

■ Features

- High noise immunity characterized by 50kV/ μ s (Typ.) common mode rejection @ VCM = 2,000V
- Operating temperature range -40°C to 110°C
- Operating VDD range from 10V to 30V
- Fast switching speed and fast output rise/fall time
- 250kHz maximum switching speed
- Offers Lower Dynamic Power Dissipation
- Under voltage lockout protection (UVLO) with Hysteresis — Optimized for driving MOSFETs

■ Applications

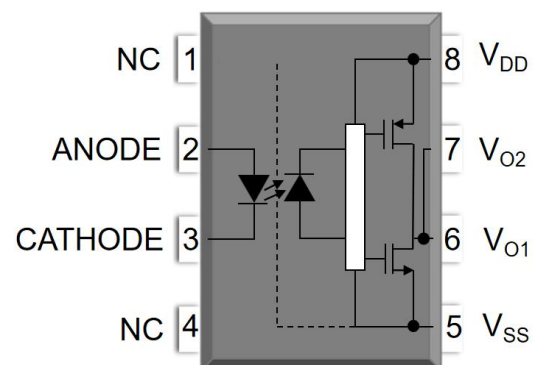
- MOSFET gate drive
- Plasma Display Panel
- High Performance DC/DC convertor
- High performance UPS
- Switching power suppliers

■ Description

The MP3182 is a 3.0 A Output Current, High Speed MOSFET Gate Drive Optocoupler. It consists of a aluminium gallium arsenide (AlGaAs) light emitting diode optically coupled to a CMOS detector with PMOS and NMOS output power transistors integrated circuit power stage. It is ideally suited for high frequency driving of power MOSFETS used in Plasma Display Panels (PDPs), motor control inverter applications and high performance DC/DC converters.

The device is packaged in an 8-pin dual in-line housing compatible with 260°C reflow processes for lead free solder compliance.

■ Schematic





MP3182 Series
DIP8, DC Input, 3.0A, Gate Driver 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
Input Current(Rise/Fall Time)	TR(IN)/TF(IN)	500	ns	
Reverse Voltage	VR	5	V	
Input Power Dissipation	PI	45	mW	
OUTPUT				
Supply Voltage	VDD-VSS	35	V	
Output Voltage	VO(PEAK)	VDD	V	
“High” Peak Output Current	IOH(PEAK)	3.0	A	2
“Low” Peak Output Current	IOL(PEAK)	3.0	A	2
Output Power Dissipation	PO	250	mW	
COMMON				
Total Power Dissipation	Ptot	295	mW	
Isolation Voltage	Viso	5000	Vrms	3
Operating Temperature	Topr	-40~110	°C	
Storage Temperature	Tstg	-55~125	°C	
Soldering Temperature	Tsol	260	°C	4

Note 1. $\leq 1\mu\text{s}$ P.W, 300pps

Note 2. Maximum pulse width = $10\mu\text{s}$.

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

Note 4. For 10 seconds.

TRUTH TABLE

LED	VDD-VSS "Positive Going" (Turn-on)	VDD-VSS "Negative Going" (Turn-off)	VO
Off	0V to 30V	0V to 30V	Low
On	0V to 7.1V	0V to 6.0V	Low
On	7.1V to 8.5V	6.0V to 7.5V	Transition
On	8.5V to 30V	7.5V to 30V	High



MP3182 Series

DIP8, DC Input, 3.0A, Gate Driver Photo Coupler

RECOMMENDED OPERATION CONDITIONS

PARAMETER	SYMBOL	MIN	MAX	UNIT
Operating Temperature	TA	-40	100	°C
Supply Voltage	VDD-VSS	10	30	V
Input Current (ON)	IF(ON)	10	16	mA
Input Voltage (OFF)	VF(OFF)	-3.6	0.8	V

ELECTRICAL OPTICAL CHARACTERISTICS (VDD=30V, VSS=GND, TA=25°C unless specified otherwise)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	TEST CONDITION	NOTE
INPUT CHARACTERISTICS							
Forward Voltage	VF	1.1	1.4	1.8	V	IF=10mA	
Reverse Current	IR	-	0.01	1	μA	VR=5V	
Reverse Breakdown Voltage	BVR	5	-	-	V	IR=10μA	
Input Threshold Current	IFLH	-	2.6	7.5	mA	IO= 0mA, VO> 5V	
Input Threshold Voltage	VFHL	0.8	1.3	-	V	IO= 0mA, VO< 5V	
Input Capacitance	Cin	-	60	-	pF	VF=0, f=1MHz	
OUTPUT CHARACTERISTICS							
High Level Supply Current	IDDH	-	1.7	3.0	mA	IF=10mA, VO=Open	
Low Level Supply Current	IDDL	-	2.0	3.0	mA	VF=0.8V, VO= Open	
High Level Output Voltage	VOH	VDD-0.3	VDD-0.1	-	V	IF=10mA, IO=-100mA	
Low Level Output Voltage	VOL	-	0.06	0.5	V	IF= 0mA, IO= 100mA	
High Level Output Current	IOH	-	-0.9	-0.5	A	VO= VDD-1V	1
		-	-	-2.5	A	VO= VDD-6V	2
Low Level Output Current	IOL	0.5	1.2	-	A	VO=VSS+1V	1
		2.5	-	-	A	VO=VSS+6V	2
Under Voltage Lockout Threshold	VUVLO+	7.1	7.9	8.5	V	IF= 10mA, VO> 5V	
	VUVLO-	6.0	6.8	7.5	V	IF= 10mA, VO< 5V	
UVLO Hysteresis	UVLO _{HYS}	-	1.1	-	V		
Isolation Resistance	Riso	10 ⁹	-	-	Ω	DC500V, 40 ~ 60%R.H.	

Note1. Maximum pulse width = 50μs.

Note2. Maximum pulse width = 10μs.



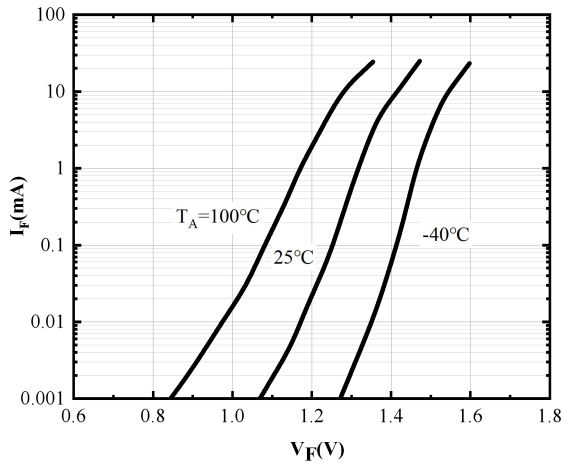
MP3182 Series

DIP8, DC Input, 3.0A, Gate Driver Photo Coupler

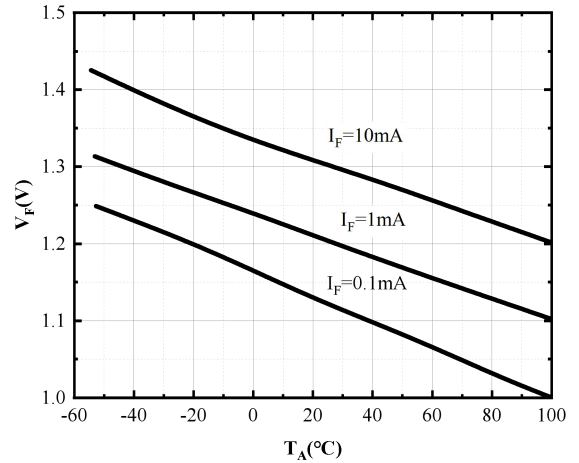
ELECTRICAL OPTICAL CHARACTERISTICS (VDD=30V, VSS=GND, TA=25°C unless specified otherwise)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	TEST CONDITION	NOTE
SWITCHING CHARACTERISTICS							
Propagation Delay Time to Output Low Level	TPHL	50	94	200	ns	IF=10mA, Cg= 10nF, Rg= 10Ω, f= 250kHz, Duty = 50%,	
Propagation Delay Time to Output High Level	TPLH	50	62	200			
Pulse Width Distortion	PWD	-	32	65			
Propagation Delay Difference Between Any Two Parts	PDD	-90	-	90			
Rise Time	tr	-	30	-			
Fall Time	tf	-	20	-			
UVLO Turn On Delay	tUVLO+	-	2.0	-	μs	IF= 10mA, VO> 5V	
UVLO Turn Off Delay	tUVLO-	-	0.3	-	μs	IF= 10mA, VO< 5V	
Common Mode Transient Immunity at Logic High	CMH	35	50	-	kV/μs	IF=10mA, VDD=30V,VCM=2.0kV	
Common Mode Transient Immunity at Logic Low	CML	35	50	-	kV/μs	VF=0V VDD=30V,VCM=2.0kV	

