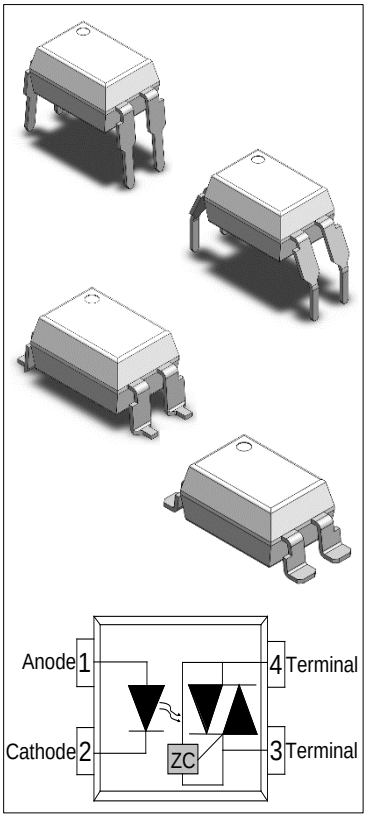
JOC304XD4 Series

Rev.A.1.0

DESCRIPTION:

The JOC304XD4 series combine an AIGaAs infrared emitting diode as the emitter which is optically coupled to a monolithic silicon zero-cross photo triac in a plastic DIP4 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 ℃ to 100 ℃
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	℃
	Input Power Dissipation	P_I	100	mW
	Power Dissipation Derating (Ta≥25℃)	ΔP_D/℃	-1.33	mW/℃
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	℃
	Output Power Dissipation	P_O	250	mW

	Power Dissipation Derating (Ta≥25℃)	ΔP_D/℃	-3.33	mW/℃
Total Power Dissipation		P_{tot}	350	mW
Isolation Voltage		V_{iso}	5000①	Vrms
Operating Temperature		T_{opr}	-55~100	℃
Storage Temperature		T_{stg}	-55~125	℃
Soldering Temperature		T_{sol}	260②	℃

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

NOTE2: For 10 seconds

ELECTRICAL CHARACTERISTICS (Temperature=25°C)

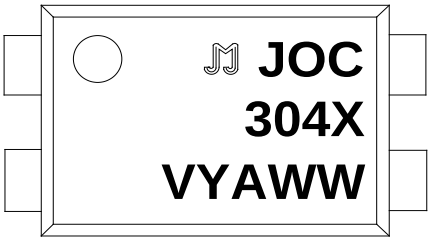
Parameter			Symbol	Condition	Min.	Typ.	Max.	Unit
Input	Forward Voltage		V_F	I_F=10mA	-	1.27	2.2	V
	Reverse Current		I_R	V_R=6V	-	-	1	μA
	Input Capacitance		C_{in}	V=0, f=1kHz	-	10	-	pF
Output	Peak Off-state Current, Either Direction		I_{OFF}	V_{OFF}=400V, I_F=0	-	-	100③	nA
	Peak On-state Voltage, Either Direction		V_{TM}	I_{TM}=100mA	-	1.7	2.5	V
	Critical Rate of Rise of Off-state voltage		dV/dt	V_{PEAK}=400V, I_F=0	1000④	-	-	V/μs
Transfer Characteristics	LED Trigger Current	JOC3041D4	I_{FT}	Terminal Voltage=3V I_{TM}=100mA	-	-	15	mA
		JOC3042D4			-	-	10	
		JOC3043D4			-	-	5	
	Holding Current		I_H	I_{TM}=2mA, I_F=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=1MHz	-	10	-	pF
	Response Time		t_{on}	V_D=6V, R_L=100Ω, I_F=20mA	-	15	50	μs
Zero-crossing Characteristics	Inhibit Voltage		V_{IH}	I_F=Rated I_{FT}	-	-	20	V
	Leakage in Inhibited State		I_{OFF2}	I_F=Rated I_{FT}, V_{OFF}=Rated V_{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



JOC : Company Abbr.
304X : Part Number & Rank
V : VDE Option
Y : Fiscal Year
A : Manufacturing Code
WW : Work Week

ORDERING INFORMATION

JOC304XD4(Y)(Z)-GV

JOC – Company Abbr.
304X – Part Number
(1/2/3)
D4 – DIP4 Package
Y – Lead Form Option (M/S/SL/None)
Z – Tape and Reel Option (T1/T3)
G – Green
V – VDE Option (V or None)

Packing Quantity

Option	Quantity	Quantity – Inner box	Quantity –Outer box
None	100 Units/Tube	32 Tubes/Inner box	10 Inner box/Outer box =32k Units
M	100 Units/Tube	32 Tubes/Inner box	10 Inner box/Outer box =32k Units
S (T1)	1500 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box =22.5k Units
SL(T1)	1500 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box =22.5k Units
SL(T3)	1000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box =15k Units

