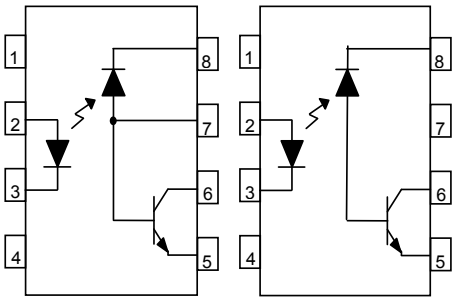
ISOCOM COMPONENTS

6N135, 6N136, ICPL4502, ICPL4503

DESCRIPTION

The 6N135, 6N136, ICPL4502 and ICPL4503 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.



6N135 / 6N136 ICPL4502 / ICPL4503

1. NC
2. Anode
3. Cathode
4. NC
5. Gnd
6. Vout
7. VB (6N135/6N136) NC (ICPL4502/ ICPL4503)
8. V_{CC}

FEATURES

- High speed 1Mbit/s
- High AC Isolation Voltage 5000V_{rms}
- Guaranteed performance from 0°C to 70°C
- Wide Operating temperature range -55°C to 100°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 G after PN for 10mm lead spacing
- Add SM after PN for Surface Mount,
- 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 (6N135 and 6N136 only)	5V
Base Current (6N135 and 6N136 only)	5mA
Output Voltage	-0.5 to 20V
Supply Voltage	-0.5 to 30V
Power Dissipation	100mW

Total Package

Isolation Voltage	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 V_F	$\Delta V_F/\Delta T_A$	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		140	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 = 0°C to 70°C unless otherwise specified)

COUPLED

Parameter	Symbol	Test Condition	Min	Typ.*	Max	Unit
Current Transfer Ratio	CTR	6N135 6N136 / ICPL4502 / ICPL4503 I_F = 16mA, V_O = 0.4V V_{CC} = 4.5V, T_A = 25°C	7 19		50 50	%
		6N135 6N136 / ICPL4502 / ICPL4503 I_F = 16mA, V_O = 0.5V V_{CC} = 4.5V	5 15			
Logic Low Output Voltage	V_{OL}	6N135 I_F = 16mA, I_O = 1.1mA, V_{CC} = 4.5V, T_A = 25°C		0.18	0.4	V
		6N136 / ICPL4502 / ICPL4503 I_F = 16mA, I_O = 3mA, V_{CC} = 4.5V, T_A = 25°C		0.25	0.4	
		6N135 I_F = 16mA, I_O = 0.8mA, V_{CC} = 4.5V			0.5	
		6N136 / ICPL4502 / ICPL4503 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, I_F = 16mA, V_{CC} = 5V unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ.*	Max	Unit
Propagation Delay Time to Logic Low	T_{PHL}	6N135 R_L = 4.1kΩ, T_A = 25°C R_L = 4.1kΩ		0.35	1.5 2.0	µs
		6N136 / ICPL4502 / ICPL4503 R_L = 1.9kΩ, T_A = 25°C R_L = 1.9kΩ		0.35	0.8 1.0	
Propagation Delay Time to Logic High	T_{PLH}	6N135 R_L = 4.1kΩ, T_A = 25°C R_L = 4.1kΩ		0.5	1.5 2.0	µs
		6N136 / ICPL4502 / ICPL4503 R_L = 1.9kΩ, T_A = 25°C R_L = 1.9kΩ			0.8 1.0	
Common Mode Transient Immunity at Logic High	CM_H	6N135 I_F = 0mA, V_{CM} = 10Vp-p, R_L = 4.1kΩ, T_A = 25°C	1000			V/µs
		6N136 / ICPL4502 I_F = 0mA, V_{CM} = 10Vp-p, R_L = 1.9kΩ, T_A = 25°C	1000			
		ICPL4503 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	6N135 I_F = 16mA, V_{CM} = 10Vp-p, R_L = 4.1kΩ, T_A = 25°C	1000			V/µs
		6N136 / ICPL4502 I_F = 16mA, V_{CM} = 10Vp-p, R_L = 1.9kΩ, T_A = 25°C	1000			
		ICPL4503 I_F = 16mA, V_{CM} = 1500Vp-p, R_L = 1.9kΩ, T_A = 25°C	15000	20000		

