

# AQW05C-01FTG

## 30A Bidirectional Discrete TVS, General Purpose ESD Protection



**Note:** This package image is for example and reference only. For detail package drawing, please refer to the package section in this datasheet.

### Pinout



### Functional Block Diagram



### Description

The AQW05C-01FTG bidirectional TVS is fabricated in a proprietary silicon avalanche technology. These diodes provide a high ESD (electrostatic discharge) protection level for electronic equipment.

The AQW05C-01FTG TVS can safely absorb repetitive ESD strikes of  $\pm 30\text{kV}$  (contact and air discharge as defined in IEC 61000-4-2) without any performance degradation. In addition, it can safely dissipate a 30A 8/20 $\mu\text{s}$  surge event as defined in IEC 61000-4-5, 2<sup>nd</sup> Edition.

### Features & Benefits

- ESD, IEC 61000-4-2,  $\pm 30\text{kV}$  contact/air
- ESD, ISO10605 330pF 330 $\Omega$ ,  $\pm 30\text{kV}$  contact/air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Maximum surge tolerance, IEC 61000-4-5 2<sup>nd</sup> Edition, 30A (8/20 $\mu\text{s}$ )
- Halogen-free, lead-free and RoHS-compliant
- Moisture Sensitivity Level (MSL-1)
- AEC-Q101 qualified and PPAP capable

### Applications

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

#### 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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### Absolute Maximum Ratings

Symbol	Parameter	Value	Units
$I_{PP}$	Peak Current ( $t_p=8/20\mu s$ )	30	A
$T_{OP}$	Operating Temperature	-40 to 150	°C
$T_{STOR}$	Storage Temperature	-55 to 150	°C

**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.

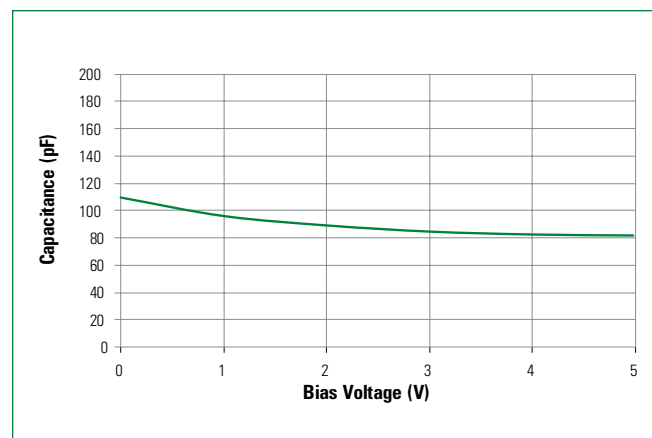
### Electrical Characteristics ( $T_{OP}=25^\circ C$ )

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	$V_{RWM}$				5	V
Breakdown Voltage	$V_{BR}$	$I_R=1mA$ , I/O to GND	6			V
Reverse Leakage Current	$I_{LEAK}$	$V_R=5V$ , I/O to GND			1	$\mu A$
Clamp Voltage <sup>1</sup>	$V_C$	$I_{PP}=1A$ , $t_p=8/20\mu s$ , I/O to GND		8.0		V
		$I_{PP}=30A$ , $t_p=8/20\mu s$ , I/O to GND		15.0		V
Dynamic Resistance <sup>2</sup>	$R_{DYN}$	TLP, $t_p=100ns$ , I/O to GND		0.16		$\Omega$
ESD Withstand Voltage <sup>1,3</sup>	$V_{ESD}$	IEC 61000-4-2 (Contact Discharge)	$\pm 30$			kV
		IEC 61000-4-2 (Air Discharge)	$\pm 30$			kV
		ISO10605 (Contact Discharge)	$\pm 30$			kV
		ISO10605 (Air Discharge)	$\pm 30$			kV
Diode Capacitance <sup>1</sup>	$C_{IO-GND}$	Reverse Bias=0V, $f=1MHz$ , I/O to GND		115		pF

