www.ct-micro.com

CT452 Series

DC Input 4-Pin Mini-Flat DMC-Isolator®

High B_{VCEO} Photo Darlington Optocoupler

Features

- High isolation 3750 VRMS
- High B_{VCEO} = 350V
- Patented coplanar structure DMC-Isolator®
- DC input with Darlington output
- Operating Temperature range - 55 °C to 110 °C
- External Creepage ≥ 5.0mm
- Distance Through Isolation ≥ 0.4mm
- Clearance Distance ≥ 5.0mm
- 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)

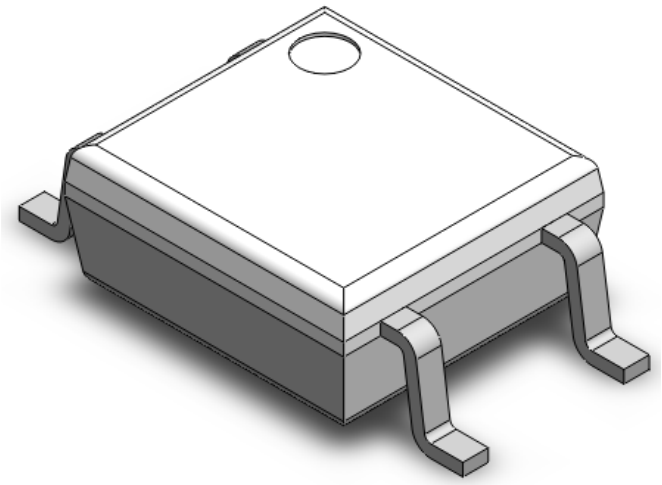
Description

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

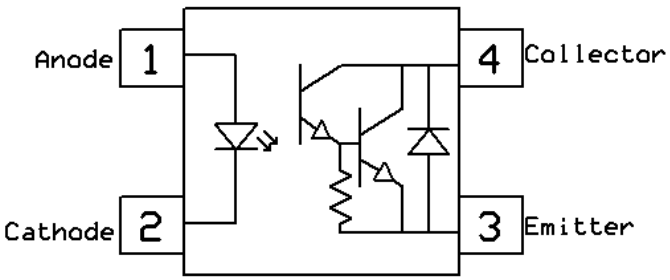
Applications

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

Package Outline



Schematic



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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	^{0}C	
T_{STG}	Storage temperature	-55 ~ +125	^{0}C	
T_{SOL}	Soldering temperature (For 10 seconds)	260	^{0}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°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	-	15	-	pF	

Detector Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
B_{VCEO}	Collector-Emitter Breakdown	I_C= 100μA	350	-	-	V	
B_{VECO}	Emitter-Collector Breakdown	I_E= 100μA	0.1	-	-	V	
I_{CEO}	Collector-Emitter Dark Current	V_{CE}= 200V, I_F=0mA	-	-	100	nA	

Transfer Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
CTR	Current Transfer Ratio	I_F= 1mA, V_{CE}= 2V	1000		15000	%	
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	I_F= 20mA, I_C= 100mA	-	-	1.2	V	
R_{IO}	Isolation Resistance	V_{IO}= 500V_{DC}	$5x10^{10}$	-	-	Ω	
C_{IO}	Isolation Capacitance	f= 1MHz	-	0.6	-	pF	

