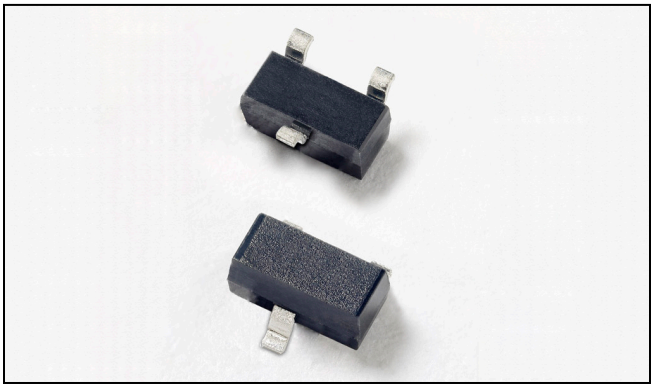
AQ24CANFD 200W TVS Diode Array

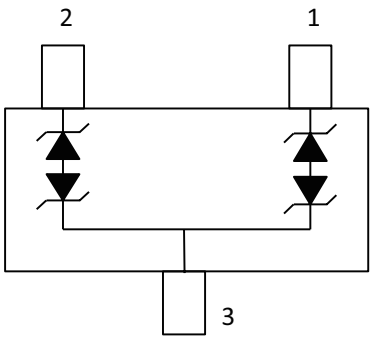


Description

The AQ24CANFD is designed to protect automotive Controller Area Network (CAN) lines from damage due to electrostatic discharge (ESD), electrical fast transient (EFT), and other overvoltage transients.

The AQ24CANFD can absorb repetitive ESD strikes above the maximum level specified in the IEC 61000-4-2 international standard without performance degradation and can safely withstand 3A surge (8/20 waveshape as defined in IEC 61000-4-5 2nd edition) at a very low clamping voltages.

Pinout and Functional Block Diagram



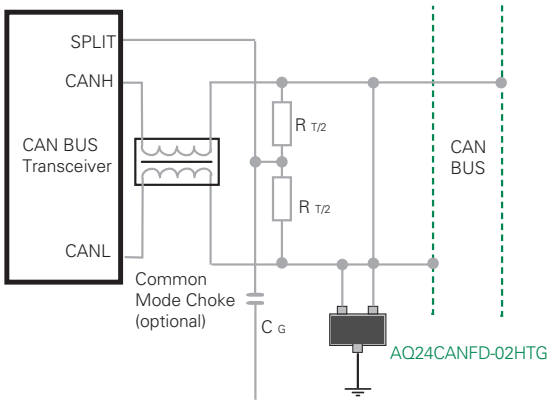
Features

- ESD, IEC 61000-4-2, ±21kV contact, ±21kV air
- EFT, IEC 61000-4-4, 50A (5/50ns)
- Lightning, 3A (8/20 as defined in IEC 61000-4-5 2nd edition)
- PPAP capable
- Low clamping voltage
- Low leakage current
- AEC-Q101 qualified
- Moisture Sensitivity Level (MSL -1)
- Halogen free, lead free and RoHS compliant

Applications

- CAN Bus Protection
- Automotive Applications
- Electronic Control Units
- Body Control Units
- ADAS Control Units
- PowerTrain Control Units
- Factory Automation
- Lightning Control (DALI)

Application Example



Absolute Maximum Ratings

Symbol	Parameter	Value	Units
P_{Pk}	Peak Pulse Power (t_p=8/20μs)	200	W
I_{PP}	Peak Pulse Current (t_p=8/20μs)	3.0	A
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°C)

