

MOC8020, MOC8021



DESCRIPTION

The MOC8020 and MOC8021 series optocoupler consists of an infrared emitting diode optically coupled to an NPN silicon photodarlington with the base pin unconnected in a standard 6 pin dual in line plastic package.

FEATURES

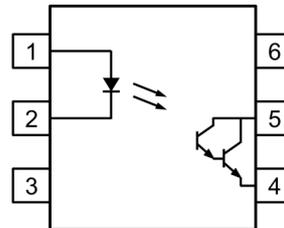
- High AC Isolation Voltage 5000V_{RMS}
- Wide Operating Temperature Range
- -25°C to 100°C
- Base pin unconnected for improved Noise Immunity in high EMI environment
- RoHS Compliant
- UL Approval E91231 Model "SS"
- VDE Approval 40028086

APPLICATIONS

- Computer Terminals
- Industrial System Controllers
- Measurement Instruments
- Signal Transmission between Systems of Different Potentials and Impedances

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 | Anode |
| 2 | Cathode |
| 3 | NC |
| 4 | Emitter |
| 5 | Collector |
| 6 | NC |

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
Reverse Voltage	6V
Power Dissipation	70mW

Output

Collector Current	80mA
Collector to Emitter Voltage V _{CEO}	35V
Emitter to Collector Voltage V _{ECO}	6V
Power Dissipation	150mW

Total Package

Total Power Dissipation	170mW
Isolation Voltage	5000V _{RMS}
Operating Temperature	-40 to 100°C
Storage Temperature	-40 to 125°C
Junction Temperature	125°C
Lead Soldering Temperature (10s)	260°C

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ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise specified)

INPUT

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

OUTPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CEO}	$I_C = 0.1\text{mA}, I_F = 0\text{mA}$	35			V
Emitter-Collector Breakdown Voltage	BV_{ECO}	$I_E = 10\mu\text{A}, I_F = 0\text{mA}$	6			V
Collector Dark Current	I_{CEO}	$V_{CE} = 10\text{V}, I_F = 0\text{mA}$			1000	nA

COUPLED

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Current transfer ratio	CTR	$I_F = 10\text{mA}, V_{CE} = 5\text{V}$ MOC8020 MOC8021	500 1000			%
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F = 20\text{mA}, I_C = 5\text{mA}$			1.0	V
Floating Capacitance	C_f	$V_{IO} = 0\text{V}, f = 1\text{MHz}$		0.6	1	pF
Cut-Off Frequency	f_c	$V_{CE} = 2\text{V}, I_C = 20\text{mA}$ $R_L = 100\Omega, -3\text{dB}$		6		kHz
Output Rise Time	t_r	$V_{CE} = 2\text{V}, I_C = 10\text{mA}$ $R_L = 100\Omega$		60	250	μs
Output Fall Time	t_f			53	250	μs

MOC8020, MOC8021

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ISOLATION

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Isolation Voltage	V_{ISO}	R.H. = 40% to 60%, $t = 1 \text{ min}$ Note 1	5000			V_{RMS}
Isolation Resistance	R_{ISO}	$V_{\text{I-O}} = 500\text{VDC}$ R.H. = 40% to 60% Note 1	5×10^{10}	1×10^{11}		Ω