Switching Characteristics

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

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

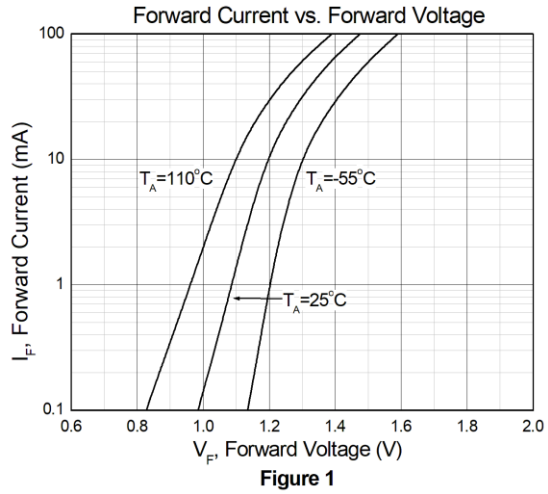

Figure 1

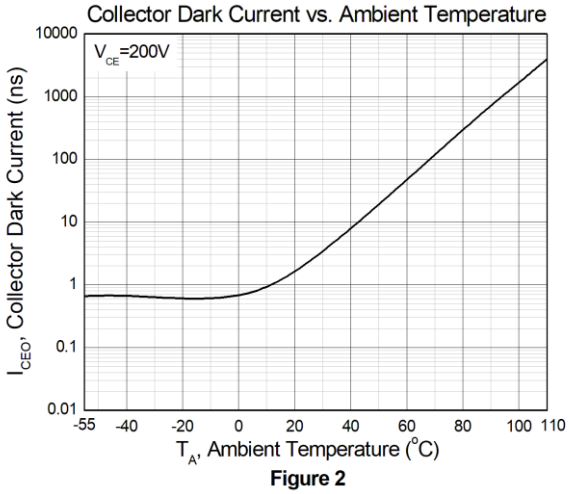

Figure 2

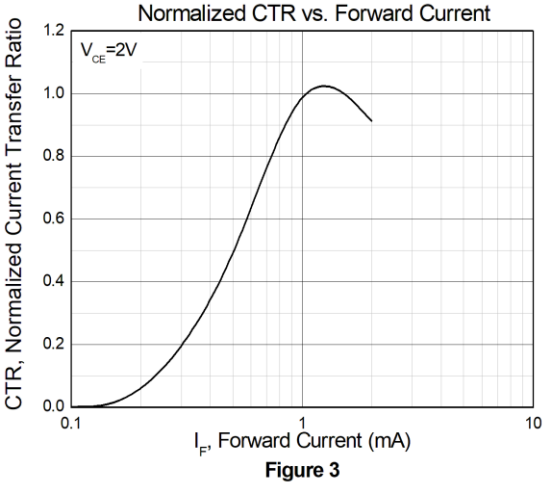

Figure 3

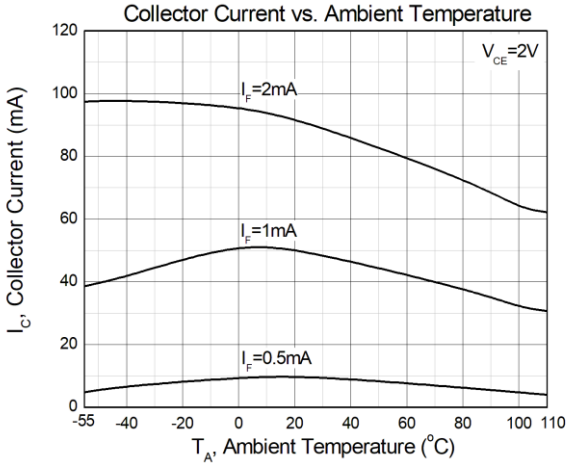

