



# CT3010, CT3011, CT3012 CT3020, CT3021, CT3022, CT3023 250V/400V Random Phase 6-Pin Phototriac Optocoupler

## Features

- High isolation 5000 VRMS
- Peak Breakdown Voltage
  - 250V – CT3010,3011,3012
  - 400V – CT3020,3021,3022,3023
- Temperature range - 55 °C to 100 °C
- Regulatory Approvals
  - UL - UL1577 (E364000)
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC – GB4943.1, GB8898
  - IEC60065, IEC60950

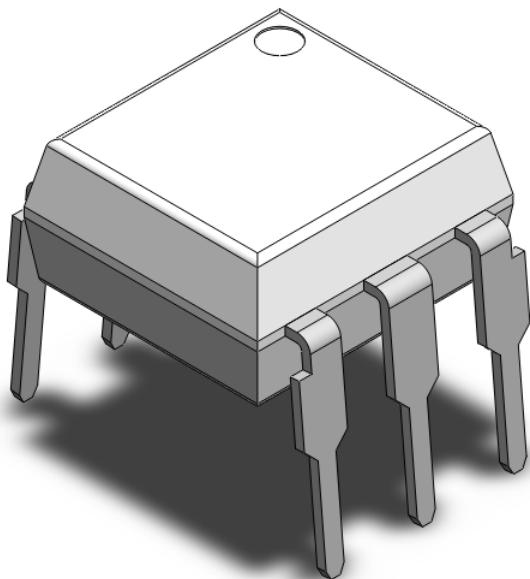
## Applications

- Motor Controls
- Lamp ballasts
- Static AC Power Switch
- Solenoid/ Valve Control

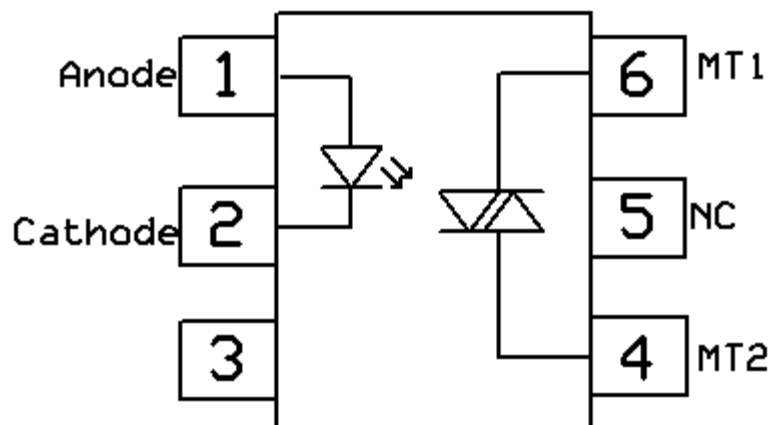
## Description

The CT3010, CT3011, CT3012, CT3020, CT3021, CT3022 and CT3023 consists of a Random Phase Photo Triac optically coupled to a gallium arsenide Infrared-emitting diode in a 6-lead DIP package with different lead forming options.

## Package Outline



## Schematic



Note: Different lead forming options available. See package dimension.



**CT3010, CT3011, CT3012**  
**CT3020, CT3021, CT3022, CT3023**  
**250V/400V Random Phase 6-Pin Phototriac Optocoupler**

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**Absolute Maximum Rating at 25°C**

<b>Symbol</b>	<b>Parameters</b>	<b>Ratings</b>	<b>Units</b>	<b>Notes</b>
V <sub>ISO</sub>	Isolation voltage	5000	V <sub>RMS</sub>	
T <sub>OPR</sub>	Operating temperature	-55 ~ +100	°C	
T <sub>STG</sub>	Storage temperature	-55 ~ +150	°C	
T <sub>SOL</sub>	Soldering temperature	260	°C	
<b>Emitter</b>				
I <sub>F</sub>	Forward current	60	mA	
I <sub>F(TRANS)</sub>	Peak transient current (≤1μs P.W,300pps)	1	A	
V <sub>R</sub>	Reverse voltage	6	V	
P <sub>D</sub>	Power dissipation	100	mW	
<b>Detector</b>				
P <sub>D</sub>	Power dissipation	300	mW	
V <sub>DRM</sub>	Off-State Output Terminal Voltage	CT3010,3011,3012	250	V
		CT3020,3021,3022,3023	400	V
I <sub>TSM</sub>	Peak Repetitive Surge Current	1	A	



