



DC Input 4-Pin Mini-Flat DMC-Isolator® High B_{VCE0} Photo Darlington Optocoupler

Features

- High isolation 3750 VRMS
- High $B_{VCE0} = 350V$
- Patented coplanar structure DMC-Isolator®
- DC input with Darlington output
- Operating temperature range - 55 °C to 110 °C
- External Creepage $\geq 5.0mm$
- Distance Through Isolation $\geq 0.4mm$
- Clearance Distance $\geq 5.0mm$
- RoHS and REACH Compliance
- Halogen Free Compliance
- Regulatory Approvals
 - ✓ UL - UL1577 (E364000)
 - ✓ VDE - EN60747-5-5(40039590)
 - ✓ CQC – GB4943.1, GB8898 (14001105803)
 - ✓ IEC62368 (FI/41119)

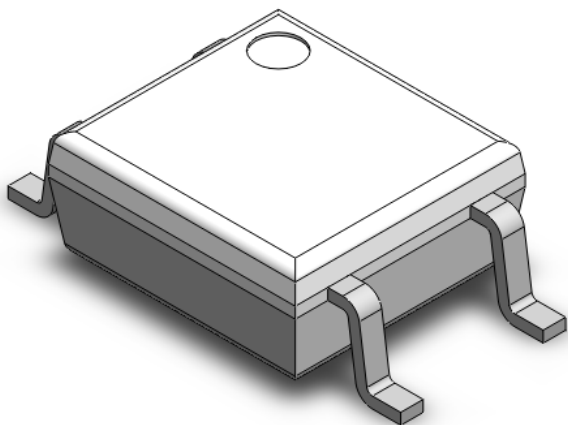
Description

The CT452 consists of a High B_{VCE0} Photodarlington optically coupled to an Infrared-emitting diode in a 4-lead Mini-Flat DMC-Isolator® package with bending option.

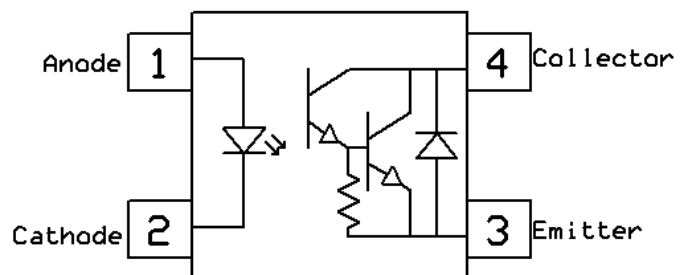
Applications

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

Package Outline



Schematic





DC Input 4-Pin Mini-Flat DMC-Isolator®
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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	3750	V _{RMS}	
T _{OPR}	Operating temperature	-55 ~ +110	°C	
T _{STG}	Storage temperature	-55 ~ +125	°C	
T _{SOL}	Soldering temperature	260	°C	
P _{TOT}	Total power dissipation	170	mW	
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 _C	Power dissipation	150	mW	
Detector				
P _D	Power dissipation	150	mW	
B _{VCEO}	Collector-Emitter Breakdown Voltage	350	V	
B _{VECO}	Emitter-Collector Breakdown Voltage	0.1	V	
I _C	Collector Current	150	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	$I_F = 10\text{mA}$	-	1.24	1.4	V	
I_R	Reverse Current	$V_R = 6\text{V}$	-	-	5	μA	
C_{IN}	Input Capacitance	$f = 1\text{MHz}$	-	15	-	pF	

Detector Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$B_{V_{CE0}}$	Collector-Emitter Breakdown	$I_C = 100\mu\text{A}$	350	-	-	V	
$B_{V_{ECO}}$	Emitter-Collector Breakdown	$I_E = 100\mu\text{A}$	0.1	-	-	V	
I_{CE0}	Collector-Emitter Dark Current	$V_{CE} = 200\text{V}$, $I_F = 0\text{mA}$	-	-	100	nA	

Transfer Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
CTR	Current Transfer Ratio	$I_F = 1\text{mA}$, $V_{CE} = 2\text{V}$	1000		15000	%	
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	$I_F = 20\text{mA}$, $I_C = 100\text{mA}$	-	-	1.2	V	
R_{IO}	Isolation Resistance	$V_{IO} = 500\text{V}_{DC}$	5×10^{10}	-	-	Ω	
C_{IO}	Isolation Capacitance	$f = 1\text{MHz}$	-	0.6	-	pF	

Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
t_r	Rise Time	$I_C = 20\text{mA}$, $V_{CE} = 2\text{V}$,	-	100	250	μs	
t_f	Fall Time	$R_L = 100\Omega$	-	20	95		



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

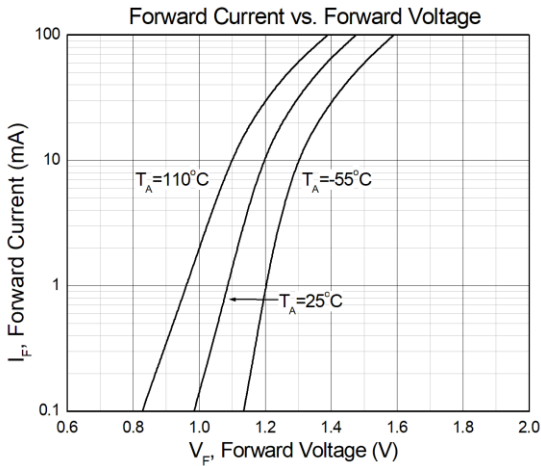


Figure 1

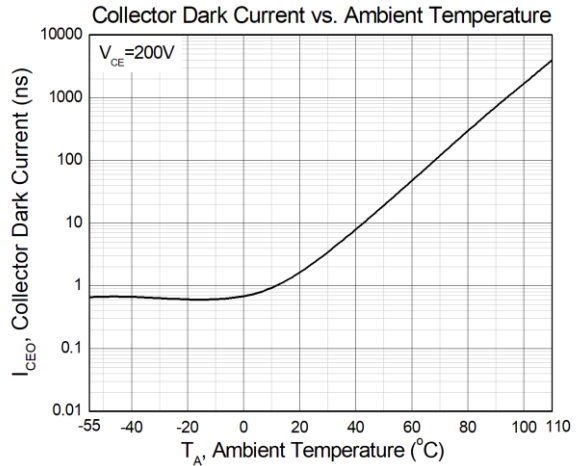


