JOCSR21X-L5X,JOCSR31X-L5X Series

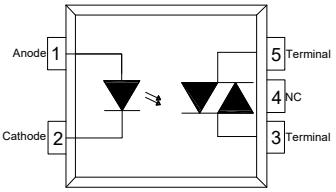
Rev.A.1.0

DESCRIPTION:

The products are thyristor opto-couplers in LSOP5 and LSOP5W packages. The device combines an AlGaAs infrared emitting diode as the emitter which is optically coupled to a monolithic silicon random-phase photo triac, the device provides 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_{AC} peripherals.

JOCSRX1X-L5

JOCSRX1X-L5W



MAIN FEATURES

High isolation 5000 VRMS
DC input with random-phase photo triac output
Operating temperature range -55 ℃ to 110 ℃
REACH & RoHS compliance
HBM: H3A; MM: M4; CDM: C3
CQC approved
VDE approved
UL approved

ABSOLUTE MAXIMUM RATINGS (Temperature=25°C)

Parameter		Symbol		Value	Unit
Input	Forward Current	I_F		50	mA
	Peak Forward Current	I_{FP}		1①	A
	Reverse Voltage	V_R		6	V
	Power Dissipation	P_D		75	mW
Output	Off-state Output Terminal Voltage	V_{OFF}	JOCSR21X	600	V
			JOCSR31X	800	
	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}		1.2	A
	Output Power Dissipation	P_O		250	mW
Total Power Dissipation		P_{tot}		325	mW
Isolation Voltage		V_{iso}		5000②	Vrms

Operating Temperature	T_{opr}	-55~110	℃
Junction Temperature	T_j	125	℃
Storage Temperature	T_{stg}	-55~125	℃
Soldering Temperature	T_{sol}	260	℃
Peak pulse voltage (T_j=25℃; non-repetitive,off-state)	V_{pp}	1	kV

NOTE1: 100μs pulse, 100Hz frequency

NOTE2: AC for 1minute, R.H.=40~60%

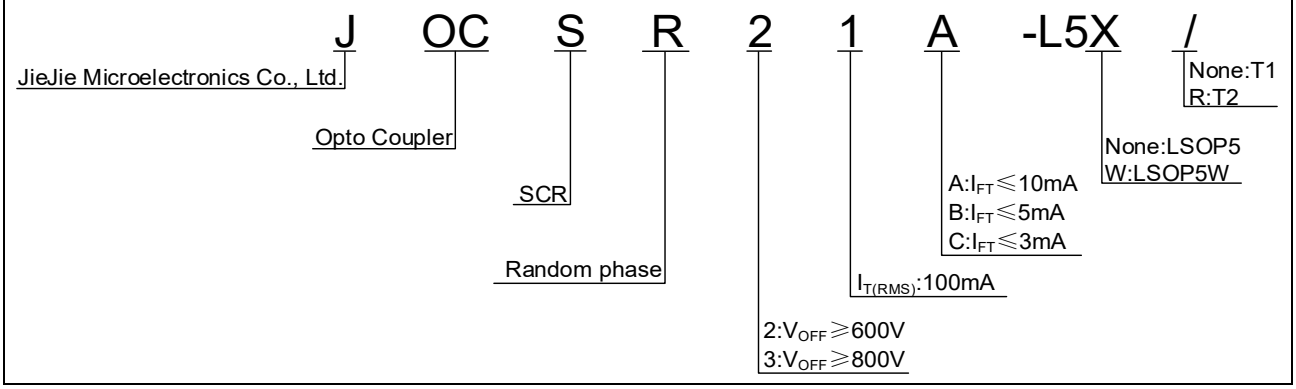
ELECTRICAL CHARACTERISTICS (Temperature=25°C)

Parameter			Symbol	Condition	Min.	Typ.	Max.	Unit
Input	Forward Voltage		V_F	I_F=10mA	-	1.2	1.5	V
	Reverse Current		I_R	V_R=6V	-	-	1	μA
	Input Capacitance		C_{in}	V=0, f=1kHz	-	14	-	pF
Output	Peak Off-state Current, Either Direction		I_{OFF}	V_{OFF}=Rated V_{OFF} I_F=0	-	-	100③	nA
	Peak On-state Voltage, Either Direction		V_{TM}	I_{TM}=100mA	-	2	2.5	V
	Critical Rate of Rise of Off-state voltage		dV/dt	V_{PEAK}= Rated V_{PEAK} I_F=0	2000④	-	-	V/μs
Transfer Characteristics	LED Trigger Current	JOCSR21A JOCSR31A	I_{FT}	Terminal Voltage=3V I_{TM}=100mA	-	-	10	mA
		JOCSR21B JOCSR31B			-	-	5	
		JOCSR21C JOCSR31C			-	-	3	
	Holding Current		I_H	I_{TM}=2mA, I_F=Rated I_{FT}	-	500	-	μA
	Isolation Resistance		R_{ISO}	DC500V 40~60%R.H.	10^{12}	10^{14}	-	Ω
	Floating Capacitance		C_{IO}	V=0, f=1MHz	-	5	-	pF
	Response Time		t_{on}	V_D=6V, R_L=100Ω, I_F=20mA	-	15	50	μs

