DC Input ,Zero-Cross Photo TRIAC Couple

Description

The SL303X,SL304X,SL306X and SL308Xseries combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a monolithic silicon random-phase photo triac in a plastic DIP6 package with different lead forming options.

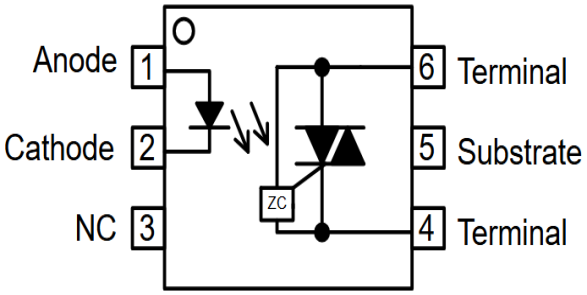
Features

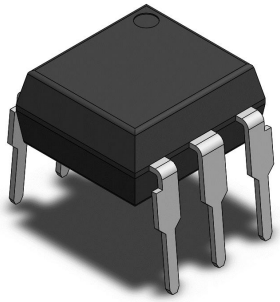
- High isolation 5000 VRMS
- DC input with zero-cross photo triac output
- Operating temperature range - 40 °C to 100 °C
- REACH & RoHS compliance
- MSL class 1

Applications

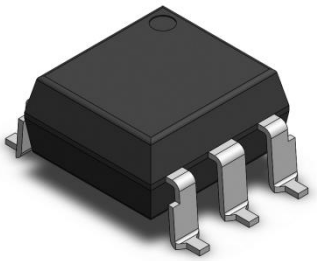
- Solenoid/valve controls
- Lighting controls
- Motor controls
- Temperature controls
- Static AC power switches
- Solid state relays
- Interfacing microprocessors to 115 to 240VAC peripherals

Functional Diagram

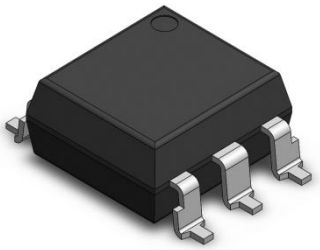




SL30XX DIP-6



SL30XXS SMD-6



SL30XXSL SMD-6

Absolute maximum ratings (TA = 25°C unless otherwise noted)

PARAMETER		SYMBOL	VALUE	UNIT	NOTE
Forward Current		I_F	60	mA	
Reverse Voltage		V_R	6	V	
Junction Temperature		Tj	125	°C	
Input Power Dissipation		P_I	100	mW	
Off-state Output Terminal Voltage	SL303X	V_{DRM}	250	V	
	SL304X		400		
	SL306X		600		
	SL308X		800		
Peak Repetitive Surge Current PW=100μs, 120pps		I_{TSM}	1	A	
Junction Temperature		Tj	125	°C	
Output Power Dissipation		P_O	300	mW	
Total Power Dissipation		Ptot	400	mW	
Isolation Voltage		Viso	5000	Vrms	1
Operating Temperature		Topr	-40~100	°C	
Storage Temperature		Tstg	-55~125	°C	
Soldering Temperature		Tsol	260	°C	2

Note 1. AC For 1 Minute, R.H. = 40 ~ 60%

Note 2. For 10 seconds

Electrical Optical characteristics (TA = 25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
Forward Voltage	V_F	-	1.24	1.4	V	I_F=10mA	
Reverse Current	I_R	-	-	10	μA	V_R=6V	
Input Capacitance	Cin	-	8.5	250	pF	V=0, f=1kHz	
Peak Off-state Current, Either Direction	I_{DRM}	-	-	100	nA	V_{DRM}=Rated V_{DRM} I_F=0	3
Peak On-state Current, Either Direction	V_{TM}	-	1.59	2.5	V	I_{TM}=100mA	
Critical Rate of Rise of Off-state Voltage	dV/dt	1000	-	-	V/μs	V_{PEAK} =Rated V_{DRM}	4

TRANSFER CHARACTERISTICS

LED Trigger Current	SL3031,SL3041,SL3061,SL3081	I_{FT}	-	-	15	mA	Terminal Voltage = 3V I_{TM}=100mA	
	SL3032 SL3042 SL3062 SL3082		-	-	10			
	SL3033 SL3043 SL3063 SL3083		-	-	5			
Holding Current		I_H	-	237	-	μA		
Isolation Resistance		Riso	10^12	10^14	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance		C_{IO}	-	0.4	-	pF	V=0, f=1MHz	

Note3. Test voltage must be applied within dV/dt rating.

