



CT1010-W, CT1011-W, CT1012-W, CT1013-W, CT1014-W CT1015-W, CT1016-W, CT1017-W, CT1018-W, CT1019-W DC Input 4-Pin LSOP DMC-Isolator® Phototransistor Optocoupler

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Features

- High isolation 5000 VRMS
- Patented coplanar structure DMC-Isolator®
- DC input with transistor output
- Operating Temperature range - 55 °C to 125 °C
- External creepage distance > 8.0 mm
- Clearance distance > 8.4mm
- Distances through insulation > 0.4 mm
- RoHS and REACH Compliance
- Halogen Free Compliance
- MSL class 1
- Regulatory Approvals
 - ✓ UL - UL1577 (E364000)
 - ✓ VDE - EN60747-5-5 (VDE0884-5)
 - ✓ CQC - GB4943.1, GB8898 (19001231775)
 - ✓ IEC62368 (FI/41119)

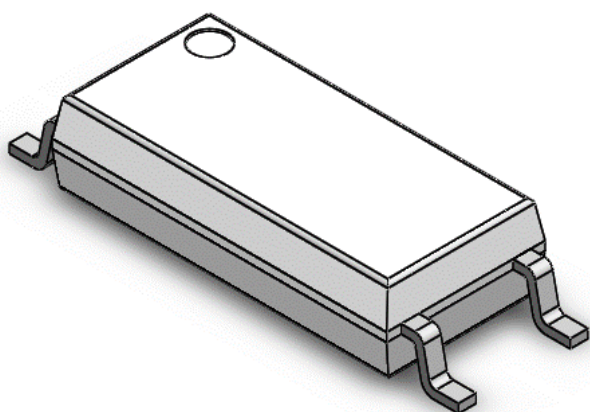
Description

The CT1010-W, CT1011-W, CT1012-W, CT1013-W, CT1014-W, CT1015-W, CT1016-W, CT1017-W, CT1018-W, CT1019-W consists of a photo transistor optically coupled to an Infrared-emitting diode in a 4-lead LSOP DMC-Isolator® Package.

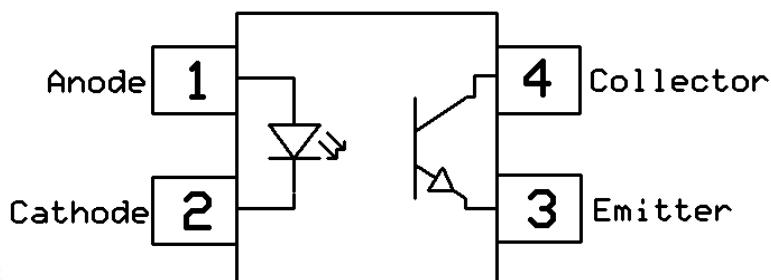
Applications

- Switch mode power supplies
- Computer peripheral interface
- Microprocessor system interface

Package Outline



Schematic





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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 ~ +125	$^{\circ}\text{C}$	
T_{STG}	Storage temperature	-55 ~ +150	$^{\circ}\text{C}$	
T_{SOL}	Soldering temperature (For 10 seconds)	260	$^{\circ}\text{C}$	
T_{J}	Junction temperature	125	$^{\circ}\text{C}$	
Emitter				
I_{F}	Forward current	50	mA	
$I_{\text{F(TRANS)}}$	Peak transient current ($\leq 1\mu\text{s}$ P.W, 300pps)	1	A	
V_{R}	Reverse voltage	6	V	
P_{D}	Power dissipation	85	mW	
Detector				
P_{C}	Power dissipation	150	mW	
B_{VCEO}	Collector-Emitter Breakdown Voltage	80	V	
B_{VECO}	Emitter-Collector Breakdown Voltage	7	V	
I_{C}	Collector Current	50	mA	



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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	$I_F = 10\text{mA}$	-	1.26	1.4	V	
		$I_F = 50\text{mA}$	-	1.42	1.5	V	
I_R	Reverse Current	$V_R = 6\text{V}$	-	-	5	μA	
C_{IN}	Input Capacitance	$f = 1\text{kHz}$	-	45	-	pF	

