

## IS6005 / IS6010 / IS6015

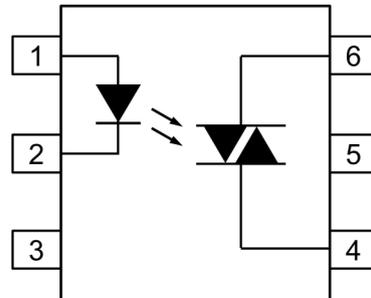


### DESCRIPTION

The IS6005, IS6010 and IS6015 are optically coupled isolators consisting of a Gallium Arsenide infrared emitting diode coupled with a light activated silicon bilateral switch performing the functions of a triac.

These photocouplers provide random phase control of high current triacs or thyristors. They feature greatly enhanced static dv/dt capability to ensure stable switching performance of inductive loads.

These devices are mounted in a standard 6 pin dual-in-line package.



- 1 Anode
- 2 Cathode
- 3 NC
- 4 Main Terminal
- 5 Substrate (Do not Connect)
- 6 Main Terminal

### FEATURES

- High Repetitive Peak Off-state Voltage  
 $V_{DRM}$  : minimum 600V
- High Critical Rate of Rise of Off-state Voltage  
dv/dt : minimum 1000V/ $\mu$ s )
- High Isolation Voltage between Input and Output  
Viso : 5000Vrms
- Lead Free and RoHS Compliant
- Safety Approvals Pending

### APPLICATIONS

- Solenoid / Valve Controls
- Lamp Ballasts
- Static AC Power Switch
- Interfacing Microprocessors to 115 and 240Vac Peripherals
- Solid State Relays
- Incandescent Lamp Dimmers
- Temperature Controls
- Motor Controls

### 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 ( $T_A = 25^\circ\text{C}$ )

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	50mA
Reverse Voltage	6V
Power dissipation	100mW
Junction Temperature	125°C

#### Output

Off State Output Terminal Voltage	600V
Peak Repetitive Surge Current (Pulse width = 1ms, 120pps)	1A
Power Dissipation	300mW
Junction Temperature	125°C

#### Total Package

Isolation Voltage	5000V <sub>RMS</sub>
Total Power Dissipation	330mW
Operating Temperature	-40 to 110°C
Storage Temperature	-55 to 150 °C
Lead Soldering Temperature (10s)	260°C

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**Recommended Operating Conditions**

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	$V_{AC}$			240	$V_{AC}$
Forward Current					mA
IS6005	$I_F$	7.5	10	30	
IS6010		15	20	30	
IS6015		22.5	25	30	
Operating Temperature	$T_A$	-25		85	$^{\circ}C$

**NOTE :**

Recommended operating conditions are given as a design guideline to obtain expected performance of the device.

Each item is an independent guideline.

Please also refer to specified characteristics in this document.



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

**INPUT**

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Forward Voltage	$V_F$	$I_F = 20\text{mA}$		1.2	1.4	V
Reverse Current	$I_R$	$V_R = 6\text{V}$		0.05	10	$\mu\text{A}$

**OUTPUT**

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Peak Off-state Current Either Direction	$I_{\text{DRM}}$	$V_{\text{DRM}} = 600\text{V}$ $I_F = 0\text{mA}$ Note 1			100	nA
On-State Voltage Either Direction	$V_{\text{TM}}$	$I_{\text{TM}} = 100\text{mA (Peak)}$			3.0	V
Critical Rate of Rise of Off-State Voltage	dv/dt	$I_F = 0\text{mA}$ $V_{\text{IN}} = 240\text{V}_{\text{RMS}}$	1000			V/ $\mu\text{s}$

**COUPLED**

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Input Trigger Current Either Direction	$I_{\text{FT}}$	Main Terminal Voltage = 3V Note 2  IS6005 IS6010 IS6015			5 10 15	mA
Holding Current Either Direction	$I_{\text{H}}$			200		$\mu\text{A}$

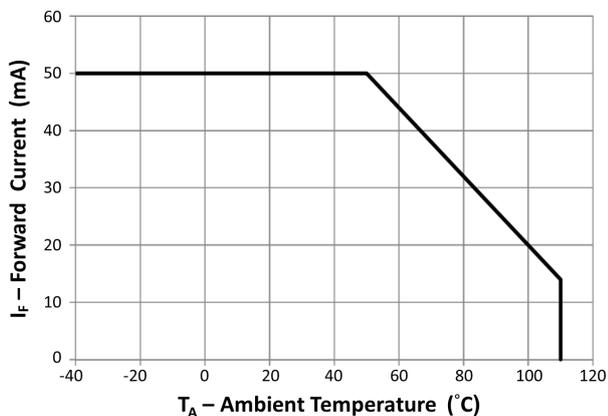
**ISOLATION**

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Insulation Voltage	$V_{\text{ISO}}$	AC 1 minute, RH 40 to 60%	5000			$V_{\text{RMS}}$

