

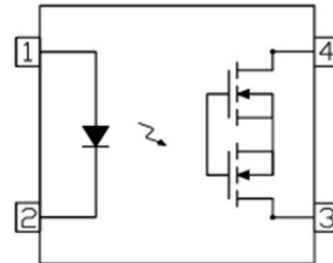


## ISP06, ISP25, ISP40, ISP60

### 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)

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



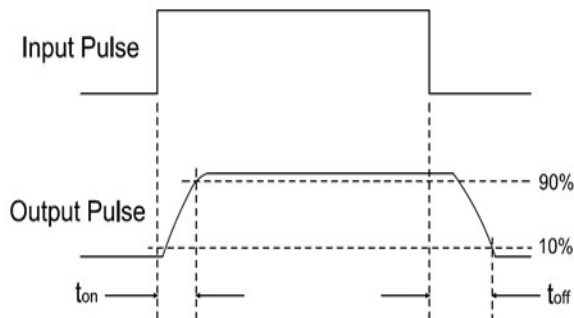
**ISP06, ISP25, ISP40, ISP60**

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

**COUPLED**

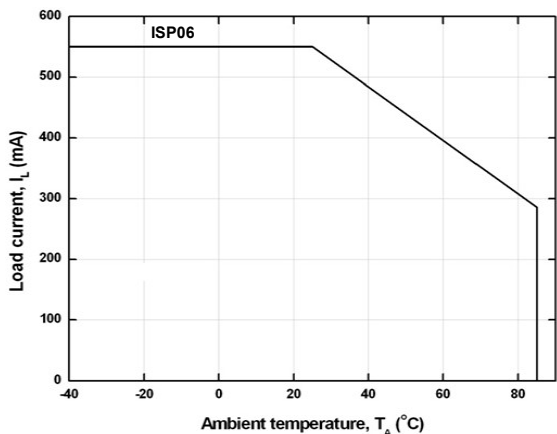
Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit	
LED Turn On Current	$I_{F(\text{on})}$	$I_L = \text{Max}$		2.5	5	mA	
LED Turn Off Current	$I_{F(\text{off})}$	$I_L = \text{Max}$	0.4	2.5		mA	
Turn On Time	$T_{\text{on}}$	$I_F = 10\text{mA}, I_L = \text{Max}, R_L = 200\Omega$				ms	
			ISP06		1.4		3
			ISP25		1.2		3
			ISP40		0.4		3
Turn Off Time	$T_{\text{off}}$	$I_F = 10\text{mA}, I_L = \text{Max}, R_L = 200\Omega$				ms	
			ISP06		0.05		0.5
			ISP25		0.05		0.5
			ISP40		0.05		0.5
ISP60		0.05	0.5				
Isolation Resistance	$R_{I-O}$	$V_{I-O} = 500\text{VDC}$	$5 \times 10^{10}$			$\Omega$	
Isolation Capacitance	$C_{I-O}$	$V = 0\text{V}, f = 1\text{MHz}$		1.5		pF	

