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CTM3051, CTM3052, CTM3053

600V Random Phase MFP-4L DMC-Isolator®

Phototriac Optocoupler

Features

- High isolation 3750 VRMS
- Patented coplanar structure DMC-Isolator®
- Peak Breakdown Voltage 600V
- Operating temperature range - 55 °C to 100 °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
  - ✓ IEC60065, IEC60950

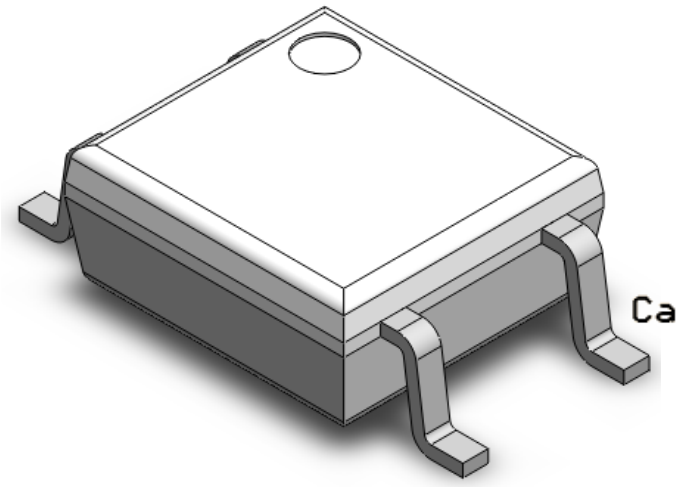
Description

The CTM3051, CTM3052, CTM3053 series consists of a Random Phase Photo Triac optically coupled to an Infrared-emitting diode in a a 4-lead Mini-Flat DMC-Isolator® package.

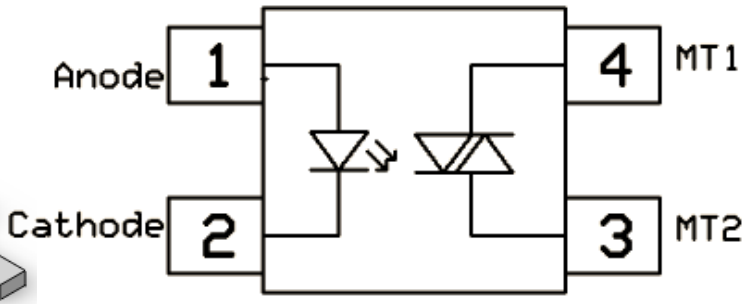
Applications

- Motor Controls
- Lamp ballasts
- Static AC Power Switch
- Solenoid/ Valve Control

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 ~ +100	°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	60	mA	
$I_{F(TRANS)}$	Peak transient current (≤1μs P.W,300pps)	1	A	
V_R	Reverse voltage	6	V	
P_D	Power dissipation	100	mW	
Detector				
P_D	Power dissipation	300	mW	
V_{DRM}	Off-State Output Terminal Voltage	600	V	
I_{TSM}	Peak Repetitive Surge Current	1	A	

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	-	-	1.5	V	
I_R	Reverse Current	V_R = 6V	-	-	5	μA	
C_{IN}	Input Capacitance	f= 1MHz	-	45	-	pF	

Detector Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
I_{DRM}	Peak Blocking Current	I_F= 0mA, V_{DRM}= Rated V_{DRM}	-	-	100	nA	
V_{TM}	Peak On-State Voltage	I_F= Rated I_{FT}, I_{TM}= 100mA	-	-	2.5	V	
dv/dt	Critical Rate of Rise off-State Voltage	V_{PEAK}= Rated V_{DRM}	1000	-	-	V/μs	

Transfer Characteristics

Symbol	Parameters		Test Conditions	Min	Typ	Max	Units	Notes
I_{FT}	Input Trigger Current	CTM3051	Terminal Voltage = 3V I_{TM}=100mA	-	-	15	mA	
		CTM3052		-	-	10		
		CTM3053		-	-	5		
I_H	Holding Current		Terminal Voltage from “ON” to “OFF” “ON” state I_F=0mA	-	250	-	μA	
R_{IO}	Isolation Resistance		V_{IO}= 500V_{DC}, 40 ~ 60% R.H.	$1x10^{11}$	-	-	Ω	
C_{IO}	Isolation Capacitance		f= 1MHz	-	0.25	-	pF	