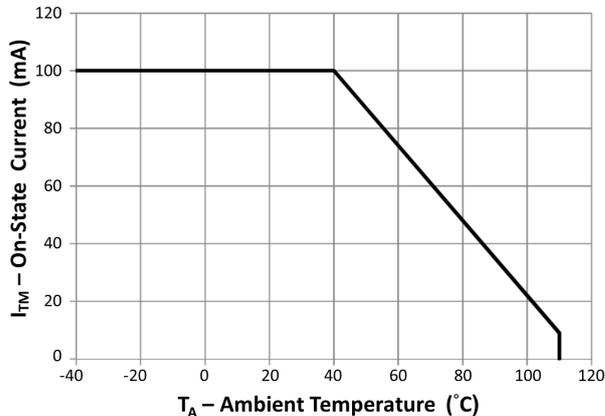
Measured with input leads shorted together and output leads shorted together.

Note 1 : Test Voltage must be applied within static dv/dt rating.

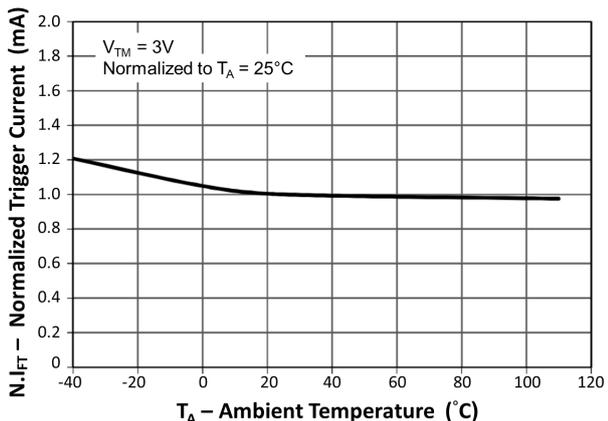
Note 2 : Guaranteed to trigger at an  $I_F$  value less than or equal to max  $I_{\text{FT}}$ ,  
Recommended  $I_F$  lies between Rated  $I_{\text{FT}}$  to Absolute Max  $I_F$ .



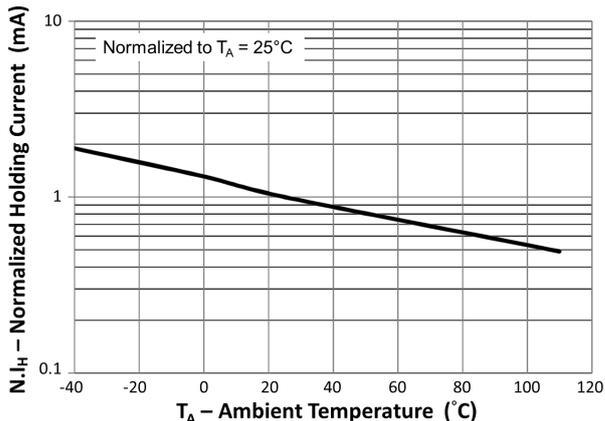
**Fig 1 Forward Current vs Ambient Temperature**



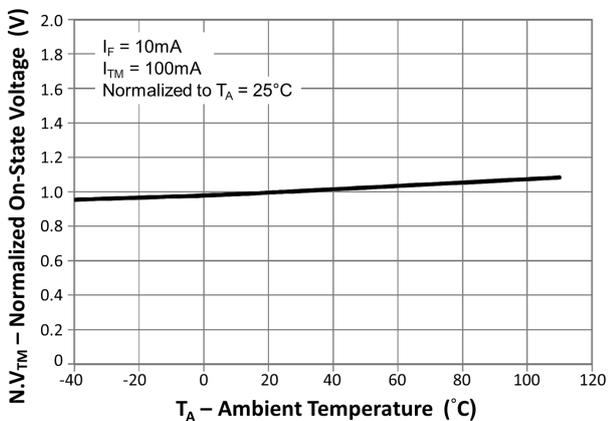
**Fig 2 On-State Current vs Ambient Temperature**