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

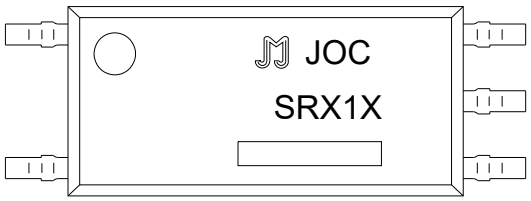
NOTE4: Refer to Fig.14 & Fig.15

ORDERING INFORMATION



Packing Quantity			
Option	**Quantity**	**Quantity – Inner box**	**Quantity –Outer box**
LSOP5	3000 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box =30k Units

MARKING



Characteristics Curves

FIG.1: Max. Allowable LED Forward Current vs. Ambient Temperature

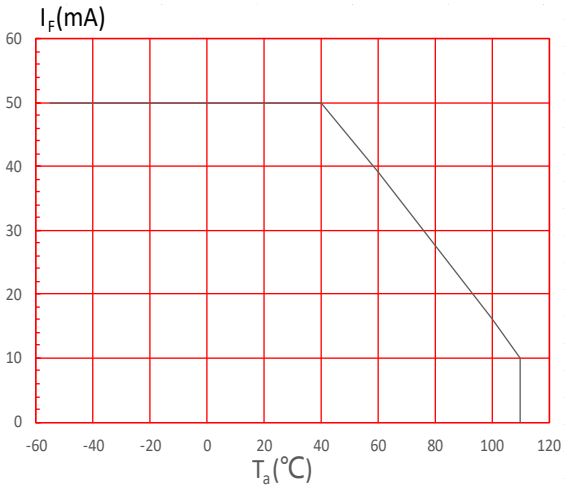


