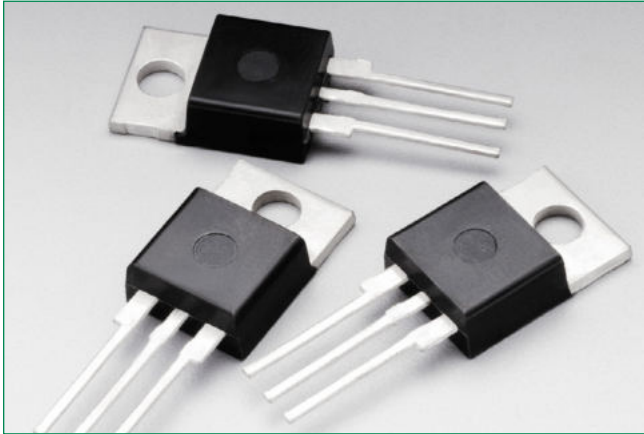


2N6394

Surface Mount – 50 - 800V



Description

The 2N6394 is designed primarily for half-wave AC control applications, such as motor controls, heating controls and power supplies.

Features

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

Additional Information



Resources

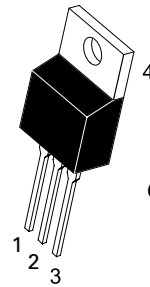
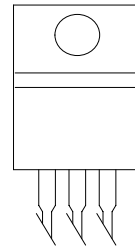


Accessories

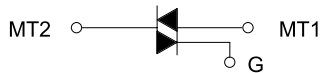


Samples

Pin Out

TO-220AB
CASE 221A
STYLE 4

Functional Diagram



2N6394

Surface Mount – 50 - 800V

Maximum Ratings † (T_J = 25°C unless otherwise noted)

| Rating | Symbol | Value | Unit |
|------------------------------------------------------------------------------------------------------------------|----------------------|-------------|------------------|
| Peak Repetitive Off-State Voltage (Note 1) (T _J = -40 to 110°C, Sine Wave, 50 to 60 Hz, Gate Open) | 2N6394 | 50 | V |
| | 2N6395 | 100 | |
| | 2N6397 | 400 | |
| | 2N6399 | 800 | |
| On-State RMS Current (180° Conduction Angles; T _C = 90°C) | I _{T (RMS)} | 12 | A |
| Peak Non-Repetitive Surge Current (1/2 Cycle, Sine Wave, 60 Hz, T _J = 90°C) | I _{TSM} | 100 | A |
| Circuit Fusing Considerations (t = 8.3 ms) | I _{2t} | 40 | A ² s |
| Forward Peak Gate Power (Pulse Width ≤ 1.0 μs, T _C = 90°C) | P _{GM} | 20 | W |
| Forward Average Gate Power (t = 8.3 ms, T _C = 90°C) | P _{G(AV)} | 0.5 | W |
| Forward Peak Gate Current (Pulse Width ≤ 1.0 μs, T _C = 90°C) | I _{GM} | 2.0 | A |
| Operating Junction Temperature Range | T _J | -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.

Thermal Characteristics

| Rating | Symbol | Value | Unit |
|--------------------------------------------------------------------------------|------------------|-------|------|
| † Thermal Resistance, Junction to Case | R _{θJC} | 2.0 | °C/W |
| Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds | T _L | 260 | °C |

† Indicates JEDEC Registered Data.

Electrical Characteristics - OFF (T_C = 25°C unless otherwise noted; Electricals apply in both directions)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---------------------------------------------------------------------------------------------------------|--------------------------------------|-----|-----|-----|------|
| *Peak Repetitive Blocking Current (V _D = V _{DRM} = V _{RRM} ; Gate Open) | I _{DRM} I _{RRM} | - | - | 1.0 | μA |
| | | - | - | 2.0 | mA |

