

MCT6, MCT61, MCT62, MCT66



DESCRIPTION

The MCT6, MCT61, MCT62 and MCT66 dual channel optically coupled isolators consist of an infrared light emitting diode and an NPN silicon photo transistor mounted in a space efficient Dual In Line Plastic Package.

FEATURES

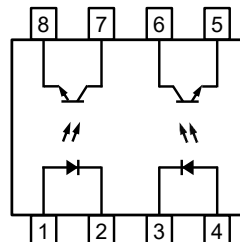
- AC Isolation Voltage 5000V_{RMS}
- BV_{CEO} 30V min
- Wide Operating Temperature Range -40°C to +105°C
- RoHS Compliant
- UL File E91231 Model "FF"
- VDE Approval 40028086

APPLICATIONS

- Programmable Controllers
- Hybrid substrates require high density mounting.

ORDER INFORMATION

- Add Suffix "X" for VDE Approval
- Add G after PN for 10mm lead spacing
- Add SM after PN for Surface Mount
- Add SMT&R after PN for Surface Mount Tape & Reel



1, 4 Anode
2, 3 Cathode
5, 8 Emitter
6, 7 Collector

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Stresses exceeding the absolute maximum ratings can cause permanent damage to the device. Exposure to absolute maximum ratings for long periods of time can adversely affect reliability.

Input

Forward Current	50mA
Pulse Forward Current (Pulse 100µs Frequency 100Hz)	1A
Reverse Voltage	6V
Power Dissipation	70mW

Output

Collector to Emitter Voltage V _{CEO}	70V
Emitter to Collector Voltage V _{ECO}	6V
Collector Current	50mA
Power Dissipation	150mW

Total Package

Isolation Voltage	5000V _{RMS}
Total Power Dissipation	200mW
Operating Temperature	-40 to +105°C
Storage Temperature	-55 to +125°C
Junction Temperature	125°C
Lead Soldering Temperature (10s)	260°C

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ELECTRICAL CHARACTERISTICS (Ambient Temperature = 25°C unless otherwise specified)

INPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Forward Voltage	V_F	$I_F = 20\text{mA}$		1.2	1.4	V
Reverse Current	I_R	$V_R = 4\text{V}$			10	μA
Terminal Capacitance	C_t	$V = 0\text{V}, f = 1\text{KHz}$		30	250	pF

OUTPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CEO}	$I_C = 1\text{mA}$	30			V
Emitter-Collector Breakdown Voltage	BV_{ECO}	$I_E = 10\mu\text{A}$	6			V
Collector-Emitter Dark Current	I_{CEO}	$V_{CE} = 20\text{V}$			100	nA

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ELECTRICAL CHARACTERISTICS (Ambient Temperature = 25°C unless otherwise specified)

COUPLED

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Current Transfer Ratio	CTR	$I_F = 10\text{mA}, V_{CE} = 10\text{V}$				%
		MCT6	20			
		MCT66	6			
		$I_F = 5\text{mA}, V_{CE} = 5\text{V}$				
		MCT61	50			
		MCT62	100			
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F = 16\text{mA}, I_C = 2\text{mA}$			0.4	V
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		$I_F = 40\text{mA}, I_C = 2\text{mA}$			0.4	
		MCT66				
Floating Capacitance	C_f	$V = 0\text{V}, f = 1\text{MHz}$		0.6	1	pF
Cut-Off Frequency	f_c	$V_{CE} = 5\text{V}, I_C = 2\text{mA}$ $R_L = 100\Omega$ -3dB		80		kHz
Output Rise Time	t_r	$V_{CE} = 2\text{V}$ $I_C = 2\text{mA}$ $R_L = 100\Omega$		4	18	μs
Output Fall Time	t_f			3	18	

ISOLATION

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Input to Output Isolation Voltage	V_{ISO}	AC 1 minute, RH = 40% to 60% Note 1	5000			V_{RMS}
Input to Output Isolation Resistance	R_{ISO}	$V_{IO} = 500\text{V}$, RH = 40% to 60% Note 1	5×10^{10}	1×10^{11}		Ω

Note 1 : Measure with input leads shorted together and output leads shorted together.

