



MPC816 Series

DIP4, DC Input Photo Transistor Coupler

■ Features

- High isolation 5000 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- REACH compliance
- Halogen free
- MSL class 1
- Regulatory Approvals
 - UL - UL1577
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC – GB4943.1-2022

■ Applications

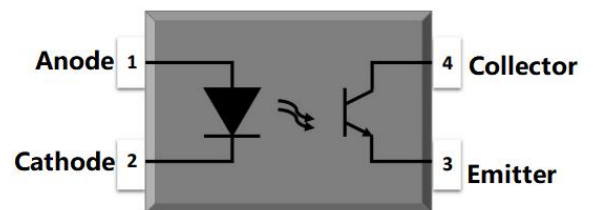
- Switch mode power supplies
- Programmable controllers
- Office equipment
- System appliances, measuring instruments
- Telecommunication equipments
- Home appliances, such as fan heaters, etc.

■ Description

The MPC816 series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic DIP4 package with different lead forming options.

With the robust coplanar double mold structure, MPC816 series provide the most stable isolation feature.

■ Schematic





MPC816 Series

DIP4, DC Input Photo Transistor Coupler

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT	NOTE
INPUT				
Forward Current	I_F	60	mA	
Peak Forward Current	I_{FP}	1	A	1
Reverse Voltage	V_R	6	V	
Input Power Dissipation	P_I	100	mW	
OUTPUT				
Collector - Emitter Voltage	V_{CEO}	80	V	
Emitter - Collector Voltage	V_{ECO}	6	V	
Collector Current	I_C	50	mA	
Output Power Dissipation	P_O	150	mW	
COMMON				
Total Power Dissipation	P_{tot}	200	mW	
Isolation Voltage	V_{iso}	5000	V _{rms}	2
Operating Temperature	T_{opr}	-55~110	°C	
Storage Temperature	T_{stg}	-55~150	°C	
Soldering Temperature	T_{sol}	260	°C	

Note 1. 100μs pulse, 100Hz frequency

Note 2. AC For 1 Minute, R.H. = 40 ~ 60%



MPC816 Series

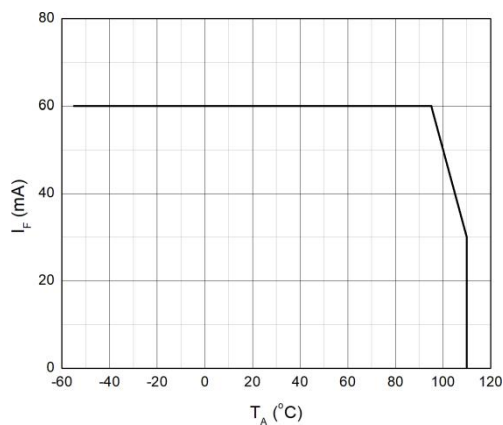
DIP4, DC Input Photo Transistor Coupler

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	$I_F=10\text{mA}$	
Reverse Current	I_R	-	-	10	μA	$V_R=6\text{V}$	
Input Capacitance	C_{in}	-	10	-	pF	$V=0, f=1\text{kHz}$	
OUTPUT							
Collector Dark Current	I_{CEO}	-	-	100	nA	$V_{CE}=20\text{V}, I_F=0\text{mA}$	
Collector-Emitter Breakdown Voltage	BV_{CEO}	80	-	-	V	$I_C=0.1\text{mA}, I_F=0\text{mA}$	
Emitter-Collector Breakdown Voltage	BV_{ECO}	6	-	-	V	$I_E=0.1\text{mA}, I_F=0\text{mA}$	
TRANSFER CHARACTERISTICS							
Current Transfer Ratio	MPC816	CTR	50	-	600	$I_F=5\text{mA}, V_{CE}=5\text{V}$	
	MPC816A		80	-	160		
	MPC816B		130	-	260		
	MPC816C		200	-	400		
	MPC816D		300	-	450		
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	-	0.06	0.2	V	$I_F=20\text{mA}, I_C=1\text{mA}$	
Isolation Resistance	R_{ISO}	10^{12}	10^{14}	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance	C_{IO}	-	0.4	1	pF	$V=0, f=1\text{MHz}$	
Cut-off Frequency	f_c	-	80	-	kHz	$V_{CE}=2\text{V}, I_C=2\text{mA}$ $R_L=100\Omega, -3\text{dB}$	3
Response Time (Rise)	t_r	-	3	18	μs	$V_{CE}=2\text{V}, I_C=2\text{mA}$ $R_L=100\Omega$	4
Response Time (Fall)	t_f	-	4	18	μs		4

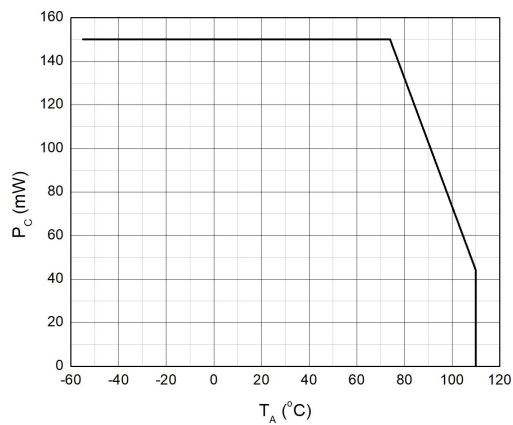
Note 3. Fig.12&13

Note 4. Fig.14

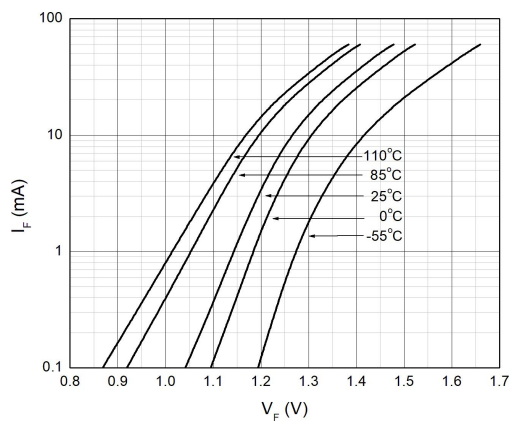
CHARACTERISTIC CURVES



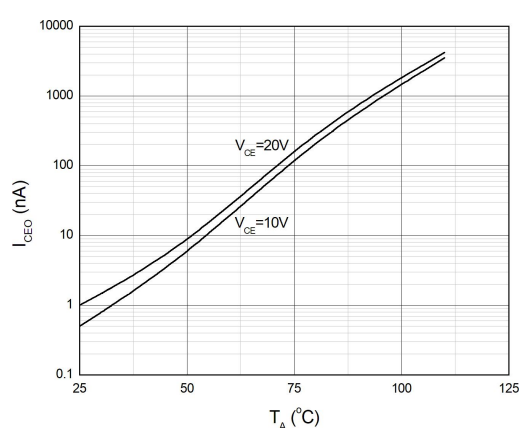
**Fig.1 Forward Current
vs. Ambient Temperature**



