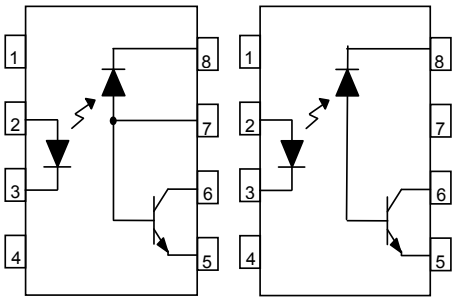
ICPLW135, ICPLW136, ICPLW4503

DESCRIPTION

The ICPLW135, ICPLW136 and ICPLW4503 devices each consist of an infrared emitting diode, optically coupled to a high speed photo detector transistor. A separate connection for the photodiode bias and output-transistor collector increase the speed by several orders of magnitude over conventional phototransistor couplers by reducing the base-collector capacitance of the input transistor.

These devices belong to Isocom wide body package range optocouplers.



ICPLW135
ICPLW136

ICPLW4503

1. NC
2. Anode
3. Cathode
4. NC
5. Gnd
6. Vout
7. V_B (ICPLW135/ ICPLW136) NC (ICPLW4503)
8. V_{CC}

FEATURES

- High Speed 1Mbit/s
- Wide Body Package
- 15kV/µs min. Common Mode Transient Immunity (ICPLW4503)
- High AC Isolation Voltage 5000V_{RMS}
- Guaranteed Performance from 0°C to +70°C
- Pb Free and RoHS Compliant
- Safety Approvals Pending

APPLICATIONS

- Line Receivers
- Telecommunication Equipments
- Power Transistor Isolation in Motor Drives
- Replacement of Low Speed Phototransistor Optocouplers
- Feedback Loop in Switch Mode Power Supplies
- High Speed Logic Ground Isolation
- Home Appliances

ORDER INFORMATION

- Add SMT&R after PN for Surface Mount Tape & Reel

.

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Input Diode

Forward Current	25mA
Peak Forward Current (50% duty cycle, 1ms pulse width)	50mA
Peak Transient Current (≤1µs pulse width, 300pps)	1A
Reverse Voltage	5V
Power dissipation	45mW

Output

Output Current	8mA
Peak Output Current	16mA
Emitter-Base Reverse Voltage*	5V
Base Current* (*ICPLW135 and ICPLW136 only)	5mA
Output Voltage	-0.5 to 20V
Supply Voltage	-0.5 to 30V
Power Dissipation	100mW

Total Package

Isolation Voltage (R.H. 40 - 60%, 1 min, Pins 1, 2, 3 & 4 shorted together, Pins 5, 6, 7 & 8 shorted together)	5000V_{RMS}
Operating Temperature	-55 to +100 °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

ELECTRICAL CHARACTERISTICS (T_A = 0°C to +70°C unless otherwise specified)

INPUT

Parameter	Symbol	Test Condition	Min	Typ*	Max	Unit
Forward Voltage	V_F	I_F = 16mA		1.45	1.8	V
Reverse Voltage	V_R	I_R = 10µA	5.0			V
Temperature Coefficient of Forward Voltage	$\Delta V_F/\Delta T_A$	I_F = 16mA		-1.9		mV/°C

OUTPUT

Parameter	Symbol	Test Condition	Min	Typ.*	Max	Unit
Logic High Output Current	I_{OH}	I_F = 0mA, V_O = V_{CC} = 5.5V, T_A = 25°C		0.001	0.5	µA
		I_F = 0mA, V_O = V_{CC} = 15V, T_A = 25°C		0.01	1	
		I_F = 0mA, V_O = V_{CC} = 15V			50	
Logic Low Supply Current	I_{CCL}	I_F = 16mA, V_O = Open, V_{CC} = 15V		110	200	µA
Logic High Supply Current	I_{CCH}	I_F = 0mA, V_O = Open, V_{CC} = 15V, T_A = 25°C		0.01	1	µA
		I_F = 0mA, V_O = Open, V_{CC} = 15V			2	

