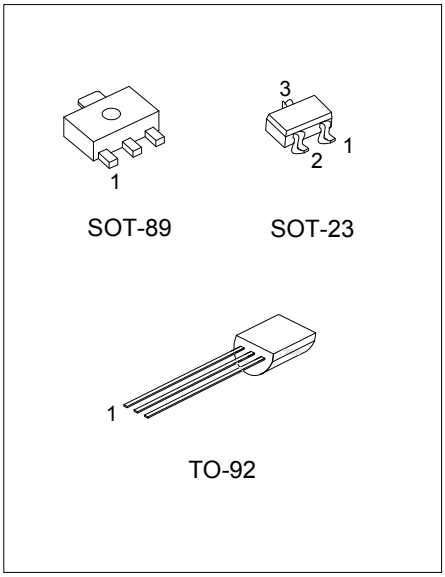
MCR100

SCR

SENSITIVE GATE SILICON CONTROLLED RECTIFIERS REVERSE BLOCKING THYRISTORS



Lead-free: MCR100L
Halogen-free:MCR100G

■ 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/μsec minimum at 110°C
* Glass-passivated surface for reliability and uniformity

■ ORDERING INFORMATION

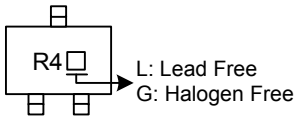
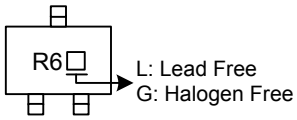
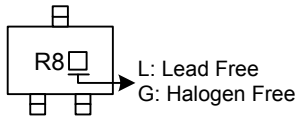
Ordering Number			Package	Pin assignment			Packing
Normal	Lead Free Plating	Halogen Free		1	2	3	
MCR100-4-x-AB3-R	MCR100L-4-x-AB3-R	MCR100G-4-x-AB3-R	SOT-89	G	A	K	Tape Reel
MCR100-4-x-AE3-R	MCR100L-4-x-AE3-R	MCR100G-4-x-AE3-R	SOT-23	G	K	A	Tape Reel
MCR100-4-x-T92-B	MCR100L-4-x-T92-B	MCR100G-4-x-T92-B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

MCR100L-4-x-AB3-R

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

■ MARKING FOR SOT-23

MCR100-4	MCR100-6	MCR100-8
		

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Peak Repetitive Off-State Voltage(Note 1) (T_J=-40 ~ 110°C, Sine Wave, 50 ~ 60Hz; Gate Open)	MCR100-4	V_{DRM},V_{RRM}	200	V
	MCR100-6		400	V
	MCR100-8		600	V
On-Sate RMS Current (Tc=80°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°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°C, Pulse Width ≤1.0μs)		P_{GM}	0.1	W
Forward Average Gate Power (T_A=25°C, t=8.3ms)		$P_{G(AV)}$	0.1	W
Peak Gate Current – Forward (T_A=25°C, Pulse Width≤1.0μs)		I_{GM}	1	A
Peak Gate Voltage – Reverse (T_A=25°C, Pulse Width≤1.0μs)		V_{GRM}	5	V
Operating Junction Temperature Range (Rated V_{RRM} and V_{DRM})		T_J	-40 ~ +110	°C
Storage Temperature Range		T_{STG}	-40 ~ +150	°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	°C/W
	SOT-23/SOT-89		400	°C/W

■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise stated)

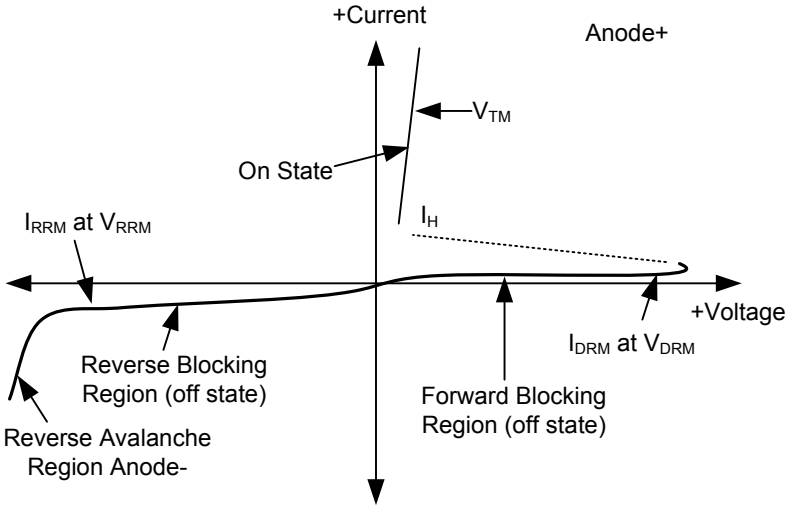
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Peak Forward or Reverse Blocking Current	T_C=25°C	I_{DRM}, I_{RRM}	V_D=Rated V_{DRM} and V_{RRM}; R_{GK}=1kΩ			10	μA
	T_C=125°C					100	μA
ON CHARACTERISTICS							
Peak Forward On-State Voltage (Note 2)		V_{TM}	I_{TM}=1A Peak @ T_A=25°C			1.7	V
Gate Trigger Current (Continuous DC)(Note3)		I_{GT}	V_{AK}=7Vdc, R_L=100Ω, T_C=25°C		40	200	μA
Holding Current (Note 4)	T_C=25°C	I_H	V_{AK}=7Vdc, initiating current=20mA		0.5	5	mA
	T_C=-40°C					10	mA
Latch Current	T_C=25°C	I_L	V_{AK}=7V, Ig=200μA		0.6	10	mA
	T_C=-40°C					15	mA
Gate Trigger Voltage (continuous dc) (Note 3)	T_C=25°C	V_{GT}	V_{AK}=7Vdc, R_L=100Ω		0.62	0.8	V
	T_C=-40°C					1.2	V
DYNAMIC CHARACTERISTICS							
Critical Rate of Rise of Off-State Voltage		dv/dt	V_D=Rated V_{DRM}, Exponential Waveform, R_{GK}=1000Ω, T_J=110°C	20	35		V/μs
Critical Rate of Rise of On-State Current		di/dt	I_{PK}=20A; Pw=10μsec; diG/dt=1A/μsec, Igt=20mA			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≤1.0ms, duty cycle ≤1%
3. R_{GK}=1000Ω 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