FIG.2: On-state Terminal Current vs. Ambient Temperature

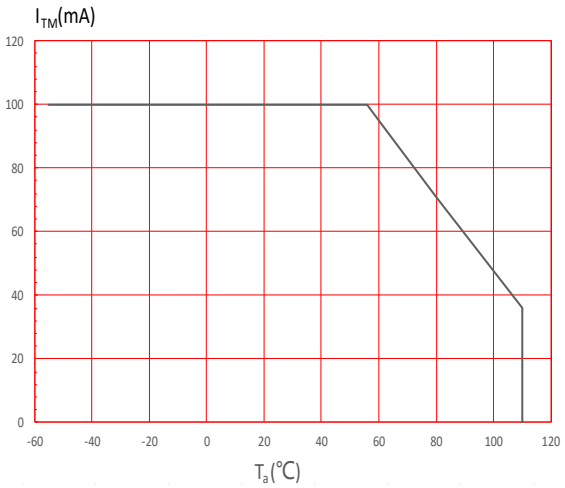


FIG.3: Forward Current vs. Forward Voltage

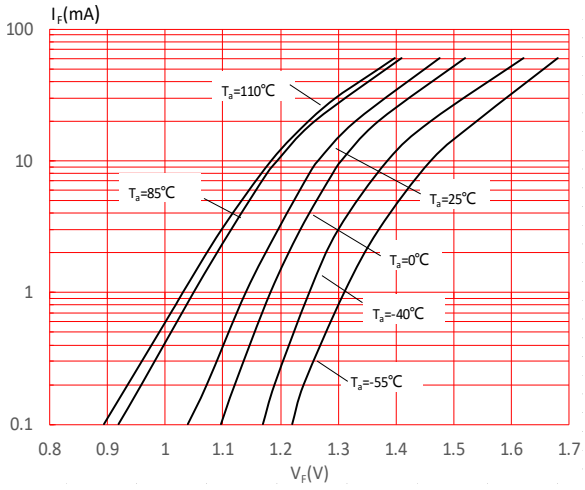


FIG.4: Normalized Off-state Terminal Current vs. Ambient Temperature

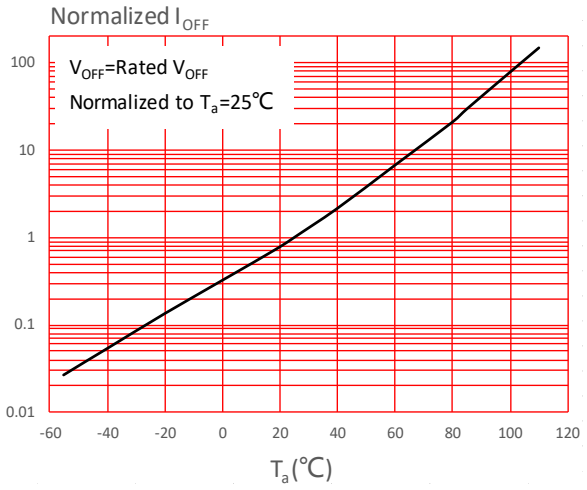


FIG.5: Normalized Off-state Terminal Voltage vs. Ambient Temperature

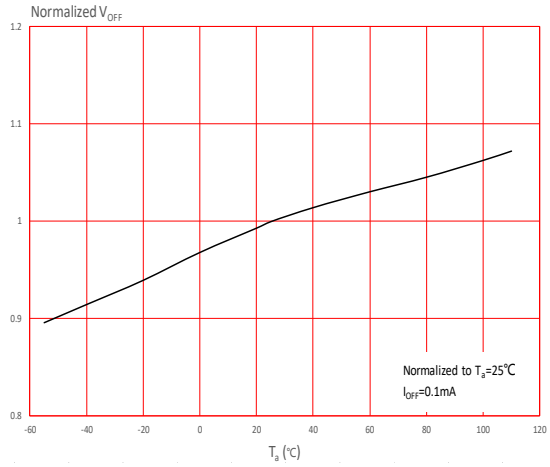


FIG.6: Normalized Trigger Current vs. Ambient Temperature

