

# Reverse Blocking Triode Thyristors

... designed for industrial and consumer applications such as power supplies; battery chargers; temperature, motor, light and welder controls.

- Economical for a Wide Range of Uses
- High Surge Current —  $I_{TSM} = 350$  Amp
- Practical Level Triggering and Holding Characteristics —  
4 and 5.2 mA (Typ) @  $T_C = 25^\circ\text{C}$
- Rugged Construction in Either Pressfit, Stud or Isolated Stud Package

## MAXIMUM RATINGS ( $T_C = 100^\circ\text{C}$ unless otherwise noted.)

| Rating  | Symbol                       | Value                    | Unit                 |
|---|------------------------------|--------------------------|----------------------|
| *Peak Repetitive Forward or Reverse Blocking Voltage, Note 1<br>( $T_J = -40$ to $+100^\circ\text{C}$ , 1/2 Sine Wave, 50 to 400 Hz, Gate Open)<br>2N3870, 2N3896, 2N6171<br>2N3871, 2N3897, 2N6172<br>2N3872, 2N3898, 2N6173<br>2N3873, 2N3899, 2N6174 | $V_{RRM}$<br>or<br>$V_{DRM}$ | 100<br>200<br>400<br>600 | Volts                |
| *Peak Non-Repetitive Forward or Reverse Blocking Voltage ( $t \leq 5$ ms)<br>2N3870, 2N3896, 2N6171<br>2N3871, 2N3897, 2N6172<br>2N3872, 2N3898, 2N6173<br>2N3873, 2N3899, 2N6174   | $V_{RSM}$<br>or<br>$V_{DSM}$ | 150<br>330<br>660<br>700 | Volts                |
| *Average On-State Current, Note 2<br>( $T_C = -40$ to $+65^\circ\text{C}$ )<br>( $T_C = +85^\circ\text{C}$ )  | $I_{T(AV)}$                  | 22<br>11                 | Amps                 |
| *Peak Non-Repetitive Surge Current<br>(One cycle, 60 Hz) ( $T_C = +65^\circ\text{C}$ )  | $I_{TSM}$                    | 350                      | Amps                 |
| Circuit Fusing<br>( $T_C = -40$ to $+100^\circ\text{C}$ )<br>( $t = 1$ to 8.30 ms)  | $I^2t$                       | 510                      | $\text{A}^2\text{s}$ |

\* Indicates JEDEC Registered Data.

Notes: 1. Ratings apply for zero or negative gate voltage. Devices shall not have a positive bias applied to the gate concurrently with a negative potential on the anode. Devices should not be tested with constant current source for forward or reverse blocking capability such that the voltage applied exceeds the rated blocking voltage.

2. Isolated stud devices must be derated an additional 10 percent.

|                                       |                  |             |
|---------------------------------------|------------------|-------------|
| Peak Gate Voltage                     | V <sub>GM</sub>  | 10          |
| *Operating Junction Temperature Range | T <sub>J</sub>   | -40 to +100 |
| *Storage Temperature Range            | T <sub>stg</sub> | -40 to +150 |
| Stud Torque                           | —                | 30          |

\*Indicates JEDEC Registered Data.

### \*THERMAL CHARACTERISTICS

| Characteristic   | Symbol           | Max      |
|--|------------------|----------|
| Thermal Resistance, Junction to Case<br>2N3870 thru 2N3873, 2N3896 thru 2N3899<br>2N6171 thru 2N6174 | R <sub>θJC</sub> | 0.9<br>1 |

\* Indicates JEDEC Registered Data.

### ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted.)

| Characteristic  | Symbol                              |
|---|-------------------------------------|
| *Peak Forward or Reverse Blocking Current<br>(Rated V <sub>DRM</sub> or V <sub>RRM</sub> , gate open, T <sub>J</sub> = 100°C)<br>2N3870, 2N3896, 2N6171<br>2N3871, 2N3897, 2N6172<br>2N3872, 2N3898, 2N6173<br>2N3873, 2N3899, 2N6174<br>(Rated V <sub>DRM</sub> or V <sub>RRM</sub> , gate open, T <sub>J</sub> = 25°C)<br>All Devices | I <sub>DRM</sub> , I <sub>RRM</sub> |
| *Peak On-State Voltage<br>(I <sub>TM</sub> = 69 A Peak)   | V <sub>TM</sub>                     |
| *Gate Trigger Current (Continuous dc)<br>(V <sub>D</sub> = 12 V, R <sub>L</sub> = 24 ohms)  | I <sub>GT</sub>                     |
| *Gate Trigger Voltage (Continuous dc)<br>(V <sub>D</sub> = 12 V, R <sub>L</sub> = 24 ohms)  | V <sub>GT</sub>                     |
| *Holding Current (Gate Open)<br>(V <sub>D</sub> = 12 V, I <sub>TM</sub> = 200 mA)   | I <sub>H</sub>                      |
| *Gate Controlled Turn-On Time (t <sub>d</sub> + t <sub>r</sub> )<br>(I <sub>TM</sub> = 41 Adc, V <sub>D</sub> = rated V <sub>DRM</sub> ,<br>I <sub>GT</sub> = 40 mAdc, Rise Time ≤ 0.05 μs, Pulse Width = 10 μs)  | t <sub>gt</sub>                     |
| Circuit Commutated Turn-Off Time<br>(I <sub>TM</sub> = 10 A, I <sub>R</sub> = 10 A)<br>(I <sub>TM</sub> = 10 A, I <sub>R</sub> = 10 A, T <sub>C</sub> = 100°C)  | t <sub>q</sub>                      |
| Forward Voltage Application Rate<br>(T <sub>C</sub> = 100°C, V <sub>D</sub> = Rated V <sub>DRM</sub> )  | dv/dt                               |

