

Silicon TVS diodes

- ESD / transient protection of CAN/LIN bus networks power supply lines according to:
 IEC61000-4-2 (ESD): $\pm 30\text{kV}$ (air / contact)
 IEC61000-4-4 (EFT): 80 A (5/50 ns)
 IEC61000-4-5 (surge): 5 A (8/20 μs)
 ISO7637-2: Pulse 1 (max. 50 V),
 Pulse 2 (max. 125 V), Pulse 3a, b (max. 800 V)
- Max. working voltage: 24 V
- Low capacitance: 24 pF typ.
- Low clamping voltage: < 41 V
- Extremely low reverse current: < 1 nA typ.
- Pb-free (RoHS compliant) package

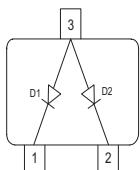


Applications

- Low and High-Speed CAN
- Fault Tolerant CAN
- Industrial control networks
- 12/24 V DC power supply lines



ESD24VS2U



Type	Package	Configuration	Marking
ESD24VS2U	SOT23	2 lines, uni-directional*	EUs

* 1 line, bi-directional between pins 1 and 2, if pin 3 is not connected

Maximum Ratings at $T_A = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Value		Unit
ESD contact discharge ¹⁾	V_{ESD}	30		kV
Peak pulse current ($t_p = 8 / 20 \mu\text{s}$) ²⁾	I_{pp}	5		A
Peak pulse power ($t_p = 8 / 20 \mu\text{s}$) ²⁾	P_{pk}	230		W
Operating temperature range	T_{op}	-55...150		$^\circ\text{C}$
Storage temperature	T_{stg}	-65...150		

Electrical Characteristics at $T_A = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Characteristics

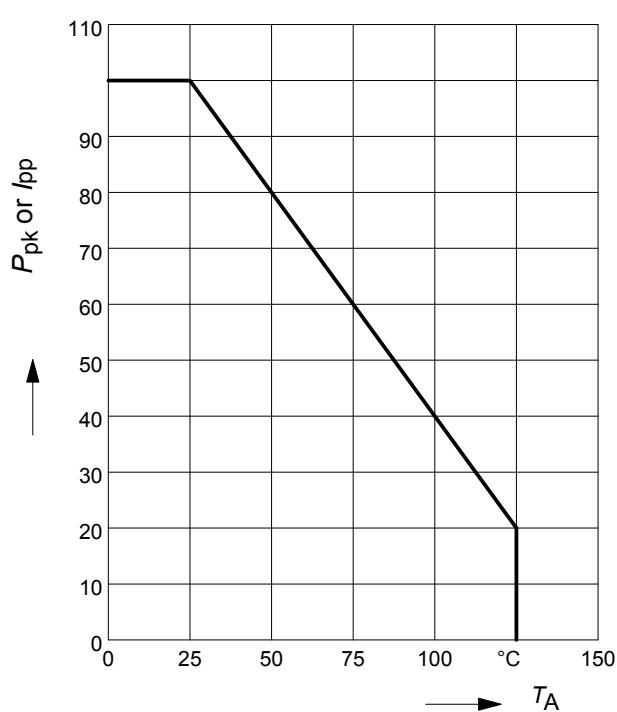
Reverse working voltage	V_{RWM}	-	-	24	V
Breakdown voltage $I_{(\text{BR})} = 1 \text{ mA}$	$V_{(\text{BR})}$	26	-	32	
Reverse current $V_R = 24 \text{ V}$	I_R	-	<1	10	nA
Clamping voltage $I_{\text{PP}} = 1 \text{ A}, t_p = 8 / 20 \mu\text{s}$ ²⁾ $I_{\text{PP}} = 5 \text{ A}, t_p = 8 / 20 \mu\text{s}$ ²⁾	V_{CL}	-	30 36	34 41	V
Line capacitance ³⁾ $V_R = 0 \text{ V}, f = 1 \text{ MHz}, (\text{pins 1 to 2, pin 3 n.c.})$ $V_R = 0 \text{ V}, f = 1 \text{ MHz}, (\text{pins 1 or 2 to 3})$	C_T	- -	24 48	28 52	pF

¹ V_{ESD} according to IEC61000-4-2. Device stressed with 10 positive / negative ESD pulses.

