



## JOC305XD5 Series

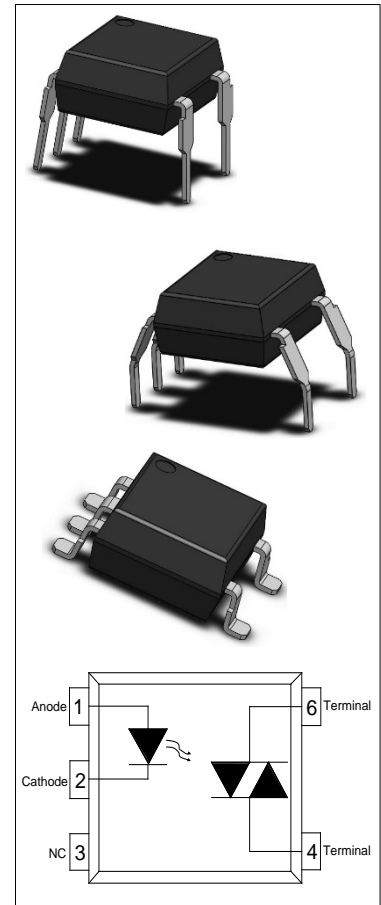
Rev.A.1.0

### DESCRIPTION:

The JOC305XD5 series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a monolithic silicon random-phase photo triac in a plastic DIP5 package with different lead forming options. With the robust coplanar double mold structure, JOC305XD5 series provide the most stable isolation feature. 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 265 V<sub>AC</sub> peripherals.

### MAIN FEATURES

- High isolation 5000 VRMS
- DC input with random-phase 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 <sub>F</sub>	60	mA
	Reverse Voltage	V <sub>R</sub>	6	V
	Junction Temperature	T <sub>j</sub>	125	°C
	Input Power Dissipation	P <sub>I</sub>	100	mW
	Power Dissipation Derating (T <sub>a</sub> ≥ 25°C)	Δ P <sub>D</sub> /°C	-1.33	mW/°C
Output	Off-state Output Terminal Voltage	V <sub>OFF</sub>	600	V
	Peak On-state Current (100μs pulse, 120 pps)	I <sub>TP</sub>	2	A
	On-state RMS Current	I <sub>T(RMS)</sub>	100	mA
	Peak Repetitive Surge Current (P <sub>W</sub> =10 ms)	I <sub>TSM</sub>	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/°C
Total Power Dissipation		$P_{tot}$	350	mW
Isolation Voltage		$V_{iso}$	5000 <sup>①</sup>	V <sub>rms</sub>
Operating Temperature		$T_{opr}$	-55~100	°C
Storage Temperature		$T_{stg}$	-55~125	°C
Soldering Temperature		$T_{sol}$	260 <sup>②</sup>	°C

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

**NOTE2:** For 10 seconds

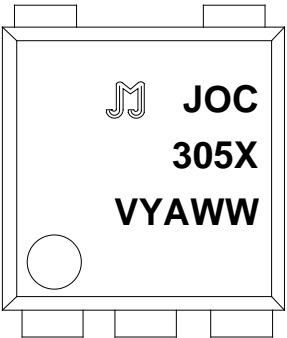
### ELECTRICAL CHARACTERISTICS (Temperature=25°C)

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	
Input	Forward Voltage	$V_F$	$I_F=10\text{mA}$	-	1.24	1.4	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	$I_{OFF}$	$V_{OFF}=600\text{V}, I_F=0$	-	-	100 <sup>③</sup>	nA	
	Peak On-state Voltage, Either Direction	$V_{TM}$	$I_{TM}=100\text{mA}$	-	1.8	2.5	V	
	Critical Rate of Rise of Off-state voltage	dV/dt	$V_{PEAK}=600\text{V}, I_F=0$	1000 <sup>④</sup>	-	-	V/μs	
Transfer Characteristics	LED Trigger Current	JOC3051D5	Terminal Voltage=3V $I_{TM}=100\text{mA}$	-	-	15	mA	
		JOC3052D5		-	-	10		
		JOC3053D5		-	-	5		
	Holding Current		$I_H$	$I_{TM}=2\text{mA}, I_F=\text{Rated } I_{FT}$	-	250	-	μA
	Isolation Resistance		$R_{ISO}$	DC500V 40~60%R.H.	$10^{12}$	$10^{14}$	-	Ω
	Floating Capacitance		$C_{IO}$	$V=0, f=1\text{MHz}$	-	5	-	pF
	Response Time		$t_{on}$	$V_D=6\text{V}, R_L=100\Omega, I_F=20\text{mA}$	-	15	50	μs

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

**NOTE4:** Refer to Fig.14 & Fig.15

**ORDERING AND MARKING INFORMATION**

<b>MARKING INFORMATION</b>			
		<p>JOC : Company Abbr.                      305X : Part Number &amp; Rank                      V : VDE Option                      Y : Fiscal Year                      A : Manufacturing Code                      WW : Work Week</p>	
<b>ORDERING INFORMATION</b>			
<b>JOC305XD5(Y)(Z)-GV</b>			
<p>JOC – Company Abbr.                      305X – Part Number (1/2/3)                      D5 – DIP5 Package                      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>			
<b>Packing Quantity</b>			
<b>Option</b>	<b>Quantity</b>	<b>Quantity – Inner box</b>	<b>Quantity –Outer box</b>
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

