

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.

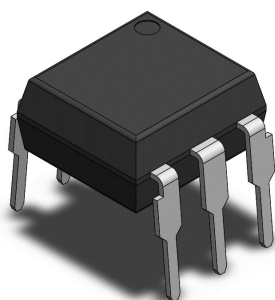
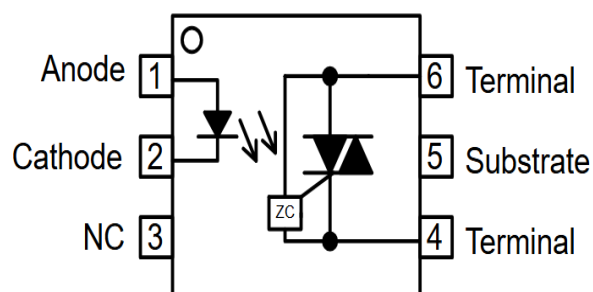
Applications

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

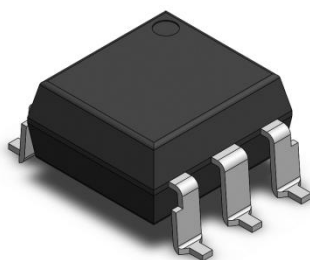
Features

- 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

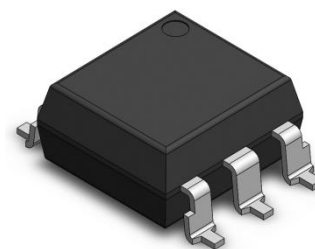
Functional Diagram



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		T _j	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		T _j	125	°C	
Output Power Dissipation		P _O	300	mW	
Total Power Dissipation		P _{tot}	400	mW	
Isolation Voltage		V _{iso}	5000	V _{rms}	1
Operating Temperature		T _{opr}	-40~100	°C	
Storage Temperature		T _{stg}	-55~125	°C	
Soldering Temperature		T _{sol}	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	C _{in}	-	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	SL3031,SL3041,SL3061,SL3081	I_{FT}	-	-	15	mA	Terminal Voltage = 3V $I_{TM}=100mA$	
Trigger	SL3032 SL3042 SL3062 SL3082		-	-	10			
Current	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

