Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

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6N135, 6N136, ICPL4502, ICPL4503

DESCRIPTION

The 6N135, 6N136, ICPL4502 and ICPL4503 devices each consists 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 increases the speed by several orders of magnitude over conventional phototransistor couplers by reducing the base-collector capacitance of the input transistor.

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
- UL File E91231
- VDE Approval Certificate No. 40044376 for 6N135 and 6N136, with suffix "V"

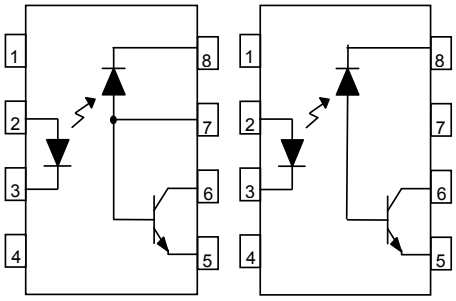
APPLICATIONS

- 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

.



6N135 / 6N136 ICPL4502 / ICPL4503

1 NC
2 Anode
3 Cathode
4 NC
5 GND
6 V_O
7 V_B (6N135, 6N136)
NC (ICPL4502, ICPL4503)
8 V_{CC}

A 0.1µF bypass Capacitor shall be connected between V_{CC} and GND.

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	25mA
Forward Peak 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)	5V
Base Current (6N135 and 6N136)	5mA
Supply Voltage	-0.5V to 30V
Output Voltage	-0.5V to 20V
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

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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
Forward Voltage Temperature Coefficient	$\Delta V_F/\Delta T_A$	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 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
		I_F = 16mA, I_O = 0.8mA, V_{CC} = 4.5V,			0.5	
		6N136 / ICPL4502 / ICPL4503 I_F = 16mA, I_O = 3mA, V_{CC} = 4.5V, T_A = 25°C		0.25	0.4	
		I_F = 16mA, I_O = 2.4mA, V_{CC} = 4.5V			0.5	
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	7		50	%
		6N136 / ICPL4502 / ICPL4503	19		50	
		I_F = 16mA, V_O = 0.4V V_{CC} = 4.5V, T_A = 25°C				
		6N135	5			
		6N136 / ICPL4502 / ICPL4503	15			
		I_F = 16mA, V_O = 0.5V V_{CC} = 4.5V				

ISOLATION

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

* 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		0.3	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