Characteristics Curves

FIG.1: Forward Current vs. Ambient Temperature

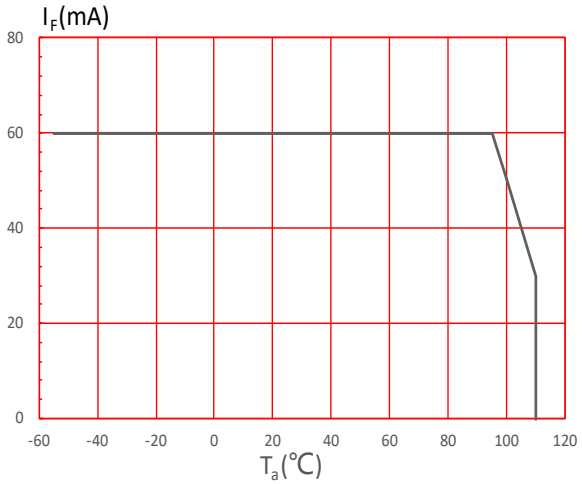


FIG.2: On-state Terminal Current vs. Ambient Temperature

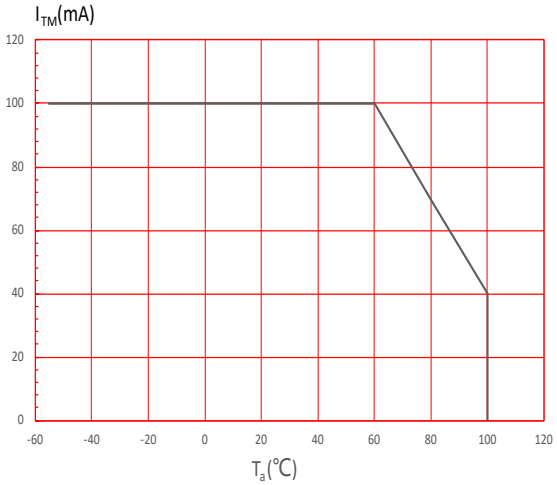


FIG.3: Forward Current vs. Forward Voltage

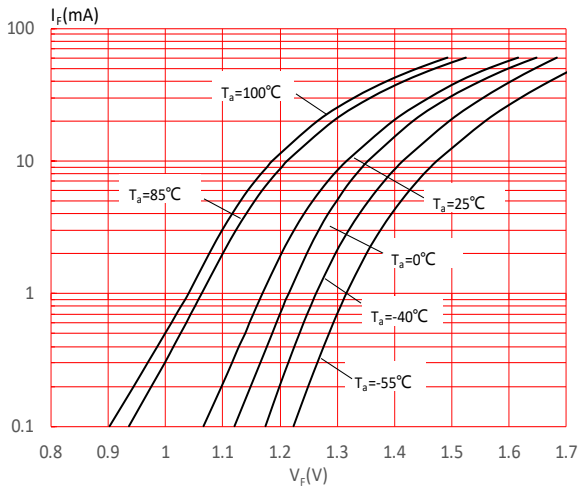


FIG.4: Normalized Off-state Terminal Current vs. Ambient Temperature

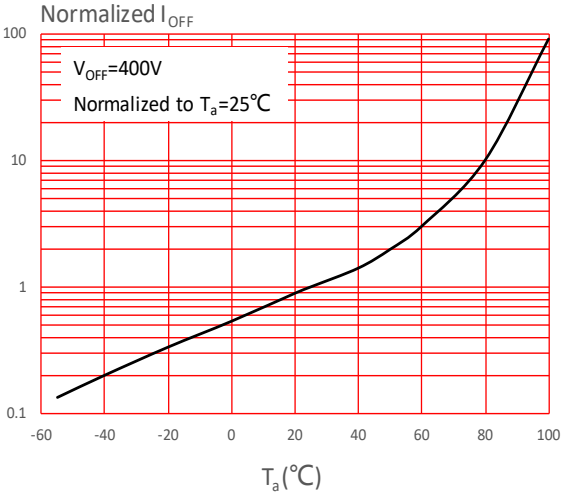


FIG.5: Normalized Off-state Terminal Voltage vs. Ambient Temperature

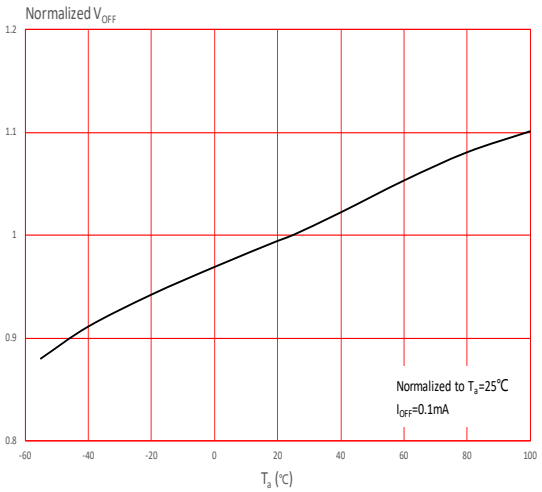


