Features

- High isolation 5000 VRMS
- DC input with a high speed driver
- Operating temperature range - 40 °C to 110 °C
- Rail to rail output
- REACH & RoHS compliance
- Halogen free (Optional)
- MSL class 1

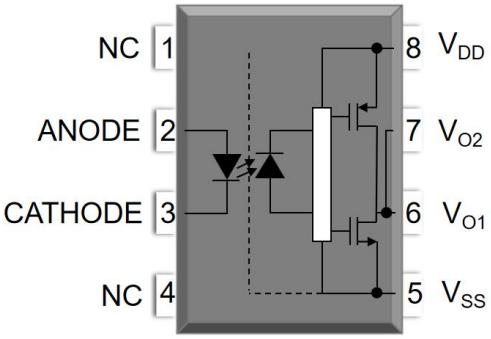
Applications

- IGBT/MOSFET gate drive
- Uninterruptible power supply
- Industrial Inverter
- AC/Brushless DC motor drives

Description

The MP3120 series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to an integrated circuit with a power output stage in a plastic DIP8 package with different lead forming options.

Schematic



ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT	Note
INPUT				
Forward Current	IF	25	mA	
Peak Forward Current	IFP	50	mA	1
Peak Transient Current	IF(trans)	1	A	2
Operating Frequency	f	50	kHz	
Reverse Voltage	VR	5	V	
Input Power Dissipation	PI	100	mW	
OUTPUT				
Supply Voltage	VDD-VSS	35	V	
Output Voltage	VO	VDD	V	
Peak Output Current	IO	2.5	A	
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. 50% duty, 1ms P.W

Note 2. ≤1μs P.W, 300pps

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 11.5V	0V to 10V	Low
On	11.5V to 13.5V	10V to 12V	Transition
On	13.5V to 30V	12V to 30V	High

RECOMMENDED OPERATION CONDITIONS

PARAMETER	SYMBOL	MIN	MAX	UNIT
Operating Temperature	TA	-40	100	°C
Supply Voltage	VDD-VSS	15	30	V
Input Current (ON)	IF(ON)	7	16	mA
Input Voltage (OFF)	VF(OFF)	0	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	-	1.36	1.8	V	IF=10mA	
Reverse Current	IR	-	-	10	μA	VR=5V	
Input Threshold Current	IFLH	-	2.5	5	mA	IO= 0mA, VO> 5V	
Input Threshold Voltage	VFHL	0.8	1.26	-	V	IO= 0mA, VO< 5V	
Input Capacitance	Cin	-	13	-	pF	V=0, f=1MHz	
OUTPUT CHARACTERISTICS							
High Level Supply Current	IDDH	-	1.4	3.0	mA	IF= 7 to 10mA, VO= Open	
Low Level Supply Current	IDDL	-	1.5	3.0	mA	VF = 0 to 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	-	VSS+0.06	VSS+0.25	V	IF= 0mA, IO= 100mA	
High Level Output Current	IOH	-	-	-1	A	VO= VDD-1.5V	1
		-	-	-2.5	A	VO= VDD-4.0V	2
Low Level Output Current	IOL	1	-	-	A	VO= VSS+1.5V	1
		2.5	-	-	A	VO= VSS+4.0V	2
Under Voltage Lockout Threshold	VUVLO+	11	12.5	13.5	V	IO= 10mA, VO> 5V	
	VUVLO-	9.5	11	12	V	IO= 10mA, VO< 5V	
Isolation Resistance	Riso	10^12	10^14	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance	CIO	-	1.0	-	pF	VF=0, f=1MHz	

Note1. Maximum pulse width = 50μs.

Note2. Maximum pulse width = 10μs.

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	190	500	ns	IF= 10mA, Cg= 10nF, Rg= 10Ω, f= 10kHz, Duty = 50%, TA= 25℃	
Propagation Delay Time to Output High Level	TPLH	50	130	500			
Pulse Width Distortion	PWD	-	60	200			
Propagation Delay Difference Between Any Two Parts	PDD	-100	-	100			
Rise Time	tr	-	70	-			
Fall Time	tf	-	30	-			
UVLO Turn On Delay	tUVLO(ON)	-	1.6	-	μs	IF= 10mA, VO> 5V	
UVLO Turn Off Delay	tUVLO(OFF)	-	0.4	-	μs	IF= 10mA, VO< 5V	
Common Mode Transient Immunity at Logic High	|CMH|	20	-	-	kV/μs	IF=10mA, VDD=30V, TA=25℃, VCM= 2kV	
Common Mode Transient Immunity at Logic Low	|CML|	20	-	-	kV/μs	IF=0mA, VDD=30V, TA= 25℃, VCM= 2kV	