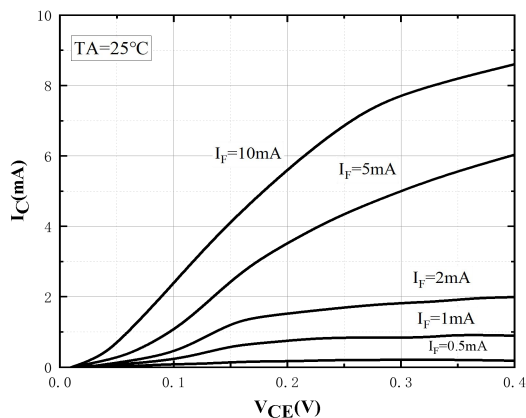
**Fig.2 Collector Power Dissipation
vs. Ambient Temperature**



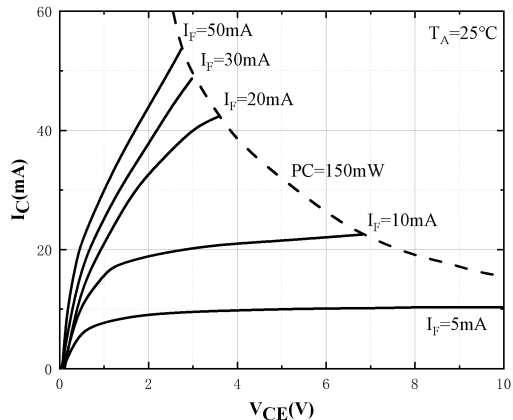
**Fig.3 Forward Current
vs. Forward Voltage**



