

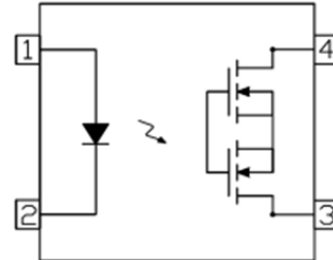


## ISP06, ISP25, ISP40, ISP60

### DESCRIPTION

The ISP06, ISP25, ISP40 and ISP60 are Single Channel Solid State Relays (Photo MOSFET) each consists of an infrared emitting diode optically coupled to a high voltage output detector. The detector consists of a Photo Voltaic Diode Array and high voltage output MOSFETs.

This Single Channel Output configuration is equivalent to 1 Form A of Electro-mechanical Relay.



### FEATURES

- Normally Open Single Pole Single Throw Relay
- High Output Voltages 60V to 600V
- Low ON Resistance
- Low Operating Current
- High AC Isolation Voltage 5000V<sub>RMS</sub>
- Wide Operating Temperature Range
- -40°C to 85°C
- Pb Free and RoHS Compliant
- Safety Approvals Pending

### APPLICATIONS

- Industrial Controls
- Telephone/Exchange Equipment
- Measurement Equipment
- FA/OA Equipment
- Security System
- Reed Relay Replacement

### 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<sub>A</sub> = 25°C)

#### Input Diode

Forward Current	50mA
Reverse Voltage	5V
Forward Peak Current (f=100Hz, Duty Cycle = 0.1%)	1A
Power dissipation	75mW

#### Output

	ISP06	ISP25	ISP40	ISP60
Output	60	250	400	600
Breakdown Voltage V <sub>L</sub> (V)				
Load Current I <sub>L</sub>				
Continuous (mA)	550	180	120	50
Pulse (A)	1.2	0.5	0.3	0.15
(100ms, 1 shot, V <sub>L</sub> = DC)				
Power Dissipation				500mW

#### Total Package

Isolation Voltage (R.H. = 40% - 60%, 1 min)	5000V <sub>RMS</sub>
Total Power Dissipation	550mW
Operating Temperature	-40 to 85 °C
Storage Temperature	-40 to 125 °C
Lead Soldering Temperature (10s)	260°C

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**ISP06, ISP25, ISP40, ISP60**

**Truth Table**

Input	Output
ON	CLOSE
OFF	OPEN

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise specified)

**INPUT**

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Forward Voltage	$V_F$	$I_F = 10\text{mA}$		1.18	1.5	V
Reverse Current	$I_R$	$V_R = 5\text{V}$			1	$\mu\text{A}$

**OUTPUT**

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit	
Off State Leakage Current	$I_{\text{leak}}$	$I_F = 0\text{mA}, V_L = \text{Max}$			1	$\mu\text{A}$	
On Resistance	$R_{d(\text{ON})}$	$I_F = 10\text{mA}, I_L = \text{Max}, t = 1\text{s}$		ISP06	0.7	2.5	$\Omega$
				ISP25	6.5	15	
				ISP40	20	30	
				ISP60	40	70	
Output Capacitance	$C_{\text{out}}$	$V_L = 0\text{V}, f = 1\text{MHz}$		ISP06	85		pF
				ISP25	60		
				ISP40	45		
				ISP60	30		



