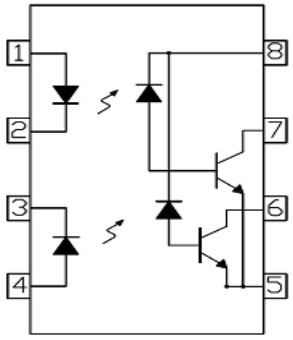
ICPL0530, ICPL0531

DESCRIPTION

The ICPL0530 and ICPL0531 dual channel devices each consists of an infrared emitting diode optically coupled to a high speed photo detector transistor. Separate connection for the photodiode and output transistor collector increases the speed by several order of magnitude over conventional phototransistor couplers by reducing the base-collector capacitance of the input transistor.

These devices belong to Isocom Compact Range of optocouplers.



1	Anode (Channel 1)
2	Cathode (Channel 1)
3	Cathode (Channel 2)
4	Cathode (Channel 2)
5	GND
6	Output (Channel 2)
7	Output (Channel 1)
8	V_{CC}

FEATURES

- High speed 1Mbit/s
- Half Pitch 1.27mm
- High AC Isolation Voltage 3750V_{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, Data Communication
- Telecommunication Equipments
- Power Transistor Isolation in Motor Drives
- Replacement of Low Speed Phototransistor Optocouplers
- Switch Mode Power Supplies
- High Speed Logic Ground Isolation
- Home Appliances

ORDER INFORMATION

Available in Tape and Reel with 2000pcs per reel

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

Input	
Forward Current	25mA
Peak Forward Current (50% Duty Cycle, 1ms P.W.)	50mA
Peak Transient Current (≤1µs P.W., 300pps)	1A
Reverse Voltage	5V
Power dissipation	45mW
Output	
Output Current	8mA
Peak Output Current	16mA
Output Voltage	-0.5 to 20V
Supply Voltage	-0.5 to 30V
Base-Emitter Reverse Voltage	5V
Power Dissipation	100mW
Total Package	
Isolation Voltage	3750V_{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		1.4	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		-1.6		mV/°C
Input Capacitance	C_{IN}	V_F = 0V, f = 1MHz		60		pF

OUTPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
High Level Supply Current	I_{CCH}	I_F = 0mA, V_{CC} = 15V, V_O = Open, T_A = 25 °C		0.01	1	µA
		I_F = 0mA, V_{CC} = 15V, V_O = Open			2	
Low Level Supply Current	I_{CCL}	I_F = 16mA, V_{CC} = 15V V_O = Open		120	200	µA

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	ICPL0530				%
		V_{CC} = 4.5V, I_F = 16mA, V_O = 0.4V, T_A = 25 °C	7		50	
		V_{CC} = 4.5V, I_F = 16mA, V_O = 0.5V	5			
		ICPL0531				
		V_{CC} = 4.5V, I_F = 16mA, V_O = 0.4V, T_A = 25 °C	19		50	
		V_{CC} = 4.5V, I_F = 16mA, V_O = 0.5V	15			
High Level Output Current	I_{OH}	V_{CC} = 5.5V, V_O = 5.5V, I_F = 0mA, T_A = 25 °C		0.001	0.5	µA
		V_{CC} = 15V, V_O = 15V, I_F = 0mA, T_A = 25 °C		0.01	1	
		V_{CC} = 15V, V_O = 15V, I_F = 0mA			50	
Low Level Output Voltage	V_{OL}	ICPL0530				V
		V_{CC} = 4.5V, I_F = 16mA, I_O = 1.1mA, T_A = 25 °C		0.18	0.4	
		V_{CC} = 4.5V, I_F = 16mA, I_O = 0.8mA			0.5	
		ICPL0531		0.3	0.4	
		V_{CC} = 4.5V, I_F = 16mA, I_O = 3mA, T_A = 25 °C				
		V_{CC} = 4.5V, I_F = 16mA, I_O = 2.4mA			0.5	