\*Indicates JEDEC Registered Data.

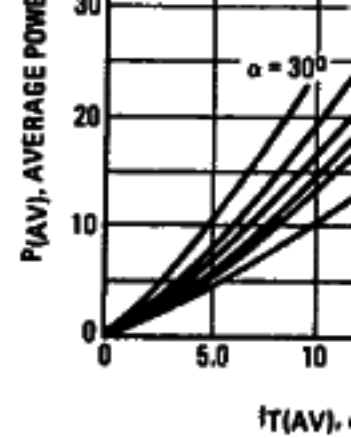
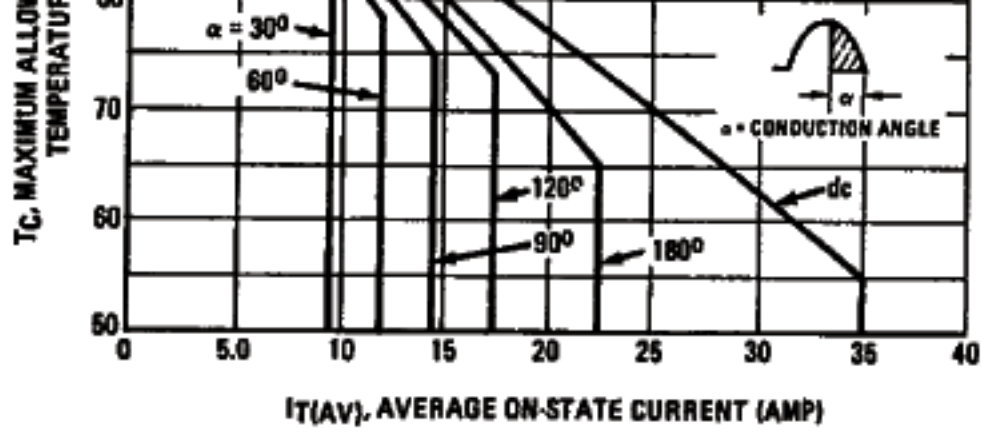
