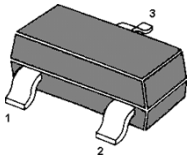
MCR100 Series

Sensitive Gate Silicon Controlled Rectifiers



1. SOT-23 Plastic Package
2. MARKING:

MCR100-3:100-3
MCR100-4:100-4
MCR100-5:100-5
MCR100-6:100-6
MCR100-7:100-7
MCR100-8:100-8

Features

- Sensitive Gate Allows Triggering by Microcontrollers and Other Logic Circuits
- Blocking Voltage to 600 V
- On−State Current Rating of 0.8 Amperes RMS at 80°C
- High Surge Current Capability − 10 A
- Minimum and Maximum Values of IGT, VGT and IH Specified for Ease of Design
- Immunity to dV/dt − 20 V/μsec Minimum at 110°C
- Glass-Passivated Surface for Reliability and Uniformity

PIN ASSIGNMENT	
1	Cathode
2	Gate
3	Anode

MAXIMUM RATINGS (T_J=25°C unless otherwise noted.)

Rating		Symbol	Value	Unit
Peak Repetitive Forward and Reverse Blocking Voltage, Note 1 (T_J=25 to 125°C, R_{GK}=1KΩ)	MCR100-3	V_{DRM} and V_{RRM}	100	Volts
	MCR100-4		200	
	MCR100-5		300	
	MCR100-6		400	
	MCR100-7		500	
	MCR100-8		600	
Forward Current RMS (All Conduction Angles)		$I_{T(RMS)}$	0.8	Amps
Peak Forward Surge Current, T_A=25°C (1/2 Cycle, Sine Wave, 60Hz)		I_{TSM}	10	Amps
Circuit Fusing (t=8.3ms)		I^2t	0.415	A^2s
Peak Gate Power - Forward, T_A=25°C		P_{GM}	0.1	Watts
Average Gate Power - Forward, T_A=25°C		$P_{GF(AV)}$	0.01	Watt
Peak Gate Current - Forward, T_A=25°C (300μs,120PPS)		I_{GFM}	1	Amp
Peak Gate Voltage - Reverse		V_{GRM}	5	Volts
Operating Junction Temperature Range @ Rated V_{RRM} and V_{DRM}		T_J	-40 to +125	°C
Storage Temperature Range		T_s	-40 to +150	°C

Note 1. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance,Junction−to−Case Junction−to−Ambient	$R_{\theta JC}$ $R_{\theta JA}$	75 200	°C/W
Lead Solder Temperature (<1/16″ from case, 10 secs max)	T_L	260	°C

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

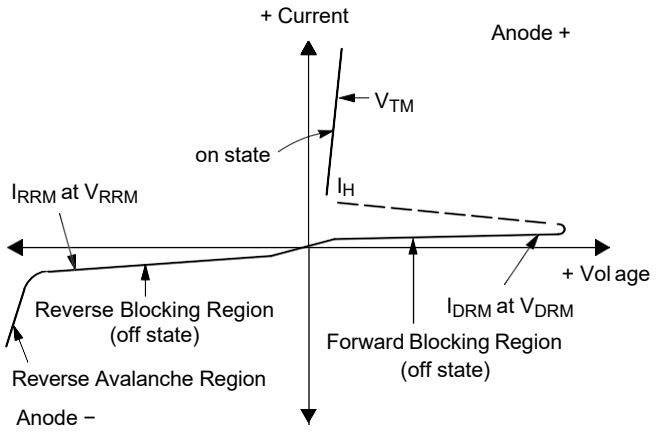
Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Peak Repetitive Forward or Reverse Blocking Current (Note 2)		I_{DRM}, I_{RRM}				μA
	T_C = 25°C		−	−	10	
(V_D = Rated V_{DRM} and V_{RRM}; R_{GK} = 1 kΩ)	T_C = 110°C		−	−	100	
ON CHARACTERISTICS						
Peak Forward On−State Voltage* (I_{TM} = 1.0 A Peak @ T_A = 25°C)		V_{TM}	−	−	1.7	V
Gate Trigger Current (Continuous dc) (Note 3) (V_{AK} = 7.0 Vdc, R_L = 100 Ω)	T_C = 25°C	I_{GT}	−	40	200	μA
Holding Current(2)	T_C = 25°C	I_H	−	0.5	5.0	mA
(V_{AK} = 7.0 Vdc, Initiating Current = 20 mA)	T_C = −40°C		−	−	10	
Latch Current	T_C = 25°C	I_L	−	0.6	10	mA
(V_{AK} = 7.0 V, Ig = 200 μA)	T_C = −40°C		−	−	15	
Gate Trigger Voltage (Continuous dc) (Note 3)	T_C = 25°C	V_{GT}	−	0.62	0.8	V
(V_{AK} = 7.0 Vdc, R_L = 100 Ω) T_C = −40°C			−	−	1.2	
DYNAMIC CHARACTERISTICS						
Critical Rate of Rise of Off−State Voltage (V_D = Rated V_{DRM}, Exponential Waveform, R_{GK} = 1000 Ω,T_J = 110°C)		dV/dt	20	35	−	V/μs
Critical Rate of Rise of On−State Current (I_{PK} = 20 A; Pw = 10 μsec; diG/dt = 1 A/μsec, Igt = 20 mA)		di/dt	−	−	50	A/μs

