

ESD Protection Diode

SC-74 Quad Monolithic Common Anode

MMQA, SZMMQA Quad Common Anode Series

This quad monolithic silicon voltage suppressor is designed for applications requiring transient overvoltage protection capability. It is intended for use in voltage and ESD sensitive equipment such as computers, printers, business machines, communication systems, medical equipment, and other applications. Its quad junction common anode design protects four separate lines using only one package. These devices are ideal for situations where board space is at a premium.

Features

- SC-74 Package Allows Four Separate Unidirectional Configurations
- Peak Power-Min. 24 W @ 1.0 ms (Unidirectional), per Figure 5 Waveform
- Peak Power-Min. 150 W @ 20 μs (Unidirectional), per Figure 6 Waveform
- Maximum Clamping Voltage @ Peak Pulse Current
- Low Leakage < 2.0 μA
- ESD Rating of Class 3B (exceeding 16 kV) per the Human Body Model
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant*

SC-74 QUAD SURGE PROTECTION 24 WATTS PEAK POWER 5.6 – 33 VOLTS



SC-74 CASE 318F STYLE 1

PIN ASSIGNMENT



- PIN 1. CATHODE
 - 2. ANODE
 - 3. CATHODE
 - 4. CATHODE
 - 5. ANODE6. CATHODE

MARKING DIAGRAM



xxx = Specific Device Code

M = Date CadePb-Free Package

(Note: Microdot may be in either location)

DEVICE MARKING & ORDERING INFORMATION

See specific marking and ordering information in the device marking and ordering information table on page 6 of this data sheet.

1

^{*}For additional information on our Pb-Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, <u>SOLDERRM/D</u>

THERMAL CHARACTERISTICS (T_A = 25°C Unless Otherwise Noted)

Characteristic	Symbol	Value	Unit
Peak Power Dissipation @ 1.0 ms (Note 1) @ T _A ≤ 25°C	P _{pk}	24	W
Peak Power Dissipation @ 20 μs (Note 2) @ T _A ≤ 25°C	P _{pk}	150	W
Total Power Dissipation on FR-5 Board (Note 3) @ T _A = 25°C	P _D	225 1.8	MW mW/°C
Thermal Resistance from Junction-to-Ambient	$R_{ heta JA}$	556	°C/W
Total Power Dissipation on Alumina Substrate (Note 4) @ T _A = 25°C Derate above 25°C	P _D	300 2.4	MW mW/°C
Thermal Resistance from Junction-to-Ambient	$R_{ heta JA}$	417	°C/W
Junction and Storage Temperature Range	T _J , T _{stg}	-55 to +150	°C
Lead Solder Temperature – Maximum (10 Second Duration)	TL	260	°C

- 1. Non-repetitive current pulse per Figure 5 and derate above T_A = 25 °C per Figure 4. 2. Non-repetitive current pulse per Figure 6 and derate above T_A = 25 °C per Figure 4.
- 3. $FR-5 = 1.0 \times 0.75 \times 0.62$ in.
- 4. Alumina = 0.4 x 0.3 x 0.024 in., 99.5% alumina

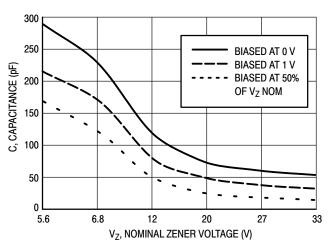
ELECTRICAL CHARACTERISTICS ($T_A = 25 \, ^{\circ}\text{C}$ Unless Otherwise Noted) UNIDIRECTIONAL

(Circuit tied to pins 1, 2, and 5; Pins 2, 3, and 5; Pins 2, 4, and 5; or Pins 2, 5, and 6) ($V_F = 0.9 \text{ V Max} \otimes I_F = 10 \text{ mA}$)

