

# Silicon Controlled Rectifiers

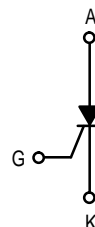
## Reverse Blocking Thyristors

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

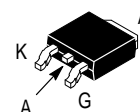
- To Obtain "DPAK" in Surface Mount Leadform (Case 369A)
  - Shipped in Sleeves — No Suffix, i.e. MCR8DCN
  - Shipped in 16 mm Tape and Reel — Add "T4" Suffix to Device Number, i.e. MCR8DCNT4
- To Obtain "DPAK" in Straight Lead Version (Case 369) Shipped in Sleeves — Add "-1" Suffix to Device Number,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



**MCR8DCM**  
**MCR8DCN**

Motorola Preferred Devices

SCRs  
8.0 AMPERES RMS  
600 thru 800 VOLTS



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

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

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage <sup>(1)</sup> Peak Repetitive Reverse Voltage ( $T_J = -40$ to $125^\circ\text{C}$ )	$V_{DRM}$ $V_{RRM}$	600 800	Volts
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	$T_{\text{stg}}$	-40 to 150	

### THERMAL CHARACTERISTICS

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

### ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C unless otherwise noted)

Characteristics	Symbol	Min	Typ	Max	Unit
Peak Forward Blocking Current Peak Reverse Blocking Current (V <sub>AK</sub> = Rated V <sub>DRM</sub> or V <sub>RPM</sub> , Gate Open) T <sub>J</sub> = 25°C T <sub>J</sub> = 125°C	I <sub>DRM</sub> I <sub>RPM</sub>	— —	— —	0.01 5.0	mA
Peak On-State Voltage (1) (I <sub>TM</sub> = 16 A)	V <sub>TM</sub>	—	1.4	1.8	Volts
Gate Trigger Current (Continuous dc) (V <sub>D</sub> = 12 V, R <sub>L</sub> = 100 Ω, T <sub>J</sub> = 25°C) (V <sub>D</sub> = 12 V, R <sub>L</sub> = 100 Ω, T <sub>J</sub> = -40°C)	I <sub>GT</sub>	2.0 —	7.0 —	15 30	mA
Gate Trigger Voltage (Continuous dc) (V <sub>D</sub> = 12 V, R <sub>L</sub> = 100 Ω, T <sub>J</sub> = 25°C) (V <sub>D</sub> = 12 V, R <sub>L</sub> = 100 Ω, T <sub>J</sub> = -40°C) (V <sub>D</sub> = 12 V, R <sub>L</sub> = 100 Ω, T <sub>J</sub> = 125°C)	V <sub>GT</sub>	0.5 — 0.2	0.65 — —	1.0 2.0 —	Volts
Holding Current (V <sub>D</sub> = 12 V, I <sub>T</sub> = 200 mA, T <sub>J</sub> = 25°C) (V <sub>D</sub> = 12 V, I <sub>T</sub> = 200 mA, T <sub>J</sub> = -40°C)	I <sub>H</sub>	4.0 —	22 —	30 60	mA
Latching Current (V <sub>D</sub> = 12 V, I <sub>G</sub> = 15 mA, T <sub>J</sub> = 25°C) (V <sub>D</sub> = 12 V, I <sub>G</sub> = 30 mA, T <sub>J</sub> = -40°C)	I <sub>L</sub>	4.0 —	22 —	30 60	mA

### DYNAMIC CHARACTERISTICS

Characteristics	Symbol	Min	Typ	Max	Unit
Critical Rate of Rise of Off-State Voltage (V <sub>D</sub> = Rated V <sub>DRM</sub> , Exponential Waveform, Gate Open, T <sub>J</sub> = 125°C)	dv/dt	50	200	—	V/μs

(1) Pulse Test; Pulse Width ≤ 2.0 msec, Duty Cycle ≤ 2%.

