

4N25, 4N26, 4N27, 4N28



DESCRIPTION

The 4N25, 4N26, 4N27 and 4N28 optocouplers each consists of an infrared emitting diode optically coupled to an NPN silicon photo transistor in a standard 6 pin dual in line plastic package.

FEATURES

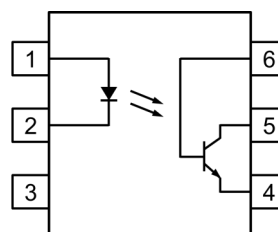
- High AC Isolation Voltage 5000V_{RMS}
- Wide Operating Temperature Range -55°C to 100°C
- RoHS Compliant
- UL Approval E91231 Model "GG"
- VDE Approval 40028086

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 | Base |

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	60mA
Reverse Voltage	6V
Power Dissipation	105mW
Junction Temperature	125°C

Output

Collector Current	50mA
Collector to Emitter Voltage V _{CEO}	70V
Collector to Emitter Voltage V _{CBO}	70V
Emitter to Collector Voltage V _{ECO}	6V
Emitter to Base Voltage V _{EBO}	6V
Power Dissipation	160mW

Total Package

Total Power Dissipation	200mW
Isolation Voltage	5000V _{RMS}
Operating Temperature	-55 to 100°C
Storage Temperature	-55 to 150°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	$I_F = 60\text{mA}$		1.4	1.7	V
Reverse Current	I_R	$V_R = 6\text{V}$			10	μA
Terminal Capacitance	C_t	$V_F = 0\text{V}, f = 1\text{kHz}$		30	250	pF

OUTPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CEO}	$I_C = 0.1\text{mA}, I_F = 0\text{mA}$	70			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}	$V_{CE} = 10\text{V}, I_F = 0\text{mA}$			50	nA

COUPLED

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Current transfer ratio	CTR	$I_F = 10\text{mA}, V_{CE} = 5\text{V}$				%
		4N25, 4N26	40		80	
		4N27, 4N28	63		125	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F = 10\text{mA}, I_C = 2.5\text{mA}$		0.25	0.4	V
Floating Capacitance	C_f	$V_{IO} = 0\text{V}, f = 1\text{MHz}$		0.6	1	pF
Cut-Off Frequency	f_C	$V_{CC} = 5\text{V}, I_F = 10\text{mA}$ $R_L = 75\Omega, -3\text{dB}$		150		kHz
Output Rise Time	t_r	$V_{CC} = 5\text{V}, I_F = 10\text{mA}$ $R_L = 75\Omega$		2	7	μs
Output Fall Time	t_f			2	8	μs

ISOLATION

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

Measured with input leads shorted together and output leads shorted together.



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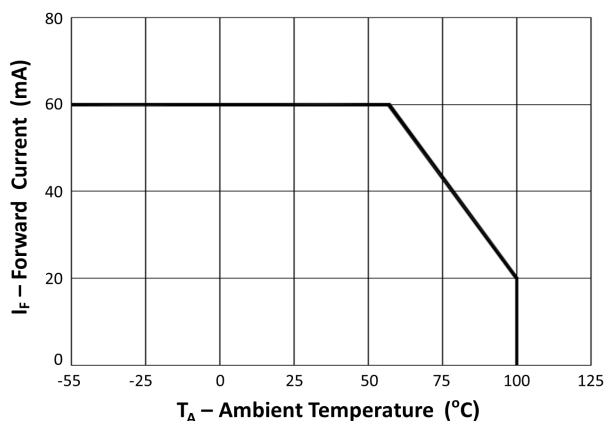


