SY2A206208AOA

CAN Bus TVS Protection

General Description

The SY2A206208AOA is a low-capacitance transient voltage suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for Controller Area Network (CAN) transceivers.

With typical capacitance of 12pF, SY2A206208AOA is designed to protect parasitic-sensitive systems against over-voltage and over-current transient events. It complies with IEC 61000-4-2 (ESD), (±30kV air, ±30kV contact discharge), IEC 61000-4-5 (surge) (4A, 8/20μs).

The device can protect two automotive CAN bus lines.

The SY2A206208AOA is available in a compact SOT-23 package.

Features

- Transient protection for data lines
  - IEC61000-4-2 (ESD) ±30kV (air) ±30kV (contact)
  - IEC61000-4-5 (surge) 4A (8/20μs)
- For 24V and below operating voltage
- Can be used for data, control or CAN bus line protection
- Low capacitance: 12pF (typical)
- Low leakage current: 0.01μA @ V_{RWM} (typical)
- AEC-Q101 qualified

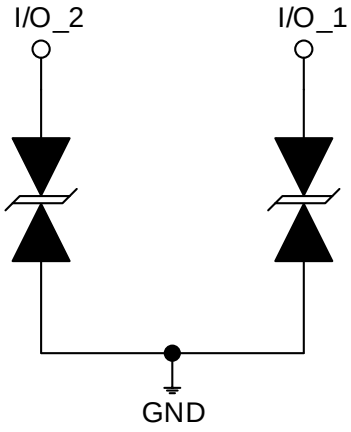
Applications

- CAN/CAN-FD bus protection
- Automotive applications

Mechanical Characteristics

- SOT-23 package
- Marking: device code, date code
- Packaging: tape and reel

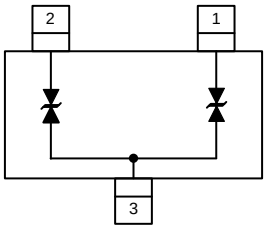
Circuit Diagram



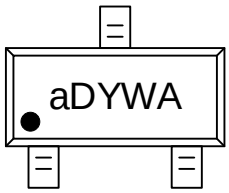
Ordering Information

Part Number	Package type	Top Mark
SY2A206208AOA	SOT-23 RoHS Compliant and Halogen Free	aDYWA

Pinout (Top View)



Marking Codes



Note 1: “aD” is device code, fixed.

Note 2: “YWA” is date code.

Absolute Maximum Rating				
Parameter	**Symbol**	**Min**	**Max**	**Unit**
Maximum Peak Pulse Current (8/20μs)	I_{PP}		4	A
Maximum Peak Pulse Power (8/20μs)	P_{PK}		180	W
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V_{ESD}	-30	30	kV
Operating Temperature	T_{OPT}	-40	+85	℃
Storage Temperature	T_{STG}	-55	+150	C

Electrical Characteristics T_A = 25℃						
Parameter	**Symbol**	**Test Condition**	**Min**	**Typ**	**Max**	**Unit**
Nominal Reverse Working Voltage	V_{RWM}				24	V
Reverse Leakage Current @ V_{RWM}	I_R	V_R =24V, T_A = 25 C Between I/O and GND		0.01	0.1	μA
Reverse Breakdown Voltage @ I_T	V_{BR}	I_T = 1mA Between I/O and GND	26.7		35	V
Clamping Voltage @ I_{PP}	V_C (1)	I_{PP} = 16A, t_p = 10/100ns Between I/O and GND			40	V
Clamping Voltage @ I_{PP}	V_C (1)	I_{PP} = 4A, t_p = 8/20μs Between I/O and GND			45	V
Dynamic Resistance	R_{DYN} (1,2)	t_p = 10/100ns Between I/O and GND		0.23		Ω
Parasitic Capacitance	C_{ESD} (1)	V_R = 0V, f = 1MHz Between I/O and GND		12	17	pF

Notes 1: The device is not guaranteed to function outside its operating conditions.

Notes 2: R_{DYN} calculated based on I_{PP}=8A to I_{PP}=16A, t_p = 10/100ns.