# CT3010, CT3011, CT3012 CT3020, CT3021, CT3022, CT3023

## 250V/400V Random Phase 6-Pin Phototriac Optocoupler

### Electrical Characteristics $T_A = 25^\circ\text{C}$ (unless otherwise specified)

#### Emitter Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$V_F$	Forward voltage	$I_F = 10\text{mA}$	-	-	1.5	V	
$I_R$	Reverse Current	$V_R = 6\text{V}$	-	-	5	$\mu\text{A}$	
$C_{IN}$	Input Capacitance	$f = 1\text{MHz}$	-	45	-	pF	

#### Detector Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$I_{DRM}$	Peak Blocking Current	$I_F = 0\text{mA}$ , $V_{DRM} = \text{Rated } V_{DRM}$	-	-	100	nA	
$V_{TM}$	Peak On-State Voltage	$I_F = \text{Rated } I_{FT}$ , $I_{TM} = 100\text{mA}$	-	-	2.5	V	
dv/dt	Critical Rate of Rise off-State Voltage	$V_{PEAK} = \text{Rated } V_{DRM}$	-	100	-	V/ $\mu\text{s}$	

#### Transfer Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$I_{FT}$	Input Trigger Current	CT3020	Terminal Voltage = 3V	-	-	30	mA
		CT3010, CT3021		-	-	15	
		CT3011, CT3022		-	-	10	
		CT3012, CT3023		-	-	5	
$I_H$	Holding Current		-	250	-	$\mu\text{A}$	
$R_{IO}$	Isolation Resistance	$V_{IO} = 500\text{V}_{DC}$	$1 \times 10^{11}$	-	-		
$C_{IO}$	Isolation Capacitance	$f = 1\text{MHz}$	-	0.25	-	pF	



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## Typical Characteristic Curve