**Turn on / Turn off Time**

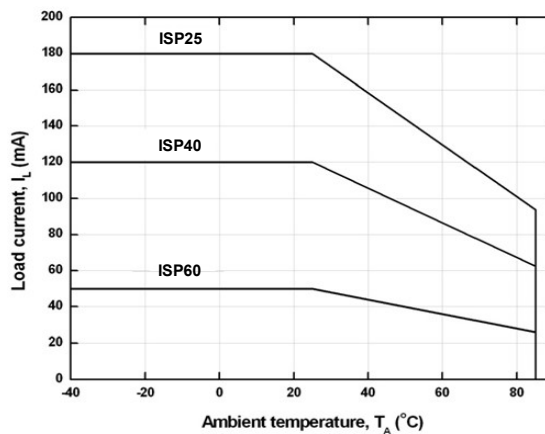




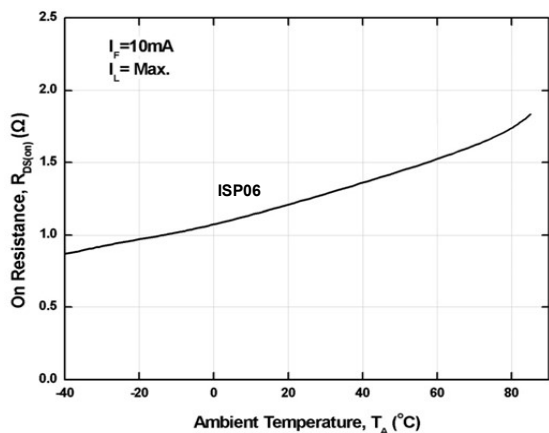
**ISP06, ISP25, ISP40, ISP60**



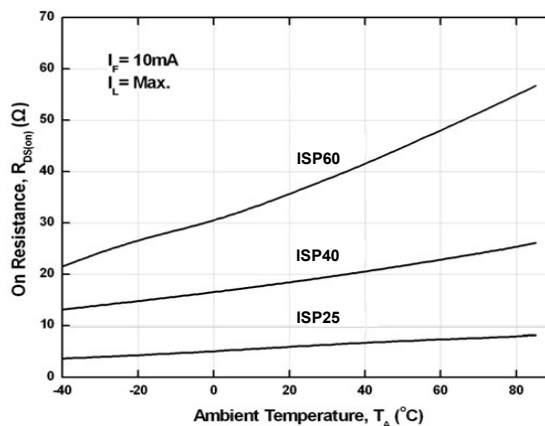
**Fig 1a Load Current vs Ambient Temperature**



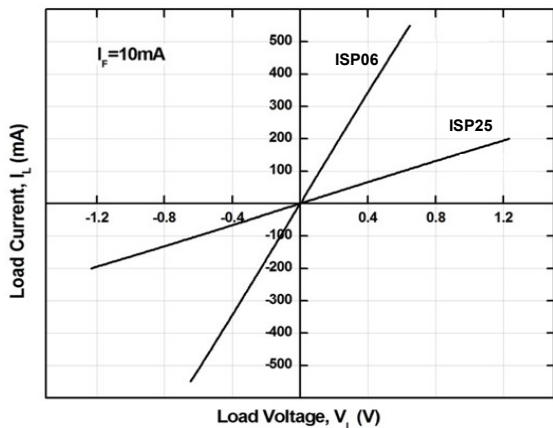
**Fig 1b Load Current vs Ambient Temperature**



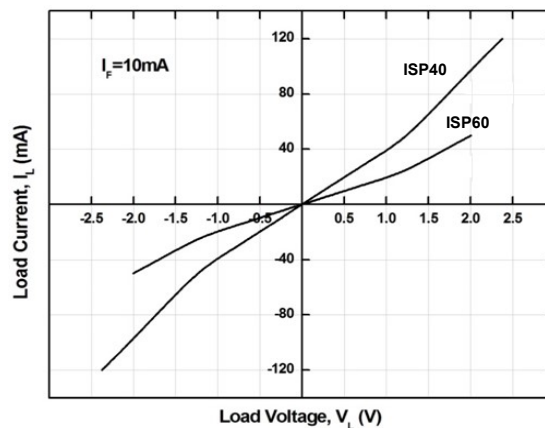
**Fig 2a On Resistance vs Ambient Temperature**