Detector Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$B_{V_{CEO}}$	Collector-Emitter Breakdown	$I_C = 100\mu\text{A}$	80	-	-	V	
$B_{V_{ECO}}$	Emitter-Collector Breakdown	$I_E = 100\mu\text{A}$	7	-	-	V	
I_{CEO}	Collector-Emitter Dark Current	$V_{CE} = 20\text{V}$, $I_F = 0\text{mA}$	-	-	100	nA	



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Transfer Characteristics

Symbol	Parameters		Test Conditions	Min	Typ	Max	Units	Notes
CTR	Current Transfer Ratio	CT1012-W	$I_F = 1\text{mA}$, $V_{CE} = 5\text{V}$	22	-	-	%	
		CT1013-W		34	-	-		
		CT1014-W		56	-	-		
		CT1011-W	$I_F = 10\text{mA}$, $V_{CE} = 5\text{V}$	60	-	300		
		CT1012-W		63	-	125		
		CT1013-W		100	-	200		
		CT1014-W		160	-	320		
		CT1010-W	$I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$	50	-	600		
		CT1015-W		50	-	150		
		CT1016-W		100	-	300		
		CT1017-W		80	-	160		
		CT1018-W		130	-	260		
		CT1019-W		200	-	400		
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage		$I_F = 10\text{mA}$, $I_C = 1\text{mA}$	-	-	0.4	V	
R_{IO}	Isolation Resistance		$V_{IO} = 500\text{V}_{DC}$	5×10^{10}	-	-	Ω	
C_{IO}	Isolation Capacitance		$f = 1\text{MHz}$	-	-	1	pF	

Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
T_{ON}	Turn On Time	$I_C = 5\text{mA}$, $V_{CE} = 5\text{V}$, $R_L = 100\Omega$	-	4.8	22	μs	
T_{OFF}	Turn Off Time		-	4.2	22		
t_r	Rise Time		-	2.7	18		
t_f	Fall Time		-	4	18		



