

DIGITRON SEMICONDUCTORS

MCR72 SERIES

SILICON CONTROLLED RECTIFIERS

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

| Rating | Symbol | Value | Unit |
|---|--------------|-------------|----------------------|
| Peak repetitive off-state voltage⁽¹⁾ ($T_J = -40$ to $+110^\circ\text{C}$, sine wave, 50 to 60Hz, gate open) | | | |
| MCR72-1 | | 25 | |
| MCR72-2 | | 50 | |
| MCR72-3 | V_{DRM} | 100 | V |
| MCR72-4 | V_{RRM} | 200 | |
| MCR72-5 | | 300 | |
| MCR72-6 | | 400 | |
| MCR72-7 | | 500 | |
| MCR72-8 | | 600 | |
| On-state RMS current (180° conduction angles, $T_C = 83^\circ\text{C}$) | $I_{T(RMS)}$ | 8.0 | A |
| Peak non-repetitive surge current (half-cycle, sine wave, 60Hz, $T_J = 110^\circ\text{C}$) | I_{TSM} | 100 | A |
| Circuit fusing consideration ($t = 8.3\text{ms}$) | I^2t | 40 | A^2s |
| Forward peak gate voltage ($t \leq 10\mu\text{s}$, $T_C = 83^\circ\text{C}$) | V_{GM} | ± 5.0 | V |
| Forward peak gate current ($t \leq 10\mu\text{s}$, $T_C = 83^\circ\text{C}$) | I_{GM} | 1.0 | A |
| Forward peak gate power (pulse width $\leq 10\mu\text{s}$, $T_C = 83^\circ\text{C}$) | P_{GM} | 5.0 | W |
| Average gate power ($t = 8.3\text{ms}$, $T_C = 83^\circ\text{C}$) | $P_{G(AV)}$ | 0.75 | W |
| Operating junction temperature range | T_J | -40 to +110 | $^\circ\text{C}$ |
| Storage temperature range | T_{stg} | -40 to +150 | $^\circ\text{C}$ |
| Mounting torque | - | 8.0 | In. lb. |

Note 1: V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; 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

| Characteristic | Symbol | Maximum | Unit |
|---|-----------------|---------|---------------------------|
| Thermal resistance, junction to case | $R_{\theta JC}$ | 2.2 | $^\circ\text{C}/\text{W}$ |
| Thermal resistance, junction to ambient | $R_{\theta JA}$ | 60 | $^\circ\text{C}/\text{W}$ |
| Lead solder temperature (lead length 1/8" from case, 10s max) | T_L | 260 | $^\circ\text{C}$ |

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|--------------------------|--------|--------|-----------|---------------|
| OFF CHARACTERISTICS | | | | | |
| Peak forward or reverse blocking current⁽²⁾ ($V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}$, $R_{GK} = 1\text{k}\Omega$) $T_C = 25^\circ\text{C}$ $T_C = 110^\circ\text{C}$ | I_{DRM} , I_{RRM} | - - | - - | 10 500 | μA |
| ON CHARACTERISTICS | | | | | |
| Peak forward on-state voltage ($I_{TM} = 16\text{A}$, pulse width $\leq 1\text{ms}$, duty cycle $\leq 2\%$) | V_{TM} | - | 1.7 | 2.0 | V |
| Gate trigger current (continuous dc) ⁽³⁾ ($V_D = 12\text{V}$, $R_L = 100\Omega$) | I_{GT} | - | 30 | 200 | μA |
| Gate trigger voltage (continuous dc) ⁽³⁾ ($V_D = 12\text{V}$, $R_L = 100\Omega$) | V_{GT} | - | 0.5 | 1.5 | V |

