Truth Table

LED	V_{CC} – GND (Turn ON, +ve going)	V_{CC} – GND (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		
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	25	35		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	25	35		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}	RH = 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).

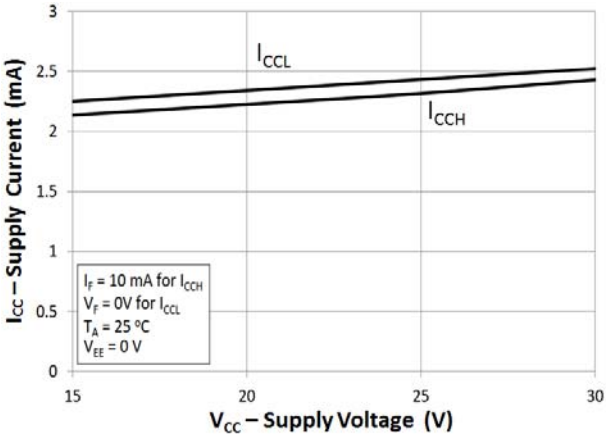


Fig 1 Supply Current vs Supply Voltage

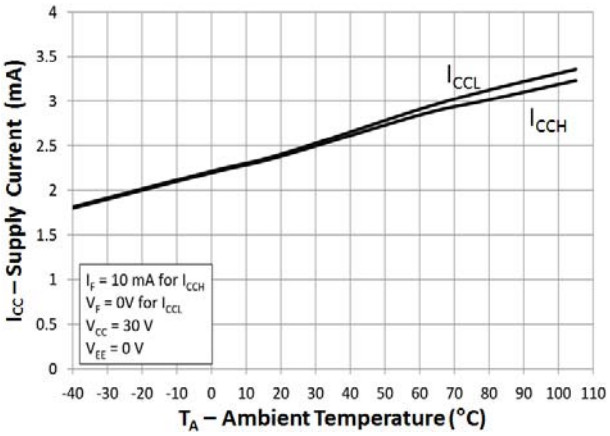


Fig 2 Supply Current vs Ambient Temperature