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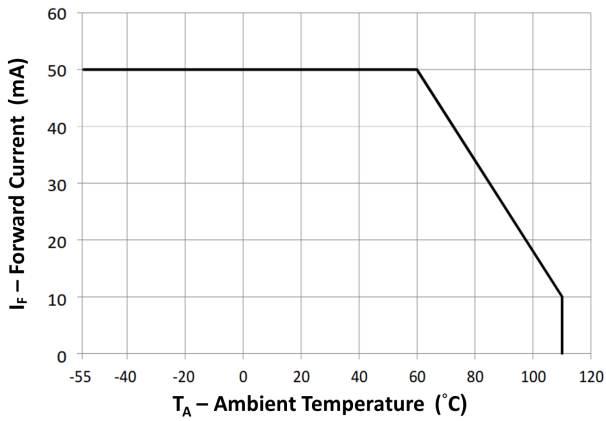


Fig 1 Forward Current vs Ambient Temperature

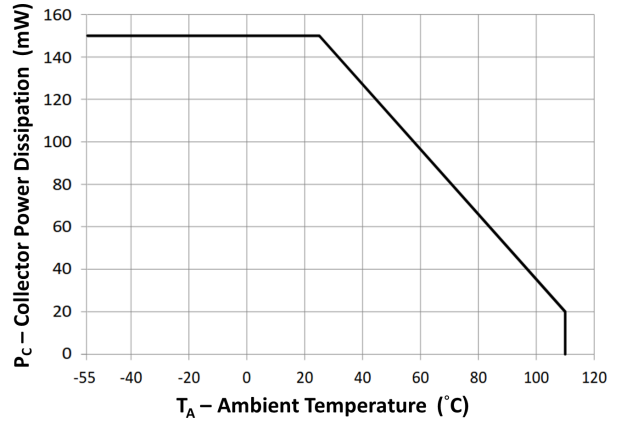


Fig 2 Collector Power Dissipation vs Ambient Temperature

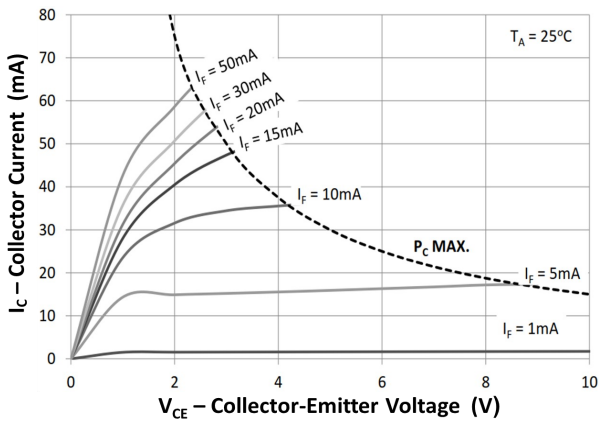


Fig 3 Collector Current vs Collector-Emitter Voltage (1)

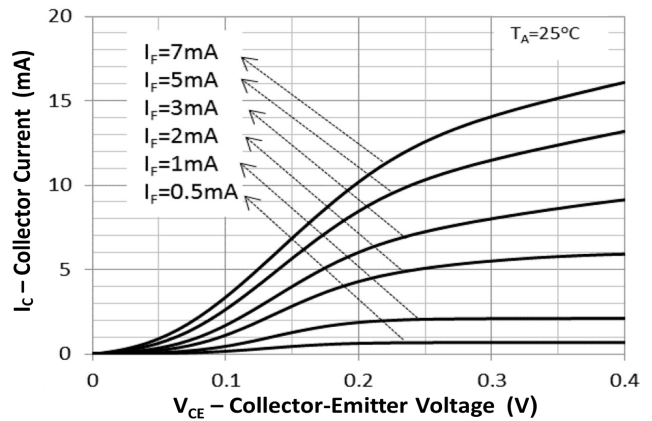


Fig 4 Collector Current vs Collector-Emitter Voltage (2)

