



MPC303X, MPC304X, MPC306X, MPC308X Series

DIP6, DC Input, Zero-Cross Photo TRIAC Optocoupler

■ Features

- High isolation 5000 VRMS
- DC input with zero-cross photo triac output
- Operating temperature range - 40 °C to 110 °C
- RoHS & REACH Compliance
- Halogen free
- MSL class 1
- Regulatory Approvals
 - UL - UL1577
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC – GB4943.1-2022

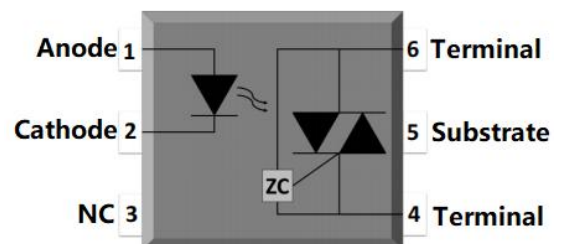
■ Applications

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

■ Description

The MPC303X, MPC304X, MPC306X and MPC308X series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a monolithic silicon zero-cross photo triac in a plastic DIP6 package with different lead forming options.

■ Schematic





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ABSOLUTE MAXIMUM RATINGS					
PARAMETER		SYMBOL	VALUE	UNIT	NOTE
INPUT					
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	
OUTPUT					
Off-state Output Terminal Voltage	MPC303X	V _{DRM}	250	V	
	MPC304X		400		
	MPC306X		600		
	MPC308X		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	
COMMON					
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



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ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C							
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
INPUT							
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	
OUTPUT							
Peak Off-state Current, Either Direction	I _{DRM}	-	-	500	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	V _{PEAK} =Rated V _{DRM}	4
TRANSFER CHARACTERISTICS							
LED Trigger Current	MPC3031, MPC3041, MPC3061, MPC3081	I _{FT}	-	-	15	Terminal Voltage = 3V I _{TM} =100mA	
	MPC3032, MPC3042, MPC3062, MPC3082		-	-	10		
	MPC3033, MPC3043, MPC3063, MPC3083		-	-	5		
Holding Current Saturation Voltage	I _H	-	237	-	μA		
Isolation Resistance	R _{iso}	10 ¹²	10 ¹⁴	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance	C _{IO}	-	0.4	-	pF	V=0, f=1MHz	
ZERO-CROSS CHARACTERISTICS							
Inhibit Voltage	V _{INH}	-	-	20	V	I _F =Rated I _{FT}	
Leakage in Inhibited State	I _{DRM2}	-	-	500	μA	I _F =Rated I _{FT} V _{DRM} =Rated V _{DRM}	

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

Note4. Refer to Fig.17 & Fig.18.

