



CTH281-4 Series

DC Input 16-Pin DMC[®] Half Pitch Mini-Flat

Phototransistor Optocoupler

Features

- High isolation 3750 V_{RMS}
- Patented coplanar structure **DMC[®]**
- Various CTR selection available
- DC input with transistor output
- Operating temperature range - 55 °C to 125 °C
- RoHS and REACH compliance
- Halogen Free compliance
- Regulatory Approvals
 - ✓ UL - UL1577 (pending approval)
 - ✓ VDE - EN60747-5-5 (VDE0884-5)
 - ✓ CQC - GB4943.1, GB8898

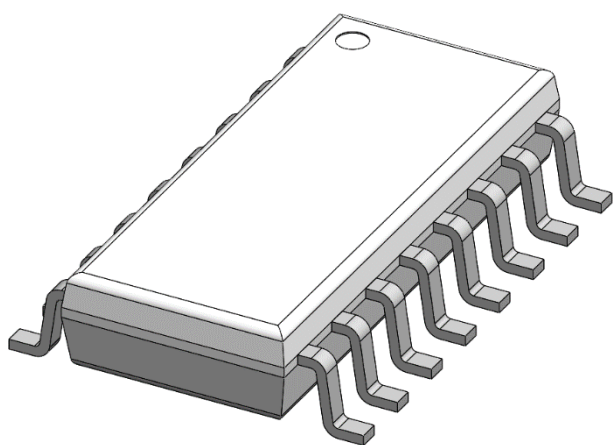
Description

The CTH281-4 series have four isolated channels, each channel contains a photo transistor optically coupled to two gallium arsenide Infrared-emitting diode in a 16-lead **DMC[®]** half pitch Mini-Flat package.

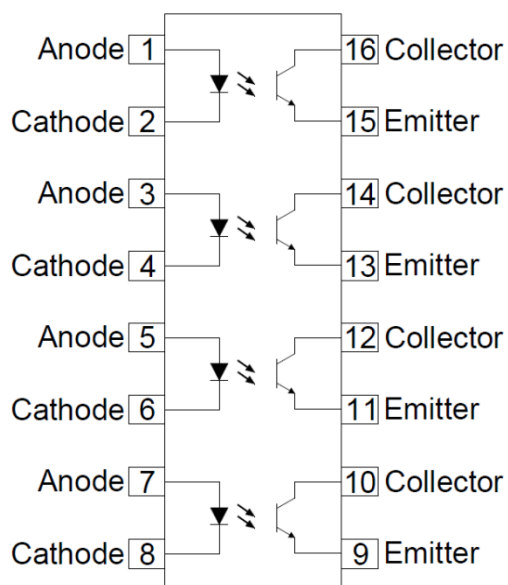
Applications

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

Package Outline



Schematic





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Absolute Maximum Rating at 25°C

Symbol	Parameters	Ratings	Units	Notes
V _{ISO}	Isolation voltage	3750	V _{RMS}	1
T _{OPR}	Operating temperature	-55 ~ +125	°C	
T _{STG}	Storage temperature	-55 ~ +150	°C	
T _{SOL}	Soldering temperature	260	°C	2
P _{TOT}	Total power dissipation	200	mW	
Emitter				
I _F	Forward current	50	mA	3
I _{F(TRANS)}	Peak transient current (≤1μs P.W,300pps)	1	A	3
V _R	Reverse voltage	6	V	3
P _D	Power dissipation	70	mW	3
Detector				
P _C	Power dissipation	100	mW	3
B _{VCEO}	Collector-Emitter Breakdown Voltage	80	V	3
B _{VECO}	Emitter-Collector Breakdown Voltage	7	V	3
I _C	Collector Current	50	mA	3

Notes

1. AC for 1 minute, RH = 40 ~ 60%.
2. For reflow process
3. Each Channel



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

Emitter Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
V_F	Forward voltage	$I_F = 10\text{mA}$	-	1.24	1.4	V	
C_{IN}	Input Capacitance	$f = 1\text{MHz}$	-	10	30	pF	