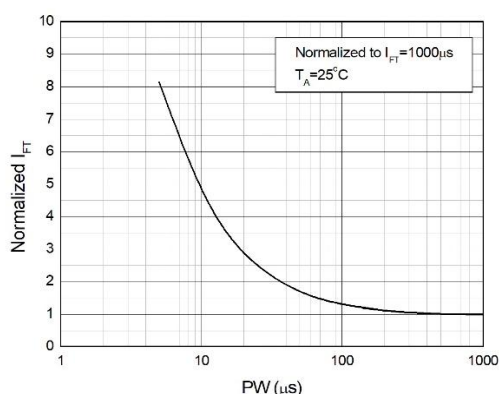


Fig.2 Normalized Off-state Terminal Voltage vs. Ambient Temperature

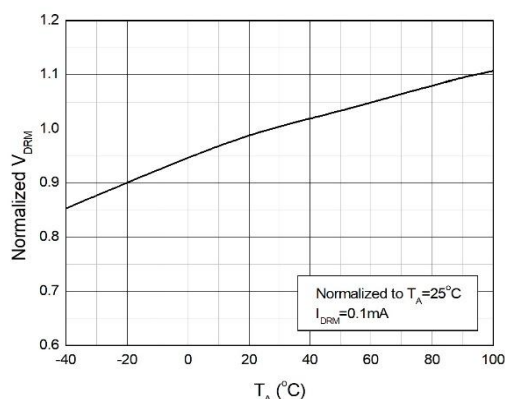


Fig.3 Off-state Terminal Current vs. Ambient Temperature

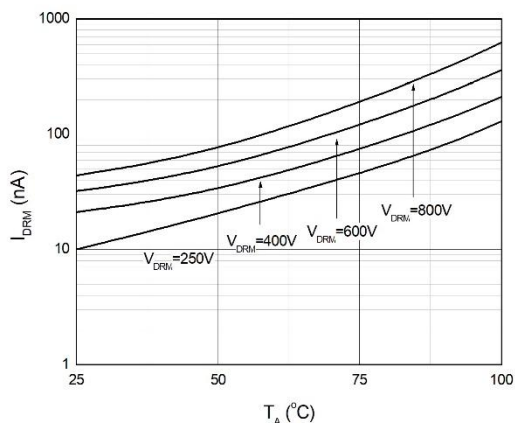
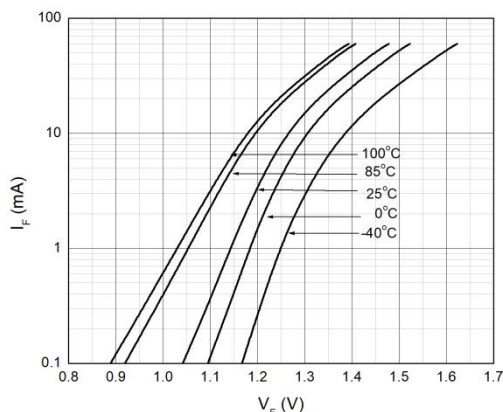
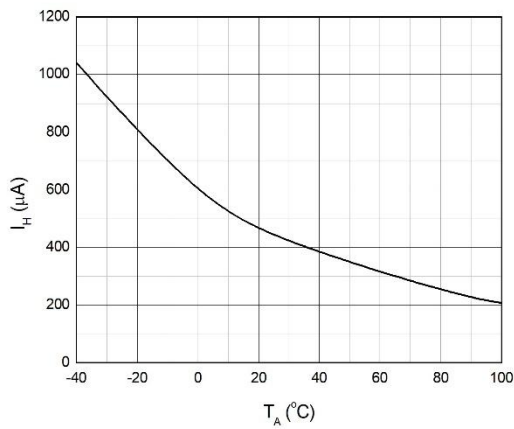


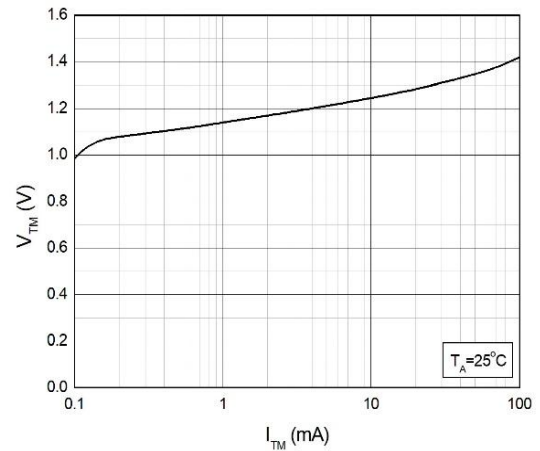
Fig.4 Forward Current vs. Forward Voltage



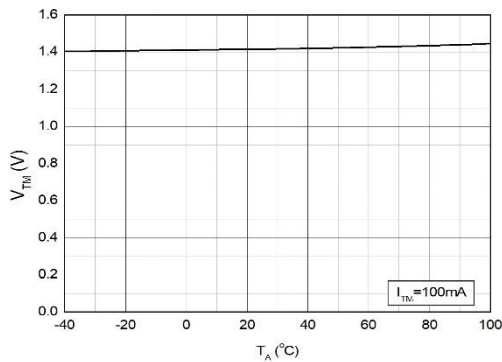
**Fig.5 Holding Current
vs. Ambient Temperature**



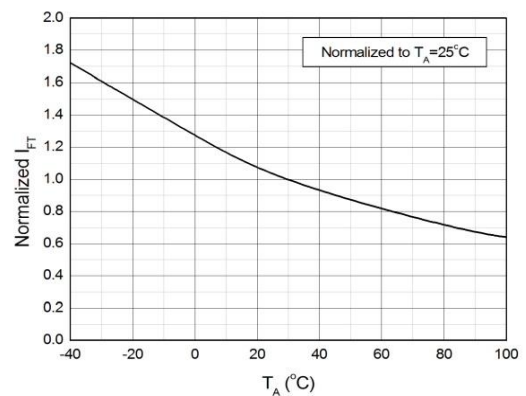
**Fig.6 Forward Current
vs. Ambient Temperature**