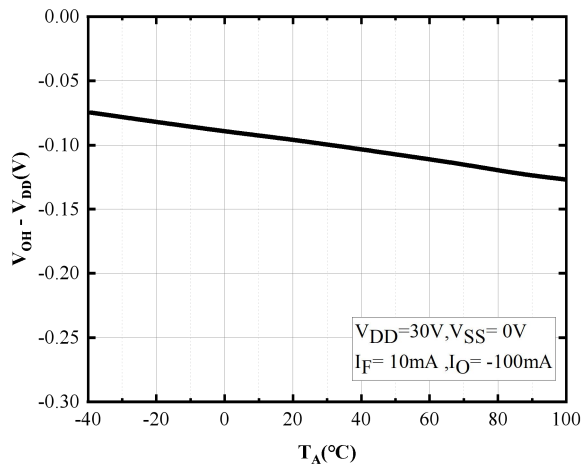
CHARACTERISTIC CURVES



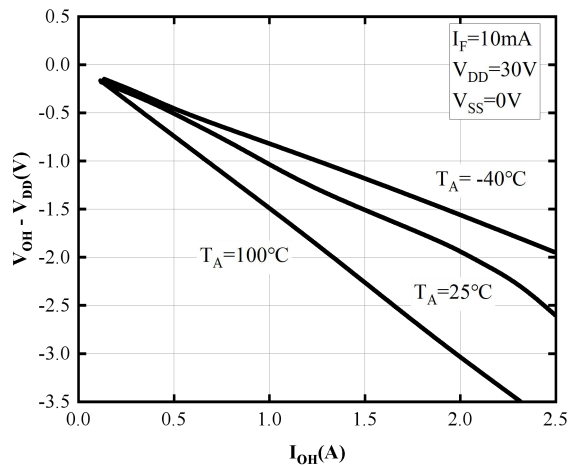
**Fig.1 Forward Current
vs. Forward Voltage**



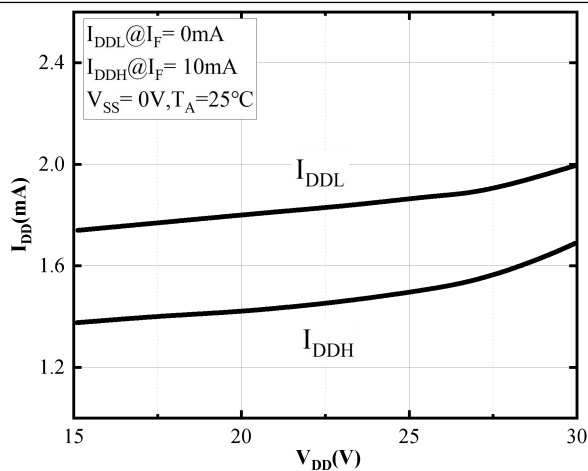
**Fig.2 Forward Voltage
vs. Ambient Temperature**



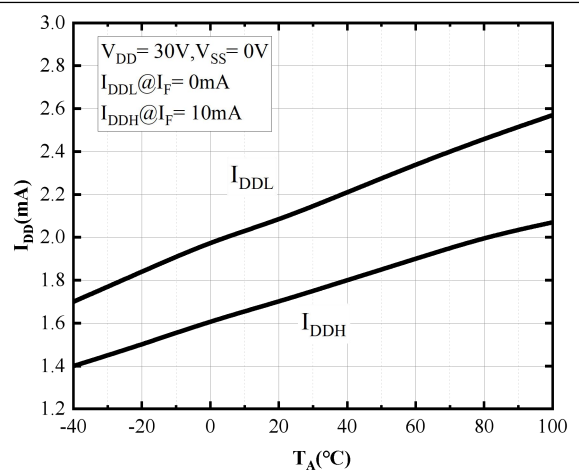
**Fig.3 High Level Output Voltage
vs. Ambient Temperature**



**Fig.4 High Level Output Voltage
vs. High Level Output Current**

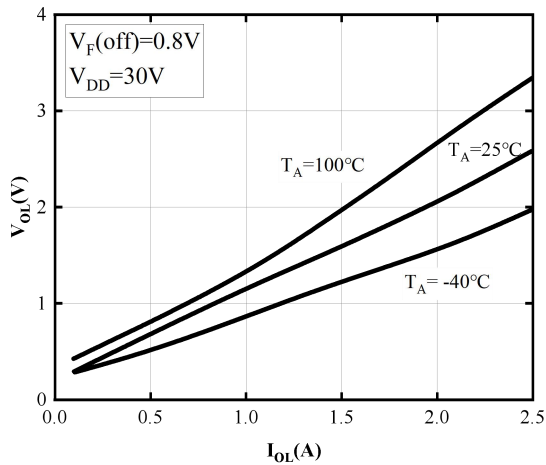


**Fig.5 Supply Current
vs. Supply Voltage**

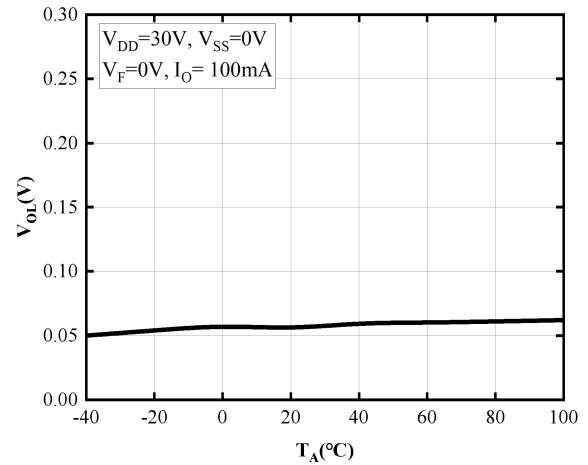


**Fig.6 Supply Current
vs. Ambient Temperature**

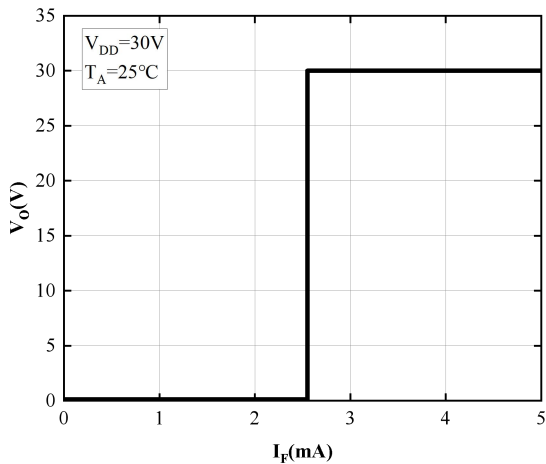
CHARACTERISTIC CURVES



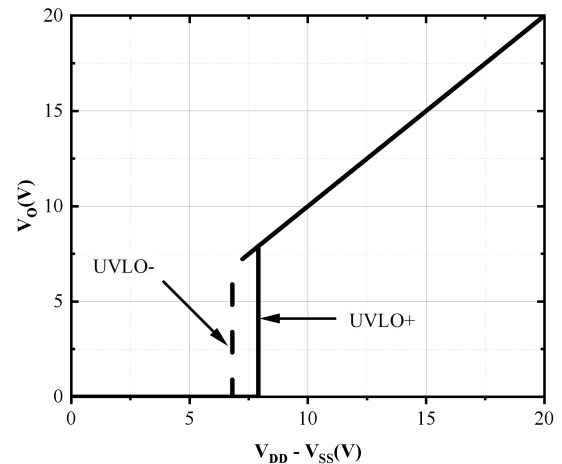
**Fig.7 Low Level Output Voltage
vs. Low Level Output Current**



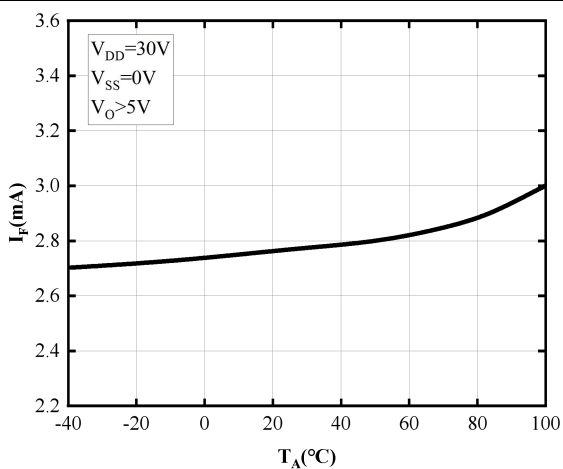
**Fig.8 Low Level Output Voltage
vs. Ambient Temperature**



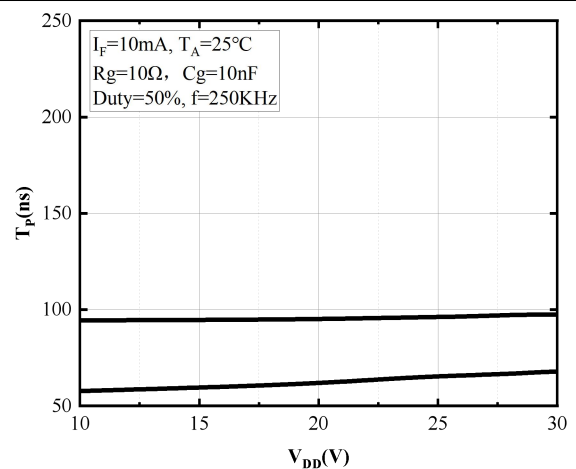
**Fig.9 Output Voltage
vs. Forward Current**



