Surge Protection - AQ22-01FTG

AQ22-01FTG, 950W Discrete Unidirectional TVS Diode

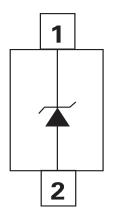




Description

The Unidirectional AQ22-01FTG is designed for use in electronic equipment for low speed and DC applications. It will protect any sensitive equipment from damage due to electrostatic discharge (ESD) and other transient events. The AQ22 series can safely absorb repetitive ESD strikes at ±30kV (contact discharge, IEC 61000-4-2) without performance degradation and safely dissipate 27A of 8/20µs induced surge current (IEC 61000-4-5 2nd edition) with very low clamping voltages.

Pinout and Functional Block Diagram



Features

- ESD, IEC 61000-4-2, ±30kV contact, ±30kV air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, IEC 61000-4-5 2nd edition, 27A (t_p=8/20µs)
- Low clamping voltage

- Low leakage current
- Small SOD323 package fits 0805 footprints
- AEC-Q101 qualified
- Moisture Sensitivity Level(MSL -1)
- Halogen-free, lead-free and RoHS-compliant

Applications

- Switches / Buttons
- Test Equipment / Instrumentation
- Point-of-Sale Terminals
- Medical Equipment
- Notebooks / Desktops / Servers
- Computer Peripherals
- Automotive applications

Life Support Note:

Not Intended for Use in Life Support or Life Saving Applications

The products shown herein are not designed for use in life sustaining or life saving applications unless otherwise expressly indicated.

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Specifications are subject to change without notice.

Revision: 09/02/20

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Absolute Maximum Ratings

Symbol	Parameter	Value	Units	
P_{pk}	Peak Pulse Power (t _p =8/20µs)	950	W	
T _{OP}	T _{OP} Operating Temperature		°C	
T _{STOR}	Storage Temperature	-55 to 150	°C	

Notes:

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the component. This is a stress only rating and operation of the component at these or any other conditions above those indicated in the operational sections of this specification is not implied.

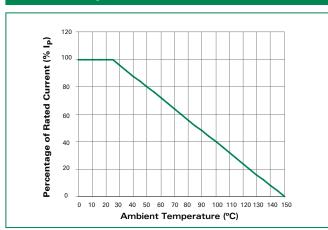
Electrical Characteristics (T_{OP}=25°C)

Parameter	Symbol	Test Conditions	Min	Тур	Max	Units
Reverse Standoff Voltage	V _{RWM}	I _R =1μA			22.0	V
Breakdown Voltage	V _{BR}	I _R =1mA	23			V
Reverse Leakage Current	I _{LEAK}	V _R =22V		0.02	0.5	μΑ
Clamp Voltage ¹	V _c	I _{pp} =27A, t _p =8/20μs, Fwd		35.5		V
Dynamic Resistance ²	R _{DYN}	TLP, t _p =100ns, I/O to Ground		0.13		Ω
Peak Pulse Current	l _{pp}	t _p =8/20μs			27	А
ESD Withstand Voltage ¹	\/	IEC 61000-4-2 (Contact Discharge)	±30			kV
	V _{ESD}	IEC 61000-4-2 (Air Discharge)	±30			kV
Diode Capacitance ¹	C _{I/O-GND}	Reverse Bias=0V, f=1MHz		160		pF

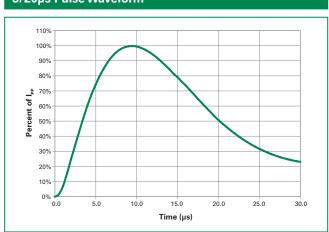
Note

- 1. Parameter is guaranteed by design and/or component characterization.
- $2. Transmission\ Line\ Pulse\ (TLP)\ with\ 100 ns\ width,\ 2ns\ rise\ time,\ and\ average\ window\ t1=70 ns\ to\ t2=90 ns$



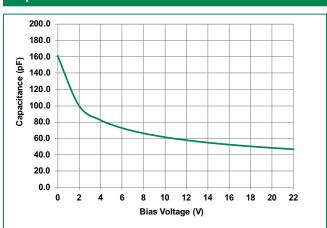


8/20µs Pulse Waveform

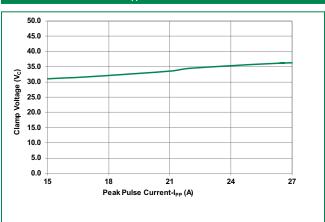




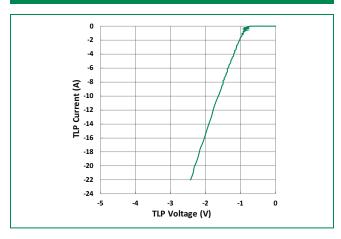
Capacitance vs Reverse Bias



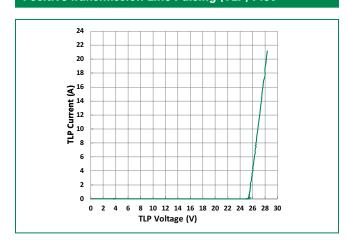
Clamping Voltage vs I



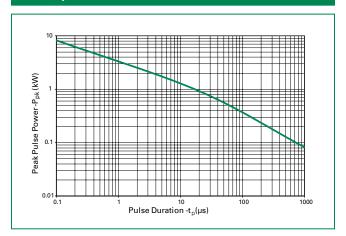
Negative Transmission Line Pulsing (TLP) Plot



