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CTM131 Series

DC Input 5-Pin Mini-Flat DMC-Isolator® Phototransistor Optocoupler

Features

- High isolation 3750 VRMS
- Patented coplanar structure DMC-Isolator®
- Various CTR selection available
- DC input with transistor output
- Operating Temperature range - 55 °C to 110 °C
- 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 (14001105803)
  - ✓ IEC62368 (FI/41119)

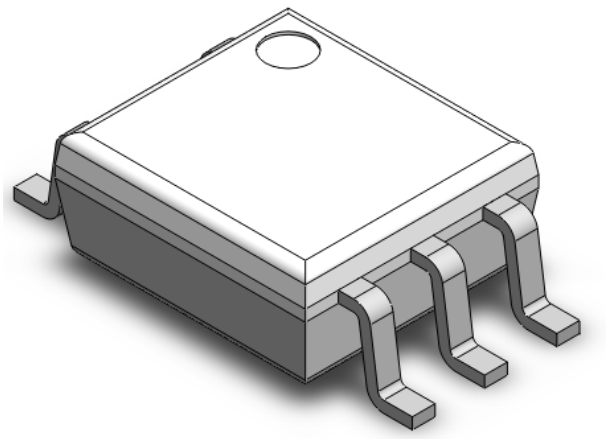
Description

These CTM131 series of general purpose optocoupler consists of a photo transistor optically coupled to an Infrared-emitting diode in a 5-lead Mini-Flat DMC-Isolator® package.

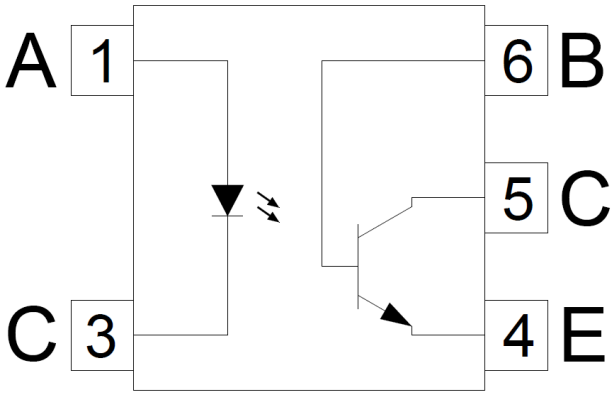
Applications

- DC-DC Converters
- Programmable controllers
- Telecommunication equipment
- Hybrid substrates that require high density mounting

Package Outline



Schematic



Absolute Maximum Ratings T_A = 25°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.)	3750	V_{RMS}	
T_{OPR}	Operating temperature	-55 ~ +110	°C	
T_{STG}	Storage temperature	-55 ~ +150	°C	
T_{SOL}	Soldering temperature (For 10 seconds)	260	°C	
P_{TOT}	Total power dissipation	200	mW	
Emitter				
I_F	Forward current	50	mA	
$I_{F(TRANS)}$	Peak transient current (≤1μs P.W,300pps)	1	A	
V_R	Reverse voltage	6	V	
P_D	Power dissipation	70	mW	
Detector				
P_C	Power dissipation	150	mW	
B_{VCEO}	Collector-Emitter Breakdown Voltage	80	V	
B_{VECO}	Emitter-Collector Breakdown Voltage	7	V	
B_{VCBO}	Collector-Base Breakdown	80	V	
B_{VEBO}	Emitter-Base Breakdown	7	V	
I_C	Collector Current	50	mA	

Electrical Characteristics *T_A = 25°C, unless otherwise specified*

Emitter Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
V_F	Forward voltage	I_F=10mA	-	1.24	1.4	V	
I_R	Reverse Current	V_R = 6V	-	-	5	μA	
C_{IN}	Input Capacitance	f= 1MHz	-	10	250	pF	

Detector Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
B_{VCEO}	Collector-Emitter Breakdown	I_C= 500μA	80	-	-	V	
B_{VECO}	Emitter-Collector Breakdown	I_E= 100μA	7	-	-	V	
B_{VCBO}	Collector-Base Breakdown	I_{CB} = 0.1mA	80			V	
B_{VEBO}	Emitter-Base Breakdown	I_{EB} = 0.1mA	7			V	
I_{CEO}	Collector-Emitter Dark Current	V_{CE}= 48V, I_F=0mA	-	-	100	nA	
		V_{CE}= 48V, I_F=0mA, T_A=85°C	-	-	50	μA	