* Typical values at T_A = 25°C

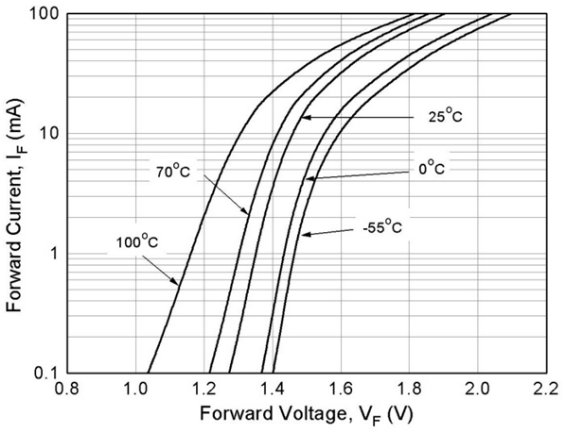


Fig 1 Forward Current vs Forward Voltage

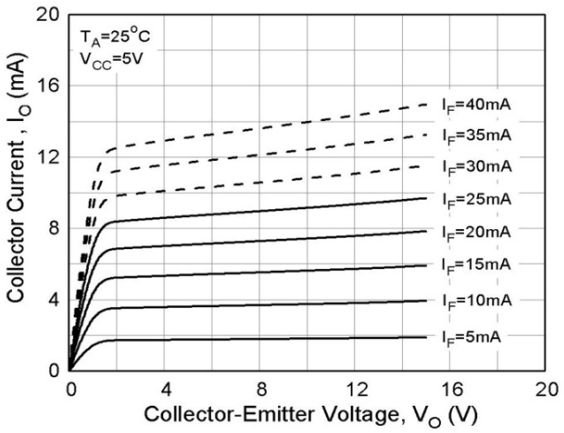


Fig 2 Output Current vs Output Voltage

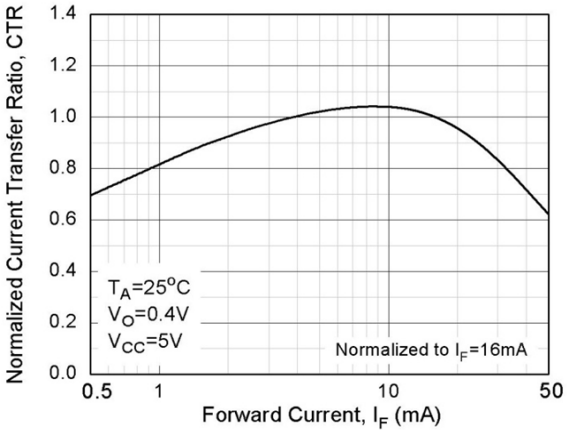


Fig 3 Normalized CTR vs Forward Current

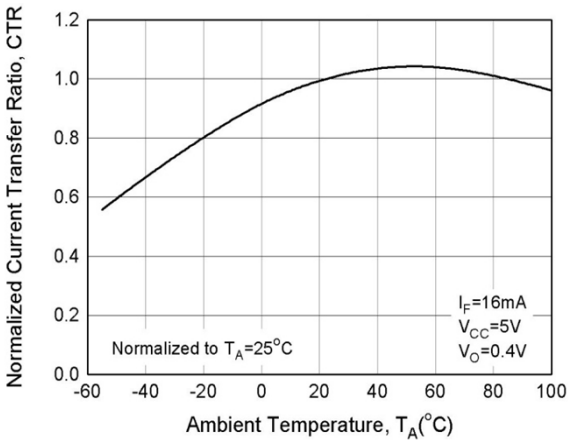


Fig 4 Normalized CTR vs T_A