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

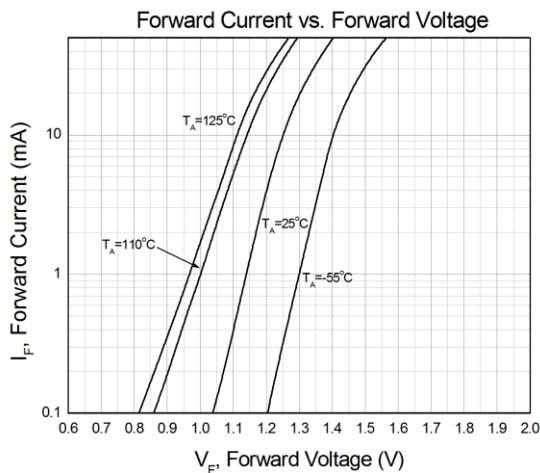


Figure 1

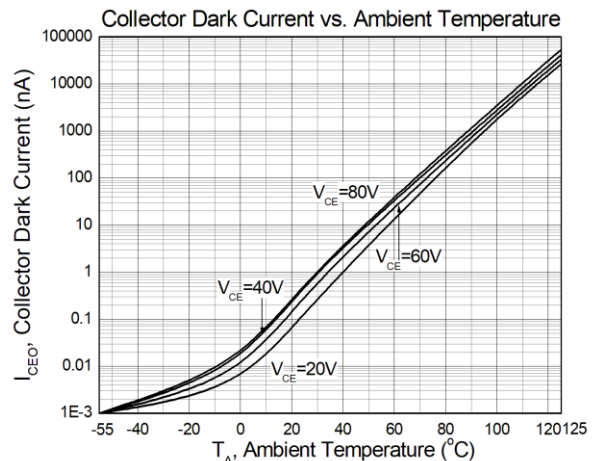


Figure 2

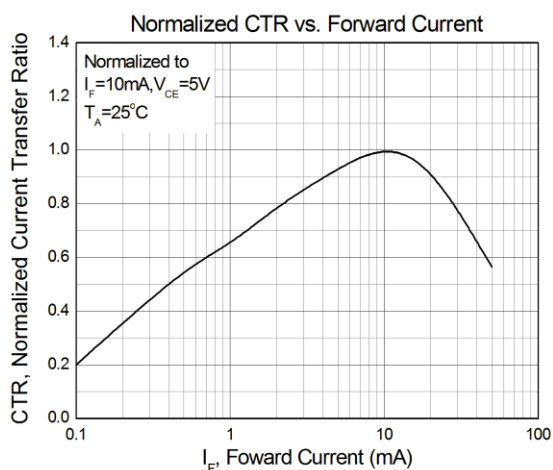


Figure 3

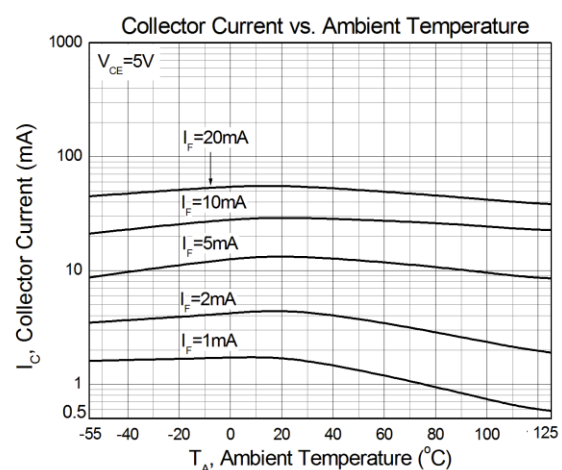


Figure 4

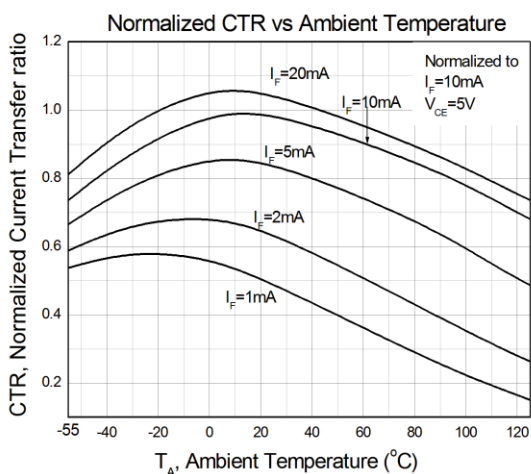


Figure 5

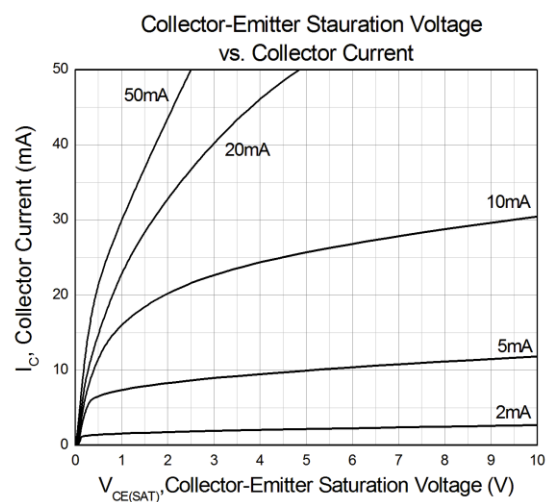


Figure 6



CT1010-W, CT1011-W, CT1012-W, CT1013-W, CT1014-W CT1015-W, CT1016-W, CT1017-W, CT1018-W, CT1019-W DC Input 4-Pin LSOP DMC-Isolator® Phototransistor Optocoupler