* Typical values at T_A = 25°C

ELECTRICAL CHARACTERISTICS (T_A = -40°C to +70°C unless otherwise specified)

COUPLED

Parameter	Symbol	Test Condition	Min	Typ.*	Max	Unit
Current Transfer Ratio	CTR	ICPLW135 ICPLW136 / ICPLW4503 I_F = 16mA, V_O = 0.4V V_{CC} = 4.5V, T_A = 25°C	7 19		50 50	%
		ICPLW135 ICPLW136 / ICPLW4503 I_F = 16mA, V_O = 0.5V V_{CC} = 4.5V	5 15			
Logic Low Output Voltage	V_{OL}	ICPLW135 I_F = 16mA, I_O = 1.1mA, V_{CC} = 4.5V, T_A = 25°C		0.18	0.4	V
		ICPLW136 / ICPLW4503 I_F = 16mA, I_O = 3mA, V_{CC} = 4.5V, T_A = 25°C		0.25	0.4	
		ICPLW135 I_F = 16mA, I_O = 0.8mA, V_{CC} = 4.5V			0.5	
		ICPLW136 / ICPLW4503 I_F = 16mA, I_O = 2.4mA, V_{CC} = 4.5V			0.5	

* Typical values at T_A = 25°C

ELECTRICAL CHARACTERISTICS (T_A = 0°C to +70°C unless otherwise specified)

Switching Characteristics (T_A = 0°C to +70°C, V_{CC} = 5V, I_F = 16mA unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ.*	Max	Unit
Propagation Delay Time to Logic Low	T_{PHL}	ICPLW135 R_L = 4.1kΩ, T_A = 25°C R_L = 4.1kΩ		0.36	1.5 2.0	µs
		ICPLW136 / ICPLW4503 R_L = 1.9kΩ, T_A = 25°C R_L = 1.9kΩ		0.32	0.8 1.0	
Propagation Delay Time to Logic High	T_{PLH}	ICPLW135 R_L = 4.1kΩ, T_A = 25°C R_L = 4.1kΩ		0.45	1.5 2.0	µs
		ICPLW136 / ICPLW4503 R_L = 1.9kΩ, T_A = 25°C R_L = 1.9kΩ		0.25	0.8 1.0	
Common Mode Transient Immunity at Logic High	CM_H	ICPLW135 I_F = 0mA, V_{CM} = 10Vp-p, R_L = 4.1kΩ, T_A = 25°C	1000			V/µs
		ICPLW136 I_F = 0mA, V_{CM} = 10Vp-p, R_L = 1.9kΩ, T_A = 25°C	1000			
		ICPLW4503 I_F = 0mA, V_{CM} = 1500Vp-p, R_L = 1.9kΩ, T_A = 25°C	15000	20000		
Common Mode Transient Immunity at Logic Low	CM_L	ICPLW135 I_F = 16mA, V_{CM} = 10Vp-p, R_L = 4.1kΩ, T_A = 25°C	1000			V/µs
		ICPLW136 I_F = 16mA, V_{CM} = 10Vp-p, R_L = 1.9kΩ, T_A = 25°C	1000			
		ICPLW4503 I_F = 16mA, V_{CM} = 1500Vp-p, R_L = 1.9kΩ, T_A = 25°C	15000	20000		