CHARACTERISTIC CURVES

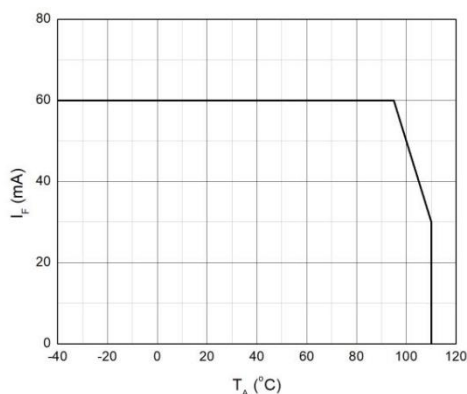


Fig.1 Forward Current vs. Ambient Temperature

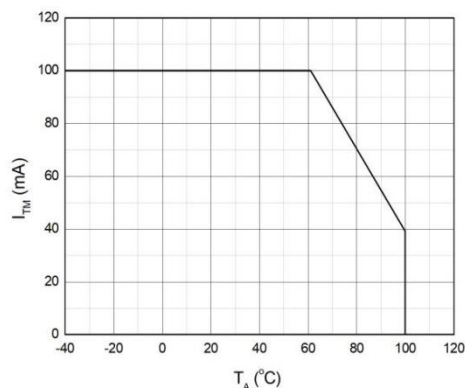


Fig.2 On-state Terminal Current vs. Ambient Temperature

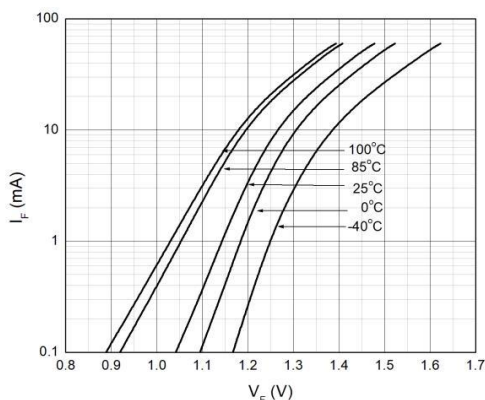


Fig.3 Forward Current vs. Forward Voltage

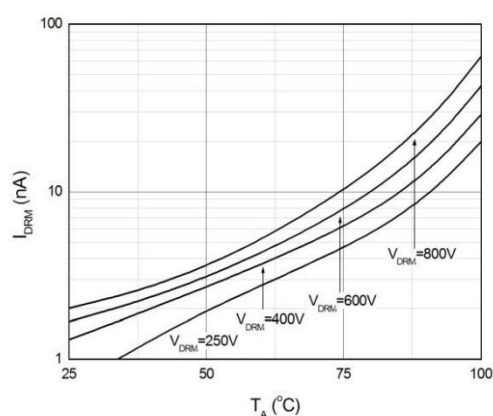


Fig.4 Off-state Terminal Current vs. Ambient Temperature

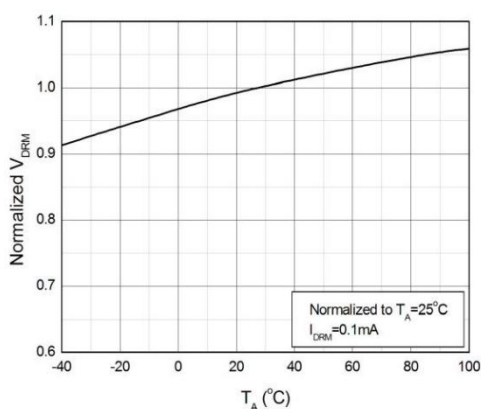


Fig.5 Normalized Off-state Terminal Voltage vs. Ambient Temperature

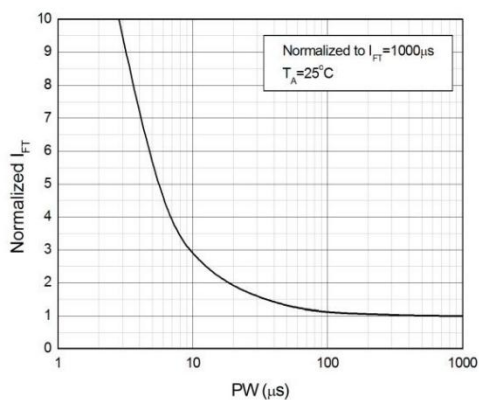


Fig.6 Normalized Trigger Current vs. LED Trigger Pulse Width