	E	Breakdowr	ı Volta	ge	Ma Reve Leak Curr	rse age		Max Reverse Voltage @ Max Ipsm	Reverse Voltage @ IRSM Maximul Prse (Note 8) Temperate Ge (Clamping Coefficie	Maximum	<u> </u>	itance Volt 1 MHz
		Vzт (Note 6) (V)		@ l _{ZT}	I _R	V _R	Max Zener Impedance (Note 7)	Reverse Surge Current		Temperature Coefficient	(p	F)
Device (Note 5)	Min	Nom	Max	(mA)	(nA)	(V)	Z ZT @ I ZT (Ω) (mA)	IRSM (A)	VRSM (V)	(mV/°C)	Min	Max
MMQA5V6T1G	5.32	5.6	5.88	1.0	2000	3.0	400	3.0	8.0	1.26	-	-
MMQA6V2T1G/T3G	5.89	6.2	6.51	1.0	700	4.0	300	2.66	9.0	10.6	-	-
MMQA6V8T1G	6.46	6.8	7.14	1.0	500	4.3	300	2.45	9.8	10.9	100	250
MMQA12VT1G	11.4	12	12.6	1.0	75	9.1	80	1.39	17.3	14	-	-
MMQA13VT1G	12.4	13	13.7	1.0	75	9.8	80	1.29	18.6	15	_	_
MMQA15VT1G	14.3	15	15.8	1.0	75	11	80	1.1	21.7	16	-	_
MMQA18VT1G	17.1	18	18.9	1.0	75	14	80	0.923	26	19	-	_
MMQA20VT1G/T3G	19	20	21	1.0	75	15	80	0.84	28.6	20.1	-	_
MMQA22VT1G	20.9	22	23.1	1.0	75	17	80	0.758	31.7	22	-	_
MMQA24VT1G	22.8	24	25.2	1.0	75	18	100	0.694	34.6	25	-	_
MMQA27VT1G	25.7	27	28.4	1.0	75	21	125	0.615	39	28	-	-
MMQA33VT1G	31.4	33	34.7	1.0	75	25	200	0.504	48.6	37	_	_

- 5. Includes SZ-prefix devices where applicable.
- 6. V_Z measured at pulse test current I_T at an ambient temperature of 25 °C.
- 7. Z_{ZT} is measured by dividing the AC voltage drop across the device by the AC current supplied. The specified limits are I_{Z(AC)} = 0.1 I_{Z(DC)}, with AC frequency = 1 kHz.
- 8. Surge current waveform per Figure 5 and derate per Figure 4.

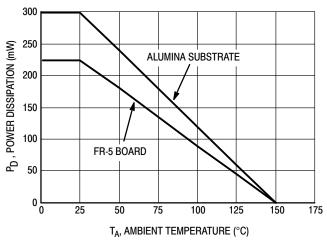
TYPICAL CHARACTERISTICS



10,000 1,000 1,000 +150°C +150°C +25°C 10 5.6 6.8 20 27 33 V_Z, NOMINAL ZENER VOLTAGE (V)