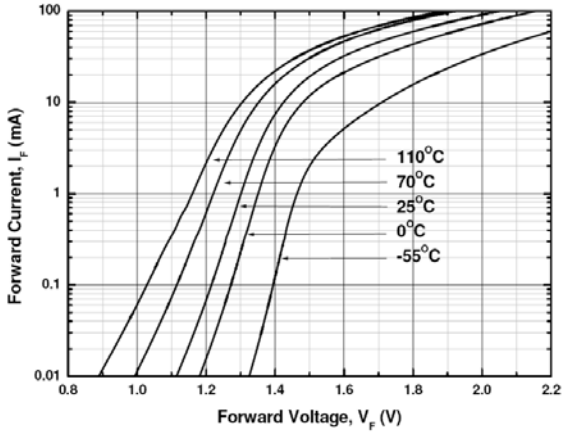


Fig 1 Forward Current vs Forward Voltage

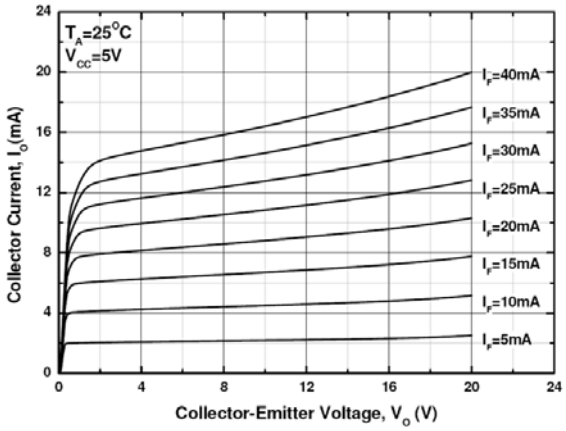


Fig 2 Output Current vs Output Voltage

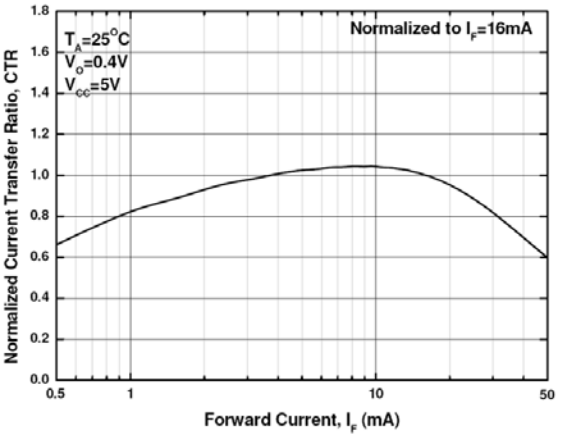


Fig 3 Normalized CTR vs Forward Current

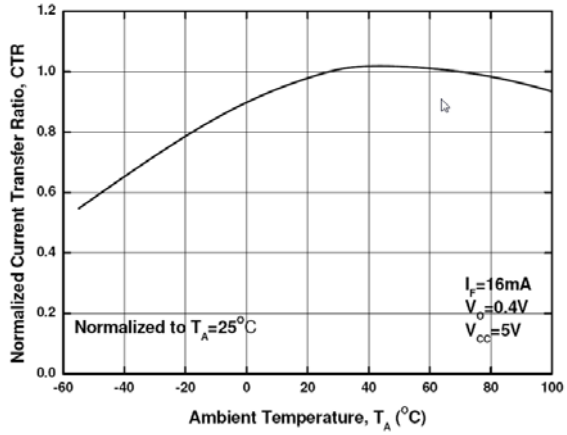


Fig 4 Normalized CTR vs T_A

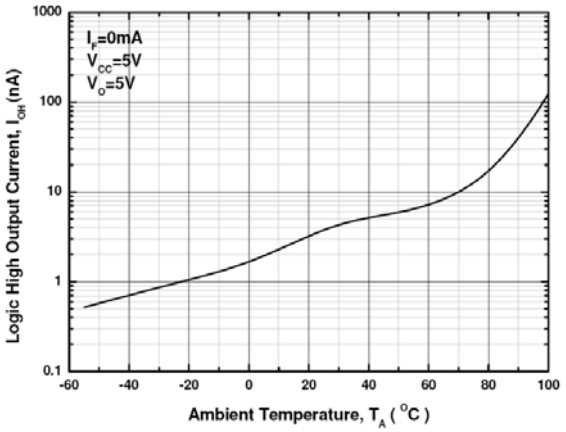


Fig 5 High Level Output Current vs T_A

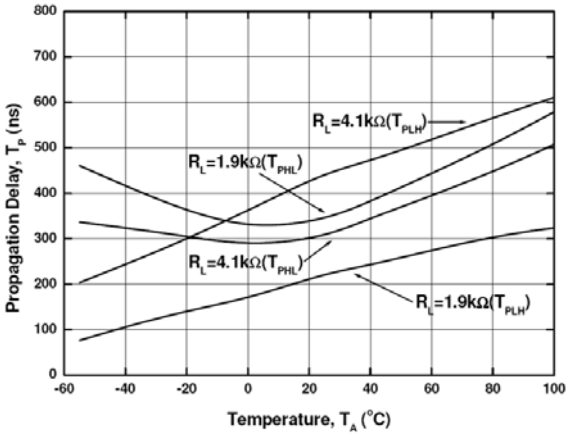