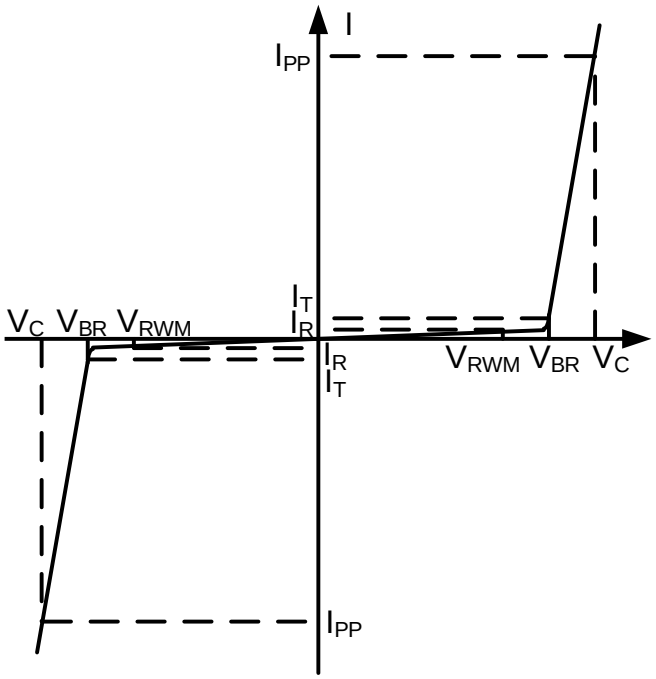
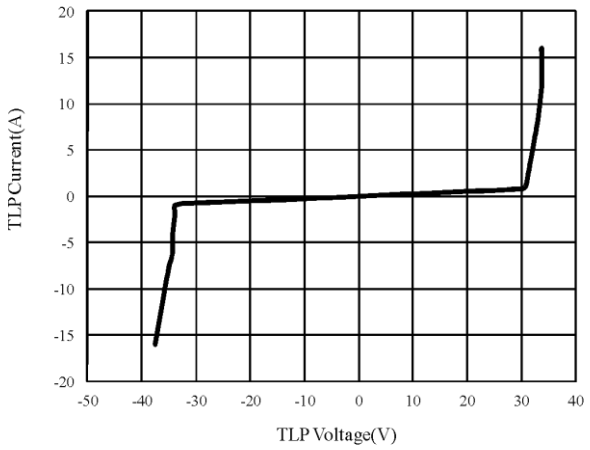