Note4. Refer to Fig.15 & Fig.16

Characteristic Curves

Fig.1 Normalized Trigger Current vs. LED Trigger Pulse Width

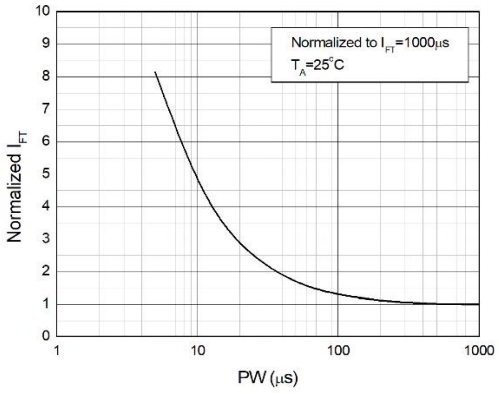


Fig.2 Normalized Off-state Terminal Voltage vs. Ambient Temperature

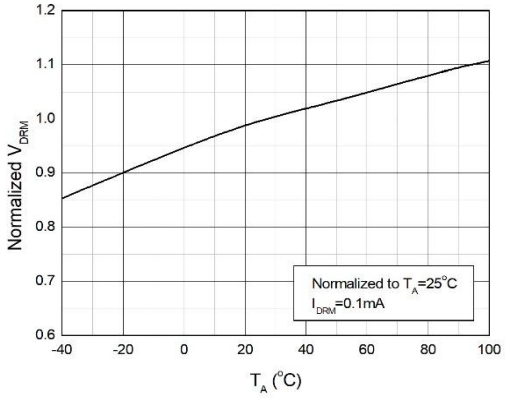


Fig.3 Off-state Terminal Current vs. Ambient Temperature

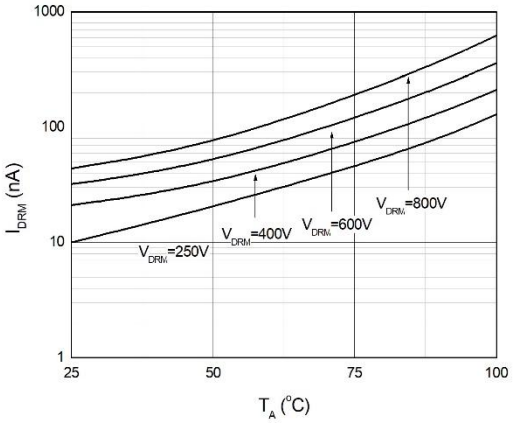


Fig.4 Forward Current vs. Forward Voltage

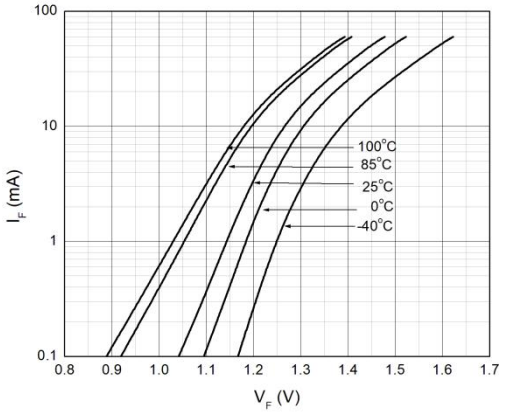


