



MPC303X-4L, MPC304X-4L, MPC306X-4L, MPC308X-4L Series

DIP4, 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 100 °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

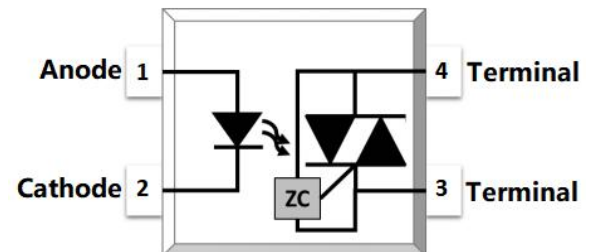
■ Description

The MPC303X-4L, MPC304X-4L and MPC306X-4L, MPC308X-4L 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 DIP4 package with different lead forming options.

With the robust coplanar double mold structure,

MPC303X-4L, MPC304X-4L and MPC306X-4L, MPC308X-4L series provide the most stable isolation feature.

■ Schematic





**MPC303X-4L, MPC304X-4L,
MPC306X-4L, MPC308X-4L Series**
DIP4, DC Input, Zero-Corss Photo TRIAC Optocoupler

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-4L	250	V	
	MPC304X-4L	400		
	MPC306X-4L	600		
	MPC308X-4L	800		
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	Vrms	1
Operating Temperature	T_{opr}	-40~100	°C	
Storage Temperature	T_{stg}	-55~150	°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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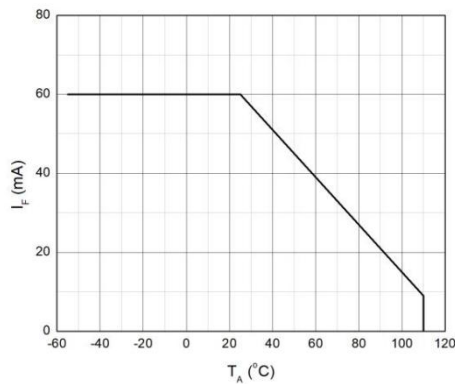
ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C

PARAMETER		SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
INPUT								
Forward Voltage		V_F	-	1.24	1.4	V	$I_F=10\text{mA}$	
Reverse Current		I_R	-	-	10	μA	$V_R=6\text{V}$	
Input Capacitance		C_{in}	-	8.5	250	pF	$V=0, f=1\text{kHz}$	
OUTPUT								
Peak Off-state Current, Either Direction		I_{DRM}	-	-	100	nA	$V_{DRM}=\text{Rated } V_{DRM}$ $I_F=0$	3
Peak On-state Current, Either Direction		V_{TM}	-	1.59	2.5	V	$I_{TM}=100\text{mA}$	
Critical Rate of Rise of Off-state Voltage Breakdown Voltage		dV/dt	1000	-	-	V	$V_{PEAK}=\text{Rated } V_{DRM}$	4
TRANSFER CHARACTERISTICS								
LED Trigger Current	MPC3031-4L, MPC3041-4L, MPC3061-4L, MPC3081-4L	I_{FT}	-	-	15	mA	Terminal Voltage = 3V $I_{TM}=100\text{mA}$	
	MPC3032-4L, MPC3042-4L, MPC3062-4L, MPC3082-4L		-	-	10			
	MPC3032-4L, MPC3043-4L, MPC3063-4L, MPC3083-4L		-	-	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	1	pF	$V=0, f=1\text{MHz}$	
ZERO-CROSS CHARACTERISTICS								
Inhibit Voltage		V_{INH}	-	-	20	V	$I_F=\text{Rated } I_{FT}$	
Leakage in Inhibited State		I_{DRM2}	-	-	500	μA	$I_F=\text{Rated } I_{FT}$ $V_{DRM}=\text{Rated } V_{DRM}$	

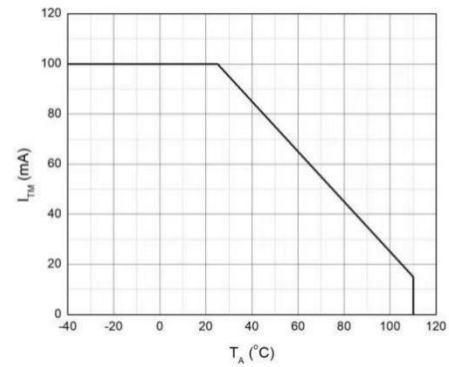
Note3. Test voltage must be applied within dV/dt rating.

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

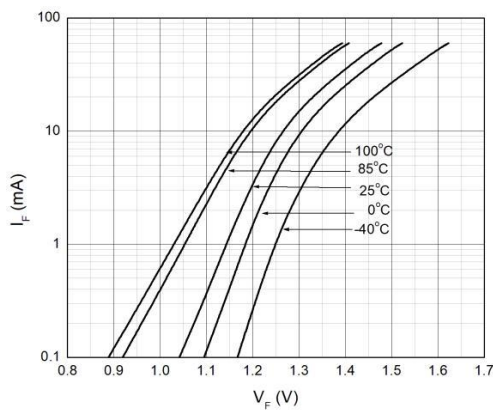
CHARACTERISTIC CURVES



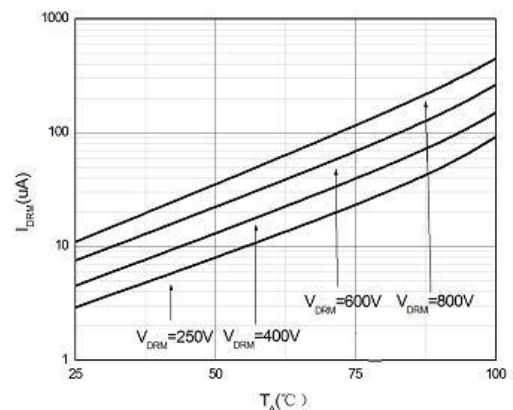
**Fig.1 Forward Current
vs. Ambient Temperature**



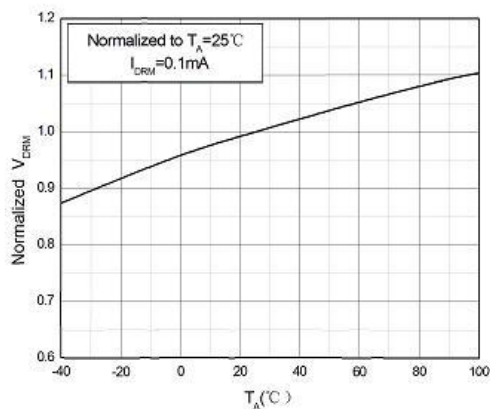
**Fig.2 On-state Terminal Current
vs. Ambient Temperature**



