

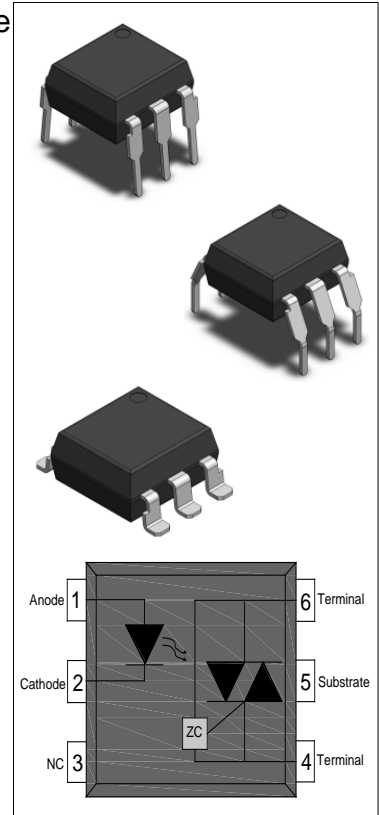


JOC304X Series

Rev.A.1.0

DESCRIPTION:

The JOC304X series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a monolithic silicon zero-cross photo triac in a plastic DIP6 and SMD package with different lead forming options. The products are widely used in solenoid/valve controls, lighting controls, motor controls, temperature controls, static AC power switches, solid state relays, interfacing microprocessors up to 120 V_{AC} peripherals.



MAIN FEATURES

- High isolation 5000 VRMS
- DC input with zero-cross photo triac output
- Operating temperature range -55 °C to 100 °C
- REACH & RoHS compliance
- HBM: H3A ; MM: M4
- CQC approved
- VDE approved
- UL approved

ABSOLUTE MAXIMUM RATINGS (Temperature=25°C)

Parameter		Symbol	Value	Unit
Input	Forward Current	I _F	60	mA
	Reverse Voltage	V _R	6	V
	Junction Temperature	T _j	125	°C
	Input Power Dissipation	P _I	100	mW
	Power Dissipation Derating (T _a ≥ 25°C)	Δ P _D /°C	-1.33	mW/°C
Output	Off-state Output Terminal Voltage	V _{OFF}	400	V
	Peak On-state Current (100μs pulse, 120 pps)	I _{TP}	2	A
	On-state RMS Current	I _{T(RMS)}	100	mA
	Peak Repetitive Surge Current (P _W =10 ms)	I _{TSM}	1	A
	Junction Temperature	T _j	125	°C
	Output Power Dissipation	P _O	250	mW

	Power Dissipation Derating ($T_a \geq 25^\circ\text{C}$)	$\Delta P_D / ^\circ\text{C}$	-3.33	mW/ $^\circ\text{C}$
Total Power Dissipation		P_{tot}	350	mW
Isolation Voltage		V_{iso}	5000 ^①	V _{rms}
Operating Temperature		T_{opr}	-55~100	$^\circ\text{C}$
Storage Temperature		T_{stg}	-55~125	$^\circ\text{C}$
Soldering Temperature		T_{sol}	260 ^②	$^\circ\text{C}$

NOTE1: AC for 1minute, R.H.=40~60%

NOTE2: For 10 seconds

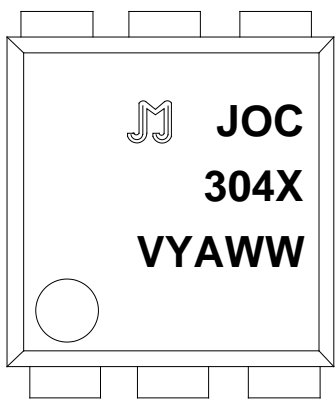
ELECTRICAL CHARACTERISTICS (Temperature=25 $^\circ\text{C}$)

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit
Input	Forward Voltage	V_F	$I_F=10\text{mA}$	-	1.27	2.2	V
	Reverse Current	I_R	$V_R=6\text{V}$	-	-	1	μA
	Input Capacitance	C_{in}	$V=0, f=1\text{kHz}$	-	10	-	pF
Output	Peak Off-state Current, Either Direction	I_{OFF}	$V_{\text{OFF}}=400\text{V}, I_F=0$	-	-	100 ^③	nA
	Peak On-state Voltage, Either Direction	V_{TM}	$I_{\text{TM}}=100\text{mA}$	-	1.7	2.5	V
	Critical Rate of Rise of Off-state voltage	dV/dt	$V_{\text{PEAK}}=400\text{V}, I_F=0$	1000 ^④	-	-	V/ μs
Transfer Characteristics	LED Trigger Current	JOC3041	Terminal Voltage=3V $I_{\text{TM}}=100\text{mA}$	-	-	15	mA
		JOC3042		-	-	10	
		JOC3043		-	-	5	
	Holding Current	I_H	$I_{\text{TM}}=2\text{mA}, I_F=\text{Rated } I_{\text{FT}}$	-	250	-	μA
	Isolation Resistance	R_{ISO}	DC500V 40~60%R.H.	10^{12}	10^{14}	-	Ω
	Floating Capacitance	C_{IO}	$V=0, f=1\text{MHz}$	-	10	-	pF
Response Time	t_{on}	$V_D=6\text{V}, R_L=100\Omega, I_F=20\text{mA}$	-	15	50	μs	
Zero-crossing Characteristics	Inhibit Voltage	V_{IH}	$I_F=\text{Rated } I_{\text{FT}}$	-	-	20	V
	Leakage in Inhibited State	$I_{\text{OFF}2}$	$I_F=\text{Rated } I_{\text{FT}}, V_{\text{OFF}}=\text{Rated } V_{\text{OFF}}$	-	-	1	mA

NOTE3: Test voltage must be applied within dV/dt ratings.