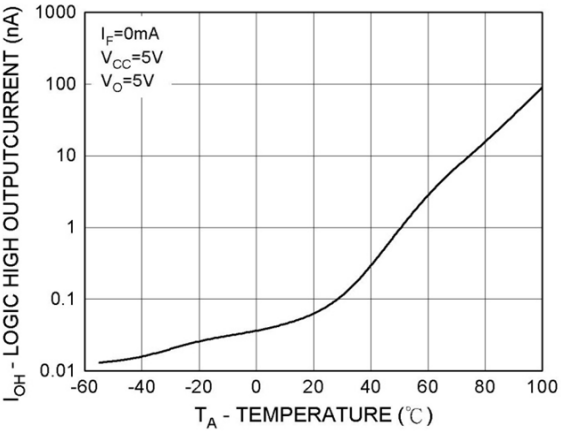


Fig 5 Logic High Output Current vs T_A

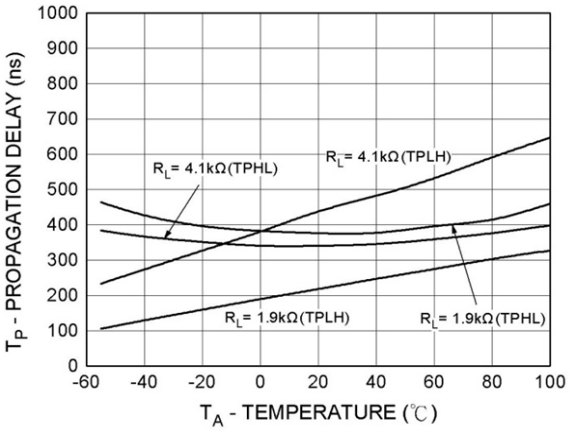


Fig 6 Propagation Delay vs T_A

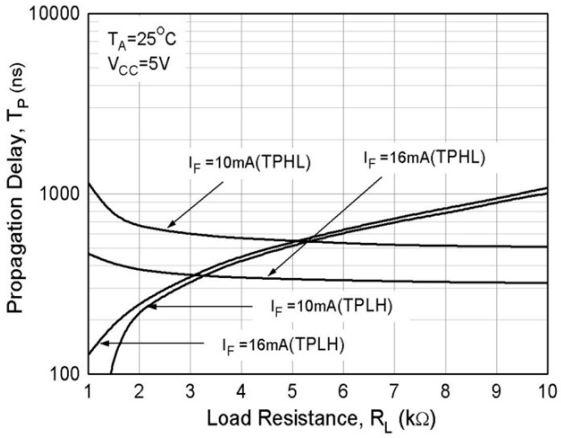
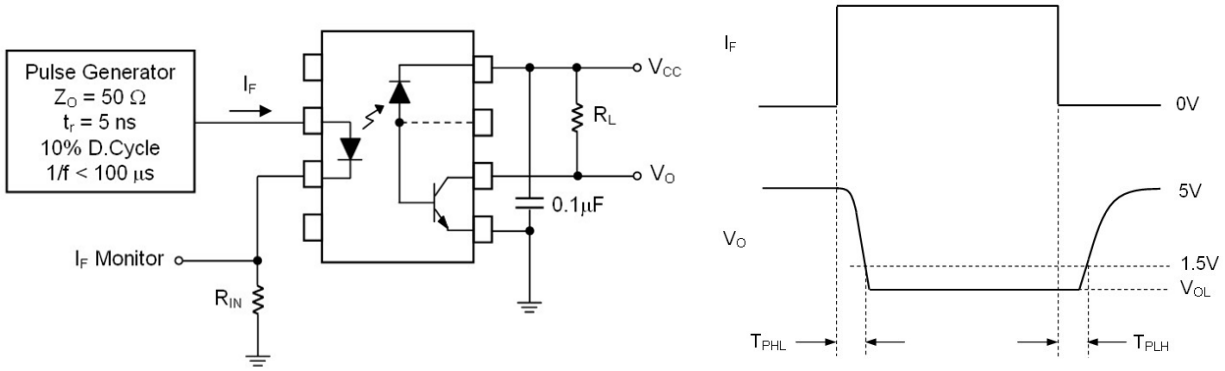
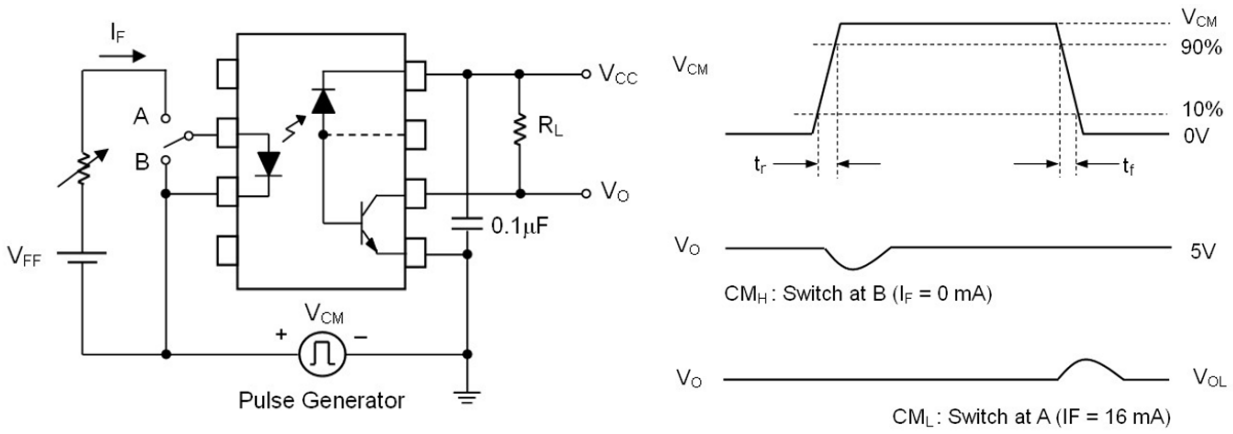


Fig 7 Propagation Delay vs Load Resistance



Switching Time Test Circuit



Common Mode Transient Immunity Test Circuit

