ICPLW2601, ICPLW2611

DESCRIPTION

The ICPLW2601 and ICPLW2611 devices each consists of an infrared emitting diode optically coupled to a high speed integrated photo detector logic gate with a strobable output.

These devices belong to Isocom wide body package range optocouplers.

FEATURES

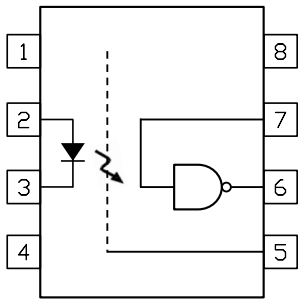
- High Speed 10Mbit/s
- Wide Body Package
- Guaranteed Performance from −40°C to 85°C
- Strobable Logic Gate Output
- Minimum Common Mode Transient Immunity 10kV/µs at V_{CM} 1000V (ICPLW2611)
- High AC Isolation Voltage 5000V_{RMS}
- Pb Free and RoHS Compliant
- Safety Approvals Pending

APPLICATIONS

- Line Receivers, Data Communication
- LSTTL to TTL, LSTTL or 5V CMOS
- Data Multiplexing
- Pulse Transformer Replacement
- Switch Mode Power Supplies
- Ground Loop Elimination
- Computer Peripheral Interface

ORDER INFORMATION

- 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
6 V_O
7 V_E
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	50mA
Reverse Voltage	5V
Power dissipation	100mW
Output	
Output Current	50mA
Output Voltage	7.0V
Supply Voltage	7.0V
Enable Input Voltage (maximum 500mV above V_{CC})	5.5V
Power Dissipation	85mW
Total Package	
Isolation Voltage	5000V_{RMS}
Operating Temperature	−40 to 85°C
Junction Temperature	125°C
Storage Temperature	−55 to 125°C
Lead Soldering Temperature (10s)	260°C

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Truth Table (Positive Logic)

Input	Enable	Output
H	H	L
L	H	H
H	L	H
L	L	H
H	NC	L
L	NC	H

ELECTRICAL CHARACTERISTICS (T_A = −40 to 85°C unless otherwise specified)

INPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Forward Voltage	V_F	I_F = 10mA		1.4	1.8	V
Forward Voltage Temperature Coefficient	$\Delta V_F/\Delta T$	I_F = 10mA		−1.9		mV/°C
Reverse Voltage	V_R	I_R = 100µA, T_A = 25°C	5.0			V
Input Capacitance	C_{IN}	V_F = 0V, f = 1MHz		70		pF

OUTPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Low Level Supply Current	I_{CCH}	I_F = 0mA, V_{CC} = 5.5V V_E = 0.5V		6.5	10	mA
Low Level Supply Current	I_{CCL}	I_F = 10mA, V_{CC} = 5.5V V_E = 0.5V		8	13	mA
High Level Enable Current	I_{EH}	V_{CC} = 5.5V, V_E = 2.0V		−0.6	−1.6	mA
Low Level Enable Current	I_{EL}	V_{CC} = 5.5V, V_E = 0.5V		−0.8	−1.6	mA
High Level Enable Voltage	V_{EH}	I_F = 10mA, V_{CC} = 5.5V	2.0			V
Low Level Enable Voltage	V_{EL}	I_F = 10mA, V_{CC} = 5.5V			0.8	V

COUPLED

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
High Level Output Current	I_{OH}	I_F = 250µA, V_E = 2.0V V_{CC} = V_O = 5.5V		2.1	100	µA
Low Level Output Voltage	V_{OL}	I_F = 5mA, V_E = 2.0V V_{CC} = 5.5V, I_{OL} = 13mA		0.35	0.6	V
Input Threshold Current	I_{FT}	V_{CC} = 5.5V, V_E = 2.0V V_O = 0.6V, I_{OL} = 13mA		3.0	5	mA

ELECTRICAL CHARACTERISTICS (T_A = −40 to 85°C, V_{CC} = 5V, I_F = 7.5mA unless otherwise specified)

SWITCHING

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Propagation Delay Time to High Output Level	t_{PHL}	R_L = 350Ω C_L = 15pF T_A = 25°C		35	100	ns
Propagation Delay Time to Low Output Level	t_{PLH}			40	100	
Pulse Width Distortion	$\|t_{PHL} - t_{PLH}\|$	R_L = 350Ω C_L = 15pF		5	40	
Output Rise Time (10% to 90%)	t_r			40		
Output Fall Time (90% to 10%)	t_f			10		
Enable Propagation Delay Time to High Output Level	t_{ELH}	V_{EH} = 3.0V R_L = 350Ω C_L = 15pF		15		
Enable Propagation Delay Time to Low Output Level	t_{EHL}			15		