CHARACTERISTIC CURVES

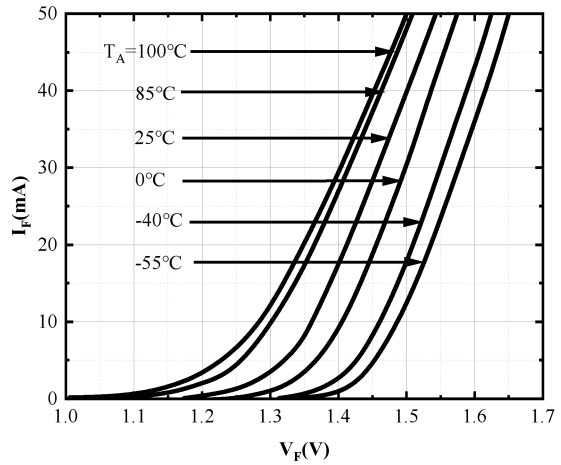


Fig.1 Forward Current vs. Forward Voltage

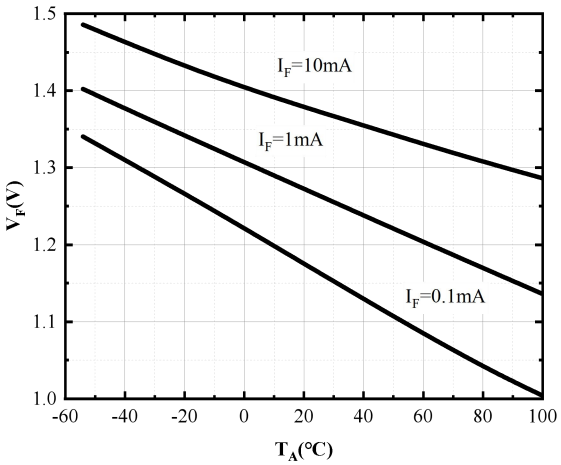


Fig.2 Forward Voltage vs. Ambient Temperature

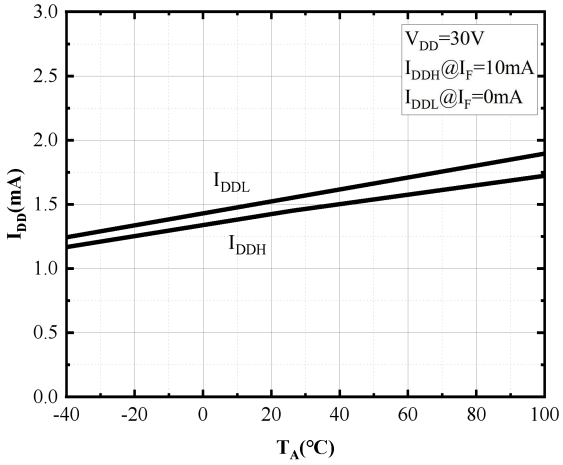


Fig.3 Supply Current vs. Ambient Temperature

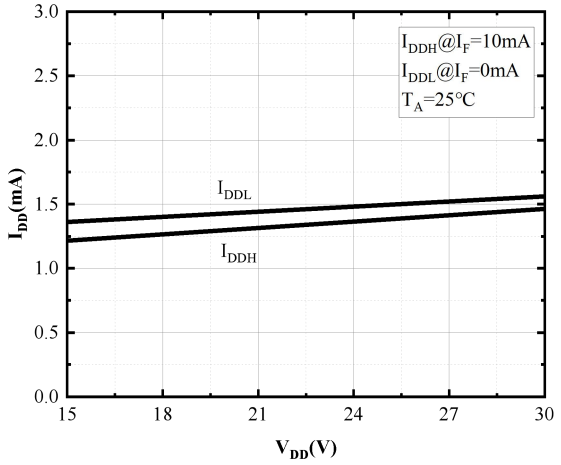


Fig.4 Supply Current vs. Supply Voltage

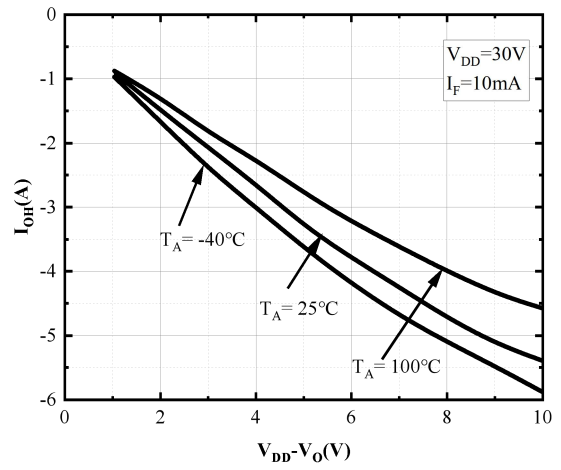


Fig.5 High Level Output Voltage vs. High Level Output Current

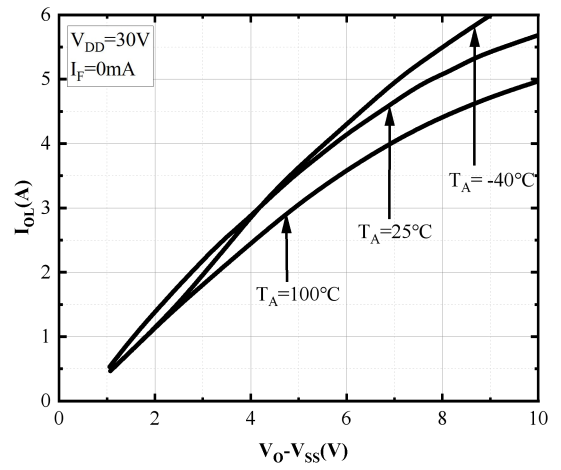


Fig.6 Low Level Output Voltage vs. Low Level Output Current

CHARACTERISTIC CURVES