Detector Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$B_{V_{CEO}}$	Collector-Emitter Breakdown	$I_C = 0.1\text{mA}$	80	-	-	V	
$B_{V_{ECO}}$	Emitter-Collector Breakdown	$I_E = 0.1\text{mA}$	7	-	-	V	
I_{CEO}	Collector-Emitter Dark Current	$V_{CE} = 20\text{V}$, $I_F = 0\text{mA}$	-	-	100	nA	

Transfer Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes	
CTR	Current Transfer Ratio	CTH281-4	$I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$	50	-	600	%	
		CTH281-4GB		100	-	600		
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	$I_F = 20\text{mA}$, $I_C = 1\text{mA}$	-	0.1	0.2	V		
R_{IO}	Isolation Resistance	$V_{IO} = 500\text{V}_{DC}$	5×10^{10}			Ω		
C_{IO}	Isolation Capacitance	$f = 1\text{MHz}$		0.5	1	pF		

Switching Characteristics

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



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Test Circuit

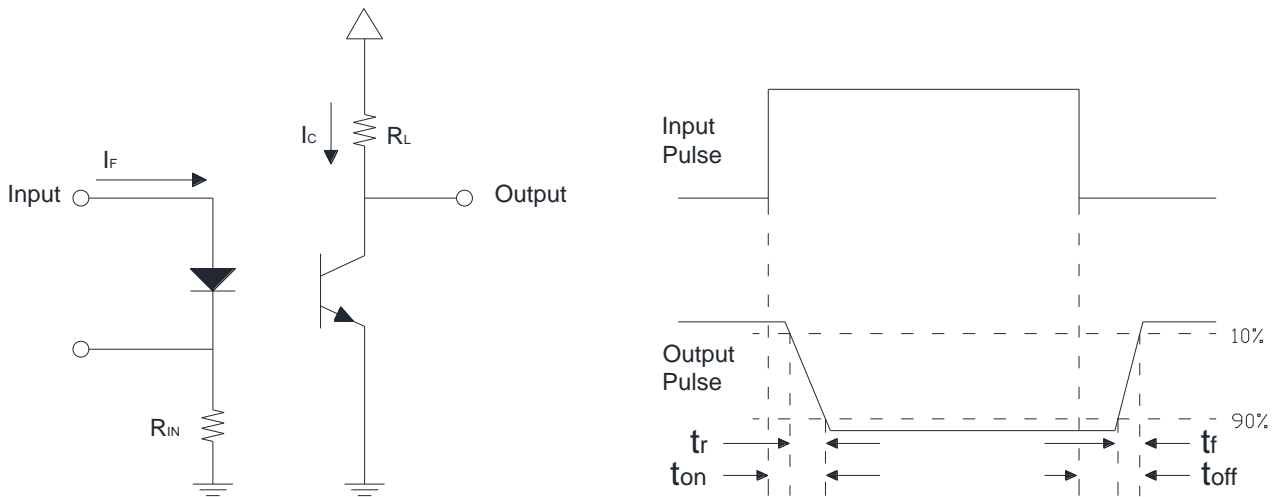


Figure 11: Switching Time Test Circuits

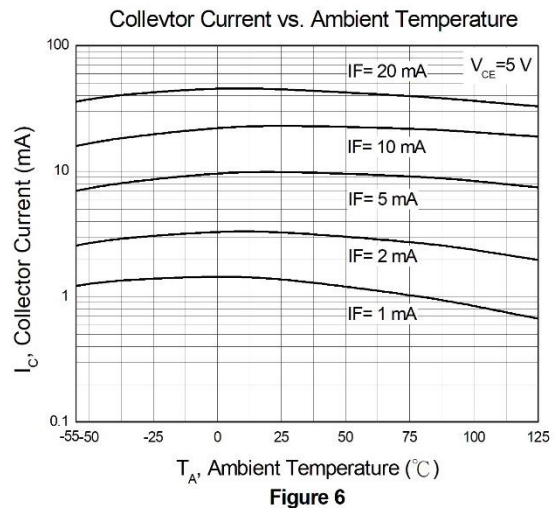
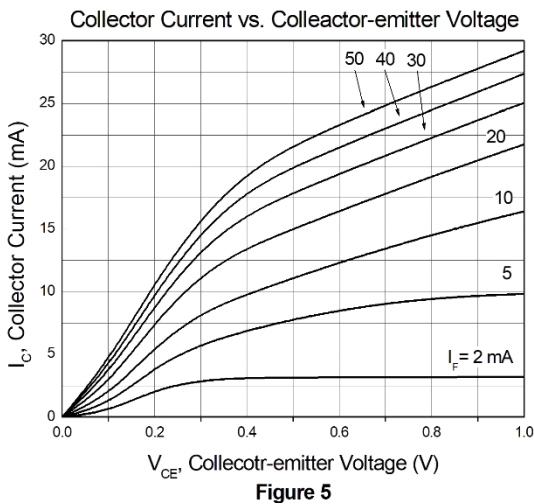
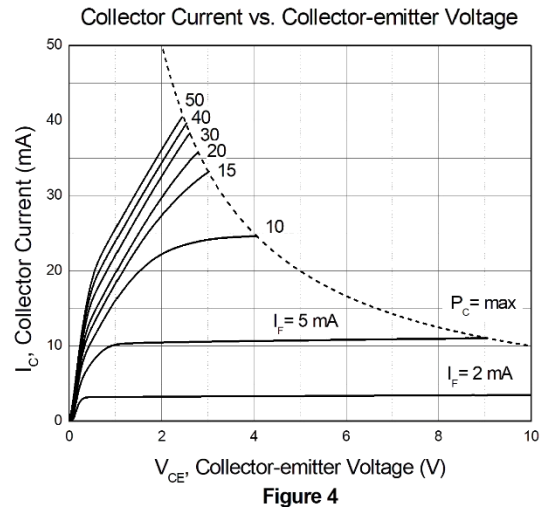
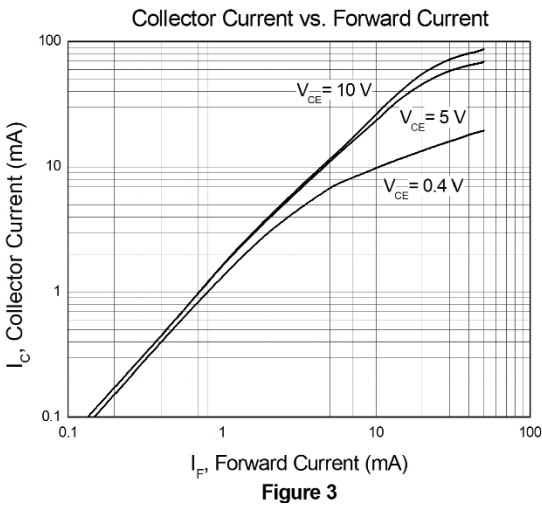
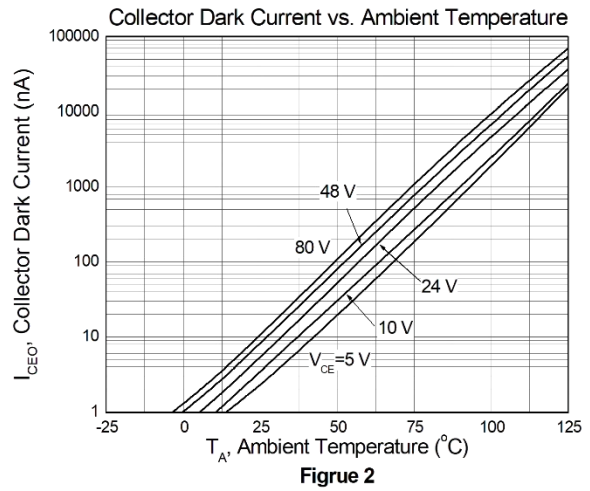
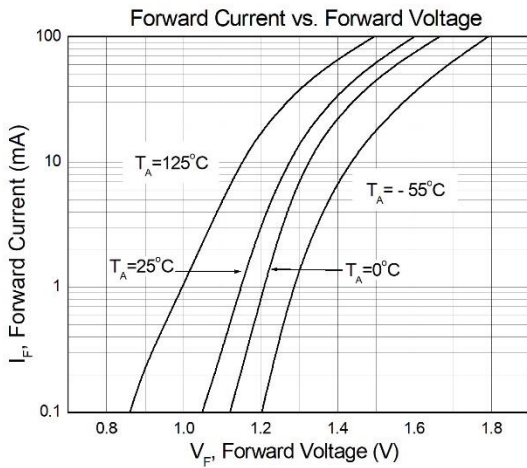


