## Maximum Ratings ($T_J$ = 25°C unless otherwise noted)

| Rating | | Symbol | Value | Unit |
|---|---|---|---|---|
| Peak Repetitive Off–State Voltage (Note 1)<br>(– 40 to 110°C, Sine Wave, 50 to 60 Hz, $R_{GK}$=1Kohm) | MCR106-6<br>MCR106-8 | $V_{DRM}$,<br>$V_{RRM}$ | 400<br>600 | V |
| On-State RMS Current<br>(180° Conduction Angles; $T_C$ = 93°C) | | $I_{TM\ (RMS)}$ | 4.0 | A |
| Peak Non-Repetitive Surge Current<br>(1/2 Cycle, Sine Wave 60 Hz, $T_J$ = 110°C | | $I_{TSM}$ | 25 | A |
| Average On-State Current<br>(180° Conduction Angles; $T_C$ = 93°C) | | $I_{T(AV)}$ | 2.55 | A |
| Circuit Fusing Consideration (t = 8.3 ms) | | $I^2t$ | 2.6 | $A^2s$ |
| Forward Peak Gate Power (($T_C$ = 93°C, Pulse Width ≤ 1.0 μs) | | $P_{GM}$ | 0.5 | W |
| Forward Average Gate Power, ($T_C$ = 93°C, t = 8.3 ms) | | $P_{G(AV)}$ | 0.1 | W |
| Forward Peak Gate Current, ($T_C$ = 93°C, Pulse Width ≤ 1.0 μs) | | $I_{GM}$ | 0.2 | A |
| Peak Reverse Gate Voltage, ($T_C$ = 93°C, Pulse Width ≤ 1.0 μs) | | $V_{RGM}$ | 6.0 | V |
| Operating Junction Temperature Range | | $T_J$ | -40 to +110 | °C |
| Storage Temperature Range | | $T_{stg}$ | -40 to +150 | °C |
| Mounting Torque | | – | 6.0 | in. lb. |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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.
2. Torque rating applies with use of compression washer (B52200-F006 or equivalent). Mounting torque in excess of 6 in. lb. does not appreciably lower case-to-sink thermal resistance. Anode lead and heatsink contact pad are common. (See AN209B). For soldering purposes (either terminal connection or device mounting), soldering temperatures shall not exceed +200°C. For optimum results, an activated flux (oxide removing) is recommended.

## Thermal Characteristics

| Rating | | Symbol | Value | Unit |
|---|---|---|---|---|
| Thermal Resistance, | Junction–to–Case (AC)<br>Junction–to–Ambient | $R_{\theta JC}$<br>$R_{\theta JA}$ | 3.0<br>75 | °C/W |
| Maximum Lead Temperature for Soldering Purposes, 1/8″ from case for 10 seconds | | $T_L$ | 260 | °C |

## Electrical Characteristics - OFF ($T_J$ = 25°C unless otherwise noted)

| Characteristic | | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Peak Repetitive Forward or Reverse Blocking Current<br>($V_{AK}$ = Rated $V_{DRM}$ and $V_{RRM}$; $R_{GK}$=1Kohm) | $T_J$ = 25°C | $I_{DRM}$,<br>$I_{RRM}$ | - | - | 10 | μA |
| | $T_J$ = 110°C | | - | - | 200 | |

## Electrical Characteristics - ON ($T_J$ = 25°C unless otherwise noted)

| Characteristic | | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Peak Forward On–State Voltage (Note 3) ($I_{TM}$ = 4 A Peak) | | $V_{TM}$ | – | – | 2.0 | V |
| Gate Trigger Current (Continuous DC) (Note 4) | ($V_{AK}$ = 7 Vdc;<br>$R_L$ = 100 Ω) | $I_{GT}$ | – | – | 200 | μA |
| | ($T_C$ = –40°C) | | – | – | 500 | |
| Gate Trigger Voltage (Continuous DC) (Note 4) ($V_{AK}$ = 12 V; $R_L$ = 100 Ω, TJ=110°C) | | $V_{GT}$ | – | – | 1.0 | V |
| Gate Trigger Non-Trigger Voltage (Note 4) $V_{AK}$ = 12VDC; $R_L$ = 100 Ω) | | $V_{GD}$ | 0.2 | – | – | V |
| Holding Current<br>($V_{AK}$=7V,, Initiating Current = 200 mA, $R_{GK}$ = 1kΩ) | | $I_H$ | – | – | 5.0 | mA |

