



#### Features

- High isolation 3750 V<sub>RMS</sub>
- 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

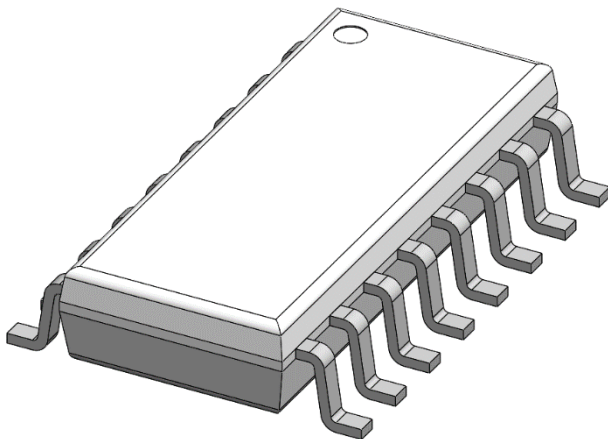
#### Description

The CTH247 series have four isolated channels, each channel contains a photo transistor optically coupled to a gallium arsenide Infrared-emitting diode in a 16-lead half pitch Mini-Flat **DMC®** package.

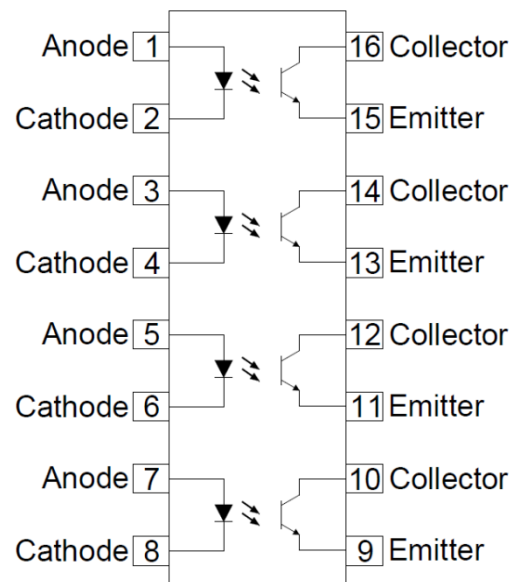
#### Applications

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

#### Package Outline



#### Schematic



**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	3750	V <sub>RMS</sub>	<b>1</b>
T <sub>OPR</sub>	Operating temperature	-55 ~ +125	°C	
T <sub>STG</sub>	Storage temperature	-55 ~ +150	°C	
T <sub>SOL</sub>	Soldering temperature	260	°C	<b>2</b>
P <sub>TOT</sub>	Total power dissipation	200	mW	
<b>Emitter</b>				
I <sub>F</sub>	Forward current	50	mA	<b>3</b>
I <sub>F(TRANS)</sub>	Peak transient current (≤1μs P.W,300pps)	1	A	<b>3</b>
V <sub>R</sub>	Reverse voltage	6	V	<b>3</b>
P <sub>D</sub>	Power dissipation	70	mW	<b>3</b>
<b>Detector</b>				
P <sub>C</sub>	Power dissipation	100	mW	<b>3</b>
B <sub>VCEO</sub>	Collector-Emitter Breakdown Voltage	80	V	<b>3</b>
B <sub>VECO</sub>	Emitter-Collector Breakdown Voltage	7	V	<b>3</b>
I <sub>C</sub>	Collector Current	50	mA	<b>3</b>

## Notes

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



**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	
$I_R$	Reverse Current	$V_R = 6\text{V}$	-	-	5	$\mu\text{A}$	
$C_{IN}$	Input Capacitance	$f = 1\text{MHz}$	-	10	30	$\text{pF}$	

**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	$I_F = 5\text{mA}$ , $V_{CE} = 5\text{V}$	CTH247	50		600	%	
			CTH247A	80		160		
			CTH247B	130		260		
			CTH247C	200		400		
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	$I_F = 20\text{mA}$ , $I_C = 1\text{mA}$	-	0.1	0.2	V		
$R_{IO}$	Isolation Resistance	$V_{IO} = 500\text{V}_{DC}$	$5 \times 10^{10}$			$\Omega$		
$C_{IO}$	Isolation Capacitance	$f = 1\text{MHz}$		0.5	1	$\text{pF}$		