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

MOC8020, MOC8021

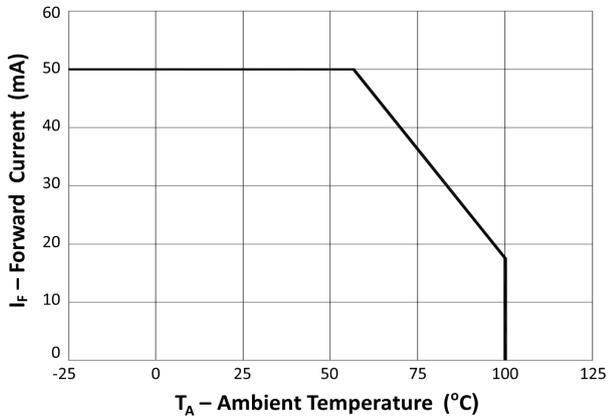


Fig 1 Forward Current vs Ambient Temperature

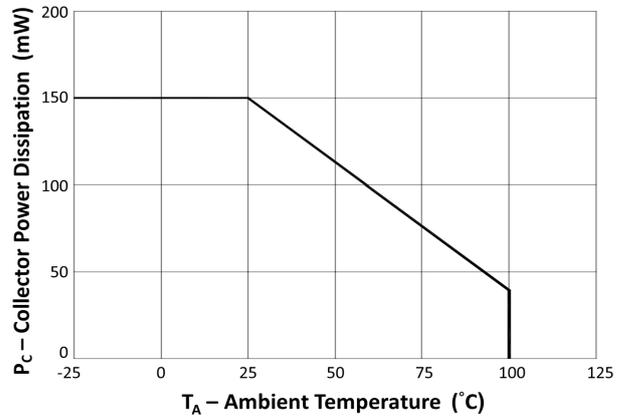


Fig 2 Collector Power Dissipation vs Ambient Temperature

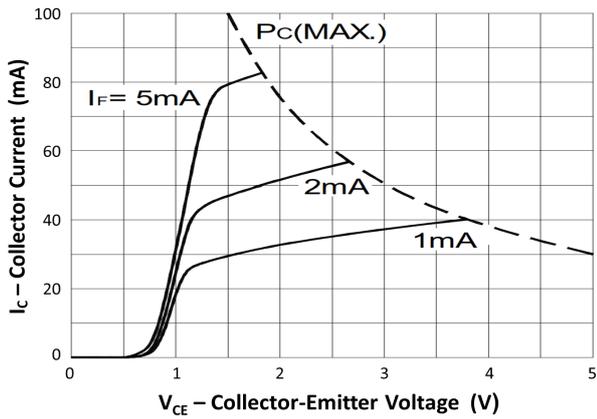


Fig 3 Collector Current vs Collector-Emitter Voltage (1)

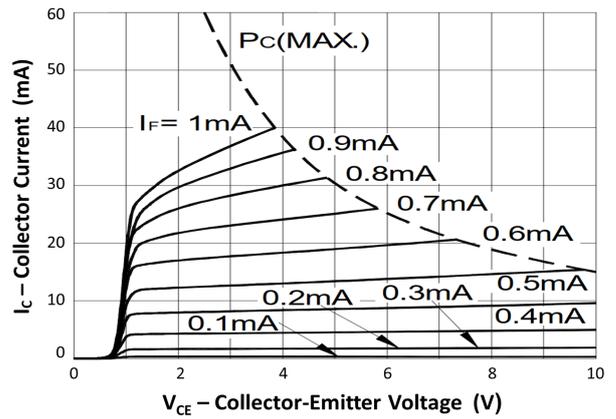


Fig 4 Collector Current vs Collector-Emitter Voltage (2)

