

## Triacs

### Bidirectional Triode Thyristors

... designed primarily for full-wave ac control applications, such as light dimmers, motor controls, heating controls and power supplies.

- Triggering Specified in Three Quadrants
- Blocking Voltage to 800 Volts
- All Diffused and Glass Passivated Junctions for Greater Parameter Uniformity and Stability
- Small, Rugged, Thermowatt Construction for Low Thermal Resistance, High Heat Dissipation and Durability

**SC141**  
**SC146**

**TRIACs**  
**6 and 10 AMPERES RMS**  
**200 thru 800 VOLTS**



**CASE 221A-04**  
**(TO-220AB)**  
**STYLE 4**

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

| Rating                                                                                    | Symbol            | Value                    | Unit                 |
|-------------------------------------------------------------------------------------------|-------------------|--------------------------|----------------------|
| Peak Repetitive Off-State Voltage, Note 1 (Gate Open, $T_J = 25$ to $125^\circ\text{C}$ ) | $V_{DRM}$         | 200<br>400<br>600<br>800 | Volts                |
| SC141 B<br>D<br>SC146 M<br>N                                                              |                   |                          |                      |
| RMS On-State Current<br>( $T_C = 80^\circ\text{C}$ )                                      | $I_T(\text{RMS})$ | 6<br>10                  | Amps                 |
| Peak Non-Repetitive Surge Current<br>(One Full Cycle, 60 Hz)                              | $I_{TSM}$         | 80<br>120                | Amps                 |
| Circuit Fusing Considerations<br>( $t = 8.3$ ms)                                          | $I^2t$            | 26.5<br>60               | $\text{A}^2\text{s}$ |
| SC141<br>SC146                                                                            |                   |                          |                      |
| Peak Gate Power (Pulse Width = $10 \mu\text{s}$ )                                         | $P_{GM}$          | 10                       | Watts                |
| Average Gate Power ( $T_C = +80^\circ\text{C}$ , $t = 8.3$ ms)                            | $P_{G(AV)}$       | 0.5                      | Watt                 |
| Peak Gate Current (Pulse Width = $10 \mu\text{s}$ )                                       | $I_{GM}$          | 3.5                      | Amps                 |
| Peak Gate Voltage                                                                         | $V_{GM}$          | 10                       | Volts                |
| Operating Junction Temperature Range                                                      | $T_J$             | $-40$ to $+125$          | $^\circ\text{C}$     |
| Storage Temperature Range                                                                 | $T_{stg}$         | $-40$ to $+125$          | $^\circ\text{C}$     |

Note 1.  $V_{DRM}$  for all types can be applied on a continuous basis. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded

MOTOROLA THYRISTOR DEVICE DATA

3-244

## SC141 • SC146

## THERMAL CHARACTERISTICS

| Characteristic                                         | Symbol          | Max        | Unit                 |
|--------------------------------------------------------|-----------------|------------|----------------------|
| Thermal Resistance, Junction to Case<br>SC141<br>SC146 | $R_{\theta JC}$ | 2.2<br>1.5 | $^{\circ}\text{C/W}$ |

ELECTRICAL CHARACTERISTICS ( $T_C = 25^{\circ}\text{C}$ , Either Polarity of MT2 to MT1 Voltage unless otherwise noted.)