² I_{pp} according to IEC61000-4-5. Non-repetitive current pulse.

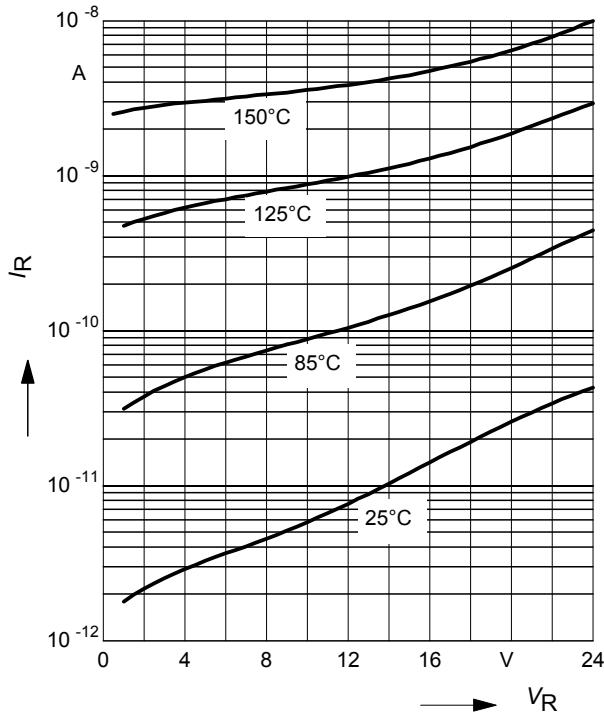
³Total capacitance line to ground (per line)

Power derating curve $P_{pk} = f(T_A)$



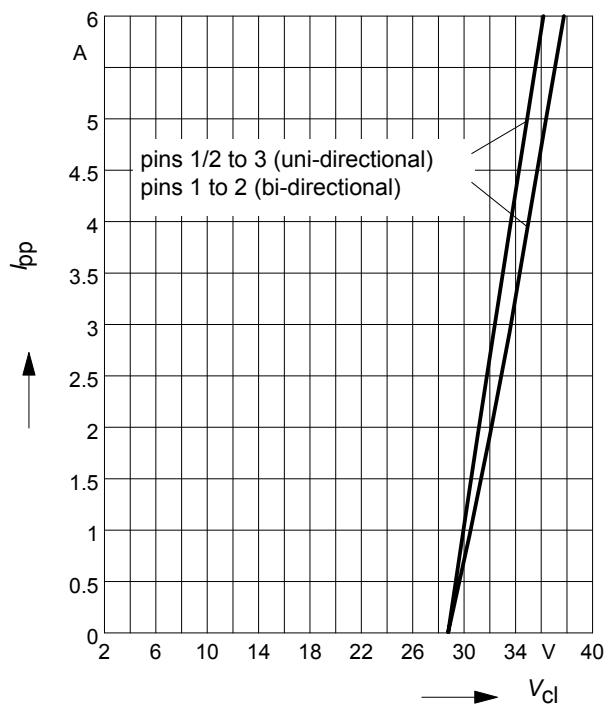
Reverse current $I_R = f(V_R)$

T_A = Parameter, pins 1 / 2 to 3
 (uni-directional)



