



## ICPLM600, ICPLM601, ICPLM611

### DESCRIPTION

The ICPLM600, ICPLM601 and ICPLM611 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 Compact Range of optocouplers.

### FEATURES

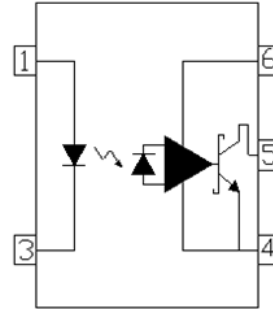
- High speed 10Mbit/s
- Half Pitch 1.27mm
- Common Mode Transient Immunity 20kV/ $\mu$ s min. (ICPLM611)
- High AC Isolation Voltage 3750V<sub>RMS</sub>
- Guaranteed Performance from -40°C to 85°C
- Pb Free and RoHS Compliant
- Safety Approvals Pending

### 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

- Available in Tape and Reel with 3000pcs per reel.



1. Anode
3. Cathode
4. GND
5. Vout
6. Vcc

VCC must be bypassed by a A 0.1 $\mu$ F capacitor.

### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C)

#### Input Diode

Forward Current	50mA
Reverse Voltage	5V
Power dissipation	100mW

#### Output

Output Current	50mA
Output Voltage	7V
Supply Voltage	7V
Power Dissipation	85mW

#### Total Package

Isolation Voltage	3750V <sub>RMS</sub>
Total Power Dissipation	85mW
Operating Temperature	-40 to 85 °C
Storage Temperature	-55 to 125 °C
Lead Soldering Temperature (10s)	260°C

#### ISOCOM COMPONENTS 2004 LTD

Unit 25B, Park View Road West, Park View Industrial Estate  
Hartlepool, Cleveland, TS25 1UD, United Kingdom  
Tel: +44 (0)1429 863 609 Fax : +44 (0)1429 863 581  
e-mail: sales@isocom.co.uk  
<http://www.isocom.com>

#### ISOCOM COMPONENTS ASIA LTD

Hong Kong Office,  
Block A, 8/F, Wah Hing Industrial mansion,  
36 Tai Yau Street, San Po Kong, Kowloon, Hong Kong.  
Tel: +852 2995 9217 Fax : +852 8161 6292  
e-mail sales@isocom.com.hk



## ICPLM600, ICPLM601, ICPLM611

### Truth Table (Positive Logic)

Input	Output
H	L
L	H

### ELECTRICAL CHARACTERISTICS ( $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$ unless otherwise specified)

#### INPUT

Parameter	Symbol	Test Condition	Min	Typ.*	Max	Unit
Forward Voltage	$V_F$	$I_F = 10\text{mA}$		1.45	1.8	V
Reverse Voltage	$V_R$	$I_R = 10\mu\text{A}$ , $T_A = 25^\circ\text{C}$	5.0			V
Temperature Coefficient of $V_F$	$\Delta V_F / \Delta T_A$	$I_F = 10\text{mA}$		-1.9		mV/ $^\circ\text{C}$
Input Capacitance	$C_{IN}$	$V_F = 0\text{V}$ , $f = 1\text{MHz}$		70		pF

#### OUTPUT

Parameter	Symbol	Test Condition	Min	Typ.*	Max	Unit
High Level Supply Current	$I_{CCH}$	$I_F = 0\text{mA}$ , $V_{CC} = 5.5\text{V}$		6.0	9	mA
Low Level Supply Current	$I_{CCL}$	$I_F = 10\text{mA}$ , $V_{CC} = 5.5\text{V}$		7.5	10	mA

#### COUPLED

Parameter	Symbol	Test Condition	Min	Typ.*	Max	Unit
High Level Output Current	$I_{OH}$	$V_{CC} = 5.5\text{V}$ , $V_O = 5.5\text{V}$ $I_F = 250\mu\text{A}$		2.1	30	$\mu\text{A}$
Low Level Output Voltage	$V_{OL}$	$V_{CC} = 5.5\text{V}$ , $I_F = 5\text{mA}$ , $I_{OL} = 13\text{mA}$		0.4	0.6	V
Input Threshold Current	$I_{FT}$	$V_{CC} = 5.5\text{V}$ , $V_O = 0.6\text{V}$ , $I_{OL} = 13\text{mA}$		2.4	5	mA