CHARACTERISTIC CURVES

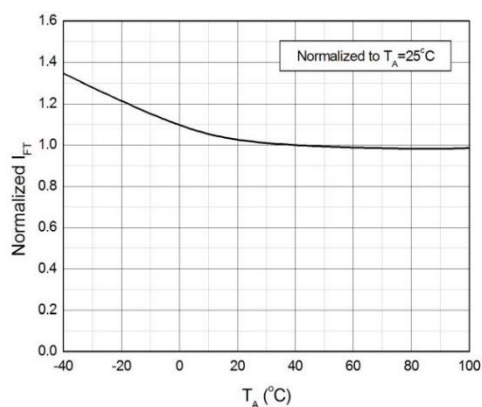


Fig.7 Normalized Trigger Current vs. Ambient Temperature

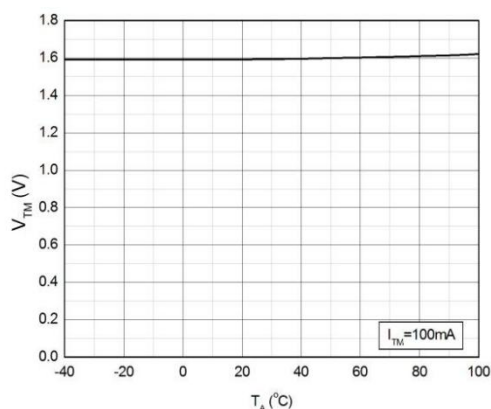


Fig.8 On-state Terminal Voltage vs. Ambient Temperature

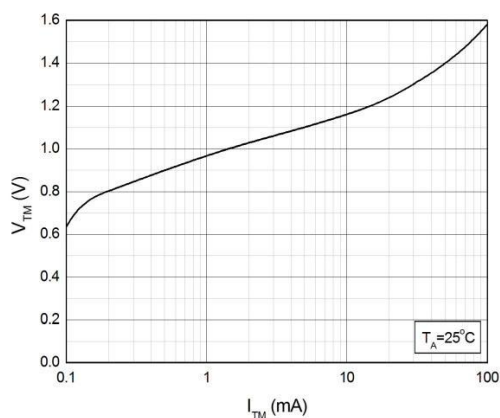


Fig.9 On-state Terminal Voltage vs. On-state Terminal Current

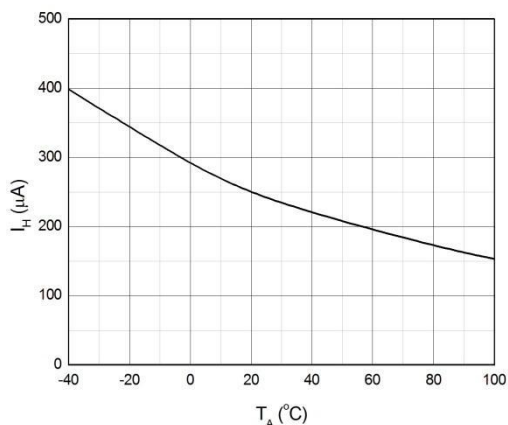


Fig.10 Holding Current vs. Ambient Temperature

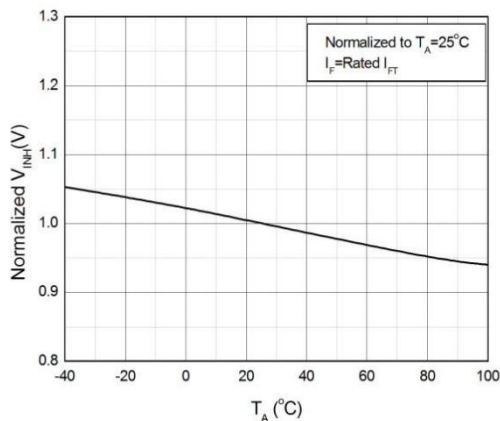


Fig.11 Normalized Inhibit Voltage vs. Ambient Temperature

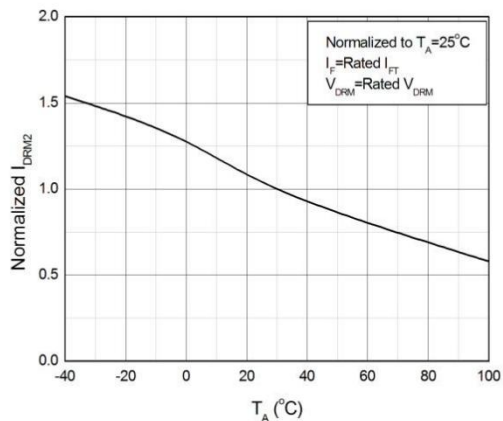