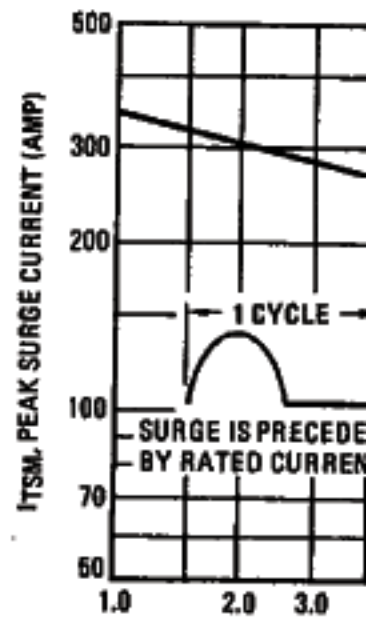
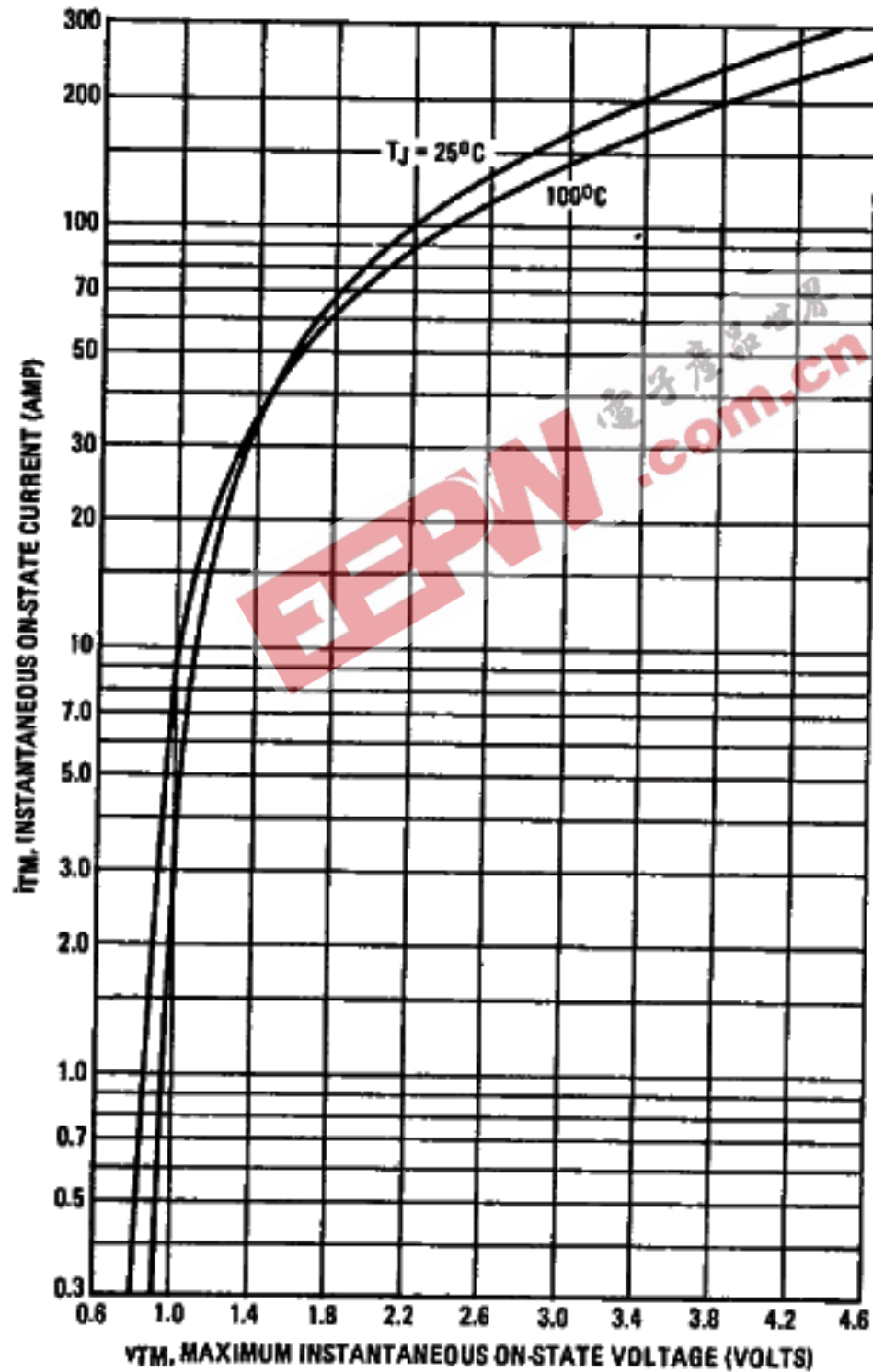


