2.5A Output Current GateDriver

Description

The SL3120R Series is a photocoupler in a DIP8 package that consists of a infrared light-emitting diode (LED)optically coupled to an high-speed photodetector IC chip

The SL3120R Series is ideal for IGBT of small capacity to middle capacity and power MOSFET gate drive

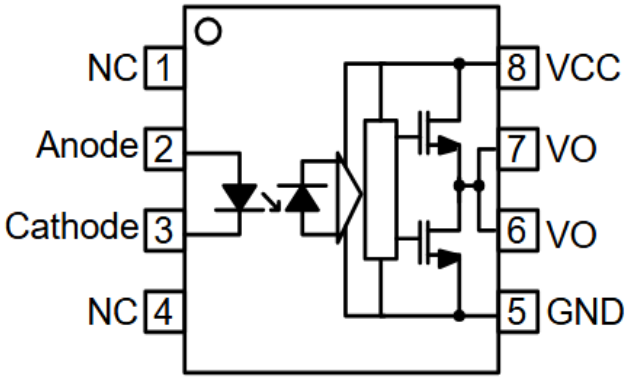
Features

- High isolation 5000 VRMS
- Fast swiching speed
- Operating temperature range - 40 °C to 100 °C
- Supply voltage: 15 to 30 V
- 2.5A Peak output current

Applications

- switch power supply
- Industrial Inverter
- Laser driver
- Isolated IGBT/Power MOSFET gate drive

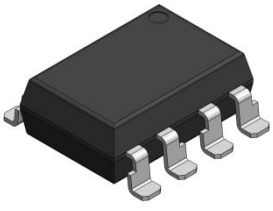
Functional Diagram



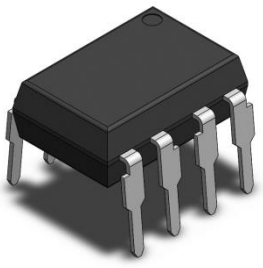
SL3120R Series

Truth Table(Positive Logic)

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



SL3120RS SMD-8



SL3120R DIP-8

ABSOLUTE MAXIMUM RATINGS (TA = 25°C unless otherwise noted)				
PARAMETER	SYMBOL	VALUE	UNIT	Note
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	
Supply Voltage	VCC	35	V	
Output Voltage	VO	35	V	
Peak Output Current	IO	2.5	A	
Output Power Dissipation	PO	250	mW	
Total Power Dissipation	Ptot	295	mW	
Isolation Voltage	Viso	5000	Vrms	3
Distance Through Insulation	Dti	0.5	mm	
Operating Temperature	Topr	-55~100	°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

RECOMMENDED OPERATION CONDITIONS				
PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Operating Temperature	TA	-40	100	°C
Supply Voltage	VCC	15	30	V
Input Current (ON)	IF(ON)	7	16	mA
Input Voltage (OFF)	VF(OFF)	0	0.8	V

ELECTRICAL OPTICAL CHARACTERISTICS(VCC=30V,VEE=GND,TA = 25°C unless otherwise noted)							
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
Forward Voltage	VF	-	1.38	1.8	V	IF=10mA	
Reverse Current	IR	-	-	10	μA	VR=5V	
Input Capacitance	Cin	-	13	-	pF	V=0, f=1MHz	
High Level Supply Current	ICCH	-	1.66	3	mA	IF= 7mA to 10mA, VO= Open	
Low Level Supply Current	ICCL	-	1.8	3	mA	VF = 0 to 0.8V, VO= Open	
High Level Output Voltage	VOH	VCC-0.3	VCC-0.1	-	V	IF= 10mA, IO= -100mA	
Low Level Output Voltage	VOL	-	VEE+0.1	VEE+0.25	V	IF= 0mA, IO= 100mA	
High Level Output Current	IOPH	-1	-	-	A	VO= VCC-1.5V	
		-2.5	-	-	A	VO= VCC-4V	
Low Level Output Current	IOPL	1	-	-	A	VO= VEE+1.5V	
		2.5	-	-	A	VO= VEE+4V	
Input Threshold Current	IFLH	-	2.38	5	mA	IO= 0mA, VO> 5V	
Input Threshold Voltage	VFHL	0.8	-	-	V	IO= 0mA, VO< 5V	
Under Voltage Lockout Threshold	VUVLO+	11	13.01	13.5	V	IO= 10mA, VO> 5V	
	VUVLO-	9.5	11.01	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	V=0, f=1MHz	