FIG.6: Normalized Trigger Current vs. Ambient Temperature

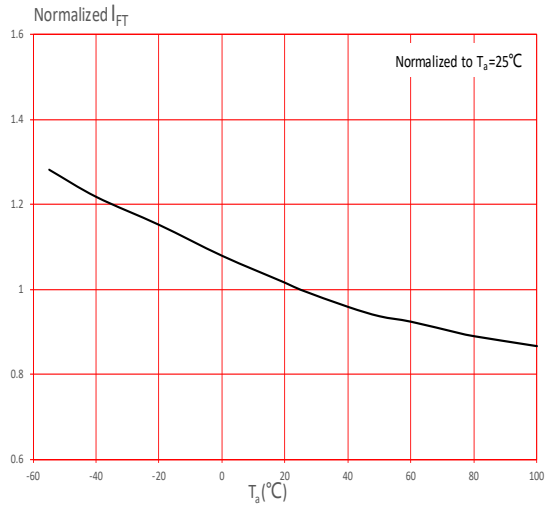


FIG.7: Normalized On-state Terminal Voltage vs. Ambient Temperature

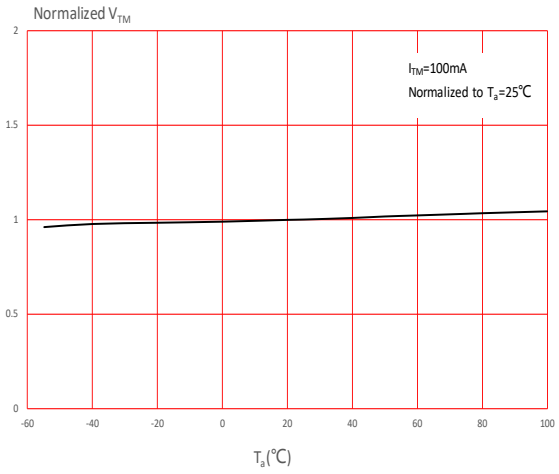


FIG.8: On-state Terminal Voltage vs. On-state Terminal Current

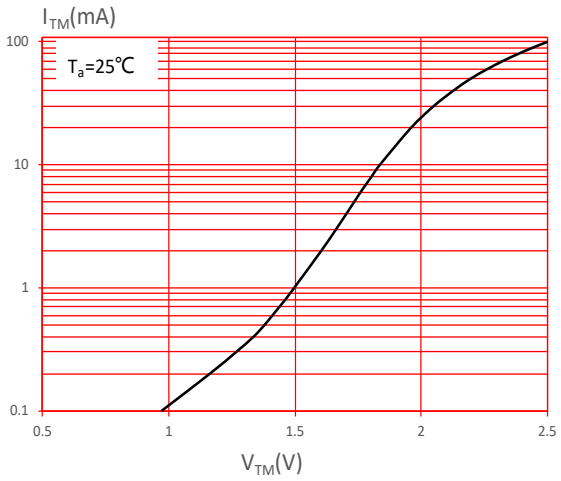


FIG.9: Normalized Holding Current vs. Ambient Temperature

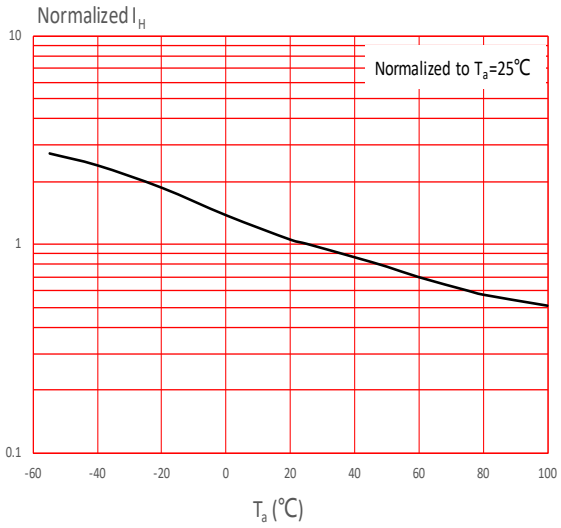


FIG.10: Normalized Leakage in Inhibit State vs. Ambient Temperature

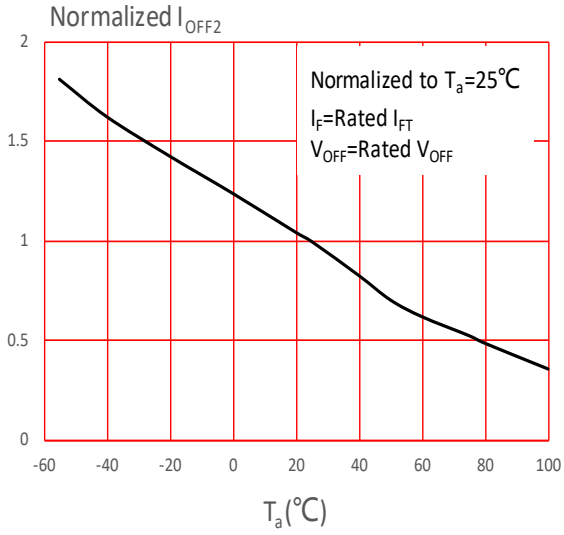
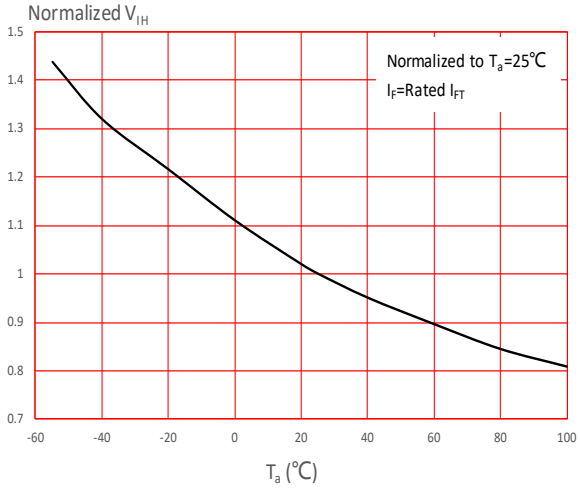