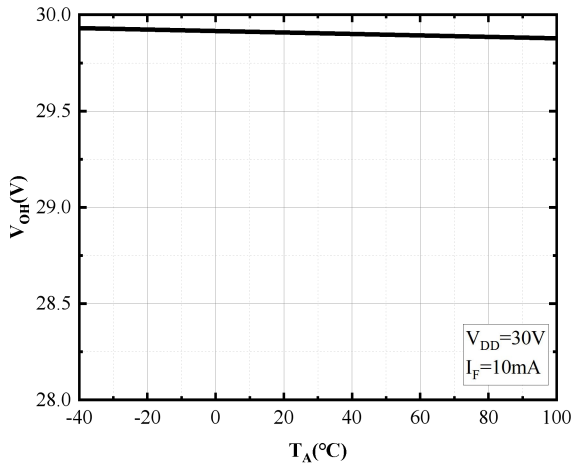


Fig.7 High Level Output Voltage vs. Ambient Temperature

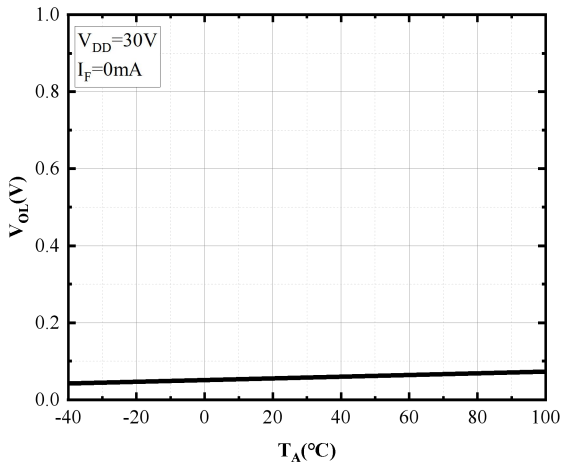


Fig.8 Low Level Output Voltage vs. Ambient Temperature

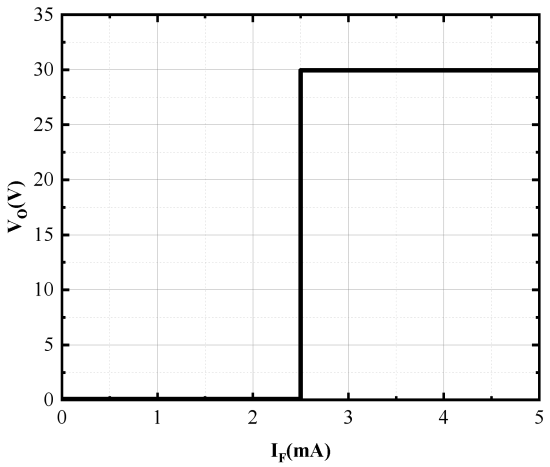


Fig.9 Output Voltage vs. Forward Current

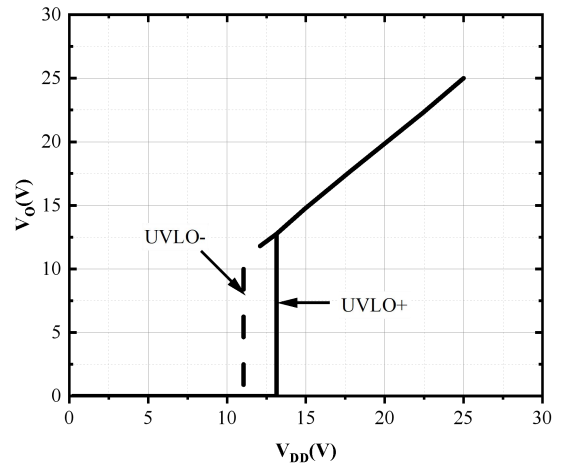


Fig.10 Output Voltage vs. Supply Voltage

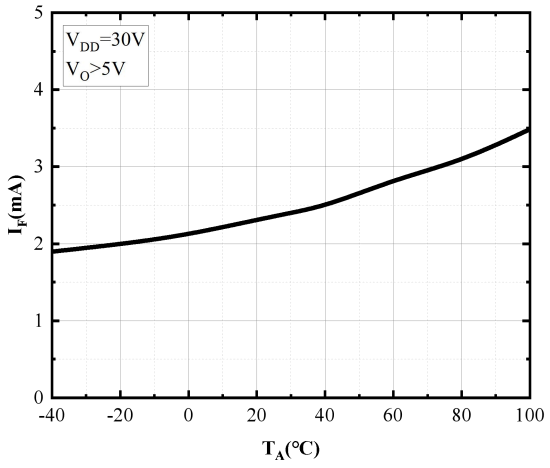


Fig.11 Forward Current vs. Ambient Temperature

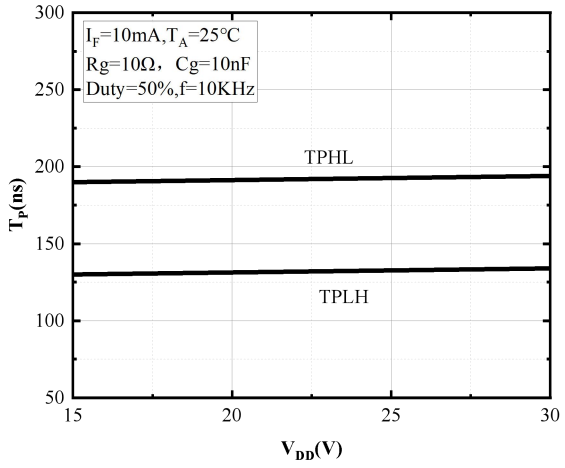


Fig.12 Propagation Delay vs. Supply Voltage

CHARACTERISTIC CURVES

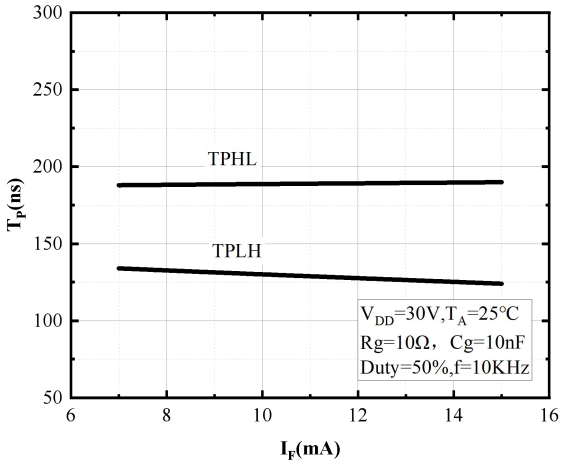


Fig.13 Propagation Delay vs. Forward Current