ELECTRICAL CHARACTERISTICS (T_A = −40 to 85°C, V_{CC} = 5V, I_F = 7.5mA unless otherwise specified)

SWITCHING

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Common Mode Transient Immunity at Logic High	CM_H	ICPLW2601 I_F = 0mA, V_{OH} = 2.0V R_L = 350Ω V_{CM} = 50Vp-p T_A = 25°C	5			kV/µs
		ICPLW2611 I_F = 0mA, V_{OH} = 2.0V R_L = 350Ω V_{CM} = 400Vp-p T_A = 25°C	10			
		ICPLW2611 I_F = 0mA, V_{OH} = 2.0V V_E = V_{CC} R_L = 350Ω V_{CM} = 400Vp-p T_A = 25°C	20			
Common Mode Transient Immunity at Logic Low	CM_L	ICPLW2601 I_F = 7.5mA, V_{OL} = 0.8V R_L = 350Ω V_{CM} = 50Vp-p T_A = 25°C	5			kV/µs
		ICPLW2611 I_F = 7.5mA, V_{OL} = 0.8V R_L = 350Ω V_{CM} = 400Vp-p T_A = 25°C	10			
		ICPLW2611 I_F = 7.5mA, V_{OL} = 0.8V V_E = V_{CC} R_L = 350Ω V_{CM} = 400Vp-p T_A = 25°C	20			

ISOLATION

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Isolation Voltage	V_{ISO}	RH = 40−60%, t = 1min T_A = 25°C	5000			V_{RMS}

Device is considered a two terminal device : pins 1 to 4 are shorted together and pins 5 to 8 are shorted together.

ELECTRICAL CHARACTERISTICS

Notes :

- V_{CC} supply must be bypassed by a 0.1µF capacitor or larger with good frequency characteristics and should be connected as close as possible to the package V_{CC} and GND pins.
- Enable Input : No pull up resistor reqired as the device has an internal pull up resistor.
- t_{PLH} : measured from the 3.75mA level on the HIGH to LOW transition of the input current pulse to the 1.5V level on the LOW to HIGH transition of the output voltage pulse.
- t_{PHL} : measured from the 3.75mA level on the LOW to HIGH transition of the input current pulse to the 1.5 V level on the HIGH to LOW transition of the output voltage pulse.
- t_r : measured from the 10% to 90% level on the LOW to HIGH transition of the output voltage pulse.
- t_f : measured from the 90% to 10% level on the HIGH to LOW transition of the output voltage pulse.
- t_{ELH} : measured from the 1.5V level on the HIGH to LOW transition of the input Enable voltage pulse to the 1.5V level on the LOW to HIGH transition of the output voltage pulse.
- t_{EHL} : measured from the 1.5V level on the LOW to HIGH transition of the input Enable voltage pulse to the 1.5V level on the HIGH to LOW transition of the output voltage pulse.
- CM_H : the maximum tolerable rate of rise of the Common Mode voltage to ensure the output will remain in the HIGH state (i.e., $V_O > 2.0V$).
- CM_L : the maximum tolerable rate of rise of the Common Mode voltage to ensure the output will remain in the LOW state (i.e., $V_O < 0.8V$).

