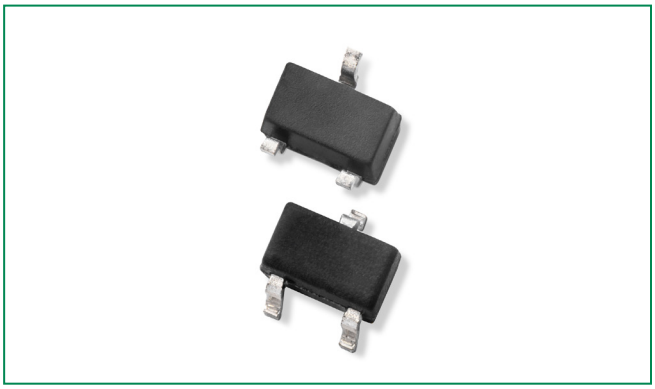
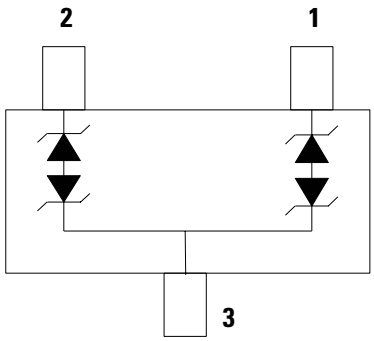
AQ24CANFD

200W, General Purpose ESD Protection

AUTOMOTIVE GRADE | RoHS | HF | GREEN



Pinout and Functional Block Diagram



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 (8/20µs waveshape as defined in IEC 61000-4-5 2nd edition) at a very low clamping voltages.

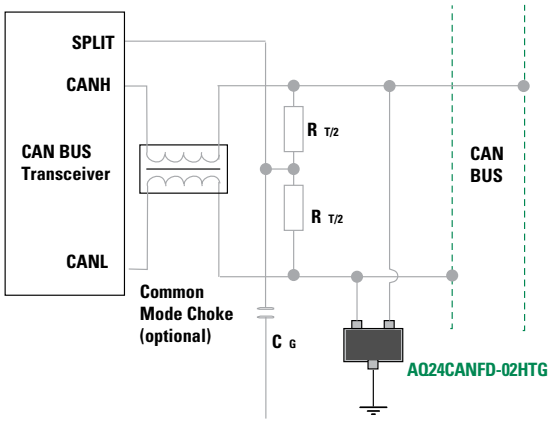
Features & Benefits

- ESD, IEC 61000-4-2, ±21kV contact, ±21kV air
- EFT, IEC 61000-4-4, 50A (5/50ns)
- Lightning, IEC 61000-4-5 2nd edition, 3A (8/20µs)
- PPAP capable
- ESD, ISO 10605, 330pF 330Ω, ±21kV contact, ±21kV air
- 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



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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AQ24CANFD

200W, General Purpose ESD Protection

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

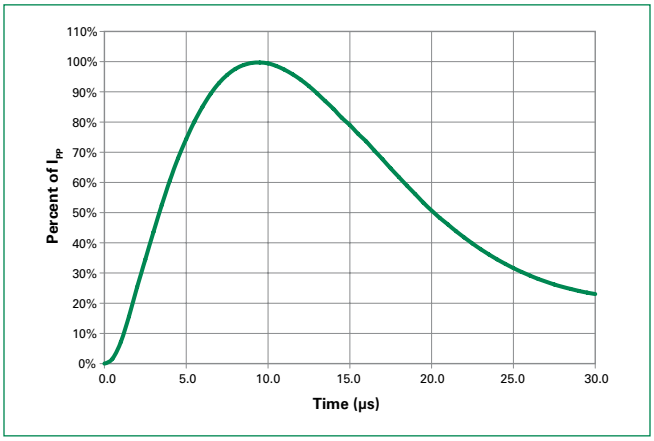
Caution: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the component. This is a stress only rating and operation of the component at these or any other conditions above those indicated in the operational sections of this specification is not implied.