**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	-	$\mu\text{s}$	
$t_f$	Fall Time		-	8	-		



Test Circuit

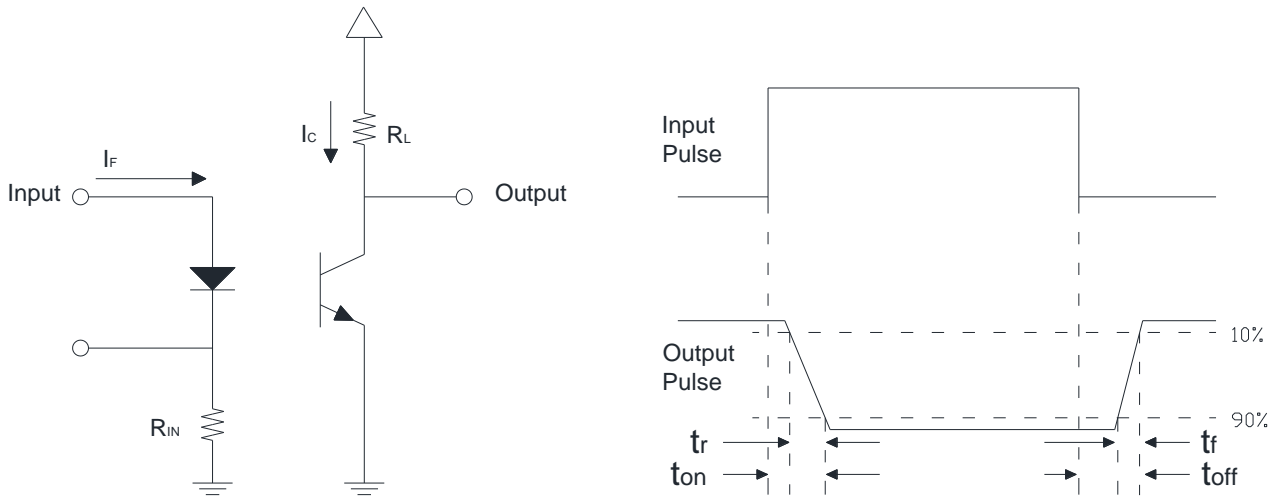


Figure 11: Switching Time Test Circuits



# CTH247 Series

## DC Input 16-Pin Half Pitch Mini-Flat DMC<sup>®</sup>