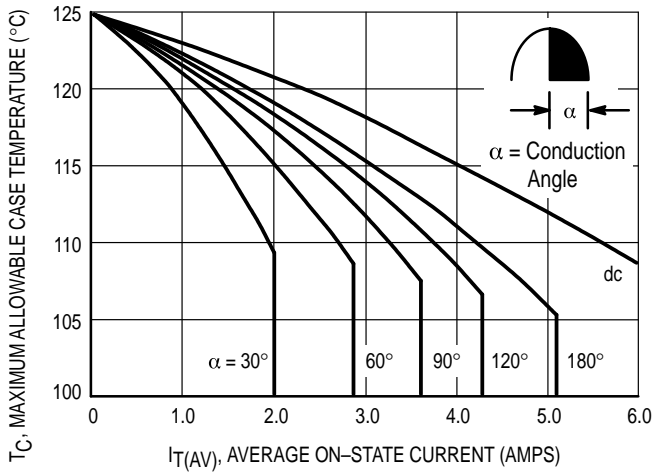


Figure 1. Average Current Derating

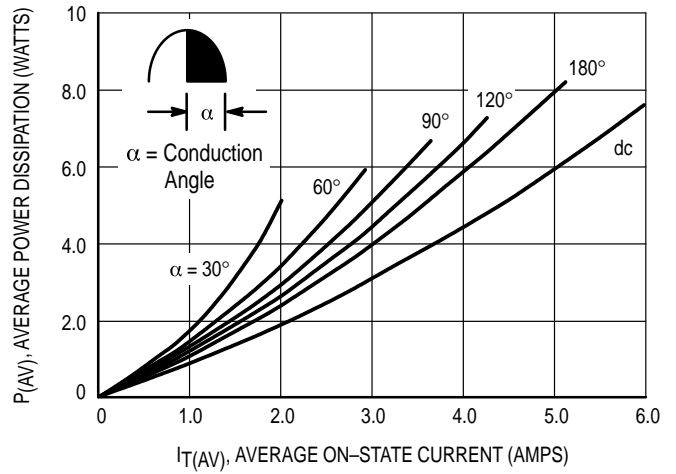


Figure 2. On-State Power Dissipation

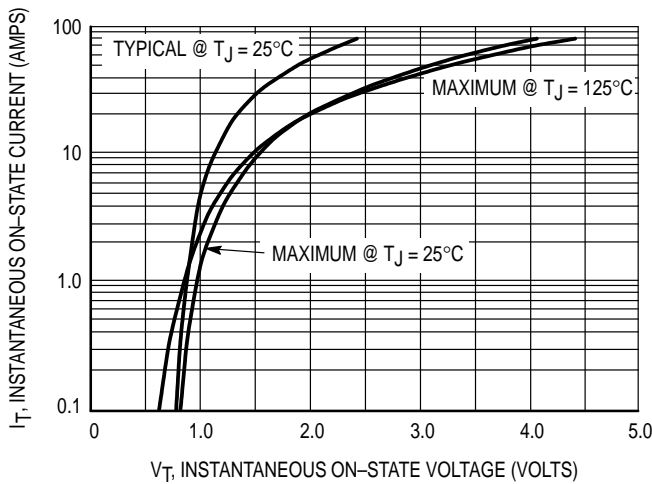


Figure 3. On-State Characteristics

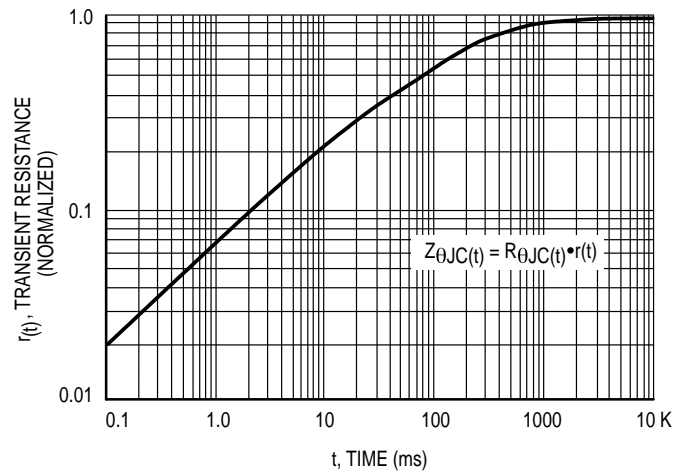


