ICPLM600, ICPLM601

DESCRIPTION

The ICPLM600 and ICPLM601 devices each consists of an infrared emitting diode optically coupled to a high speed integrated photo detector logic gate.

These devices belong to Isocom Compact Range of optocouplers.

FEATURES

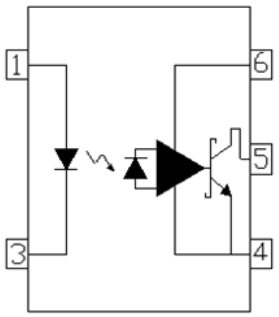
- High speed 10Mbit/s
- Half Pitch 1.27mm
- Common Mode Transient Immunity 5kV/µs min. (ICPLM601)
- High AC Isolation Voltage 3750V_{RMS}
- Guaranteed Performance from -40°C to 85°C
- Pb Free and RoHS Compliant
- Safety Approvals Pending

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 V_O
6 V_{CC}

V_{CC} must be bypassed by a A 0.1µF capacitor.

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	7V
Supply Voltage	7V
Power Dissipation	85mW
Total Package	
Isolation Voltage	3750V_{RMS}
Operating Temperature	-40 to 85 °C
Storage Temperature	-40 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 1PE, 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

Truth Table (Positive Logic)

Input	Output
H	L
L	H

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

INPUT

Parameter	Symbol	Test Condition	Min	Typ.*	Max	Unit
Forward Voltage	V_F	I_F = 10mA		1.45	1.80	V
Forward Voltage Temperature Coefficient	$\Delta V_F/\Delta T$	I_F = 10mA		−1.9		mV/°C
Reverse Voltage	V_R	I_R = 10µA	5.0			V
Input Capacitance	C_{IN}	V_F = 0V, f = 1MHz		70		pF

OUTPUT

Parameter	Symbol	Test Condition	Min	Typ.*	Max	Unit
High Level Supply Current	I_{CCH}	I_F = 0mA, V_{CC} = 5.5V		6.0	9	mA
Low Level Supply Current	I_{CCL}	I_F = 10mA, V_{CC} = 5.5V		7.5	10	mA
High Level Output Current	I_{OH}	I_F = 250µA, V_{CC} = 5.5V, V_O = 5.5V		2.1	30	µA
Low Level Output Voltage	V_{OL}	I_F = 5mA, V_{CC} = 5.5V, I_{OL} = 13mA		0.4	0.6	V

COUPLED

Parameter	Symbol	Test Condition	Min	Typ.*	Max	Unit
Input Threshold Current	I_{TH}	V_{CC} = 5.5V, V_O = 0.6V I_{OL} = 13mA		2.4	5	mA

* Typical values at T_A = 25°C

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

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

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

* Typical values at T_A = 25°C

ELECTRICAL CHARACTERISTICS

Notes :

1. The V_{CC} supply must be bypassed by a 0.1µF 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 3.75mA level on the HIGH to LOW transition of the input current pulse to the 1.5 V level on the LOW to HIGH transition of the output voltage pulse.

3. t_{PHL} – Propagation delay is 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.

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., $V_{OUT} > 2.0V$).

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., $V_{OUT} < 0.8V$).