### Phototransistor Optocoupler

### Typical Characteristic Curves

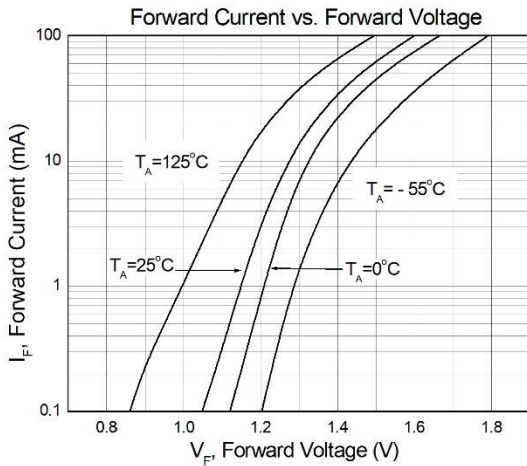


Figure 1

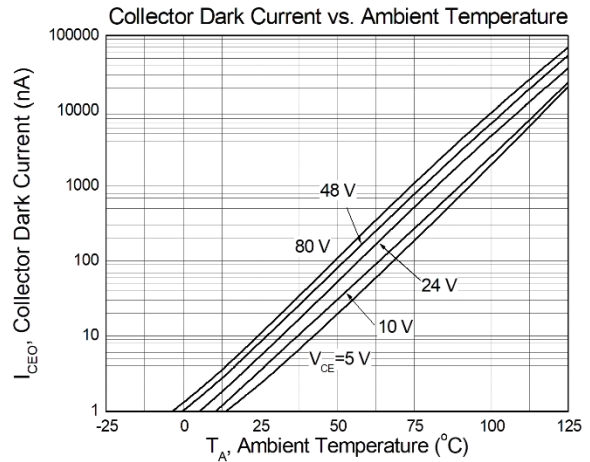


Figure 2

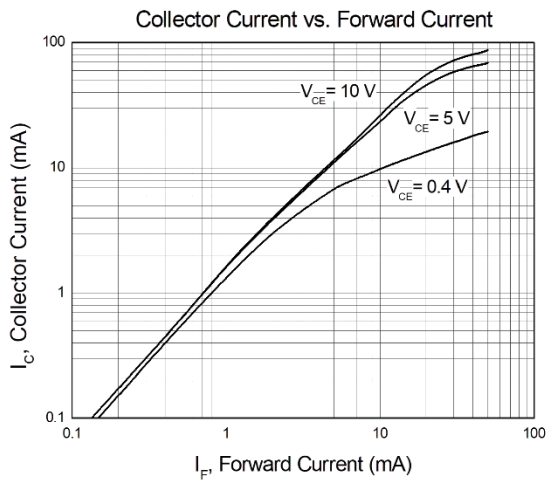


Figure 3

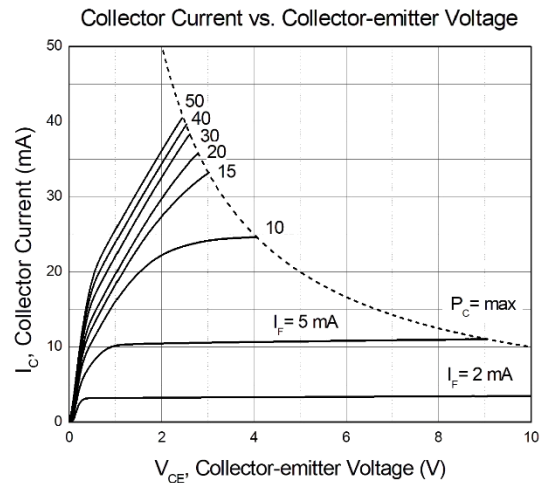


Figure 4

