

### ■ Features

- High isolation 3750 VRMS
- DC input with high speed transistor
- Operating temperature range - 55 °C to 100 °C
- REACH compliance
- Halogen free
- MSL class 1
- Regulatory Approvals
  - UL - UL1577 (Pending Approved)
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC – GB4943.1, GB8898

### ■ Applications

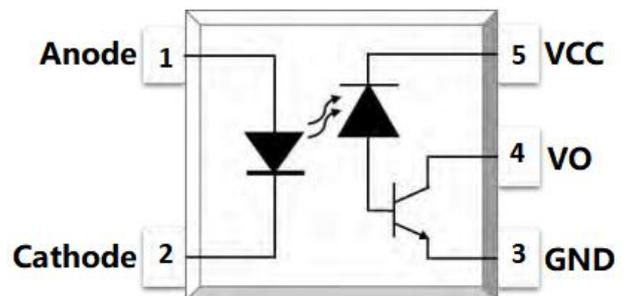
- Line receivers
- Telecommunication equipment
- Out interface to CMOS-LSTTL-TTL
- Wide bandwidth analog coupling
- Pulse Transformer replacement
- Computer-peripheral interface

### ■ Description

The MPCM501 series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon high speed photo transistor in a plastic SOP5 package.

With the robust coplanar double mold structure, MPCM501 series provide the most stable isolation feature.

### ■ Schematic





### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT	Note
INPUT				
Forward Current	$I_F$	25	mA	
Peak Forward Current	$I_{FP}$	50	mA	1
Peak Transient Current	$I_{F(trans)}$	1	A	2
Reverse Voltage	$V_R$	5	V	
Input Power Dissipation	$P_I$	100	mW	
OUTPUT				
Supply Voltage	$V_{CC}$	-0.5~30	V	
Output Voltage	$V_O$	-0.5~20	V	
Output Current	$I_o$	8	mA	
Peak Output Current	$I_o$	16	mA	
Output Power Dissipation	$P_O$	100	mW	
COMMON				
Total Power Dissipation	$P_{tot}$	200	mW	
Isolation Voltage	$V_{iso}$	3750	$V_{rms}$	3
Operating Temperature	$T_{opr}$	-40~100	°C	
Storage Temperature	$T_{stg}$	-55~125	°C	
Soldering Temperature	$T_{sol}$	260	°C	4

Note 1. 50% duty, 1ms P.W

Note 2.  $\leq 1\mu s$  P.W, 300pps

Note 3. AC For 1 Minute, R.H. = 40 ~ 60%

Note 4. For 10 seconds



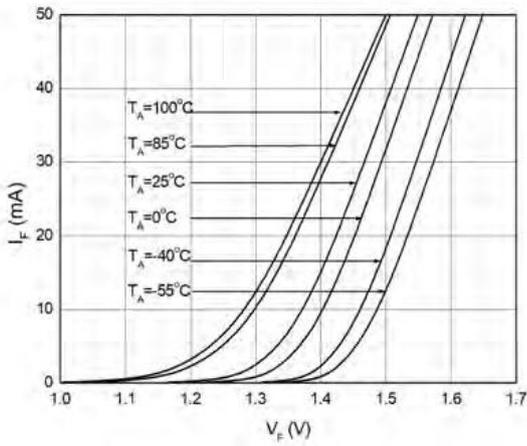
ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C							
PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	TEST CONDITION	NOTE
INPUT							
Forward Voltage	$V_F$	-	1.45	1.8	V	$I_F=16mA$	
Reverse Current	$I_R$	-	-	10	$\mu A$	$V_R=5V$	
Input Capacitance	$C_{in}$	-	60	-	pF	$V=0, f=1MHz$	
OUTPUT							
High Level Supply Current	$I_{CCH}$	-	0.01	1	$\mu A$	$I_F=0mA, V_O=Open, V_{CC}=15V, Ta=25^\circ C$	
		-	-	2	$\mu A$	$I_F=0mA, V_O=Open, V_{CC}=15V$	
Low Level Supply Current	$I_{CCL}$	-	200	-	$\mu A$	$I_F=16mA, V_O=Open, V_{CC}=15V$	
Logic High Output Current	$I_{OH}$	-	0.001	0.5	$\mu A$	$I_F=0mA, V_O=V_{CC}=5.5V, Ta=25^\circ C$	
		-	0.01	1	$\mu A$	$I_F=0mA, V_O=V_{CC}=15V, Ta=25^\circ C$	
		-	-	50	$\mu A$	$I_F=0mA, V_O=V_{CC}=15V$	
TRANSFER CHARACTERISTICS(at Ta=0 to 70°C , unless specified otherwise)							
Current Transfer Ratio	CTR	20	-	-	%	$I_F = 16mA, V_O = 0.4V, V_{CC}=4.5V, Ta=25^\circ C$	
		15	-	-		$I_F = 16mA, V_O = 0.5V, V_{CC}=4.5V$	
Logic Low Output Voltage	$V_{OL}$	-	-	0.4	V	$I_F = 16mA, I_O = 3mA, V_{CC}=4.5V, Ta=25^\circ C$	
		-	-	0.5		$I_F = 16mA, I_O = 2.4mA, V_{CC}=4.5V$	
Isolation Resistance	Riso	$10^{12}$	$10^{14}$	-	$\Omega$	DC500V, 40 ~ 60% R.H.	
Floating Capacitance	$C_{IO}$	-	0.3	-	pF	$V=0, f=1MHz$	