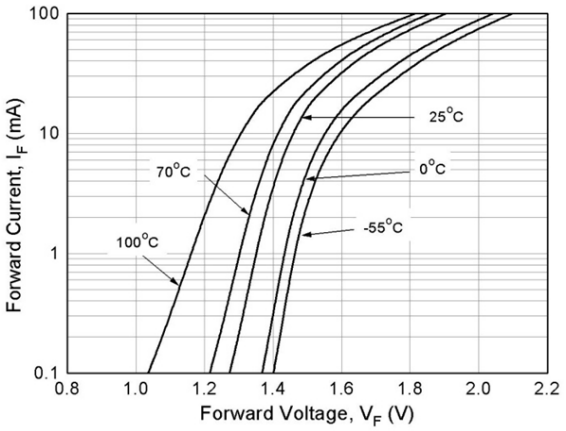


Fig 1 Forward Current vs Forward Voltage

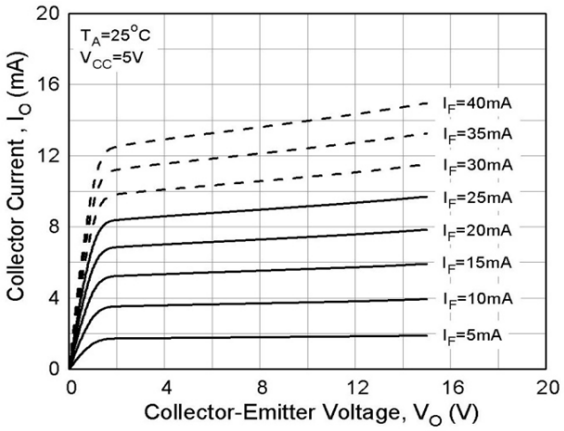


Fig 2 Output Current vs Output Voltage

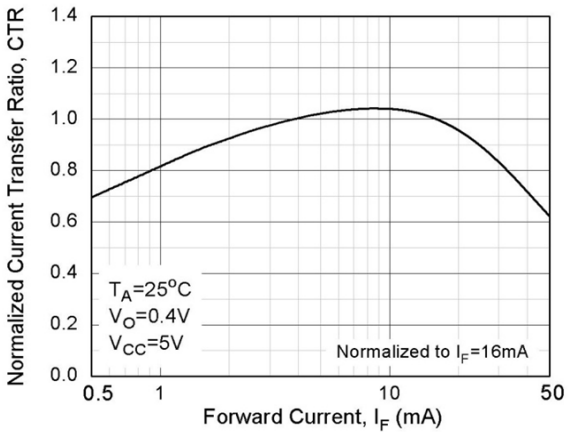


Fig 3 Normalized CTR vs Forward Current

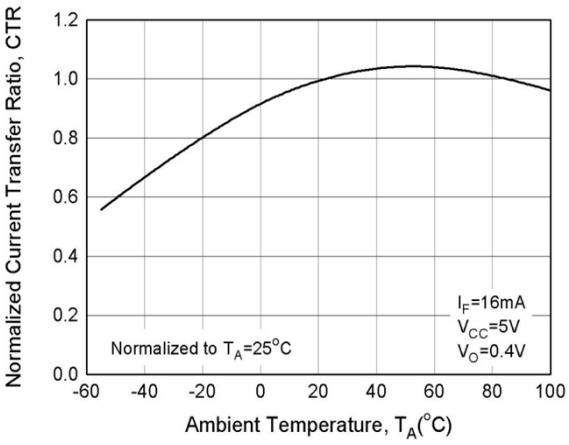


Fig 4 Normalized CTR vs T_A

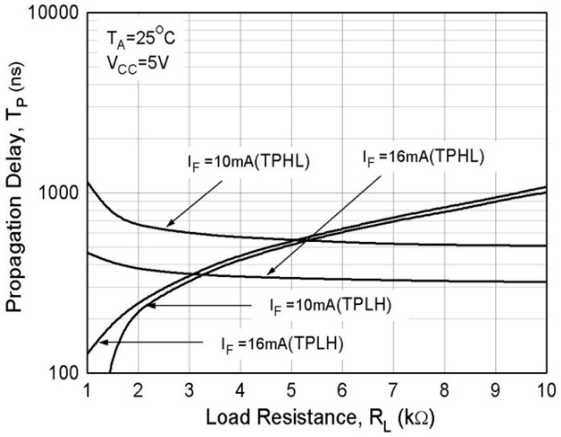