**Fig 2b On Resistance vs Ambient Temperature**



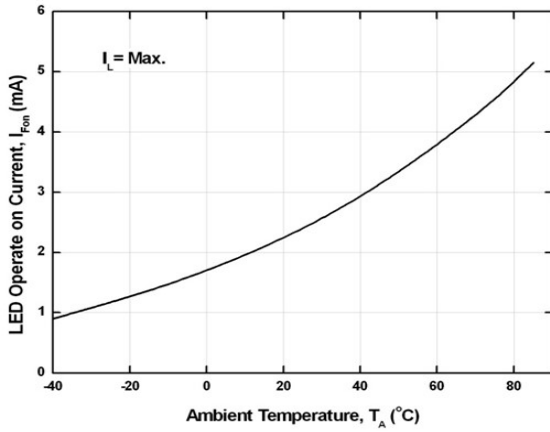
**Fig 3a Load Current vs Load Voltage**



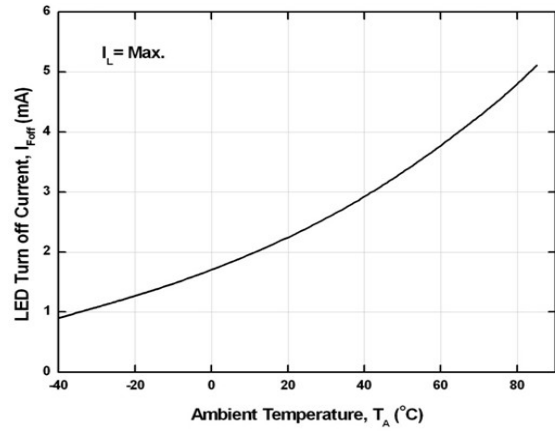
**Fig 3b Load Current vs Load Voltage**



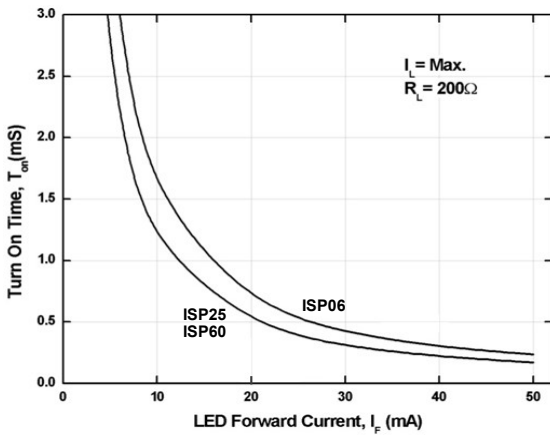
**ISP06, ISP25, ISP40, ISP60**



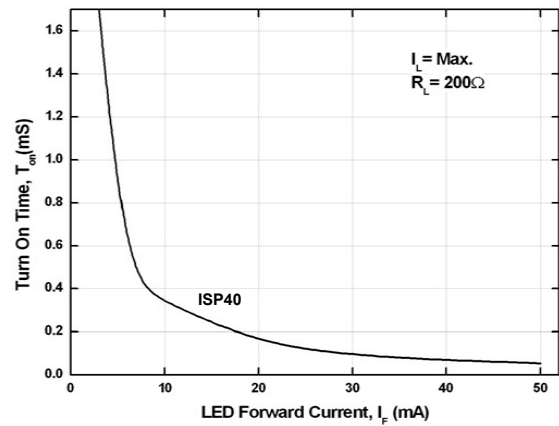
**Fig 4 LED Turn On Current vs  $T_A$**



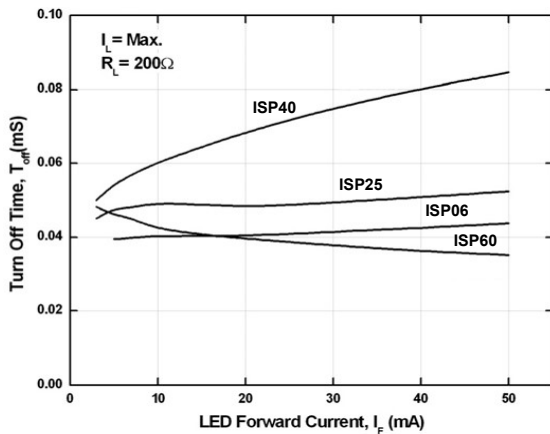
**Fig 5 LED Turn Off Current vs  $T_A$**