Transfer Characteristics

Symbol	*Parameters*		*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
CTR	Current Transfer Ratio	CTM131	I_F= 5mA, V_{CE}= 5V	50	-	600	%	
		CTM131A		50	-	150		
		CTM131B		100	-	300		
		CTM131C		100	-	600		
		CTM131D		200	-	600		
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage		I_F= 8mA, I_C= 2.4mA	-	-	0.4	V	
			I_F= 1mA, I_C= 0.2mA			0.4		
R_{IO}	Isolation Resistance		V_{IO}= 500V_{DC}	$5x10^{10}$	-	-	Ω	
C_{IO}	Isolation Capacitance		f= 1MHz	-	0.5	1	pF	

Switching Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
t_r	Rise Time	I_C= 2mA, V_{CE}= 2V, R_L= 100Ω	-	6	18	μs	
t_f	Fall Time		-	8	18		

Typical Characteristic Curves *T_A = 25°C, unless otherwise specified*

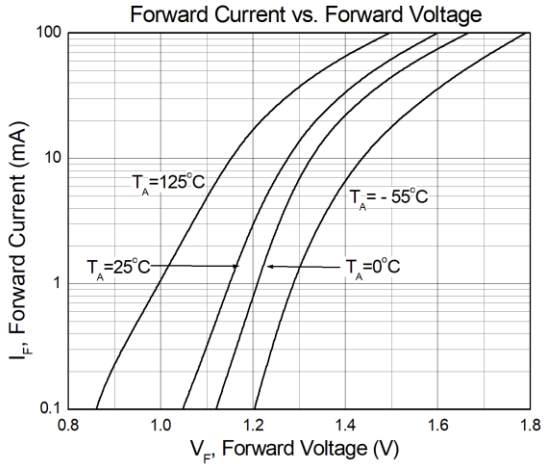


Figure 1

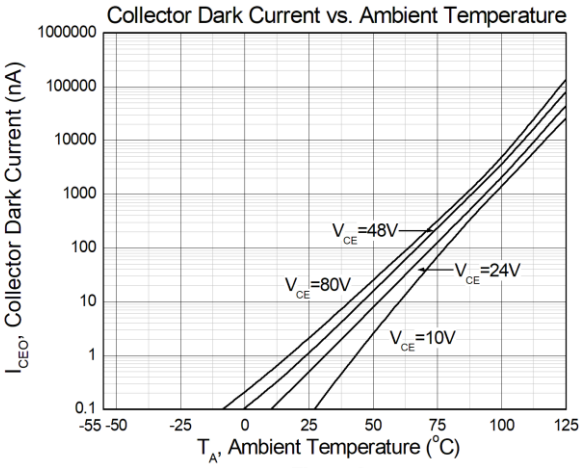


Figure 2

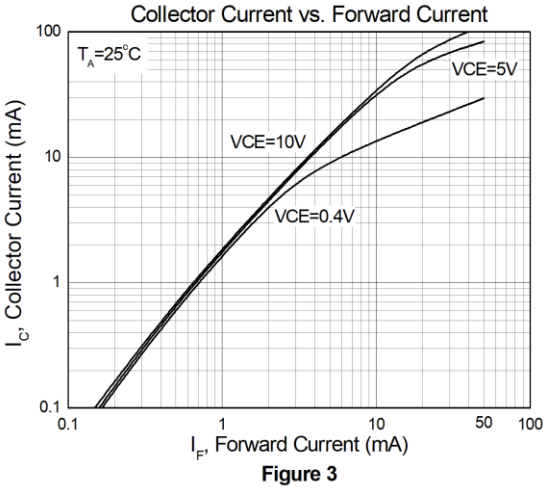


Figure 3

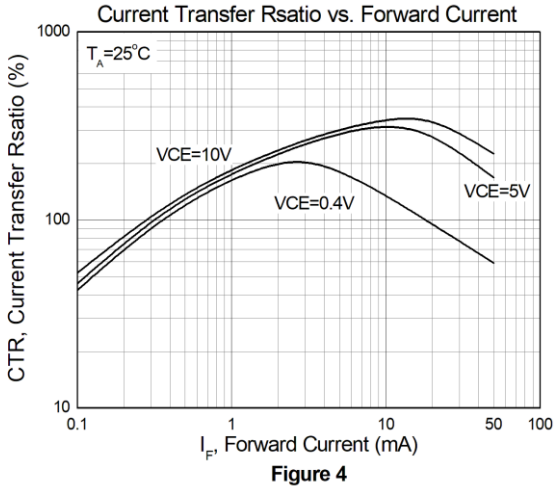


Figure 4

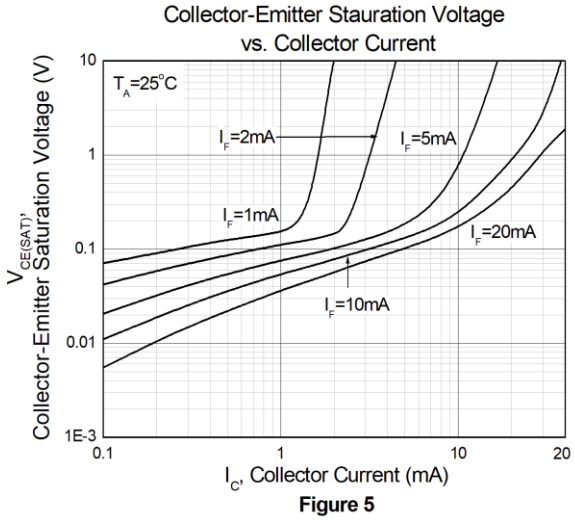