**Fig.10 Output Voltage
vs. Supply Voltage**

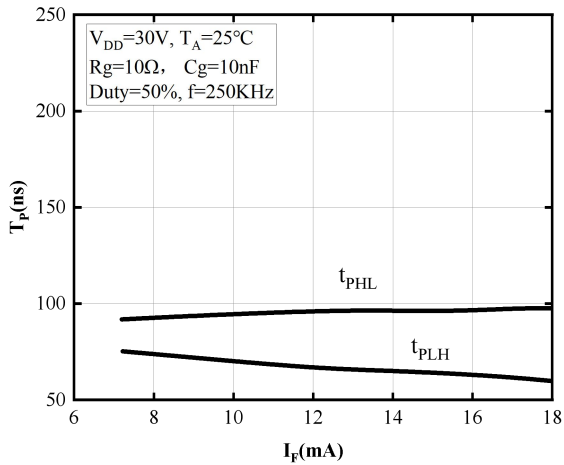


**Fig.11 Forward Current
vs. Ambient Temperature**

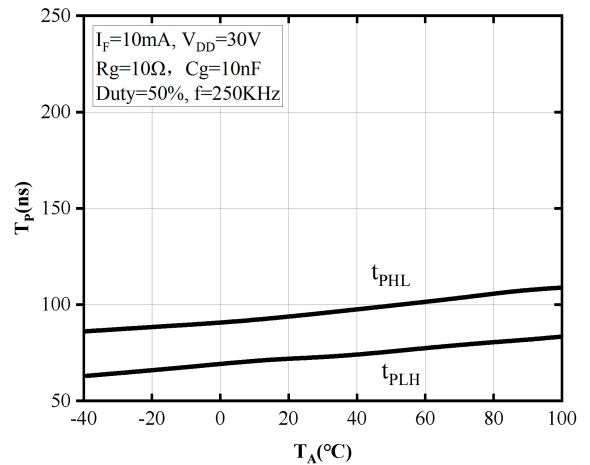


**Fig.12 Propagation Delay
vs. Supply Voltage**

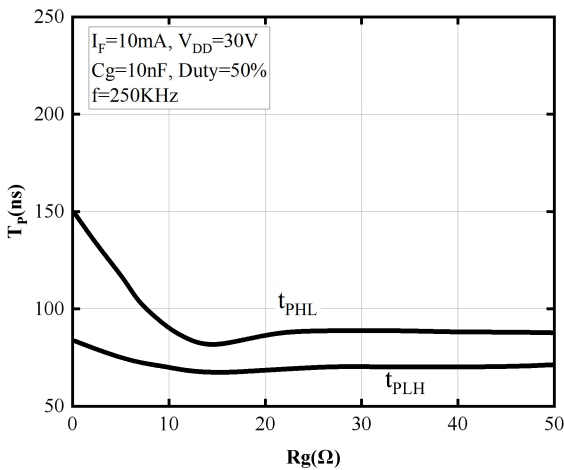
CHARACTERISTIC CURVES



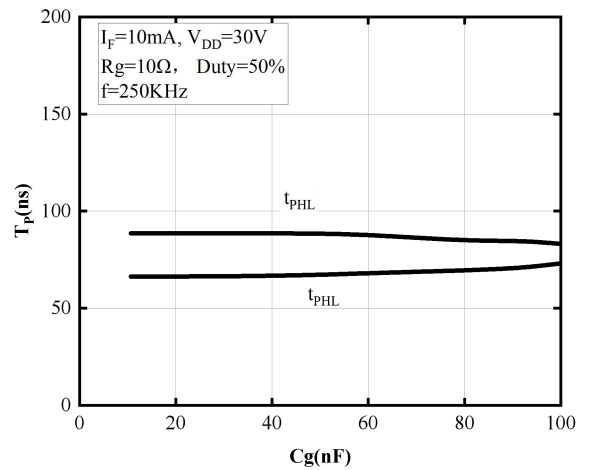
**Fig.13 Propagation Delay
vs. Forward Current**



