

■ Features

- High speed: 1Mb/s
- 15 kV/ μ s high common-mode rejection at VCM = 1500V
- Guarantee performance from temperature range: -40°C to 110°C
- High speed response: 0.8 μ s max at 5V
- Open collector output
- TTL compatible

■ Applications

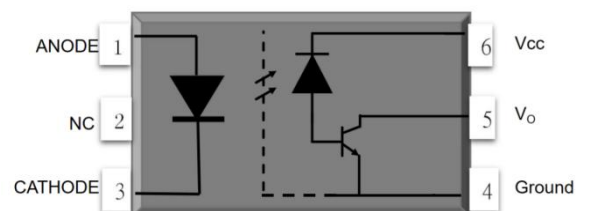
- Digital signal isolation
- Communications interface
- Micro-controller interface
- Feedback elements in switching power supplies
- Digital isolation for A/D, D/A conversion Digital field

■ Description

The MP50L series consists of a high efficient AlGaAs Light Emitting Diode and a high speed optical detector. This design provides excellent AC and DC isolation between the input and output sides of the Optocoupler.

The output of the optical detector features an open collector Schottky clamped transistor. The internal shield ensures high common mode transient immunity. A guaranteed common mode transient immunity is up to 15KV/ μ s(min). The Optocoupler operational parameters are guaranteed over the temperature range from -40°C ~ +110°C.

■ Schematic





MP50L Series
LSOP6, 1Mb/s, High Speed Photo Coupler

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT	Note
INPUT				
Forward Current	IF	25	mA	
Peak Transient Input Current	IF(TRAN)	1.0	A	1
Reverse Voltage	VR	5	V	
Input Power Dissipation	PI	45	mW	
OUTPUT				
Supply Voltage	VCC-VEE	30	V	
Output Voltage	VO	20	V	
Average Output Current	IO(AVG)	8	mA	
Peak Output Current	IO(PEAK)	16	mA	
Output Power Dissipation	PO	100	mW	
COMMON				
Isolation Voltage	Viso	5000	Vrms	2
Operating Temperature	Topr	-40~110	°C	
Storage Temperature	Tstg	-55~125	°C	
Soldering Temperature	Tsol	260	°C	3

Note 1. Maximum pulse width = 10μs

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

Note 3. For 10 seconds

TRUTH TABLE

LED	VO
On	Low
Off	High



MP50L Series

LSOP6, 1Mb/s, High Speed Photo Coupler

RECOMMENDED OPERATION CONDITIONS

PARAMETER	SYMBOL	MIN	MAX	UNIT
Operating Temperature	TA	-40	105	°C
Supply Voltage	VCC	2.7	24	V
Input Current (High Level)	IFH	3.0	10	mA
Input Voltage (OFF)	VF(OFF)	-	0.8	V

ELECTRICAL OPTICAL CHARACTERISTICS (VCC=15V, VEE=GND, TA=25°C unless specified otherwise)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	TEST CONDITION	NOTE
INPUT CHARACTERISTICS							
Forward Voltage	VF	-	1.3	1.9	V	IF=16mA	
Reverse Current	IR	-	-	10	μA	VR=3V	
Input Reverse Voltage	BVR	5	-	-	V	IR=10μA	
Input Threshold Current	ITH	-	2.0	5.0	mA	VCC=15V, VO=0.8V, IO≥0.75mA	
Input Capacitance	Cin	-	77	-	pF	VF=0, f=1MHz	
OUTPUT CHARACTERISTICS							
Logic High Supply Current	ICCH	-	0.01	1.0	μA	IF= 0mA, VO=Open, VCC=15V	
Logic Low Supply Current	ICCL	-	150	-	μA	IF=16mA, VO=Open, VCC=15V	
Logic Low Output Voltage	VOL	-	0.17	0.4	V	IF=16mA, VCC=4.5V, IO=3mA	
		-	0.15	0.4	V	IF=16mA, VCC=4.5V, IO=2.4mA	
Logic High Output Current	IOH	-	0.002	0.5	μA	IF=0mA, VO=VCC=5.5V	
		-	0.005	1.0	μA	IF=0mA, VO=VCC=15V	
Isolation Resistance	Riso	10 ⁹	-	-	Ω	DC500V, 40 ~ 60% R.H.	
TRANSFER CHARACTERISTICS							
Current Transfer Ratio	CTR	20	37	-	%	IF=16mA, VCC=4.5V, VO=0.4mA	
		15	39	-		IF=16mA, VCC=4.5V, VO=0.5mA	



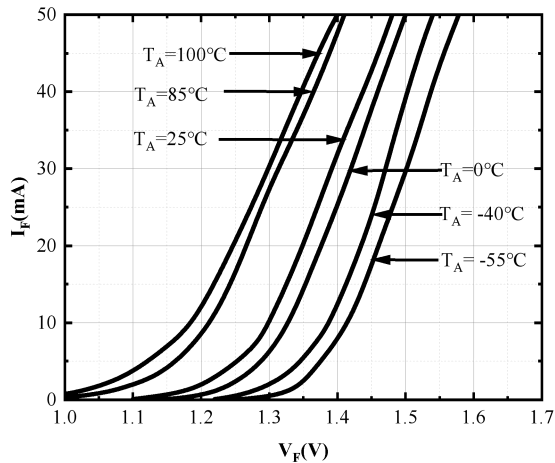
MP50L Series

LSOP6, 1Mb/s, High Speed Photo Coupler

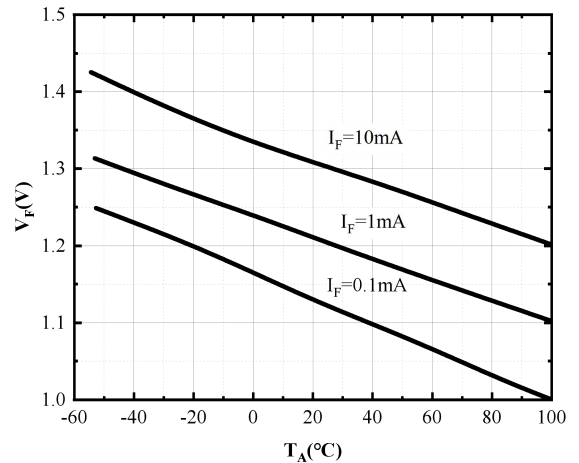
ELECTRICAL OPTICAL CHARACTERISTICS (VCC=5V, VEE=GND, TA=25°C unless specified otherwise)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	TEST CONDITION	NOTE
SWITCHING CHARACTERISTICS							
Propagation Delay Time to Output Low Level	TPHL	-	0.18	0.8	μs	IF=16mA, VCC=5V RL=1.9KΩ, f=10kHz, Duty=50%	
Propagation Delay Time to Output High Level	TPLH	-	0.24	0.8	μs		
Common Mode Transient Immunity at Logic High	CMH	15	25	-	kV/μs	IF=0mA, VCC=5V, CL=15pF RL=1.9KΩ, VCM= 1.5KV	
Common Mode Transient Immunity at Logic Low	CML	15	25	-	kV/μs	IF=16mA, VCC=5V, CL=15pF, RL=1.9KΩ, VCM=1.5KV	