Figure 2

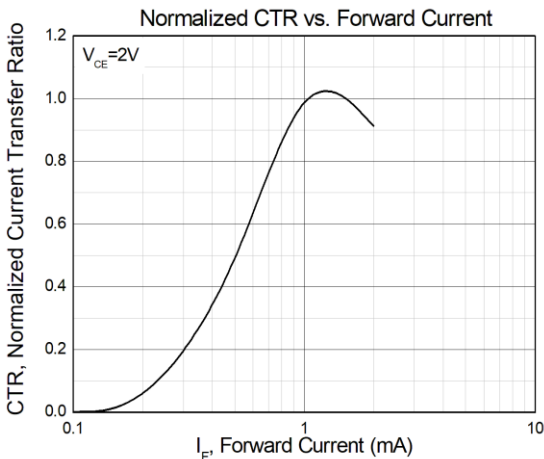


Figure 3

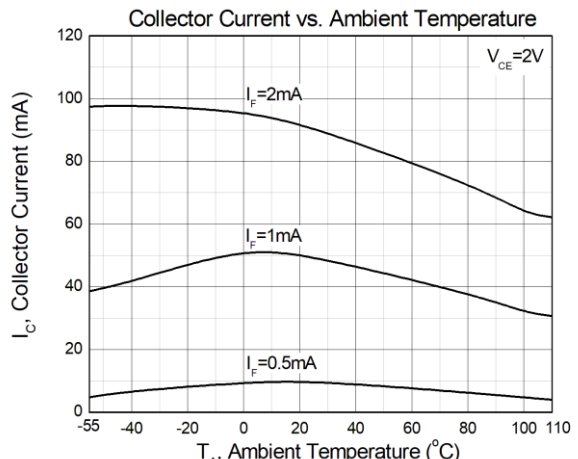


Figure 4

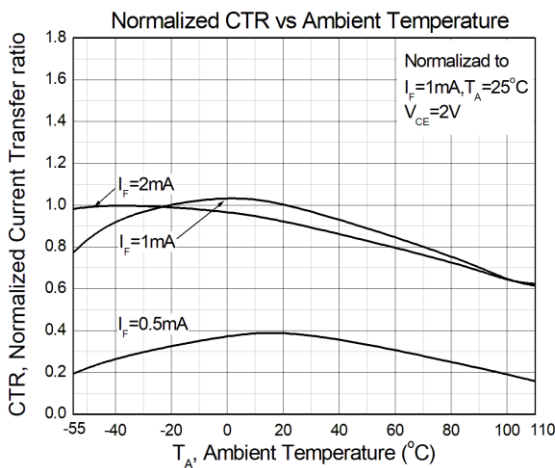


Figure 5

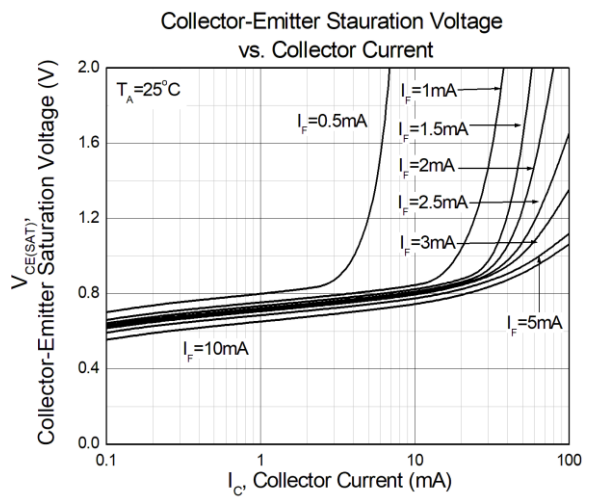


Figure 6



CT452 Series DC Input 4-Pin Mini-Flat DMC-Isolator® High V_{CE0} Photo Darlington Optocoupler

