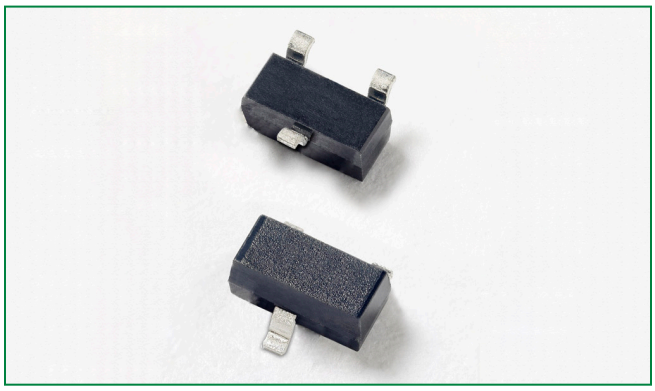
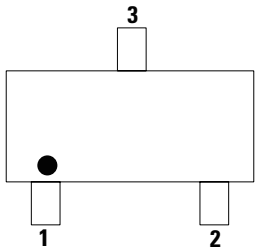
AQ12CANA-02HTG

28pF, 12A Bidirectional TVS, General Purpose ESD Protection

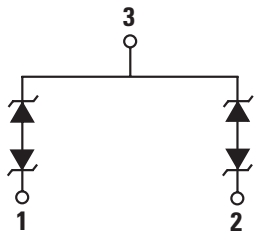
AUTOMOTIVE GRADE HF RoHS Pb



Pinout



Functional Block Diagram



Description

The AQ12CANA-02HTG bidirectional TVS is fabricated in a proprietary silicon avalanche technology. These diodes provide a high ESD (electrostatic discharge) protection level for electronic equipment.

The AQ12CANA-02HTG TVS can safely absorb repetitive ESD strikes of ±30kV (contact and air discharge as defined in IEC 61000-4-2) without any performance degradation. In addition, it can safely dissipate a 12A 8/20µs surge event as defined in IEC 61000-4-5, 2nd Edition.

Features

- ESD, IEC 61000-4-2, ±30kV contact/air
- ESD, ISO 10605, 330pF 330Ω, ±30kV contact/air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Maximum surge tolerance, IEC 61000- 4-5 2nd Edition, 12A (8/20µs)
- Halogen free, lead free and RoHS compliant
- Moisture Sensitivity Level (MSL-1)
- AEC-Q101 qualified and PPAP capable

Applications

- Automotive
- ADAS Control Units
- Body Control Units
- CAN Bus
- Electronic Control Units
- Factory Automation
- Lighting Control (DALI)
- PowerTrain Control Units

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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AQ12CANA-02HTG

28pF, 12A Bidirectional TVS, General Purpose ESD Protection

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I_{PP}	Peak Current (t_p=8/20µs)	12	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.

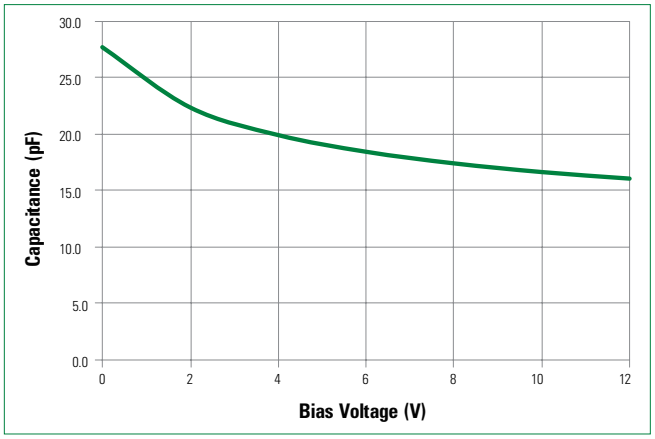
Electrical Characteristics (T_{OP}=25ºC)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}				12	V
Breakdown Voltage	V_{BR}	I_R=1mA, I/O to GND	13			V
Reverse Leakage Current	I_{LEAK}	V_R=12V, I/O to GND			0.1	µA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, I/O to GND		16.5		V
		I_{PP}=12A, t_p=8/20µs, I/O to GND		26.5		
Dynamic Resistance[2]	R_{DYN}	TLP, t_P=100ns, I/O to GND		0.32		Ω
ESD Withstand Voltage[1,3]	V_{ESD}	IEC 61000-4-2 (Contact Discharge)	±30			kV
		IEC 61000-4-2 (Air Discharge)	±30			kV
		ISO 10605 (Contact Discharge)	±30			kV
		ISO 10605 (Air Discharge)	±30			kV
Diode Capacitance[1]	C_{IO-GND}	Reverse Bias=0V, f=1MHz, I/O to GND		28		pF