Figure 4

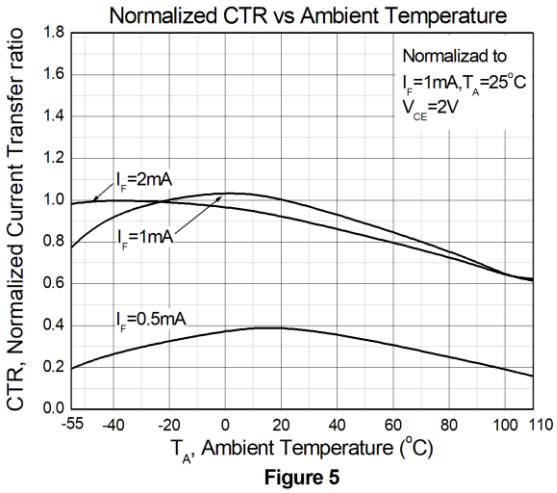

Figure 5

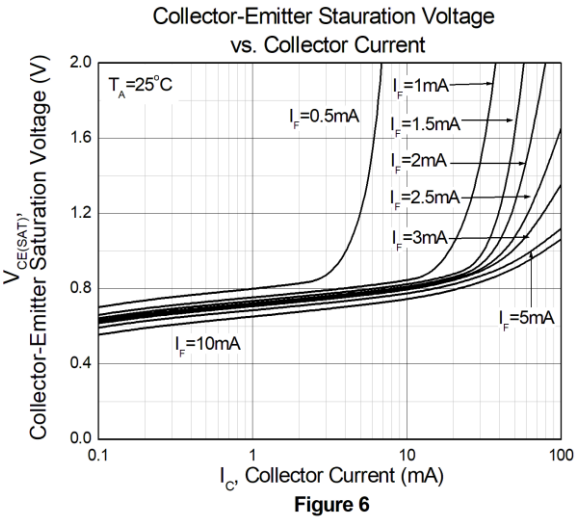

Figure 6

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

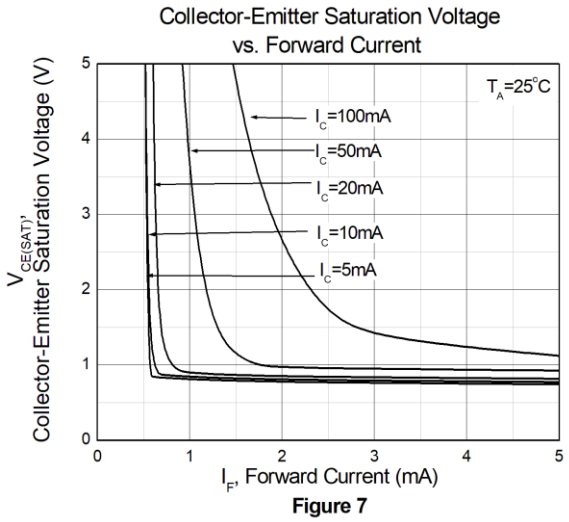

Figure 7

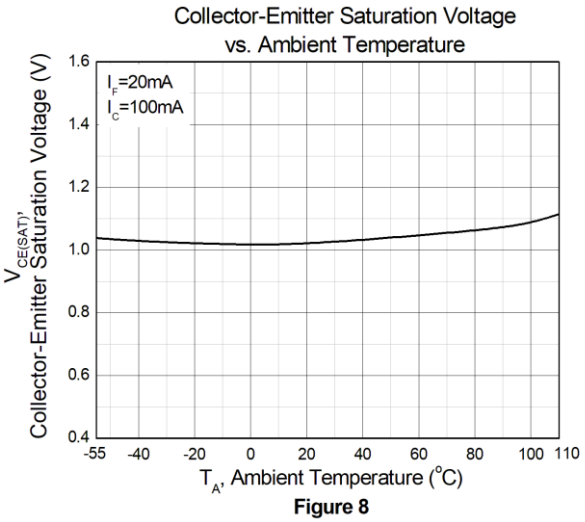

Figure 8

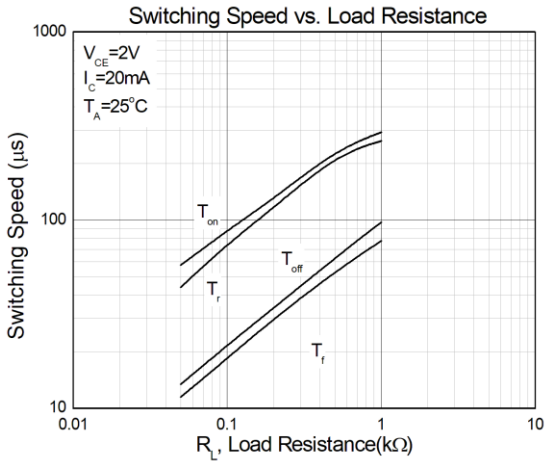

Figure 9