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

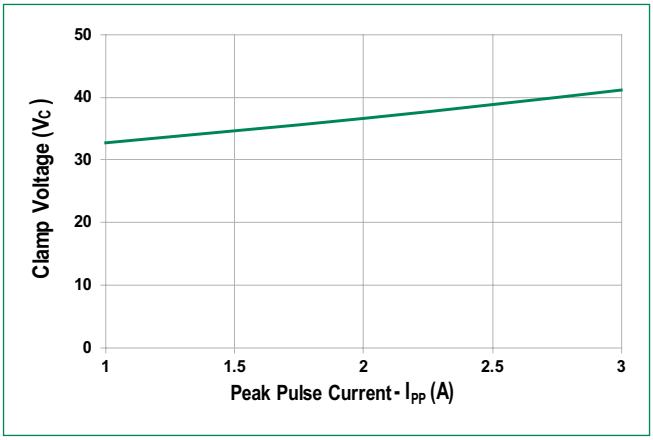
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	I_R=1µA, Pin1 or Pin2 to Pin3			24.0	V
Breakdown Voltage	V_{BR}	I_R=1mA, Pin1 or Pin2 to Pin3	26.7	28.0		V
Reverse Leakage Current	I_{LEAK}	V_R=24V		0.02	0.5	µA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, Pin 1 or Pin 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 IPP

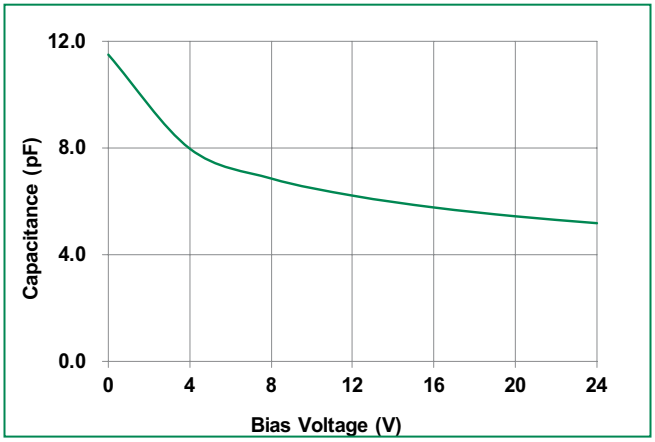


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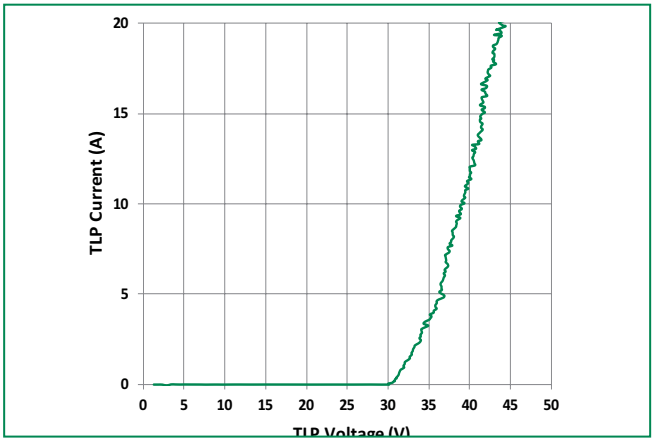
AQ24CANFD

