DIGITRON™ Semiconductors

High-reliability discrete products
and engineering services since 1977

# MCR12D, MCR12M, MCR12N

## SILICON CONTROLLED RECTIFIERS

**FEATURES**

- Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.
- Available as non-RoHS (Sn/Pb plating), standard, and as RoHS by adding "-PBF" suffix.

**MAXIMUM RATINGS**

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| **Peak repetitive off-state voltage**(1)<br>**Peak repetitive reverse voltage**<br>($T_J$ = -40 to +125°C)<br>MCR12D<br>MCR12M<br>MCR12N | $V_{DRM}$<br>$V_{RRM}$ | <br><br><br>400<br>600<br>800 | V |
| **On-state RMS current** (all conduction angles) | $I_{T(RMS)}$ | 12 | A |
| **Peak non-repetitive surge current**<br>(one half-cycle, sine wave, 60Hz, $T_J$ = 125°C) | $I_{TSM}$ | 100 | A |
| **Circuit fusing consideration** (t = 8.3ms) | $I^2t$ | 41 | $A^2s$ |
| **Peak gate power** (pulse width ≤ 1.0µs, $T_C$ = 80°C) | $P_{GM}$ | 5 | W |
| **Average gate power** (t = 8.3ms, $T_C$ = 80°C) | $P_{G(AV)}$ | 0.5 | W |
| **Peak gate current** (pulse width ≤ 1.0µs, $T_C$ = 80°C) | $I_{GM}$ | 2 | A |
| **Operating temperature range** | $T_J$ | -40 to +125 | °C |
| **Storage temperature range** | $T_{stg}$ | -40 to +150 | °C |

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** | $R_{\Theta JC}$ | 2.0 | °C/W |
| **Thermal resistance, junction to ambient** | $R_{\Theta JA}$ | 62.5 | °C/W |
| **Maximum lead temperature for soldering purposes 1/8" from case for 10s** | $T_L$ | 260 | °C |

**ELECTRICAL CHARACTERISTICS** ($T_J$ = 25°C unless otherwise specified)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | |
| **Peak forward blocking current**<br>**Peak reverse blocking current**<br>($V_{AK}$ = Rated $V_{DRM}$ or $V_{RRM}$, gate open)<br>$T_J$ = 25°C<br>$T_J$ = 125°C | $I_{DRM}$,<br>$I_{RRM}$ | <br><br><br>-<br>- | <br><br><br>-<br>- | <br><br><br>0.01<br>2.0 | mA |
| **ON CHARACTERISTICS** | | | | | |
| **Peak on-state voltage***<br>($I_{TM}$ = 24A) | $V_{TM}$ | - | - | 2.2 | V |
| **Gate trigger current** (continuous dc)<br>($V_D$ = 12V, $R_L$ = 100Ω) | $I_{GT}$ | 2.0 | 7.0 | 20 | mA |

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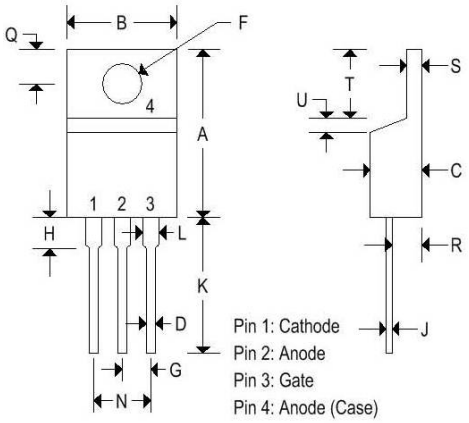
| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **Gate trigger voltage** (continuous dc)<br>($V_D$ = 12V, $R_L$ = 100Ω) | $V_{GT}$ | 0.5 | 0.65 | 1.0 | V |
| **Holding current**<br>($V_D$ = 12V) | $I_H$ | 4.0 | 25 | 40 | mA |
| **DYNAMIC CHARACTERISTICS** | | | | | |
| **Critical rate of rise of off-state voltage**<br>($V_D$ = rated $V_{DRM}$, exponential waveform, gate open, $T_J$ = 25°C) | dv/dt | 50 | 200 | - | V/µs |

* Pulse width ≤ 2.0ms, duty cycle ≤ 2%.

### MECHANICAL CHARACTERISTICS

| | |
|---|---|
| **Case:** | TO-220AB |
| **Marking:** | Body painted, 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 |