

■ Features

- High isolation 5000 VRMS
- DC input with random-phase 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

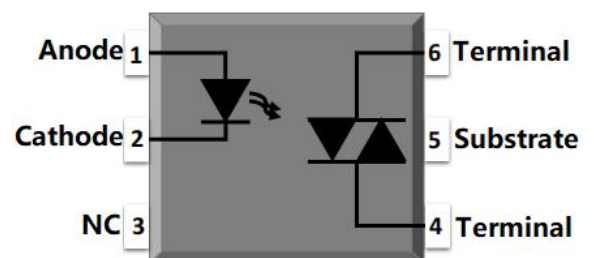
- Solenoid/valve controls
- Lighting controls
- Motor controls
- Temperature controls
- Static AC power switches
- Solid state relays
- Interfacing microprocessors to 115 to 240VAC peripherals

■ Description

The MPC301X, MPC302X and MPC305X series 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.

With the robust coplanar double mold structure, MPC301X, MPC302X and MPC305X series provide the most stable isolation feature.

■ Schematic





MPC301X, MPC302X, MPC305X Series
DIP6, DC Input, Random-Phase Photo TRIAC Coupler

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	MPC301X	V_{DRM}	250	V	
	MPC302X		400		
	MPC305X		600		
Peak Repetitive Surge Current PW=100μs, 120pps		I_{TSM}	1	A	
On-State RMS Current		$I_{T(RMS)}$	100	mA	
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



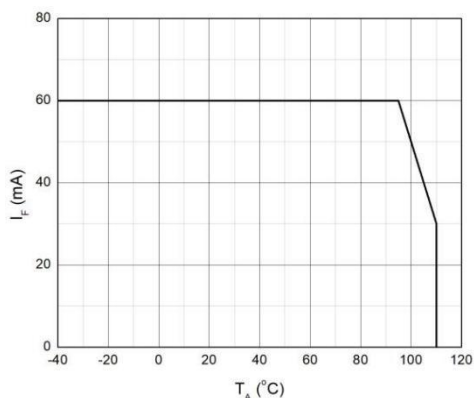
MPC301X, MPC302X, MPC305X Series
DIP6, DC Input, Random-Phase Photo TRIAC Coupler

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}	-	-	100	nA	V _{DRM} =Rated V _{DRM} I _F =0	3
Peak On-state Current, Either Direction	V _{TM}	-	1.58	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	MPC3010, MPC3021, MPC3051	I _{FT}	-	-	15	mA	Terminal Voltage = 3V I _{TM} =100mA
	MPC3011, MPC3022, MPC3052,		-	-	10		
	MPC3012, MPC3023, MPC3053,		-	-	5		
Holding Current Saturation Voltage	I _H	-	257	-	μA		
Isolation Resistance	R _{iso}	10 ¹²	10 ¹⁴	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance	C _{io}	-	0.8	-	pF	V=0, f=1MHz	

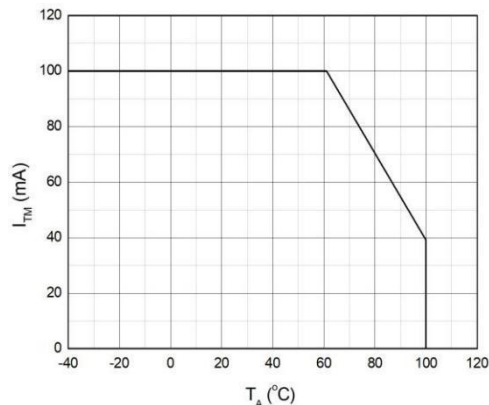
Note3. Test voltage must be applied within dV/dt rating.

Note4. Refer to Fig.15 & Fig.16.

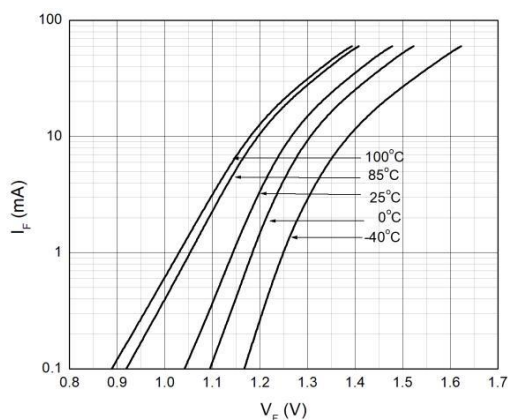
CHARACTERISTIC CURVES



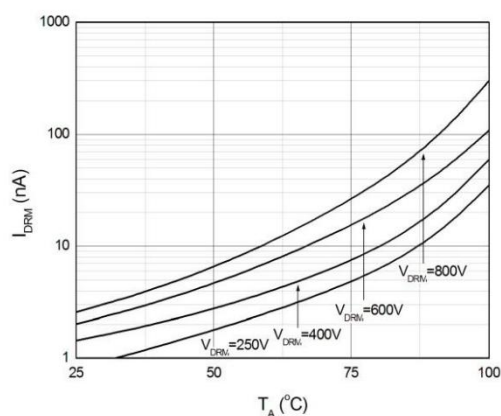
**Fig.1 Forward Current
vs. Ambient Temperature**



