



IS3051 / IS3052

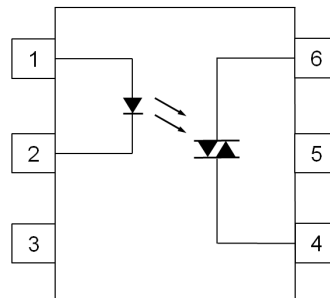


DESCRIPTION

The IS3051 and IS3052 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. The IS3051 and IS3052 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/ μ s)
- High Isolation Voltage between Input and Output V_{iso} : 5000Vrms
- Lead Free and RoHS Compliant
- UL File No. E91231
- VDE File No. 40028086

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 Suffix "X" for VDE Approval
- 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 |

Output

| | |
|---|-------|
| Peak Repetitive Surge Current (Pulse width = 1ms, 120pps) | 1A |
| Off State Output Terminal Voltage | 600V |
| Power Dissipation | 300mW |

Total Package

| | |
|----------------------------------|----------------------|
| Isolation Voltage | 5000V _{RMS} |
| Total Power Dissipation | 330mW |
| Operating Temperature | -40 to 100 °C |
| Storage Temperature | -55 to 150 °C |
| Lead Soldering Temperature (10s) | 260°C |

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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 | 1.5 | V |
| Reverse Current | I_R | $V_R = 6\text{V}$ | | 0.05 | 10 | μA |

OUTPUT

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

COUPLED

| Parameter | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|-----------------|---|-----|------|----------|---------------|
| Input Trigger Current Either Direction | I_{FT} | $V_{\text{TM}} = 3\text{V}$ Note 2 IS3051 IS3052 | | | 15 10 | mA |
| Holding Current Either Direction | I_{H} | | | 200 | | μA |

ISOLATION

| Parameter | Symbol | Test Condition | Min | Typ. | Max | Unit |
|--------------------|------------------|-------------------------------------|------|------|-----|------------------|
| Insulation Voltage | V_{ISO} | AC 1 minute, RH 40 to 60% Note 3 | 5000 | | | V_{RMS} |

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_{FT} ,
recommended I_F lies between Rated I_{FT} to Absolute Max I_F .

Note 3 : Measured with input leads shorted together and output leads shorted together.

