



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

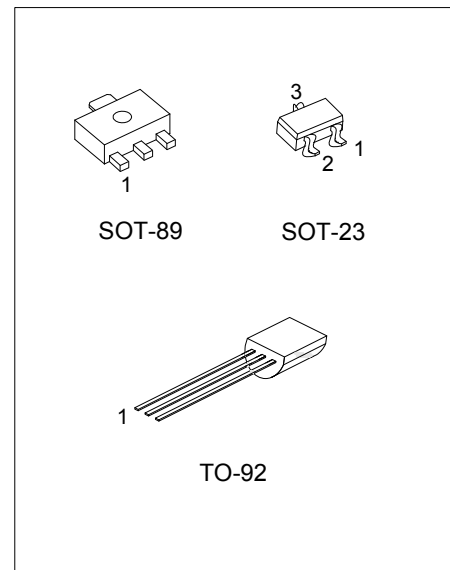
- * Sensitive gate allows triggering by micro controllers and other logic circuits
- * Blocking voltage to 600V
- * On-state current rating of 0.8A RMS at 80°C
- * High surge current capability – 10A
- * Minimum and maximum values of I_{GT} , V_{GT} and I_H specified for ease of design
- * Immunity to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

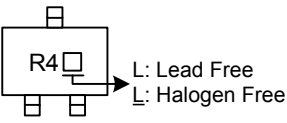
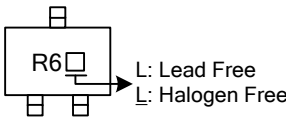
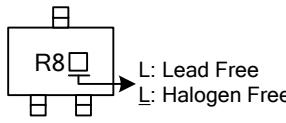
Note: Pin assignment: G: Gate K: Cathode A: Anode

<p>MCR100L-4-x-AB3-R</p>	<p>(1) 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 I_{GT}</p> <p>(4) G: Halogen Free, L: Lead Free, Blank: Pb/Sn</p>
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Lead-free: MCR100L
Halogen-free: MCR100GG

■ MARKING FOR SOT-23

MCR100L-4	MCR100L-6	MCR100L-8
 <p>R4 → L: Lead Free L: Halogen Free</p>	 <p>R6 → L: Lead Free L: Halogen Free</p>	 <p>R8 → L: Lead Free L: Halogen Free</p>



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■ 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 $^{\circ}$ 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	$^{\circ}\text{C}/\text{W}$
	SOT-23/SOT-89		400	$^{\circ}\text{C}/\text{W}$

■ 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 $\leq 1\%$

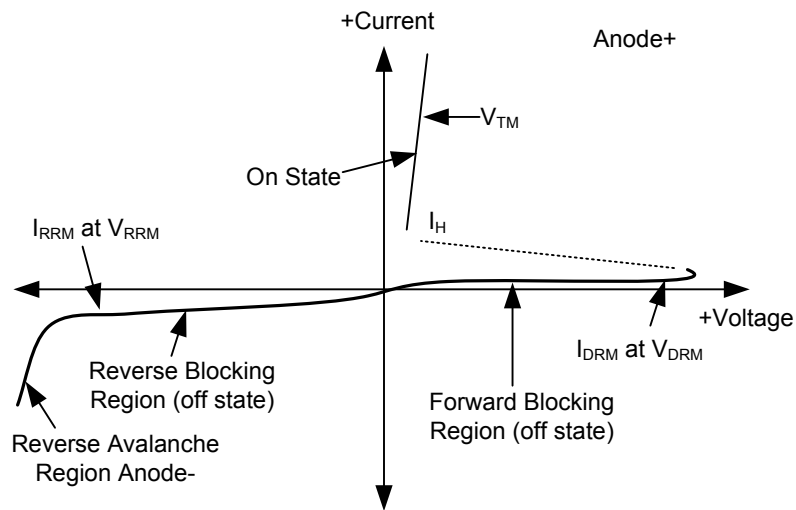
3. $R_{GK}=1000\Omega$ included in measurement.