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

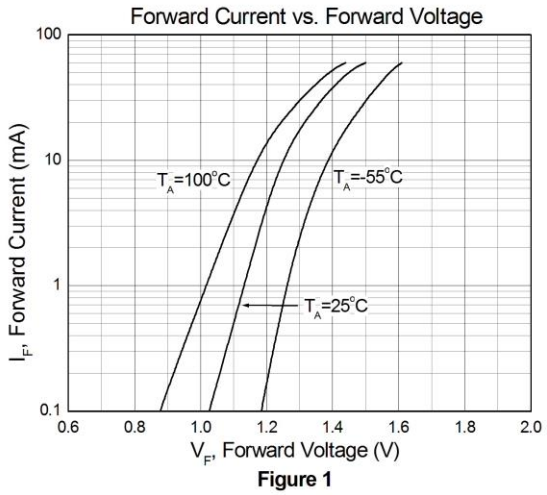


Figure 1

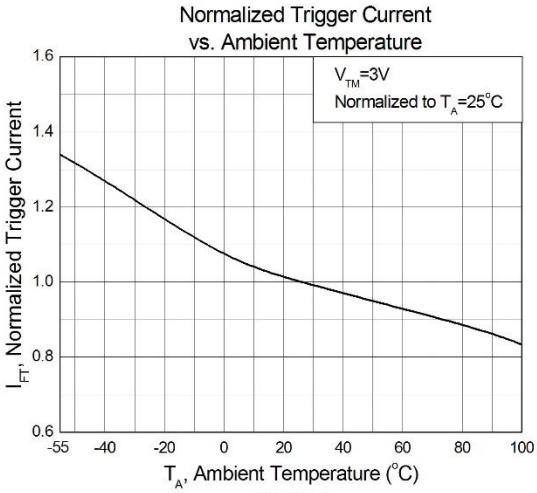


Figure 2

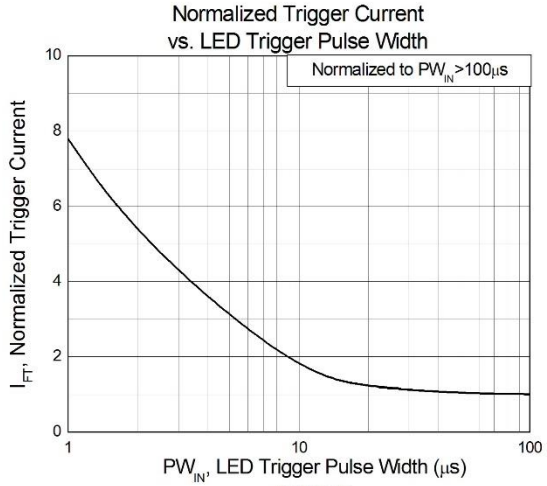


Figure 3

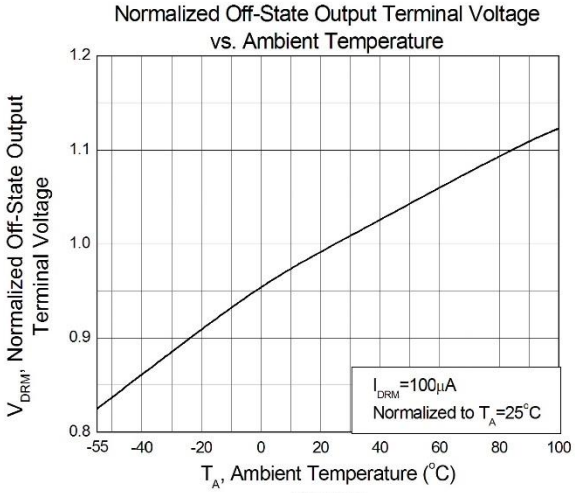


Figure 4

