Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

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ICPL3120

DESCRIPTION

The ICPL3120 consists of an Infrared Light Emitting Diode optically coupled to an Integrated Circuit with a Power Driving Output. ICPL3120 is ideally suitable to drive the Power IGBT and MOSFET in Inverters of Motor Controls and in Power Supplies.

The 2.5A peak output current is capable to direct drive IGBT/MOSFET up to ratings of 1200V/100A. For IGBTs with higher ratings, ICPL3120 can be used to drive a discrete power stage which drives the IGBT gate.

FEATURES

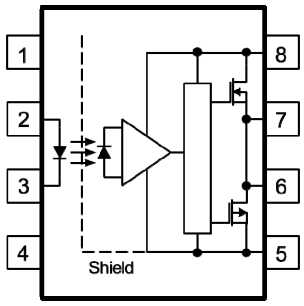
- ±2.5A Maximum Peak Output Current
- 35kV/µs Minimum Common Mode Rejection at V_{CM} 1500V
- Maximum Propagation Delay 500ns
- Maximum Propagation Delay Difference 100ns
- Wide Operating Voltage Range V_{CC} 15 to 30 V
- Maximum Supply Current I_{CC} 3.5mA
- Under Voltage Lock Out (UVLO) Protection with Hysteresis
- Guaranteed Performance over Temperature Range - 40°C to +105°C
- MSL 1
- Lead Free and RoHS Compliant
- Safety Approvals Pending

APPLICATIONS

- IGBT/MOSFET Gate Drive
- UPS
- Inverters
- AC Brushless and DC Motor Drives

ORDER INFORMATION

- Add G after PN for 10mm lead spacing
- Add SM after PN for Surface Mount
- Add SMT&R after PN for Surface Mount Tape & Reel



1 NC
2 Anode
3 Cathode
4 NC
5 GND (V_{EE})
6 V_O
7 V_O
8 V_{CC}

A 0.1µF bypass Capacitor must be connected between Pins 8 and 5.

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Stresses exceeding the absolute maximum ratings can cause permanent damage to the device.
Exposure to absolute maximum ratings for long periods of time can adversely affect reliability.

Input

Forward Current	20mA
Forward Peak Current (Pulse Width ≤ 1µs, 300pps)	1A
Forward Current Rise / Fall Time	500ns
Reverse Voltage	5V
Power dissipation	45mW

Output

Peak Output Current (Exponential waveform, Pulse Width ≤ 0.3µs, f ≤ = 15kHz)	±2.5A
Operating Frequency (Exponential waveform, $I_{O(Peak)}$ ≤ I2.5AI, Pulse Width ≤ 0.3µs)	50kHz
Supply Voltage (V_{CC} – V_{EE})	0V to 35V
Output Voltage	0V to V_{CC}
Power Dissipation	250mW

Total Package

Isolation Voltage	5000V_{RMS}
Total Power Dissipation	295mW
Operating Temperature	-40 to 105 °C
Storage Temperature	-55 to 125 °C
Junction Temperature	125 °C Max
Lead Soldering Temperature (10s)	260°C

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e-mail : sales@isocom.com.hk

Truth Table

LED	$V_{CC} - V_{EE}$ (Turn ON, +ve going)	$V_{CC} - V_{EE}$ (Turn OFF –ve going)	V_O
OFF	0 – 30V	0 – 30V	LOW
ON	0 – 11.0V	0 – 9.5V	LOW
ON	11.0 – 13.5V	9.5 – 12.0V	TRANSITION
ON	13.5 – 30V	12 – 30V	HIGH

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Operating Temperature	T_A	- 40	105	°C
Supply Voltage	$V_{CC} - V_{EE}$	15	30	V
Input Current (ON)	$I_{F(ON)}$	7	16	mA
Input Voltage (OFF)	$V_{F(OFF)}$	0	0.8	V

ELECTRICAL CHARACTERISTICS (Typical Values at $V_{CC} - V_{EE}$ = 30V and T_A = 25°C, Minimum and Maximum Values at Recommended Operating Conditions, unless otherwise specified)

INPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Forward Voltage	V_F	I_F = 10mA	1.2	1.37	1.8	V
Forward Voltage Temperature Coefficient	$\Delta V_F/\Delta T$	I_F = 10mA		−1.237		mV/°C
Reverse Voltage	V_R	I_R = 10µA	5			V
Input Threshold Current (Low to High)	I_{FLH}	V_{CC} = 30V V_O > 5V		1.8	5	mA
Input Threshold Voltage (High to Low)	V_{FHL}	V_{CC} = 30V V_O < 5V	0.8			V
Input Capacitance	C_{IN}	V_F = 0V, f = 1MHz		33		pF

OUTPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
High Level Supply Current	I_{CCH}	I_F = 10mA, V_{CC} = 30V V_O = Open		2.4	3.5	mA
Low Level Supply Current	I_{CCL}	I_F = 0mA, V_{CC} = 30V V_O = Open		2.5	3.5	mA
High Level Output Current	I_{OH}	Maximum Pulse Width = 50µs $V_O = V_{CC} - 1.5V$ Maximum Pulse Width = 10µs $V_O = V_{CC} - 4V$			-1.0 -2.5	A
Low Level Output Current	I_{OL}	Maximum Pulse Width = 50µs $V_O = V_{EE} + 1.5V$ Maximum Pulse Width = 10µs $V_O = V_{EE} + 4V$	1.0 2.5			A
High Level Output Voltage	V_{OH}	I_F = 10mA, I_O = -100mA	V_{CC}−0.3	V_{CC}−0.1		V
Low Level Output Voltage	V_{OL}	I_F = 0mA, I_O = 100mA		V_{EE} +0.1	V_{EE} +0.25	V
UVLO Threshold	V_{UVLO+}	V_O > 5V, I_F = 10mA	11.0	12.7	13.5	V
	V_{UVLO-}	V_O < 5V, I_F = 10mA	9.5	11.2	12.0	V
UVLO Hysteresis	$UVLO_{HYS}$			1.5		V

ELECTRICAL CHARACTERISTICS (Typical Values at $V_{CC} - V_{EE}$ = 30V and T_A = 25°C, Minimum and Maximum Values at Recommended Operating Conditions, unless otherwise specified)

SWITCHING

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Propagation Delay Time to High Output Level	t_{PLH}	I_F = 7 to 16mA, V_{CC} = 15 to 30V, V_{EE} = 0V, Rg = 10Ω, Cg = 25nF, f = 10kHz, Duty Cycle = 50%	50	130	500	ns
Propagation Delay Time to Low Output Level	t_{PHL}		50	130	500	
Pulse Width Distortion $\|t_{PHL} - t_{PLH}\|$ for any given device	PWD			5	70	
Propagation Delay Difference ($t_{PHL} - t_{PLH}$) between any two Devices	PDD		-100		100	
Output Rise Time (10% to 90%)	t_r			35		
Output Fall Time (90% to 10%)	t_f			35		
UVLO Turn On Delay	$t_{UVLO\ ON}$	I_F = 10mA, V_O > 5V		1.6		µs
UVLO Turn Off Delay	$t_{UVLO\ OFF}$	I_F = 10mA, V_O < 5V		0.4		µs
Common Mode Transient Immunity at High Output Level	CM_H	I_F = 10 to 16mA, V_{CC} = 30V, V_{CM} = 1500V, T_A = 25°C	35	50		kV/µs
Common Mode Transient Immunity at Low Output Level	CM_L	V_F = 0V, V_{CC} = 30V, V_{CM} = 1500V, T_A = 25°C	35	50		kV/µs

ELECTRICAL CHARACTERISTICS (Typical Values at $V_{CC} - V_{EE}$ = 30V and T_A = 25°C, Minimum and Maximum Values at Recommended Operating Conditions, unless otherwise specified)

ISOLATION

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Insulation Voltage	V_{ISO}	R.H. = 40% - 60%, T_A = 25°C t = 1 min,	5000			V
Input - Output Resistance	R_{I-O}	V_{I-O} = 500VDC		10^{12}		Ω
Input - Output Capacitance	C_{I-O}	f = 1MHz		0.92		pF

Note :

1. A 0.1uF or bigger bypass capacitor must be connected across pin 8 and pin 5.
2. PDD is the difference of t_{PHL} and t_{PLH} between any two ICPL3120 under same test conditions.
3. Common Mode Transient Immunity in High stage is the maximum tolerable negative dV_{CM}/dt on the trailing edge of the common mode impulse signal, V_{CM}, to assure that the output will remain high (V_O > 15V).
4. Common Mode Transient Immunity in Low stage is the maximum tolerable positive dV_{CM}/dt on the leading edge of the common mode impulse signal, V_{CM}, to assure that the output will remain low (V_O < 1V).