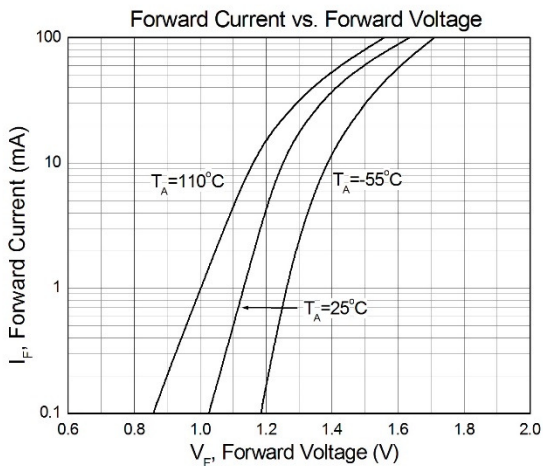


Figure 1

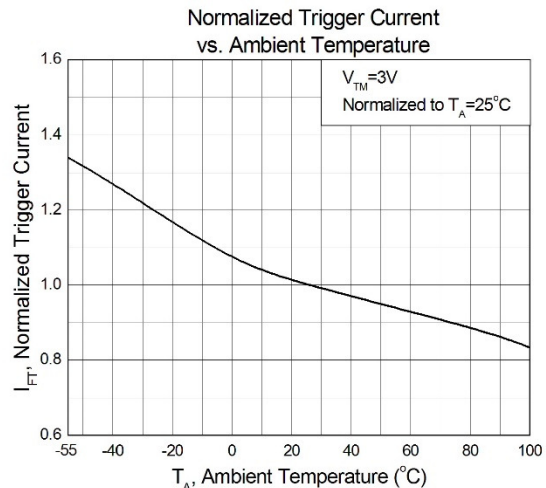


Figure 2

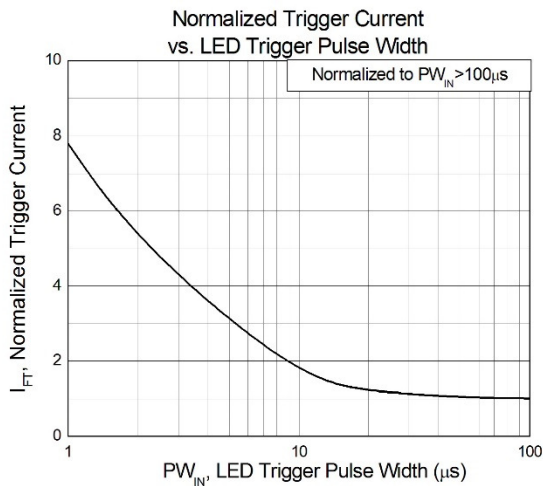


Figure 3

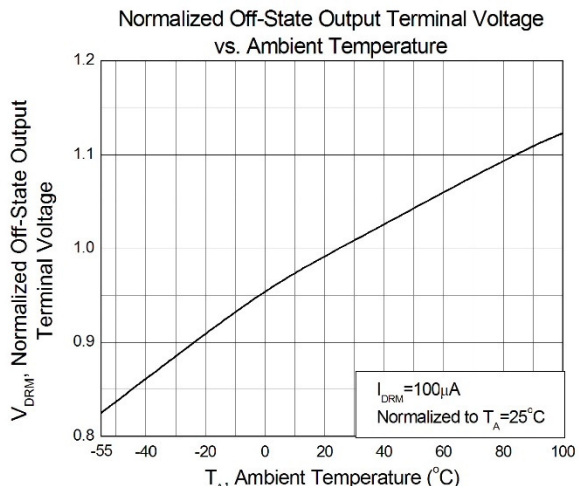


Figure 4

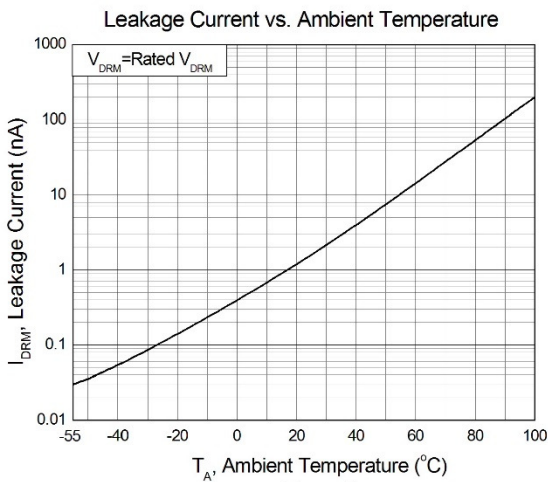


Figure 5

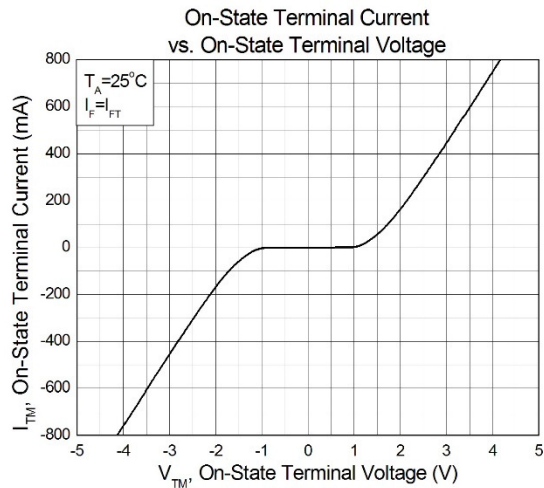
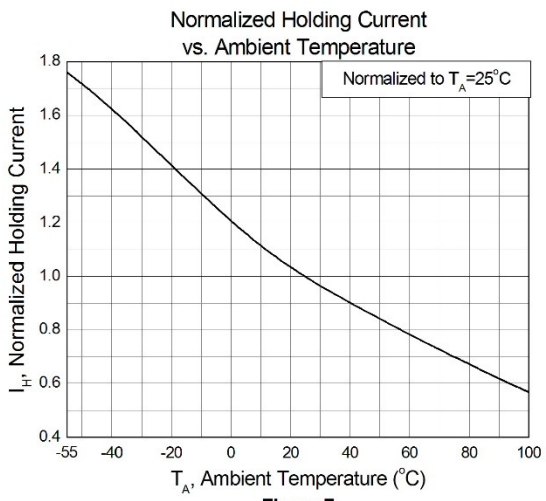