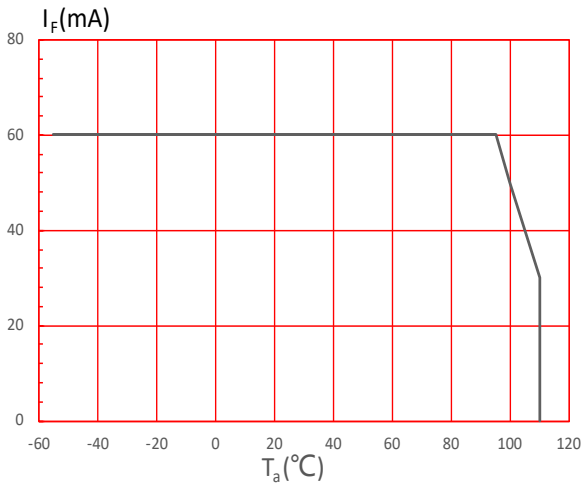


FIG.2: On-state Terminal Current vs. Ambient Temperature

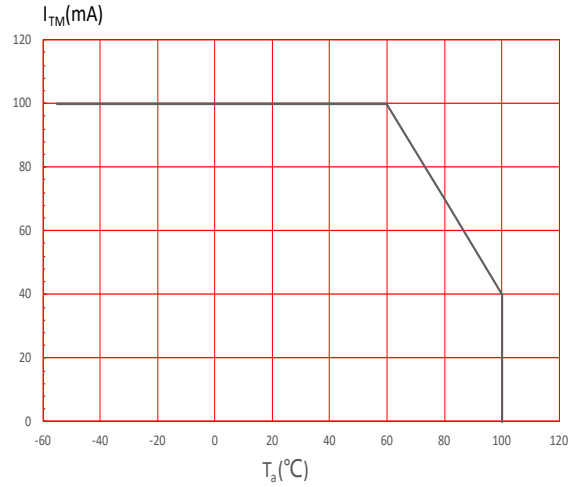


FIG.3: Forward Current vs. Forward Voltage

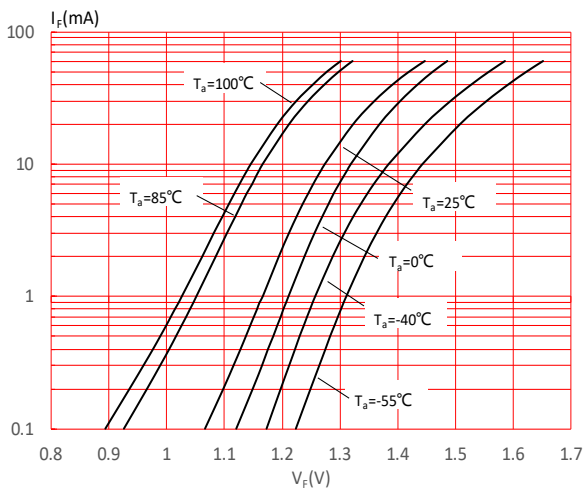


FIG.4: Normalized Off-state Terminal Current vs. Ambient Temperature

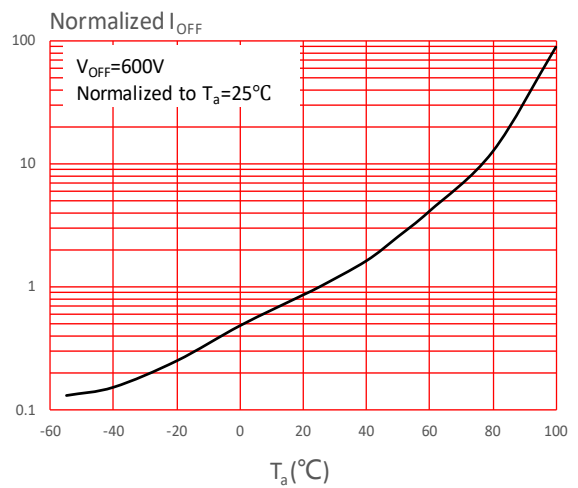


FIG.5: Normalized Off-state Terminal Voltage vs. Ambient Temperature

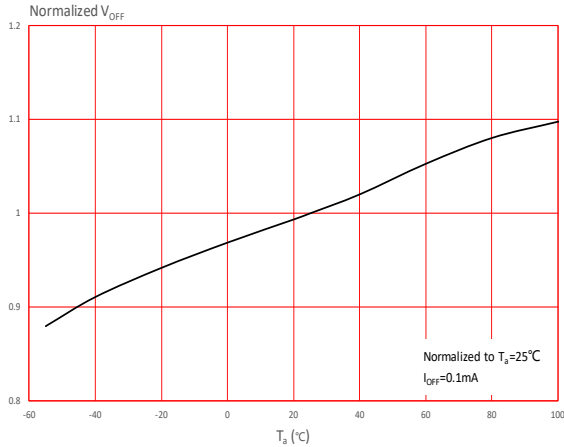
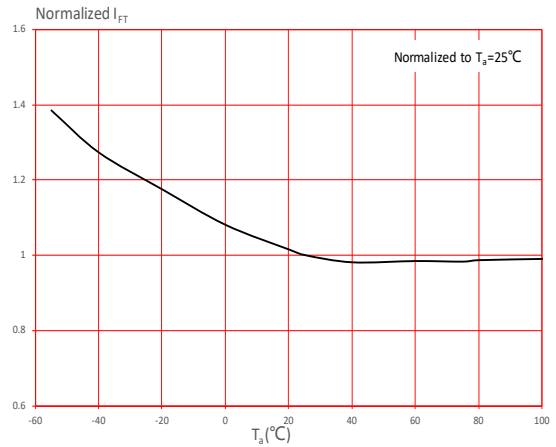
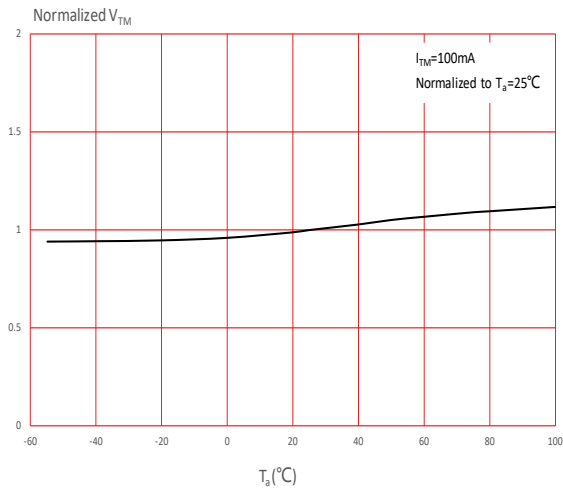