**Fig.4 Collector Dark Current
vs. Ambient Temperature**



**Fig.5 Collector Current
vs. Collector-emitter Voltage**



**Fig.6 Collector Current
vs. Collector-emitter Voltage**

CHARACTERISTIC CURVES

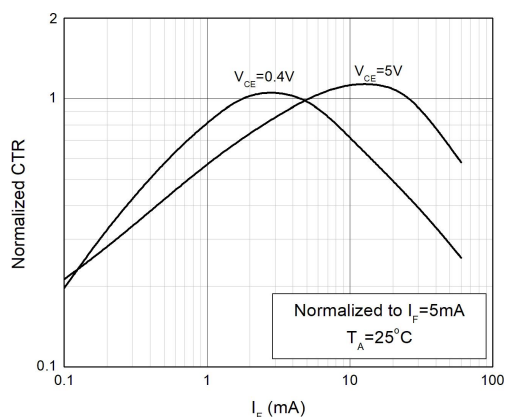


Fig.7 Normalized Current Transfer Ratio vs. Forward Current

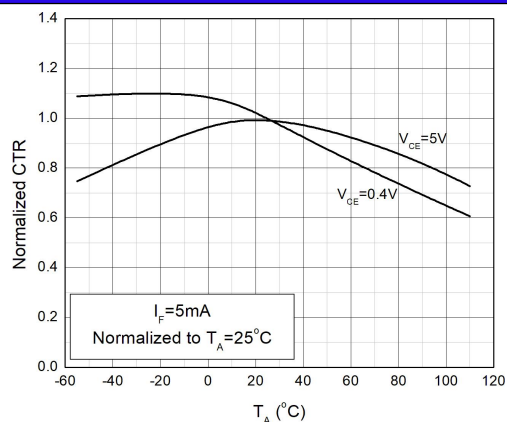


Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature

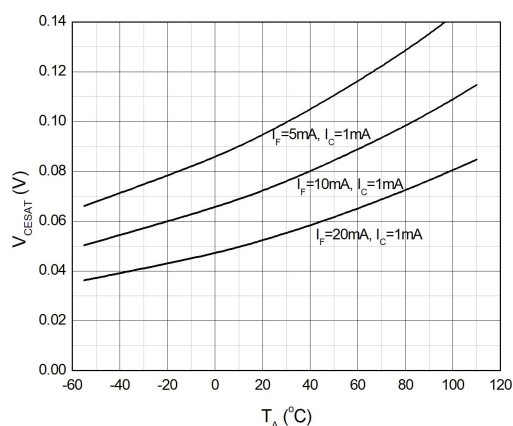


Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature

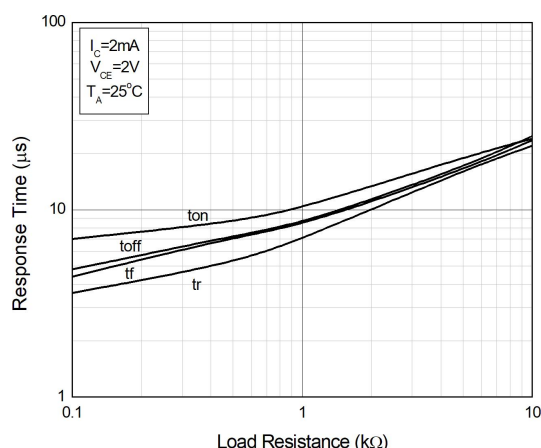


Fig.10 Switching Time vs. Load Resistance

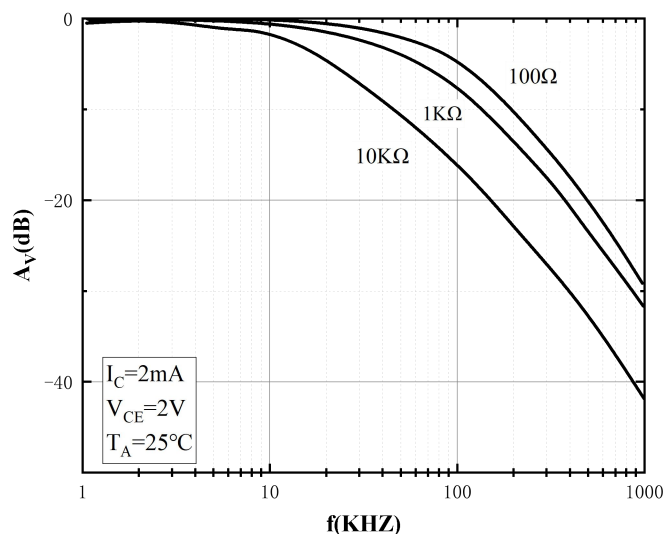


Fig.11 Frequency Response

TEST CIRCUITS

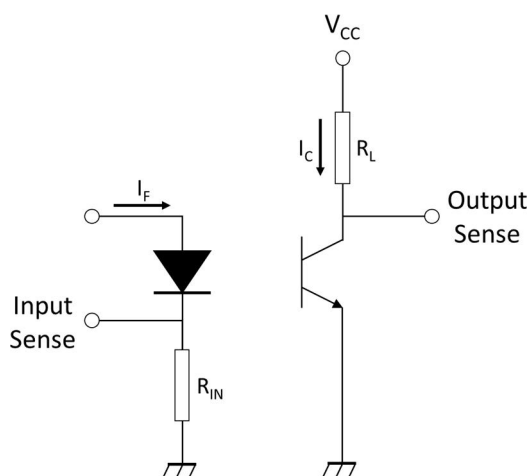


Fig.12 Test Circuits of Response Time

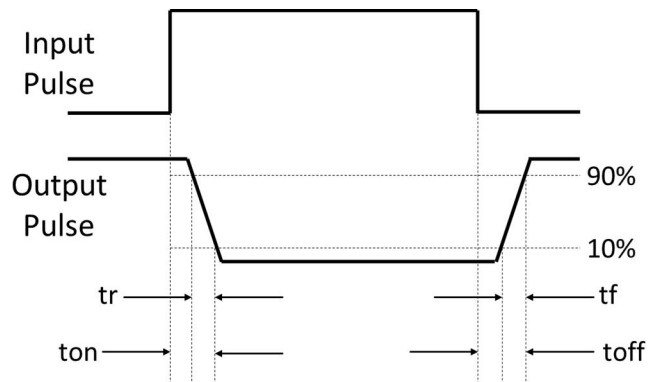


Fig.13 Curves of Response Time

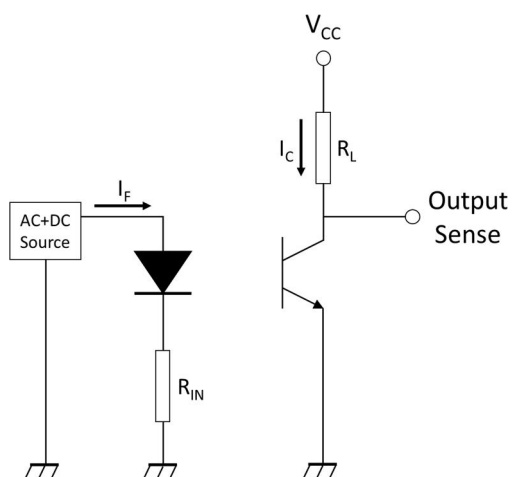
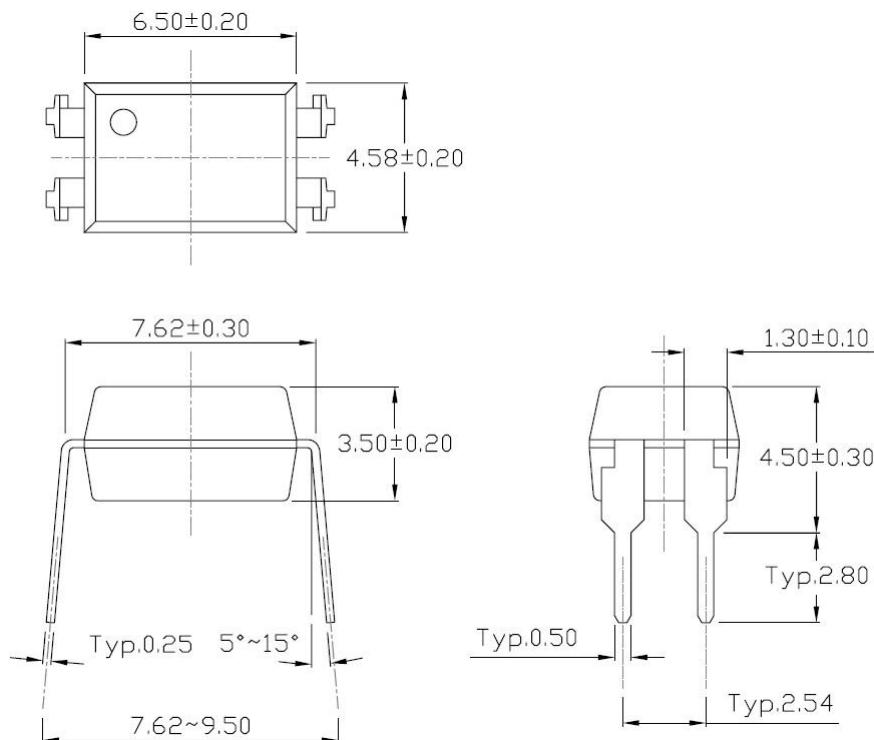