| Characteristic                                                                                                                                                                                                                                                                                                                                                                                                     | Symbol     | Min                     | Typ                   | Max                           | Unit                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------------------|-----------------------|-------------------------------|------------------------|
| Peak Blocking Current<br>( $V_D = \text{Rated } V_{DRM}$ , Gate Open)<br>$T_C = 25^{\circ}\text{C}$<br>$T_C = 100^{\circ}\text{C}$                                                                                                                                                                                                                                                                                 | $I_{DRM}$  | —<br>—                  | —<br>—                | 10<br>0.5                     | $\mu\text{A}$<br>mA    |
| Peak On-State Voltage<br>(Pulse Width $\leq 1$ ms, Duty Cycle $\leq 2\%$ )<br>SC141 $I_{TM} = 8.5$ A Peak<br>SC146 $I_{TM} = 14$ A Peak                                                                                                                                                                                                                                                                            | $V_{TM}$   | —<br>—                  | —<br>—                | 1.83<br>1.65                  | Volts                  |
| Critical Rate-of-Rise of Off-State Voltage<br>( $V_D = \text{Rated } V_{DRM}$ , Gate Open-Circuited,<br>Exponential Waveform)<br>$T_C = 100^{\circ}\text{C}$                                                                                                                                                                                                                                                       | $dv/dt$    | —                       | 50                    | —                             | $\text{V}/\mu\text{s}$ |
| Critical Rate-of-Rise of Commutating Off-State Voltage (1)<br>( $I_T(\text{RMS}) = \text{Rated } I_T(\text{RMS})$ , $V_D = \text{Rated } V_{DRM}$ ,<br>Gate Open-Circuited)<br>SC141 Commutating $di/dt = 3.0$ A/ms<br>SC146 Commutating $di/dt = 5.1$ A/ms<br>$T_C = 80^{\circ}\text{C}$                                                                                                                          | $dv/dt(c)$ | 4<br>4                  | —<br>—                | —<br>—                        | $\text{V}/\mu\text{s}$ |
| DC Gate Trigger Current (Continuous dc)<br>( $V_D = 12$ Vdc)<br>Trigger Mode<br>MT2(+), G(+); MT2(-), G(-); $R_L = 100$ Ohms<br>MT2(+), G(-); $R_L = 50$ Ohms<br>MT2(+), G(+); MT2(-), G(-); $R_L = 50$ Ohms<br>MT2(+), G(-); $R_L = 25$ Ohms<br>$T_C = -40^{\circ}\text{C}$<br>$T_C = -40^{\circ}\text{C}$                                                                                                        | $I_{GT}$   | —<br>—<br>—<br>—        | —<br>—<br>—<br>—      | 50<br>50<br>80<br>80          | mAdc                   |
| DC Gate Trigger Voltage (Continuous dc)<br>( $V_D = 12$ Vdc, Trigger Mode)<br>MT2(+), G(+); MT2(-), G(-); $R_L = 100$ Ohms<br>MT2(+), G(-); $R_L = 50$ Ohms<br>MT2(+), G(+); MT2(-), G(-); $R_L = 50$ Ohms<br>MT2(+), G(-); $R_L = 25$ Ohms<br>( $V_D = \text{Rated } V_{DRM}$ ; $R_L = 1000$ Ohms)<br>$T_C = -40^{\circ}\text{C}$<br>$T_C = -40^{\circ}\text{C}$<br>All Polarities<br>$T_C = 100^{\circ}\text{C}$ | $V_{GT}$   | —<br>—<br>—<br>—<br>0.2 | —<br>—<br>—<br>—<br>— | 2.5<br>2.5<br>3.5<br>3.5<br>— | Vdc                    |
| Holding Current<br>( $V_D = 24$ Vdc, $I_T = 0.5$ A,<br>Pulse Width = 1 ms, Duty Cycle $\leq 2\%$ ,<br>Gate Trigger Source = 7 V, 20 Ohms)<br>$T_C = 25^{\circ}\text{C}$<br>$T_C = -40^{\circ}\text{C}$                                                                                                                                                                                                             | $I_H$      | —<br>—                  | —<br>—                | 50<br>100                     | mAdc                   |
| Latching Current<br>( $V_D = 24$ Vdc)<br>(Gate Trigger Source = 15 V, 100 Ohms, Trigger Mode)<br>MT2(+), G(+); MT2(-), G(-)<br>MT2(+), G(-)<br>MT2(+), G(+); MT2(-), G(-)<br>MT2(+), G(-)<br>$T_C = -40^{\circ}\text{C}$<br>$T_C = -40^{\circ}\text{C}$                                                                                                                                                            | $I_L$      | —<br>—<br>—<br>—<br>—   | —<br>—<br>—<br>—<br>— | 100<br>200<br>200<br>400      | mAdc                   |

3

## SC141 • SC146