Figure 5

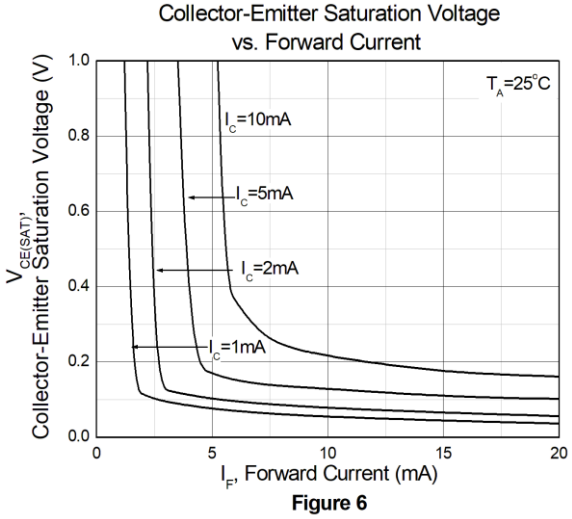


Figure 6

Typical Characteristic Curves *T_A = 25°C, unless otherwise specified*

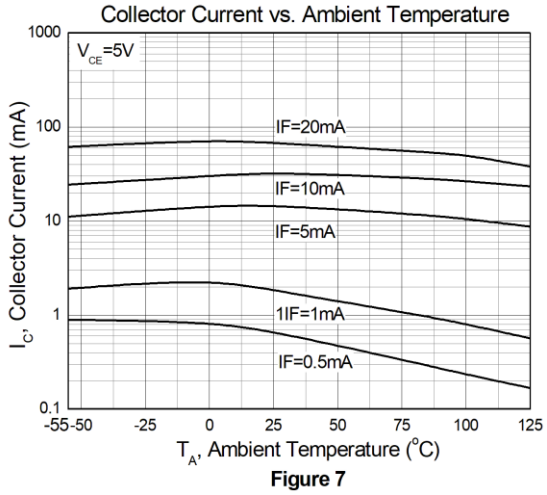


Figure 7

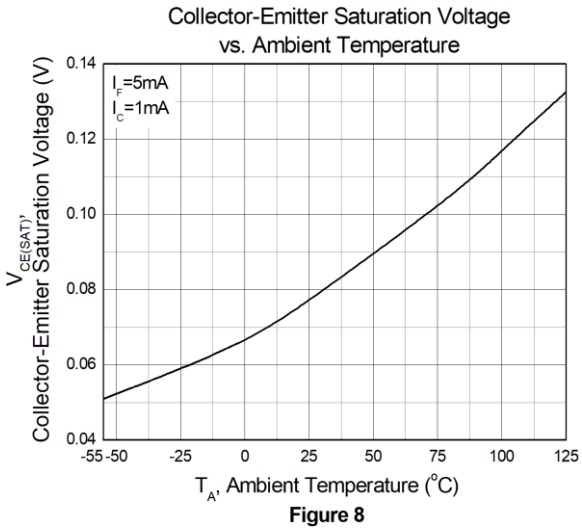


Figure 8

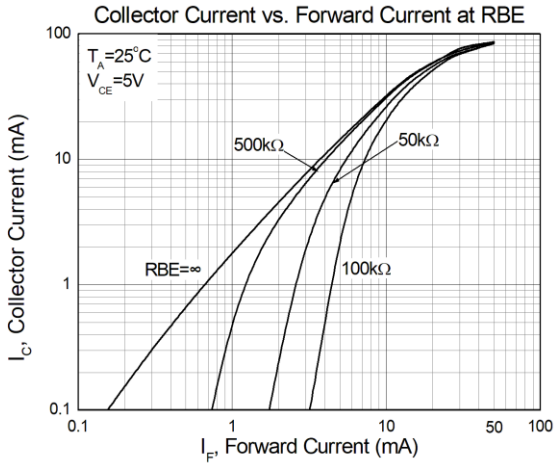


Figure 9

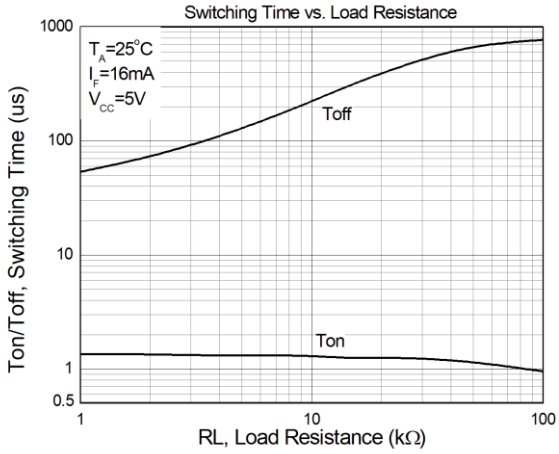


Figure 10

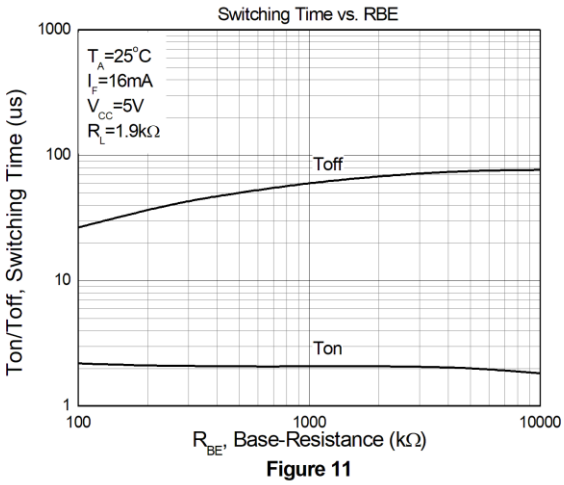
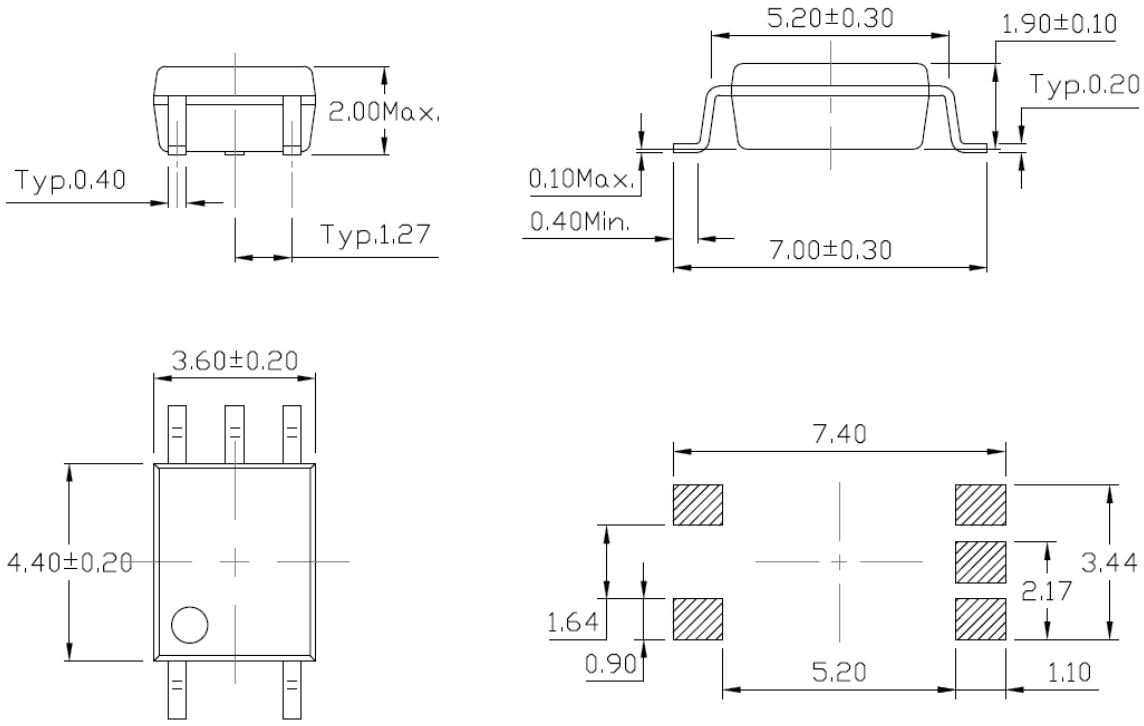


Figure 11

Package Dimension *Dimensions in mm unless otherwise stated*