NOTE4: Refer to Fig.14 & Fig.15

ORDERING AND MARKING INFORMATION

MARKING INFORMATION			
		<p>JOC : Company Abbr. 304X : Part Number & Rank V : VDE Option Y : Fiscal Year A : Manufacturing Code WW : Work Week</p>	
ORDERING INFORMATION			
JOC304X(Y)(Z)-GV			
<p>JOC – Company Abbr. 304X – Part Number (1/2/3) Y – Lead Form Option (M/SL/None) Z – Tape and Reel Option (T1) G – Green Option (G or None) V – VDE Option (V or None)</p>			
Packing Quantity			
Option	Quantity	Quantity – Inner box	Quantity –Outer box
None	65 Units/Tube	32 Tubes/Inner box	10 Inner box/Outer box =20.8k Units
M	65 Units/Tube	32 Tubes/Inner box	10 Inner box/Outer box =20.8k Units
SL(T1)	1000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box =15k Units

Characteristics Curves

FIG.1: Forward Current vs. Ambient Temperature

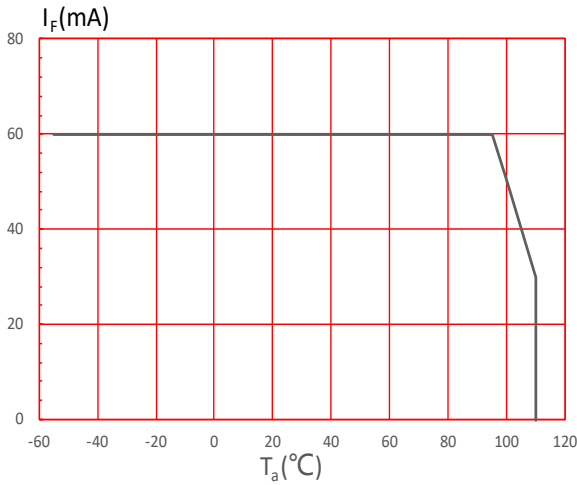


FIG.2: On-state Terminal Current vs. Ambient Temperature

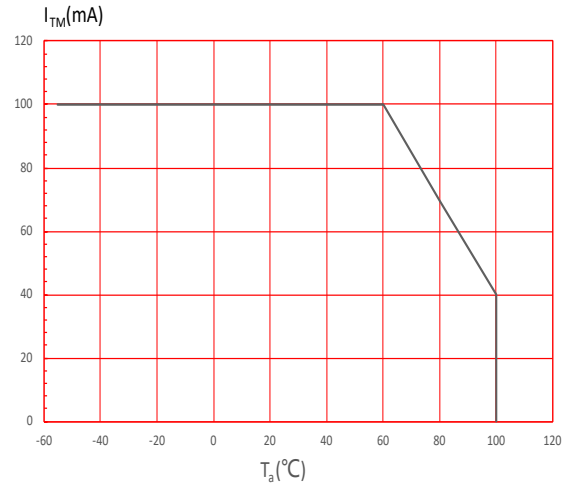


FIG.3: Forward Current vs. Forward Voltage

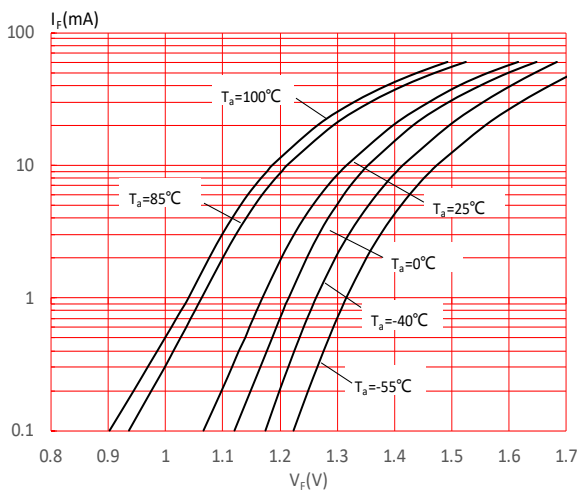


FIG.4: Normalized Off-state Terminal Current vs. Ambient Temperature

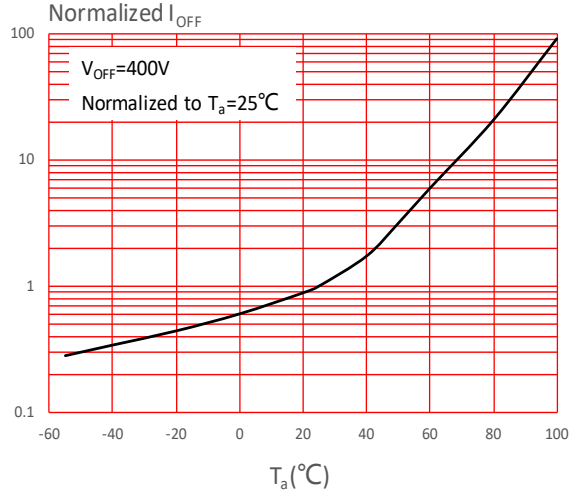


FIG.5: Normalized Off-state Terminal Voltage vs. Ambient Temperature

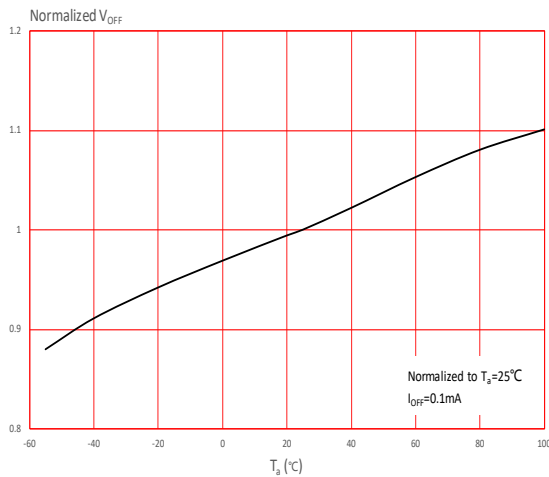


FIG.6: Normalized Trigger Current vs. Ambient Temperature

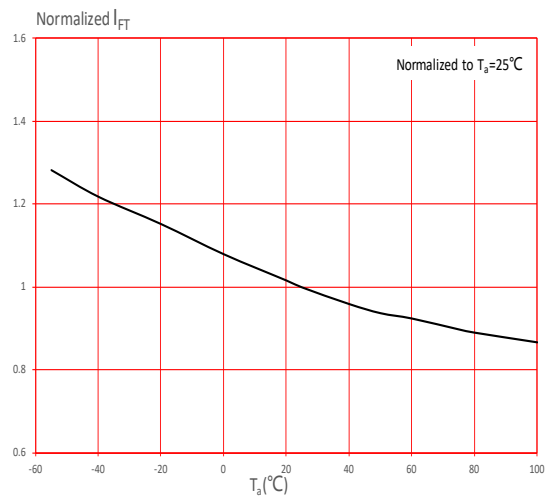


FIG.7: Normalized On-state Terminal Voltage vs. Ambient Temperature

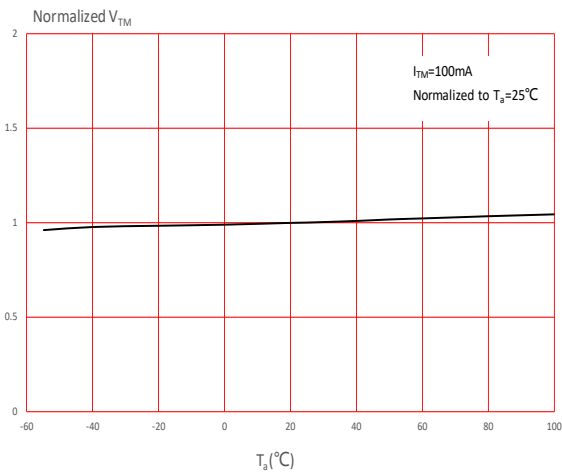