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



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



**Fig.16 Propagation Delay
vs. Load Capacitance**

TEST CIRCUITS

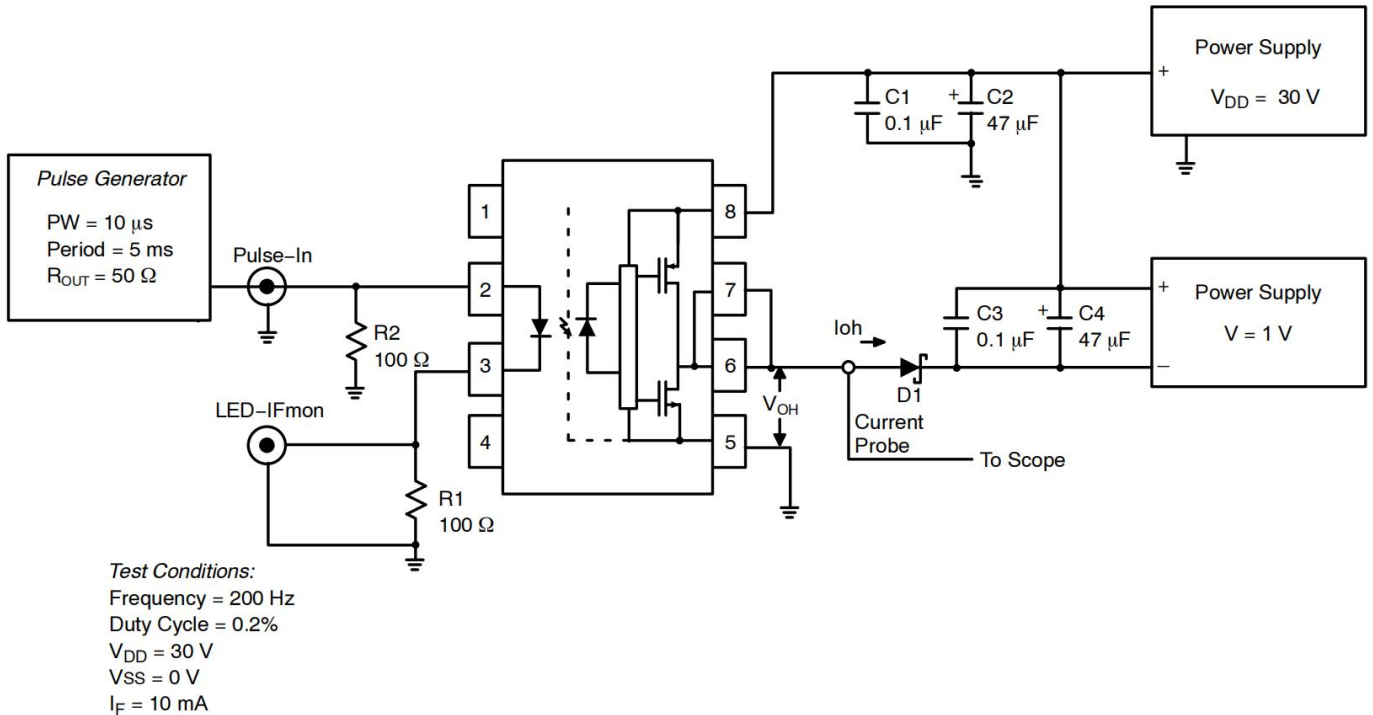


Fig.17 Test Circuits for IOH

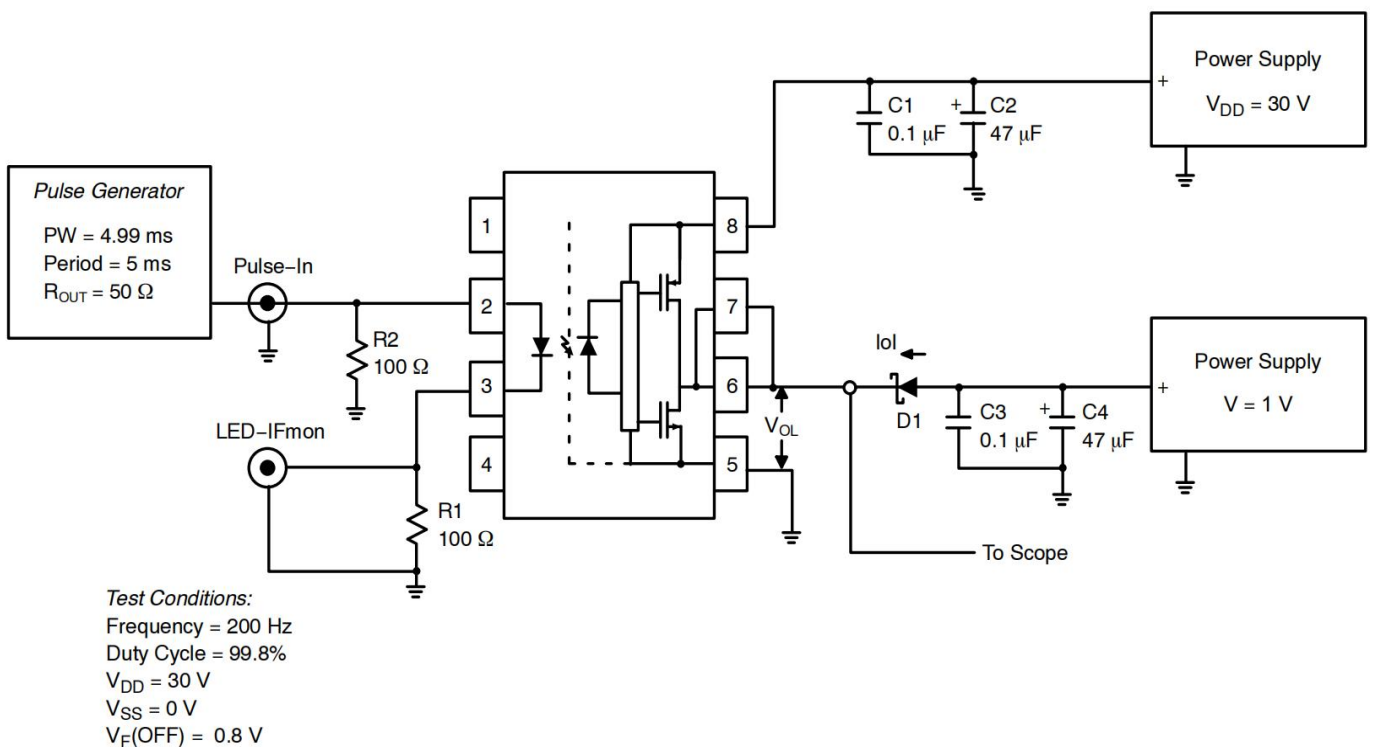


Fig.18 Test Circuits for IOL

TEST CIRCUITS

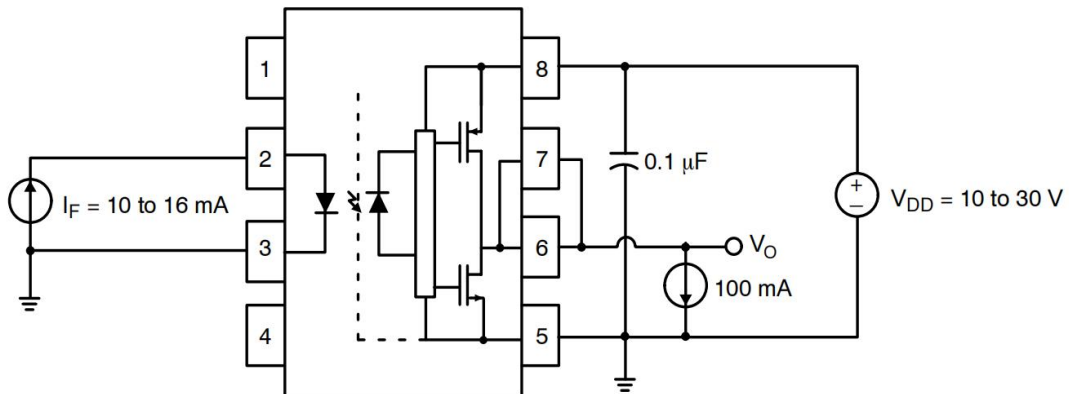


Fig.19 Test Circuits for VOH

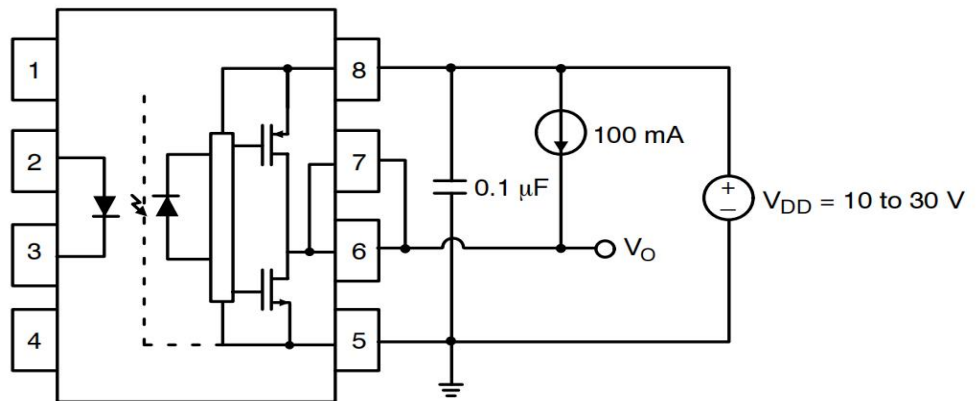


Fig.20 Test Circuits for VOL

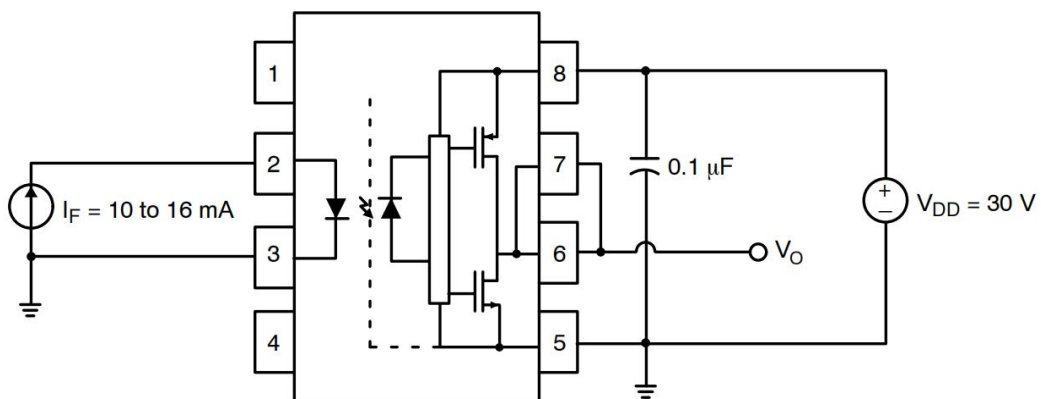


Fig.21 Test Circuits for IDDH

TEST CIRCUITS