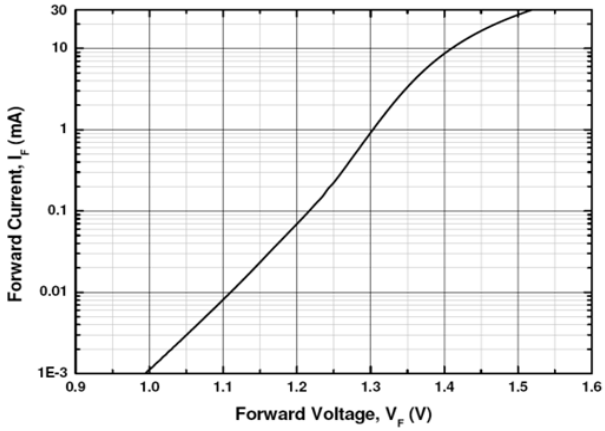


Fig 1 Forward Current vs Forward Voltage

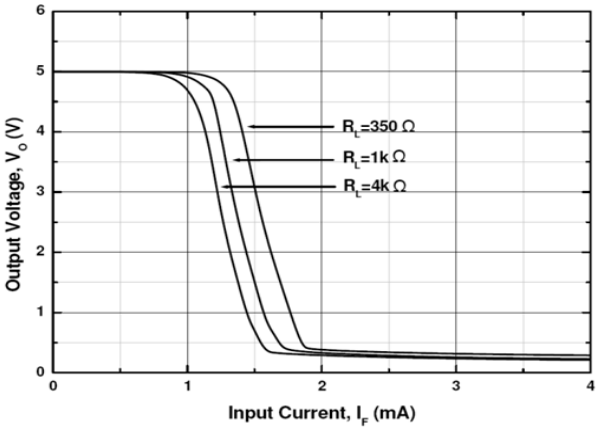


Fig 2 Output Voltage vs Forward Current

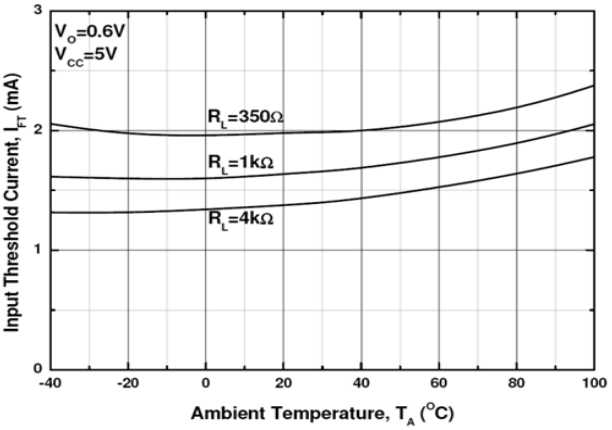


Fig 3 Input Threshold Current vs T_A

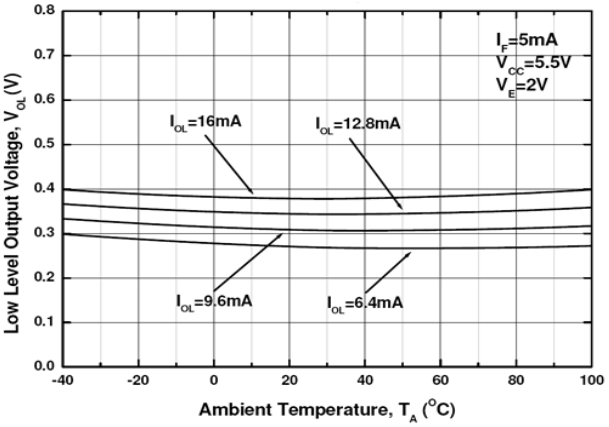


Fig 4 Low Level Output Voltage vs T_A

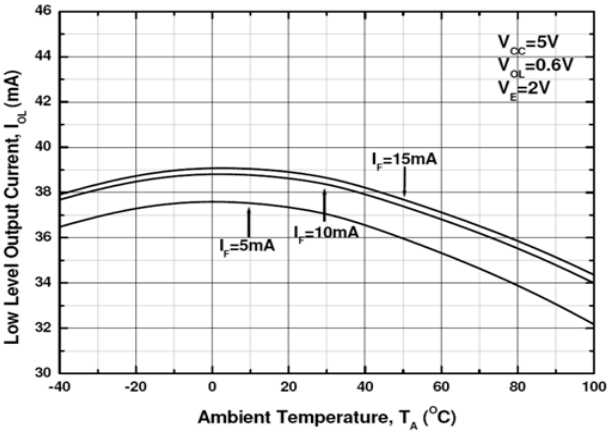


