



CT3010-4L, CT3011-4L, CT3012-4L CT3020-4L, CT3021-4L, CT3022-4L, CT3023-4L 250V/400V Random Phase 4-Pin DMC-Isolator® Phototriac Optocoupler

Features

- High isolation 5000 VRMS
- Patented coplanar structure DMC-Isolator®
- Peak Breakdown Voltage
 - 250V – CT3010-4L, CT3011-4L, CT3012-4L
 - 400V – CT3020-4L, CT3021-4L, CT3022-4L, CT3023-4L
- Operating Temperature range - 55 °C to 100 °C
- External Creepage ≥ 7.4mm
- Distance Through Isolation ≥ 0.4mm
- Clearance Distance ≥ 7.5mm (S/SL Type)
- Clearance Distance ≥ 8.0mm (M Type)
- RoHS and REACH Compliance
- Halogen Free Compliance (Optional)
- MSL class 1
- Regulatory Approvals
 - ✓ UL - UL1577 (E364000)
 - ✓ VDE - EN60747-5-5 (40039590)
 - ✓ CQC – GB4943.1, GB8898 (14001104781)
 - ✓ IEC62368 (FI/41119)

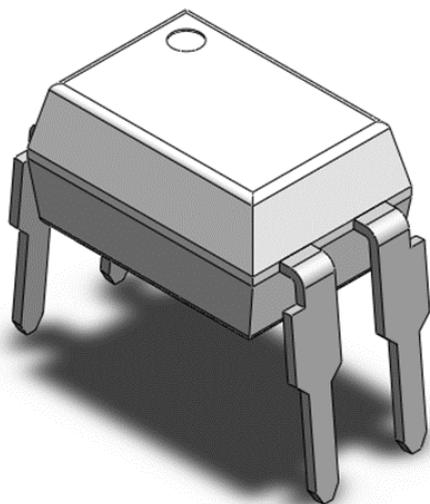
Description

The CT3010-4L, CT3011-4L, CT3012-4L, CT3020-4L, CT3021-4L, CT3022-4L and CT3023-4L series consists of a Random Phase Photo Triac optically coupled to an Infrared-emitting diode in a 4-lead DIP package DMC-Isolator® with different lead forming options.

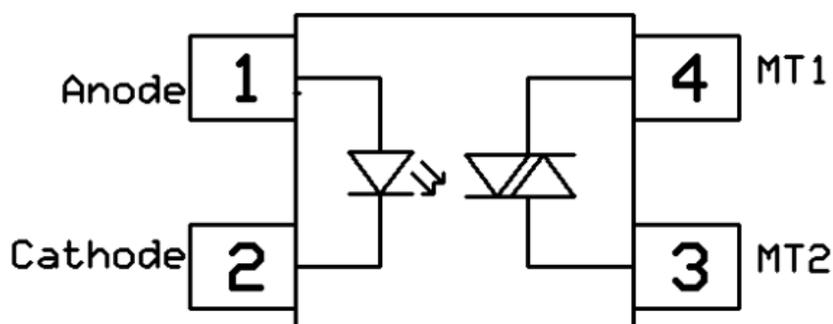
Applications

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

Package Outline



Schematic



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



CT3010-4L, CT3011-4L, CT3012-4L
CT3020-4L, CT3021-4L, CT3022-4L, CT3023-4L
250V/400V Random Phase 4-Pin DMC-Isolator®
Phototriac Optocoupler

Absolute Maximum Ratings $T_A = 25^{\circ}\text{C}$, unless otherwise specified

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameters		Ratings	Units	Notes
V _{ISO}	Isolation voltage (AC, 1 minute, 40 ~ 60% R.H.)		5000	V _{RMS}	
T _{OPR}	Operating temperature		-55 ~ +100	°C	
T _{STG}	Storage temperature		-55 ~ +150	°C	
T _{SOL}	Soldering temperature (For 10 seconds)		260	°C	
T _J	Junction temperature		115	°C	
Emitter					
I _F	Forward current		60	mA	
I _{F(TRANS)}	Peak transient current (≤1μs P.W,300pps)		1	A	
V _R	Reverse voltage		6	V	
P _D	Power dissipation		100	mW	
Detector					
P _D	Power dissipation		300	mW	
V _{DRM}	Off-State Output	CT3010-4L,3011-4L,3012-4L	250	V	
	Terminal Voltage	CT3020-4L,3021-4L,3022-4L,3023-4L	400	V	
I _{TM}	RMS on-state current		100	mA	
I _{TSM}	Peak Repetitive Surge Current		1	A	