Fig.5 Holding Current vs. Ambient Temperature

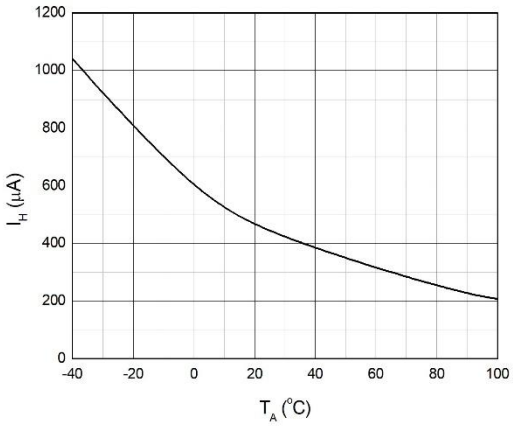


Fig.6 Forward Current vs. Ambient Temperature

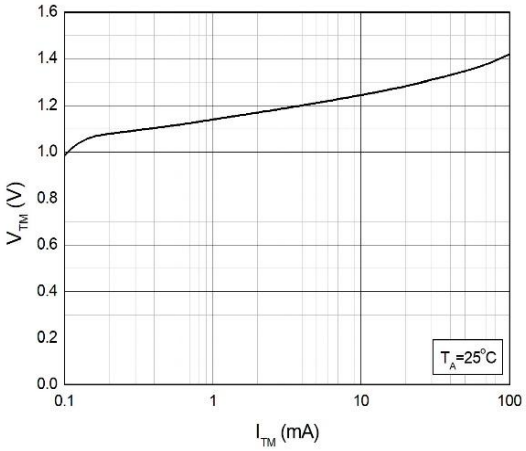


Fig.7 On-state Terminal Voltage vs. Ambient Temperature

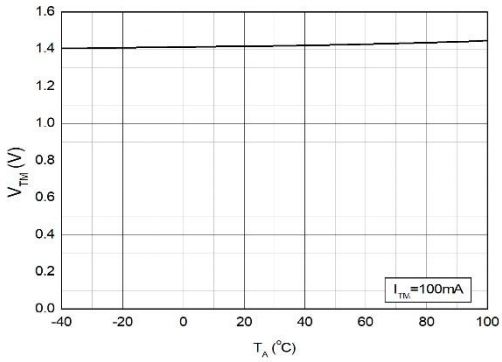


Fig.8 Normalized Trigger Current vs. Ambient Temperature

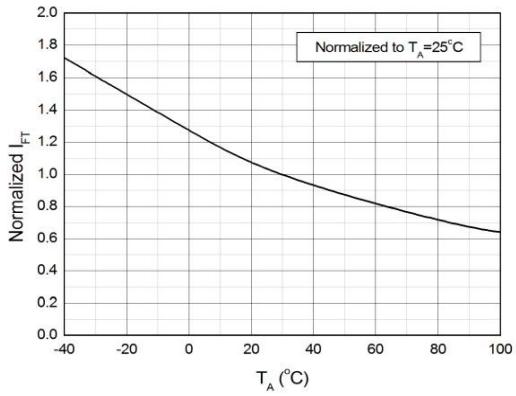


Fig.9 On-state Terminal Voltage vs. On-state Terminal Current

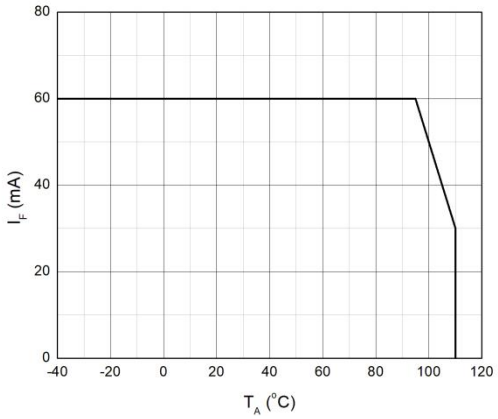