Fig 1 Forward Current vs Ambient Temperature

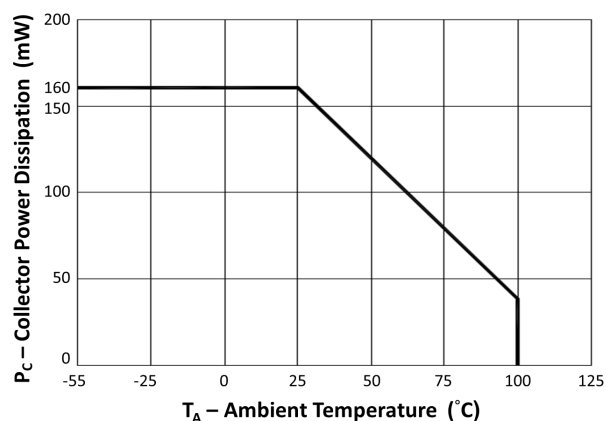


Fig 2 Collector Power Dissipation vs Ambient Temperature

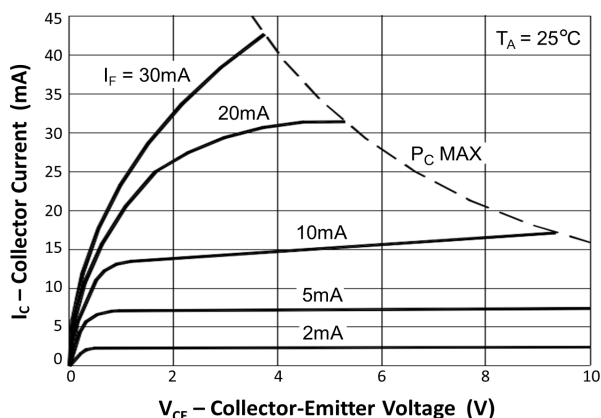


Fig 3 Collector Current vs Collector-Emitter Voltage

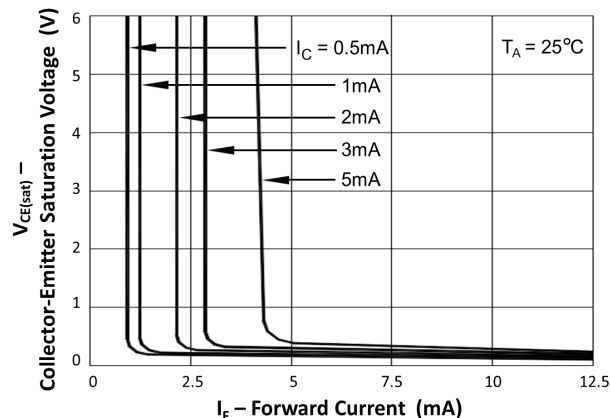


Fig 4 Collector-Emitter Saturation Voltage vs Forward Current

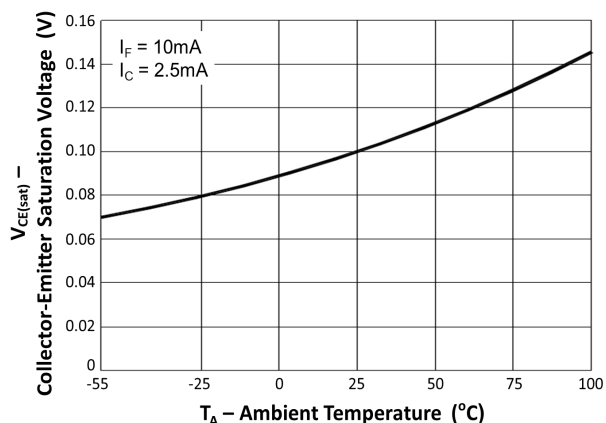


Fig 5 Collector-Emitter Saturation Voltage vs Ambient Temperature

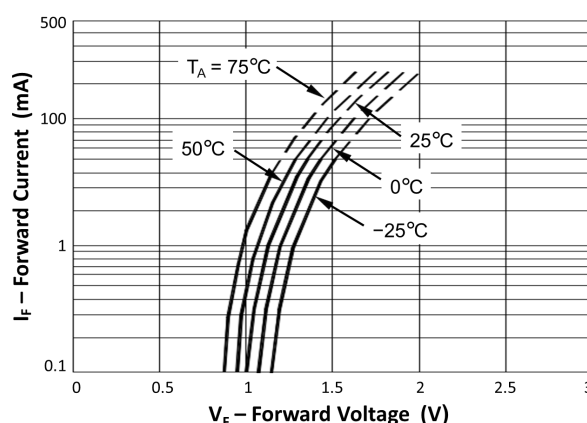


Fig 6 Forward Current vs Forward Voltage



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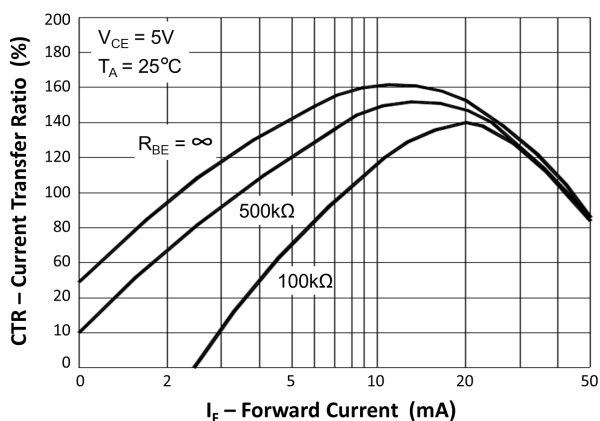