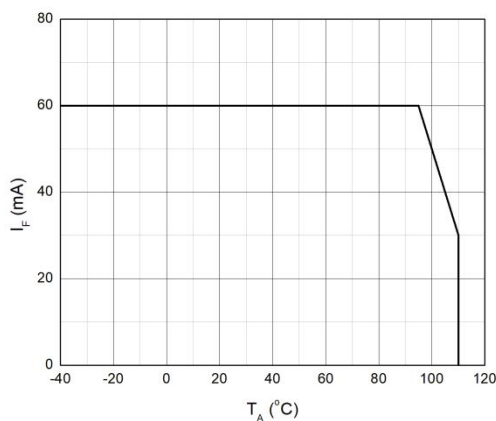
**Fig.7 On-state Terminal Voltage
vs. Ambient Temperature**



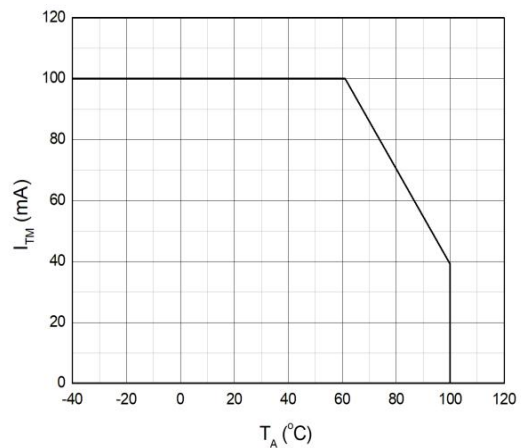
**Fig.8 Normalized Trigger Current
vs. Ambient Temperature**



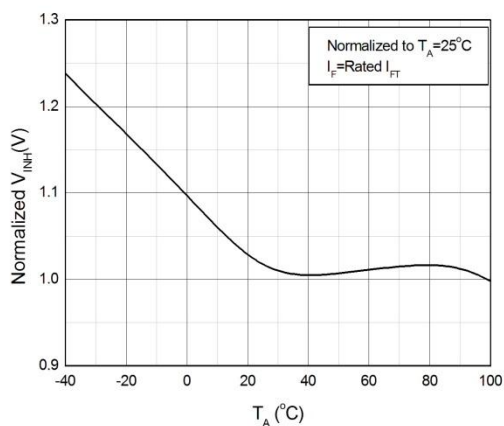
**Fig.9 On-state Terminal Voltage
vs. On-state Terminal Current**



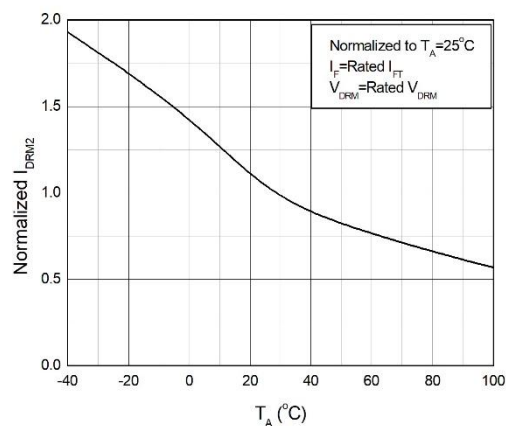
**Fig.10 On-state Terminal Current
vs. Ambient Temperature**



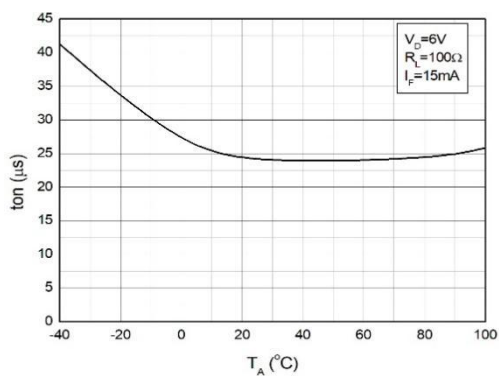
**Fig.11 Normalized Inhibit Voltage
vs. Ambient Temperature**



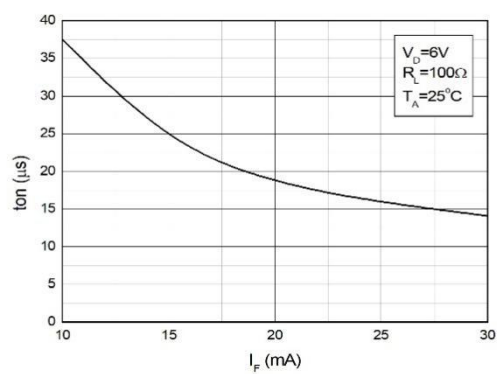
**Fig.12 Normalized Leakage in Inhibit State
vs. Ambient Temperature**



