



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



# MCR716, MCR718

Preferred Device

## Sensitive Gate 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.

#### Features

- Small Size
- Passivated Die for Reliability and Uniformity
- Low Level Triggering and Holding Characteristics
- Surface Mount Lead Form – Case 369C
- Epoxy Meets UL 94 V-0 @ 0.125 in
- ESD Ratings: Human Body Model, 3B > 8000 V  
Machine Model, C > 400 V
- Pb-Free Packages are Available

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

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage (Note 1) (T <sub>J</sub> = -40 to 110°C, Sine Wave, 50 to 60 Hz, R <sub>GK</sub> = 1 kΩ)	V <sub>DRM</sub> , V <sub>RRM</sub>	400 600	V
On-State RMS Current (180° Conduction Angles; T <sub>C</sub> = 90°C)	I <sub>T(RMS)</sub>	4.0	A
Average On-State Current (180° Conduction Angles; T <sub>C</sub> = 90°C)	I <sub>T(AV)</sub>	2.6	A
Peak Non-Repetitive Surge Current (1/2 Cycle, Sine Wave 60 Hz, T <sub>J</sub> = 110°C)	I <sub>TSM</sub>	25	A
Circuit Fusing Consideration (t = 8.3 msec)	I <sup>2</sup> t	2.6	A <sup>2</sup> sec
Forward Peak Gate Power (Pulse Width ≤ 1.0 μsec, T <sub>C</sub> = 90°C)	P <sub>GM</sub>	0.5	W
Forward Average Gate Power (t = 8.3 msec, T <sub>C</sub> = 90°C)	P <sub>G(AV)</sub>	0.1	W
Forward Peak Gate Current (Pulse Width ≤ 1.0 μsec, T <sub>C</sub> = 90°C)	I <sub>GM</sub>	0.2	A
Operating Junction Temperature Range	T <sub>J</sub>	-40 to +110	°C
Storage Temperature Range	T <sub>stg</sub>	-40 to +150	°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.

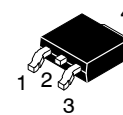
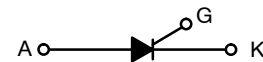
1. V<sub>DRM</sub> and V<sub>RRM</sub> for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source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



Expertise Applied | Answers Delivered

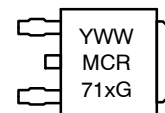
Littelfuse.com

**SCRs**  
**4.0 AMPERES RMS**  
**400 – 600 VOLTS**



**DPAK**  
**CASE 369C**  
**STYLE 4**

#### MARKING DIAGRAM



- Y = Year
- WW = Work Week
- MCR71x = Device Code  
x = 6 or 8
- G = Pb-Free Package

#### PIN ASSIGNMENT

Pin	Assignment
1	Cathode
2	Anode
3	Gate
4	Anode

#### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

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

# MCR716, MCR718

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.0	$^{\circ}C/W$
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	80	$^{\circ}C/W$
Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds	$T_L$	260	$^{\circ}C$

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

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

### OFF CHARACTERISTICS

Peak Repetitive Forward or Reverse Blocking Current; $R_{GK} = 1\text{ k}\Omega$ (Note 3) ( $V_{AK} = \text{Rated } V_{DRM}$ or $V_{RRM}$ )	$I_{DRM}$	-	-	10	$\mu A$
	$I_{RRM}$	-	-	200	
					$T_C = 25^{\circ}C$
					$T_C = 110^{\circ}C$

