


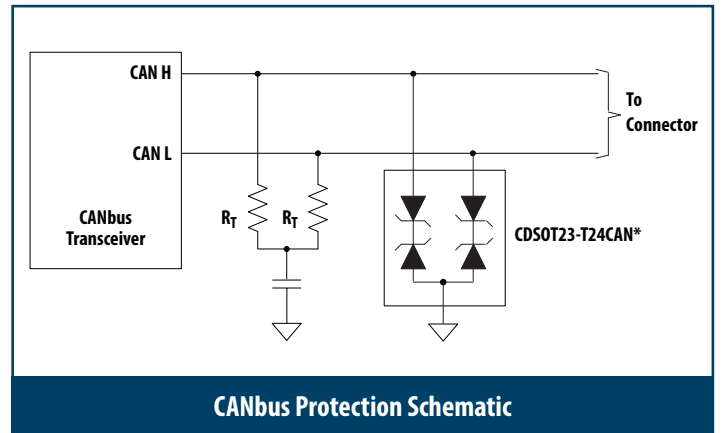
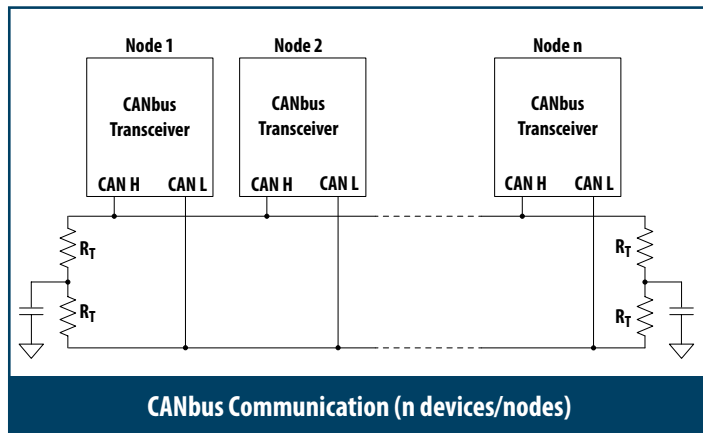
APPLICATION BRIEF

Controller Area Network (CAN) Bus Surge Protection

Bourns® Model CDSOT23-T24CAN*

	Markets	Applications	Features	Benefits
	<ul style="list-style-type: none"> AEC-Q101 Compliant Entertainment applications Comfort applications Industrial automation Medical equipment <ul style="list-style-type: none"> Computed tomography Linked equipment 	<ul style="list-style-type: none"> High-speed CANbus Industrial control networks Smart Distribution Systems (SDS) DeviceNet™ Factory & process automation systems Lift control systems 	<ul style="list-style-type: none"> Single device for two I/O lines Low capacitance for high-speed CANbus IEC 61000-4-2 30 kV ESD IEC 61000-4-5 (Level 1, CWG 1.2/50) 500 V Surge RoHS compliant* 	<ul style="list-style-type: none"> Compatible with transceivers that have internal protection against 24 V_{DC} (+ 5 %) miswiring Protection capability exceeds IEC 61000-4-2 Level 4 and IEC 61000-4-5 Level 1

Application Information



Note: Protection may not be required at every node. In many applications, protection at a subset of the total number of nodes is sufficient.

CDSOT23-T24CAN* Capabilities

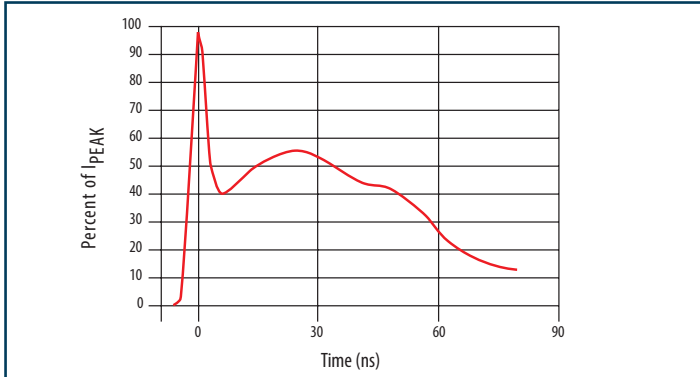
CDSOT23-T24CAN	Units	Parameter
24	V	V _{DRM}
8	A	I _{PPSM} (8/20 μs Current Waveform)
30	kV	ESD (Contact)
26.2	V	V _{BR min.} @ I _{BR} = 1 mA
0.1	μA	I _{R max.}
40	V	Typical Clamping Voltage @ I _{PPSM}
22	pF	Typical Capacitance (Line to GND)

* "Q" suffix for AEC-Q101 compliance.