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}	ICPL0530				µs
		R_L = 4.1kΩ, T_A = 25°C			1.5	
		R_L = 4.1kΩ			2.0	
		ICPL0531				
		R_L = 1.9kΩ, T_A = 25°C			0.8	
		R_L = 1.9kΩ			1.0	
Propagation Delay Time to Logic High	T_{PLH}	ICPL0530				µs
		R_L = 4.1kΩ, T_A = 25°C			1.5	
		R_L = 4.1kΩ			2.0	
		ICPL0531				
		R_L = 1.9kΩ, T_A = 25°C			0.8	
		R_L = 1.9kΩ			1.0	
Common Mode Transient Immunity at Logic High	CM_H	ICPL0530 I_F = 0mA, R_L = 4.1kΩ, V_{CM} = 10Vp-p, T_A = 25°C	1000	10000		V/µs
		ICPL0531 I_F = 0mA, R_L = 1.9kΩ, V_{CM} = 1500Vp-p, T_A = 25°C	1000			
Common Mode Transient Immunity at Logic Low	CM_L	ICPL0530 I_F = 16mA, R_L = 4.1kΩ, V_{CM} = 10Vp-p, T_A = 25°C	1000	10000		V/µs
		ICPL0531 I_F = 16mA, R_L = 350Ω, V_{CM} = 1500Vp-p, T_A = 25°C	1000			

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).

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified)

ISOLATION

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Insulation Voltage	V_{ISO}	AC 1 minute, RH 40 to 60% Input Leads Shorted together and Output Leads Shorted together	3750			V_{RMS}