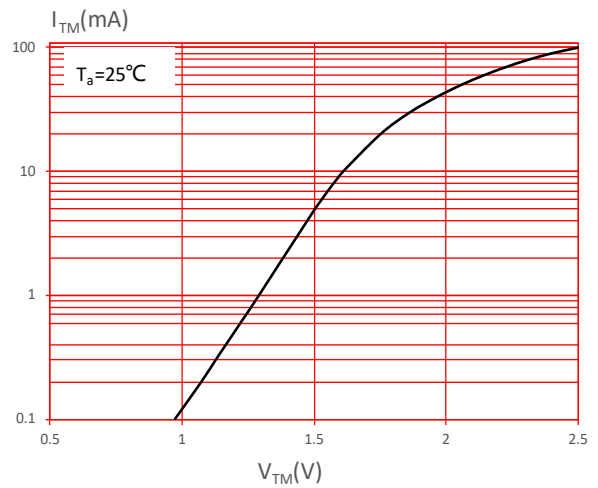
FIG.6: Normalized Trigger Current vs. Ambient Temperature



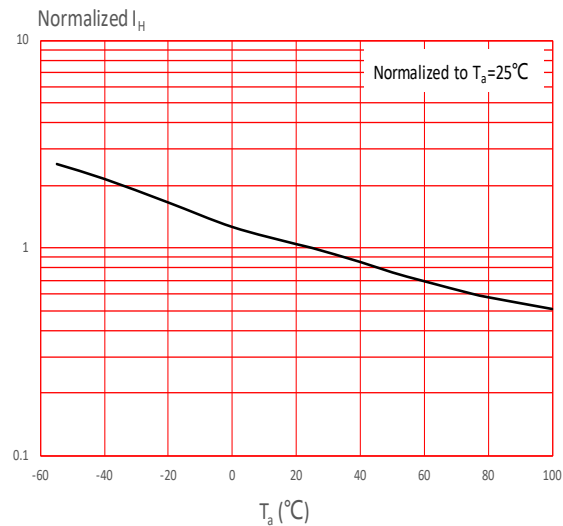
**FIG.7:** Normalized On-state Terminal Voltage vs. Ambient Temperature



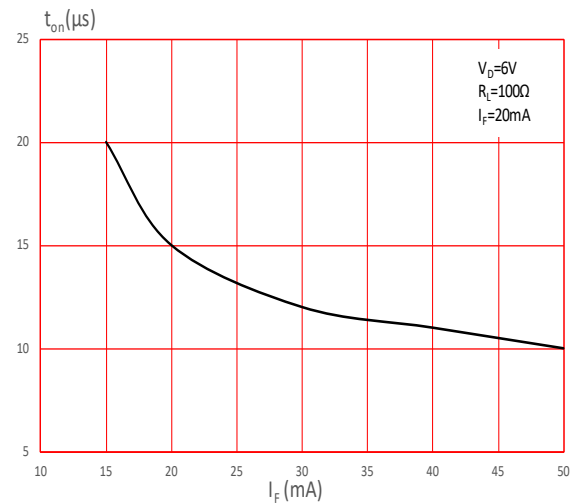
**FIG.8:** On-state Terminal Voltage vs. On-state Terminal Current



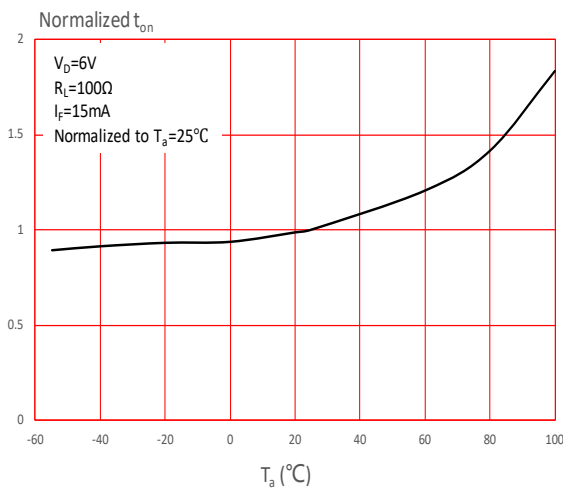
**FIG.9:** Normalized Holding Current vs. Ambient Temperature