FIG.11: Normalized Inhibit Voltage vs. Ambient Temperature



TEST CIRCUITS

FIG.12: Test Circuits of Turn On Time

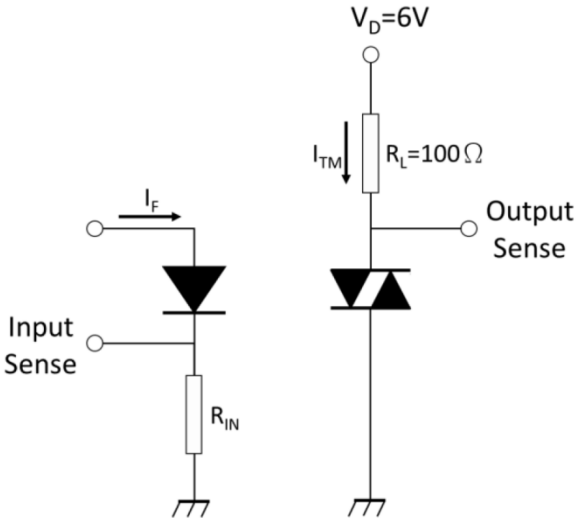


FIG.13: Waveforms of Turn On Time

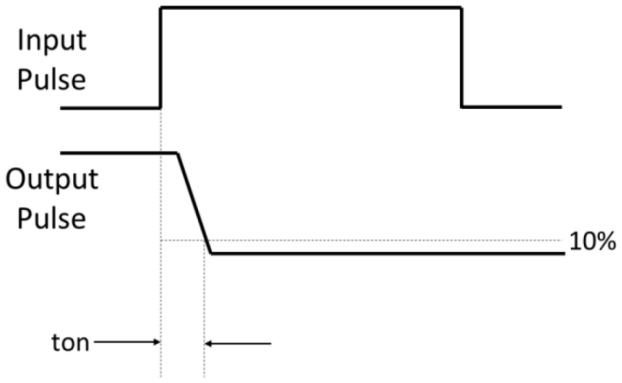


Fig.14: Test Circuits of dV/dt

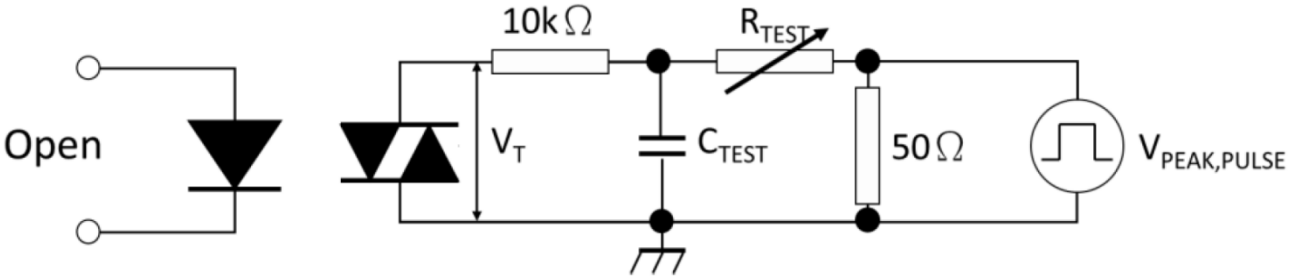
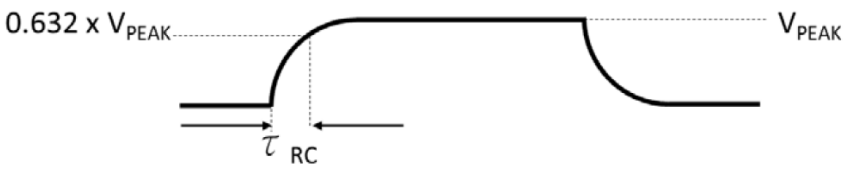


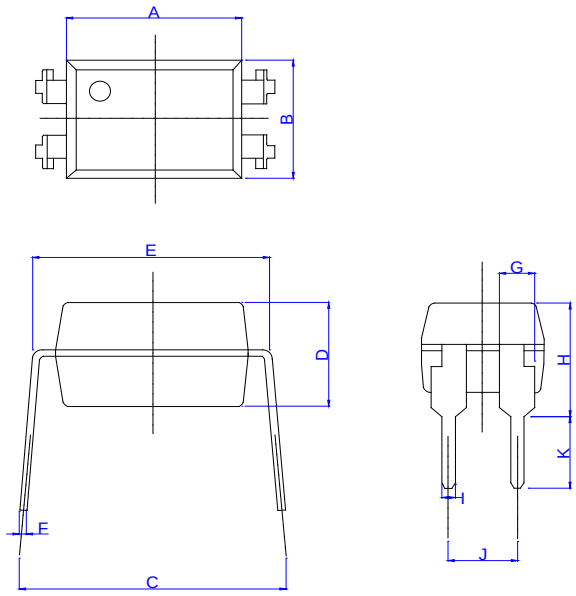
Fig.15: Waveforms of dV/dt



$$dv/dt = \frac{0.632 \times V_{PEAK}}{\tau_{RC}}$$

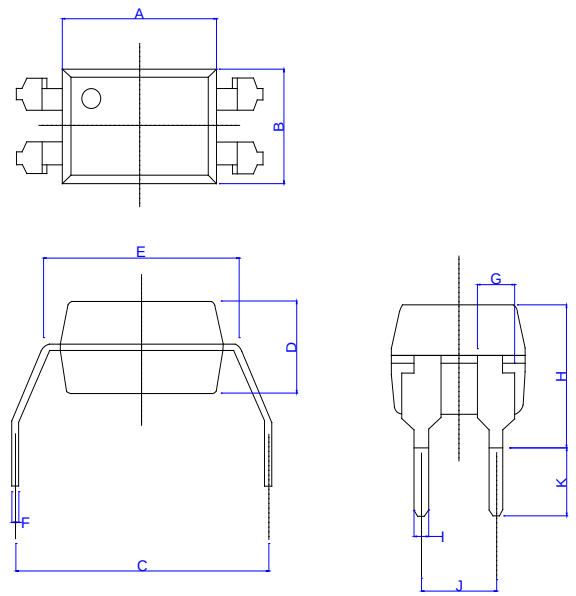
Package Dimension (Unit: mm）

Standard DIP Type:



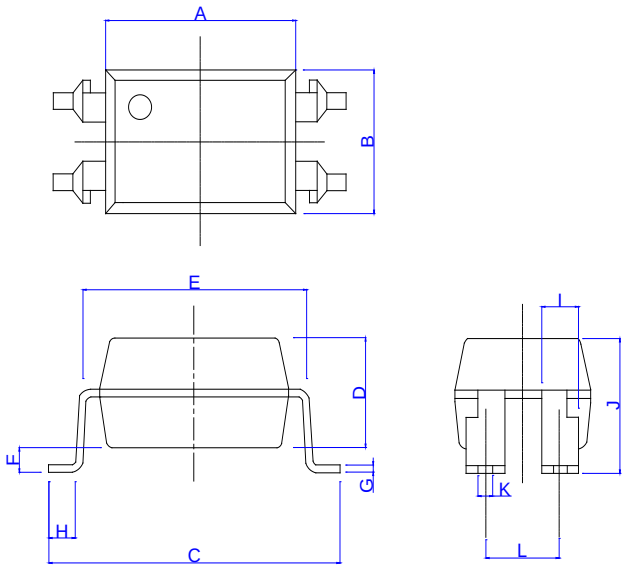
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.30		6.70	0.249		0.265
B	4.38		4.78	0.173		0.189
C	7.62		9.50	0.301		0.375
D	3.30		3.70	0.130		0.146
E	7.32		7.92	0.289		0.313
F		0.25			0.010	
G	1.20		1.40	0.047		0.055
H	4.20		4.80	0.166		0.190
I		0.50			0.020	
J		2.54			0.100	
K		2.80			0.111	

Option M Type:



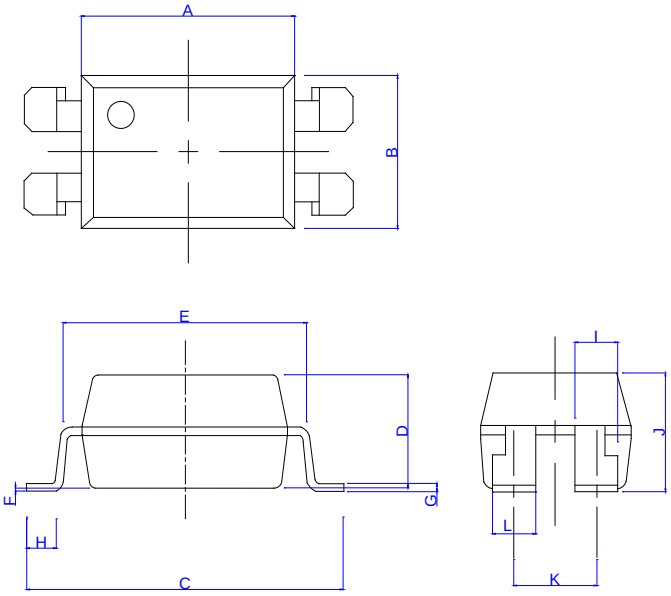
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.30		6.70	0.249		0.265
B	4.38		4.78	0.173		0.189
C	9.86		10.46	0.390		0.413
D	3.30		3.70	0.130		0.146
E	7.32		7.92	0.289		0.313
F		0.25			0.010	
G	1.20		1.40	0.047		0.055
H	4.28		4.88	0.169		0.193
I		0.50			0.020	
J		2.54			0.100	
K		2.20			0.087	

Option S Type:



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.30		6.70	0.249		0.265
B	4.38		4.78	0.173		0.189
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		0.80			0.032	
G		0.25			0.010	
H		0.80			0.032	
I	1.20		1.40	0.047		0.055
J	4.00		4.60	0.158		0.182
K		0.50			0.020	
L		2.54			0.100	

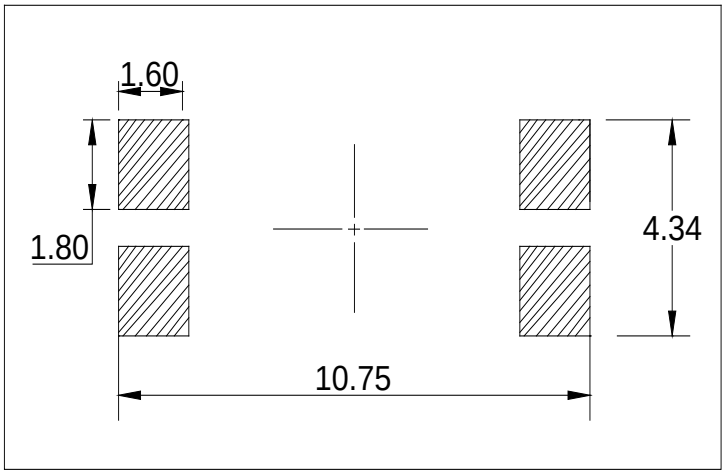
Option SL Type:



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.30		6.70	0.249		0.265
B	4.38		4.78	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	
L		1.30			0.051	

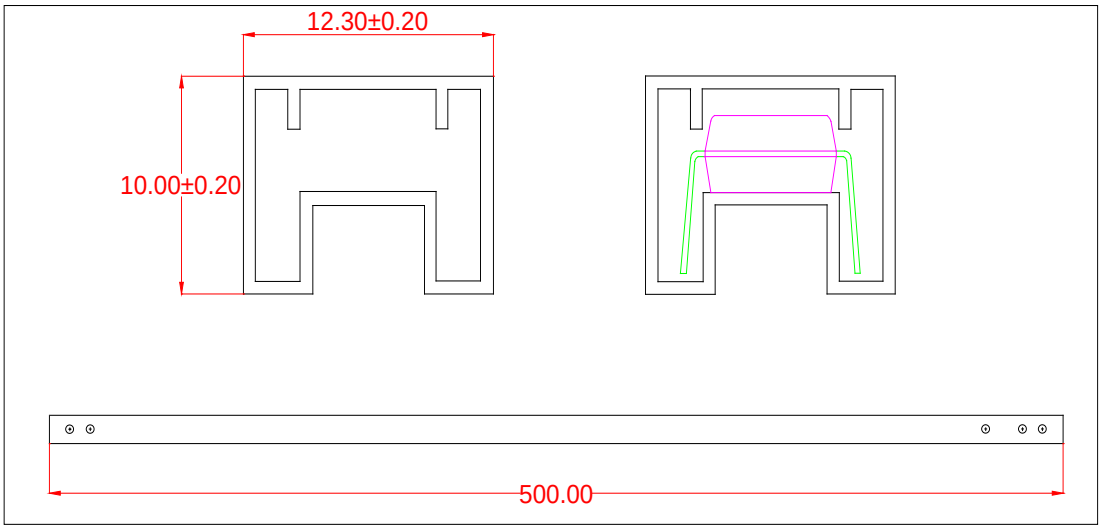
RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