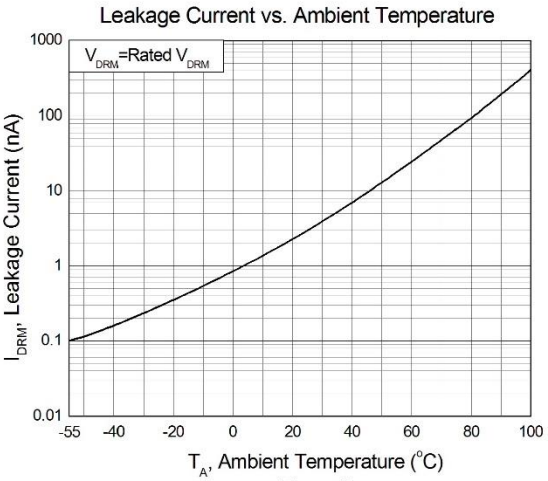


Figure 5

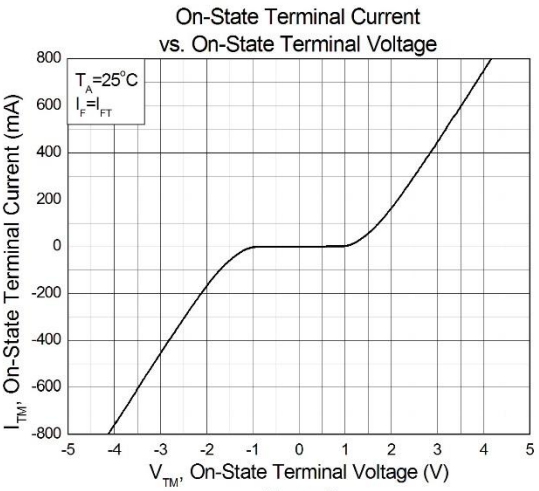


Figure 6

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

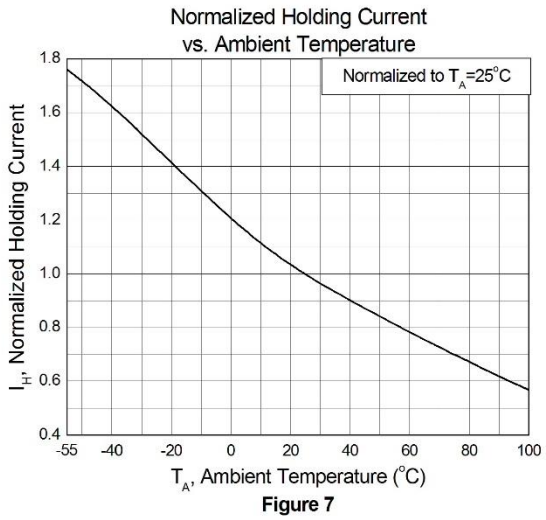
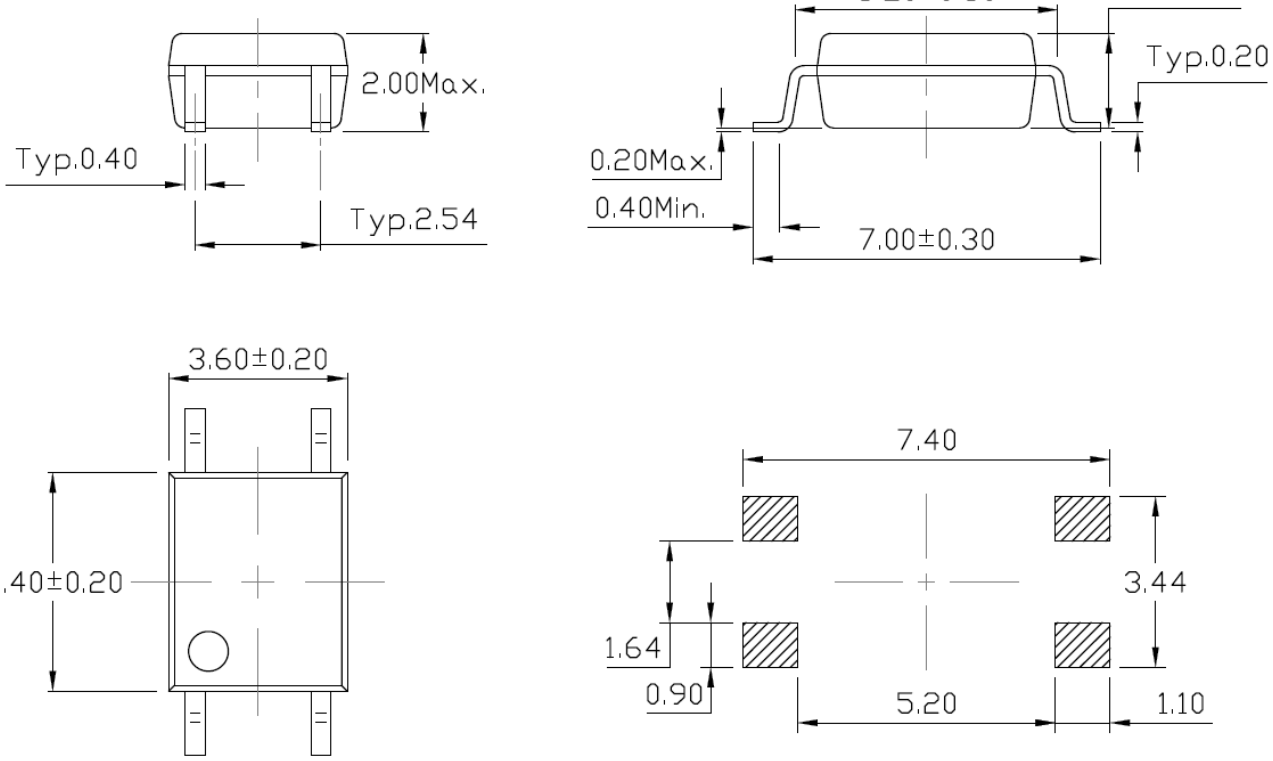
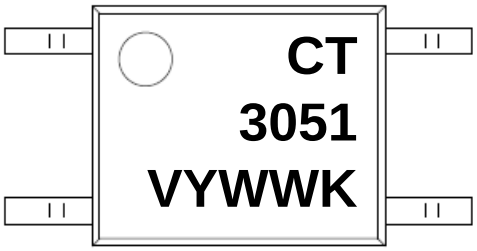