Fig.12 Normalized Leakage in Inhibit State vs. Ambient Temperature

CHARACTERISTIC CURVES

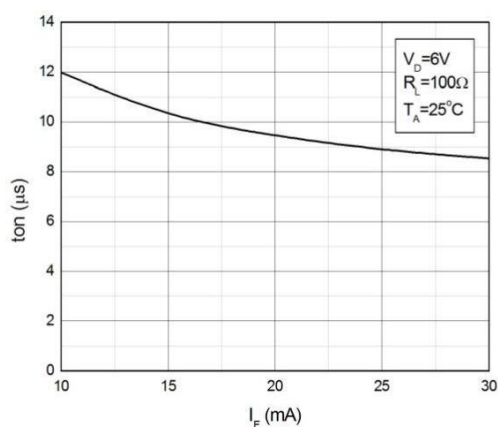


Fig.13 Turn On Time vs. Forward Current

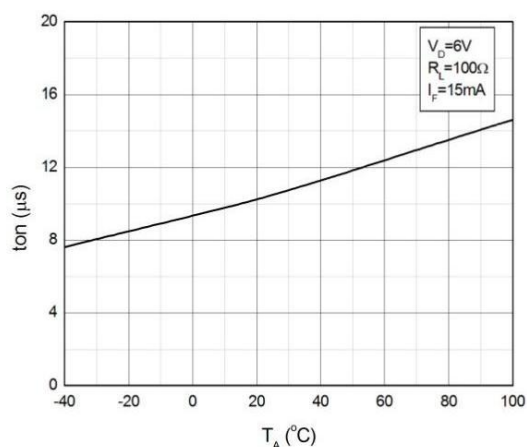


Fig.14 Turn On Time vs. Ambient Temperature

TEST CIRCUITS

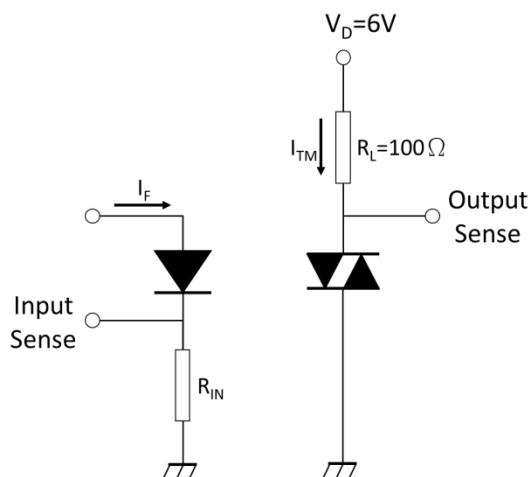


Fig.15 Test Circuits of Turn On Time

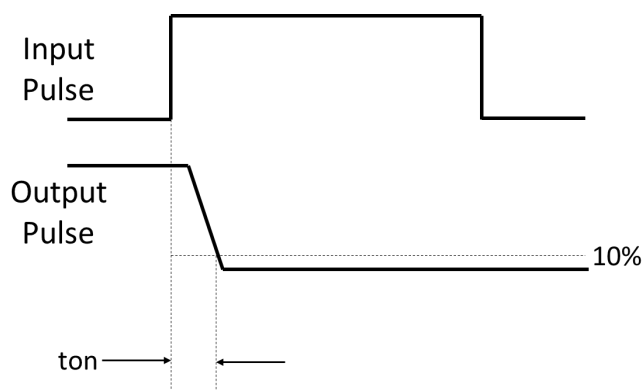


Fig.16 Waveforms of Turn On Time

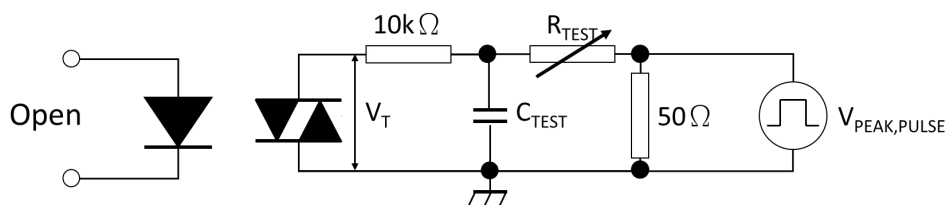


Fig.17 Test Circuits of dV/dt

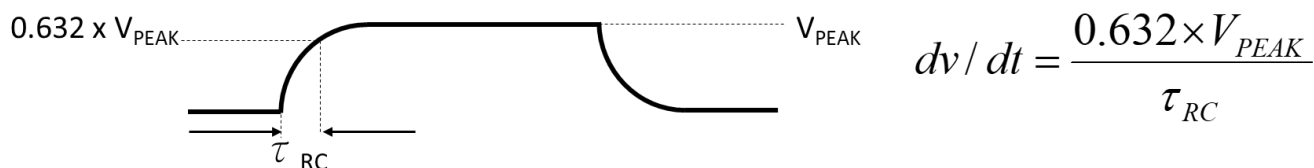
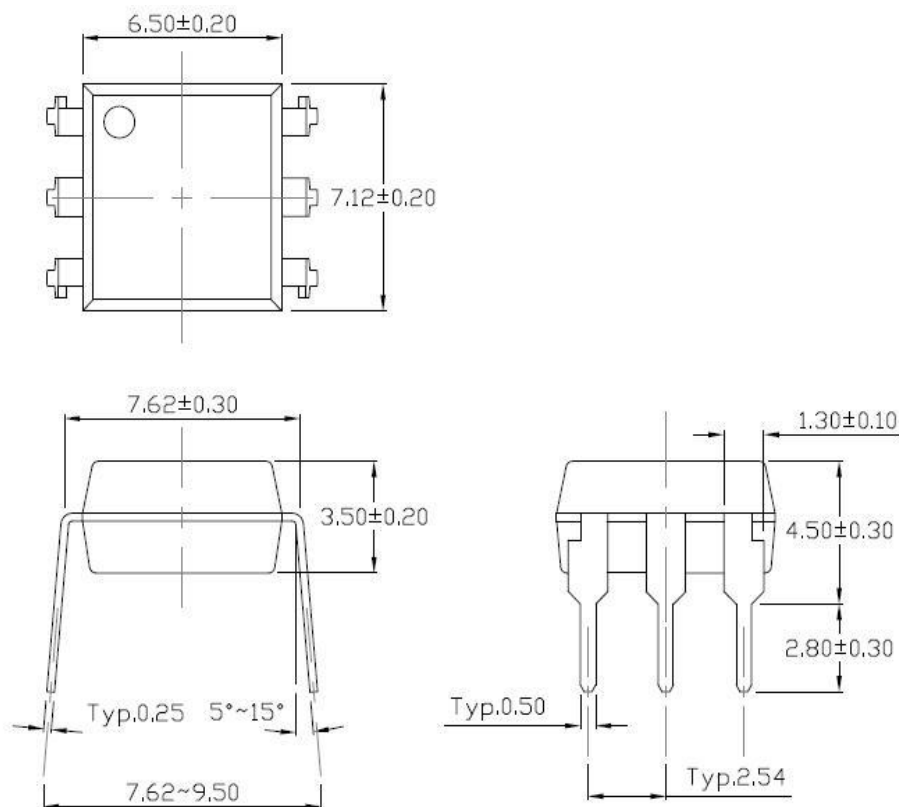