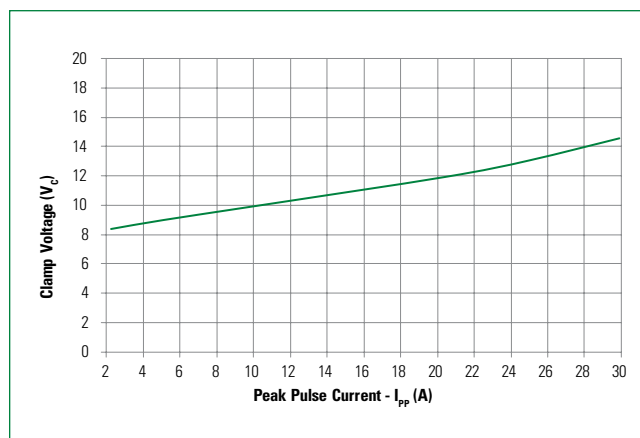
**Note:**

- Parameter is guaranteed by design and/or component characterization.
- Transmission Line Pulse (TLP) with 100ns width, 0.2ns rise time, and average window  $t1=70ns$  to  $t2=90ns$ .
- Device stressed with ten non-repetitive ESD pulses.

### Capacitance vs. Reverse Bias



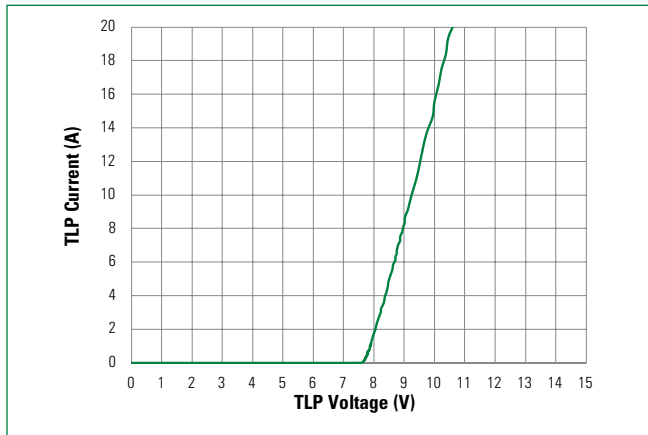
### Clamping Voltage vs $I_{PP}$



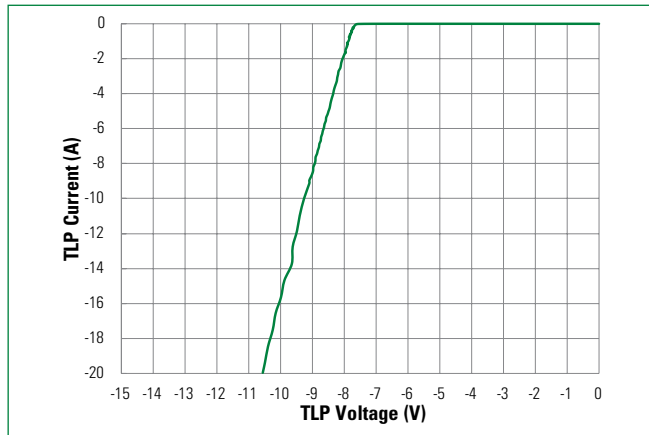
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30A Bidirectional Discrete TVS, General Purpose ESD Protection

**Positive Transmission Line Pulsing (TLP) Plot**



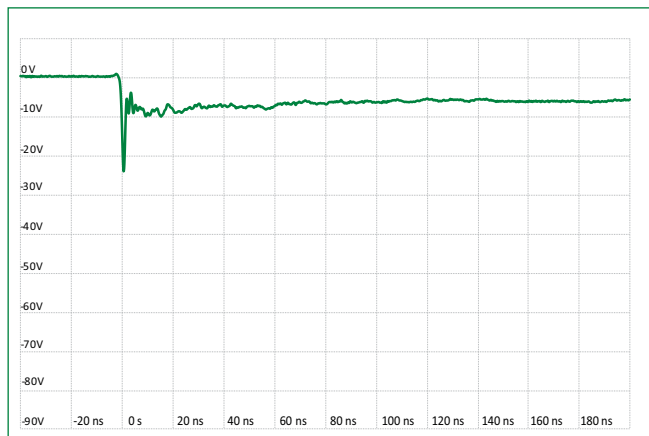
**Negative Transmission Line Pulsing (TLP) Plot**