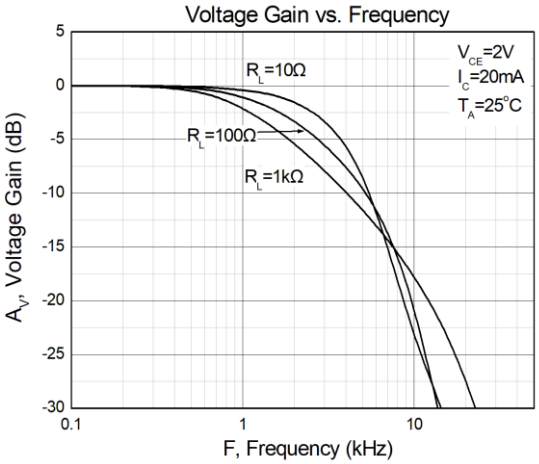

Figure 10

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Test Circuit

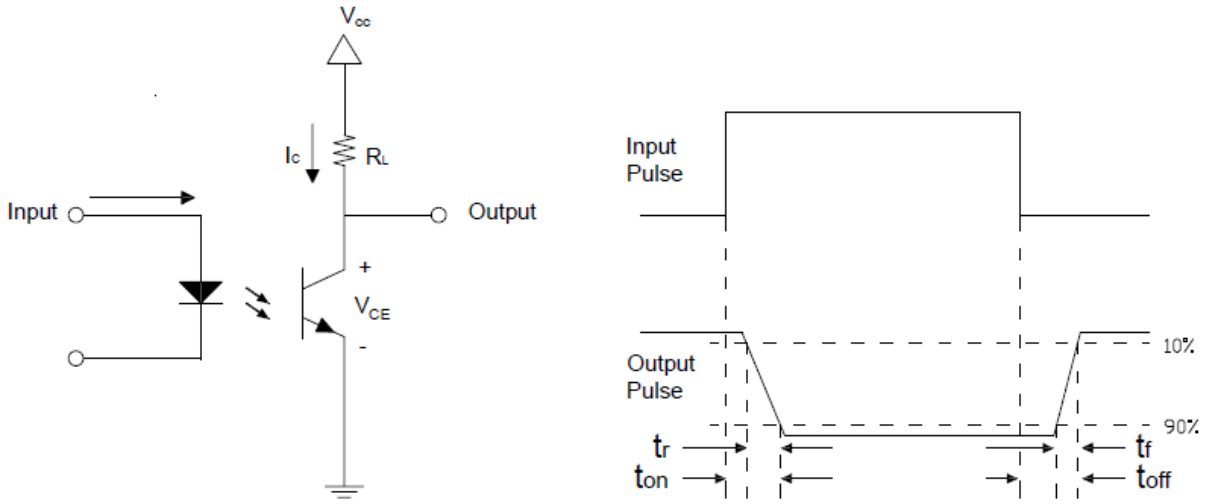

Figure 11: Switching Time Test Circuits

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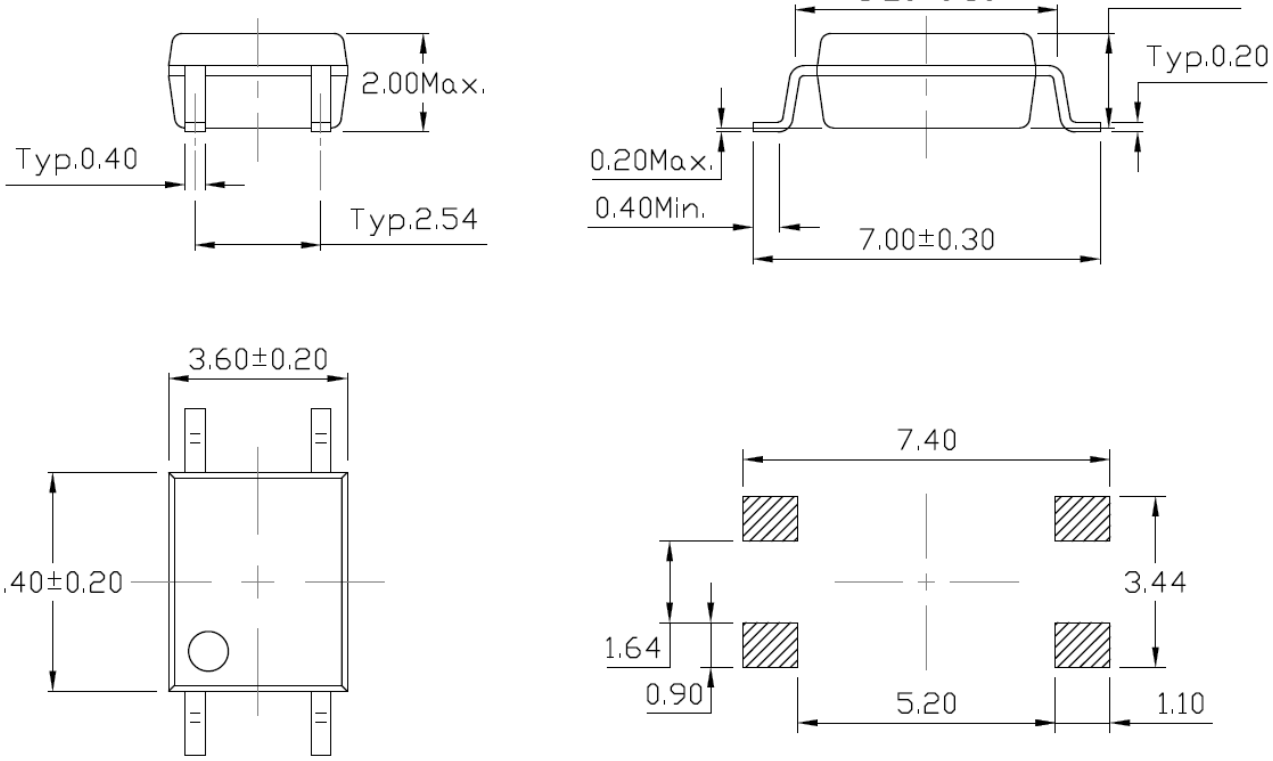
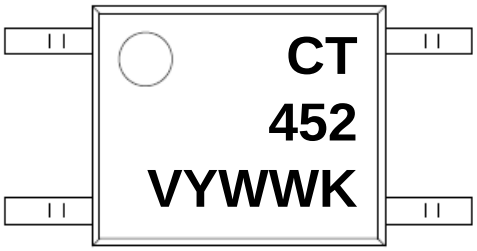