Fig 5 Propagation Delay vs Load Resistance

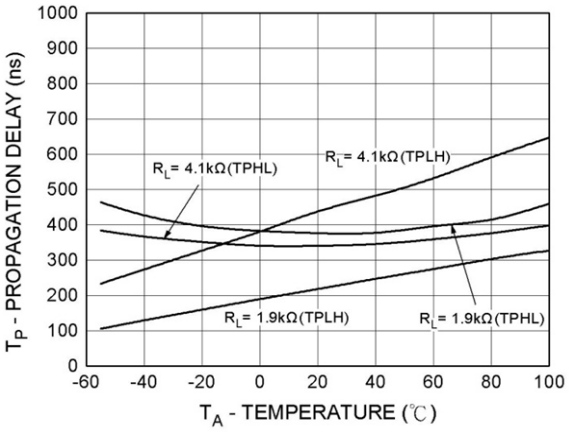


Fig 6 Propagation Delay vs T_A

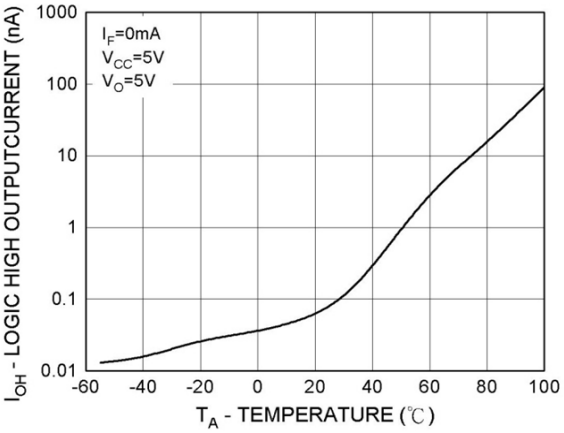
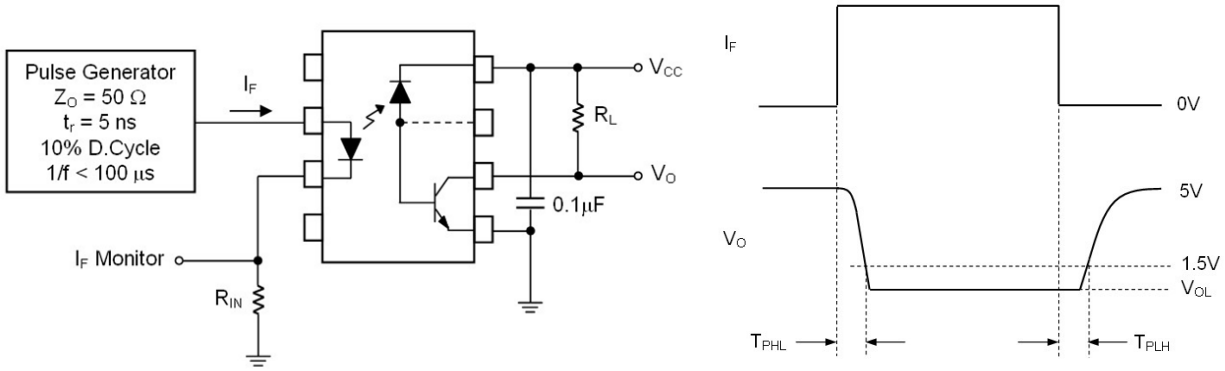
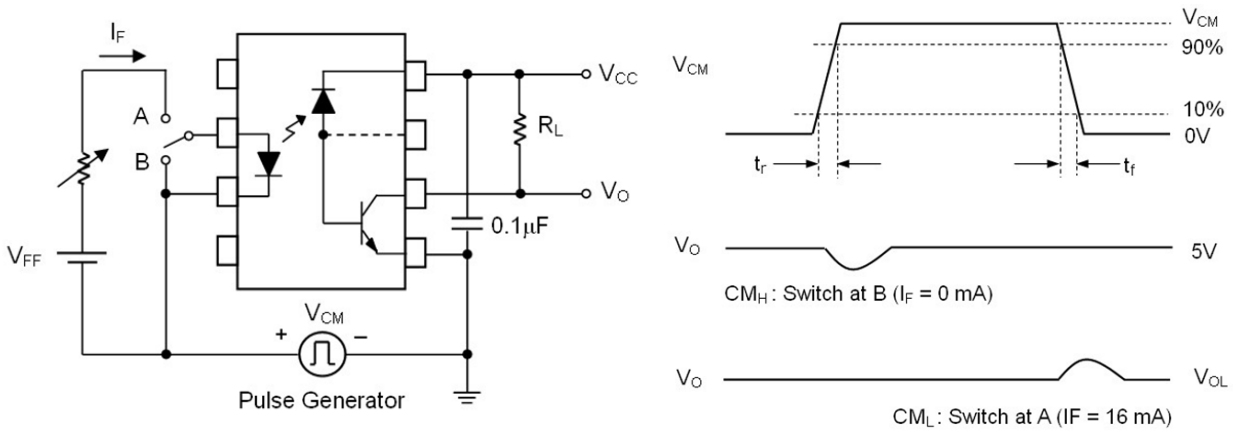


Fig 7 Logic High Output Current vs T_A



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., $V_O > 2.0V$).