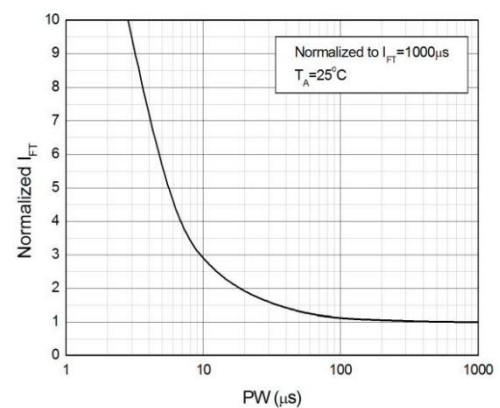
**Fig.3 Forward Current
vs. Forward Voltage**



**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

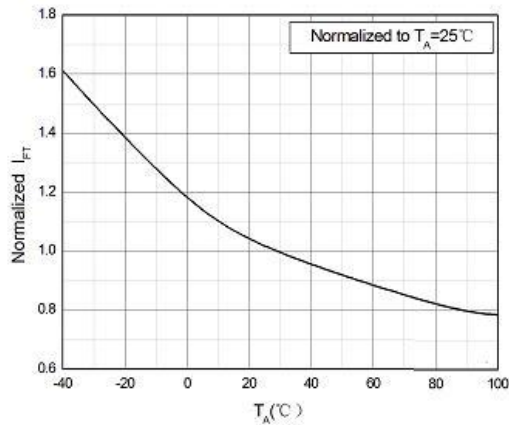


Fig.7 Normalized Trigger Current vs. Ambient Temperature

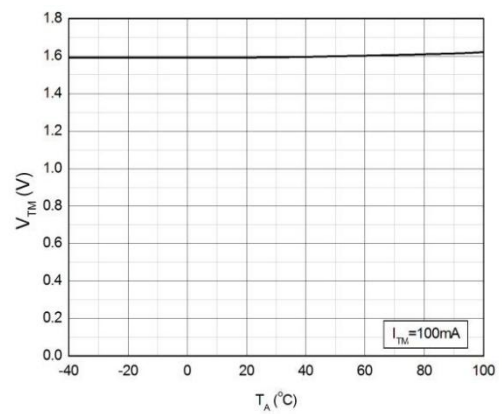


Fig.8 On-state Terminal Voltage vs. Ambient Temperature

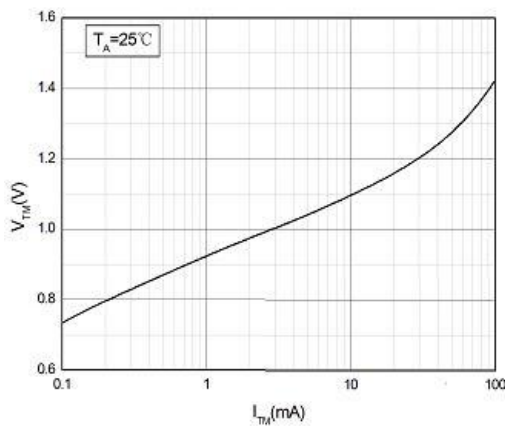


Fig.9 On-state Terminal Voltage vs. On-state Terminal Current

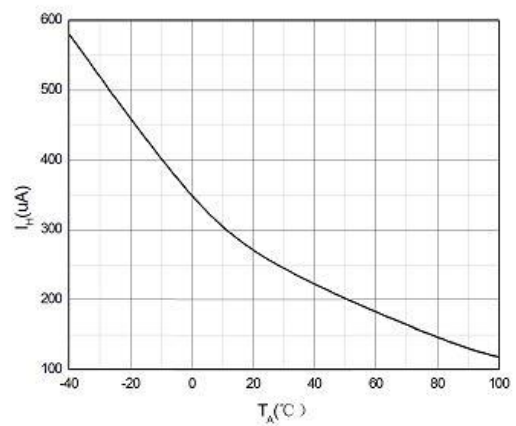


Fig.10 Holding Current vs. Ambient Temperature

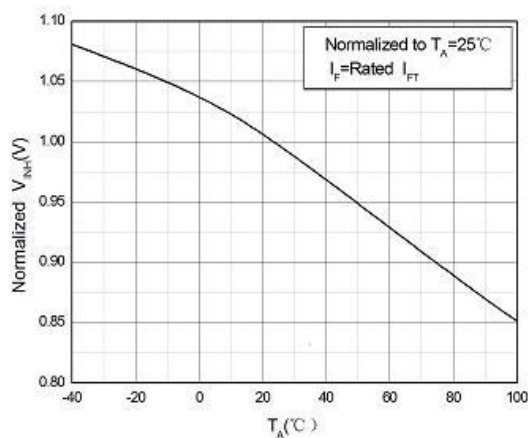


Fig.11 Normalized Inhibit Voltage vs. Ambient Temperature

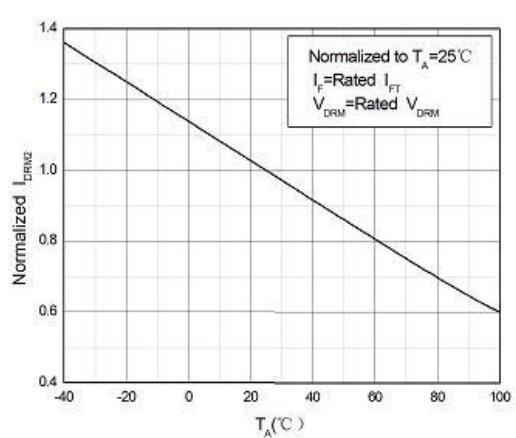
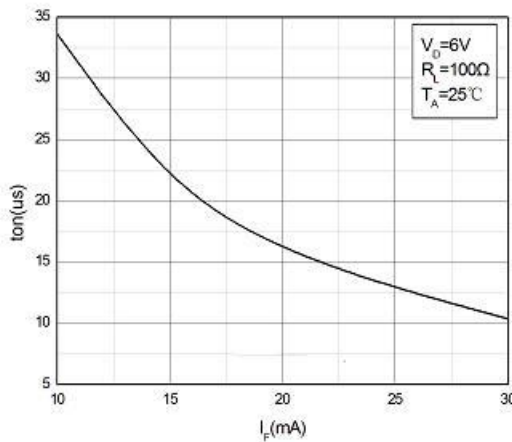
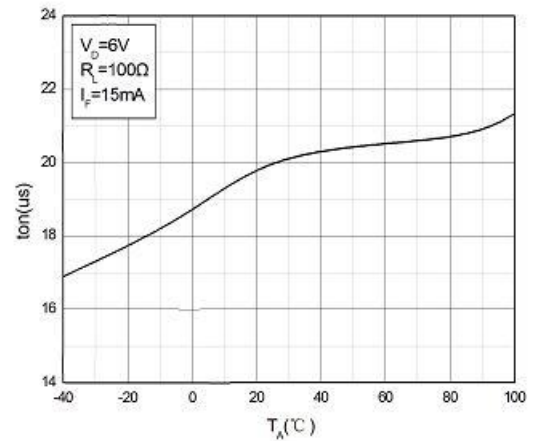