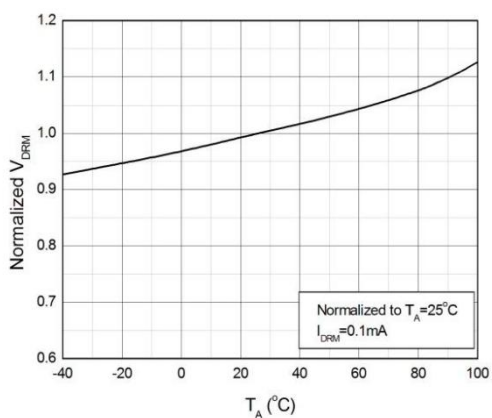
**Fig.2 On-state Terminal Current
vs. Ambient Temperature**



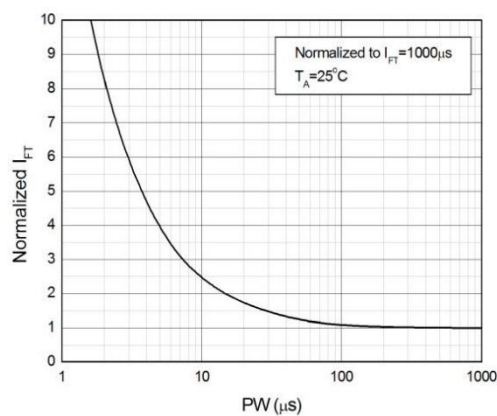
**Fig.3 Forward Current
vs. Forward Voltage**



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

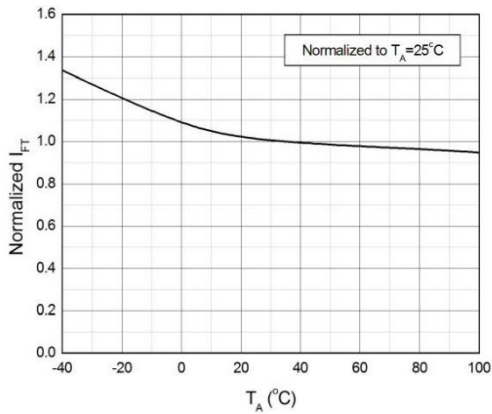


**Fig.5 Normalized Off-state Terminal Voltage
vs. Ambient Temperature**

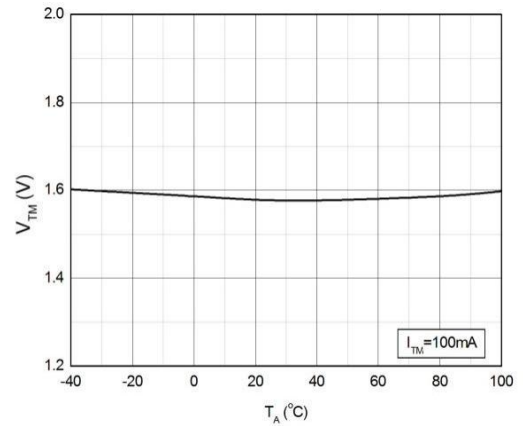


**Fig.6 Normalized Trigger Current
vs. LED Trigger Pulse Width**

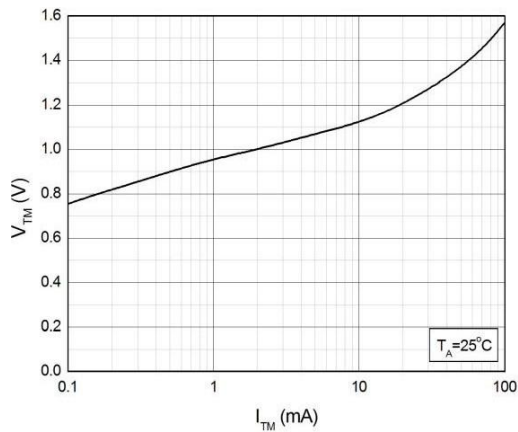
CHARACTERISTIC CURVES



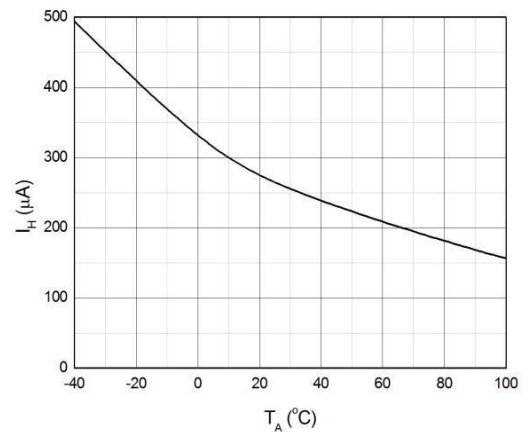
**Fig.7 Normalized Trigger Current
vs. Ambient Temperature**



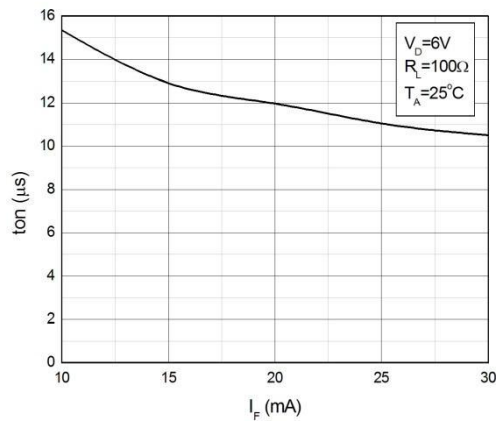
**Fig.8 On-state Terminal Voltage
vs. Ambient Temperature**