Figure 7

Package Dimension *Dimensions in mm unless otherwise stated*



Marking Information



Note:

CT	: Denotes “CT Micro”
3051	: Part Number
V	: VDE Safety Mark Option (Blank or V)
Y	: One Digit Year Code
WW	: Two Digit Work Week
K	: Manufacturing Code

Ordering Information

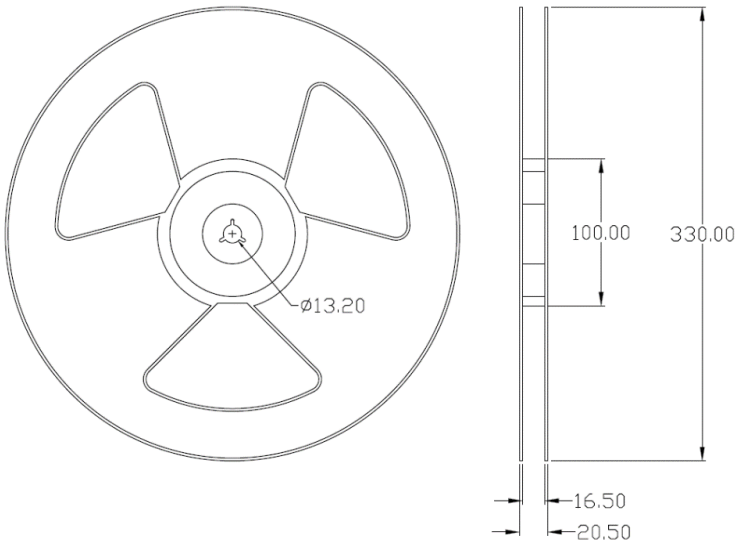
CTM305X(V)(Z)

CT = Denotes “CT Micro”
305X = Part No. (CT305X:0,1,2)
V = VDE Safety Mark Option (Blank or V)
Y = Lead Form Option (Blank or MFP)
Z = Tape and Reel Option (Blank, T1 or T2)
G = Material Option (G: Halogen Free, Blank: Non-Halogen Free)