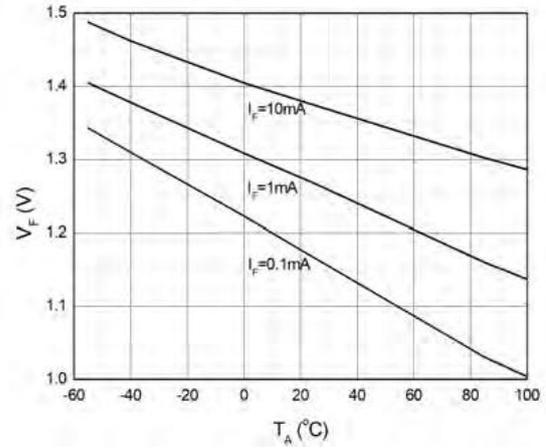
### ELECTRICAL OPTICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	TEST CONDITION	NOTE
SWITCHING CHARACTERISTICS(at Ta=0 to 70°C, I <sub>F</sub> =16mA, V <sub>CC</sub> =5V, unless specified otherwise)							
Propagation Delay Time to Logic Low	TPHL	-	0.4	0.8	μs	R <sub>L</sub> =1.9kΩ, T <sub>A</sub> =25°C	Fig.13
		-	-	1.0		R <sub>L</sub> =1.9kΩ	
Propagation Delay Time to Logic High	TPLH	-	0.35	0.8	μs	R <sub>L</sub> =1.9kΩ, T <sub>A</sub> =25°C	Fig.13
		-	-	1.0		R <sub>L</sub> =1.9kΩ	
Common Mode Transient Immunity at Logic High	CM <sub>H</sub>	15	-	-	kV/μs	I <sub>F</sub> = 0mA, V <sub>CM</sub> =1500Vpp, R <sub>L</sub> =1.9kΩ, T <sub>A</sub> =25°C	Fig.15
Common Mode Transient Immunity at Logic Low	CM <sub>L</sub>	15	-	-	kV/μs	I <sub>F</sub> = 16mA, V <sub>CM</sub> =1500Vpp, R <sub>L</sub> =1.9kΩ, T <sub>A</sub> =25°C	Fig.15

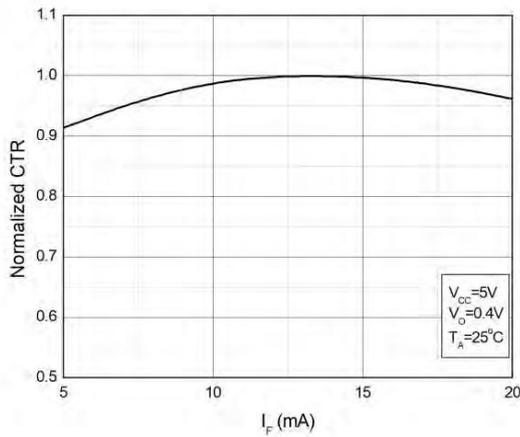
### CHARACTERISTIC CURVES



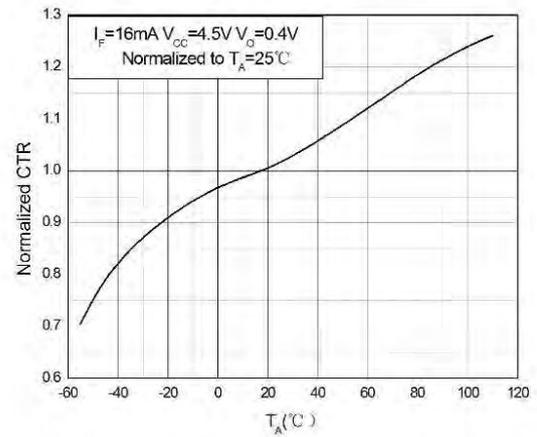
**Fig.1 Forward Current vs. Forward Voltage**