Fig.12 Normalized Leakage in Inhibit State vs. Ambient Temperature

CHARACTERISTIC CURVES



**Fig.13 Turn On Time
vs. Forward Current**



**Fig.14 Turn On Time
vs. Ambient Temperature**

TEST CIRCUITS

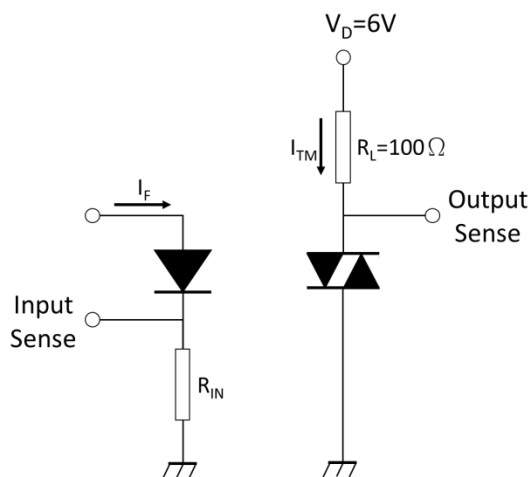


Fig.15 Test Circuits of Turn On Time

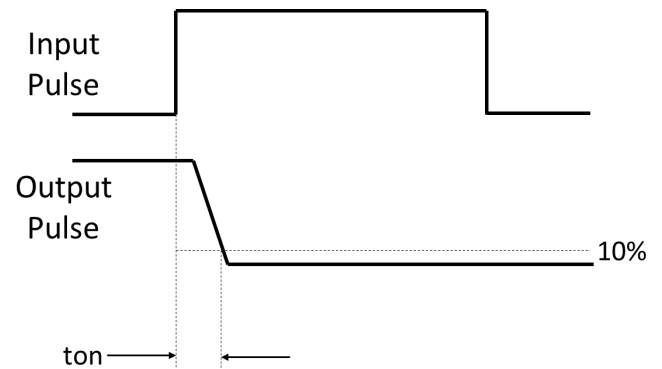


Fig.16 Waveforms of Turn On Time

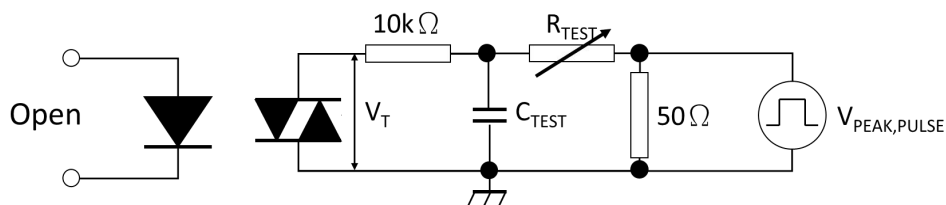


Fig.17 Test Circuits of dv/dt

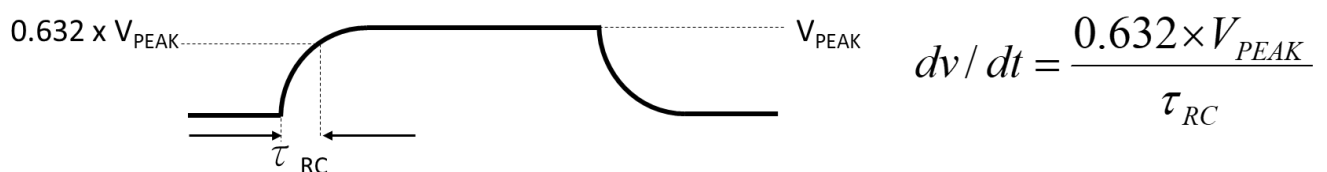
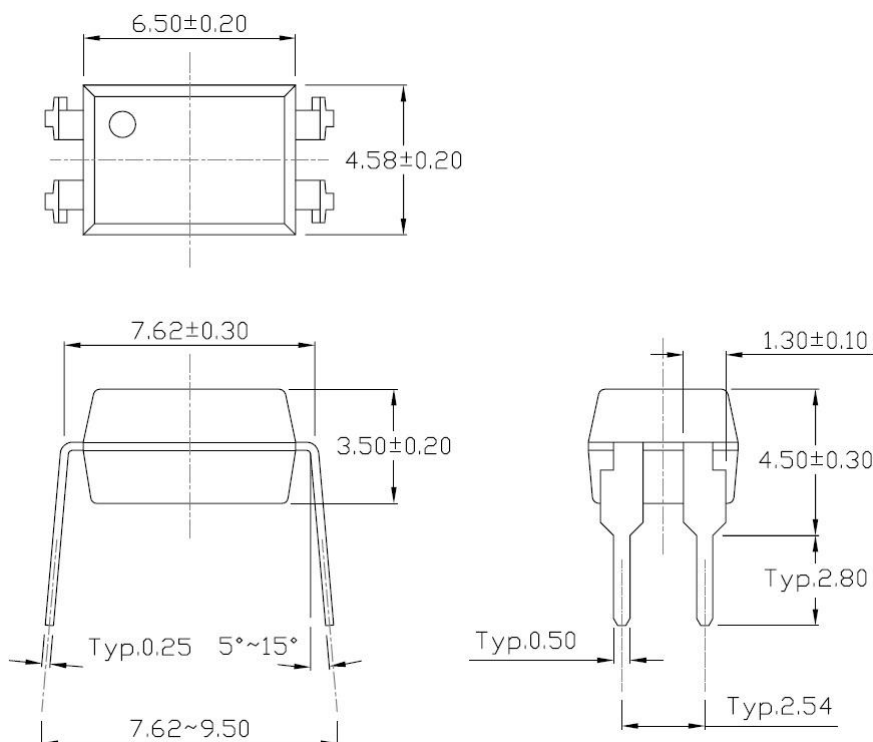