200W, General Purpose ESD Protection

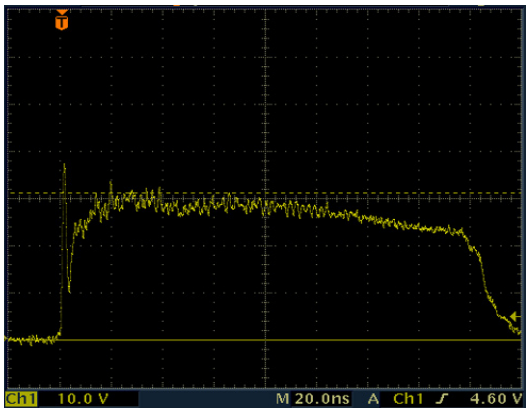
Capacitance vs. Reverse Bias



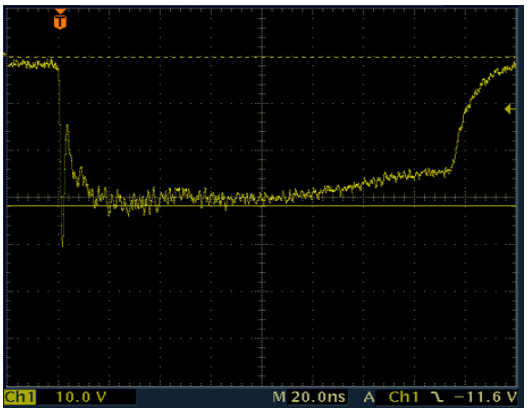
Transmission Line Pulsing(TLP) Plot



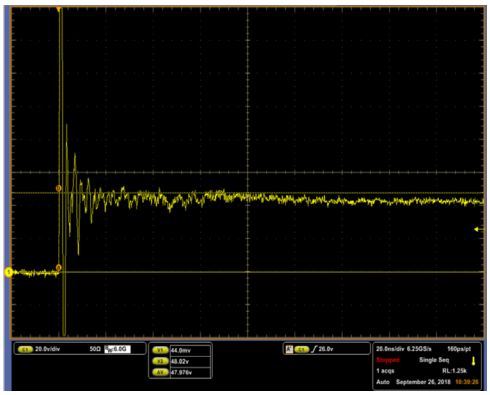
IEC 61000 -4-2 +8 kV Contact ESD Clamping Voltage



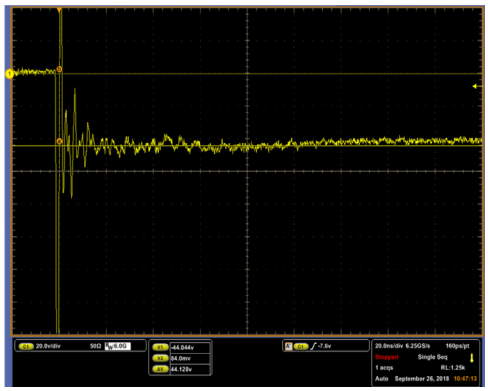
IEC 61000 -4-2 -8 kV Contact ESD Clamping Voltage



ISO10605 +8 kV Contact ESD Clamping Voltage



ISO10605 -8 kV Contact ESD Clamping Voltage

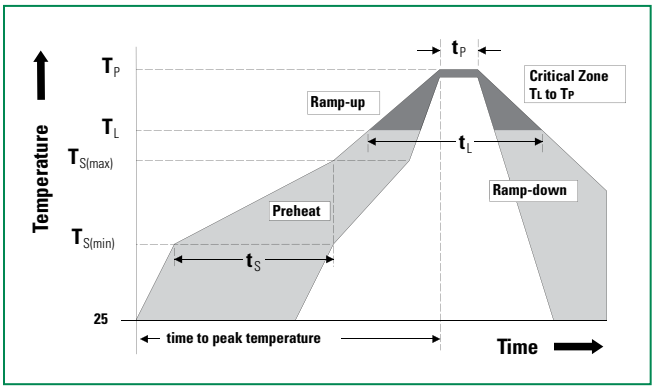


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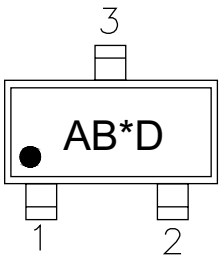
AQ24CANFD
200W, General Purpose ESD Protection