Figure 6



# CT3010, CT3011, CT3012 CT3020, CT3021, CT3022, CT3023 250V/400V Random Phase 6-Pin Phototriac Optocoupler

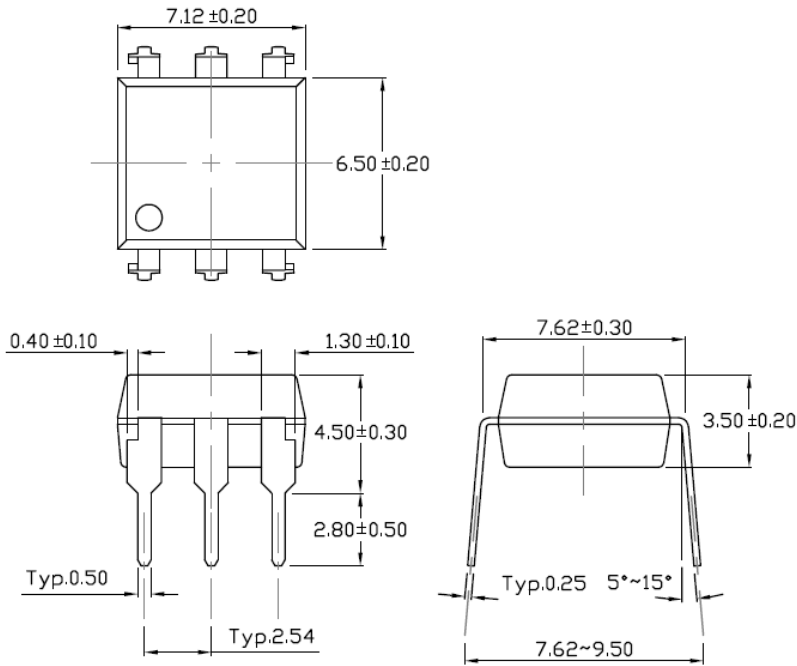




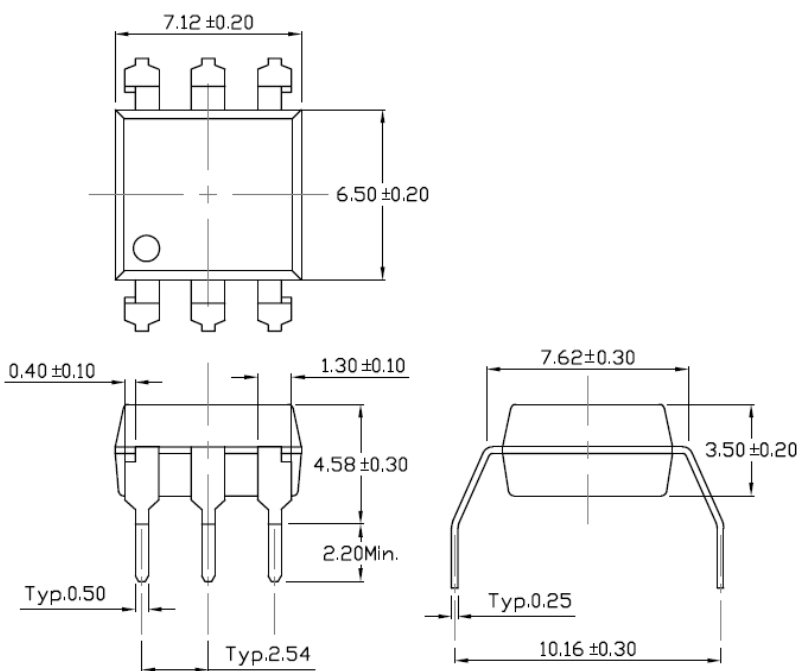
# CT3010, CT3011, CT3012 CT3020, CT3021, CT3022, CT3023 250V/400V Random Phase 6-Pin Phototriac Optocoupler