APPLICATION BRIEF

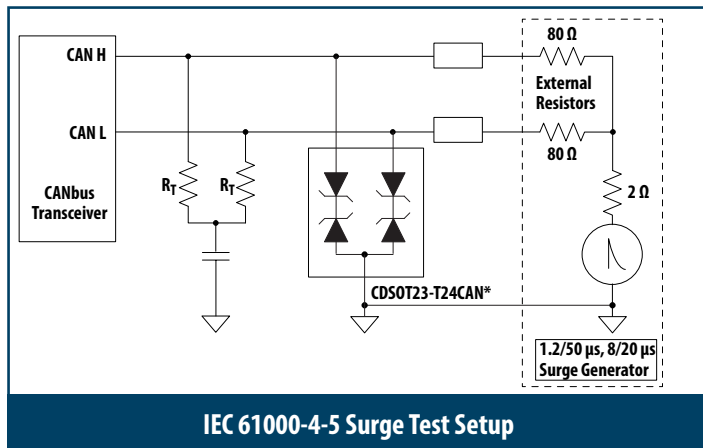
Controller Area Network (CAN) Bus Surge Protection

IEC 61000-4-2 ESD Test



IEC 61000-4-5 Surge Test

The Bourns® Model CDSOT23-T24CAN* dual TVS diode array is designed to protect a CANbus transceiver against surge events per IEC 61000-4-5 (Level 1). The surge test setup below shows an ECAT surge generator connected to the test circuit through two 80 ohm resistors and two coupling devices. The surge generator's E501B output module, which generates a 1.2/50 μ s voltage, 8/20 μ s current combination wave, was used for the test. The test circuit was subjected to five 500 V longitudinal (common mode) surges in both the positive and negative polarities. The oscilloscope



IEC 61000-4-5 Surge Test Setup

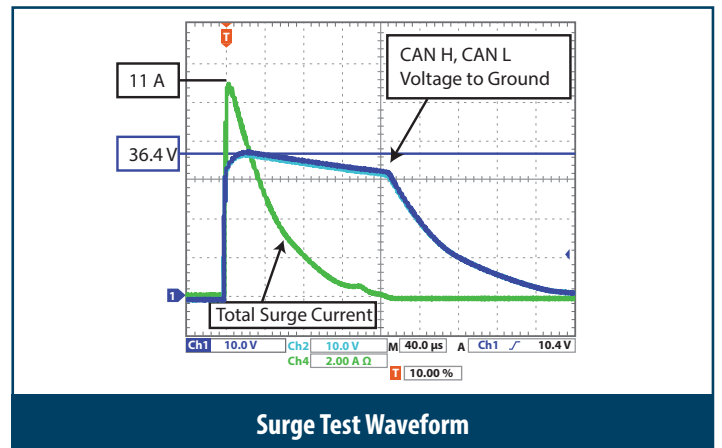
Summary

The robust surge and ESD protection capability of Bourns® Model CDSOT23-T24CAN*, protecting CANbus transceivers against IEC 61000-4-5 Level 1 500 V surges and IEC 61000-4-2 30kV ESD, has been demonstrated. Its minimum breakdown voltage of 26.2 V is designed to work in conjunction with a transceiver capable of withstanding a 24 V power cross event caused by miswiring.

* "Q" suffix for AEC-Q101 compliance.

IEC 61000-4-2 Level	Contact Discharge Test Voltage (kV)	Air Discharge Test Voltage (kV)	Peak Current (A)	Test Result
1	2	2	7.5	Pass
2	4	4	15.0	Pass
3	6	6	30.0	Pass
4	8	8	60.0	Pass
x	30	30	112.5	Pass

traces below show the clamp voltage with respect to ground for the CAN H and CAN L signal lines, as well as the total generator surge current, for each of these surges. The peak current on each line is ~ 5.5 A (11 A total for two lines) when subjected to the 500 V surge. The TVS diode clamped the voltage at the I/O of the transceiver to within 37 V during the surge. No change in performance or in supply current was measured after the surge test was completed.



Surge Test Waveform

Additional Resources

For more information on Bourns® TVS diodes and diode arrays, please visit:

www.bourns.com

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*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex
and RoHS Recast 2011/65/EU June 8, 2011.

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