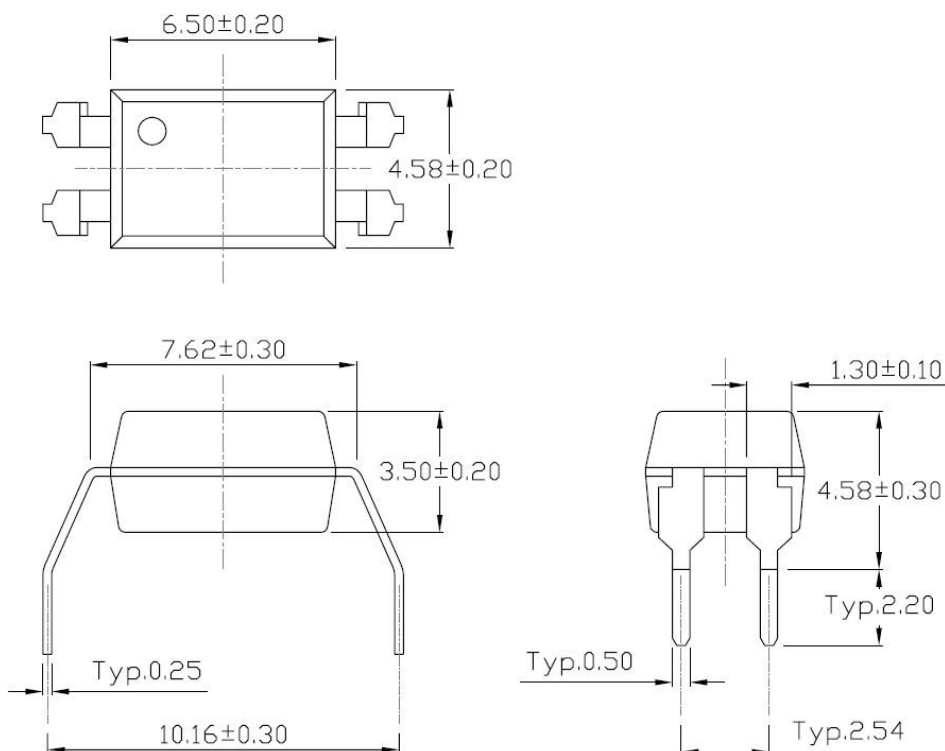
Fig.18 Waveforms of dv/dt

PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Standard DIP – Through Hole (DIP Type)

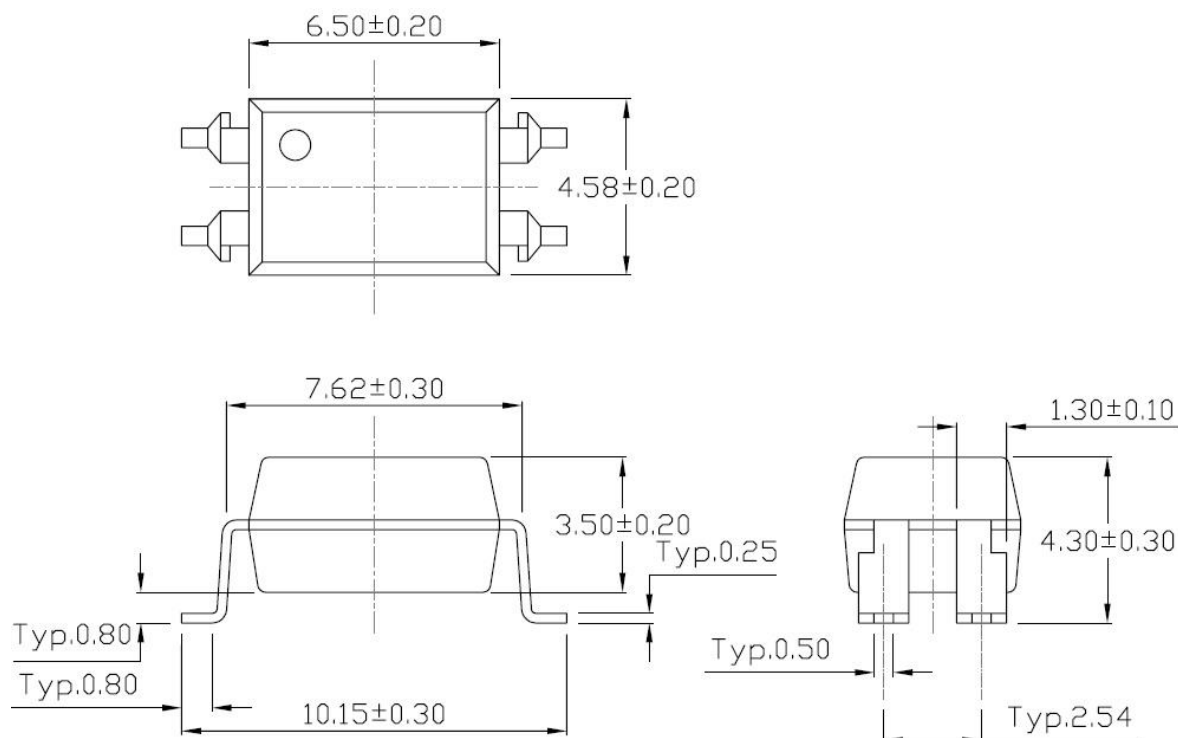


Gullwing (400mil) Lead Forming – Through Hole (M Type)