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Typical Characteristic Curves

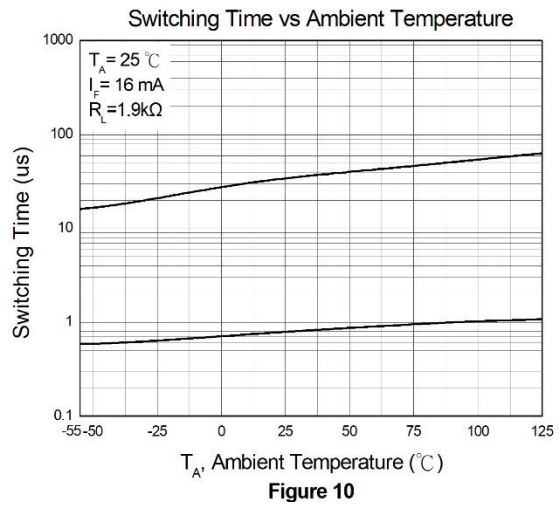
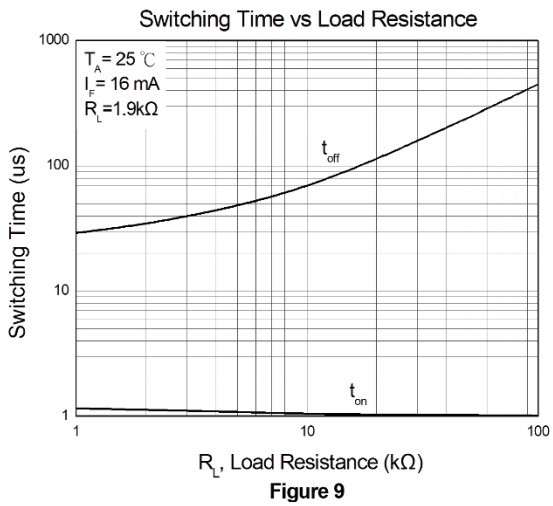
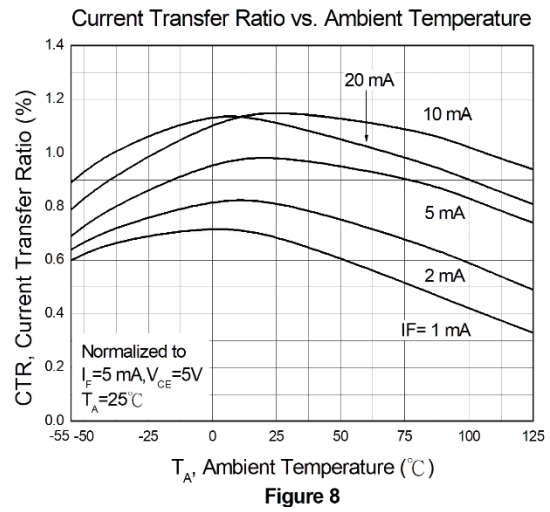
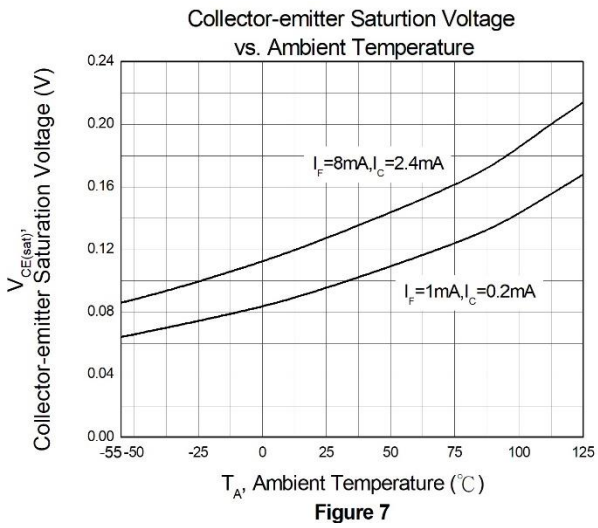