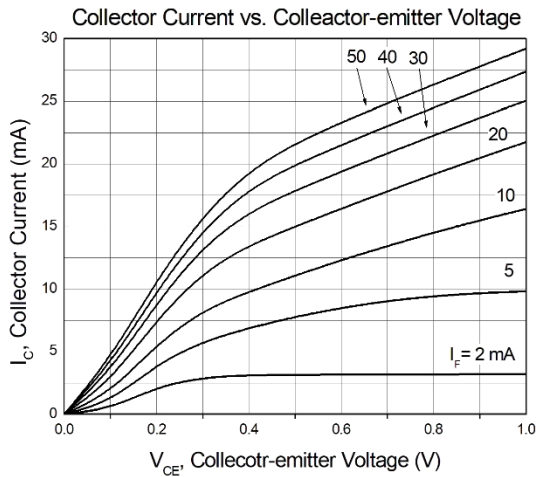


Figure 5

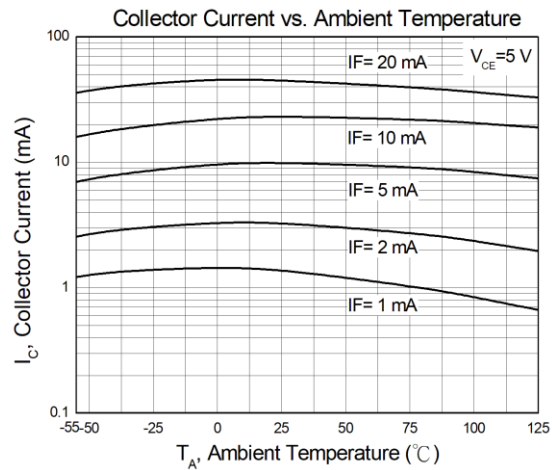


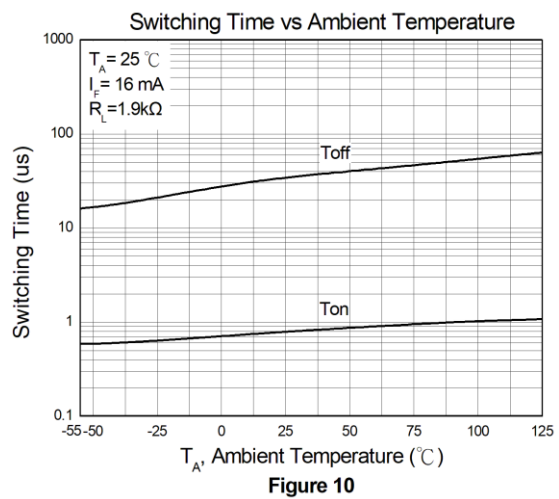
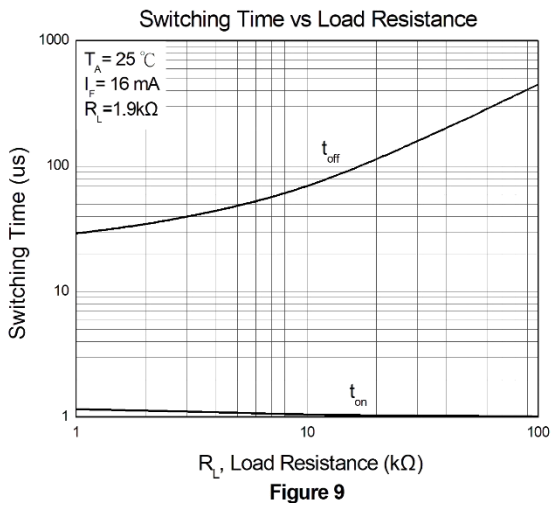
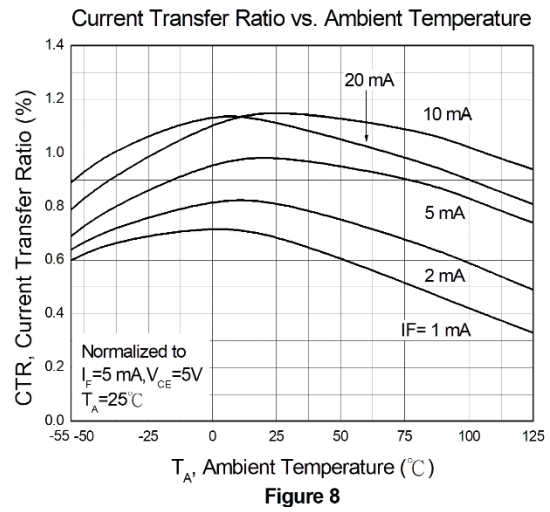
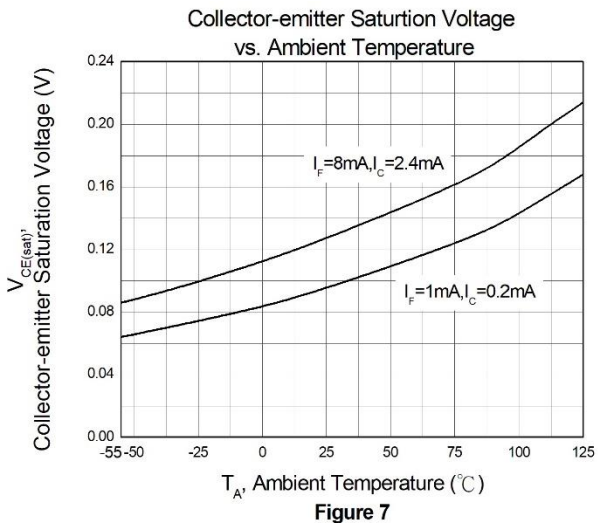
Figure 6