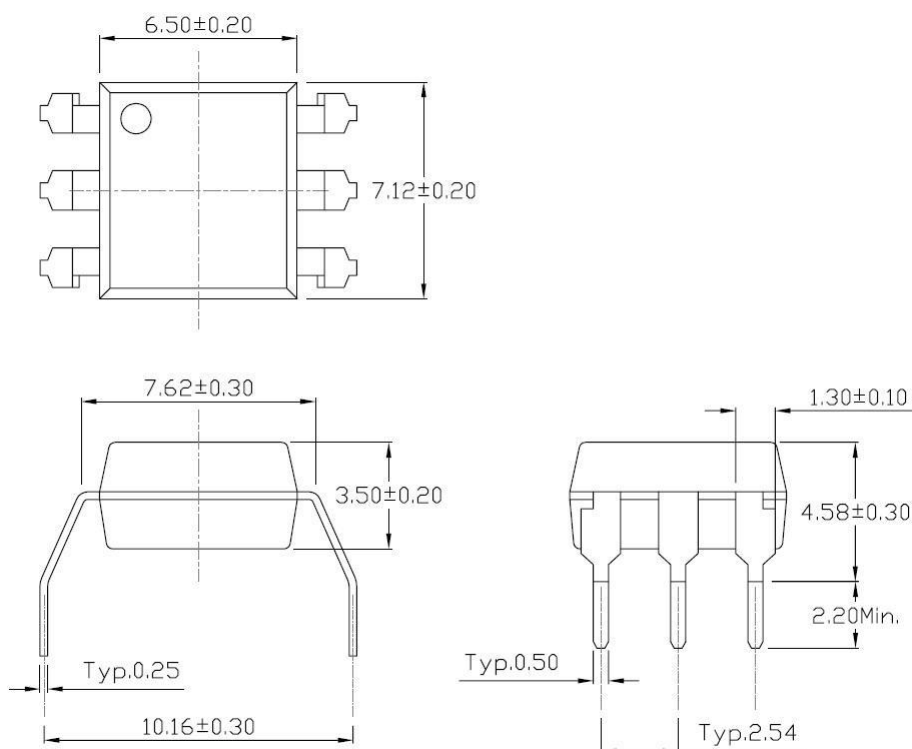
Fig.18 Waveforms of dV/dt

PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Standard DIP-Through Hole(DIP Type)

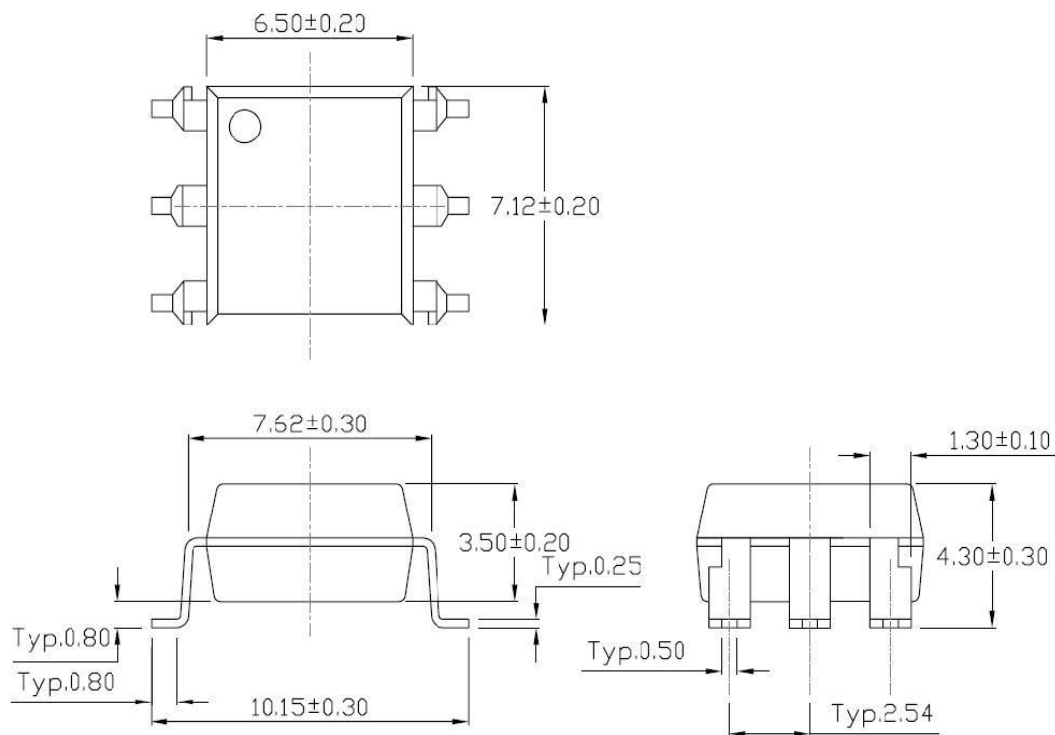


Gullwing(400mil) Lead Forming-Through Hole(M Type)

