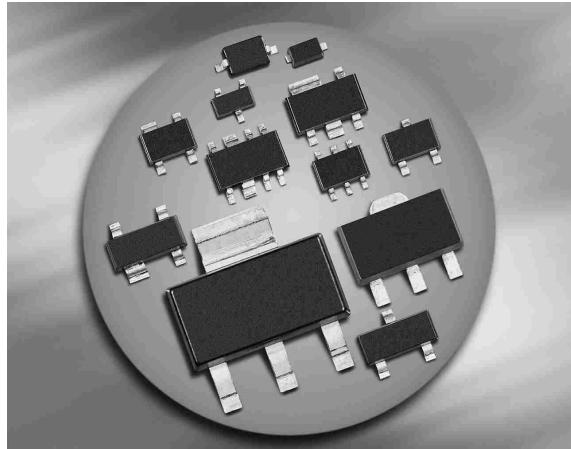


RF ESD Protection Diodes

- ESD / transient protection of RF antenna / interfaces or ultra high speed data lines acc. to:
IEC61000-4-2 (ESD): ± 20 kV (contact)
IEC61000-4-4 (EFT): 40 A (5/50 ns)
IEC61000-4-5 (surge): 10 A (8/20 μ s)
- Ultra low capacitance of 1 pF typ.
(0.5 pF per diode)
- Low clamping voltage
- Pb-free (ROHS compliant) package



Applications in anti-parallel configuration

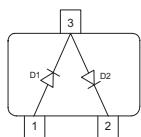
- For low RF signal levels without superimposed DC voltage: e.g. GPS, WLAN, Bluetooth

Applications in rail-to-rail configuration

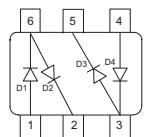
- For high RF signal levels or low RF signal levels with superimposed DC voltage: e.g. HDMI, S-ATA, Gbit Ethernet



ESD1P0RFW



ESD1P0RFS



Type	Package	Configuration	Marking
ESD1P0RFS	SOT363	2 channels	E6s
ESD1P0RFW	SOT323	1 channel	E6s

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

Parameter	Symbol	Value	Unit
ESD contact discharge ¹⁾	V_{ESD}	20	kV
Peak pulse current ($t_p = 8 / 20 \mu\text{s}$) ²⁾	I_{pp}	10	A
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 ³⁾ $V_R = 70 \text{ V}$	V_{RWM}	-	-	70	V
Reverse current $V_R = 70 \text{ V}$	I_R	-	-	100	nA
Forward clamping voltage ²⁾ $I_{\text{PP}} = 3 \text{ A}, t_p = 8/20 \mu\text{s}$ $I_{\text{PP}} = 10 \text{ A}, t_p = 8/20 \mu\text{s}$	V_{FC}	-	4	7	V
Line capacitance ⁴⁾ $V_R = 0 \text{ V}, f = 1 \text{ MHz}$ $V_R = 0 \text{ V}, f = 1 \text{ MHz, for Application example 4}$	C_T	-	1	1.5	pF
Series inductance (per diode) SOT323 SOT363	L_S	-	1.4	-	nH
		-	0.5	0.75	
		-	1.6	-	

¹⁾ V_{ESD} according to IEC61000-4-2, only valid in anti-parallel or rail-to-rail connection.

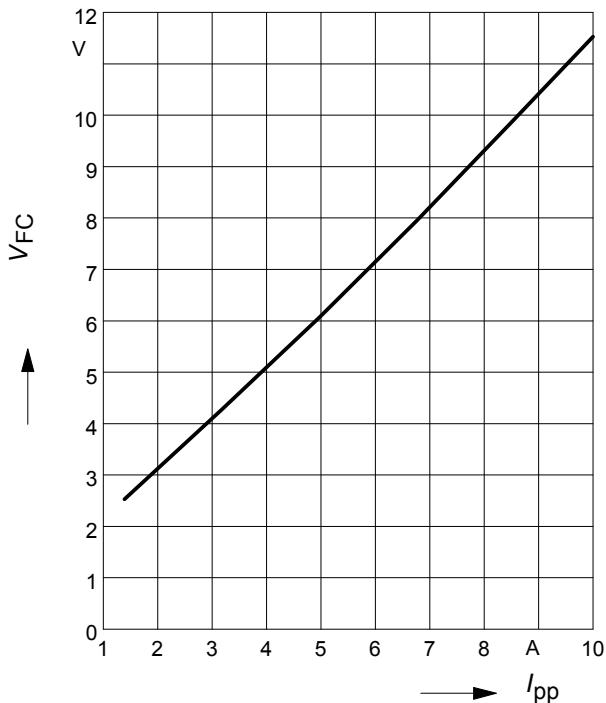
Please refer to the application examples.