Fig 7 Current Transfer Ratio vs Forward Current

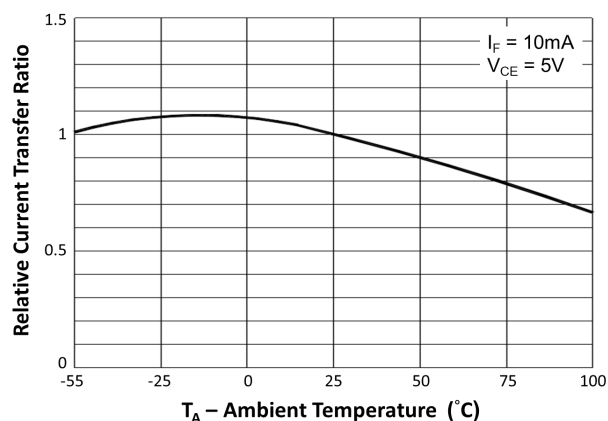


Fig 8 Relative Current Transfer Ratio vs Ambient Temperature

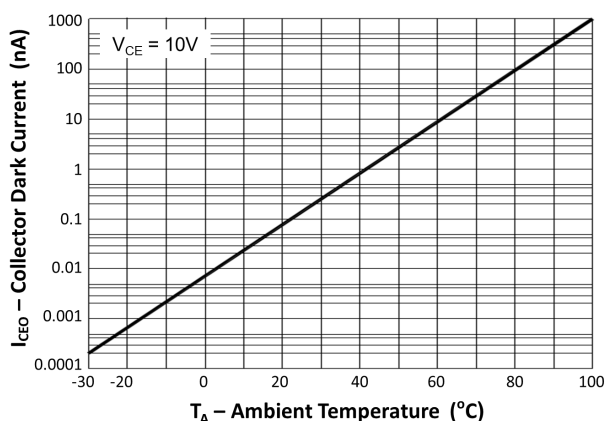


Fig 9 Collector Dark Current vs Ambient Temperature

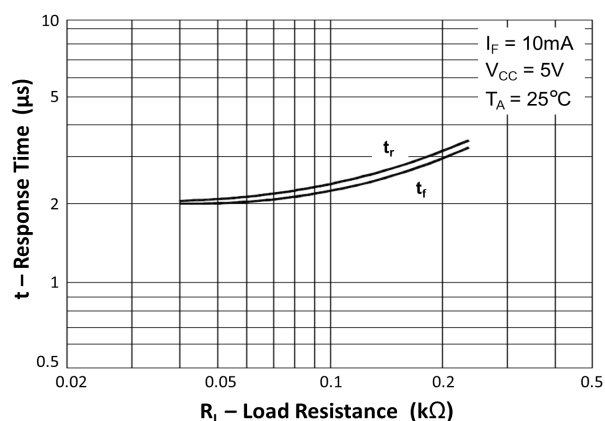


Fig 10 Response Time vs Load Resistance

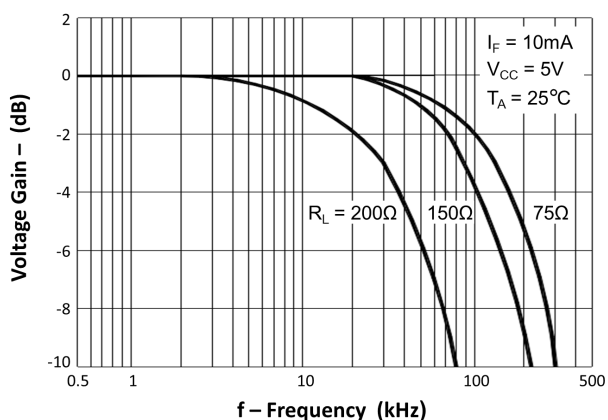
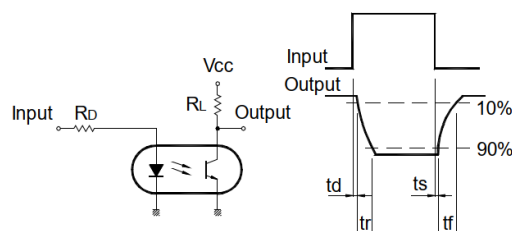
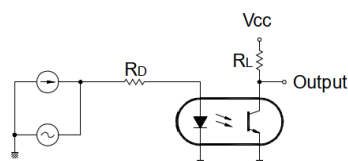


Fig 11 Frequency Response



Response Time Test Circuit



Frequency Response Test Circuit

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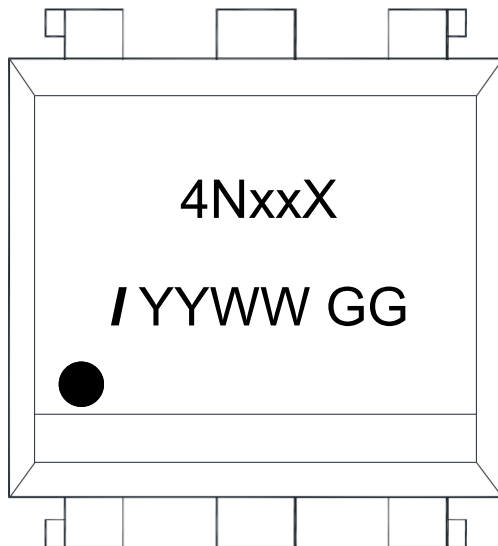
ORDER INFORMATION

4N25, 4N26, 4N27, 4N28 (UL Approval)			
After PN	PN	Description	Packing quantity
None	4N25, 4N26, 4N27, 4N28	Standard DIP6	65 pcs per tube