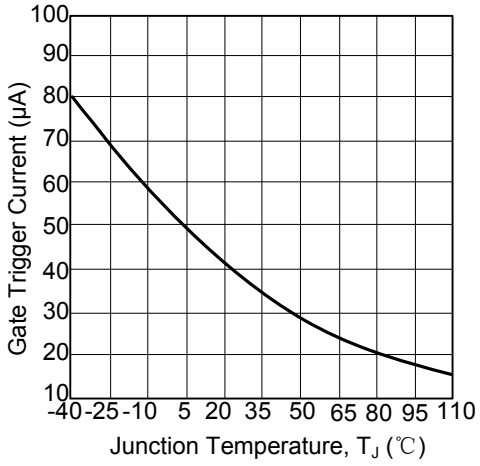


■ CLASSIFICATION OF I_{GT}

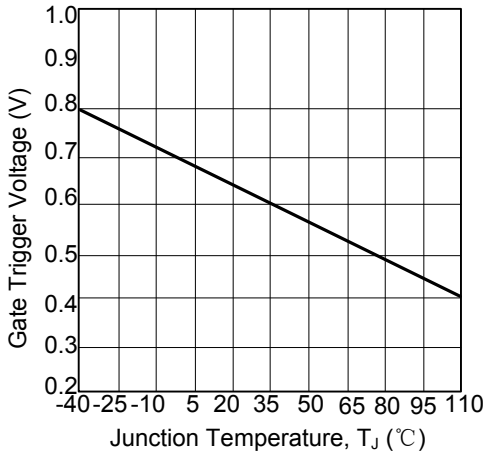
RANK	B	C	AA	AB	AC	AD
RANGE	48~105μA	95~200μA	8~16μA	14~21μA	19~25μA	23~52μA

■ TYPICAL CHARACTERISTICS

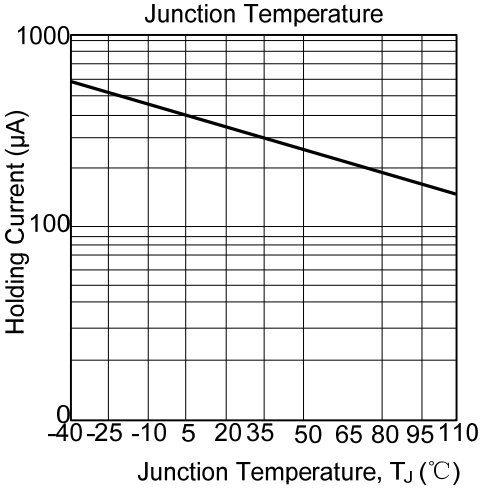
Typical Gate Trigger Current vs. Junction Temperature



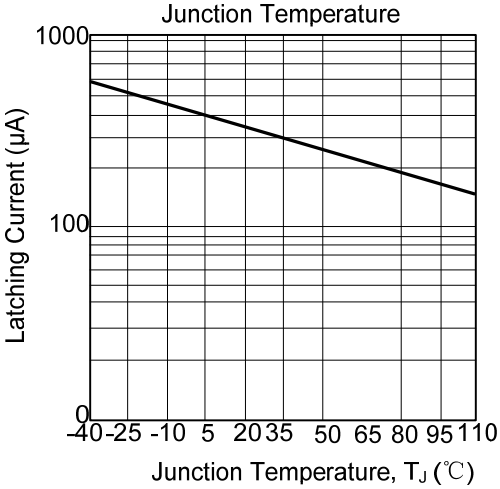
Typical Gate Trigger Voltage vs. Junction Temperature



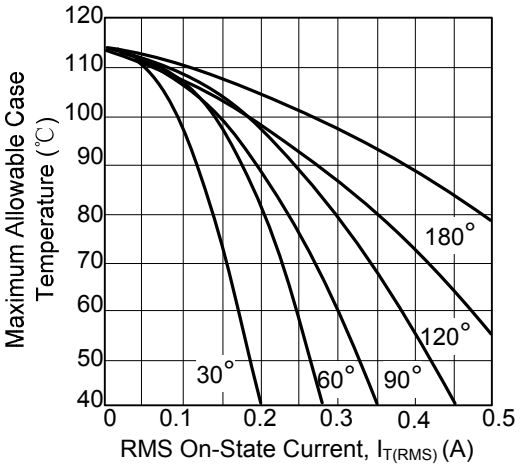
Typical Holding Current vs. Junction Temperature



Typical Latching Current vs. Junction Temperature



Typical RMS Curent Derating



Typical On-State Characteristics