

SENSITIVE GATE SILICON CONTROLLED RECTIFIERS REVERSE BLOCKING THYRISTORS

DESCRIPTION

PNPN devices designed for high volume, line-powered consumer applications such as relay and lamp drivers, small motor controls, gate drivers for larger thyristors, and sensing and detection circuits.

FEATURES

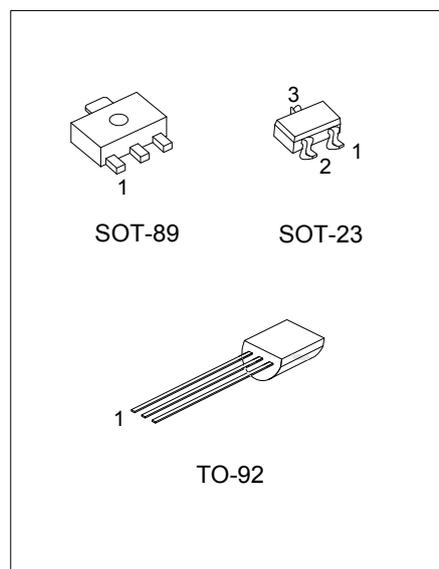
- * Sensitive gate allows triggering by micro controllers and other logic circuits
- * Blocking voltage to 600V
- * On-state current rating of 0.8A RMS at 80°C
- * High surge current capability – 10A
- * Minimum and maximum values of I_{GT} , V_{GT} and I_H specified for ease of design
- * Immunity to dV/dt – 20V/ μ sec minimum at 110°C
- * Glass-passivated surface for reliability and uniformity

ORDERING INFORMATION

| Ordering Number | | | Package | Pin assignment | | | Packing |
|------------------|-------------------|-------------------|---------|----------------|---|---|-----------|
| Normal | Lead Free Plating | Halogen Free | | 1 | 2 | 3 | |
| MCR100-4-x-AB3-R | MCR100L-4-x-AB3-R | MCR100G-4-x-AB3-R | SOT-89 | G | A | K | Tape Reel |
| MCR100-4-x-AE3-R | MCR100L-4-x-AE3-R | MCR100G-4-x-AE3-R | SOT-23 | G | K | A | Tape Reel |
| MCR100-4-x-T92-B | MCR100L-4-x-T92-B | MCR100G-4-x-T92-B | TO-92 | K | G | A | Tape Box |
| MCR100-4-x-T92-K | MCR100L-4-x-T92-K | MCR100G-4-x-T92-K | TO-92 | K | G | A | Bulk |
| MCR100-6-x-AB3-R | MCR100L-6-x-AB3-R | MCR100G-6-x-AB3-R | SOT-89 | G | A | K | Tape Reel |
| MCR100-6-x-AE3-R | MCR100L-6-x-AE3-R | MCR100G-6-x-AE3-R | SOT-23 | G | K | A | Tape Reel |
| MCR100-6-x-T92-B | MCR100L-6-x-T92-B | MCR100G-6-x-T92-B | TO-92 | K | G | A | Tape Box |
| MCR100-6-x-T92-K | MCR100L-6-x-T92-K | MCR100G-6-x-T92-K | TO-92 | K | G | A | Bulk |
| MCR100-8-x-AB3-R | MCR100L-8-x-AB3-R | MCR100G-8-x-AB3-R | SOT-89 | G | A | K | Tape Reel |
| MCR100-8-x-AE3-R | MCR100L-8-x-AE3-R | MCR100G-8-x-AE3-R | SOT-23 | G | K | A | Tape Reel |
| MCR100-8-x-T92-B | MCR100L-8-x-T92-B | MCR100G-8-x-T92-B | TO-92 | K | G | A | Tape Box |
| MCR100-8-x-T92-K | MCR100L-8-x-T92-K | MCR100G-8-x-T92-K | TO-92 | K | G | A | Bulk |

Note: Pin assignment: G: Gate K: Cathode A: Anode

| | | |
|--------------------------|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>MCR100L-4-x-AB3-R</p> | <p>(1) Packing Type (2) Package Type (3) Rank (4) Lead Plating</p> | <p>(1) B: Tape Box, K: Bulk, R: Tape Reel (2) AB3: SOT-89, AE3: SOT-23, T92: TO-92 (3) x: Refer to CLASSIFICATION OF I_{GT} (4) G: Halogen Free, L: Lead Free, Blank: Pb/Sn</p> |
|--------------------------|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



Lead-free: MCR100L
Halogen-free: MCR100G



MCR100

SCR

■ ABSOLUTE MAXIMUM RATINGS

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|-----------------------------------------------------------------------------------------------------------------------|----------|--------------------|------------|----------------------|
| Peak Repetitive Off-State Voltage(Note 1) ($T_J=-40 \sim 110^\circ\text{C}$, Sine Wave, 50 ~ 60Hz; Gate Open) | MCR100-4 | V_{DRM}, V_{RRM} | 200 | V |
| | MCR100-6 | | 400 | V |
| | MCR100-8 | | 600 | V |
| On-State RMS Current ($T_C=80^\circ\text{C}$) 180°C Condition Angles | | $I_{T(RMS)}$ | 0.8 | A |
| Peak Non-Repetitive Surge Current (1/2 cycle, Sine Wave, 60Hz, $T_J=25^\circ\text{C}$) | | I_{TSM} | 10 | A |
| Circuit Fusing Considerations ($t=8.3$ ms) | | I^2t | 0.415 | A^2s |
| Forward Peak Gate Power ($T_A=25^\circ\text{C}$, Pulse Width $\leq 1.0\mu\text{s}$) | | P_{GM} | 0.1 | W |
| Forward Average Gate Power ($T_A=25^\circ\text{C}$, $t=8.3\text{ms}$) | | $P_{G(AV)}$ | 0.1 | W |
| Peak Gate Current – Forward ($T_A=25^\circ\text{C}$, Pulse Width $\leq 1.0\mu\text{s}$) | | I_{GM} | 1 | A |
| Peak Gate Voltage – Reverse ($T_A=25^\circ\text{C}$, Pulse Width $\leq 1.0\mu\text{s}$) | | V_{GRM} | 5 | V |
| Operating Junction Temperature Range (Rated V_{RRM} and V_{DRM}) | | T_J | -40 ~ +110 | $^\circ\text{C}$ |
| Storage Temperature Range | | T_{STG} | -40 ~ +150 | $^\circ\text{C}$ |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL DATA