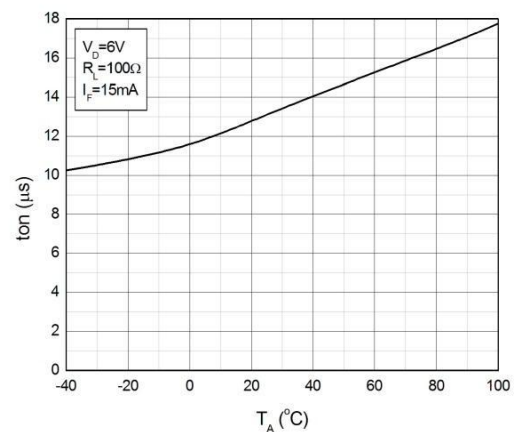
**Fig.9 On-state Terminal Voltage
vs. On-state Terminal Current**



**Fig.10 Holding Current
vs. Ambient Temperature**



**Fig.11 Turn On Time
vs. Forward Current**



**Fig.12 Turn On Time
vs. Ambient Temperature**

TEST CIRCUITS

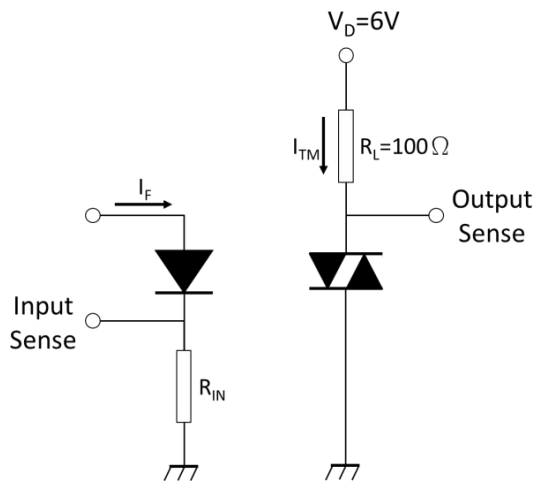


Fig.13 Test Circuits of Turn On Time

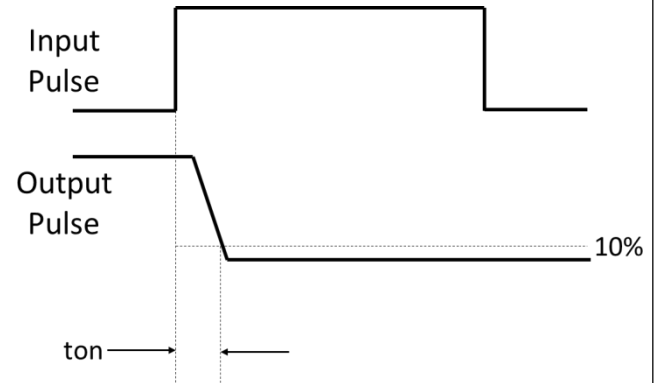


Fig.14 Waveforms of Turn On Time

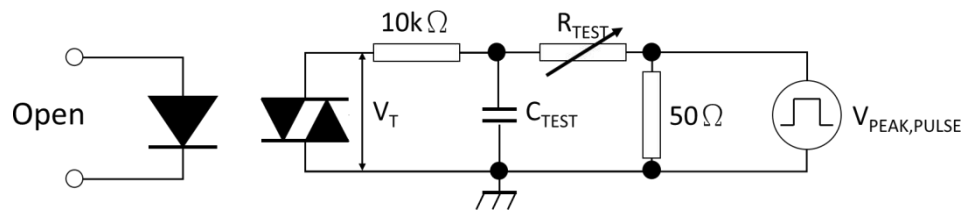


Fig.15 Test Circuits of dV/dt

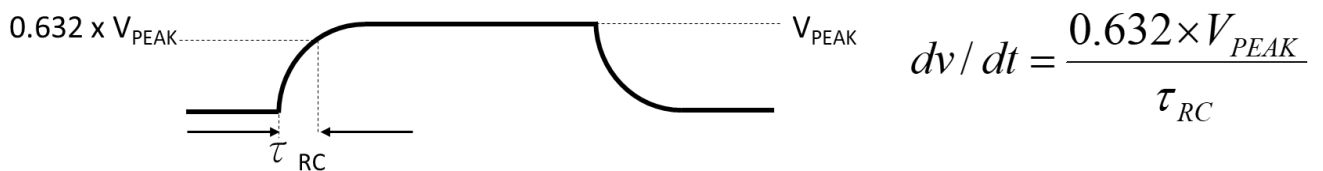
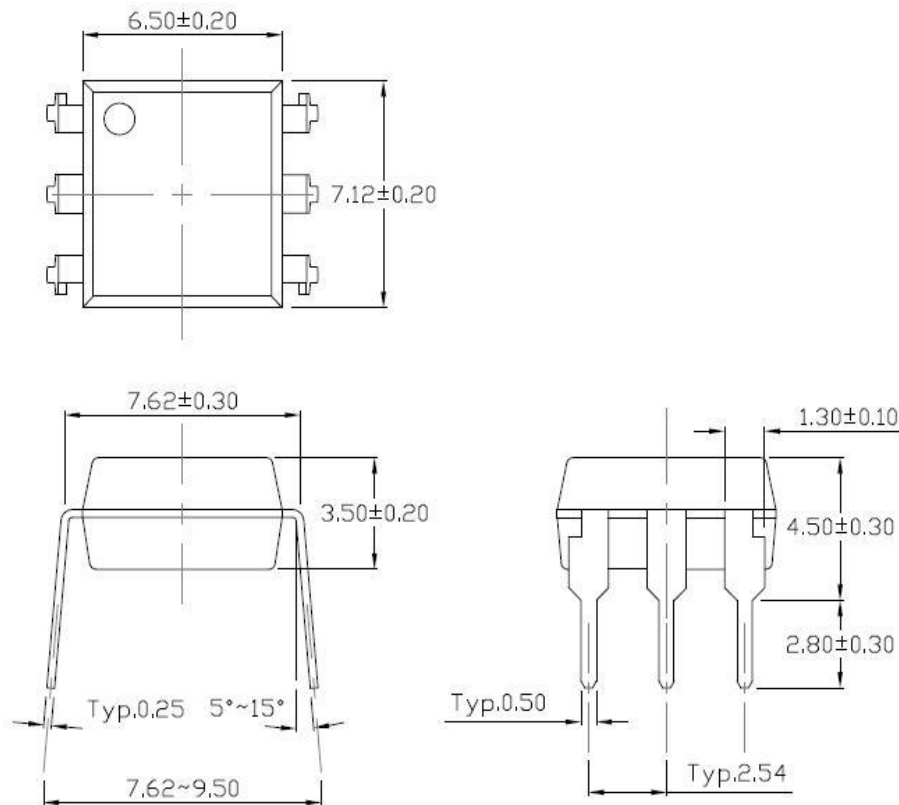