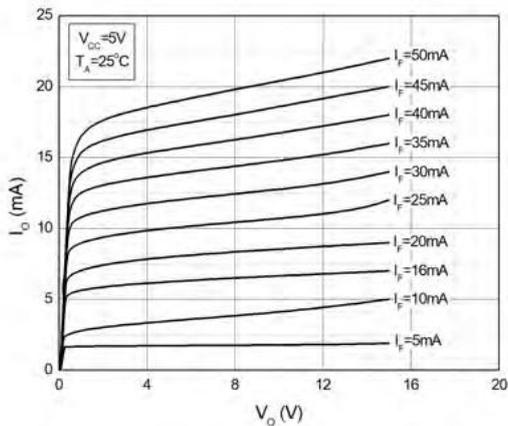
**Fig.2 Forward Voltage vs. Ambient Temperature**



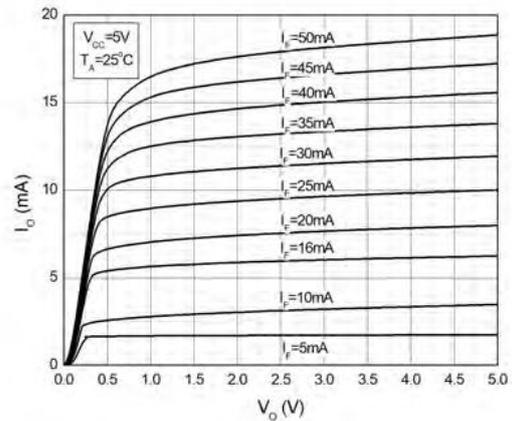
**Fig.3 Input Threshold Current vs. Ambient Temperature**



**Fig.4 Input Threshold Current vs. Ambient Temperature**

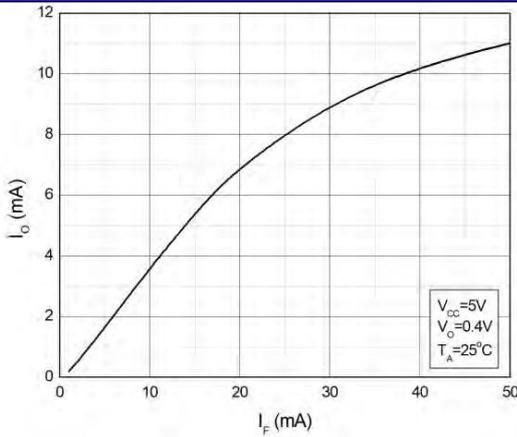


**Fig.5 Low Level Output Current vs. Ambient Temperature**

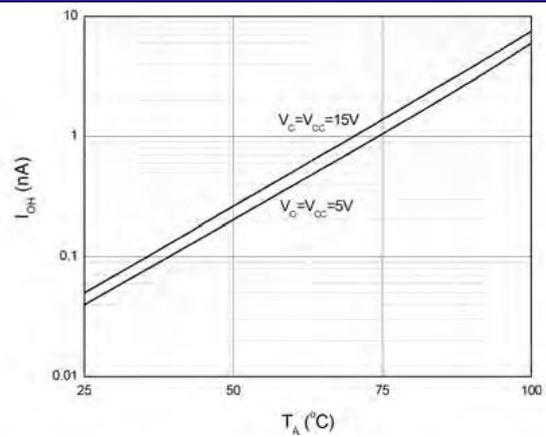


**Fig.6 Low Level Output Current vs. Ambient Temperature**

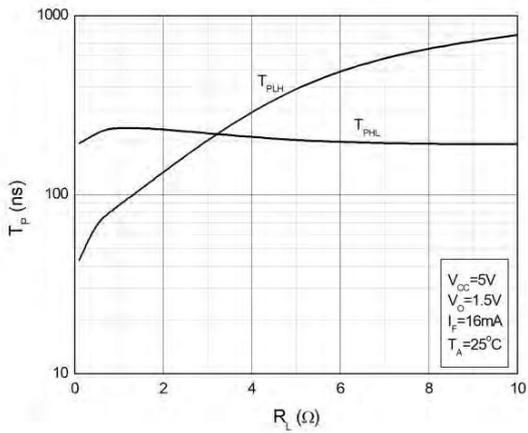
### CHARACTERISTIC CURVES



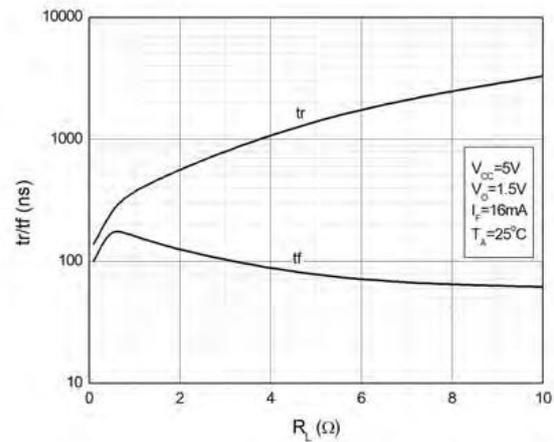
**Fig.7 Low Level Output Voltage vs. Ambient Temperature**



