

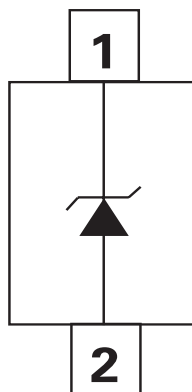
AQ22-01FTG, 950W Discrete Unidirectional TVS Diode



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 $\pm 30\text{kV}$ (contact discharge, IEC 61000-4-2) without performance degradation and safely dissipate 27A of 8/20 μs 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, $\pm 30\text{kV}$ contact, $\pm 30\text{kV}$ air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, IEC 61000-4-5 2nd edition, 27A ($t_p=8/20\mu\text{s}$)
- 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.

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
P_{pk}	Peak Pulse Power ($t_p=8/20\mu s$)	950	W
T_{OP}	Operating Temperature	-40 to 150	°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.

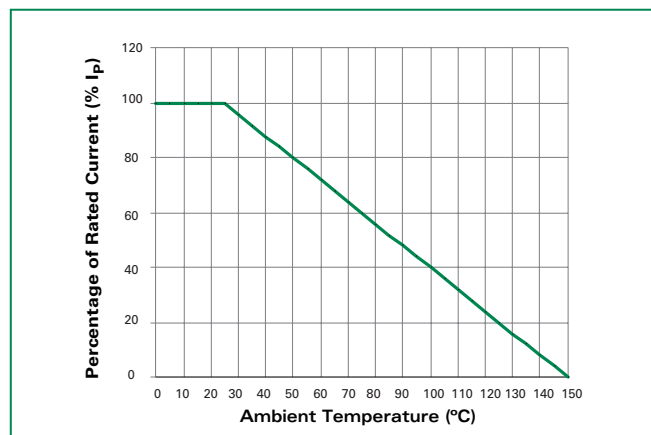
Electrical Characteristics ($T_{OP}=25^{\circ}C$)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	$I_R=1\mu A$			22.0	V
Breakdown Voltage	V_{BR}	$I_R=1mA$	23			V
Reverse Leakage Current	I_{LEAK}	$V_R=22V$		0.02	0.5	μA
Clamp Voltage ¹	V_C	$I_{PP}=27A$, $t_p=8/20\mu s$, Fwd		35.5		V
Dynamic Resistance ²	R_{DYN}	TLP, $t_p=100ns$, I/O to Ground		0.13		Ω
Peak Pulse Current	I_{PP}	$t_p=8/20\mu s$			27	A
ESD Withstand Voltage ¹	V_{ESD}	IEC 61000-4-2 (Contact Discharge)	± 30			kV
		IEC 61000-4-2 (Air Discharge)	± 30			kV
Diode Capacitance ¹	$C_{I/O-GND}$	Reverse Bias=0V, $f=1MHz$		160		pF

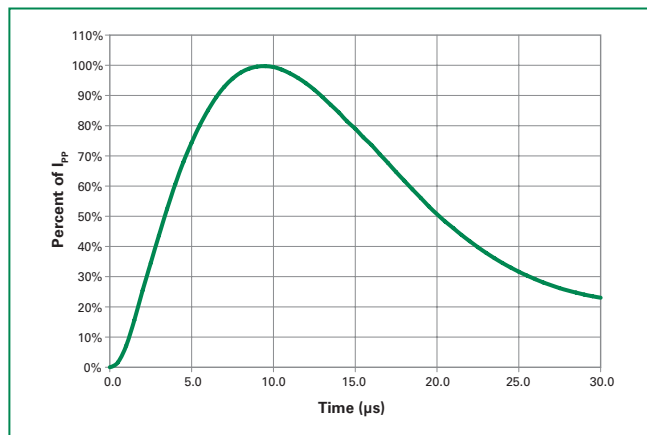
Note:

- Parameter is guaranteed by design and/or component characterization.
- Transmission Line Pulse (TLP) with 100ns width, 2ns rise time, and average window $t_1=70ns$ to $t_2=90ns$

