

# Silicon Controlled Rectifiers

## Reverse Blocking Thyristors

Designed for high volume, low cost, industrial and consumer applications such as motor control; process control; temperature, light and speed control.

- Small Size
- Passivated Die for Reliability and Uniformity
- Low Level Triggering and Holding Characteristics
- Available in Two Package Styles

Surface Mount Lead Form — Case 369A

Miniature Plastic Package — Straight Leads — Case 369

### ORDERING INFORMATION

- To Obtain "DPAK" in Surface Mount Leadform (Case 369A)  
Shipped in Sleeves — No Suffix, i.e. MCR8DCN  
Shipped in 16 mm Tape and Reel — Add "T4" Suffix to Device Number, i.e. MCR8DCNT4
- To Obtain "DPAK" in Straight Lead Version (Case 369) Shipped in Sleeves —  
Add "-1" Suffix to Device Number, i.e. MCR8DCN-1

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

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage (1)	$V_{DRM}$		Volts
Peak Repetitive Reverse Voltage ( $T_J = -40$ to $125^\circ\text{C}$ )	$V_{RRM}$	600 800	
MCR8DCM			
MCR8DCN			
On-State RMS Current (All Conduction Angles; $T_C = 105^\circ\text{C}$ )	$I_T(\text{RMS})$	8.0	Amps
Average On-State Current (All Conduction Angles; $T_C = 105^\circ\text{C}$ )	$I_T(\text{AV})$	5.1	
Peak Non-Repetitive Surge Current (One Half Cycle, 60 Hz, $T_J = 125^\circ\text{C}$ )	$I_{TSM}$	80	
Circuit Fusing Consideration ( $t = 8.3$ msec)	$I^2t$	26	$\text{A}^2\text{sec}$
Peak Gate Power (Pulse Width $\leq 10$ $\mu\text{sec}$ , $T_C = 105^\circ\text{C}$ )	$P_{GM}$	5.0	Watts
Average Gate Power ( $t = 8.3$ msec, $T_C = 105^\circ\text{C}$ )	$P_{G(\text{AV})}$	0.5	
Peak Gate Current (Pulse Width $\leq 10$ $\mu\text{sec}$ , $T_C = 105^\circ\text{C}$ )	$I_{GM}$	2.0	Amps
Operating Junction Temperature Range	$T_J$	-40 to 125	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-40 to 150	

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance — Junction to Case	$R_{\theta JC}$	2.2	$^\circ\text{C}/\text{W}$
— Junction to Ambient	$R_{\theta JA}$	88	
— Junction to Ambient (2)	$R_{\theta JA}$	80	
Maximum Lead Temperature for Soldering Purposes (3)	$T_L$	260	$^\circ\text{C}$

(1)  $V_{DRM}$  for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; 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 device are exceeded.

(2) Surface mounted on minimum recommended pad size.

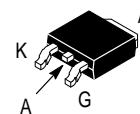
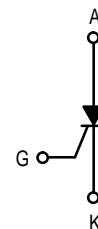
(3) 1/8" from case for 10 seconds.

Preferred devices are Motorola recommended choices for future use and best overall value.