### ON CHARACTERISTICS

Peak Reverse Gate Blocking Voltage ( $I_{GR} = 10\text{ }\mu A$ )	$V_{RGM}$	10	12.5	18	V
Peak Reverse Gate Blocking Current ( $V_{GR} = 10\text{ V}$ )	$I_{RGM}$	-	-	1.2	$\mu A$
Peak Forward On-State Voltage (Note 4) ( $I_{TM} = 5.0\text{ A Peak}$ ) ( $I_{TM} = 8.2\text{ A Peak}$ )	$V_{TM}$	-	1.3	1.5	V
		-	1.5	2.2	
Gate Trigger Current (Continuous dc) (Note 5) ( $V_D = 12\text{ Vdc}$ , $R_L = 30\text{ }\Omega$ )	$I_{GT}$	1.0	25	75	$\mu A$
		-	-	300	
Gate Trigger Voltage (Continuous dc) (Note 5) ( $V_D = 12\text{ Vdc}$ , $R_L = 30\text{ }\Omega$ )	$V_{GT}$	0.3	0.55	0.8	V
		-	-	1.0	
		0.2	-	-	
Holding Current (Note 3) ( $V_D = 12\text{ Vdc}$ , Initiating Current = 20 mA, $R_{GK} = 1\text{ k}\Omega$ )	$I_H$	0.4	1.0	5.0	mA
		-	-	10	
Latching Current (Note 3) ( $R_{GK} = 1\text{ k}\Omega$ ) ( $V_D = 12\text{ Vdc}$ , $I_G = 2.0\text{ mA}$ , $T_C = 25^{\circ}C$ ) ( $V_D = 12\text{ Vdc}$ , $I_G = 2.0\text{ mA}$ , $T_C = -40^{\circ}C$ )	$I_L$	-	-	5.0	mA
		-	-	10	
Total Turn-On Time (Source Voltage = 12 V, $R_S = 6\text{ k}\Omega$ , $I_T = 8\text{ A(pk)}$ , $R_{GK} = 1\text{ k}\Omega$ ) ( $V_D = \text{Rated } V_{DRM}$ , Rise Time = 20 ns, Pulse Width = 10 $\mu s$ )	$t_{gt}$	-	2.0	5.0	$\mu s$

### DYNAMIC CHARACTERISTICS

Critical Rate of Rise of Off-State Voltage ( $V_D = 0.67 \times \text{Rated } V_{DRM}$ , $R_{GK} = 1\text{ k}\Omega$ , Exponential Waveform, $T_J = 110^{\circ}C$ )	$dv/dt$	5.0	10	-	V/ $\mu s$
Repetitive Critical Rate of Rise of On-State Current ( $f = 60\text{ Hz}$ , $I_{PK} = 30\text{ A}$ , $PW = 100\text{ }\mu s$ , $dIG/dt = 1\text{ A}/\mu s$ )	$di/dt$	-	-	100	A/ $\mu s$

- Case 369C, when surface mounted on minimum recommended pad size.
- Ratings apply for negative gate voltage or  $R_{GK} = 1\text{ k}\Omega$ . Devices shall not have a positive gate voltage concurrently with a negative voltage on the anode. Devices should not be tested with a constant current source for forward and reverse blocking capability such that the voltage applied exceeds the rated blocking voltage.
- Pulse Test: Pulse Width  $\leq 2\text{ ms}$ , Duty Cycle  $\leq 2\%$ .
- $R_{GK}$  current not included in measurements.

### ORDERING INFORMATION

Device	Package	Shipping
MCR716T4	DPAK	2500 / Tape and Reel
MCR716T4G	DPAK (Pb-Free)	
MCR718T4	DPAK	
MCR718T4G	DPAK (Pb-Free)	

# MCR716, MCR718

## Voltage Current Characteristic of SCR

Symbol	Parameter
$V_{DRM}$	Peak Repetitive Off-State Forward Voltage
$I_{DRM}$	Peak Forward Blocking Current
$V_{RRM}$	Peak Repetitive Off-State Reverse Voltage
$I_{RRM}$	Peak Reverse Blocking Current
$V_{TM}$	Peak On-State Voltage
$I_H$	Holding Current