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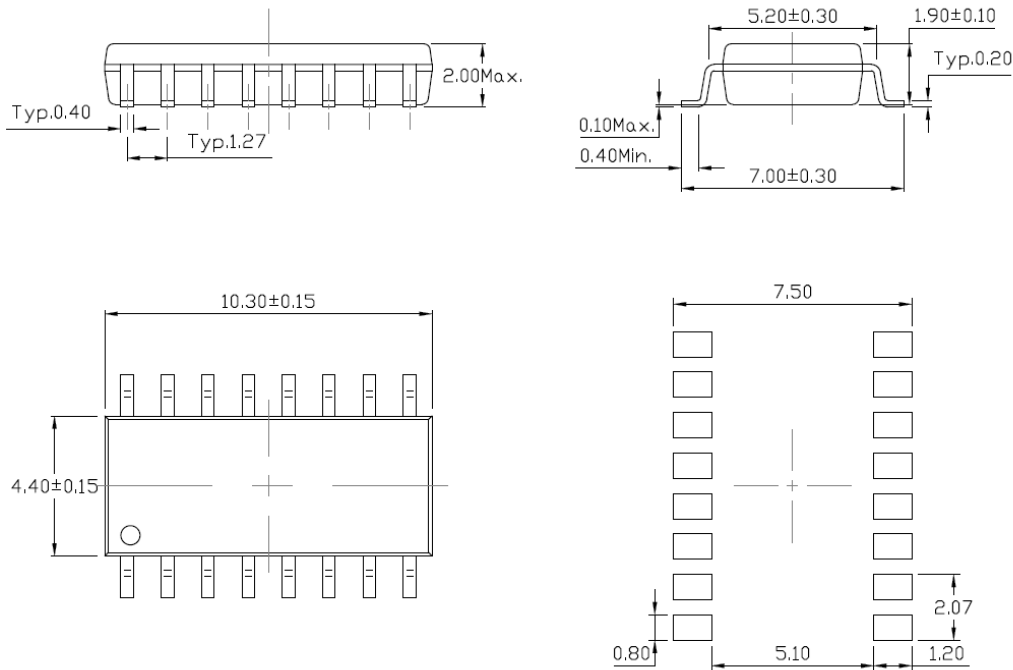


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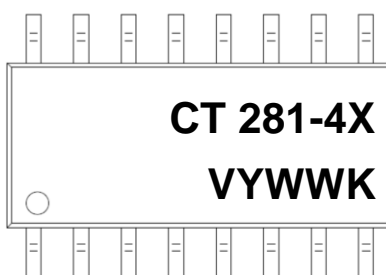
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Package Dimension *Dimensions in mm unless otherwise stated*



Marking Information



Note:

- CT : Denotes "CT Micro"
- 281-4 : Product Number
- X : CTR Rank
- V : VDE Safety Mark
- Y : Fiscal Year
- WW : Work Week
- K : Manufacturing Code



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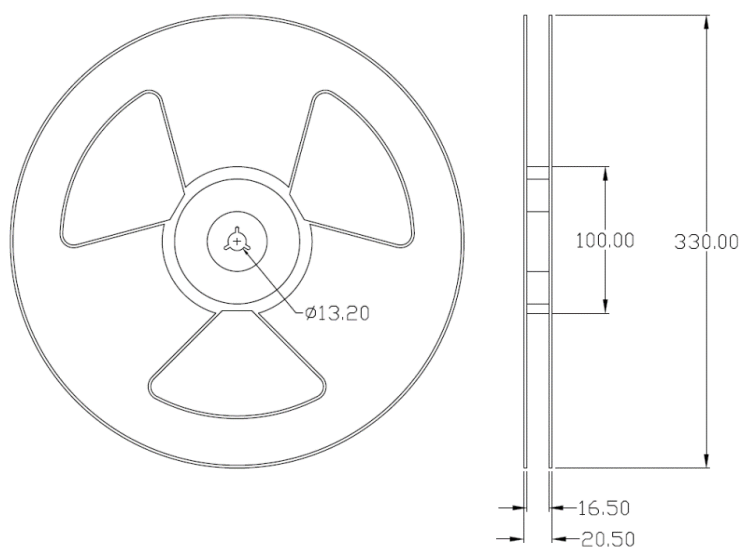
Ordering Information

CTH281-4X (V)(Z)

- CT = Denotes “CT Micro”
- H281-4 = Product Number
- X = CTR Rank Option (Blank or GB)
- V = VDE Safety Mark Option (Blank or V)
- Z = Tape and reel Option (T1 or T2)

Option	Description	Quantity
T1	Surface Mount Lead Forming – With Option 1 Taping	2000 Units/Reel
T2	Surface Mount Lead Forming – With Option 1 Taping	2000 Units/Reel

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





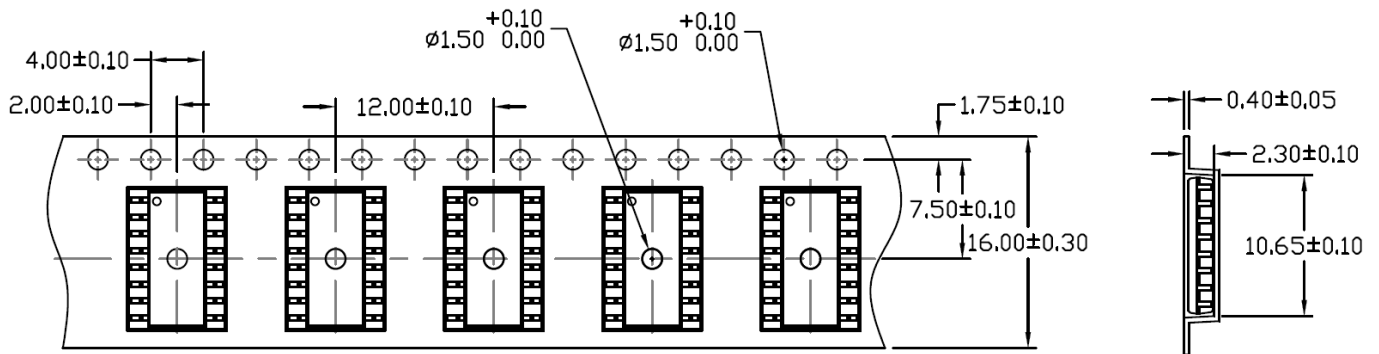
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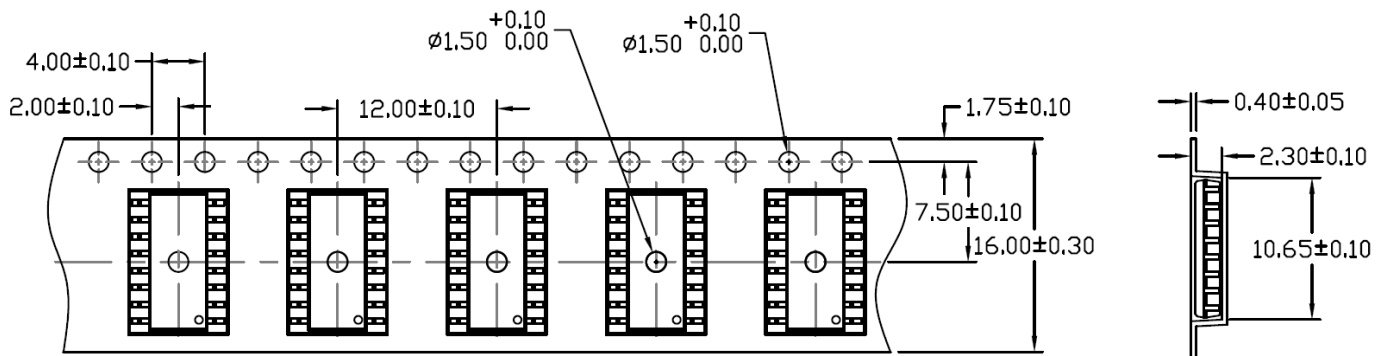
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Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