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

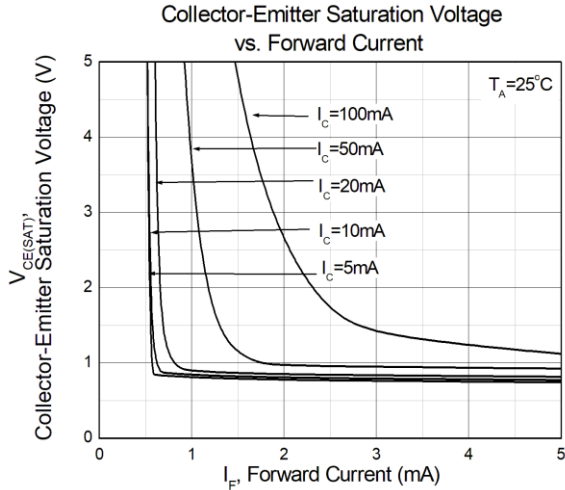


Figure 7

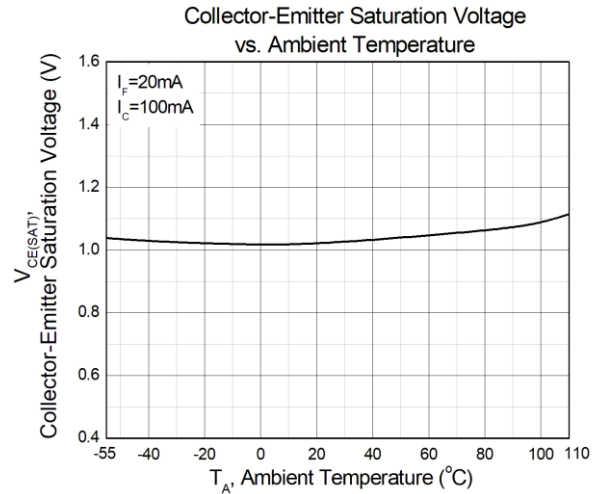


Figure 8

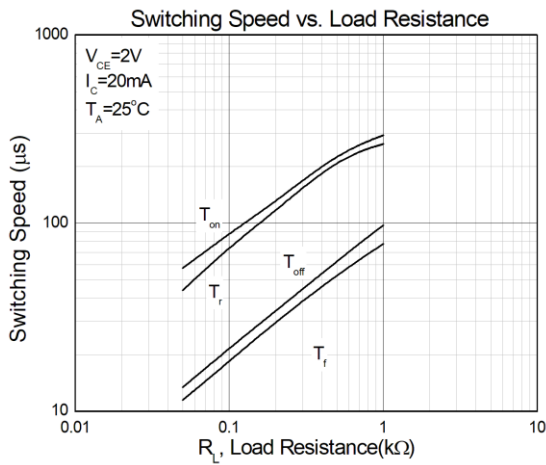


Figure 9

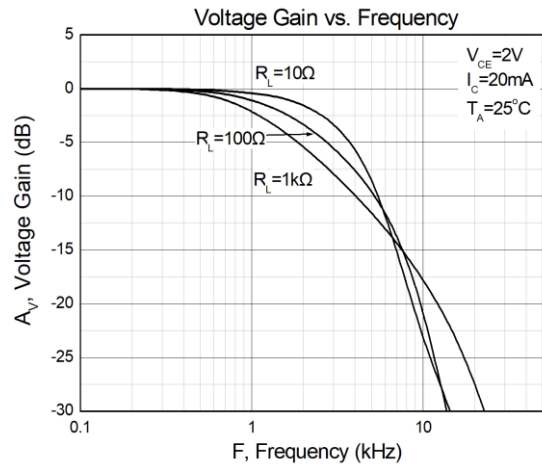


Figure 10



Test Circuit

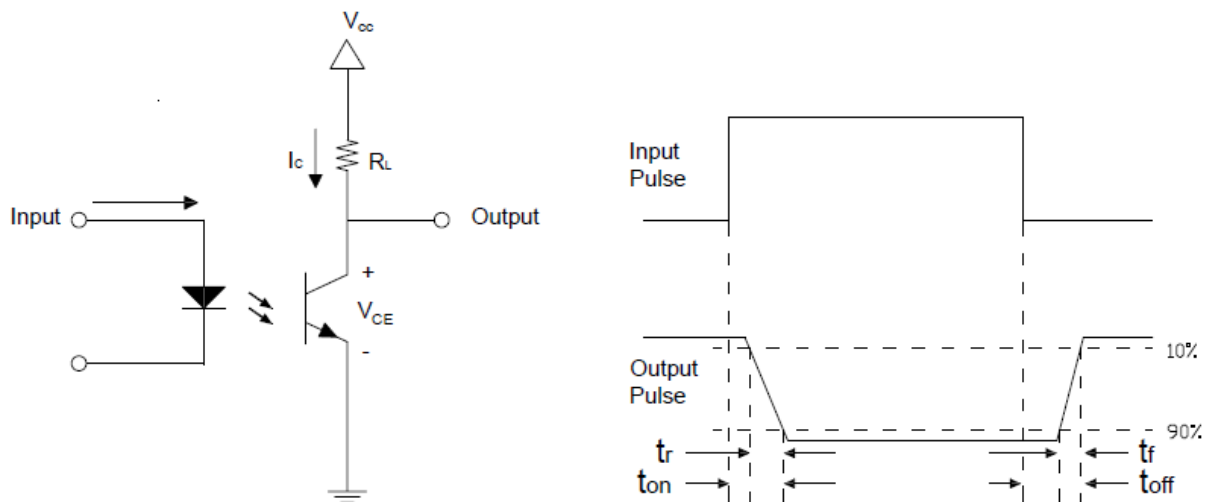