Fig 5 Low Level Output Current vs T_A

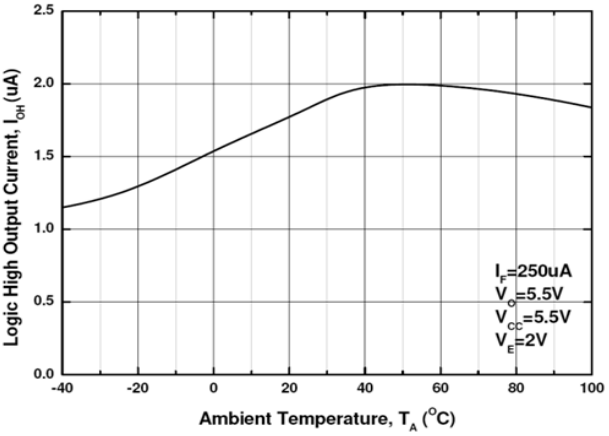


Fig 6 High Level Output Current vs T_A

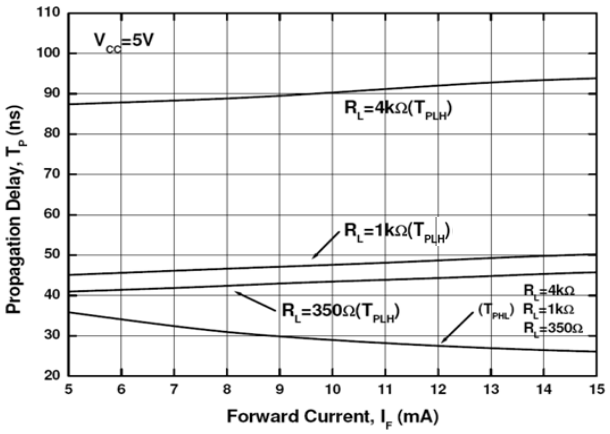


Fig 7 Propagation Delay vs Forward Current

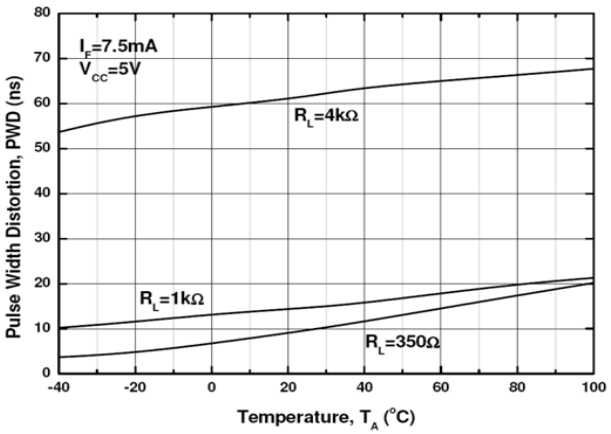


Fig 8 Pulse Width Distortion vs T_A

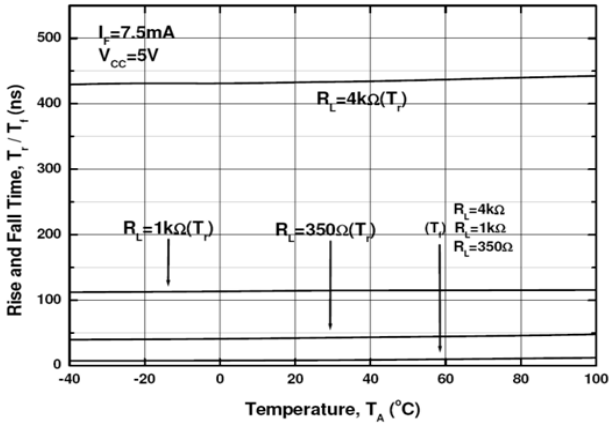
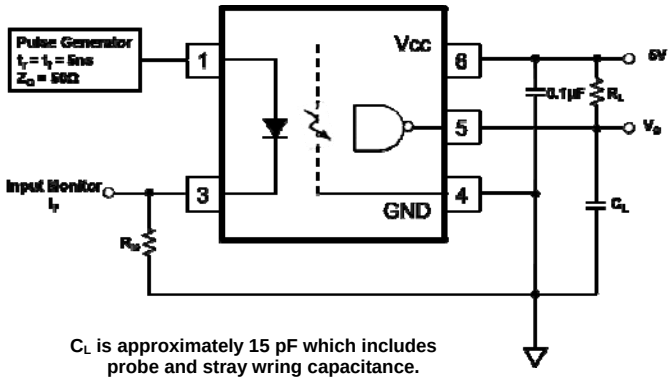