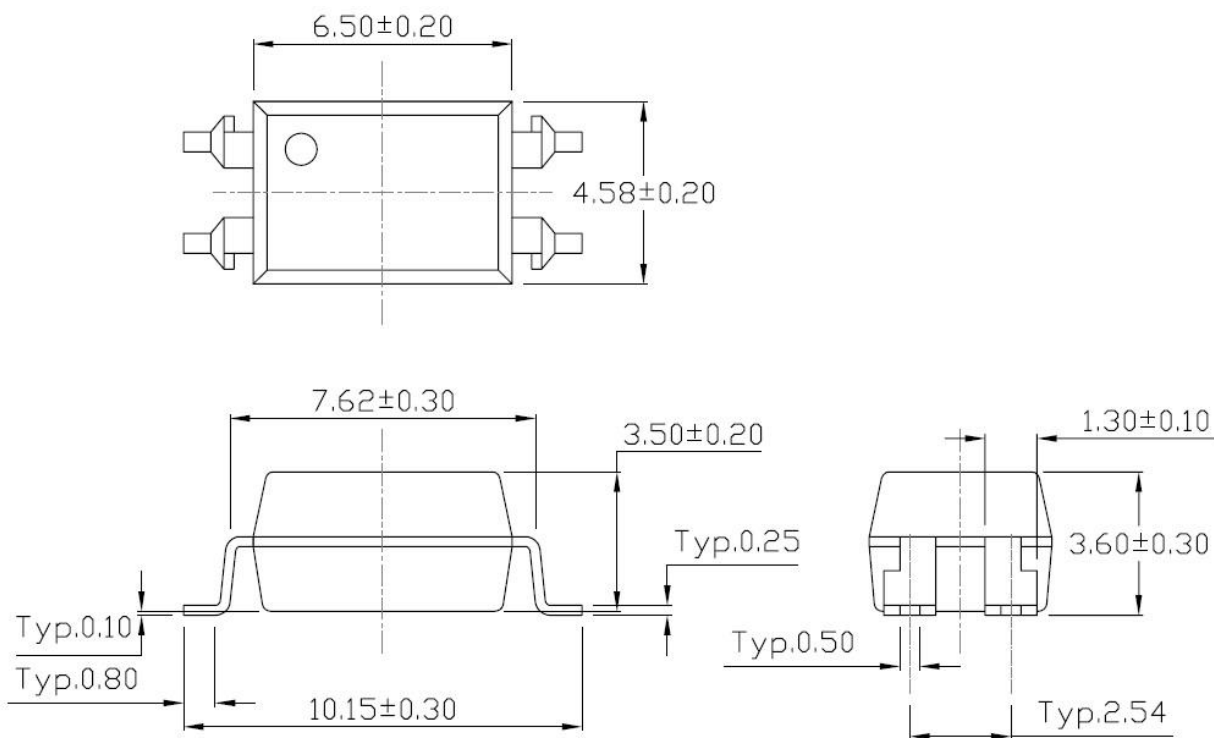


PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Surface Mount Lead Forming (S Type)

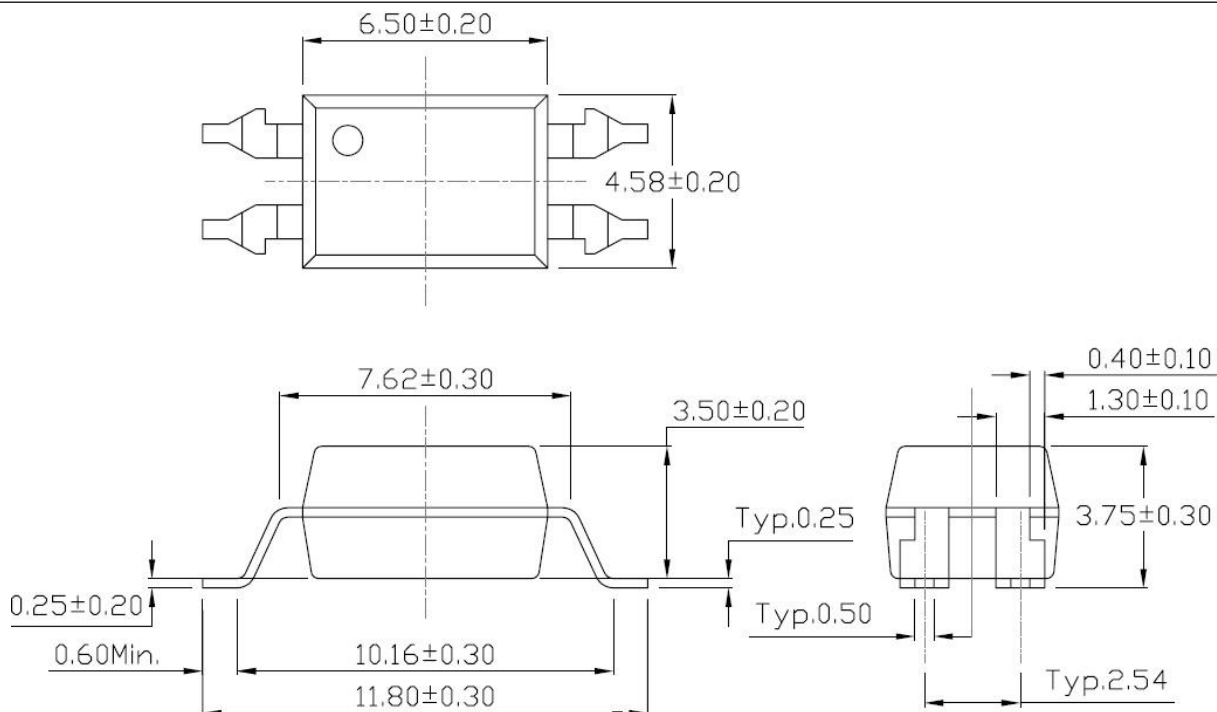


Surface Mount (Low Profile) Lead Forming (SL Type)



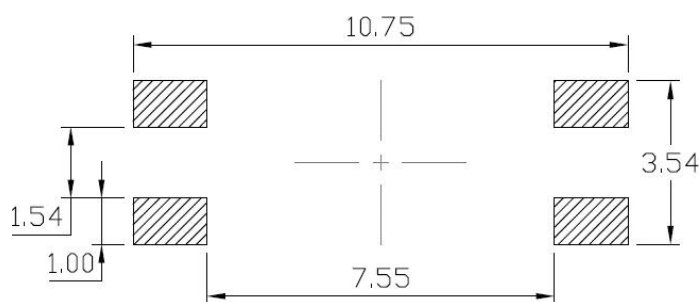
PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Surface Mount (Gullwing) Lead Forming (SLM Type)