Note:

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., $V_O > 2.0V$).

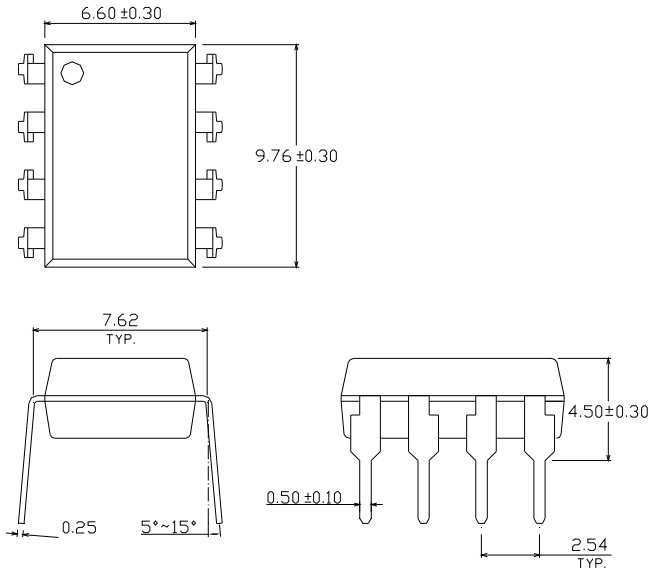
Common mode transient immunity in logic low level is the maximum tolerable (negative) dV_{CM}/dt on the trailing edge of the common mode pulse signal, V_{CM}, to assure that the output will remain in a logic low state (i.e., $V_O < 0.8V$).