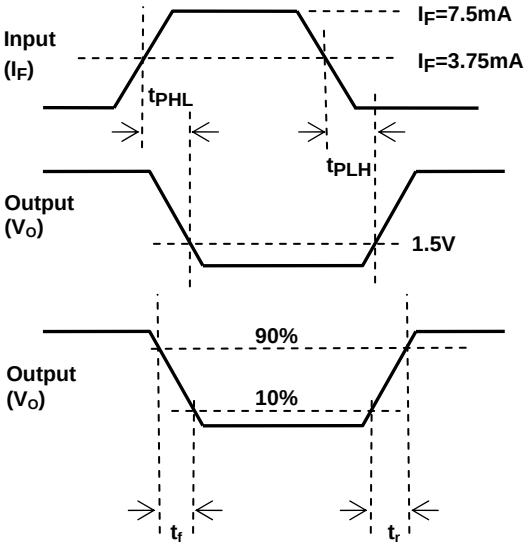


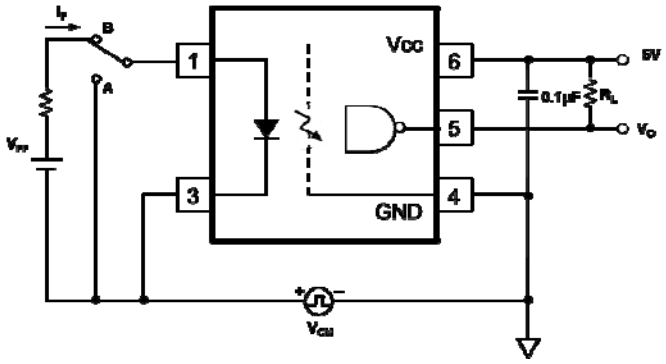
Fig 9 Rise and Fall Time vs T_A

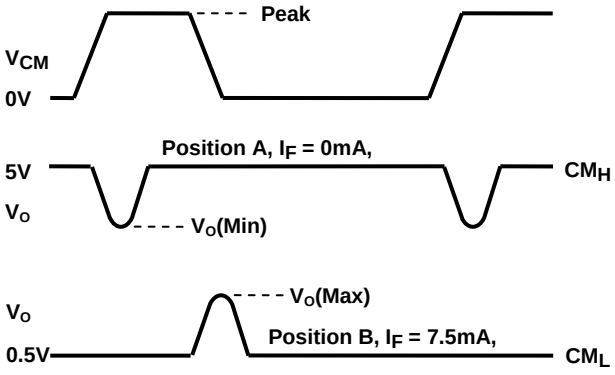


C_L is approximately 15 pF which includes probe and stray wring capacitance.



Switching Time Test Circuit





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., $V_O > 2.0V$).