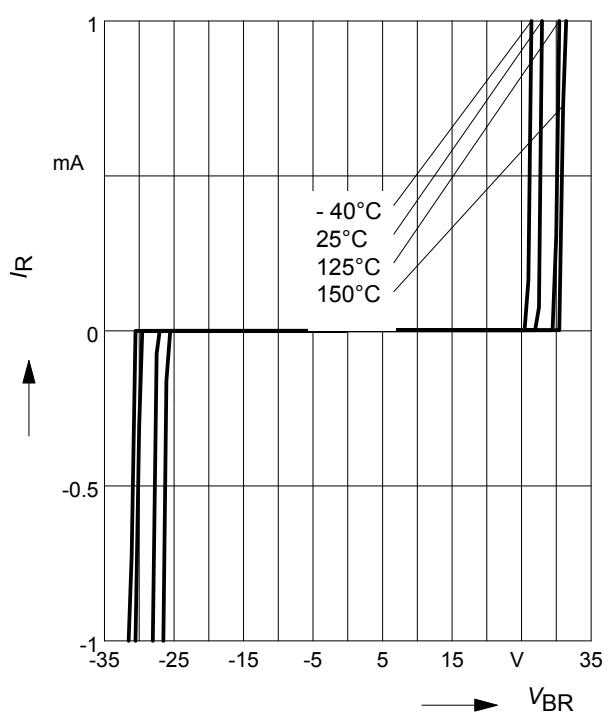
Clamping voltage, $V_{cl} = f(I_{pp})$

$t_p = 8 / 20 \mu s$



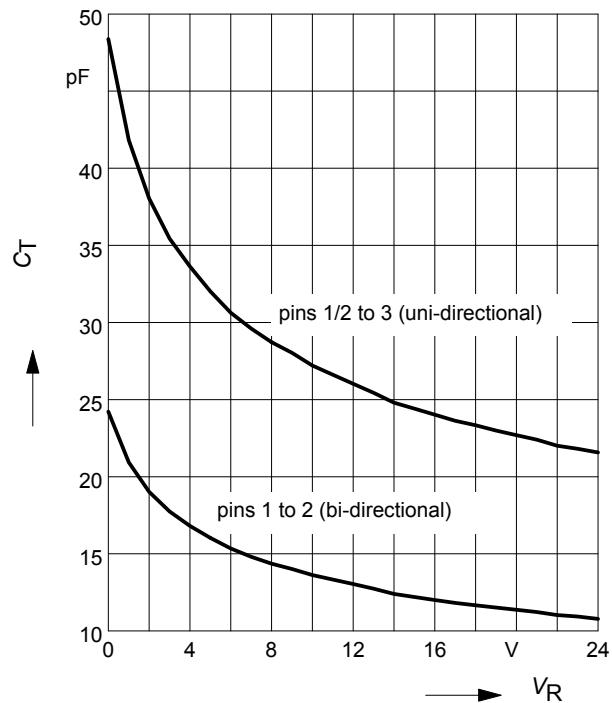
Breakdown voltage $V_{BR} = f(I_R)$

T_A = Parameter, pins 1 to 2
 (bi-directional)