Electrical Characteristics - ON (T_C = 25°C unless otherwise noted; Electricals apply in both directions)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------|-----|-----|------|
| †Peak Forward On-State Voltage (Note 2) (I _{TM} = 24 A Peak) | V _{TM} | - | 1.7 | 2.2 | V |
| †Gate Trigger Voltage (Continuous DC), All Quadrants (Continuous dc) (V _D = 12 Vdc, R _L = 100 Ohms) | I _{GT} | - | 5.0 | 30 | mA |
| †Gate Trigger Voltage (Continuous dc) (V _D = 12 Vdc, R _L = 100 Ohms) | V _{GT} | - | 0.7 | 1.5 | V |
| Gate Non-Trigger Voltage (V _D = 12 Vdc, R _L = 100 Ohms, T _J = 125°C) | V _{GD} | 0.2 | - | - | V |
| †Holding Current (V _D = 12 Vdc, Initiating Current = 200 mA, Gate Open) | I _H | - | 6.0 | 50 | mA |
| Turn-On Time (I _{TM} = 12 A, I _{GT} = 40 mAdc, V _D = Rated V _{DRM}) | t _{gt} | - | 1.0 | 2.0 | μs |
| Turn-Off Time (V _D = Rated V _{DRM}) | t _q | (I _{TM} = 12 A, I _R = 12 A) | - | 15 | μs |
| | | (I _{TM} = 12 A, I _R = 12 A, T _J = 125°C) | - | 35 | |

†Indicates JEDEC Registered Data

2. Pulse Test: Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

2N6394

Surface Mount – 50 - 800V

Dynamic Characteristics

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------------------------------------------------------------------------------------------------------------|------------|-----|-----|-----|-----------------|
| Critical Rate-of-Rise of Off-State Voltage Exponential ($V_D = \text{Rated } V_{DRM}, T_J = 125^\circ\text{C}$) | $dv/dt(c)$ | – | 50 | – | $V/\mu\text{s}$ |

Voltage Current Characteristic of Triacs (Bidirectional Device)

| 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 |

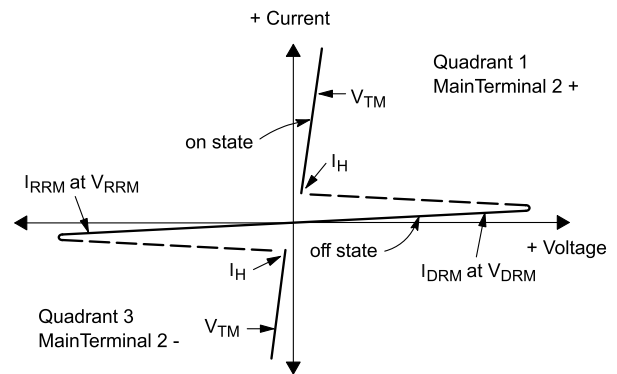


Figure 1. Current Derating

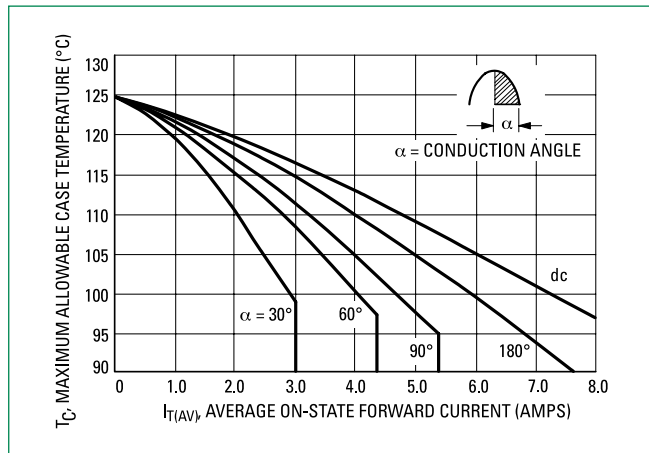
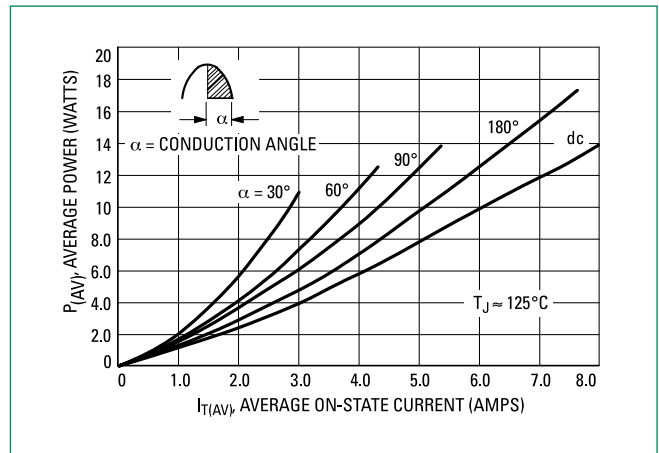