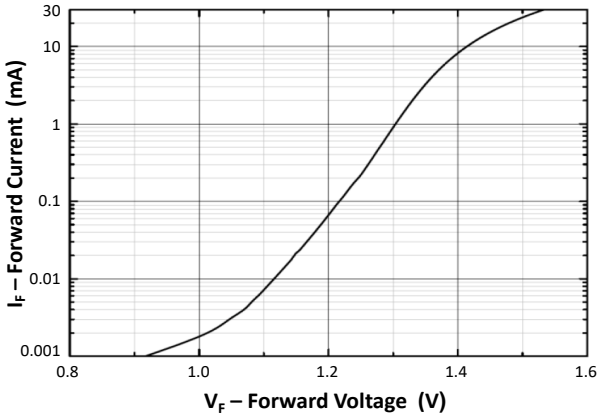


Fig 1 Forward Current vs Forward Voltage

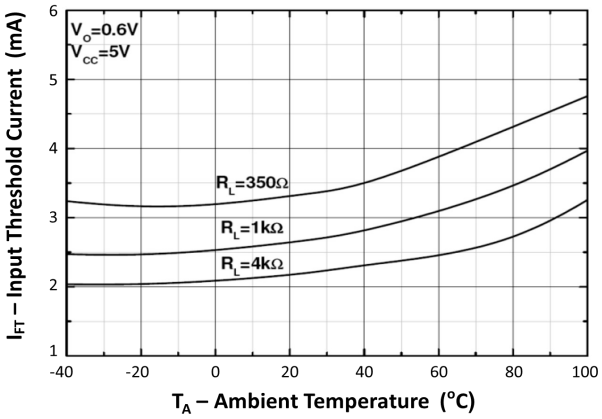


Fig 2 Input Threshold Current vs Ambient Temperature

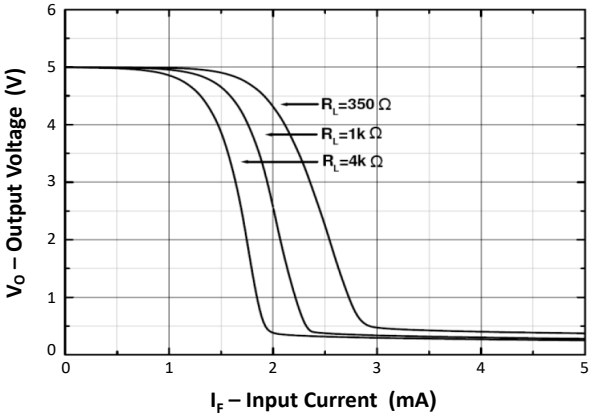


Fig 3 Output Voltage vs Input Current

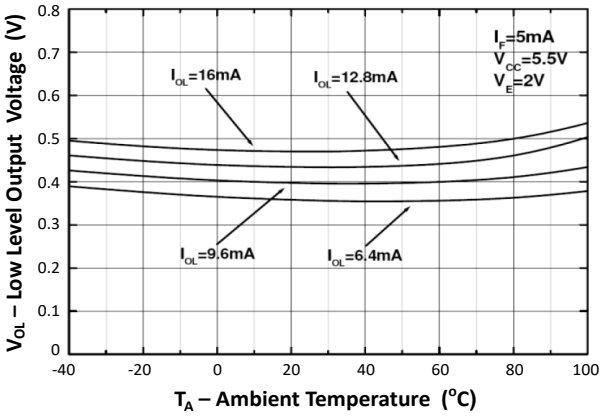


Fig 4 Low Level Output Voltage vs Ambient Temperature

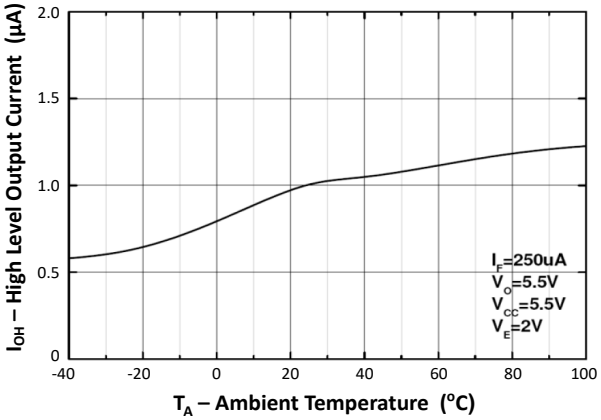