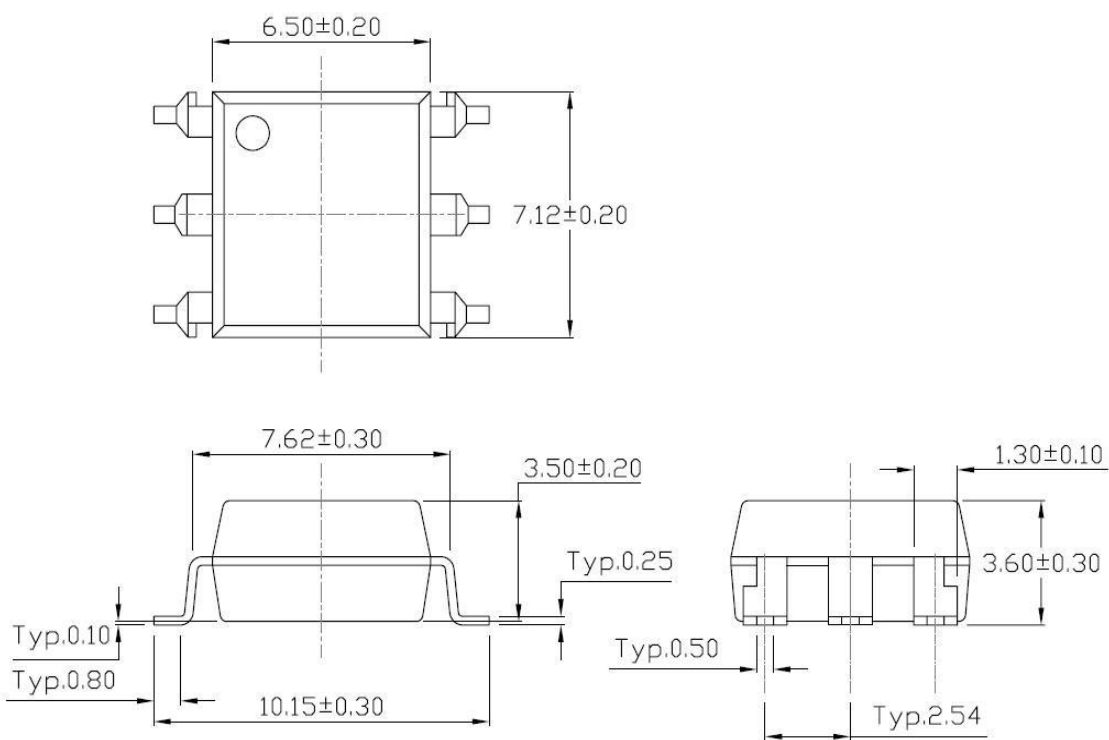


PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Surface Mount Lead Forming(S Type)

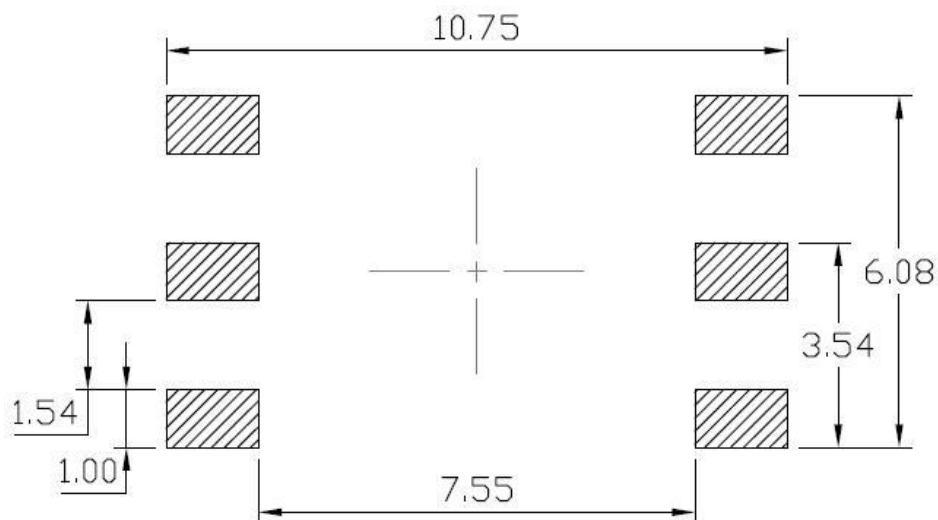


Surface Mount(Low Profile) Lead Forming(SL Type)