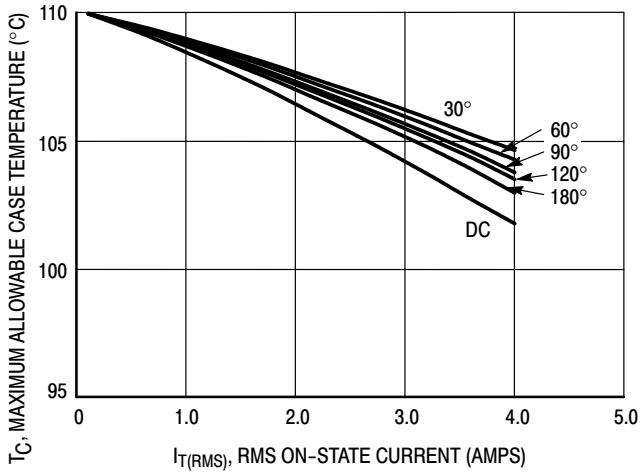
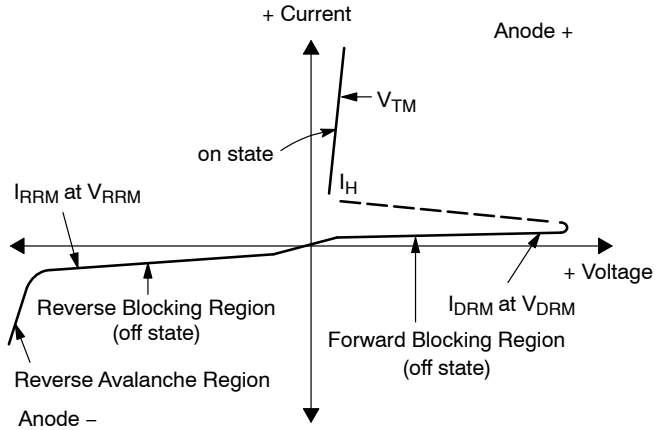