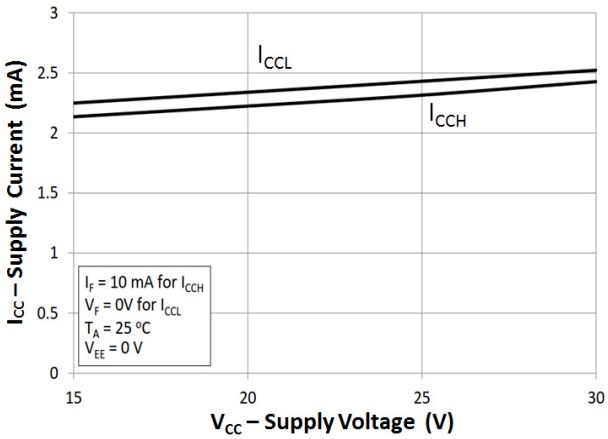


Fig 1 Supply Current vs Supply Voltage

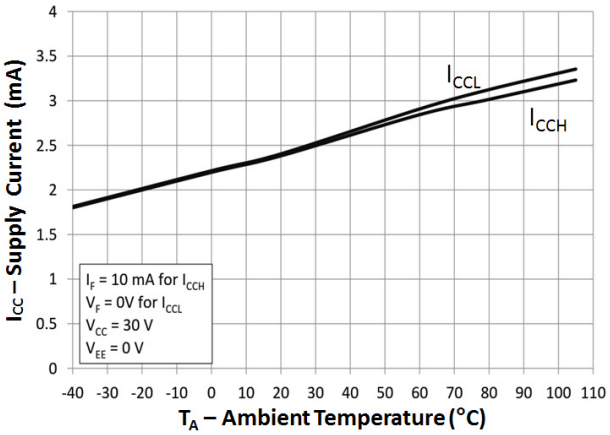


Fig 2 Supply Current vs Ambient Temperature

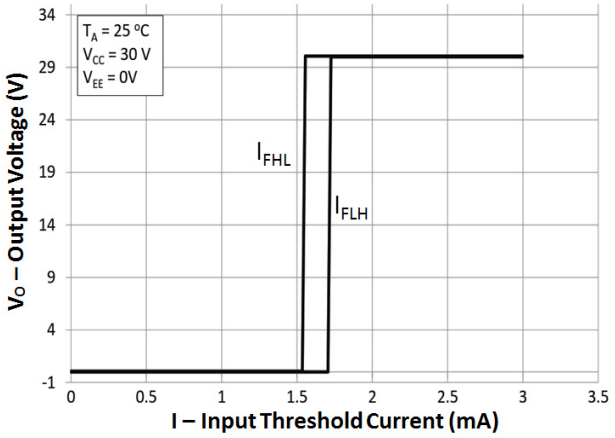


Fig 3 Transfer Characteristics

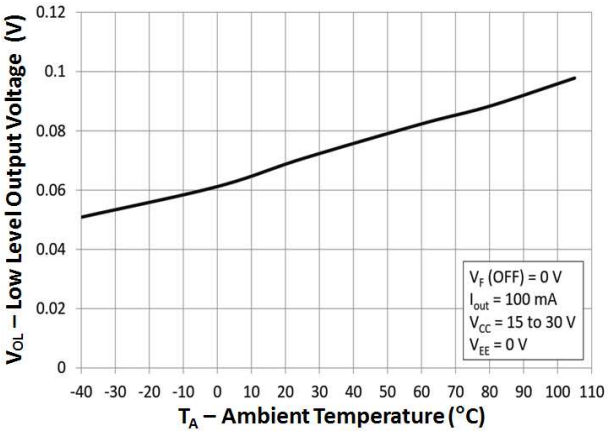


Fig 4 Output Low Voltage vs Ambient Temperature

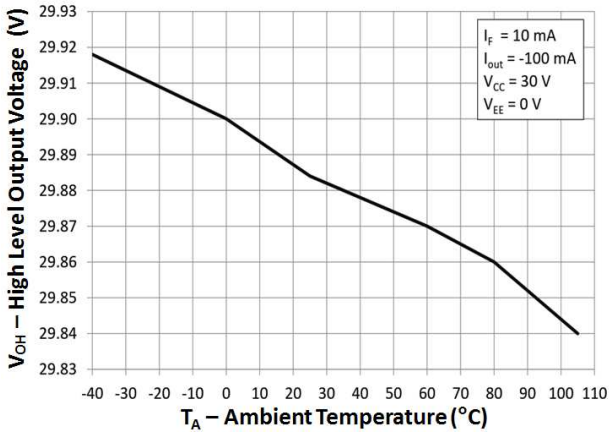


Fig 5 Output High Voltage vs Ambient Temperature

