

## Silicon Controlled Rectifiers Reverse Blocking Triode Thyristors

... PNP devices designed for high volume, low cost consumer applications such as temperature, light and speed control; process and remote control; and warning systems where reliability of operation is critical.

- Small Size
- Passivated Die Surface for Reliability and Uniformity
- Low Level Triggering and Holding Characteristics
- Recommend Electrical Replacement for C106
- Available in Two Package Styles:
  - Surface Mount Leadforms — 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., MCR706A
  - Shipped in 16 mm Tape and Reel — Add "RL" Suffix to Device Number, i.e., MCR706ARL
- To Obtain "DPAK" in Straight Lead Version:
  - Shipped in Sleeves — Add '1' Suffix to Device Number, i.e., MCR706A1

### MAXIMUM RATINGS (T<sub>J</sub> = 25°C unless otherwise noted.)

Characteristic	Symbol	Value	Unit
Peak Repetitive Forward and Reverse Blocking Voltage (1) (1/2 Sine Wave) (R <sub>GK</sub> = 1000 Ohms, T <sub>C</sub> = -40 to +110°C)	V <sub>DRM</sub> or V <sub>RRM</sub>	MCR703A1, MCR703A MCR704A1, MCR704A MCR706A1, MCR706A MCR708A1, MCR708A	Volts
Peak Non-repetitive Reverse Blocking Voltage (1/2 Sine Wave, R <sub>GK</sub> = 1000 Ohms, T <sub>C</sub> = -40 to +110°C)	V <sub>RSM</sub>	MCR703A1, MCR703A MCR704A1, MCR704A MCR706A1, MCR706A MCR708A1, MCR708A	Volts
Average On-State Current (T <sub>C</sub> = -40 to +90°C) (T <sub>C</sub> = +100°C)	I <sub>T(AV)</sub>	2.6 1.6	Amps
Surge On-State Current (1/2 Sine Wave, 60 Hz, T <sub>C</sub> = +90°C) (1/2 Sine Wave, 1.5 ms T <sub>C</sub> = +90°C)	I <sub>TSM</sub>	25 35	Amps
Circuit Fusing (t = 8.3 ms)	I <sup>2</sup> t	2.6	A <sup>2</sup> s
Peak Gate Power (Pulse Width = 10 μs, T <sub>C</sub> = 90°C)	P <sub>GM</sub>	0.5	Watt
Average Gate Power (t = 8.3 ms, T <sub>C</sub> = 90°C)	P <sub>G(AV)</sub>	0.1	Watt
Peak Forward Gate Current	I <sub>GM</sub>	0.2	Amp
Peak Reverse Gate Voltage	V <sub>RGM</sub>	6	Volts
Operating Junction Temperature Range	T <sub>J</sub>	-40 to +110	°C
Storage Temperature Range	T <sub>stg</sub>	-40 to +150	°C

1. V<sub>DRM</sub> and V<sub>RRM</sub> 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.

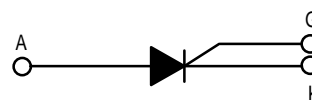
Preferred devices are Motorola recommended choices for future use and best overall value.

REV 1

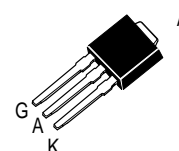
## MCR703A thru MCR708A\*

\*Motorola preferred devices

SCRs  
4.0 AMPERES RMS  
100 thru 600 VOLTS



CASE 369A  
STYLE 5



CASE 369  
STYLE 5

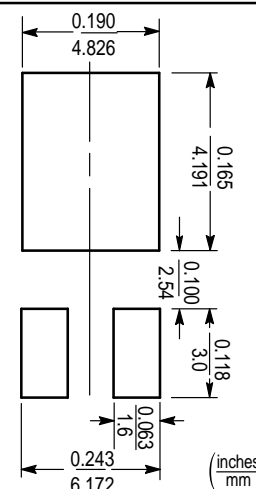


Figure 1. Minimum Pad  
Sizes for  
Surface Mounting

# MCR703A thru MCR708A

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Min	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	—	8.33	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient (Case 369A-04) <sup>(1)</sup>	$R_{\theta JA}$	—	80	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient (Case 369-03) <sup>(2)</sup>	$R_{\theta JA}$	—	85	$^{\circ}\text{C}/\text{W}$