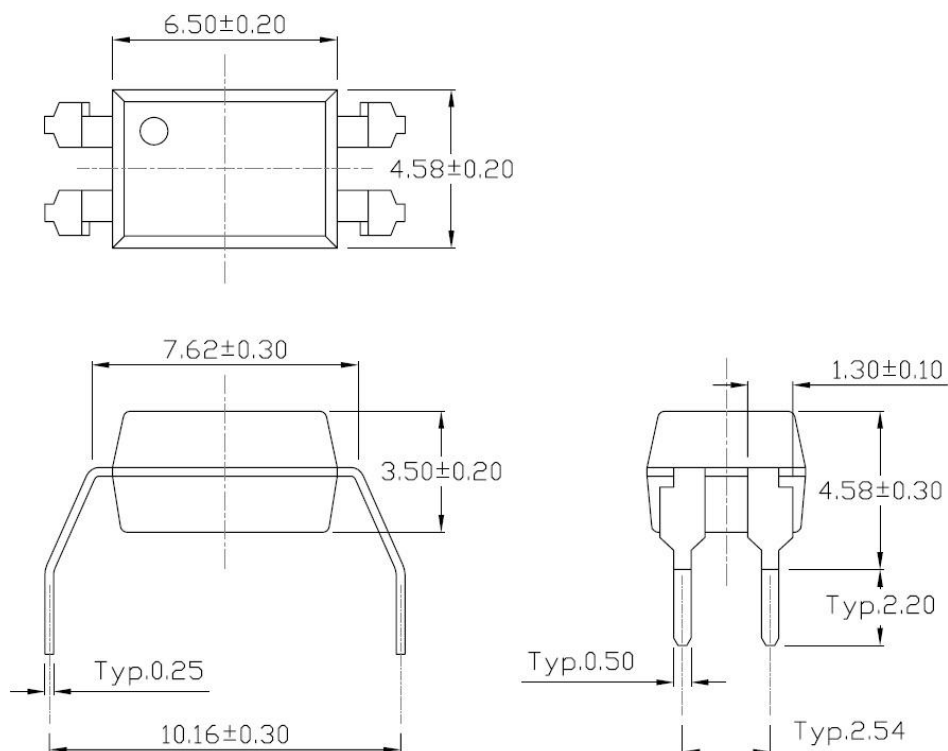
Fig.14 Test Circuits of Frequency Response

PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Standard DIP – Through Hole (DIP Type)

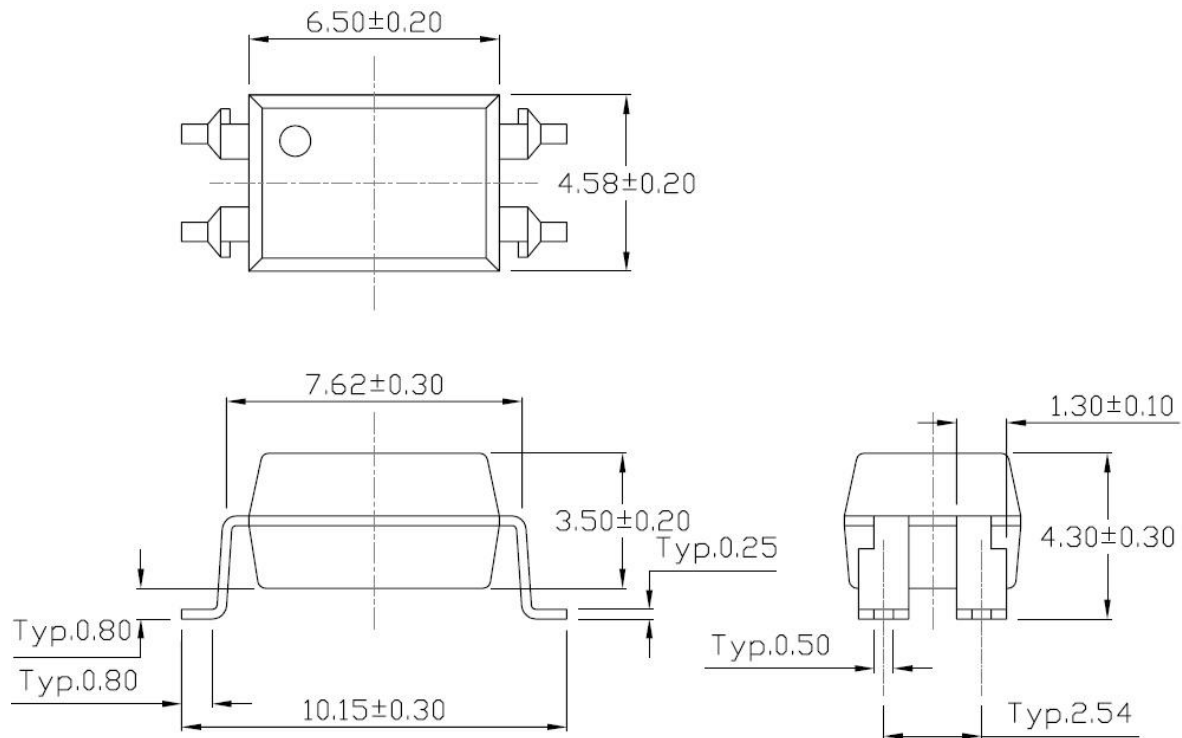


Gullwing (400mil) Lead Forming – Through Hole (M Type)