ELECTRICAL OPTICAL CHARACTERISTICS (VCC=30V,VEE=GND,TA = 25°C unless otherwise noted)							
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
SWITCHING CHARACTERISTICS							
Propagation Delay Time to Output Low Level	TPHL	50	103	500	ns	IF= 7 to 16mA, CL= 10nF, RL= 10Ω, f= 10kHz, Duty = 50%, TA= 25 °C	
Propagation Delay Time to Output High Level	TPLH	50	83	500	ns		
Pulse Width Distortion	|TPHL-TPLH|	-	20	200	ns		
Propagation Delay Skew	tPSK	-100	-	100	ns		
Rise Time	tr	-	13	-	ns		
Fall Time	tf	-	13	-	ns		
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=7 to 16mA VCC= 30V, TA= 25 °C, VCM= 2kV	
Common Mode Transient Immunity at Logic Low	CML	20	-	-	kV/μs	IF=0mA VCC= 30V, RL, TA= 25 °C, VCM= 2kV	

CHARACTERISTIC CURVES

Fig.1 Low Level Output Voltage vs. Low Level Output Current

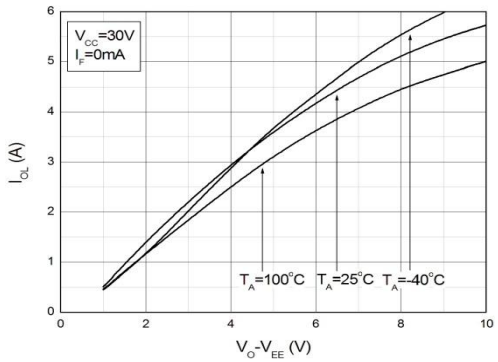


Fig.2 High Level Output Voltage vs. High Level Output Current

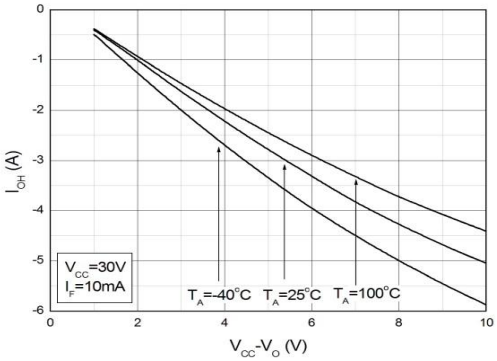


Fig.3 Supply Current vs. Supply Voltage

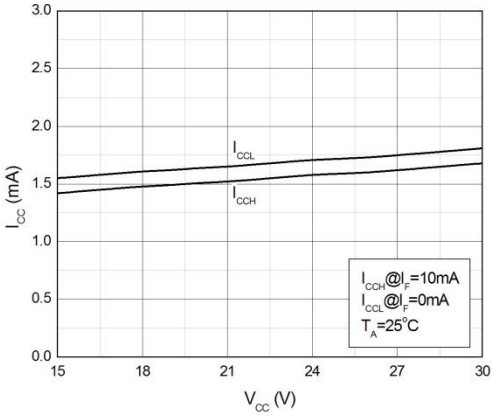


Fig.4 Supply Current vs. Ambient Temperature

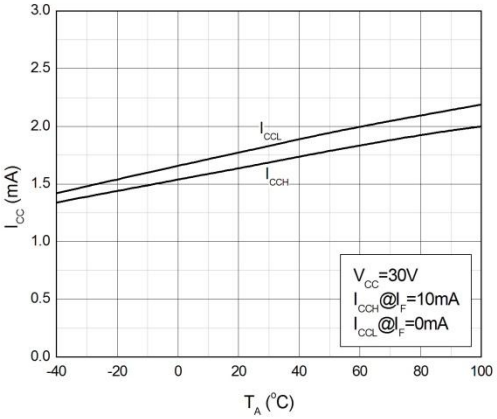


Fig.5 Forward Voltage vs. Ambient Temperature

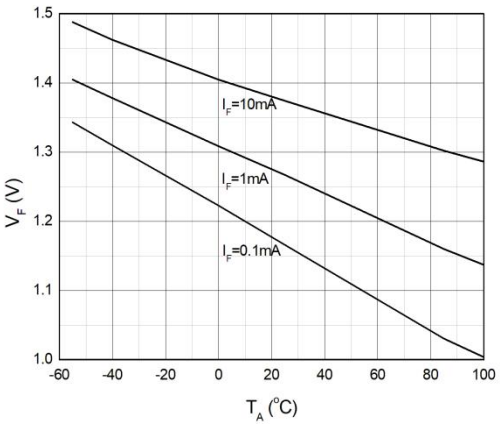
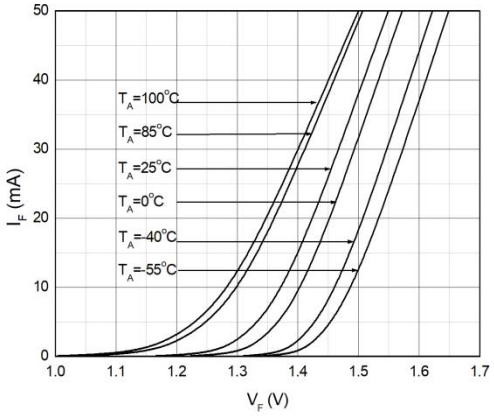