**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

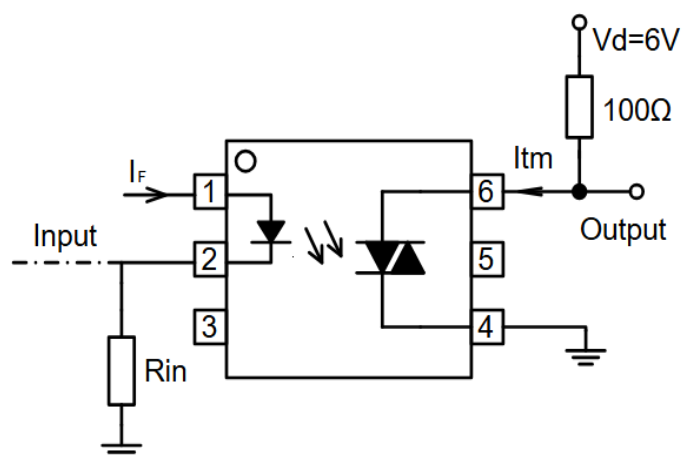


Fig.16 Waveforms of Turn On Time

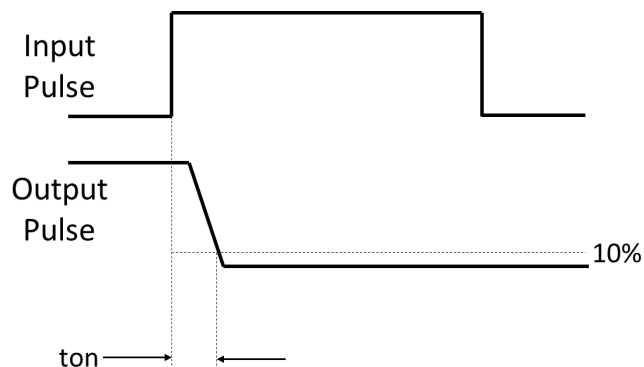