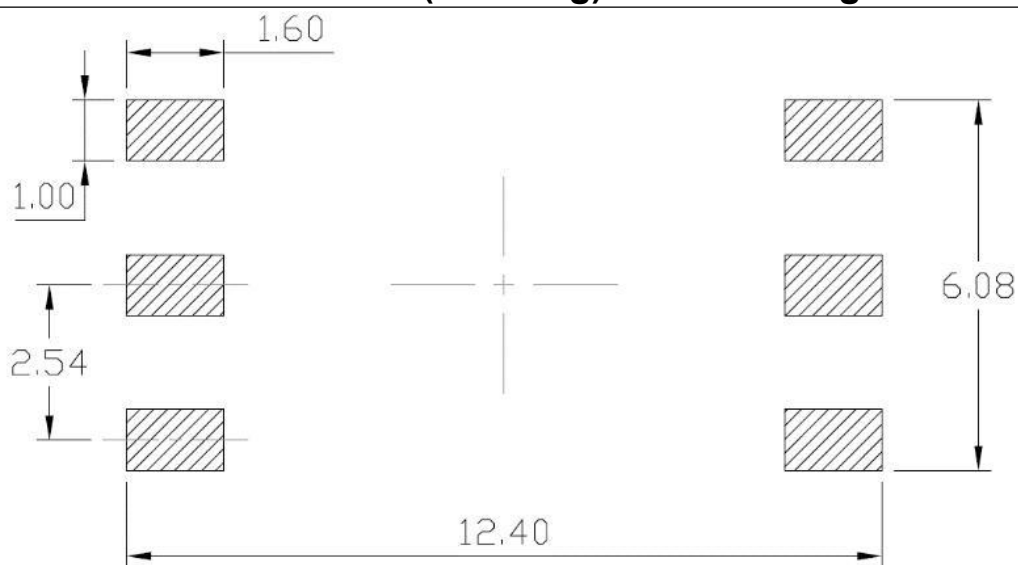


RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

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

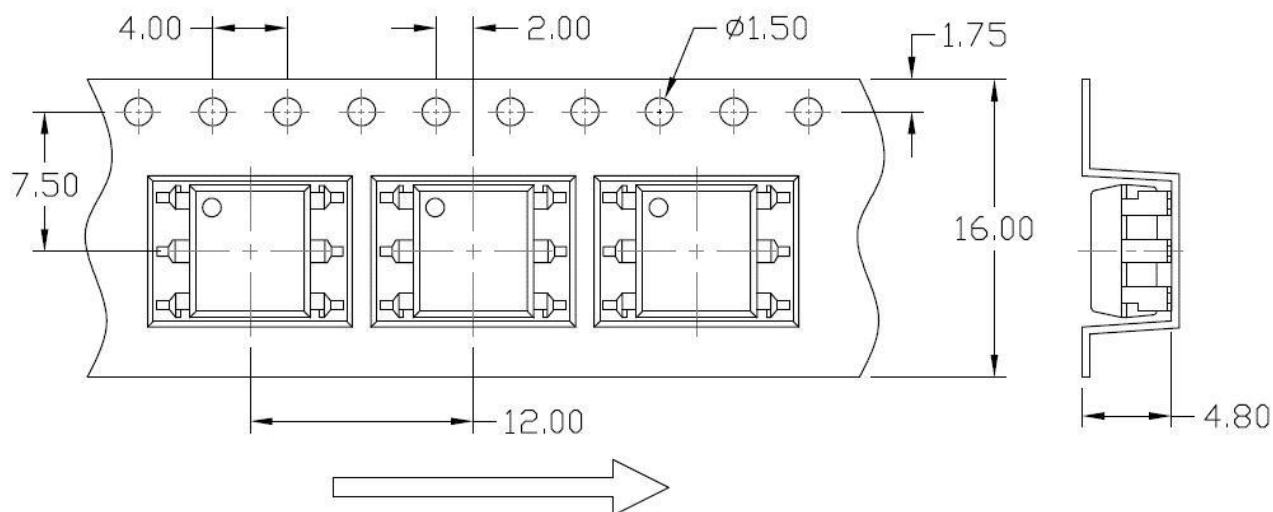


Surface Mount(Gullwing) Lead Forming

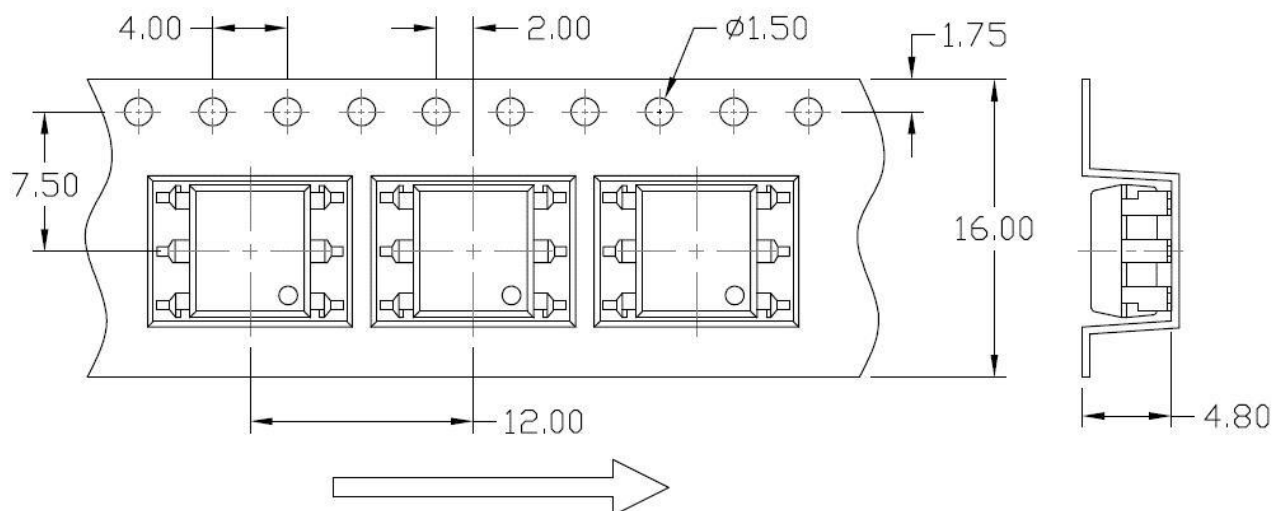


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S(T1) & SL(T1)

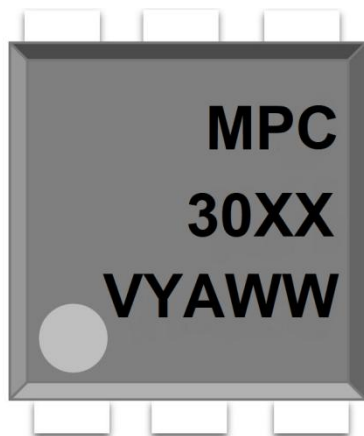


Option S(T2) & SL(T2)



ORDERING AND MARKING INFORMATION

MARKING INFORMATION



MPC : Company Abbr.
30XX : Part Number&Rank
V : VDE Option
Y : Fiscal Year
A : Manufacturing Code
WW : Work Week

ORDERING INFORMATION

MPC30XX(Y)(Z)-GV

MPC – Company Abbr.