Fig 5 High Level Output Current vs Ambient Temperature

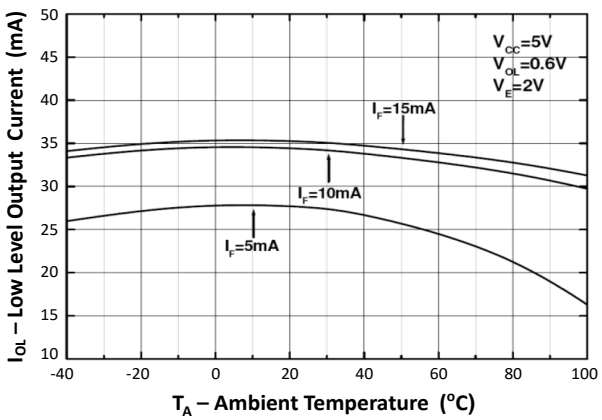


Fig 6 Low Level Output Current vs Ambient Temperature

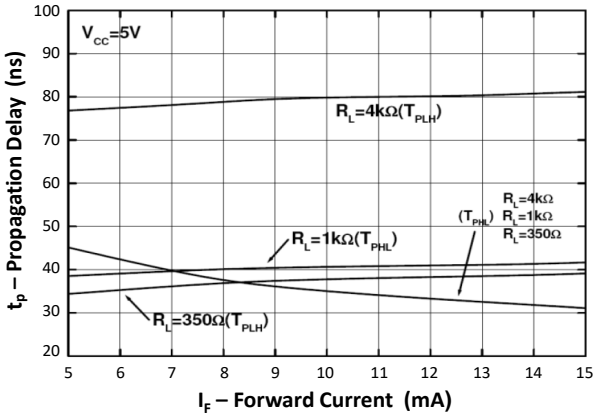


Fig 7 Propagation Delay vs Forward Current

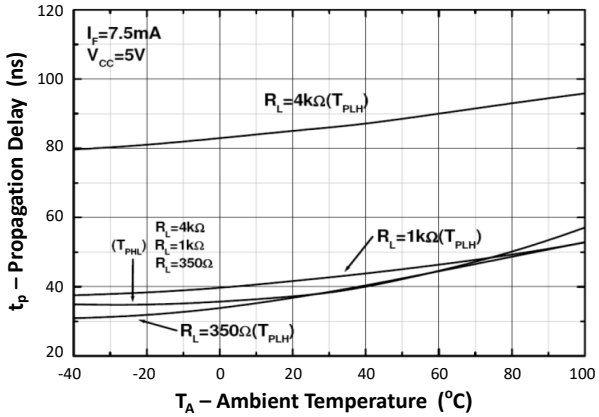


Fig 8 Propagation Delay vs Ambient Temperature

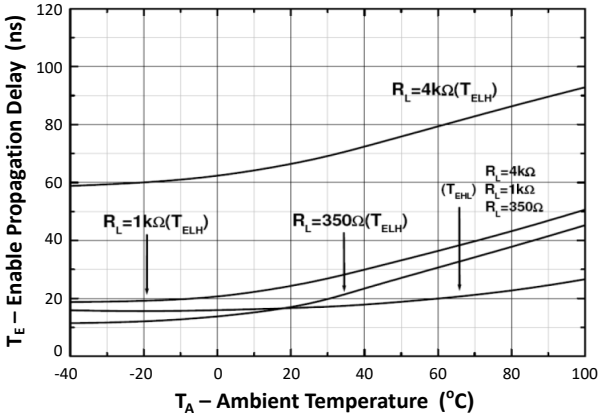