Figure 11: Switching Time Test Circuits

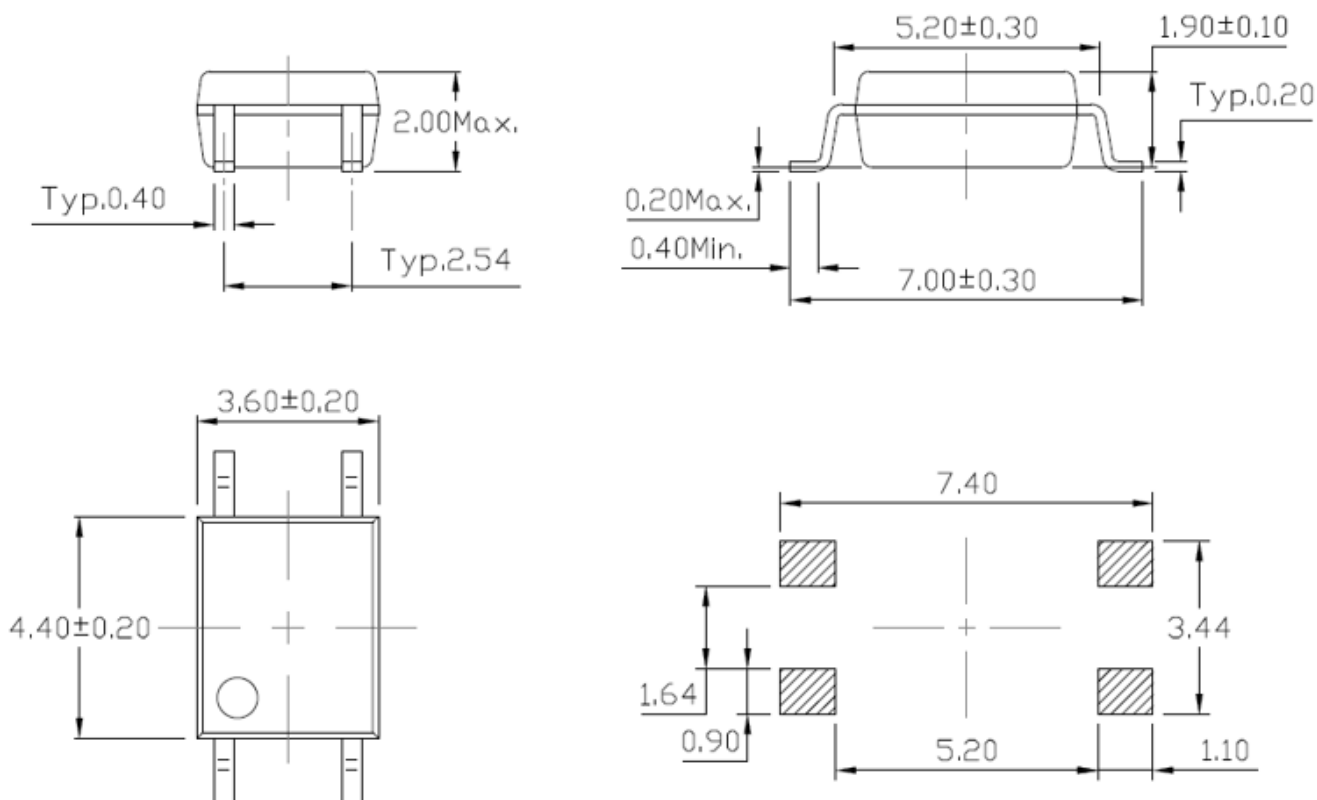


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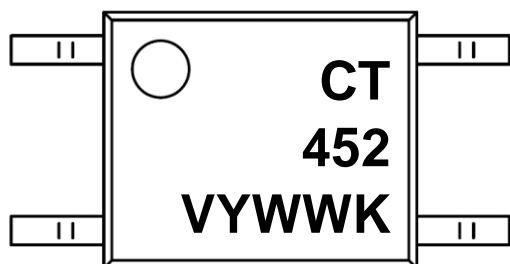
CT452 Series

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Package Dimension *Dimensions in mm unless otherwise stated*



Marking Information



Note:

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



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CT452 Series

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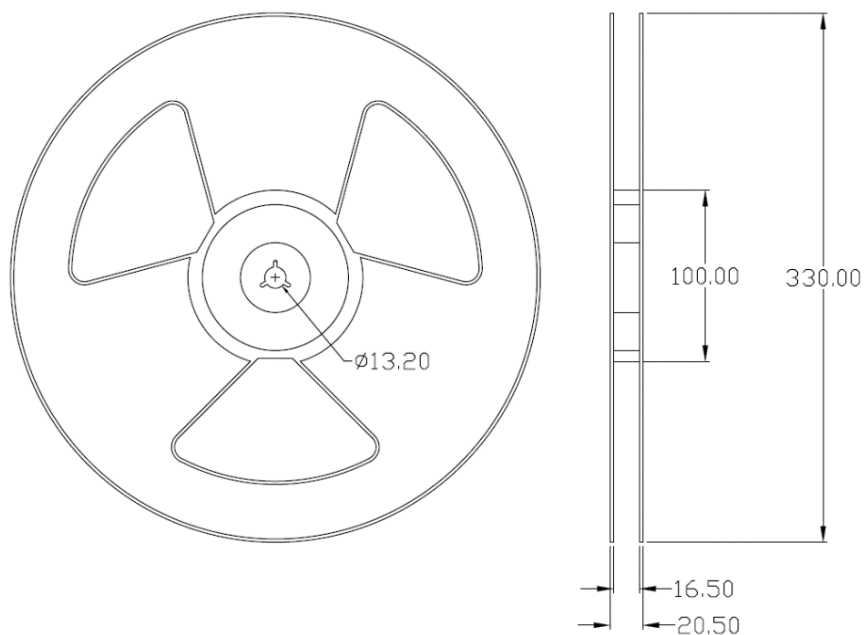
Ordering Information

CT452(V)(Z)

- CT = Denotes "CT Micro"
- 452 = Part Number
- 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	3000 Units/Reel
T2	Surface Mount Lead Forming – With Option 2 Taping	3000 Units/Reel

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



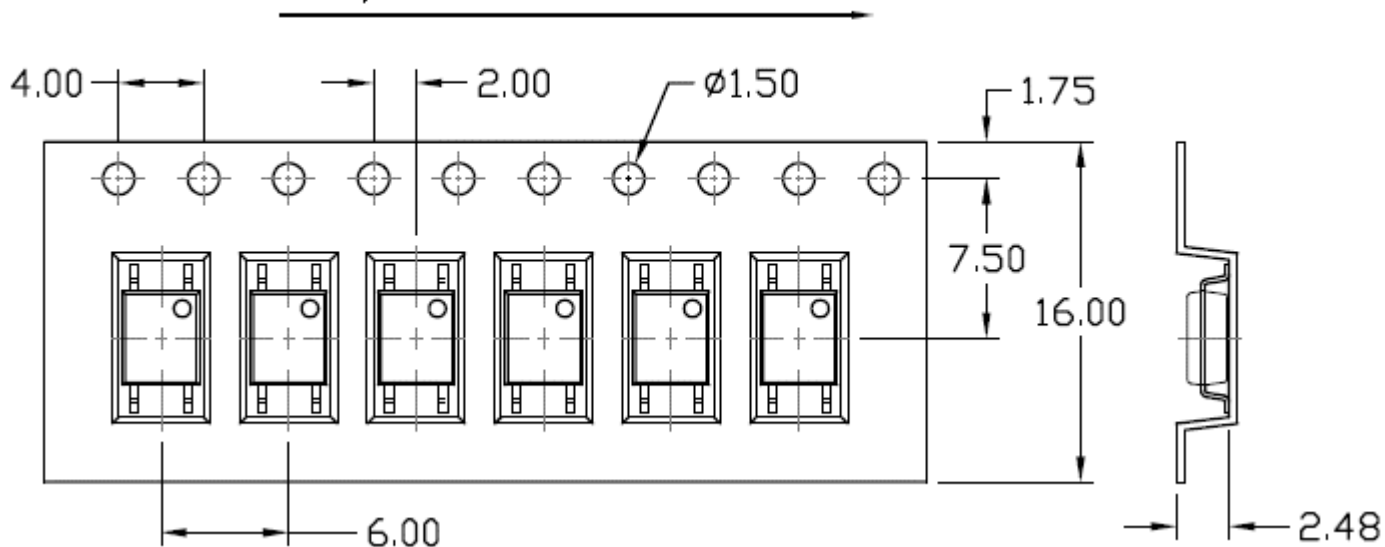


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Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