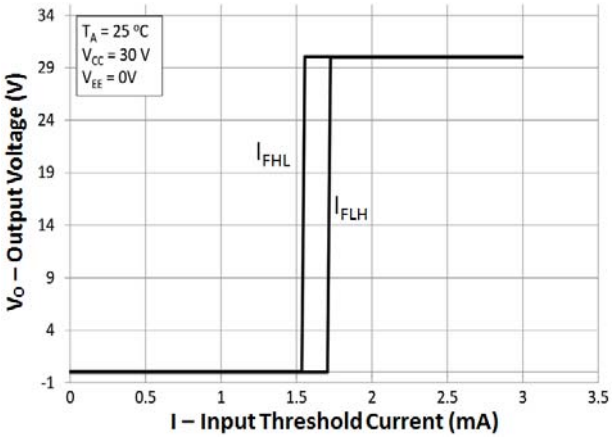


Fig 3 Transfer Characteristics

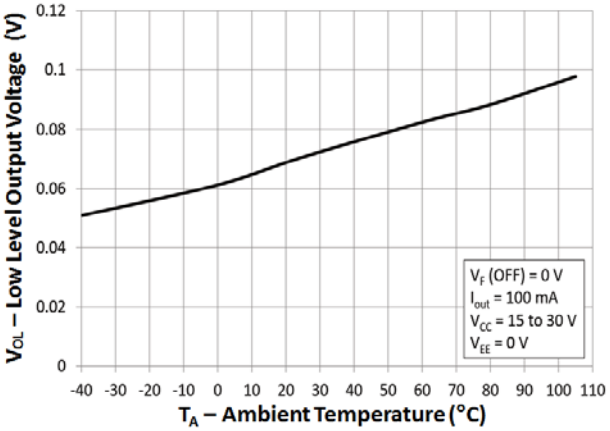


Fig 4 Output Low Voltage vs Ambient Temperature

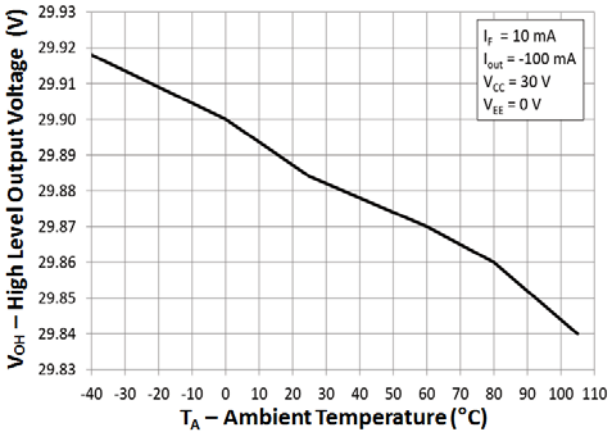


Fig 5 Output High Voltage vs Ambient Temperature

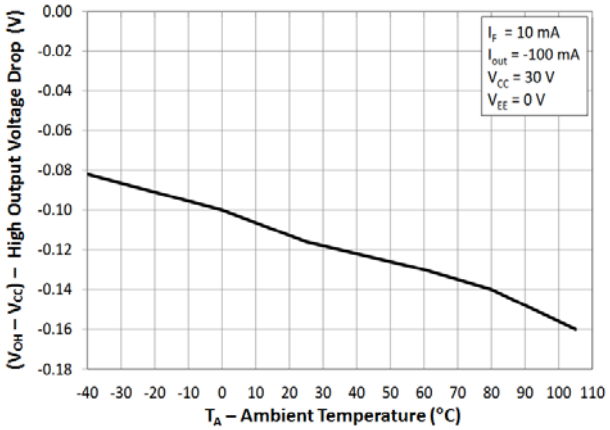


Fig 6 Output High Voltage Drop vs Ambient Temperature

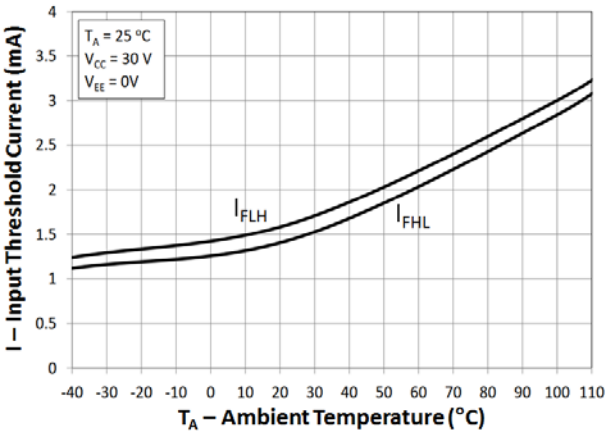


Fig 7 Input Threshold Current vs Ambient Temperature

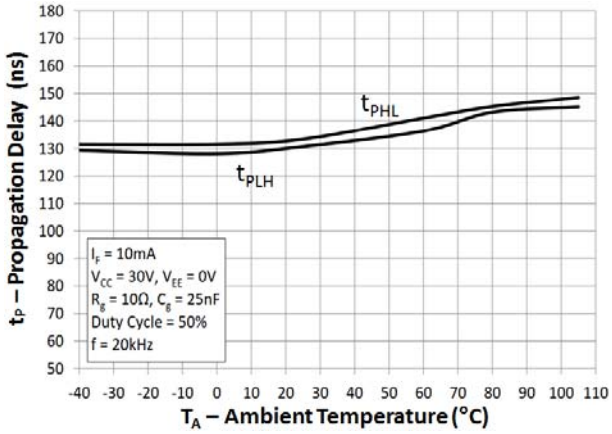


Fig 8 Propagation Delay vs Ambient Temperature

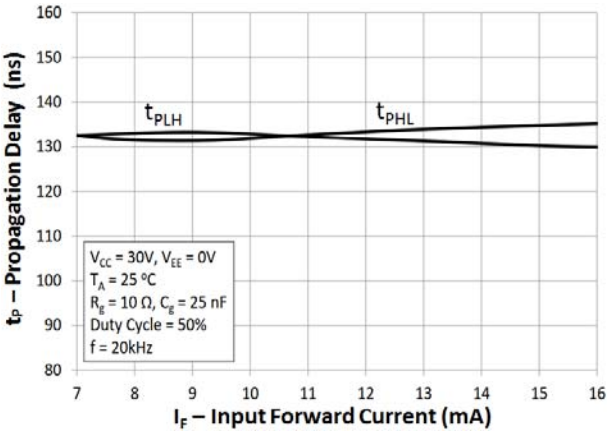