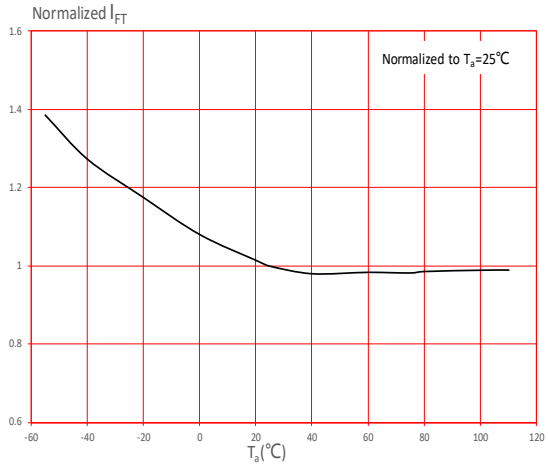


FIG.7: Normalized On-state Terminal Voltage vs. Ambient Temperature

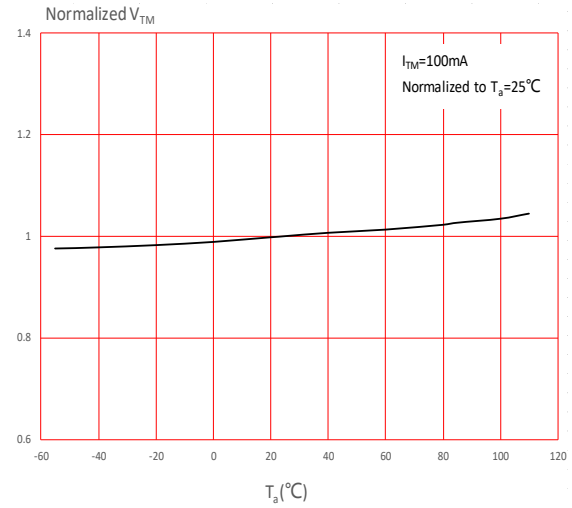


FIG.8: On-state Terminal Voltage vs. On-state Terminal Current

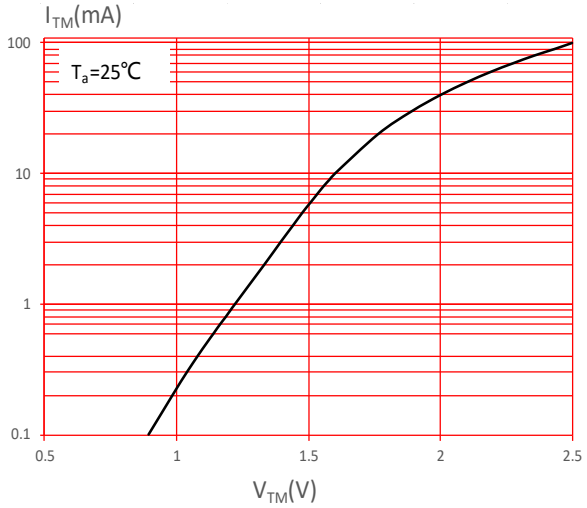


FIG.9: Normalized Holding Current vs. Ambient Temperature

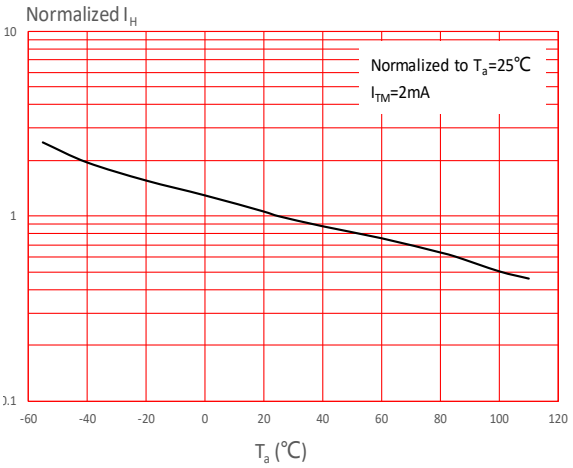


FIG.10: Turn On Time vs. Forward Current

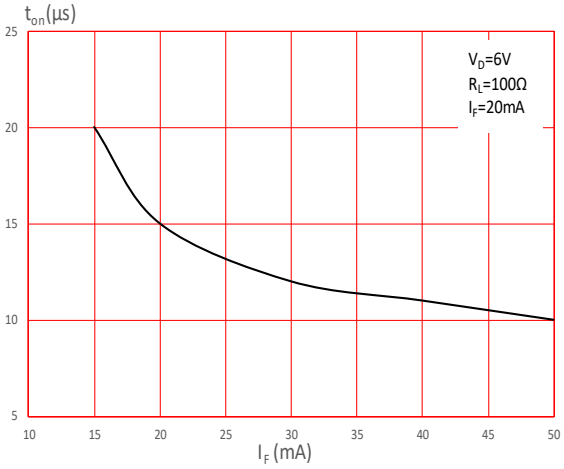
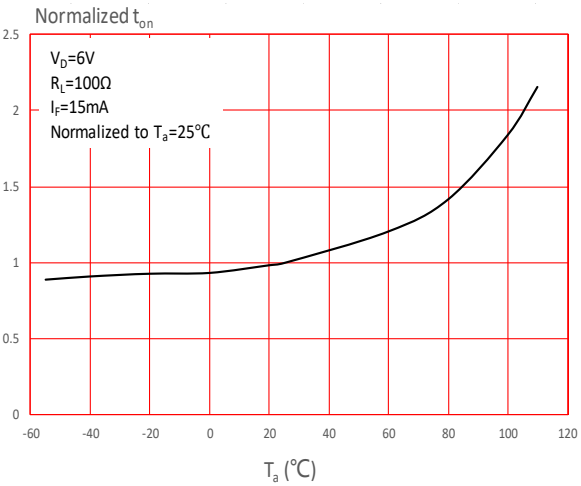