G	4N25G, 4N26G, 4N27G, 4N28G	10mm Lead Spacing	65 pcs per tube
SM	4N25SM, 4N26SM, 4N27SM, 4N28SM	Surface Mount	65 pcs per tube
SMT&R	4N25SMT&R, 4N26SMT&R 4N27SMT&R, 4N28SMT&R	Surface Mount Tape and Reel	1000 pcs per reel

4N25X, 4N26X, 4N27X, 4N28X (UL and VDE Approvals)			
After PN	PN	Description	Packing quantity
None	4N25X, 4N26X, 4N27X, 4N28X	Standard DIP6	65 pcs per tube
G	4N25XG, 4N26XG, 4N27XG, 4N28XG	10mm Lead Spacing	65 pcs per tube
SM	4N25XSM, 4N26XSM 4N27XSM, 4N28XSM	Surface Mount	65 pcs per tube
SMT&R	4N25XSMT&R, 4N26XSMT&R 4N27XSMT&R, 4N28XSMT&R	Surface Mount Tape and Reel	1000 pcs per reel

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DEVICE MARKING



xx	Device Grade (25, 26, 27, 28)
X	VDE Option
/	Isocom Components 2004 Ltd.
YY	Year Code (24=2024)
WW	Week Code (01 to 52)
GG	UL Model