**FIG.10:** Turn On Time vs. Forward Current



**FIG.11:** Normalized Turn On Time vs. Ambient Temperature



TEST CIRCUITS

FIG.12: Test Circuits of Turn On Time

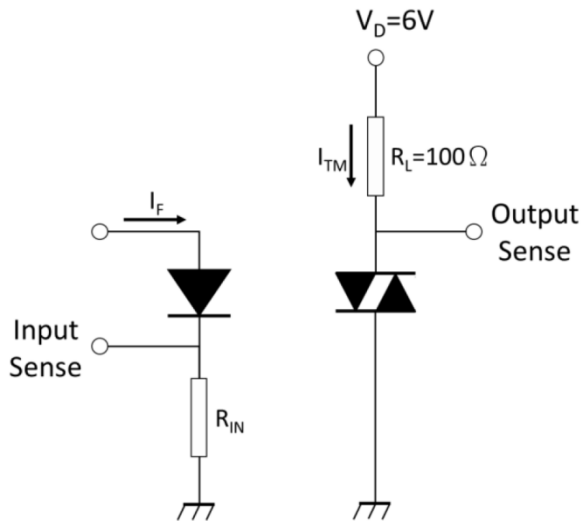


FIG.13: Waveforms of Turn On Time

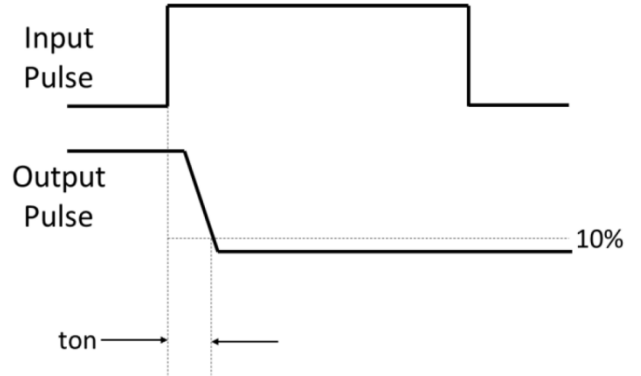


Fig.14: Test Circuits of dV/dt

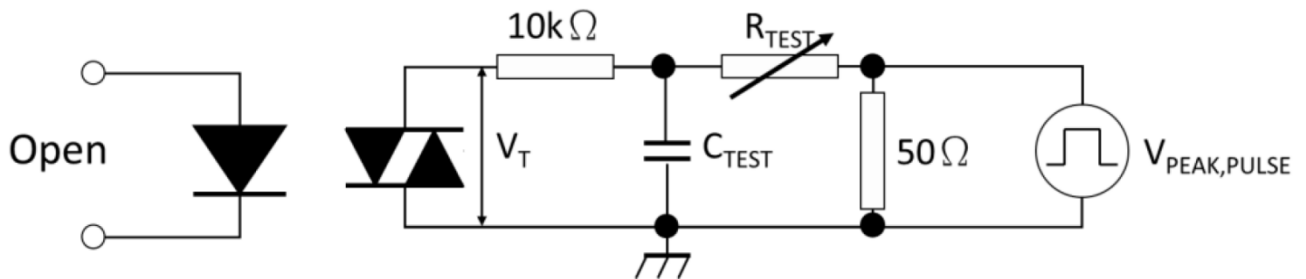
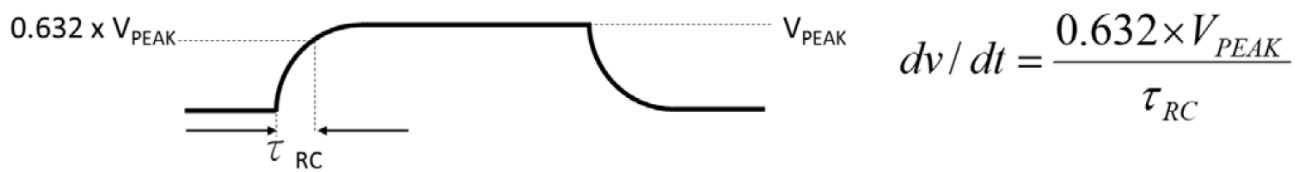
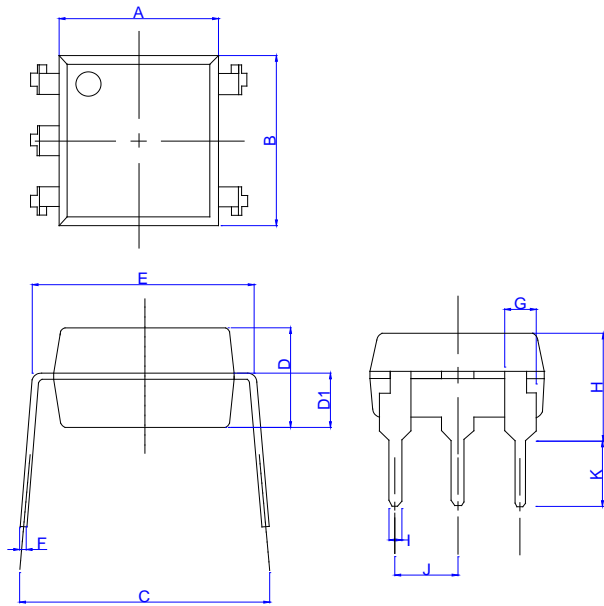