Fig 9 Enable Propagation Delay vs Ambient Temperature

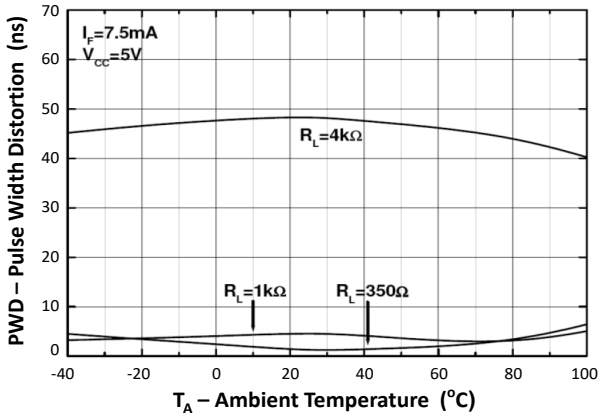


Fig 10 Pulse Width Distortion vs Ambient Temperature

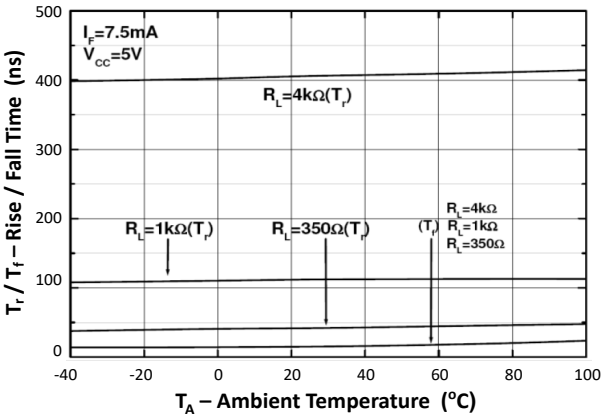
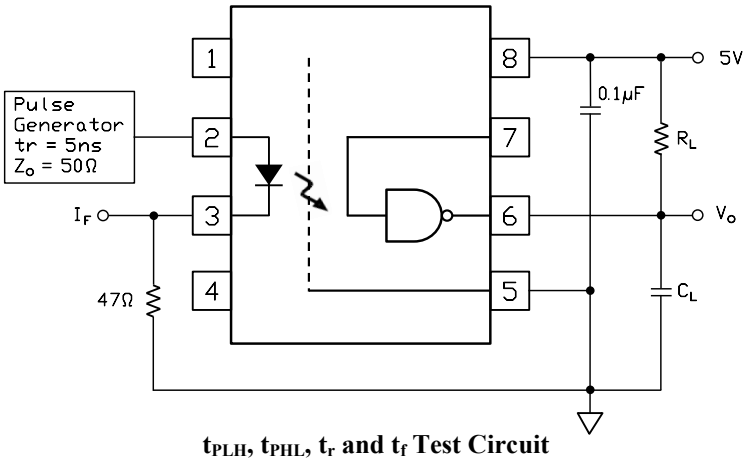
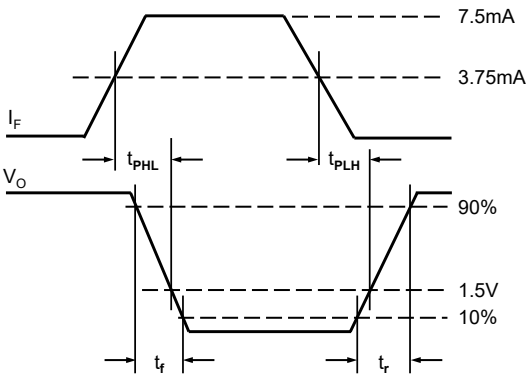
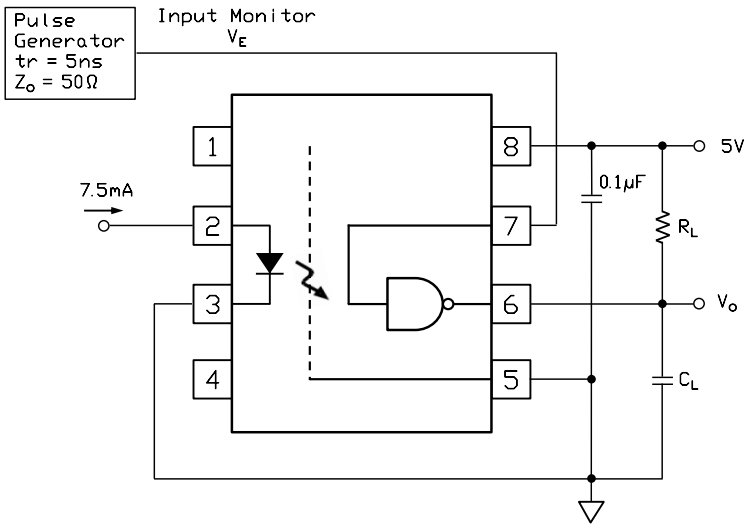


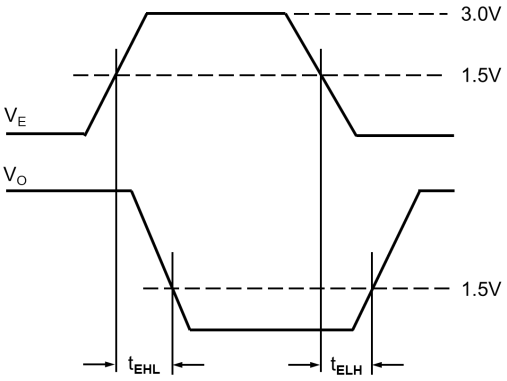
Fig 11 Rise Time / Fall Time vs Ambient Temperature