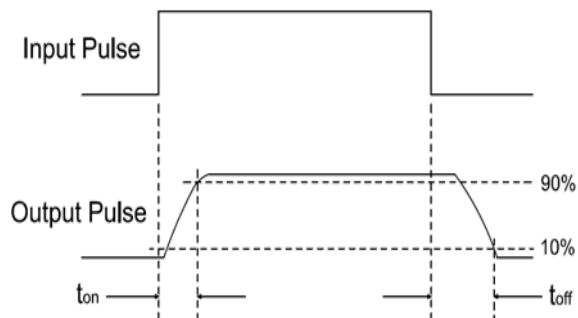
**ISP06, ISP25, ISP40, ISP60**

**ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$  unless otherwise specified)**

**COUPLED**

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit	
LED Turn On Current	$I_{F(on)}$	$I_L = \text{Max}$		2.5	5	mA	
LED Turn Off Current	$I_{F(off)}$	$I_L = \text{Max}$	0.4	2.5		mA	
Turn On Time	$T_{on}$	$I_F = 10\text{mA}, I_L = \text{Max}, R_L = 200\Omega$				ms	
			ISP06		1.4		3
			ISP25		1.2		3
			ISP40		0.4		3
Turn Off Time	$T_{off}$	$I_F = 10\text{mA}, I_L = \text{Max}, R_L = 200\Omega$				ms	
			ISP06		0.05		0.5
			ISP25		0.05		0.5
			ISP40		0.05		0.5
Isolation Resistance	$R_{L-O}$	$V_{L-O} = 500\text{VDC}$	$5 \times 10^{10}$			$\Omega$	
Isolation Capacitance	$C_{L-O}$	$V = 0\text{V}, f = 1\text{MHz}$		1.5		pF	