FIG.11: Normalized Turn On Time vs. Ambient Temperature



TEST CIRCUITS

FIG.12: Test Circuits of Turn On Time

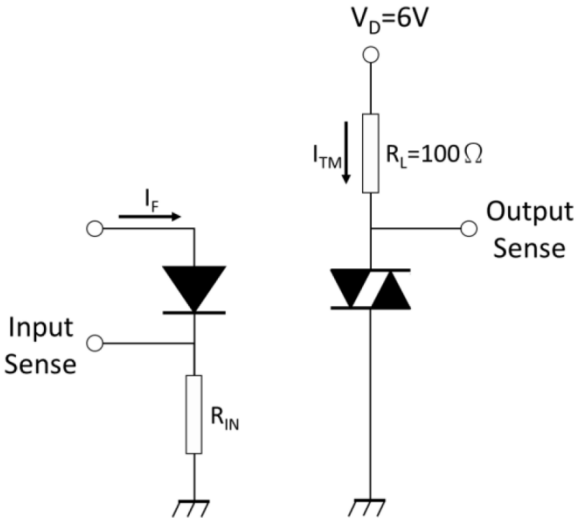


FIG.13: Waveforms of Turn On Time

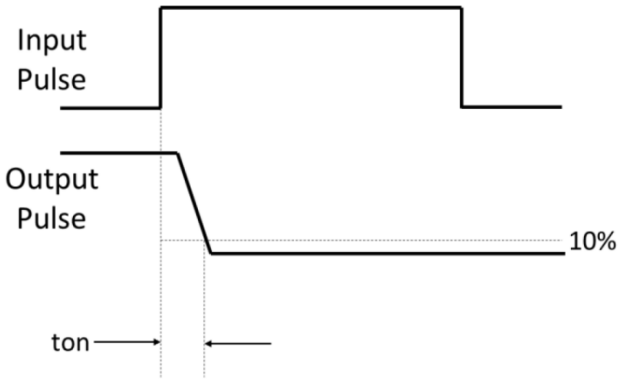


Fig.14: Test Circuits of dV/dt

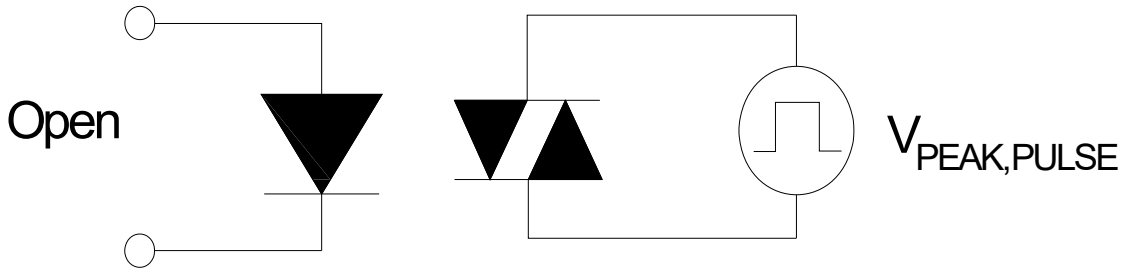
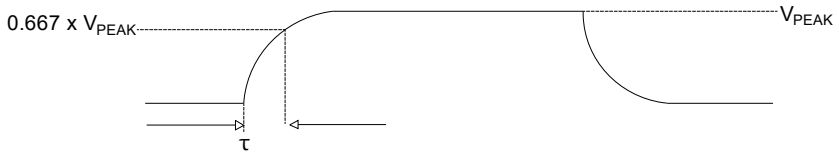
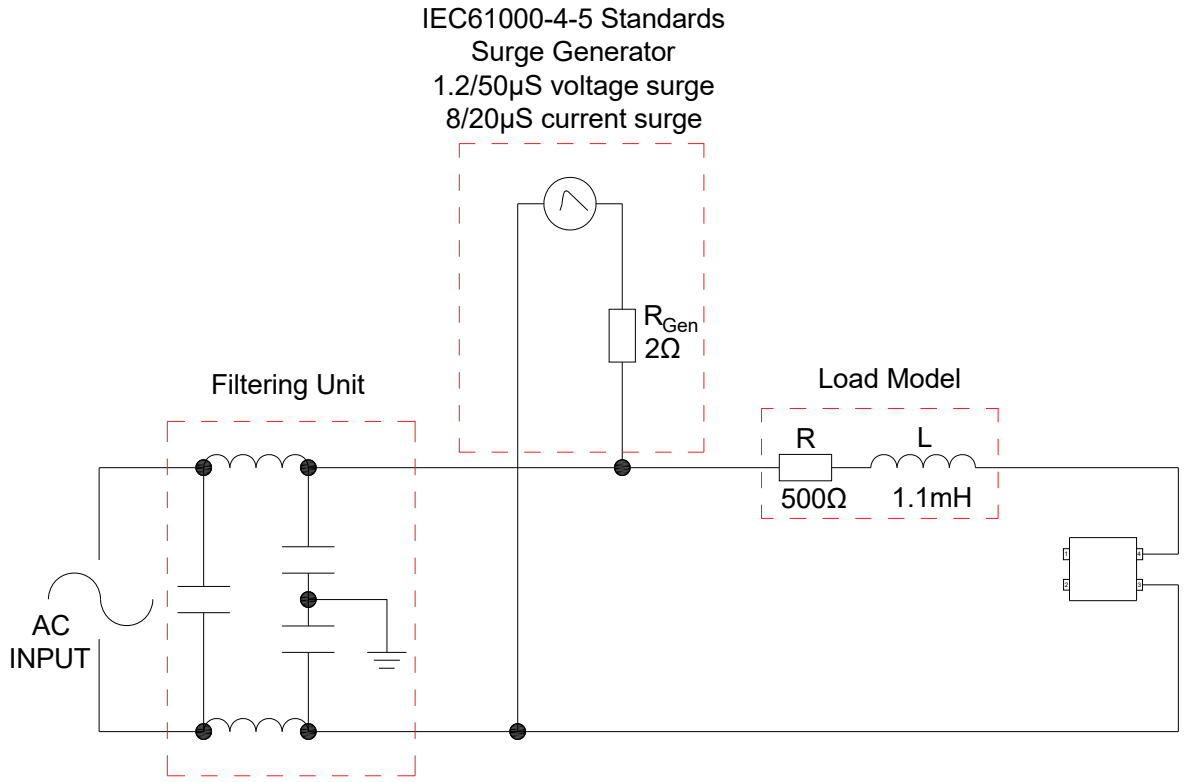