FIG.8: On-state Terminal Voltage vs. On-state Terminal Current

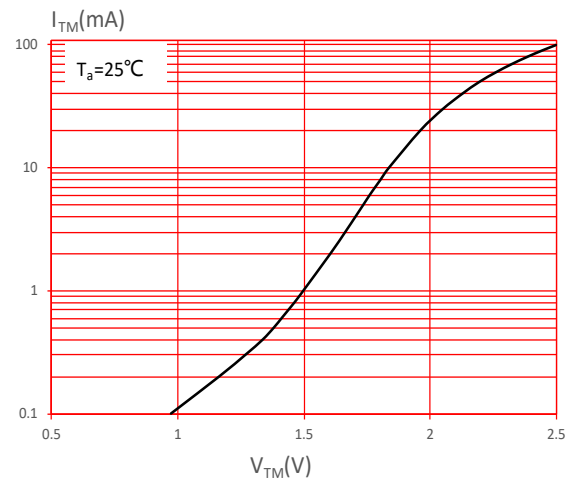


FIG.9: Normalized Holding Current vs. Ambient Temperature

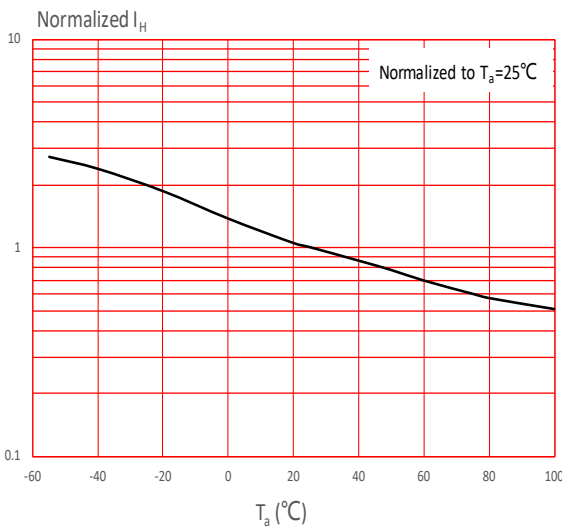


FIG.10: Normalized Leakage in Inhibit State vs. Ambient Temperature

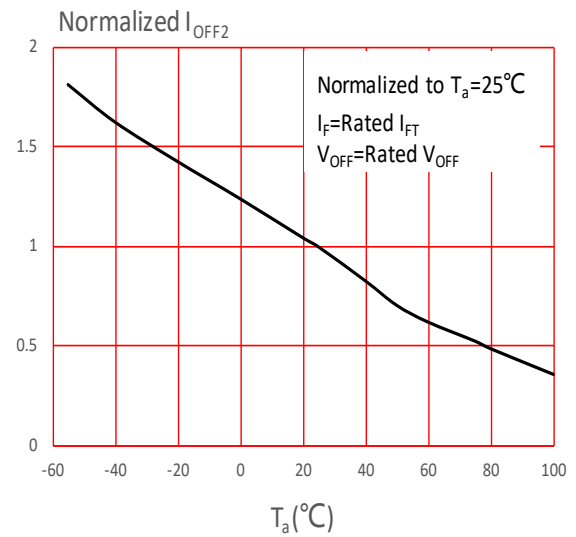
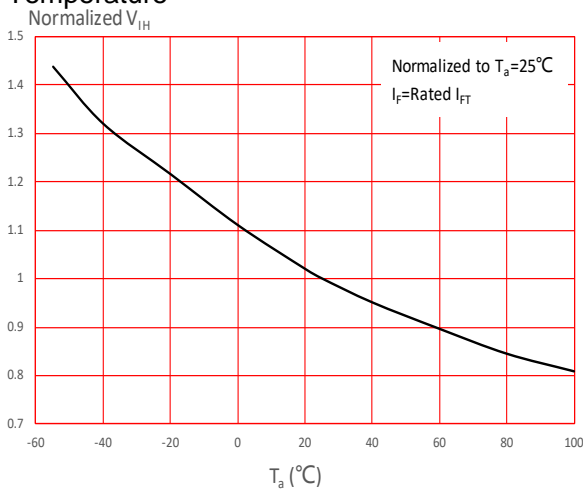


FIG.11: Normalized Inhibit Voltage vs. Ambient Temperature



TEST CIRCUITS

FIG.12: Test Circuits of Turn On Time

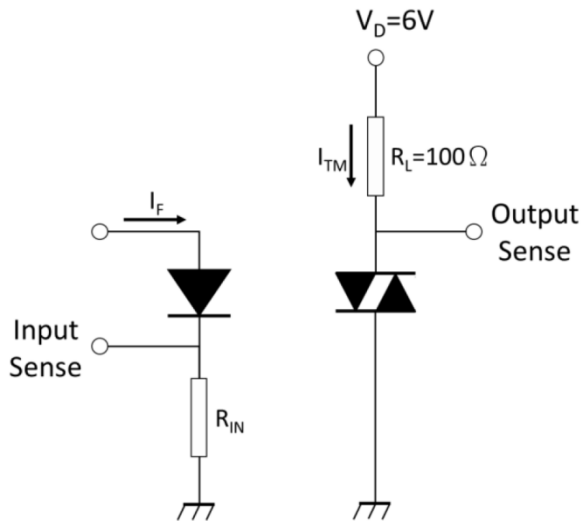


FIG.13: Waveforms of Turn On Time



Fig.14: Test Circuits of dV/dt

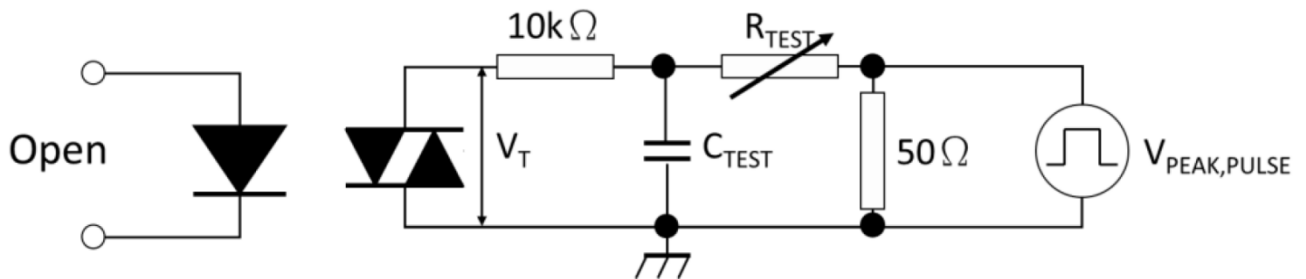
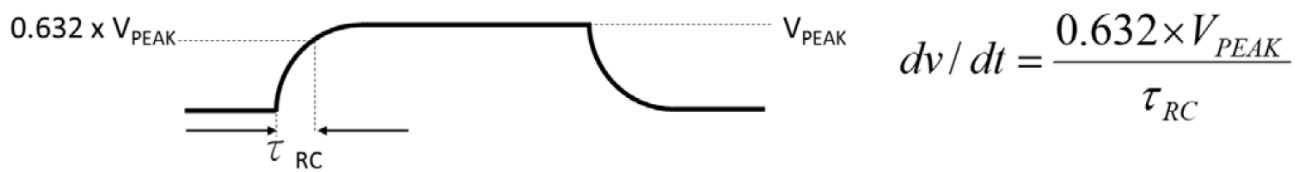
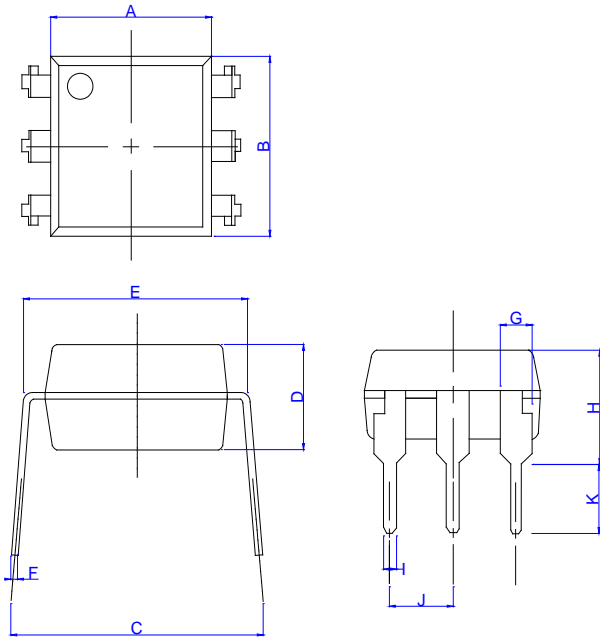