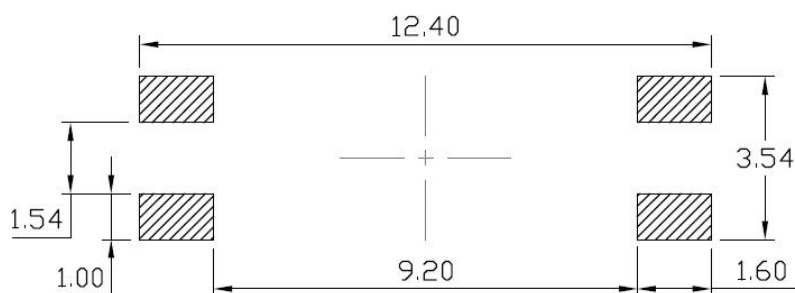


RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

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

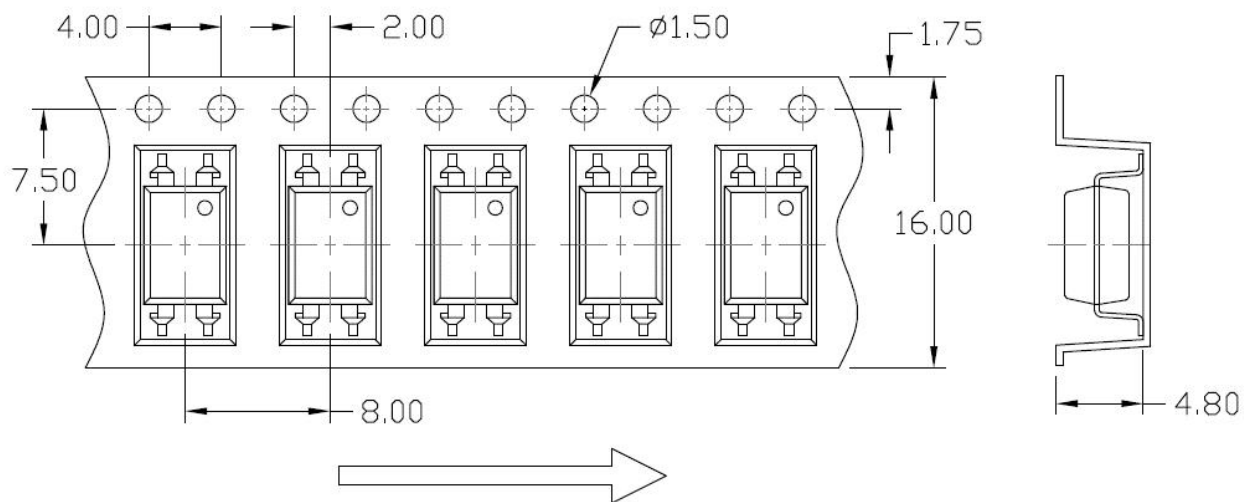


Surface Mount (Gullwing) Lead Forming

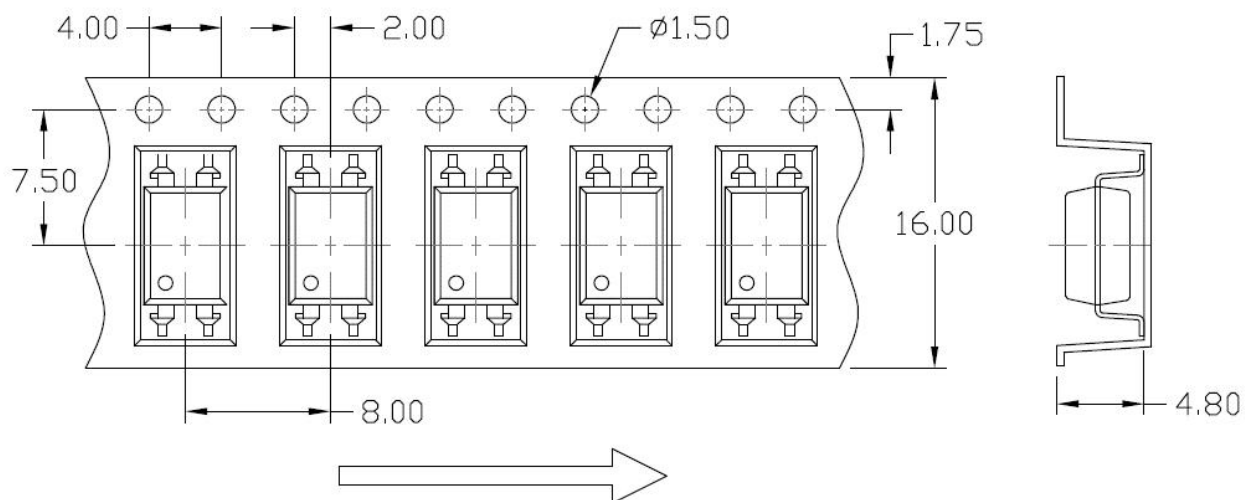


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S(T1) & SL(T1)

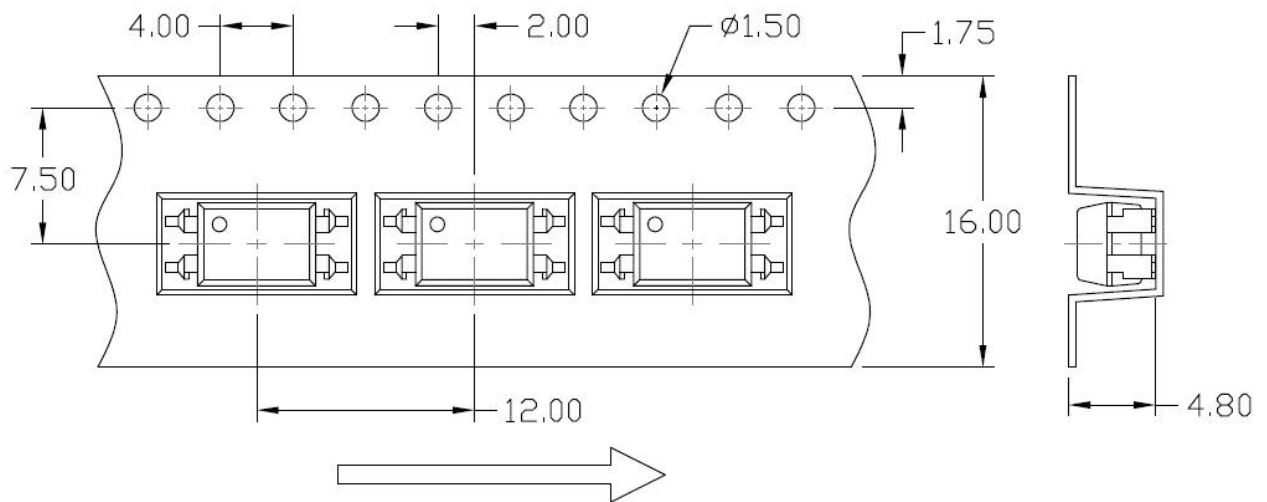


Option S(T2) & SL(T2)