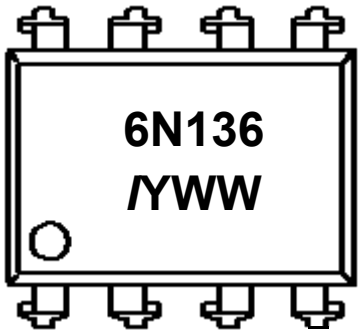
Common mode transient immunity in logic low level is the maximum tolerable (negative) dV_{CM}/dt on the trailing edge of the common mode pulse signal, V_{CM}, to assure that the output will remain in a logic low state (i.e., $V_O < 0.8V$).

ORDER INFORMATION

6N135, 6N136, ICPL4502, ICPL4503 (UL Approval)			
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

6N135V, 6N136V (UL and VDE Approvals)			
After PN	**PN**	**Description**	**Packing quantity**
None	6N135V, 6N136V	Standard Dip8	45 pcs per tube
G	6N135VG, 6N136VG	10mm Lead Spacing	45 pcs per tube
SM	6N135VSM, 6N136VSM	Surface Mount	45 pcs per reel
SMT&R	6N135VSMT&R, 6N136VSMT&R	Surface Mount Tape & Reel	1000 pcs per reel

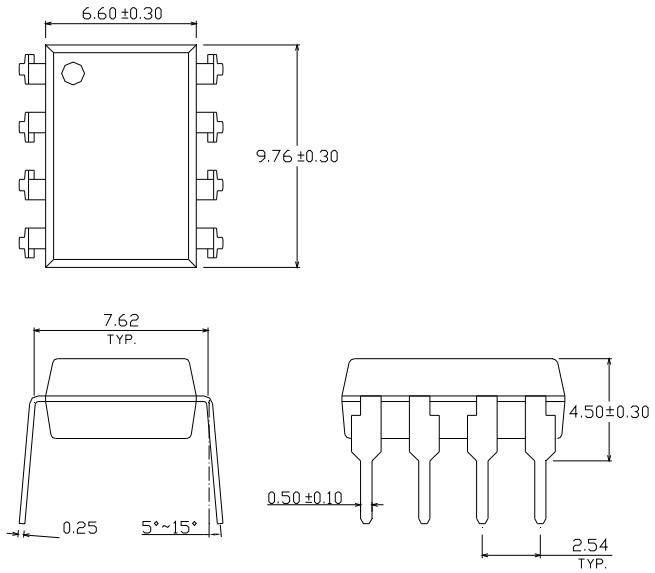
DEVICE MARKING (Example : 6N136)



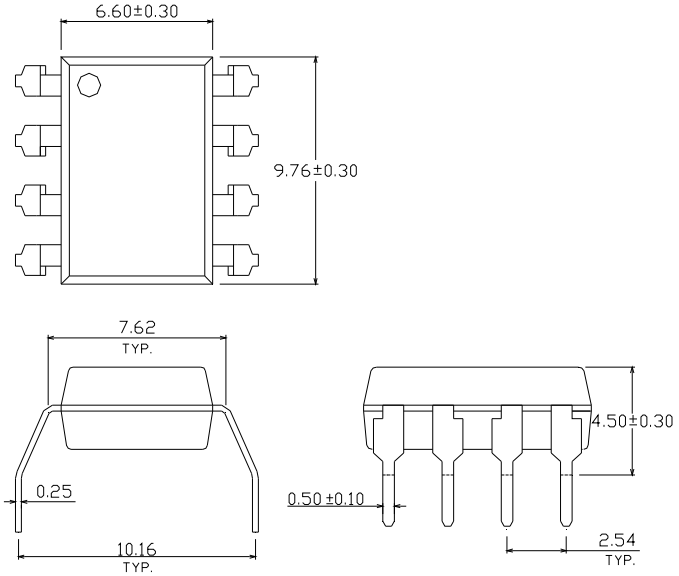
6N136	denotes Device Part Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
/	denoted Isocom

PACKAGE DIMENSIONS (mm)