## Package Dimension *Dimensions in mm unless otherwise stated*

### Standard DIP – Through Hole



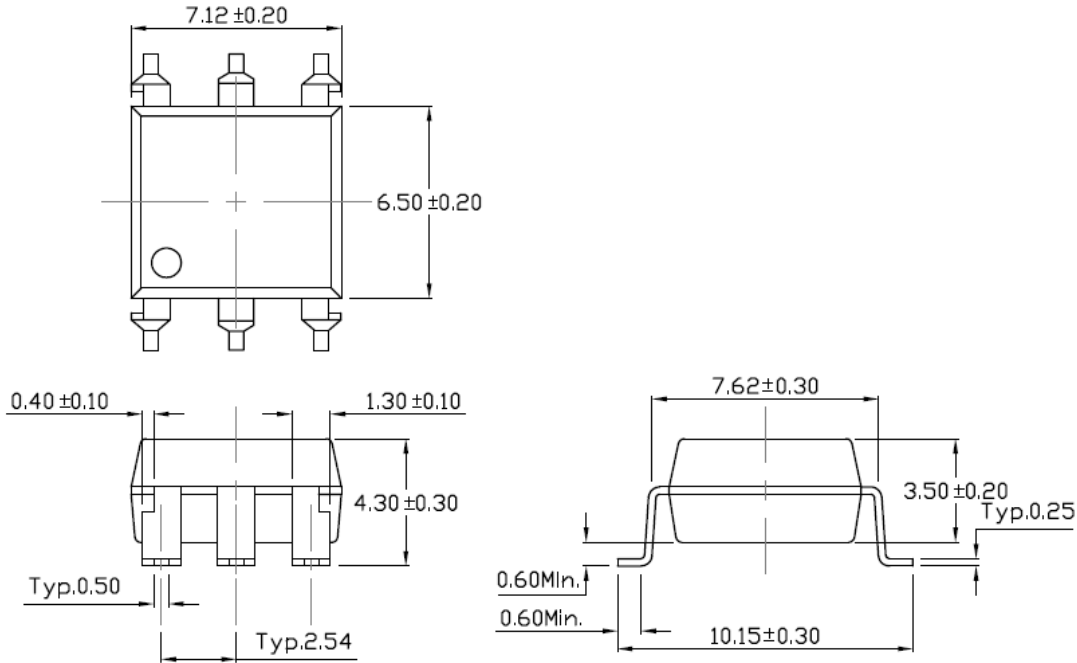
### Wide Lead Forming – Through Hole (M Type)