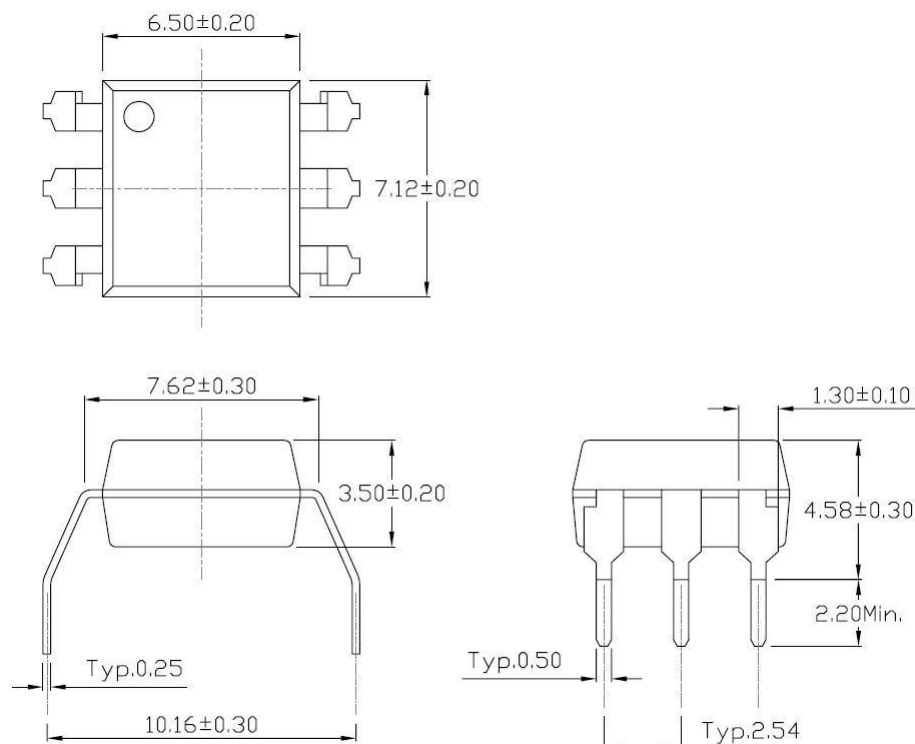
Fig.16 Waveforms of dV/dt

PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Standard DIP-Through Hole(DIP Type)

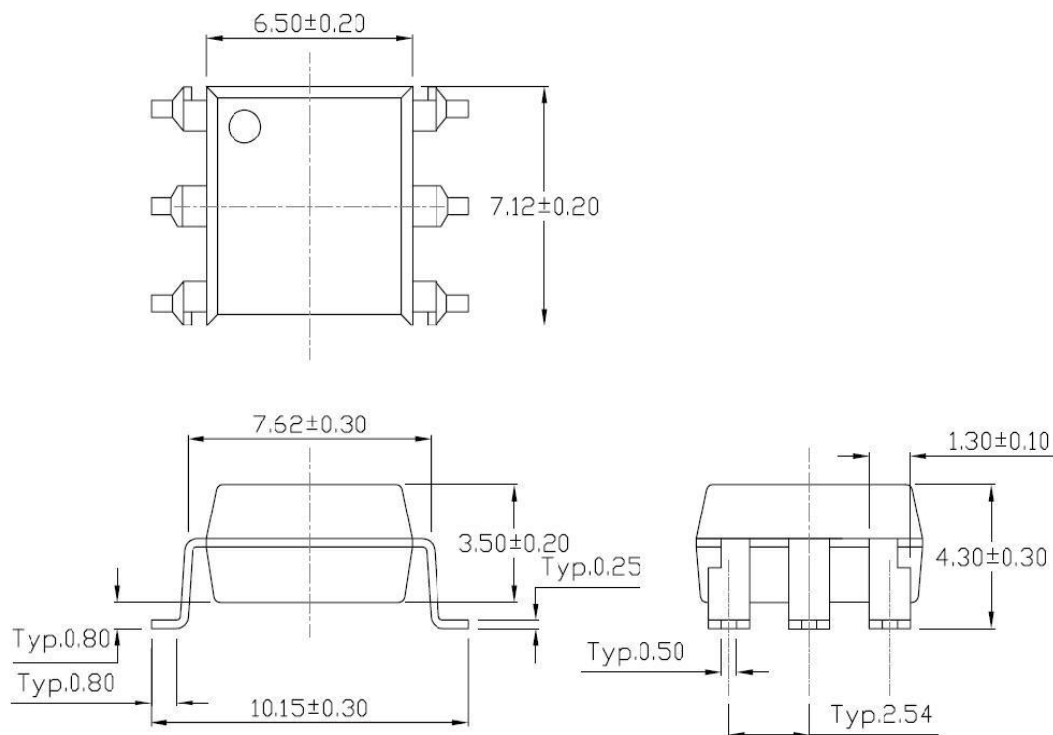


Gullwing(400mil) Lead Forming-Through Hole(M Type)