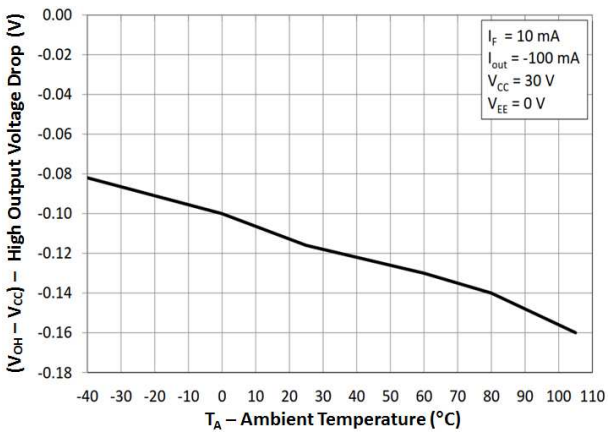


Fig 6 Output High Voltage Drop vs Ambient Temperature

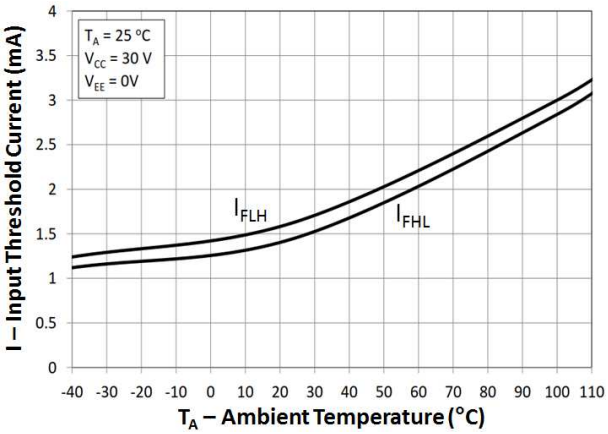


Fig 7 Input Threshold Current vs Ambient Temperature

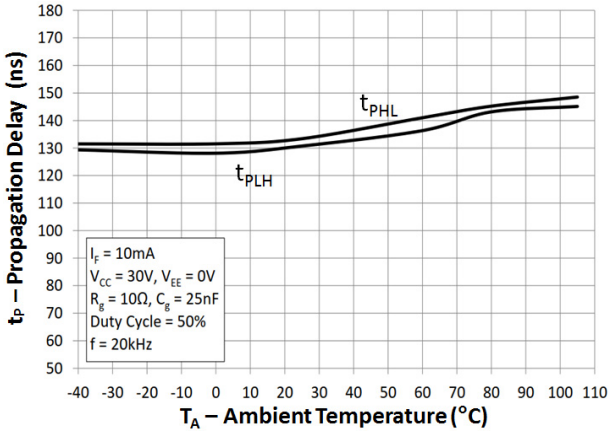


Fig 8 Propagation Delay vs Ambient Temperature

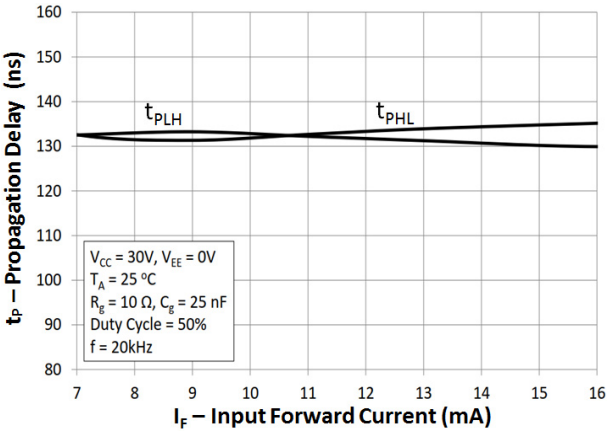


Fig 9 Propagation Delay vs Forward Current

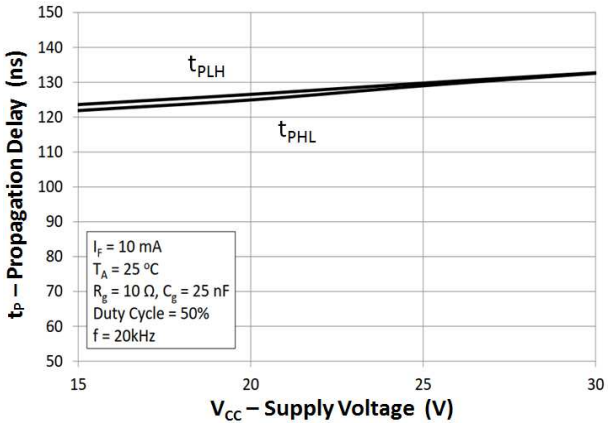