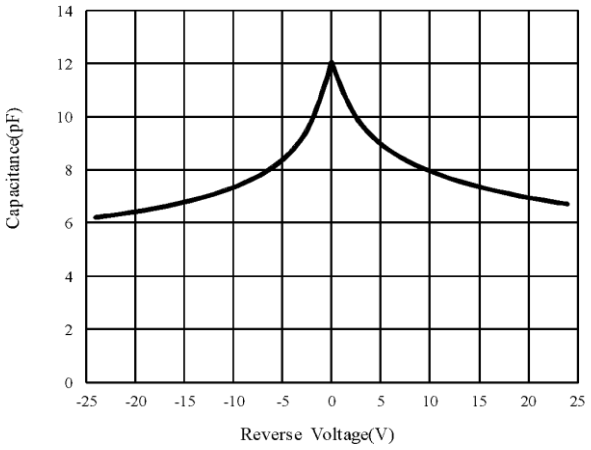
Figure 1. Bi-Directional TVS

Typical Characteristics

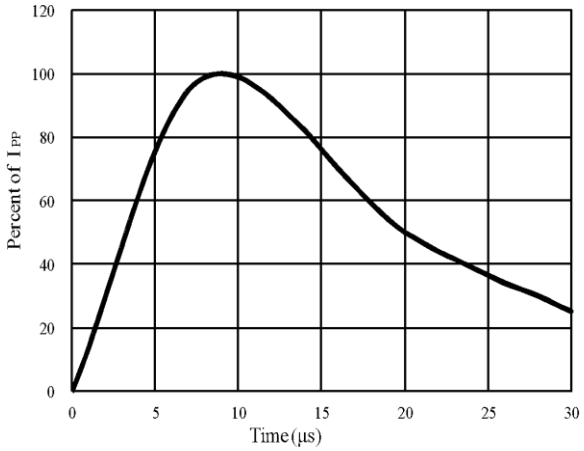
TLP Testing of I/O to GND



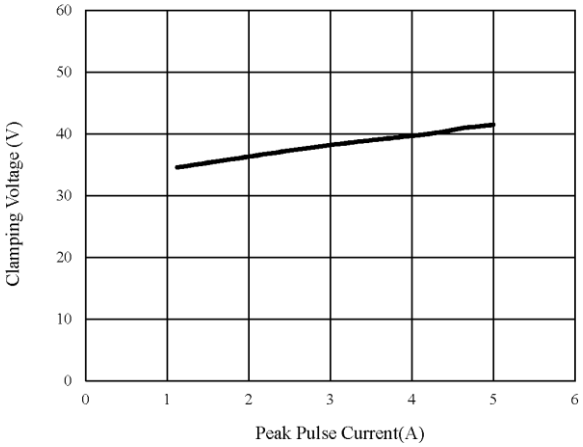
Capacitance VS. Voltage of I/O to GND



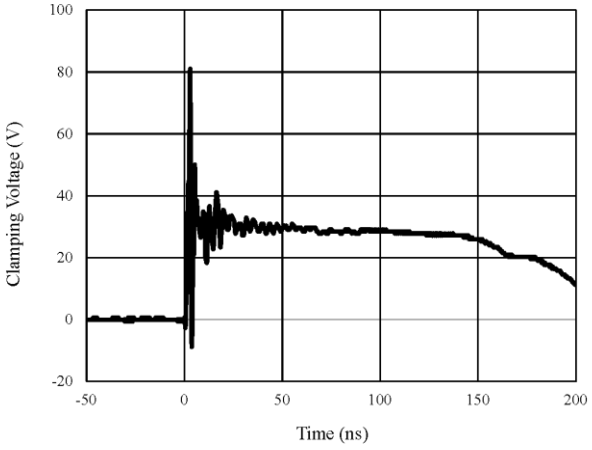
Pulse Wave form



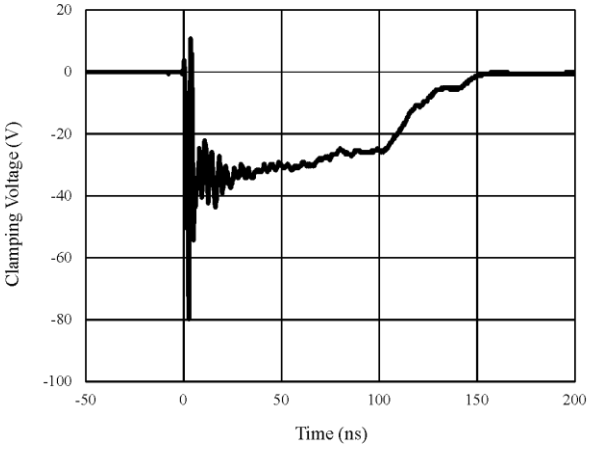
Clamping Voltage vs. Peak Pulse Current (8/20μs)



ESD Clamping of I/O to GND (+8kV Contact per IEC 61000-4-2)



ESD Clamping of I/O to GND (-8kV Contact per IEC 61000-4-2)



Application Information

The SY2A206208AOA is designed to protect two CAN bus lines against over-voltage and over-current transient events by clamping it to an acceptable reference.

The connection of the SY2A206208AOA pin is shown in the figure below. CAN bus lines are connected at Pin1 and Pin2. Pin 3 is the GND, which should connect to a ground plane. All path lengths connected to SY2A206208AOA should be as short as possible to minimize the parasitic inductance.