Fig.17 Test Circuits of dV/dt

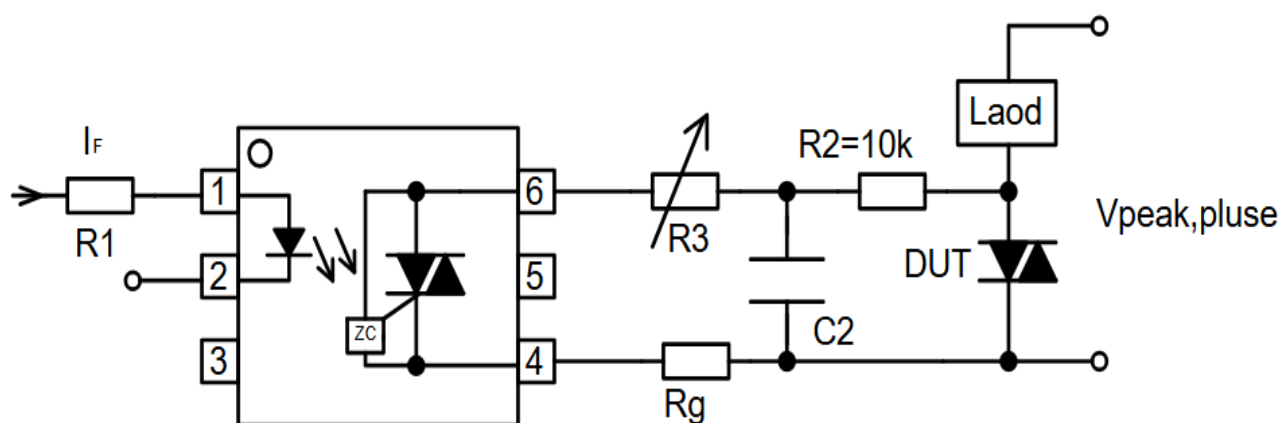
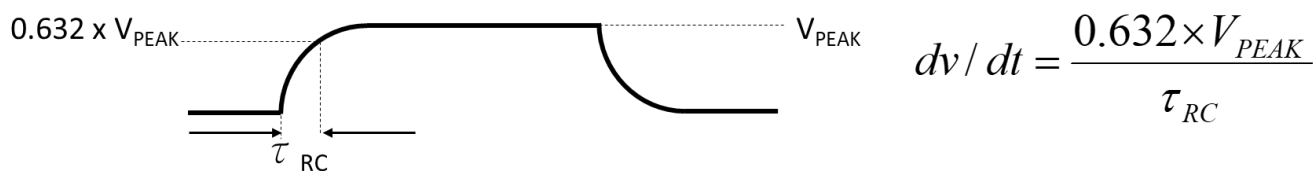
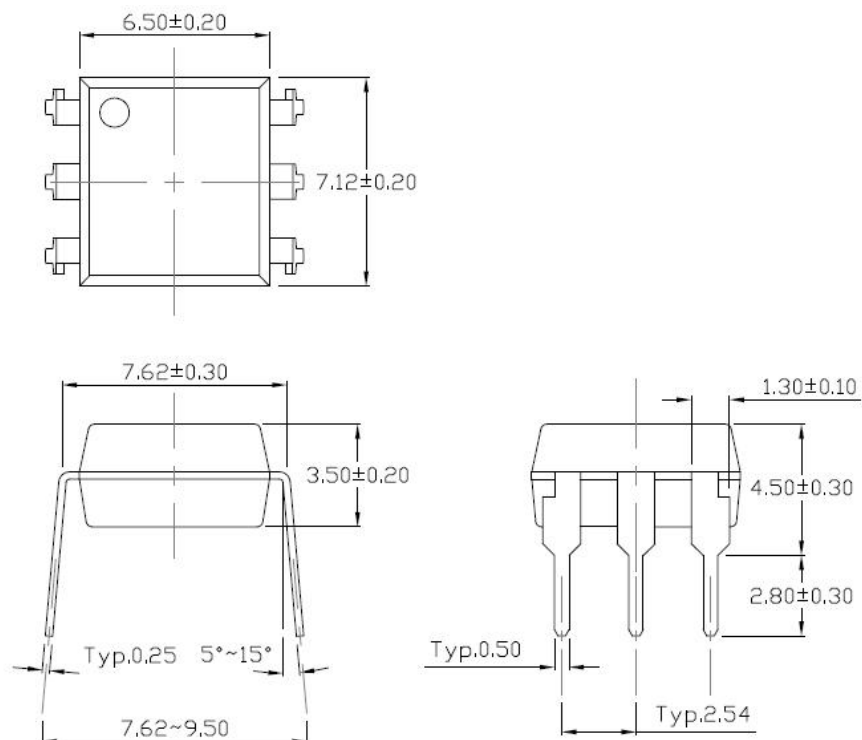