Fig.6 Forward Current vs. Forward Voltage



CHARACTERISTIC CURVES

Fig.7 Propagation Delay vs. Supply Voltage

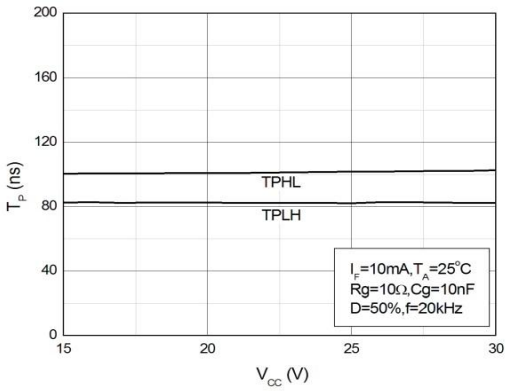


Fig.8 Forward Current vs. Ambient Temperature

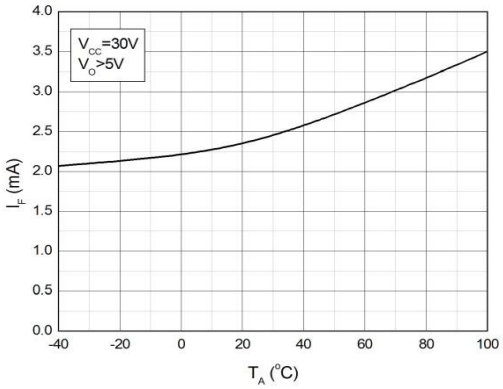


Fig.9 Output Voltage vs. Supply Voltage

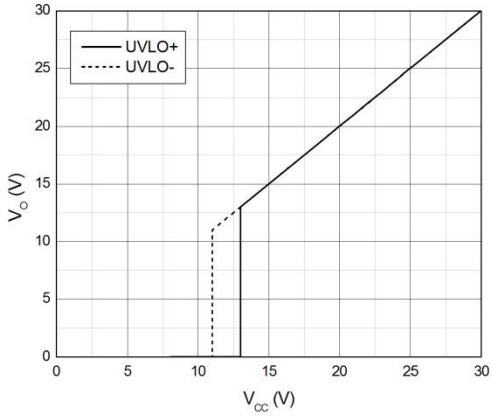


Fig.10 Output Voltage vs. Forward Current

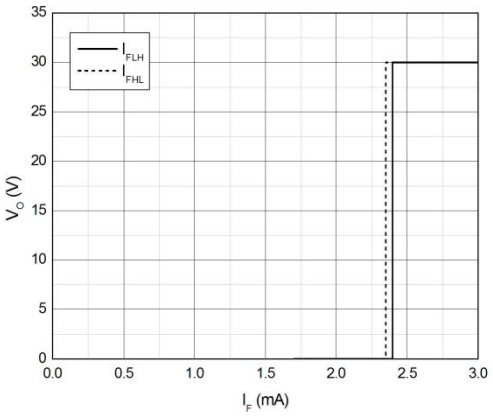


Fig.11 Low Level Output Voltage vs. Ambient Temperature

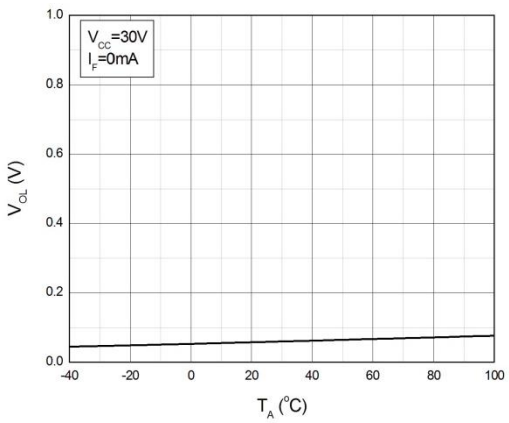
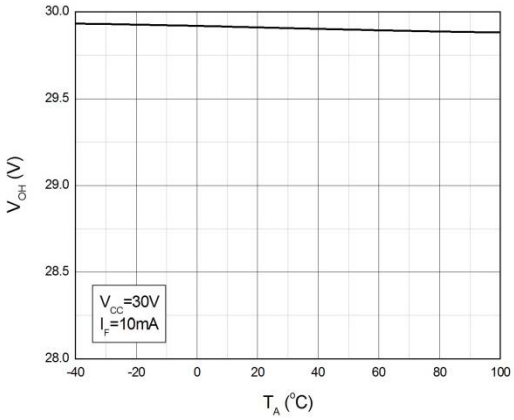


