

DIGITRON SEMICONDUCTORS

2N3870-2N3873
2N3896-2N3899
2N6171-2N6174

SILICON CONTROLLED RECTIFIERS
REVERSE BLOCKING TRIODE THYRISTOR
35 AMPS RMS, 100-800 VOLTS

Available Non-RoHS (standard) or RoHS compliant (add PBF suffix).
Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.

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

| Rating | Symbol | Value | Unit |
|--|------------------------|--------------------------|---------------------------|
| Peak repetitive forward or reverse blocking voltage ⁽¹⁾ ($T_J = -40$ to 100°C , $\frac{1}{2}$ sine wave, 50-400 Hz, gate open) 2N3870, 2N3896, 2N6171 2N3871, 2N3897, 2N6172 2N3872, 2N3898, 2N6173 2N3873, 2N3899, 2N6174 | V_{RRM} or V_{DRM} | 100 200 400 600 | Volts |
| Peak non-repetitive forward or reverse blocking voltage ($t \leq 5\text{ms}$) 2N3870, 2N3896, 2N6171 2N3871, 2N3897, 2N6172 2N3872, 2N3898, 2N6173 2N3873, 2N3899, 2N6174 | V_{RSM} or V_{DSM} | 150 330 660 700 | Volts |
| Average on-state current ⁽²⁾ ($T_C = -40$ to 65°C) ($T_C = 85^\circ\text{C}$) | $I_{T(AV)}$ | 22 11 | Amps |
| Peak non-repetitive surge current (one cycle, 60Hz) ($T_C = 65^\circ\text{C}$) | I_{TSM} | 350 | Amps |
| Circuit fusing ($T_C = -40$ to 100°C) ($t = 1$ to 8.3ms) | I^2t | 510 | A^2s |
| Peak gate power | P_{GM} | 20 | Watts |
| Average gate power | $P_{G(AV)}$ | 0.5 | Watt |
| Peak forward gate current | I_{GM} | 2 | Amps |
| Peak gate voltage | V_{GM} | 10 | Volts |
| Operating junction temperature range | T_J | -40 to 100 | $^\circ\text{C}$ |
| Storage temperature range | T_{stg} | -40 to 150 | $^\circ\text{C}$ |
| Stud torque | - | 30 | In. lb. |
| Thermal resistance, junction to case 2N3870 - 2N3873, 2N3896-2N3899 2N6171-2N6174 | $R_{\theta JC}$ | 0.9 1 | $^\circ\text{C}/\text{W}$ |

Note 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 a constant current source for forward or reverse blocking capability such that the voltage applied exceeds the rated blocking voltage.

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

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic | Symbol | Min. | Typ. | Max. | Unit |
|---|-----------------------|------|------------------|--------------------------|---------------|
| Peak forward or reverse blocking current (Rated V_{DRM} or V_{RRM} , gate open, $T_J = 100^\circ\text{C}$) 2N3870, 2N3896, 2N6171 2N3871, 2N3897, 2N6172 2N3872, 2N3898, 2N6173 2N3873, 2N3899, 2N6174 | I_{DRM} , I_{RRM} | - | 1 1 1 1 | 2.0 2.5 3.0 4.0 | mA |
| Rated V_{DRM} or V_{RRM} , gate open, $T_J = 25^\circ\text{C}$ | | | | 10 | μA |
| All devices | | - | - | 10 | μA |

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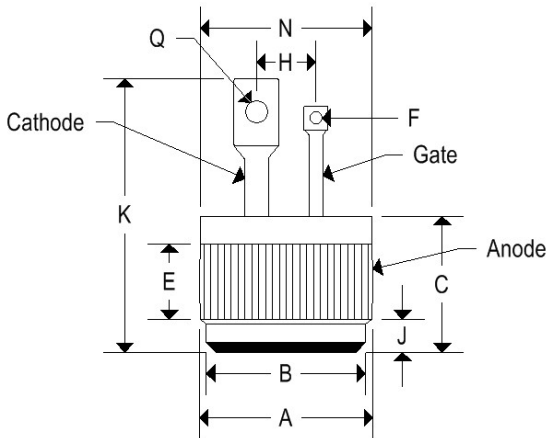
ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic | Symbol | Min. | Typ. | Max. | Unit |
|--|----------|------|------|------|------------------------|
| Peak on-state voltage ($I_{TM} = 69\text{A peak}$) | V_{TM} | - | 1.5 | 1.85 | Volts |
| Gate trigger current (continuous dc) ($V_D = 12\text{V}$, $R_L = 24\text{ohms}$) | I_{GT} | - | 9 | 80 | mA |
| | | - | 4 | 40 | |
| Gate trigger voltage (continuous dc) ($V_D = 12\text{V}$, $R_L = 24\text{ohms}$) | V_{GT} | - | 0.9 | 3 | Volts |
| | | - | 0.69 | 1.6 | |
| Holding current (gate open) ($V_D = 12\text{V}$, $I_{TM} = 200\text{mA}$) | I_H | - | 14 | 90 | mA |
| | | - | 5.2 | 50 | |
| Gate controlled turn-on time ($t_d + t_r$) ($I_{TM} = 41\text{Adc}$, $V_D = \text{rated } V_{DRM}$, $I_{GT} = 40\text{mAdc}$, Rise time $\leq 0.05\mu\text{s}$, pulse width = $10\mu\text{s}$) | t_{gt} | - | - | 1.5 | μs |
| Circuit commutated turn-off time ($I_{TM} = 10\text{A}$, $I_R = 10\text{A}$) ($I_{TM} = 10\text{A}$, $I_R = 10\text{A}$, $T_C = 100^\circ\text{C}$) | t_q | - | 25 | - | μs |
| | | - | 35 | - | |
| Forward voltage application rate ($T_C = 100^\circ\text{C}$, $V_D = \text{rated } V_{DRM}$) | dv/dt | - | 50 | - | $\text{V}/\mu\text{s}$ |

MECHANICAL CHARACTERISTICS

| 2N3870-2N3873 | |
|---------------|---------------|
| Case | DIGI PF2 |
| Marking | Alpha-numeric |
| Pin out | See below |

| | DIGI PF2 | | | |
|---|----------|-------|-------------|--------|
| | Inches | | Millimeters | |
| | Min | Max | Min | Max |
| A | 0.501 | 0.505 | 12.730 | 12.830 |
| B | 0.465 | 0.475 | 11.810 | 12.060 |
| C | 0.330 | 0.380 | 8.390 | 9.650 |
| E | 0.100 | - | 2.540 | - |
| F | 0.035 | 0.085 | 0.890 | 2.160 |
| H | 0.148 | 0.174 | 3.750 | 4.410 |
| J | 0.080 | 0.097 | 2.040 | 2.460 |
| K | - | 0.800 | - | 20.320 |
| N | - | 0.510 | - | 12.950 |
| Q | 0.065 | 0.160 | 1.650 | 4.060 |

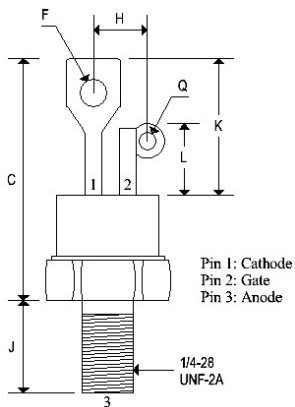
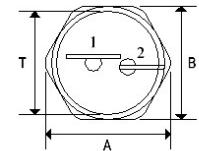


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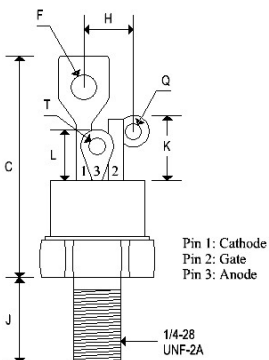
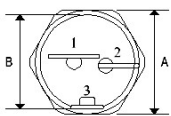
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| | |
|----------------------|---------------|
| 2N3896-2N3899 | |
| Case | TO-48 |
| Marking | Alpha-numeric |
| Pin out | See below |



| | TO-48 | | | |
|---|--------|-------|-------------|--------|
| | Inches | | Millimeters | |
| | Min | Max | Min | Max |
| A | 0.604 | 0.614 | 15.340 | 15.600 |
| B | 0.551 | 0.559 | 14.000 | 14.200 |
| C | 1.050 | 1.190 | 2.670 | 30.230 |
| F | 0.135 | 0.160 | 3.430 | 4.060 |
| H | - | 0.265 | - | 6.730 |
| J | 0.420 | 0.455 | 10.670 | 11.560 |
| K | 0.620 | 0.670 | 15.750 | 17.020 |
| L | 0.300 | 0.350 | 7.620 | 8.890 |
| Q | 0.055 | 0.085 | 1.400 | 2.160 |
| T | 0.501 | 0.505 | 12.730 | 12.830 |

| | |
|----------------------|---------------|
| 2N6171-2N6174 | |
| Case | TO-48 ISO |
| Marking | Alpha-numeric |
| Pin out | See below |

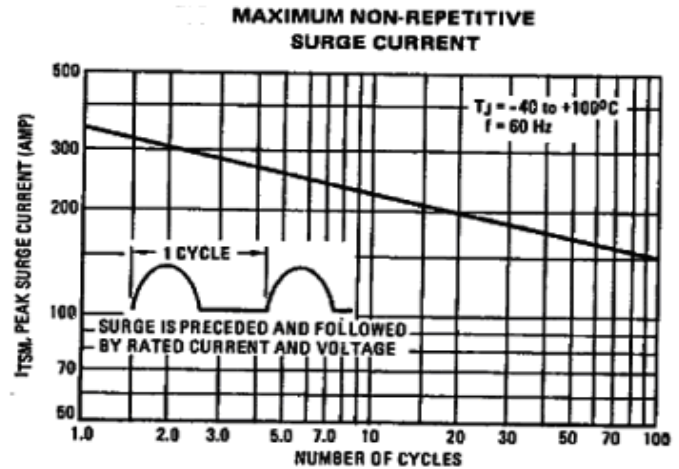
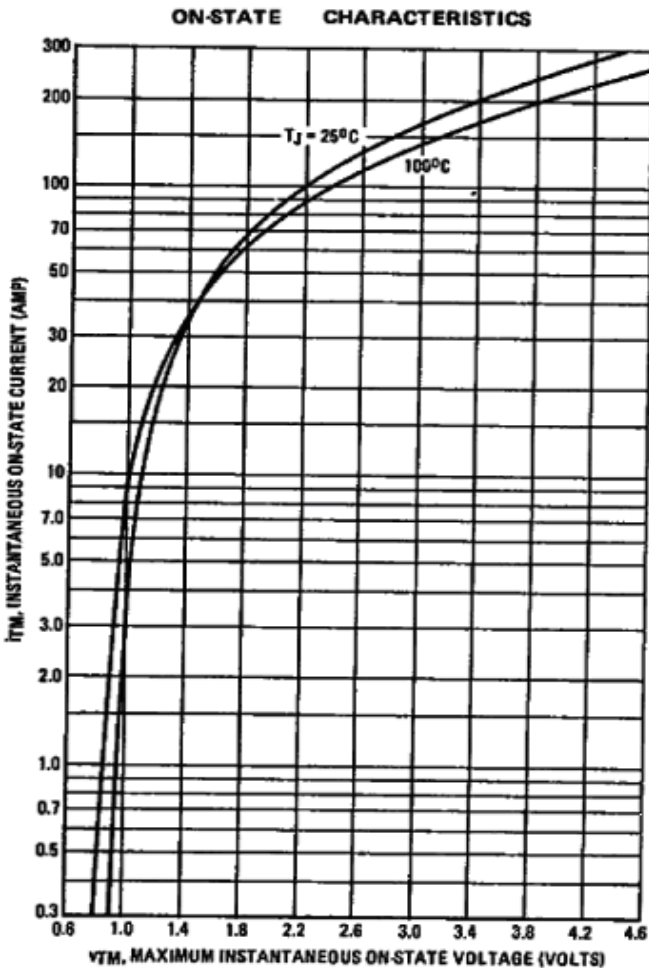
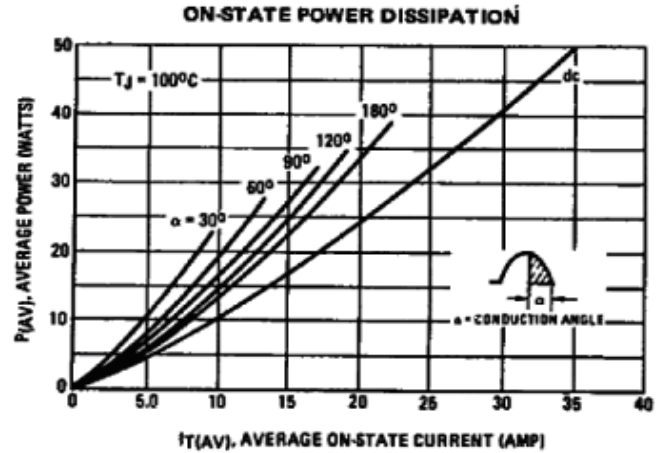
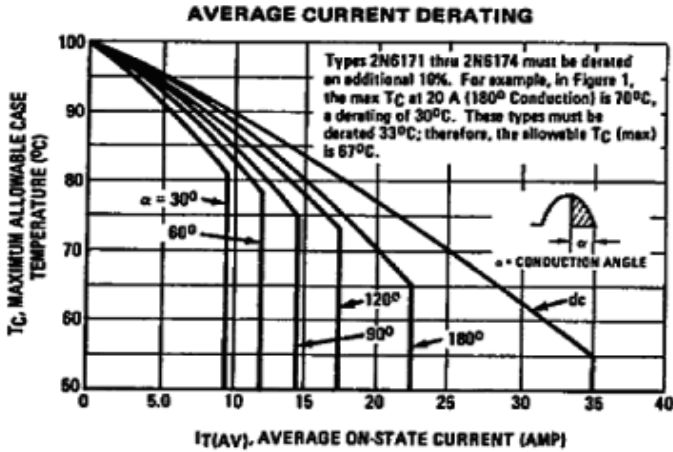


| | TO-48 ISO | | | |
|---|-----------|-------|-------------|--------|
| | Inches | | Millimeters | |
| | Min | Max | Min | Max |
| A | 0.551 | 0.559 | 14.000 | 14.200 |
| B | 0.501 | 0.505 | 12.730 | 12.830 |
| C | - | 1.280 | - | 32.510 |
| F | - | 0.160 | - | 4.060 |
| H | - | 0.265 | - | 6.730 |
| J | 0.420 | 0.455 | 10.670 | 11.560 |
| K | 0.300 | 0.350 | 7.620 | 8.890 |
| L | 0.255 | 0.275 | 6.480 | 6.990 |
| Q | 0.055 | 0.085 | 1.400 | 2.160 |
| T | 0.135 | 0.150 | 3.430 | 3.810 |

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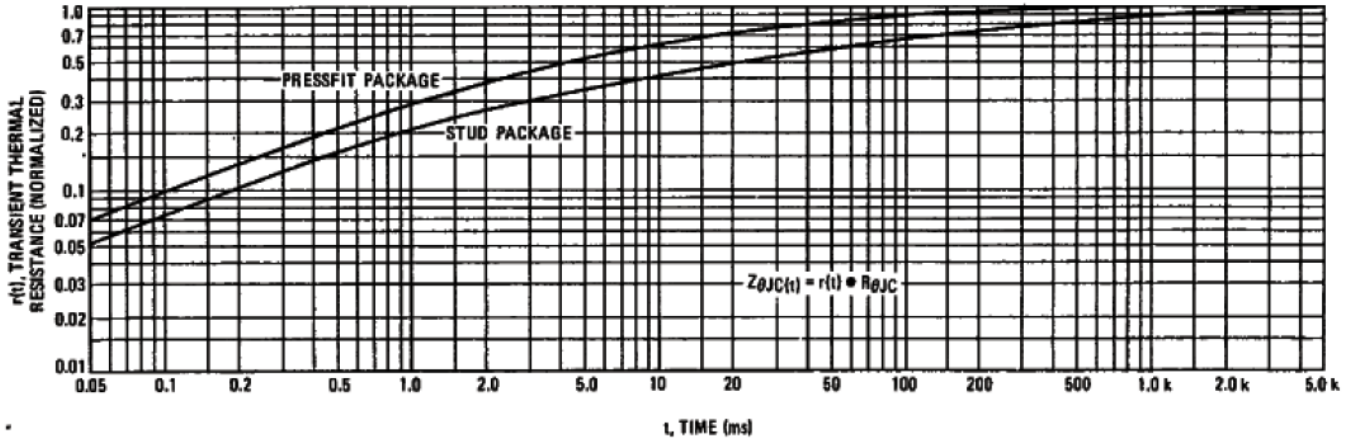
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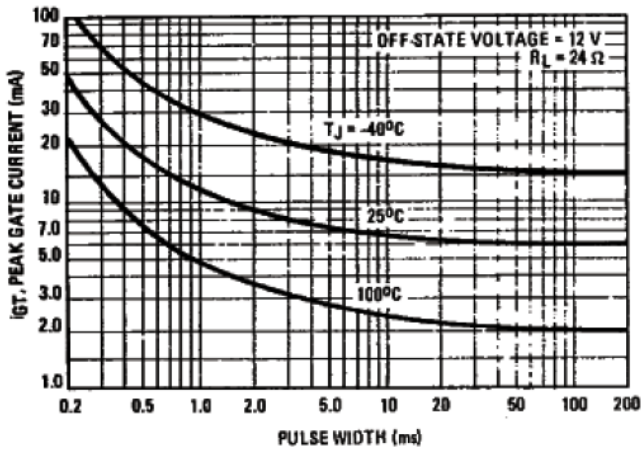
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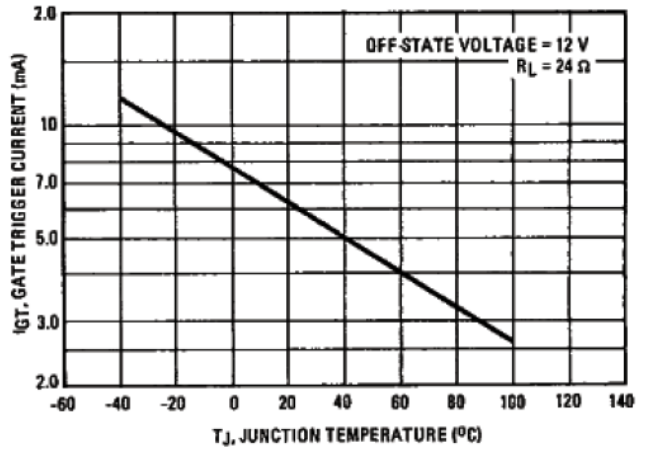
TYPICAL THERMAL RESPONSE



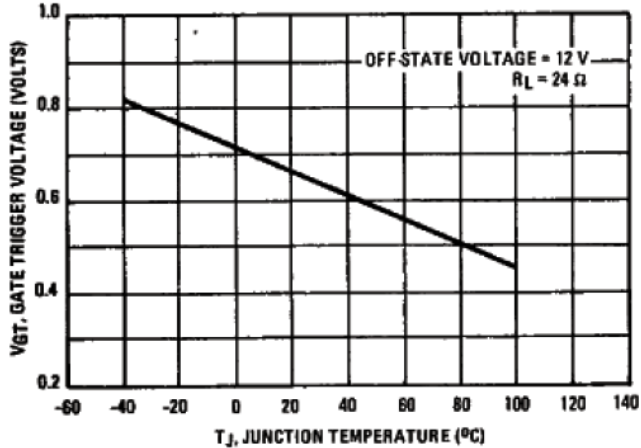
PULSE TRIGGER CURRENT



GATE TRIGGER CURRENT



GATE TRIGGER VOLTAGE



HOLDING CURRENT