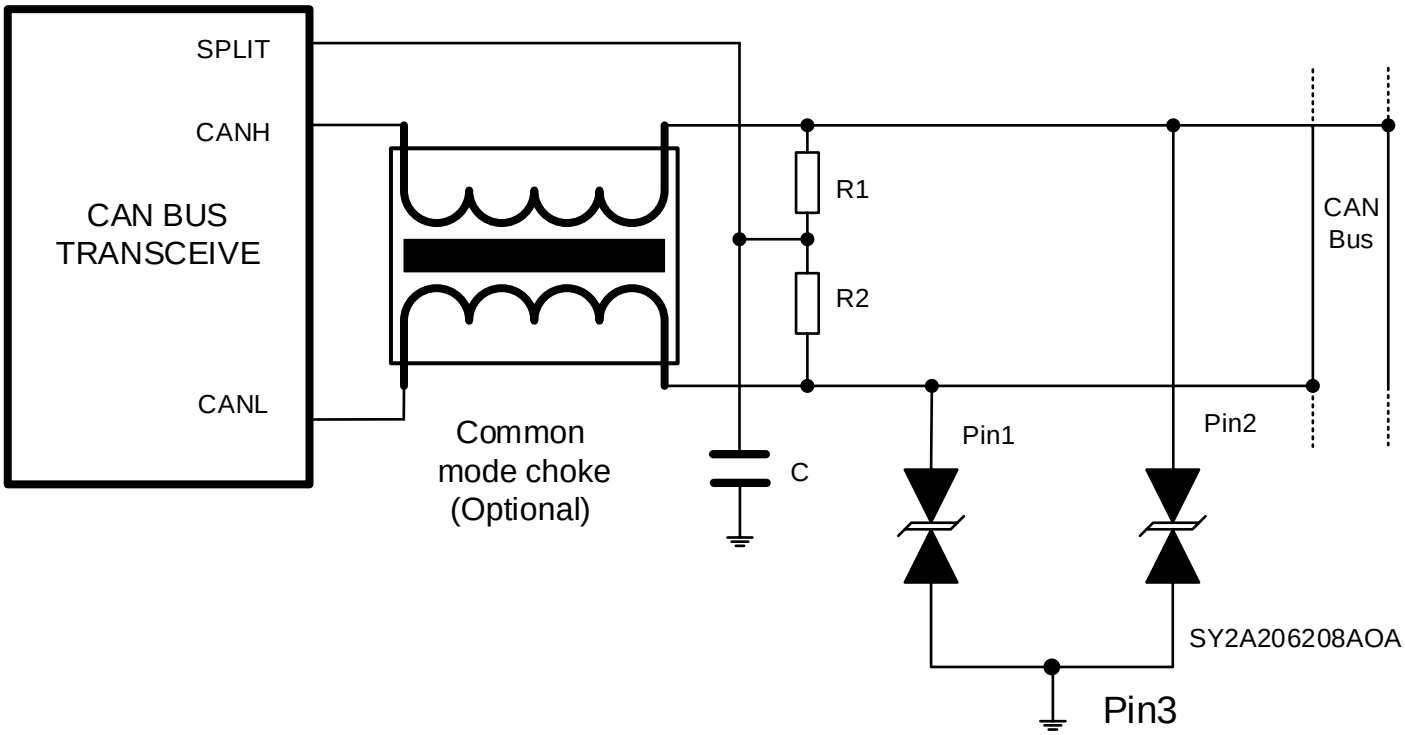


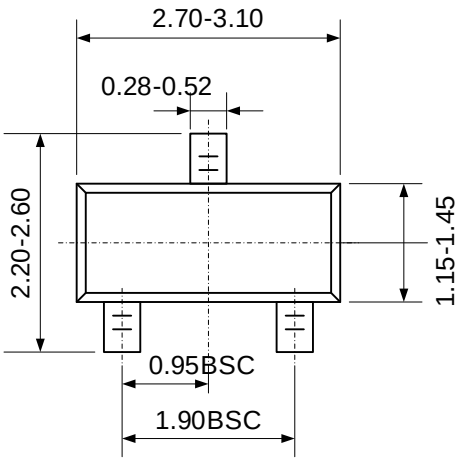
Figure 2. CAN Bus ESD/Surge Protection Circuit

PCB Layout Guidelines

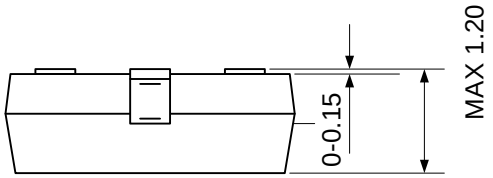
For optimum ESD protection and optimizing the circuit performance the following PCB layout guidelines are recommended:

- Place the SY2A206208AOA as close to the connectors or terminals port as possible.
- Use a large via to connect SY2A206208AOA pin to the ground.
- The SY2A206208AOA should be placed near the protected lines.
- The distance between the SY2A206208AOA ground pin to the GND reference path should be as short as possible.