Fig.10 On-state Terminal Current vs. Ambient Temperature

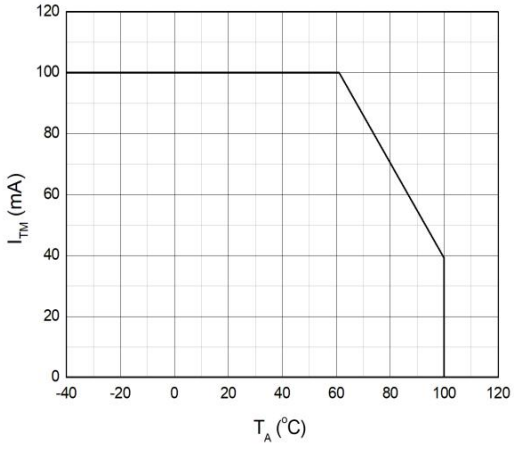


Fig.11 Normalized Inhibit Voltage vs. Ambient Temperature

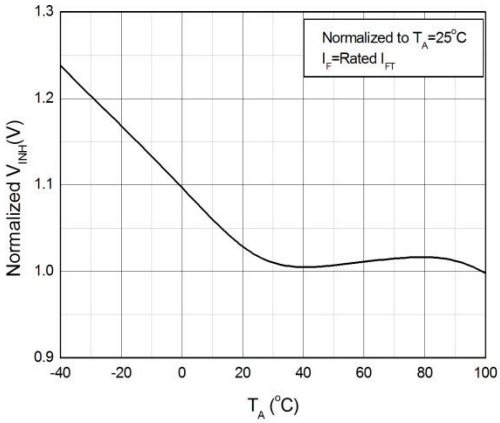


Fig.12 Normalized Leakage in Inhibit State vs. Ambient Temperature

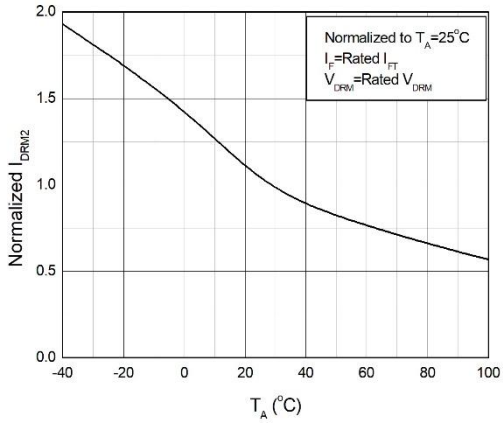


Fig.13 Turn On Time vs. Ambient Temperature

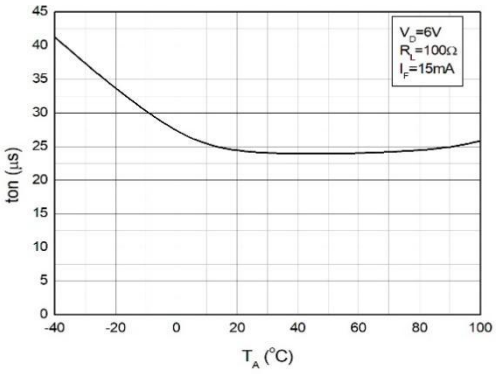
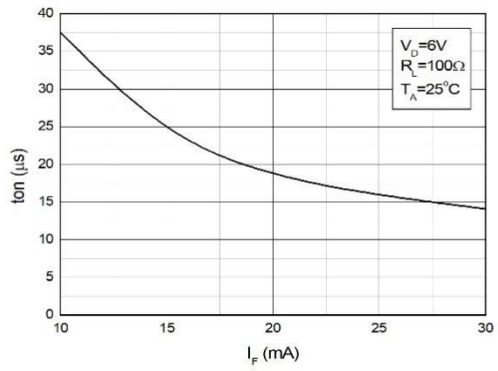