*Indicates Pulse Test: Pulse Width ≤ 1.0 ms, Duty Cycle ≤ 1%.

2. R_{GK} = 1000 Ω included in measurement.
3. Does not include R_{GK} in measurement.

Voltage Current Characteristic of SCR

Symbol	Parameter
V_{DRM}	Peak Repetitive Off State Forward Voltage
I_{DRM}	Peak Forward Blocking Current
V_{RRM}	Peak Repetitive Off State Reverse Voltage
I_{RRM}	Peak Reverse Blocking Current
V_{TM}	Peak on State Voltage
I_H	Holding Current



Typical Characteristics

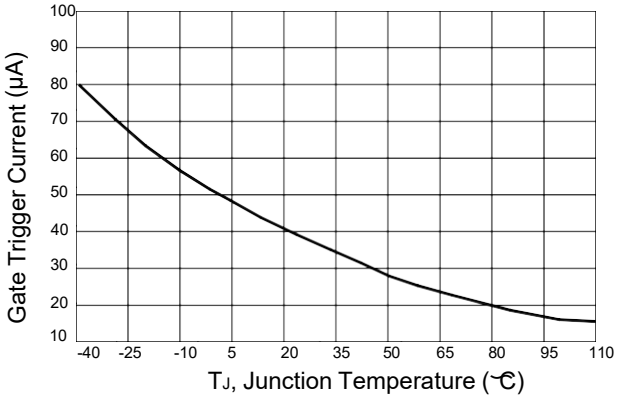


Figure 1. Typical Gate Trigger Curent Versus Junction Temperature

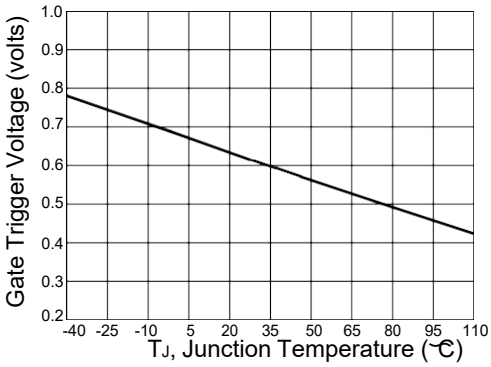


Figure 2. Typical Gate Trigger Voltage Versus Junction Temperature