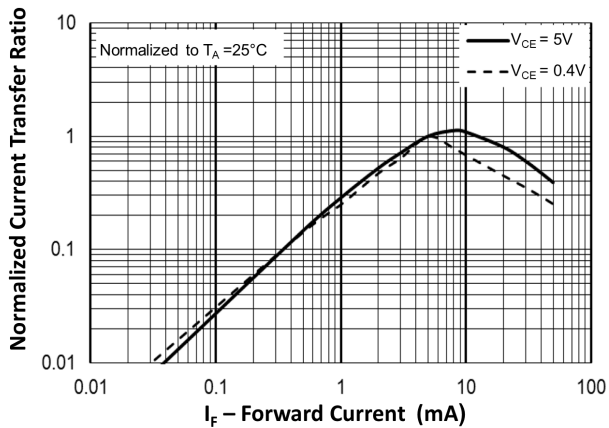


Fig 5 Current Transfer Ratio vs Forward Current

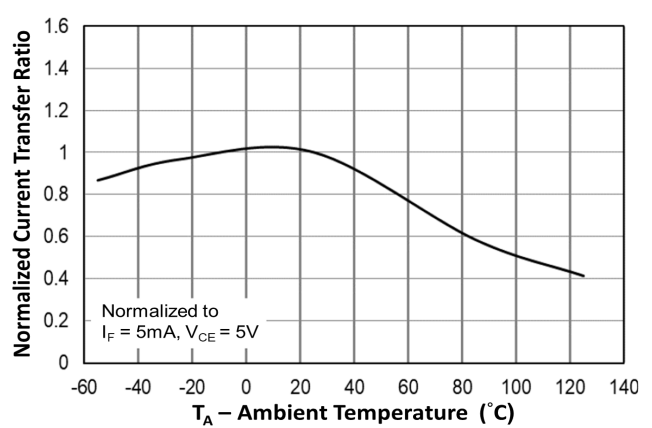


Fig 6 Normalized Current Transfer Ratio vs Ambient Temperature

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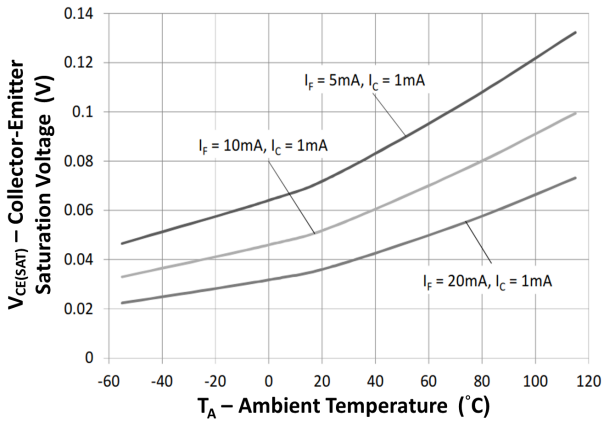