**Turn on / Turn off Time**





## ISP06, ISP25, ISP40, ISP60

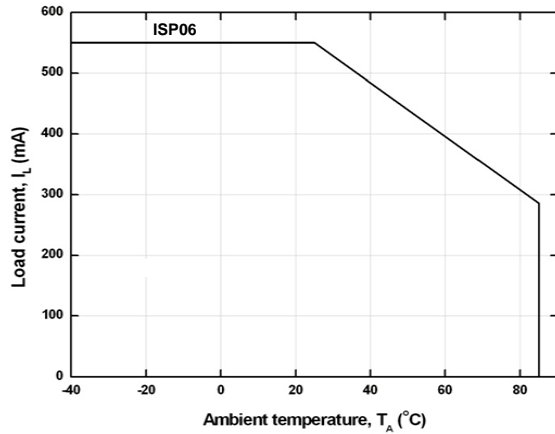


Fig 1a Load Current vs Ambient Temperature

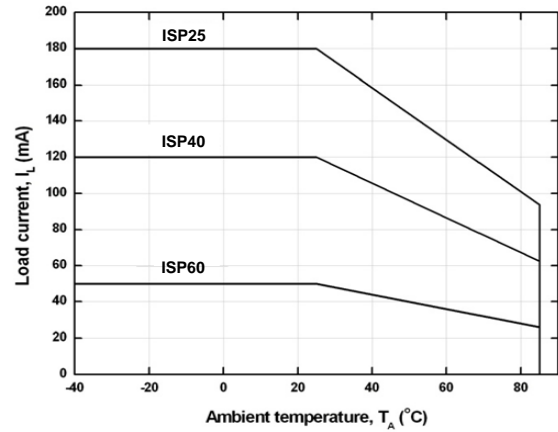


Fig 1b Load Current vs Ambient Temperature

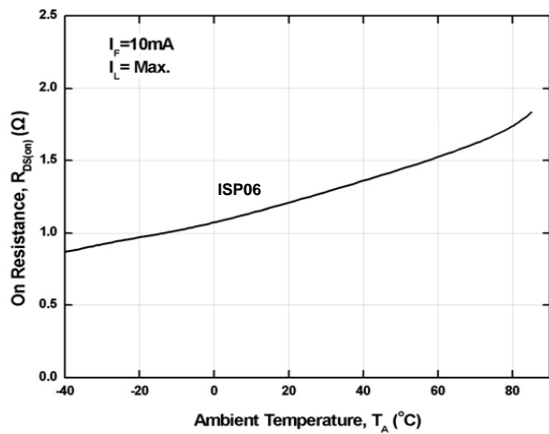


Fig 2a On Resistance vs Ambient Temperature

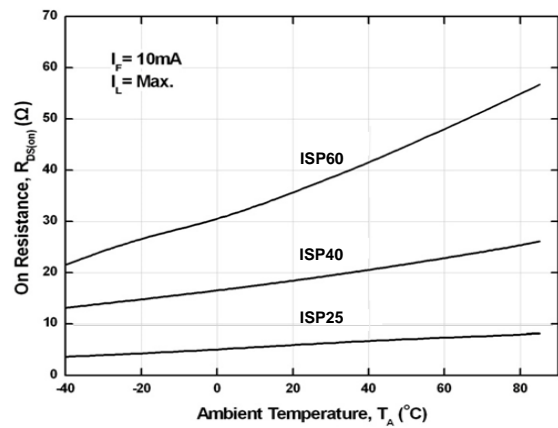


Fig 2b On Resistance vs Ambient Temperature

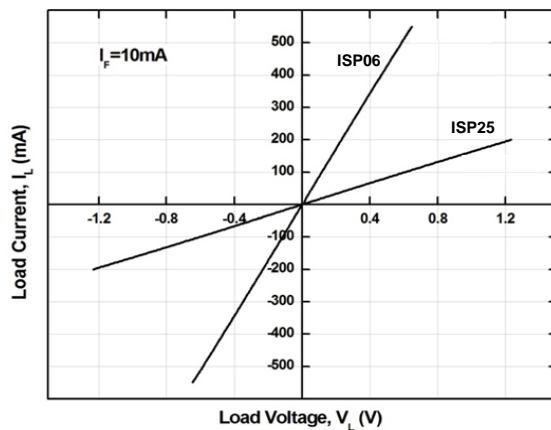


Fig 3a Load Current vs Load Voltage

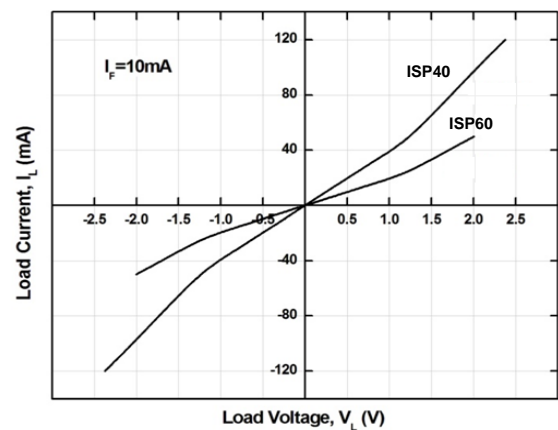
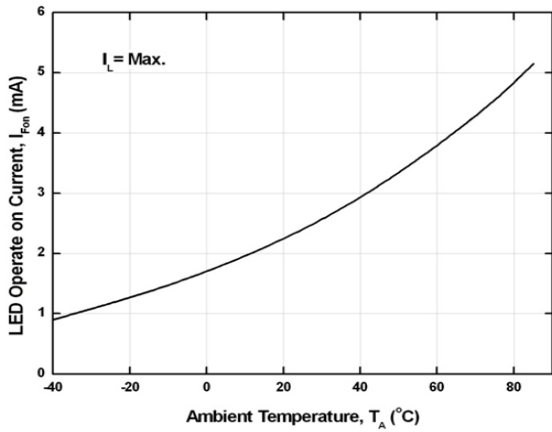