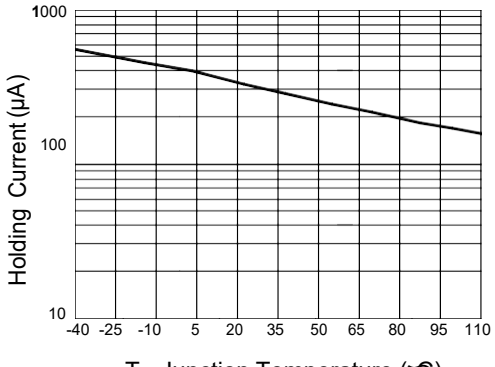


Figure 3. Typical Holding Curent Versus Junction Temperature

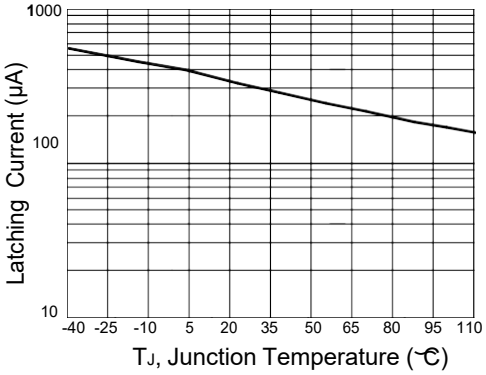


Figure 4. Typical Latching Curent Versus Junction Temperature

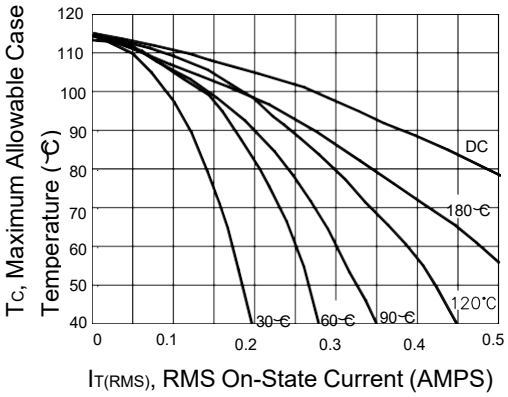


Figure 5. Typical RMS Current Derating

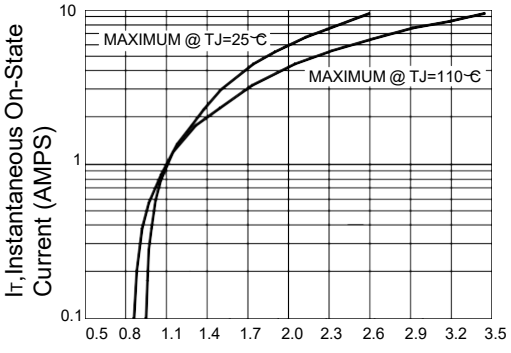
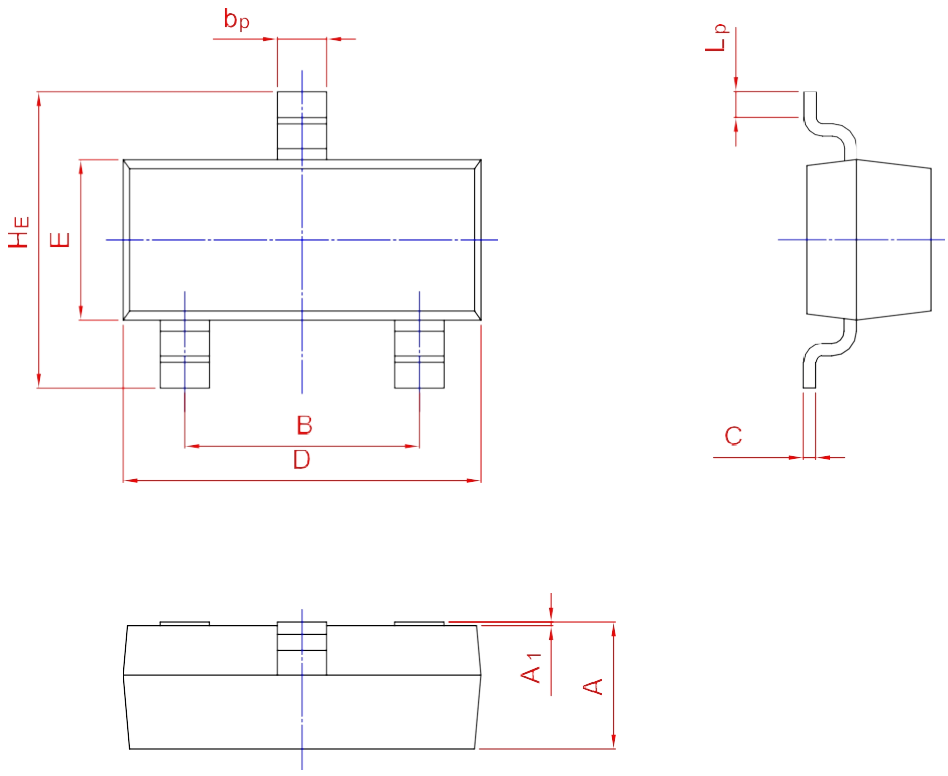


Figure 6. Typical On-State Characteristics

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads **SOT-23**



UNIT	A	B	bp	C	D	E	HE	A1	Lp
mm	1.40 0.95	2.04 1.78	0.50 0.35	0.19 0.08	3.10 2.70	1.65 1.20	3.00 2.20	0.100 0.013	0.50 0.20