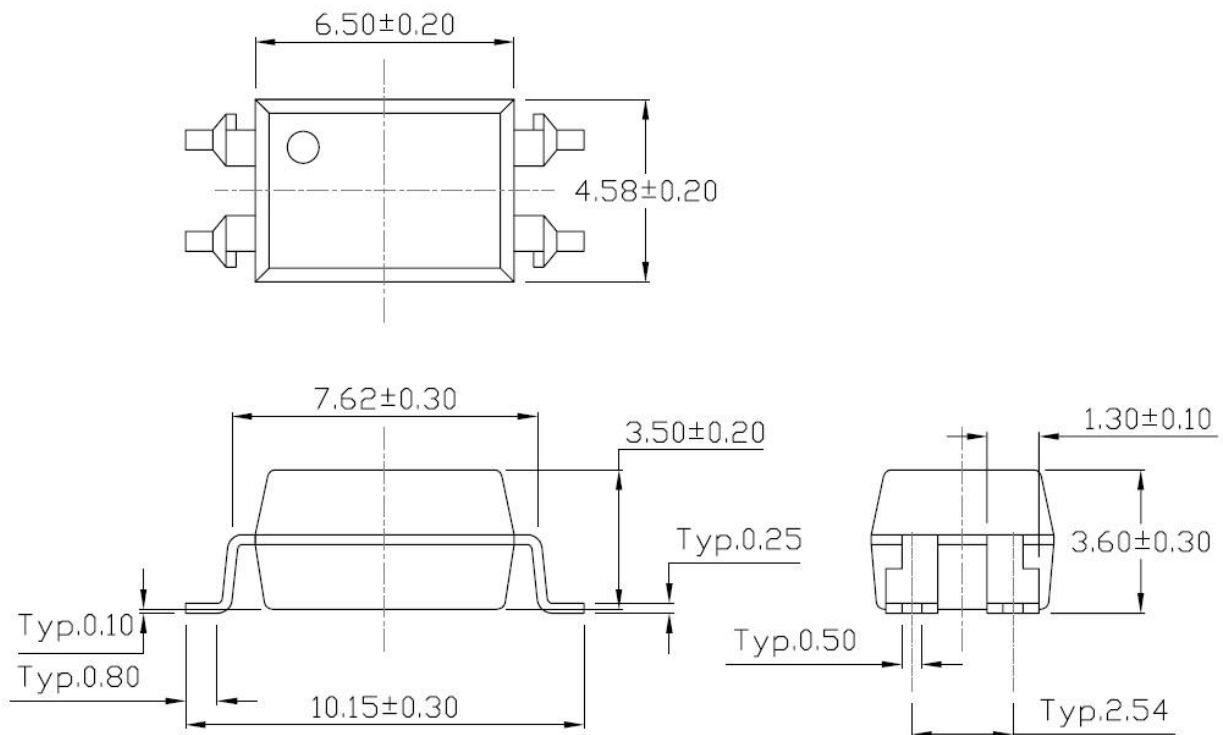


PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Surface Mount Lead Forming (S Type)

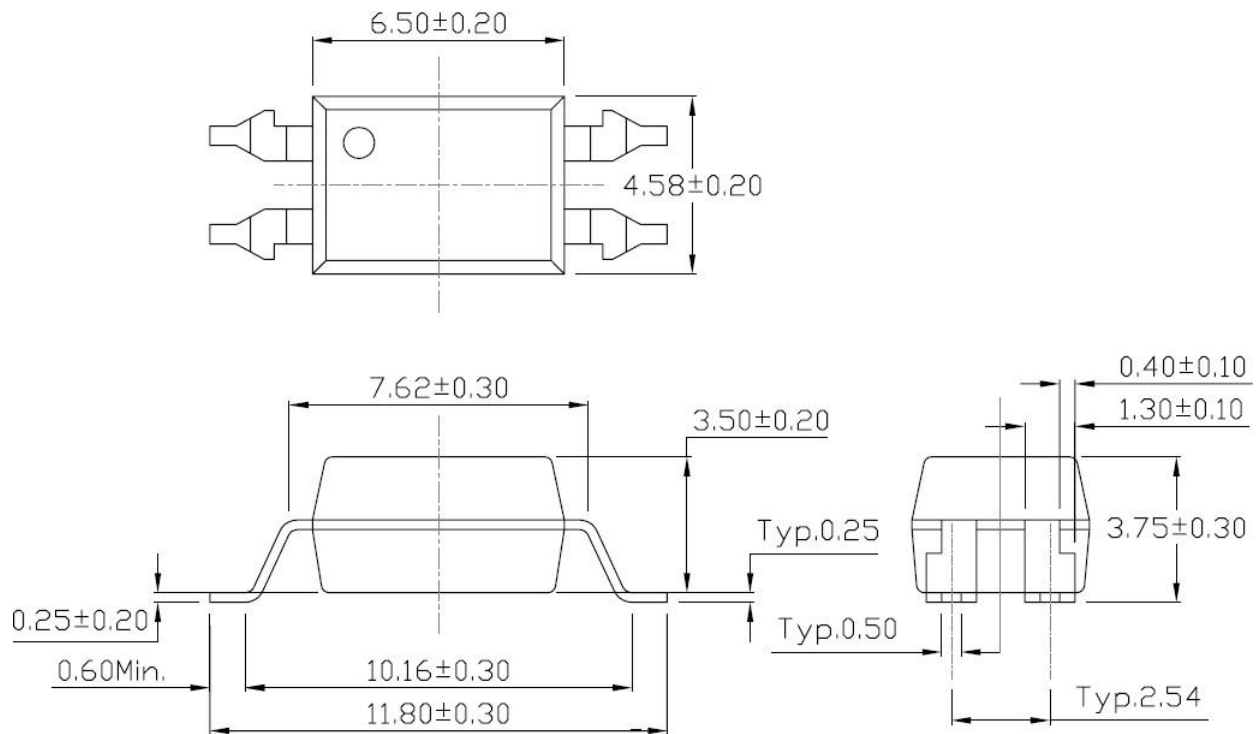


Surface Mount (Low Profile) Lead Forming (SL Type)



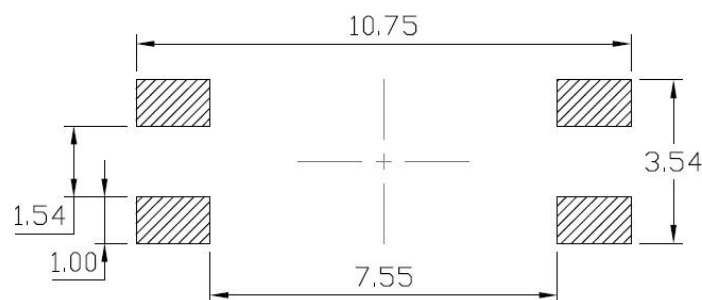
PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Surface Mount (Gullwing) Lead Forming (SLM Type)