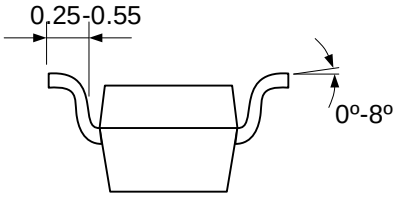
SOT-23 Package Outline



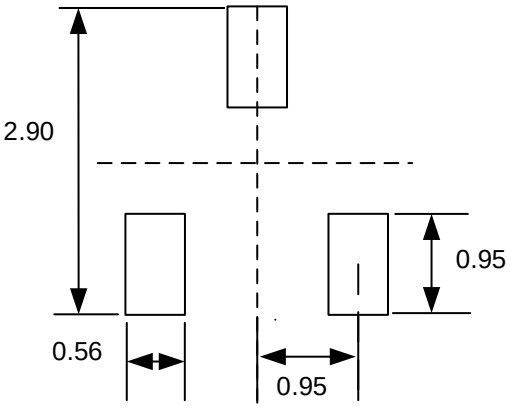
Top View



Side View



Side View

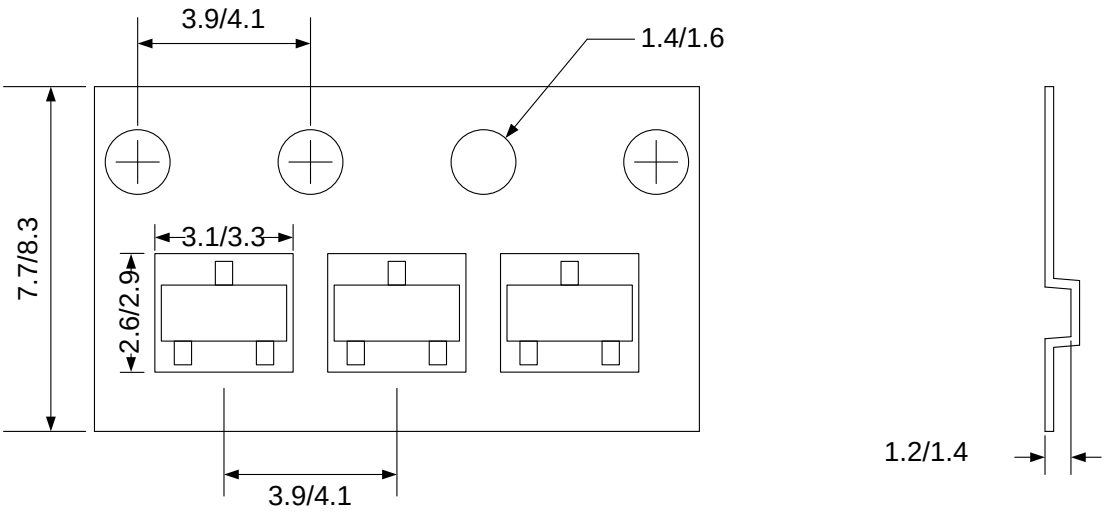


Recommended PCB Layout
(Reference only)

Notes: All dimensions are in millimeters and exclude mold flash and metal burr.

Tape and Reel Specification

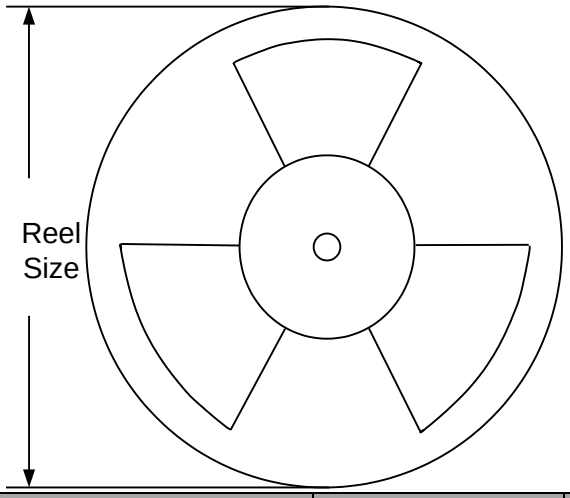
SOT-23 Taping Orientation



Dimensions In mm

Feeding direction ⟶

Carrier Tape & Reel Specification for Packages



Package Types	Tape Width (mm)	Pocket Pitch(mm)	Reel Size (Inch)	Qty per Reel (pcs)
SOT-23	8	4	7"	3000

Revision History

The revision history provided is for informational purpose only and is believed to be accurate, however, not warranted. Please make sure that you have the latest revision.

Revision Number	Revision Date	Description	Pages changed
0.9	08/01/2019	Initial Release	
1.0	08/01/2020	Production Release	

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