Fig 10 Propagation Delay vs Supply Voltage

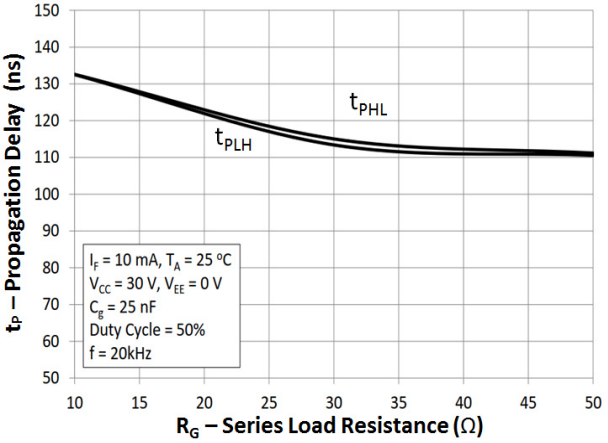


Fig 11 Propagation Delay vs Series Load Resistance

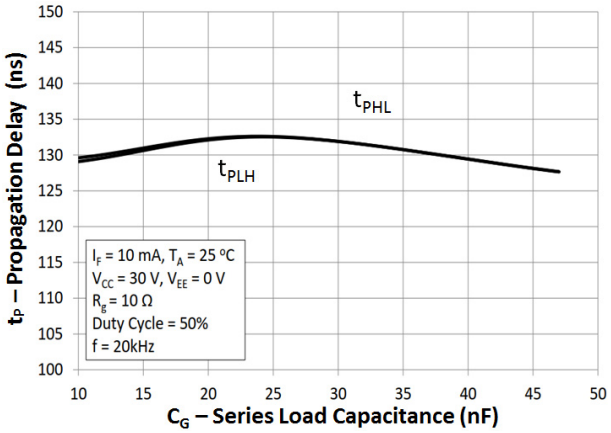


Fig 12 Propagation Delay vs Series Load Capacitance

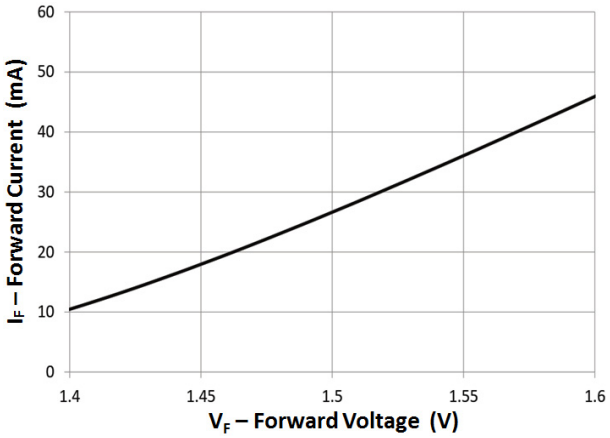
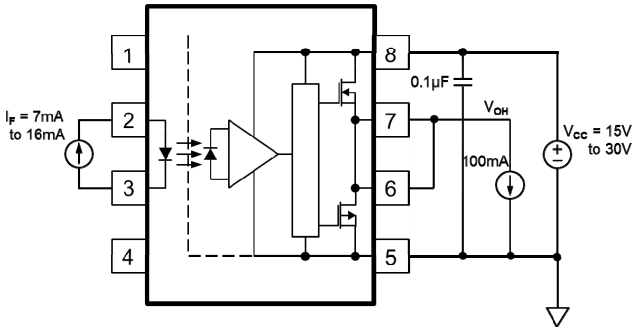
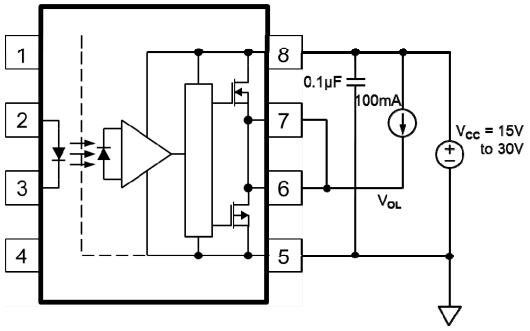


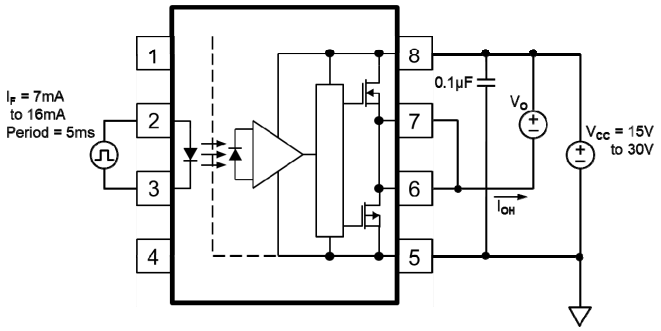
Fig 13 Forward Current vs Forward Voltage