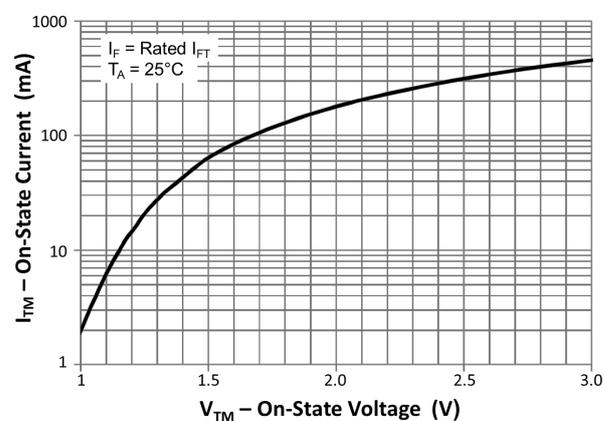
**Fig 3 Normalized Trigger Current vs Ambient Temperature**



**Fig 4 Normalized Holding Current vs Ambient Temperature**



**Fig 5 Normalized On-State Voltage vs Ambient Temperature**



**Fig 6 On-State Current vs On-State Voltage**

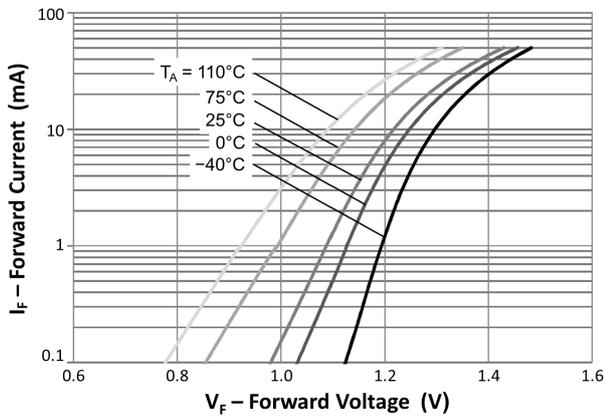


Fig 7 Forward Current vs Forward Voltage

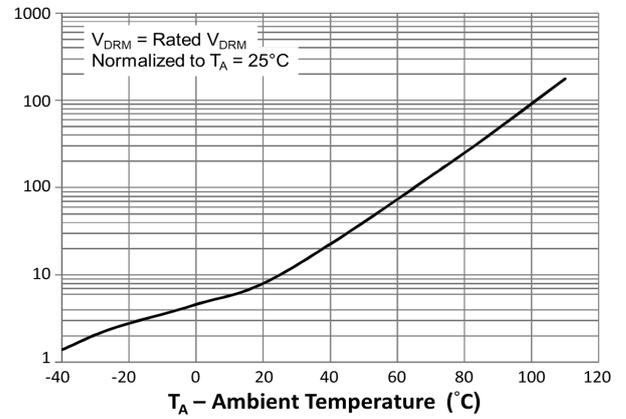


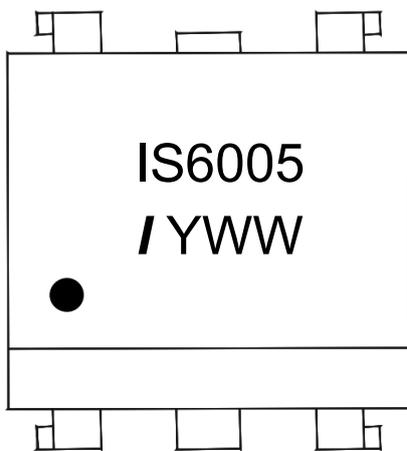
Fig 8 Normalized Peak Off-State Current vs Ambient Temperature

**ORDER INFORMATION**

IS6005 / IS6010 / IS6015			
After PN	PN	Description	Packing quantity
None	IS6005, IS6010, IS6015	Standard DIP6	65 pcs per tube
G	IS6005G, IS6010G, IS6015G	10mm Lead Spacing	65 pcs per tube
SM	IS6005SM, IS6010SM IS6015SM	Surface Mount	65 pcs per tube
SMT&R	IS6005SMT&R, IS6010SMT&R IS6015SMT&R	Surface Mount Tape & Reel	1000 pcs per reel