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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	μA	
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	-	$\text{V}/\mu\text{s}$	

Transfer Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
I_{FT}	Input Trigger Current	CT3020-4L	Terminal Voltage = 3V $I_{TM} = 100\text{mA}$	-	-	30	mA
		CT3010-4L, CT3021-4L		-	-	15	
		CT3011-4L, CT3022-4L		-	-	10	
		CT3012-4L, CT3023-4L		-	-	5	
I_H	Holding Current	Terminal Voltage from "ON" to "OFF" "ON" state $I_F = 0\text{mA}$	-	250	-	μA	
R_{IO}	Isolation Resistance	$V_{IO} = 500\text{V}_{DC}$, 40 ~ 60% R.H.	1×10^{11}	-	-	Ω	
C_{IO}	Isolation Capacitance	$f = 1\text{MHz}$	-	0.25	-	pF	



Typical Characteristic Curves $T_A = 25^\circ\text{C}$, unless otherwise specified

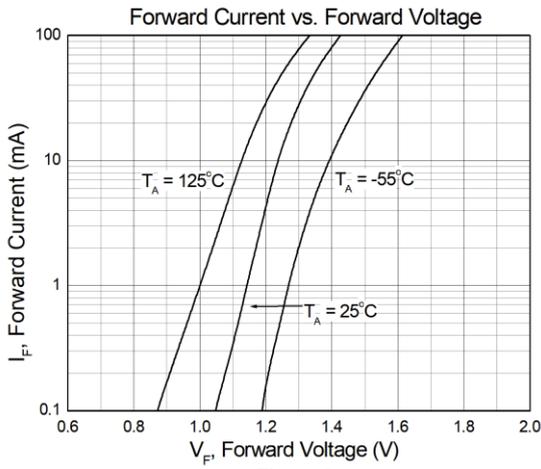


Figure 1

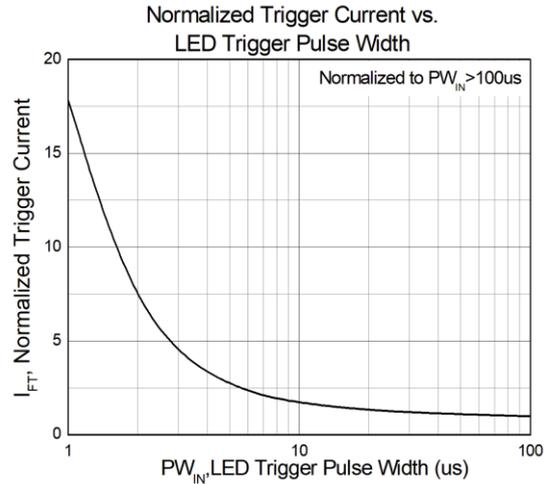


Figure 2

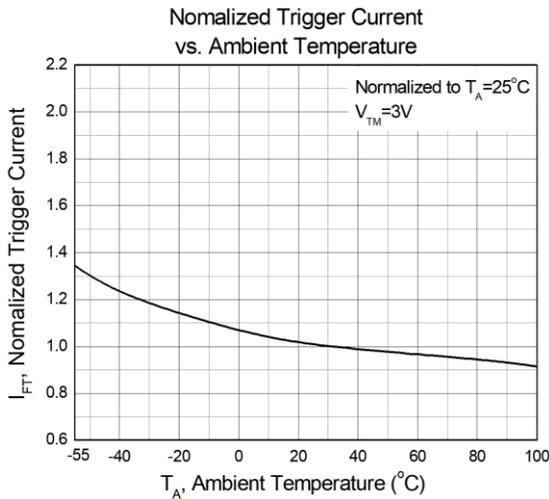


Figure 3

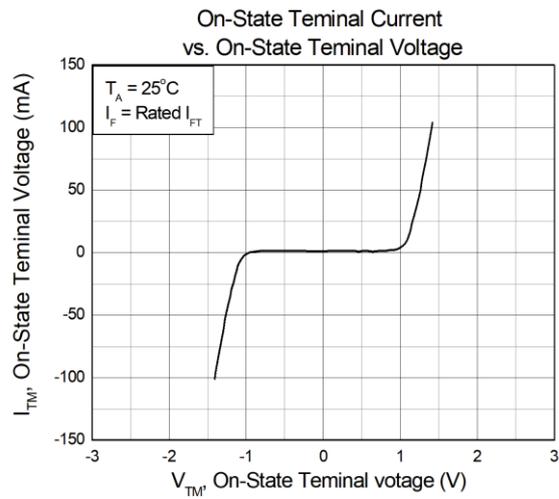


Figure 4

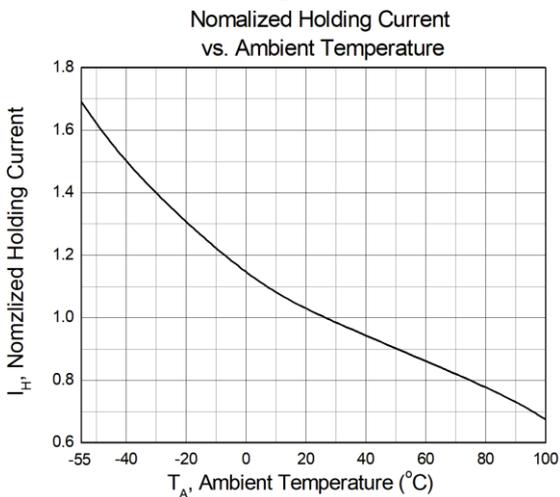


Figure 5

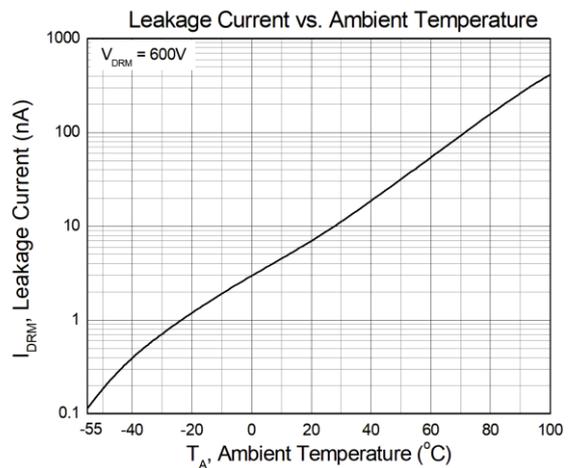


Figure 6



Typical Characteristic Curves $T_A = 25^\circ\text{C}$, unless otherwise specified