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

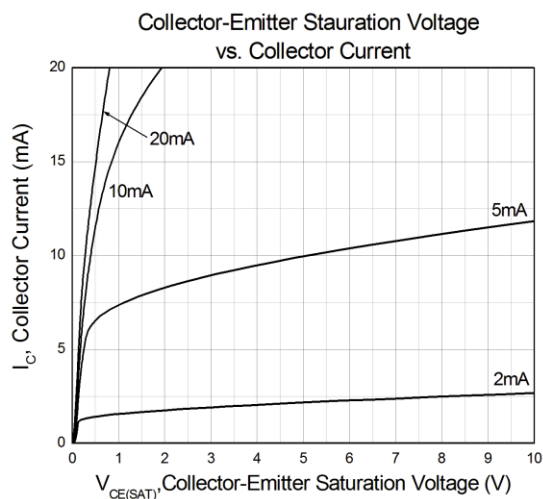


Figure 7

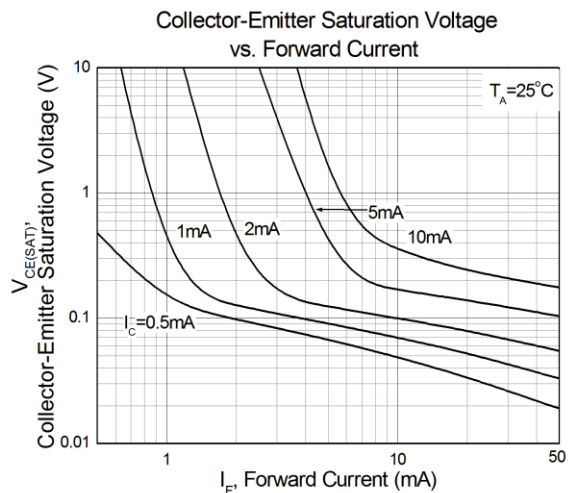


Figure 8

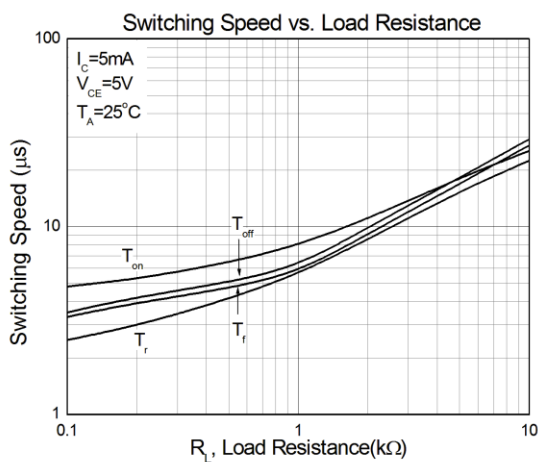


Figure 9

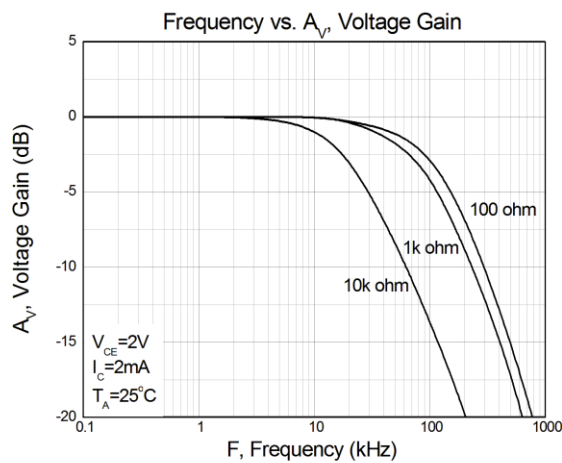


Figure 10



CT1010-W, CT1011-W, CT1012-W, CT1013-W, CT1014-W
CT1015-W, CT1016-W, CT1017-W, CT1018-W, CT1019-W
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Test Circuit