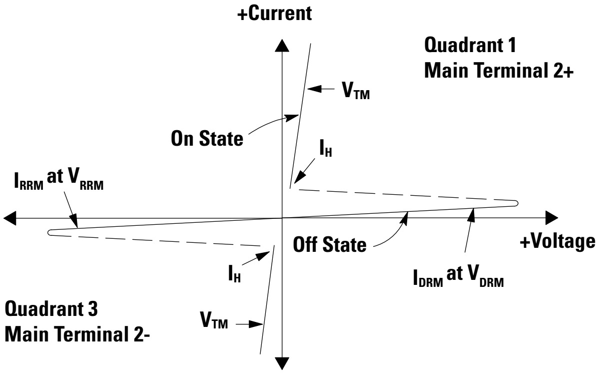
## Dynamic Characteristics

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Critical Rate of Rise of Off–State Voltage<br>($R_{GK}$ = 1 k Ω, $T_J$ = 110°C) | dv/dt | – | 10 | – | V/µs |
| Critical Rate of Rise of On–State Current<br>$I_G$ = 150 A $T_J$ = 125°C | di/dt | – | – | 75 | A/µs |

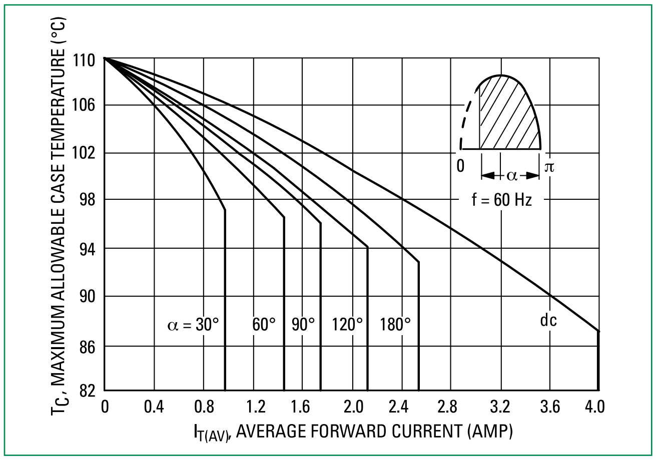
3. Pulse Test: Pulse Width ≤ 1.0 ms, Duty Cycle ≤ 1%.
4. $R_{GK}$ current is not included in measurement.

## Voltage Current Characteristic of SCR

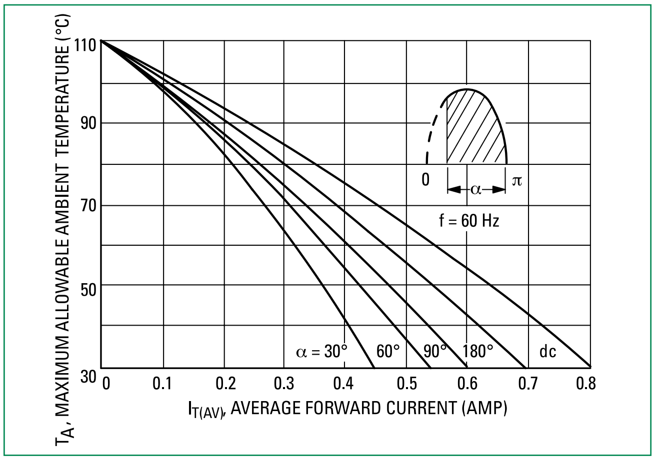
| Symbol | Parameter |
|---|---|
| $V_{DRM}$ | Peak Repetitive Forward Off State Voltage |
| $I_{DRM}$ | Peak Forward Blocking Current |
| $V_{RRM}$ | Peak Repetitive Reverse Off State Voltage |
| $I_{RRM}$ | Peak Reverse Blocking Current |
| $V_{TM}$ | Maximum On State Voltage |
| $I_H$ | Holding Current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