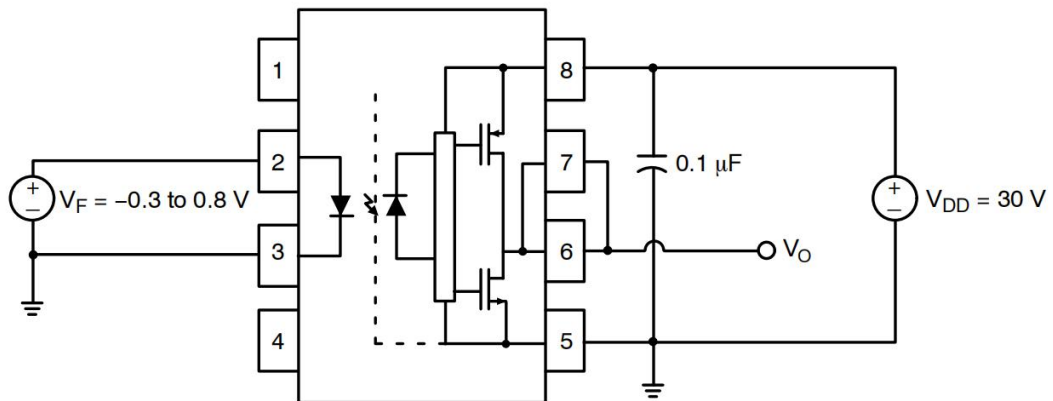


Fig.22 Test Circuits for IDDL

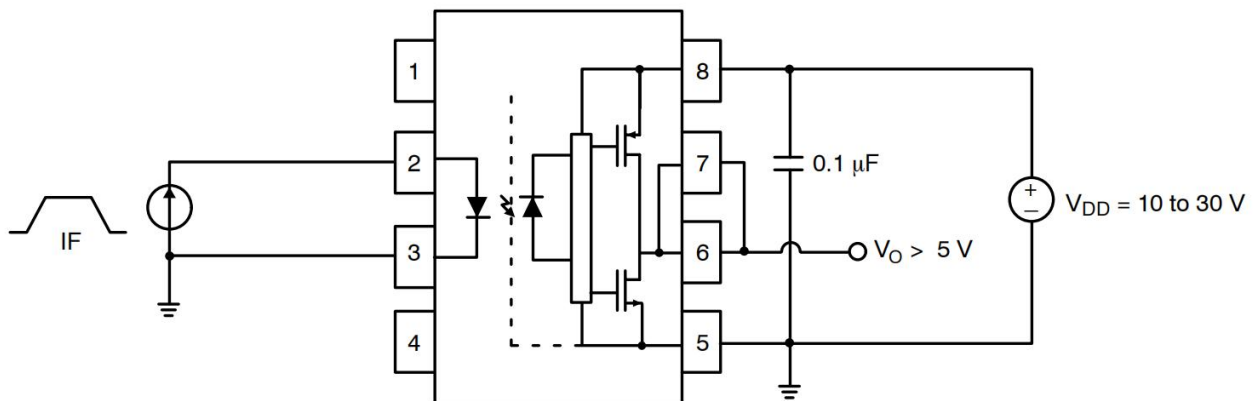


Fig.23 Test Circuits for IFLH

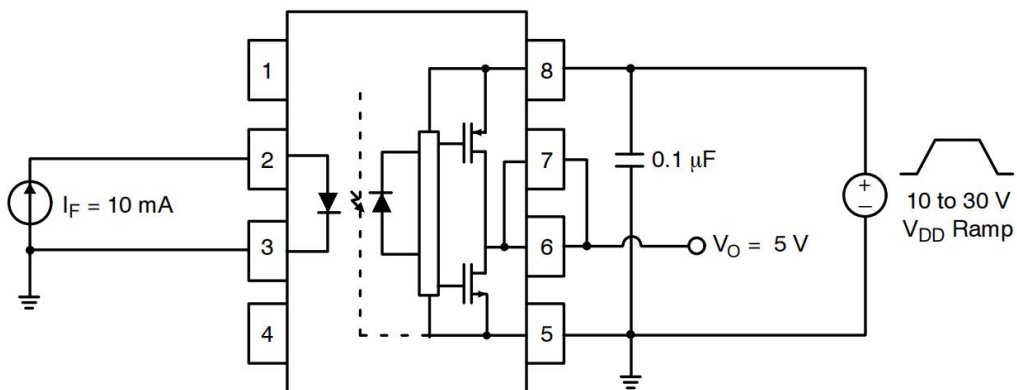


Fig.24 Test Circuits for UVLO

TEST CIRCUITS

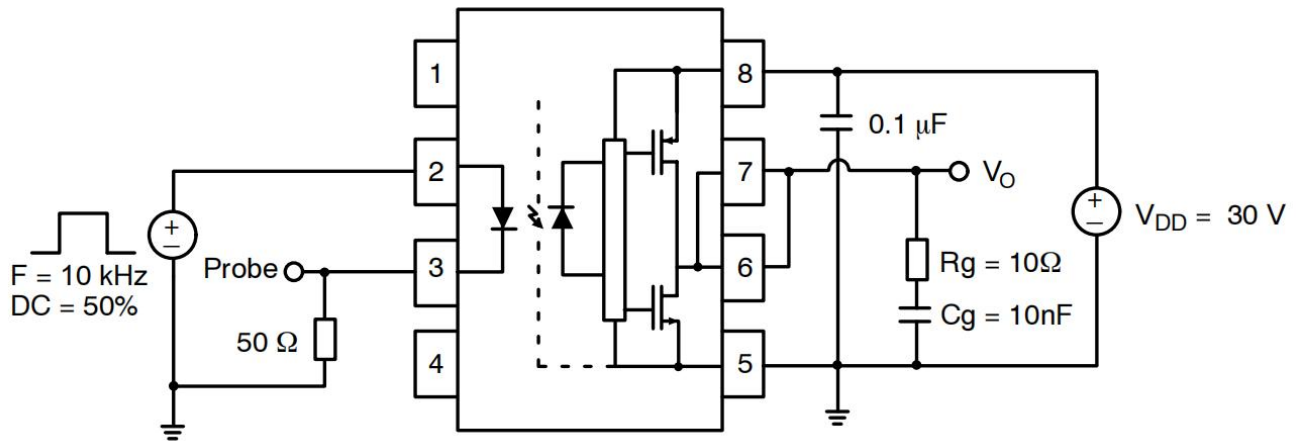


Fig.25 Test Circuits for TPHL, TPLH, tr, tf

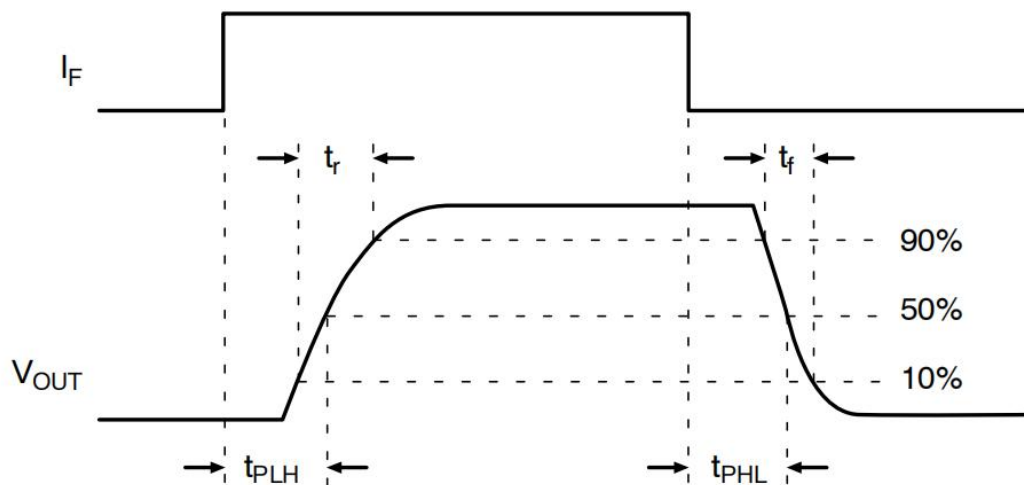


Fig.26 Wave forms of TPHL, TPLH, tr, tf

TEST CIRCUITS

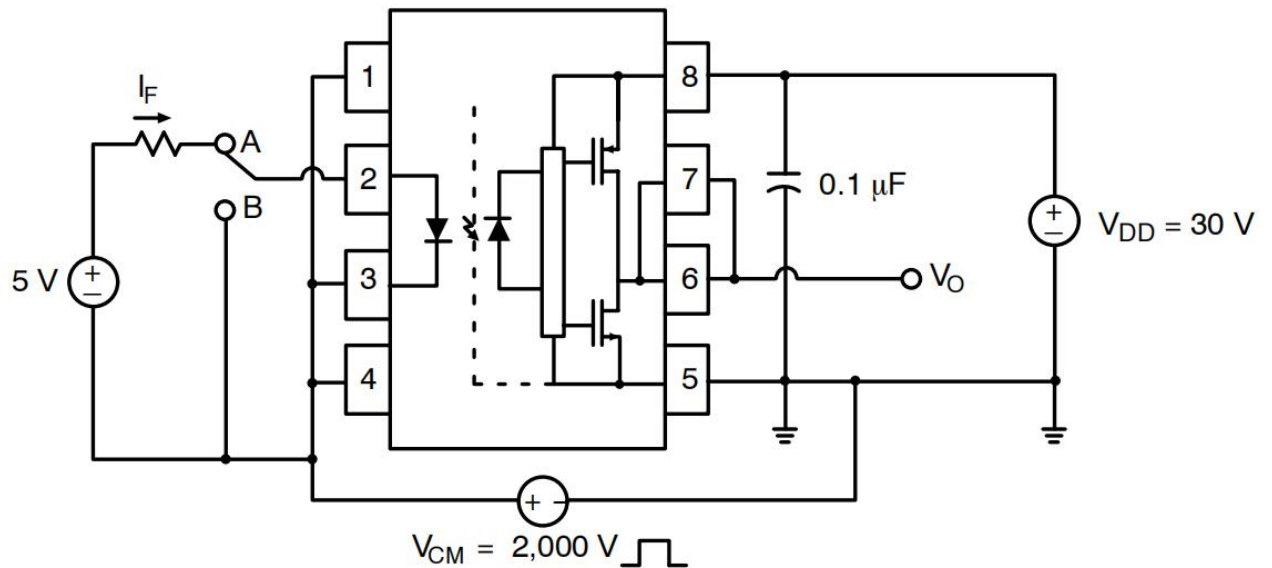


Fig.27 Test Circuits for Common Mode Transient Immunity

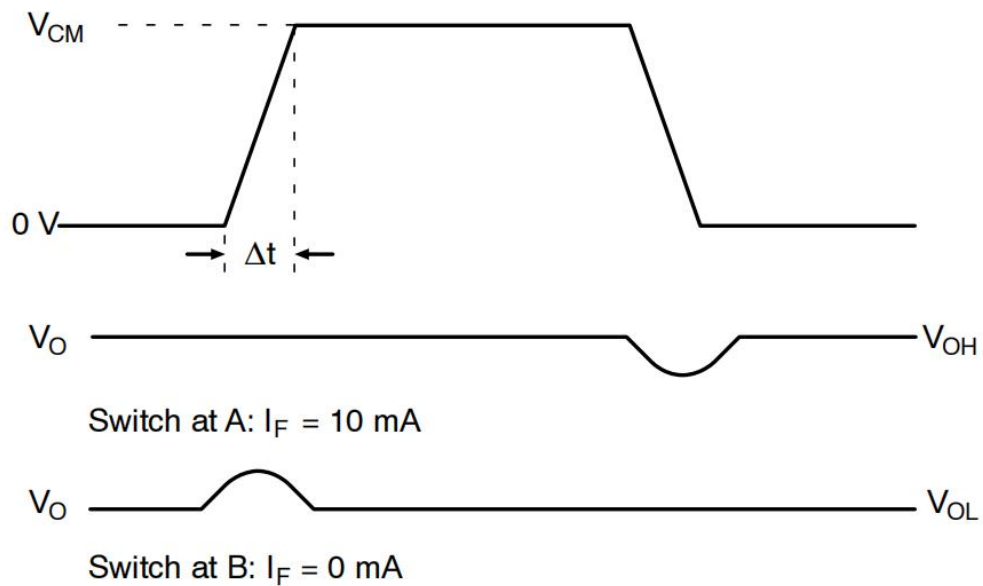
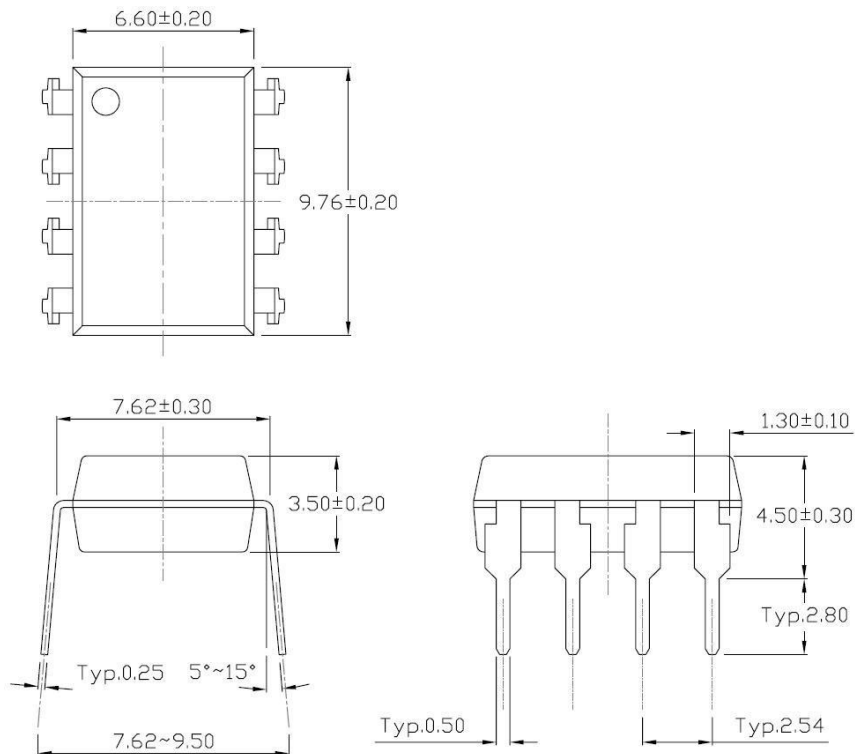