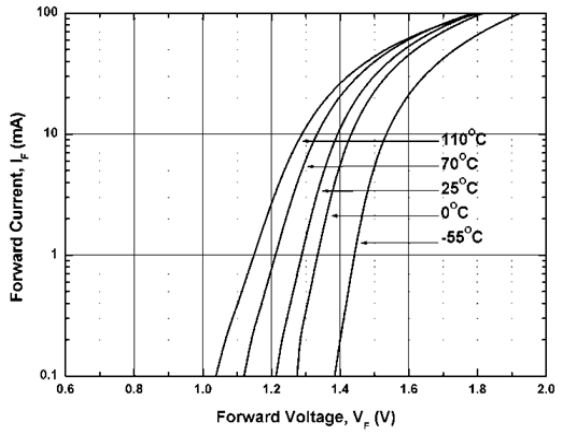


Fig 1 Forward Current vs Forward Voltage

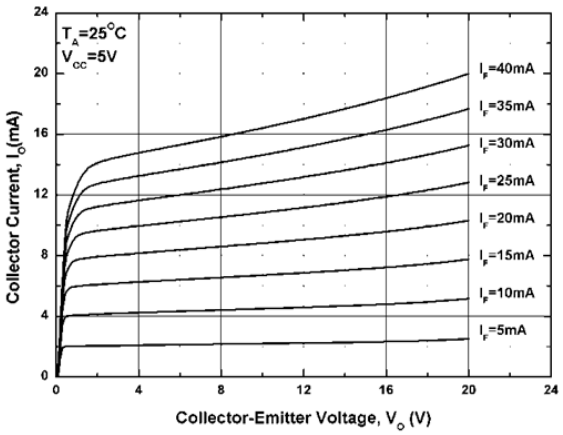


Fig 2 Output Current vs Output voltage

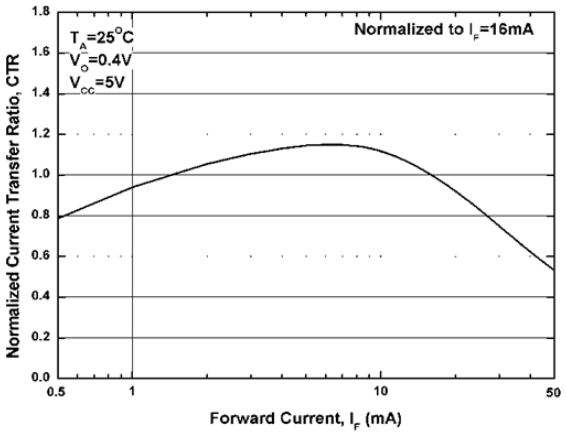


Fig 3 Current Transfer Ratio vs forward Current

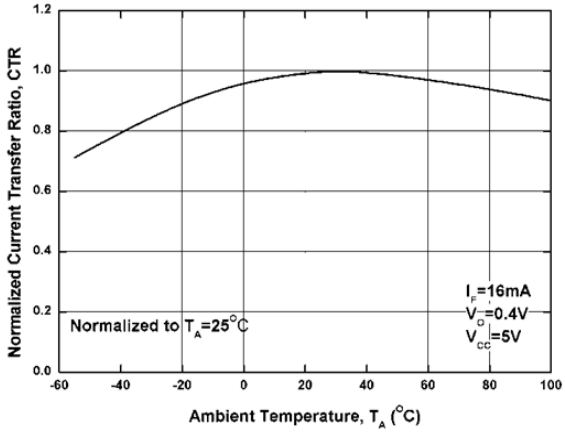


Fig 4 Current Transfer Ratio vs T_A

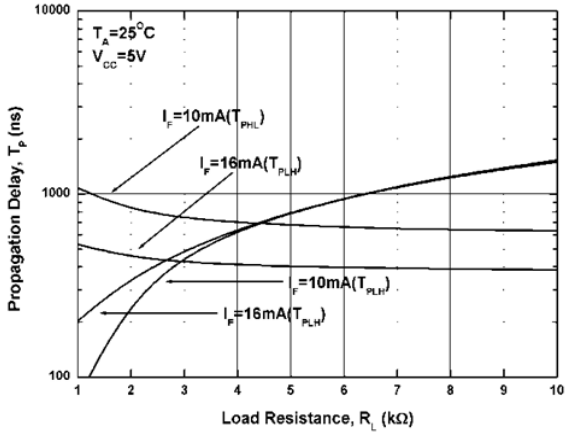


Fig 5 Propagation Delay vs Load Resistance

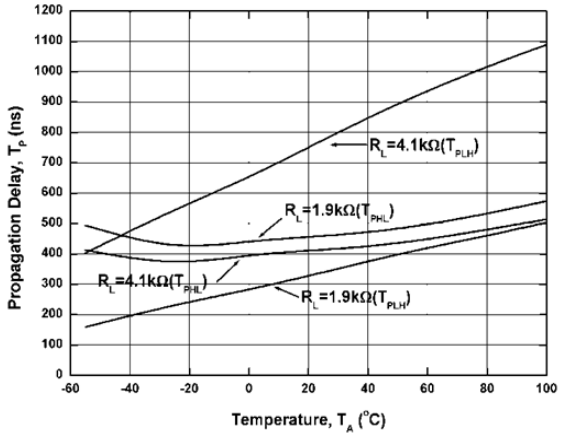


Fig 6 Propagation Delay vs T_A

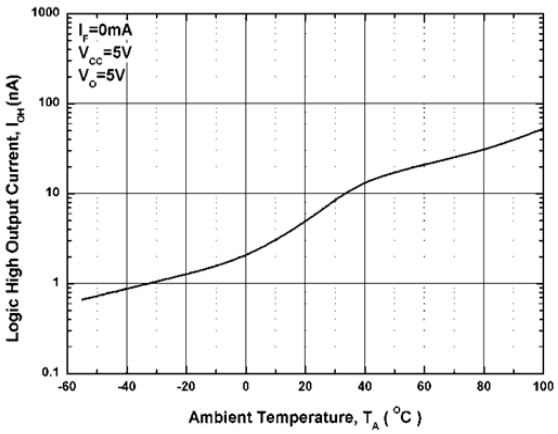
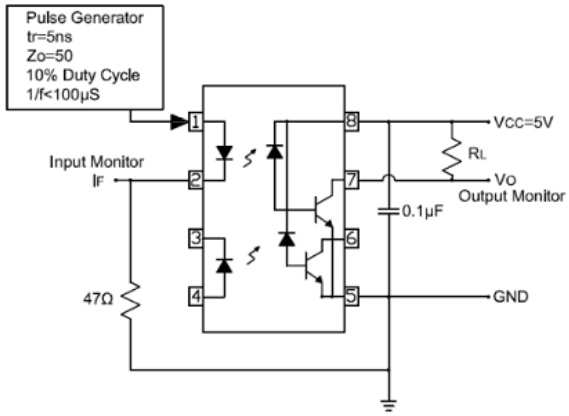