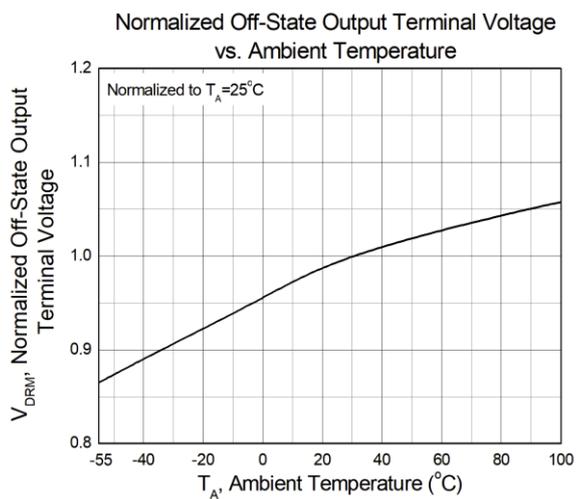


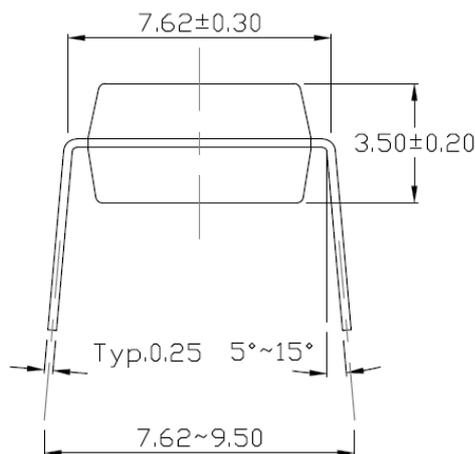
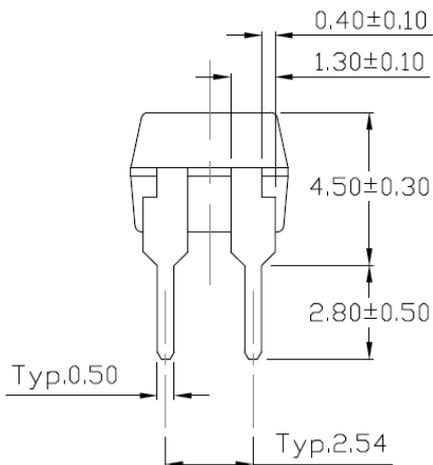
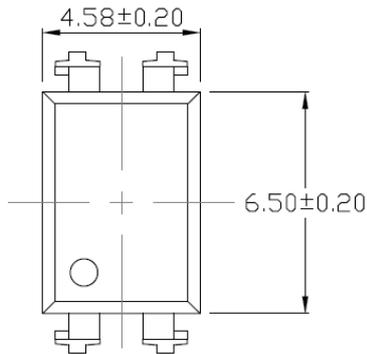
Figure 7



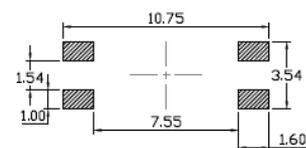
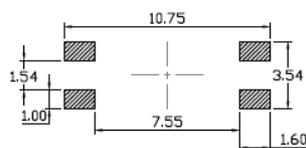
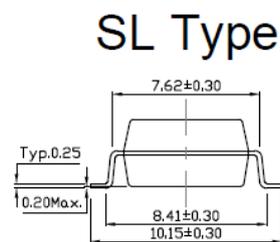
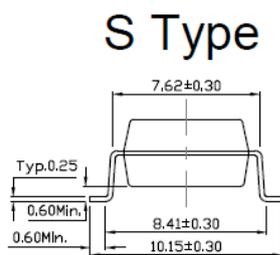
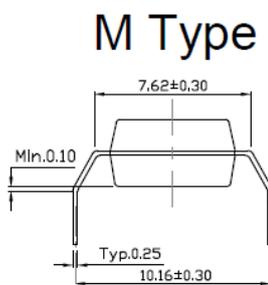
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 CT3020-4L, CT3021-4L, CT3022-4L, CT3023-4L
 250V/400V Random Phase 4-Pin DMC-Isolator®
 Phototriac Optocoupler

Package Dimension *Dimensions in mm unless otherwise stated*



Forming Option *Dimensions in mm unless otherwise stated*





Marking Information



Note:

- CT : Denotes “CT Micro”
- 3010 : Part Number
- V : VDE Safety Mark Option (Blank or V)
- Y : One Digit Year Code
- WW : Two Digit Work Week
- K : Manufacturing Code

Ordering Information

CT301X(V)(Y)(Z) -4L-G, CT302X(V)(Y)(Z) -4L-G

- CT = Denotes “CT Micro”
- 301X = Part Numbers (Current Ration Option X=0, 1 or 2)
- 302X = Part Numbers (Current Ration Option X=0, 1, 2 or 3)
- V = VDE Safety Mark Option (Blank or V)
- Y = Lead Form Option (S, SL, M or Blank)
- Z = Tape and Reel Option (Blank, T1, T2, T3 or T4)
- 4L = 4-Lead DIP Package
- G = Material Option (G: Halogen Free, Blank: Non-Halogen Free)