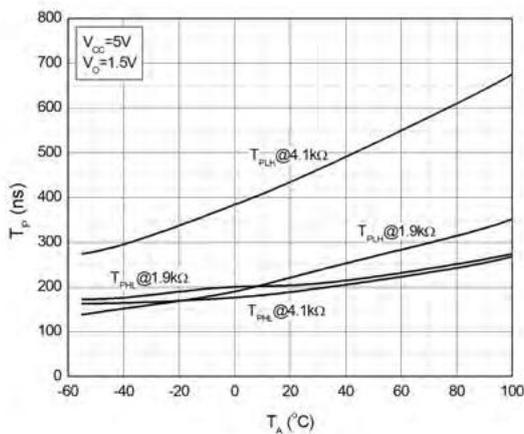
**Fig.8 Low Level Output Voltage vs. Ambient Temperature**



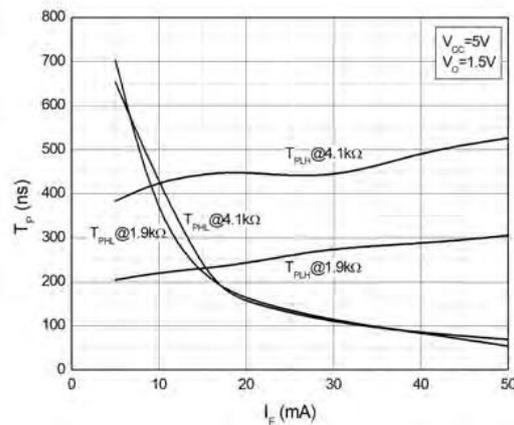
**Fig.9 High Level Output Current vs. Ambient Temperature**



**Fig.10 High Level Output Current vs. Ambient Temperature**



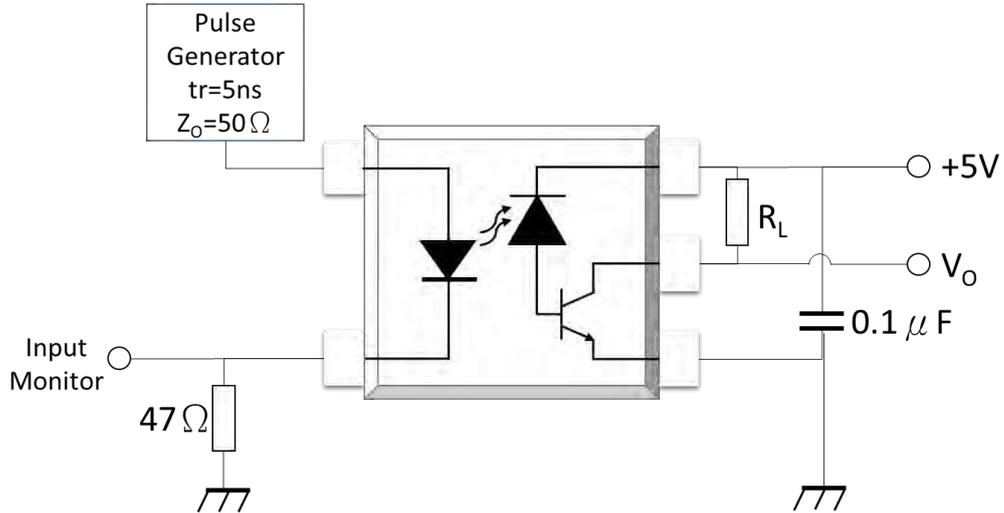
**Fig.11 Output Voltage vs. Ambient Temperature**



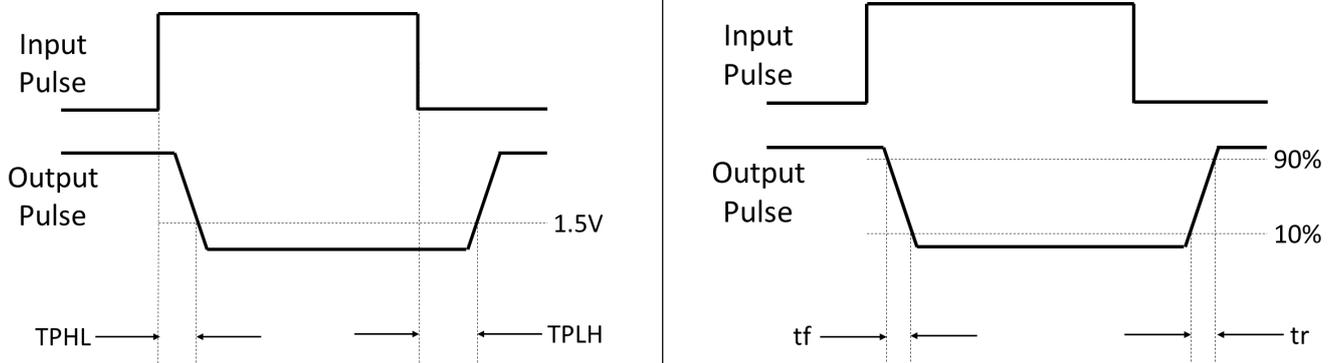
**Fig.12 Output Voltage vs. Forward Current**

