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## MCR100 Series

Preferred Device

### Sensitive Gate Silicon Controlled Rectifiers

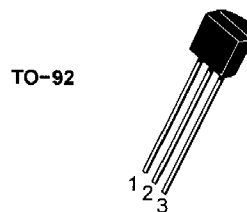
#### Reverse Blocking Thyristors

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. Supplied in an inexpensive plastic TO-226AA package which is readily adaptable for use in automatic insertion equipment.

#### Features

- Sensitive Gate Allows Triggering by Microcontrollers and Other Logic Circuits
- Blocking Voltage to 600 V
- On-State Current Rating of 0.8 A 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/ $\mu$ sec Minimum at 110°C
- Glass-Passivated Surface for Reliability and Uniformity

SCRs  
0.8 A RMS  
100 thru 600 V



TO-92  
STRAIGHT LEAD  
BULK PACK



NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

Quality Semi-Conductors

## MCR100 Series

### MAXIMUM RATINGS ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage (Notes 1 and 2) ( $T_J = -40$ to $110^\circ\text{C}$ , Sine Wave, 50 to 60 Hz; Gate Open)	$V_{\text{DRM}}$ , $V_{\text{RRM}}$	MCR100-3 100 MCR100-4 200 MCR100-6 400 MCR100-8 600	V
On-State RMS Current, ( $T_C = 80^\circ\text{C}$ ) 180° Conduction Angles	$I_{\text{T(RMS)}}$	0.8	A
Peak Non-Repetitive Surge Current, (1/2 Cycle, Sine Wave, 60 Hz, $T_J = 25^\circ\text{C}$ )	$I_{\text{TSM}}$	10	A
Circuit Fusing Consideration, ( $t = 8.3$ ms)	$I^2t$	0.415	$\text{A}^2\text{s}$
Forward Peak Gate Power, ( $T_A = 25^\circ\text{C}$ , Pulse Width $\leq 1.0$ $\mu\text{s}$ )	$P_{\text{GM}}$	0.1	W
Forward Average Gate Power, ( $T_A = 25^\circ\text{C}$ , $t = 8.3$ ms)	$P_{\text{G(AV)}}$	0.10	W
Forward Peak Gate Current, ( $T_A = 25^\circ\text{C}$ , Pulse Width $\leq 1.0$ $\mu\text{s}$ )	$I_{\text{GM}}$	1.0	A
Reverse Peak Gate Voltage, ( $T_A = 25^\circ\text{C}$ , Pulse Width $\leq 1.0$ $\mu\text{s}$ )	$V_{\text{GRM}}$	5.0	V
Operating Junction Temperature Range @ Rate $V_{\text{RRM}}$ and $V_{\text{DRM}}$	$T_J$	-40 to 110	$^\circ\text{C}$
Storage Temperature Range	$T_{\text{stg}}$	-40 to 150	$^\circ\text{C}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

- $V_{\text{DRM}}$  and  $V_{\text{RRM}}$  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.
- See ordering information for exact device number options.

### THERMAL CHARACTERISTICS

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

### ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Peak Repetitive Forward or Reverse Blocking Current (Note 2)	$I_{\text{DRM}}$ , $I_{\text{RRM}}$	-	-	10	$\mu\text{A}$
( $V_D = \text{Rated } V_{\text{DRM}}$ and $V_{\text{RRM}}$ ; $R_{\text{GK}} = 1$ $\text{k}\Omega$ )		-	-	100	
$T_C = 25^\circ\text{C}$					
$T_C = 110^\circ\text{C}$					

### ON CHARACTERISTICS

Peak Forward On-State Voltage* ( $I_{\text{TM}} = 1.0$ A Peak @ $T_A = 25^\circ\text{C}$ )	$V_{\text{TM}}$	-	-	1.7	V
Gate Trigger Current (Continuous dc) (Note 3) ( $V_{\text{AK}} = 7.0$ Vdc, $R_L = 100$ $\Omega$ )	$I_{\text{GT}}$	-	40	200	$\mu\text{A}$
Holding Current <sup>(2)</sup> ( $V_{\text{AK}} = 7.0$ Vdc, Initiating Current = 20 mA)	$I_{\text{H}}$	-	0.5	5.0	mA
		-	-	10	
Latch Current ( $V_{\text{AK}} = 7.0$ V, $I_{\text{g}} = 200$ $\mu\text{A}$ )	$I_{\text{L}}$	-	0.6	10	mA
		-	-	15	
Gate Trigger Voltage (Continuous dc) (Note 3) ( $V_{\text{AK}} = 7.0$ Vdc, $R_L = 100$ $\Omega$ ) $T_C = -40^\circ\text{C}$	$V_{\text{GT}}$	-	0.62	0.8	V
		-	-	1.2	

### DYNAMIC CHARACTERISTICS

Critical Rate of Rise of Off-State Voltage ( $V_D = \text{Rated } V_{\text{DRM}}$ , Exponential Waveform, $R_{\text{GK}} = 1000$ $\Omega$ , $T_J = 110^\circ\text{C}$ )	$dV/dt$	20	35	-	$\text{V}/\mu\text{s}$
Critical Rate of Rise of On-State Current ( $I_{\text{PK}} = 20$ A; $P_w = 10$ $\mu\text{sec}$ ; $di/dt = 1$ A/ $\mu\text{sec}$ , $I_{\text{gt}} = 20$ mA)	$di/dt$	-	-	50	$\text{A}/\mu\text{s}$

\*Indicates Pulse Test: Pulse Width  $\leq 1.0$  ms, Duty Cycle  $\leq 1\%$ .

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

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