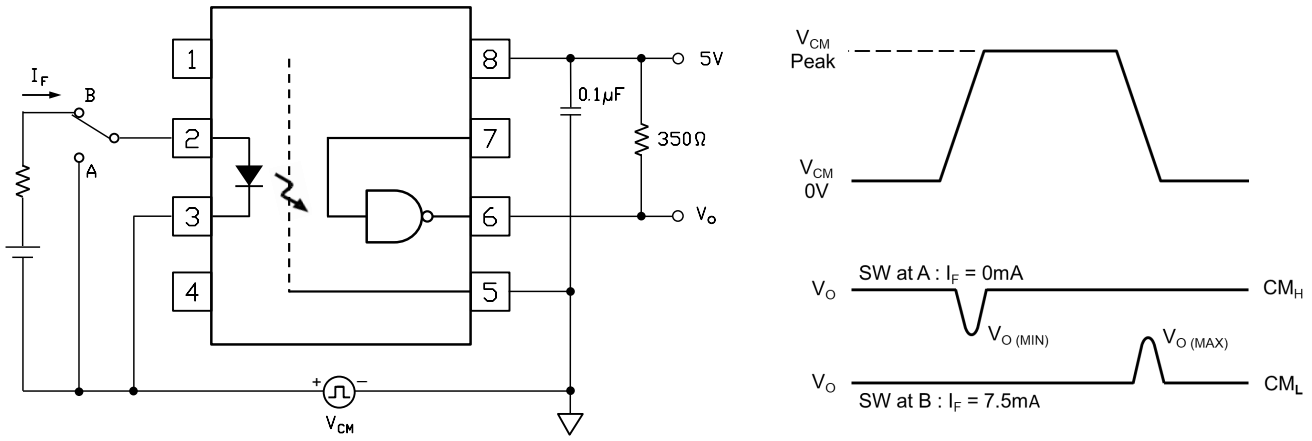


t_{PLH}, t_{PHL}, t_r and t_f Test Circuit

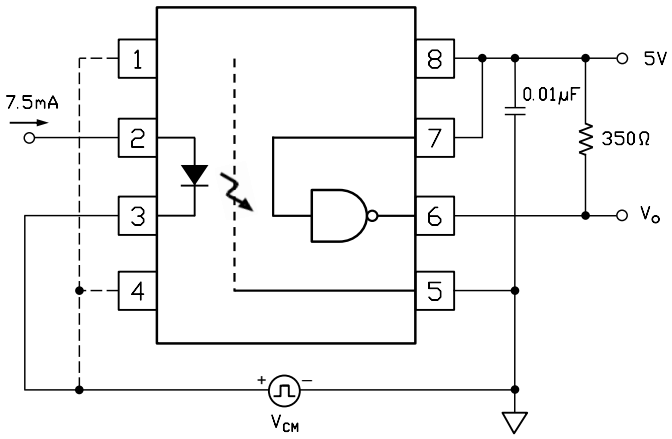




t_{ELH} and t_{EHL} Test Circuit



Common Mode Transient Immunity Test Circuit

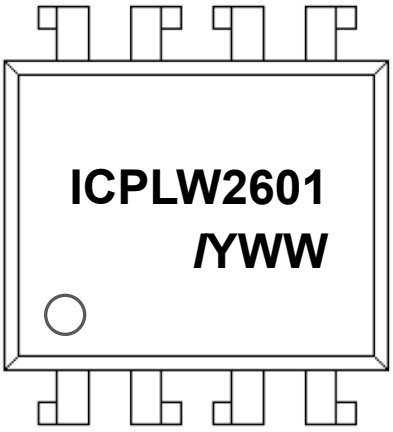


ICPLW2611 : Recommended Drive Circuit for High Common Mode Transient Immunity

ORDER INFORMATION

ICPLW2601, ICPLW2611			
After PN	**PN**	**Description**	**Packing quantity**
None	ICPLW2601, ICPLW2611	Wide Body DIP8	40 pcs per tube
SM	ICPLW2601SM, ICPLW2611SM	Surface Mount	40 pcs per tube
SMT&R	ICPLW2601SMT&R ICPLW2611SMT&R	Surface Mount Tape & Reel	500 pcs per reel