Fig.12 High Level Output Voltage vs. Ambient Temperature



CHARACTERISTIC CURVES

Fig.13 Propagation Delay vs. Load Capacitance

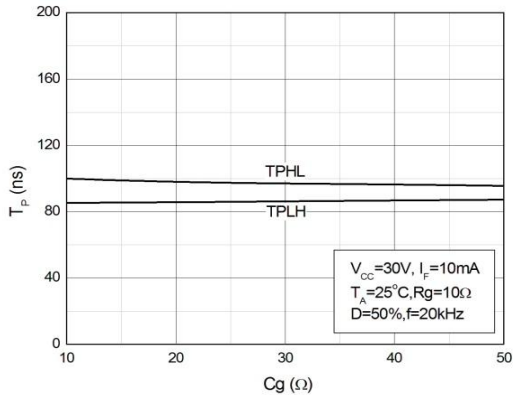


Fig.14 Propagation Delay vs. Load Resistance

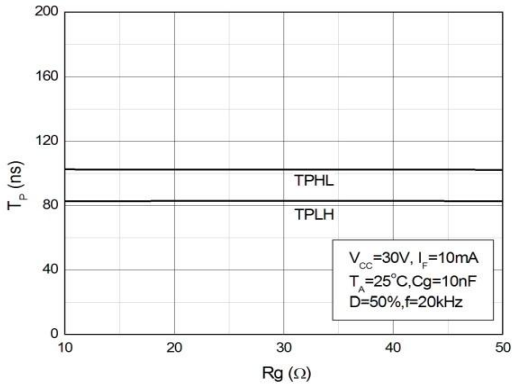


Fig.15 Propagation Delay vs. Ambient Temperature

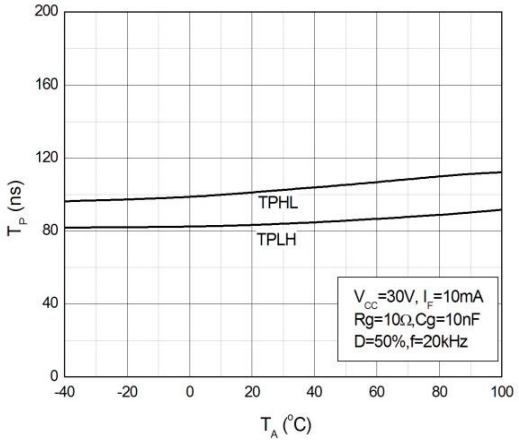
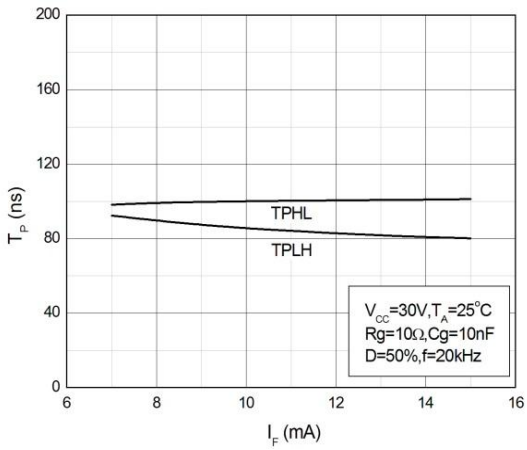