Fig.15: Waveforms of dV/dt



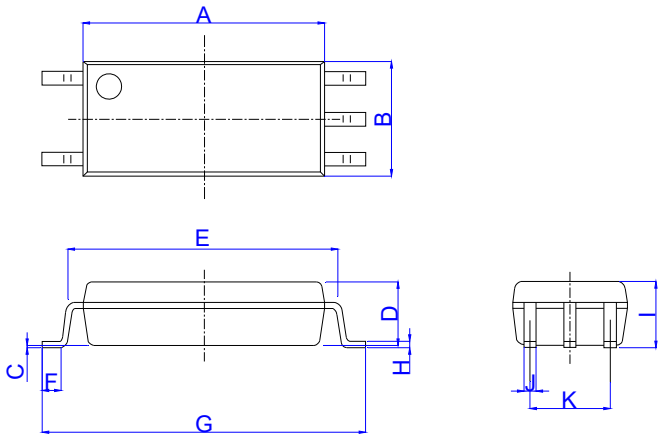
$$dV/dt=\frac{0.667 \times V_{PEAK}}{\tau}$$

FIG.16: Test circuit for inductive and resistive loads to IEC-61000-4-5 standards



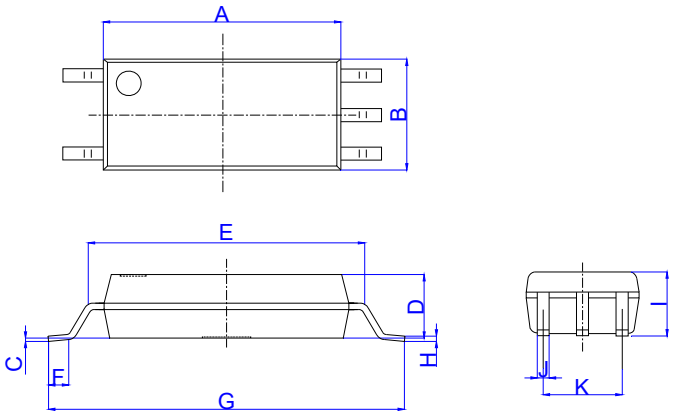
Package Dimension (Unit: mm)

LSOP5



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	7.40		7.80	0.291		0.307
B	3.40		3.80	0.134		0.150
C	0.00		0.20	0.000		0.008
D	1.80		2.20	0.071		0.087
E	8.10		8.70	0.319		0.343
F	0.40		1.00	0.016		0.039
G	9.90		10.50	0.390		0.413
H	0.10		0.30	0.004		0.012
I	1.80		2.40	0.071		0.094
J	0.25		0.55	0.010		0.022
K	2.29		2.79	0.090		0.110