Fig.15: Waveforms of dV/dt



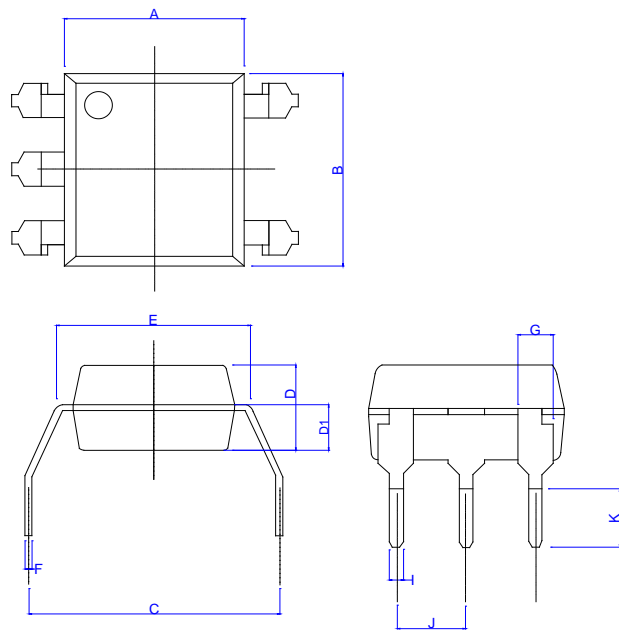
Package Dimension (Unit: mm)

Standard DIP Type:



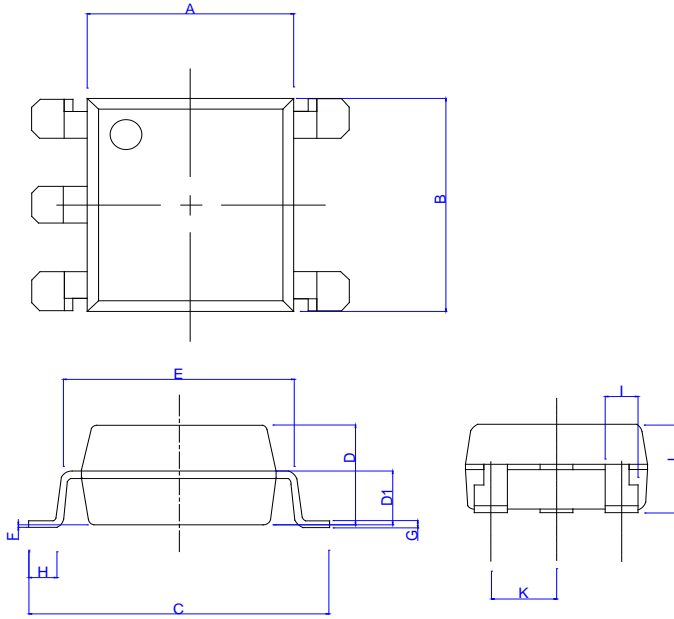
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.00		7.00	0.237		0.277
B	6.62		7.62	0.262		0.301
C	7.62		10.16	0.301		0.402
D	3.00		4.00	0.119		0.158
D1	1.55		1.95	0.061		0.077
E	7.32		7.92	0.289		0.313
F	0.16		0.36	0.006		0.014
G	0.90		1.50	0.036		0.059
H	3.50		4.50	0.138		0.178
I	0.40		0.60	0.016		0.024
J	2.29		2.79	0.091		0.110
K	2.40		3.40	0.095		0.134

Option M Type:



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.00		7.00	0.237		0.277
B	6.82		7.42	0.270		0.293
C	9.66		10.66	0.382		0.421
D	3.00		4.00	0.119		0.158
D1	1.55		1.95	0.061		0.077
E	7.32		7.92	0.289		0.313
F	0.16		0.36	0.006		0.014
G	0.90		1.50	0.036		0.059
I	0.40		0.60	0.016		0.024
J	2.29		2.79	0.091		0.110
K	2.50			0.099		

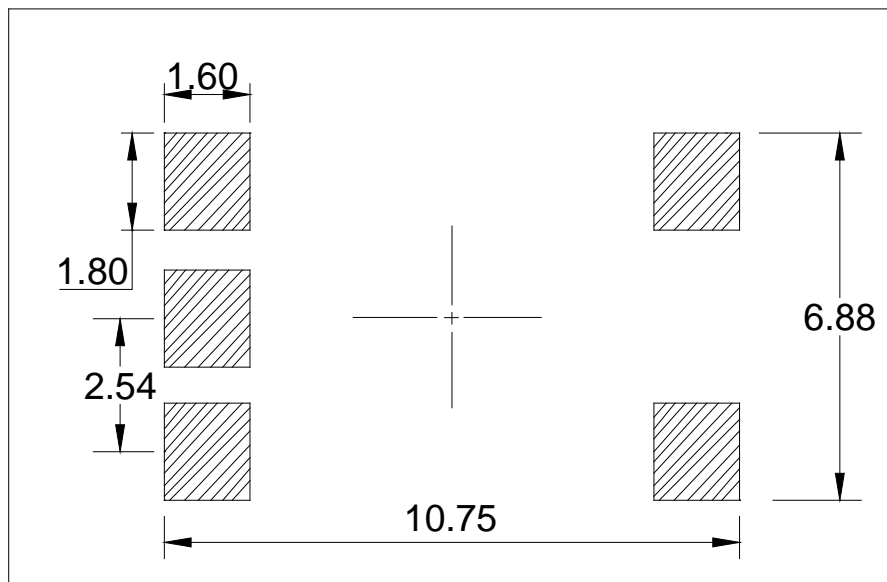
Option SL Type:



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.00		7.00	0.237		0.277
B	6.62		7.62	0.262		0.301
C	9.50		10.00	0.375		0.395
D	3.00		4.00	0.119		0.158
D1	1.55		1.95	0.061		0.077
E	7.32		7.92	0.289		0.313
F	0.10		0.65	0.004		0.026
G	0.16		0.36	0.006		0.014
H	1.00		1.40	0.047		0.055
I	0.90		1.50	0.036		0.059
J	3.35		4.35	0.132		0.172
K	2.29		2.79	0.091		0.110

**RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)**

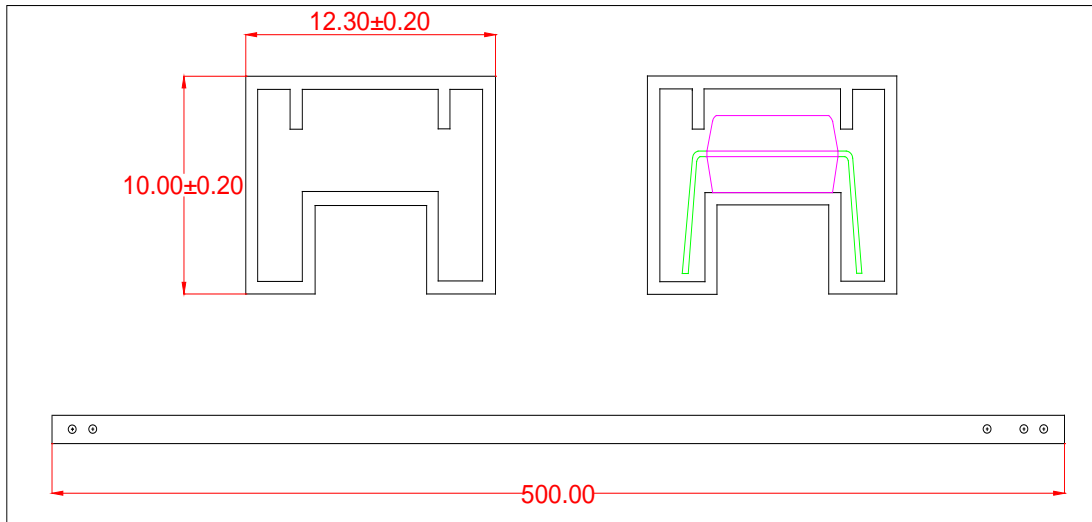
Option SL



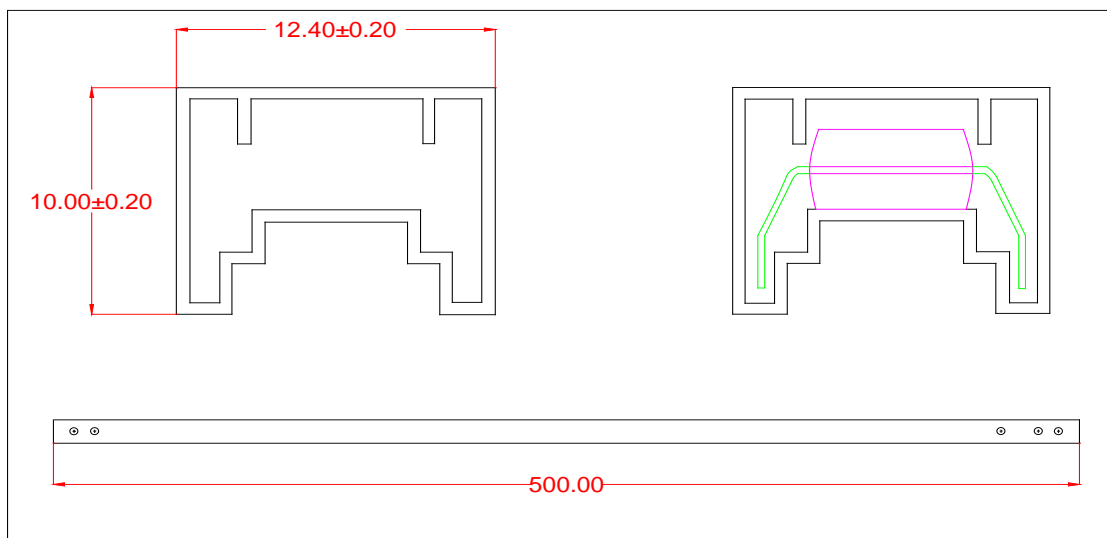


**TUBE SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

**Standard DIP**

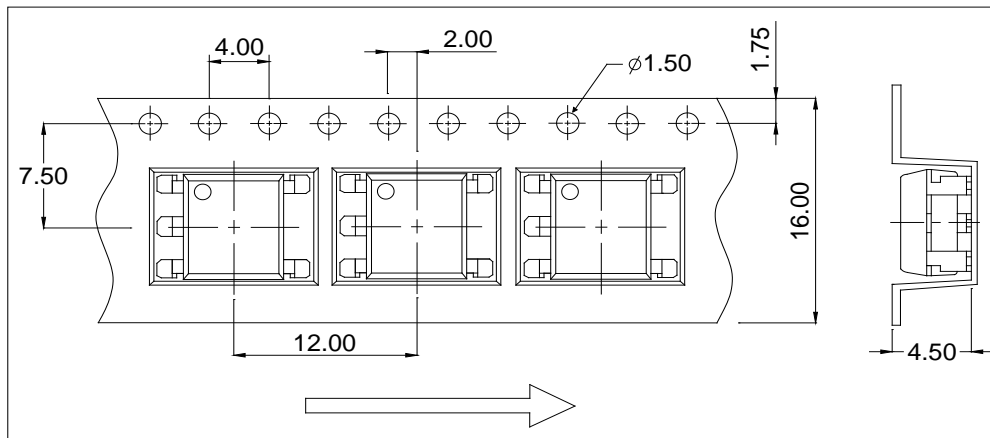


**Option M**



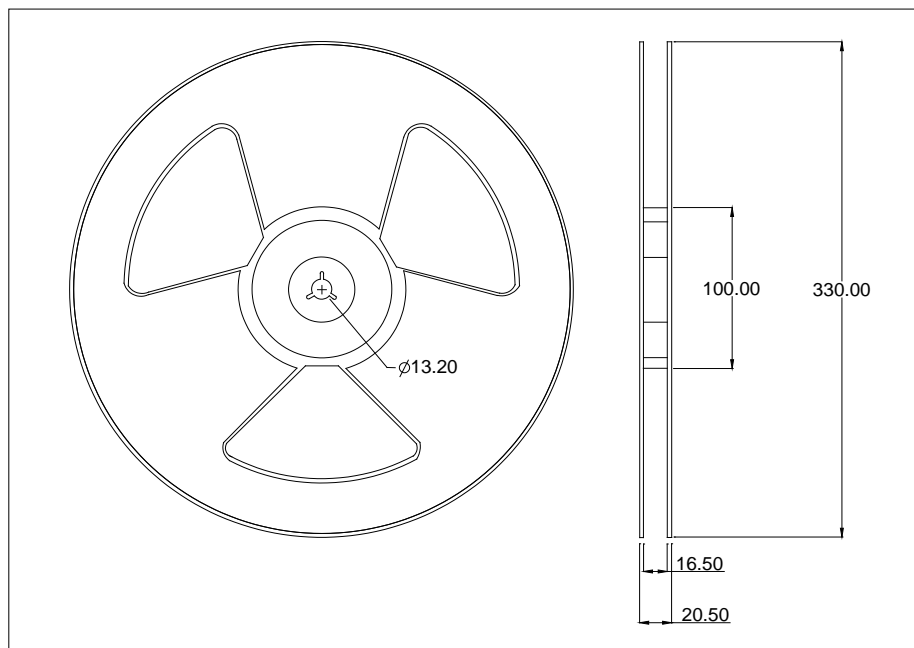
**CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

Option SL(T1)