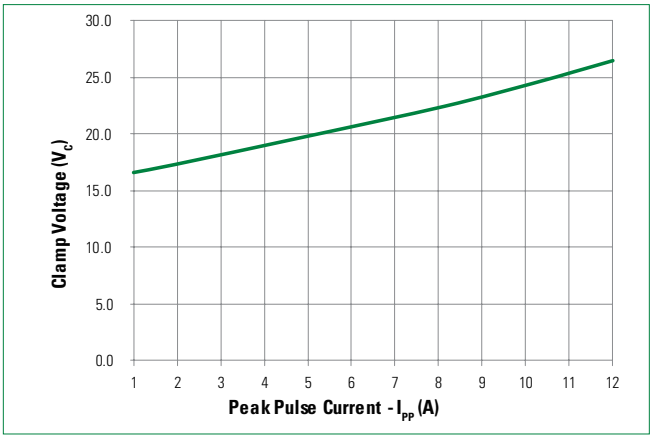
Note:

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

Capacitance vs. Reverse Bias



Clamping Voltage vs I_{PP}

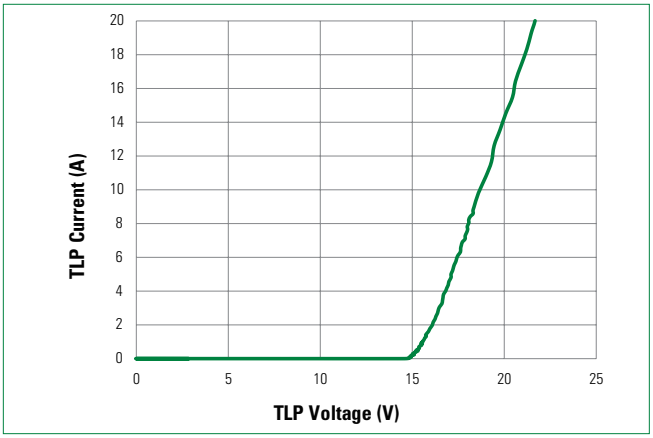


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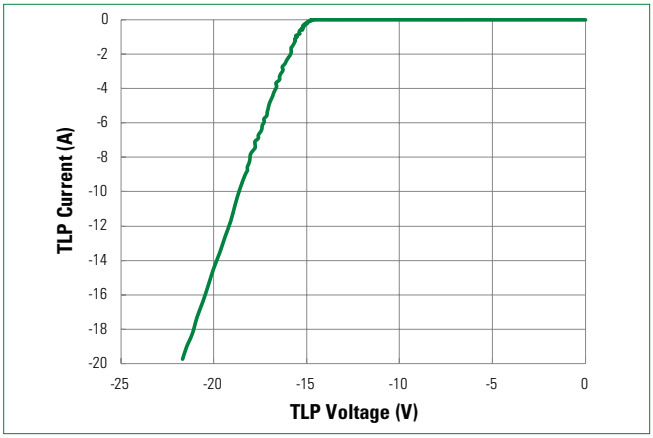
AQ12CANA-02HTG