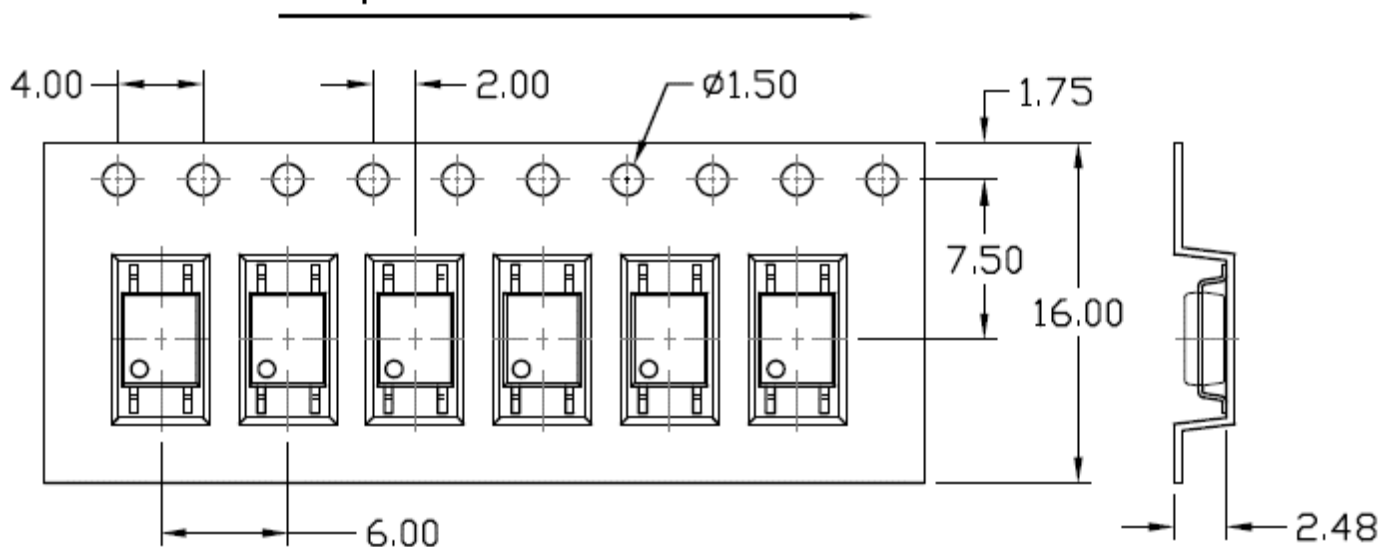
Option T1

Input Direction



Option T2

Input Direction





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Solderability Specification (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)

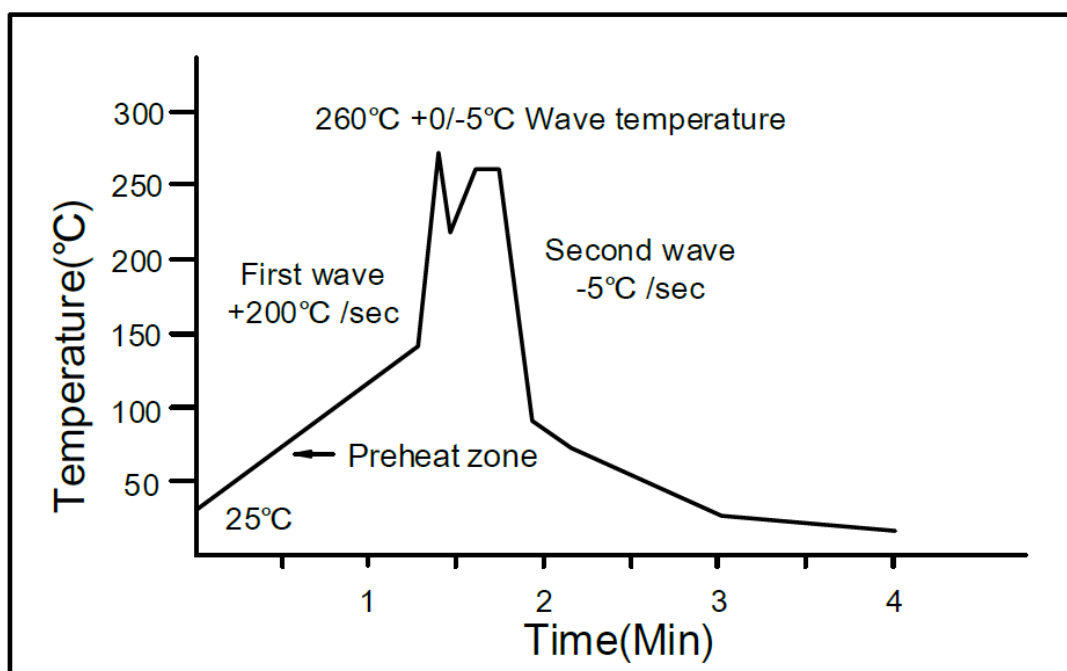
One time soldering is recommended within the condition of temperature.