FIGURE 3 - ON-STATE CHARACTERISTICS

FIGURE



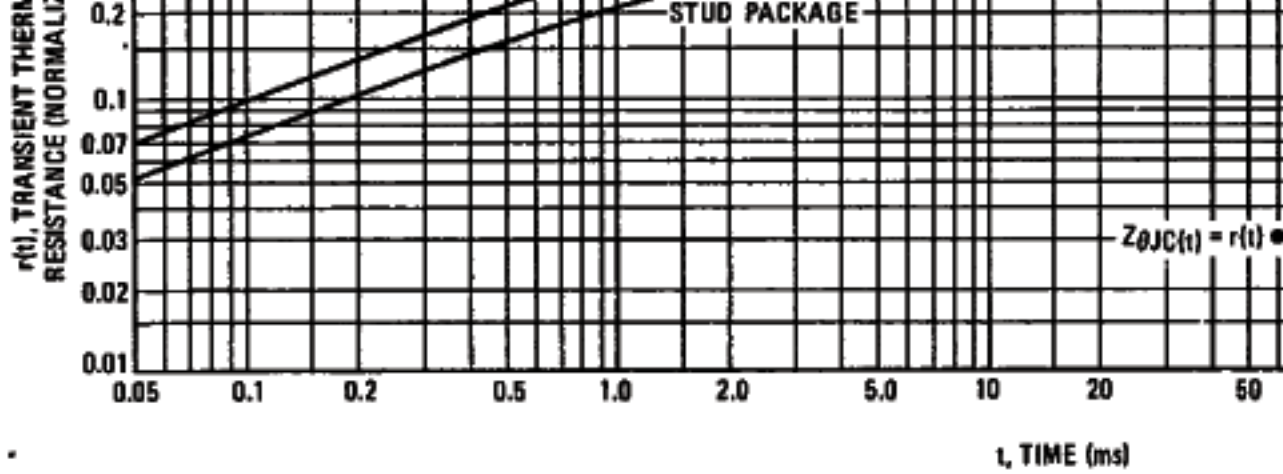


FIGURE 6 – PULSE TRIGGER CURRENT

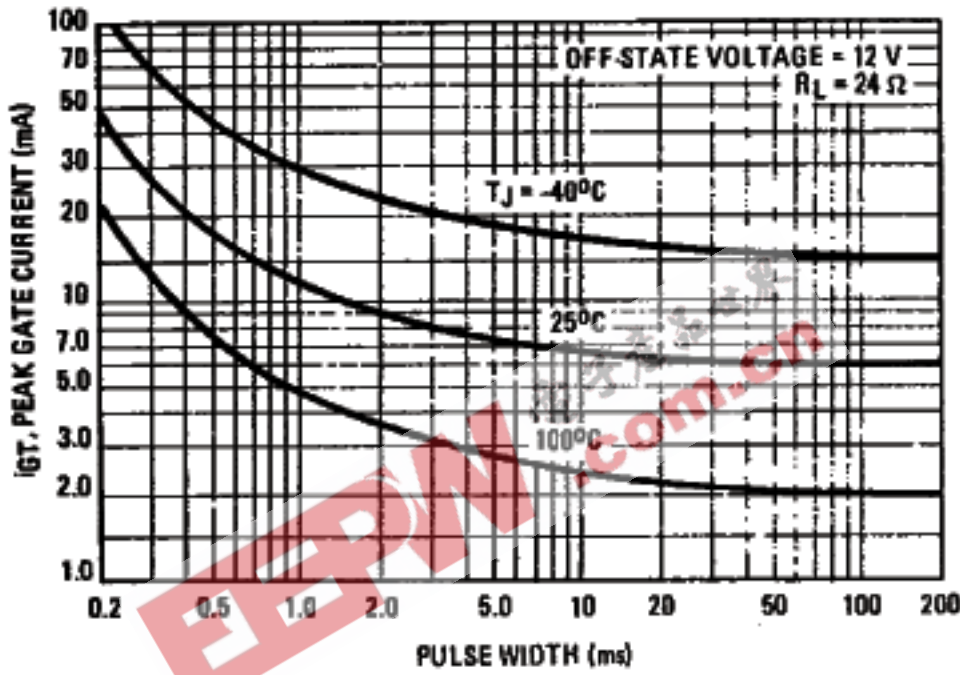
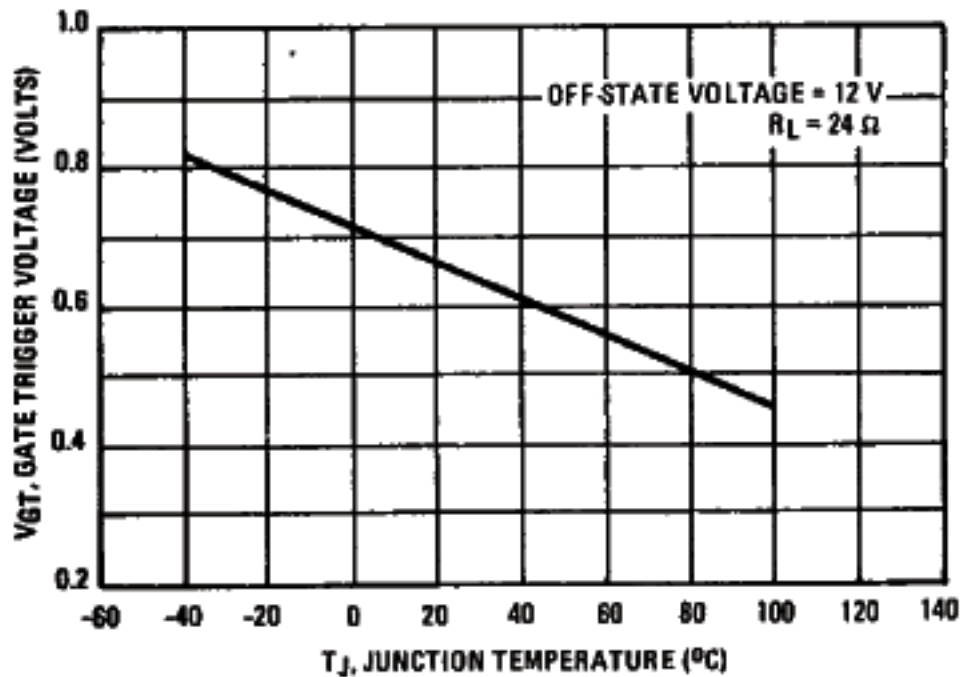


FIGURE 8 – GATE TRIGGER VOLTAGE



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