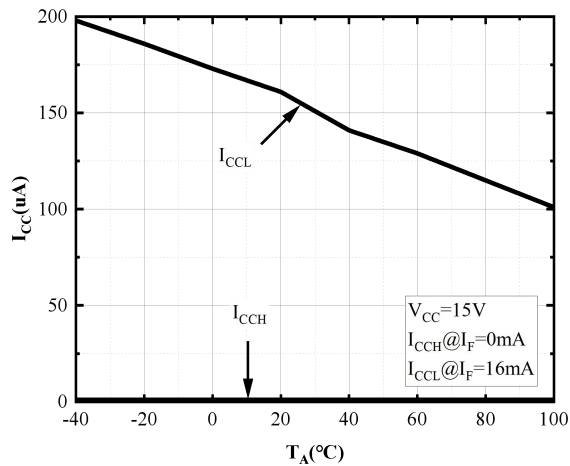
CHARACTERISTIC CURVES



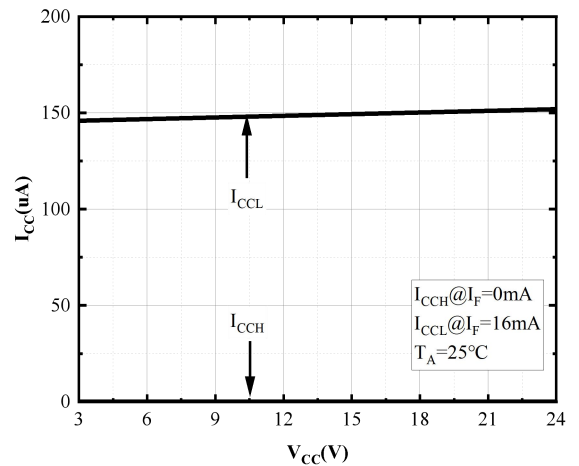
**Fig.1 Forward Current
vs. Forward Voltage**



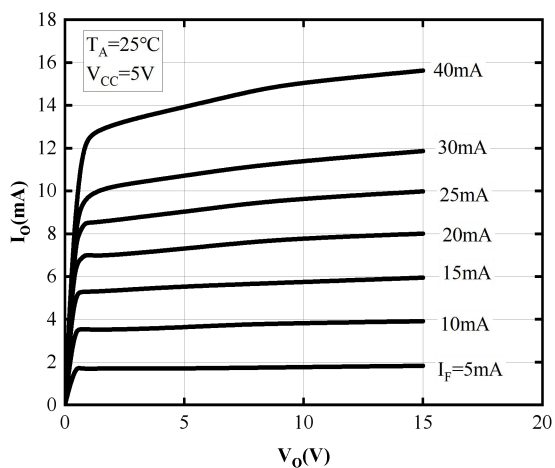
**Fig.2 Forward Voltage
vs. Ambient Temperature**



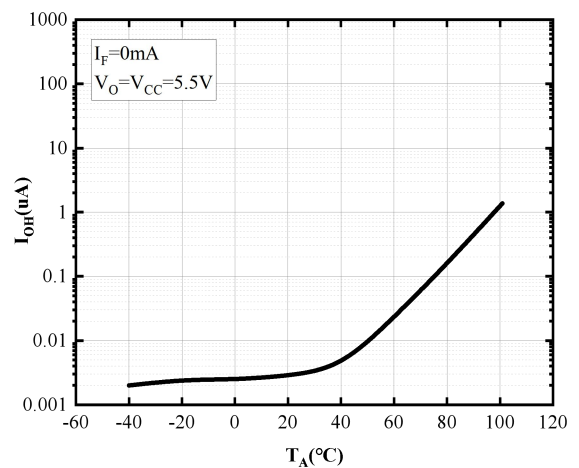
**Fig.3 Supply Current
vs. Ambient Temperature**