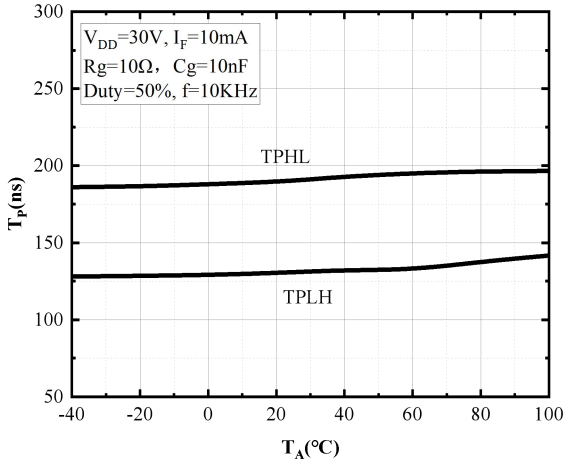


Fig.14 Propagation Delay vs. Ambient Temperature

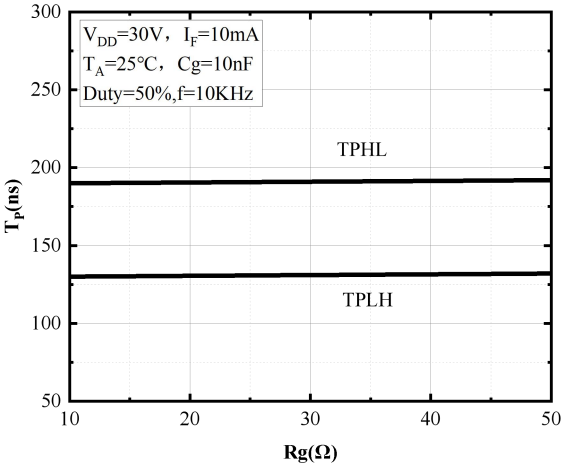


Fig.15 Propagation Delay vs. Load Resistance

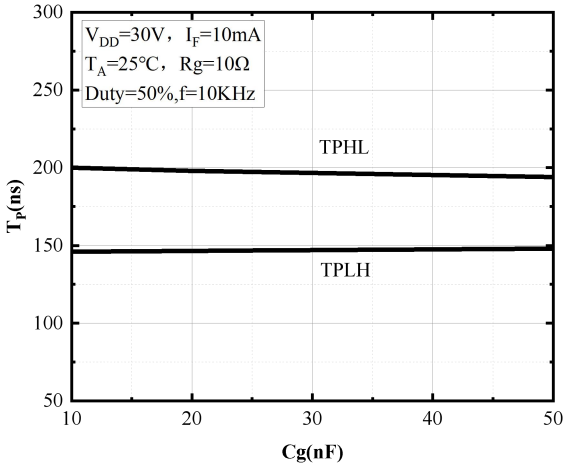


Fig.16 Propagation Delay vs. Load Capacitance

TEST CIRCUITS

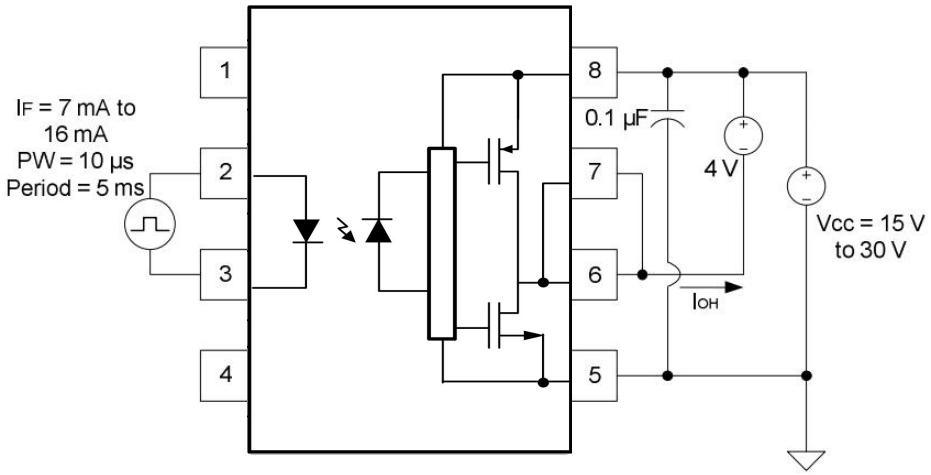


Fig.17 Test Circuits for IOH

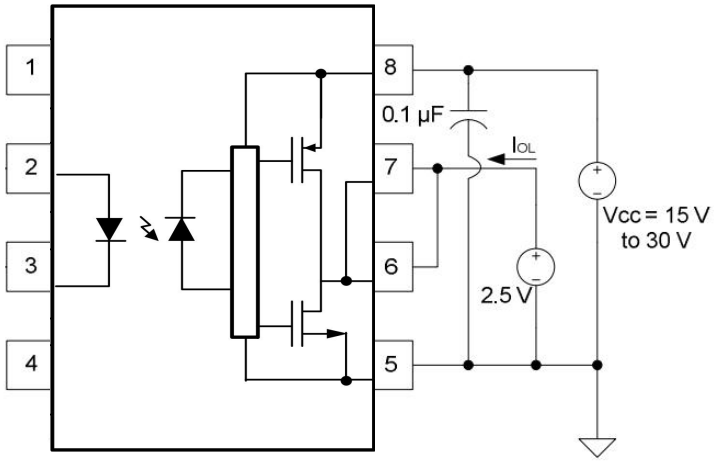


Fig.18 Test Circuits for IOL

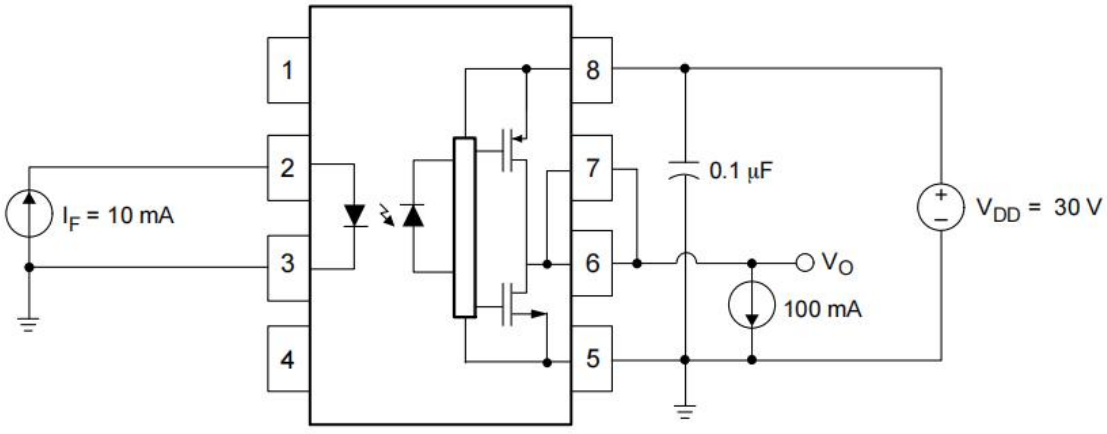


Fig.19 Test Circuits for VOH

TEST CIRCUITS

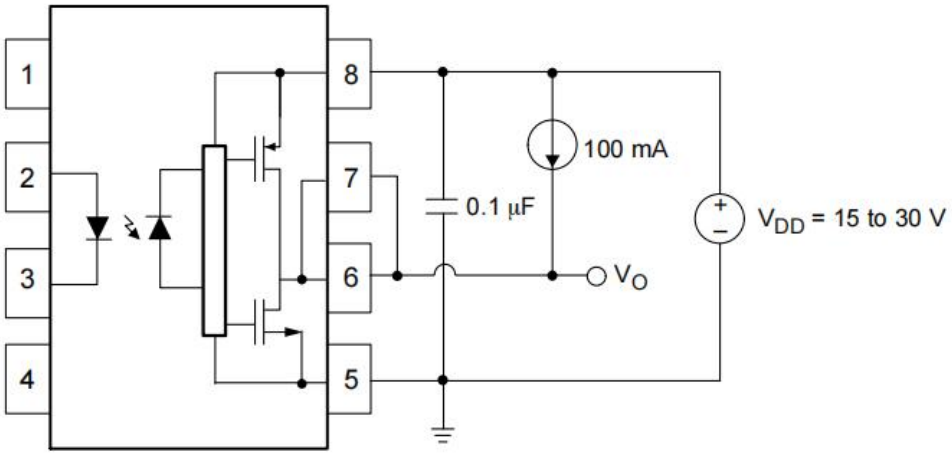


Fig.20 Test Circuits for VOL