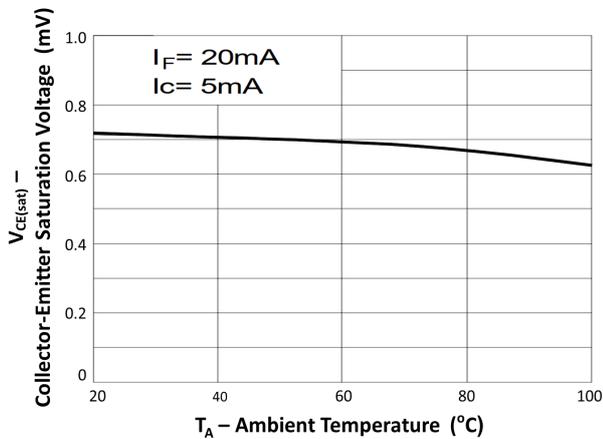


Fig 5 Collector-Emitter Saturation Voltage vs Ambient Temperature

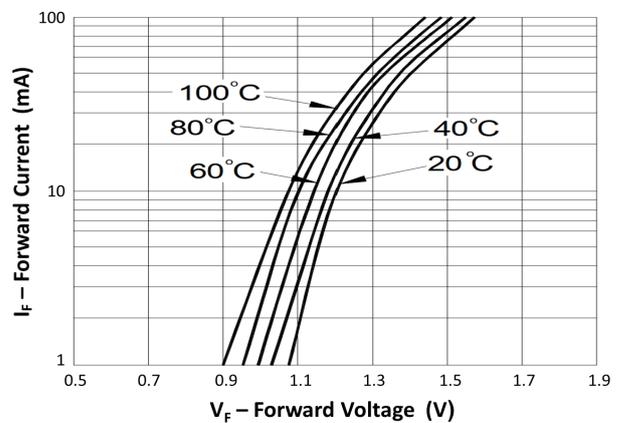


Fig 6 Forward Current vs Forward Voltage

MOC8020, MOC8021

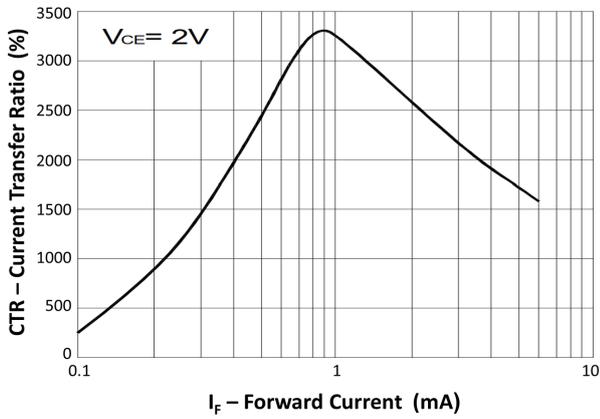


Fig 7 Current Transfer Ratio vs Forward Current

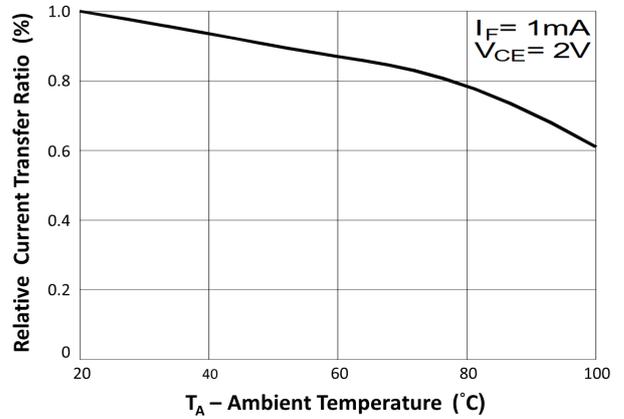


Fig 8 Relative Current Transfer Ratio vs Ambient Temperature

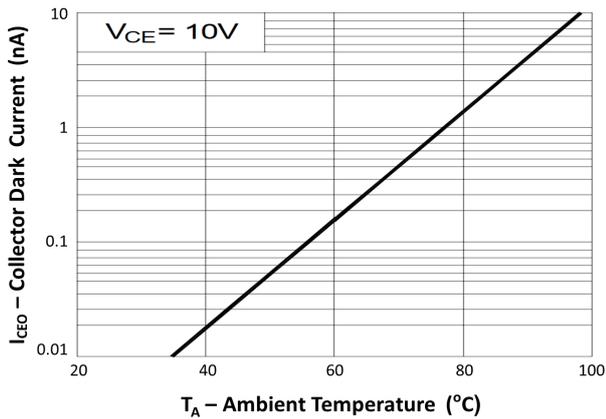


Fig 9 Collector Dark Current vs Ambient Temperature

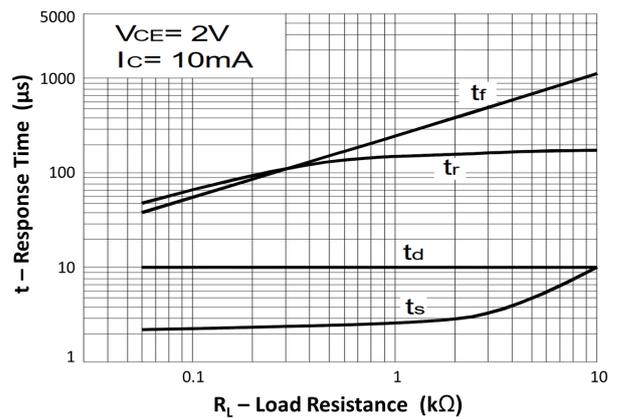


Fig 10 Response Time vs Load Resistance

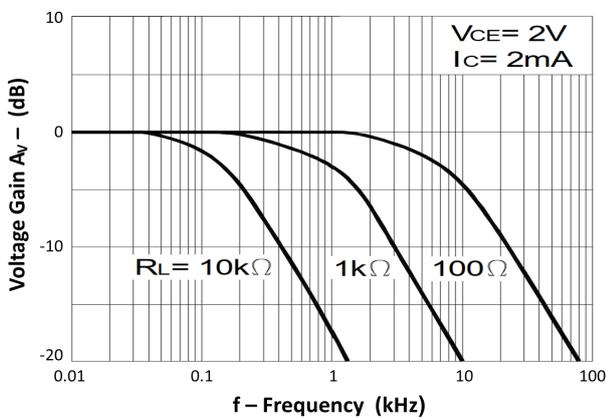
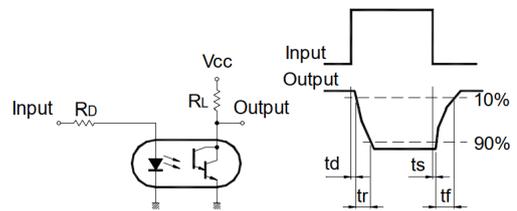
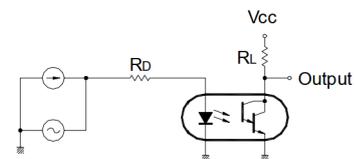


Fig 11 Frequency Response



Response Time Test Circuit



