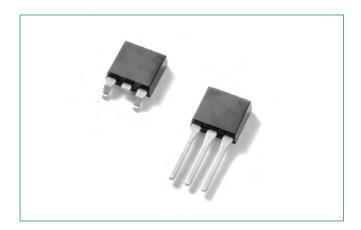
The MCR70xA Series is a PNPN component designed for high volume, low cost consumer applications such as temperature, light and speed control; process and remote control; and warning systems where reliability of operation

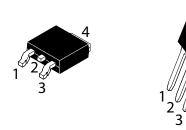


# MCR70xA Series





### **Pin Out**



# Features

is critical.

**Description** 

- Small Size
- Passivated Die Surface for Reliability and Uniformity
- Low Level Triggering and Holding Characteristics
- Recommend Electrical Replacement for C106
- Surface Mount Package Case 369C
- To Obtain "DPAK" in Straight Lead Version (Shipped in Sleeves): Add '1' Suffix to Componant Number, i.e., MCR706A1
- UL Recognized compound meeting flammability rating V-0.
- ESD Ratings: Human Body Model, 3B > 8000 V
   Machine Model, C > 400 V
- Pb–Free Packages are Available

### **Additional Information**



# **Functional Diagram**





# **Maximum Ratings** $(T_1 = 25^{\circ}C \text{ unless otherwise noted})$

Rating		Symbol	Value	Unit
Peak Repetitive Off–State Voltage (Note 1) ( $T_{\rm c}=-40~{\rm to}~+110^{\circ}{\rm C}$ , Sine Wave, 50 to 60 Hz, $R_{\rm GK}=1~{\rm k}~\Omega$ )	MCR703A MCR706A MCR708A	V <sub>DRM</sub> ,	100 400 600	V
Peak Non-Repetitive Off–State Voltage (180° Conduction Angles; $T_c = 85$ °C)	MCR703A MCR706A MCR708A	$V_{\scriptscriptstyle DSM}$	150 450 650	V
On-State RMS Current (180° Conduction Angles; T <sub>C</sub> = 90°C)		I <sub>T(RMS)</sub>	4.0	А
Average On-State Current (180° Conduction Angles)	$T_c = -40 \text{ to } +90^{\circ}\text{C}$ $T_c = +100^{\circ}\text{C}$	I <sub>T(AV)</sub>	2.6 1.6	А
Non-Repetitive Surge Current (1/2 Cycle, Sine Wave 60 Hz, T <sub>J</sub> = 110°C) (1/2 Cycle, Sine Wave 1.5 ms, T <sub>J</sub> = 110°C)		I <sub>TSM</sub>	25 35	А
Circuit Fusing Consideration (t = 8.3 ms)		l²t	2.6	A²sec
Forward Peak Gate Power (Pulse Width ≤ 1.0 µsec, T <sub>C</sub> = 90°C)		$P_{GM}$	0.5	W
Forward Peak Gate Current (Pulse Width ≤ 1.0 µsec, T <sub>c</sub> = 90°C)		I <sub>GM</sub>	0.2	А
Forward Average Gate Power (t = 8.3 ms, TC = 90°C)		P <sub>G(AV)</sub>	0.1	W
Operating Junction Temperature Range		$T_{J}$	-40 to +110	°C
Storage Temperature Range		T <sub>stg</sub>	-40 to +150	°C

Stresses exceeding Maximum Ratings may damage the Componant. 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 Componant reliability.

# Thermal Characteristics\*

Rating	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	R <sub>euc</sub>	3.0	°C/W
Thermal Resistance, Junction-to-Ambient (Note 2)	R <sub>eJA</sub>	80	C/VV
Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds	T <sub>L</sub>	260	°C

<sup>2.</sup> Case 369C when surface mounted on minimum pad sizes recommended.

# Electrical Characteristics - OFF (T<sub>J</sub> = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Тур	Max	Unit
Peak Repetitive Forward or Reverse Blocking Current ( $V_{AK}$ = Rated $V_{DRM}$ or $V_{RRM}$ , $R_{GK}$ = 1 k $\Omega$ )	T <sub>J</sub> = 25°C T <sub>J</sub> = 110°C	I <sub>DRM</sub>	-	-	10 200	μА