Figure 1. Typical Capacitance

Figure 2. Typical Leakage Current



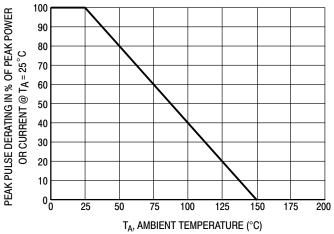


Figure 3. Steady State Power Derating Curve

Figure 4. Pulse Derating Curve

TYPICAL CHARACTERISTICS

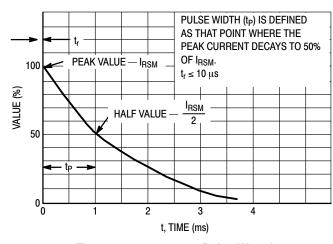


Figure 5. 10 \times 1000 μs Pulse Waveform

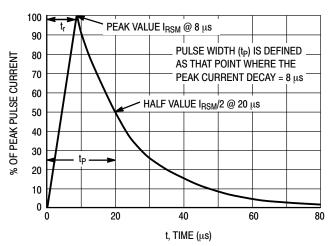


Figure 6. 8 \times 20 μs Pulse Waveform

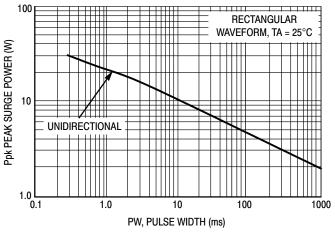


Figure 7. Maximum Non-Repetitive Surge Power, P_{pk} versus PW

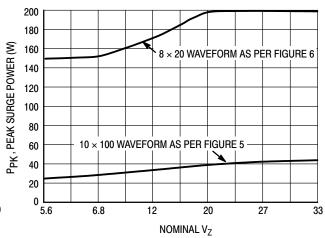


Figure 8. Typical Maximum Non-Repetitive Surge Power, P_{pk} versus V_Z

Power is defined as $V_{RSM} \, x \, I_Z(pk)$ where V_{RSM} is the clamping voltage at $I_Z(pk)$.

TYPICAL COMMON ANODE APPLICATIONS

A quad junction common anode design in a SC-74 package protects four separate lines using only one package. This adds flexibility and creativity to PCB design especially

when board space is at a premium. A simplified example of MMQA/SZMMQA Series Device applications is illustrated below.

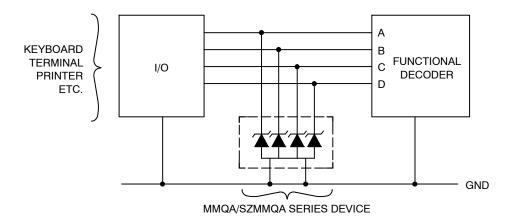


Figure 9. Computer Interface Protection

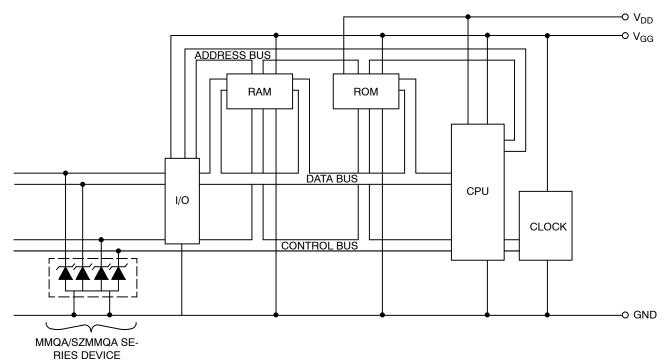


Figure 10. Microprocessor Protection

DEVICE MARKING AND ORDERING INFORMATION

Device*	Device Marking	Package	Shipping
MMQA5V6T1G	5A6		3,000/Tape & Reel
MMQA6V2T1G	6A2		3,000/Tape & Reel
MMQA6V8T1G	6A8		3,000/Tape & Reel
MMQA12VT1G	12A		3,000/Tape & Reel
MMQA15VT1G	15A	SC-74	3,000/Tape & Reel
MMQA18VT1G	IQA18VT1G 18A		3,000/Tape & Reel
MMQA20VT1G	20A		3,000/Tape & Reel
MMQA27VT1G	27A		3,000/Tape & Reel
MMQA27VT3G	27A		10,000/Tape & Reel
MMQA33VT1G	33A		3,000/Tape & Reel

DISCONTINUED (Note 9)

Device*	Device Marking	Package	Shipping
MMQA6V2T3G	6A2		10,000/Tape & Reel
MMQA13VT1G	13A		3,000/Tape & Reel
MMQA20VT3G	20A	SC-74 (Pb-Free)	10,000/Tape & Reel
MMQA22VT1G	22A	(. 2)	3,000/Tape & Reel
MMQA24VT1G	24A		3,000/Tape & Reel

[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

Mechanical Characteristics:

CASE: Void-free, Transfer-molded, Thermosetting Plastic Case.

FINISH: Corrosion resistant finish, easily solderable.

Package designed for optimal automated board assembly.

Small package size for high density applications.

Available in 8 mm Tape and Reel.

Use the Device Number to order the 7 inch/3,000 unit reel.

Replace the "T1" with "T3" in the Device Number to order the 13 inch/10,000 unit reel.

^{*}IncludeS SZ-prefix devices where applicable.

^{9.} **DISCONTINUED:** This device is not recommended for new design. Please contact your **onsemi** representative for information. The most current information on this device may be available on www.onsemi.com.