Marking Information

Note:

CT	: Denotes “CT Micro”
M131	: Part Number
X	: CTR Rank Option
V	: VDE Safety Mark Option (Blank or V)
Y	: One Digit Year Code
WW	: Two Digit Work Week
K	: Manufacturing Code

Ordering Information

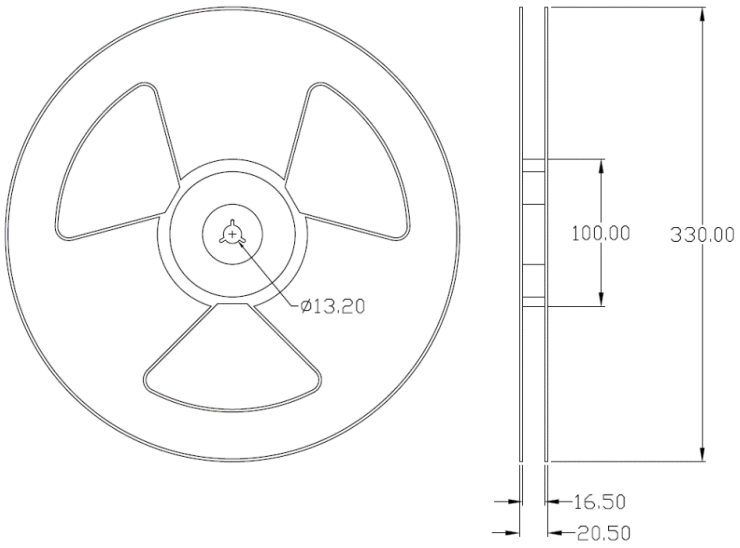
CTM131X (V)(Z)

CT = Denotes “CT Micro”
M131 = Part Number
X = CTR Rank Option (Blank, A, B, C or D)
V = VDE Safety Mark Option (Blank or V)
Z = Tape and Reel Option (Blank, T1 or T2)