\* Typical values at  $T_A = 25^\circ\text{C}$



## ICPLM600, ICPLM601, ICPLM611

### ELECTRICAL CHARACTERISTICS ( $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$ unless otherwise specified)

#### Switching Characteristics ( $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$ , $I_F = 7.5\text{mA}$ , $V_{CC} = 5\text{V}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ.*	Max	Unit
Propagation Delay Time to Logic Low	$T_{PHL}$	$R_L = 350\Omega$ , $C_L = 15\text{pF}$ , $T_A = 25^\circ\text{C}$		41	100	ns
Propagation Delay Time to Logic High	$T_{PLH}$	$R_L = 350\Omega$ , $C_L = 15\text{pF}$ , $T_A = 25^\circ\text{C}$		50	100	ns
Pulse Width Distortion	$ t_{PHL} - t_{PLH} $	$R_L = 350\Omega$ , $C_L = 15\text{pF}$		9	35	ns
Propagation Delay Skew	$t_{PSK}$	$R_L = 350\Omega$ , $C_L = 15\text{pF}$			40	ns
Output Rise Time	$t_r$	$R_L = 350\Omega$ , $C_L = 15\text{pF}$		40		ns
Output Fall Time	$t_f$	$R_L = 350\Omega$ , $C_L = 15\text{pF}$		10		ns
Common Mode Transient Immunity at Logic High	$CM_H$	ICPLM600 $I_F = 0\text{mA}$ , $V_{OH} = 2.0\text{V}$ , $R_L = 350\Omega$ , $V_{CM} = 10\text{Vp-p}$ , $T_A = 25^\circ\text{C}$		1000		V/ $\mu\text{s}$
		ICPLM601 $I_F = 0\text{mA}$ , $V_{OH} = 2.0\text{V}$ , $R_L = 350\Omega$ , $V_{CM} = 50\text{Vp-p}$ , $T_A = 25^\circ\text{C}$	5000			
		ICPLM611 $I_F = 0\text{mA}$ , $V_{OH} = 2.0\text{V}$ , $R_L = 350\Omega$ , $V_{CM} = 1\text{kVp-p}$ , $T_A = 25^\circ\text{C}$	20000			
Common Mode Transient Immunity at Logic Low	$CM_L$	ICPLM600 $I_F = 7.5\text{mA}$ , $V_{OL} = 0.8\text{V}$ , $R_L = 350\Omega$ , $V_{CM} = 10\text{Vp-p}$ , $T_A = 25^\circ\text{C}$		1000		V/ $\mu\text{s}$
		ICPLM601 $I_F = 7.5\text{mA}$ , $V_{OL} = 0.8\text{V}$ , $R_L = 350\Omega$ , $V_{CM} = 50\text{Vp-p}$ , $T_A = 25^\circ\text{C}$	5000			
		ICPLM611 $I_F = 7.5\text{mA}$ , $V_{OL} = 0.8\text{V}$ , $R_L = 350\Omega$ , $V_{CM} = 1\text{kVp-p}$ , $T_A = 25^\circ\text{C}$	20000			

\* Typical values at  $T_A = 25^\circ\text{C}$



## ICPLM600, ICPLM601, ICPLM611

### ELECTRICAL CHARACTERISTICS

#### Notes :

1. The  $V_{CC}$  supply must be bypassed by a  $0.1\mu\text{F}$  capacitor or larger with good high frequency characteristic and should be connected as close as possible to the package  $V_{CC}$  and GND pins.
2.  $t_{PLH}$  – Propagation delay is measured from the  $3.75\text{mA}$  level on the HIGH to LOW transition of the input current pulse to the  $1.5\text{V}$  level on the LOW to HIGH transition of the output voltage pulse.
3.  $t_{PHL}$  – Propagation delay is measured from the  $3.75\text{mA}$  level on the LOW to HIGH transition of the input current pulse to the  $1.5\text{V}$  level on the HIGH to LOW transition of the output voltage pulse.
4.  $t_{PSK}$  – The magnitude of the worst case difference in  $t_{PHL}$  and/or  $t_{PLH}$  that will be seen between devices at any given temperature within the worst case operating condition range.
4.  $t_r$  – Rise time is measured from the 10% to the 90% levels on the LOW to HIGH transition of the output pulse.
5.  $t_f$  – Fall time is measured from the 90% to the 10% levels on the HIGH to LOW transition of the output pulse.
6.  $CM_H$  – The maximum tolerable rate of rise of the common mode voltage to ensure the output will remain in the HIGH state (i.e.,  $V_{OUT} > 2.0\text{V}$ ).
7.  $CM_L$  – The maximum tolerable rate of rise of the common mode voltage to ensure the output will remain in the LOW output state (i.e.,  $V_{OUT} < 0.8\text{V}$ ).