Figure 1. RMS Current Derating

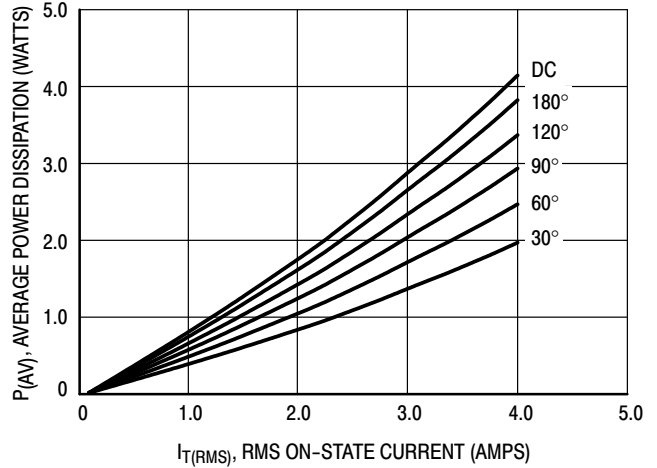


Figure 2. On-State Power Dissipation

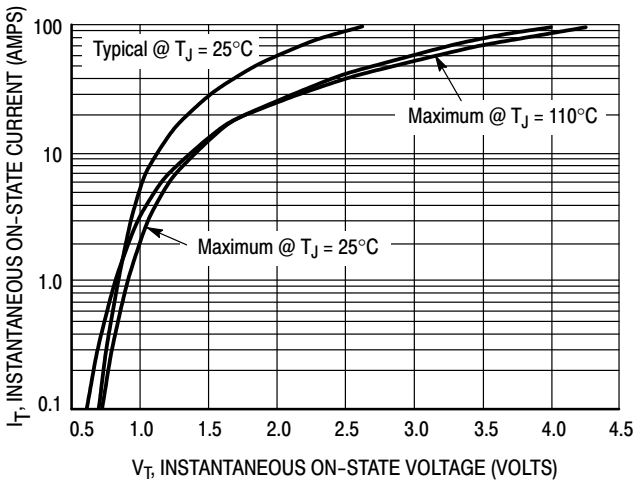


Figure 3. On-State Characteristics

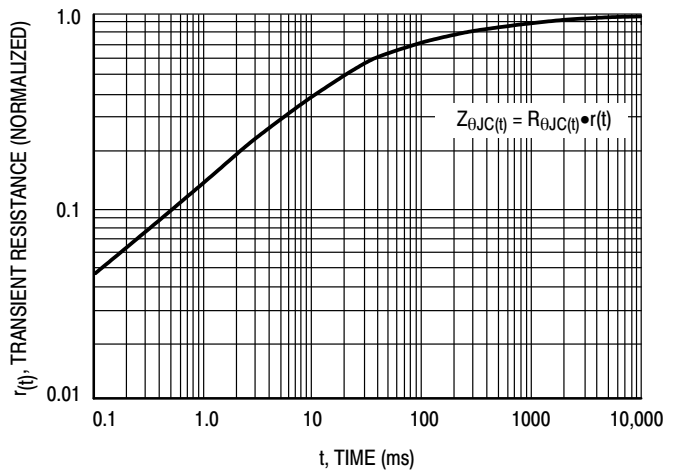


Figure 4. Transient Thermal Response

# MCR716, MCR718

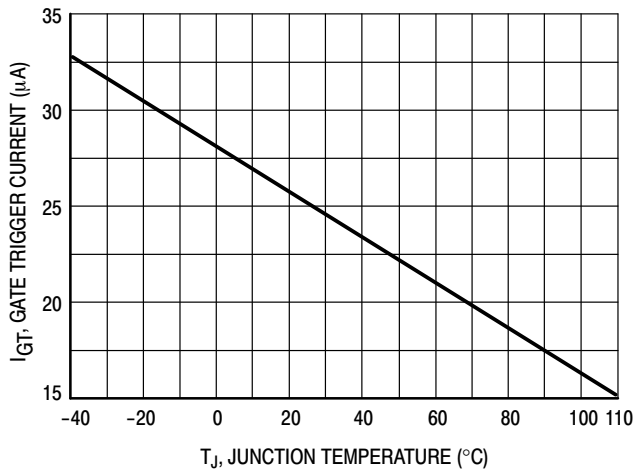


Figure 5. Typical Gate Trigger Current versus Junction Temperature

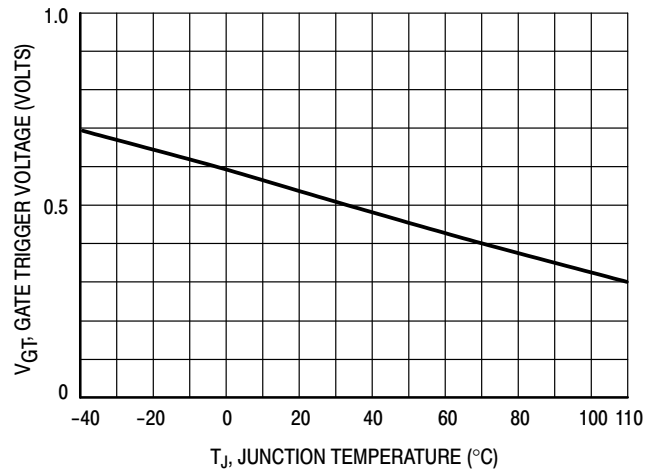


Figure 6. Typical Gate Trigger Voltage versus Junction Temperature

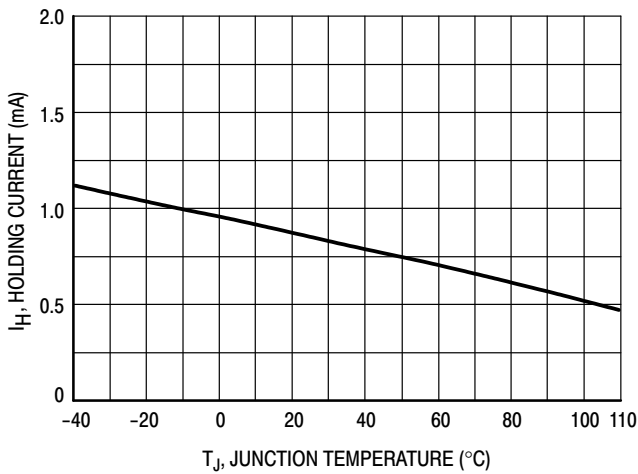


Figure 7. Typical Holding Current versus Junction Temperature

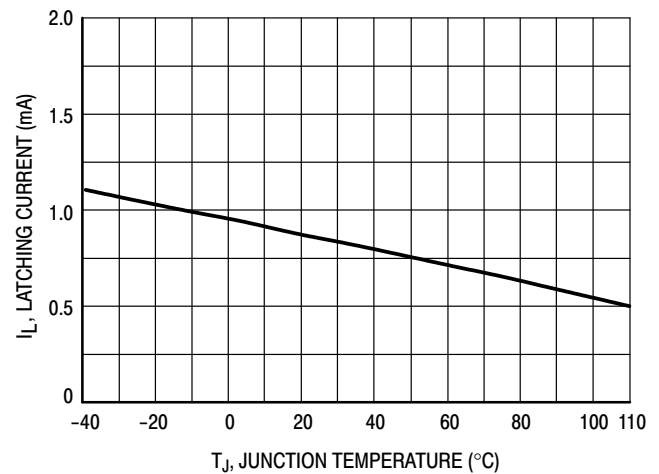


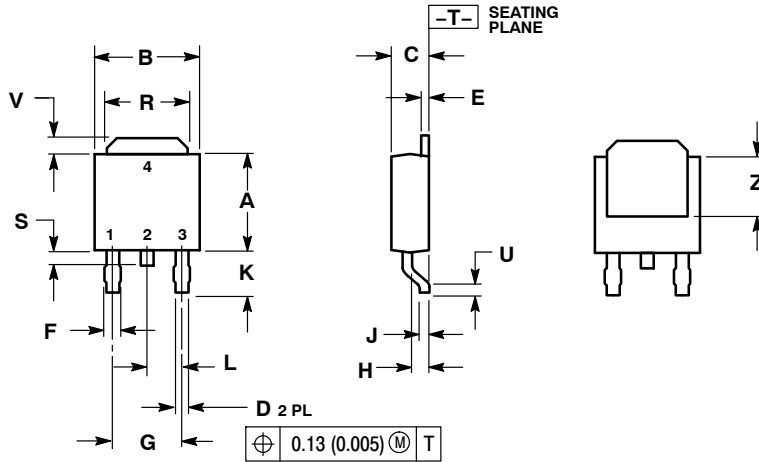
Figure 8. Typical Latching Current versus Junction Temperature



# MCR716, MCR718

## PACKAGE DIMENSIONS

**DPAK**  
CASE 369C-01  
ISSUE A

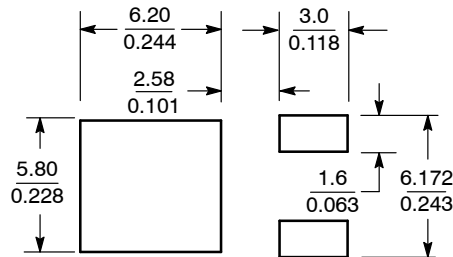


- NOTES:  
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.235	0.245	5.97	6.22
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	0.018	0.023	0.46	0.58
F	0.037	0.045	0.94	1.14
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	0.180	0.215	4.57	5.45
S	0.025	0.040	0.63	1.01
U	0.020	---	0.51	---
V	0.035	0.050	0.89	1.27
Z	0.155	---	3.93	---

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

### SOLDERING FOOTPRINT



SCALE 3:1  $\left(\frac{\text{mm}}{\text{inches}}\right)$

Littelfuse products are not designed for, and shall not be used for, any purpose (including, without limitation, automotive, military, aerospace, medical, life-saving, life-sustaining or nuclear facility applications, devices intended for surgical implant into the body, or any other application in which the failure or lack of desired operation of the product may result in personal injury, death, or property damage) other than those expressly set forth in applicable Littelfuse product documentation. Warranties granted by Littelfuse shall be deemed void for products used for any purpose not expressly set forth in applicable Littelfuse documentation. Littelfuse shall not be liable for any claims or damages arising out of products used in applications not expressly intended by Littelfuse as set forth in applicable Littelfuse documentation. The sale and use of Littelfuse products is subject to Littelfuse Terms and Conditions of Sale, unless otherwise agreed by Littelfuse.

Littelfuse.com