Fig.16 Propagation Delay vs. Forward Current



TEST CIRCUITS

Fig.17 Test Circuits for IOH

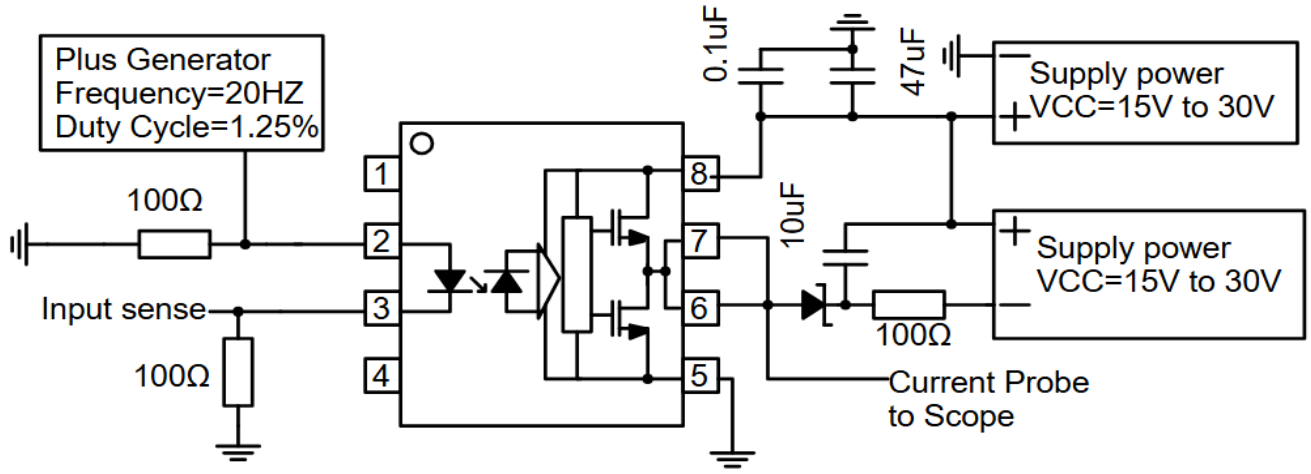
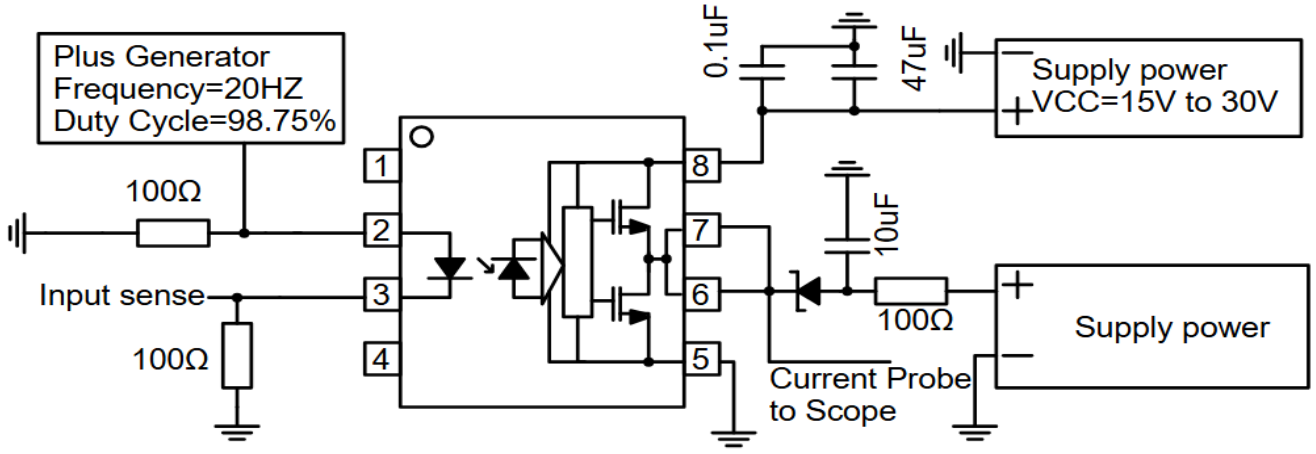


Fig.18 Test Circuits for IOL