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

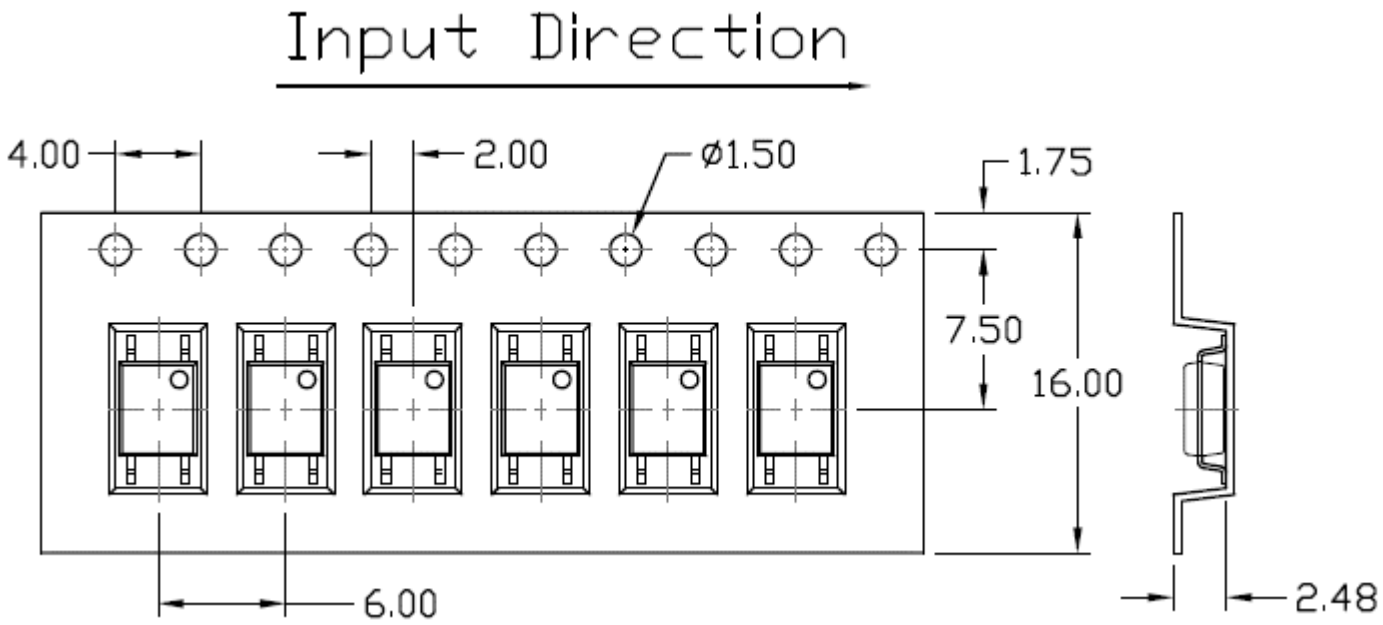
Reel Dimension *All dimensions are in mm, unless otherwise stated*