Option	*Description*	*Quantity*
T1	Surface Mount Lead Forming – With Option 1 Tapping	3000 Units/Reel
T2	Surface Mount Lead Forming – With Option 2 Tapping	3000 Units/Reel

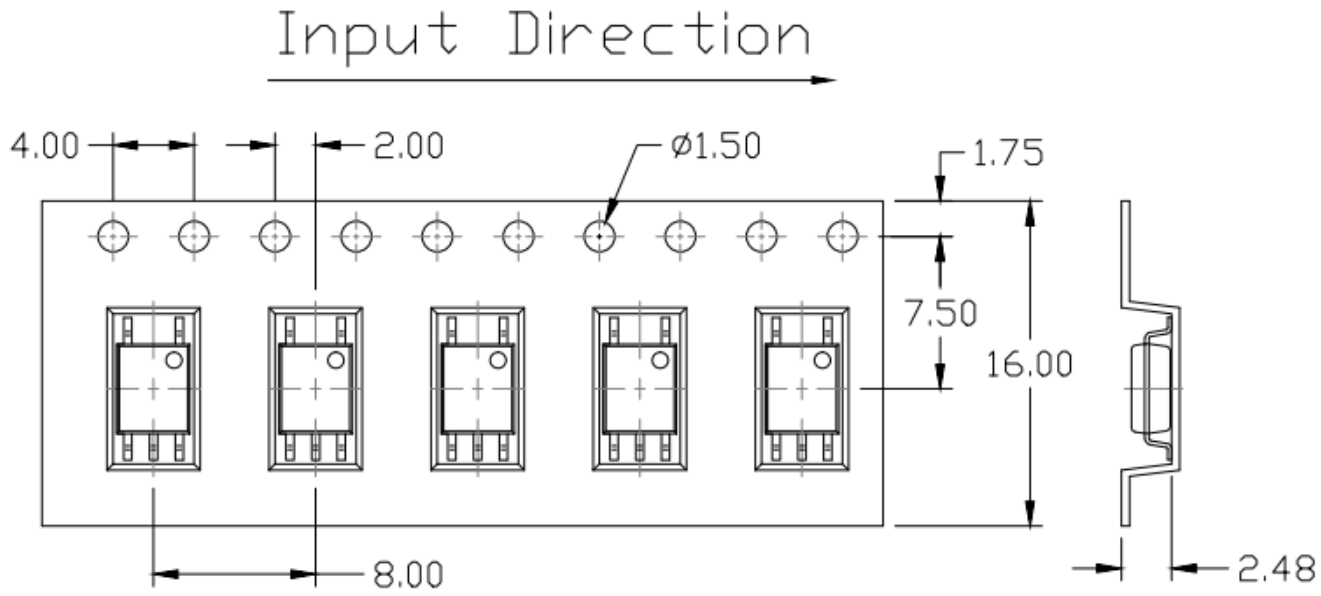
Reel Dimension *All dimensions are in mm, unless otherwise stated*