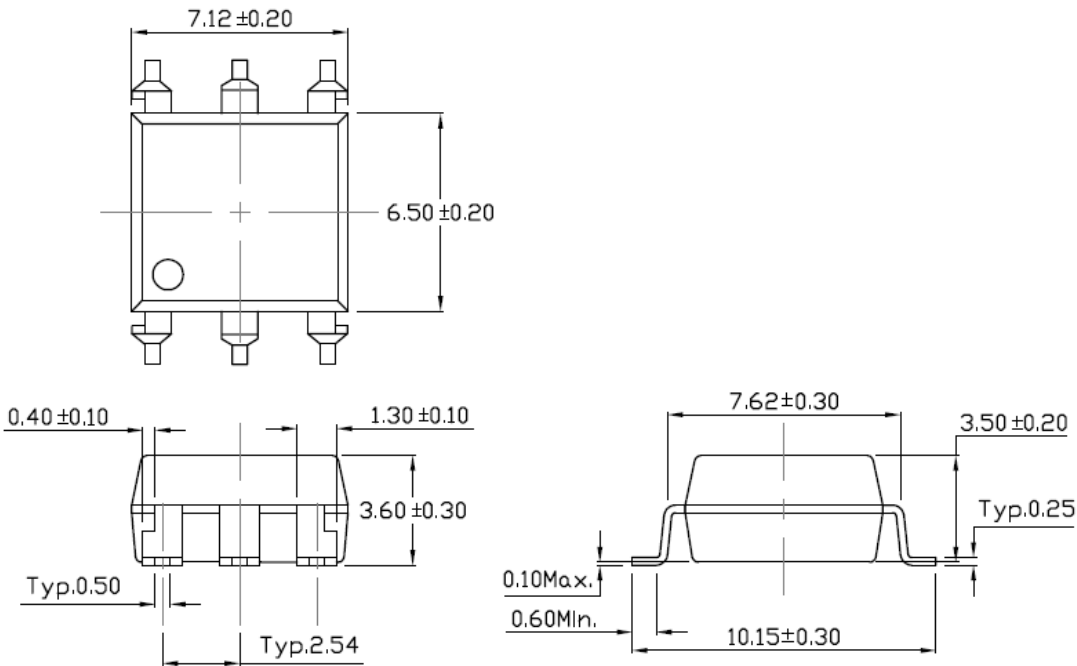


**CT3010, CT3011, CT3012**  
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**Surface Mount Forming (S Type)**



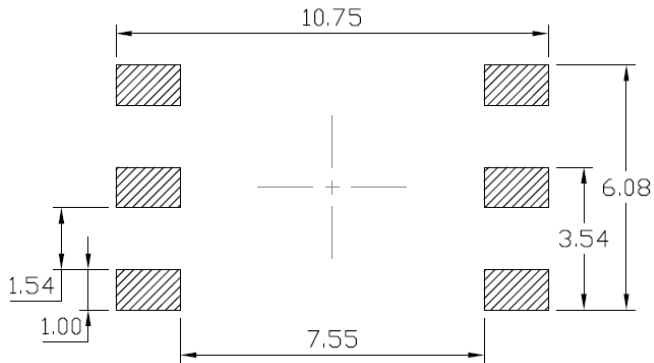
**Surface Mount Forming (Low Profile) (SL Type)**



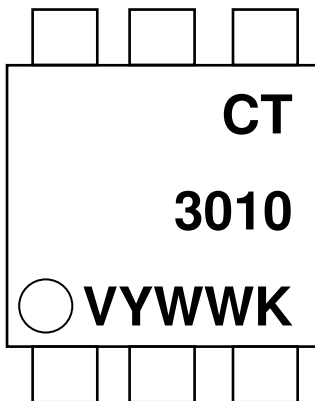


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**Recommended Solder Mask** *Dimensions in mm unless otherwise stated*



**Marking Information**



**Note:**

- CT : Denotes "CT Micro"
- 3010 : Part Number
- V : VDE Option
- Y : Fiscal Year
- WW : Work Week
- K : Manufacturing Code





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## Ordering Information

CT301X(Y)(Z)-G, CT302X(Y)(Z)-G

X = Part No. (CT301X:0,1,2), (CT302X : 0,1,2,3)

Y = Lead form option (S, SL, M or none)

Z = Tape and reel option (T1, T2 or none)

G= Material option (G: Green, None: Non-green)

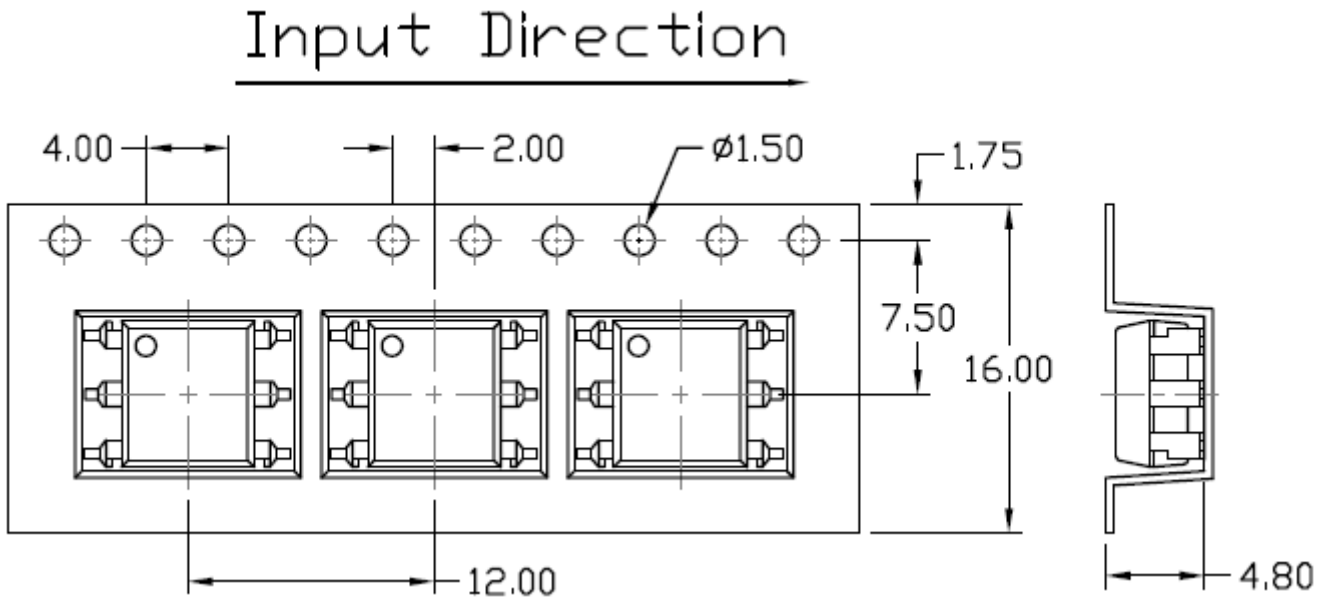
<b>Option</b>	<b>Description</b>	<b>Quantity</b>
None	Standard 6 Pin Dip	50Units/Tube
M	Gullwing (400mil) Lead Forming	50Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1000 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1000 Units/Reel
SL(T1)	Surface Mount (Low Profile) Lead Forming – With Option 1 Taping	1000 Units/Reel
SL(T2)	Surface Mount (Low Profile) Lead Forming – With Option 2 Taping	1000 Units/Reel