**MCR8DCM**  
**MCR8DCN**

Motorola Preferred Devices

**SCRs**  
**8.0 AMPERES RMS**  
**600 thru 800 VOLTS**



**CASE 369A-13**  
**STYLE 4**

**MCR8DCM MCR8DCN**
**ELECTRICAL CHARACTERISTICS** ( $T_J = 25^\circ\text{C}$  unless otherwise noted)

Characteristics	Symbol	Min	Typ	Max	Unit
Peak Forward Blocking Current Peak Reverse Blocking Current ( $V_{AK}$ = Rated $V_{DRM}$ or $V_{RRM}$ , Gate Open)	$I_{DRM}$ $I_{RRM}$	—	—	0.01 5.0	mA
$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$					
Peak On-State Voltage (1) ( $I_{TM} = 16 \text{ A}$ )	$V_{TM}$	—	1.4	1.8	Volts
Gate Trigger Current (Continuous dc) ( $V_D = 12 \text{ V}$ , $R_L = 100 \Omega$ , $T_J = 25^\circ\text{C}$ ) ( $V_D = 12 \text{ V}$ , $R_L = 100 \Omega$ , $T_J = -40^\circ\text{C}$ )	$I_{GT}$	2.0 —	7.0 —	15 30	mA
Gate Trigger Voltage (Continuous dc) ( $V_D = 12 \text{ V}$ , $R_L = 100 \Omega$ , $T_J = 25^\circ\text{C}$ ) ( $V_D = 12 \text{ V}$ , $R_L = 100 \Omega$ , $T_J = -40^\circ\text{C}$ ) ( $V_D = 12 \text{ V}$ , $R_L = 100 \Omega$ , $T_J = 125^\circ\text{C}$ )	$V_{GT}$	0.5 — 0.2	0.65 —	1.0 2.0	Volts
Holding Current ( $V_D = 12 \text{ V}$ , $I_T = 200 \text{ mA}$ , $T_J = 25^\circ\text{C}$ ) ( $V_D = 12 \text{ V}$ , $I_T = 200 \text{ mA}$ , $T_J = -40^\circ\text{C}$ )	$I_H$	4.0 —	22 —	30 60	mA
Latching Current ( $V_D = 12 \text{ V}$ , $I_G = 15 \text{ mA}$ , $T_J = 25^\circ\text{C}$ ) ( $V_D = 12 \text{ V}$ , $I_G = 30 \text{ mA}$ , $T_J = -40^\circ\text{C}$ )	$I_L$	4.0 —	22 —	30 60	mA

**DYNAMIC CHARACTERISTICS**

Characteristics	Symbol	Min	Typ	Max	Unit
Critical Rate of Rise of Off-State Voltage ( $V_D$ = Rated $V_{DRM}$ , Exponential Waveform, Gate Open, $T_J = 125^\circ\text{C}$ )	$dv/dt$	50	200	—	$\text{V}/\mu\text{s}$

(1) Pulse Test; Pulse Width  $\leq 2.0 \text{ msec}$ , Duty Cycle  $\leq 2\%$ .