REVISION HISTORY

Revision	Description of Changes	Date
13	MMQA6V2T3G, MMQA13VT1G, MMQA20VT3G, MMQA22VT1G, MMQA24VT1G OPN Marked as Discontinued + Rebranded the Data Sheet to onsemi format	9/3/2025

This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.





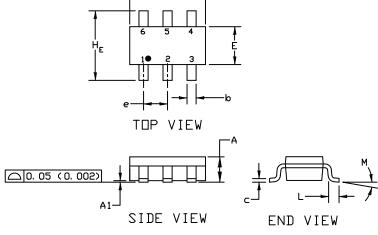
SC-74 CASE 318F ISSUE P

DATE 07 OCT 2021

NOTES:

- 1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994
- 2. CONTROLLING DIMENSION: INCHES
- MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.

	MI	LLIMETER	25		INCHES	
DIM	MIN.	N□M.	MAX.	MIN.	N□M.	MAX.
A	0. 90	1. 00	1. 10	0. 035	0. 039	0. 043
A1	0. 01	0. 06	0. 10	0. 001	0. 002	0. 004
ھ	0. 25	0. 37	0. 50	0. 010	0. 015	0. 020
U	0.10	0. 18	0. 26	0. 004	0. 007	0. 010
D	2. 90	3. 00	3. 10	0. 114	0. 118	0. 122
E	1. 30	1. 50	1. 70	0. 051	0. 059	0. 067
e	0. 85	0. 95	1. 05	0. 034	0. 037	0. 041
Η _E	2. 50	2. 75	3. 00	0. 099	0. 108	0. 118
١	0. 20	0. 40	0. 60	0, 008	0. 016	0. 024
М	0*		10*	0*		10*



GENERIC MARKING DIAGRAM*

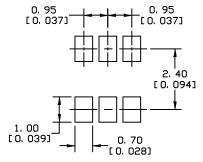


XXX = Specific Device Code

M = Date Code

= Pb-Free Package
 (Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.



For additional information on our Pb-Free strategy and soldering details, please download the UN Seniconductor Soldering and Mounting Techniques Reference Manual, SULDERRM/D.

SOLDERING FOOTPRINT

STYLE 1: PIN 1. CATHODE 2. ANODE 3. CATHODE 4. CATHODE 5. ANODE 6. CATHODE	STYLE 2: PIN 1. NO CONNECTION 2. COLLECTOR 3. EMITTER 4. NO CONNECTION 5. COLLECTOR 6. BASE	STYLE 3: PIN 1. EMITTER 1 2. BASE 1 3. COLLECTOR 2 4. EMITTER 2 5. BASE 2 6. COLLECTOR 1	STYLE 4: PIN 1. COLLECTOR 2 2. EMITTER 1/EMITTER 2 3. COLLECTOR 1 4. EMITTER 3 5. BASE 1/BASE 2/COLLECTOR 3 6. BASE 3	STYLE 5: PIN 1. CHANNEL 1 2. ANODE 3. CHANNEL 2 4. CHANNEL 3 5. CATHODE 6. CHANNEL 4	STYLE 6: PIN 1. CATHODE 2. ANODE 3. CATHODE 4. CATHODE 5. CATHODE 6. CATHODE
STYLE 7: PIN 1. SOURCE 1 2. GATE 1 3. DRAIN 2 4. SOURCE 2 5. GATE 2 6. DRAIN 1	STYLE 8: PIN 1. EMITTER 1 2. BASE 2 3. COLLECTOR 2 4. EMITTER 2 5. BASE 1 6. COLLECTOR 1	STYLE 9: PIN 1. EMITTER 2 2. BASE 2 3. COLLECTOR 1 4. EMITTER 1 5. BASE 1 6. COLLECTOR 2	STYLE 10: PIN 1. ANODE/CATHODE 2. BASE 3. EMITTER 4. COLLECTOR 5. ANODE 6. CATHODE	STYLE 11: PIN 1. EMITTER 2. BASE 3. ANODE/CATHOD 4. ANODE 5. CATHODE 6. COLLECTOR	E

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DESCRIPTION:	SC-74		PAGE 1 OF 1

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