### TEST CIRCUITS

**Fig.13 Test Circuits for TPHL, TPLH, tr, tf**

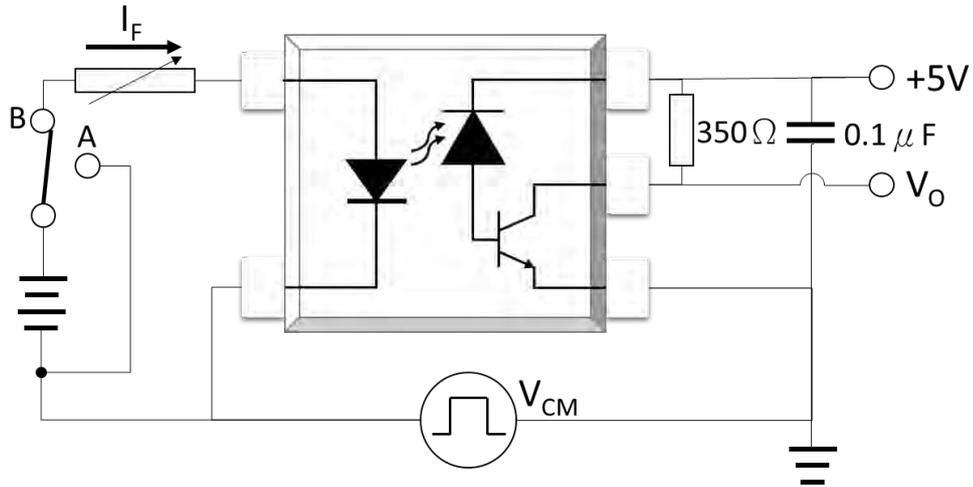


**Fig.14 Waveforms of TPHL, TPLH, tr, tf**

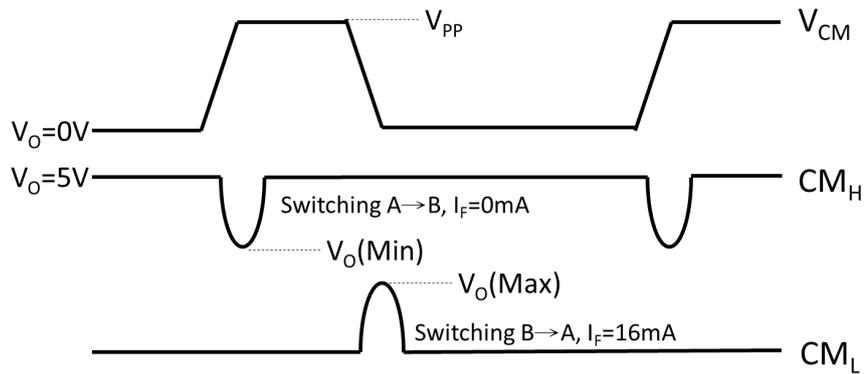