## ICPLM600, ICPLM601, ICPLM611

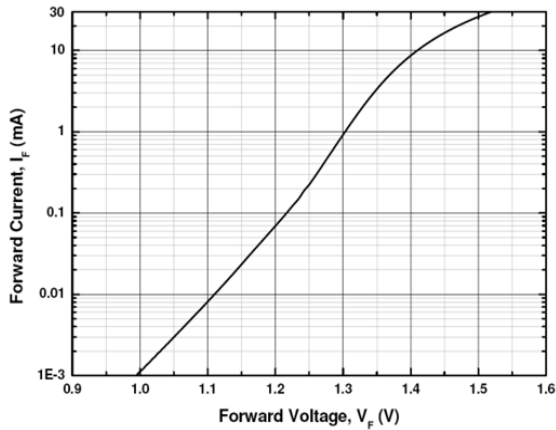


Fig 1 Forward Current vs Forward Voltage

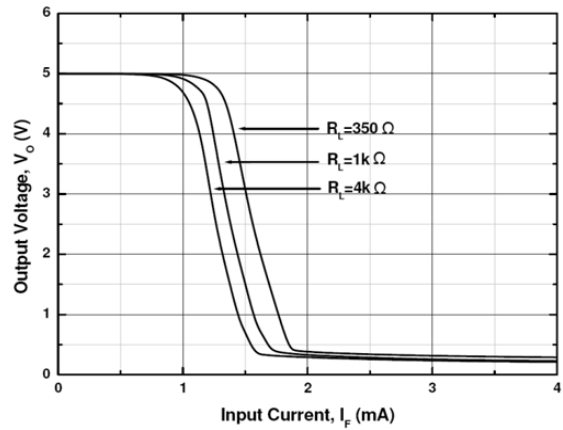


Fig 2 Output Voltage vs Forward Current

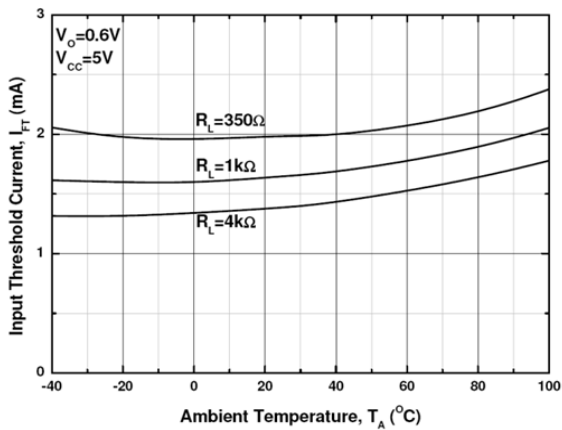


Fig 3 Input Threshold Current vs  $T_A$

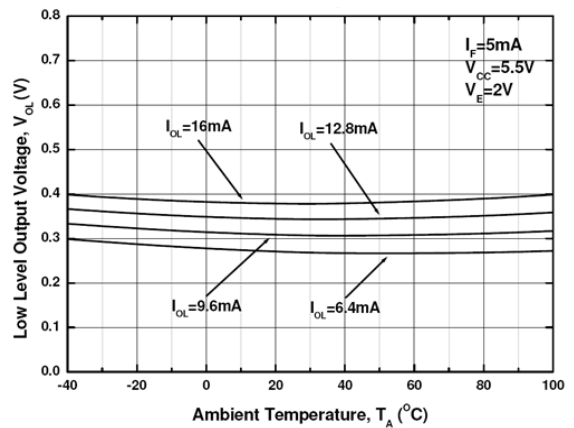


Fig 4 Low Level Output Voltage vs  $T_A$

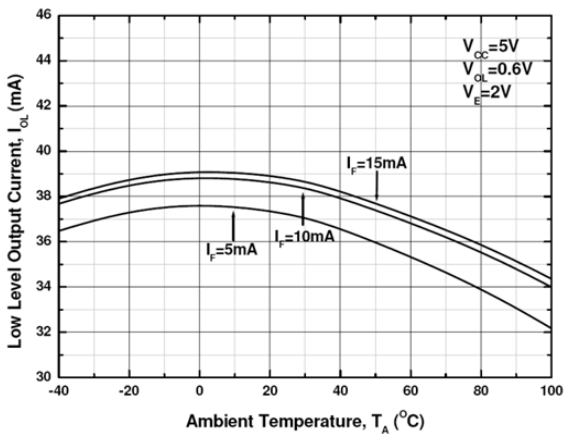


Fig 5 Low Level Output Current vs  $T_A$

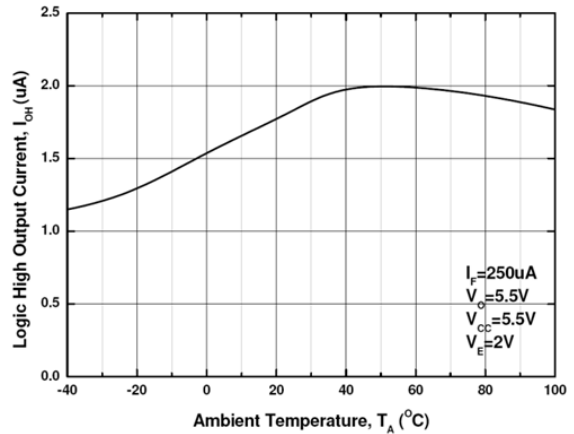


Fig 6 High Level Output Current vs  $T_A$