Fig 7 Logic High Output Current vs T_A



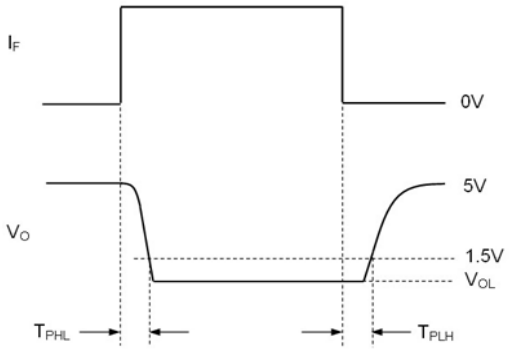
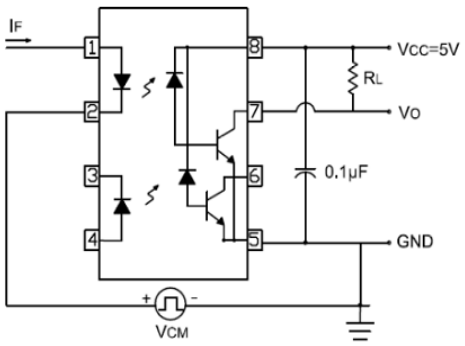


Fig 8 Switching Time Test Circuit



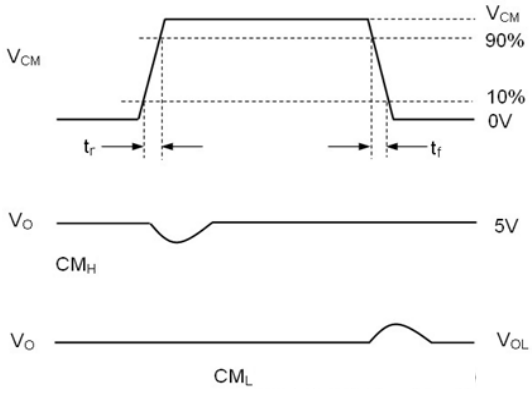
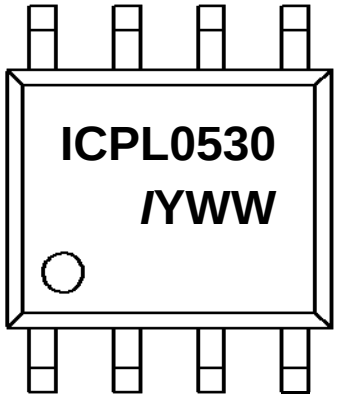


Fig 9 Transient Immunity Test Circuit

ORDER INFORMATION

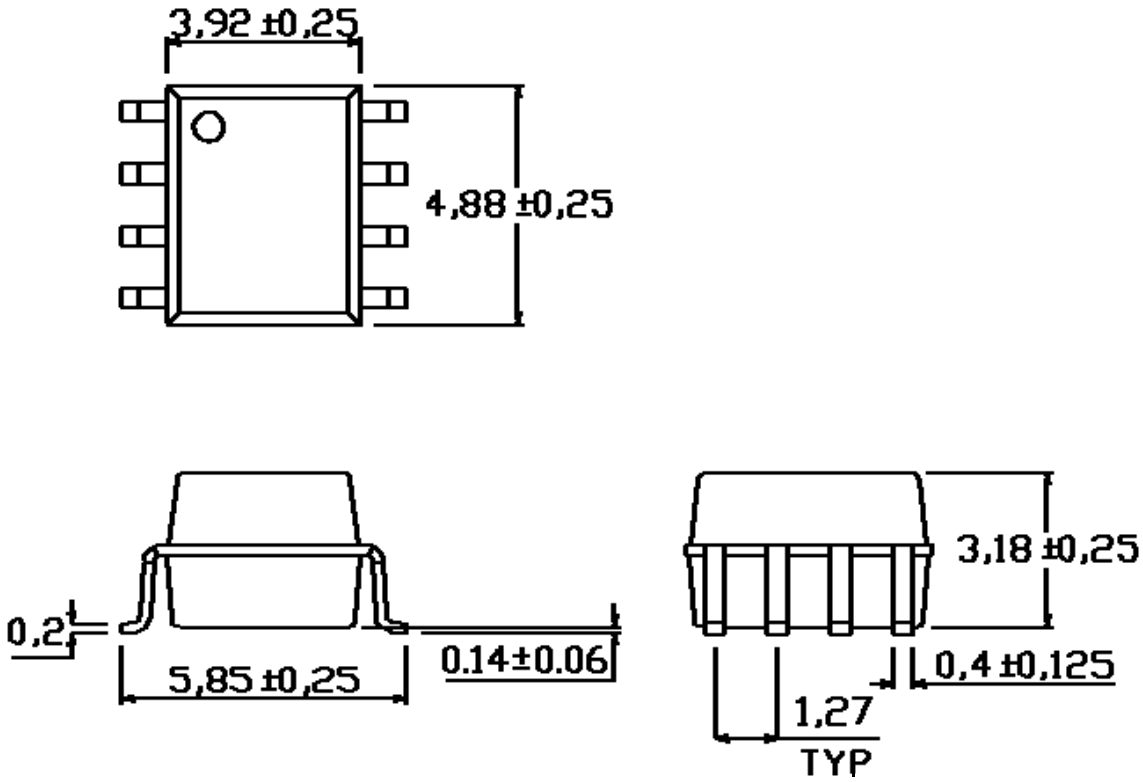
ICPL0530, ICPL0531			
After PN	**PN**	**Description**	**Packing quantity**
None	ICPL0530, ICPL0531	Surface Mount Tape & Reel	2000 pcs per reel