Option	Description	Quantity
None	Standard 4 Pin DIP	100 Units/Tube
M	Gullwing (400mil) Lead Forming	100 Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1500 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1500 Units/Reel
SL(T1)	Surface Mount (Low Profile) Lead Forming– With Option 1 Taping	1500 Units/Reel
SL(T2)	Surface Mount (Low Profile) Lead Forming – With Option 2 Taping	1500 Units/Reel

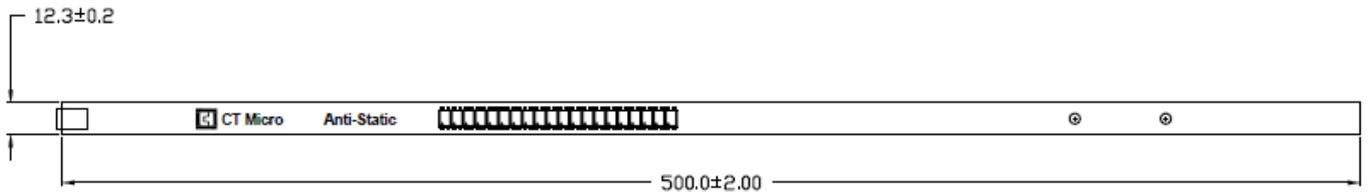


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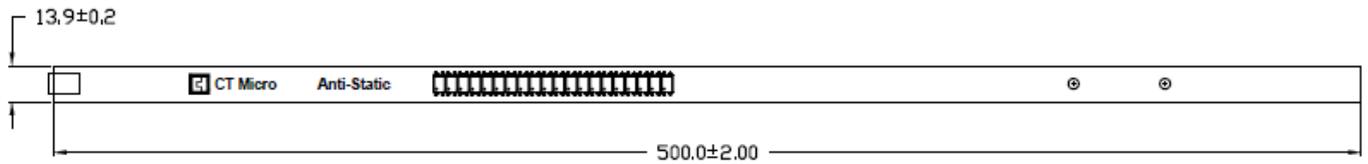
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Carrier Specifications *Dimensions in mm unless otherwise stated*