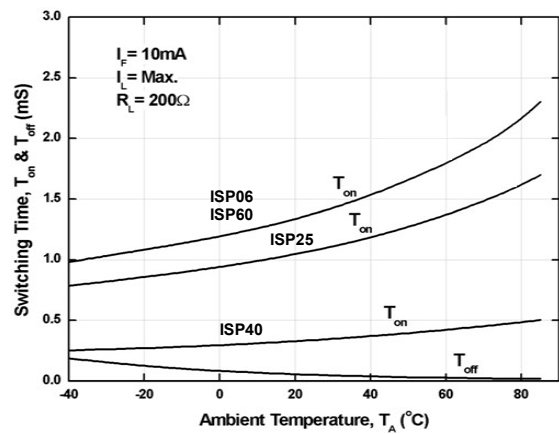
**Fig 6a Turn On Time vs LED Forward Current**



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



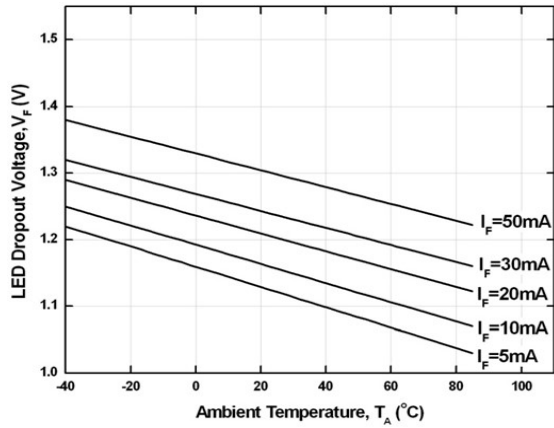
**Fig 7 Turn Off Time vs LED Forward Current**



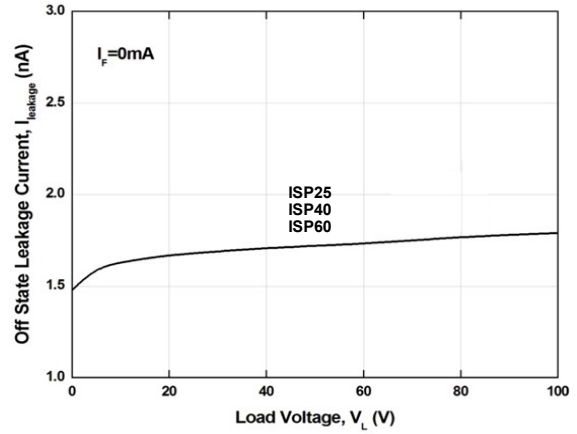
**Fig 8 Switching Time vs Ambient Temperature**