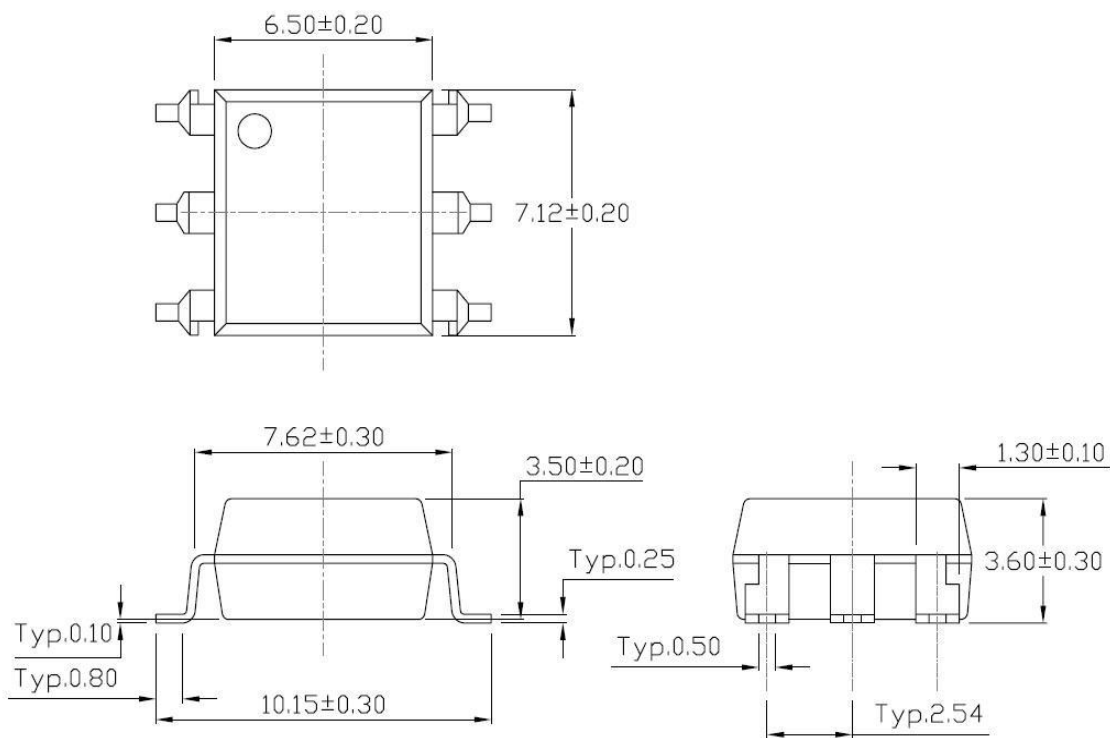


PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Surface Mount Lead Forming(S Type)

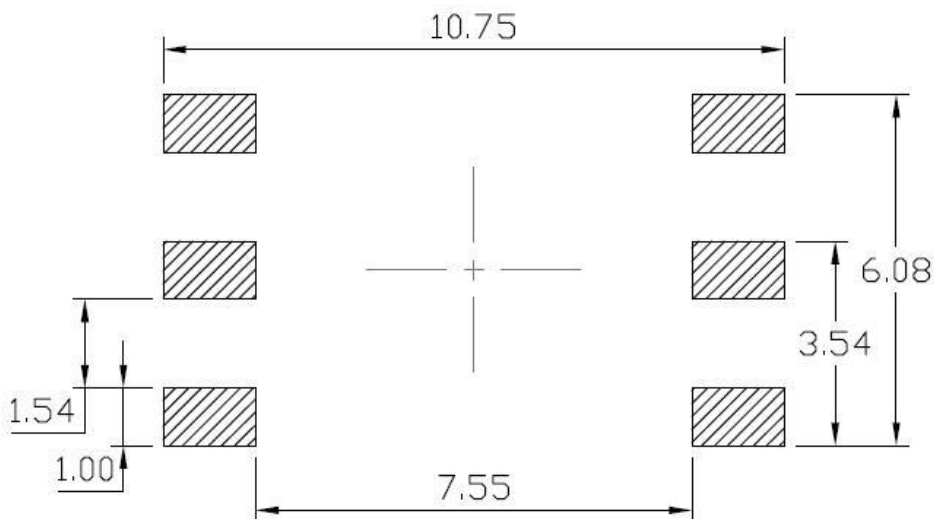


Surface Mount(Low Profile) Lead Forming(SL Type)