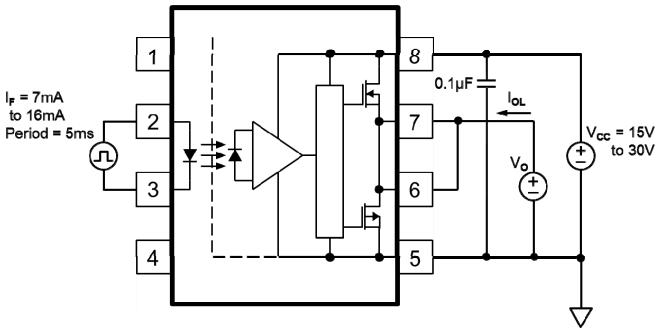
V_{OH} Test Circuit



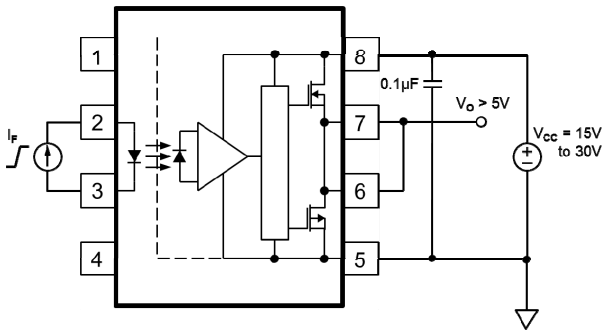
V_{OL} Test Circuit



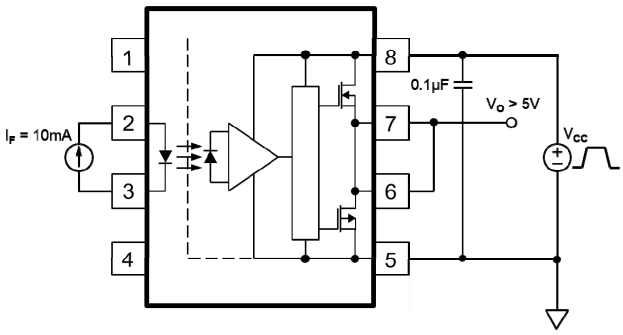
I_{OH} Test Circuit



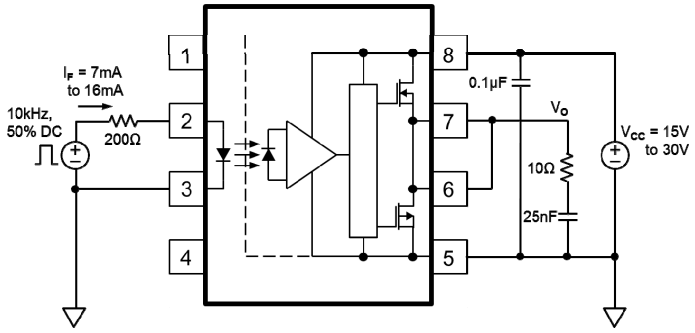
I_{OL} Test Circuit

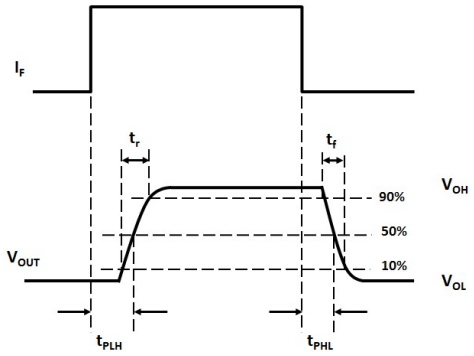


I_{FLH} Test Circuit

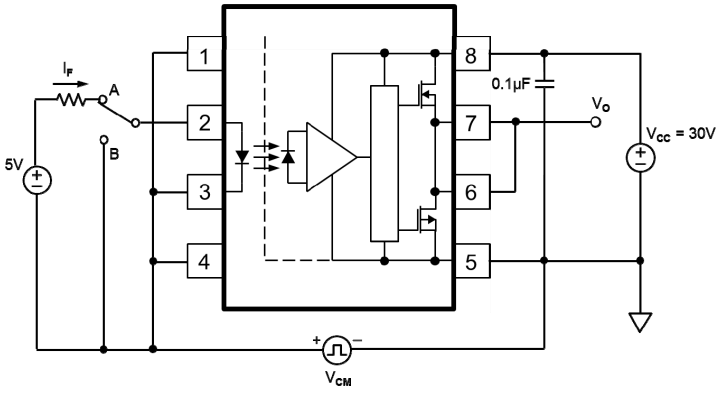


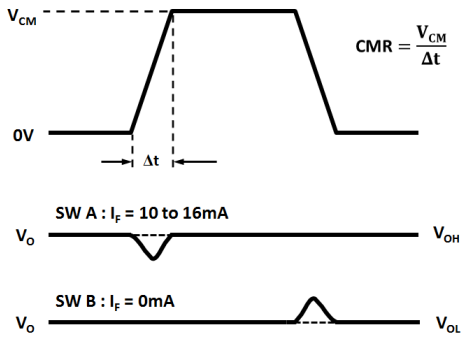
UVLO Test Circuit





t_r, t_f, t_{PLH} and t_{PHL} Test Circuit



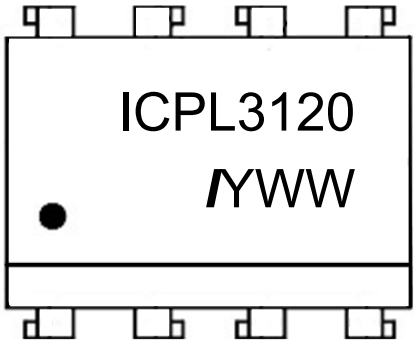


CMR Test Circuit

ORDER INFORMATION

ICPL3120			
After PN	**PN**	**Description**	**Packing quantity**
None	ICPL3120	Standard DIP8	50 pcs per tube
G	ICPL3120G	10mm Lead Spacing	50 pcs per tube
SM	ICPL3120SM	Surface Mount	50 pcs per tube
SMT&R	ICPL3120SMT&R	Surface Mount Tape & Reel	1000 pcs per reel