### TEST CIRCUITS

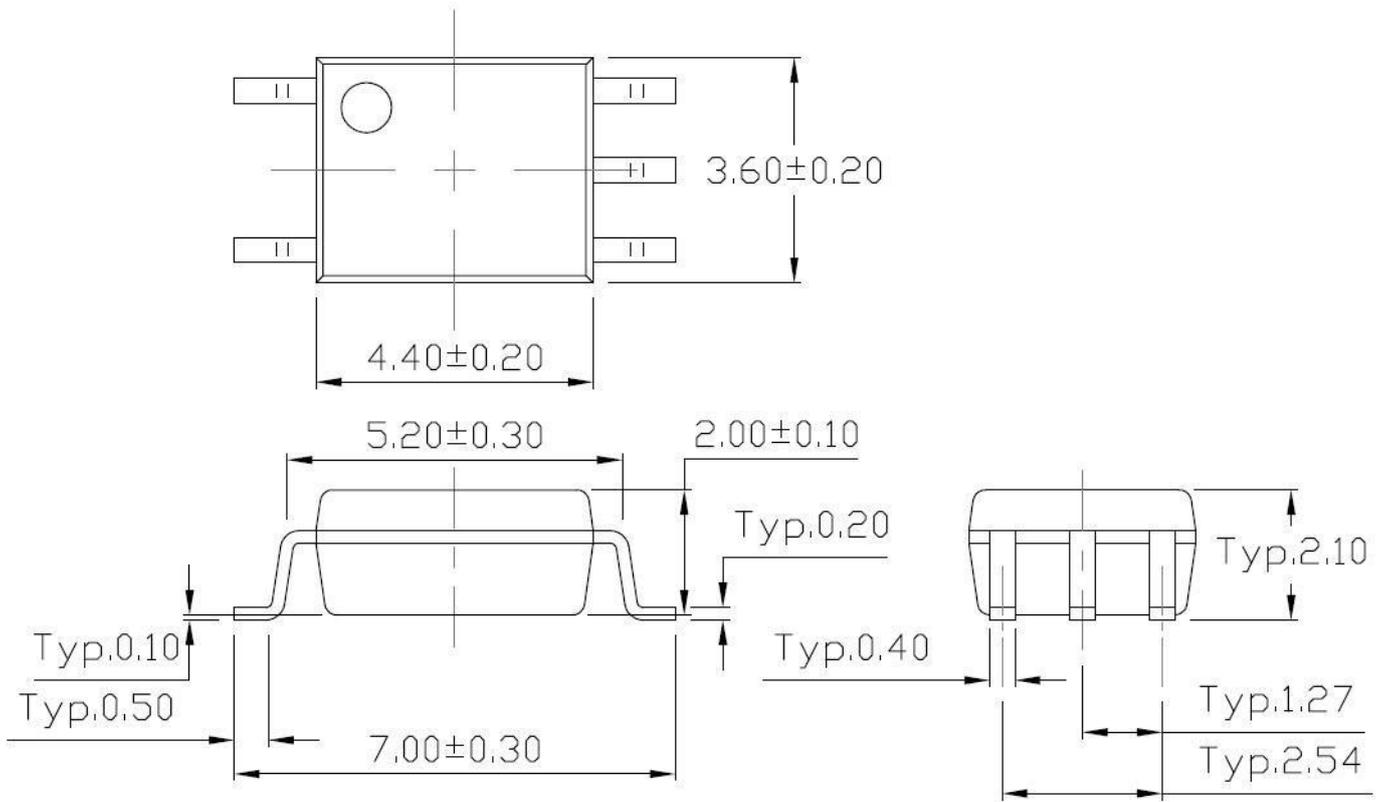
**Fig.15 Test Circuits for Common Mode Transient Immunity**



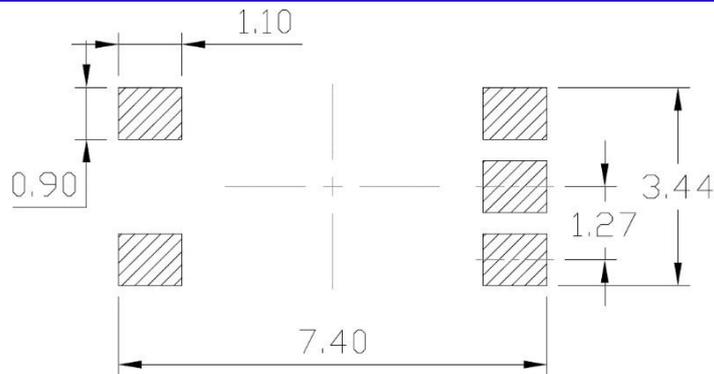
**Fig.16 Waveforms of Common Mode Transient Immunity**



### PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

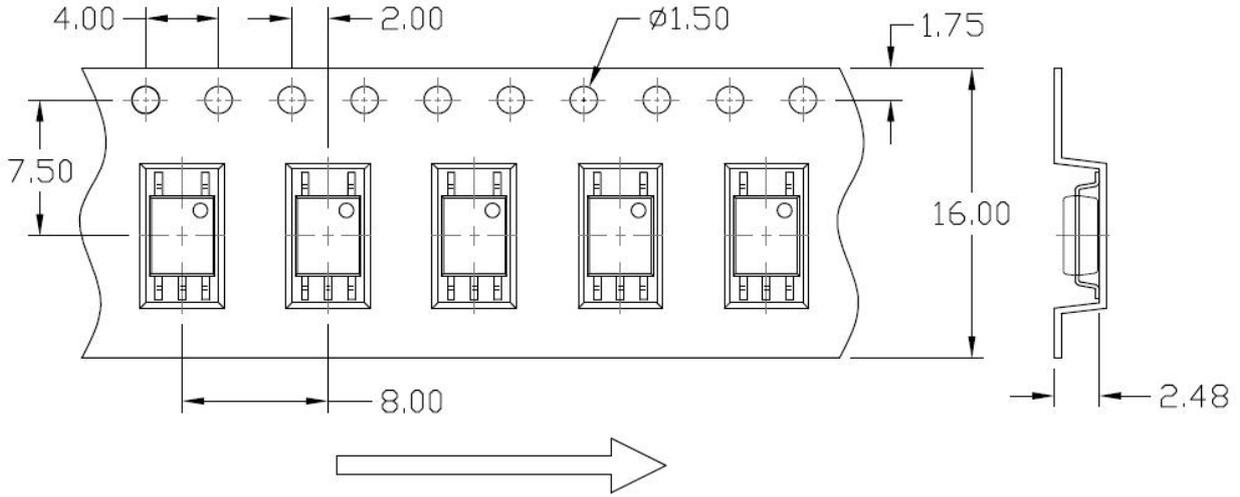


### Recommended Solder Mask (Dimensions in mm unless otherwise stated)

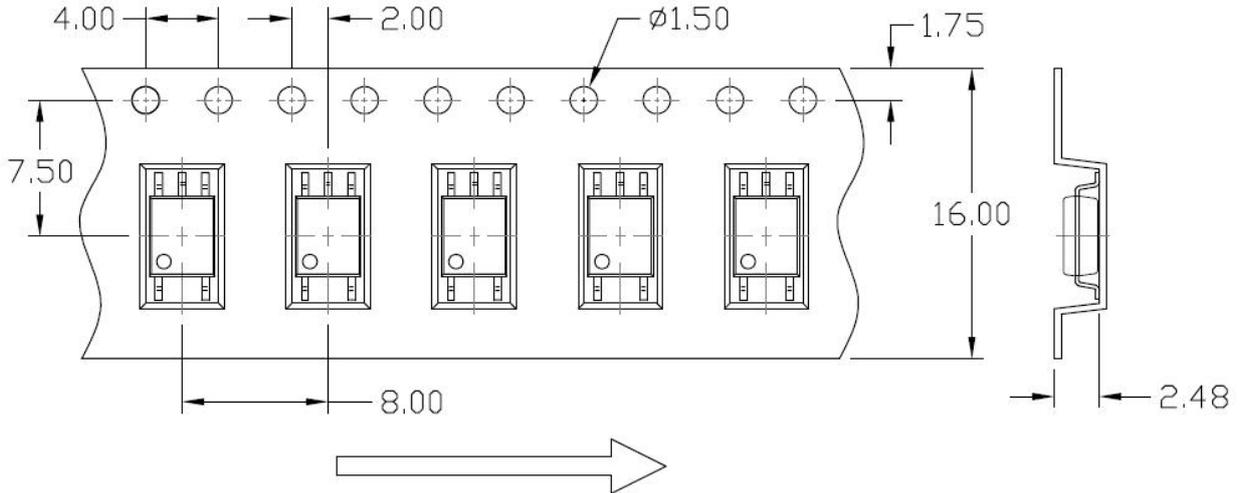


**CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

**Option T1**

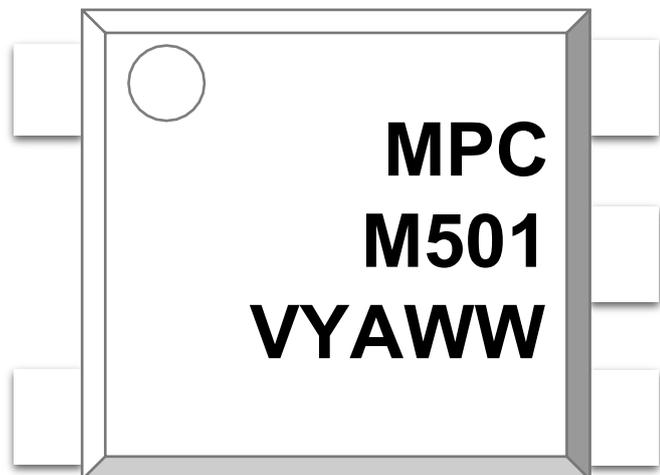


**Option T2**



### ORDERING AND MARKING INFORMATION

#### MARKING INFORMATION



**MPC** : Company Abbr.

**M501** : Part Number

**V** : VDE Option

**Y** : Fiscal Year

**A** : Manufacturing Code

**WW** : Work Week

#### ORDERING INFORMATION

### MPCM501(Z)-GV

MPC – Company Abbr.