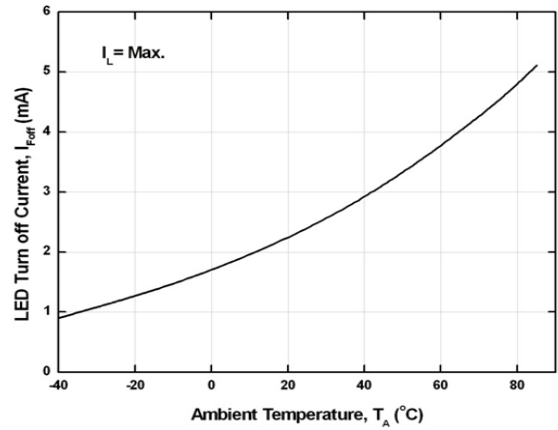
Fig 3b Load Current vs Load Voltage



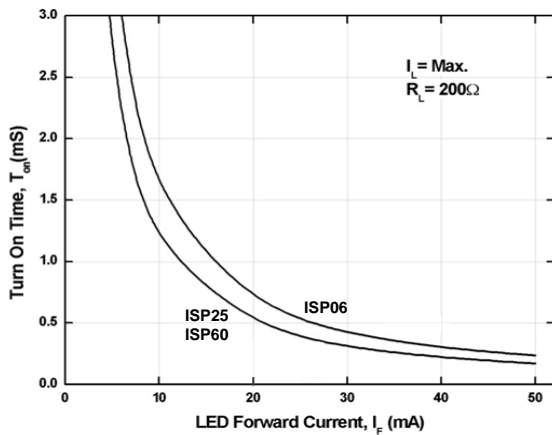
**ISP06, ISP25, ISP40, ISP60**



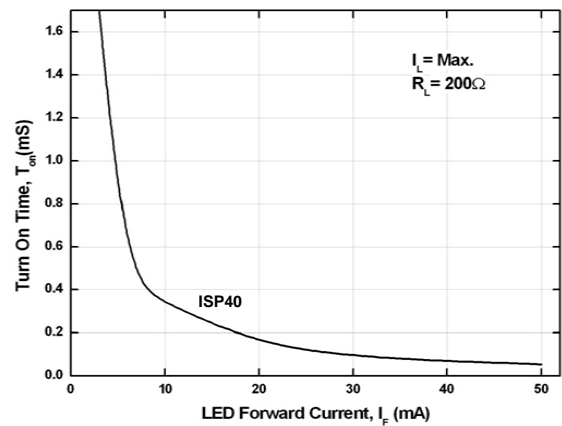
**Fig 4 LED Turn On Current vs  $T_A$**



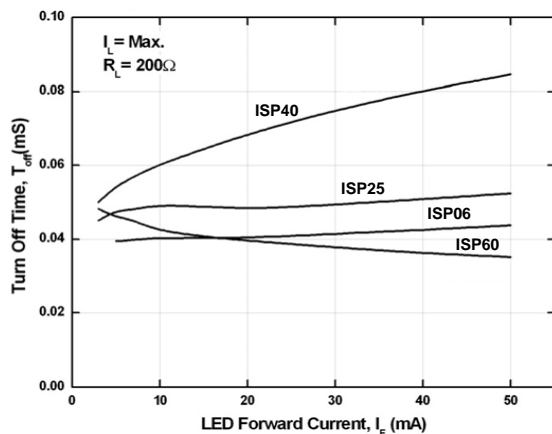
**Fig 5 LED Turn Off Current vs  $T_A$**



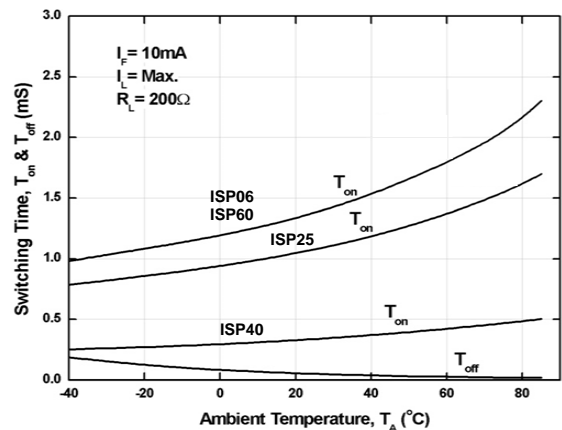
**Fig 6a Turn On Time vs LED Forward Current**