## ICPLM600, ICPLM601, ICPLM611

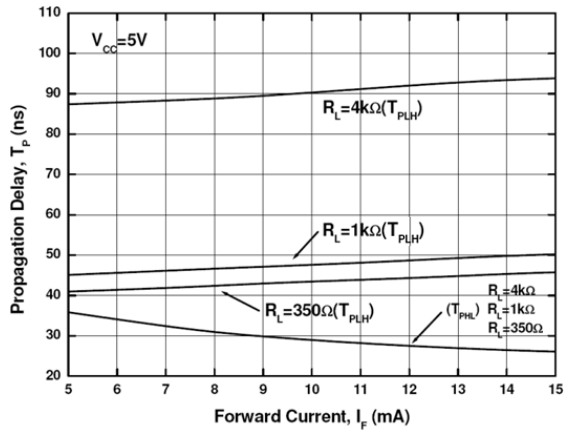


Fig 7 Propagation Delay vs Forward Current

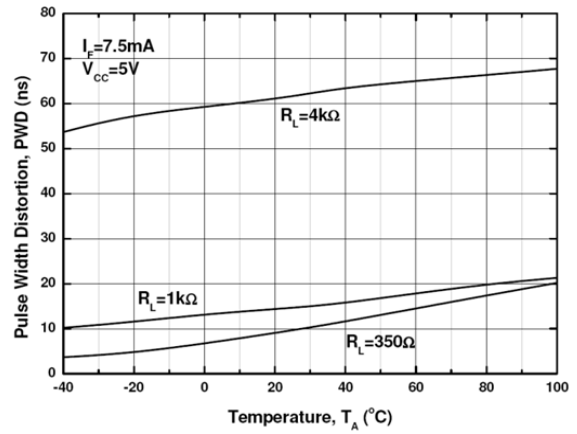


Fig 8 Pulse Width Distortion vs  $T_A$

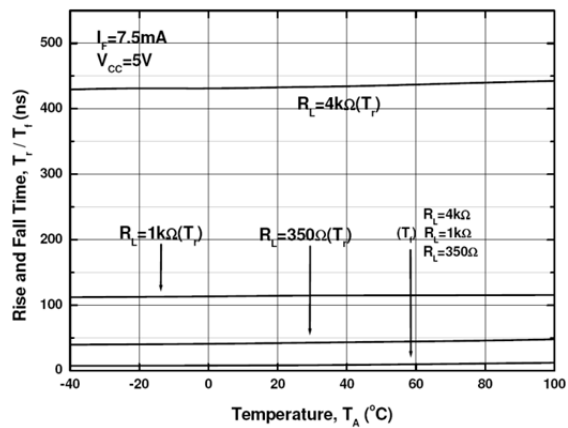
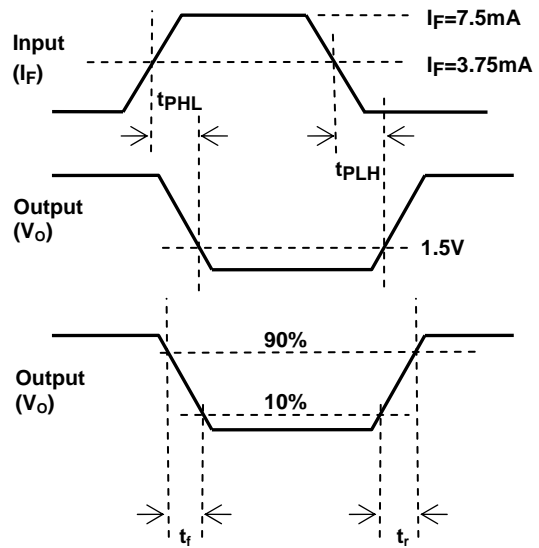
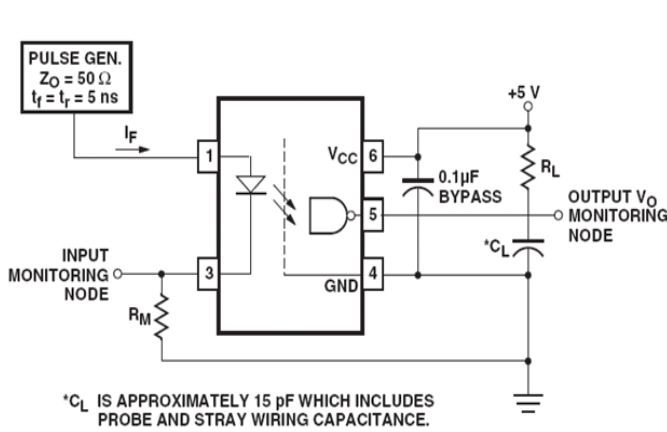


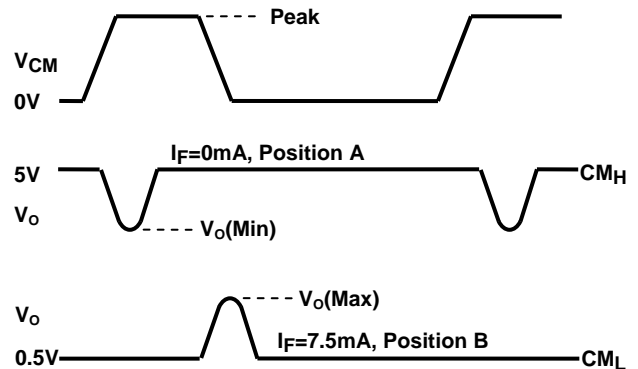
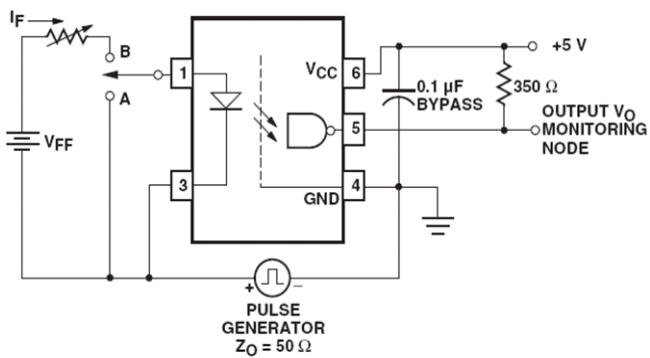
Fig 9 Rise and Fall Time vs  $T_A$



**ICPLM600, ICPLM601, ICPLM611**



**Fig 10 Switching Time Test Circuit**



**Fig 11 Common Mode Transient Immunity Test Circuit**

Common mode transient immunity in logic high level is the maximum tolerable (positive)  $dV_{CM}/dt$  on the leading edge of the common mode pulse signal  $V_{CM}$ , to assure that the output will remain in a logic high state (i.e.,  $V_o > 2.0V$ ).

Common mode transient immunity in logic low level is the maximum tolerable (negative)  $dV_{CM}/dt$  on the trailing edge of the common mode pulse signal,  $V_{CM}$ , to assure that the output will remain in a logic low state (i.e.,  $V_o < 0.8V$ ).