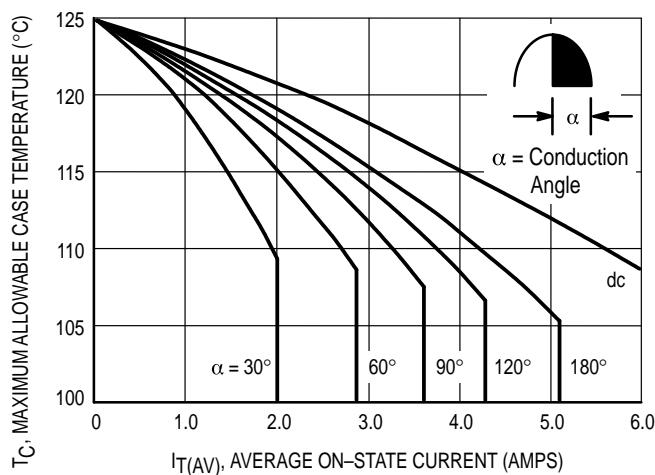


Figure 1. Average Current Derating

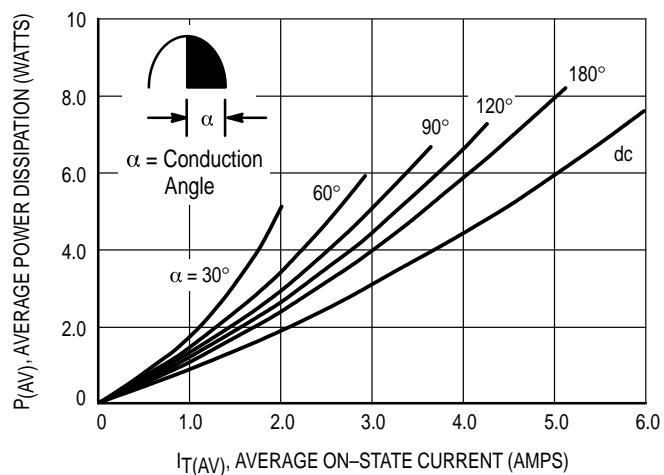


Figure 2. On-State Power Dissipation

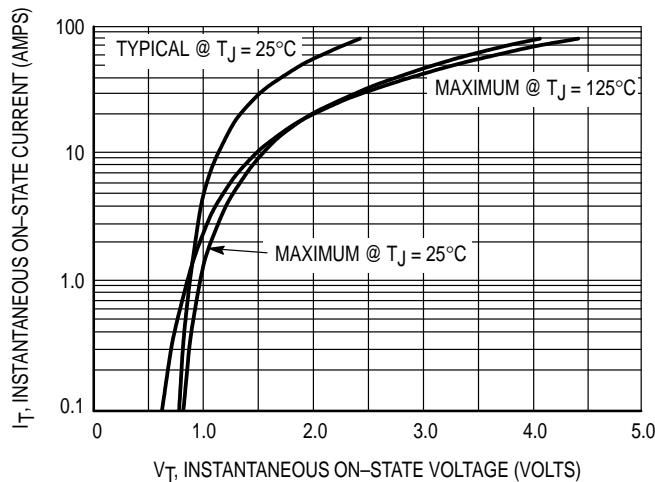


Figure 3. On-State Characteristics

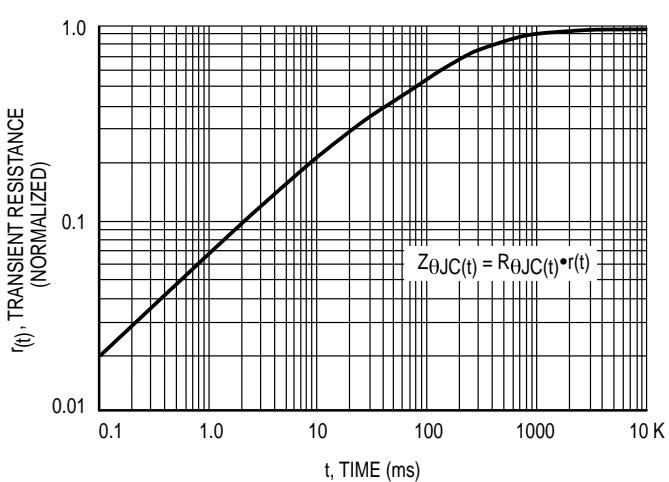