**Fig 6b Turn On Time vs LED Forward Current**



**Fig 7 Turn Off Time vs LED Forward Current**



**Fig 8 Switching Time vs Ambient Temperature**



## ISP06, ISP25, ISP40, ISP60

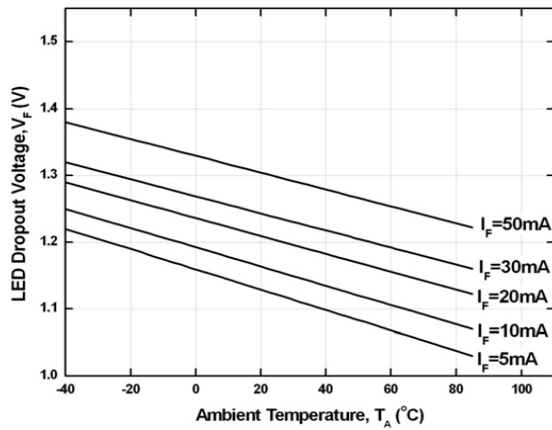


Fig 9 LED Dropout Voltage vs  $T_A$

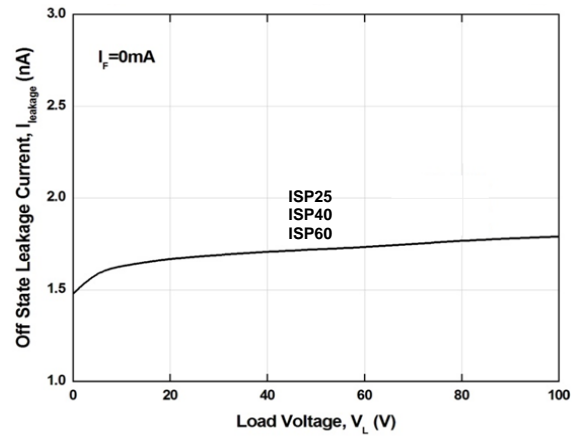


Fig 10 Off State Leakage Current vs Load Voltage

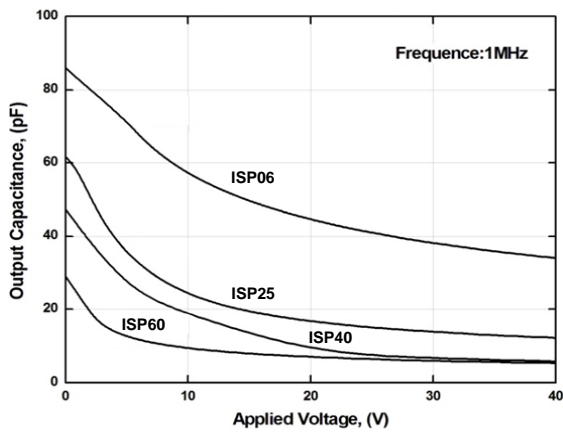


Fig 11 Output Capacitance vs Applied Voltage

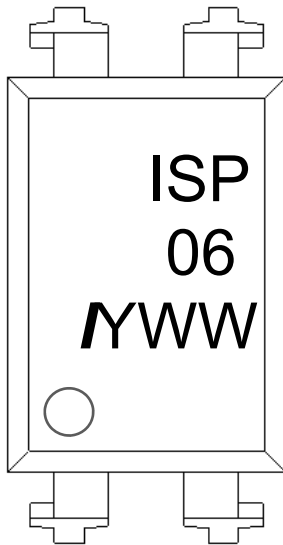


## ISP06, ISP25, ISP40, ISP60

### ORDER INFORMATION

ISP06, ISP25, ISP40, ISP60			
After PN	PN	Description	Packing quantity
None	ISP06, ISP25, ISP40, ISP60	Standard DIP4	100 pcs per tube
G	ISP06G, ISP25G, ISP40G, ISP60G	10mm Lead Spacing	100 pcs per tube
SM	ISP06SM, ISP25SM, ISP40SM, ISP60SM	Surface Mount	100 pcs per tube
SMT&R	ISP06SMT&R, ISP25SMT&R, ISP40SMT&R, ISP60SMT&R	Surface Mount Tape & Reel	1000 pcs per reel

### DEVICE MARKING



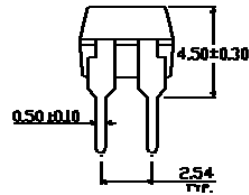
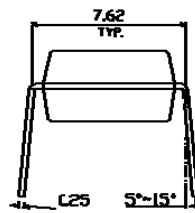
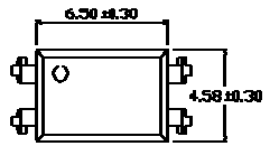
ISP06 denotes Device Part Number (ISP06 is used as example)  
I denotes Isocom  
Y denotes 1 digit Year code  
WW denotes 2 digit Week code



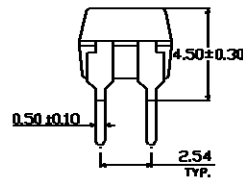
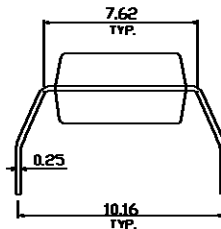
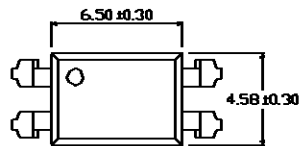
## ISP06, ISP25, ISP40, ISP60