Fig 7 Collector-Emitter Saturation Voltage vs Ambient Temperature

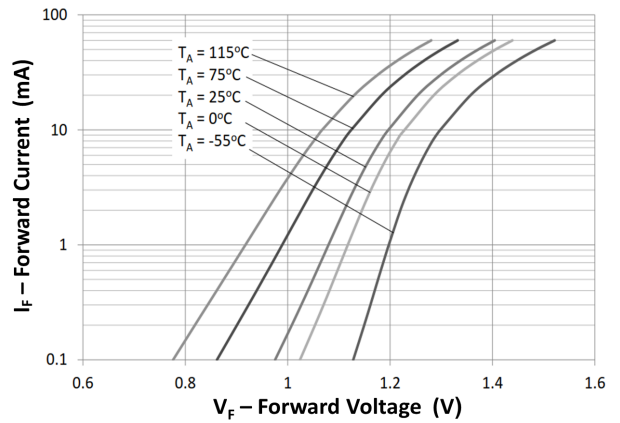


Fig 8 Forward Current vs Forward Voltage

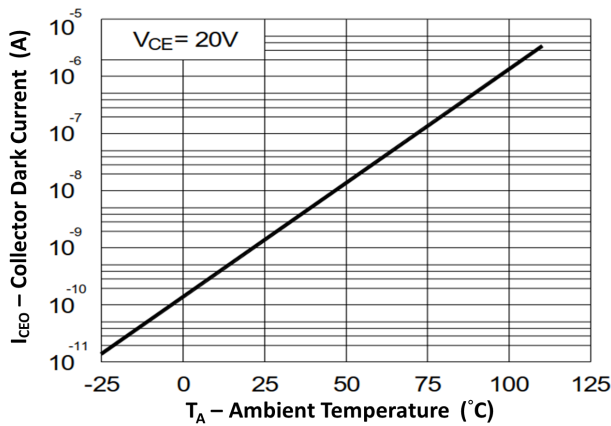


Fig 9 Collector Dark Current vs Ambient Temperature

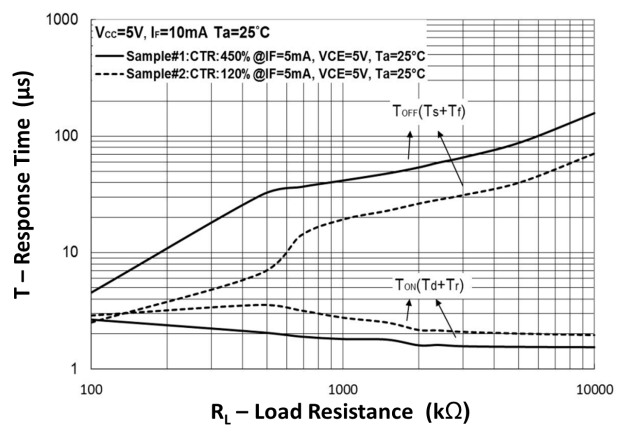


Fig 10 Response Time vs Load Resistance

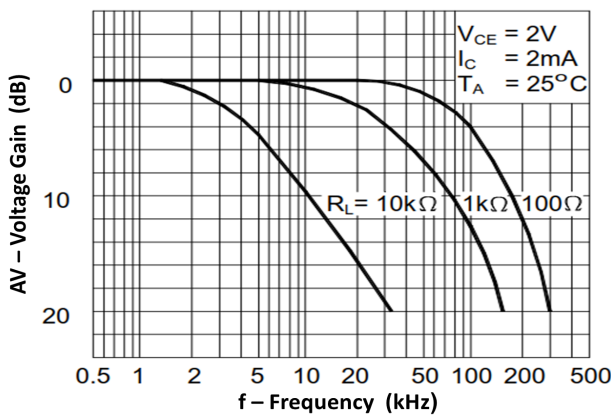
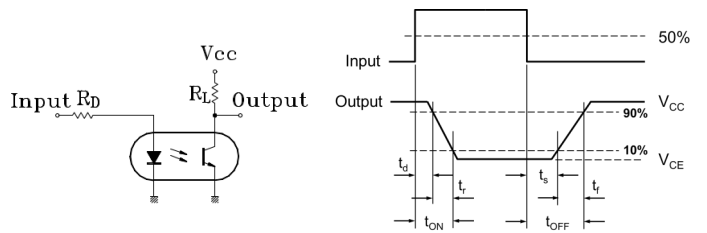
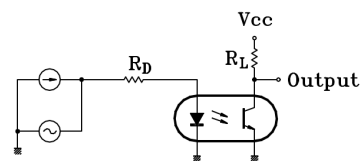