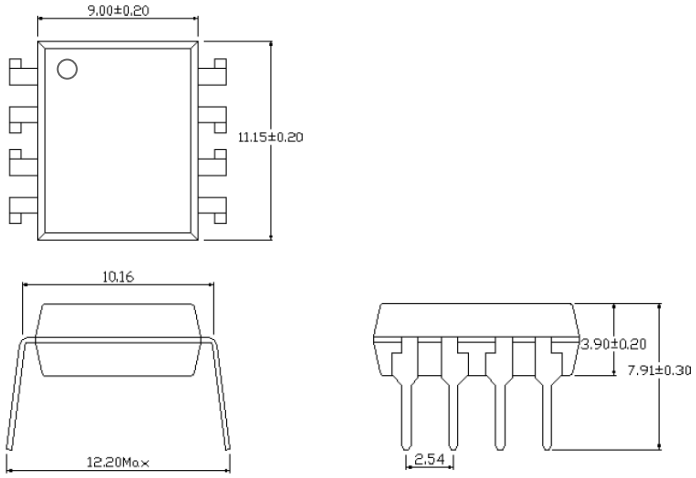
DEVICE MARKING
Example : ICPLW2601



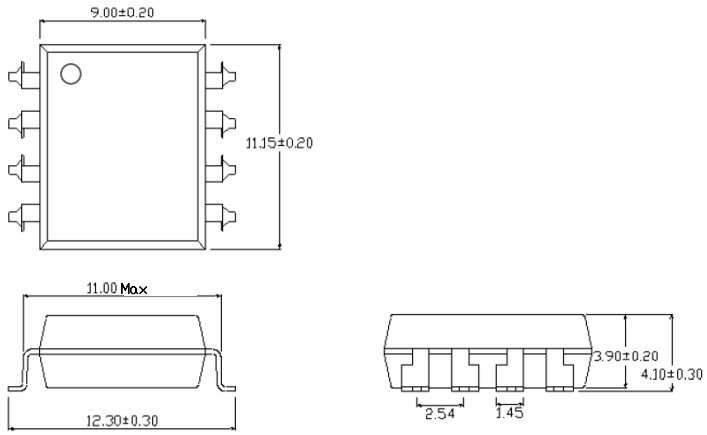
ICPLW2601	denotes Device Part Number
I	denotes Isocom
Y	denotes Year code
WW	denotes 2 digit Week Code

PACKAGE DIMENSIONS (mm)

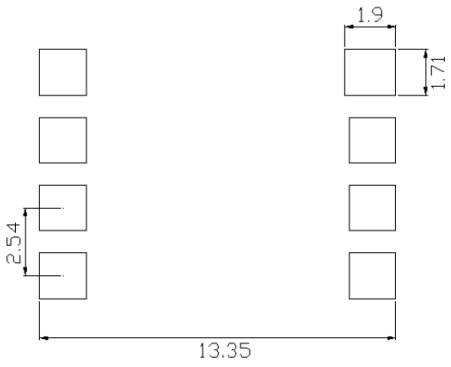
DIP



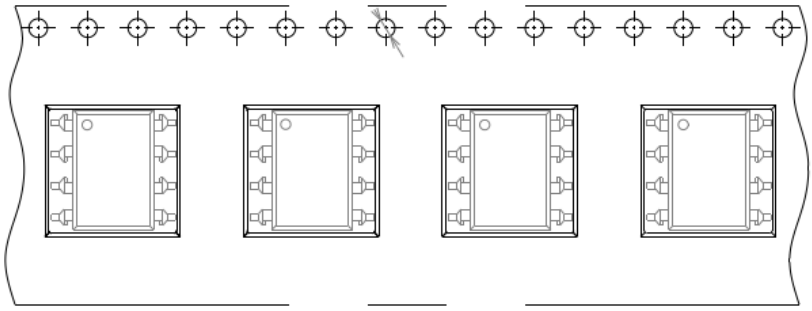
SMD



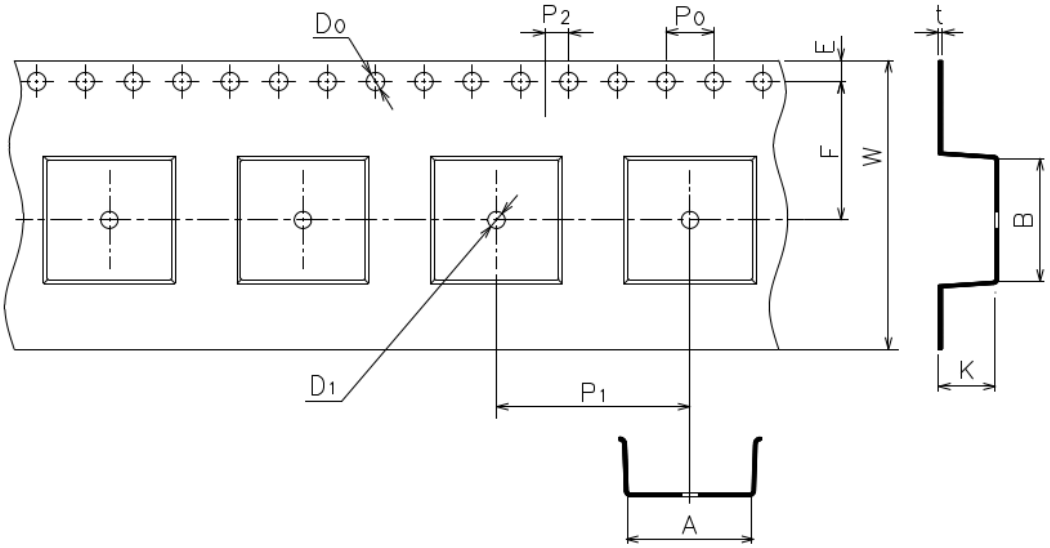
RECOMMENDED PAD LAYOUT FOR SMD (mm)