Frequency Response Test Circuit

MOC8020, MOC8021

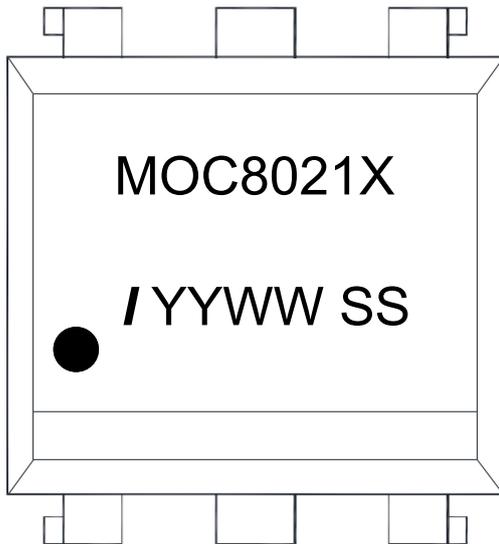
ORDER INFORMATION

MOC8020, MOC8021 (UL Approval)			
After PN	PN	Description	Packing quantity
None	MOC8020, MOC8021	Standard DIP6	65 pcs per tube
G	MOC8020G, MOC8021G	10mm Lead Spacing	65 pcs per tube
SM	MOC8020SM, MOC8021SM	Surface Mount	65 pcs per tube
SMT&R	MOC8020SMT&R MOC8021SMT&R	Surface Mount Tape and Reel	1000 pcs per reel

MOC8020X, MOC8021X (UL and VDE Approvals)			
After PN	PN	Description	Packing quantity
None	MOC8020X, MOC8021X	Standard DIP6	65 pcs per tube
G	MOC8020XG, MOC8021XG	10mm Lead Spacing	65 pcs per tube
SM	MOC8020XSM, MOC8021XSM	Surface Mount	65 pcs per tube
SMT&R	MOC8020XSMT&R MOC8021XSMT&R	Surface Mount Tape and Reel	1000 pcs per reel