**Fig.4 Supply Current
vs. Supply Voltage**

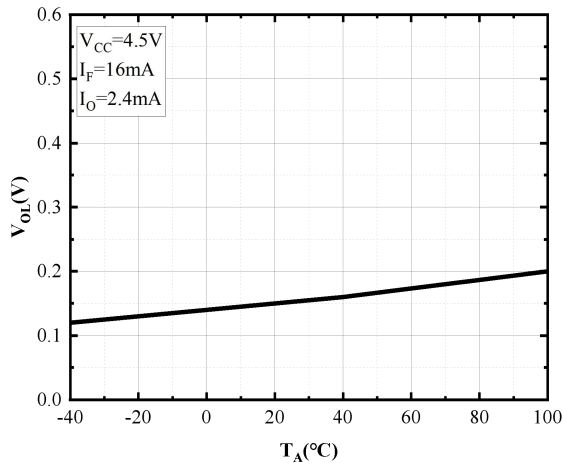


**Fig.5 Output Current
vs. Output Voltage**

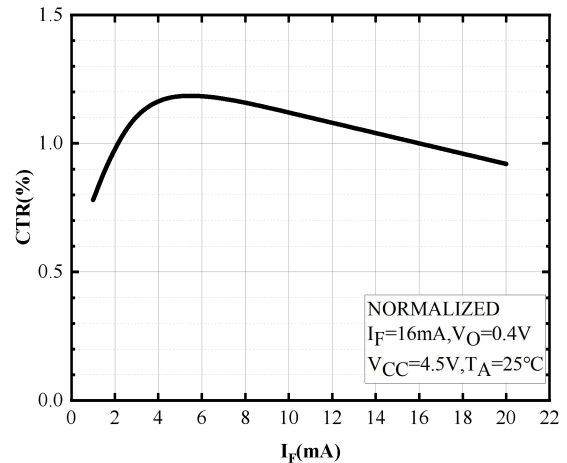


**Fig.6 Logic High Output Current
vs. Ambient Temperature**

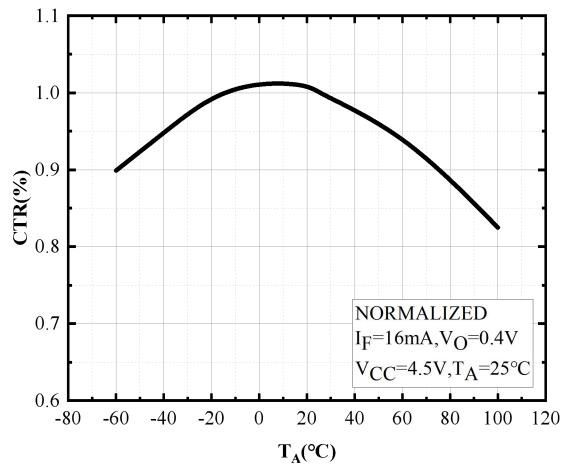
CHARACTERISTIC CURVES



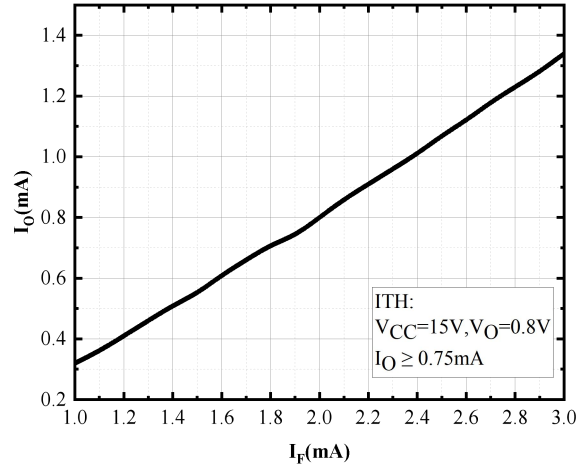
**Fig.7 Logic Low Output Voltage
vs. Ambient Temperature**



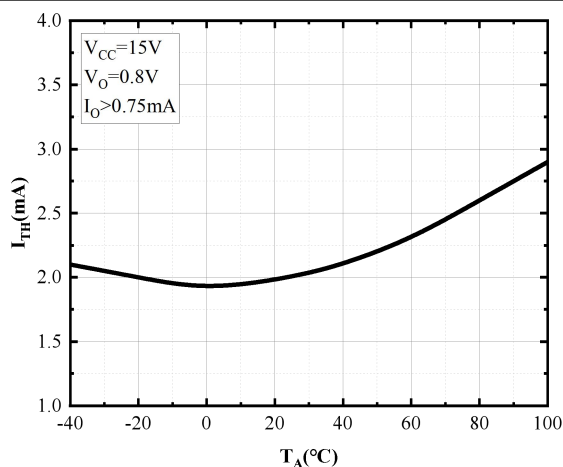
**Fig.8 Current Transfer Ratio
vs. Input Current**



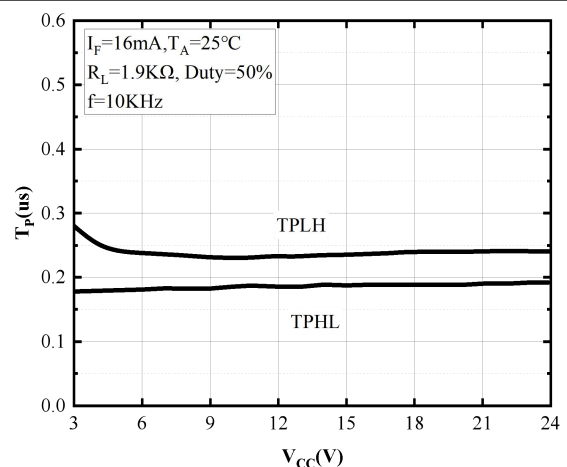
**Fig.9 Current Transfer Ratio
vs. Ambient Temperature**