Package Dimension *Dimensions in mm unless otherwise stated*



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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Ordering Information

CT452 (V)(Z)

CT = Denotes “CT Micro”

452 = Part Number

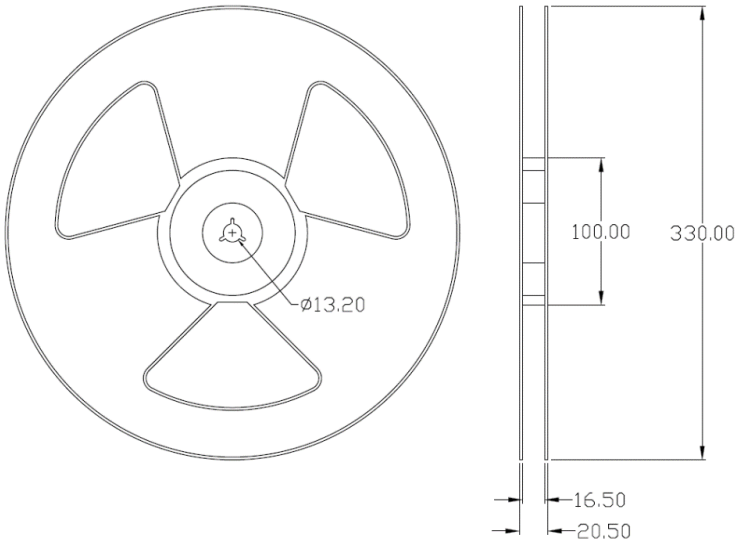
V = VDE Safety Mark Option (Blank or V)