DEVICE MARKING

Example : MOC8021X

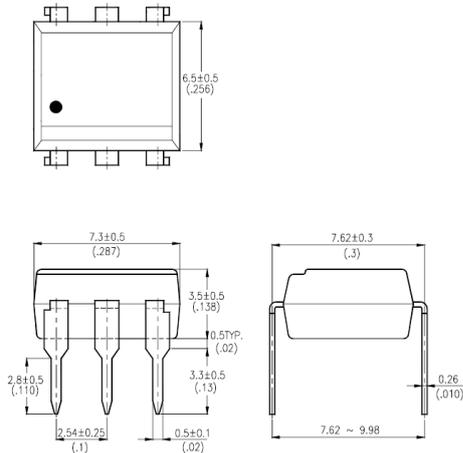


MOC8021X	Device Part Number
/	Isocom
YY	2 digit Year code
WW	2 digit Week code
SS	UL Model

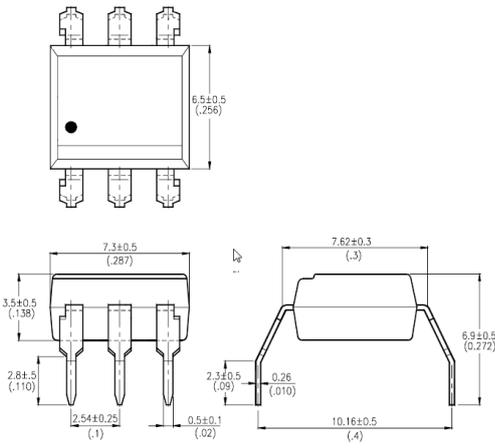
MOC8020, MOC8021

PACKAGE DIMENSIONS in mm (inch)

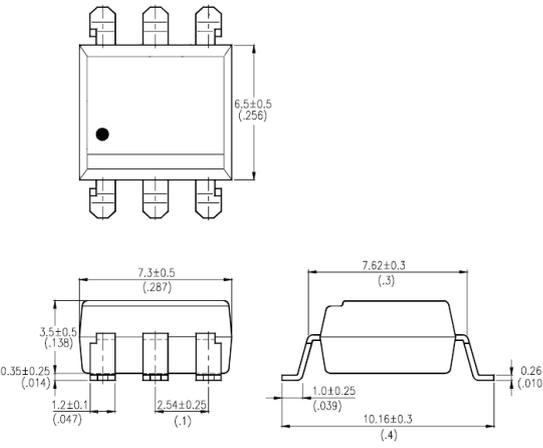
DIP



G Form

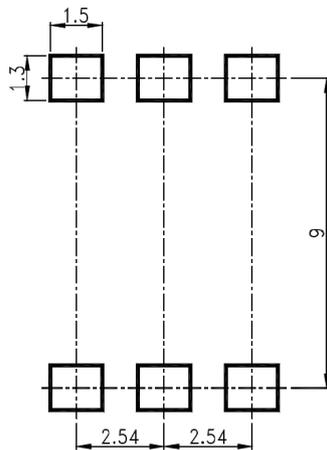


Surface Mount

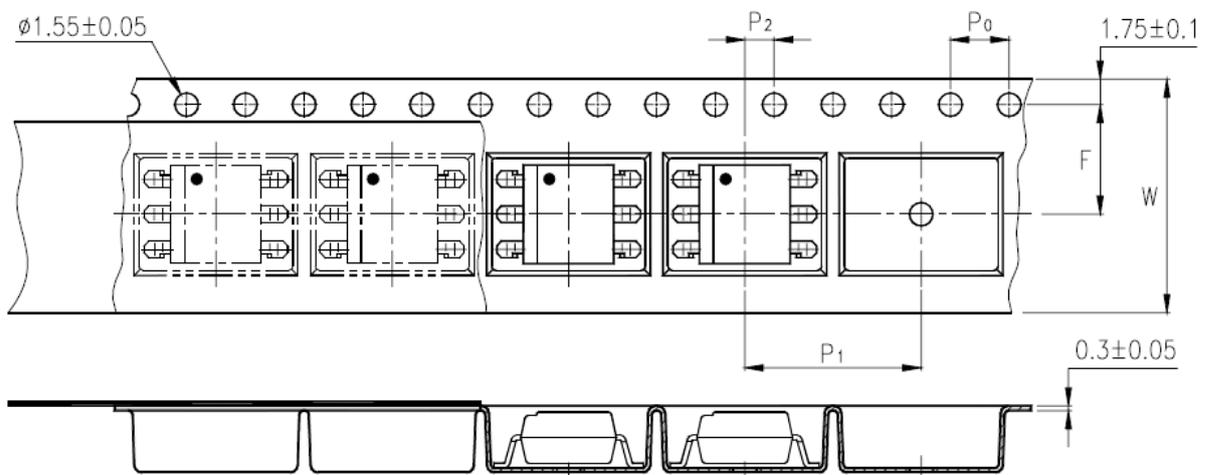




RECOMMENDED SOLDER PAD LAYOUT (mm)



