

MOC3030, MOC3031, MOC3032, MOC3033



DESCRIPTION

The MOC303x Series are optically coupled isolators consisting of a Gallium Arsenide infrared emitting diode coupled with a monolithic silicon detector performing the functions of a zero crossing bilateral triac mounted in a standard 6 pin dual-in-line package.

FEATURES

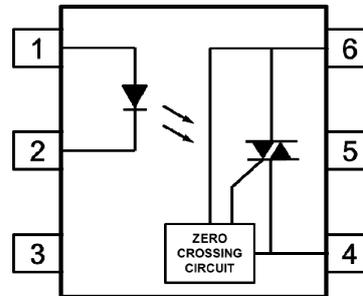
- Zero Voltage Crossing
- Triac Driver Output
- High V_{DRM} minimum 250V
- High Critical Rate of Rise of Off-State Voltage dv/dt minimum 1000V/ μ s
- Isolation Voltage 5000V_{RMS}
- RoHS Compliant
- UL File No. E91231 Package System "TT"
- VDE File No. 40028086

APPLICATIONS

- Solenoid / Valve Controls
- Light Controls
- AC Motor Drivers
- Temperature Controls
- AC Motor Starters
- Solid State Relays

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 | Main Terminal 1 |
| 5 | Substrate,
(Do not Connect) |
| 6 | Main Terminal 2 |

ABSOLUTE MAXIMUM RATINGS

$T_A = 25^\circ\text{C}$ unless otherwise specified.

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
Junction Temperature	125°C
Power dissipation	120mW

Output

Off State Output Terminal Voltage	250V
On State RMS Current	100mA _{RMS}
Peak Repetitive Surge Current (Pulse Width 100 μ s, 120pps)	1.0A
Junction Temperature	125°C
Power Dissipation	300mW

Total Package

Isolation Voltage	5000V _{RMS}
Total Power Dissipation	330mW
Operating Temperature	-40 to 110°C
Storage Temperature	-55 to 150°C
Lead Soldering Temperature (10s)	260°C

ISOCOM COMPONENTS 2004 LTD

Unit 25B, Park View Road West, Park View Industrial Estate
Hartlepool, Cleveland, TS25 1PE, United Kingdom
Tel : +44 (0)1429 863 609 Fax : +44 (0)1429 863 581
e-mail : sales@isocom.co.uk
<http://www.isocom.com>

ISOCOM COMPONENTS ASIA LTD

Hong Kong Office
Block A, 8/F, Wah Hing Industrial Mansions
36 Tai Yau Street, San Po Kong, Kowloon, Hong Kong
Tel: +852 2995 9217 Fax : +852 8161 6292
e-mail : sales@isocom.com.hk



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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	$I_F = 20\text{mA}$		1.2	1.4	V
Reverse Current	I_R	$V_R = 6\text{V}$		0.05	10	μA

OUTPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Peak Off-state Current Either Direction	I_{DRM}	$V_{\text{DRM}} = 250\text{V}$ $I_F = 0\text{mA}$ Note 1			500	nA
Peak Blocking Voltage Either Direction	V_{DRM}	$I_{\text{DRM}} = 500\text{nA}$	250			V
On-state Voltage Either Direction	V_{TM}	$I_{\text{TM}} = 100\text{mA (peak)}$			3.0	V
Critical Rate of Rise of Off-state Voltage (Static dv/dt)	dv/dt	$I_F = 0\text{mA}$ $V_{\text{PEAK}} = \text{Rated } V_{\text{DRM}}$	1000			V/ μs

COUPLED

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Input Trigger Current Either Direction	I_{FT}	$V_{\text{TM}} = 3\text{V}$ Note 2 MOC3030 MOC3031 MOC3032 MOC3033			30 15 10 5	mA
Holding Current Either Direction	I_{H}			200		μA

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

ZERO CROSSING CHARACTERISTICS

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Inhibit Voltage	V_{INH}	$I_F = \text{Rated } I_{FT}$ MT1-MT2 Voltage above which device will not trigger		5	20	V
Leakage Current at Inhibit State	I_{DRM2}	$I_F = \text{Rated } I_{FT}$ $V_{DRM} = 250\text{V}$ Off-state			500	μA

ISOLATION

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Isolation Voltage Input-Output	V_{ISO}	RH = 40 to 60%, t = 1 min Note 3	5000			V_{RMS}

Note 1 : Test Voltage must be applied within dv/dt rating.