**Fig.10 Output Current
vs. Input Current**

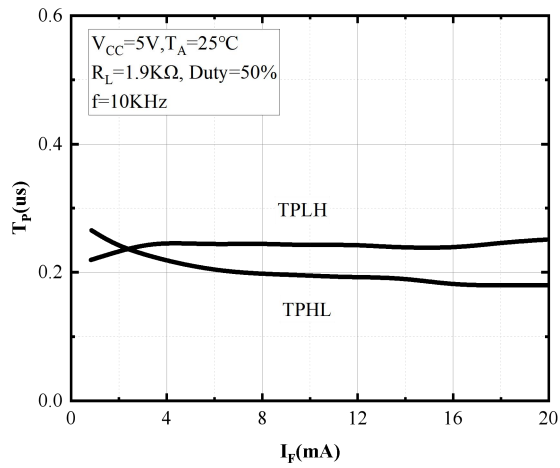


**Fig.11 Input Threshold Current
vs. Ambient Temperature**

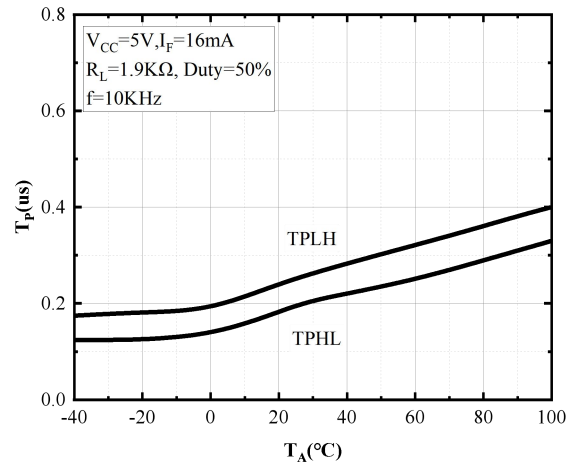


**Fig.12 Propagation Delay
vs. Supply Voltage**

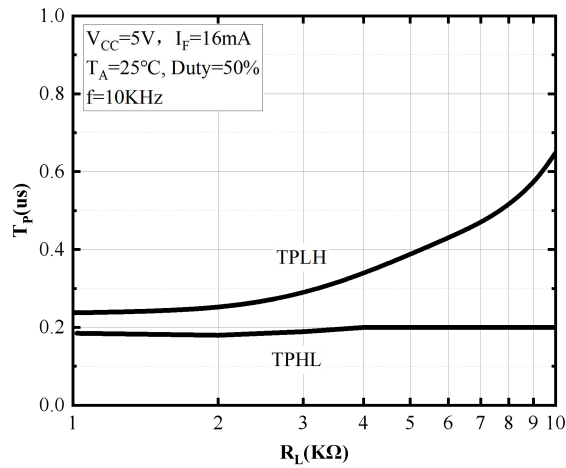
CHARACTERISTIC CURVES



**Fig.13 Propagation Delay
vs. Forward Current**



**Fig.14 Propagation Delay
vs. Ambient Temperature**



**Fig.15 Propagation Delay
vs. Load Resistance**

TEST CIRCUITS

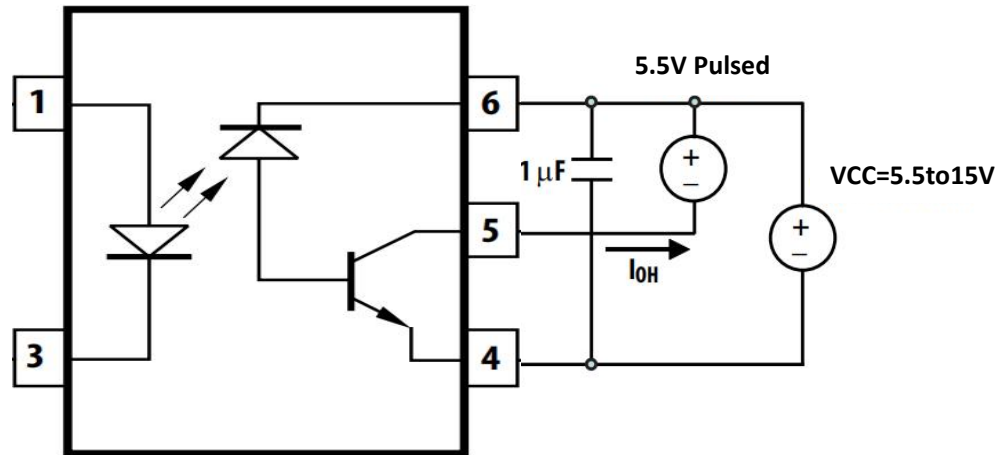


Fig.16 Test Circuits for I_{OH}