²⁾ I_{pp} according to IEC61000-4-5, only valid in anti-parallel or rail-to-rail connection.

Please refer to the application examples.

³⁾Only valid in rail-to-rail configuration $V_{\text{CC}} \geq V_{\text{RWM}}$
⁴⁾Total capacitance line to ground (2 diodes in parallel)

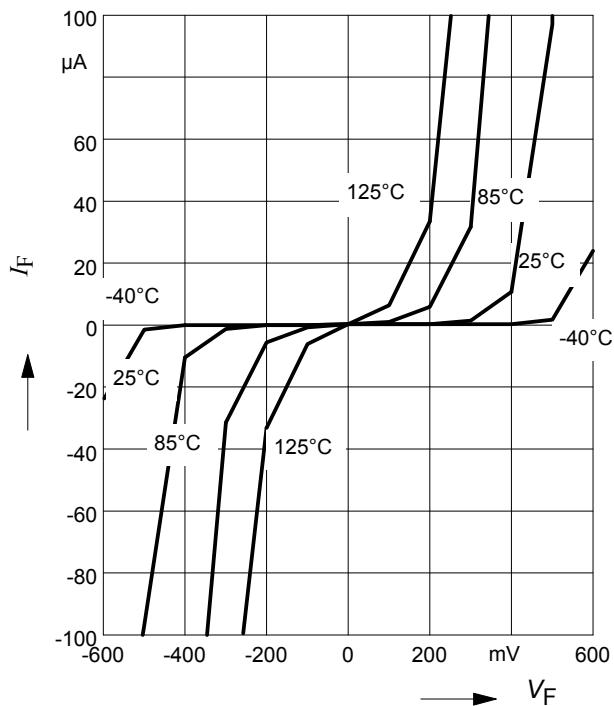
Forward clamping voltage $V_{FC} = f(I_{PP})$
 $t_p = 8 / 20 \mu s$