M501 – Part Number

Z – Tape and Reel Option (T1/T2)

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

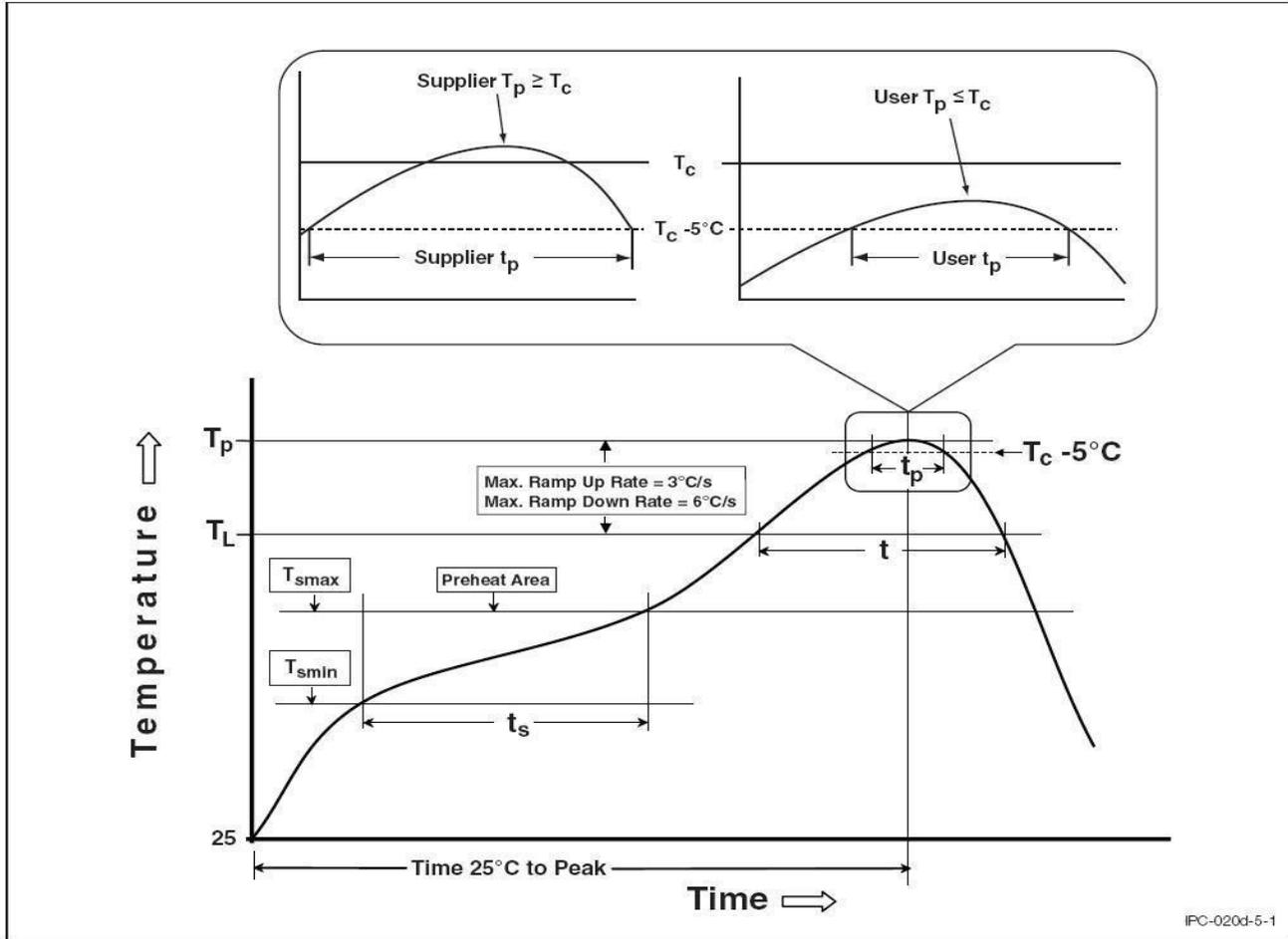
V – VDE Option (V or None)

#### PACKING QUANTITY

Option	Description	Quantity
T1	Surface Mount Lead Forming – With Option 1 Taping	3000Units/Reel
T2	Surface Mount Lead Forming – With Option 2 Taping	3000Units/Reel

### REFLOW INFORMATION

#### REFLOW PROFILE



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T <sub>smin</sub> )	100	150°C
Temperature Max. (T <sub>smax</sub> )	150	200°C
Time (t <sub>s</sub> ) from (T <sub>smin</sub> to T <sub>smax</sub> )	60-120 seconds	60-120 seconds
Ramp-up Rate (t <sub>L</sub> to t <sub>P</sub> )	3°C/second max.	3°C/second max.
Liquidous Temperature (T <sub>L</sub> )	183°C	217°C
Time (t <sub>L</sub> ) Maintained Above (T <sub>L</sub> )	60 – 150 seconds	60 – 150 seconds
Peak Body Package Temperature	235°C +0°C / -5°C	260°C +0°C / -5°C
Time (t <sub>P</sub> ) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate (T <sub>P</sub> to T <sub>L</sub> )	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	2018-12-21	Datasheet Complete