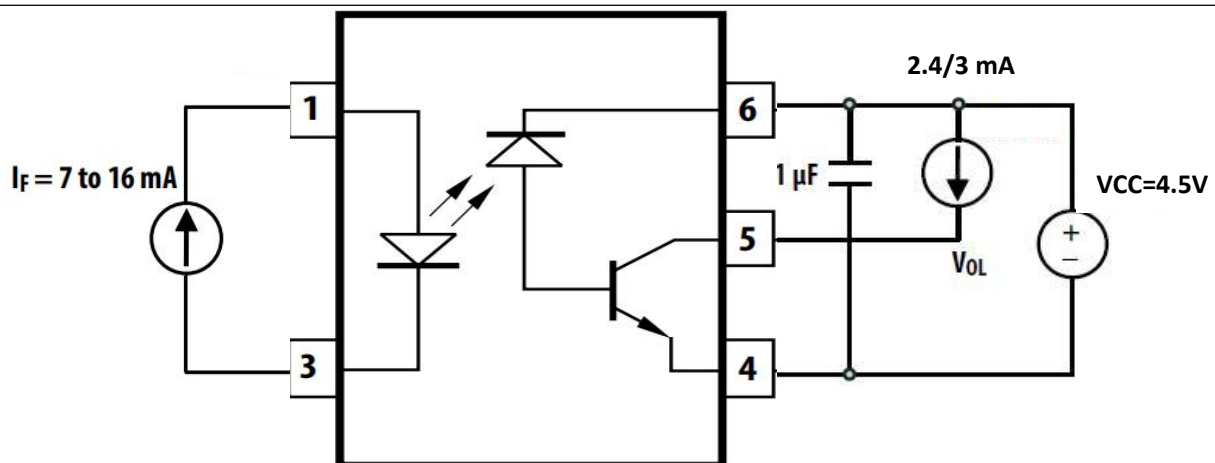


Fig.17 Test Circuits for V_{OL}

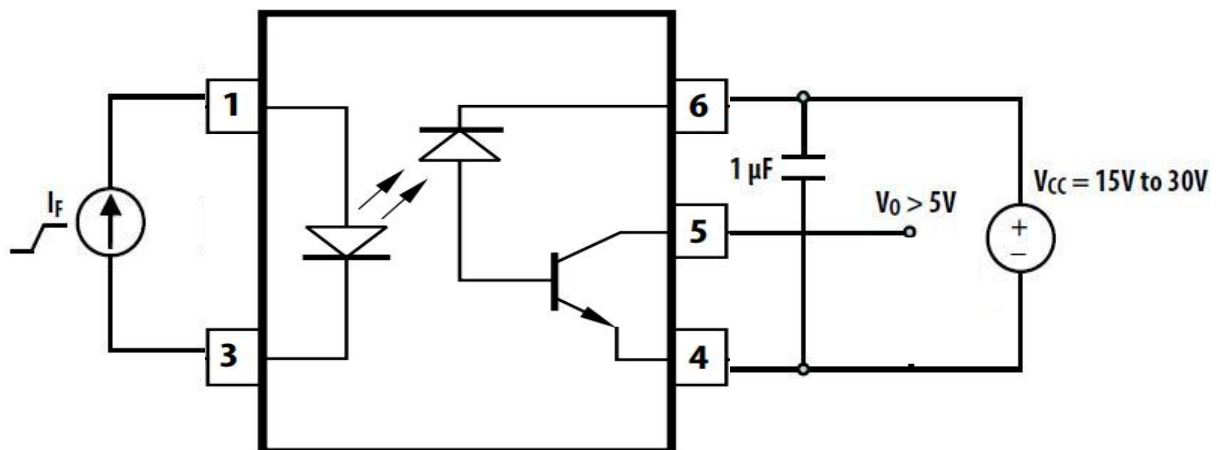


Fig.18 Test Circuits for I_{TH}

TEST CIRCUITS

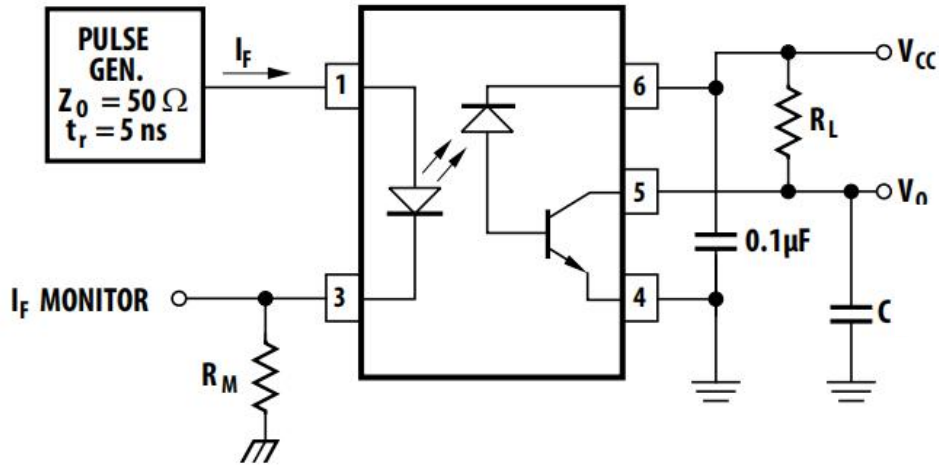


Fig.19 Test Circuits for TP HL, TPLH, tr, tf

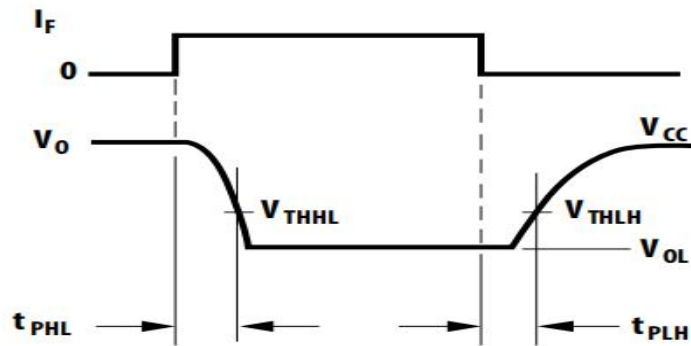


Fig.20 Wave forms of TP HL, TPLH, tr, tf

TEST CIRCUITS

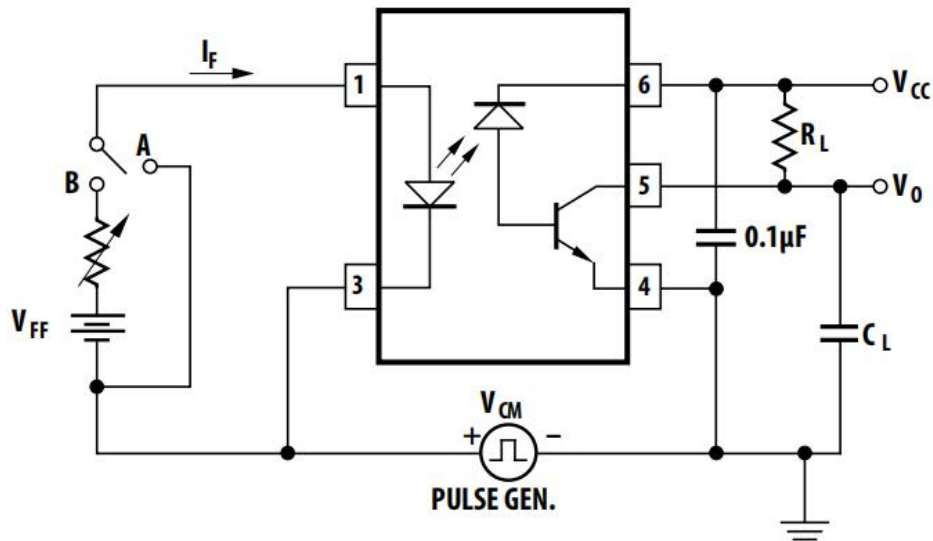


Fig.21 Test Circuits for Common Mode Transient Immunity

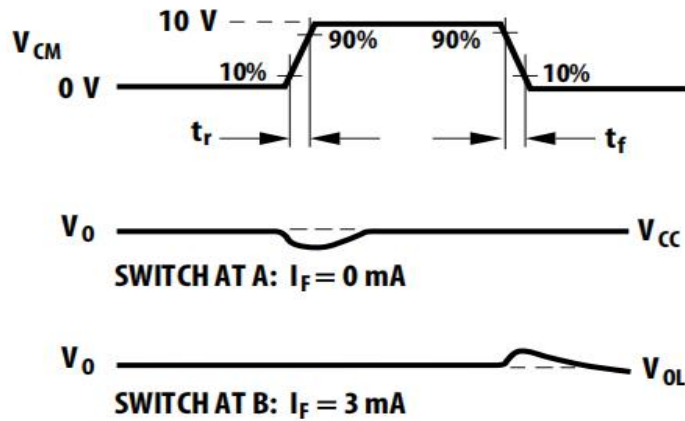
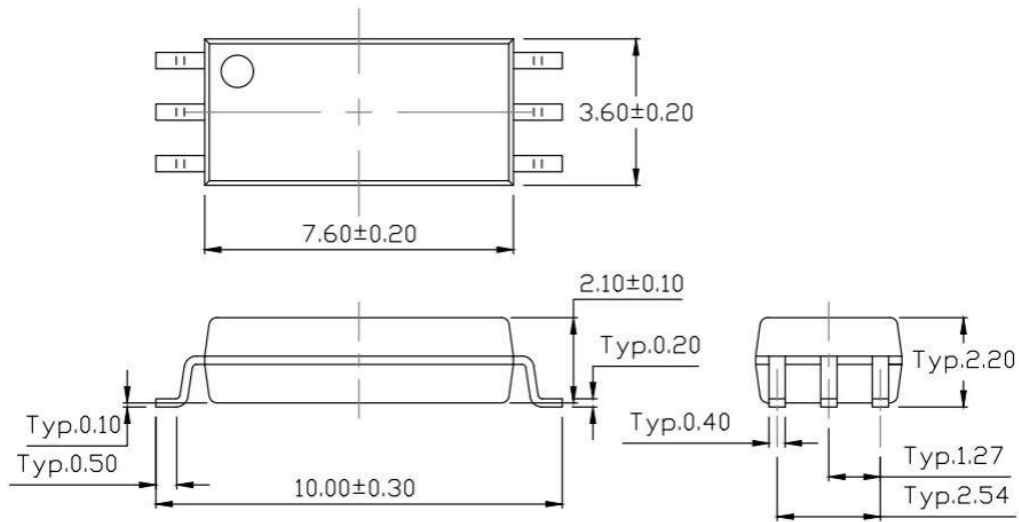