Figure 2. Maximum On-State Characteristics



2N6394

Surface Mount – 50 - 800V

Figure 3. On-State Characteristics

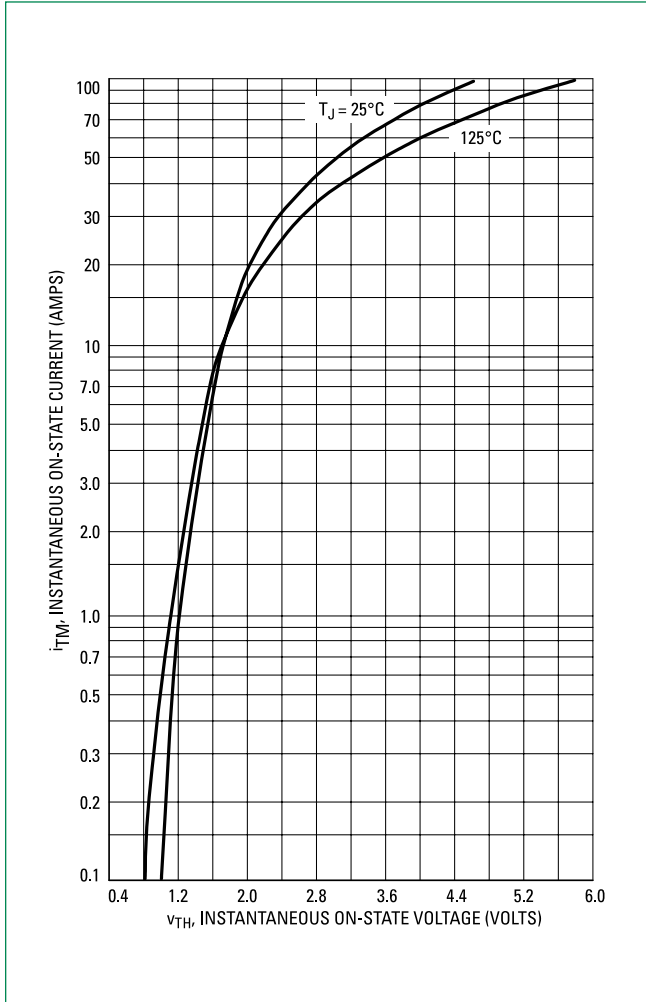


Figure 4. Maximum Non-Repetitive Surge Current

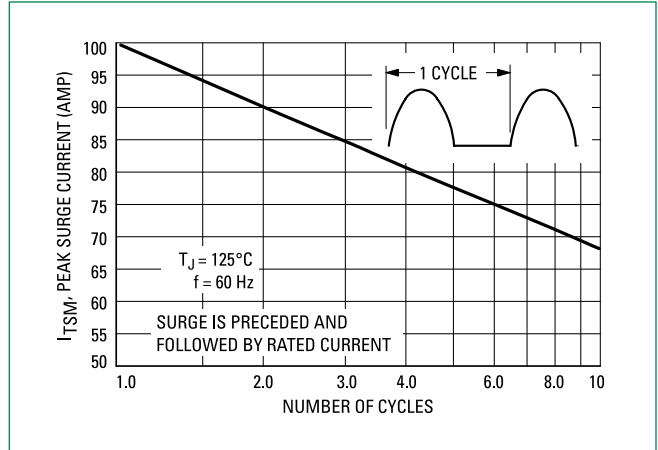
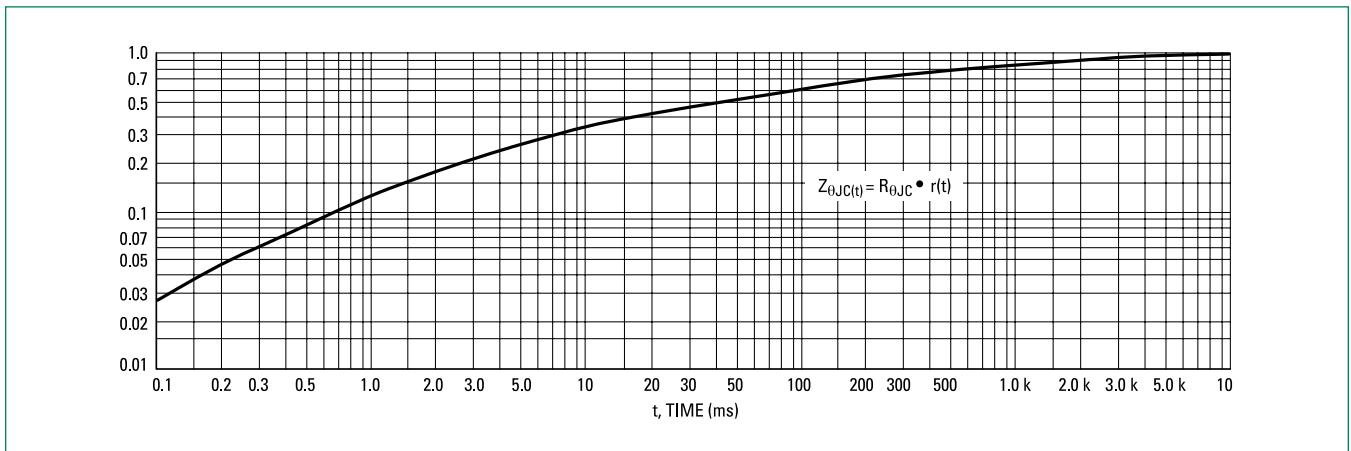


Figure 5. Typical Thermal Response



2N6394

Surface Mount – 50 - 800V

Typical Characteristics

Figure 6. Typical Gate Trigger Current vs. Pulse Width

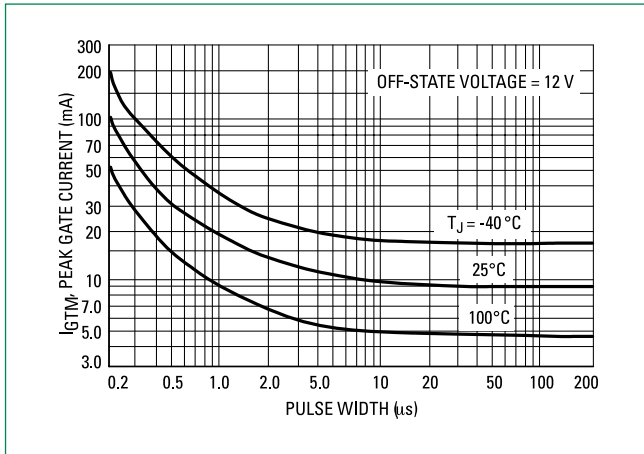


Figure 7. Typical Gate Trigger Current vs. Temperature

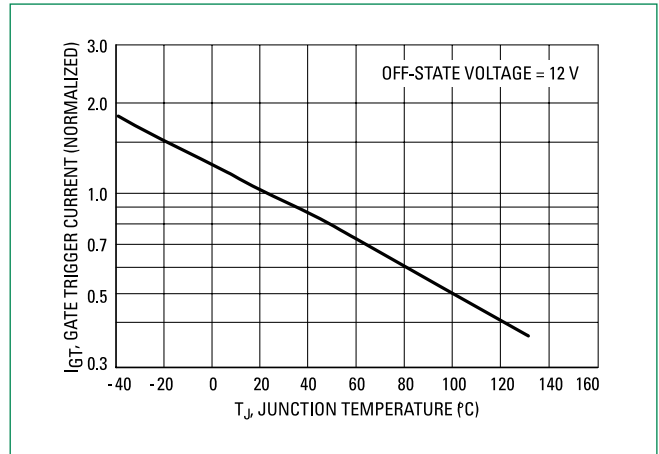


Figure 8. Typical Gate Trigger Voltage vs. Temperature

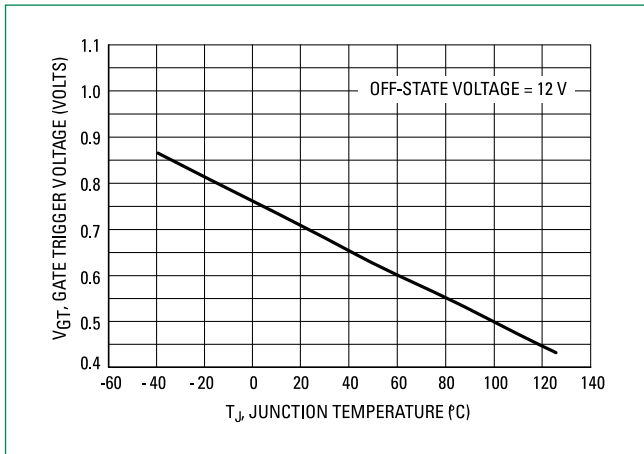
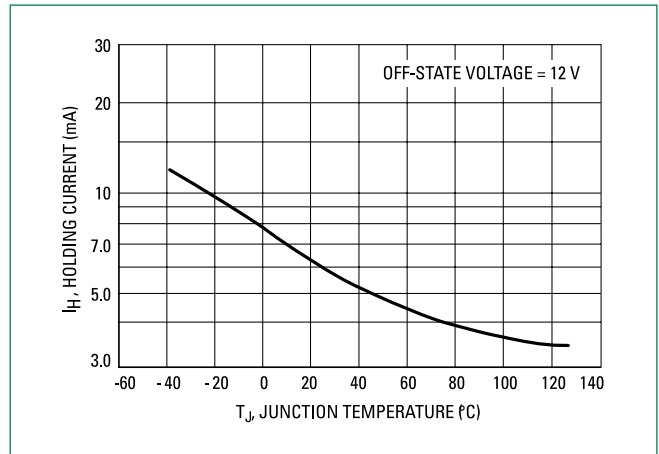