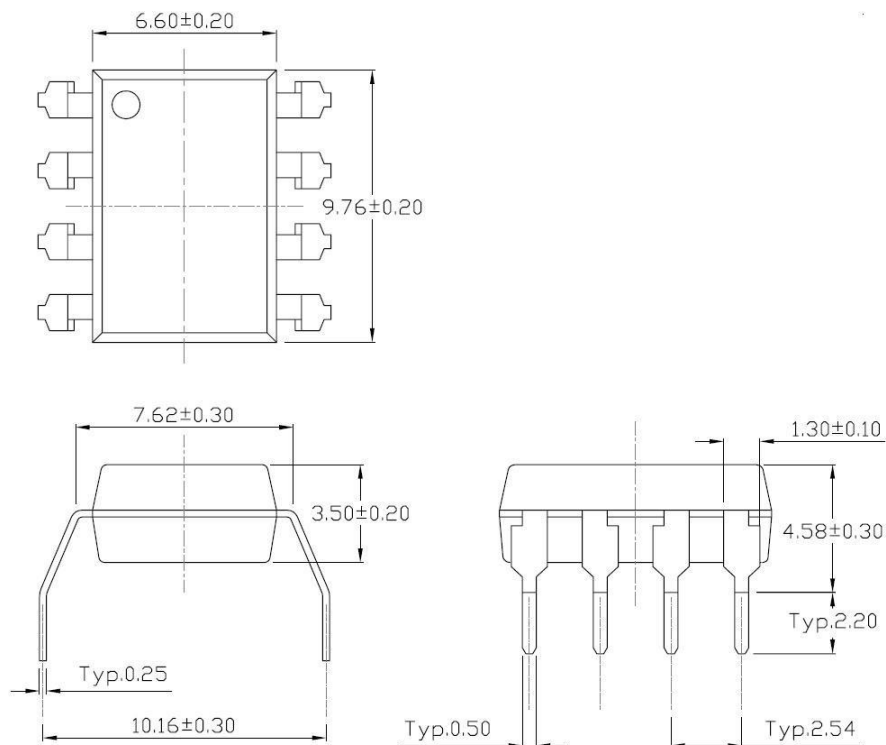
Fig.28 Waveforms of Common Mode Transient Immunity

PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Standard DIP – Through Hole (DIP Type)

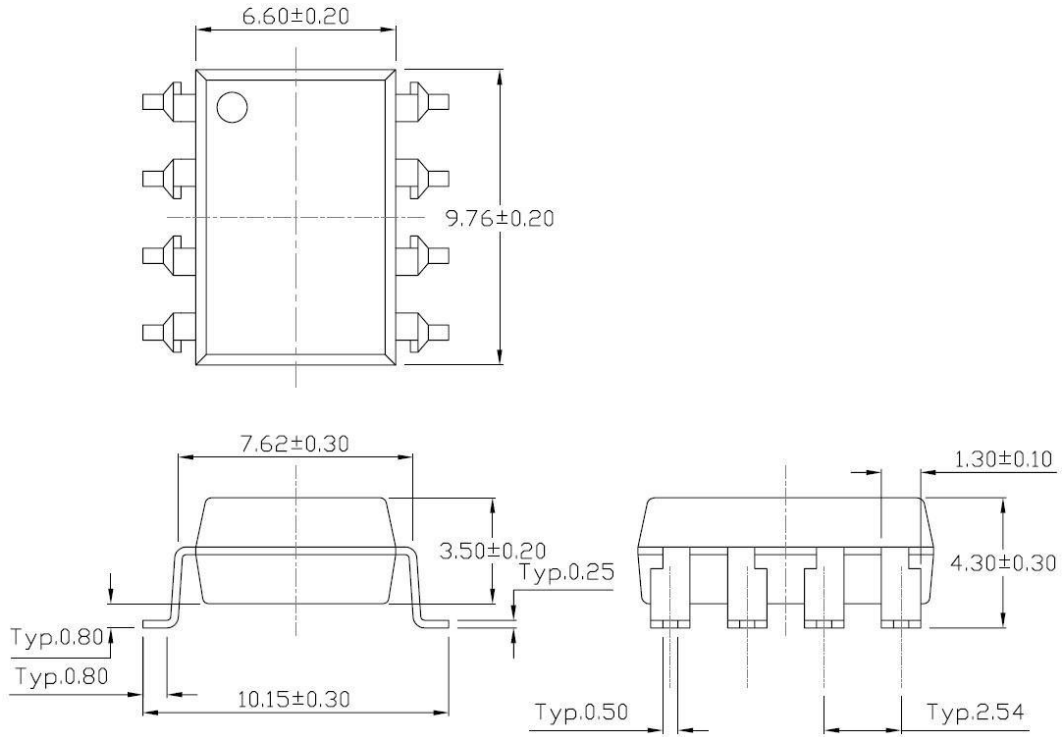


Gullwing (400mil) Lead Forming – Through Hole (M Type)

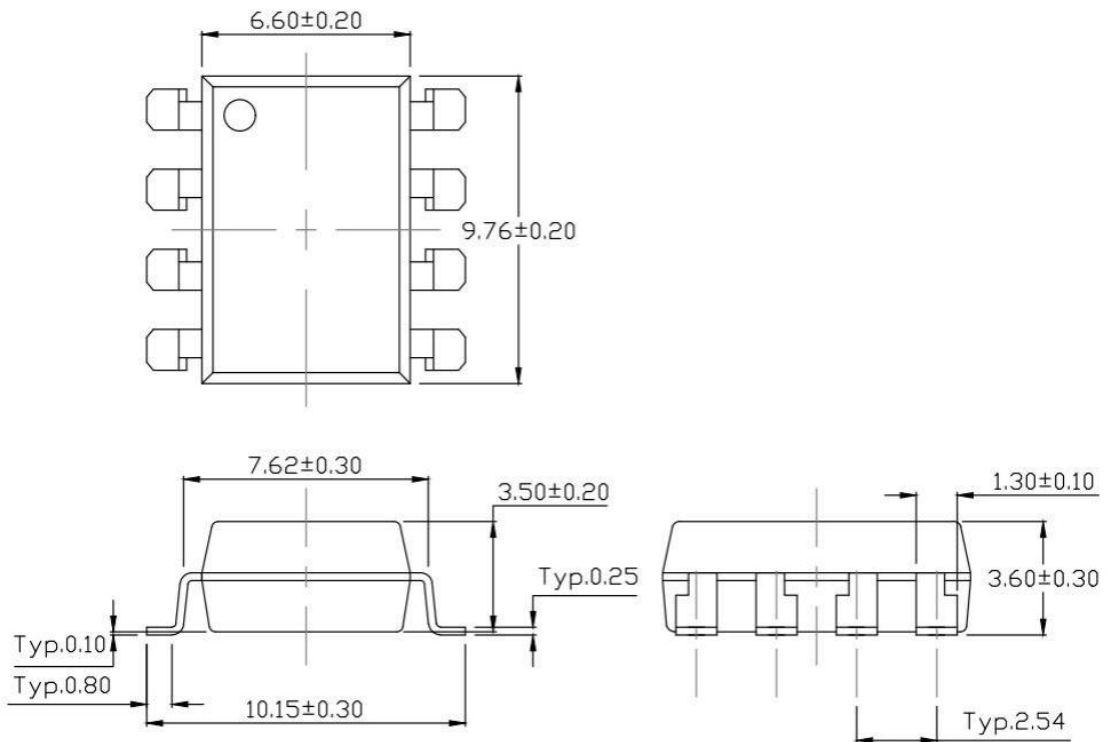


PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Surface Mount Lead Forming (S Type)