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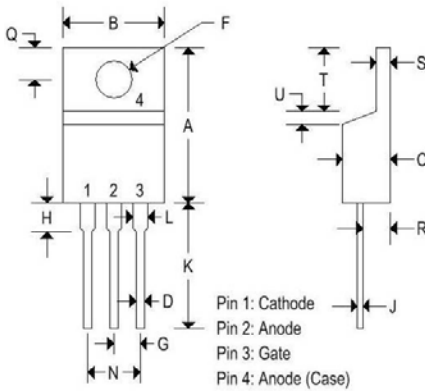
SILICON CONTROLLED RECTIFIERS

| | | | | | |
|---|----------|-----|-----|-----|------------|
| Gate non-trigger voltage ($V_D = 12V, R_L = 100\Omega, T_J = 110^\circ C$) | V_{GD} | 0.1 | - | - | V |
| Holding current ($V_D = 12V, \text{gate open, initiating current} = 200mA$) | I_H | - | - | 6.0 | mA |
| Gate controlled turn-on time ($V_D = \text{Rated } V_{DRM}, I_{TM} = 16A, I_G = 2mA$) | t_{gt} | - | 1.0 | - | μs |
| DYNAMIC CHARACTERISTICS | | | | | |
| Critical rate of rise of off-state voltage ($V_D = \text{rated } V_{DRM}, R_{GK} = 1k\Omega, T_J = 110^\circ C, \text{exponential waveform}$) | dv/dt | - | 10 | - | V/ μs |

Note 2: Ratings apply for negative gate voltage or $R_{GK} = 1k\Omega$. Devices shall not have a positive gate voltage concurrently with a negative voltage on the anode. Devices should not be tested with a constant current source for forward and reverse blocking capability such that the voltage applied exceeds the rated blocking voltage.
 Note 3: R_{GK} current not included in measurement.

MECHANICAL CHARACTERISTICS

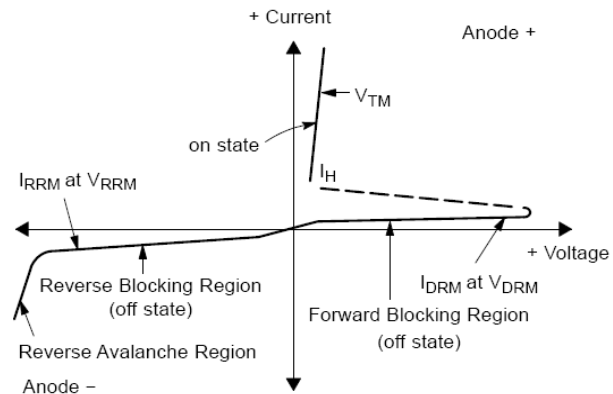
| | |
|----------------|---------------|
| Case | TO-220AB |
| Marking | Alpha-numeric |
| Pin out | See below |



| | TO-220AB | | | |
|---|----------|-------|-------------|--------|
| | Inches | | Millimeters | |
| | Min | Max | Min | Max |
| A | 0.575 | 0.620 | 14.600 | 15.750 |
| B | 0.380 | 0.405 | 9.650 | 10.290 |
| C | 0.160 | 0.190 | 4.060 | 4.820 |
| D | 0.025 | 0.035 | 0.640 | 0.890 |
| F | 0.142 | 0.147 | 3.610 | 3.730 |
| G | 0.095 | 0.105 | 2.410 | 2.670 |
| H | 0.110 | 0.155 | 2.790 | 3.930 |
| J | 0.014 | 0.022 | 0.360 | 0.560 |
| K | 0.500 | 0.562 | 12.700 | 14.270 |
| L | 0.045 | 0.055 | 1.140 | 1.390 |
| N | 0.190 | 0.210 | 4.830 | 5.330 |
| Q | 0.100 | 0.120 | 2.540 | 3.040 |
| R | 0.080 | 0.110 | 2.040 | 2.790 |
| S | 0.045 | 0.055 | 1.140 | 1.390 |
| T | 0.235 | 0.255 | 5.970 | 6.480 |
| U | - | 0.050 | - | 1.270 |
| V | 0.045 | - | 1.140 | - |
| Z | - | 0.080 | - | 2.030 |

Voltage Current Characteristic of SCR

| Symbol | Parameter |
|-----------|---|
| V_{DRM} | Peak Repetitive Off State Forward Voltage |
| I_{DRM} | Peak Forward Blocking Current |
| V_{RRM} | Peak Repetitive Off State Reverse Voltage |
| I_{RRM} | Peak Reverse Blocking Current |
| V_{TM} | Peak On State Voltage |
| I_H | Holding Current |