Fig 9 Propagation Delay vs Forward Current

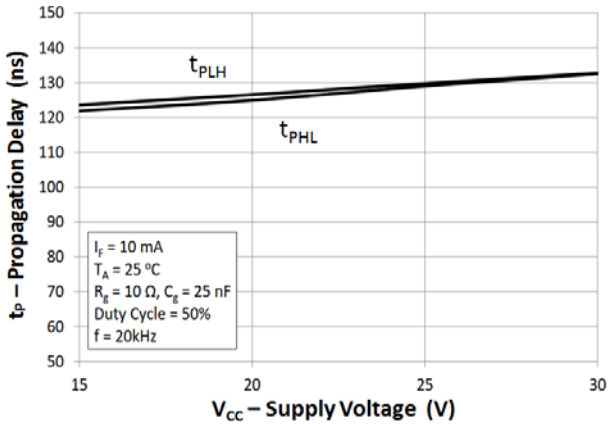


Fig 10 Propagation Delay vs Supply Voltage

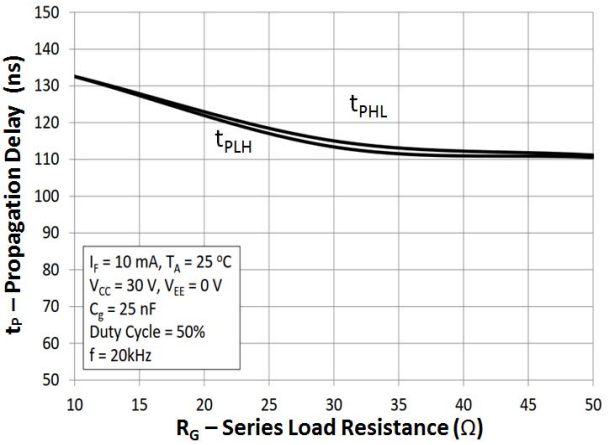


Fig 11 Propagation Delay vs Series Load Resistance

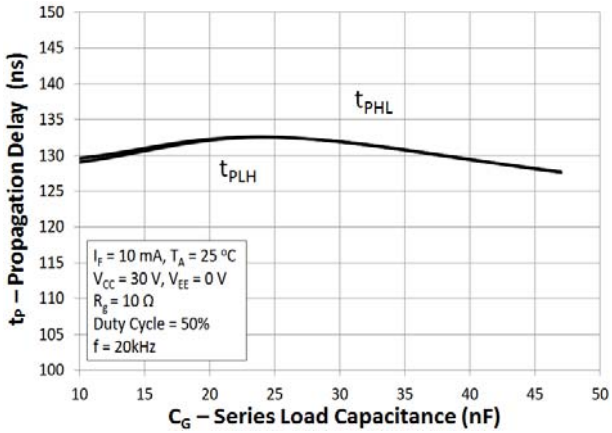


Fig 12 Propagation Delay vs Series Load Capacitance

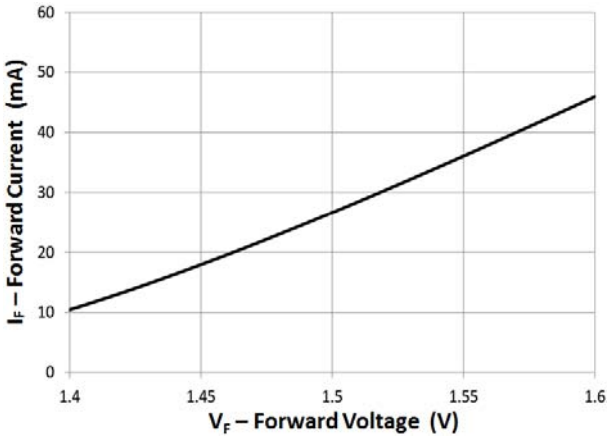
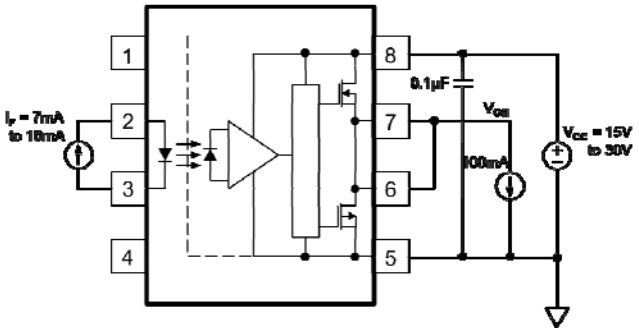
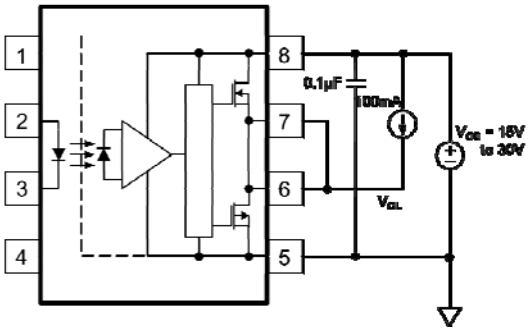


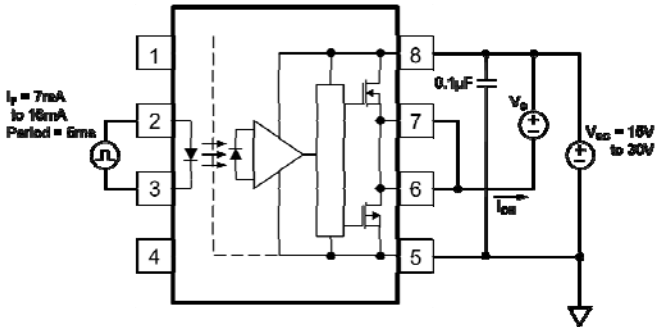
Fig 13 Forward Current vs Forward Voltage