Fig 6 Propagation Delay vs T_A

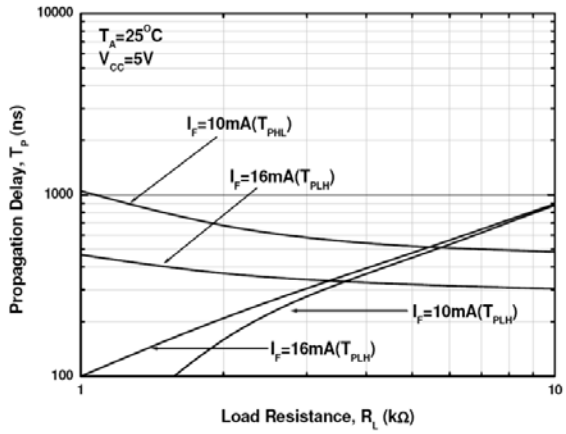


Fig 7 Propagation Delay vs Load Resistance

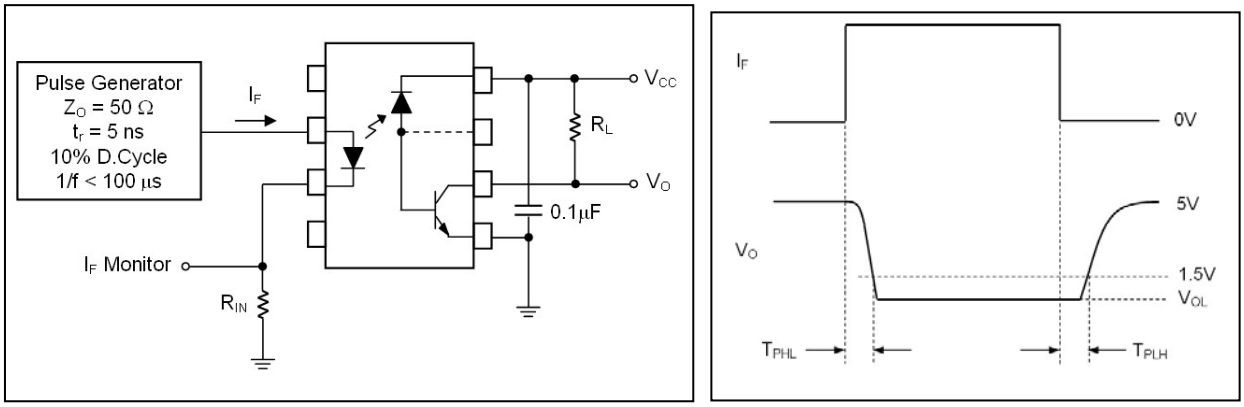


Fig 8 Switching Time Test Circuit

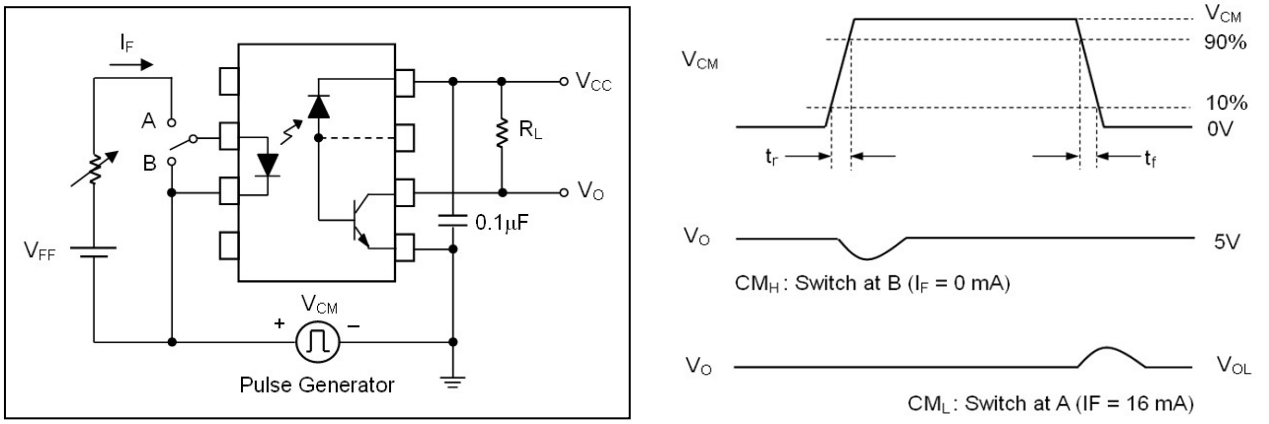


Fig 9 Common Mode Transient Immunity Test Circuit

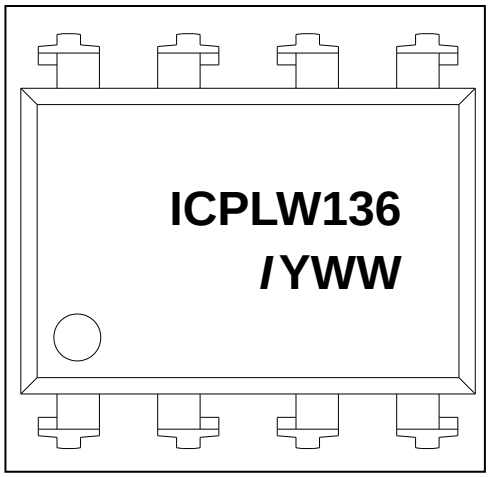
CM_H : Common mode transient immunity in logic high level is the maximum tolerable (positive) dV_{CM}/dt on the leading edge of the common mode pulse signal V_{CM}, to assure that the output will remain in a logic high state (i.e., $V_O > 2.0V$).

CM_L : 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

ICPLW135, ICPLW136, ICPLW4503			
After PN	**PN**	**Description**	**Packing quantity**
None	ICPLW135, ICPLW136, ICPLW4503	Standard DIP	45 pcs per tube
SM	ICPLW135SMT&R, ICPLW136SMT&R, ICPLW4503SMT&R	Surface Mount Tape and Reel	500 pcs per reel