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)

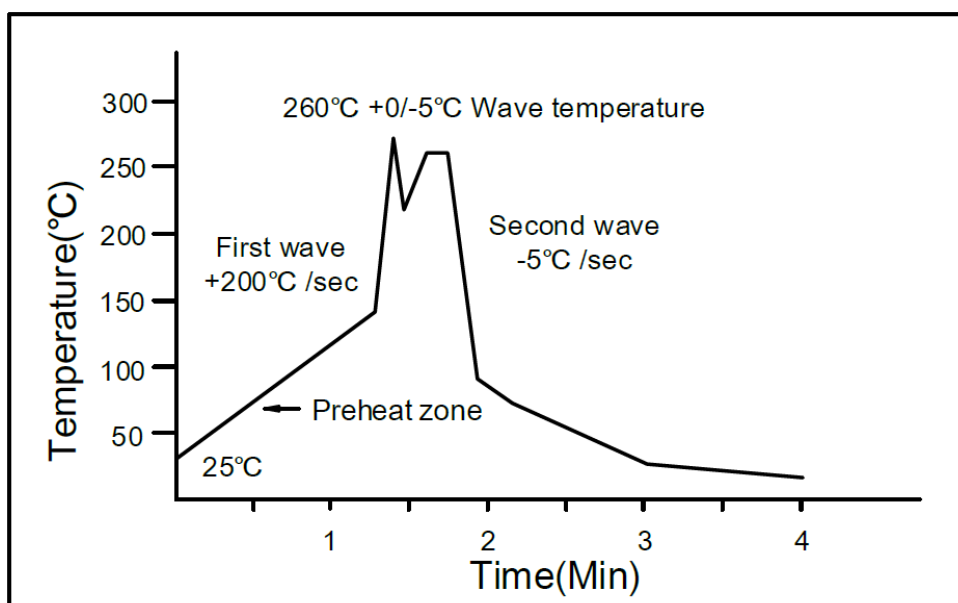
One time soldering is recommended within the condition of temperature.

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

Time: 10 sec.

Preheat temperature: 25 to 140°C .

Preheat time: 30 to 80 sec.



Hand soldering by soldering iron (Follow the standard MIL-STD 202G, Method 210F)

Allow single lead soldering in every single process.