Fig 11 Frequency Response



Response Time Test Circuit



Frequency Response Test Circuit

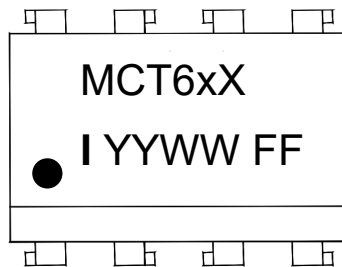
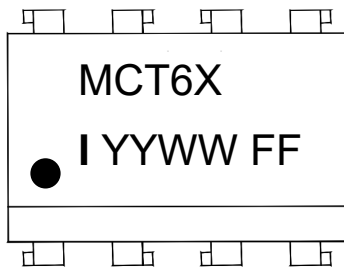
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ORDER INFORMATION

MCT6, MCT61, MCT62, MCT66 (UL Approval)			
After PN	PN	Description	Packing quantity
None	MCT6, MCT61, MCT62, MCT66	Standard DIP8	50 pcs per tube
G	MCT6G, MCT61G, MCT62G, MCT66G	10mm Lead Spacing	50 pcs per tube
SM	MCT6SM, MCT61SM MCT62SM, MCT66SM	Surface Mount	50 pcs per tube
SMT&R	MCT6SMT&R, MCT61SMT&R MCT62SMT&R, MCT66SMT&R	Surface Mount Tape & Reel	1000 pcs per reel

MCT6, MCT61, MCT62, MCT66 (UL and VDE Approvals)			
After PN	PN	Description	Packing quantity
None	MCT6X, MCT61X, MCT62X, MCT66X	Standard DIP8	50 pcs per tube
G	MCT6XG, MCT61XG MCT62XG, MCT66XG	10mm Lead Spacing	50 pcs per tube
SM	MCT6XSM, MCT61XSM MCT62XSM, MCT66XSM	Surface Mount	50 pcs per tube
SMT&R	MCT6XSMT&R, MCT61XSMT&R MCT62XSMT&R, MCT66XSMT&R	Surface Mount Tape & Reel	1000 pcs per reel

DEVICE MARKING



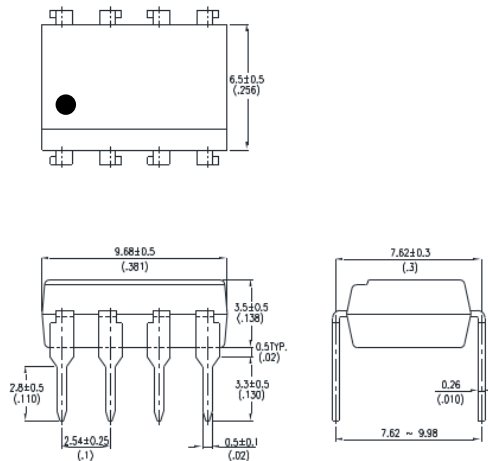
- | | |
|--------------|--|
| MCT6 / MCT6x | Device Part Number where x is "1" "2" or "6" |
| X | VDE version |
| I | Isocom |
| YY | Year code |
| WW | Week code |
| FF | UL Model |



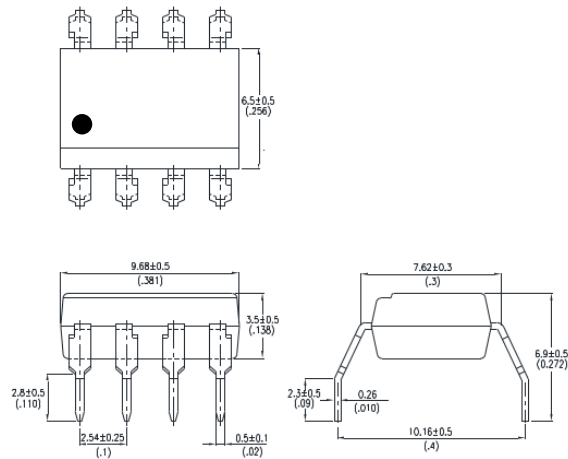
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PACKAGE DIMENSIONS in mm (inch)