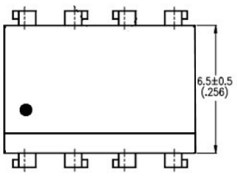
DEVICE MARKING

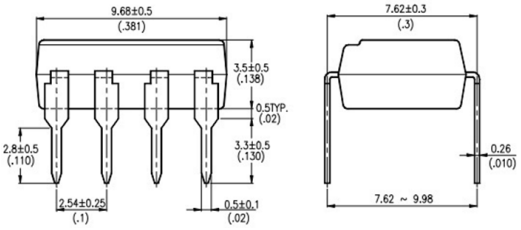


ICPL3120	denotes Device Part Number
/	denotes Isocom
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code

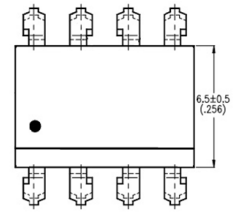
PACKAGE DIMENSIONS in mm (inch)

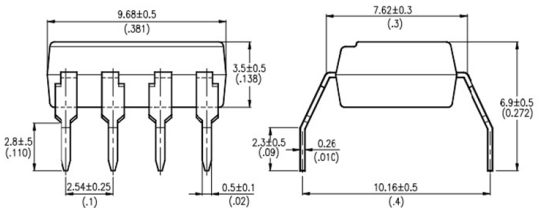
DIP



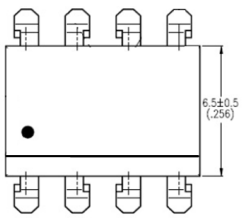


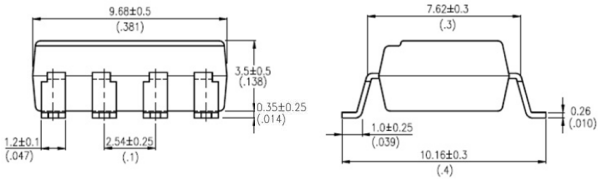
G Form



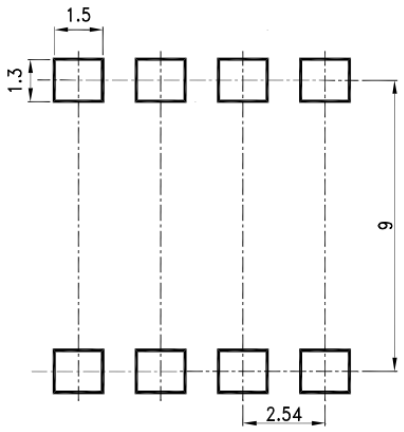


SMD

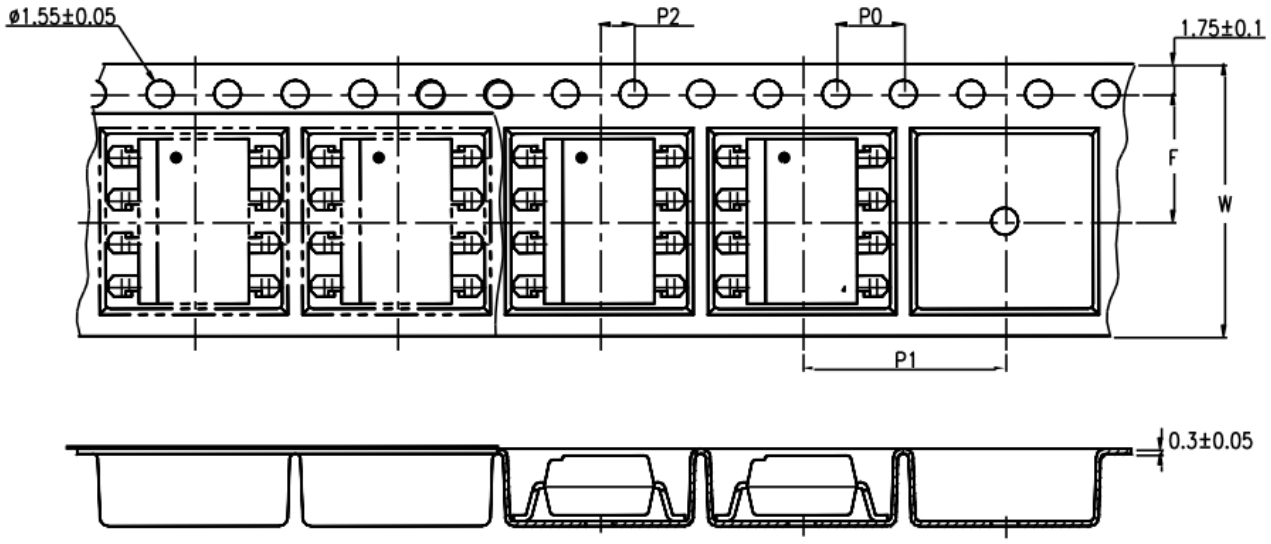




RECOMMENDED SOLDER PAD LAYOUT (mm)