ORDER INFORMATION

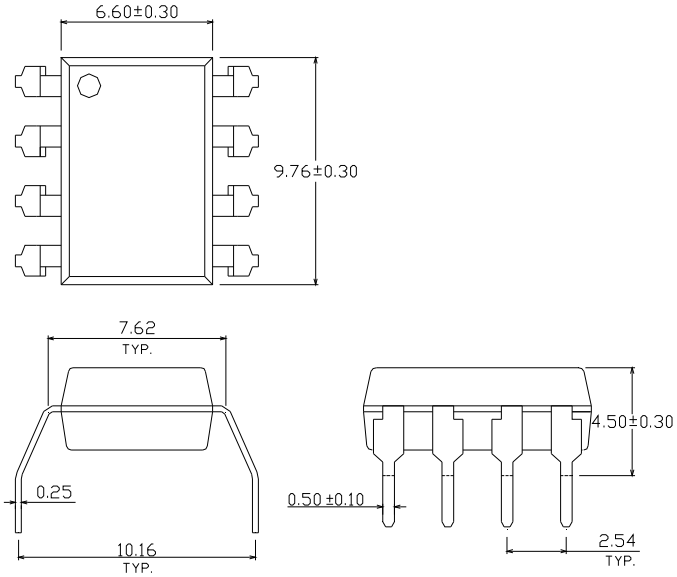
6N135, 6N136, ICPL4502, ICPL4503			
After PN	**PN**	**Description**	**Packing quantity**
None	6N135, 6N136, ICPL4502, ICPL4503	Standard Dip8	45 pcs per tube
G	6N135G, 6N136G, ICPL4502G, ICPL4503G	10mm Lead Spacing	45 pcs per tube
SM	6N135SM, 6N136SM, ICPL4502SM, ICPL4503SM	Surface Mount	45 pcs per reel
SMT&R	6N135SMT&R, 6N136SMT&R, ICPL4502SMT&R, ICPL4503SMT&R	Surface Mount Tape & Reel	1000 pcs per reel

PACKAGE DIMENSIONS (mm)