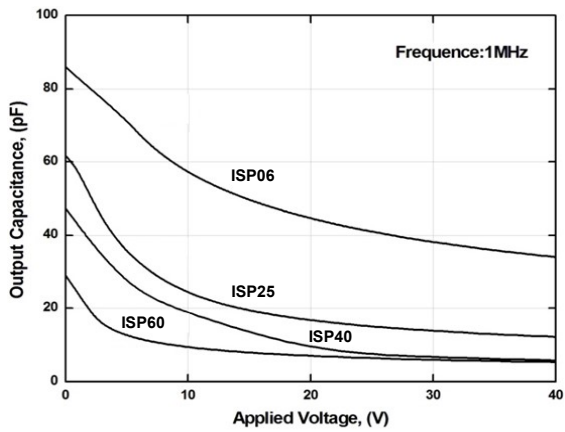
**ISP06, ISP25, ISP40, ISP60**



**Fig 9 LED Dropout Voltage vs  $T_A$**



**Fig 10 Off State Leakage Current vs Load Voltage**



**Fig 11 Output Capacitance vs Applied Voltage**

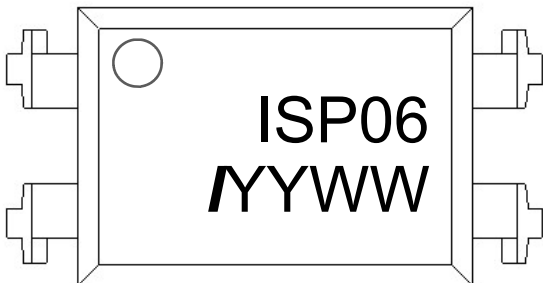


## ISP06, ISP25, ISP40, ISP60

### 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



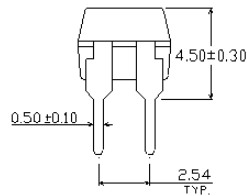
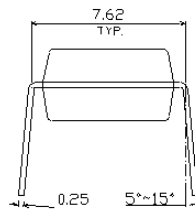
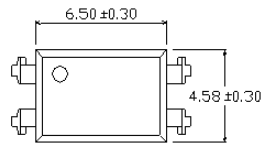
ISP06 denotes Device Part Number (ISP06 is used as example)  
I denotes Isocom  
YY denotes 2 digit year code  
WW denotes 2 digit Week code



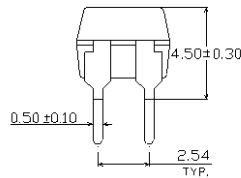
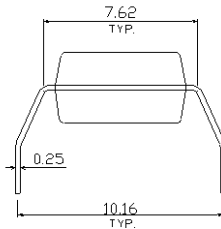
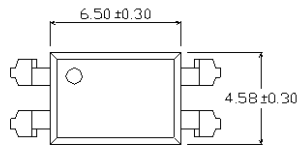
## ISP06, ISP25, ISP40, ISP60

### PACKAGE DIMENSIONS (mm)

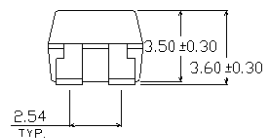
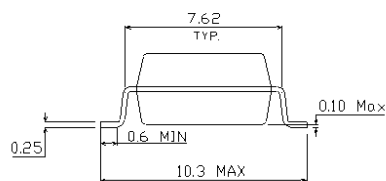
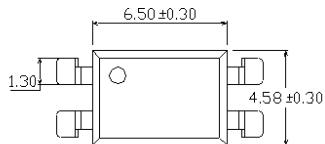
**DIP**



**G Form**



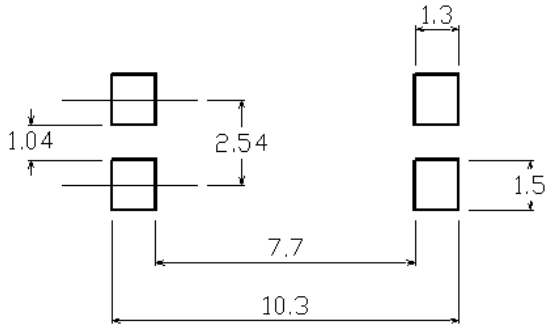
**SMD**



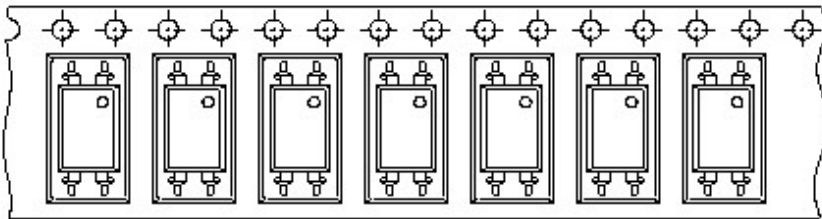


**ISP06, ISP25, ISP40, ISP60**

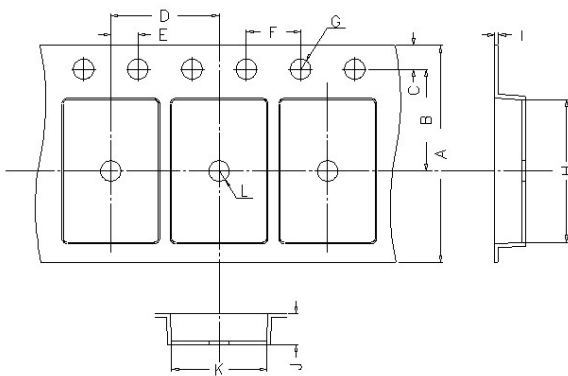
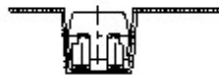
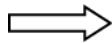
**RECOMMENDED PAD LAYOUT FOR SMD (mm)**