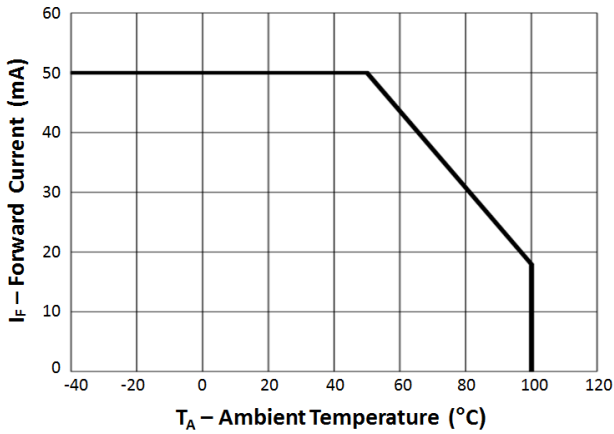


Fig 1 Forward Current vs Ambient Temperature

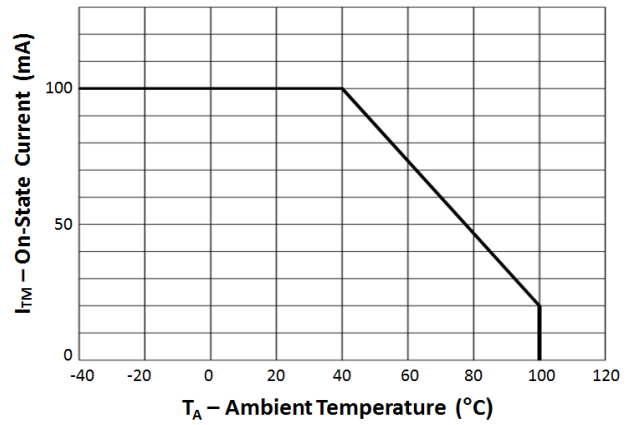


Fig 2 On-State Current vs Ambient Temperature

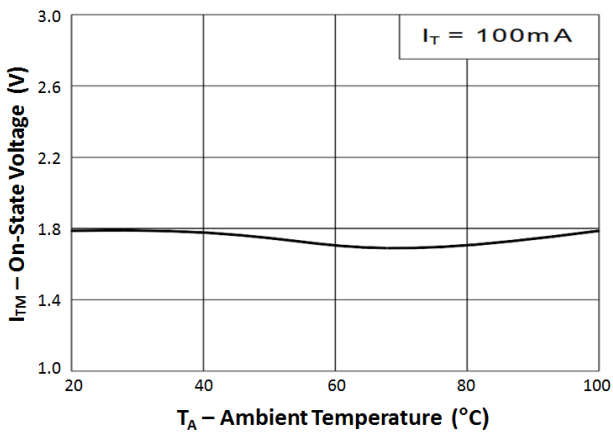


Fig 3 On-State Voltage vs Ambient Temperature

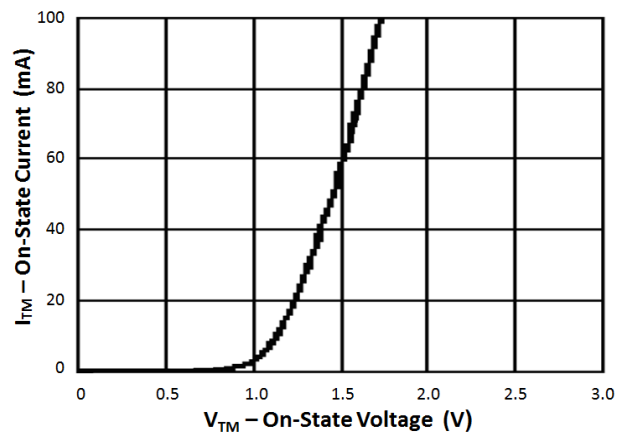


Fig 4 On-State Current vs On-State Voltage

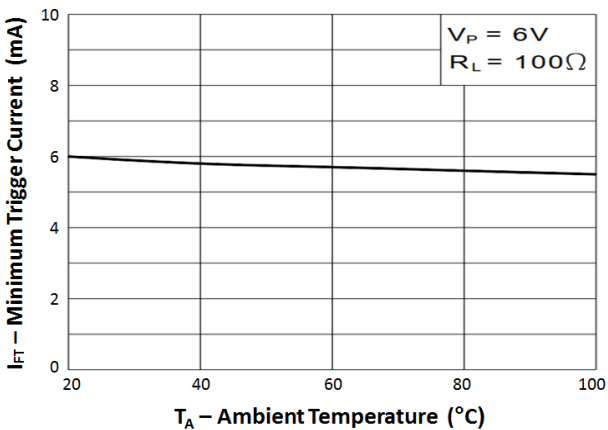


Fig 5 Minimum Trigger Current vs Ambient Temperature

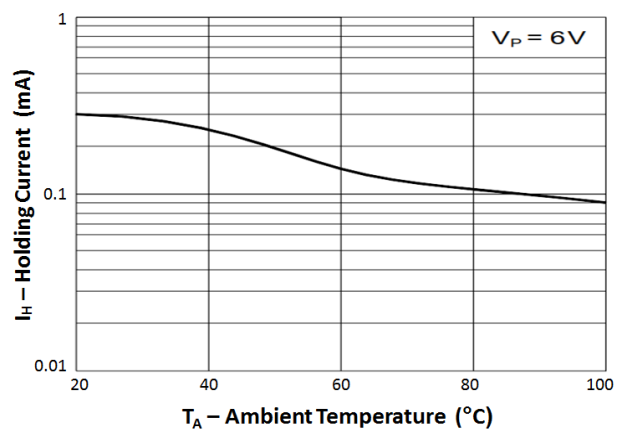


Fig 6 Holding Current vs Ambient Temperature

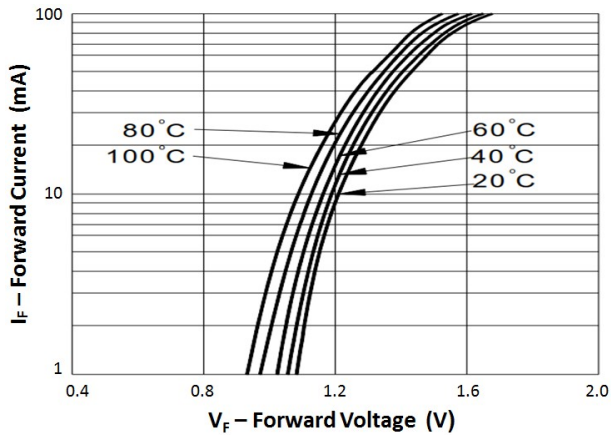


Fig 7 Forward Current vs Forward Voltage

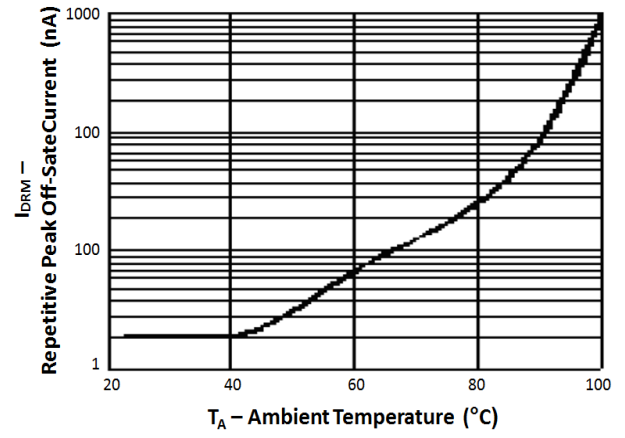


Fig 8 Repetitive Peak Off-State Current vs Ambient Temperature



IS3051 / IS3052

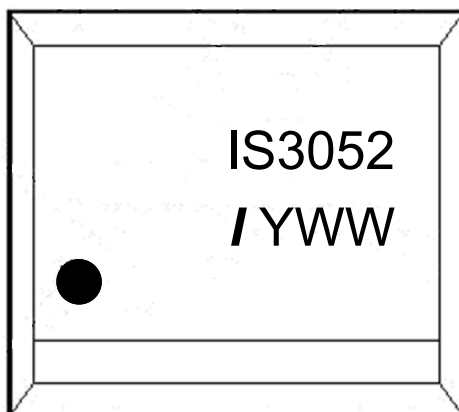
ORDER INFORMATION

| IS3051 / IS3052 (UL Approval) | | | |
|-------------------------------|--------------------------|---------------------------|-------------------|
| After PN | PN | Description | Packing quantity |
| None | IS3051, IS3052 | Standard DIP6 | 65 pcs per tube |
| G | IS3051G, IS3052G | 10mm Lead Spacing | 65 pcs per tube |
| SM | IS3051SM, IS3052SM | Surface Mount | 65 pcs per tube |
| SMT&R | IS3051SMT&R, IS3052SMT&R | Surface Mount Tape & Reel | 1000 pcs per reel |

| IS3051X / IS3052X (UL Approval and VDE Approvals) | | | |
|---|-------------------------------|---------------------------|-------------------|
| After PN | PN | Description | Packing quantity |
| None | IS3051X, IS3052X | Standard DIP6 | 65 pcs per tube |
| G | IS3051XG, IS3052XG | 10mm Lead Spacing | 65 pcs per tube |
| SM | IS3051XSM, IS3052XSM | Surface Mount | 65 pcs per tube |
| SMT&R | IS3051XSMT&R, IS3052XSMT&R | Surface Mount Tape & Reel | 1000 pcs per reel |