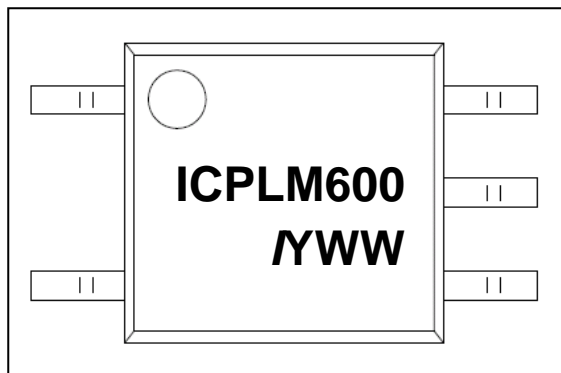


## ICPLM600, ICPLM601, ICPLM611

### ORDER INFORMATION

ICPLM600, ICPLM601, ICPLM611			
After PN	PN	Description	Packing quantity
None	ICPLM600, ICPLM601, ICPLM611	Surface Mount Tape & Reel	3000 pcs per reel

### DEVICE MARKING



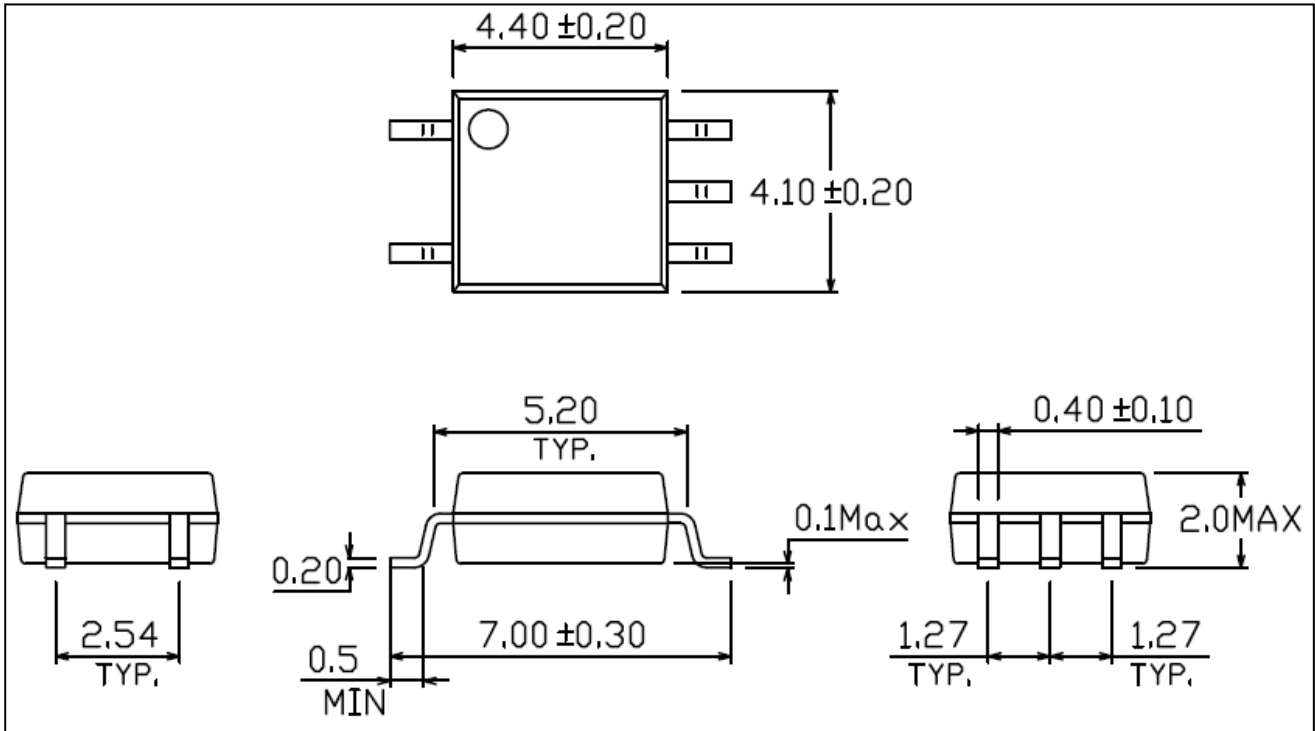
ICPLM600 denotes Device Part Number (ICPLM600 is used as example)  
Y denotes 1 digit Year code  
WW denotes 2 digit Week code  
/ denotes Isocom