Option S/SL

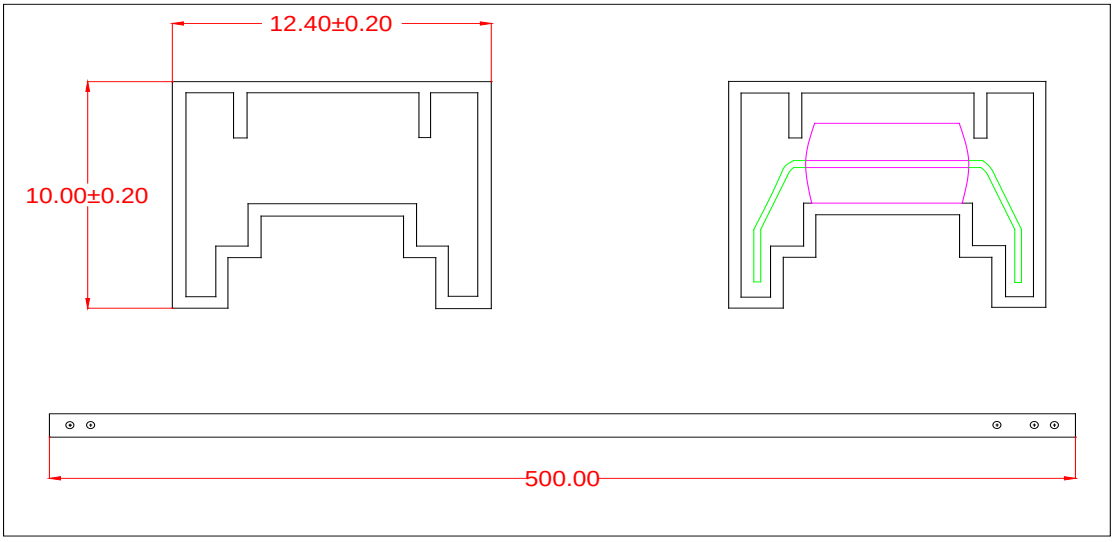


TUBE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Standard DIP

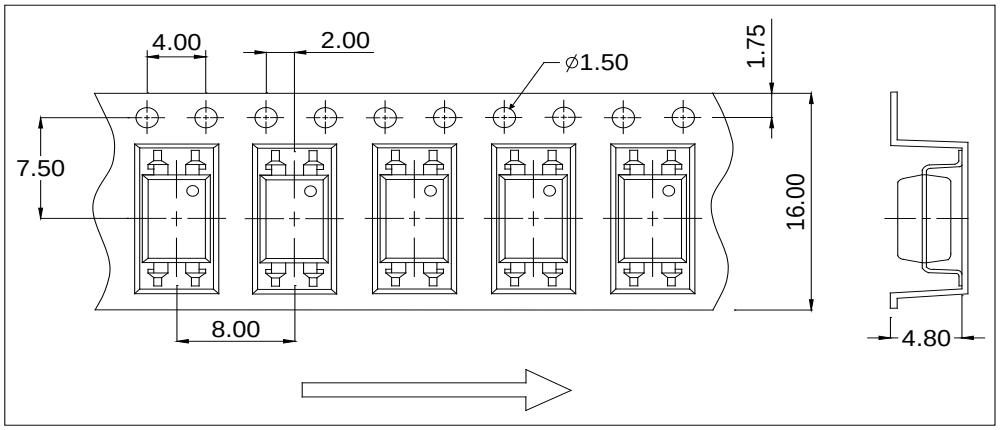


Option M

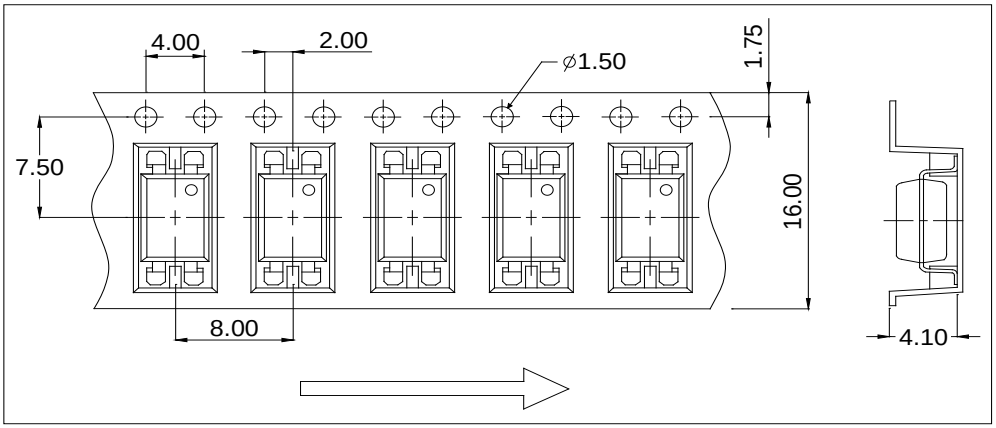


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

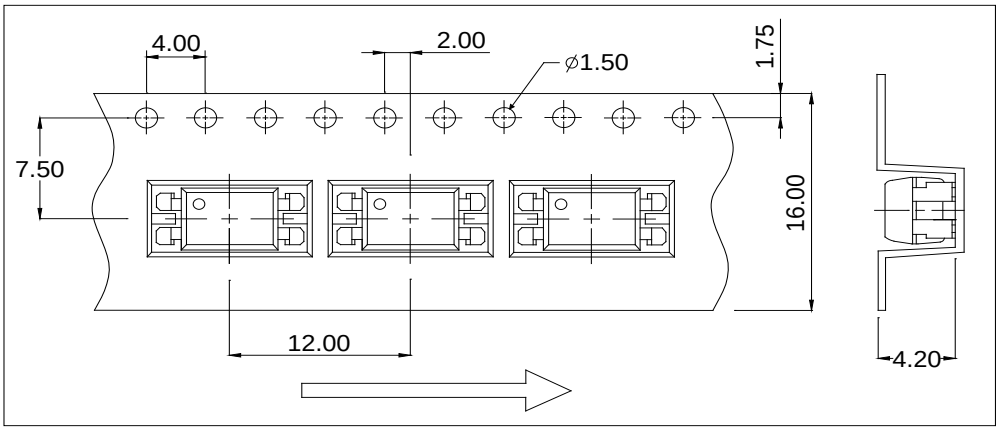
Option S(T1)



Option SL(T1)

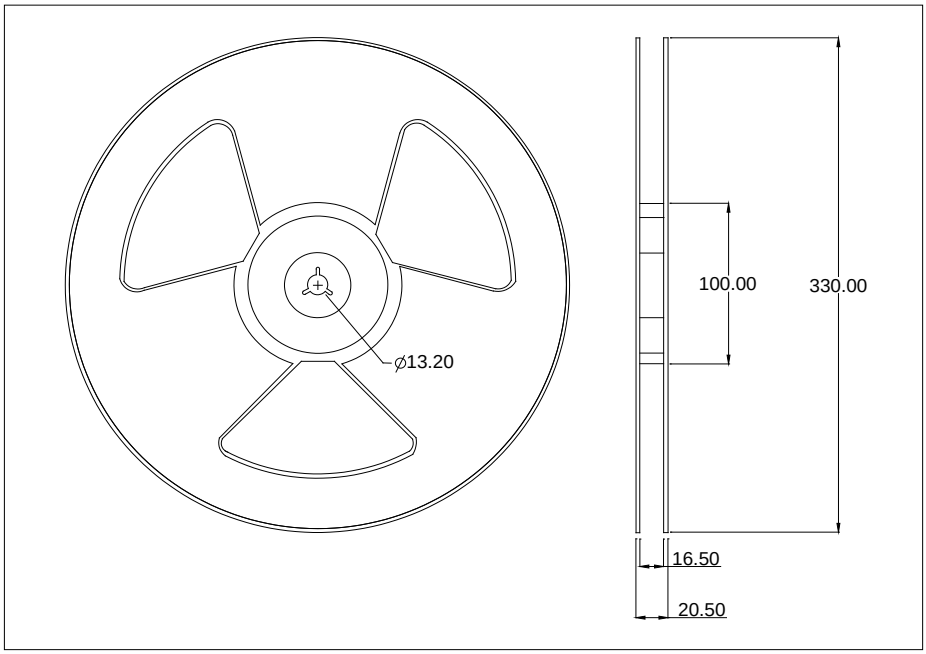


Option SL(T3)