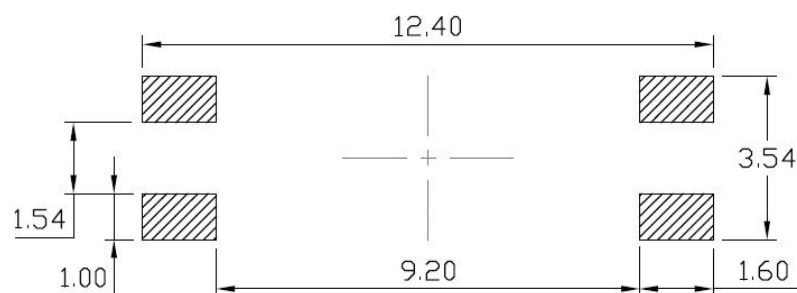


RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

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

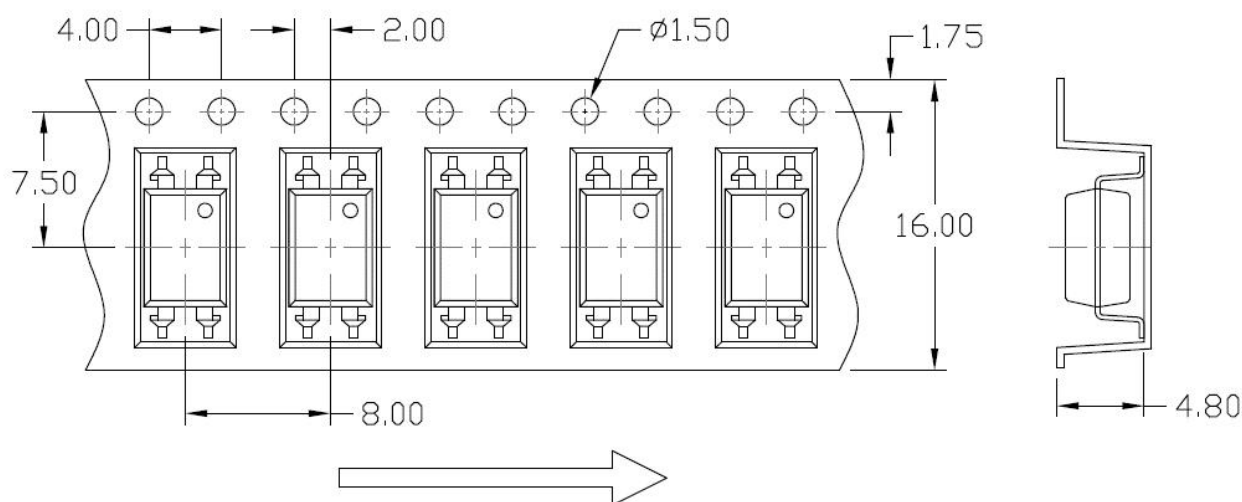


Surface Mount (Gullwing) Lead Forming

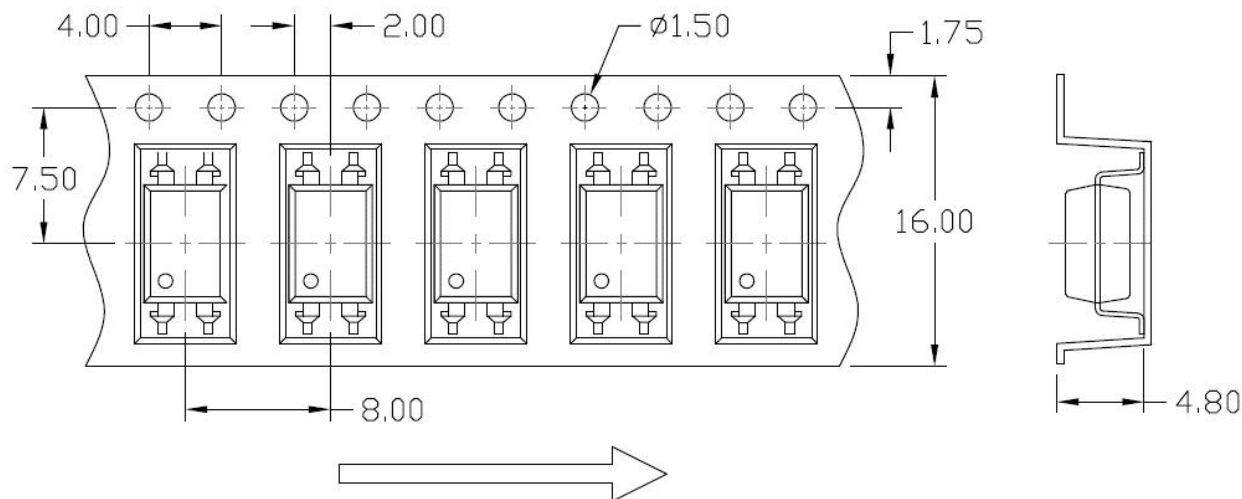


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S(T1) & SL(T1)

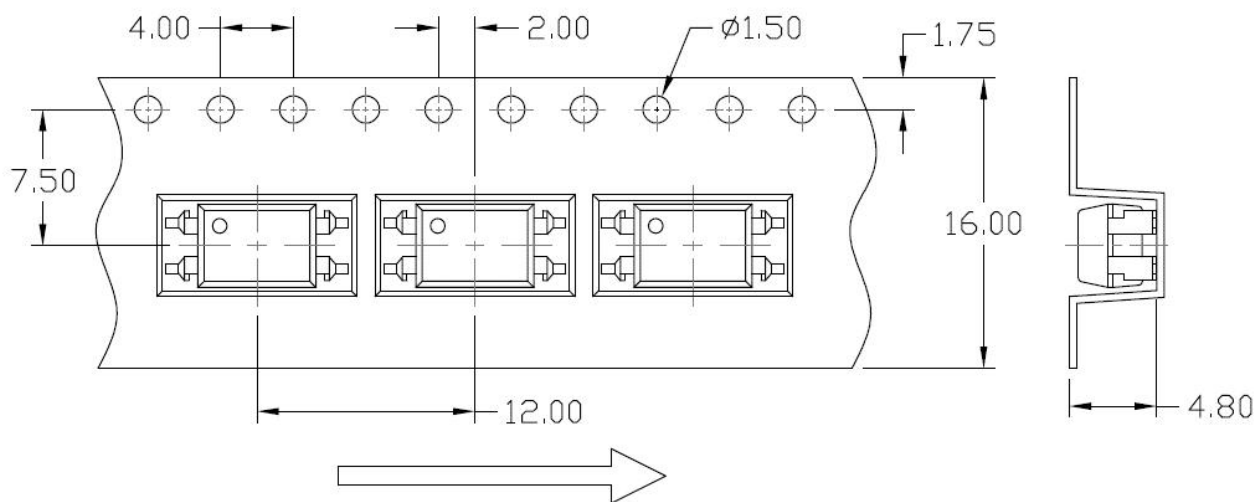


Option S(T2) & SL(T2)