TEST CIRCUITS

Fig.19 Test Circuits for TPHL, TPLH, tr, tf

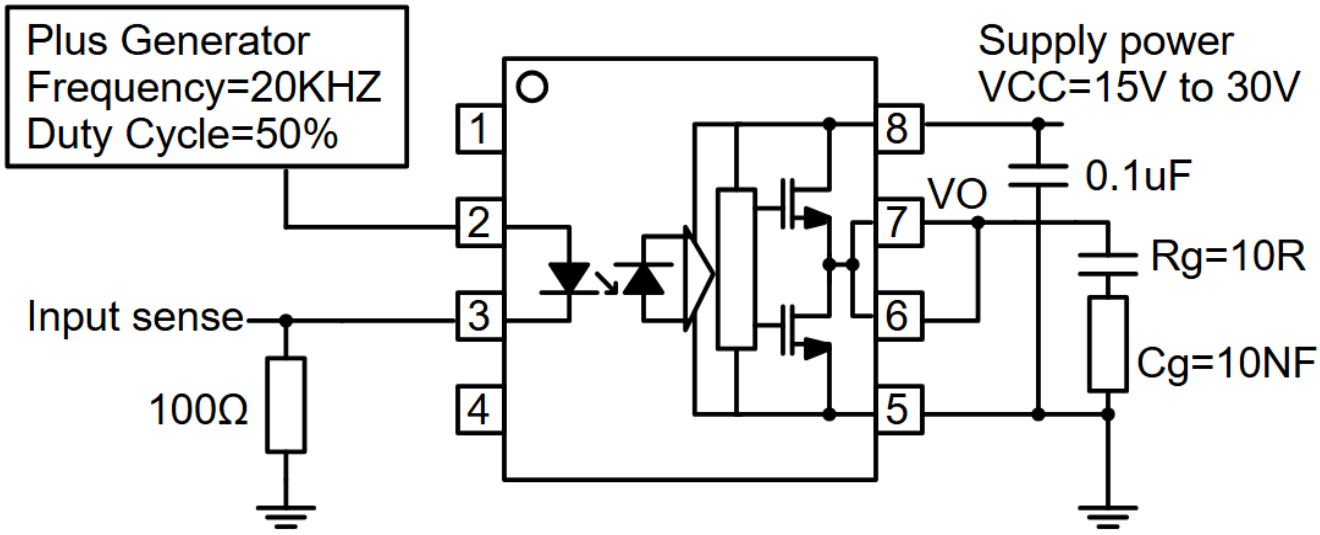
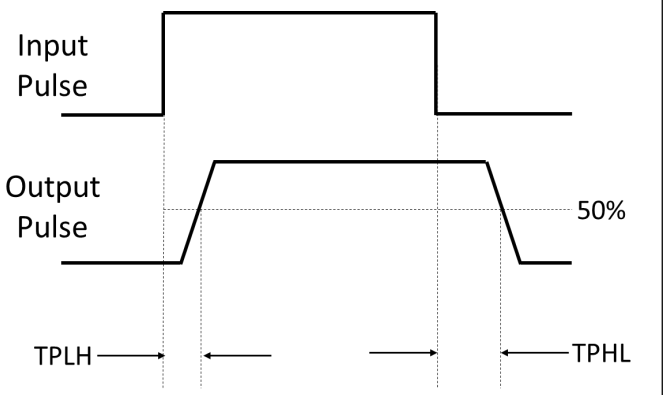
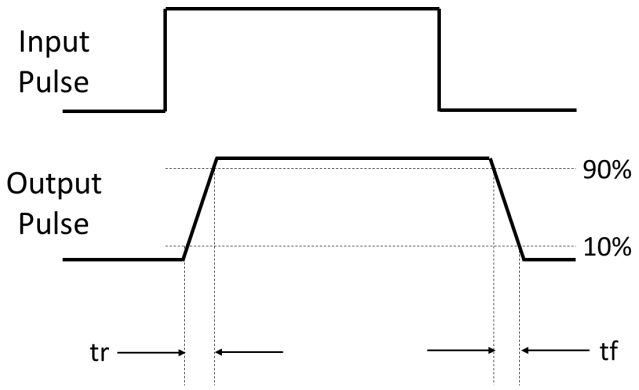