28pF, 12A Bidirectional TVS, General Purpose ESD Protection

Positive Transmission Line Pulsing (TLP) Plot



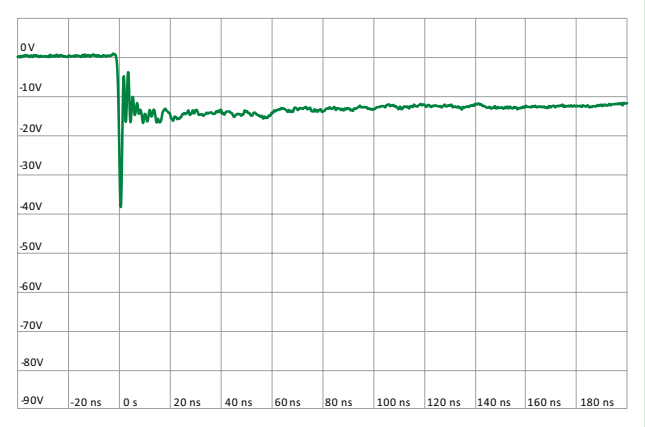
Negative Transmission Line Pulsing (TLP) Plot



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



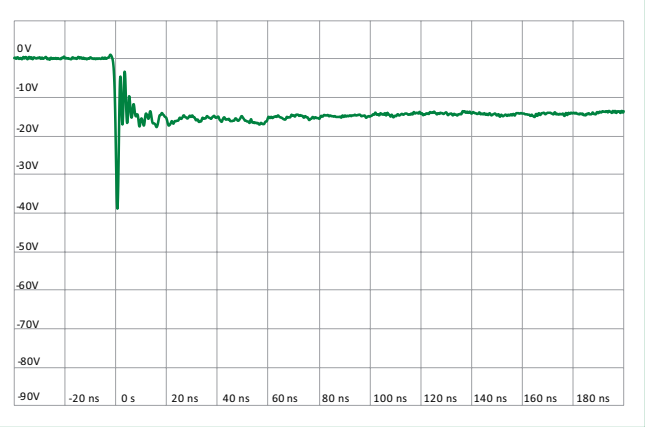
IEC 61000-4-2 -8 kV Contact ESD Clamping Voltage



ISO10605 Contact Discharge Plot at +8 kV



ISO10605 Contact Discharge Plot at -8 kV



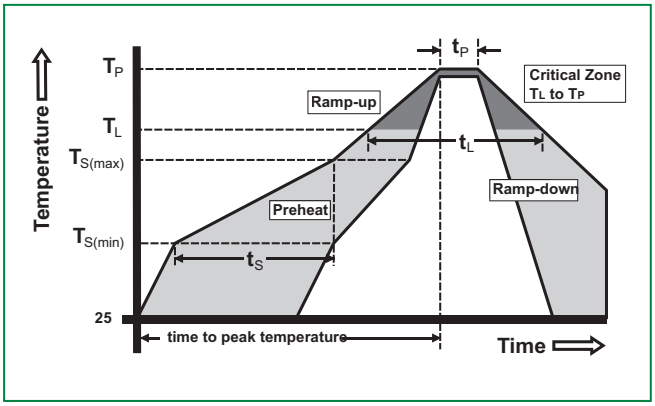
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AQ12CANA-02HTG

28pF, 12A Bidirectional TVS, General Purpose ESD Protection

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 – 120 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)		30 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Do not exceed		260°C



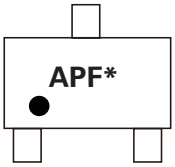
Product Characteristics

Lead Plating	Matte Tin
Lead material	Copper Alloy
Lead Coplanarity	0.004 inches (0.102mm)
Body Material	Molded Compound
Flammability	UL Recognized compound meeting flammability rating V-0

Ordering Information

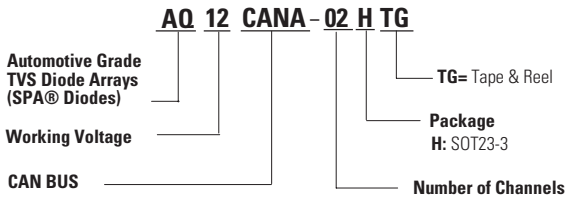
Part Number	Package	Min. Order Qty.
AQ12CANA-02HTG	SOT23-3L	3000