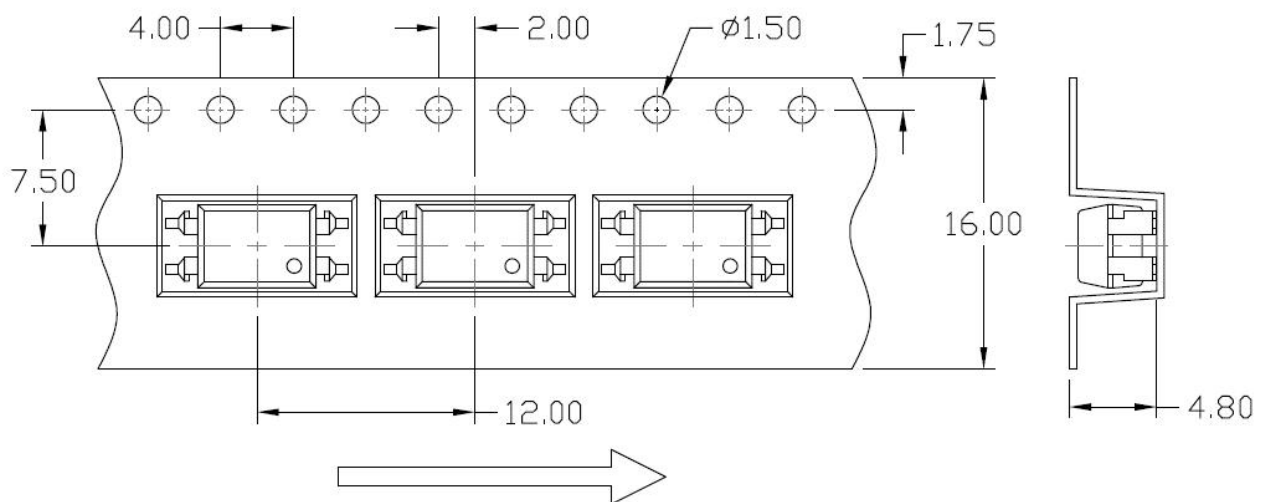


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S(T3) & SL(T3)

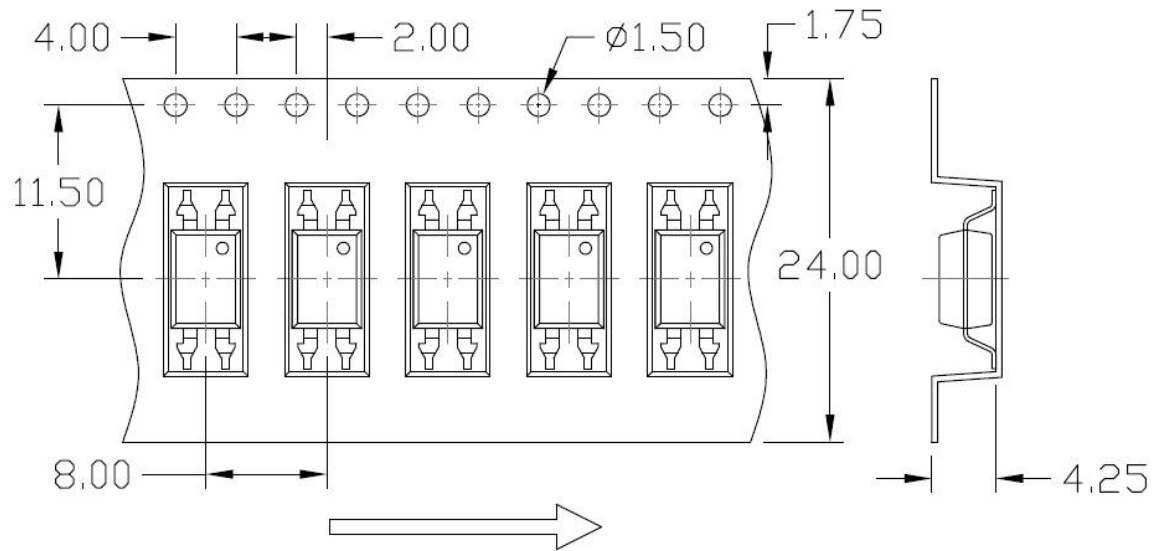


Option S(T4) & SL(T4)

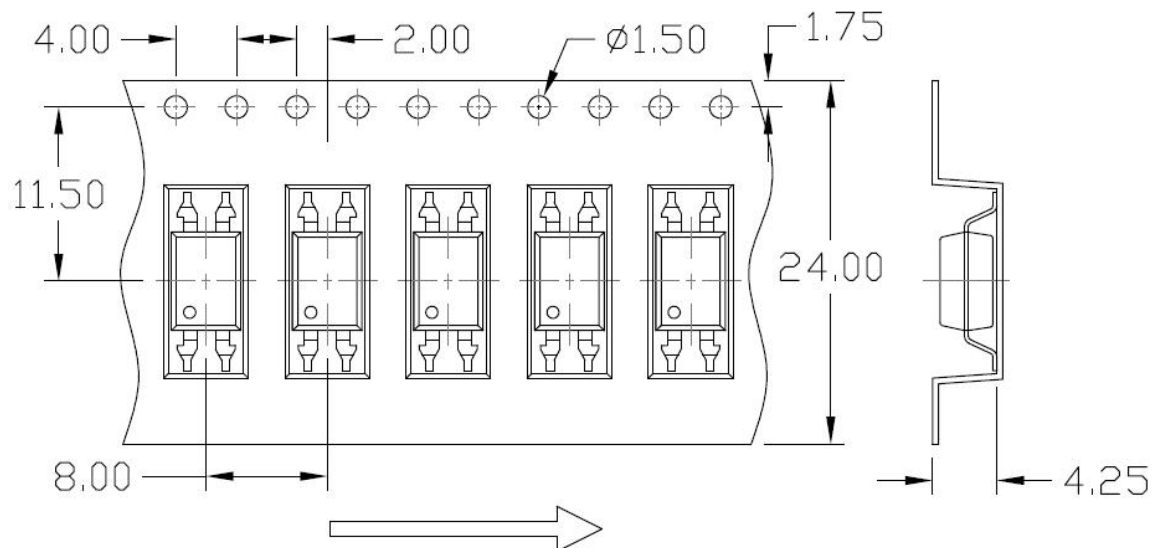


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option SLM(T1)