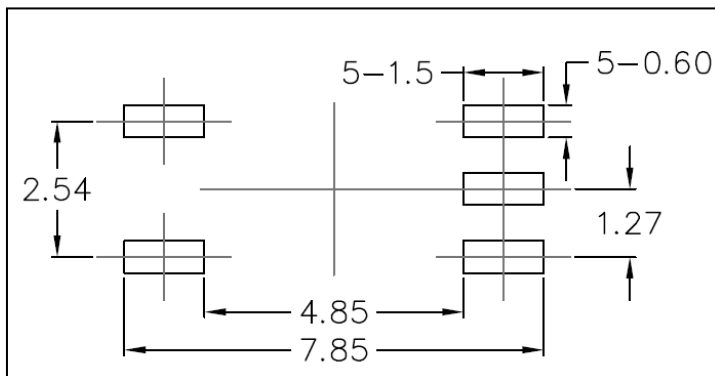


## ICPLM600, ICPLM601, ICPLM611

### PACKAGE DIMENSIONS (mm)



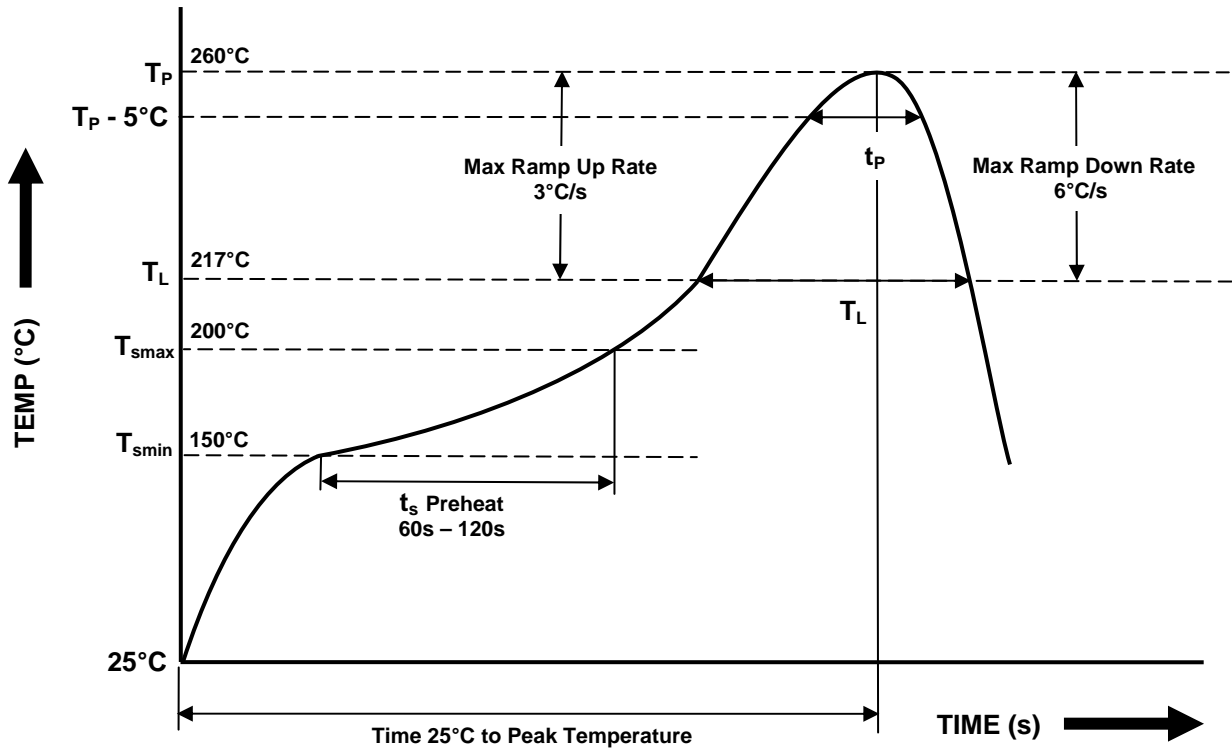
### RECOMMENDED PAD LAYOUT (mm)