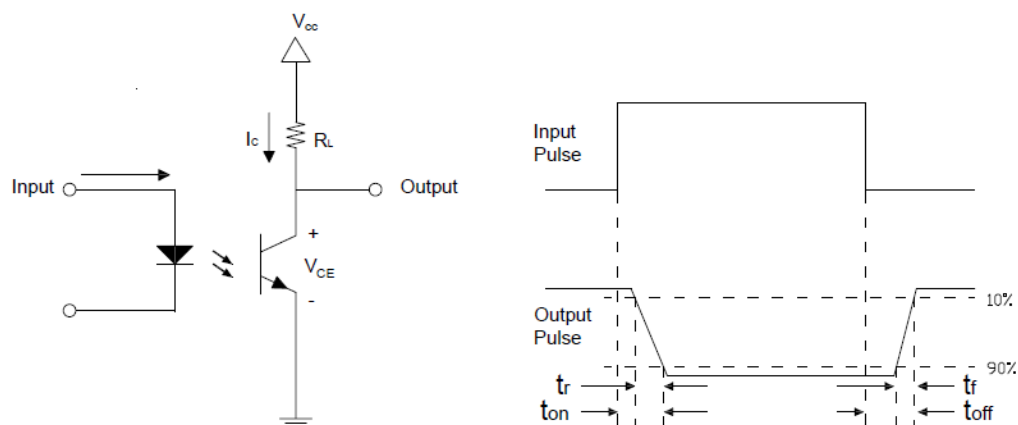


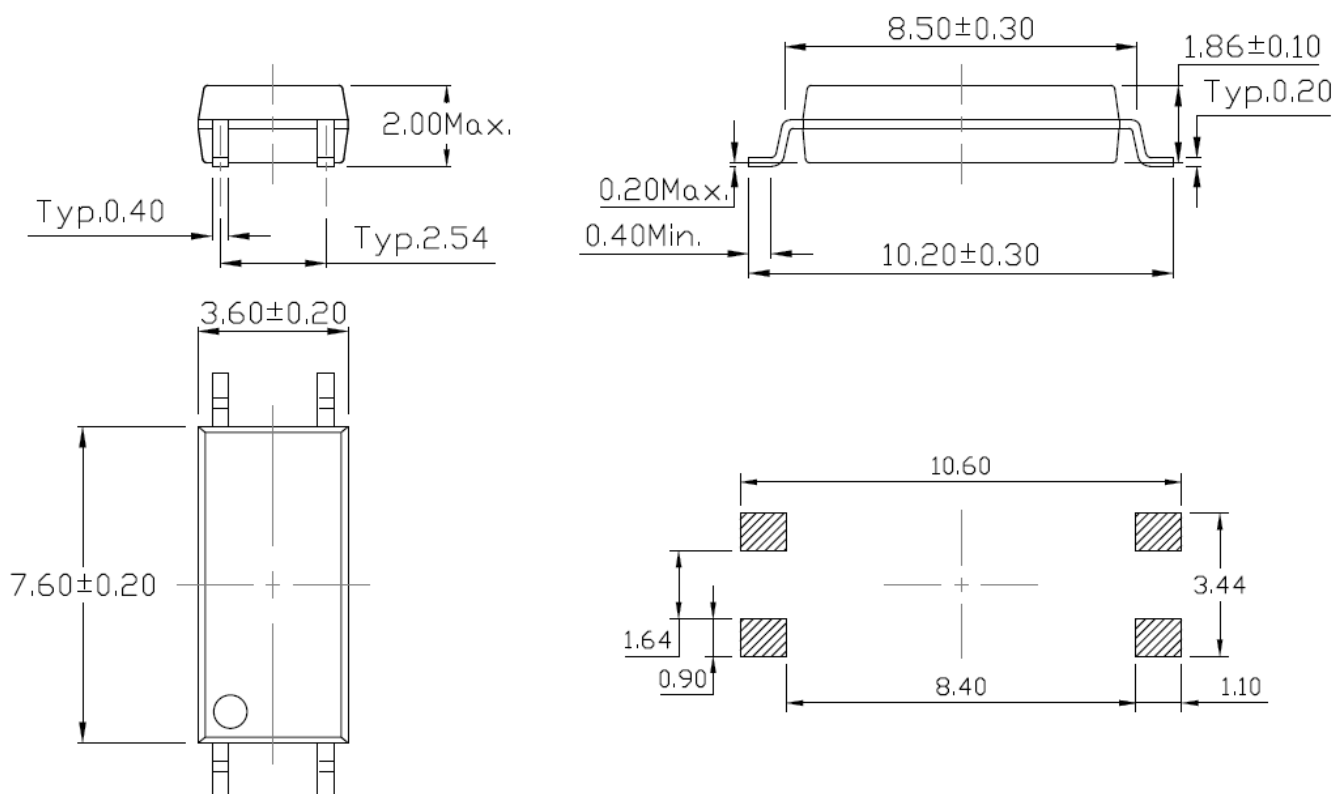
Figure 11: Switching Time Test Circuits



CT1010-W, CT1011-W, CT1012-W, CT1013-W, CT1014-W CT1015-W, CT1016-W, CT1017-W, CT1018-W, CT1019-W DC Input 4-Pin LSOP DMC-Isolator® Phototransistor Optocoupler

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Package Dimension *Dimensions in mm unless otherwise stated*



Marking Information



Note:

- CT : Denotes "CT Micro"
- 1011 : Part Number
- V : VDE Safety Mark Option (Blank or V)
- Y : One Digit Year Code
- WW : Two Digit Work Week
- K : Manufacturing Code
- : Lead Frame Material Option
(Blank : Copper ; • : Iron)