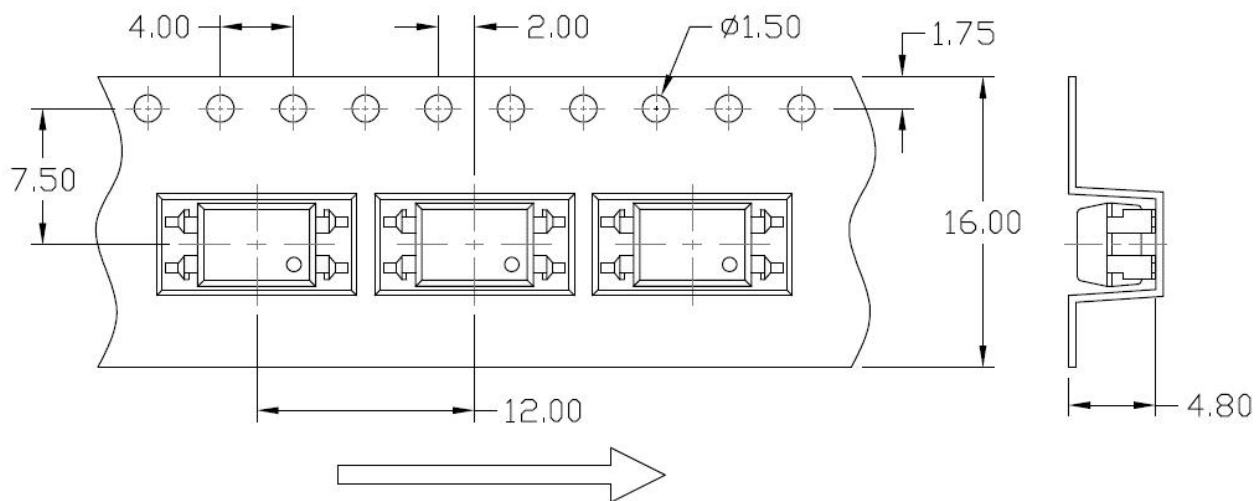


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S(T3) & SL(T3)

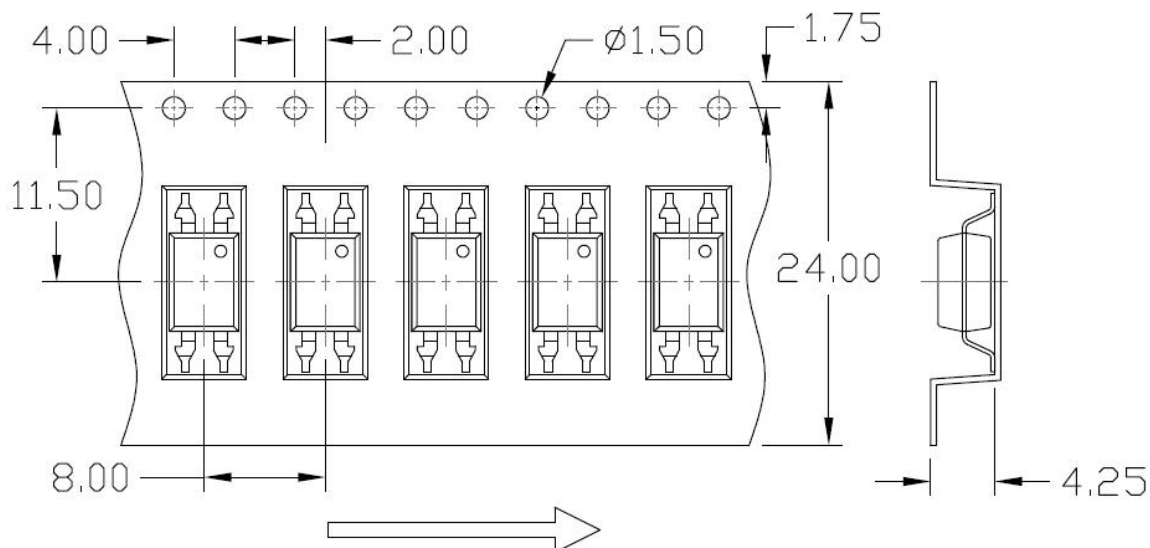


Option S(T4) & SL(T4)

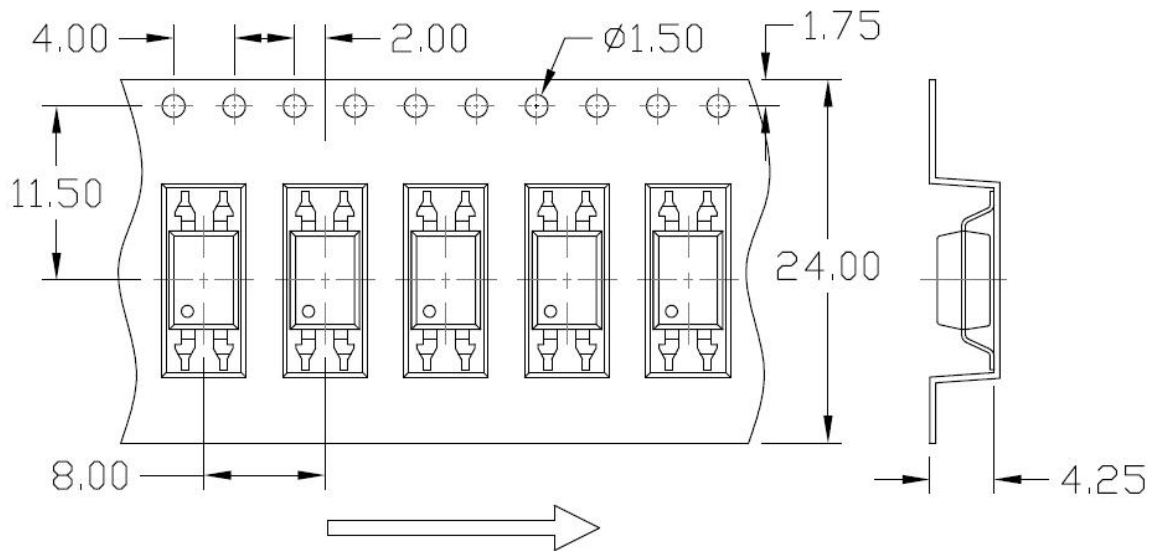


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option SLM(T1)