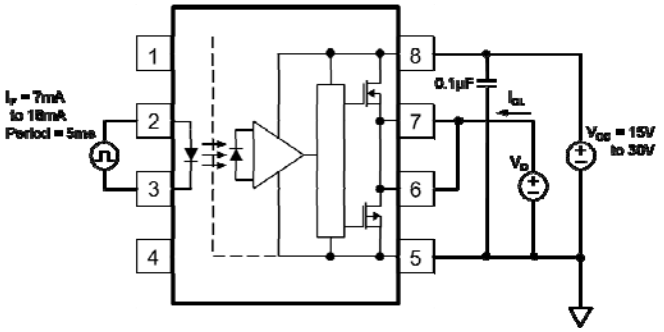
V_{OH} Test Circuit



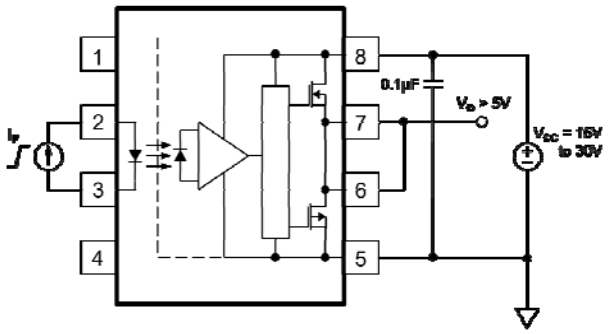
V_{OL} Test Circuit



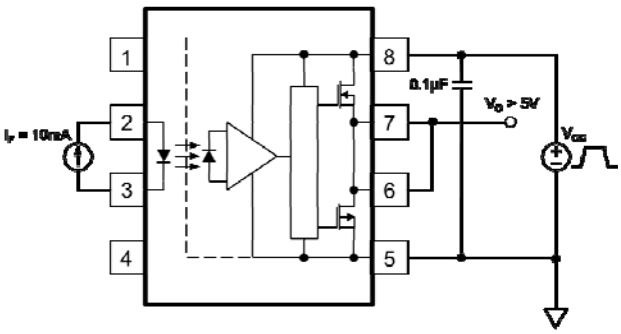
I_{OH} Test Circuit



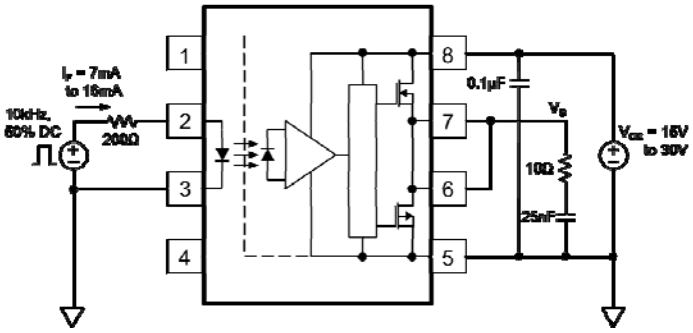
I_{OL} Test Circuit

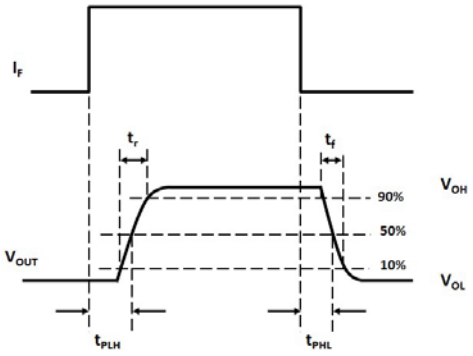


I_{FLH} Test Circuit

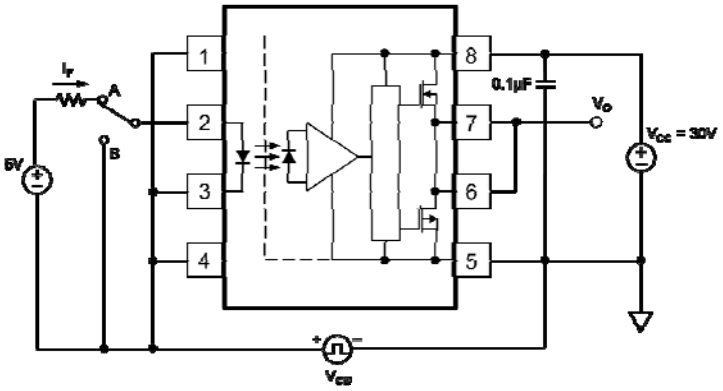


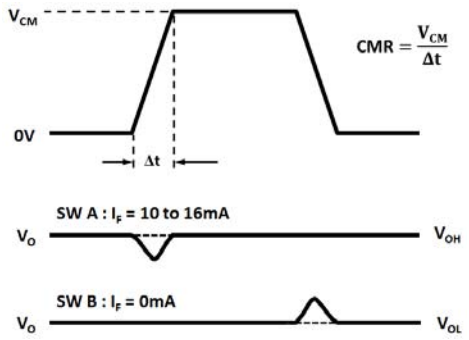
UVLO Test Circuit