Fig.14 Turn On Time vs. Forward Current



Test Circuits

Fig.15 Test Circuits of Turn On Time

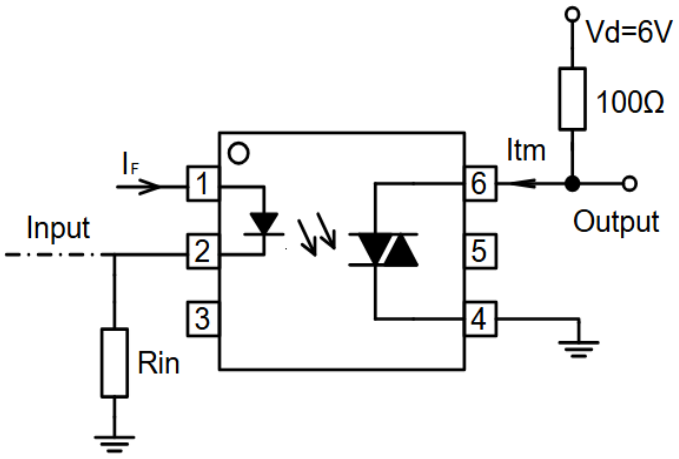


Fig.16 Waveforms of Turn On Time

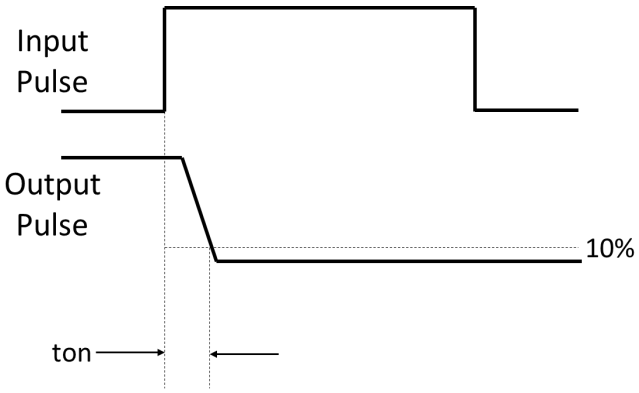


Fig.17 Test Circuits of dV/dt

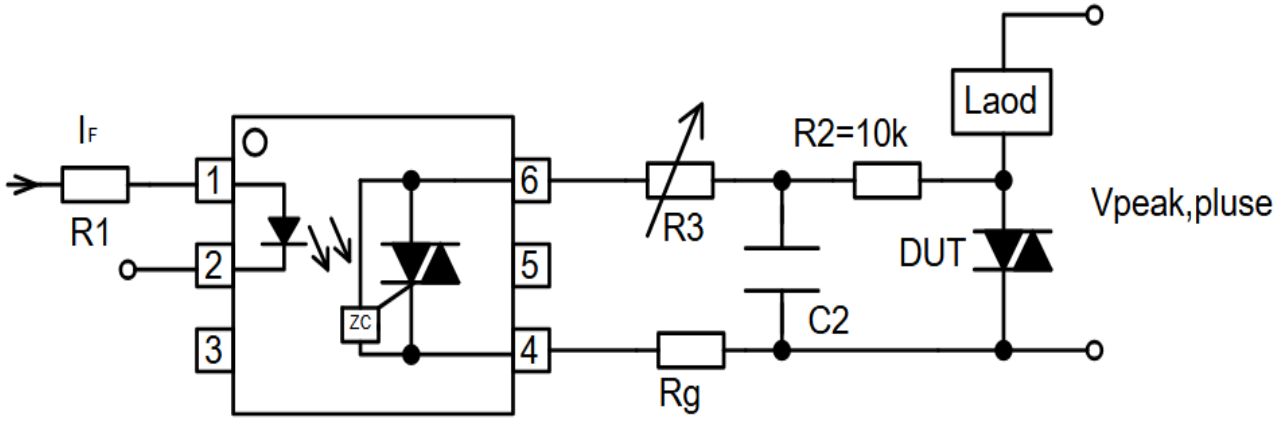
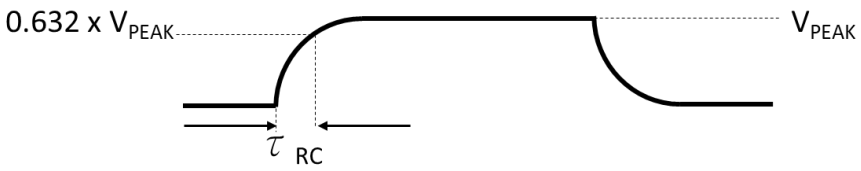