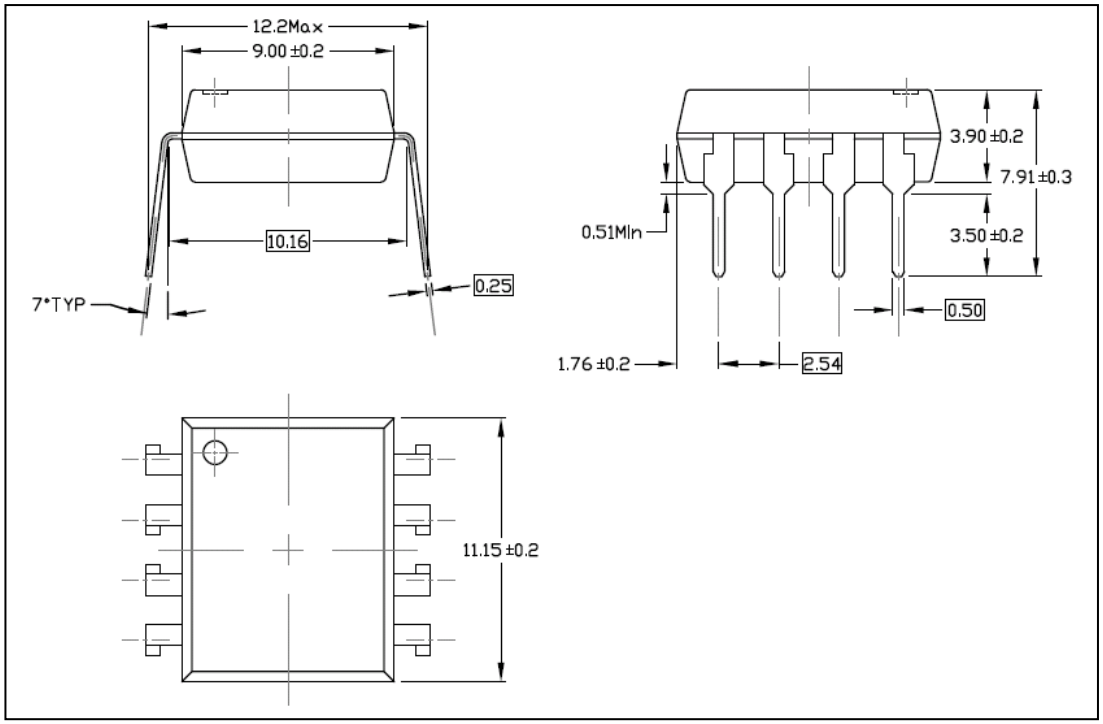
DEVICE MARKING



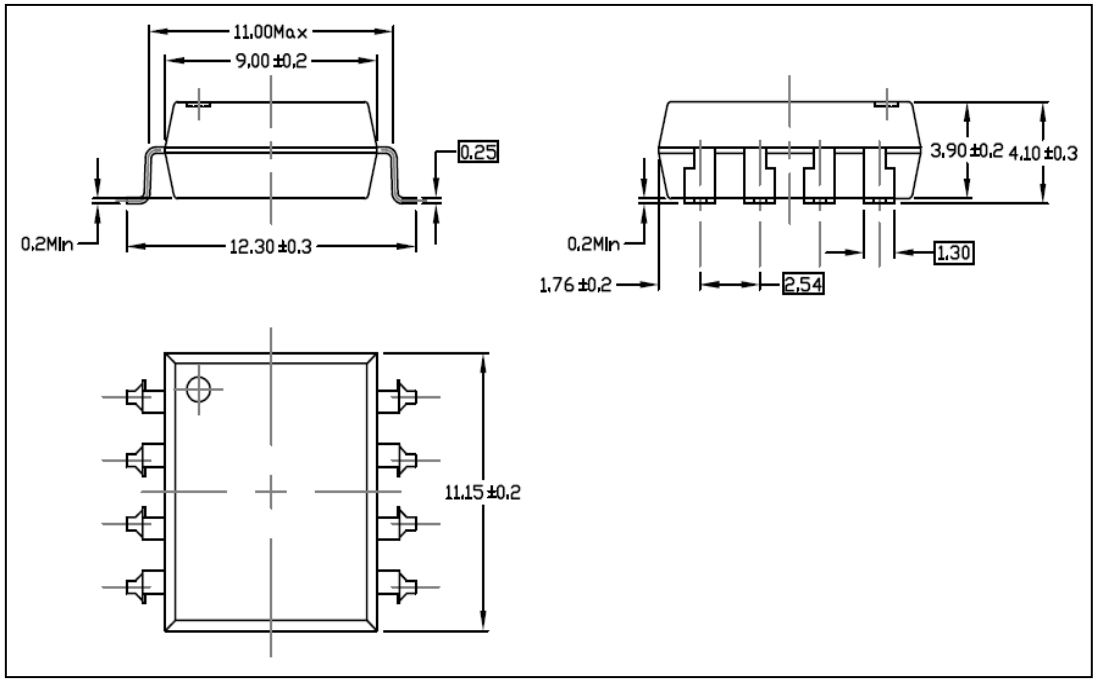
ICPLW136	denotes Device Part Number (ICPLW136 is used as example)
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
/	denotes Isocom