TAPE AND REEL PACKAGING



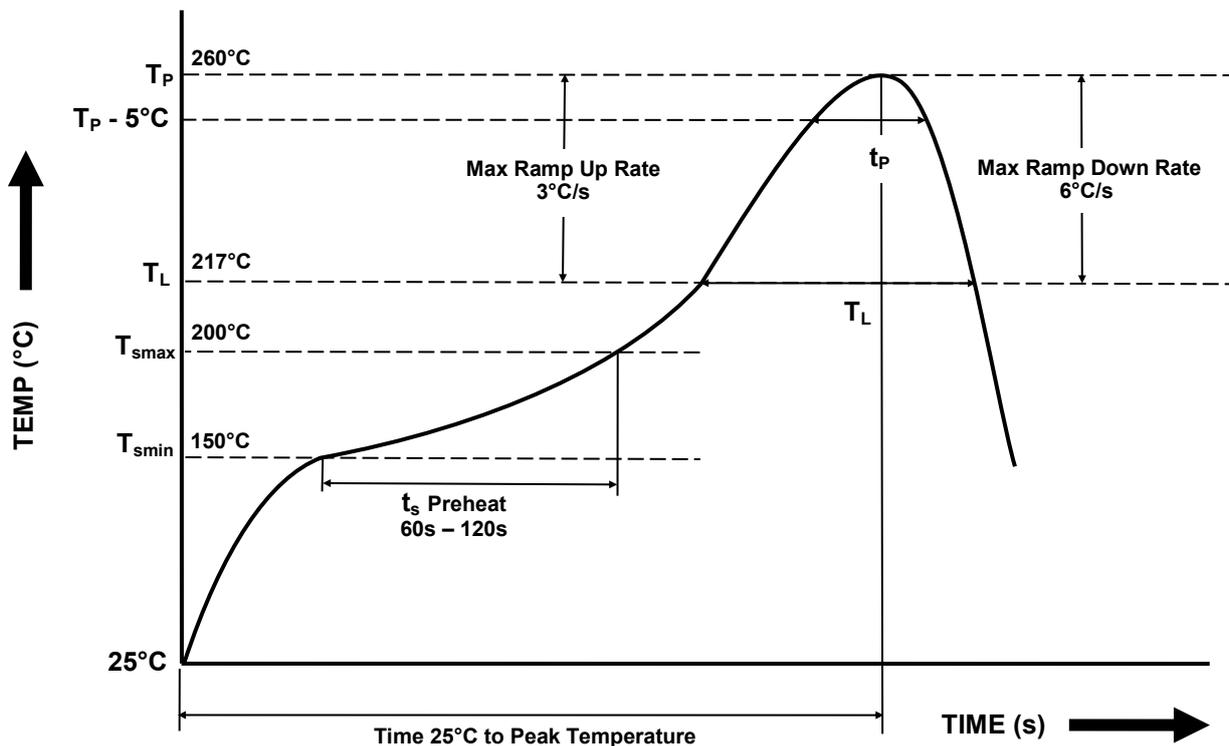
Description	Symbol	Dimension mm (inch)
Tape Width	W	16 ± 0.3 (0.63)
Pitch of Sprocket Holes	P ₀	4 ± 0.1 (0.15)
Distance of Compartment to Sprocket Holes	F	7.5 ± 0.1 (0.295)
	P ₂	2 ± 0.1 (0.079)
Distance of Compartment to Compartment	P ₁	12 ± 0.1 (0.472)



IR REFLOW SOLDERING TEMPERATURE PROFILE

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°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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