**DEVICE MARKING**

Example : IS6005



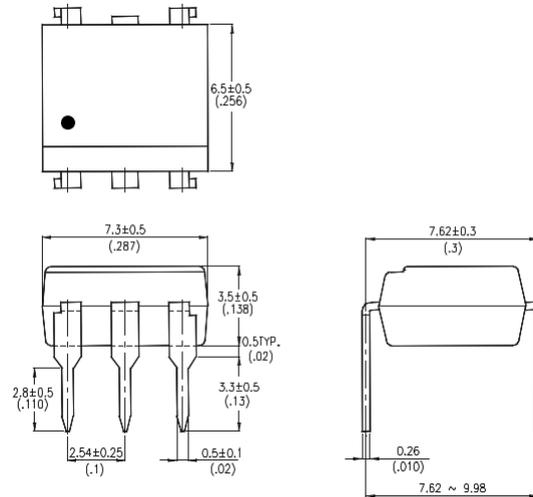
IS6005      denotes Device Part Number  
 /            denotes Isocom  
 Y            denotes 1 digit Year code  
 WW         denotes 2 digit Week code



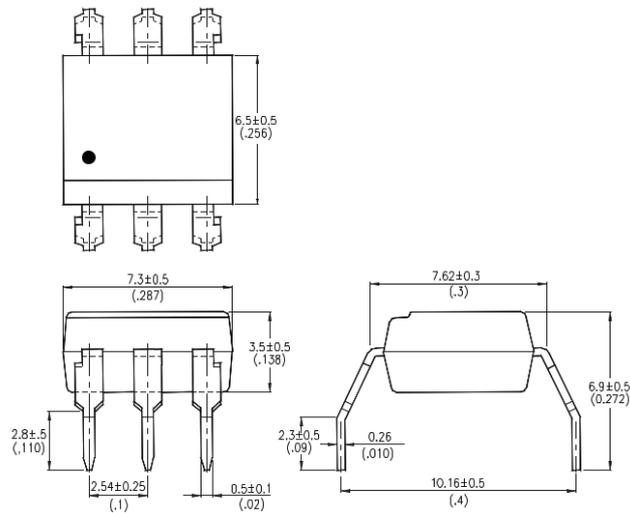
**IS6005 / IS6010 / IS6015**

**PACKAGE DIMENSIONS in mm (inch)**

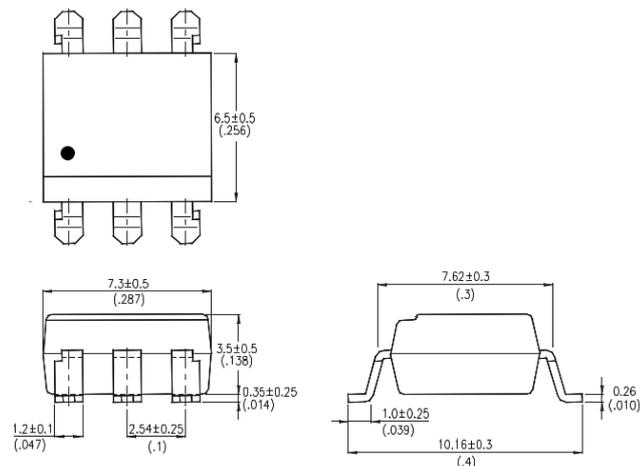
**DIP**



**G Form**

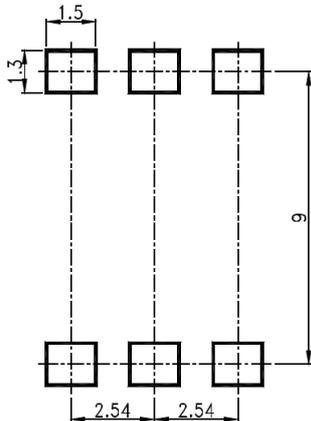


**SMD**

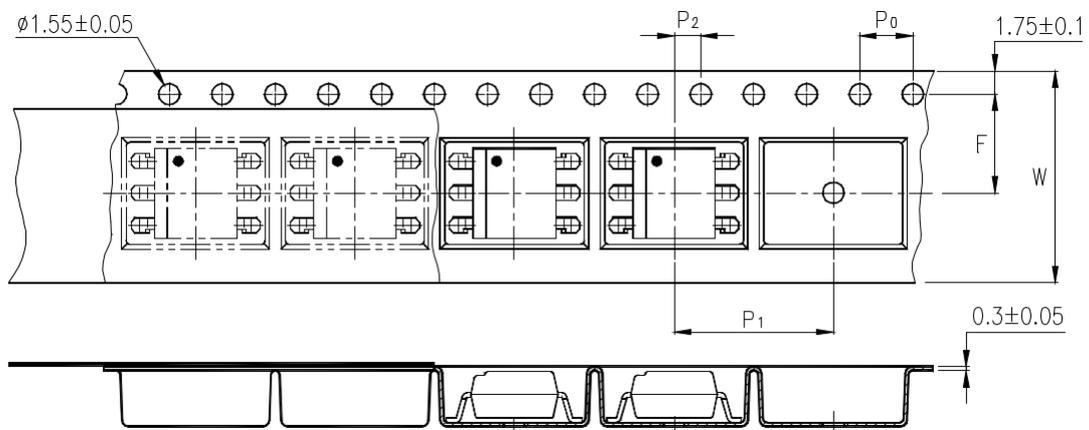




**RECOMMENDED PAD LAYOUT FOR SMD (mm)**



**TAPE AND REEL PACKAGING**

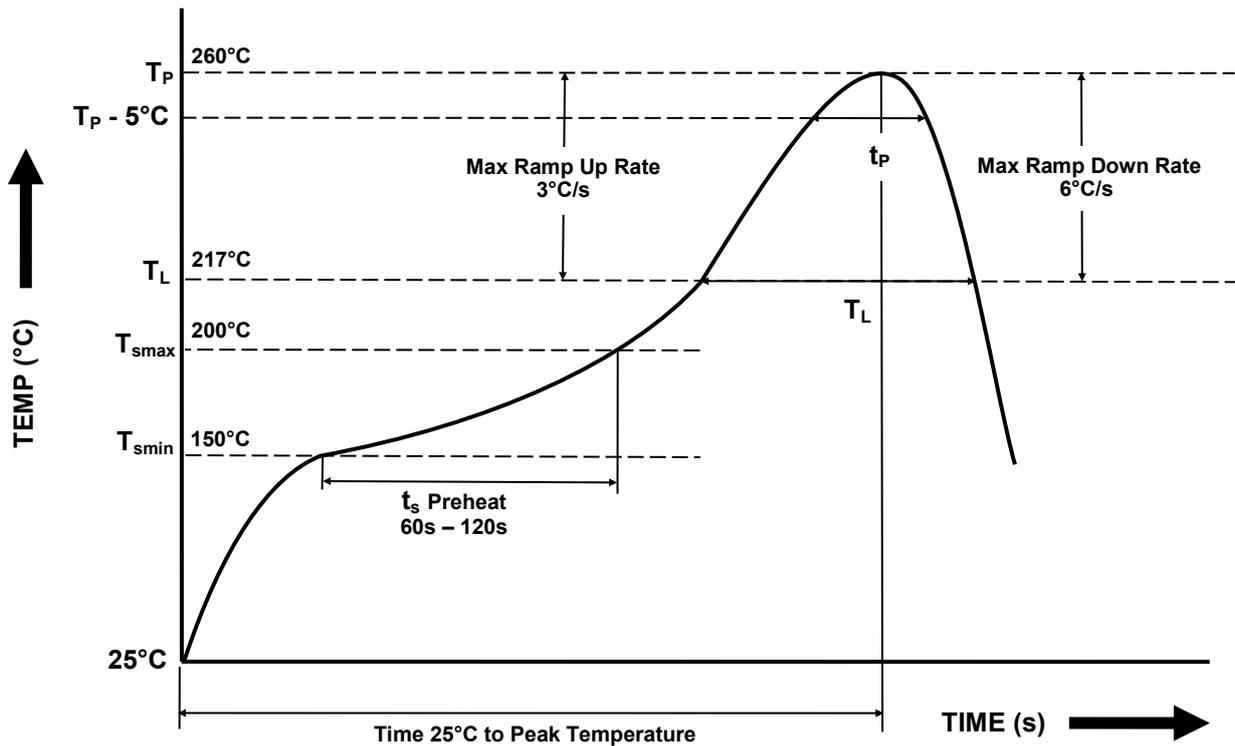


Description	Symbol	Dimension mm (inch)
Tape Width	W	16 ± 0.3 (0.63)
Pitch of Sprocket Holes	P <sub>0</sub>	4 ± 0.1 (0.15)
Distance of Compartment to Sprocket Holes	F	7.5 ± 0.1 (0.295)
	P <sub>2</sub>	2 ± 0.1 (0.079)
Distance of Compartment to Compartment	P <sub>1</sub>	12 ± 0.1 (0.472)



**IR REFLOW SOLDERING TEMPERATURE PROFILE**

Note : One Time Reflow Soldering is Recommended.  
Do Not Immerse Device Body in Solder Paste.



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 ( $T_P$ ) - Time at Peak Temperature - 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 10s max 217°C 30s max 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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