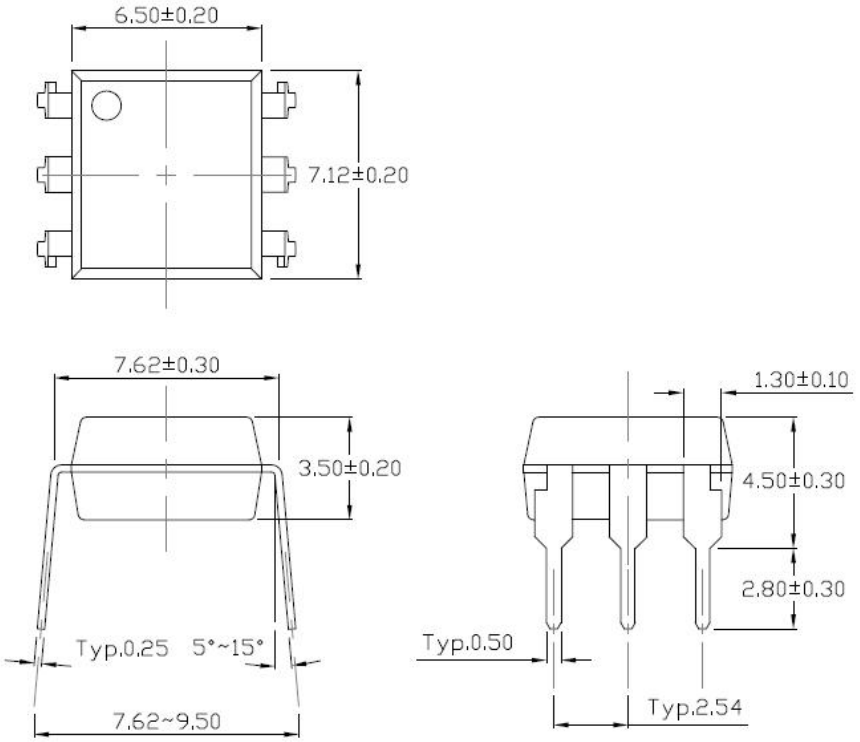
Fig.18 Waveforms of dV/dt



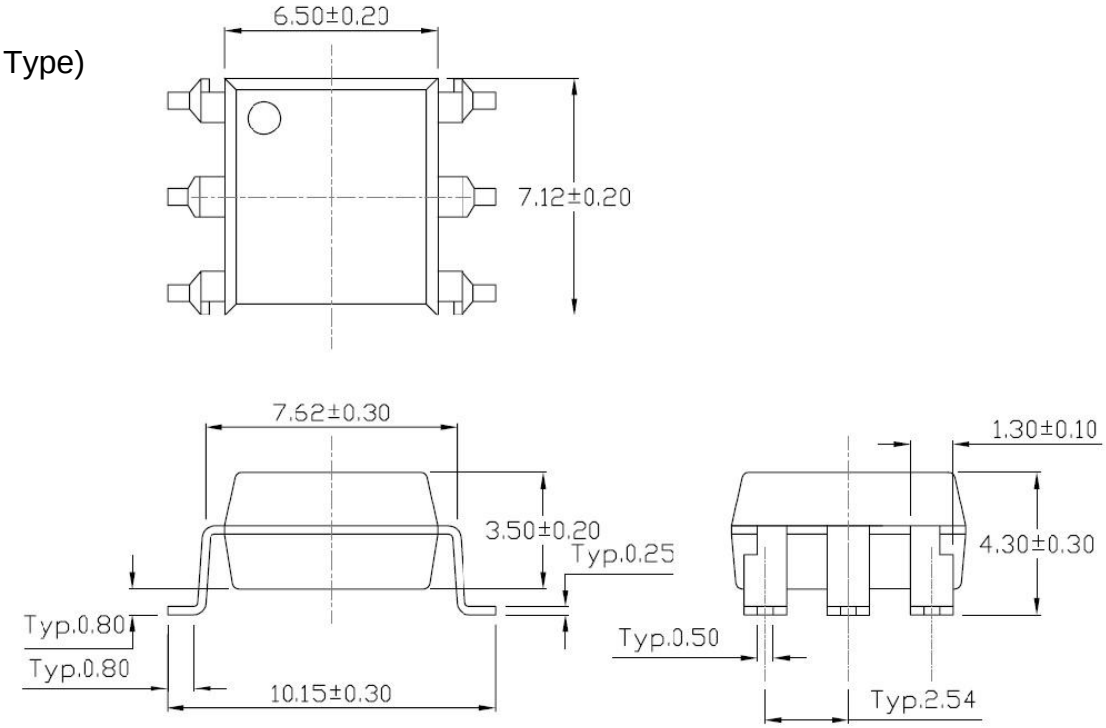
$$dv/dt = \frac{0.632 \times V_{PEAK}}{\tau_{RC}}$$

Package Dimensions (Dimensions in mm unless otherwise stated)