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

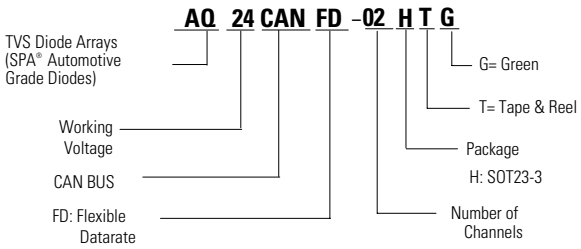


Part Marking System



AB : Part code
* : Assembly code
D : Date code

Part Numbering System



Ordering Information

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

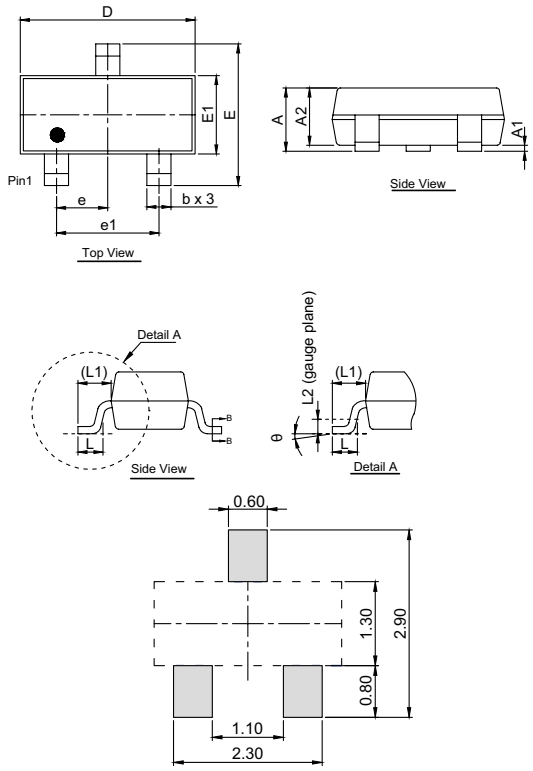
Product Characteristics

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

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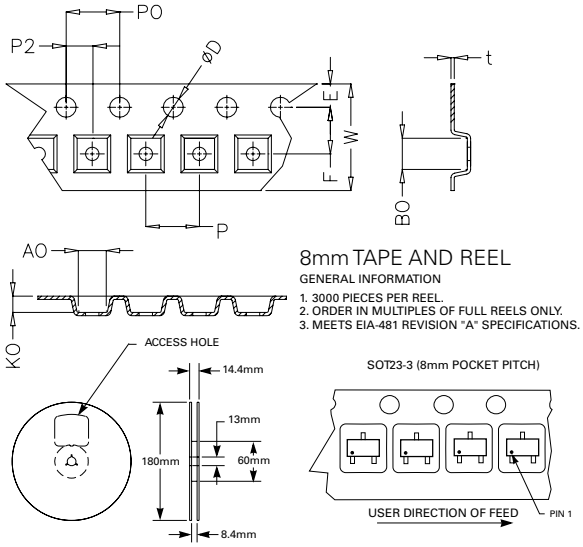
Package Dimensions — SOT23-3



Recommended soldering pad layout (unit :mm)

Symbol	Millimeters			Inches		
	Min	Nom	Max	Min	Nom	Max
A	0.89	-	1.17	0.035	-	0.046
A1	0.00	-	0.15	0.000	-	0.006
A2	0.88	0.95	1.02	0.035	0.037	0.040
D	2.80	2.90	3.04	0.110	0.114	0.120
E	2.10	2.35	2.64	0.083	0.093	0.104
E1	1.20	1.30	1.40	0.047	0.051	0.055
e	0.95 BSC			0.037BSC		
e1	1.90 BSC			0.075BSC		
L	0.28	0.44	0.60	0.011	0.017	0.024
L1	0.54 REF			0.021 REF		
L2	0.25 BSC			0.010 BSC		
θ	0°	-	8°	0°	-	8°

Embossed Carrier Tape & Reel Specification — SOT23-3



Symbol	Millimetres		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	0.22	0.24	0.009	0.009

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