Figure 4. Transient Thermal Response

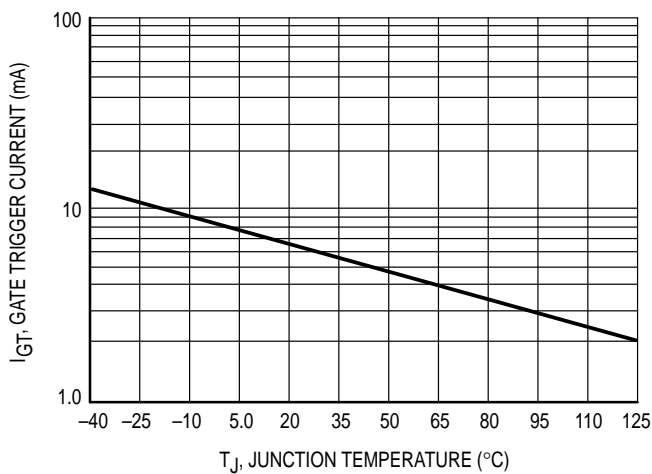


Figure 5. Typical Gate Trigger Current versus Junction Temperature

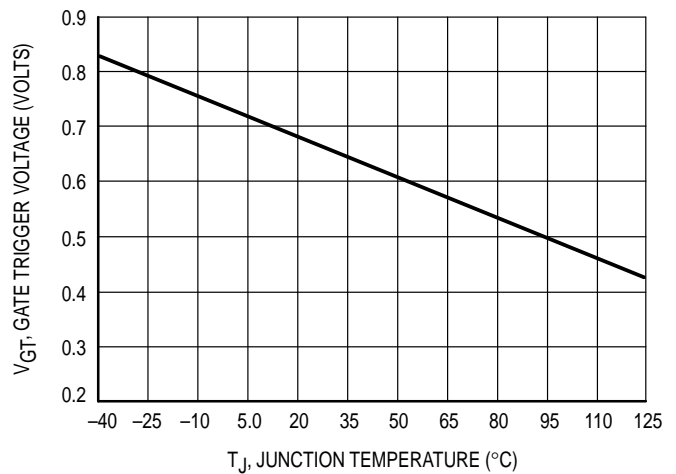
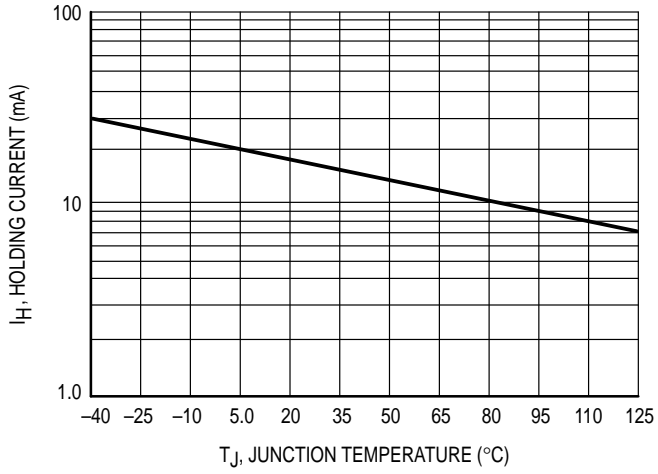
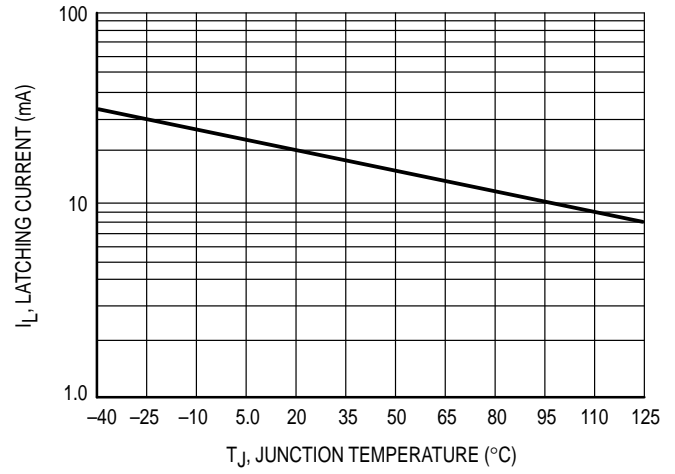