Option T1/T2

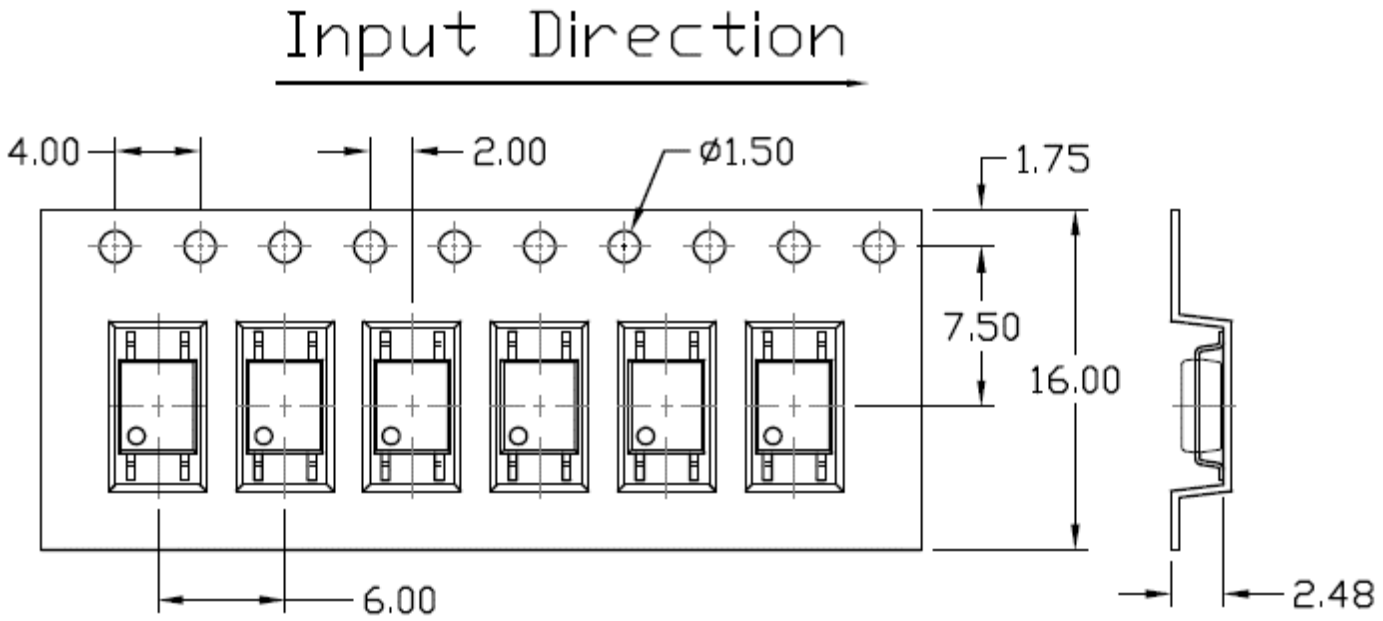


Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

Option T1



Option T2

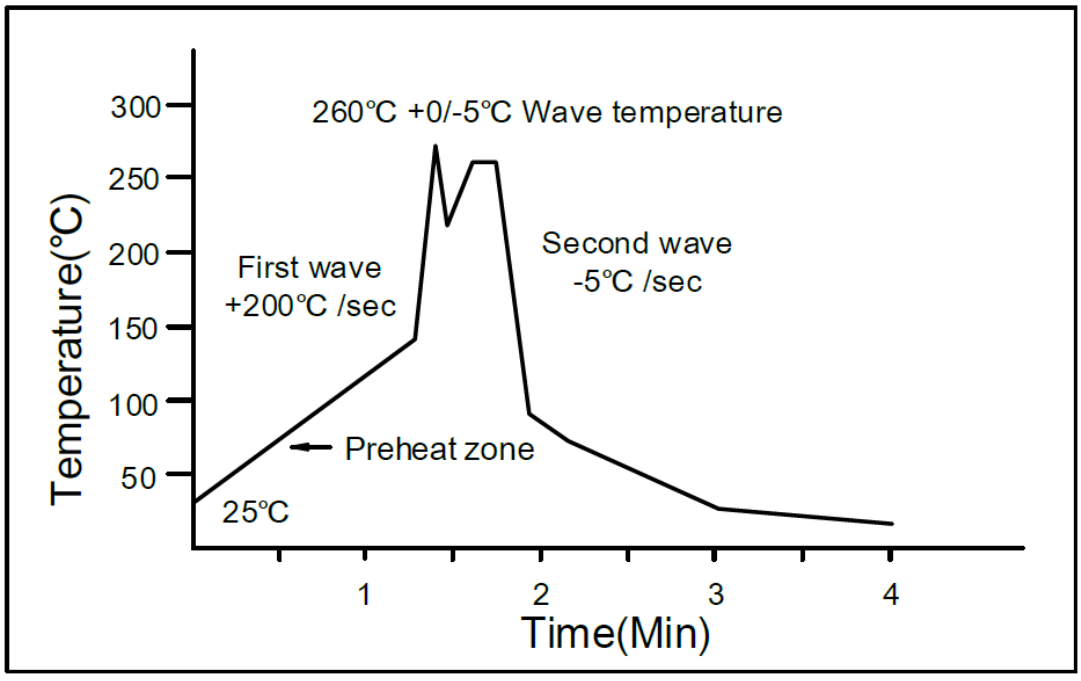


Solderability spec (Follow the JEDEC standard JESD22-B102)