Tube Option Standard DIP

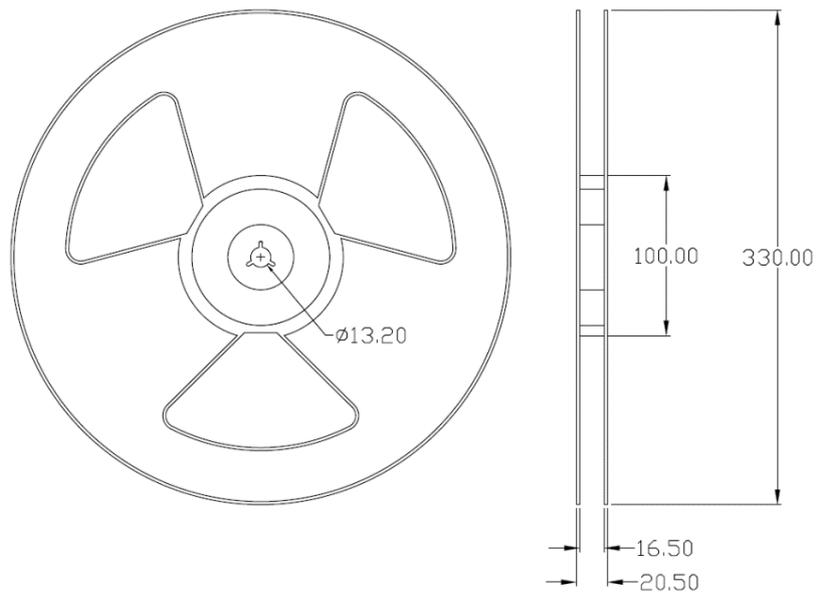


Tube Option M Type



Reel Dimension *All dimensions are in mm, unless otherwise stated*

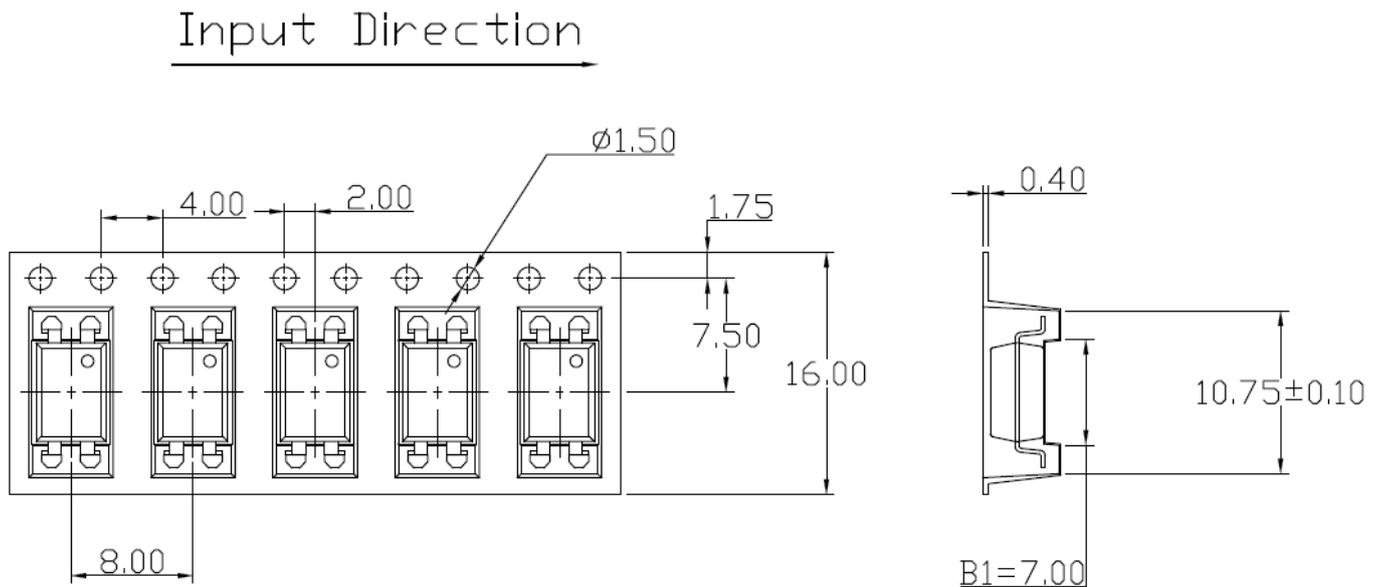
Option S(T1/T2) & SL(T1/T2)