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*

Option T1/T2



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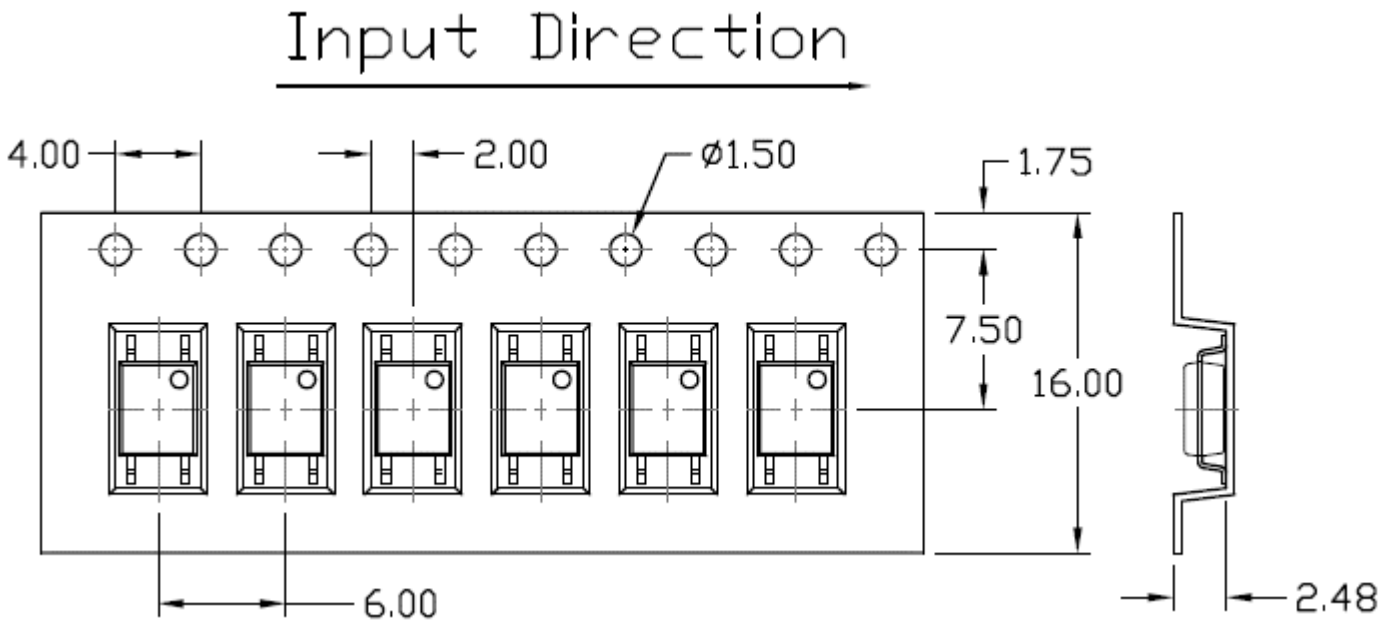
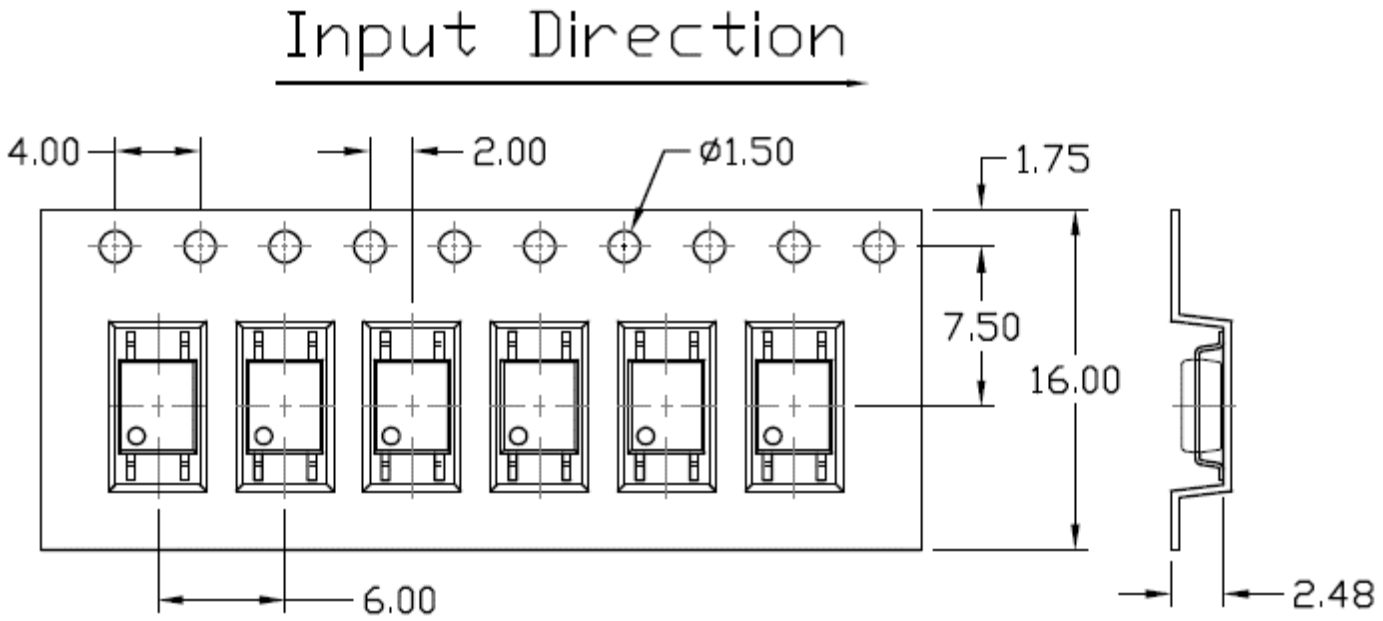
Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