Option T1/T2

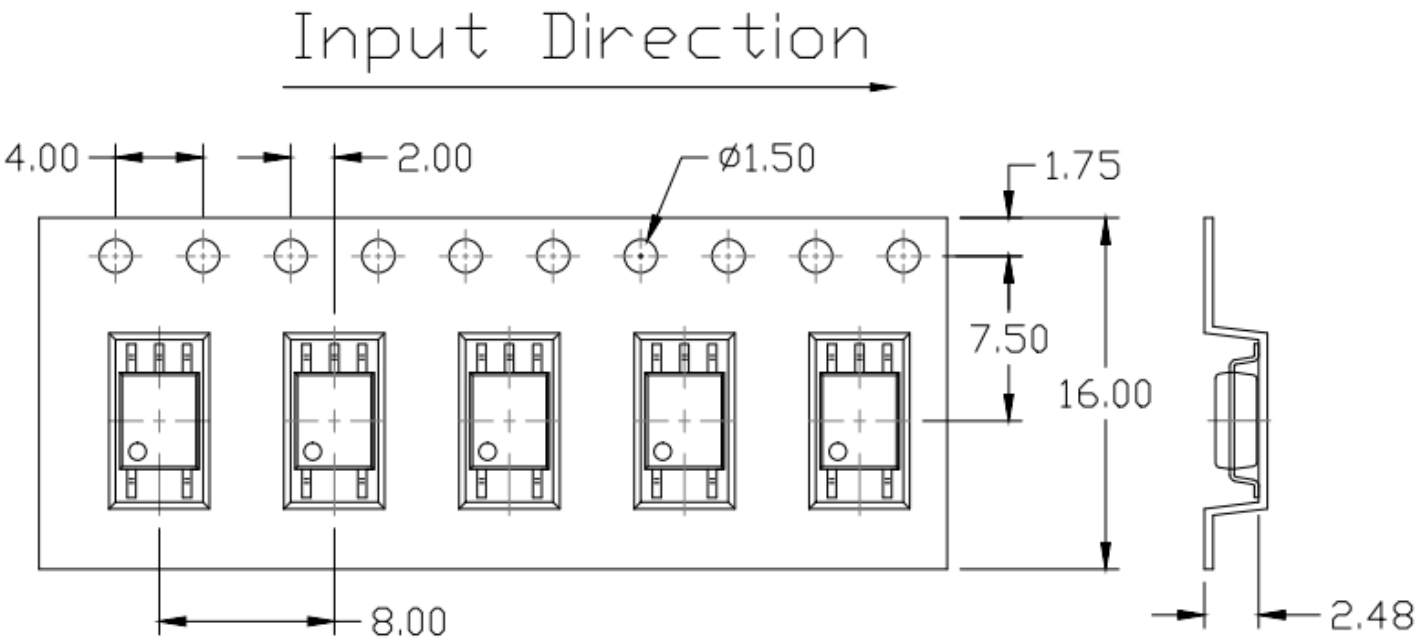


Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

Option T1



Option T2

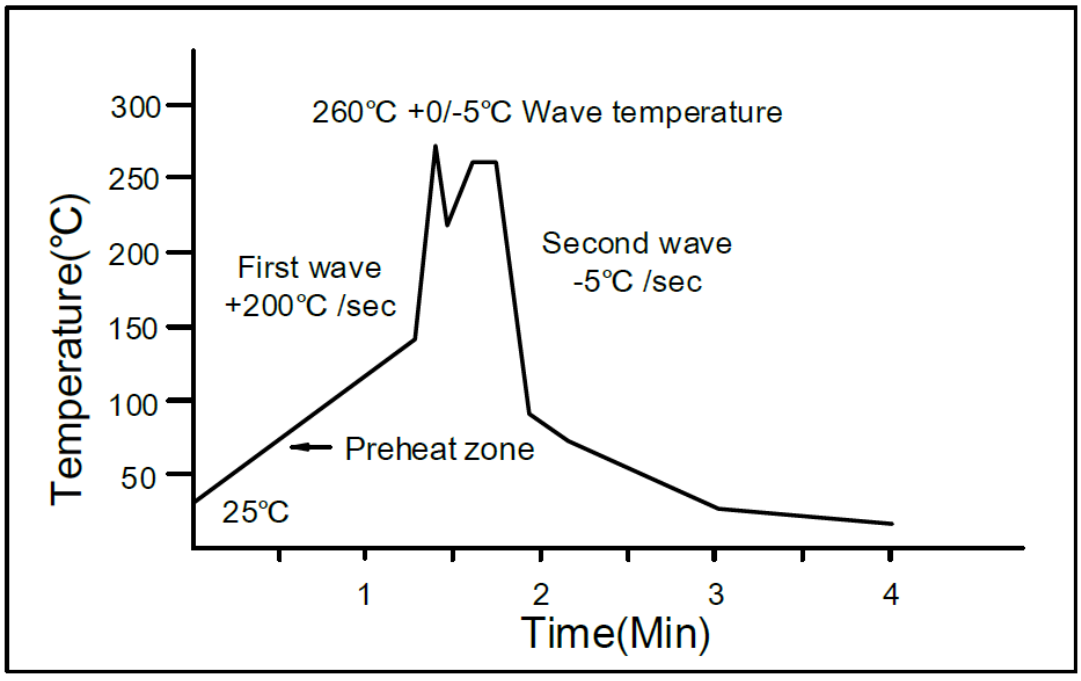


Solderability spec (Follow the JEDEC standard JESD22-B102)