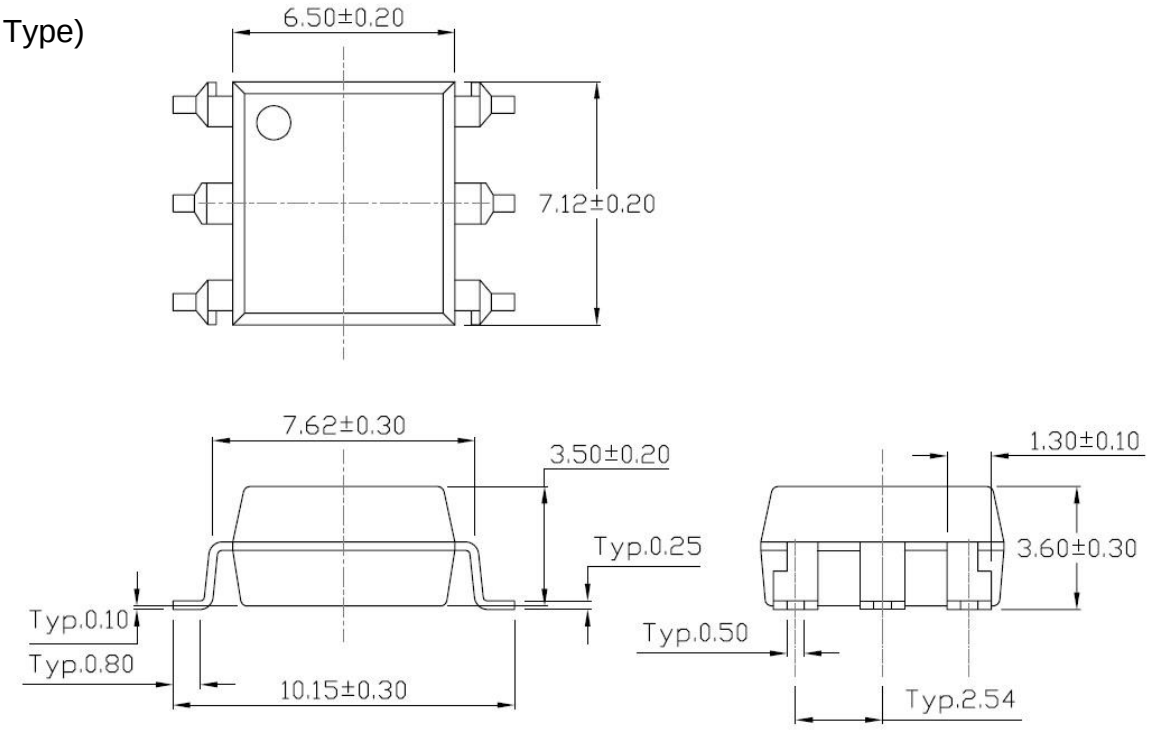
DIP-6



SMD-6 (S Type)

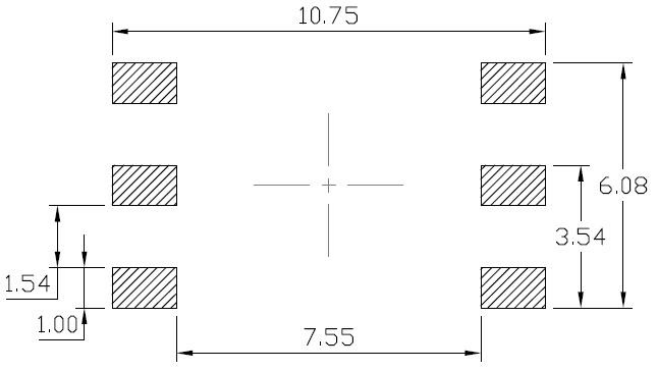


SMD-6 (SL Type)