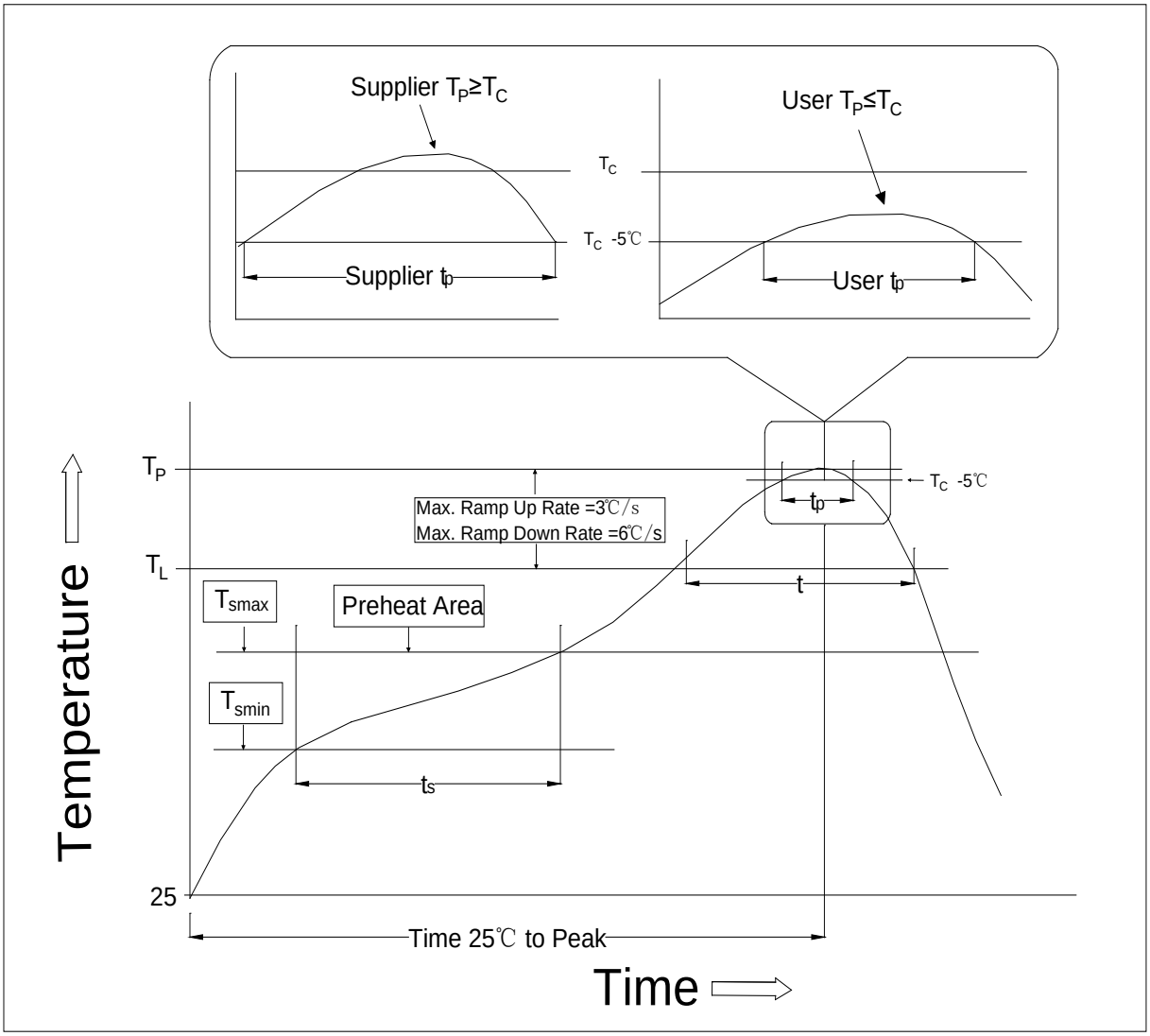


REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option SL

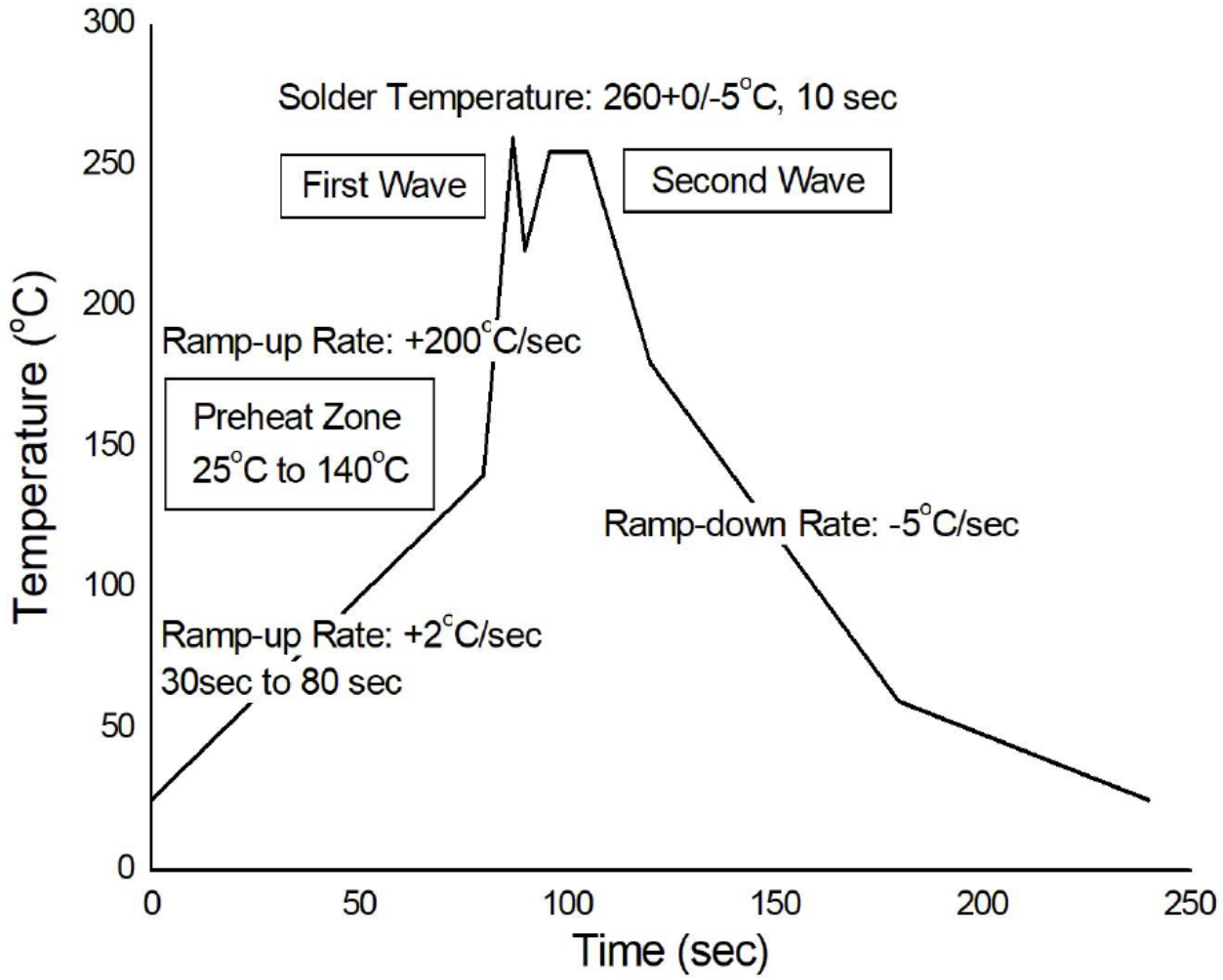


REFLOW INFORMATION



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	100	150℃
Temperature Max. (Tsmax)	150	200℃
Time (ts) from (Tsmin to Tsmax)	60-120 seconds	60-120 seconds
Ramp-up Rate (tL to tP)	3℃/second max.	3℃/second max.
Liquidus Temperature (TL)	183℃	217℃
Time (tL) Maintained Above (TL)	60-150 seconds	60-150 seconds
Peak Body Package Temperature	235℃+0℃/-5℃	260℃+0℃/-5℃
Time (tP) within 5℃ of 260℃	20 seconds	30 seconds
Ramp-down Rate (TP to TL)	6℃/second max.	6℃/second max.
Time 25℃ to Peak Temperature	6 minutes max.	8 minutes max.

WAVE SOLDERING



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

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