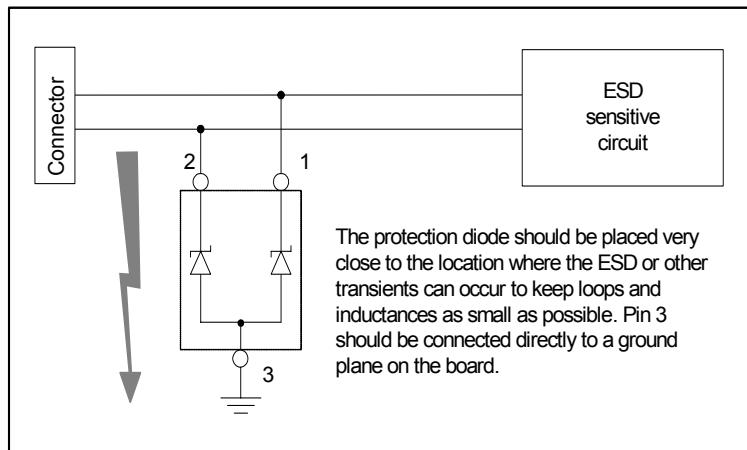


Line capacitance $C_T = f(V_R)$

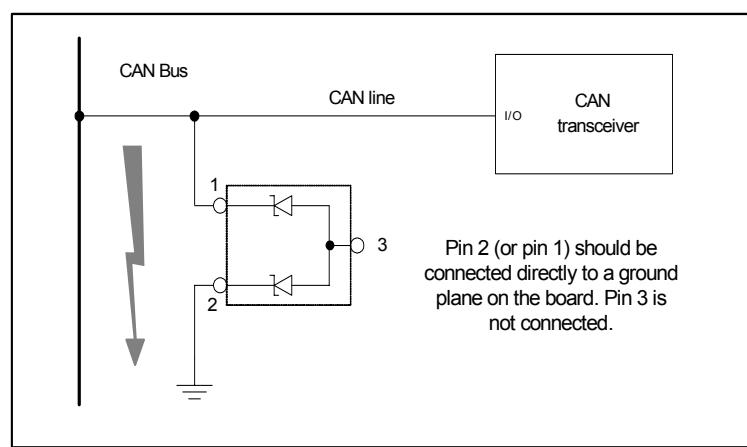
$f = 1\text{MHz}$



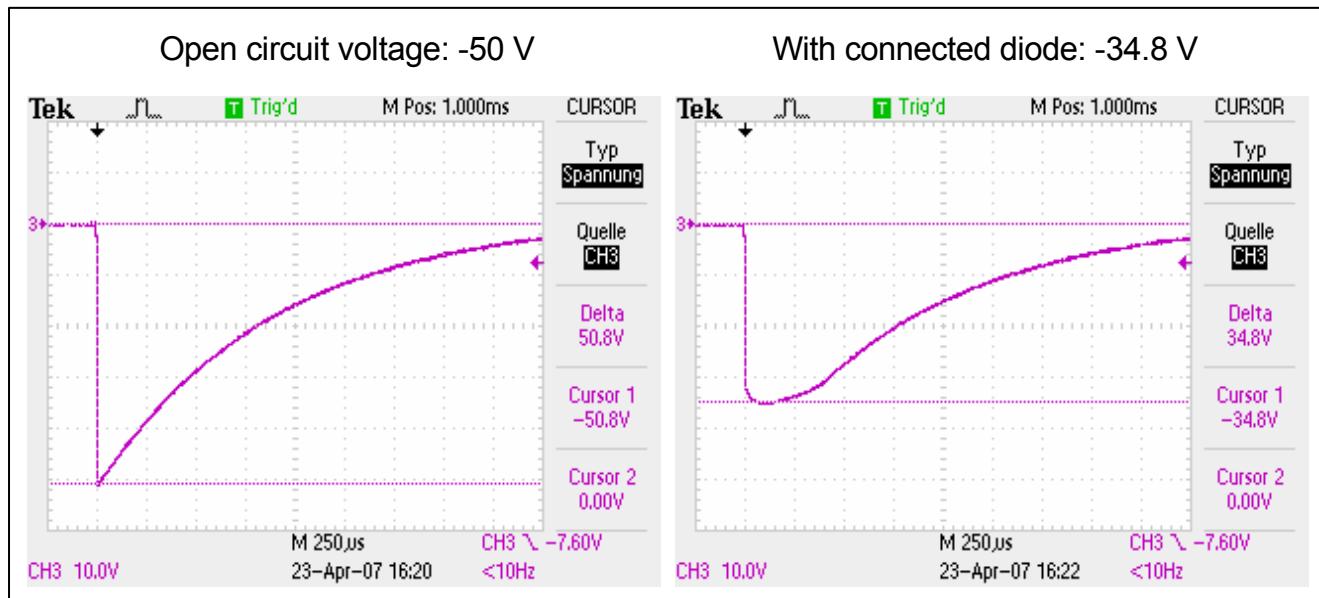
Application example ESD24VS2U (uni-directional)
 12V / 24V DC power supply line protection