DEVICE MARKING

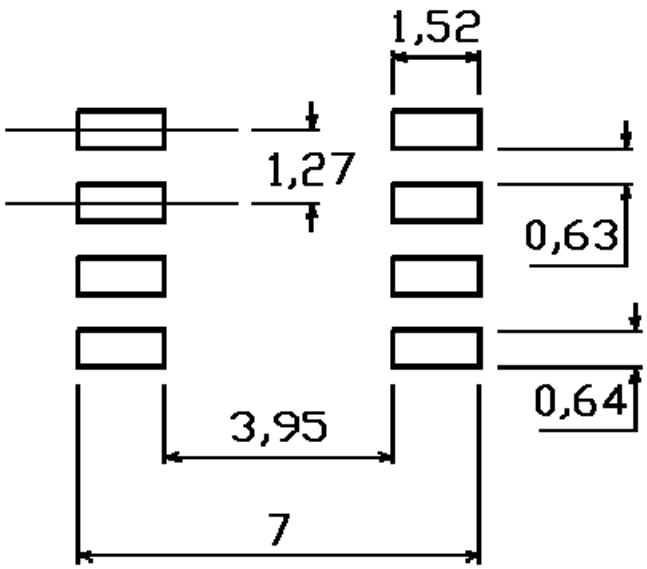


ICPL0530	denotes Device Part Number (ICPL0530 is used as example)
I	denotes Isocom
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code

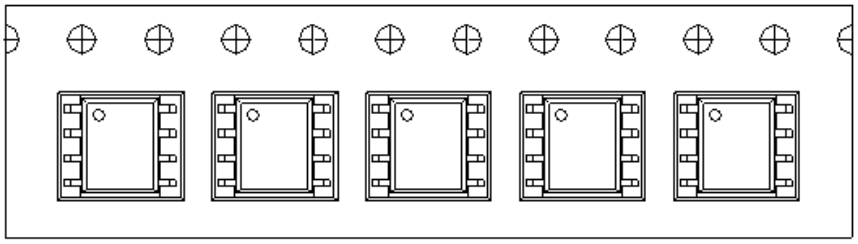
PACKAGE DIMENSIONS (mm)



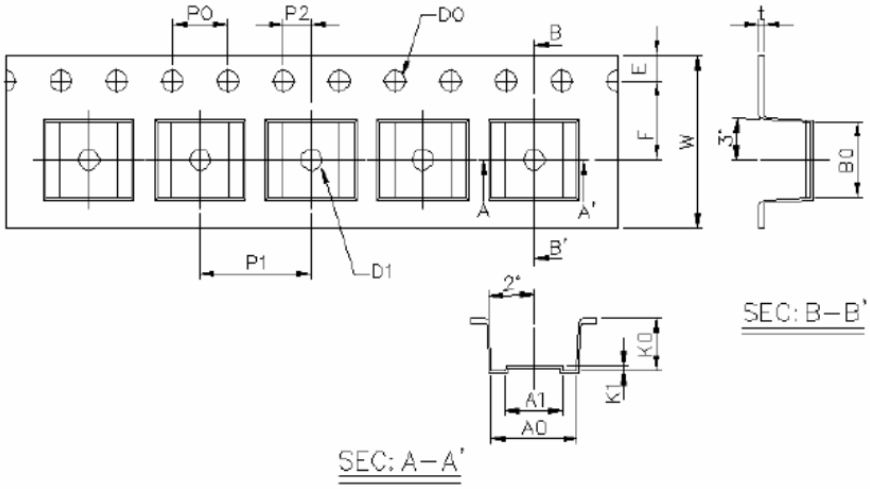
RECOMMENDED PAD LAYOUT (mm)