DIP

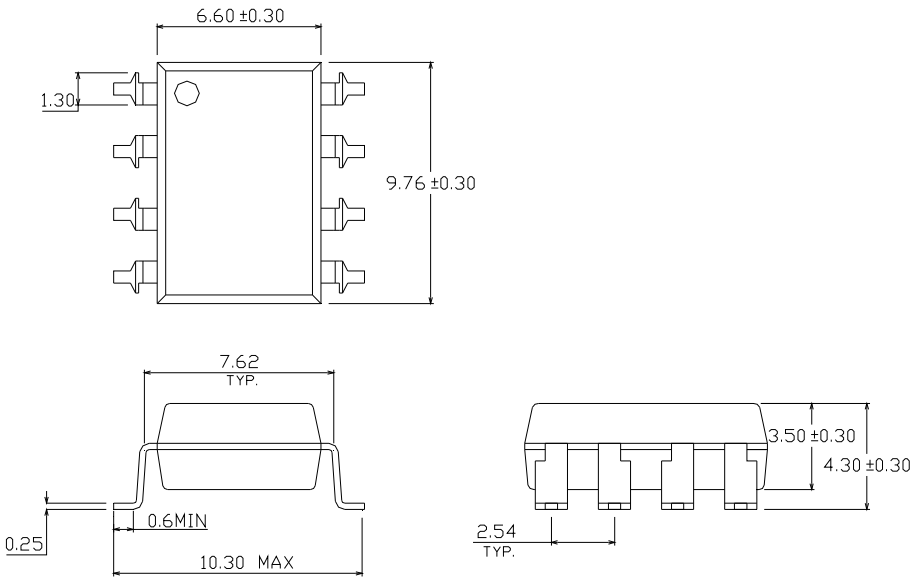


G FORM

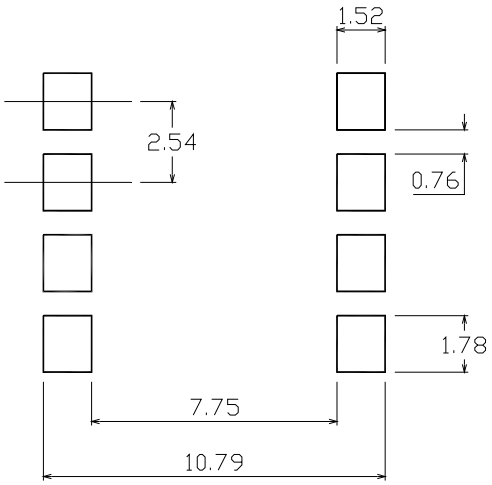


PACKAGE DIMENSIONS (mm)

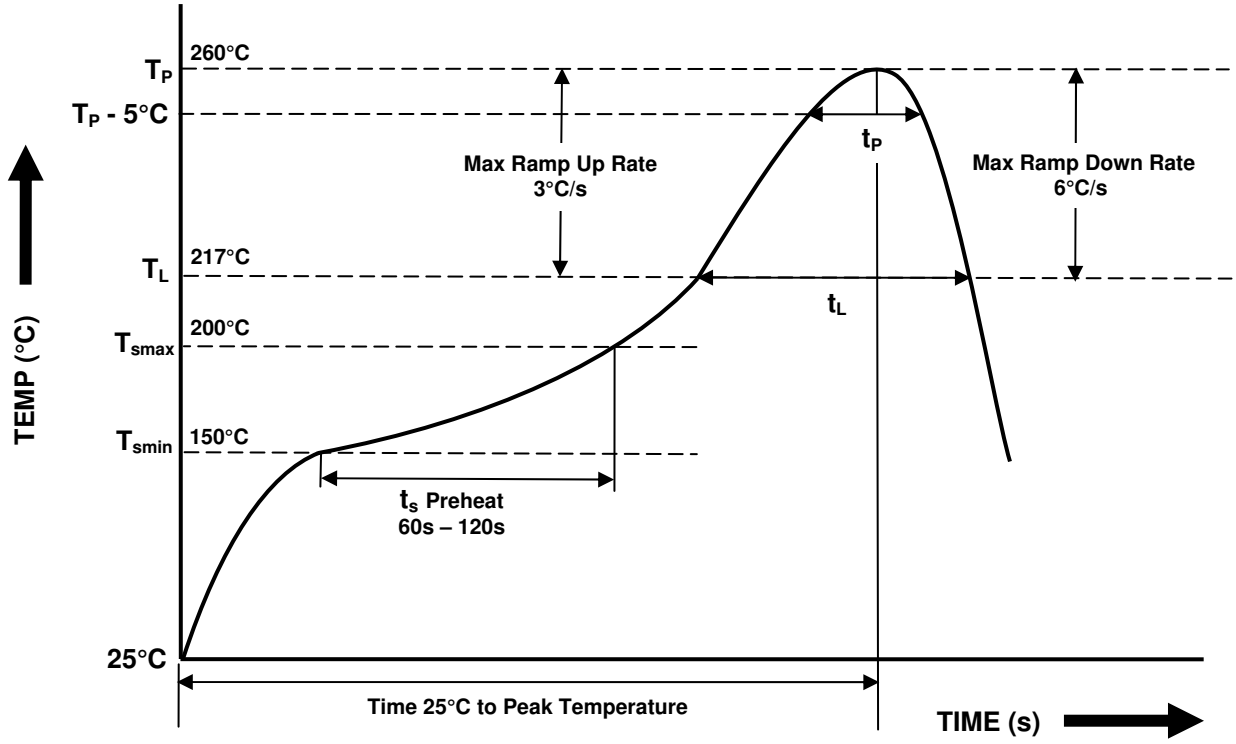
SMD



RECOMMENDED PAD LAYOUT FOR SMD (mm)