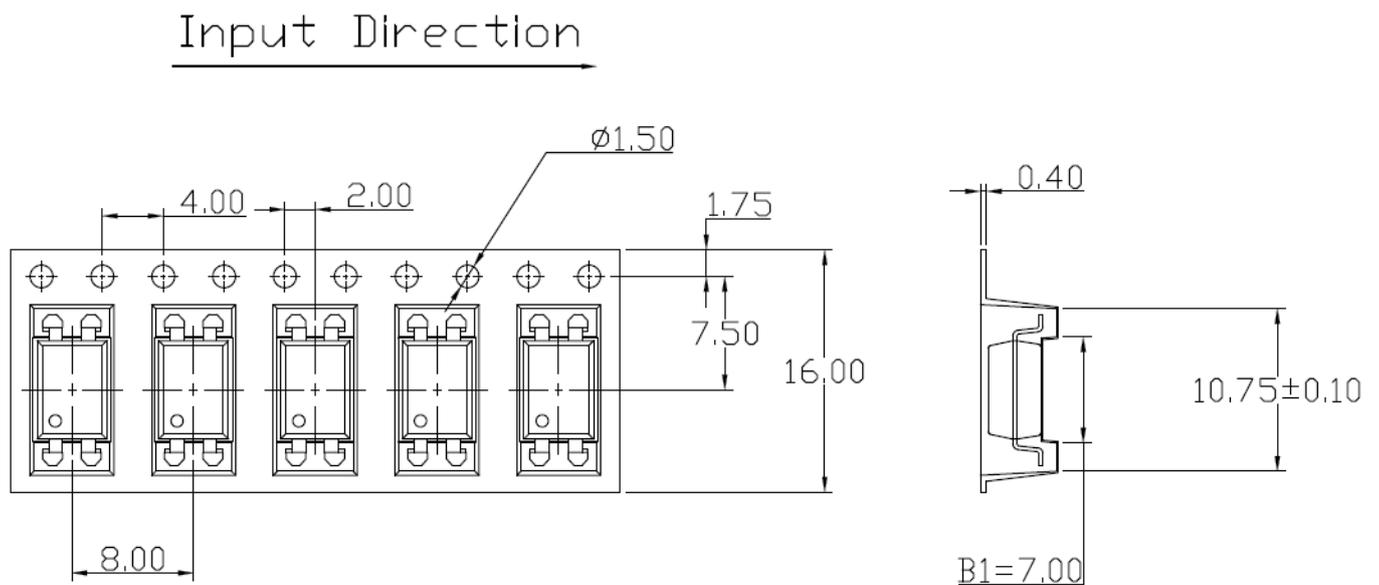


Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

Option S(T1) & SL(T1)



Option S(T2) & SL(T2)





Solderability spec (Follow the JEDEC standard JESD22-B102)

Reflow Soldering: Immersed surface, other than the end of pin as cut-surface, must be covered by solder.

Solder-Bath: More than 95% of the electrode must be covered with solder.

Wave soldering (Follow the JEDEC standard JESD22-A111)

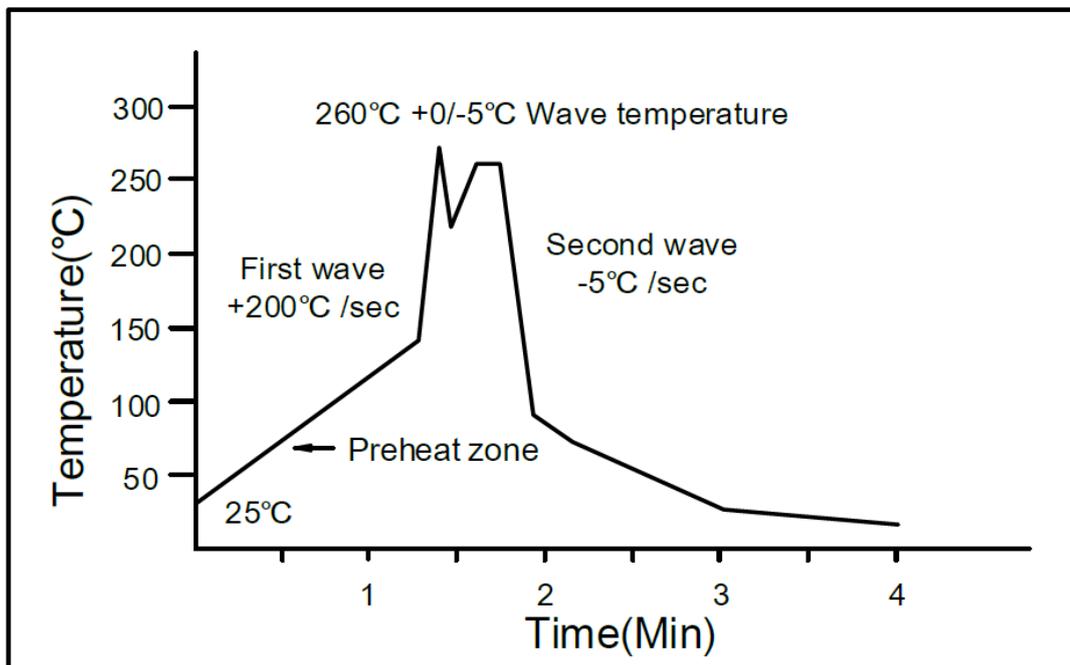
One time soldering is recommended within the condition of temperature.