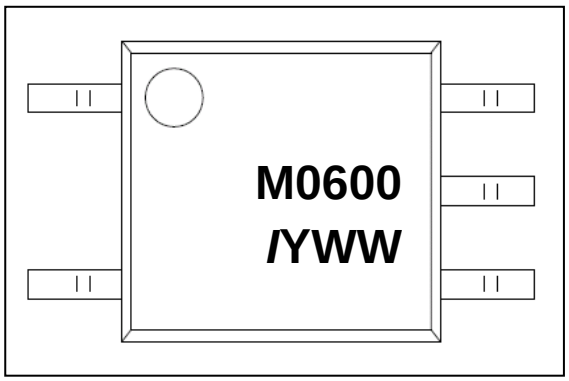
Common mode transient immunity in logic low level is the maximum tolerable (negative) dV_{CM}/dt on the trailing edge of the common mode pulse signal, V_{CM}, to assure that the output will remain in a logic low state (i.e., $V_O < 0.8V$).

ORDER INFORMATION

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

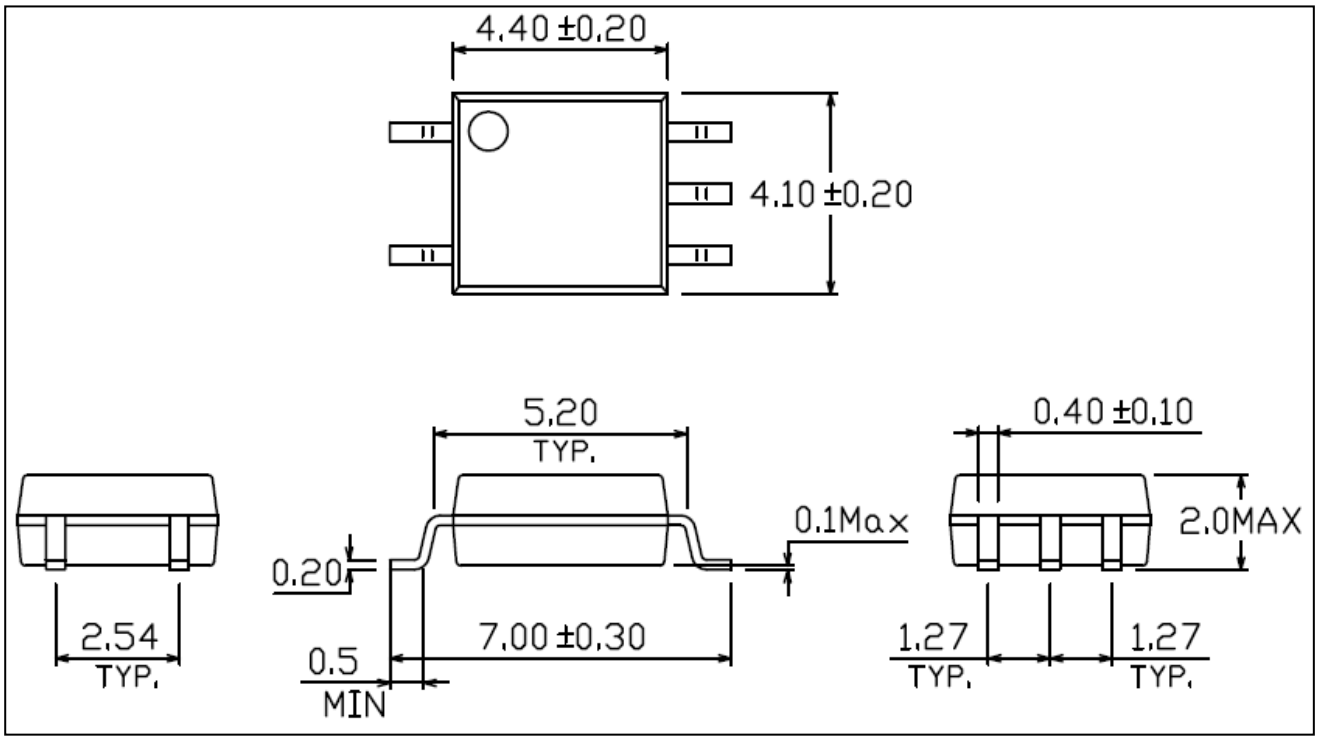
DEVICE MARKING

Example : ICPLM600

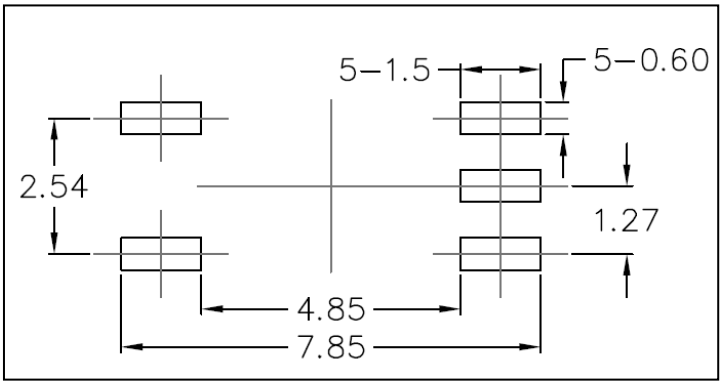


M0600	denotes Device Part Number
I	denotes Isocom
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code

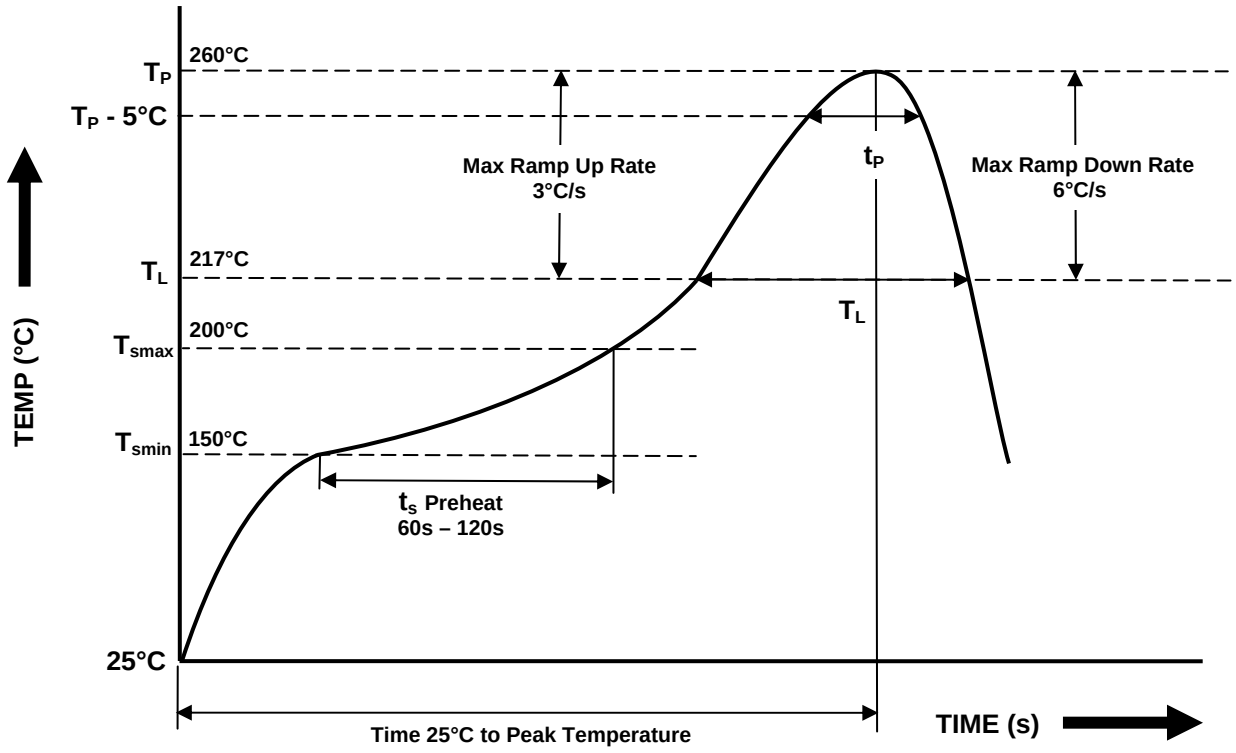
PACKAGE DIMENSIONS (mm)