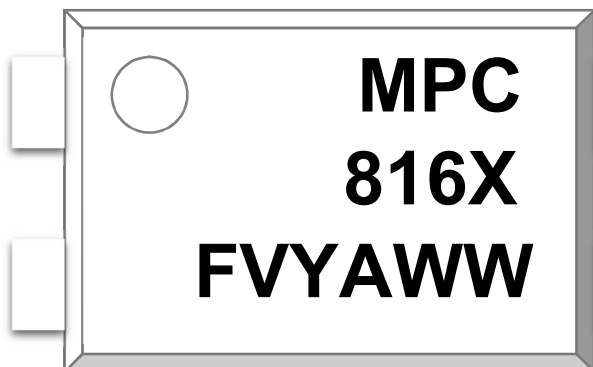


Option SLM(T2)



ORDERING AND MARKING INFORMATION

MARKING INFORMATION



MPC : Company Abbr

816 : Part Number

X : CTR Rank

F : Leadframe Option(F: Iron, None: Copper)

V : VDE Option

Y : Fiscal Year

A : Manufacturing Code

WW : Work Week

ORDERING INFORMATION

MPC816XN(Y)(Z)-FGV

MPC– Company Abbr.

816 – Part Number

X – Rank1(A/B/C/D or None)

N – Rank2 (1~9 or None)

(Y) – Lead Form Option (M/S/SL/SLM/None)

(Z)– Tape and Reel Option (T1/T2/T3/T4)

F – Leadframe Option (F:Iron, None:Copper)

G – Green

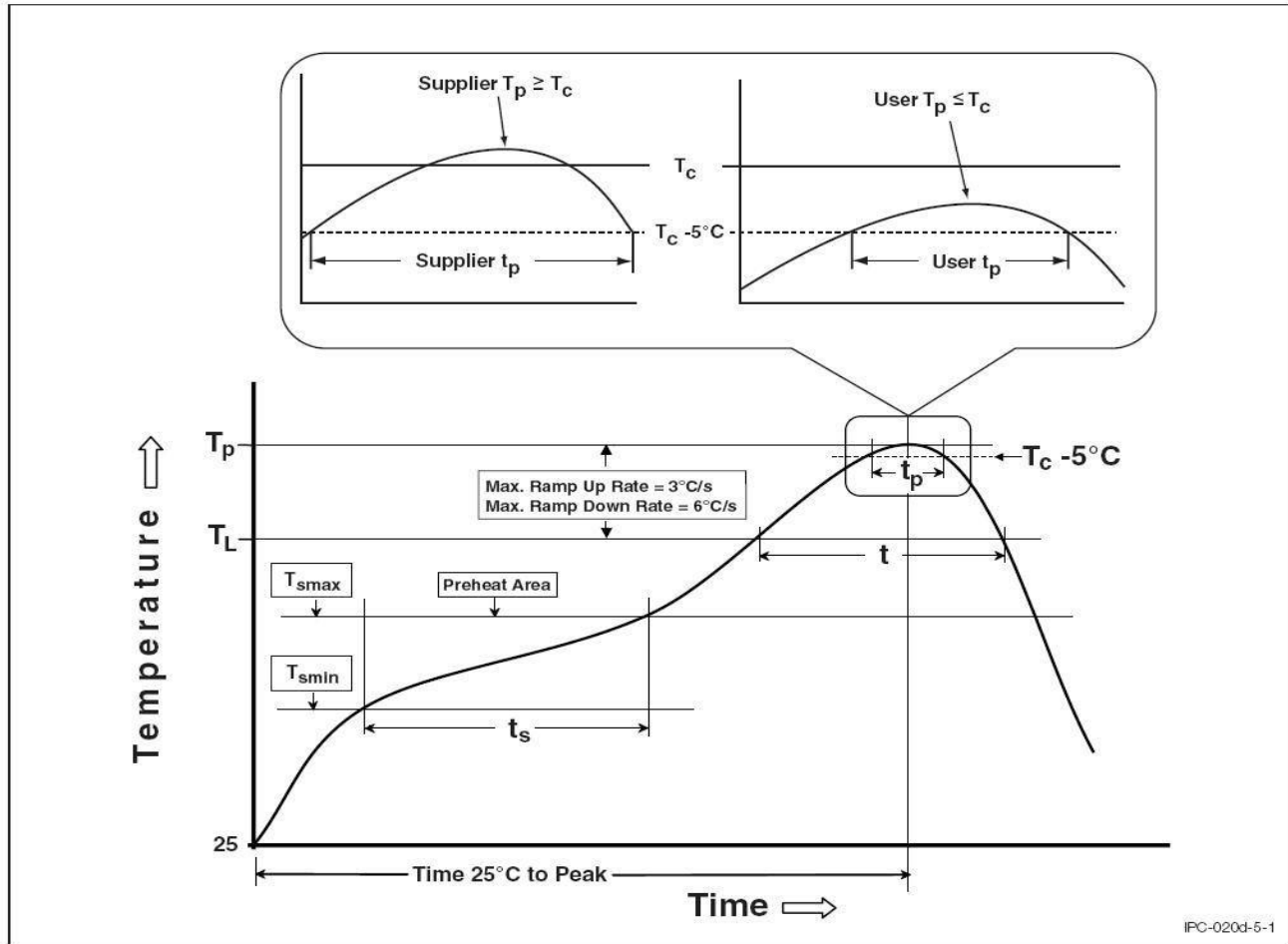
V – VDE Option (V or None)

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	1000 Units/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



IPC-020d-5-1

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.



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DIP4, DC Input Photo Transistor Coupler

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	2020-03-28	Upgrade Datasheet
1.2	2023-07-05	Upgrade Datasheet
1.3	2024-05-31	Upgrade Datasheet