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



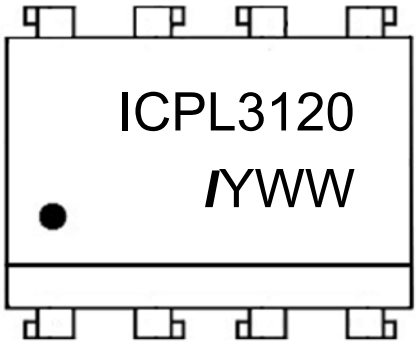


CMR Test Circuit

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

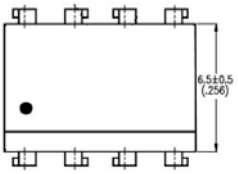
DEVICE MARKING

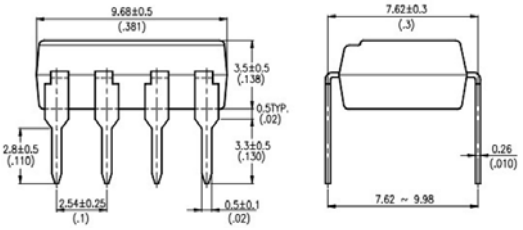


ICPL3120	denotes Device Part Number
I	denotes Isocom
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code

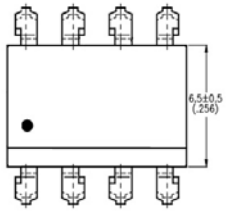
PACKAGE DIMENSIONS in mm (inch)