Fig.18 Waveforms of dV/dt

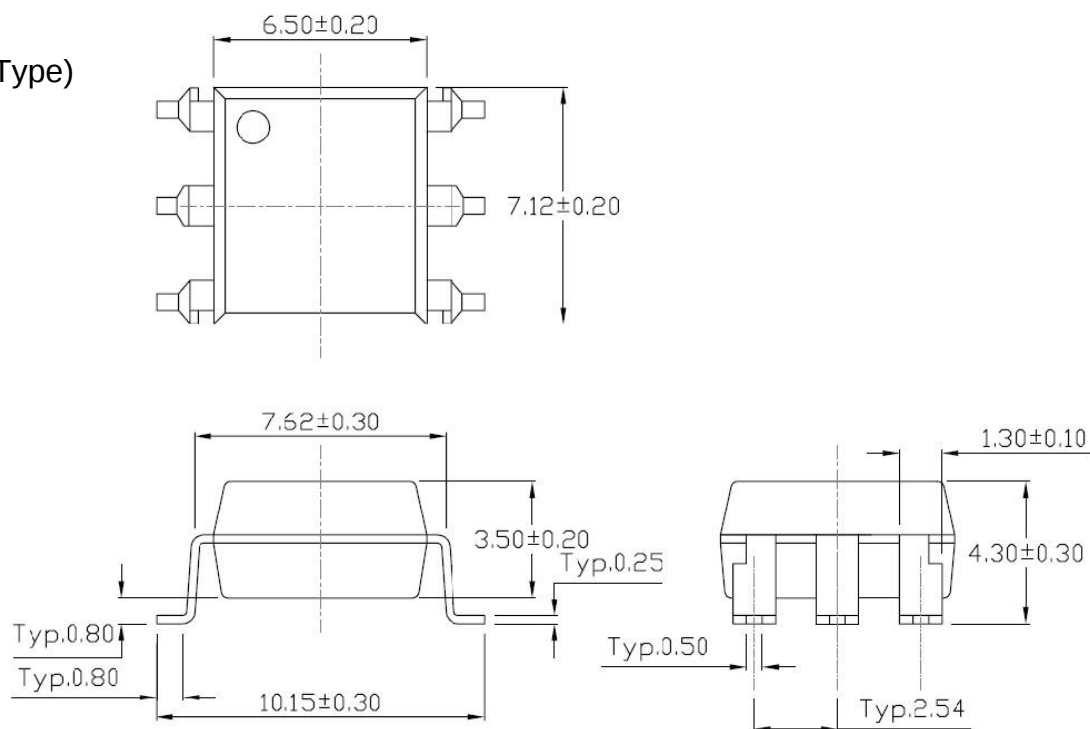


Package Dimensions (Dimensions in mm unless otherwise stated)

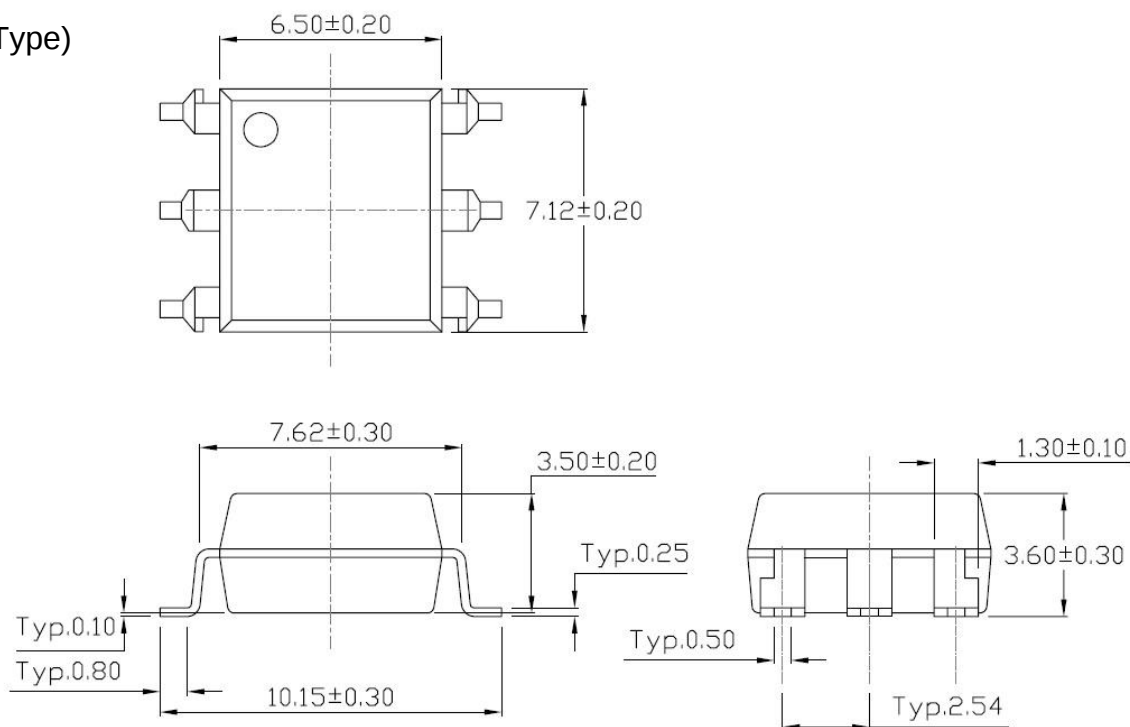
DIP-6



SMD-6 (S Type)

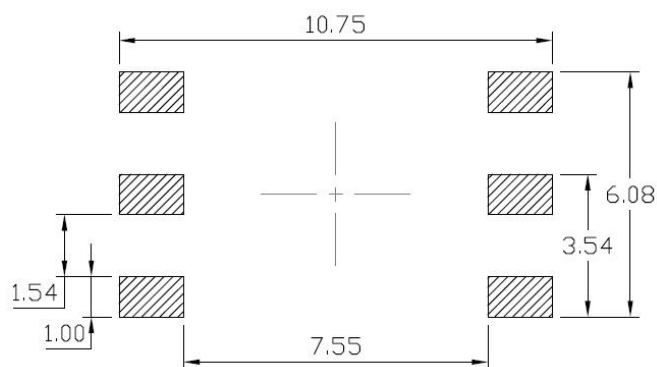


SMD-6 (SL Type)