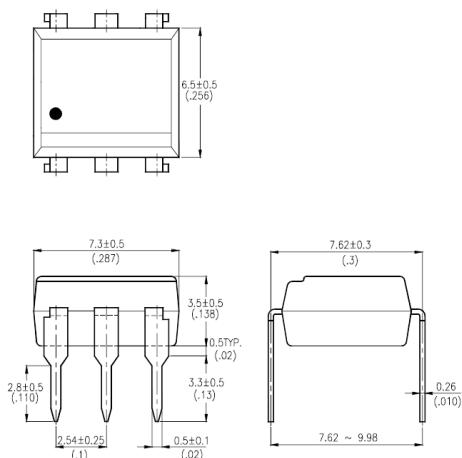


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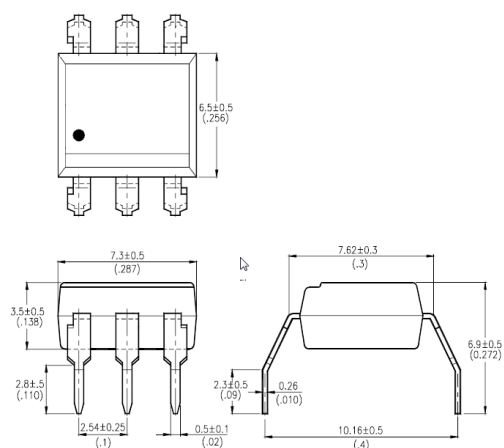
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PACKAGE DIMENSIONS in mm (inch)