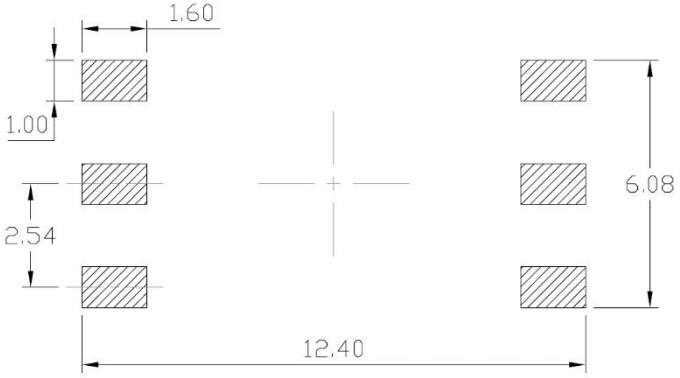


Recommended Solder Mask (Dimensions in mm unless otherwise stated)

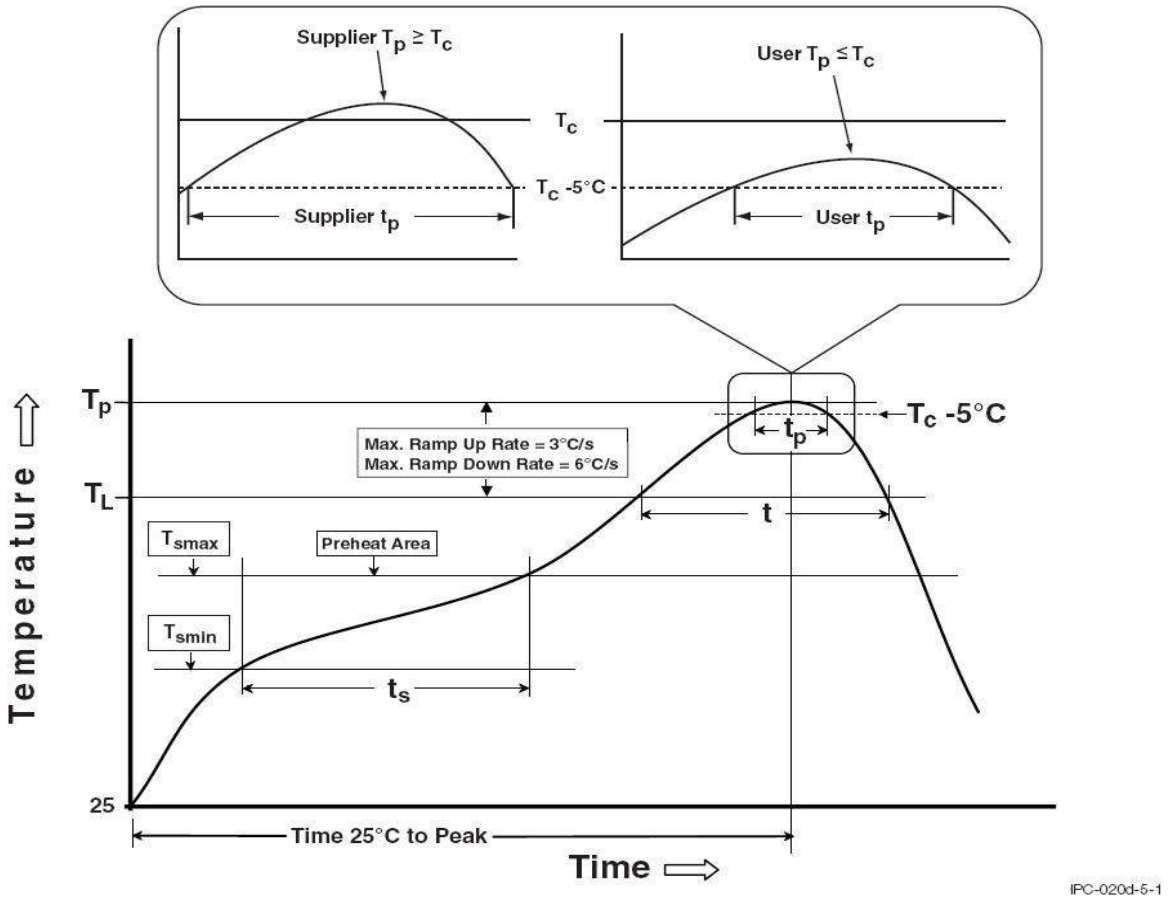
Surface Mount Lead Forming & Surface Mount (Low Profile) Lead Forming



Surface Mount (Gullwing) Lead Forming



Reflow Profile



Reflow Information

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