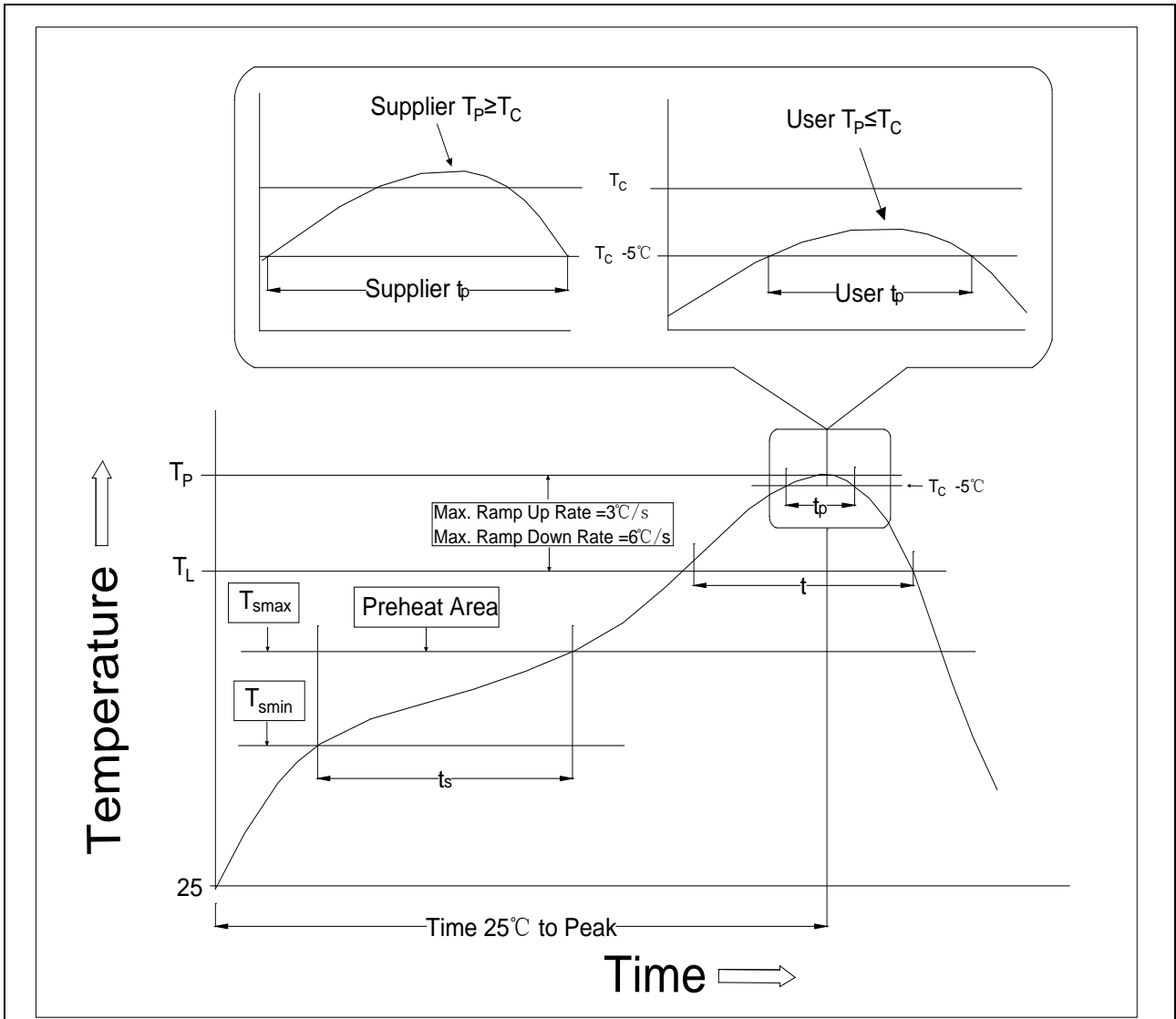


**REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

Option SL

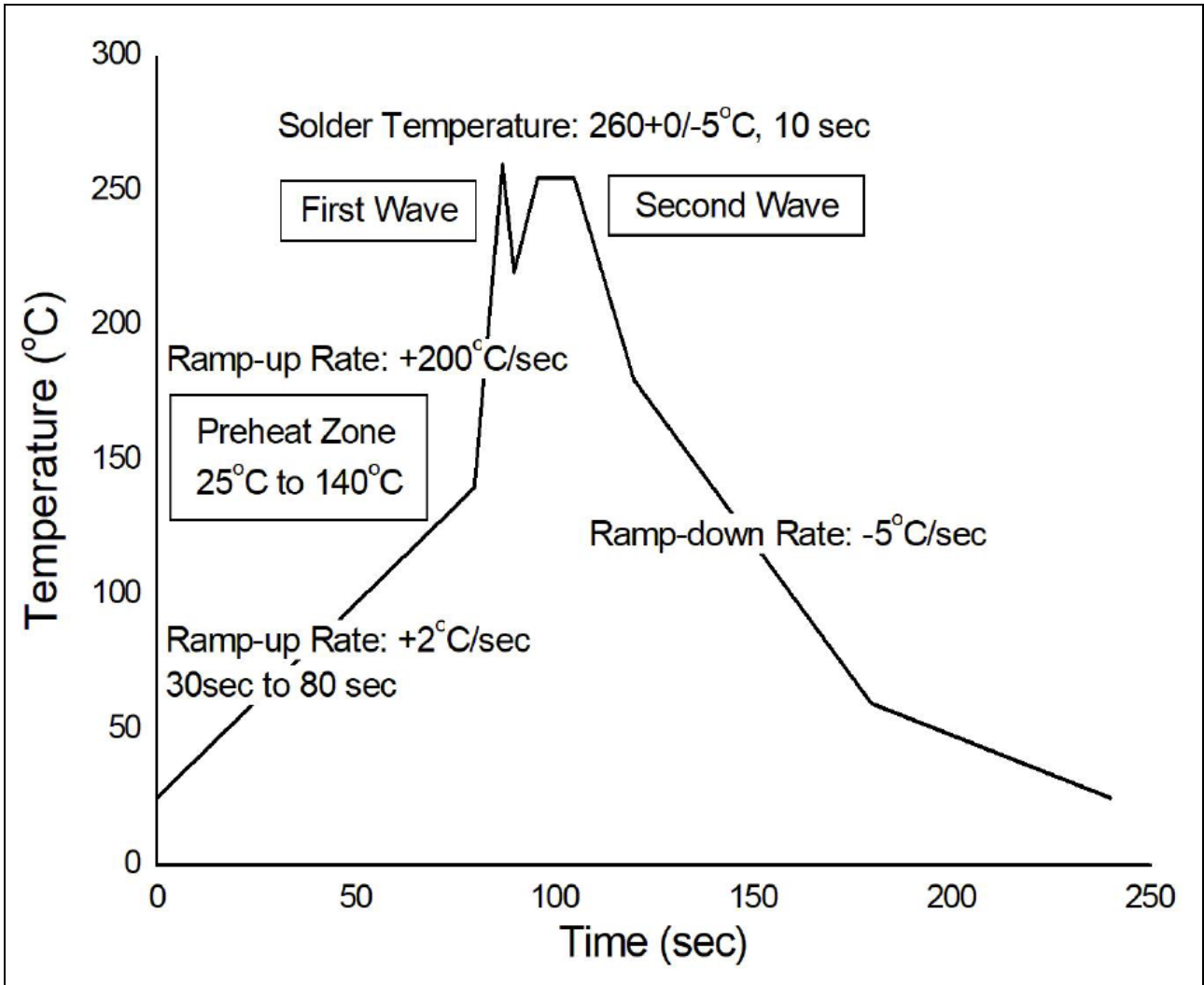


**REFLOW INFORMATION**



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T <sub>smin</sub> )	100	150°C
Temperature Max. (T <sub>smax</sub> )	150	200°C
Time (t <sub>s</sub> ) from (T <sub>smin</sub> to T <sub>smax</sub> )	60-120 seconds	60-120 seconds
Ramp-up Rate (t <sub>L</sub> to t <sub>P</sub> )	3°C/second max.	3°C/second max.
Liquidus Temperature (T <sub>L</sub> )	183°C	217°C
Time (t <sub>L</sub> ) Maintained Above (T <sub>L</sub> )	60-150 seconds	60-150 seconds
Peak Body Package Temperature	235°C+0°C/-5°C	260°C+0°C/-5°C
Time (t <sub>P</sub> ) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate (T <sub>P</sub> to T <sub>L</sub> )	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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