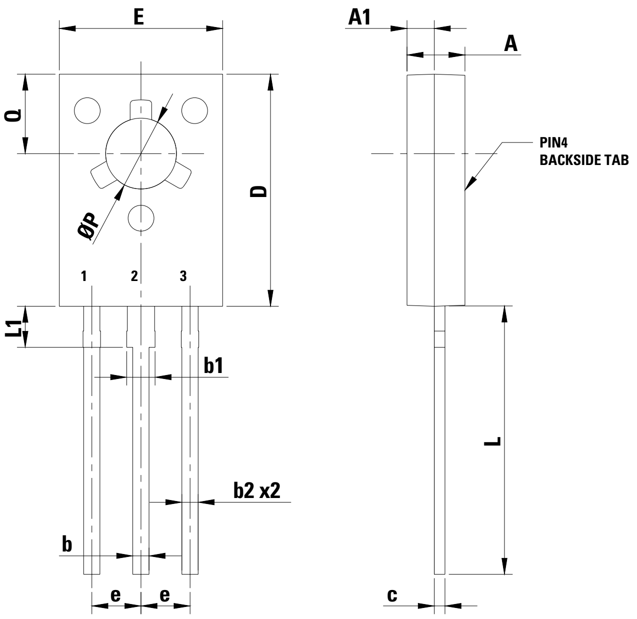
## Figure 1. Average Current Derating



## Figure 2. On–State Power Dissipation



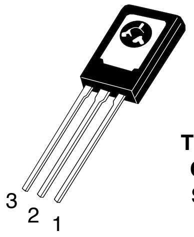
## Dimensions



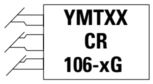
| Dim | Inches | | Millimeters | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 0.102 | 0.110 | 2.60 | 2.80 |
| A1 | 0.047 | 0.055 | 1.20 | 1.40 |
| b | 0.028 | 0.034 | 0.70 | 0.86 |
| b2 | 0.028 | 0.034 | 0.70 | 0.86 |
| c | 0.019 | 0.022 | 0.49 | 0.57 |
| D | 0.417 | 0.449 | 10.60 | 11.40 |
| E | 0.291 | 0.323 | 7.40 | 8.20 |
| e | 0.090 TYP | | 2.29 TYP | |
| L | 0.551 | 0.630 | 14.00 | 16.00 |
| L1 | 0.091 | 0.106 | 2.30 | 2.70 |
| P | 0.118 | 0.134 | 3.00 | 3.40 |
| Q | 0.142 | 0.157 | 3.60 | 4.00 |
| b1 | 0.047 | 0.055 | 1.2 | 1.4 |

1. Dimensioning and Tolerancing Per ANSI Y14.5M, 1982.
2. Controlling Dimension: Inch.
3. 077-01 Thru -08 Obsolete, New Standard 077-09.

## Part Marking System



**TO–225AA**
**CASE 77**
**STYLE 2**



| | |
|---|---|
| **Y-** | **Year** |
| **M-** | **Month** |
| **T-** | **Assembly Location** |
| **XX-** | **Sequence Number** |
| **CR106-x-** | **Device Code x=6 or 8** |
| **G-** | **Pb-Free Package** |

| Pin Assignment | |
|---|---|
| 1 | Cathode |
| 2 | Anode |
| 3 | Gate |
| 4 | Anode |

## Ordering Information

| Device | Package | Shipping |
|---|---|---|
| MCR106–6 | TO–225AA | 2500 / Box |
| MCR106–6G | TO–225AA<br>(Pb–Free) | |
| MCR106–8 | TO–225AA | |
| MCR106–8G | TO–225AA<br>(Pb–Free) | |

Revised: 08/18/20