## ELECTRICAL CHARACTERISTICS ( $T_C = 25^{\circ}\text{C}$ and $R_{GK} = 1000$ ohms unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Forward or Reverse Blocking Current ( $V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}$ ) $T_C = 25^{\circ}\text{C}$ $T_C = 110^{\circ}\text{C}$	$I_{DRM}, I_{RRM}$	— —	—	10 200	$\mu\text{A}$
Peak Forward "On" Voltage ( $I_{TM} = 8.2$ A Peak, Pulse Width = 1 to 2 ms, 2% Duty Cycle)	$V_{TM}$	—	—	2.2	Volts
Gate Trigger Current (Continuous dc) <sup>(3)</sup> ( $V_{AK} = 12$ Vdc, $R_L = 24$ Ohms) ( $V_{AK} = 12$ Vdc, $R_L = 24$ Ohms, $T_C = -40^{\circ}\text{C}$ )	$I_{GT}$	— —	25	75 300	$\mu\text{A}$
Gate Trigger Voltage (Continuous dc) (Source Voltage = 12 V, $R_S = 50$ Ohms) ( $V_{AK} = 12$ Vdc, $R_L = 24$ Ohms, $T_C = -40^{\circ}\text{C}$ )	$V_{GT}$	—	—	1	Volts
Gate Non-Trigger Voltage ( $V_{AK} = \text{Rated } V_{DRM}$ , $R_L = 100$ Ohms, $T_C = 110^{\circ}\text{C}$ )	$V_{GD}$	0.2	—	—	Volts
Holding Current ( $V_{AK} = 12$ Vdc, $I_{GT} = 2$ mA) $T_C = 25^{\circ}\text{C}$ (Initiating On-State Current = 200 mA) $T_C = -40^{\circ}\text{C}$	$I_H$	— —	—	5 10	mA
Total Turn-On Time (Source Voltage = 12 V, $R_S = 6$ k Ohms) ( $I_{TM} = 8.2$ A, $I_{GT} = 2$ mA, Rated $V_{DRM}$ ) (Rise Time = 20 ns, Pulse Width = 10 $\mu\text{s}$ )	$t_{gt}$	—	2	—	$\mu\text{s}$
Forward Voltage Application Rate ( $V_D = \text{Rated } V_{DRM}$ , Exponential Waveform, $T_C = 110^{\circ}\text{C}$ )	$dv/dt$	—	10	—	$\text{V}/\mu\text{s}$

- Case 369A-04 when surface mounted on minimum pad sizes recommended.
- Case 369-03 standing in free air.
- $R_{GK}$  current not included in measurement.