Note 2 : Guaranteed to trigger at an I_F value less than or equal to max I_{FT} , recommended I_F lies between Rated I_{FT} to Absolute Max I_F .

Note 3 : Measured with input leads shorted together and output leads shorted together.

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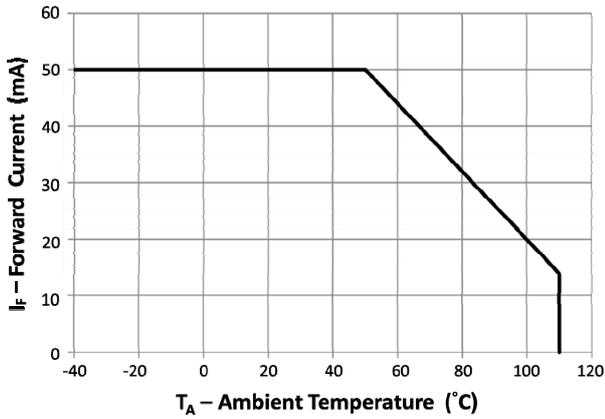


Fig 1 Forward Current vs Ambient Temperature

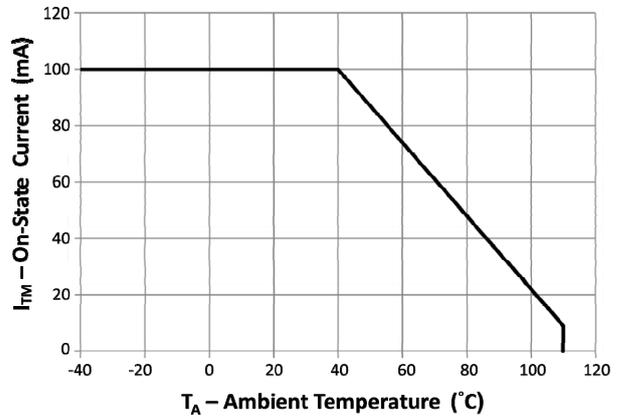


Fig 2 On-State Current vs Ambient Temperature

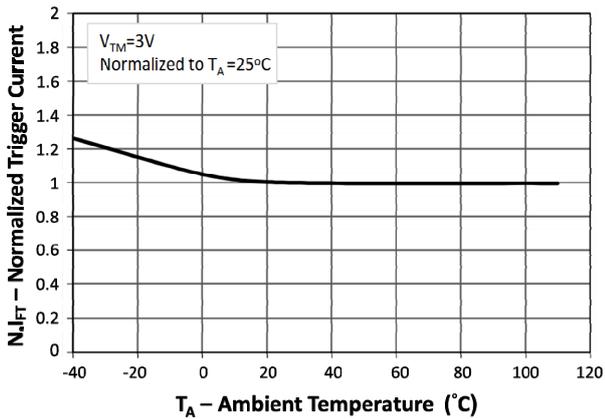


Fig 3 Normalized Trigger Current vs Ambient Temperature

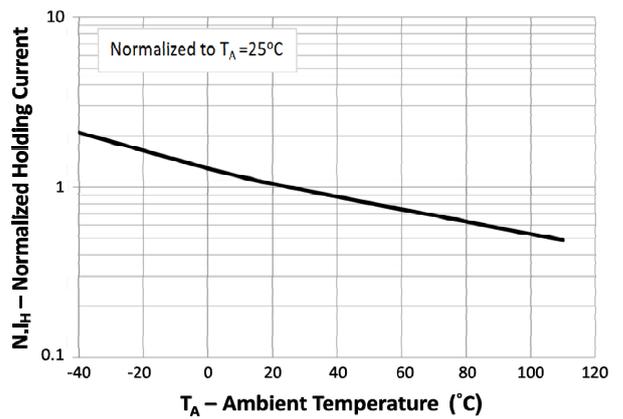


Fig 4 Normalized Holding Current vs Ambient Temperature