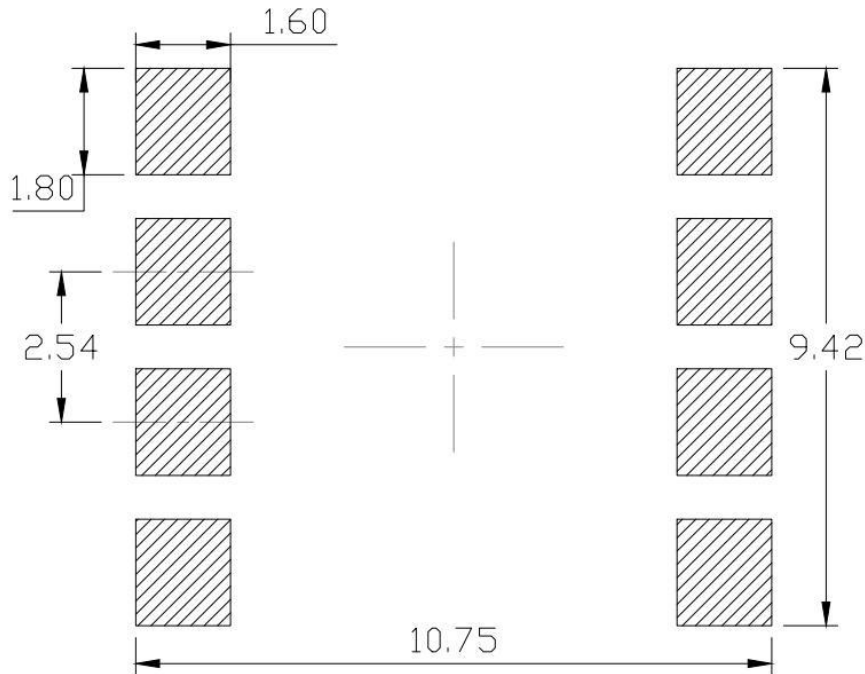


Surface Mount (Low Profile) Lead Forming (SL Type)

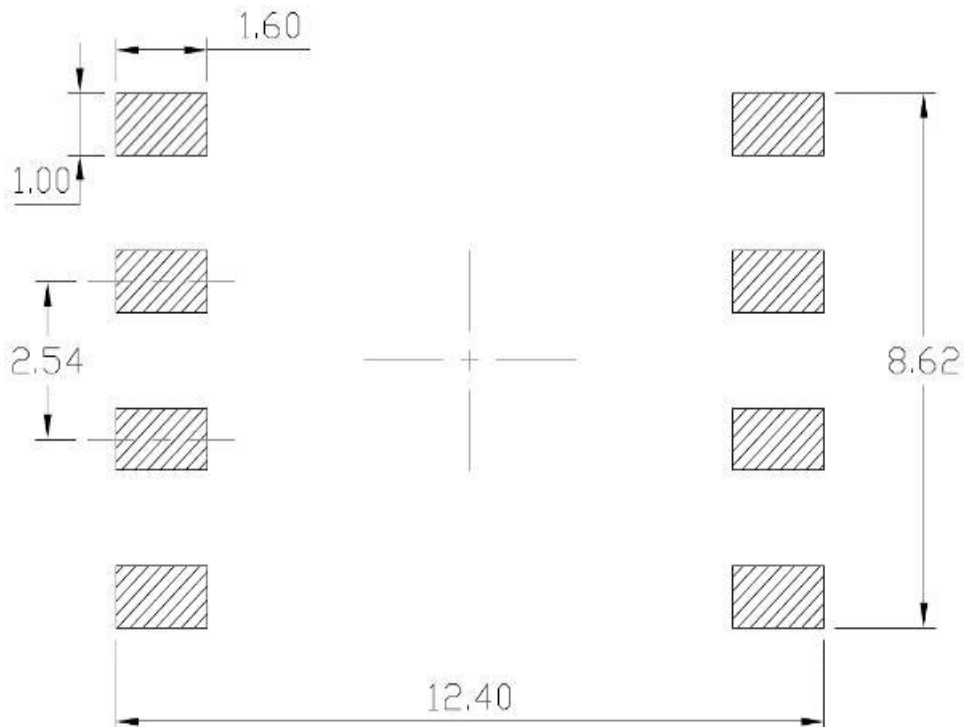


Recommended Solder Mask (Dimensions in mm unless otherwise stated)

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

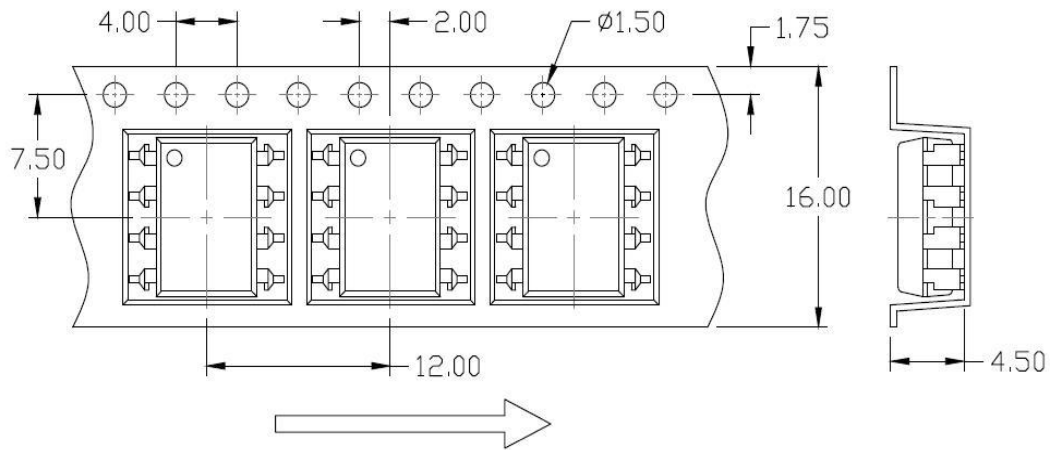


Surface Mount (Gullwing) Lead Forming

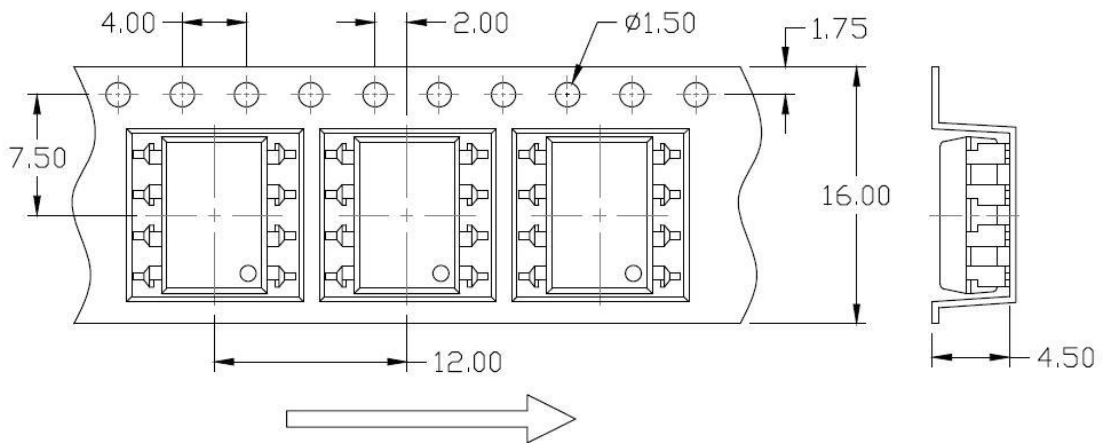


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S(T1)

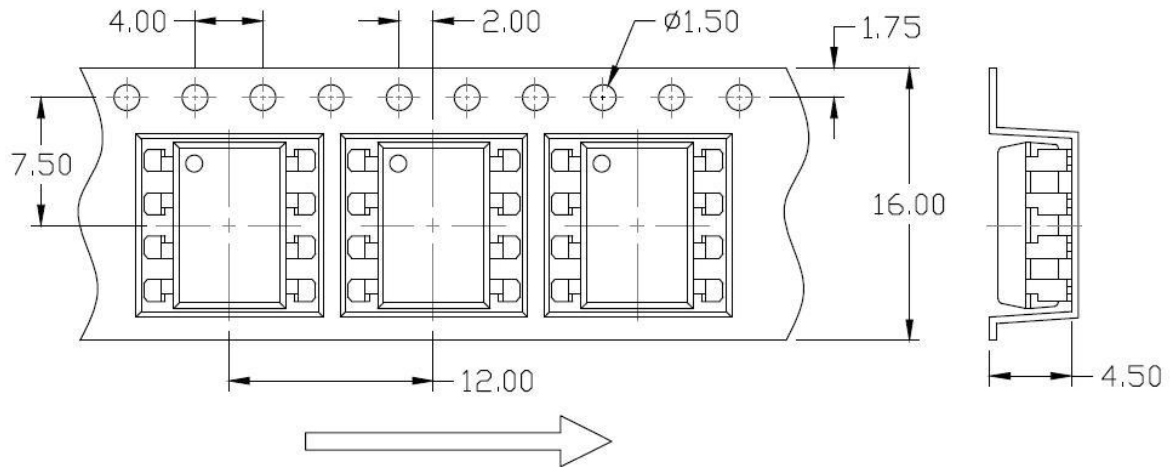


Option S(T2)