Figure 4. Transient Thermal Response

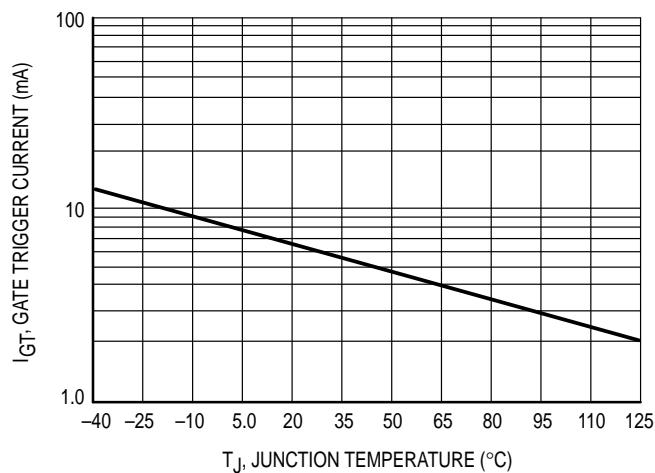


Figure 5. Typical Gate Trigger Current versus Junction Temperature

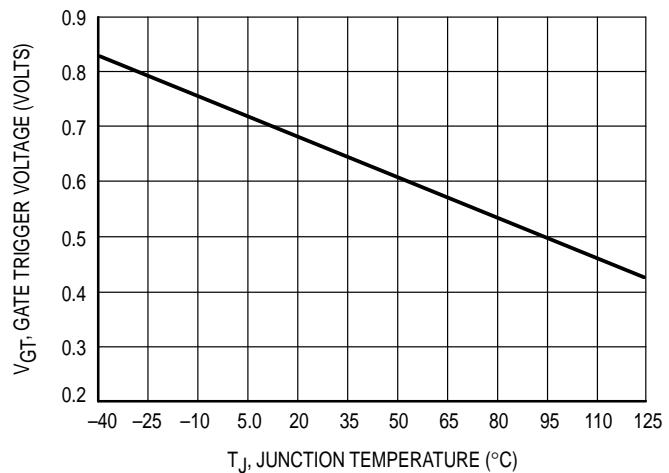
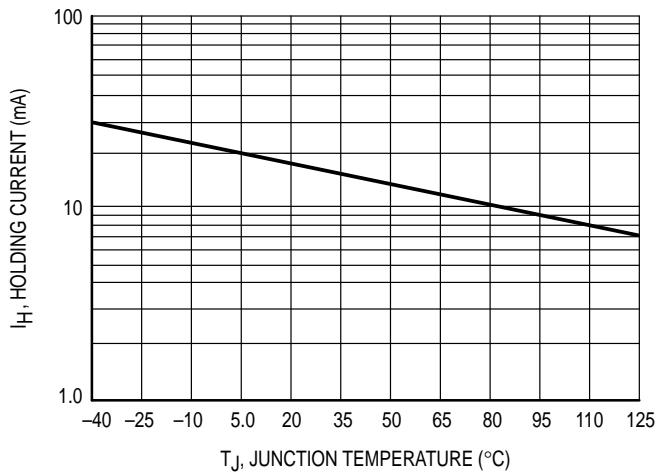
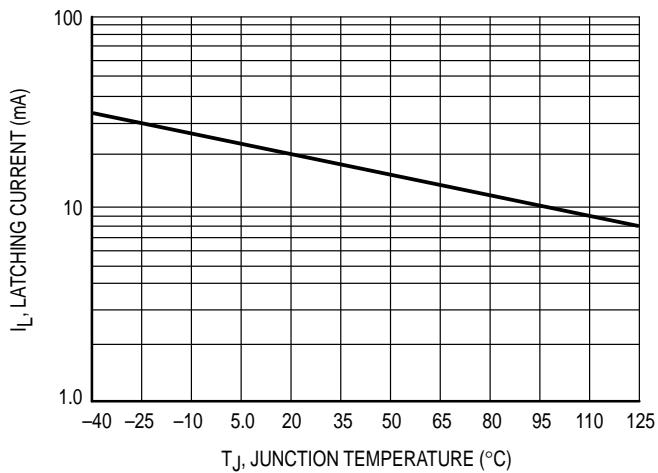