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

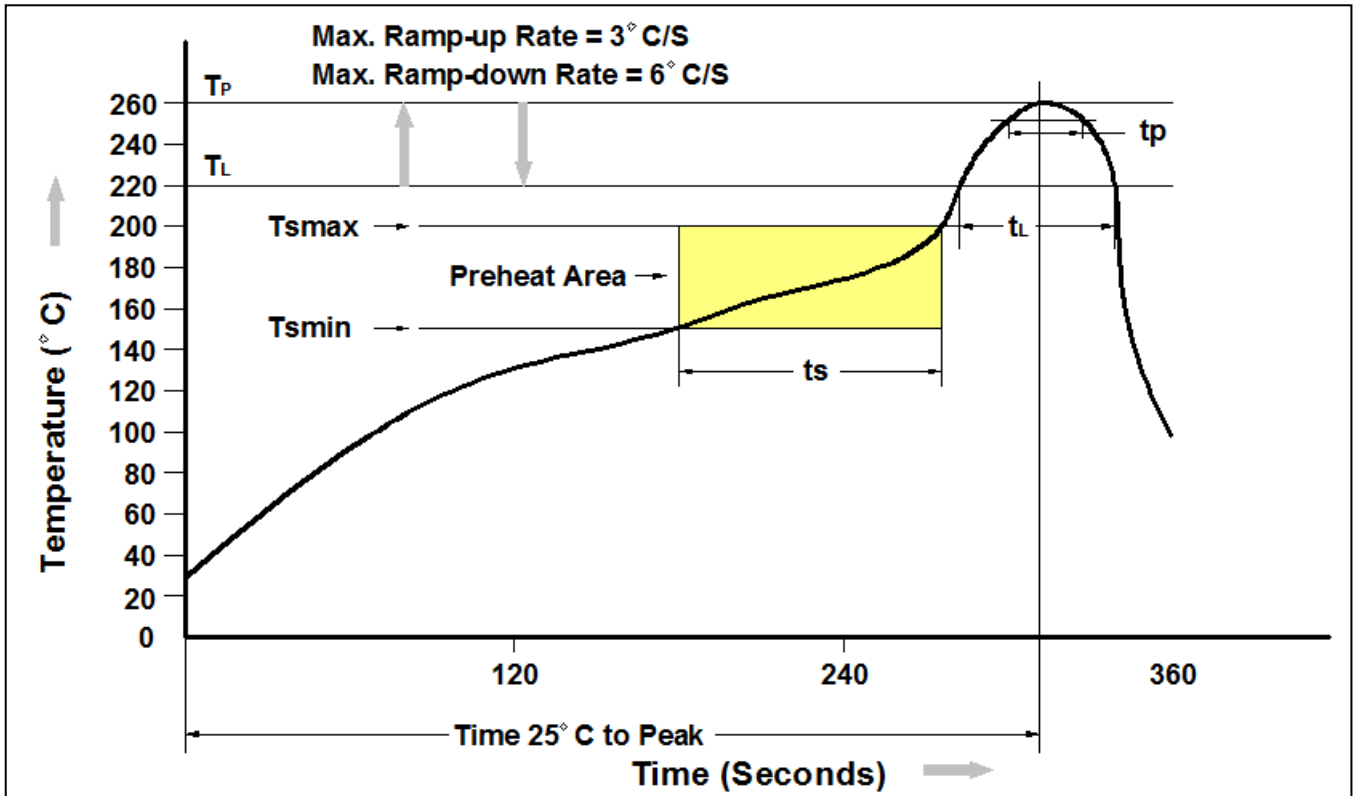
Time: 5 sec max.



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



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	150°C
Temperature Max. (Tsmax)	200°C
Time (ts) from (Tsmin to Tsmax)	60-120 seconds
Ramp-up Rate (tl to tp)	3°C/second max.
Liquidous Temperature (Tl)	217°C
Time (tl) Maintained Above (Tl)	60 – 150 seconds
Peak Body Package Temperature	260°C +0°C / -5°C
Time (tp) within 5°C of 260°C	30 seconds
Ramp-down Rate (Tp to Tl)	6°C/second max
Time 25°C to Peak Temperature	8 minutes max.



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