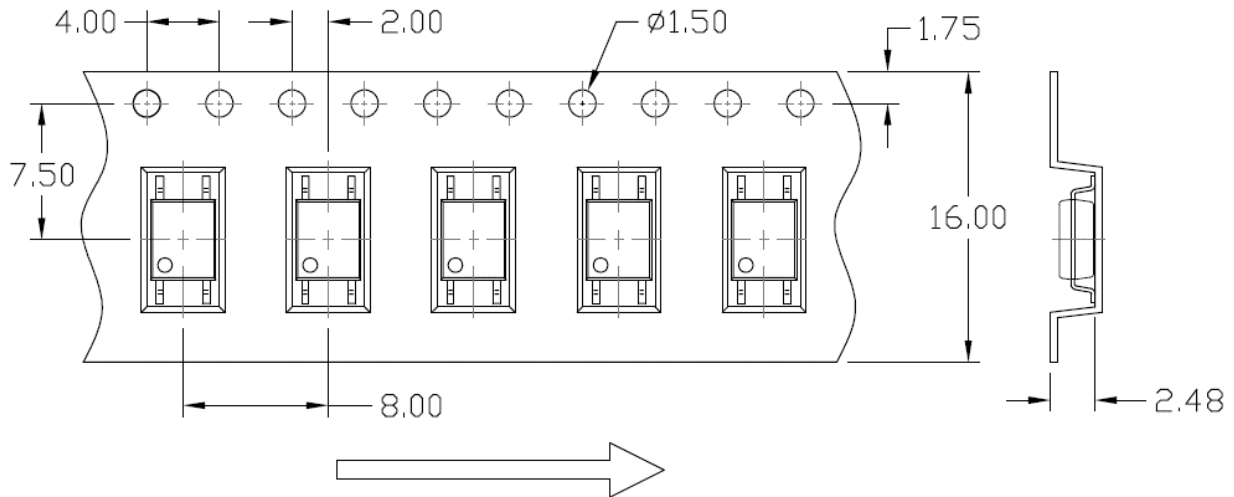


### CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

#### Option T1



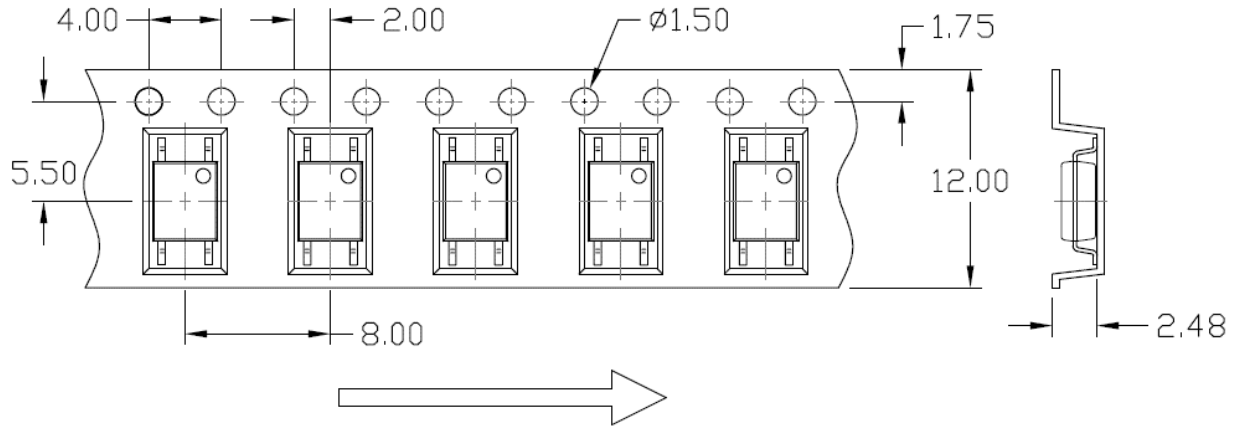
#### Option T2



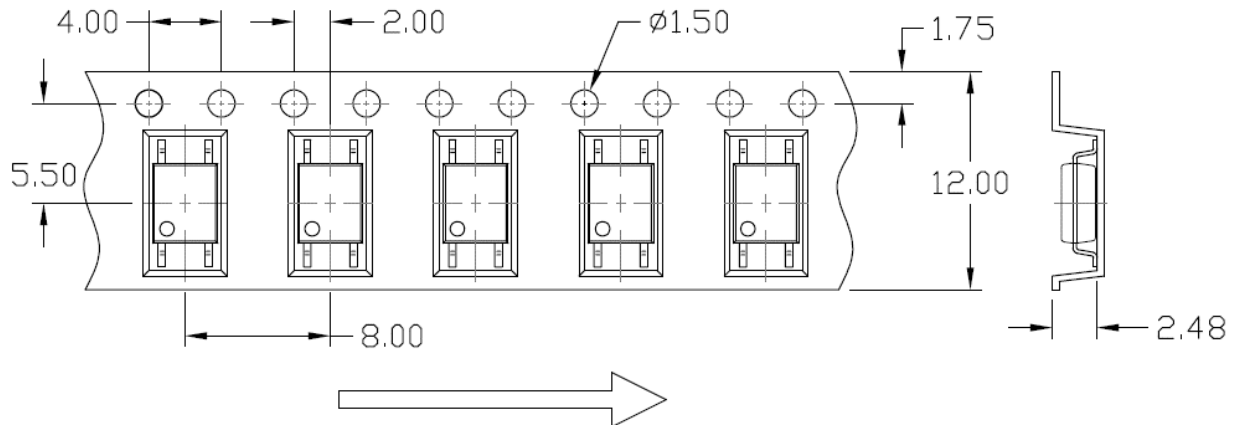


### CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

#### Option T3



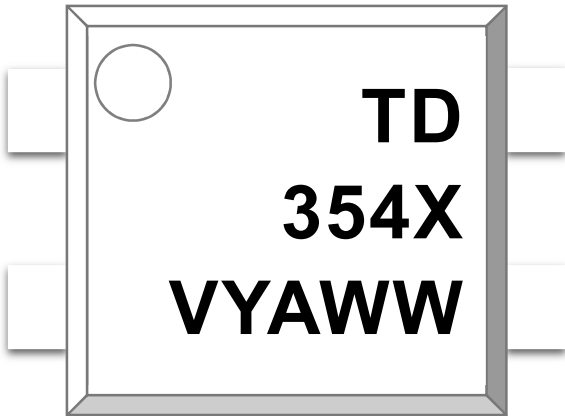
#### Option T4





**ORDERING AND MARKING INFORMATION**

**MARKING INFORMATION**



**TD** : Company Abbr.  
**354** : Part Number  
**X** : CTR Rank  
**V** : VDE Option  
**Y** : Fiscal Year  
**A** : Manufacturing Code  
**WW** : Work Week