4. Does not include R_{GK} in measurement



■ VOLTAGE CURRENT CHARACTERISTIC OF SCR

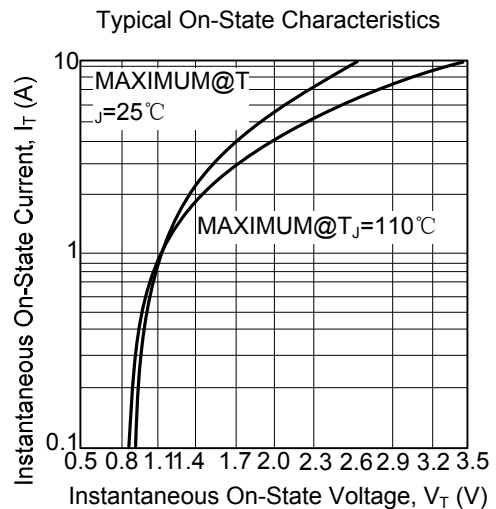
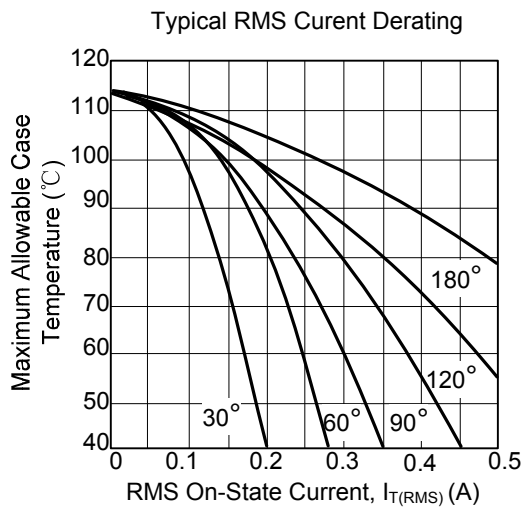
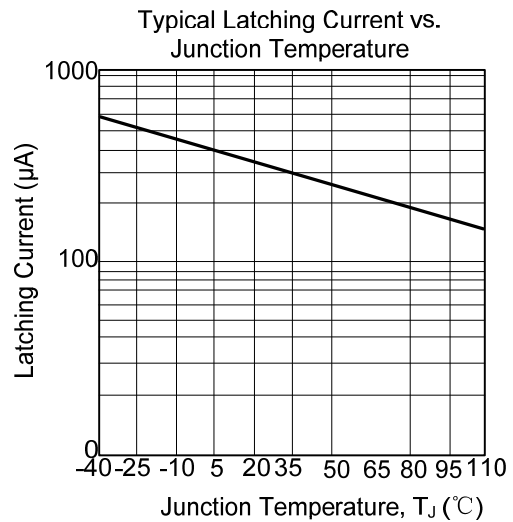
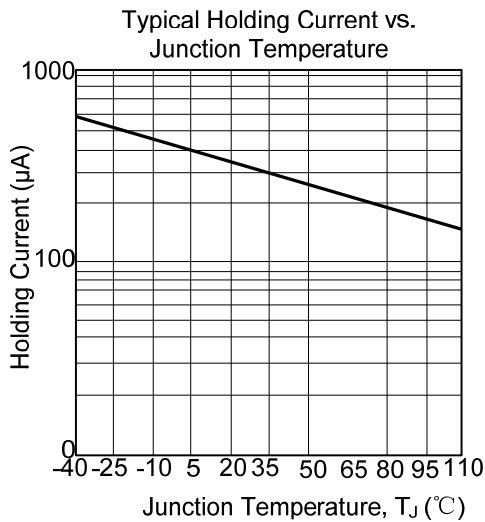
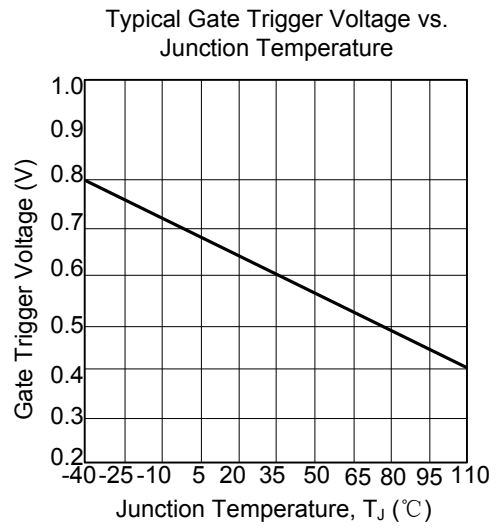
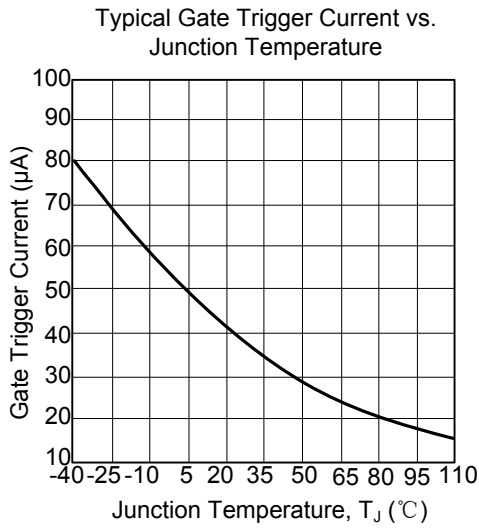
PARAMETER	SYMBOL
Peak Repetitive Off Stat Forward Voltage	V_{DRM}
Peak Forward Blocking Current	I_{DRM}
Peak Repetitive Off State Reverse Voltage	V_{RRM}
Peak Reverse Blocking Current	I_{RRM}
Peak On State Voltage	V_{TM}
Holding Current	I_H



■ 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

■ TYPICAL CHARACTERISTICS



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