DIP

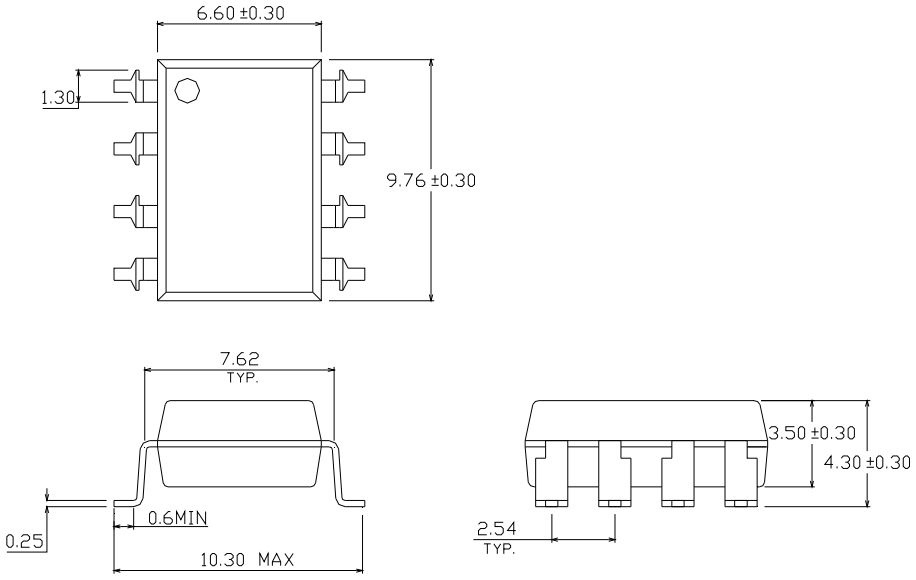


G-Form

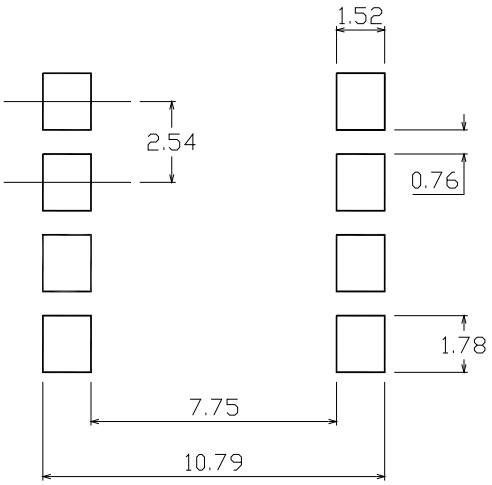


PACKAGE DIMENSIONS (mm)