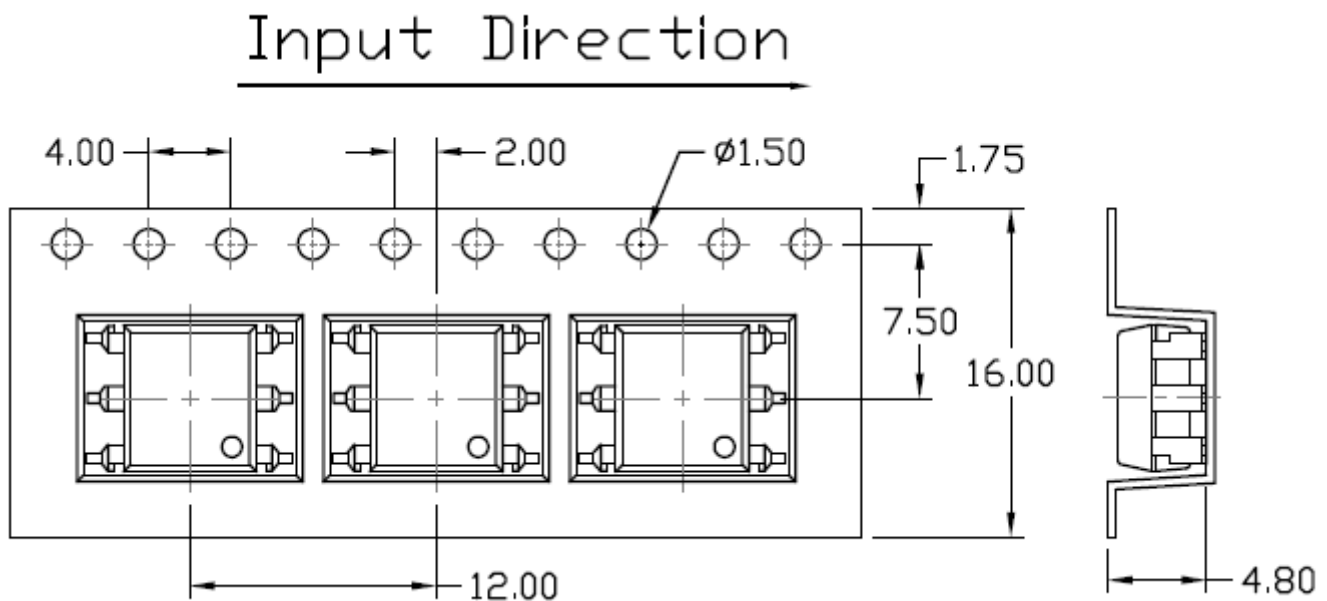
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**Carrier Tape Specifications** *Dimensions in mm unless otherwise stated*