TAPE AND REEL PACKAGING

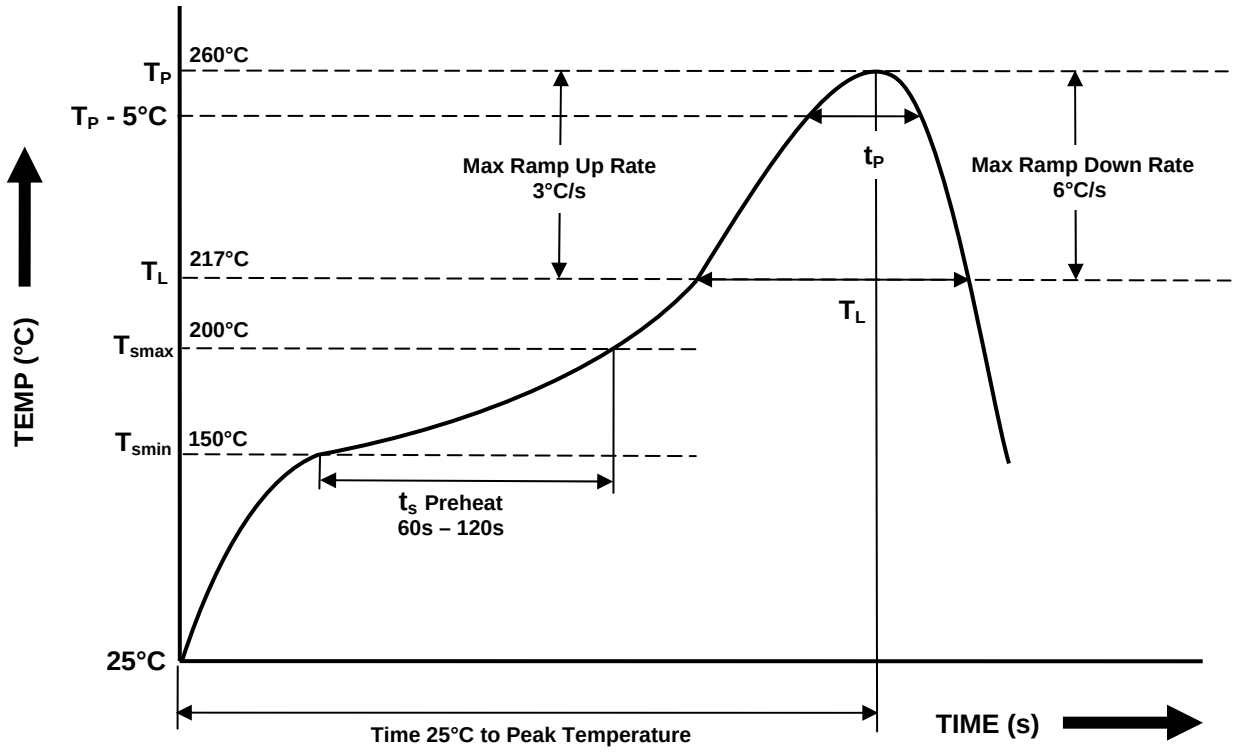


Direction of feed from reel



Dimension No.	**A0**	**A1**	**B0**	**D0**	**D1**	**E**	**F**
Dimension (mm)	6.2±0.1	4.1±0.1	5.28±0.1	1.5±0.1	1.5±0.3	1.75±0.1	5.5±0.1
Dimension No.	**Po**	**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

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

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- Do not immerse device body in solder paste.

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COMPONENTS

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