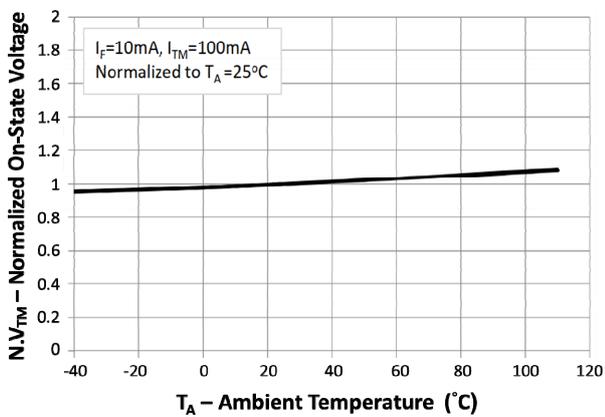


Fig 5 Normalized On-state Voltage vs Ambient Temperature

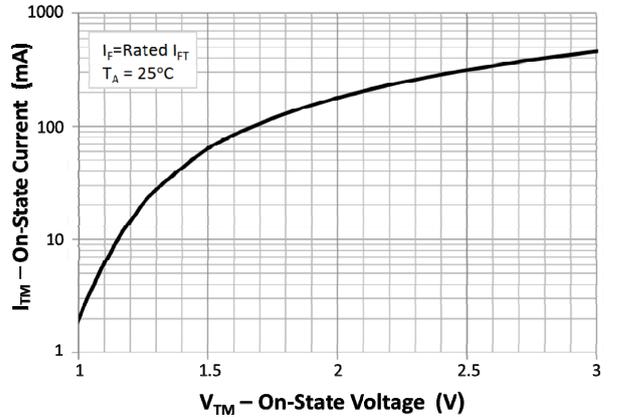


Fig 6 On-state Current On-state Voltage

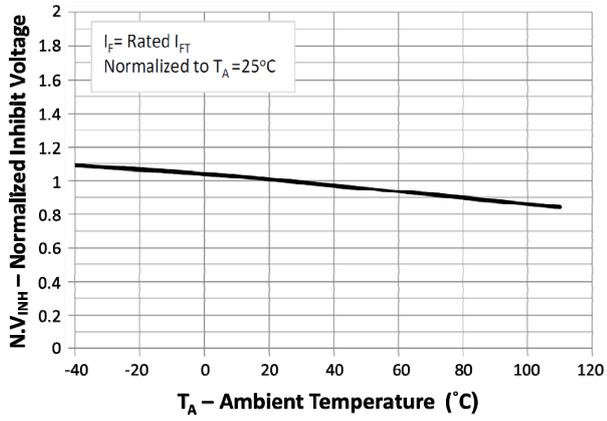


Fig 7 Normalized Inhibit Voltage vs Ambient Temperature

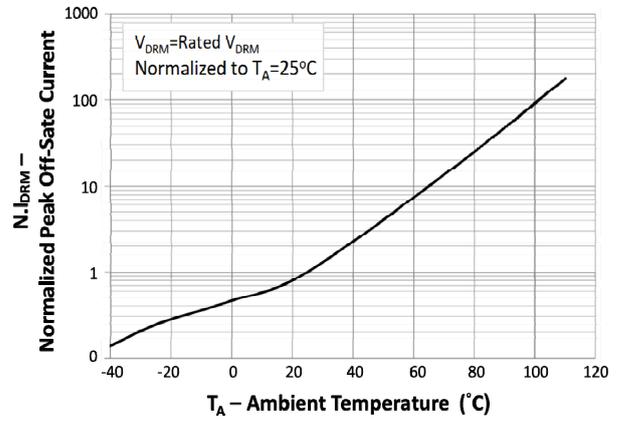


Fig 8 Normalized Peak Off-state Current vs Ambient Temperature

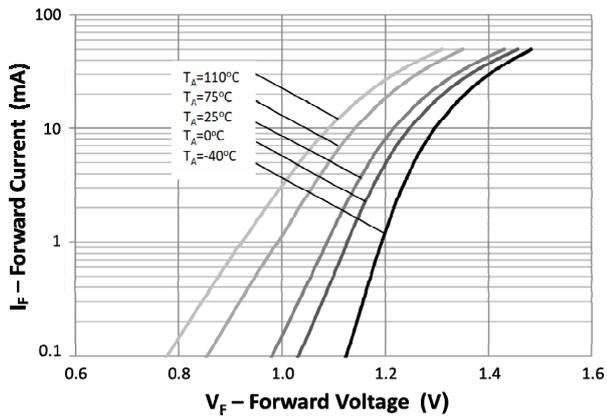


Fig 9 Forward Current vs Forward Voltage



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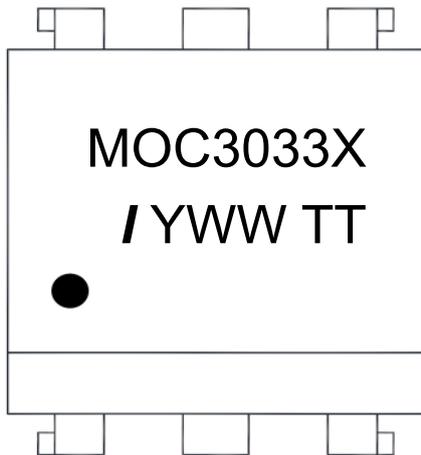
ORDER INFORMATION

MOC303x (UL Approval)			
After PN	PN	Description	Packing quantity
None	MOC3030, MOC3031 MOC3032, MOC3033	Standard DIP6	65 pcs per tube
G	MOC3030G, MOC3031G MOC3032G, MOC3033G	10mm Lead Spacing	65 pcs per tube
SM	MOC3030SM, MOC3031SM MOC3032SM, MOC3033SM	Surface Mount	65 pcs per tube
SMT&R	MOC3030SMT&R MOC3031SMT&R MOC3032SMT&R MOC3033SMT&R	Surface Mount Tape & Reel	1000 pcs per reel

MOC303x (UL and VDE Approvals)			
After PN	PN	Description	Packing quantity
None	MOC3030X, MOC3031X MOC3032X, MOC3033X	Standard DIP6	65 pcs per tube
G	MOC3030XG, MOC3031XG MOC3032XG, MOC3033XG	10mm Lead Spacing	65 pcs per tube
SM	MOC3030XSM, MOC3031XSM MOC3032XSM, MOC3033XSM	Surface Mount	65 pcs per tube
SMT&R	MOC3030XSMT&R MOC3031XSMT&R MOC3032XSMT&R MOC3033XSMT&R	Surface Mount Tape & Reel	1000 pcs per reel