# CTH247 Series

## DC Input 16-Pin Half Pitch Mini-Flat DMC<sup>®</sup>

### Phototransistor Optocoupler



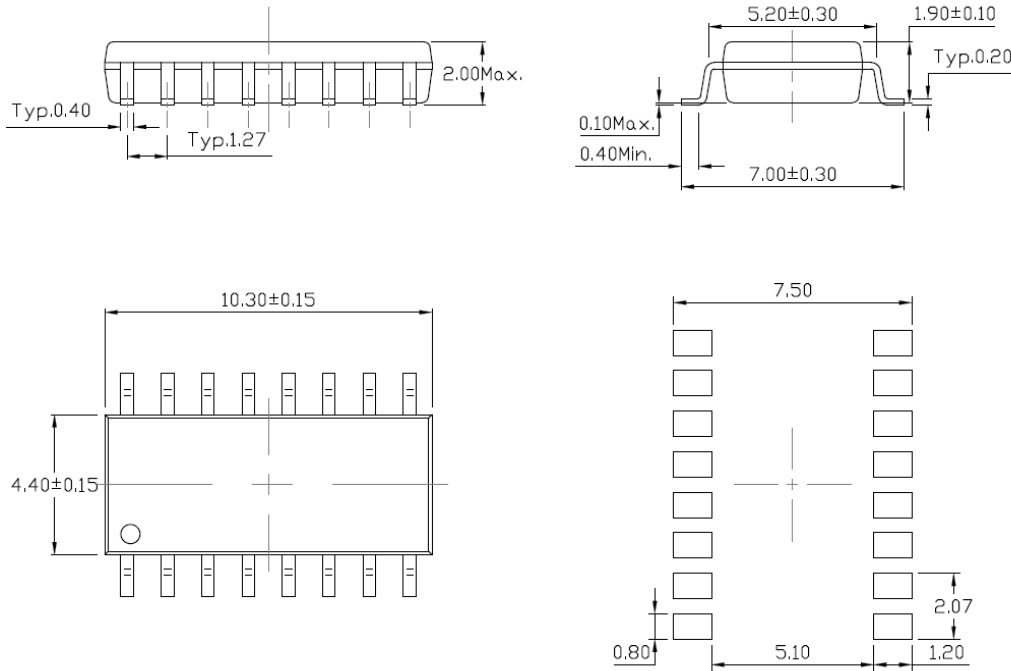


# CTH247 Series

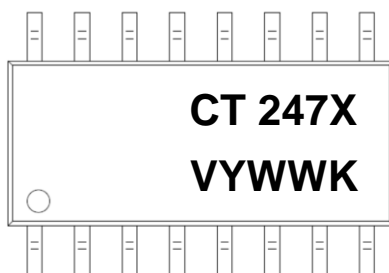
## DC Input 16-Pin Half Pitch Mini-Flat DMC<sup>®</sup>

### Phototransistor Optocoupler

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



#### Marking Information



#### Note:

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



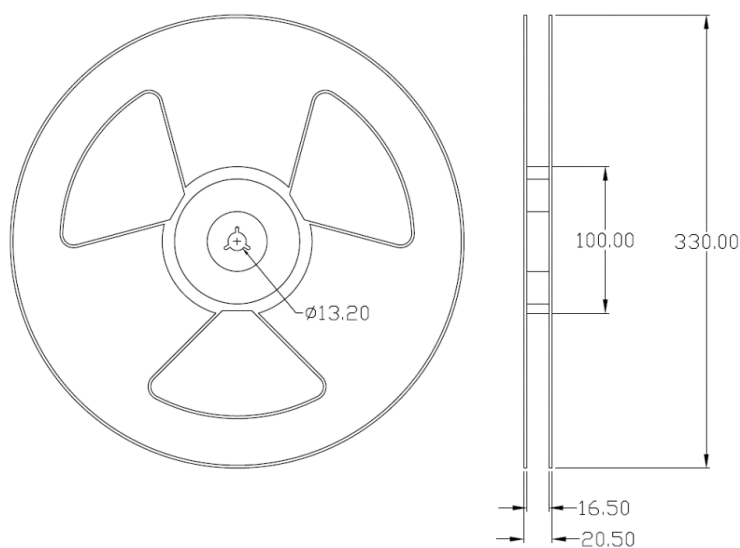
Ordering Information

CTH247X (V)(Z)

- CT = Denotes “CT Micro”
- H247 = Product Number
- X = CTR Rank Option (Blank, A, B or C)
- 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*