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.

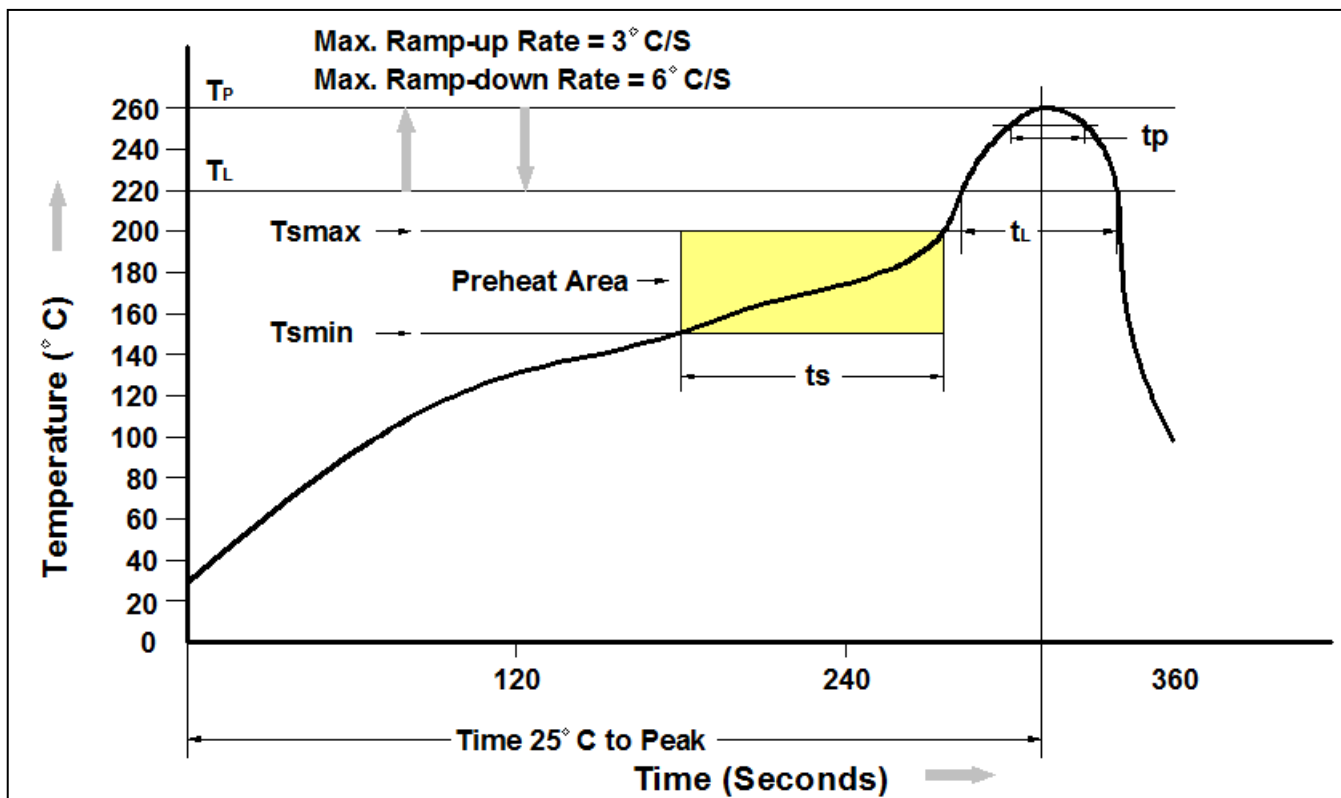
Temperature: $350 \pm 10^\circ\text{C}$

Time: 5 sec max.



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



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (Tsmmin)	150°C
Temperature Max. (Tsmax)	200°C
Time (ts) from (Tsmmin 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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- 2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness*