

## Thyristors

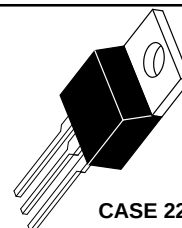
### Silicon Controlled Rectifiers

... designed for back-to-back SCR output devices for solid state relays or applications requiring high surge operation.

- Photo Glass Passivated Blocking Junctions for High Temperature Stability, Center Gate for Uniform Parameters
- 400 Amperes Surge Capability
- Blocking Voltage to 800 Volts

**MCR264-4  
thru  
MCR264-10**

**SCRs**  
**40 AMPERES RMS**  
**200 thru 800 VOLTS**



**CASE 221A-04  
(TO-220AB)  
STYLE 3**

#### MAXIMUM RATINGS ( $T_J = 25^\circ\text{C}$ unless otherwise noted.)

| Rating                                                                                                                  | Symbol                      | Value                    | Unit             |
|-------------------------------------------------------------------------------------------------------------------------|-----------------------------|--------------------------|------------------|
| Peak Repetitive Forward and Reverse Blocking Voltage <sup>(1)</sup><br>( $T_J = 25$ to $125^\circ\text{C}$ , Gate Open) | $V_{DRM}$<br>$V_{RRM}$      | 200<br>400<br>600<br>800 | Volts            |
| Forward Current ( $T_C = 80^\circ\text{C}$ )<br>(All Conduction Angles)                                                 | $I_{T(RMS)}$<br>$I_{T(AV)}$ | 40<br>25                 | Amps             |
| Peak Non-repetitive Surge Current – 8.3 ms<br>(1/2 Cycle, Sine Wave) 1.5 ms                                             | $I_{TSM}$                   | 400<br>450               | Amps             |
| Forward Peak Gate Power                                                                                                 | $P_{GM}$                    | 20                       | Watts            |
| Forward Average Gate Power                                                                                              | $P_{G(AV)}$                 | 0.5                      | Watt             |
| Forward Peak Gate Current<br>(300 $\mu\text{s}$ , 120 PPS)                                                              | $I_{GM}$                    | 2                        | Amps             |
| Operating Junction Temperature Range                                                                                    | $T_J$                       | $-40$ to $+125$          | $^\circ\text{C}$ |
| Storage Temperature Range                                                                                               | $T_{stg}$                   | $-40$ to $+150$          | $^\circ\text{C}$ |

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.

These devices are rated for use in applications subject to high surge conditions. Care must be taken to insure proper heat sinking when the device is to be used at high sustained currents.



# MCR264-4 thru MCR264-10

## THERMAL CHARACTERISTICS

| Characteristic                          | Symbol          | Max | Unit                 |
|-----------------------------------------|-----------------|-----|----------------------|
| Thermal Resistance, Junction to Case    | $R_{\theta JC}$ | 1   | $^{\circ}\text{C/W}$ |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 60  | $^{\circ}\text{C/W}$ |

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

| Characteristic                                                                                                                                                            | Symbol             | Min    | Typ      | Max      | Unit                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------|----------|----------|------------------------------|
| Peak Forward or Reverse Blocking Current<br>( $V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}$ , Gate Open) $T_J = 25^{\circ}\text{C}$<br>$T_J = 125^{\circ}\text{C}$ | $I_{DRM}, I_{RRM}$ | —<br>— | —<br>—   | 10<br>2  | $\mu\text{A}$<br>$\text{mA}$ |
| Forward "On" Voltage <sup>(1)</sup><br>( $I_{TM} = 80 \text{ A}$ )                                                                                                        | $V_{TM}$           | —      | 1.4      | 2        | Volts                        |
| Gate Trigger Current (Continuous dc)<br>(Anode Voltage = 12 Vdc, $R_L = 100 \text{ Ohms}$ , $T_C = -40^{\circ}\text{C}$ )                                                 | $I_{GT}$           | —<br>— | 15<br>30 | 50<br>90 | $\text{mA}$                  |
| Gate Trigger Voltage (Continuous dc)<br>(Anode Voltage = 12 Vdc, $R_L = 100 \text{ Ohms}$ )                                                                               | $V_{GT}$           | —      | 1        | 1.5      | Volts                        |
| Gate Non-Trigger Voltage<br>(Anode Voltage = Rated $V_{DRM}$ , $R_L = 100 \text{ Ohms}$ , $T_J = 125^{\circ}\text{C}$ )                                                   | $V_{GD}$           | 0.2    | —        | —        | Volts                        |
| Holding Current<br>(Anode Voltage = 12 Vdc)                                                                                                                               | $I_H$              | —      | 30       | 60       | $\text{mA}$                  |
| Turn-On Time<br>( $I_{TM} = 40 \text{ A}$ , $I_{GT} = 60 \text{ mAdc}$ )                                                                                                  | $t_{gt}$           | —      | 1.5      | —        | $\mu\text{s}$                |
| Critical Rate-of-Rise of Off-State Voltage<br>(Gate Open, $V_D = \text{Rated } V_{DRM}$ , Exponential Waveform)                                                           | $dv/dt$            | —      | 50       | —        | $\text{V}/\mu\text{s}$       |

1. Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

FIGURE 1 — AVERAGE CURRENT DERATING

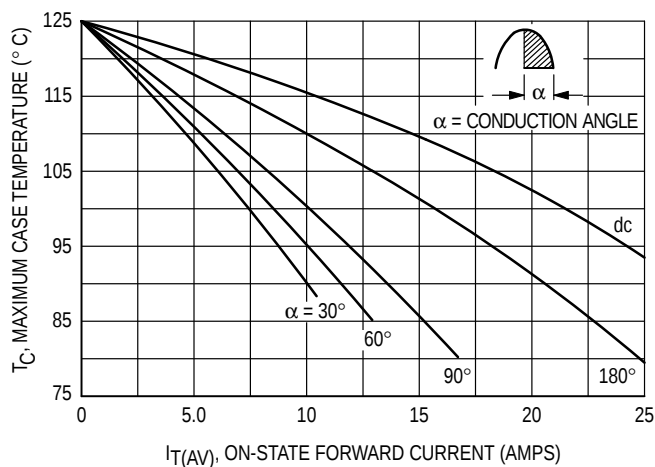


FIGURE 2 — MAXIMUM ON-STATE POWER DISSIPATION

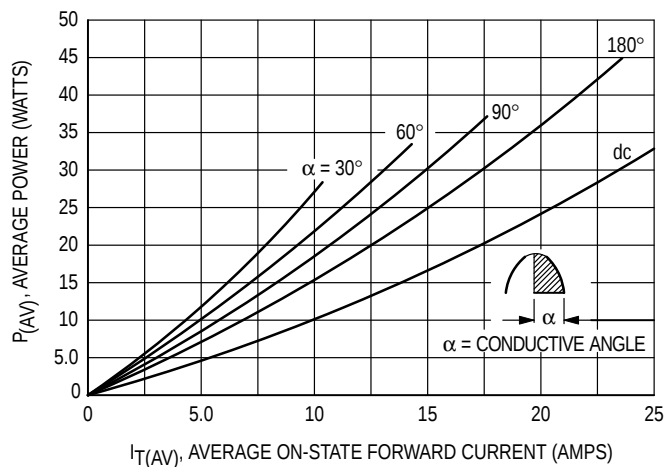


FIGURE 3 — GATE TRIGGER CURRENT

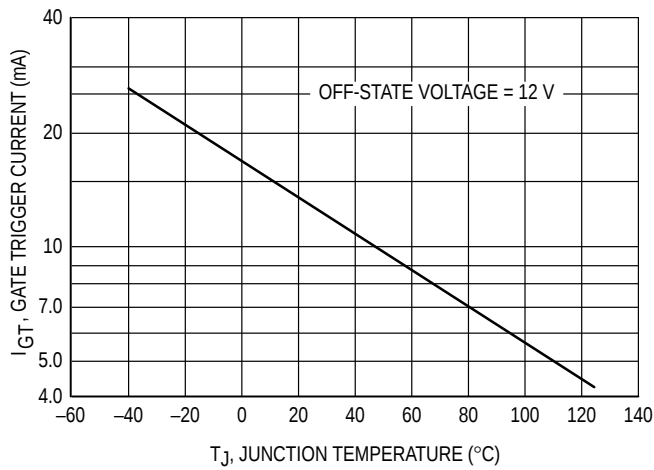


FIGURE 4 — NEW GATE TRIGGER VOLTAGE

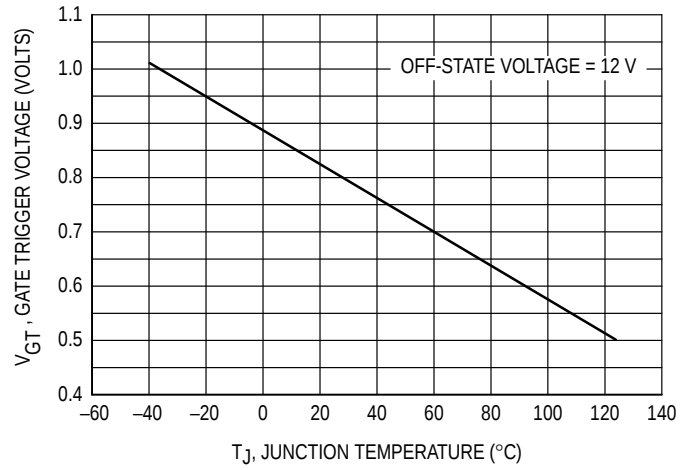


FIGURE 5 — HOLDING CURRENT

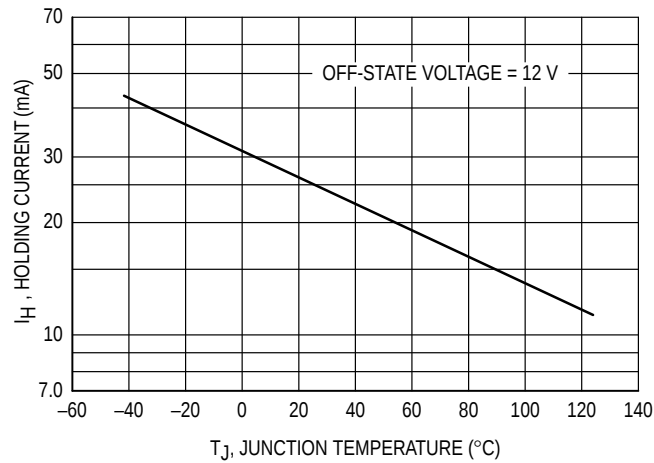


FIGURE 6 — TYPICAL FORWARD VOLTAGE

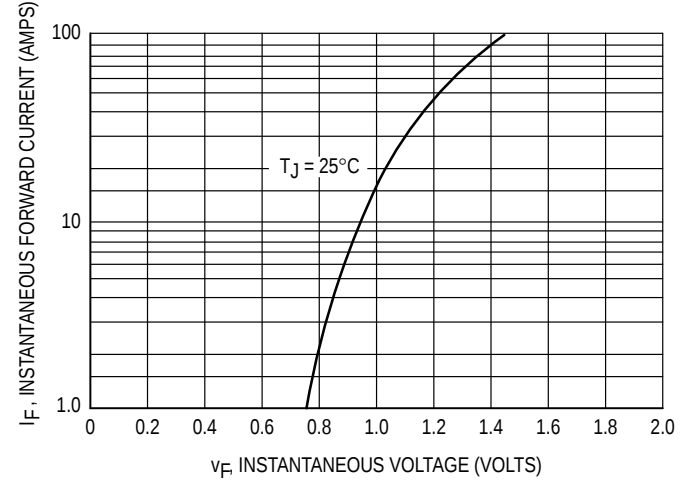
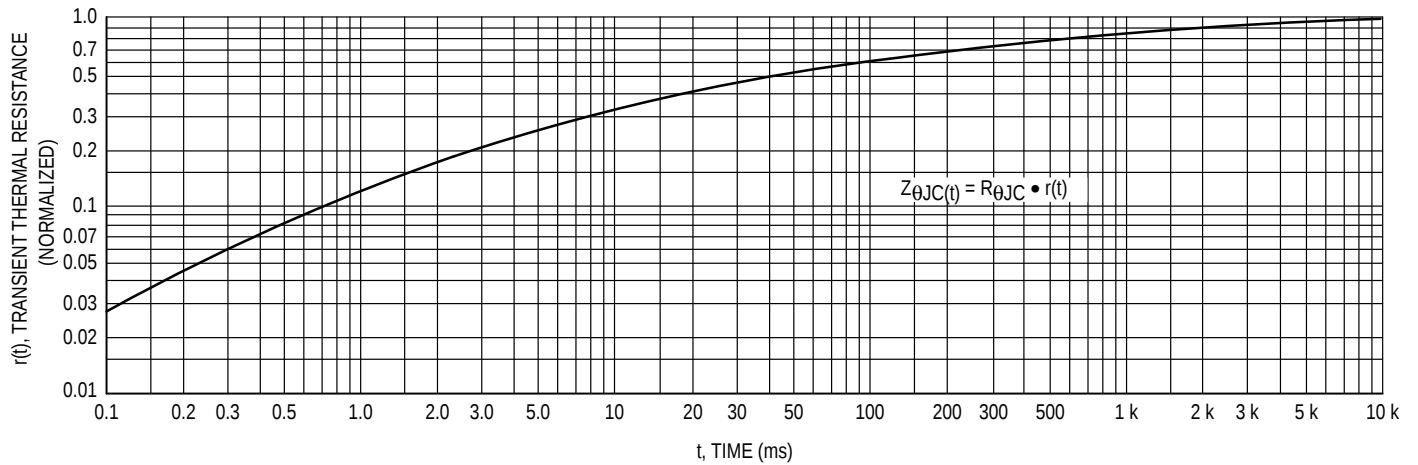
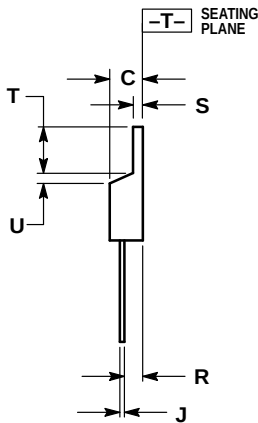
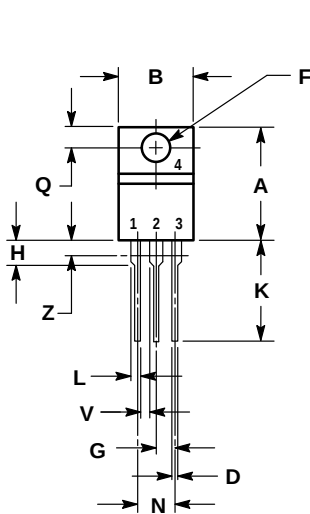


FIGURE 7 — THERMAL RESPONSE



PACKAGE DIMENSIONS



STYLE 3:  
PIN 1. CATHODE  
2. ANODE  
3. GATE  
4. ANODE

NOTES:  
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.

| DIM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | 0.570  | 0.620 | 14.48       | 15.75 |
| B   | 0.380  | 0.405 | 9.66        | 10.28 |
| C   | 0.160  | 0.190 | 4.07        | 4.82  |
| D   | 0.025  | 0.035 | 0.64        | 0.88  |
| F   | 0.142  | 0.147 | 3.61        | 3.73  |
| G   | 0.095  | 0.105 | 2.42        | 2.66  |
| H   | 0.110  | 0.155 | 2.80        | 3.93  |
| J   | 0.014  | 0.022 | 0.36        | 0.55  |
| K   | 0.500  | 0.562 | 12.70       | 14.27 |
| L   | 0.045  | 0.055 | 1.15        | 1.39  |
| N   | 0.190  | 0.210 | 4.83        | 5.33  |
| Q   | 0.100  | 0.120 | 2.54        | 3.04  |
| R   | 0.080  | 0.110 | 2.04        | 2.79  |
| S   | 0.045  | 0.055 | 1.15        | 1.39  |
| 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  |

CASE 221A-04  
(TO-220AB)

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