DEVICE MARKING

Example : MOC3033X



MOC3033X Denotes Device Part Number

/ denotes Isocom

Y denotes 2 digit Year code

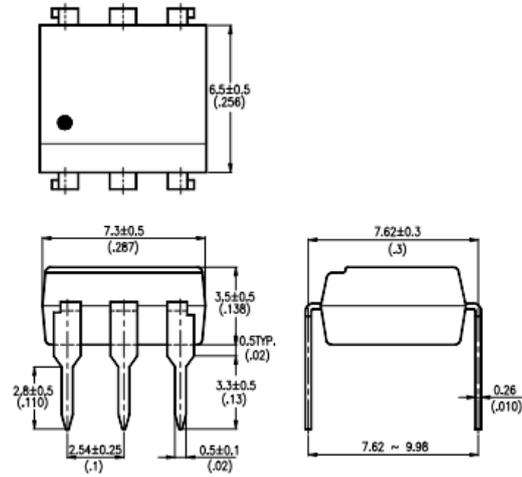
WW denotes 2 digit Week code

TT UL Package System Code

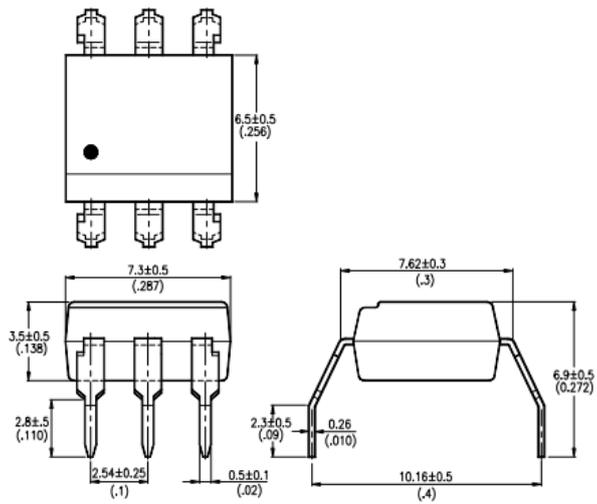
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PACKAGE DIMENSIONS in mm (inch)