# **Electrical Characteristics** - **ON** $(T_J = 25^{\circ}\text{C unless otherwise noted})$

Characteristic	Symbol	Min	Тур	Max	Unit
Peak Forward "On" Voltage (I <sub>TM</sub> = 8.2 A Peak, Pulse Width = 1 to 2 ms, 2% Duty Cycle)	V <sub>TM</sub>	_	_	2.2	V
Gate Trigger Current (Continuous dc) (Note 3) $T_{_{J}} = 25^{\circ}\text{C}$ $(V_{_{AK}} = 12 \text{ V}; \text{ R}_{_{L}} = 24 \Omega)$ $T_{_{J}} = -40^{\circ}\text{C}$	I <sub>GT</sub>		25 -	75 300	μА
Gate Trigger Voltage (Continuous dc) (Note 3) $T_J = 25^{\circ}\text{C}$ $(V_{AK} = 12 \text{ V}; \text{ R}_L = 24 \Omega)$ $T_J = -40^{\circ}\text{C}$	V <sub>GT</sub>	_ _		0.8 1.0	V
Gate Non-Trigger Voltage (Note 3) ( $V_{AK}$ = 12 Vdc; $R_L$ = 100 $\Omega$ , $T_C$ =110°)		0.2	_	_	V
Holding Current ( $V_{AK} = 12 \text{ Vdc}$ , $R_{GK} = 1 \text{ k }\Omega$ ) $T_{C} = 25 ^{\circ}\text{C}$ (Initiating Current = 20 mA) $T_{C} = -40 ^{\circ}\text{C}$	I <sub>H</sub>			5.0 10	mA
Peak Reverse Gate Blocking Voltage (I <sub>GR</sub> = 10 μA)		10	12.5	18	V
Peak Reverse Gate Blocking Current (V <sub>GR</sub> = 10 V)		_	_	1.2	μА
Total Turn-On Time (Source Voltage = 12 V, RS = 6 kQ) ( $I_{TM}$ = 8.2 A, $I_{GT}$ = 2 mA, Rated $V_{DRM}$ ) (Rise Time = 20 ns, Pulse Width = 10 µs)	t <sub>gt</sub>	-	2.0	-	μѕ

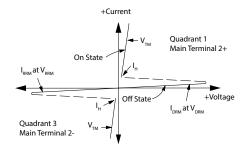
<sup>1.</sup> V<sub>DRM</sub> and V<sub>SRM</sub> for all Types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the Componants are exceeded.



### **Dynamic Characteristics\*** Characteristic **Symbol** Min Тур Max Unit Critical Rate of Rise of Off-State Voltage dv/dt 10 V/µs $(V_D = Rated V_{DRM'} R_{GK} = 1 k \Omega, Exponential Waveform, Gate Open, T_c = 110°C)$ Repetitive Critical Rate of Rise of On-State Current di/dt 100 A/μs (Cf = 60 Hz, $I_{PK}$ = 30 A, PW = 100 $\mu$ s, diG/dt = 1 A/ $\mu$ s)

### **Voltage Current Characteristic of SCR**

Symbol	Parameter			
V <sub>DRM</sub>	Peak Repetitive Forward Off State Voltage			
I <sub>DRM</sub>	Peak Forward Blocking Current			
V <sub>RRM</sub>	Peak Repetitive Reverse Off State Voltage			
I <sub>RRM</sub>	Peak Reverse Blocking Current			
V <sub>TM</sub>	Maximum On State Voltage			
I <sub>H</sub>	Holding Current			



# Figure 1. RMS Current Derating

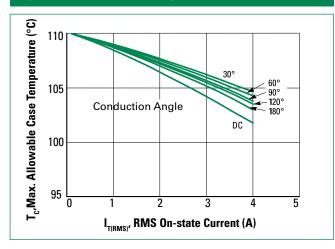


Figure 2. On-State Power Dissipation

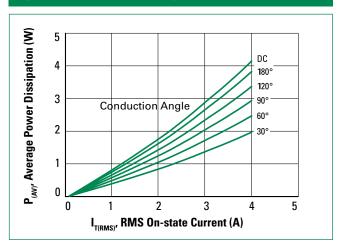


Figure 3. On-State Characteristics

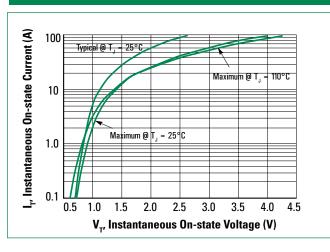
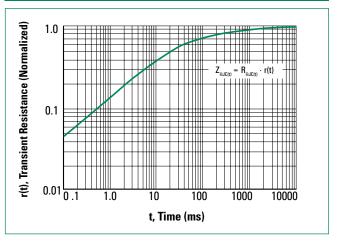


Figure 4. Transient Thermal Response



<sup>3.</sup> RGK current not included in measurement.