Part Marking System



AP=Part code
F=Assembly code
***=**Date code

Part Numbering System

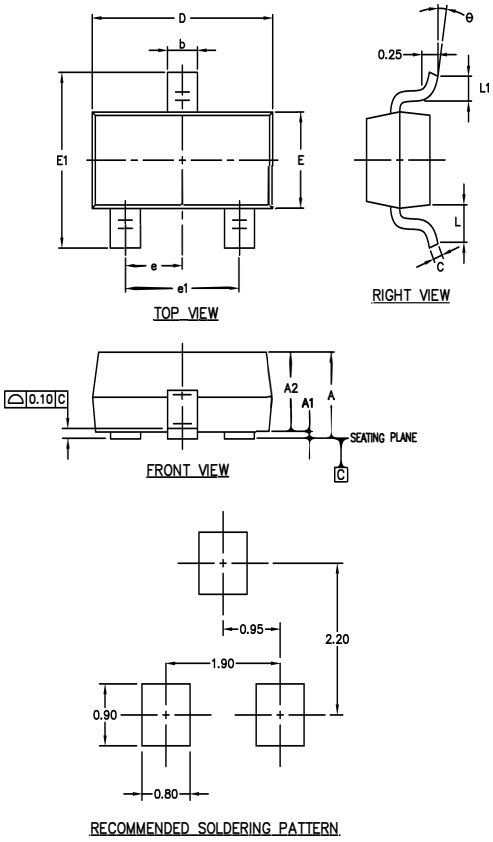


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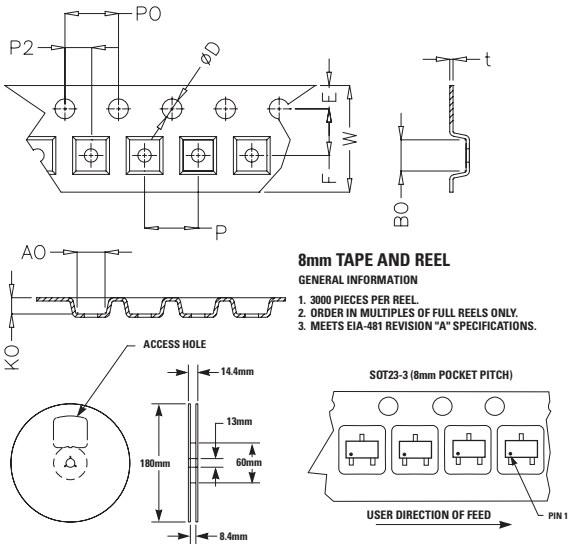
28pF, 12A Bidirectional TVS, General Purpose ESD Protection

Package Dimensions - SOT23-3



Package	SOT23-3			
Pins	3			
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.890	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.880	1.050	0.035	0.041
b	0.300	0.510	0.012	0.020
C	0.080	0.200	0.003	0.008
D	2.800	3.040	0.110	0.120
E	1.200	1.400	0.047	0.055
E1	2.100	2.640	0.083	0.104
e	0.950 TYP		0.037 TYP	
e1	1.780	2.050	0.070	0.081
L	0.550 REF		0.022 REF	
L1	0.300	0.550	0.012	0.022
θ	0°	8°	0°	8°

Embossed Carrier Tape & Reel Specification — SOT23-3



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
E	1.65	1.85	0.065	0.073
F	3.40	3.60	0.134	0.142
P2	1.90	2.10	0.075	0.083
D	1.40	1.60	0.055	0.063
P0	3.90	4.10	0.154	0.161
W	7.70	8.30	0.303	0.327
P	3.90	4.10	0.154	0.161
A0	3.05	3.25	0.120	0.128
B0	2.67	2.87	0.105	0.113
K0	1.12	1.32	0.044	0.052
t	0.18	0.24	0.007	0.009

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