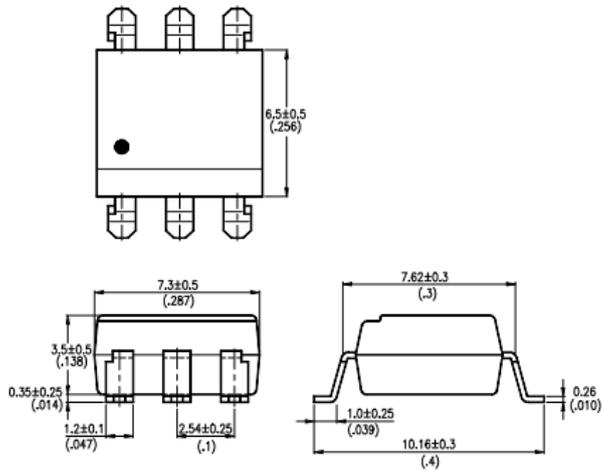
DIP



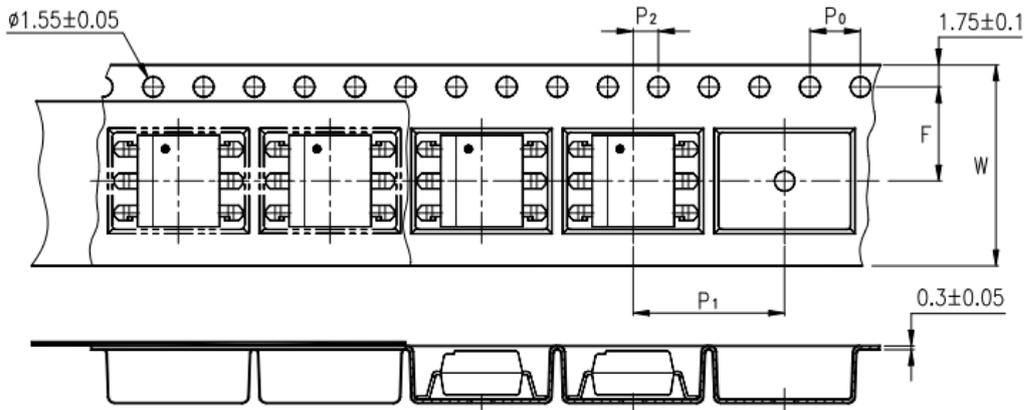
G Form



SMD

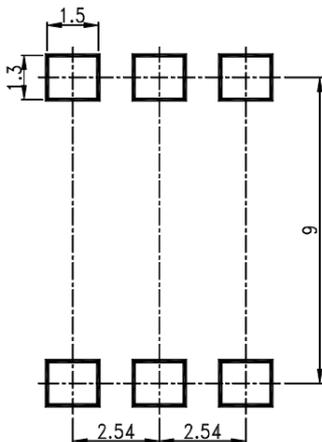


TAPE AND REEL PACKAGING

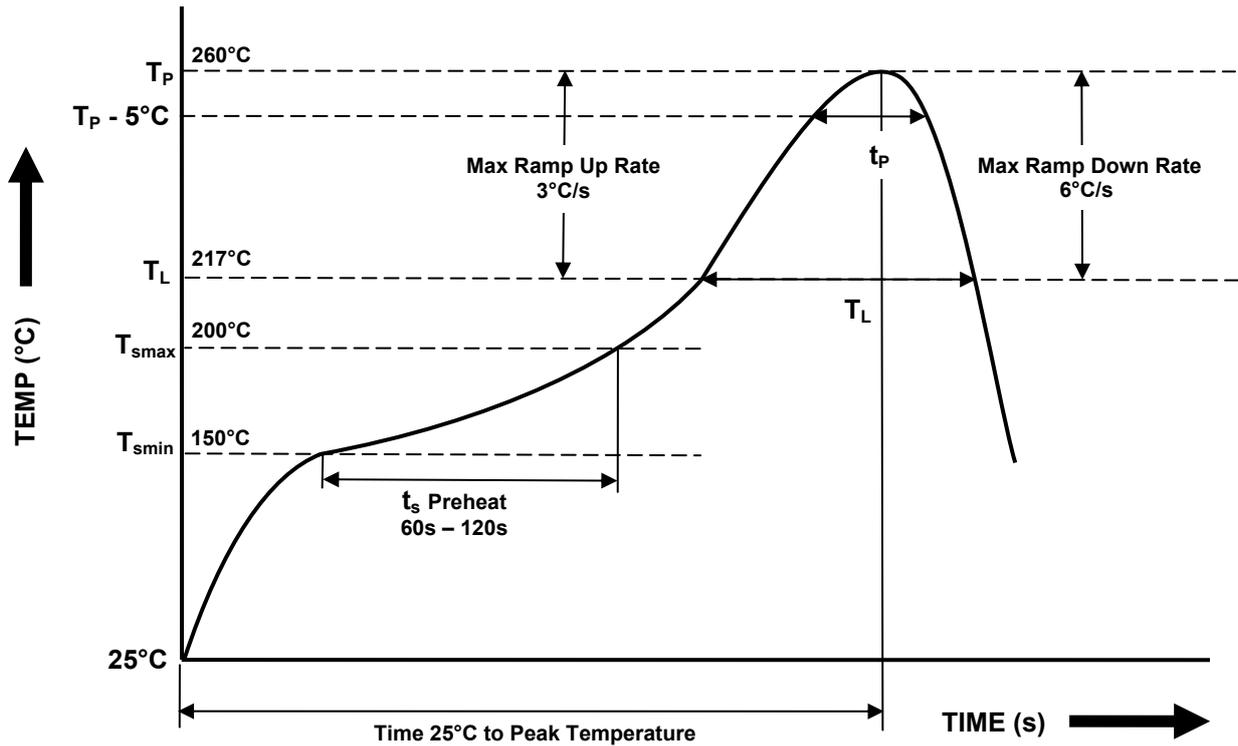


Description	Symbol	Dimension mm (inch)
Tape Width	W	16 ± 0.3 (0.63)
Pitch of Sprocket Holes	P ₀	4 ± 0.1 (0.15)
Distance of Compartment to Sprocket Holes	F	7.5 ± 0.1 (0.295)
	P ₂	2 ± 0.1 (0.079)
Distance of Compartment to Compartment	P ₁	12 ± 0.1 (0.47)

RECOMMENDED PAD LAYOUT for SMD (mm)



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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