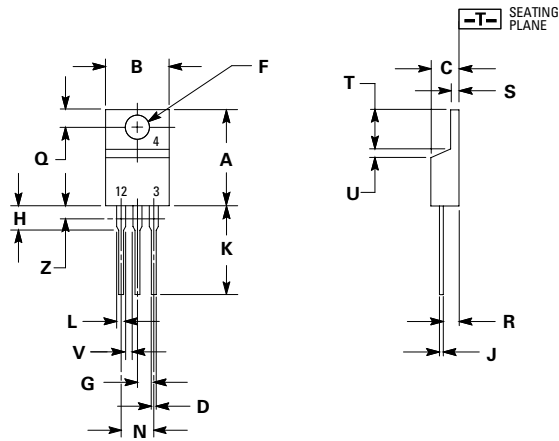
Figure 9. Typical Holding Current vs. Temperature



2N6394

Surface Mount – 50 - 800V

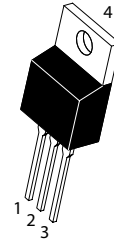
Dimensions



| Dim | Inches | | Millimeters | |
|-----|--------|-------|-------------|-------|
| | Min | Max | Min | Max |
| A | 0.590 | 0.620 | 14.99 | 15.75 |
| B | 0.380 | 0.420 | 9.65 | 10.67 |
| C | 0.178 | 0.188 | 4.52 | 4.78 |
| D | 0.025 | 0.035 | 0.64 | 0.89 |
| F | 0.142 | 0.147 | 3.61 | 3.73 |
| G | 0.095 | 0.105 | 2.41 | 2.67 |
| H | 0.110 | 0.130 | 2.79 | 3.30 |
| J | 0.018 | 0.024 | 0.46 | 0.61 |
| K | 0.540 | 0.575 | 13.72 | 14.61 |
| L | 0.060 | 0.075 | 1.52 | 1.91 |
| N | 0.195 | 0.205 | 4.95 | 5.21 |
| Q | 0.105 | 0.115 | 2.67 | 2.92 |
| R | 0.085 | 0.095 | 2.16 | 2.41 |
| S | 0.045 | 0.060 | 1.14 | 1.52 |
| T | 0.235 | 0.255 | 5.97 | 6.47 |
| U | 0.000 | 0.050 | 0.00 | 1.27 |
| V | 0.045 | — | 1.15 | — |
| Z | — | 0.080 | — | 2.04 |

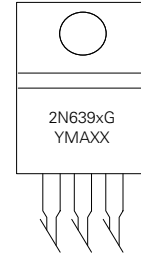
1. Dimensioning and tolerancing per ansi y14.5m, 1982.
2. Controlling dimension: inch.
3. Dimension z defines a zone where all body and lead irregularities are allowed.

Part Marking System



TO-220AB
CASE 221A
STYLE 12

x =D, M, or N
Y =Year
M =Month
A =Assembly Site
XX =Lot Serial Code
G =Pb-Free Package



| Pin Assignment | |
|----------------|---------|
| 1 | Cathode |
| 2 | Anode |
| 3 | Gate |
| 4 | Anode |

Ordering Information

| Device | Package | Shipping |
|----------|-----------------------|------------------|
| 2N6394G | TO-220AB (Pb-Free) | 1000 Units / Box |
| 2N6394TG | | 1000 Units / Box |
| 2N6395G | | 1000 Units / Box |
| 2N6397G | | 1000 Units / Box |
| 2N6397TG | | 1000 Units / Box |
| 2N6399G | | 1000 Units / Box |
| 2N6399TG | | 1000 Units / Box |

Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at <http://www.littelfuse.com/disclaimer-electronics>.