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



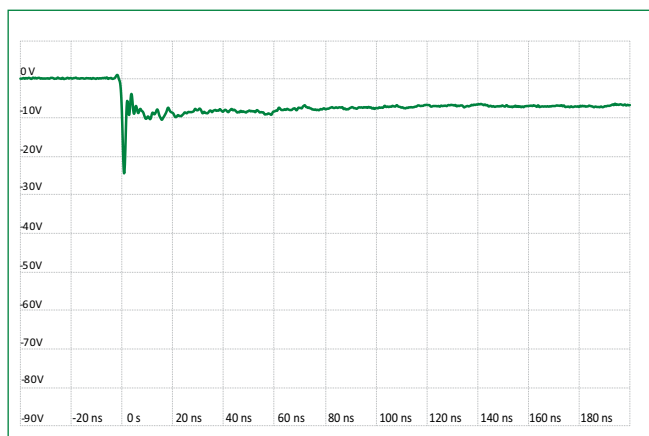
**IEC 61000-4-2 -8 kV Contact ESD Clamping Voltage**



**ISO10605 Contact Discharge Plot at +8 kV**



**ISO10605 Contact Discharge Plot at -8 kV**

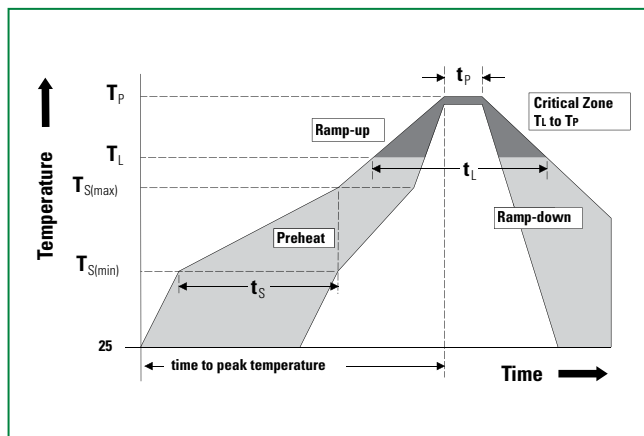


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## 30A Bidirectional Discrete TVS, General Purpose ESD Protection

### Soldering Parameters

<b>Reflow Condition</b>	Pb – Free assembly	
<b>Pre Heat</b>	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (min to max) ( $t_s$ )	60 – 120 secs
<b>Average ramp up rate (Liquidus) Temp (<math>T_L</math>) to peak</b>	3°C/second max	
<b><math>T_{S(max)}</math> to <math>T_L</math> - Ramp-up Rate</b>	3°C/second max	
<b>Reflow</b>	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Temperature ( $t_L$ )	60 – 150 seconds
<b>Peak Temperature (<math>T_p</math>)</b>	260 <sup>+0/-5</sup> °C	
<b>Time within 5°C of actual peak Temperature (<math>t_p</math>)</b>	30 seconds	
<b>Ramp-down Rate</b>	6°C/second max	
<b>Time 25°C to peak Temperature (<math>T_p</math>)</b>	8 minutes Max.	
<b>Do not exceed</b>	260°C	



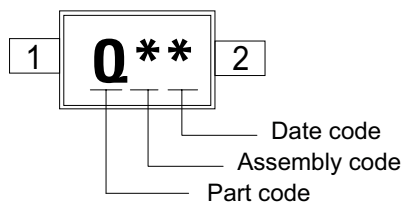
### Ordering Information

Part Number	Package	Min. Order Qty.
AQW05C-01FTG	SOD323	3000

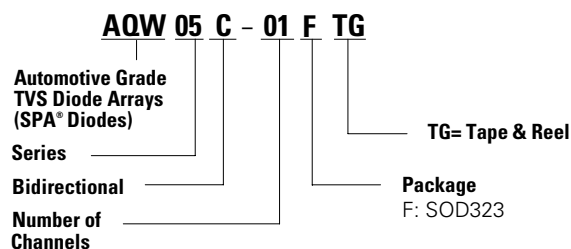
### Product Characteristics

<b>Lead Plating</b>	Matte Tin
<b>Lead material</b>	Alloy 42
<b>Body Material</b>	Molded Compound
<b>Flammability</b>	UL Recognized compound meeting flammability rating V-0