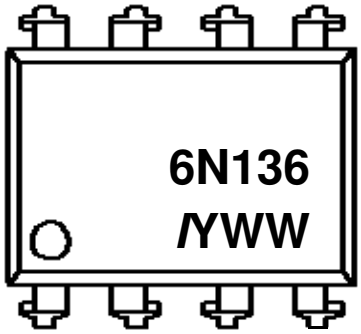


REFLOW SOLDERING TEMPERATURE PROFILE
(One Time Reflow Soldering is Recommended)



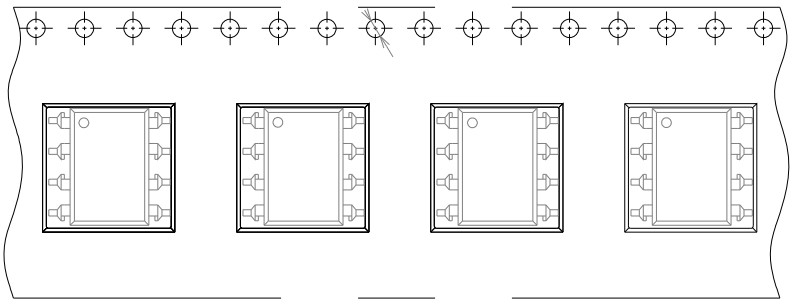
Profile Details	Conditions
Preheat - Min Temperature (T_{SMIN}) - Max Temperature (T_{SMAX}) - Time T_{SMIN} to T_{SMAX} (t_s)	 150°C 200°C 60s - 120s
Soldering Zone - Peak Temperature (T_P) - Liquidous Temperature (T_L) - Time within 5°C of Actual Peak Temperature (T_P – 5°C) - Time maintained above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

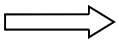
DEVICE MARKING (Example 6N136)



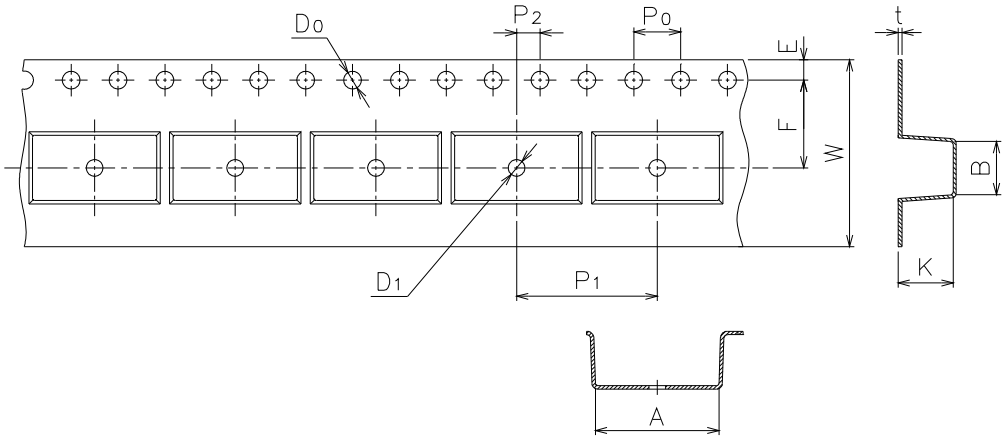
6N136	denotes Device Part Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
/	denotes Isocom

TAPE AND REEL PACKAGING





Direction of feed from reel



Dimension No.	A	B	Do	D1	E	F
Dimension(mm)	10.4±0.1	10.0±0.1	1.5±0.1	1.5±0.1	1.75±0.1	7.5±0.1
Dimension No.	Po	P1	P2	t	W	K
Dimension (mm)	4.0±0.1	12.0±0.1	2.0±0.1	0.4±0.1	16.0+0.3/ -0.1	4.5±0.1

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.