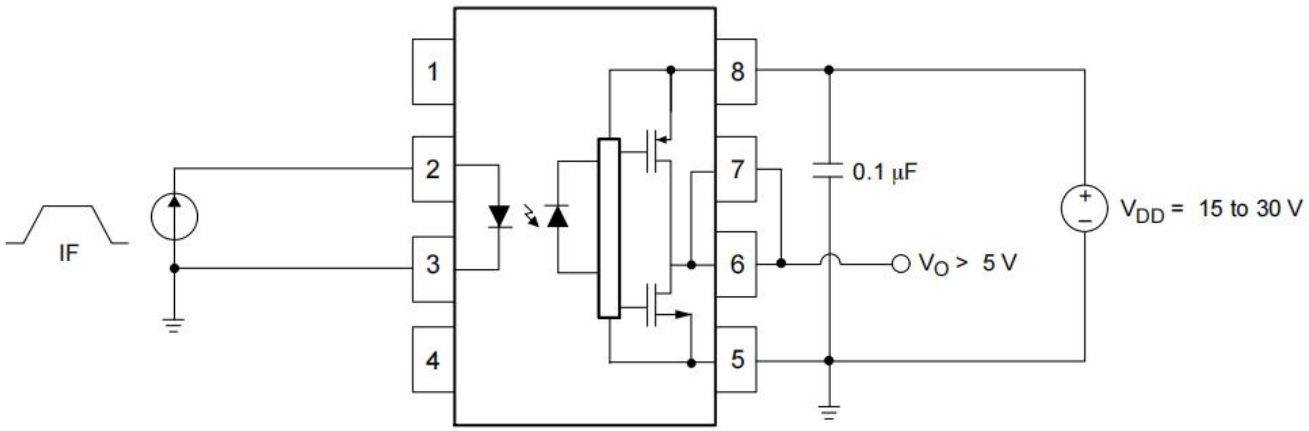


Fig.21 Test Circuits for IFHL

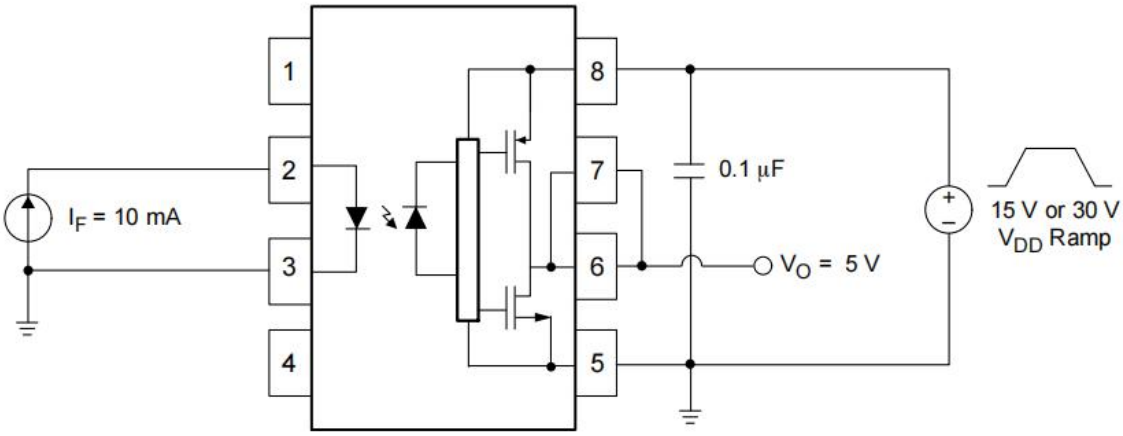


Fig.22 Test Circuits for UVLO

TEST CIRCUITS

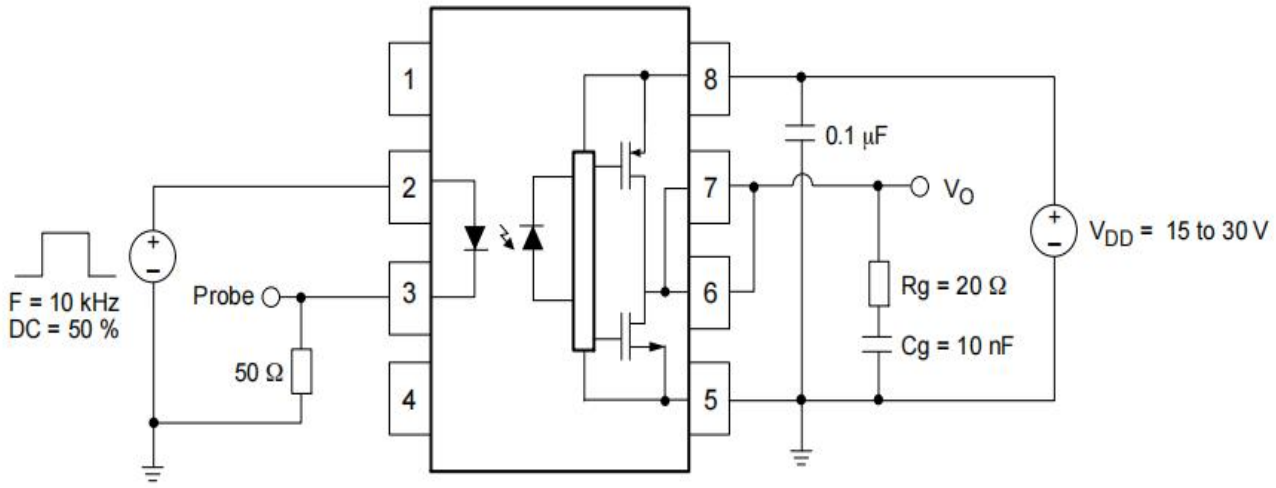


Fig.23 Test Circuits for TPHL, TPLH, tr, tf

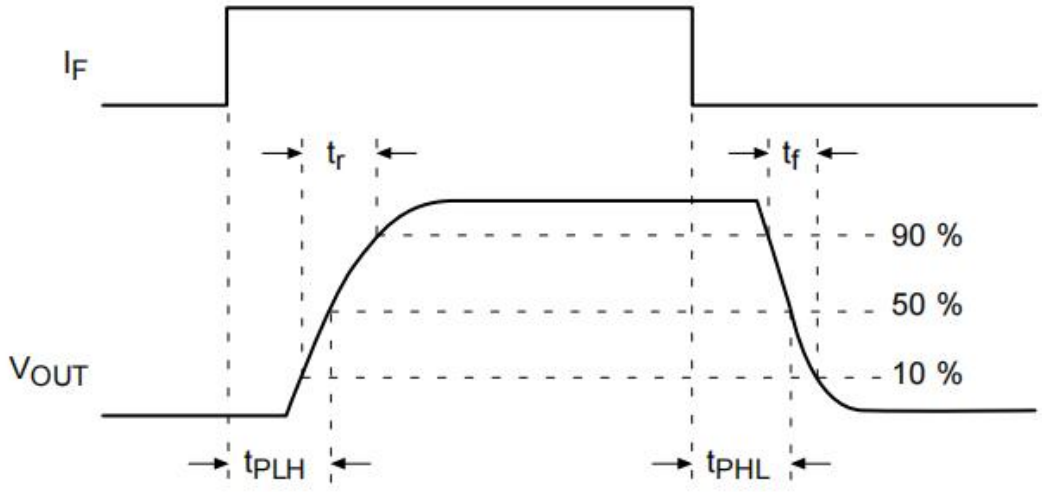


Fig.24 Wave forms of TPHL, TPLH, tr, tf

TEST CIRCUITS

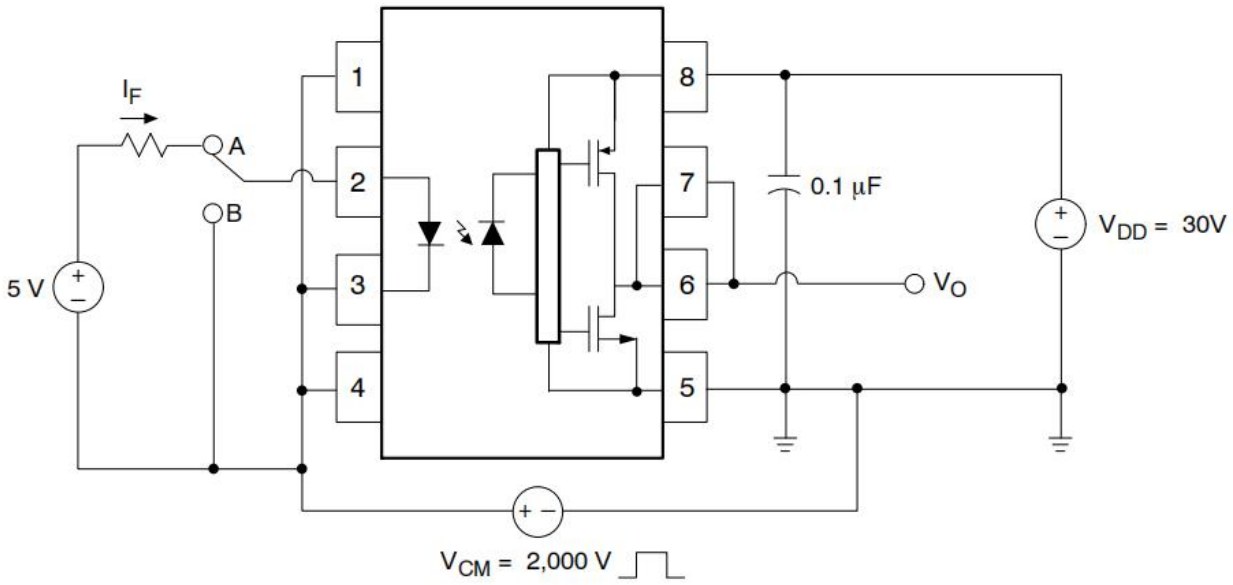


Fig.25 Test Circuits for Common Mode Transient Immunity

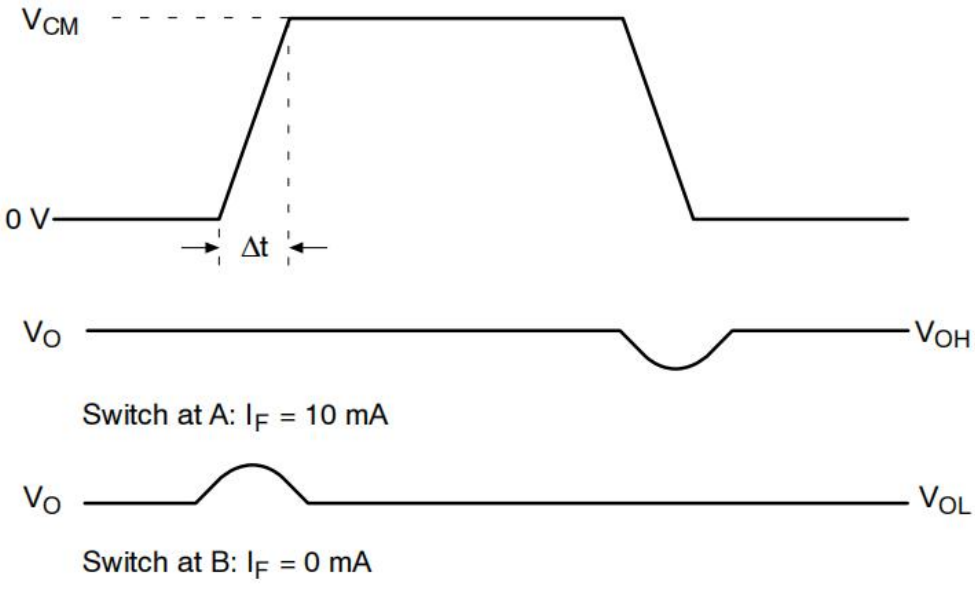
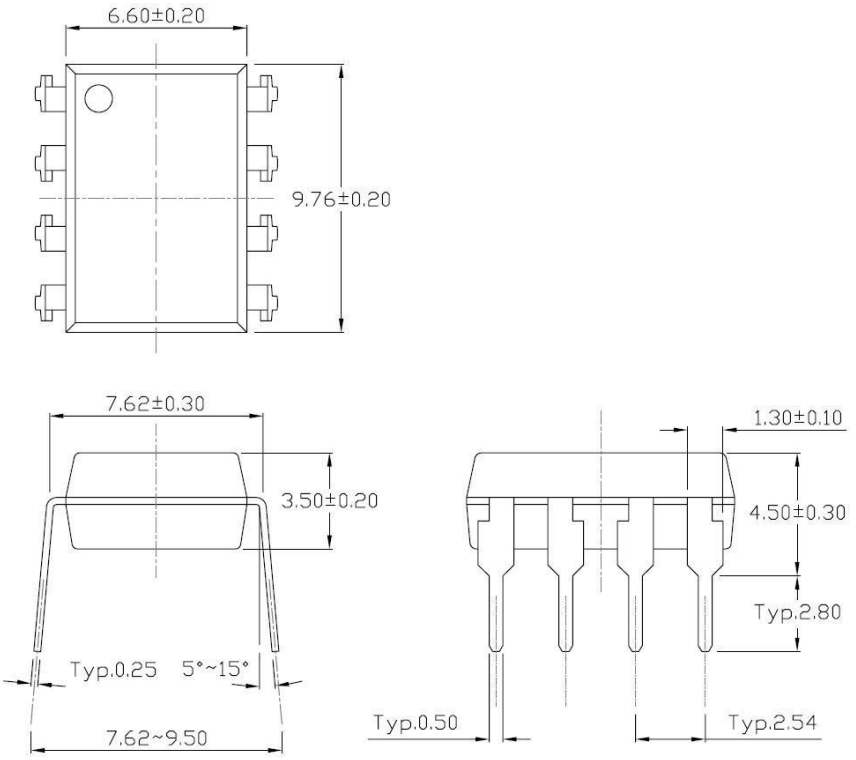


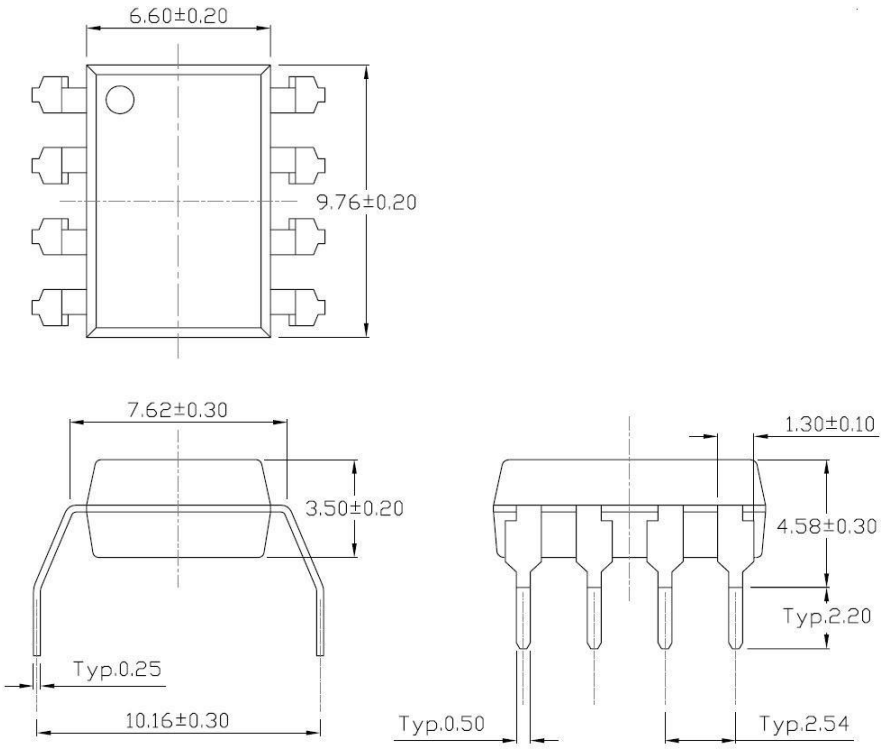
Fig.26 Waveforms of Common Mode Transient Immunity

PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Standard DIP – Through Hole (DIP Type)

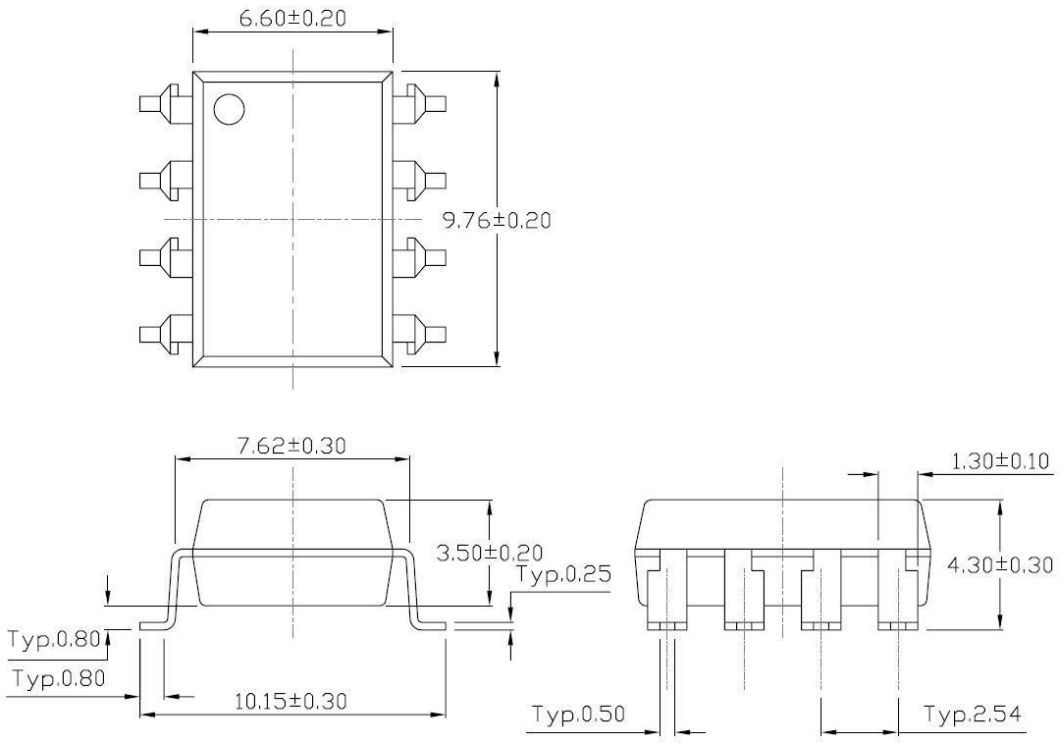


Gullwing (400mil) Lead Forming – Through Hole (M Type)

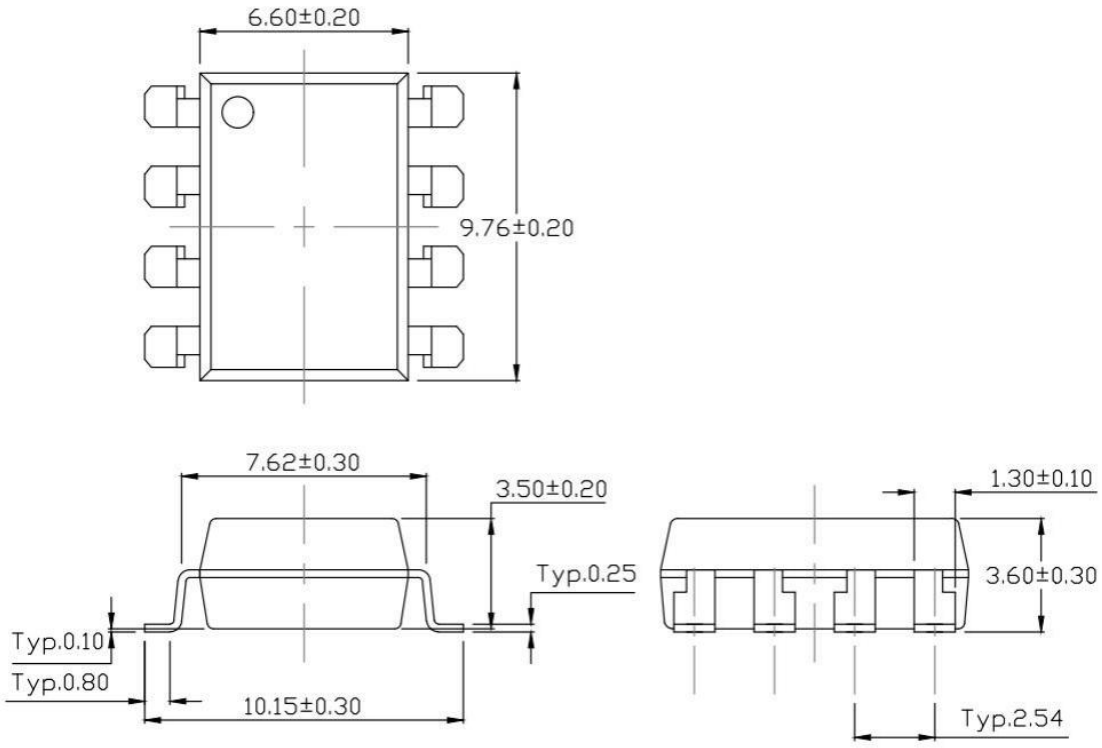


PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Surface Mount Lead Forming (S Type)

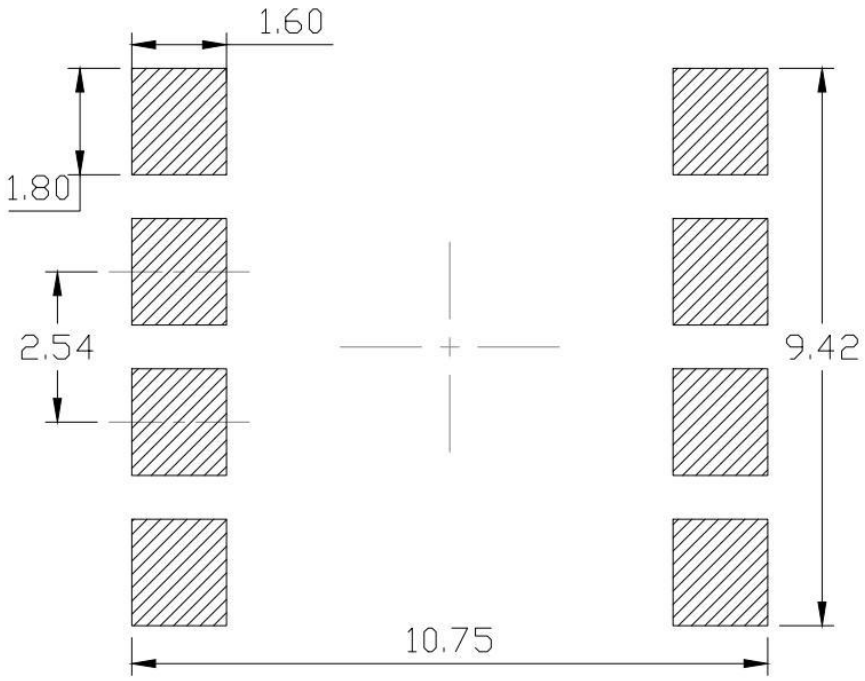


Surface Mount (Low Profile) Lead Forming (SL Type)