30XX – Part Number&Rank(31/32/33/41/42/43/61/62/63/81/82/83)

Y – Lead Form Option (M/S/SL/None)

Z – Tape and Reel Option (T1/T2)

G – Material Option (G: Green, None: Non-Green)

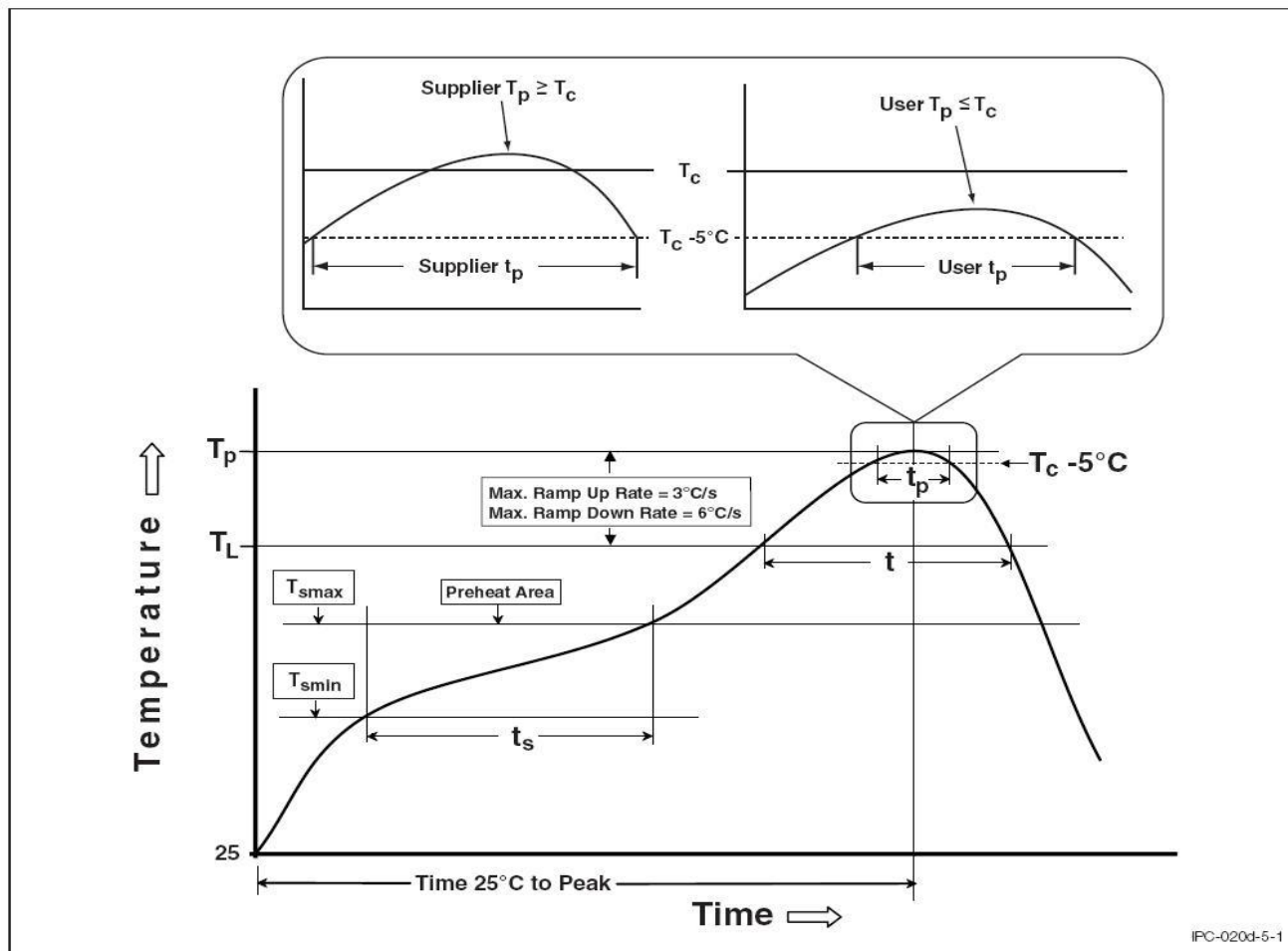
V – VDE Option (V or None)

PACKING QUANTITY

Option	Quantity	Quantity – Inner box	Quantity – Outer box
None	50 Units/Tube	32 Tubes/Inner box	10 Inner box/Outer box = 16k Units
M	50 Units/Tube	32 Tubes/Inner box	10 Inner box/Outer box = 16k Units
S(T1)	1000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 15k Units
S(T2)	1000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 15k Units
SL(T1)	1000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 15k Units
SL(T2)	1000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 15k Units

REFLOW INFORMATION

REFLOW PROFILE



IPC-0204-5-1

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.



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DISCLAIMER

- Our company is continually improving the quality, reliability, function and design. Our company reserves the right to make changes without further notices.
- The characteristic curves shown in this datasheet are representing typical performance which are not guaranteed.
- This product is not intended to be used for military, aircraft, automotive, medical, life sustaining or lifesaving applications or any other application which can result in human injury or death.
- Immerge unit's body in solder paste is not recommended.
- Discoloration might be occurred on the package surface after soldering, reflow or long-time use. It neither impacts the performance nor reliability.

■ Revision History

Version	Date	Subjects (major changes since last revision)
1.0	2022-07-21	Datasheet Complete
1.1	2023-07-05	Upgrade Datasheet