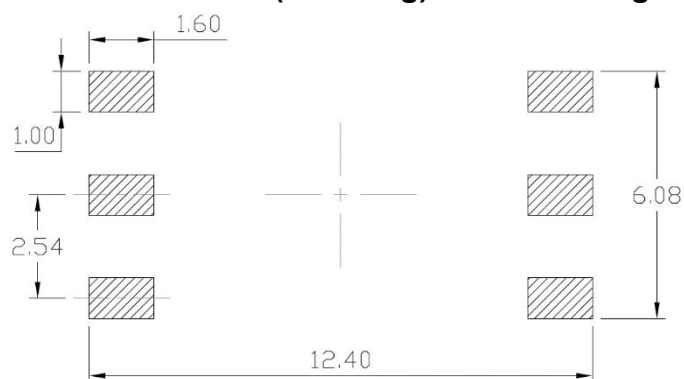


Recommended Solder Mask (Dimensions in mm unless otherwise stated)

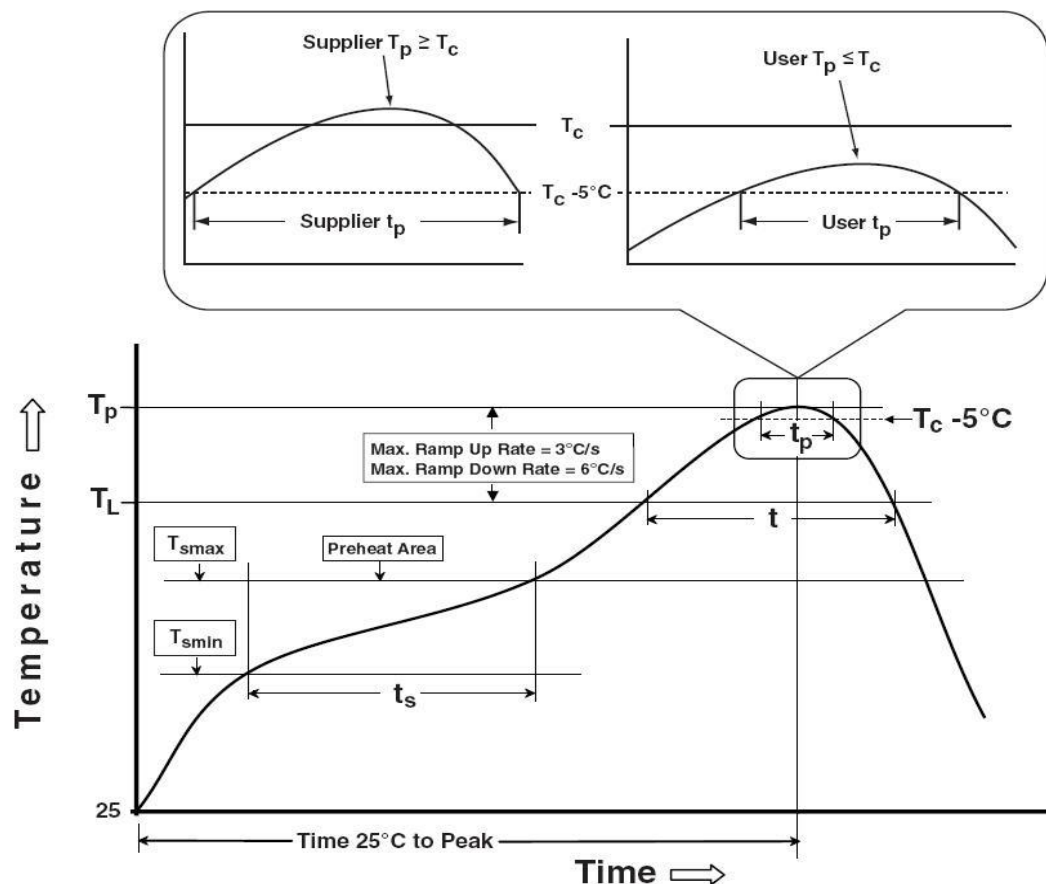
Surface Mount Lead Forming & Surface Mount (Low Profile) Lead Forming



Surface Mount (Gullwing) Lead Forming



Reflow Profile



IPC-020d-5-1

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.
Liquidous 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.