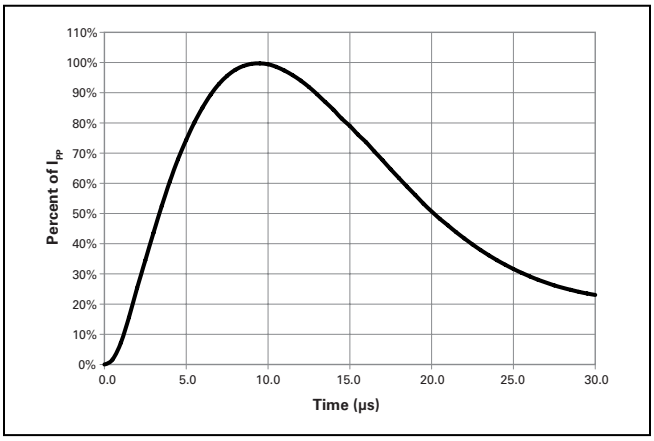
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	I_R≤1μA, Pin1 or Pin2 to Pin3			24.0	V
Breakdown Voltage	V_{BR}	I_R=1mA, Pin1 or Pin2 to Pin3	26.7	28.0		V
Leakage Current	I_{LEAK}	V_R=24V		0.02	0.5	μA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20μs, Pin 1 or Pin 2 to Pin 3		32.7	40.0	V
		I_{PP}=3A, t_p=8/20μs, Pin 1 or Pin 2 to Pin 3		41.2	50.0	V
Dynamic Resistance[2]	R_{DYN}	TLP, t_p=100ns, I/O to GND		0.5		Ω
ESD Withstand Voltage[1]	V_{ESD}	IEC 61000-4-2 (Contact Discharge)			±21	kV
		IEC 61000-4-2 (Air Discharge)			±21	kV
Diode Capacitance[1]	$C_{I/O-GND}$	Reverse Bias=0V, f=1MHz; Pin 1 or Pin2 to Pin 3		11.5	14.0	pF

Note:

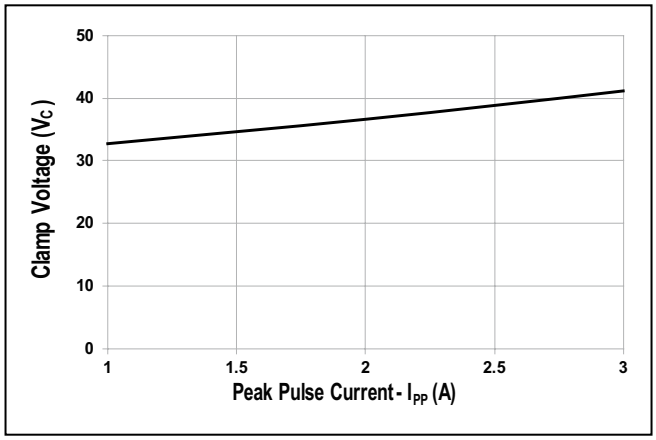
1 Parameter is guaranteed by design and/or component characterization.