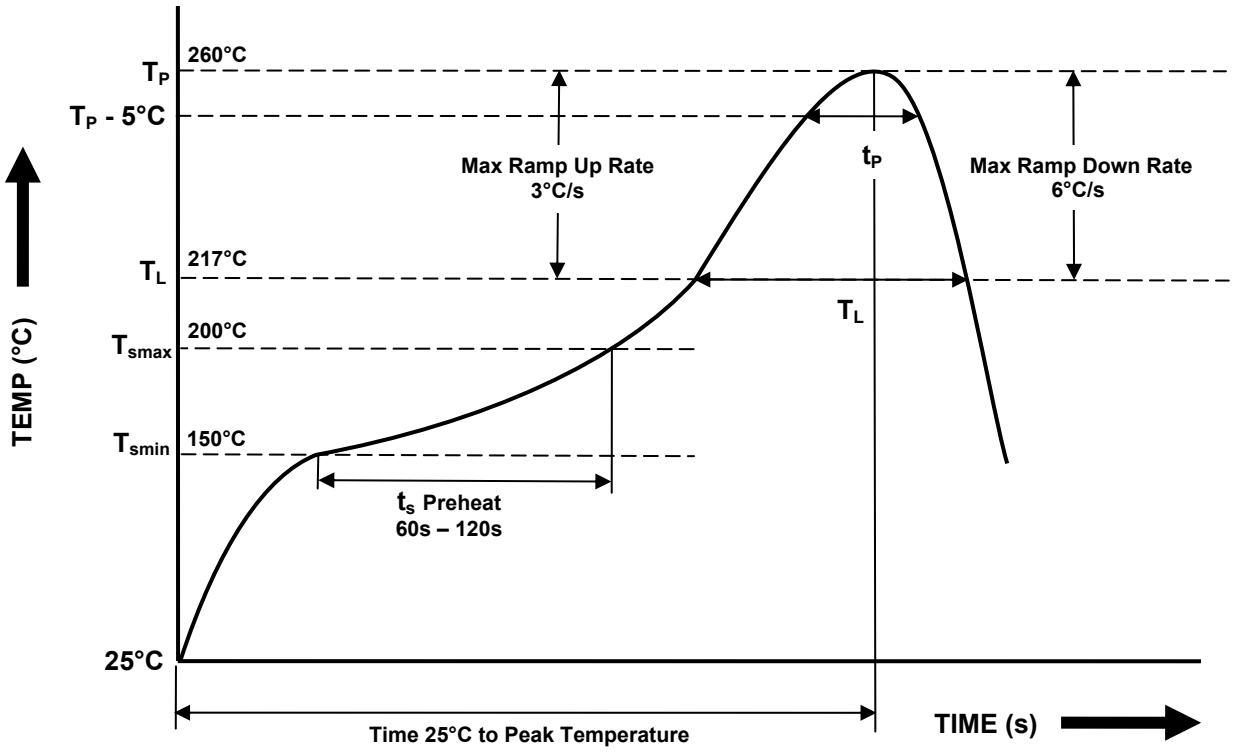
TAPE AND REEL PACKAGING



Description	Symbol	Dimension mm (inch)
Tape Width	W	16 ± 0.3 (0.63)
Pitch of Sprocket Holes	P_0	4 ± 0.1 (0.15)
Distance of Compartment to Sprocket Holes	F	7.5 ± 0.1 (0.295)
	P_2	2 ± 0.1 (0.079)
Distance of Compartment to Compartment	P_1	12 ± 0.1 (0.47)

IR REFLOW SOLDERING TEMPERATURE PROFILE

Note : One Time Reflow Soldering is Recommended.
Do Not Immerse Device Body in Solder Paste.



Profile Details	Conditions
Preheat - Min Temperature (T_{SMIN}) - Max Temperature (T_{SMAX}) - Time T_{SMIN} to T_{SMAX} (t_s)	 150°C 200°C 60s - 120s
Soldering Zone - Peak Temperature (T_P) - Time at Peak Temperature - Liquidous Temperature (T_L) - Time within 5°C of Actual Peak Temperature (T_P – 5°C) - Time maintained above T_L (t_L) - Ramp Up Rate (T_L to T_P) - Ramp Down Rate (T_P to T_L)	 260°C 10s max 217°C 30s max 60s - 100s 3°C/s max 6°C/s max
Average Ramp Up Rate (T_{smax} to T_P)	3°C/s max
Time 25°C to Peak Temperature	8 minutes max

ISOCOM COMPONENTS

DISCLAIMER

Isocom Components is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing Isocom Components products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such Isocom Components products could cause loss of human life, bodily injury or damage to property.

In developing your designs, please ensure that Isocom Components products are used within specified operating ranges as set forth in the most recent Isocom Components products specifications.

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Gallium arsenide (GaAs) is a substance used in the products described in this document. GaAs dust and fumes are toxic. Do not break, cut or pulverize the product, or use chemicals to dissolve them. When disposing of the products, follow the appropriate regulations. Do not dispose of the products with other industrial waste or with domestic garbage.

The products described in this document are subject to the foreign exchange and foreign trade laws.

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