DEVICE MARKING

Example : IS3052



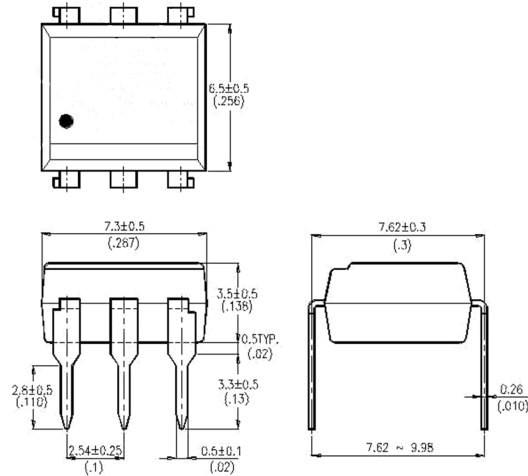
- IS3052 denotes Device Part Number
- / denotes Isocom
- Y denotes 1 digit Year code
- WW denotes 2 digit Week code



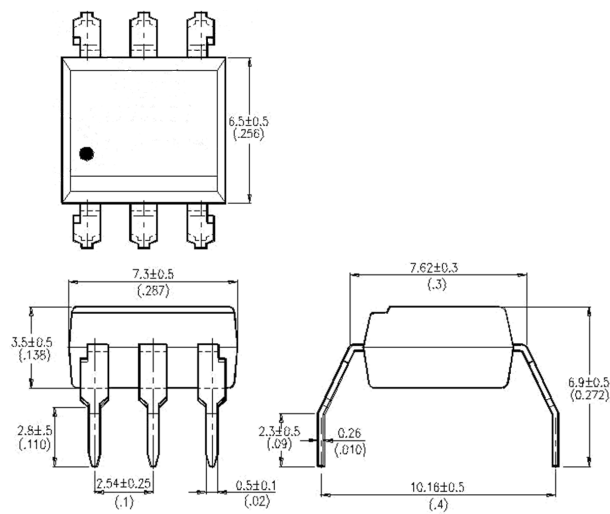
IS3051 / IS3052

PACKAGE DIMENSIONS in mm (inch)

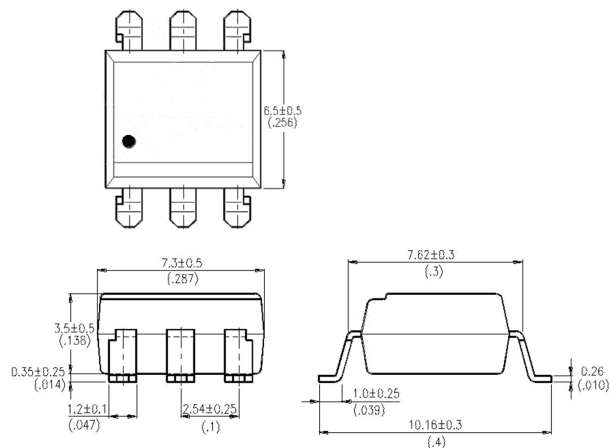
DIP



G Form

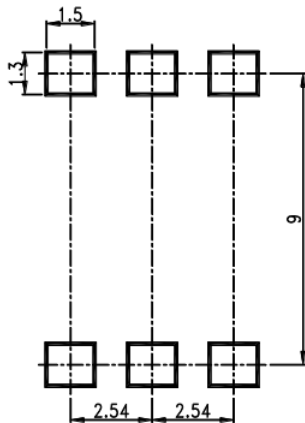


SMD

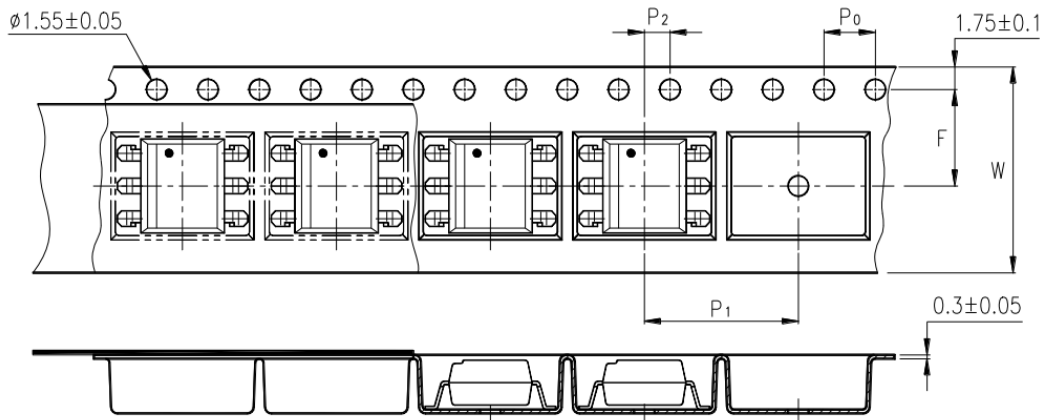




RECOMMENDED PAD LAYOUT FOR SMD (mm)