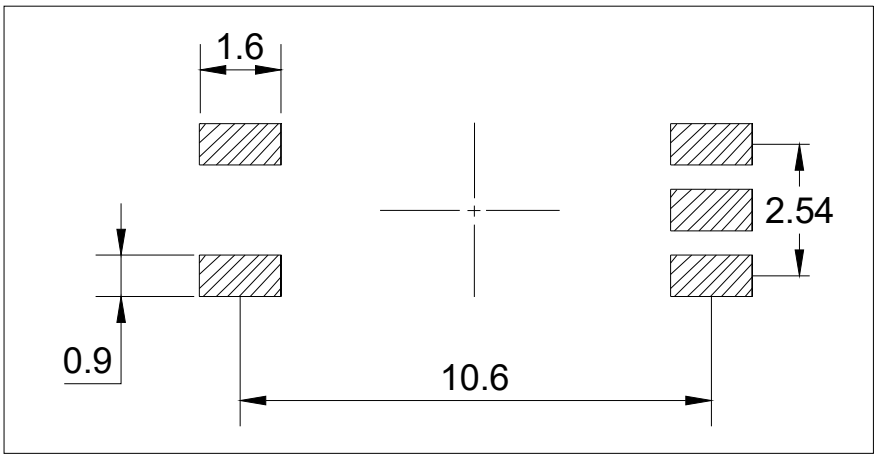
LSOP5W



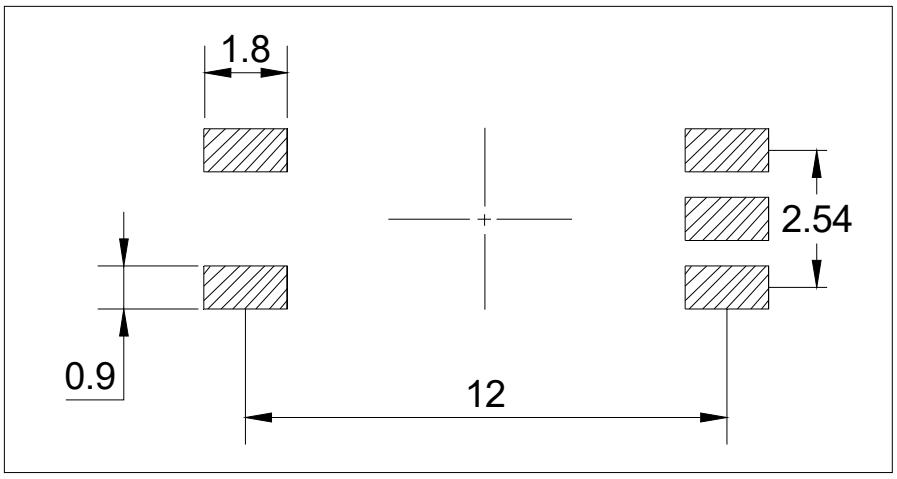
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	7.40		7.80	0.291		0.307
B	3.40		3.80	0.134		0.150
C	0.00		0.20	0.000		0.008
D	1.80		2.20	0.071		0.087
E	8.10		8.70	0.319		0.343
F	0.55		1.15	0.022		0.045
G	10.78		11.38	0.424		0.448
H	0.06		0.26	0.002		0.010
I	1.80		2.40	0.071		0.094
J	0.25		0.55	0.010		0.022
K	2.29		2.79	0.090		0.110

RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

LSOP5

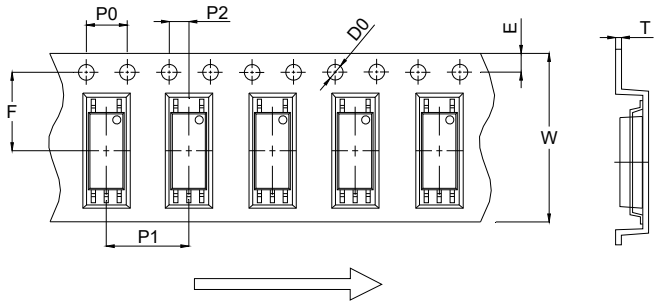


LSOP5W



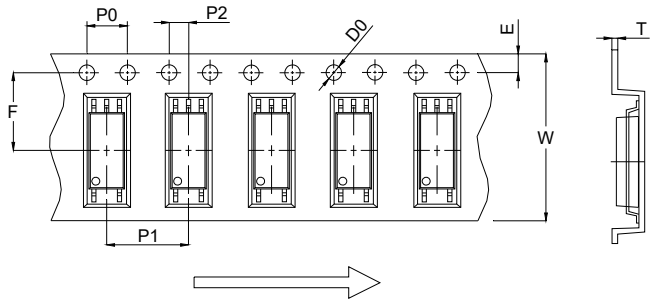
CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option None



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
D0	1.50	1.55	1.60	0.059	0.061	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
T	0.35	0.40	0.45	0.014	0.016	0.018
W	15.80	16.00	16.20	0.622	0.630	0.638