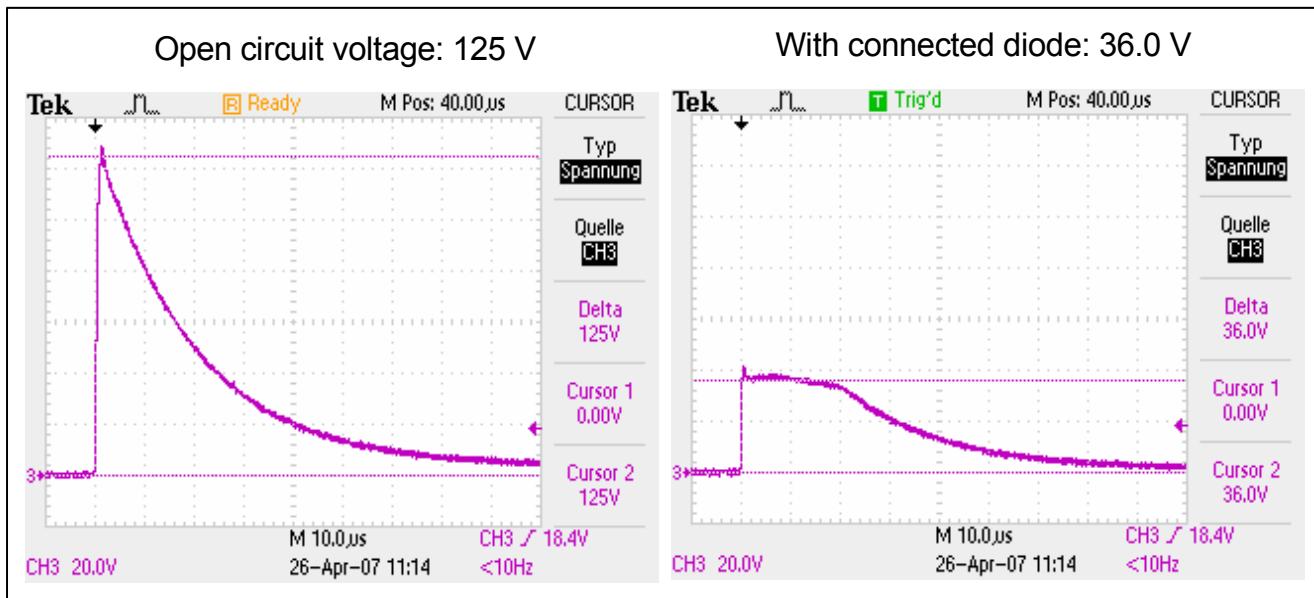
Application example ESD24VS2U (bi-directional)
 Single Wire CAN and LIN bus protection



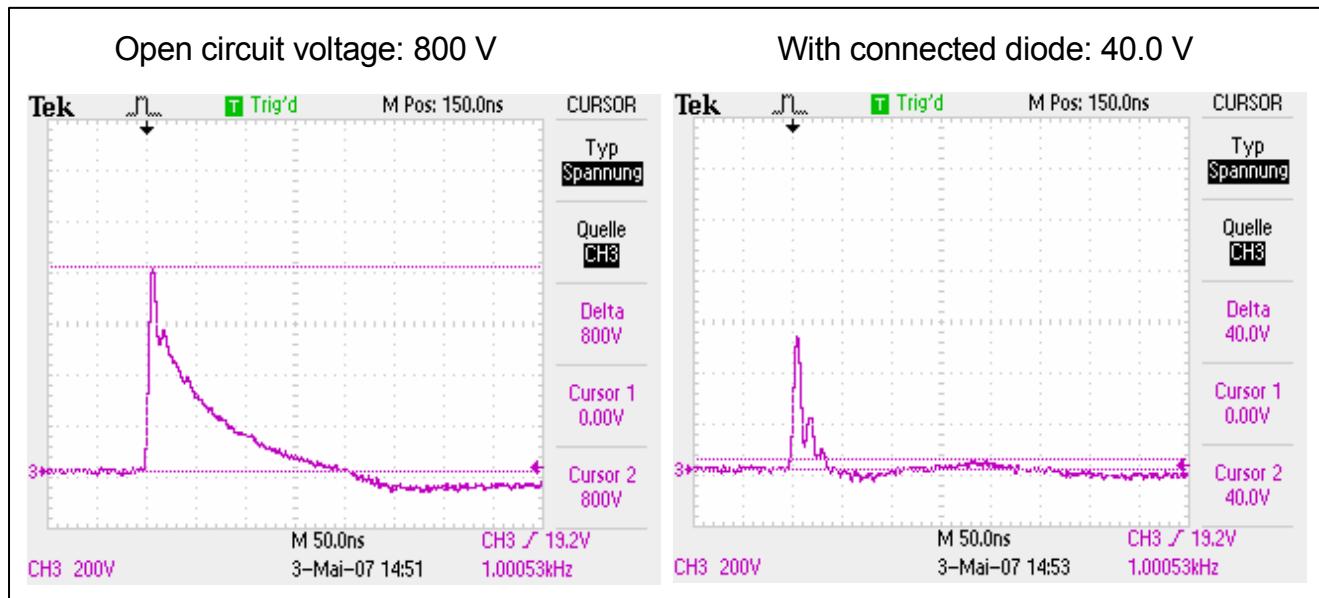
Clamping voltage according to ISO 7637-2: Pulse 1