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)

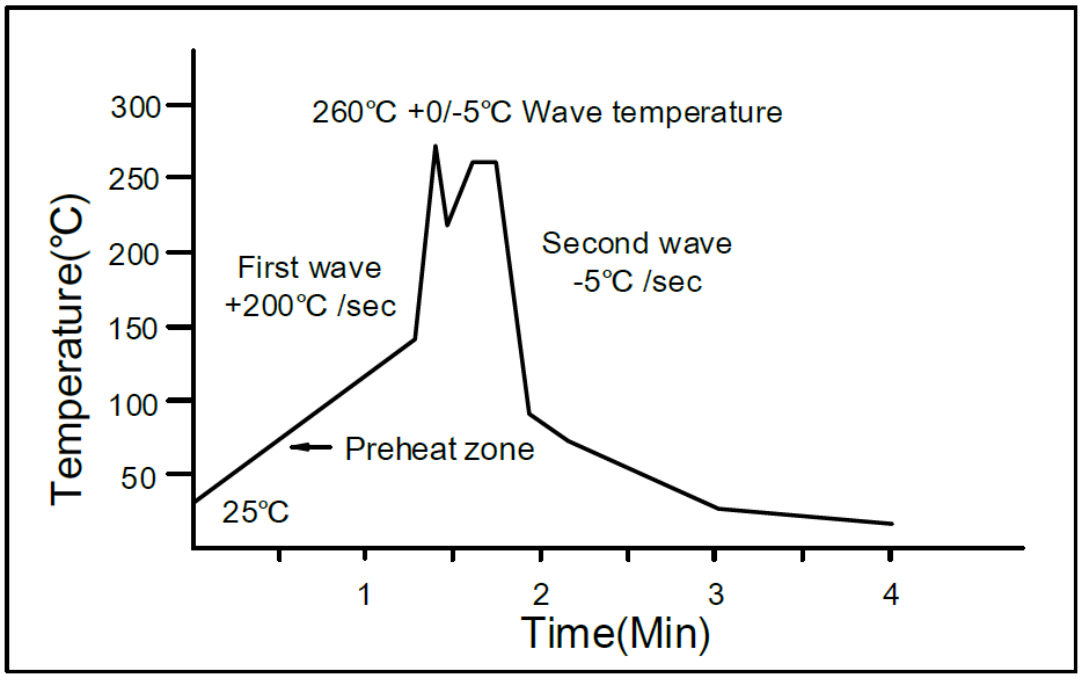
One time soldering is recommended within the condition of temperature.