| PARAMETER | | SYMBOL | MAX | UNIT |
|---------------------|---------------|---------------|-----|--------------------|
| Junction to Ambient | TO-92 | θ_{JA} | 200 | $^\circ\text{C/W}$ |
| | SOT-23/SOT-89 | | 400 | $^\circ\text{C/W}$ |

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

| PARAMETER | | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|-----------------------------------------------|-------------------------|--------------------|---------------------------------------------------------------------------------------------------------|-----|------|-----|------------------|
| OFF CHARACTERISTICS | | | | | | | |
| Peak Forward or Reverse Blocking Current | $T_C=25^\circ\text{C}$ | I_{DRM}, I_{RRM} | $V_D=\text{Rated } V_{DRM} \text{ and } V_{RRM};$ $R_{GK}=1\text{k}\Omega$ | | | 10 | μA |
| | $T_C=125^\circ\text{C}$ | | | | | 100 | μA |
| ON CHARACTERISTICS | | | | | | | |
| Peak Forward On-State Voltage (Note 2) | | V_{TM} | $I_{TM}=1\text{A Peak @ } T_A=25^\circ\text{C}$ | | | 1.7 | V |
| Gate Trigger Current (Continuous DC)(Note3) | | I_{GT} | $V_{AK}=7\text{Vdc}, R_L=100\Omega, T_C=25^\circ\text{C}$ | | 40 | 200 | μA |
| Holding Current (Note 4) | $T_C=25^\circ\text{C}$ | I_H | $V_{AK}=7\text{Vdc}$, initiating current=20mA | | 0.5 | 5 | mA |
| | $T_C=-40^\circ\text{C}$ | | | | | 10 | mA |
| Latch Current | $T_C=25^\circ\text{C}$ | I_L | $V_{AK}=7\text{V}$, $I_g=200\mu\text{A}$ | | 0.6 | 10 | mA |
| | $T_C=-40^\circ\text{C}$ | | | | | 15 | mA |
| Gate Trigger Voltage (continuous dc) (Note 3) | $T_C=25^\circ\text{C}$ | V_{GT} | $V_{AK}=7\text{Vdc}, R_L=100\Omega$ | | 0.62 | 0.8 | V |
| | $T_C=-40^\circ\text{C}$ | | | | | 1.2 | V |
| DYNAMIC CHARACTERISTICS | | | | | | | |
| Critical Rate of Rise of Off-State Voltage | | d_V/dt | $V_D=\text{Rated } V_{DRM}$, Exponential Waveform, $R_{GK}=1000\Omega$, $T_J=110^\circ\text{C}$ | 20 | 35 | | V/ μs |
| Critical Rate of Rise of On-State Current | | di/dt | $I_{PK}=20\text{A}$; $P_w=10\mu\text{sec}$; $di/dt=1\text{A}/\mu\text{sec}$, $I_{gt}=20\text{mA}$ | | | 50 | A/ μs |

Notes: 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. Indicates Pulse Test Width $\leq 1.0\text{ms}$, duty cycle $\leq 1\%$

3. $R_{GK}=1000\Omega$ included in measurement.

4. Does not include R_{GK} in measurement

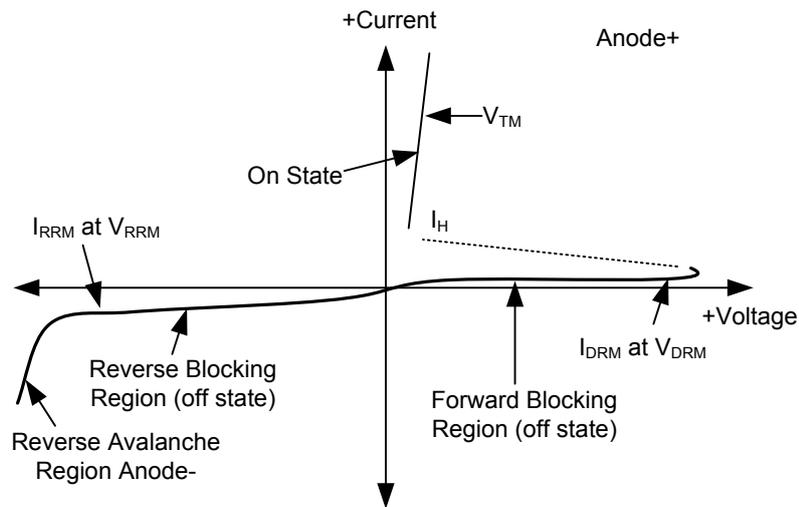


MCR100

SCR

VOLTAGE CURRENT CHARACTERISTIC OF SCR

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



CLASSIFICATION OF I_{GT}

| RANK | B | C | AA | AB | AC | AD |
|-------|----------------|----------------|--------------|---------------|---------------|---------------|
| RANGE | 48~105 μ A | 95~200 μ A | 8~16 μ A | 14~21 μ A | 19~25 μ A | 23~52 μ A |