PACKAGE DIMENSIONS (mm)

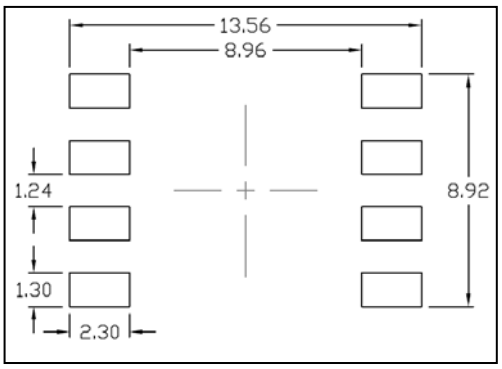
DIP



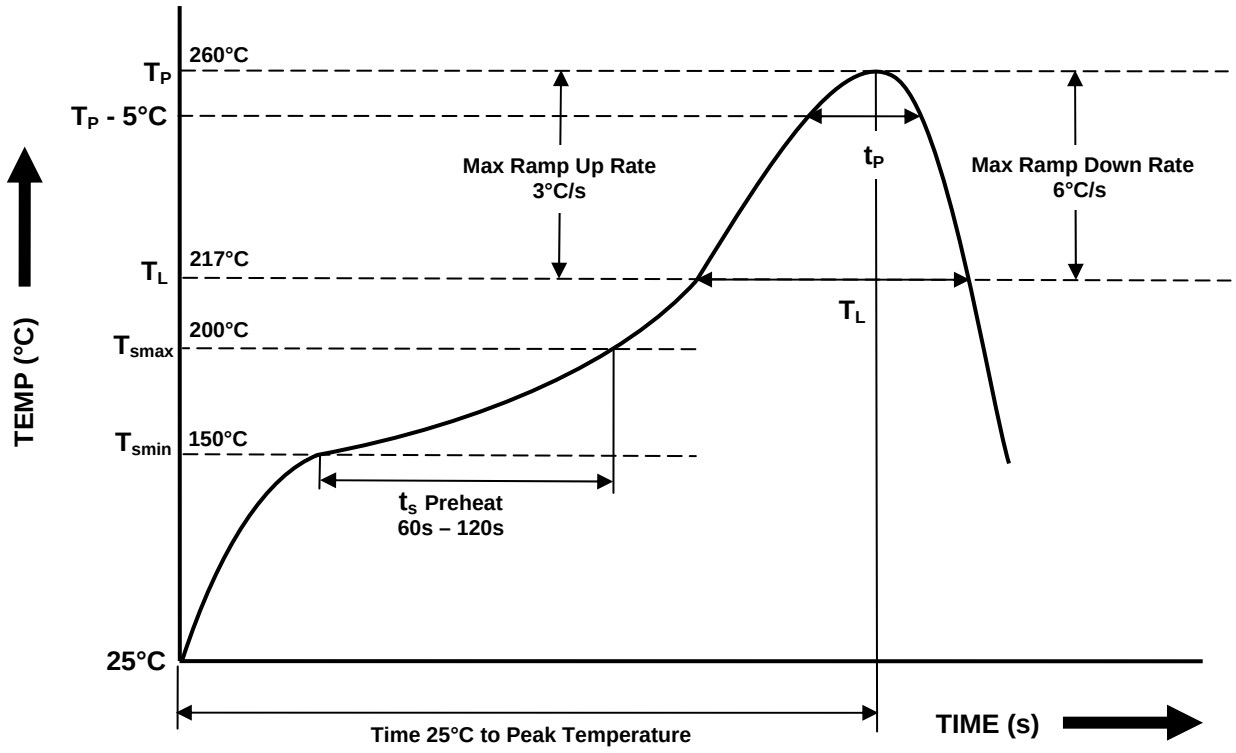
SMD



RECOMMENDED PAD LAYOUT FOR SMD (mm)