### PACKAGE DIMENSIONS (mm)

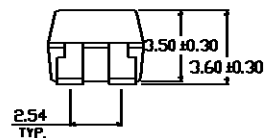
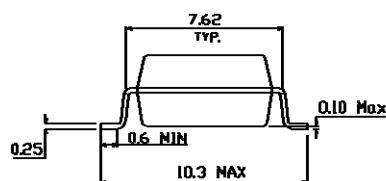
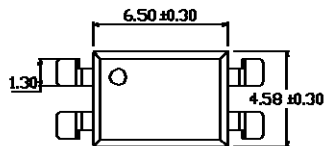
DIP



G Form



SMD

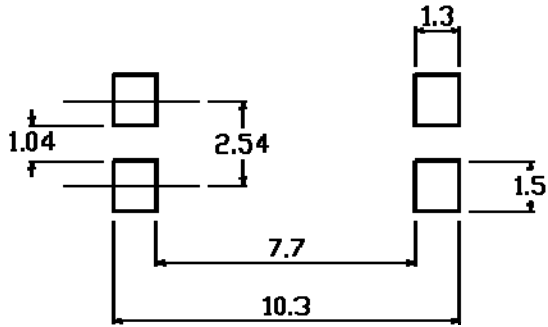




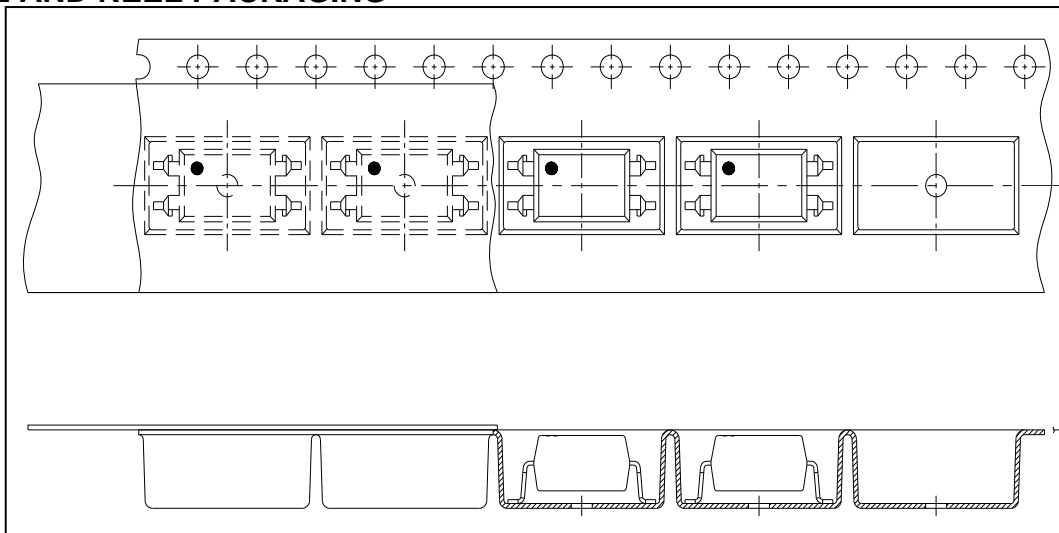


**ISP06, ISP25, ISP40, ISP60**

**RECOMMENDED PAD LAYOUT FOR SMD (mm)**



**TAPE AND REEL PACKAGING**



Direction of feed from reel

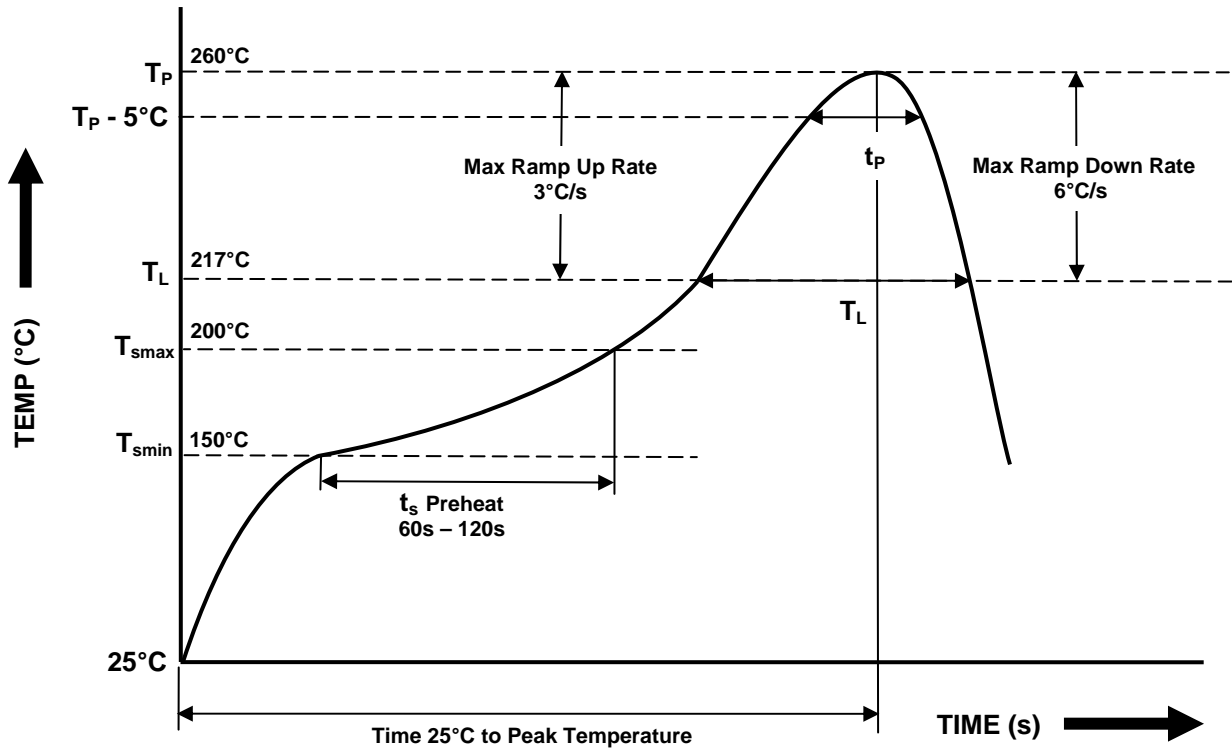


Dimension No.	<b>A</b>	<b>B</b>	<b>Do</b>	<b>D1</b>	<b>E</b>	<b>F</b>
Dimension (mm)	10.4±0.1	4.55±0.1	1.5±0.1	1.5±0.05	1.75±0.1	7.5±0.1
Dimension No.	<b>Po</b>	<b>P1</b>	<b>P2</b>	<b>t</b>	<b>W</b>	<b>K</b>
Dimension (mm)	4.0±0.1	12.0±0.1	2.0±0.1	0.33±0.1	16.0+0.3/ -0.1	4.55±0.1



**ISP06, ISP25, ISP40, ISP60**

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



Profile Details	Conditions
<b>Preheat</b> - Min Temperature (T <sub>SMIN</sub> ) - Max Temperature (T <sub>SMAX</sub> ) - Time T <sub>SMIN</sub> to T <sub>SMAX</sub> (t <sub>s</sub> )	150°C 200°C 60s - 120s
<b>Soldering Zone</b> - Peak Temperature (T <sub>P</sub> ) - Liquidous Temperature (T <sub>L</sub> ) - Time within 5°C of Actual Peak Temperature (T <sub>P</sub> - 5°C) - Time maintained above T <sub>L</sub> (t <sub>L</sub> ) - Ramp Up Rate (T <sub>L</sub> to T <sub>P</sub> ) - Ramp Down Rate (T <sub>P</sub> to T <sub>L</sub> )	260°C 217°C 30s 60s - 100s 3°C/s max 6°C/s max
Average Ramp Up Rate (T <sub>smax</sub> to T <sub>P</sub> )	3°C/s max
Time 25°C to Peak Temperature	8 minutes max



**ISOCOM**  
— — — — —  
**COMPONENTS**

## ISP06, ISP25, ISP40, ISP60

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- Do not immerse device body in solder paste.



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