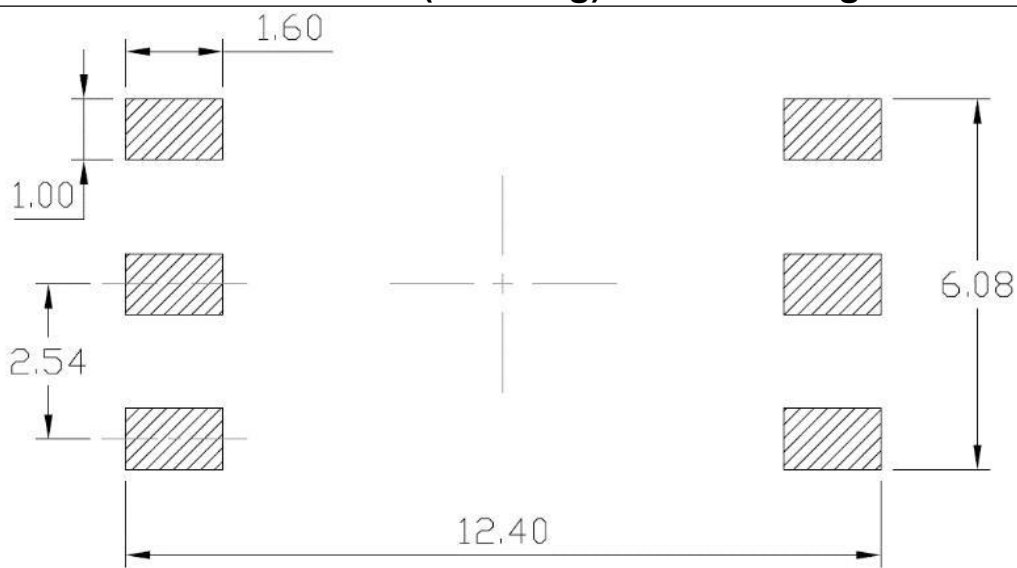


RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

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

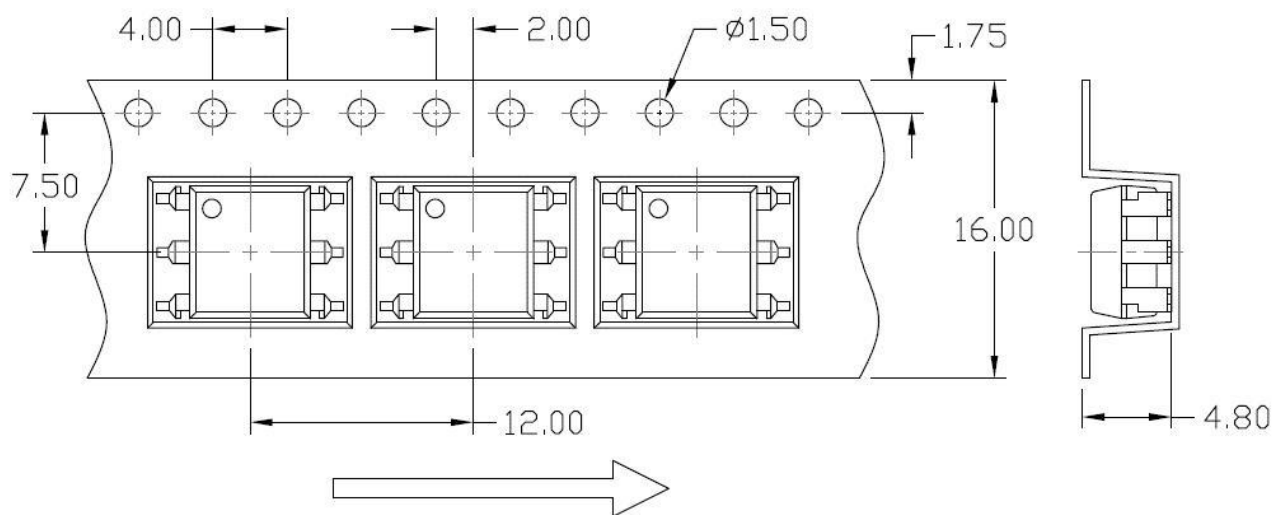


Surface Mount(Gullwing) Lead Forming

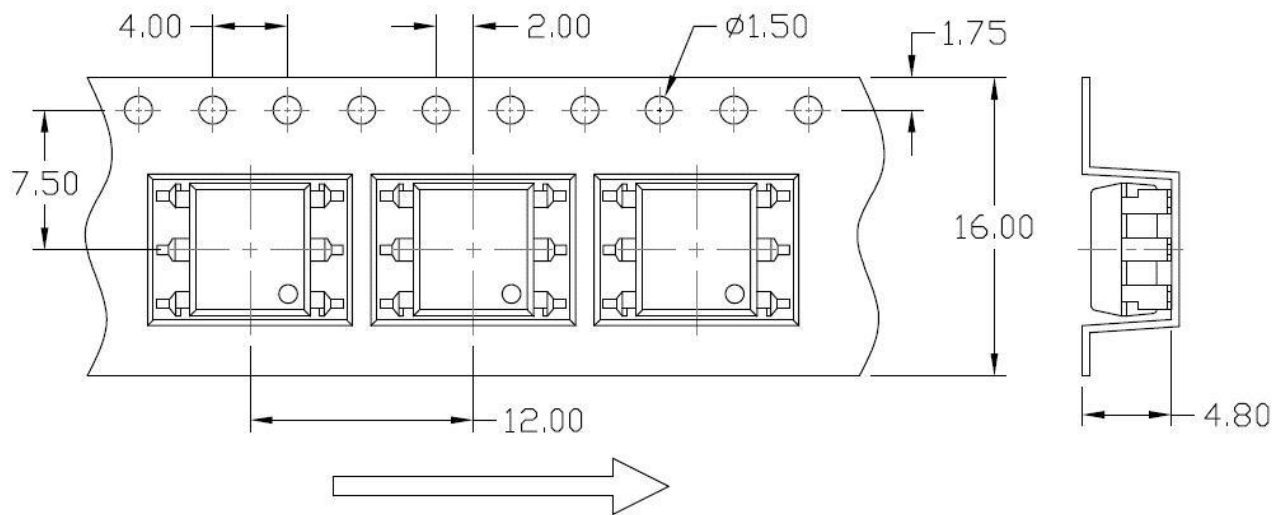


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S(T1) & SL(T1)