Fig.15: Waveforms of dV/dt



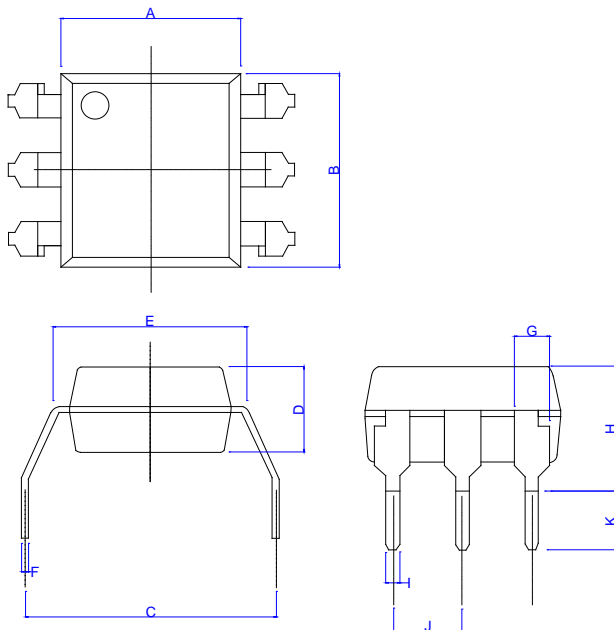
Package Dimension (Unit: mm)

Standard DIP Type:



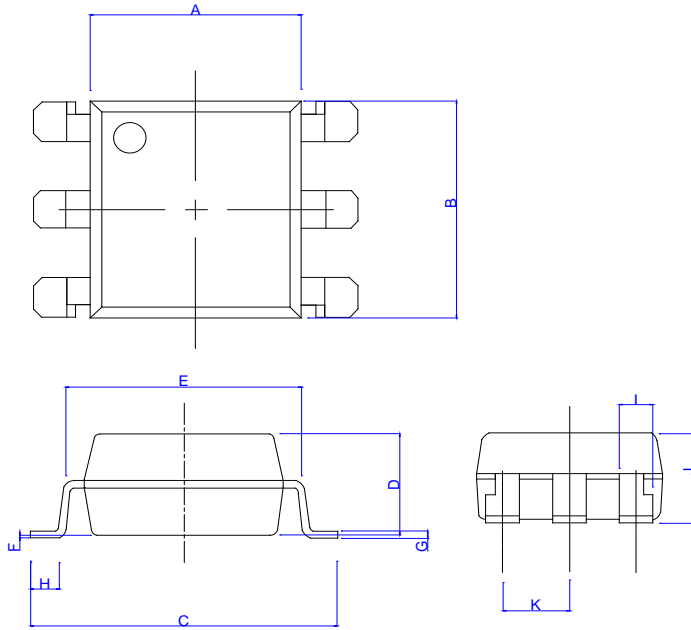
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.30		6.70	0.249		0.265
B	6.92		7.32	0.274		0.289
C	7.62		9.50	0.301		0.375
D	3.30		3.70	0.130		0.146
E	7.32		7.92	0.289		0.313
F		0.25			0.010	
G	1.20		1.40	0.047		0.055
H	4.20		4.80	0.166		0.190
I		0.50			0.020	
J		2.54			0.100	
K	2.50		3.10	0.099		0.123

Option M Type:



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.30		6.70	0.249		0.265
B	6.92		7.32	0.274		0.289
C	9.86		10.46	0.390		0.413
D	3.30		3.70	0.130		0.146
E	7.32		7.92	0.289		0.313
F		0.25			0.010	
G	1.20		1.40	0.047		0.055
H	4.28		4.88	0.169		0.193
I		0.50			0.020	
J		2.54			0.100	
K	2.20			0.087		

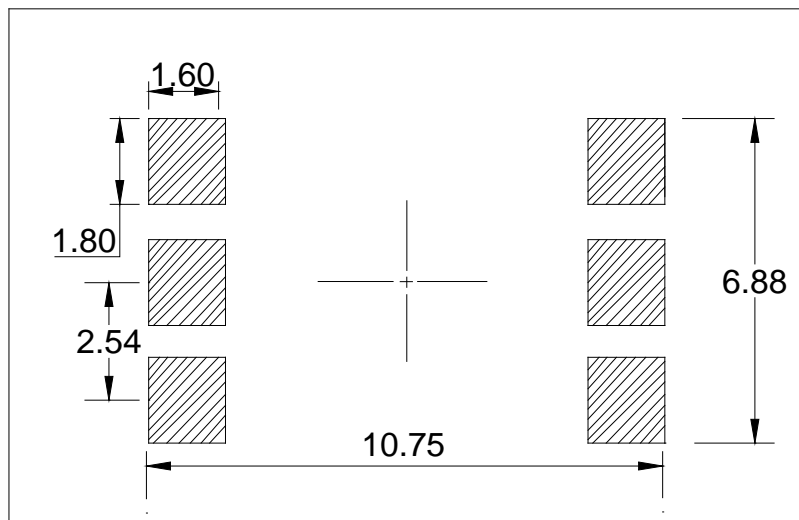
Option SL Type:



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.30		6.70	0.249		0.265
B	6.92		7.32	0.274		0.289
C	9.85		10.45	0.389		0.413
D	3.30		3.70	0.130		0.146
E	7.32		7.92	0.289		0.313
F		0.10			0.004	
G		0.25			0.010	
H		0.80			0.032	
I	1.20		1.40	0.047		0.055
J	3.30		3.90	0.130		0.154
K		2.54			0.100	

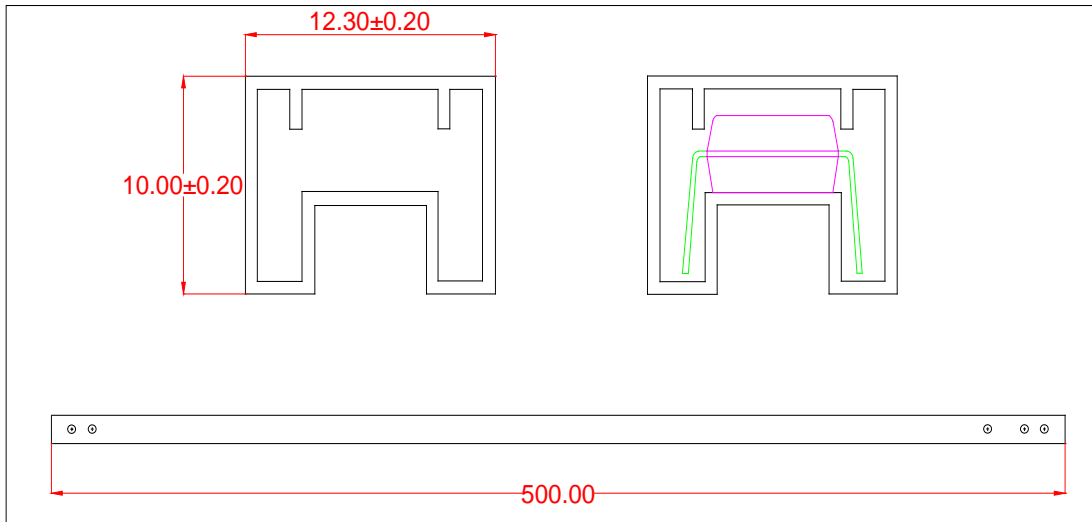
RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