Fig.20 Waveforms of TPHL, TPLH, tr, tf





TEST CIRCUITS

Fig.21 Test Circuits for Common Mode Transient Immunity

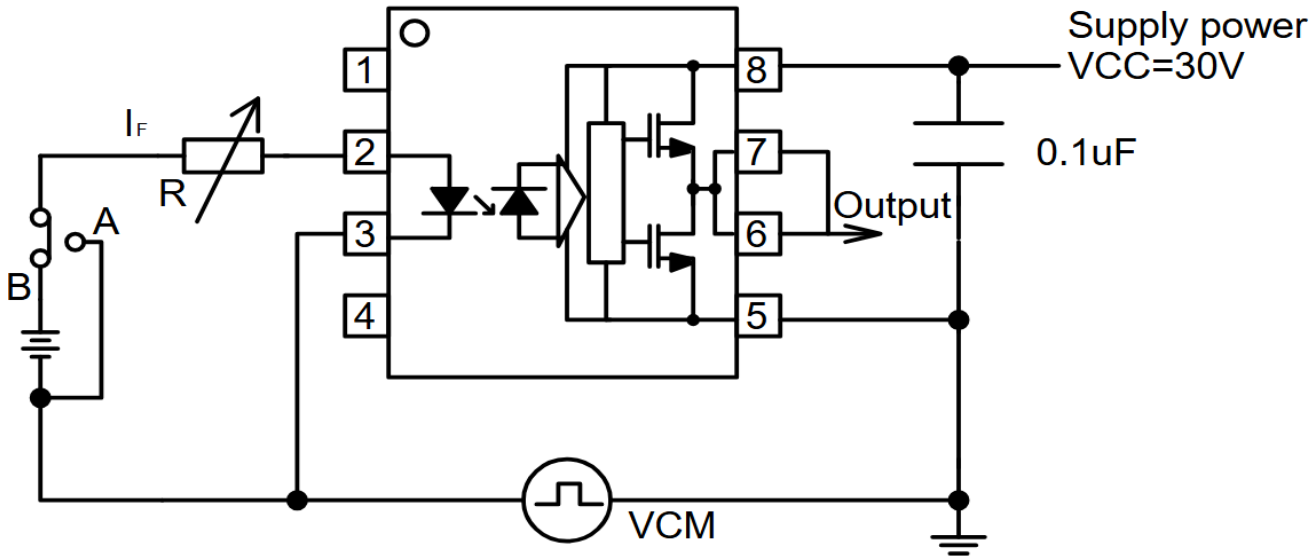
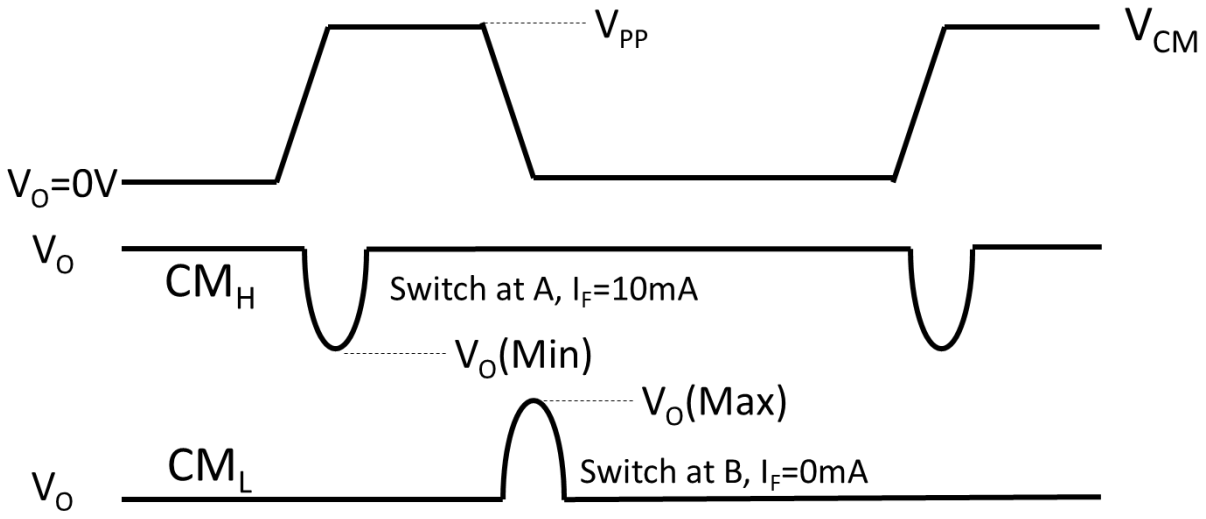
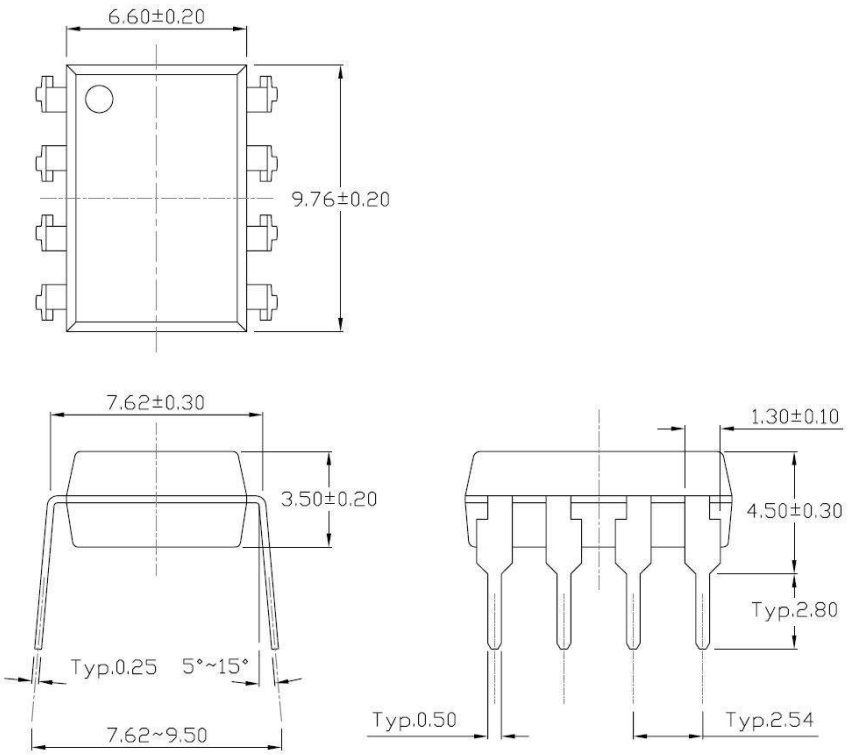


