



**MCR100**

**SCR**

**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**

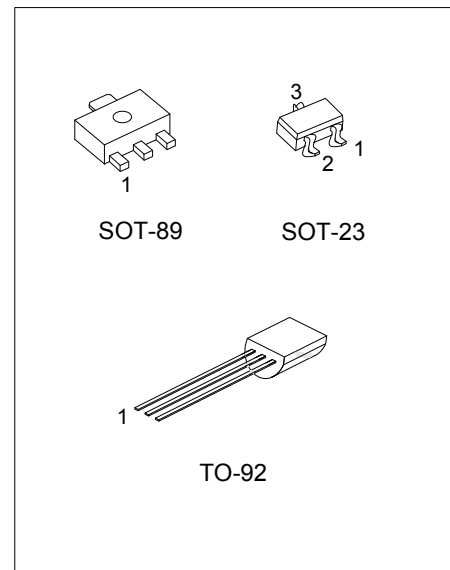
- \* Sensitive gate allows triggering by micro controllers and other logic circuits
- \* Blocking voltage to 600V
- \* On-state current rating of 0.8A RMS at 80°C
- \* High surge current capability – 10A
- \* Minimum and maximum values of  $I_{GT}$ ,  $V_{GT}$  and  $I_H$  specified for ease of design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

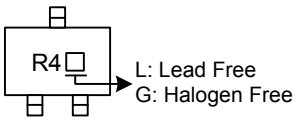
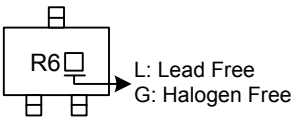
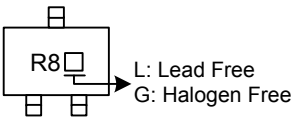
Note: Pin assignment: G: Gate K: Cathode A: Anode

<p>MCR100L-4-x-AB3-R</p>	<p>(1) B: Tape Box, K: Bulk, R: Tape Reel</p> <p>(2) AB3: SOT-89, AE3: SOT-23, T92: TO-92</p> <p>(3) x: Refer to CLASSIFICATION OF <math>I_{GT}</math></p> <p>(4) G: Halogen Free, L: Lead Free, Blank: Pb/Sn</p>
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Lead-free: MCR100L  
Halogen-free: MCR100G

■ MARKING FOR SOT-23

MCR100-4	MCR100-6	MCR100-8
 <p>R4 → L: Lead Free G: Halogen Free</p>	 <p>R6 → L: Lead Free G: Halogen Free</p>	 <p>R8 → L: Lead Free G: Halogen Free</p>



## 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	$\text{A}^2\text{s}$
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	$\theta_{JA}$	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
<b>OFF CHARACTERISTICS</b>							
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	$\mu\text{A}$
	$T_C=125^\circ\text{C}$					100	$\mu\text{A}$
<b>ON CHARACTERISTICS</b>							
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	$\mu\text{A}$
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
<b>DYNAMIC CHARACTERISTICS</b>							
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/ $\mu\text{s}$
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/ $\mu\text{s}$

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  $\leq 1\%$

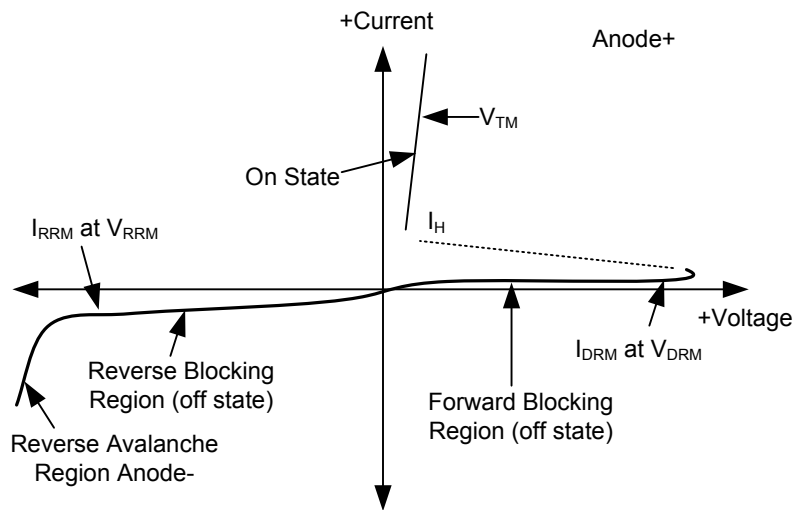
3.  $R_{GK}=1000\Omega$  included in measurement.