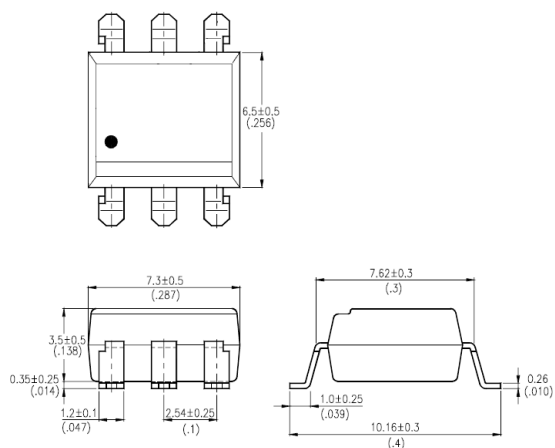
DIP



G Form



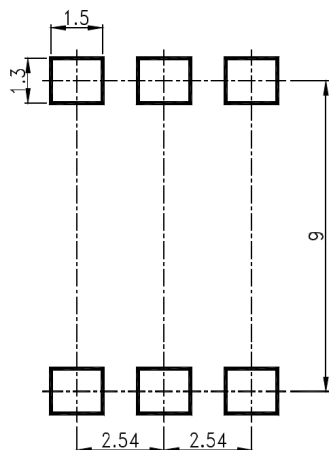
Surface Mount



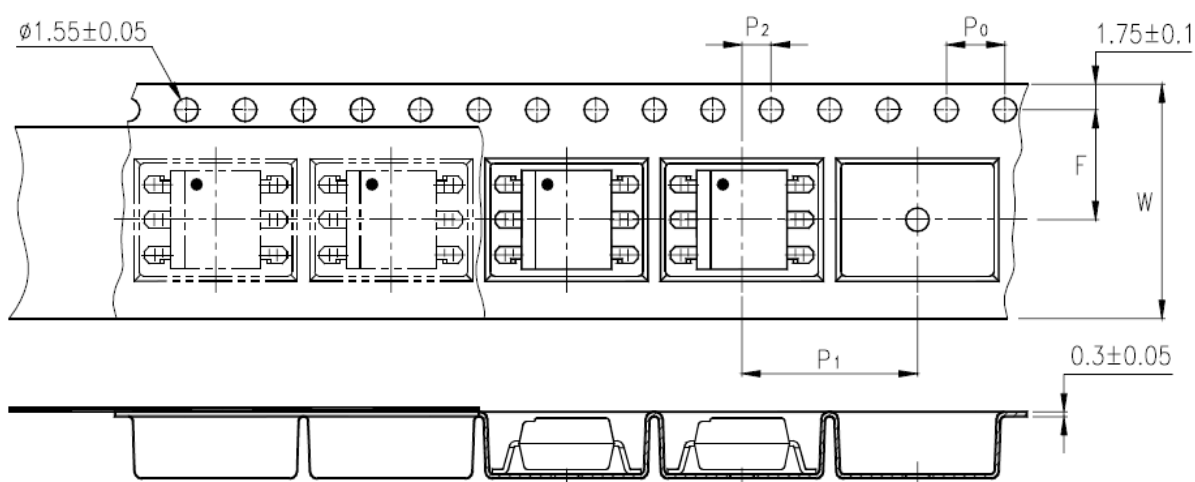


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RECOMMENDED SOLDER PAD LAYOUT (mm)



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)

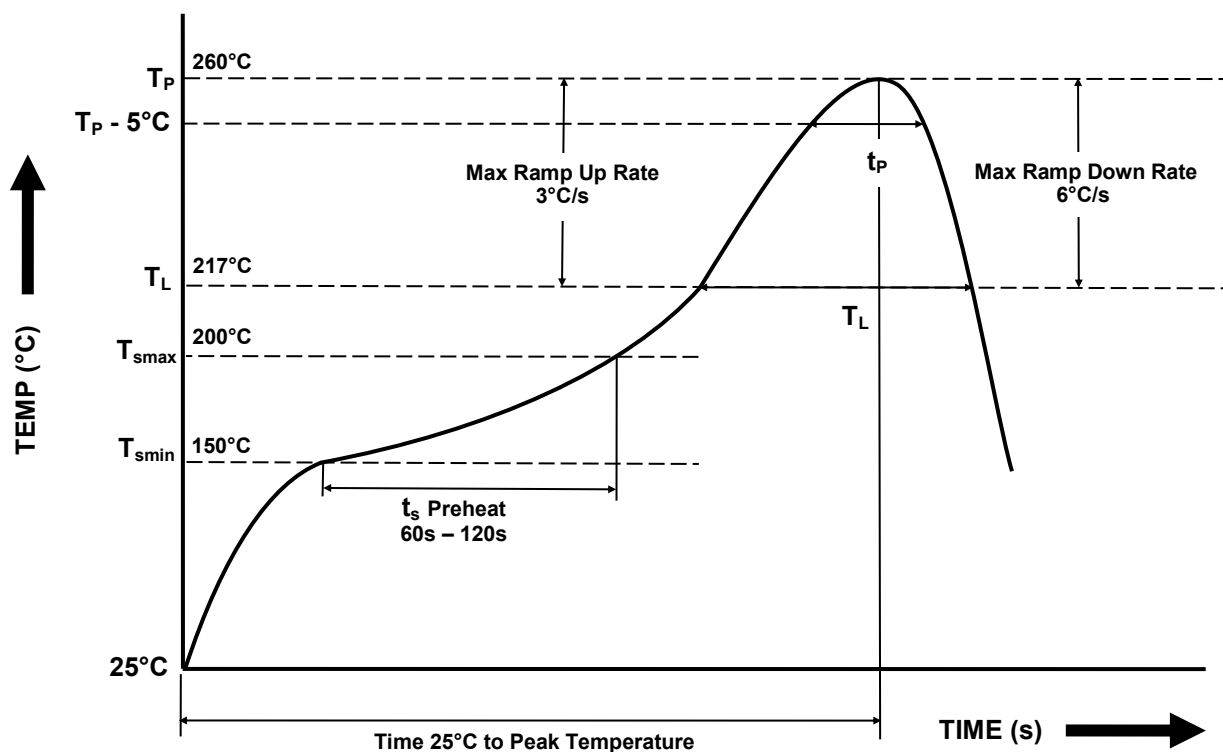


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IR REFLOW SOLDERING TEMPERATURE PROFILE

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 ($T_P - 5^\circ\text{C}$) - 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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