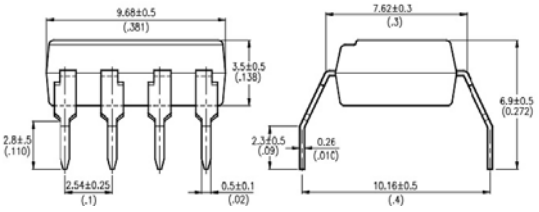
DIP



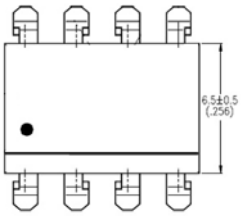


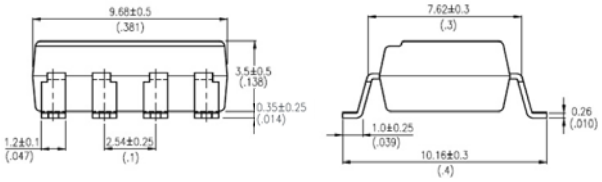
G Form



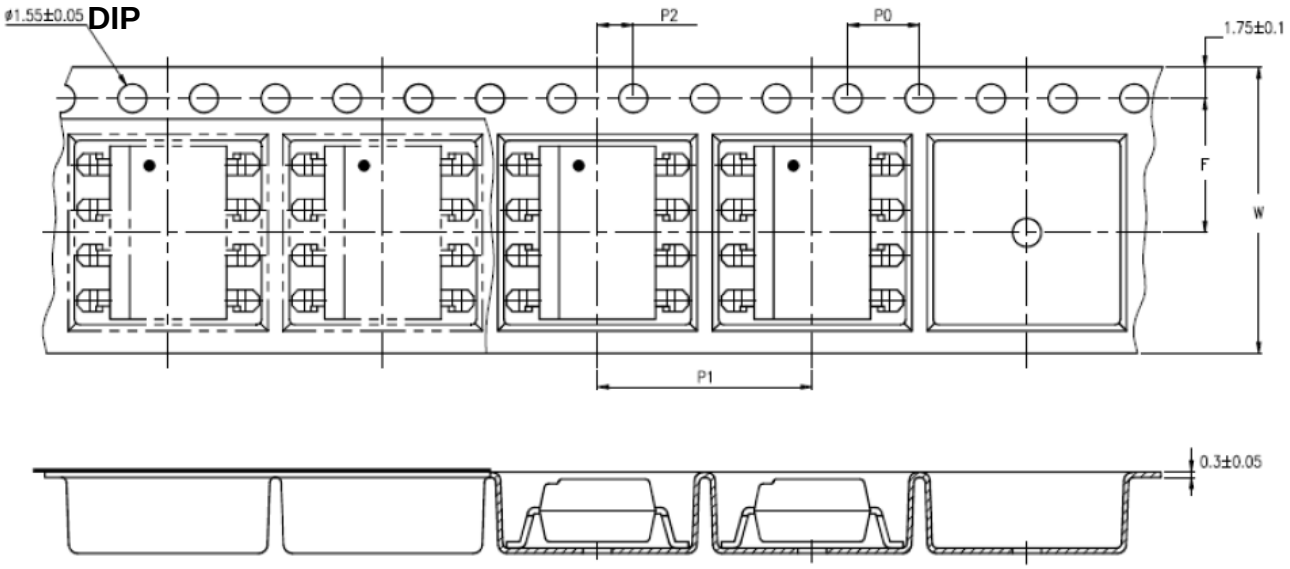


SMD



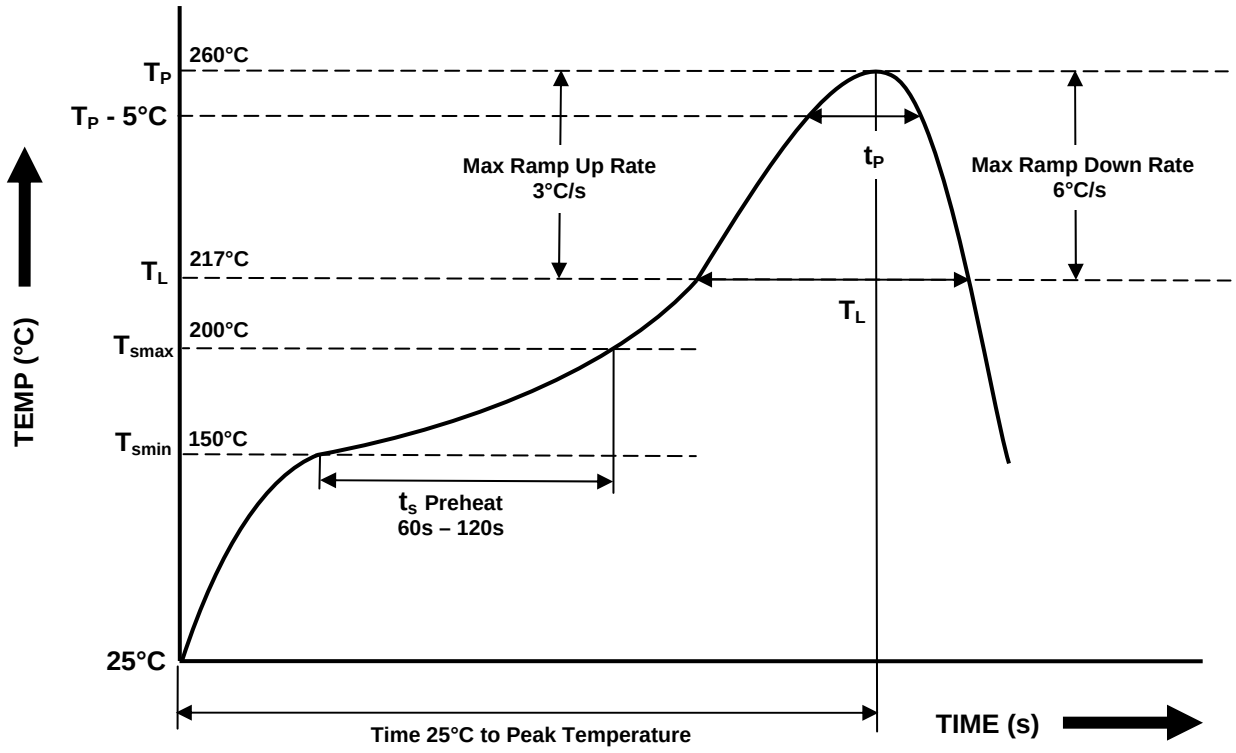


TAPE AND REEL PACKAGING



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
(One Time Reflow Soldering is Recommended)



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

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- The products shown in this publication are designed for the general use in electronic applications such as office automation equipment, communications devices, audio/visual equipment, electrical application and instrumentation.

- For equipment/application where high reliability or safety is required, such as space applications, nuclear power control equipment, medical equipment, etc., please contact our sales representatives.

- When requiring a device for any ”specific” application, please contact our sales for advice.

- The contents described herein are subject to change without prior notice.

- Do not immerse device body in solder paste.

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