Option R



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T	0.35	0.40	0.45	0.014	0.016	0.018
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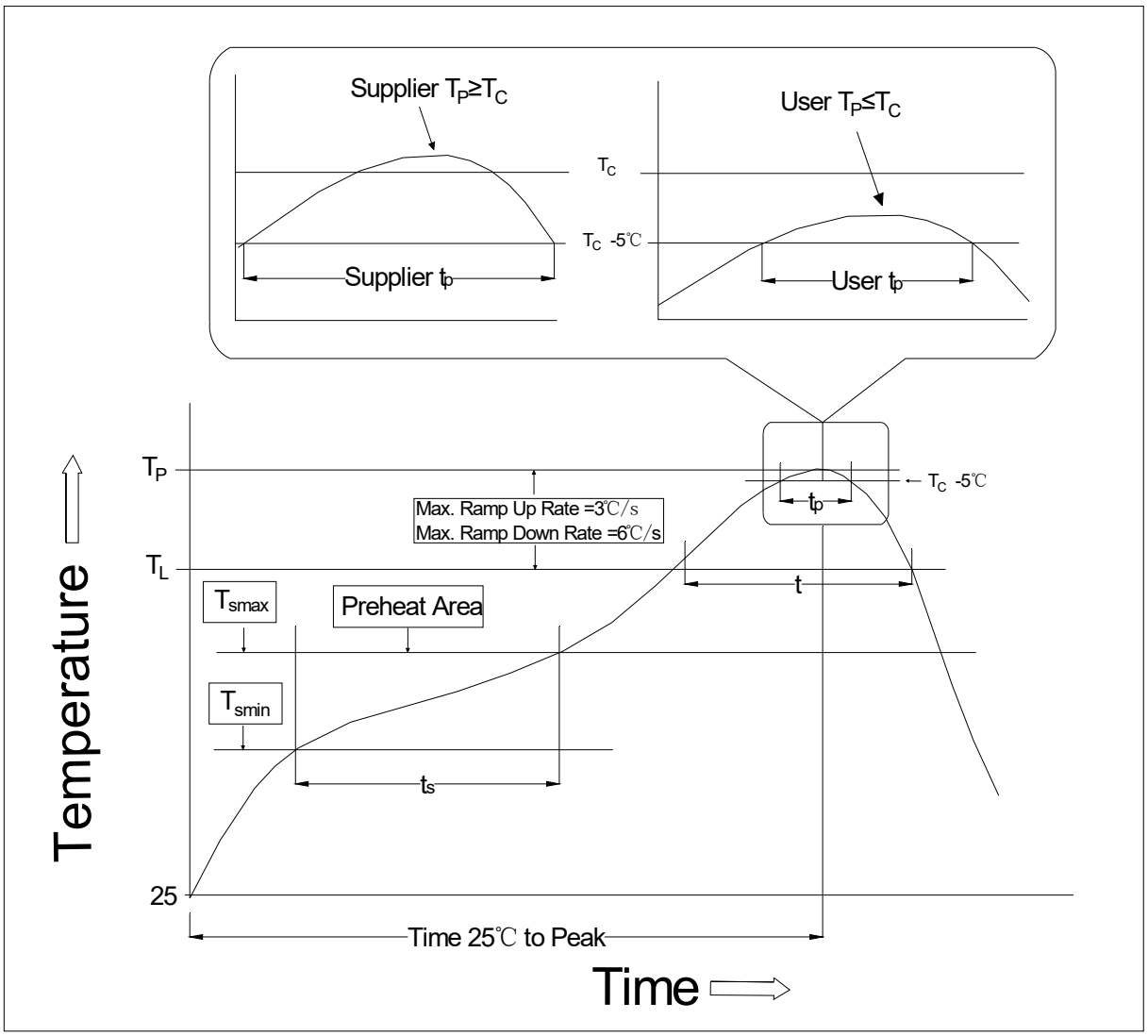
REFLOW INFORMATION



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℃	10 seconds	10 seconds
Ramp-down Rate (TP to TL)	3-6℃/second	3-6℃/second
Time 25℃ to Peak Temperature	6 minutes max.	8 minutes max.

Note:

1. Reflow soldering is recommended at the temperatures and times shown, no more than three times.

2. Avoid direct contact between the epoxy body and any tools or surfaces exceeding its maximum storage temperature.

3. Application of pressure on the epoxy body is prohibited at elevated temperatures. In specific scenarios, any applied force must not exceed 2.5N.

4. Ensure the component has cooled to ambient temperature before proceeding with any subsequent manufacturing steps.

5. The component has a shelf life of one year when stored under standard conditions.

6. Recommend storage Temp.: 0~40°C;

Recommend storage humidity: <60%;

MSL level: MSL 1