Option SL

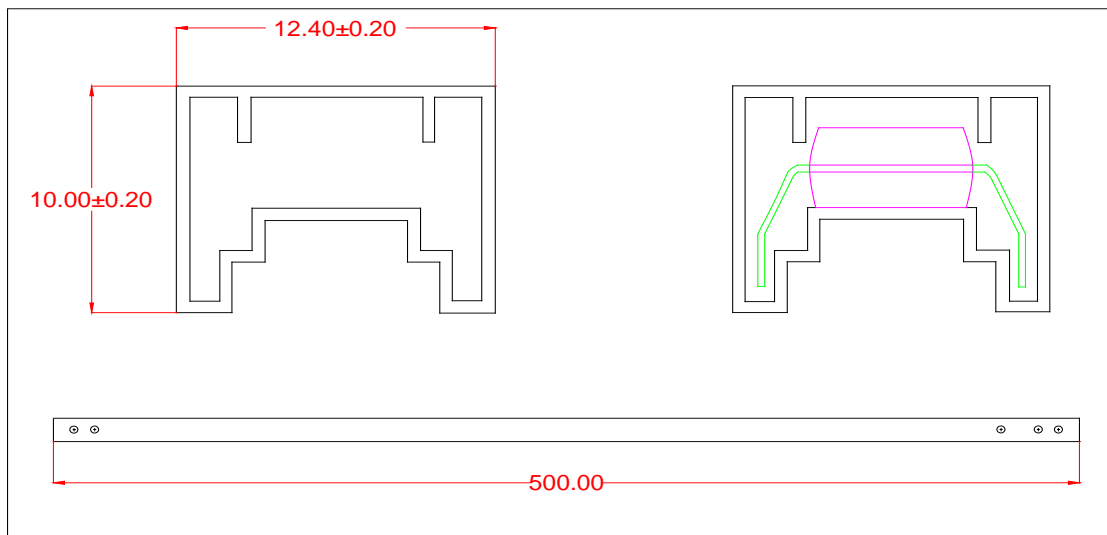


TUBE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Standard DIP

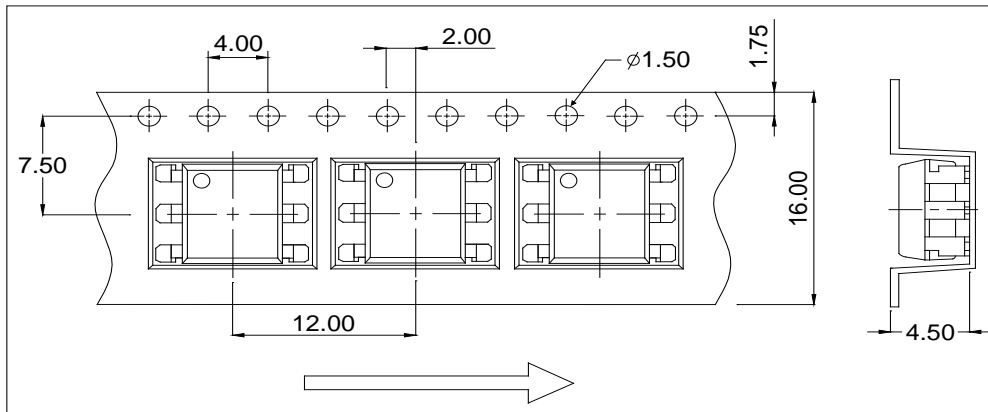


Option M



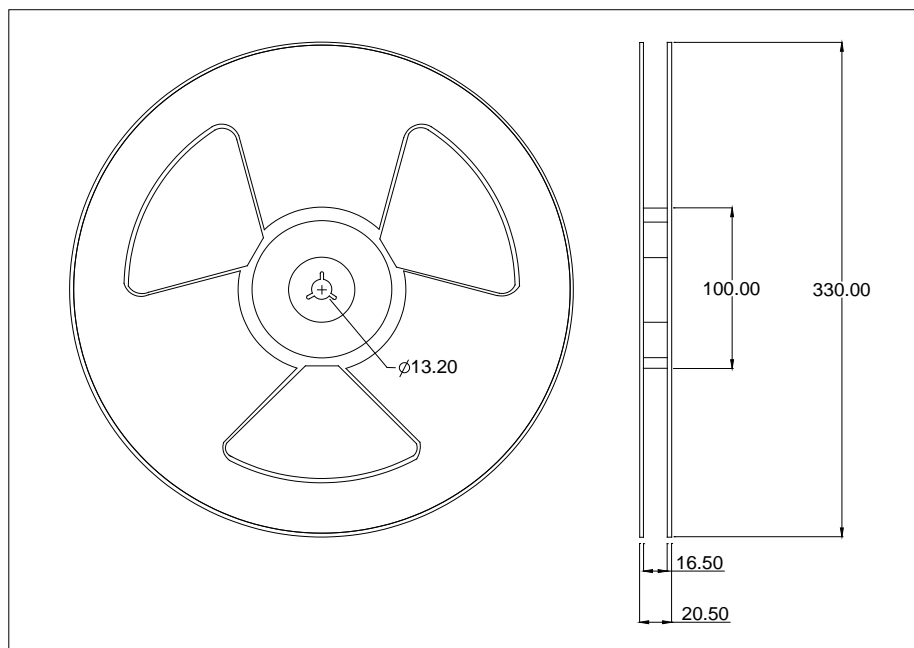
CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option SL(T1)