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Ordering Information

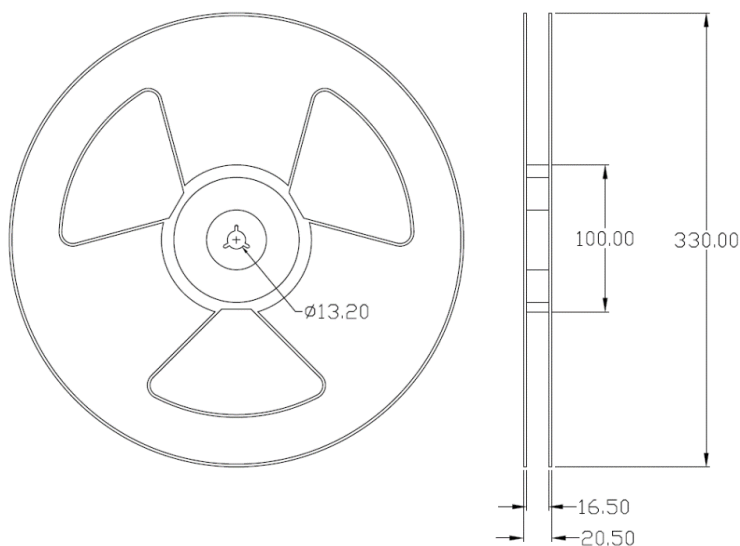
CT101X (V)(Z) -W-H

CT	= Denotes "CT Micro"
101X	= Part Numbers (X= 0,1,2,3,4,5,6,7,8,9)
V	= VDE Safety Mark Option (Blank or V)
Z	= Tape and Reel Option (Blank, T1 or T2)
W	= Outline Color (W, White)
H	= Lead frame option (H: Iron, None: Copper)