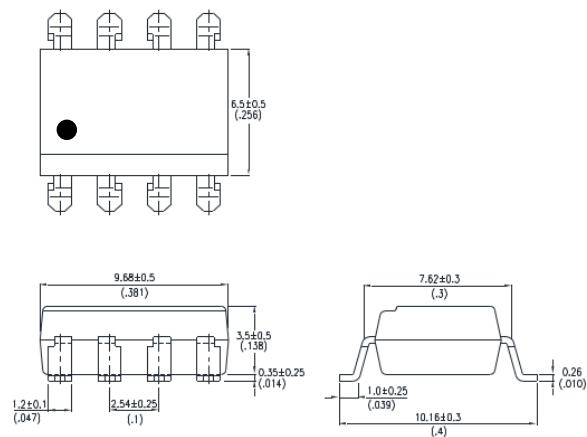
DIP



G Form



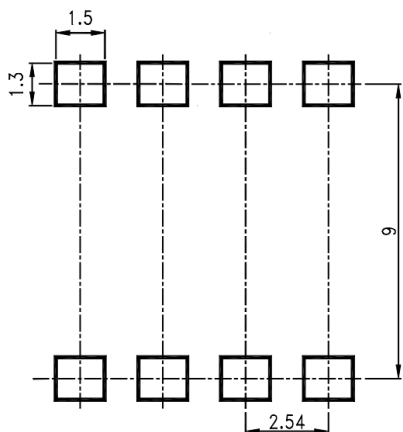
SMD



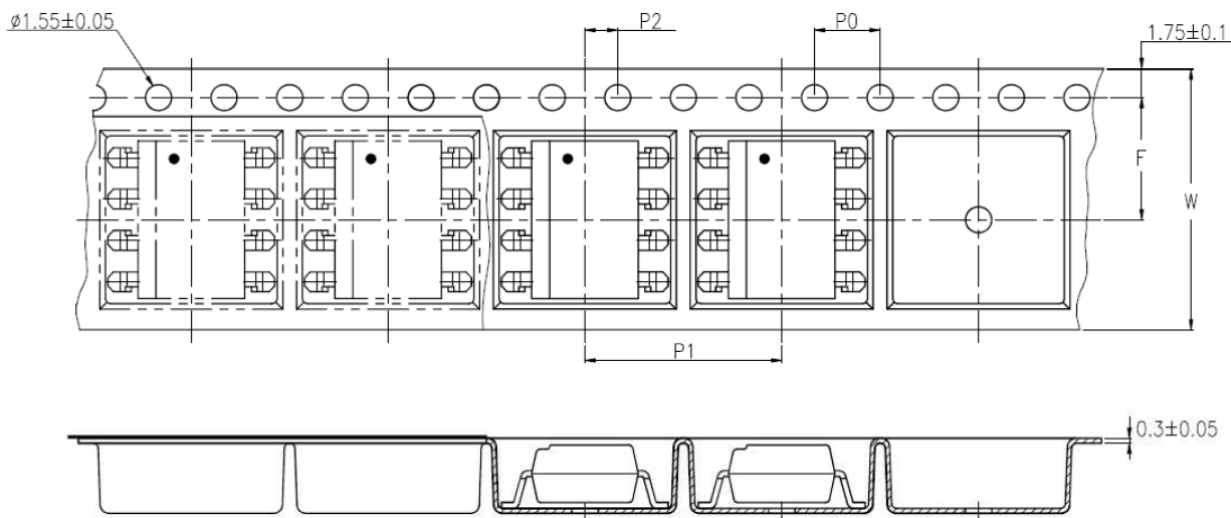


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RECOMMENDED PAD LAYOUT FOR SMD (mm)