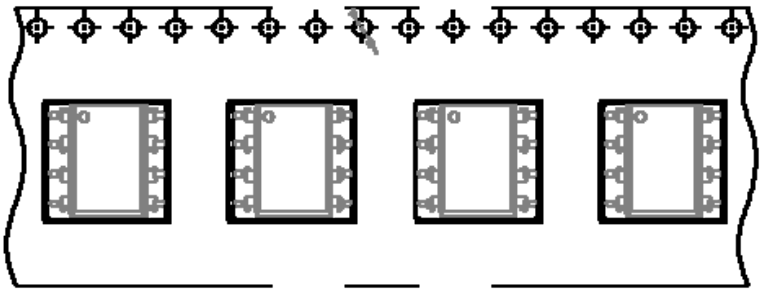
SMD



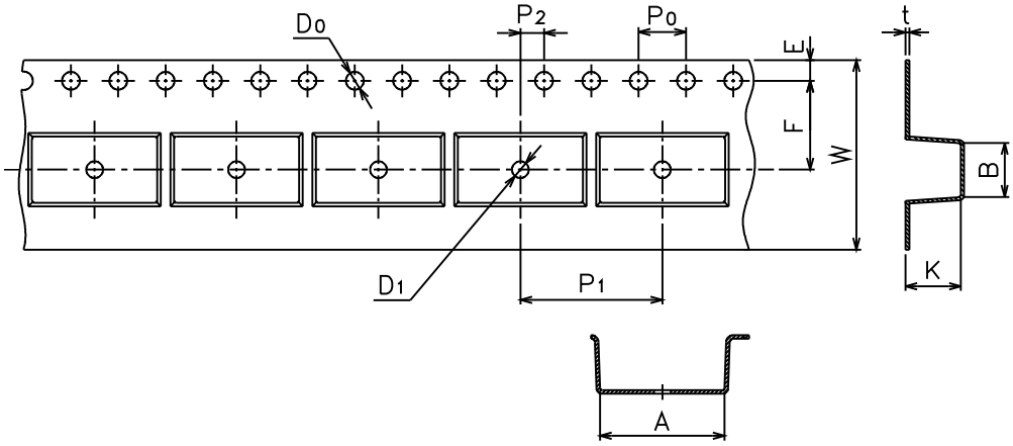
RECOMMENDED PAD LAYOUT FOR SMD (mm)



TAPE AND REEL PACKAGING

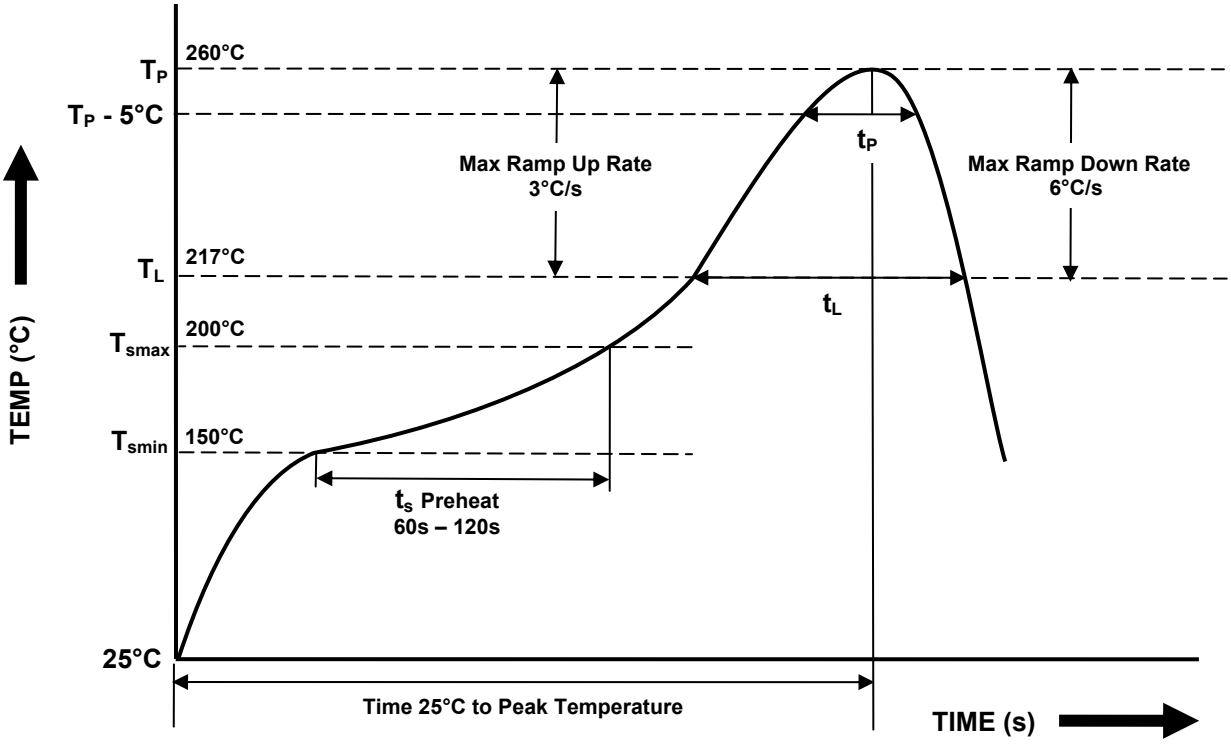


Direction of feed from reel



Dimension No.	A	B	D_0	D_1	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.	P_0	P_1	P_2	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

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

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

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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.

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