Figure 5. Typical Gate Trigger Current vs Junction Temperature

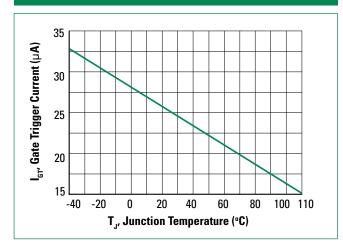


Figure 6. Typical Gate Trigger Voltage vs Junction Temperature

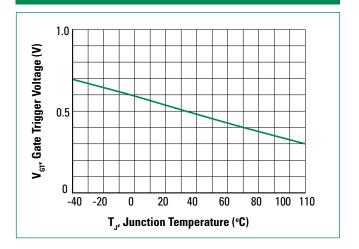


Figure 7. Typical Holding Current vs Junction Temperature

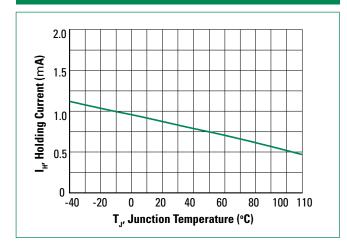
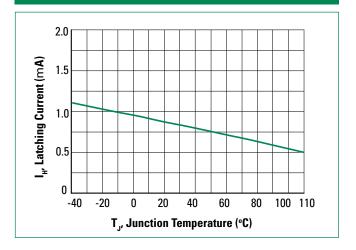
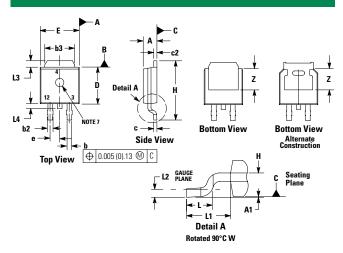


Figure 8. Typical Latching Current vs Junction Temperature





# **Dimensions**

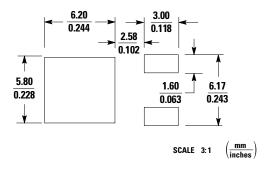


D.	Inc	hes	Millimeters		
Dim	Min Max		Min	Max	
Α	0.087	0.094	2.20	2.40	
A1	0.000	0.005	0.00	0.12	
b	0.022	0.030	0.55	0.75	
b2	0.026	0.033	0.65	0.85	
b3	0.209	0.217	5.30	5.50	
С	0.019	0.023	0.49	0.59	
c2	0.019	0.023	0.49	0.59	
D	0.213	0.224	5.40	5.70	
E	0.252	0.260	6.40	6.60	
е	0.091		2.30		
Н	0.374	0.406	9.50	10.30	
L	0.058	0.070	1.47	1.78	
L1	0.1	14	2.9	90	
L2	0.019	0.023	0.49	0.59	
L3	0.053	0.065	1.35	1.65	
L4	0.028	0.039	0.70	1.00	
Z	0.154	-	3.90	-	

- Dimensioning and Tolerancing per ANSI Y14.5M, 1982.
  Controlling Dimension: Inch.

- STYLE 6: PIN 1. GATE 2. ANODE 3. CATHODE 4. ANODE

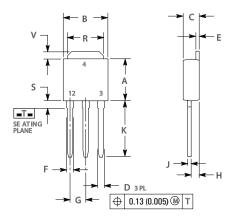
**Soldering Footprint** 

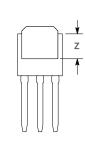




### **Dimensions**

### DPAK-3 Case 369D-01 Issue B





	Inc	hes	Millimeters		
Dim	Min	Max	Min	Max	
Α	0.213	0.224	5.40	5.70	
В	0.252	0.260	6.40	6.60	
С	0.087	0.094	2.20	2.40	
D	0.024	0.030	0.60	0.75	
E	0.022	0.026	0.55	0.65	
F	0.031	0.039	0.78	0.98	
G	0.0	91	2.30		
Н	0.046	0.050	1.18	1.28	
J	0.019	0.023	0.49	0.59	
K	0.291	0.315	7.40	8.00	
R	0.209	0.217	5.30	5.50	
S	0.0	0.063		60	
V	0.053	0.065 1.35		1.65	
Z	0.150		3.80		

- 1. Dimensioning and Tolerancing per ANSI Y14.5M, 1982
- 2. Controlling Dimension: Inch.

STYLE 6: PIN 1. GATE

ANODE
 CATHODE
 ANODE

# **Part Marking System**

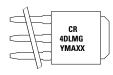


DPAK Case 369C Style 6





DPAK-3 Case 369D Style 6



X Y M A XX G =D, M, or N =Month =Assembly Site =Lot Serial Code =Pb-Free Package

Pin Assignment			
1	Gate		
2 Anode			
3	Cathode		
4	Anode		

# **Ordering Information**

Componant	Package		Shipping
MCR703AT4		369C	
MCR703AT4G		369C (Pb-Free)	2500
MCR706AT4	DPAK	369C	Tape & Reel
MCR706AT4G		369C (Pb-Free)	
MCR708A		369C	
MCR708AG		369C (Pb-Free)	4000
MCR708A1		369D	Units/ Box
MCR708A1G	DPAK-3	369D (Pb-Free)	
MCR708AT4		369C	2500
MCR708AT4G	DPAK	369C (Pb-Free)	Tape & Reel

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