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

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

Option T1/T2



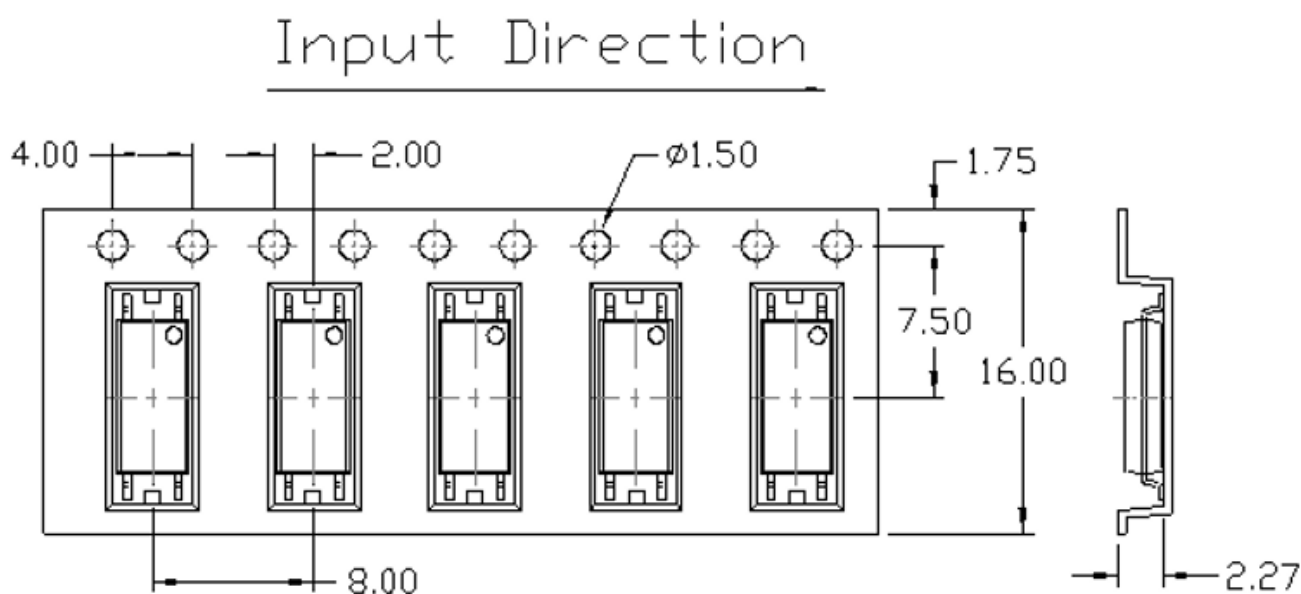


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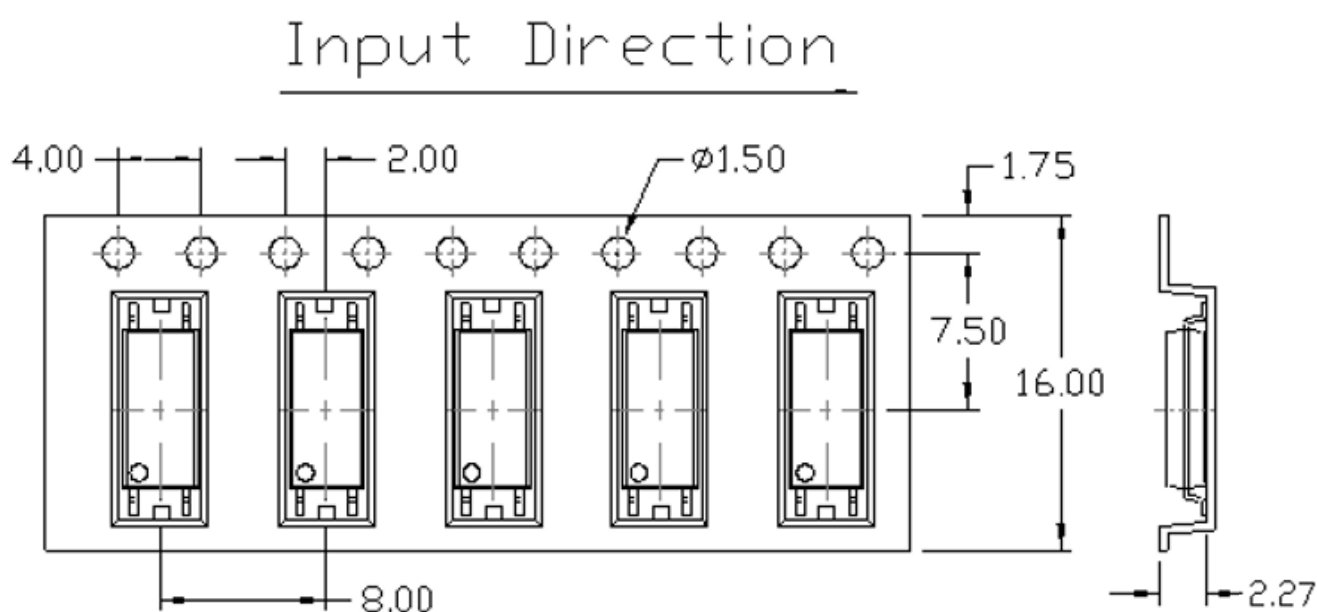
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Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

Option T1



Option T2





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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)

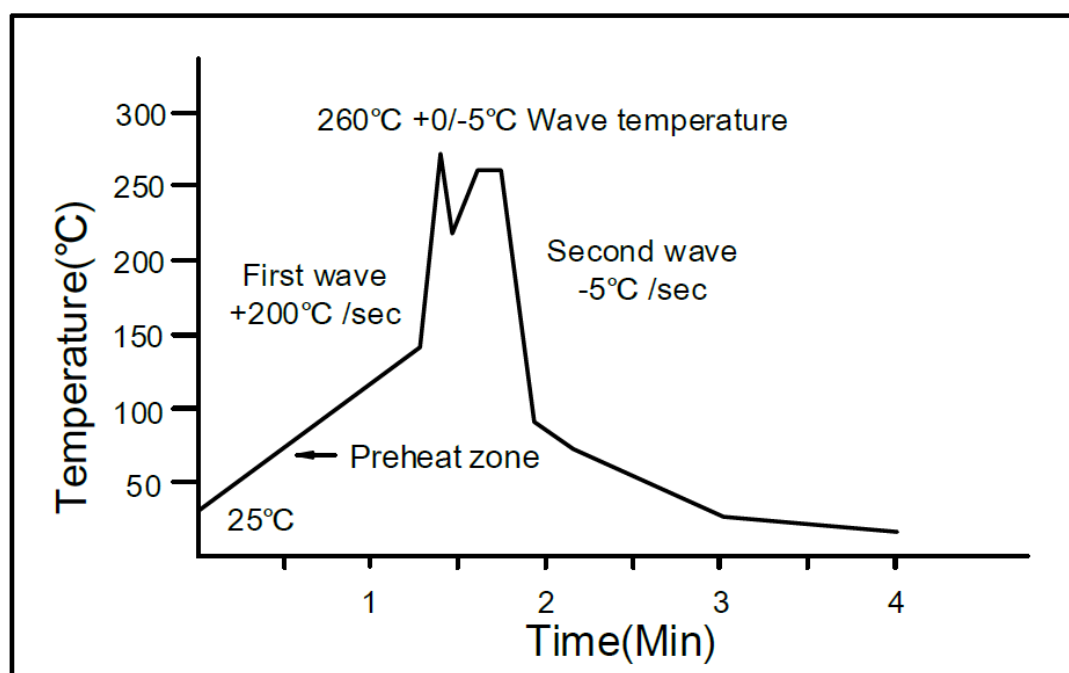
One time soldering is recommended within the condition of temperature.

