Surface Mount - 50 - 800V > 2N6400

2N6400

ittelfuse

Expertise Applied | Answers Delivered



Description

Designed primarily for half-wave ac control applications, such as motor controls, heating controls and power supplies; or wherever half-wave silicon gate-controlled, solid-state devices are needed.

Features

- Glass Passivated Junctions for Greater Parameter Uniformity and Stability
- Small, Rugged, Thermowatt Construction for Low Thermal Resistance, High Heat Dissipation and Durability
- Blocking Voltage to 800 V
- These are Pb-Free devices

Functional Diagram



Additional Information



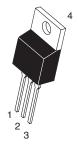




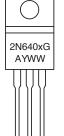
Samples

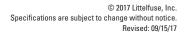
Po

Pin Out



TO-220AB CASE 221A STYLE 3







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| Maximum Ratings † ($T_J = 25^{\circ}C$ unless otherwise noted) | | | | |
|--|--------------------|-------------------|-------|------|
| Rating Part Number | | | Value | Unit |
| | 2N6400 | | 50 | |
| | 2N6401 | | 100 | |
| Peak Repetitive Off-State Voltage (Note 1) | 2N6402 | V _{drm,} | 200 | V |
| $(T_{J} = -40 \text{ to } 110^{\circ}\text{C}, \text{ Sine Wave, 50 to 60 Hz, Gate Open})$ | 2N6403 | V _{RRM} | 400 | v |
| | 2N6404 | | 600 | |
| | 2N6405 | | 800 | |
| On-State RMS Current (180° Conduction Angles; T _c = 100°C) | | | 16 | A |
| Average On-State RMS Current (180° Conduction Angles; T _c = 100°C) | | | 10 | A |
| Peak Non–Repetitive Surge Current (1/2 Cycle, Sine Wave, 60 Hz, T _J = 90°C) | | | 160 | A |
| Circuit Fusing Considerations (t = 8.3 ms) | | | 145 | A²s |
| Forward Peak Gate Power (Pulse Width \leq 1.0 $\mu s,T_{c}$ = 100° | P _{GM} | 20 | W | |
| Forward Average Gate Power (t = 8.3 ms, $T_c = 100^{\circ}C$) | P _{G(AV)} | 0.5 | W | |
| Forward Peak Gate Current (Pulse Width \leq 1.0 $\mu s, T_c$ = 100 | I _{GM} | 2.0 | A | |
| Operating Junction Temperature Range | TJ | -40 to +125 | °C | |
| Storage Temperature Range | T _{stg} | -40 to +125 | °C | |

†Indicates JEDEC Registered Data

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.

Maximum Ratings † ($T_1 = 25^{\circ}C$ unless otherwise noted)

| Rating | Symbol | Value | Unit |
|--|------------------|-------|------|
| Thermal Resistance, Junction-to-Case | R _{eJC} | 1.5 | °C/W |
| Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds | TL | 260 | °C |

† Indicates JEDEC Registered Data



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Electrical Characteristics - **OFF** ($T_c = 25^{\circ}C$ unless otherwise noted)

| Characteristic | | Symbol | Min | Тур | Max | Unit |
|--|------------------------|--------------------|-----|-----|-----|------|
| †Peak Repetitive Blocking Current ($V_{AK} = V_{DRM} = V_{RRM}$; Gate Open) | $T_{J} = 25^{\circ}C$ | l _{DRM} , | - | - | 1.0 | μA |
| | T _J = 125°C | I _{RRM} | - | - | 2.0 | mA |

Electrical Characteristics - ON

| Characteristic | | | Min | Тур | Max | Unit |
|---|-------------------------|------------------|-----|-----|-----|------|
| †Peak Forward On–State Voltage ($I_{TM} = 32 \text{ A Peak}$, Pulse Width $\leq 1 \text{ ms}$, Duty Cycle $\leq 2\%$) | | V _{TM} | _ | _ | 1.7 | V |
| †Gate Trigger Voltage (Continuous DC), All Quadrants | $T_c = 25^{\circ}C$ | | - | 9.0 | 30 | mA |
| (Continuous dc) (V_{_{\rm D}} = 12 Vdc, R_{_{\rm L}} = 100 Ω) | $T_c = -40^{\circ}C$ | GT | - | _ | 60 | |
| | $T_c = 25^{\circ}C$ | | _ | 0.7 | 1.5 | V |
| †Gate Trigger Voltage (Continuous dc) (V $_{\rm D}$ = 12 Vdc, R $_{\rm L}$ = 100 Ω) | $T_c = -40^{\circ}C$ | V _{GT} | - | - | 2.5 | |
| Gate Non–Trigger Voltage ($V_D = 12$ Vdc, $R_L = 100 \Omega$) $T_C = +125^{\circ}C$ | | V _{gD} | 0.2 | - | - | V |
| | $T_c = 25^{\circ}C$ | | - | 18 | 40 | mA |
| †Holding Current (V_{D} = 12 Vdc, Initiating Current = 200 mA, Gate Open) | $T_c = -40^{\circ}C$ | I _H | - | _ | 60 | |
| Turn-On Time ($I_{TM} = 12 \text{ A}, I_{GT} = 40 \text{ mAdc}, V_{D} = \text{Rated } V_{DRM}$) | | t _{gt} | - | 1.0 | _ | μs |
| | $T_c = 25^{\circ}C$ | - t _q | - | 15 | - | μs |
| Turn-Off Time (I _{TM} = 16 A, IR = 16 A, VD = Rated V _{DRM}) | T _J = +125°C | | _ | 35 | - | |