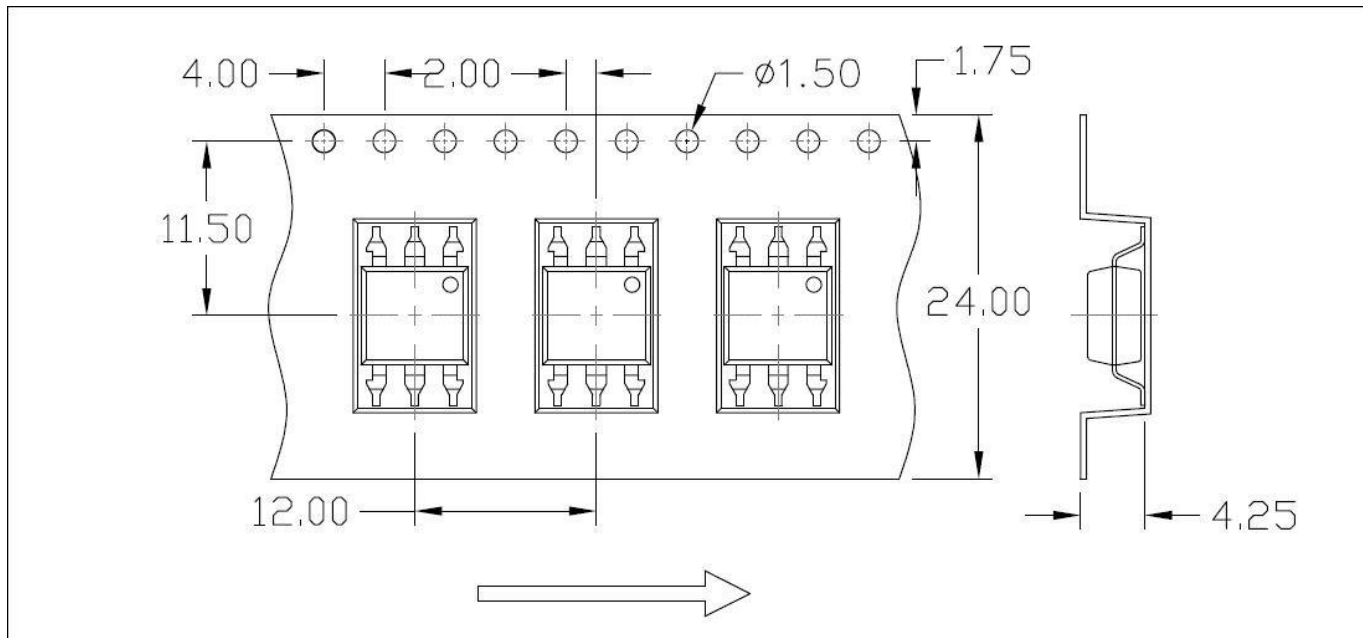


Option S(T2) & SL(T2)

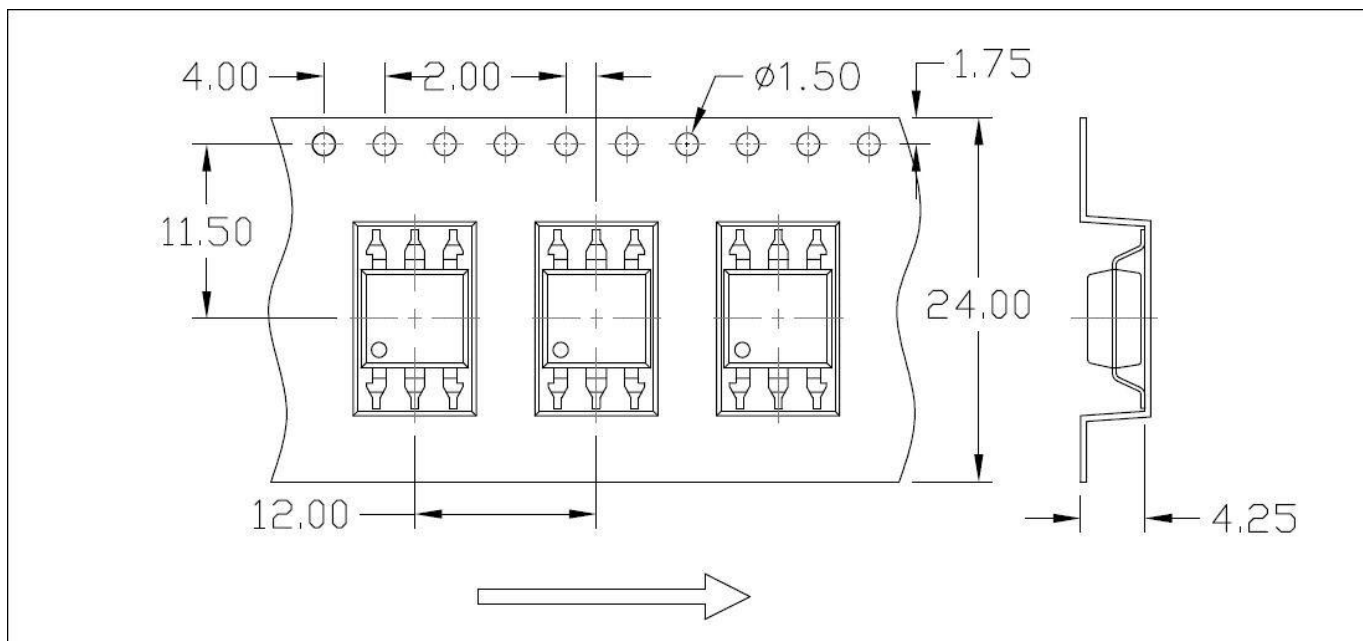


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option SLM(T1)