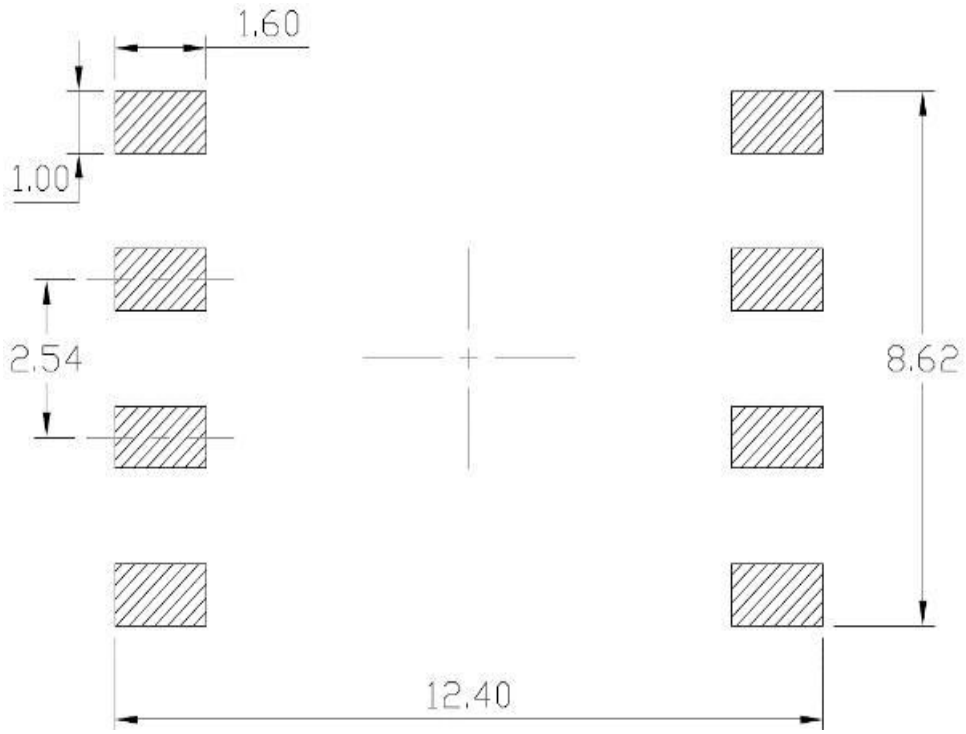


Recommended Solder Mask (Dimensions in mm unless otherwise stated)

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

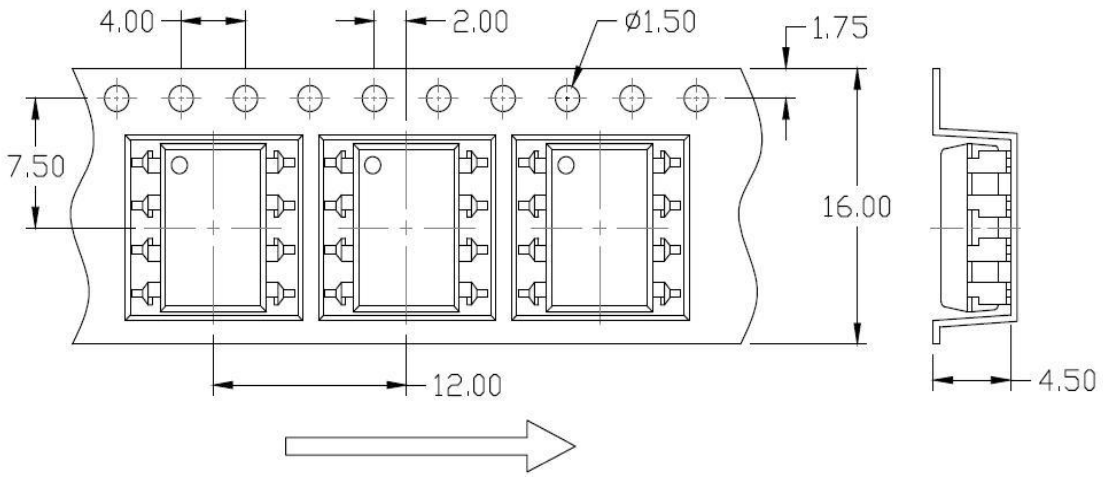


Surface Mount (Gullwing) Lead Forming

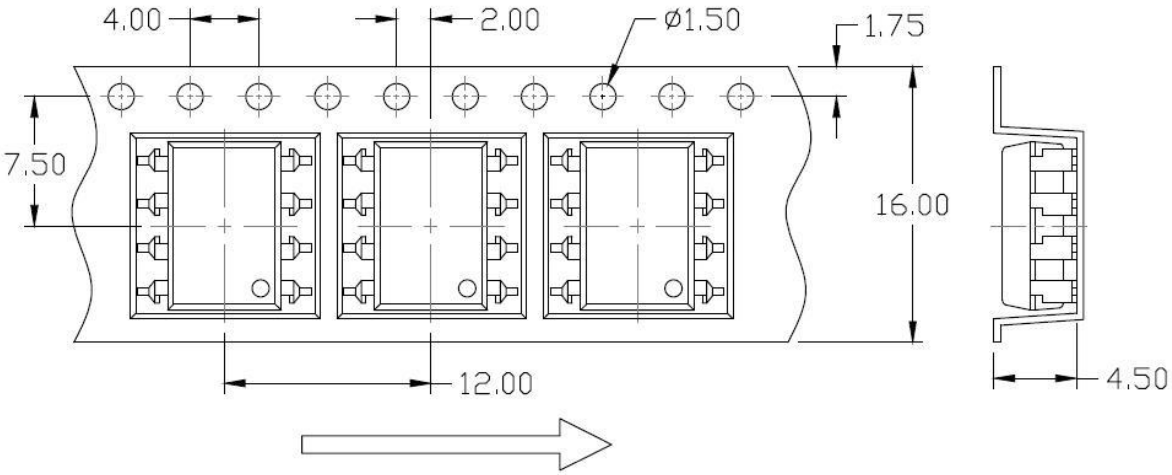


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S(T1)

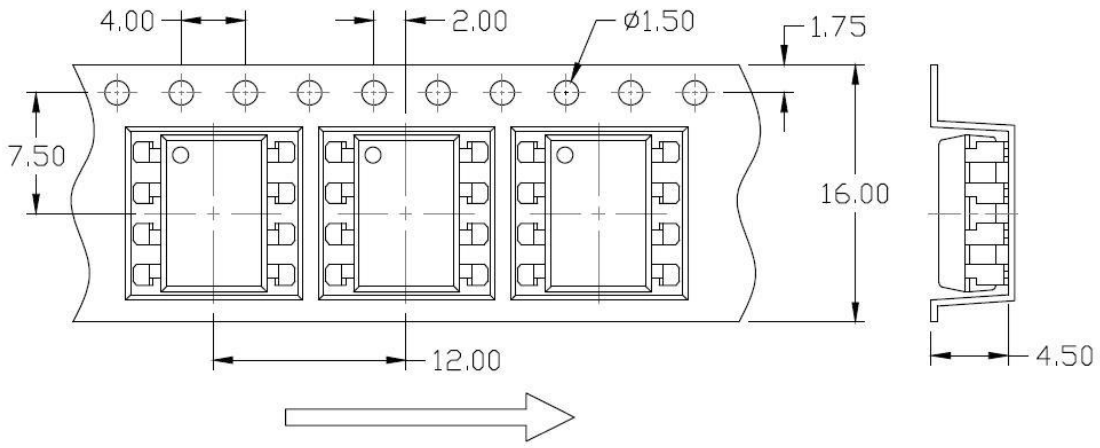


Option S(T2)