Temperature: $260 \pm 0/-5^\circ\text{C}$.

Time: 10 sec.

Preheat temperature: 25 to 140°C .

Preheat time: 30 to 80 sec.



Iron soldering (Follow the standard MIL-STD 202G, Method 210F)

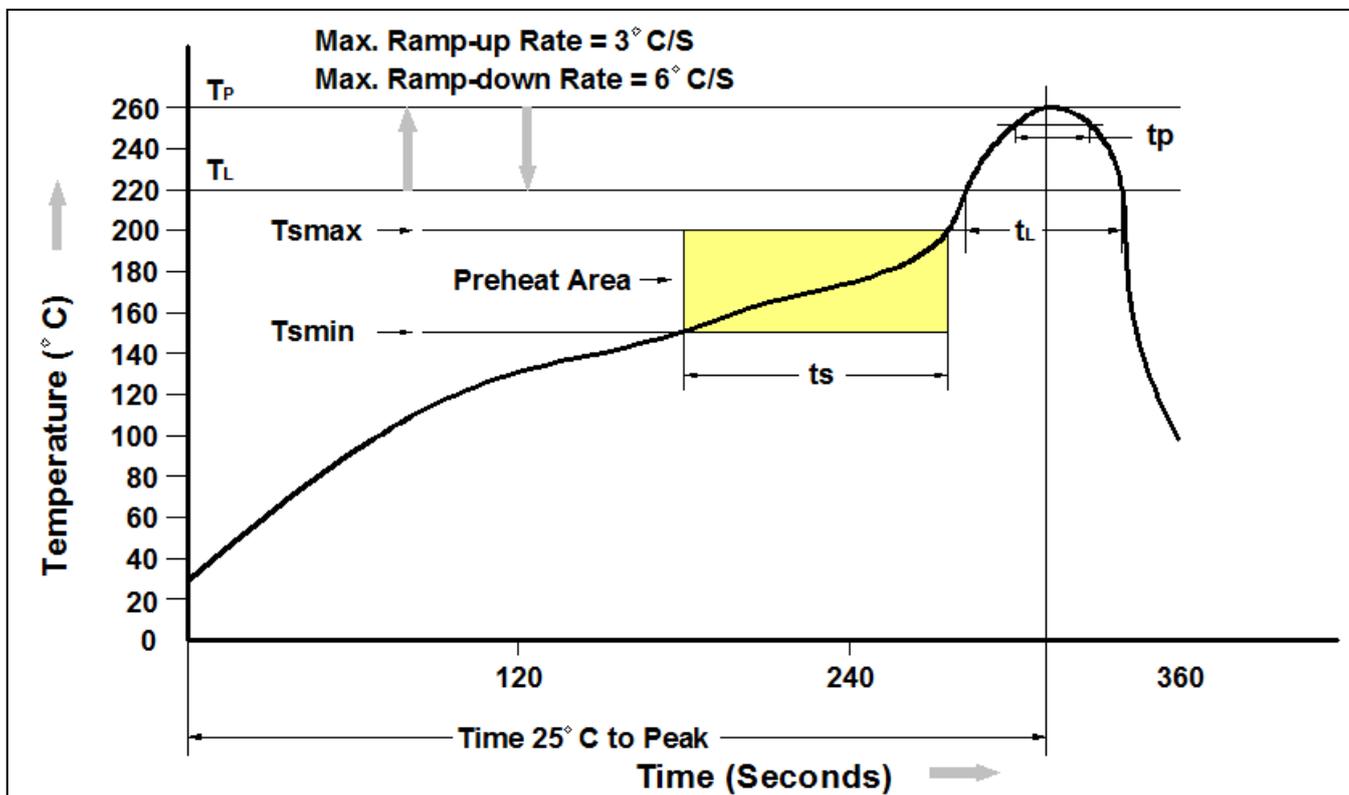
Allow single lead soldering in every single process.

One time soldering is recommended. Temperature: $350 \pm 10^\circ\text{C}$

Time: 5 sec max.



Reflow Profile (Follow the JEDEC standard J-STD-020)



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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