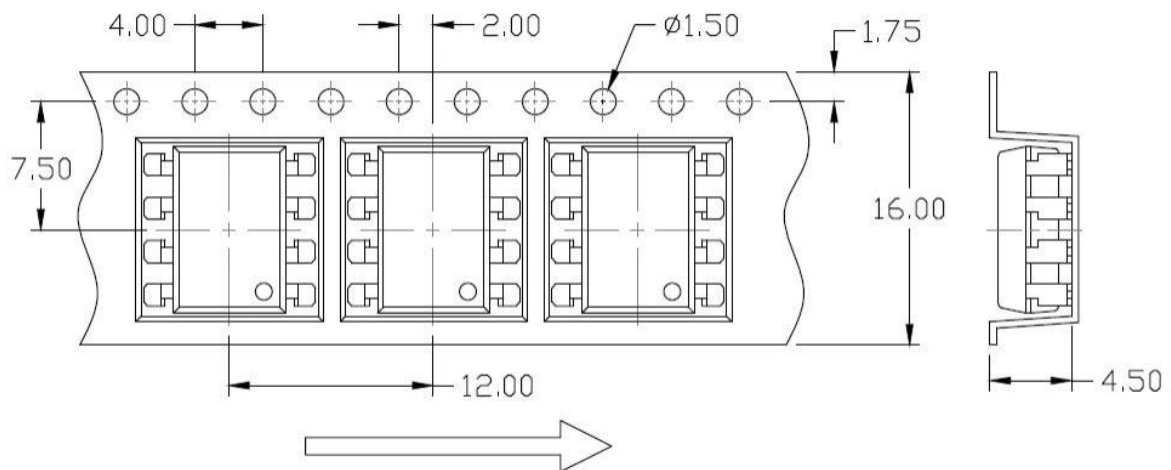


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option SL(T1)

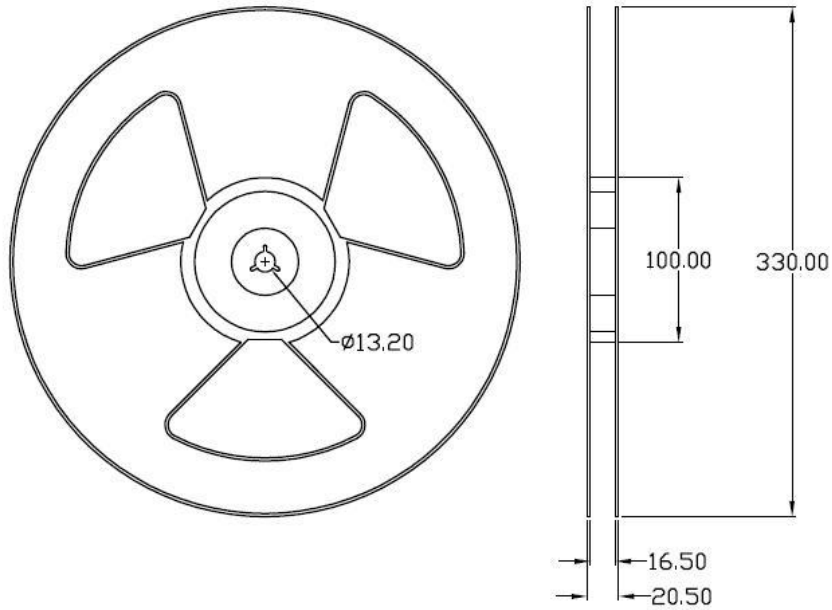


Option SL(T2)



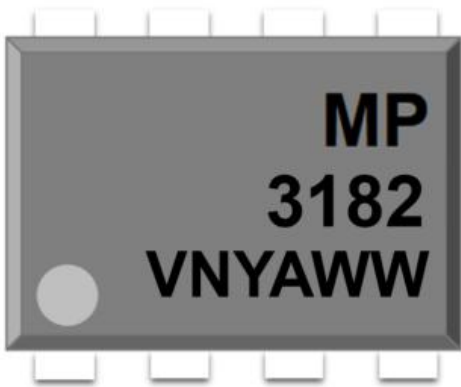
REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S & SL



ORDERING AND MARKING INFORMATION

MARKING INFORMATION



MP	: Company Abbr.
3182	: 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

MP3182(Y)(Z)-GV(XN)

MP -Company Abbr.

3182 -Part Number.

(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).

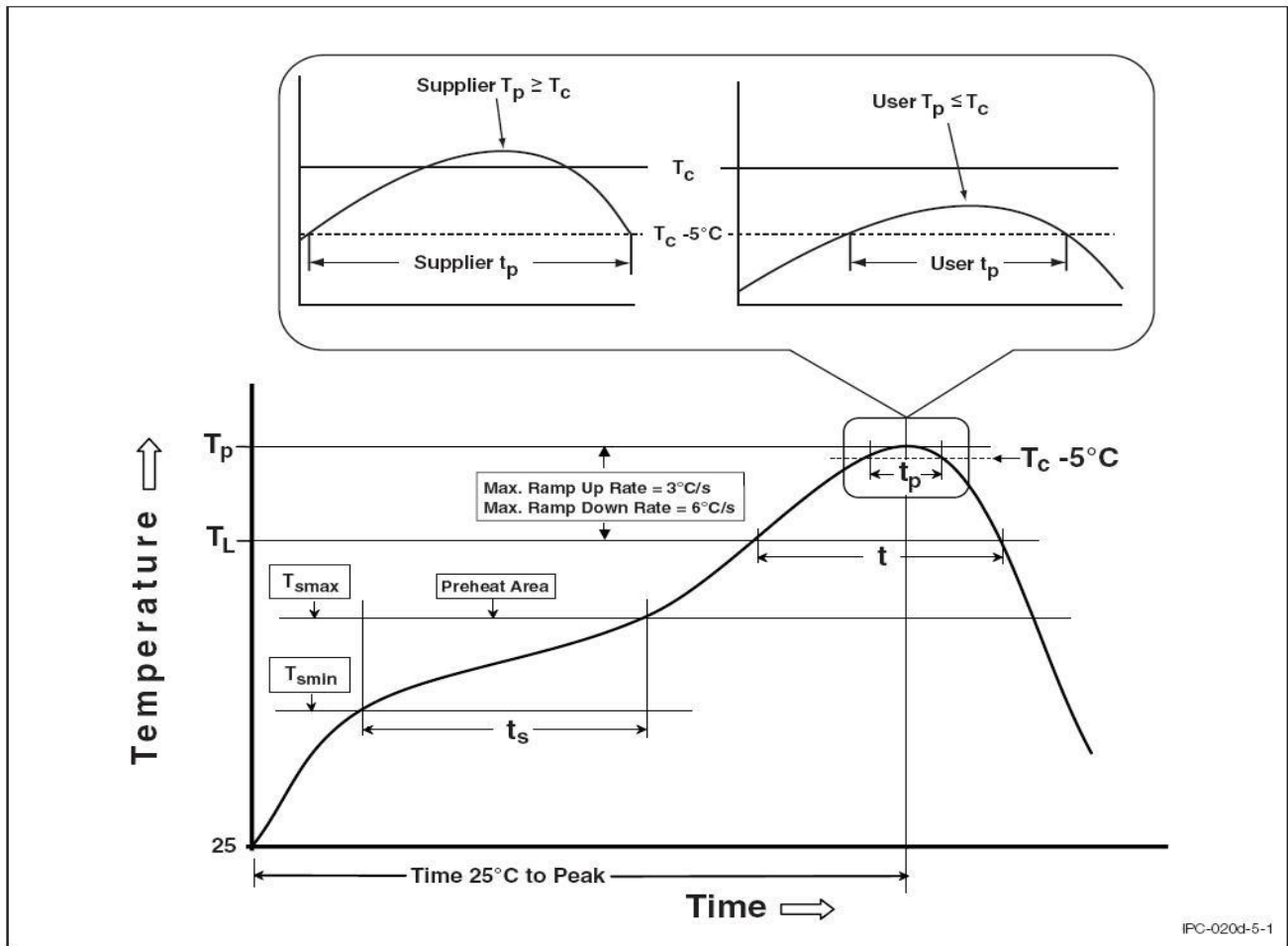
(XN)-Customer Specified Option (X: A~Z or None; N:1~9 or None).

PACKING QUANTITY

Option	Quantity	Quantity – Inner box	Quantity – Outer box
None	45 Units/Tube	32 Tubes/Inner box	10 Inner box/Outer box = 14.4k Units
M	45 Units/Tube	32 Tubes/Inner box	10 Inner box/Outer box = 14.4k 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 (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.



MP3182 Series

DIP8, DC Input, 3.0A, Gate Driver 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	2023-04-18	Datasheet Complete
1.0	2024-05-18	Upgrade Datasheet