Figure 6. Typical Gate Trigger Voltage versus Junction Temperature

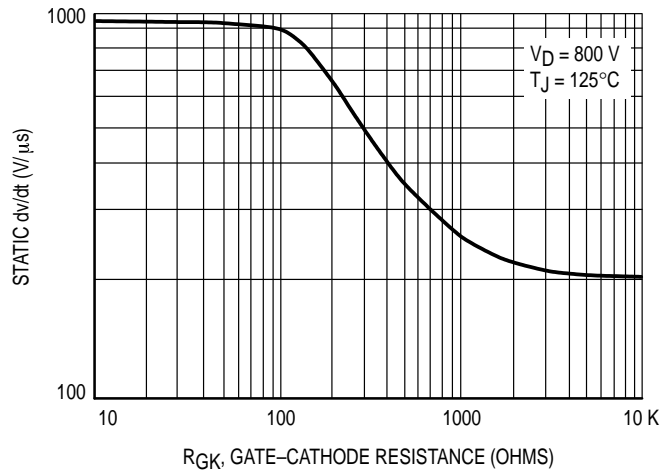
**MCR8DCM MCR8DCN**



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

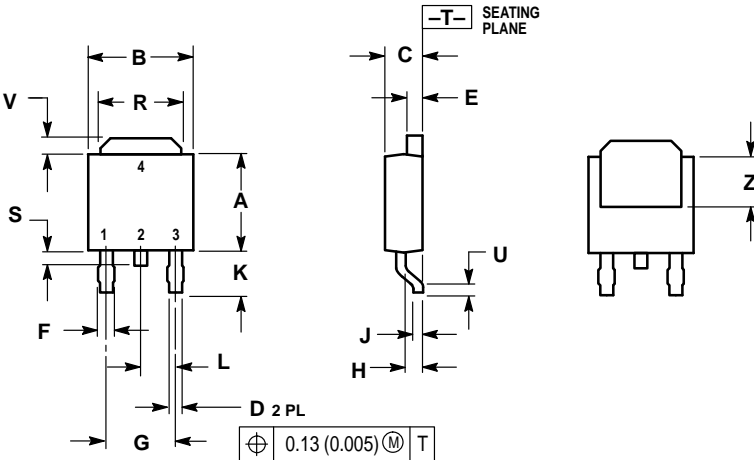


**Figure 8. Typical Latching Current versus Junction Temperature**



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

PACKAGE DIMENSIONS



- NOTES:  
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
 2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.235	0.250	5.97	6.35
B	0.250	0.265	6.35	6.73
C	0.086	0.094	2.19	2.38
D	0.027	0.035	0.69	0.88
E	0.033	0.040	0.84	1.01
F	0.037	0.047	0.94	1.19
G	0.180 BSC		4.58 BSC	
H	0.034	0.040	0.87	1.01
J	0.018	0.023	0.46	0.58
K	0.102	0.114	2.60	2.89
L	0.090 BSC		2.29 BSC	
R	0.175	0.215	4.45	5.46
S	0.020	0.050	0.51	1.27
U	0.020	—	0.51	—
V	0.030	0.050	0.77	1.27
Z	0.138	—	3.51	—

STYLE 4:  
 PIN 1. CATHODE  
 2. ANODE  
 3. GATE  
 4. ANODE

CASE 369A-13  
 ISSUE Y

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