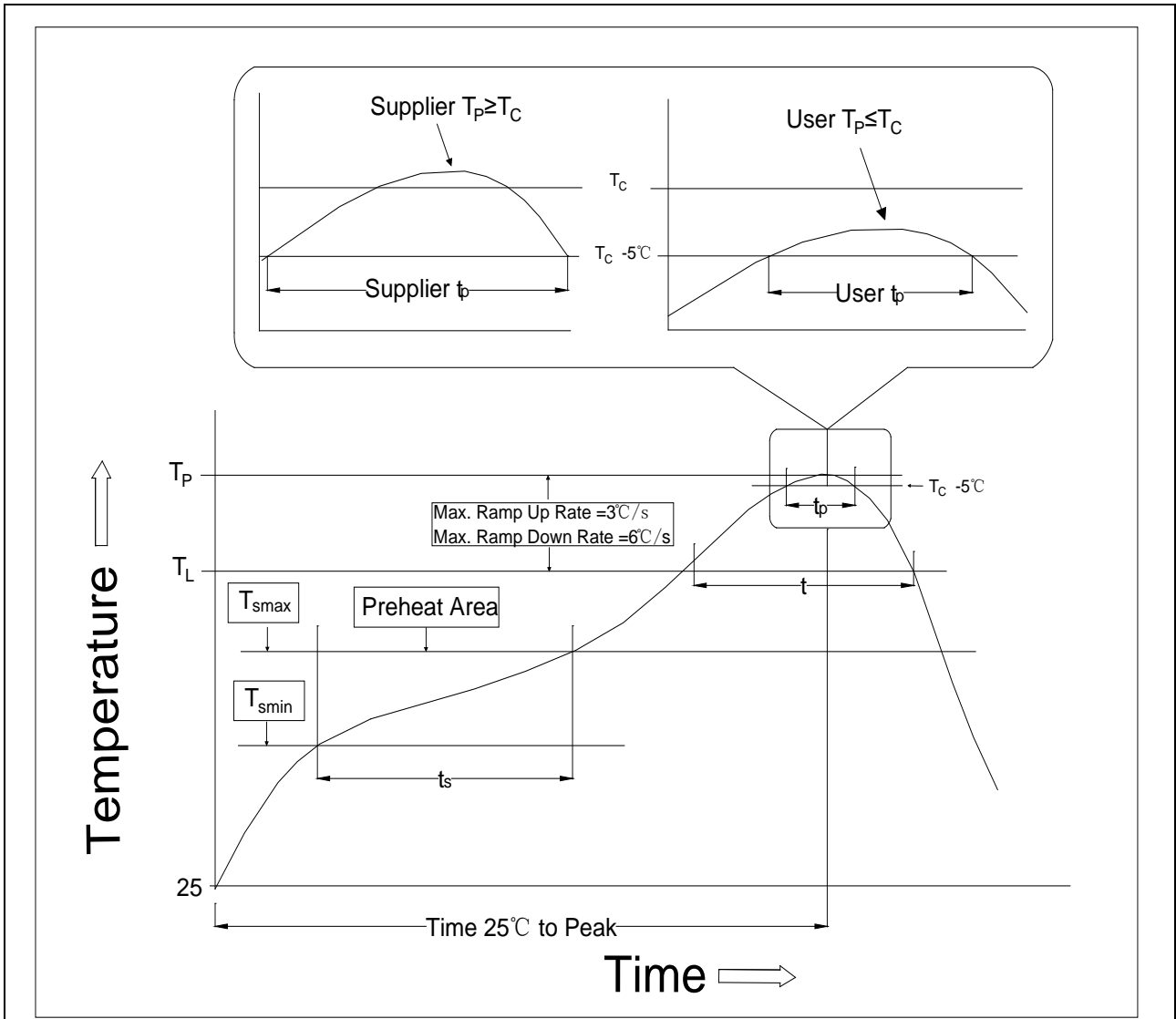


REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option SL

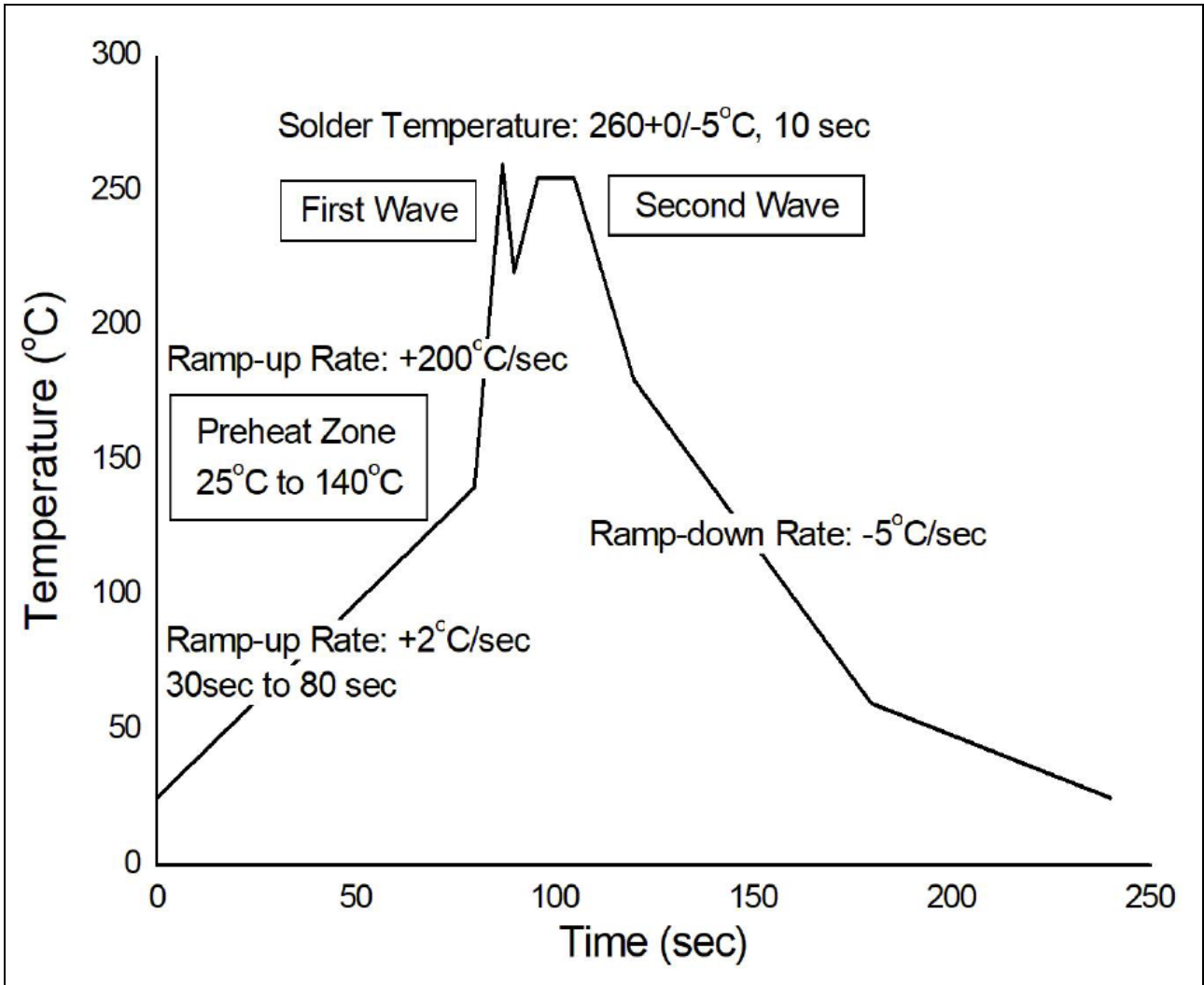


REFLOW INFORMATION



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T _{smin})	100	150°C
Temperature Max. (T _{smax})	150	200°C
Time (t _s) from (T _{smin} to T _{smax})	60-120 seconds	60-120 seconds
Ramp-up Rate (t _L to t _P)	3°C/second max.	3°C/second max.
Liquidus Temperature (T _L)	183°C	217°C
Time (t _L) Maintained Above (T _L)	60-150 seconds	60-150 seconds
Peak Body Package Temperature	235°C+0°C/-5°C	260°C+0°C/-5°C
Time (t _P) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate (T _P to T _L)	6°C/second max.	6°C/second max.
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.


WAVE SOLDERING



HAND SOLDERING BY SOLDERING IRON	
Soldering Temperature	360±5°C
Soldering Time	3s max.

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