**TAPE AND REEL PACKAGING**



Direction of feed from reel

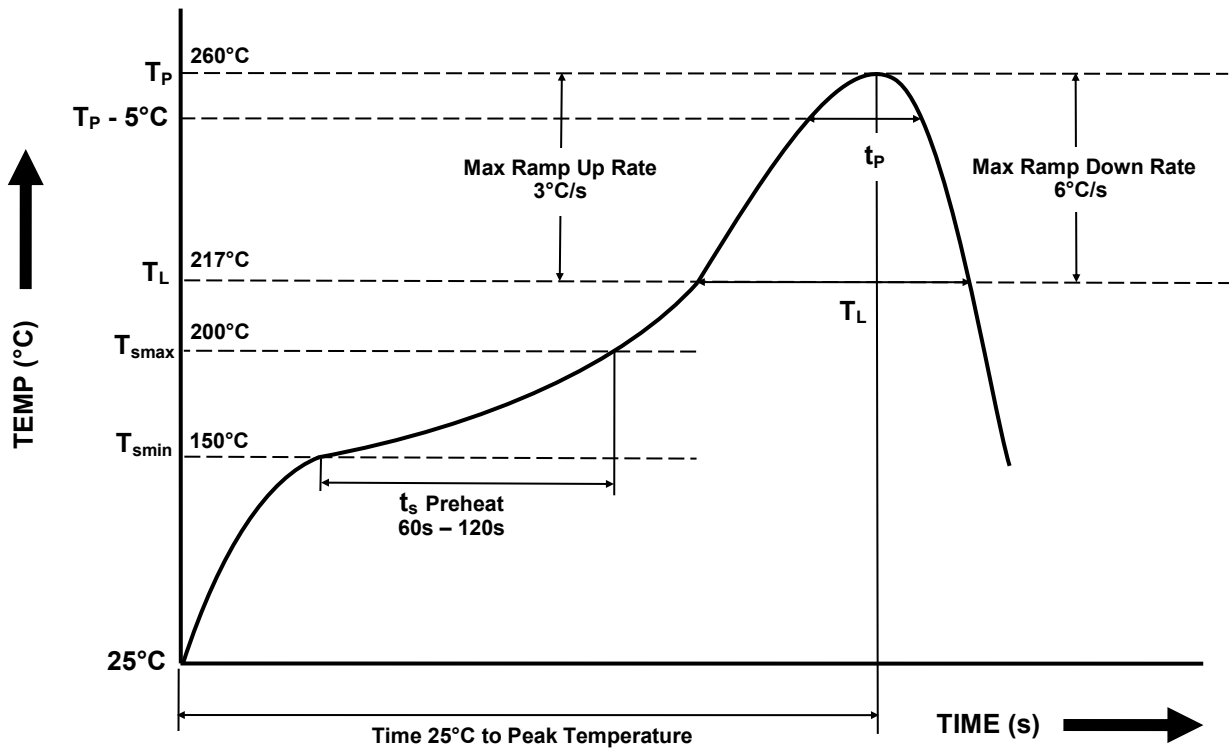


Dimension No.	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
Dimension(mm)	16.00±0.3	7.5±0.1	1.75±0.1	8.0±0.1	2.0±0.1	4.0±0.1
Dimension No.	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>K</b>	<b>L</b>
Dimension(mm)	1.5+0.1/-0	10.4±0.1	0.4±0.05	4.55±0.1	5.1±0.1	1.5±0.05



**ISP06, ISP25, ISP40, ISP60**

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



Profile Details	Conditions
<b>Preheat</b> - Min Temperature ( $T_{SMIN}$ ) - Max Temperature ( $T_{SMAX}$ ) - Time $T_{SMIN}$ to $T_{SMAX}$ ( $t_s$ )	150°C 200°C 60s - 120s
<b>Soldering Zone</b> - 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