R_i = 10 Ohm, t_d = 2 ms, 5000 pulses


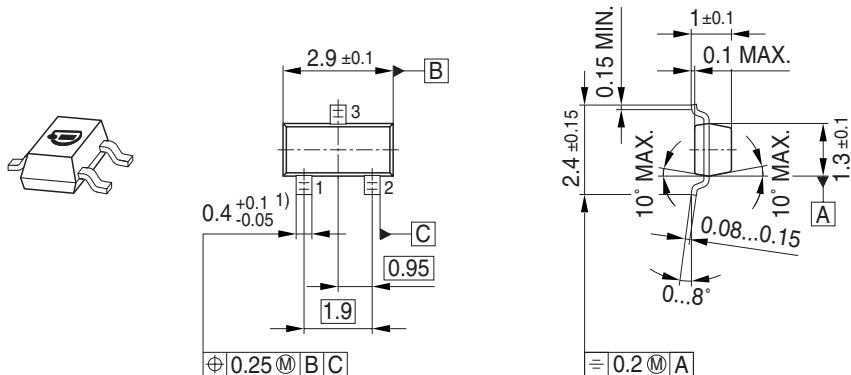
Clamping voltage according to ISO 7637-2: Pulse 2a

R_i = 10 Ohm, t_d = 2 us, 4000 pulses, 60 min


Clamping voltage according to ISO 7637-2: Pulse 3

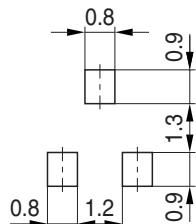
R_i = 50 Ohm, t_d = 100 ns, 10 min


Package Outline

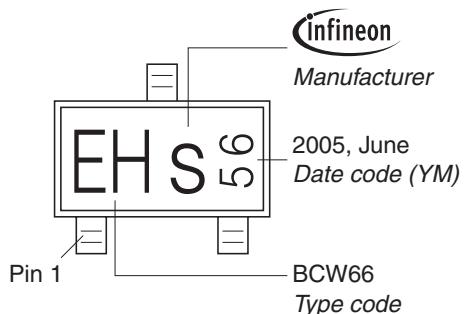


1) Lead width can be 0.6 max. in dambar area

Foot Print

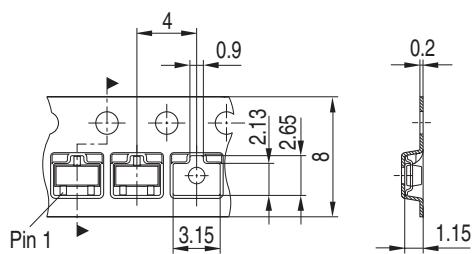


Marking Layout (Example)



Standard Packing

Reel ø180 mm = 3.000 Pieces/Reel
Reel ø330 mm = 10.000 Pieces/Reel



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