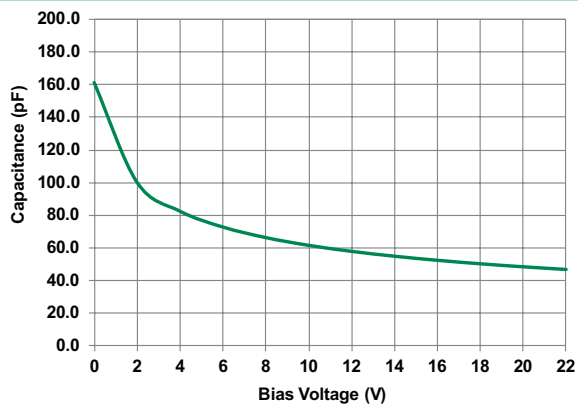
Power Derating Curve



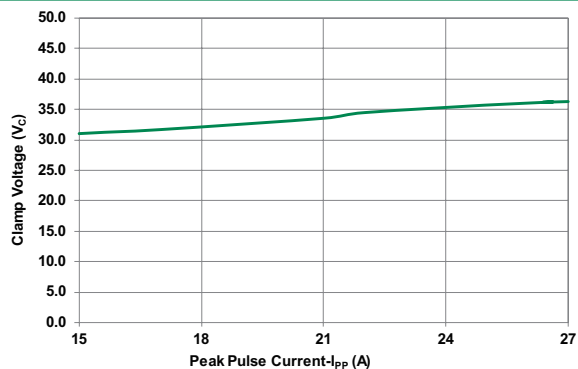
8/20 μs Pulse Waveform



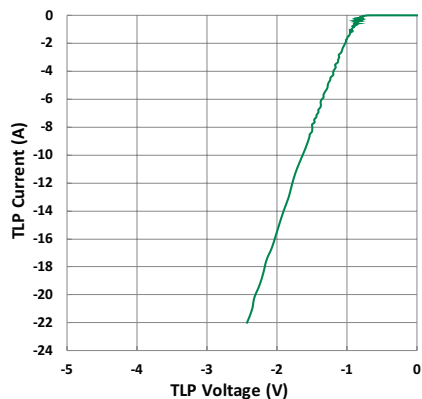
Capacitance vs Reverse Bias



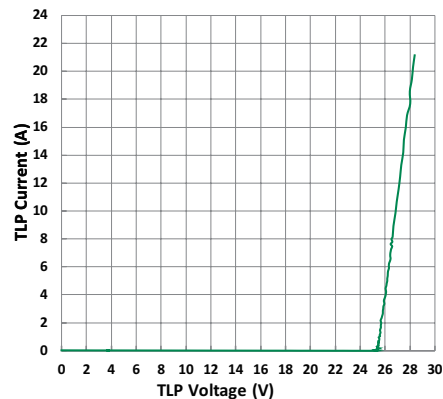
Clamping Voltage vs I_{pp}



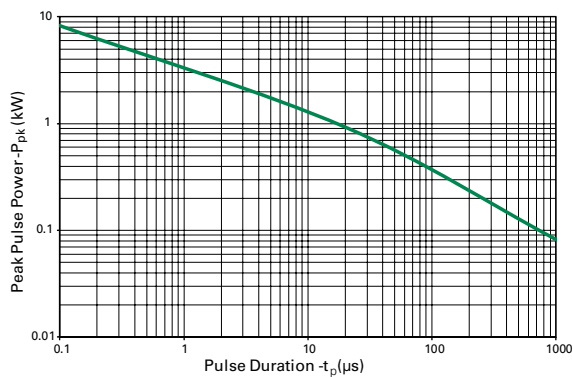
Negative Transmission Line Pulsing (TLP) Plot



Positive Transmission Line Pulsing (TLP) Plot



Non-Repetitive Peak Pulse Power vs. Pulse Time



The screenshot displays an oscilloscope interface with a yellow signal trace on a black background with a white grid. The signal starts with a high-frequency, high-amplitude burst, then settles into a noisy plateau. A sharp drop in the signal amplitude occurs towards the right side of the screen. The bottom of the screen features a control panel with various settings and a table of data points.

Control Panel Settings:

- 16. Oscilloscope
- 17. Deriv
- 18. 10.00V
- 19. 10.00V
- 20. 10.00V
- 21. 10.00V
- 22. 10.00V
- 23. 10.00V
- 24. 10.00V
- 25. 10.00V
- 26. 10.00V
- 27. 10.00V
- 28. 10.00V
- 29. 10.00V
- 30. 10.00V
- 31. 10.00V
- 32. 10.00V
- 33. 10.00V
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- 97. 10.00V
- 98. 10.00V
- 99. 10.00V
- 100. 10.00V

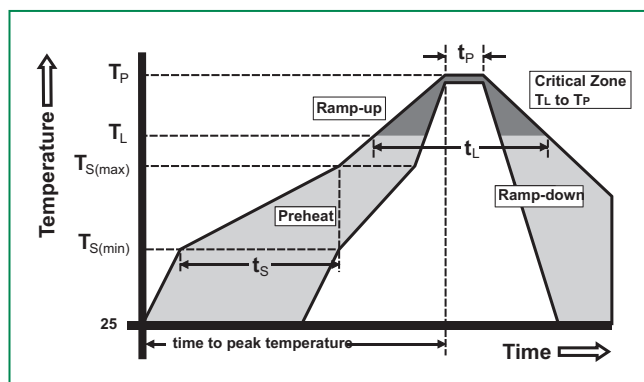
Table Data:

Time	Amplitude	Frequency	Phase	Power	Energy	Entropy	Information	Complexity	Order	Stability	Robustness	Adaptability	Flexibility	Resilience	Resilience
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.013	0.000	0.000													

The screenshot shows a Tektronix oscilloscope interface. The main display area features a grid with a yellow signal trace. The trace starts with a very sharp, high-amplitude spike on the left, followed by a series of smaller, irregular spikes, and then settles into a noisy plateau. The top of the screen has a menu bar with options like 'File', 'Edit', 'View', 'Measure', 'Trigger', 'Acquire', 'Display', 'Help', and 'Settings'. The bottom panel contains several control sections: on the left, a '5.0V/div' scale and a '500ns' timebase; in the center, a '10.00V' peak-to-peak measurement and a '4.335V' level measurement; on the right, a '40.00ns' time interval measurement and a '10ps/div' vertical scale. The bottom right corner shows the date 'May 22, 2020' and a time '10:12:00'.

Soldering Parameters

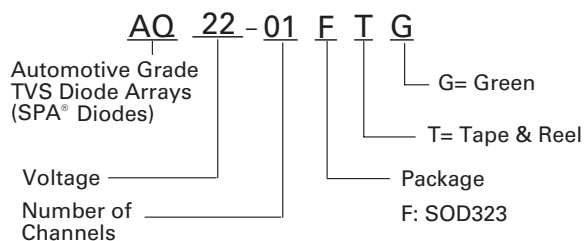
Reflow Condition		Pb – Free assembly
Pre Heat	- Temperature Min ($T_{s(min)}$)	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus) Temp (T_L) to peak		3°C/second max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	- Temperature (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

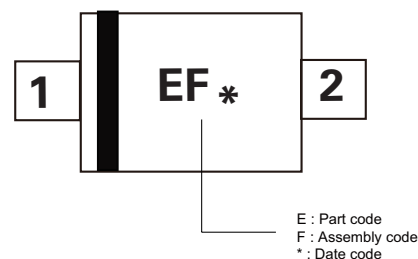
Part Numbering System



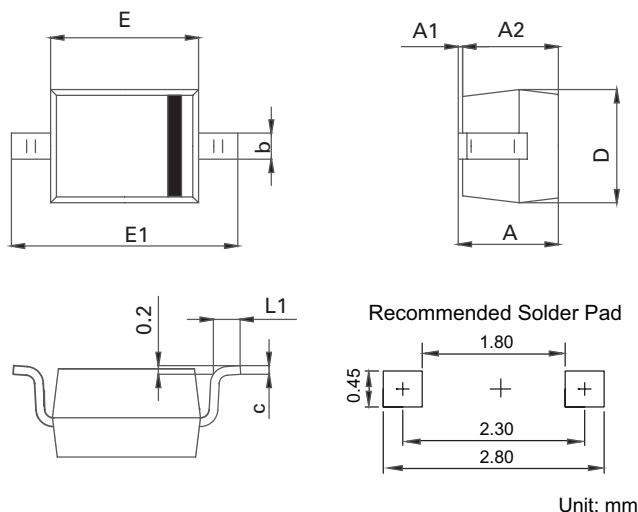
Ordering Information

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

Part Marking System

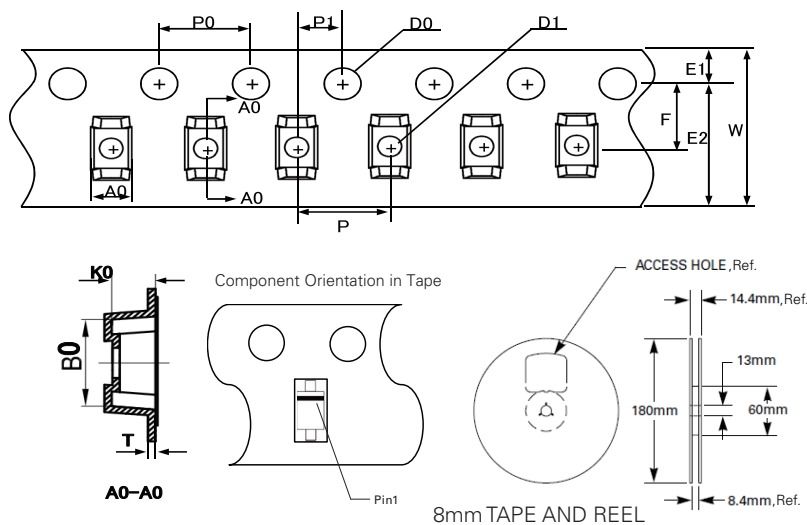


Package Dimensions -SOD323



Symbol	SOD323			
	Millimeters		Inches	
	Min	Max	Min	Max
A	-	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
c	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
B0	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
T	0.254+/-0.13

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