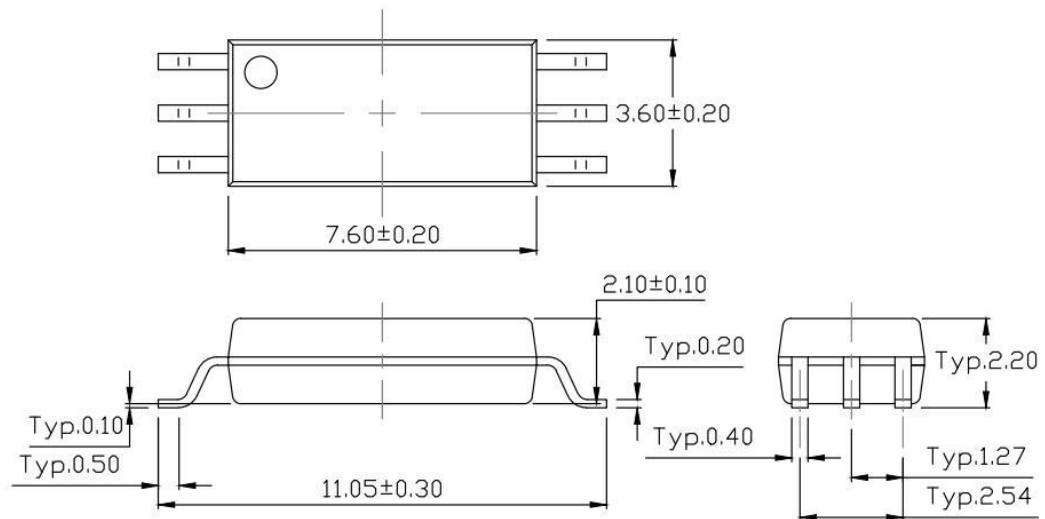
Fig.22 Waveforms of Common Mode Transient Immunity

PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Standard P Type

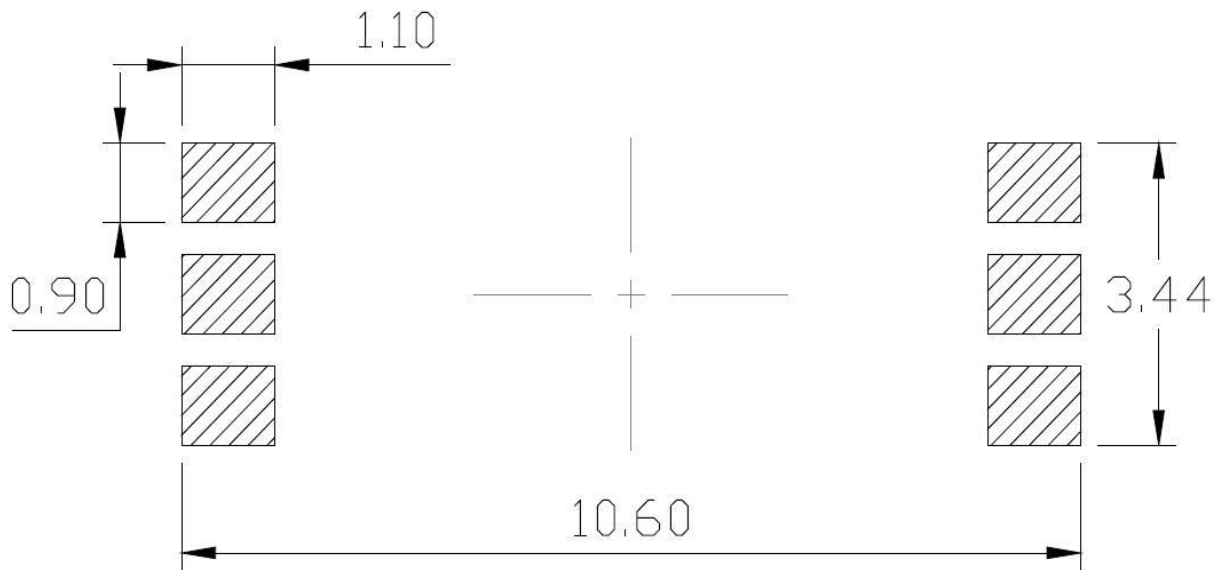


Standard W Type

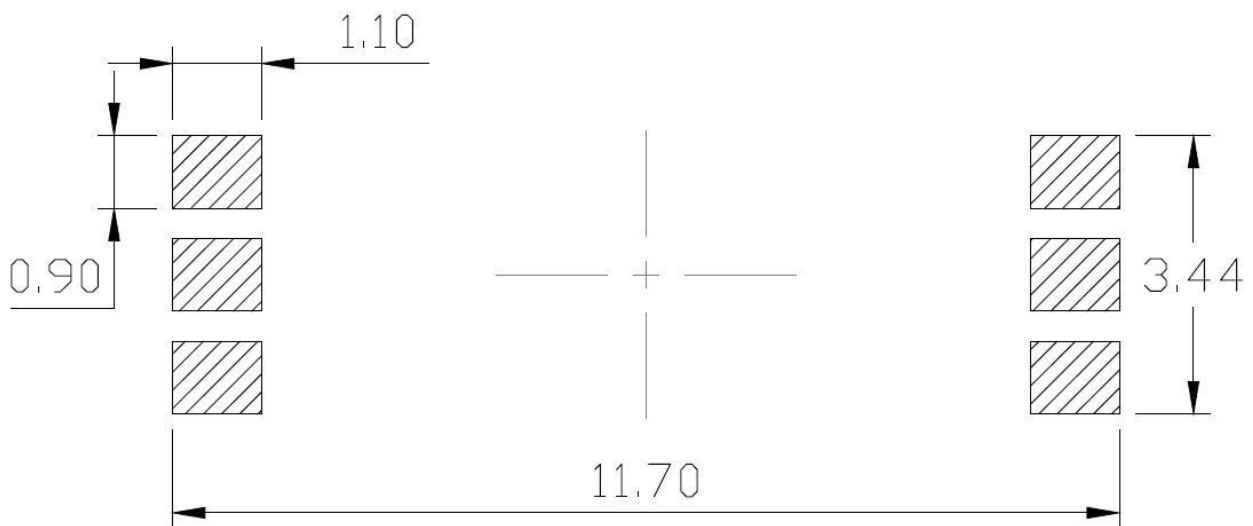


Recommended Solder Mask (Dimensions in mm unless otherwise stated)

Standard P Type

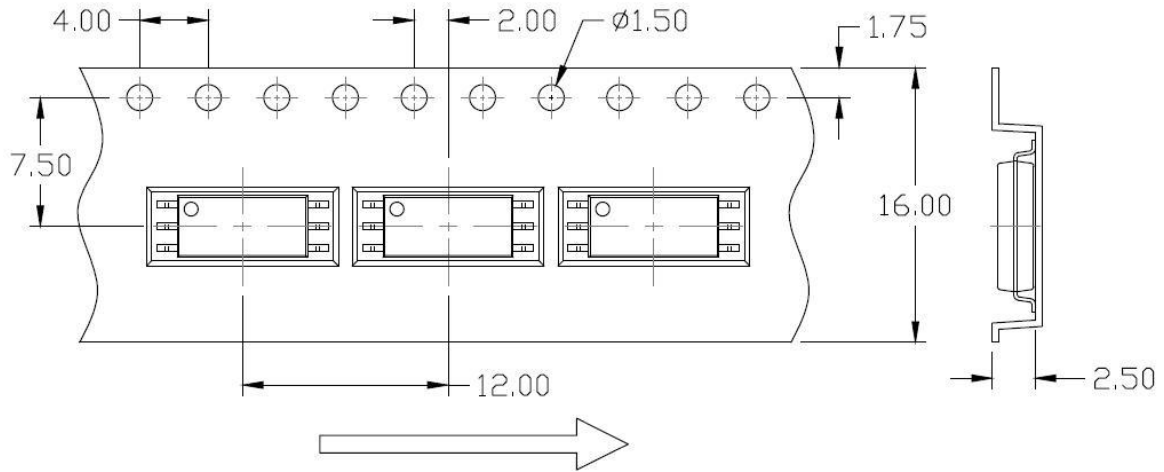


Standard W Type

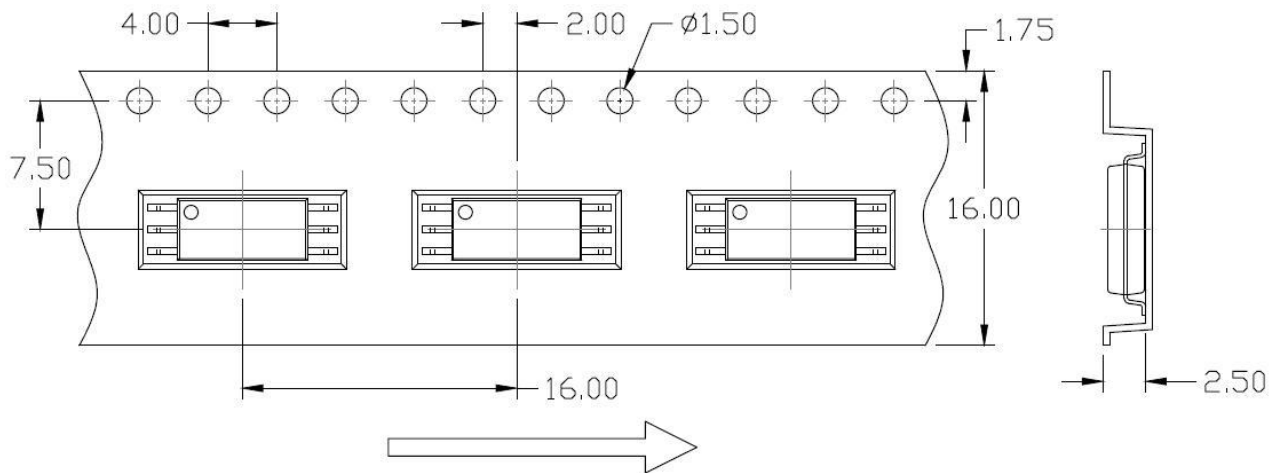


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option P(T3)