**ICPLM600, ICPLM601, ICPLM611**

**IR REFLOW SOLDERING TEMPERATURE PROFILE**  
(One Time Reflow Soldering is Recommended)

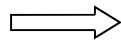
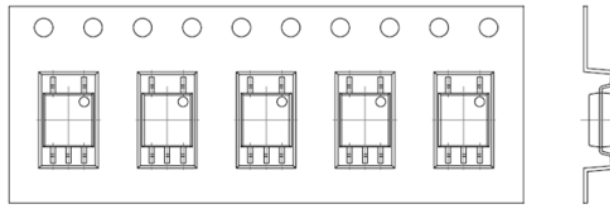


Profile Details	Conditions
<b>Preheat</b> - Min Temperature ( $T_{SMIN}$ ) - Max Temperature ( $T_{SMAX}$ ) - Time $T_{SMIN}$ to $T_{SMAX}$ ( $t_s$ )	150°C 200°C 60s - 120s
<b>Soldering Zone</b> - Peak Temperature ( $T_P$ ) - Liquidous Temperature ( $T_L$ ) - Time within 5°C of Actual Peak Temperature ( $T_P - 5^\circ\text{C}$ ) - 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 217°C 30s 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

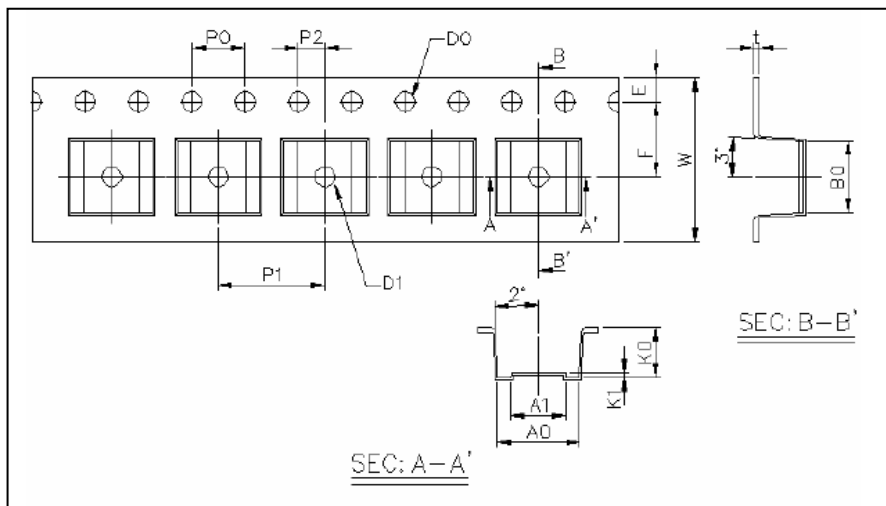


**ICPLM600, ICPLM601, ICPLM611**

**TAPE AND REEL PACKAGING**



Direction of feed from reel



Dimension No.	<b>A0</b>	<b>B0</b>	<b>D0</b>	<b>D1</b>	<b>E</b>	<b>F</b>
Dimension (mm)	4.4±0.1	7.4±0.1	1.5±0.1	1.5±0.3	1.75±0.1	7.5±0.1
Dimension No.	<b>Po</b>	<b>P1</b>	<b>P2</b>	<b>t</b>	<b>W</b>	<b>K0</b>
Dimension (mm)	4.0±0.1	12.0±0.1	2.0±0.1	0.4±0.1	16.0 +0.3/-0.1	2.4±0.1



**ISOCOM**  
— — — — —  
**COMPONENTS**

## ICPLM600, ICPLM601, ICPLM611

### NOTES :

- Isocom is continually improving the quality, reliability, function or design and Isocom reserves the right to make changes without further notices.
- 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.



**ISOCOM**  
— — — — —  
**COMPONENTS**

## DISCLAIMER

ISOCOM 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 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 products could cause loss of human life, bodily injury or damage to property.

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

\_\_ The ISOCOM products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These ISOCOM products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation Instruments, traffic signal instruments, combustion control instruments, medical Instruments, all types of safety devices, etc.. Unintended Usage of ISOCOM products listed in this document shall be made at the customer's own risk.

\_\_ 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.

\_\_ The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by ISOCOM Components for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of ISOCOM Components or others.

\_\_ The information contained herein is subject to change without notice.