**ORDERING INFORMATION**

**TD354X(Z)-GV**

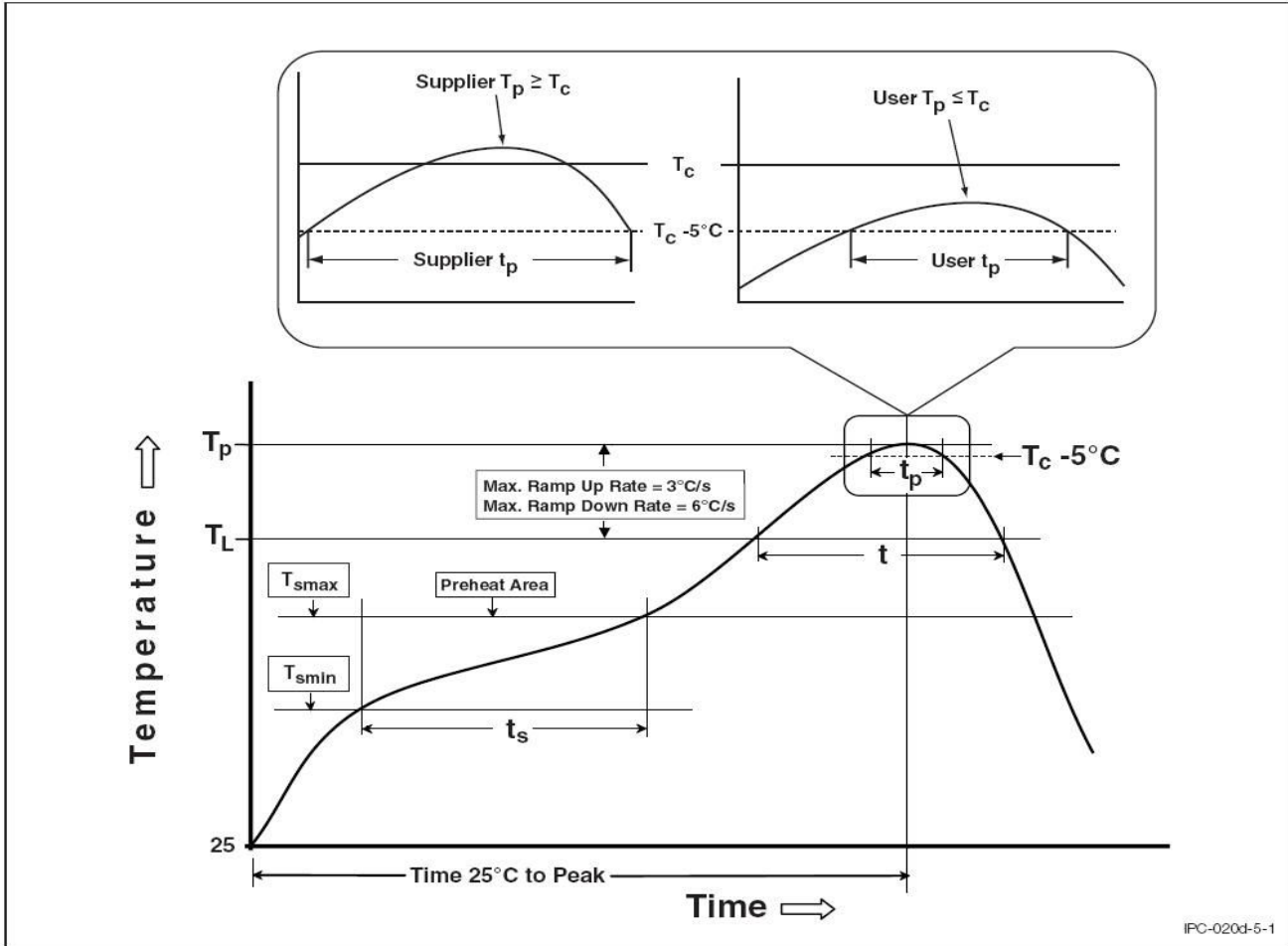
TD – Company Abbr.  
 354 – Part Number  
 X – Rank (A/B or None)  
 Z – Tape and Reel Option (T1/T2/T3/T4)  
 G – Green  
 V – VDE Option (V or None)

**PACKING QUANTITY**

Option	Description	Quantity
T1	Surface Mount Lead Forming – With Option 1 Taping	3000Units/Reel
T2	Surface Mount Lead Forming – With Option 2 Taping	3000Units/Reel
T3	Surface Mount Lead Forming – With Option 3 Taping	3000Units/Reel
T4	Surface Mount Lead Forming – With Option 4 Taping	3000Units/Reel

**REFLOW INFORMATION**

**REFLOW PROFILE**



IPC-020d-5-1

Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T <sub>smin</sub> )	100	150°C
Temperature Max. (T <sub>smax</sub> )	150	200°C
Time (t <sub>s</sub> ) from (T <sub>smin</sub> to T <sub>smax</sub> )	60-120 seconds	60-120 seconds
Ramp-up Rate (t <sub>L</sub> to t <sub>P</sub> )	3°C/second max.	3°C/second max.
Liquidous Temperature (T <sub>L</sub> )	183°C	217°C
Time (t <sub>L</sub> ) Maintained Above (T <sub>L</sub> )	60 – 150 seconds	60 – 150 seconds
Peak Body Package Temperature	235°C +0°C / -5°C	260°C +0°C / -5°C
Time (t <sub>P</sub> ) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate (T <sub>P</sub> to T <sub>L</sub> )	6°C/second max	6°C/second max
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.



### DISCLAIMER

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- Please contact LIGHTNING sales agent for special application request.
- Immerge unit's body in solder paste is not recommended.
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