### Part Marking System



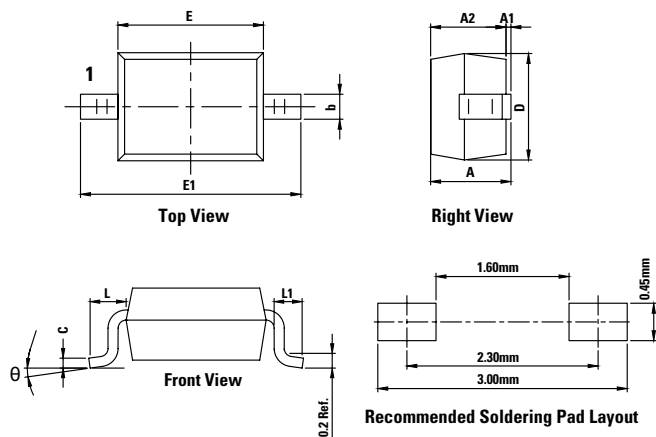
### Part Numbering System



# AQW05C-01FTG

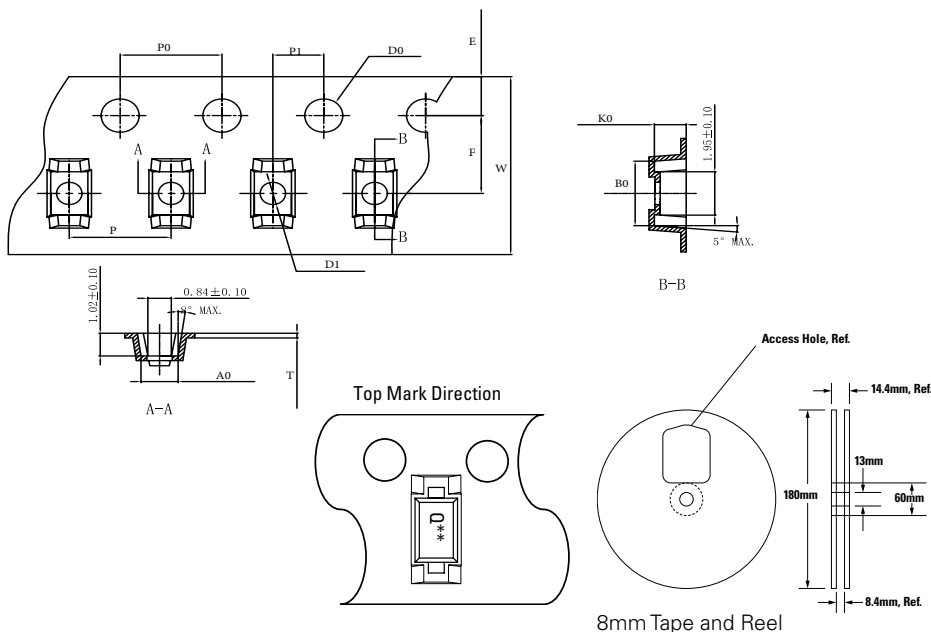
## 30A Bidirectional Discrete TVS, General Purpose ESD Protection

### Package Dimensions — SOD323



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.80	1.00	0.031	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	2.75	0.098	0.108
L1	0.25	0.40	0.010	0.016
L	0.475 REF		0.019 REF	
θ	0°	8°	7°	8°

### Embossed Carrier Tape & Reel Specification — SOD323



Symbol	Millimeters
A0	1.36min/1.62max
B0	2.85min/3.40max
W	8.0+0.3/-0.10
D0	1.40min/1.60max
D1	∅0.95min/∅1.25max
E	1.75+/-0.10
F	3.50+/-0.10
P0	4.00+/-0.10
P1	2.00+/-0.10
K0	1.15min/1.45max
T	0.254+/-0.02

**Product Disclaimer:** 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" includes Littelfuse, Inc., and all of its affiliate entities. <http://www.littelfuse.com/disclaimer-electronics>