TAPE AND REEL PACKAGING

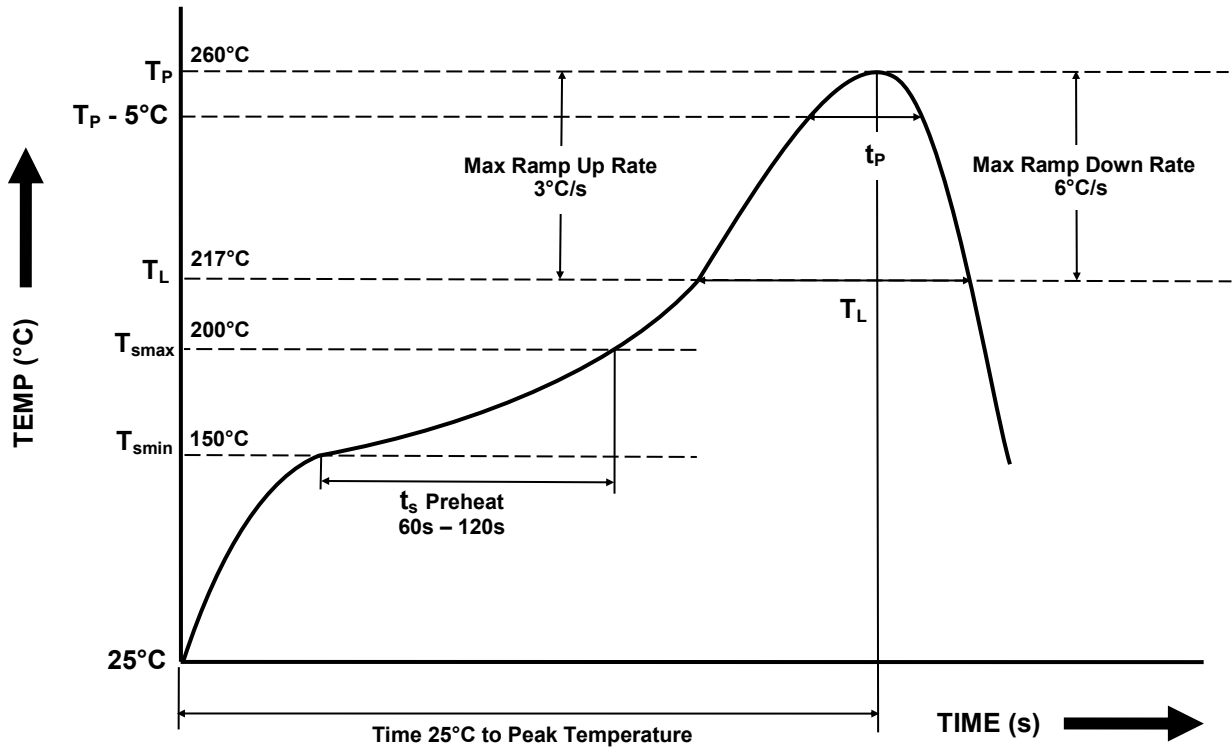


Description	Symbol	Dimension mm (inch)
Tape Width	W	16 ± 0.3 (0.63)
Pitch of Sprocket Holes	P ₀	4 ± 0.1 (0.15)
Distance of Compartment to Sprocket Holes	F	7.5 ± 0.1 (0.295)
	P ₂	2 ± 0.1 (0.079)
Distance of Compartment to Compartment	P ₁	12 ± 0.1 (0.472)



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IR REFLOW SOLDERING TEMPERATURE PROFILE FOR SMD
One Time Reflow Soldering is Recommended.
Do not immerse device body in solder paste.



Profile Details	Conditions
Preheat - Min Temperature (T_{SMIN}) - Max Temperature (T_{SMAX}) - Time T_{SMIN} to T_{SMAX} (t_s)	150°C 200°C 60s - 120s
Soldering Zone - Peak Temperature (T_P) - Time at Peak Temperature - Liquidous Temperature (T_L) - Time within 5°C of Actual Peak Temperature ($T_P - 5^\circ C$) - Time maintained above T_L (t_L) - Ramp Up Rate (T_L to T_P) - Ramp Down Rate (T_P to T_L)	260°C 10s max 217°C 30s max 60s - 100s 3°C/s max 6°C/s max
Average Ramp Up Rate (T_{smax} to T_P)	3°C/s max
Time 25°C to Peak Temperature	8 minutes max



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