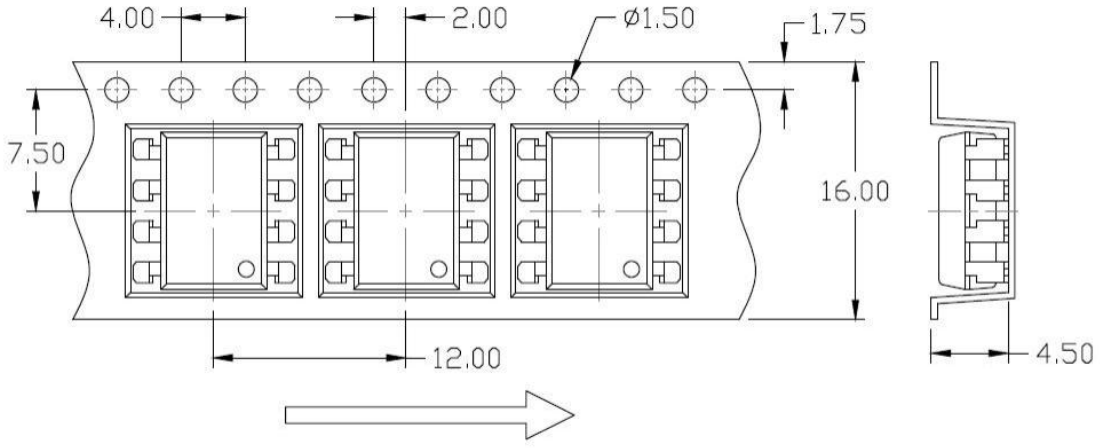


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option SL(T1)

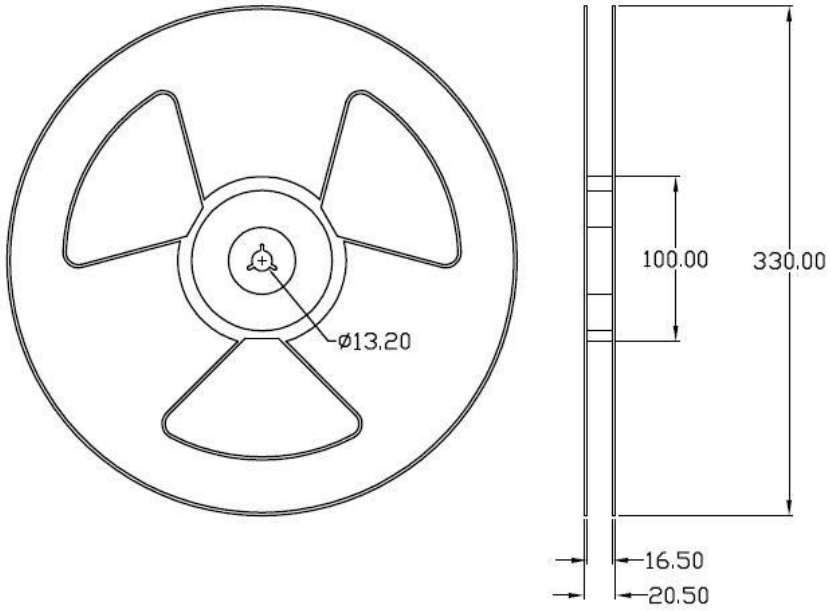


Option SL(T2)



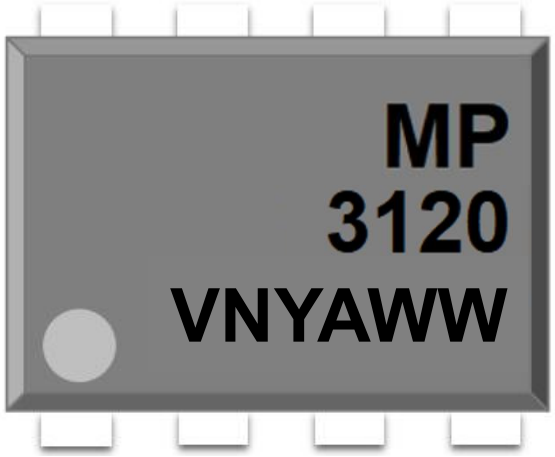
REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S & SL



ORDERING AND MARKING INFORMATION

MARKING INFORMATION



MP	: Company Abbr.
3120	: 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

MP3120(Y)(Z)-GV(XN)

MP -Company Abbr.

3120 -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).

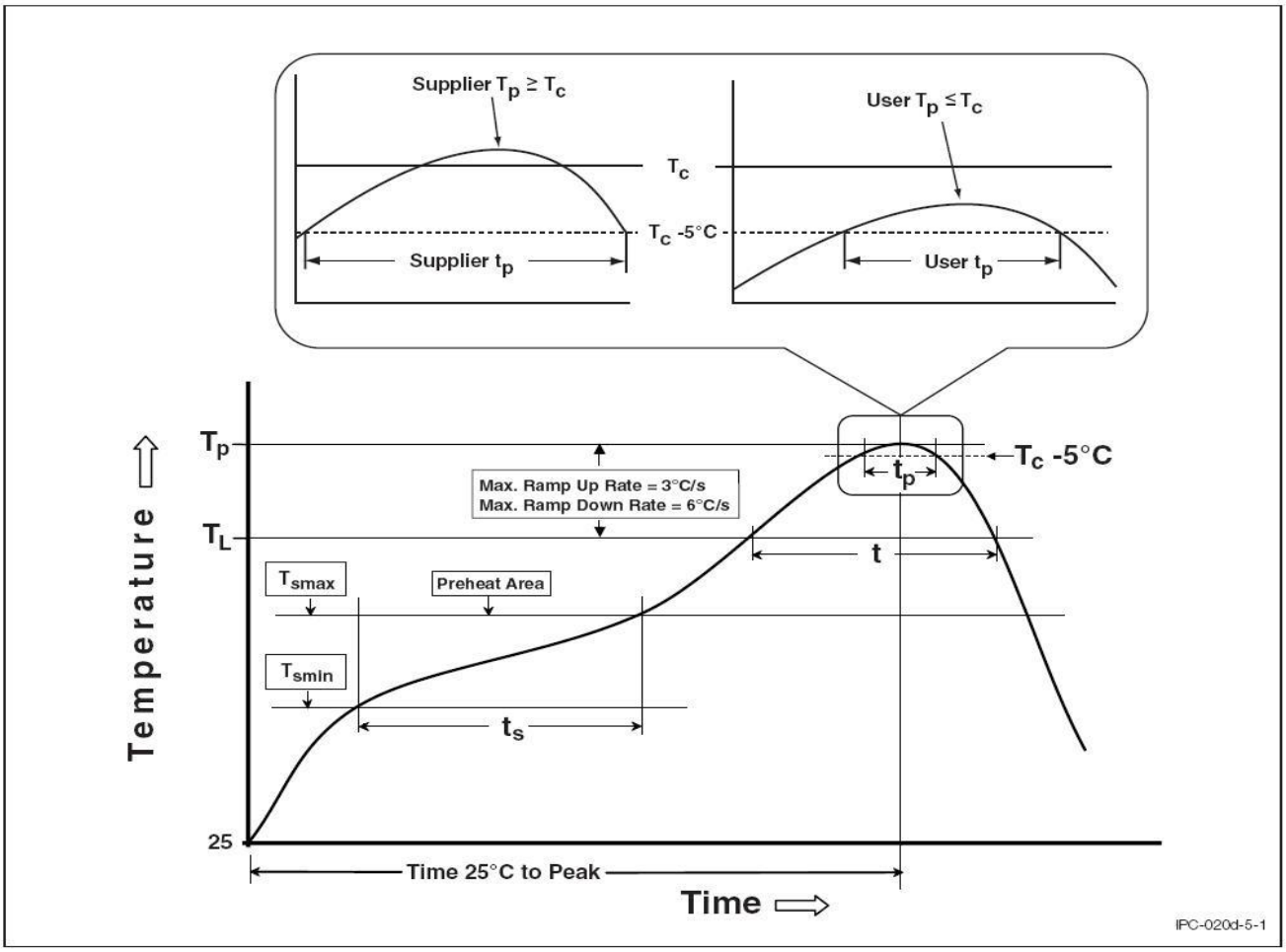
(XN)-Customer Specified Option (X: A~Z or None； N:1~9 or None).

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. (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.

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	2024-04-18	Datasheet Complete