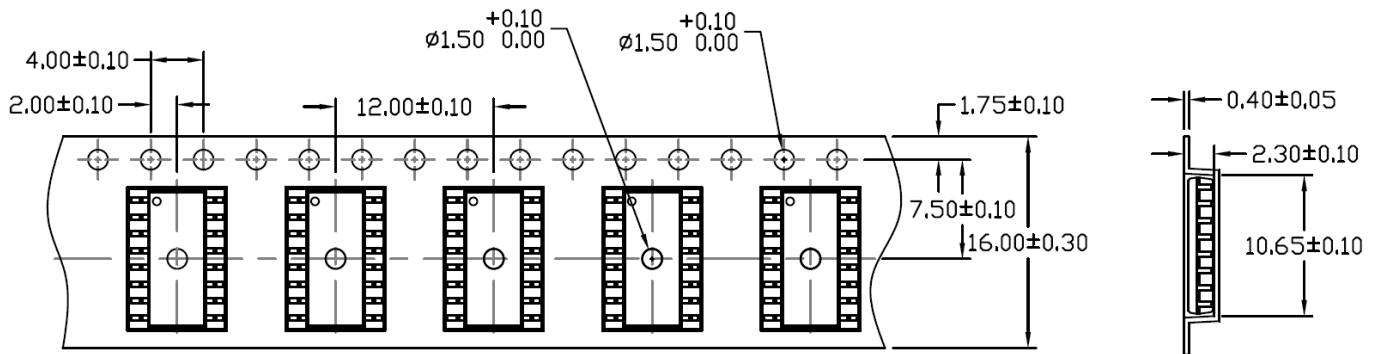




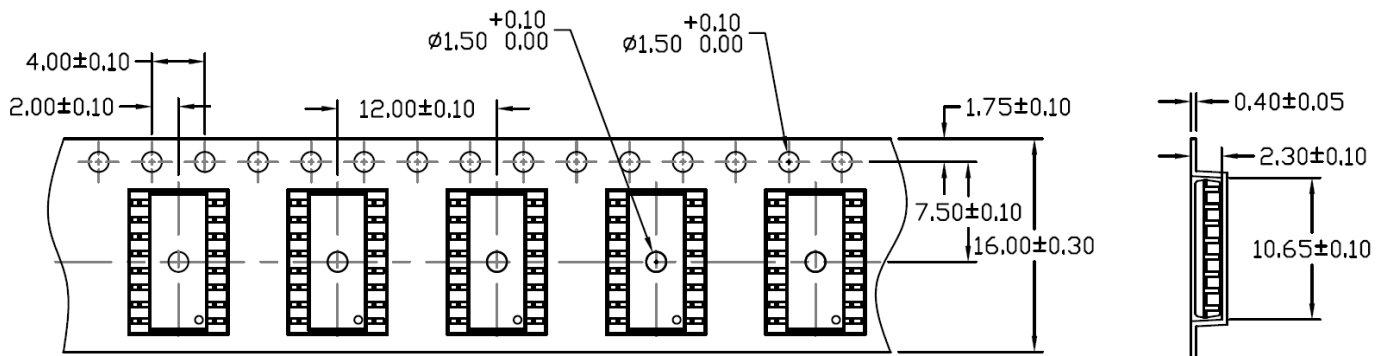


**Carrier Tape Specifications** *Dimensions in mm unless otherwise stated*

**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)

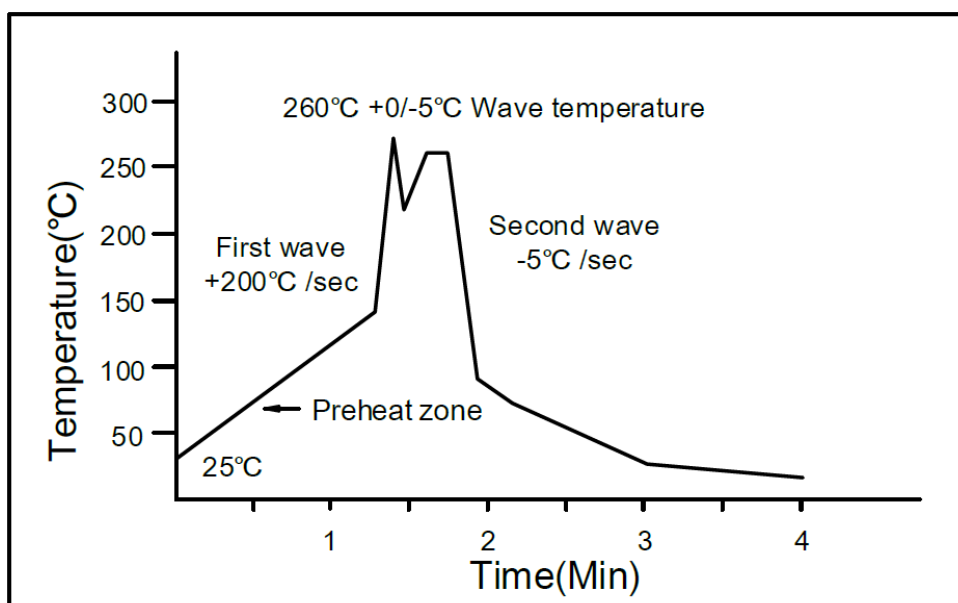
One time soldering is recommended within the condition of temperature.