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

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: $350 \pm 10^\circ\text{C}$

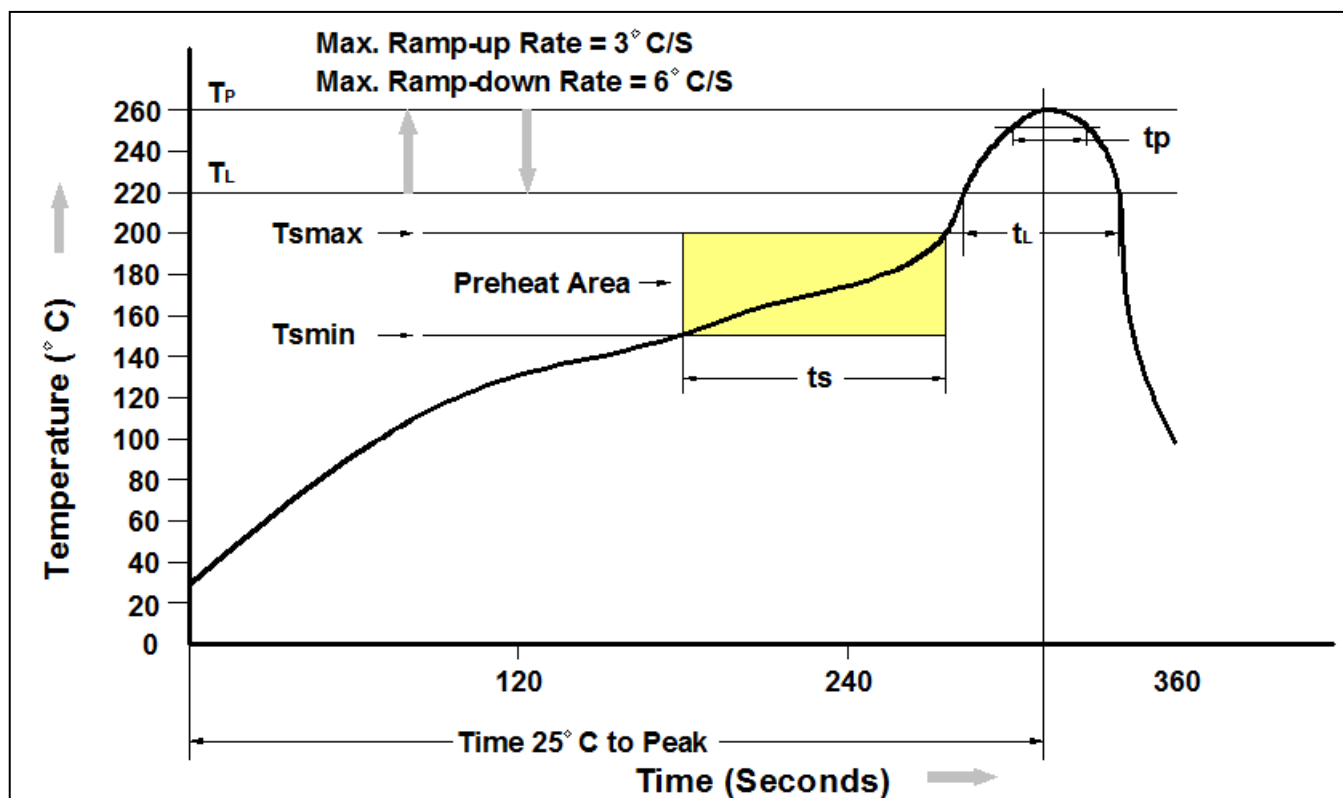
Time: 5 sec max.



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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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