Option SLM(T2)

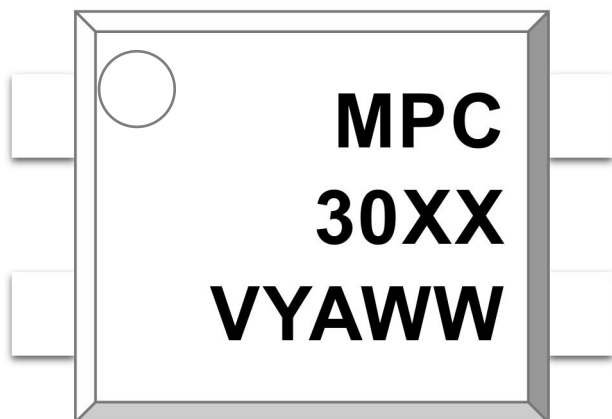




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ORDERING AND MARKING INFORMATION

MARKING INFORMATION



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

ORDERING INFORMATION

MPC30XX-4L(Y)(Z)-GV

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

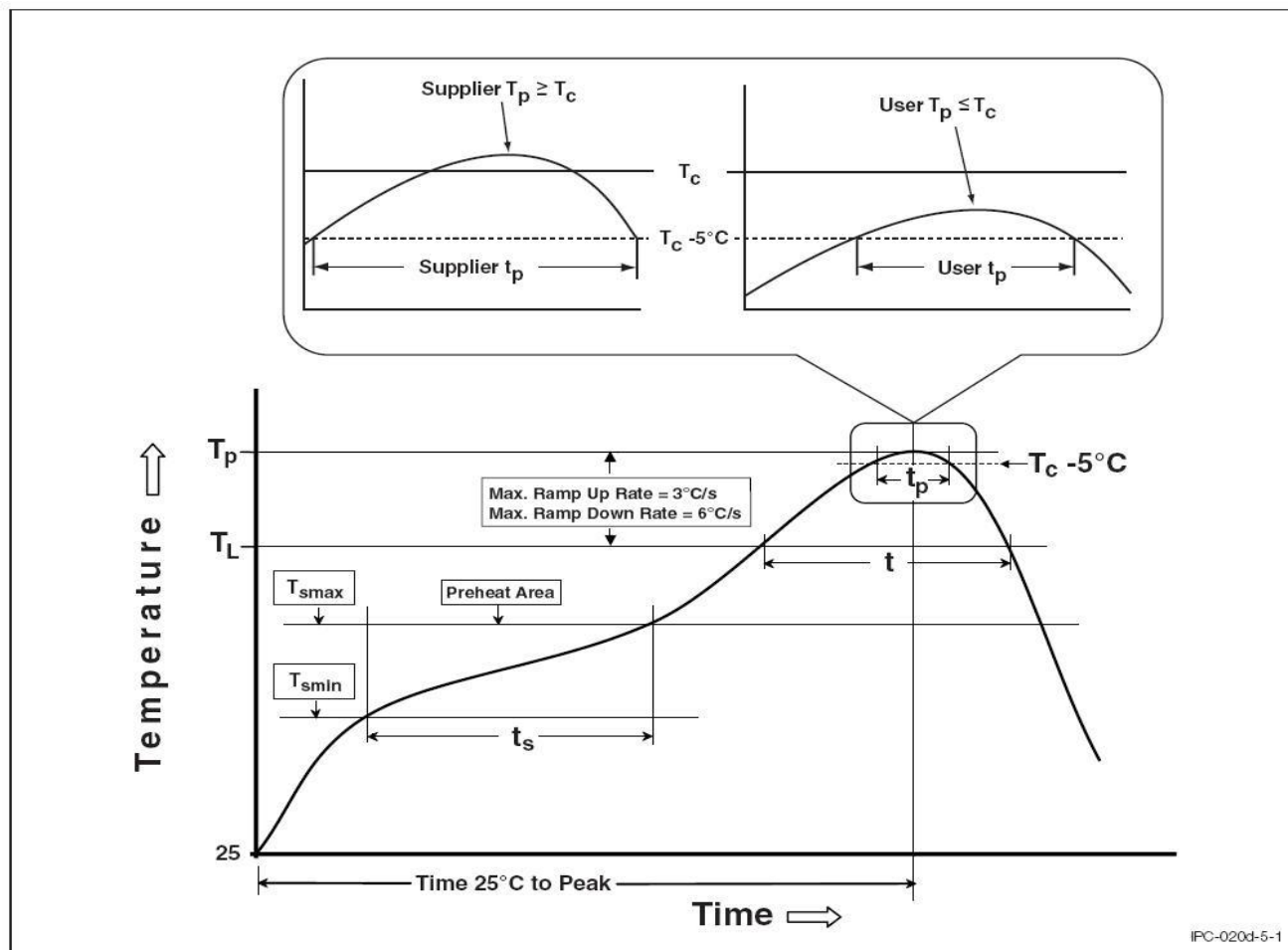
Y – Lead Form Option (M/S/SL/SLM/None)
Z – Tape and Reel Option (T1/T2/T3/T4)
G – Green
V – VDE Option (V or None)

PACKING QUANTITY

Option	Description	Quantity
None	Standard 4 Pin Dip	100 Units/Tube
M	Gullwing (400mil) Lead Forming	100 Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1500 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1500 Units/Reel
S(T3)	Surface Mount Lead Forming – With Option 3 Taping	1000 Units/Reel
S(T4)	Surface Mount Lead Forming – With Option 4 Taping	1000Units/Reel
SL(T1)	Surface Mount (Low Profile) Lead Forming– With Option 1 Taping	1500 Units/Reel
SL(T2)	Surface Mount (Low Profile) Lead Forming – With Option 2 Taping	1500 Units/Reel
SL(T3)	Surface Mount (Low Profile) Lead Forming– With Option 3 Taping	1000 Units/Reel
SL(T4)	Surface Mount (Low Profile) Lead Forming – With Option 4 Taping	1000 Units/Reel
SLM(T1)	Surface Mount (Gullwing) Lead Forming– With Option 1 Taping	1500 Units/Reel
SLM(T2)	Surface Mount (Gullwing) Lead Forming – With Option 2 Taping	1500 Units/Reel

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 (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	2018-12-21	Datasheet Complete
1.1	2023-07-05	Upgrade Datasheet