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

Time: 10 sec.

Preheat temperature: 25 to  $140^\circ\text{C}$ .

Preheat time: 30 to 80 sec.



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

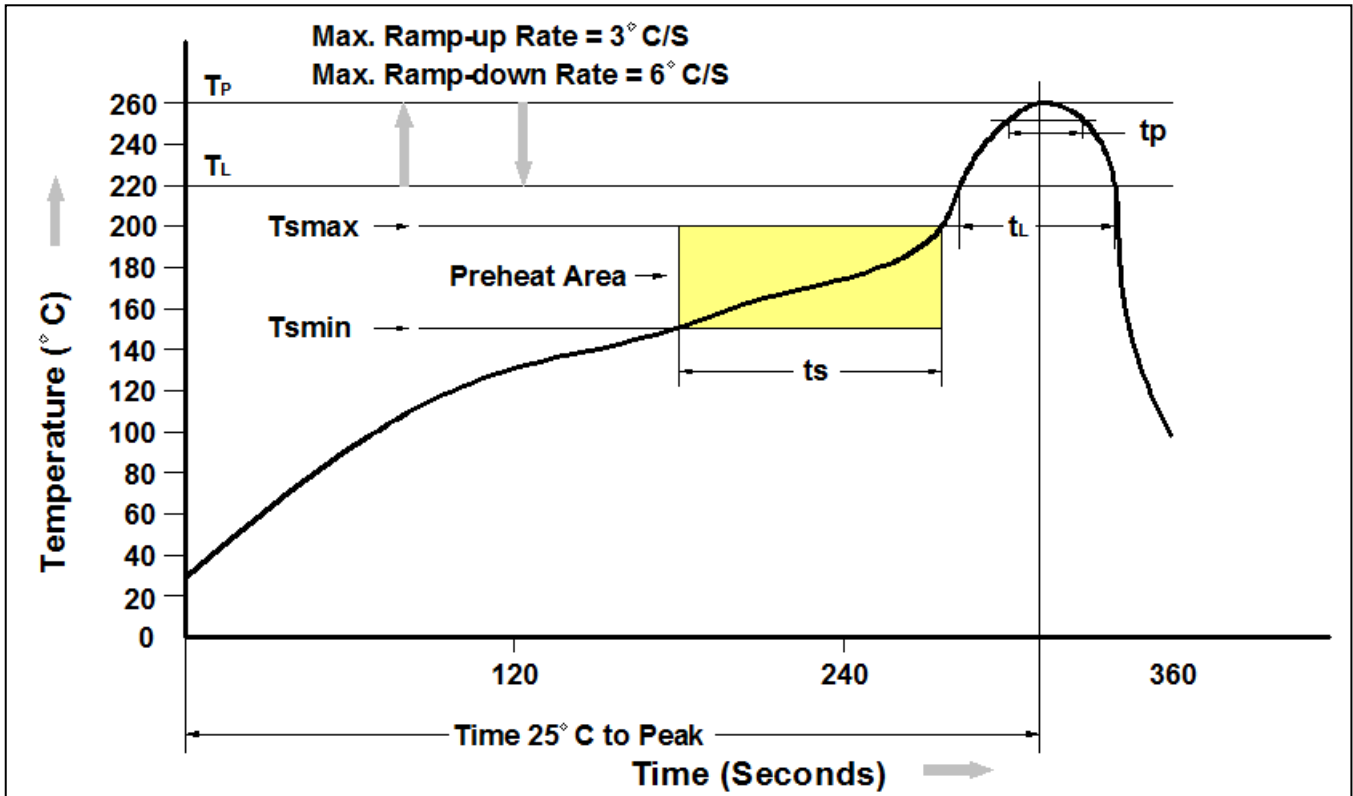
Allow single lead soldering in every single process.

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

Time: 5 sec max.



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



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



DC Input 16-Pin Half Pitch Mini-Flat DMC®  
Phototransistor Optocoupler

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