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)

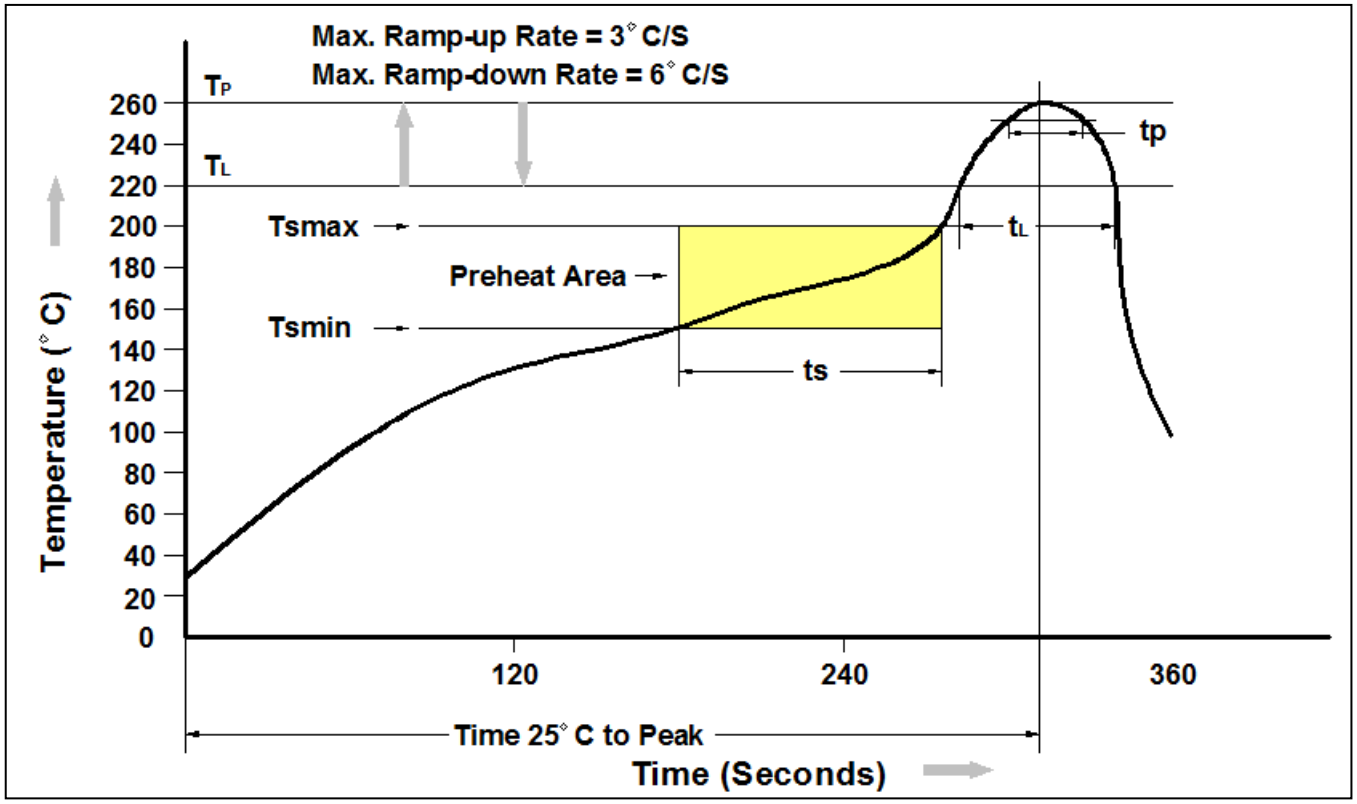
One time soldering is recommended within the condition of temperature.
Temperature: 260+0/-5˚C.
Time: 10 sec.
Preheat temperature: 25 to 140˚C.
Preheat time: 30 to 80 sec.



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±10˚C
Time: 5 sec max.

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



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	150°C
Temperature Max. (Tsmax)	200°C
Time (ts) from (Tsmin to Tsmax)	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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