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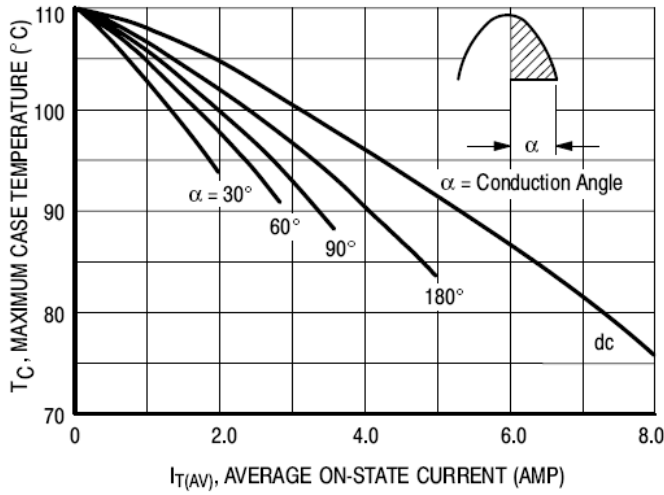


Figure 1. Average Current Derating

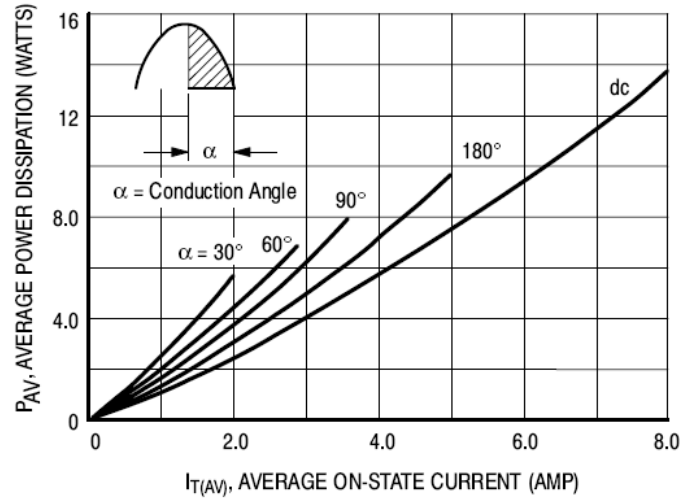


Figure 2. On-State Power Dissipation

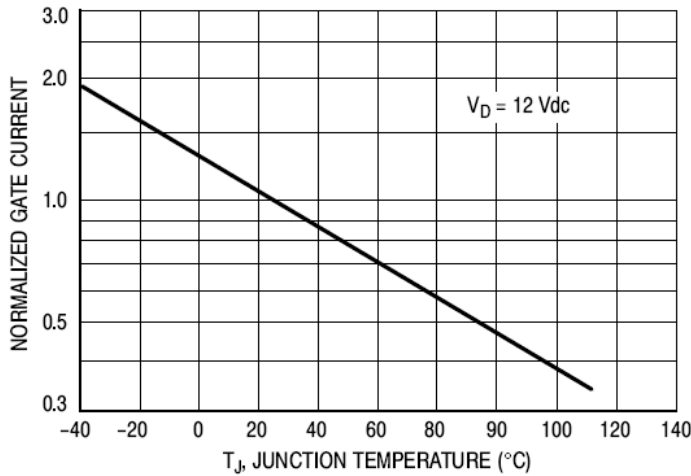


Figure 3. Normalized Gate Current

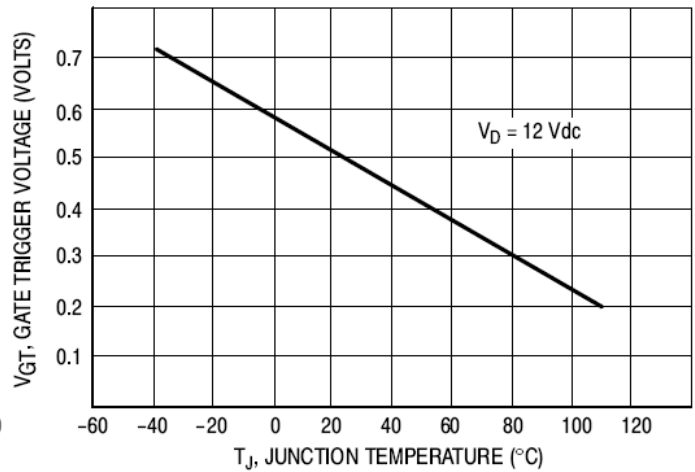


Figure 4. Gate Voltage