TAPE AND REEL PACKAGING

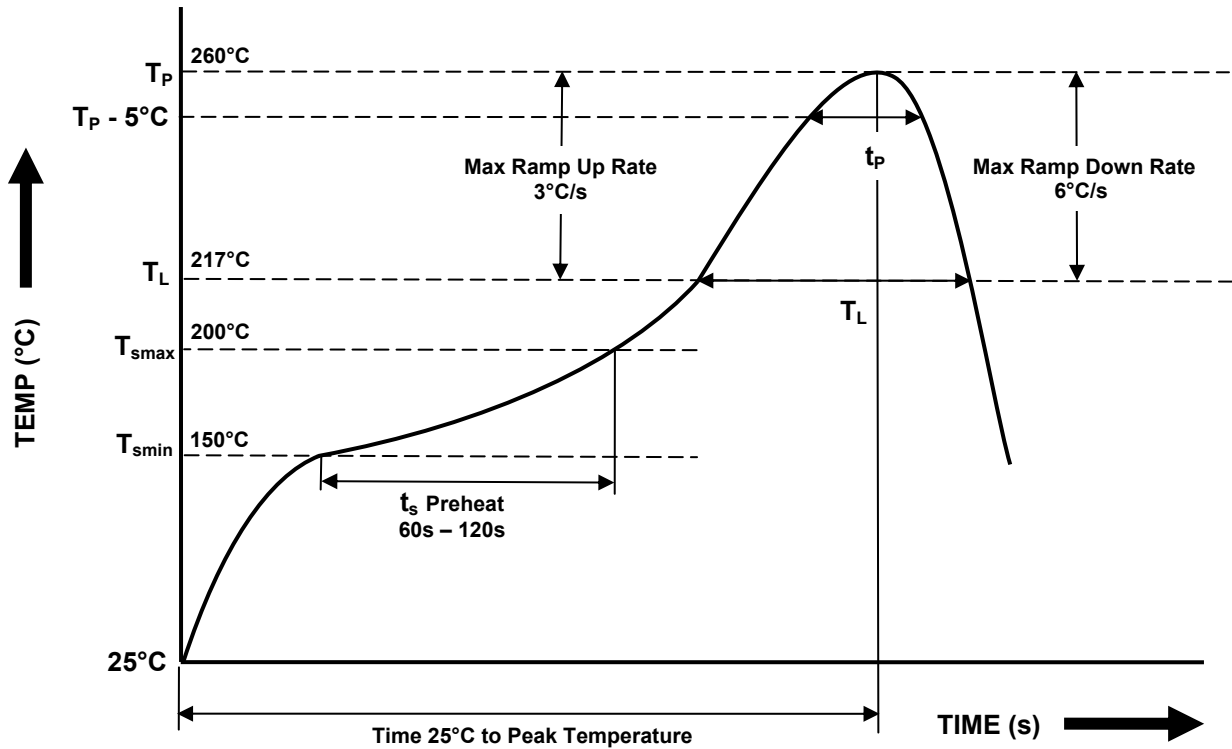


| Description | Symbol | Dimension mm (inch) |
|---|--------|------------------------|
| Tape Width | W | 16 ± 0.3 (0.63) |
| Pitch of Sprocket Holes | P_0 | 4 ± 0.1 (0.15) |
| Distance of Compartment to Sprocket Holes | F | 7.5 ± 0.1 (0.295) |
| | P_2 | 2 ± 0.1 (0.079) |
| Distance of Compartment to Compartment | P_1 | 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 |
|---|--|
| 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) - Time at Peak Temperature - Liquidous Temperature (T_L) - Time within 5°C of Actual Peak Temperature ($T_P - 5^\circ C$) - 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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