TAPE AND REEL PACKAGING

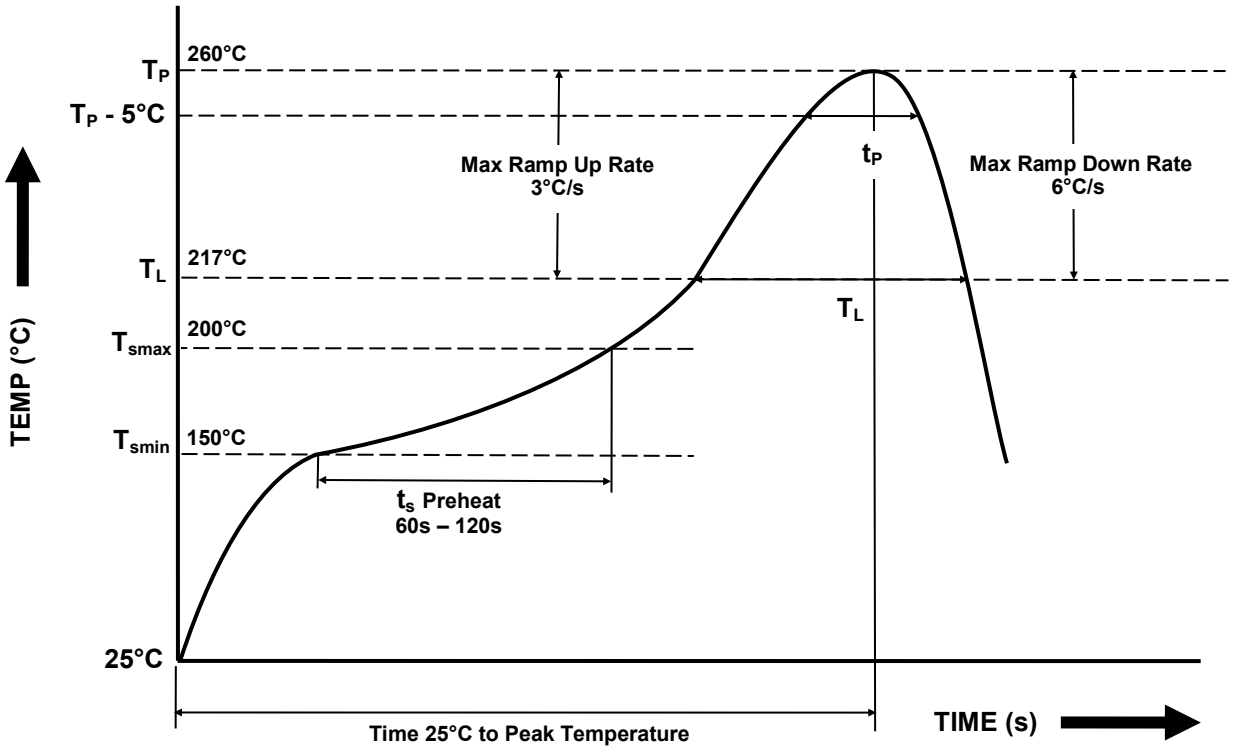


Direction of feed from reel



Dimension	A	B	D_0	D_1	E	F
mm	12.7±0.1	11.45±0.1	1.5±0.1	1.5±0.1	1.75±0.1	11.5±0.1
Dimension	P_0	P_1	P_2	t	W	K
mm	4.0±0.1	16.0±0.1	2.0±0.1	0.4±0.05	24.00±0.3	4.6±0.1

IR REFLOW SOLDERING TEMPERATURE PROFILE
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

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