Temperature: 260+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.

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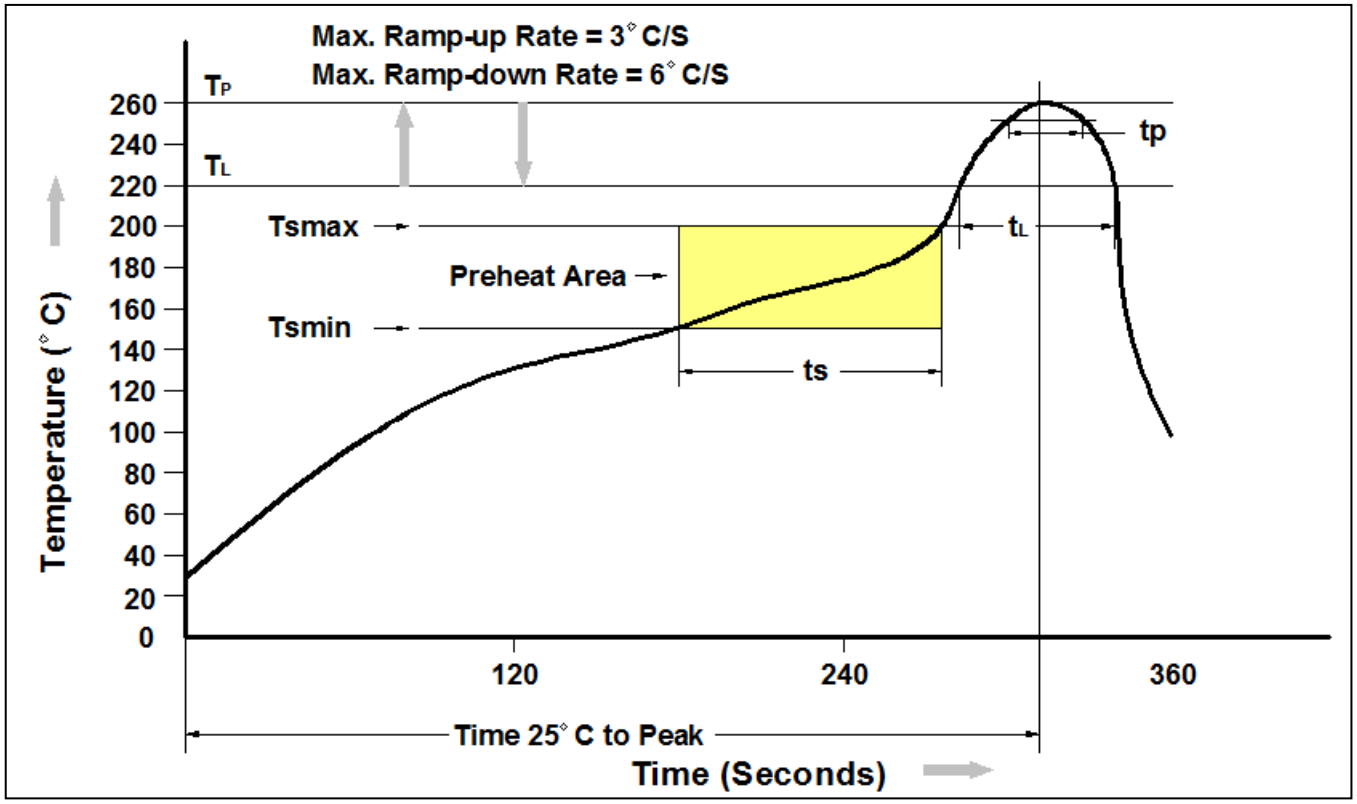
Reflow Profile (Follow the JEDEC standard J-STD-020)



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 (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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