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)

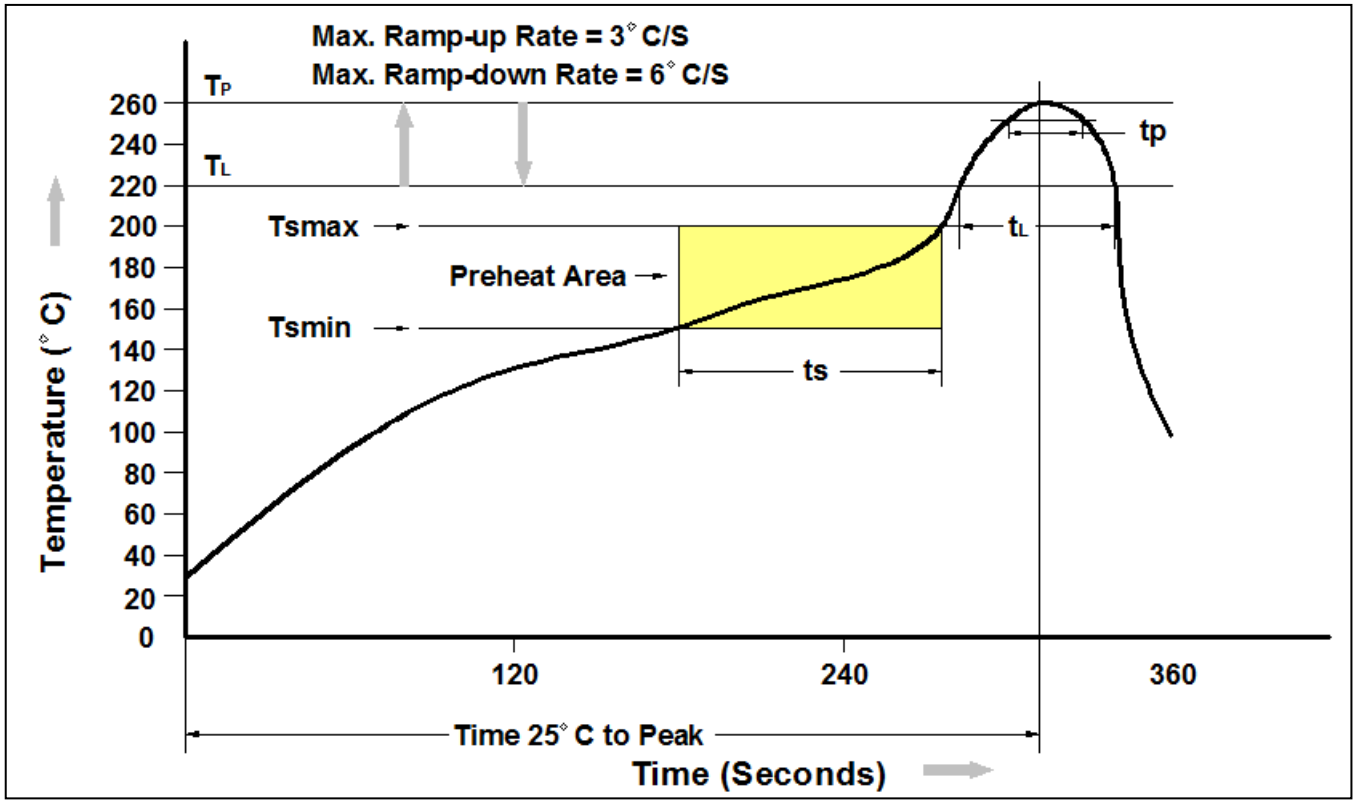
One time soldering is recommended within the condition of temperature.
Temperature: 260+0/-5˚C.
Time: 10 sec.
Preheat temperature: 25 to 140˚C.
Preheat time: 30 to 80 sec.



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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