Positive Transmission Line Pulsing (TLP) Plot

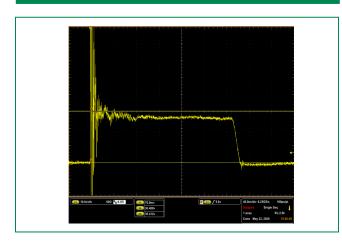


Non-Repetitive Peak Pulse Power vs. Pulse Time

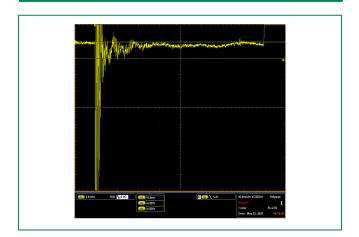


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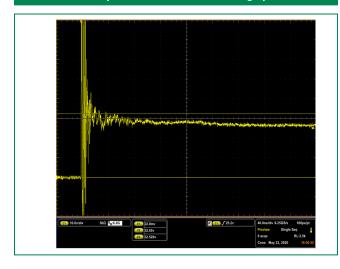
IEC 61000-4-2 +8 kV Contact ESD Clamping Voltage



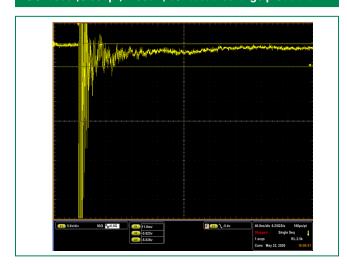
IEC 61000-4-2 -8 kV Contact ESD Clamping Voltage



ISO10605 (C:330pF, R:330Ω) contact discharge plot at +8 kV



ISO10605 (C:330pF, R:330Ω) contact discharge plot at -8 kV



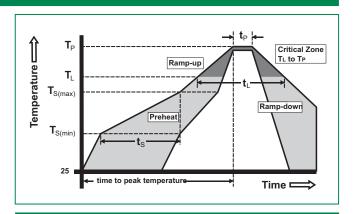
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PRELIMINARY & CONFIDENTIAL

Littelfuse, Inc. has characterized initial samples of this device and is currently conducting reliability testing. Parts numbers and specifications are subject to change until

Soldering Parameters

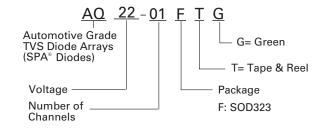
Reflow Condition		Pb – Free assembly	
Pre Heat	-Temperature Min (T _{s(min)})	150°C	
	-Temperature Max (T _{s(max)})	200°C	
	-Time (min to max) (t _s)	60 – 180 secs	
Average rai	mp up rate (Liquidus) Temp (T _L)	3°C/second max	
$T_{S(max)}$ to T_{L}	- Ramp-up Rate	3°C/second max	
Reflow	-Temperature (T _L) (Liquidus)	217°C	
	-Temperature (t _L)	60 - 150 seconds	
Peak Temperature (T _p)		260+0/-5 °C	
Time within 5°C of actual peak Temperature (t _p)		20 - 40 seconds	
Ramp-down Rate		6°C/second max	
Time 25°C to peak Temperature (T _p)		8 minutes Max.	
Do not exceed		260°C	



Product Characteristics

Lead Plating	Matte Tin		
Lead Material	Copper Alloy		
Lead Coplanarity	0.0004 inches (0.102mm)		
Substrate Material	Silicon		
Body Material	Molded Compound		
Flammability	UL Recognized compound meeting flammability rating V-0		

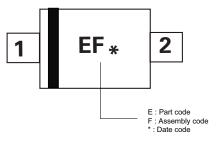
Part Numbering System



Ordering Information

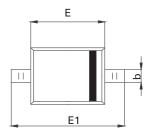
Part Number	Package	Min. Order Qty.
AQ22-01FTG	SOD323	3000

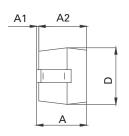
Part Marking System

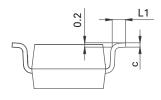


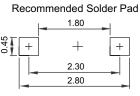
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Package Dimensions -SOD323





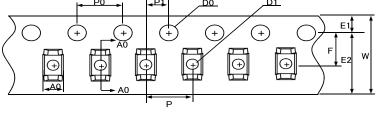


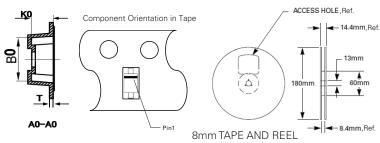


Unit: mm

	SOD323			
Symbol	Millir	neters	Inches	
	Min	Max	Min	Max
Α	-	1.00	-	0.039
A1	0.00	0.10	0.000	0.004
A2	0.80	0.90	0.031	0.035
b	0.25	0.35	0.010	0.014
С	0.08	0.15	0.003	0.006
D	1.20	1.40	0.047	0.055
E	1.60	1.80	0.063	0.071
E1	2.50	2.70	0.098	0.106
L1	0.25	0.40	0.010	0.016

Embossed Carrier Tape & Reel Specification — SOD323





Symbol	Millimeters
A0	1.36min/1.62max
В0	2.90+/-0.10
W	8.0+0.3/-0.10
D0	1.50+0.10
D1	ø1.00min/ø1.25max
E	1.75+/-0.10
E2	-
F	3.50+/-0.05
P0	4.00+/-0.10
P	4.00+/-0.10
P1	2.00+/-0.05
K0	1.15min/1.45max
Т	0.254+/-0.13

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