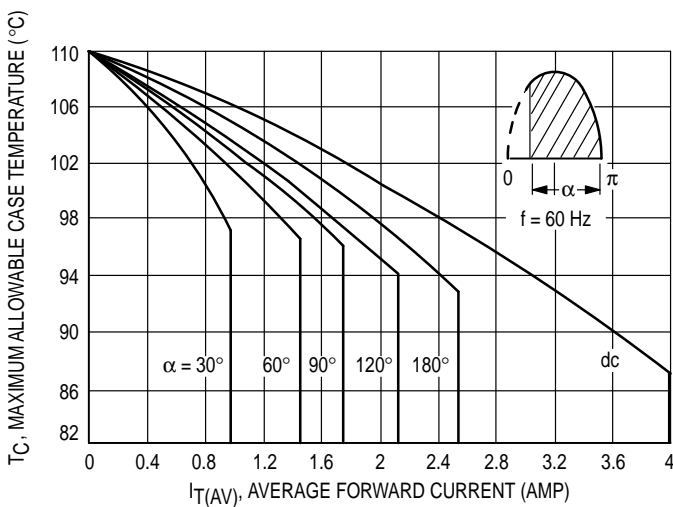


Figure 2. Maximum Case Temperature

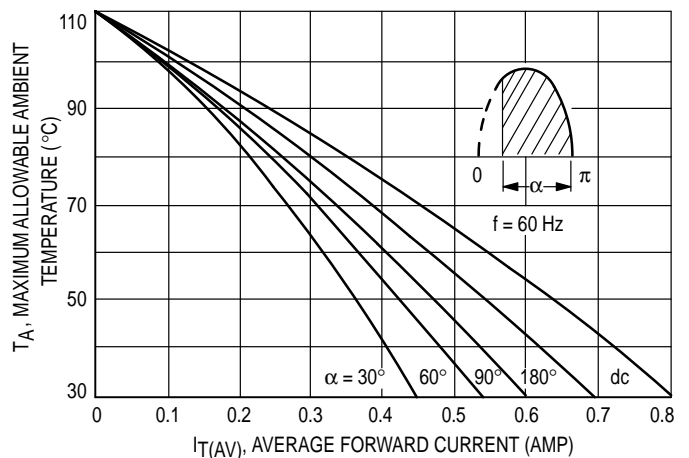
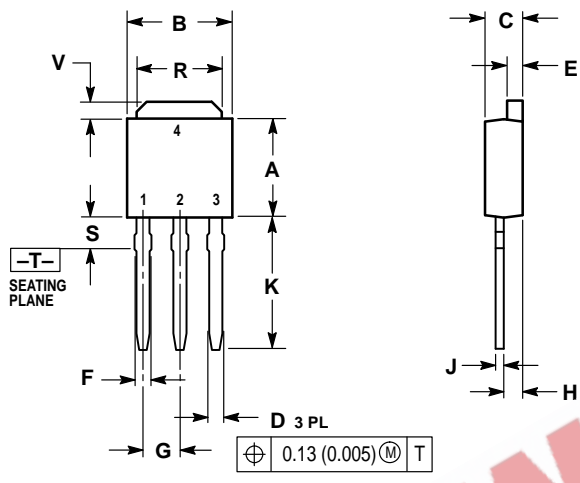


Figure 3. Maximum Ambient Temperature

PACKAGE DIMENSIONS



STYLE 5:  
 PIN 1. GATE  
 2. ANODE  
 3. CATHODE  
 4. ANODE

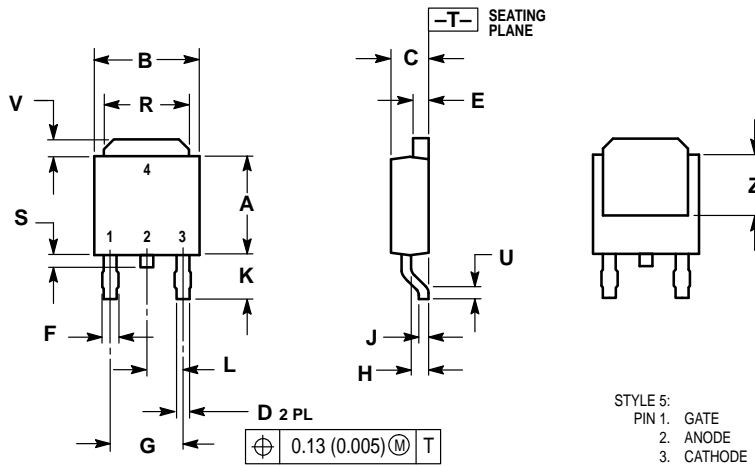
- NOTES:  
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
 2. CONTROLLING DIMENSION: INCH.

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	0.090 BSC		2.29 BSC	
H	0.034	0.040	0.87	1.01
J	0.018	0.023	0.46	0.58
K	0.350	0.380	8.89	9.65
R	0.175	0.215	4.45	5.46
S	0.050	0.090	1.27	2.28
V	0.030	0.050	0.77	1.27

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CASE 369

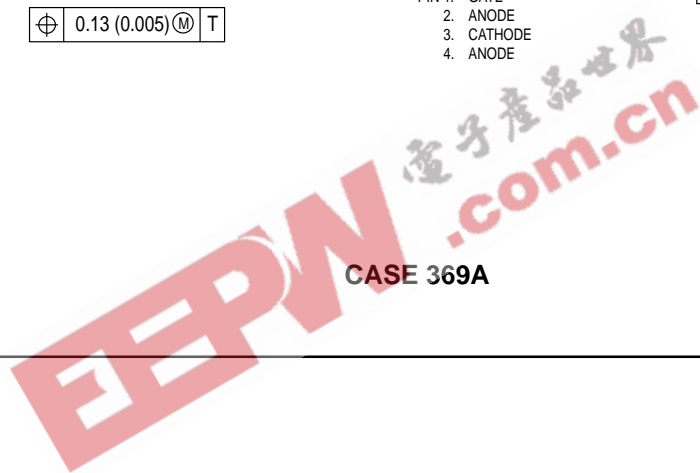
**MCR703A thru MCR708A**



- NOTES:  
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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 5:  
 PIN 1. GATE  
 2. ANODE  
 3. CATHODE  
 4. ANODE



**CASE 369A**

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MCR703A/D