†Indicates JEDEC Registered Data

Dynamic Characteristics

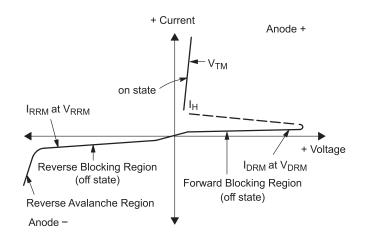
| Characteristic | | Symbol | Min | Тур | Max | Unit |
|--|-------------------------|----------|-----|-----|-----|------|
| Critical Rate–of–Rise of Off-State Voltage ($V_{D} = Rated V_{DRM'}$ Exponential Waveform) | T _J = +125°C | dv/dt(c) | _ | 50 | _ | V/µs |



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Voltage Current Characteristic of SCR

| Symbol | Parameter |
|------------------|---|
| V _{drm} | Peak Repetitive Forward Off State Voltage |
| I _{DRM} | Peak Forward Blocking Current |
| V _{RRM} | Peak Repetitive Reverse Off State Voltage |
| I _{RRM} | Peak Reverse Blocking Current |
| V _{TM} | Maximum On State Voltage |
| I _H | Holding Current |



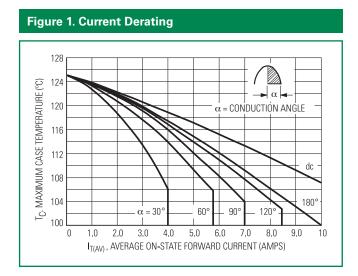
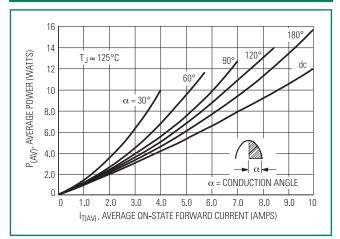


Figure 2. Maximum On-State Power Dissipation





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Figure 3. On–State Characteristics

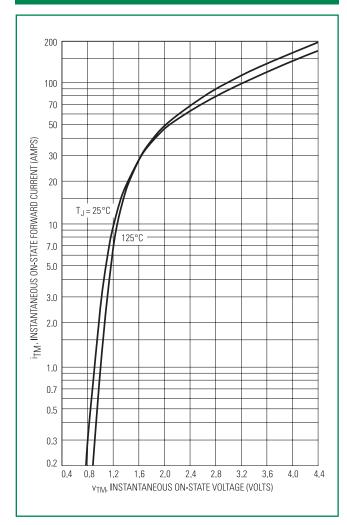


Figure 4. Maximum Non-Repetitive Surge Current

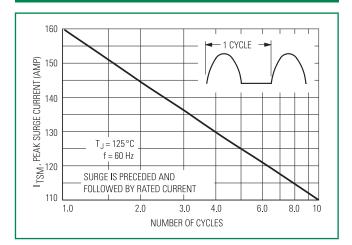
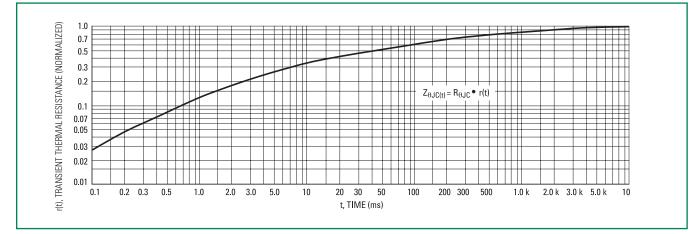


Figure 5. Thermal Response





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Typical Characteristics

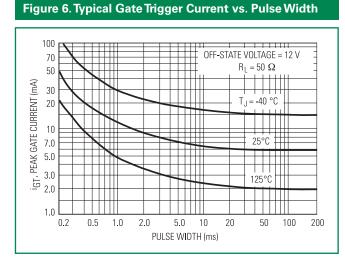


Figure 8. Typical Gate Trigger Voltage vs. Junction Temperature

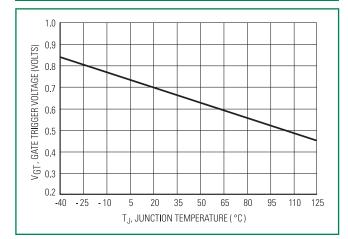


Figure 7. Typical Gate Trigger Current vs. Junction Temperature

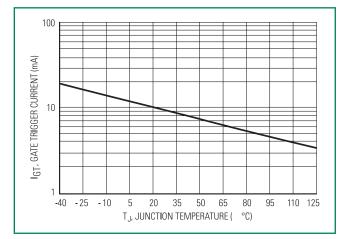


Figure 9. Typical Holding Current vs. Junction Temperature