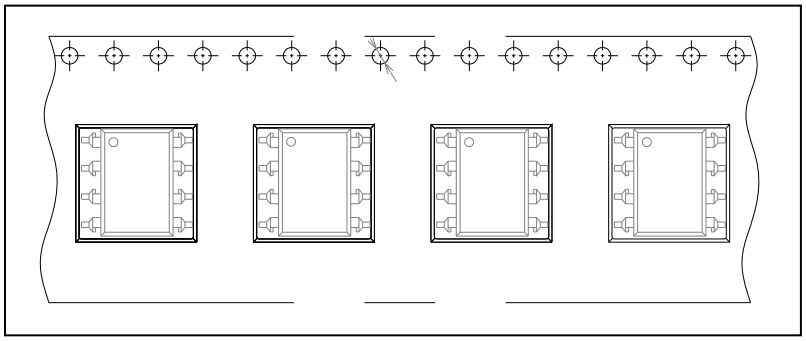


IR REFLOW SOLDERING TEMPERATURE PROFILE
(One Time Reflow Soldering is Recommended)

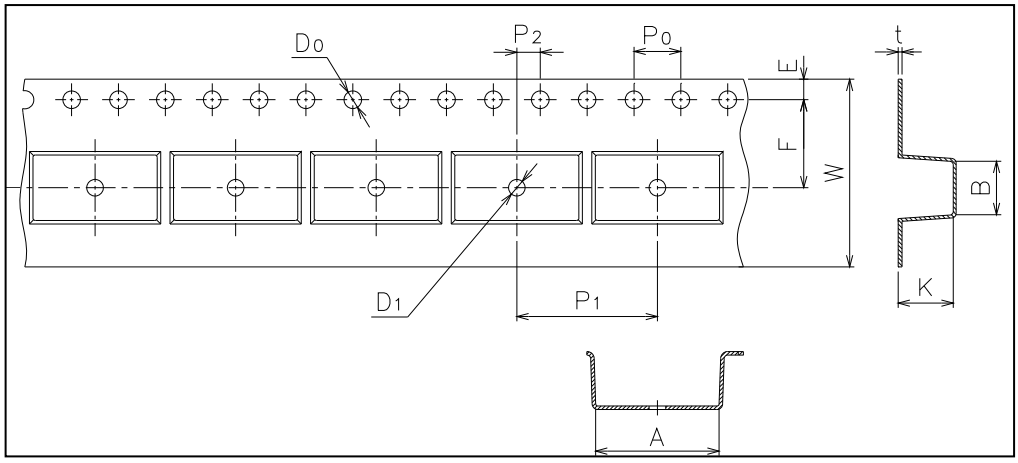


Profile Details	Conditions
Preheat - Min Temperature (T_{SMIN}) - Max Temperature (T_{SMAX}) - Time T_{SMIN} to T_{SMAX} (t_s)	 150°C 200°C 60s - 120s
Soldering Zone - Peak Temperature (T_P) - Liquidous Temperature (T_L) - Time within 5°C of Actual Peak Temperature (T_P – 5°C) - Time maintained above 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.	**A**	**B**	**Do**	**D1**	**E**	**F**
Dimension(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 No.	**Po**	**P1**	**P2**	**t**	**W**	**K**
Dimension (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

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- 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.

ICPLW135, ICPLW136, ICPLW4503

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