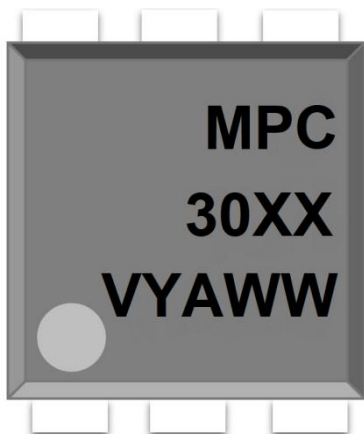


Option SLM(T2)



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 (10/11/12/21/22/23/51/52/53)

Y – Lead Form Option (M/S/SL/None)

Z – Tape and Reel Option (T1/T2)

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

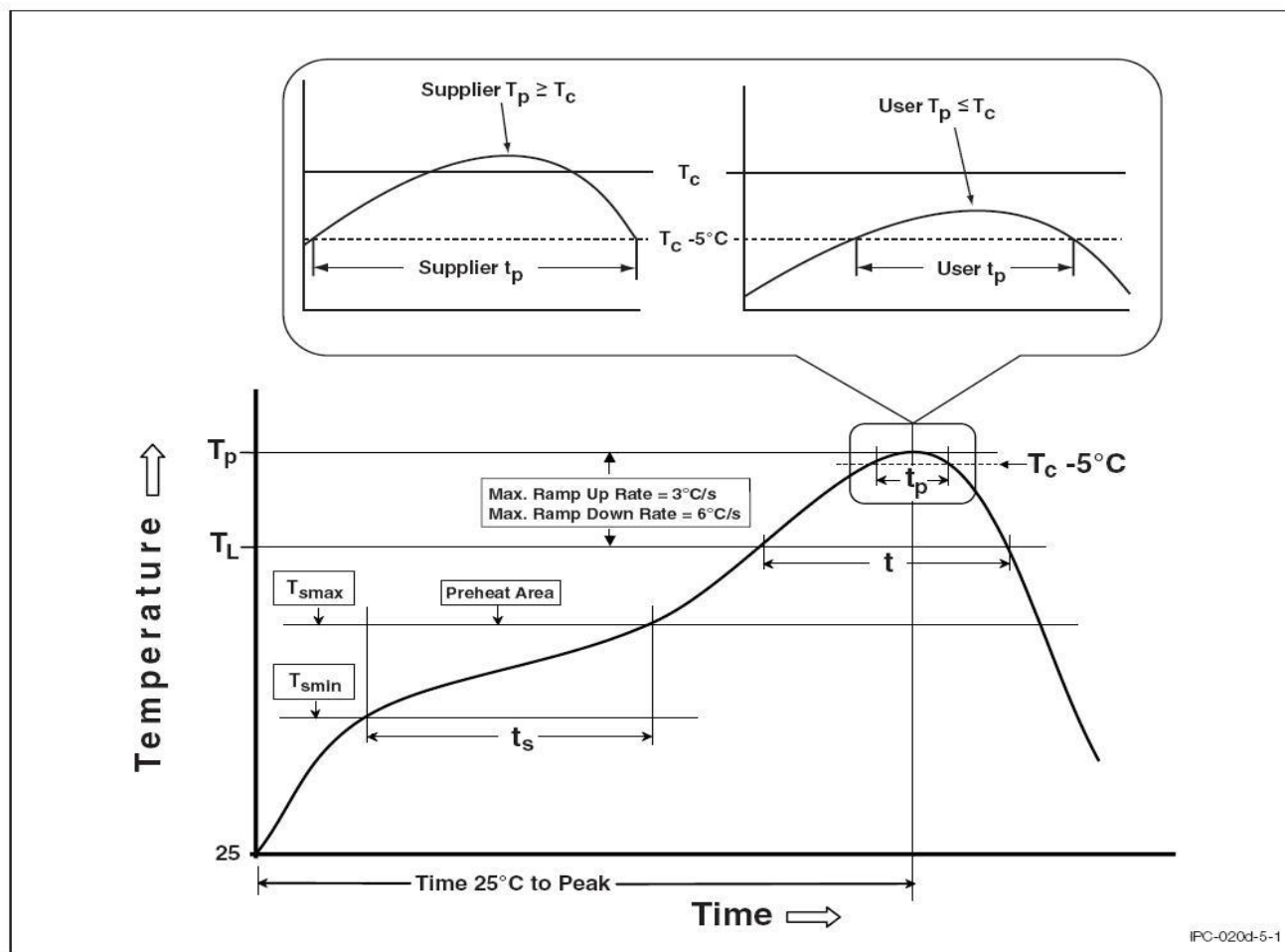
V – VDE Option (V or None)

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



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 (TL)	183°C	217°C
Time (t _L) 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 (t _P) 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.



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