Figure 6. Typical Gate Trigger Voltage versus Junction Temperature

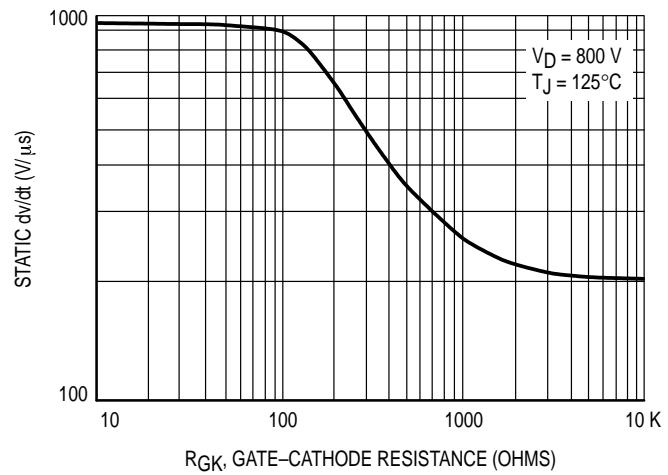
## MCR8DCM MCR8DCN



**Figure 7. Typical Holding Current versus Junction Temperature**

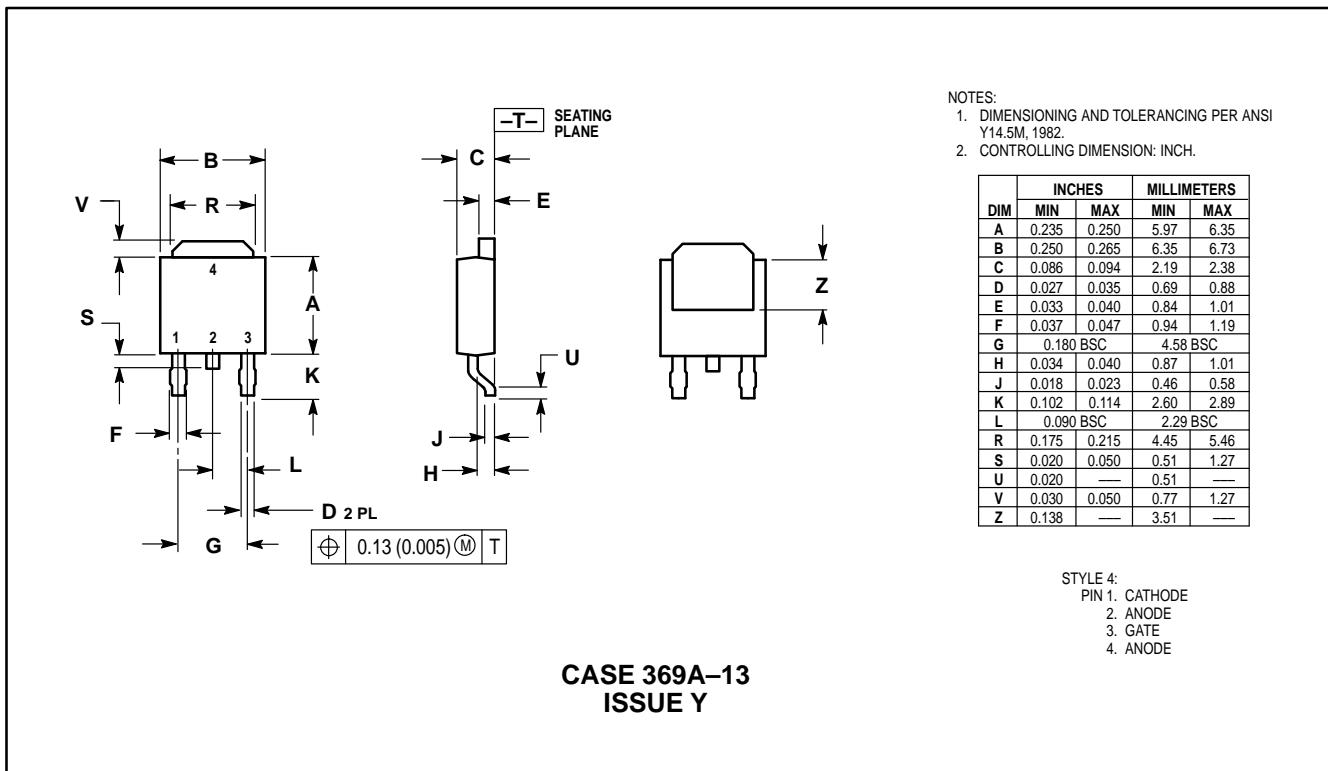


**Figure 8. Typical Latching Current versus Junction Temperature**



**Figure 9. Exponential Static dv/dt versus Gate-Cathode Resistance**

## PACKAGE DIMENSIONS



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