RECOMMENDED PAD LAYOUT (mm)

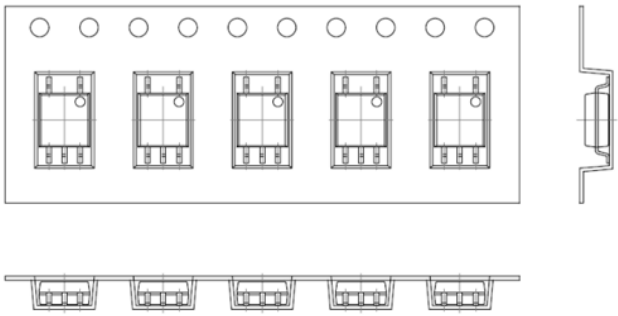


IR REFLOW SOLDERING TEMPERATURE PROFILE
(One Time Reflow Soldering is Recommended)

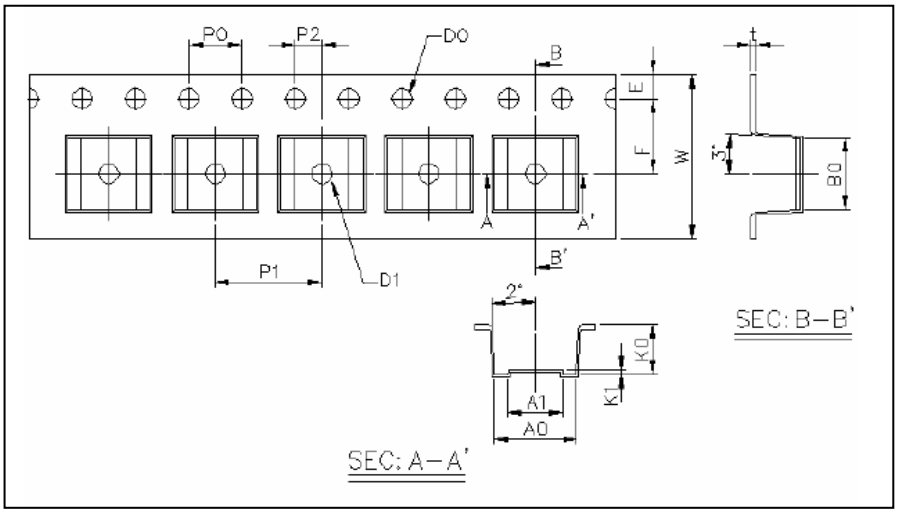


Profile Details	Conditions
Preheat - Min Temperature (T_{SMIN}) - Max Temperature (T_{SMAX}) - Time T_{SMIN} to T_{SMAX} (t_s)	 150°C 200°C 60s - 120s
Soldering Zone - Peak Temperature (T_P) - Liquidous Temperature (T_L) - Time within 5°C of Actual Peak Temperature (T_P – 5°C) - Time maintained above T_L (t_L) - Ramp Up Rate (T_L to T_P) - Ramp Down Rate (T_P to T_L)	 260°C 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

TAPE AND REEL PACKAGING



Direction of feed from reel



Dimension No.	A0	A1	B0	D0	D1	E	F
Dimension(mm)	6.2±0.1	4.1±0.1	7.4±0.1	1.5±0.1	1.5±0.1	1.75±0.1	5.5±0.1
Dimension No.	P0	P1	P2	t	W	K0	K1
Dimension (mm)	4.0±0.1	8.0±0.1	2.0±0.1	0.4±0.1	12.0 +0.3 / -0.1	3.7±0.1	0.3±0.1

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- 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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