2 Transmission Line Pulse (TLP) with 100ns width, 2ns rise time, and average window t1=70ns to t2= 90ns

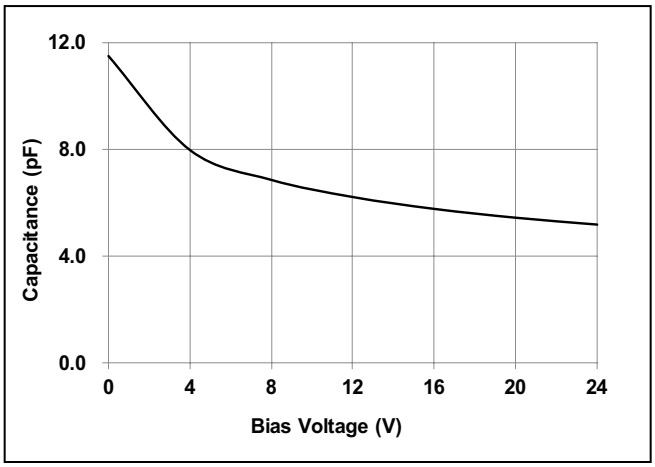
8/20μs Pulse Waveform



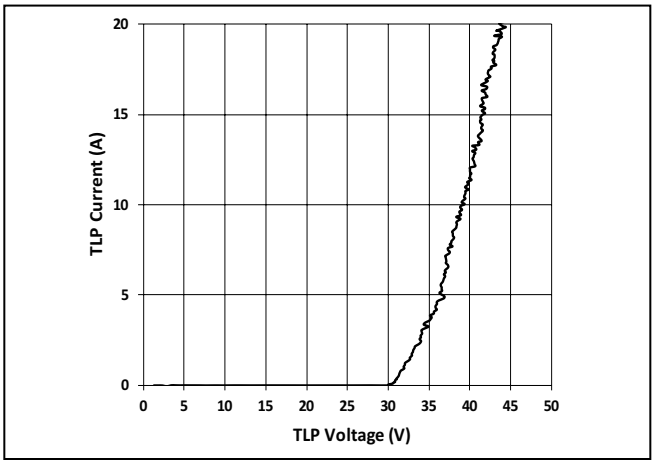
Clamping Voltage vs I_{PP}



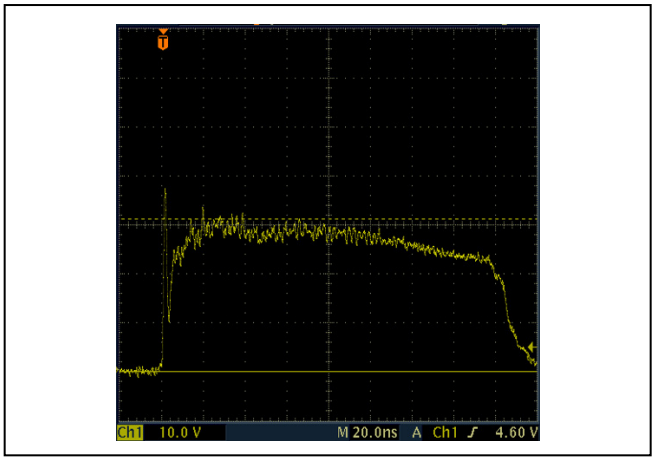
Capacitance vs. Reverse Bias



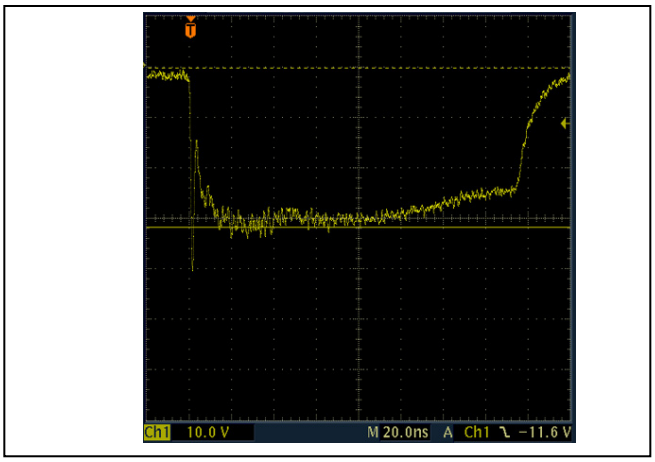
Transmission Line Pulsing(TLP) Plot



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

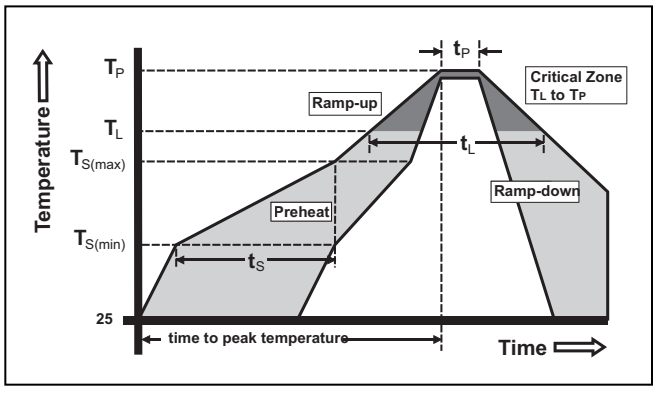


IEC 61000 -4-2 -8 kV Contact ESD Clamping Voltage

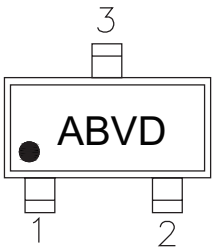


Soldering Parameters

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



Part Marking System

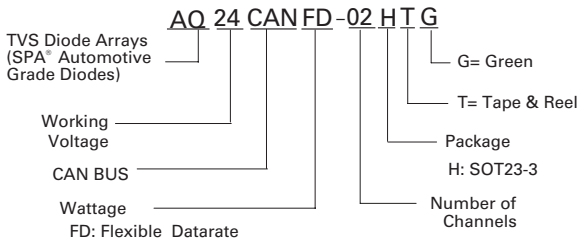


AB : Part code
V : Assembly code
D : Date code

Ordering Information

Part Number	Package	Marking	Min. Order Qty.
AQ24CANFD-02HTG	SOT23-3	ABVD	3000

Part Numbering System



Product Characteristics

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

Notes :
1. All dimensions are in millimeters
2. Dimensions include solder plating.
3. Dimensions are exclusive of mold flash & metal burr.