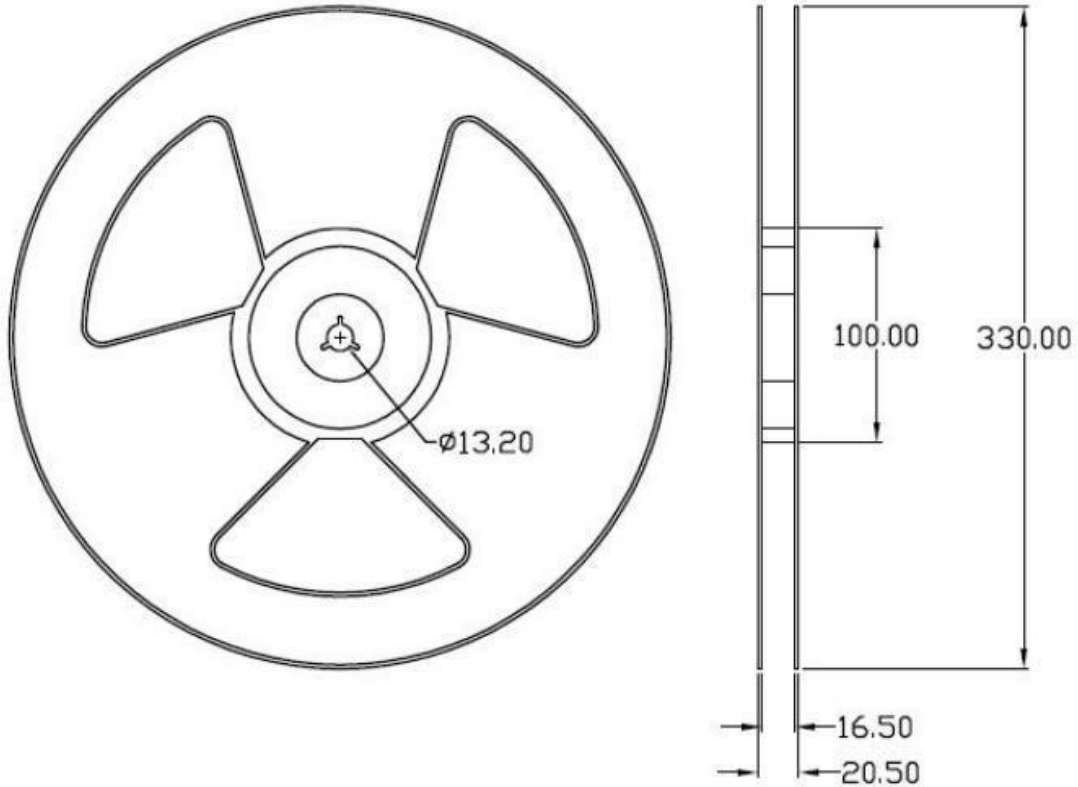


Option W(T3)



REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option



ORDERING AND MARKING INFORMATION

MARKING INFORMATION

	MP	: Company Abbr.
	50L	: Part Number
	V	: VDE Option (V or None)
	N	:Customer Specified Option(1~9 or None)
	Y	: Fiscal Year
	A	: Manufacturing Code
	WW	: Work Week

ORDERING INFORMATION

MP50L(Y)(Z)-GV(XN)

MP -Company Abbr.

50L -Part Number.

(Y) -Lead Form Option (P/W).

(Z) -Tape and Reel Option (T3).

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

V -VDE Option (V or None).

(XN)-Customer Specified Option (X: A~Z or None; N:1~9 or None)

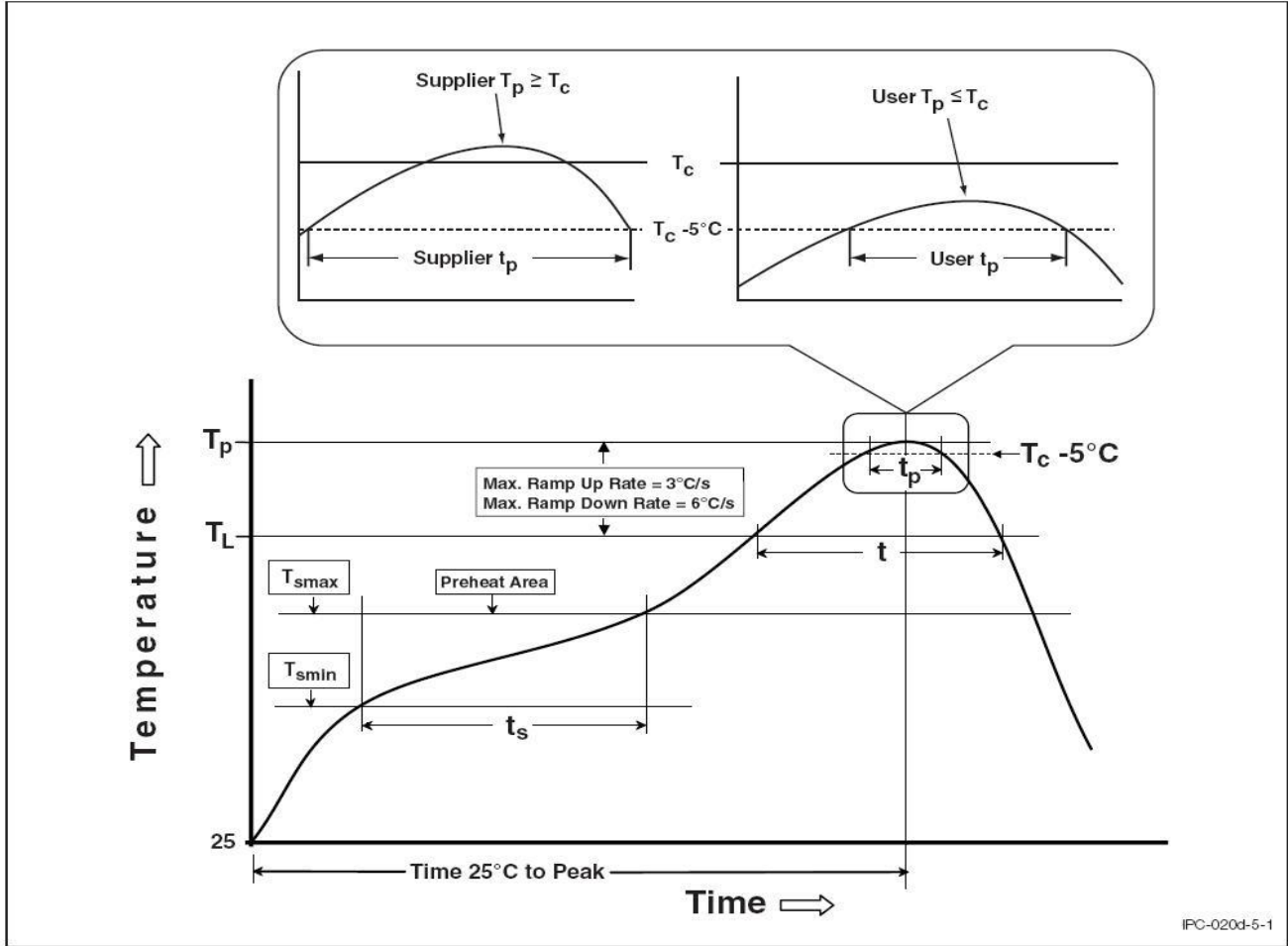
PACKING QUANTITY

Option	Quantity	Quantity – Inner box	Quantity – Outer box
P(T3)	1500 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 22.5k Units
W(T3)	1500 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 22.5k Units

S

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.



MP50L Series
LSOP6, 1Mb/s, High Speed Photo 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)
0.1	2024-06-03	Datasheet Complete