**Option S(T1) & SL(T1)**



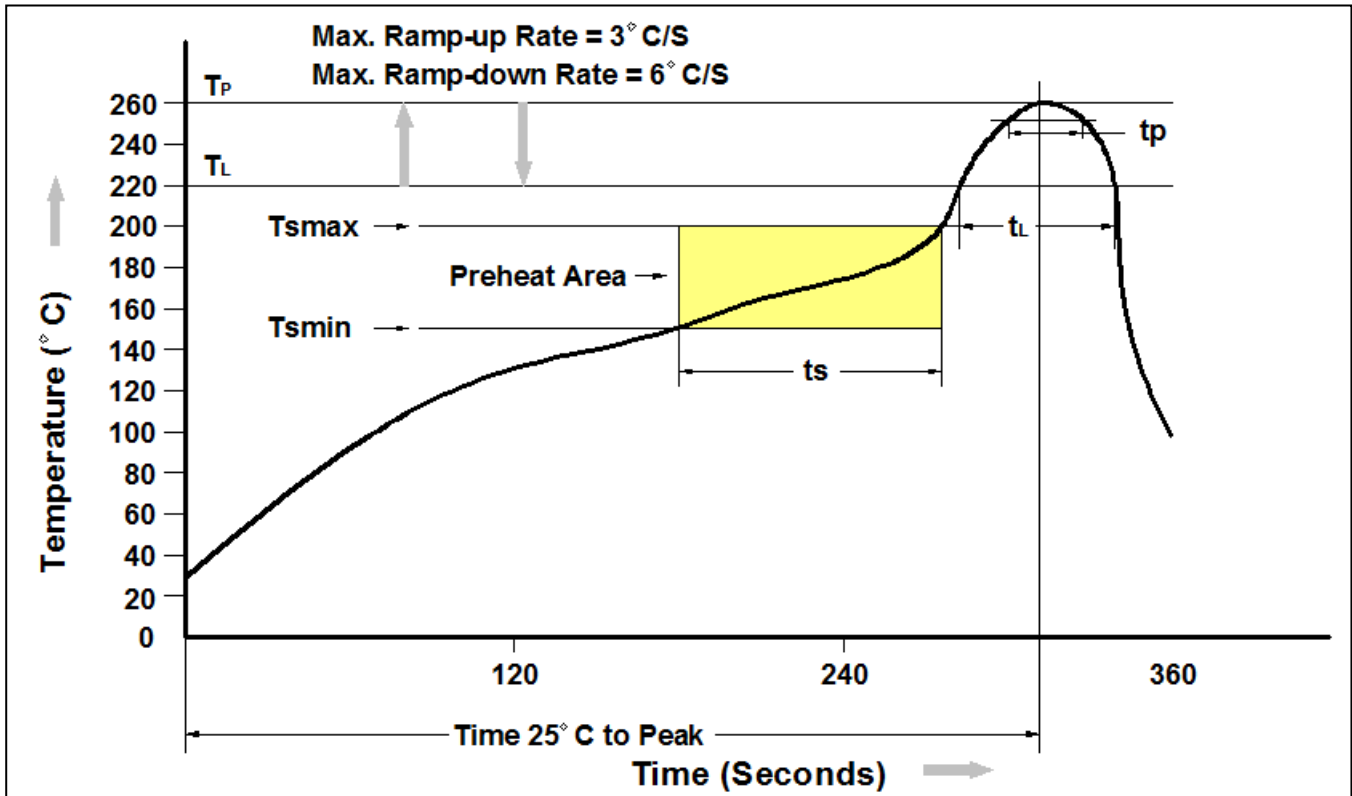
**Option S(T2) & SL(T2)**





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**Reflow Profile**



Profile Feature	Pb-Free Assembly Profile
Temperature Min. ( $T_{smin}$ )	150°C
Temperature Max. ( $T_{smax}$ )	200°C
Time ( $t_s$ ) from ( $T_{smin}$ to $T_{smax}$ )	60-120 seconds
Ramp-up Rate ( $t_L$ to $t_P$ )	3°C/second max.
Liquidous Temperature ( $T_L$ )	217°C
Time ( $t_L$ ) Maintained Above ( $T_L$ )	60 – 150 seconds
Peak Body Package Temperature	260°C +0°C / -5°C
Time ( $t_P$ ) within 5°C of 260°C	30 seconds
Ramp-down Rate ( $T_P$ to $T_L$ )	6°C/second max
Time 25°C to Peak Temperature	8 minutes max.



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