4. Does not include  $R_{GK}$  in measurement



■ VOLTAGE CURRENT CHARACTERISTIC OF SCR

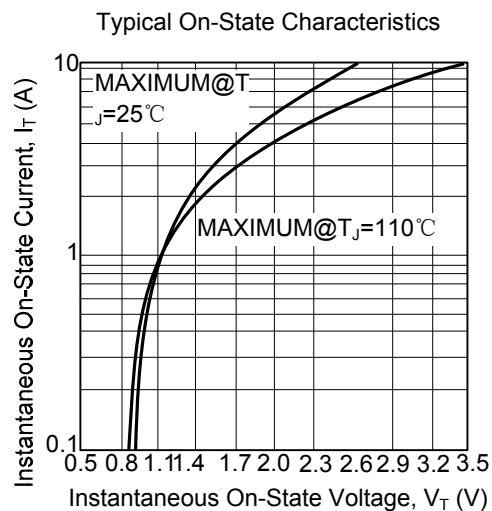
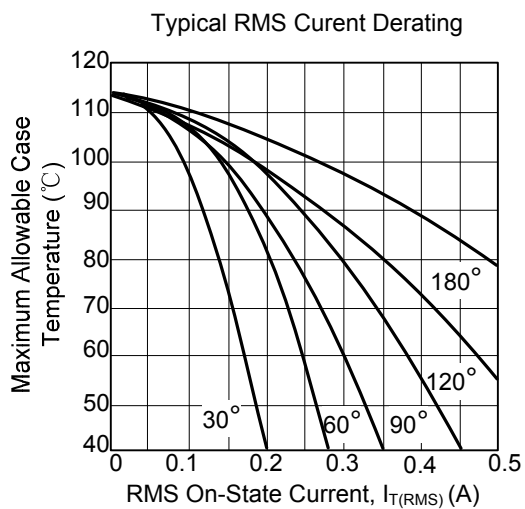
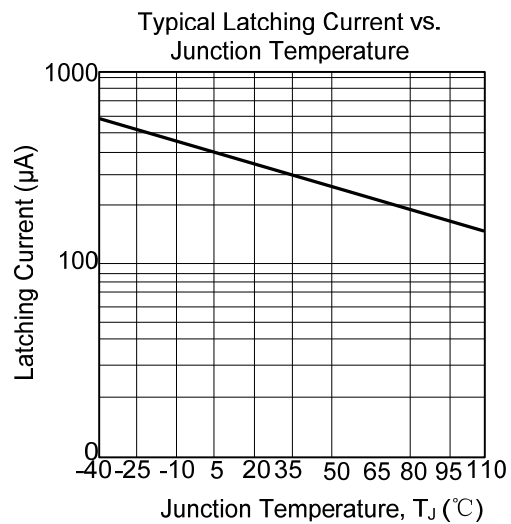
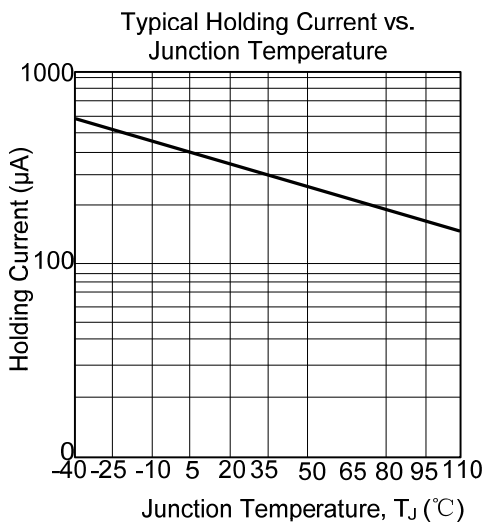
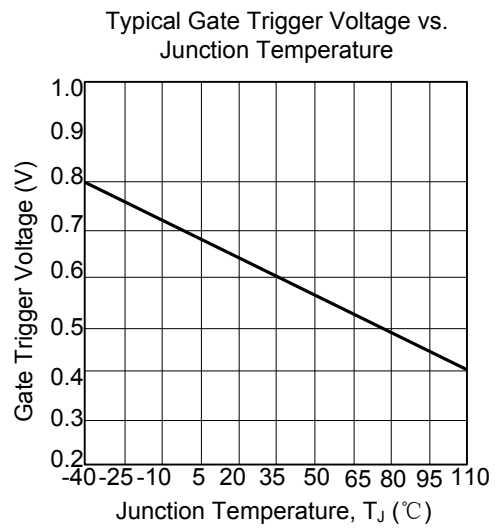
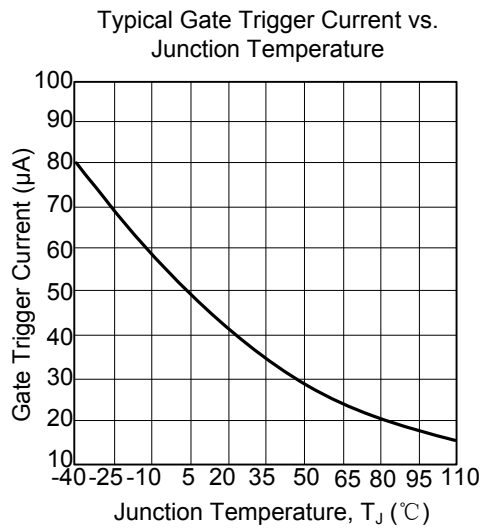
PARAMETER	SYMBOL
Peak Repetitive Off Stat Forward Voltage	$V_{DRM}$
Peak Forward Blocking Current	$I_{DRM}$
Peak Repetitive Off State Reverse Voltage	$V_{RRM}$
Peak Reverse Blocking Current	$I_{RRM}$
Peak On State Voltage	$V_{TM}$
Holding Current	$I_H$



■ CLASSIFICATION OF  $I_{GT}$

RANK	B	C	AA	AB	AC	AD
RANGE	48~105 $\mu$ A	95~200 $\mu$ A	8~16 $\mu$ A	14~21 $\mu$ A	19~25 $\mu$ A	23~52 $\mu$ A

## TYPICAL CHARACTERISTICS



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