Fig.22 Waveforms of Common Mode Transient Immunity

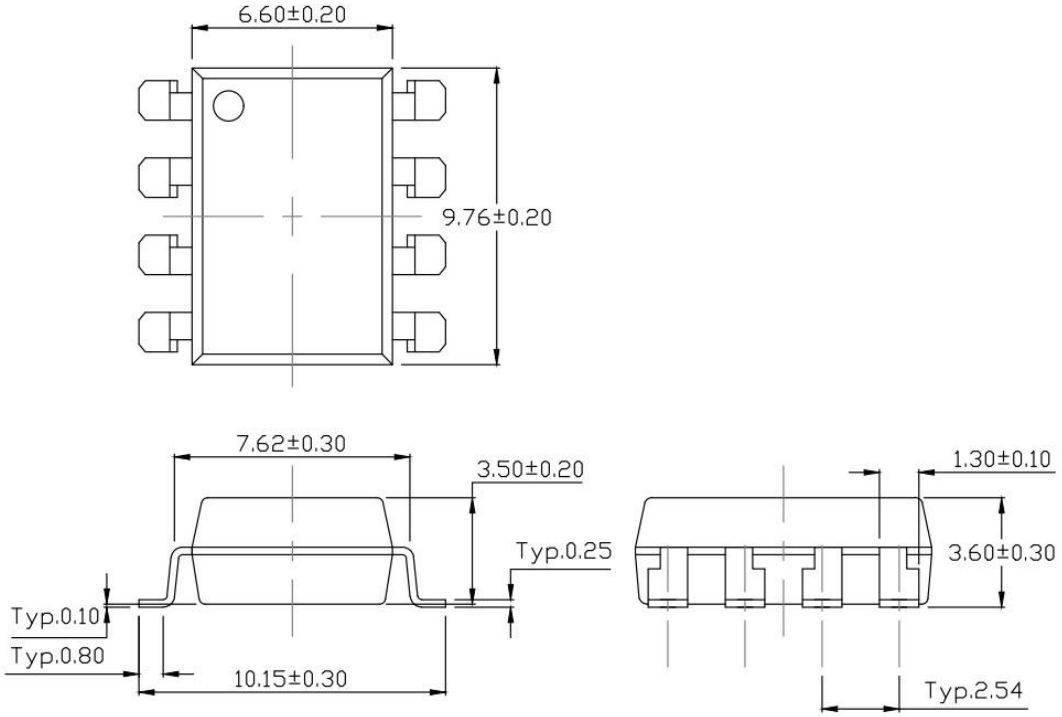


PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

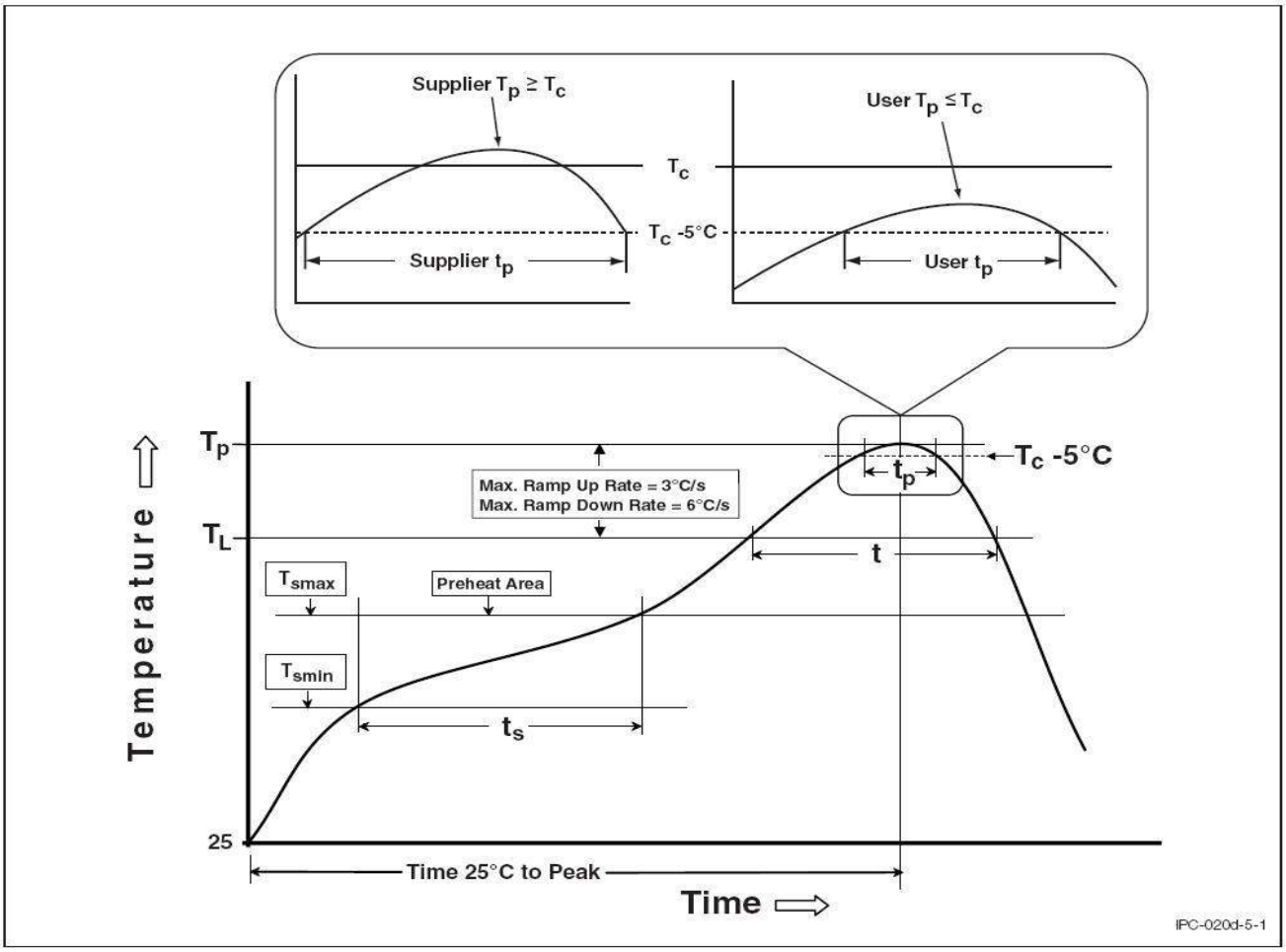
DIP-8



SMD-8



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.