Forward current $I_F = f(V_F)$

$T_A = \text{Parameter}$

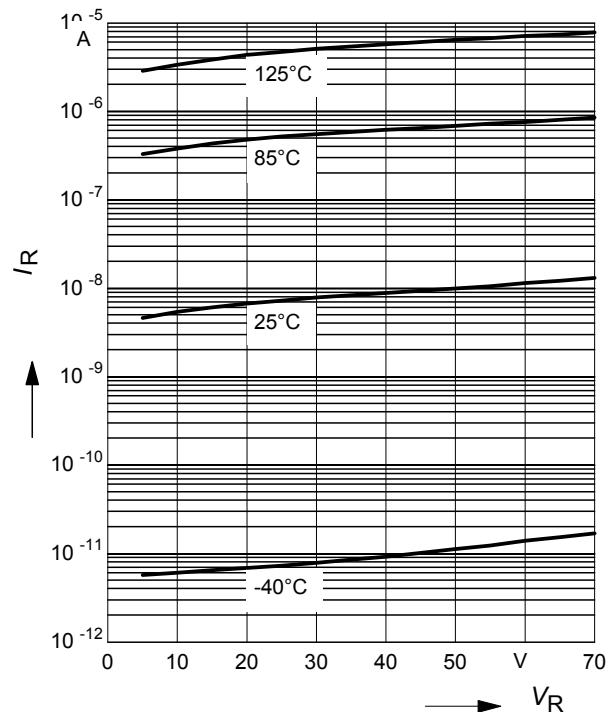
in anti-parallel configuration



Reverse current $I_R = f(V_R)$

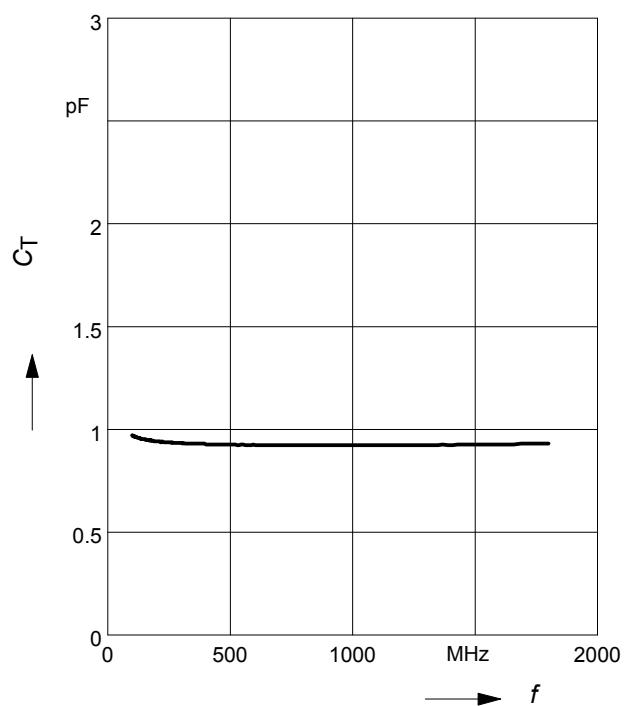
$T_A = \text{Parameter}$

in rail-to-rail configuration



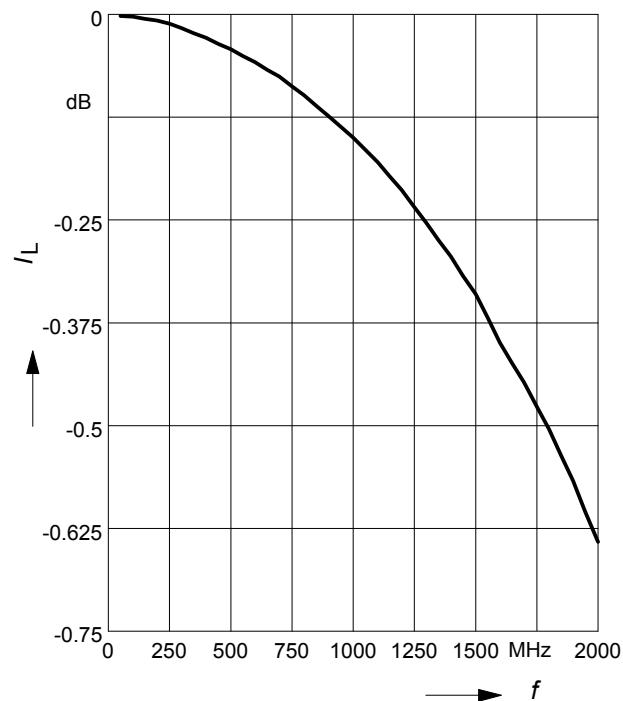
Line capacitance $C_T = f(f)$

$V_R = 0 \text{ V}$



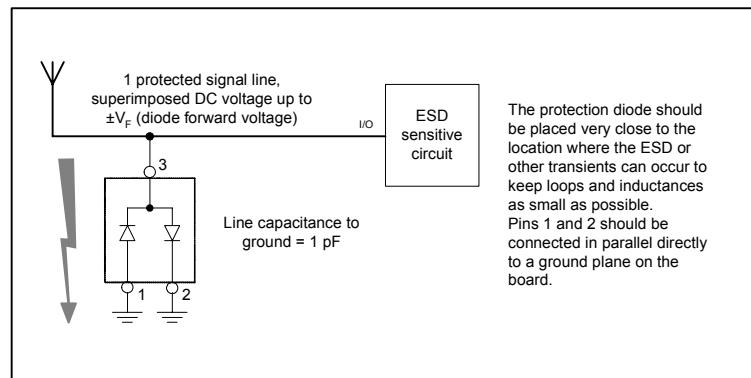
Insertion loss $|S_{21}|^2 = f(f)$

$V_R = 0 \text{ V}$, line to ground, $Z = 50 \Omega$



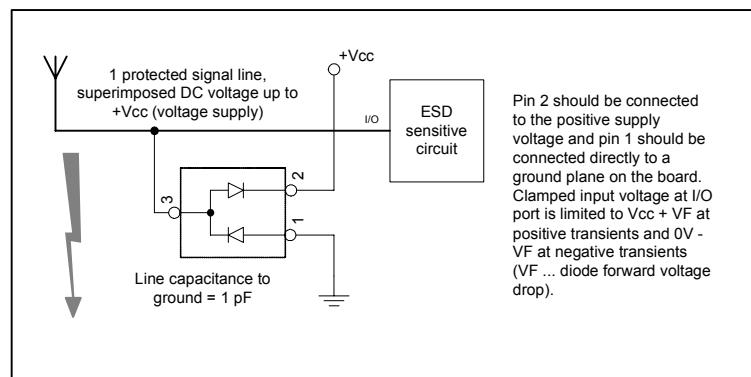
1. Application example ESD1P0RFW

1 channel, anti-parallel configuration



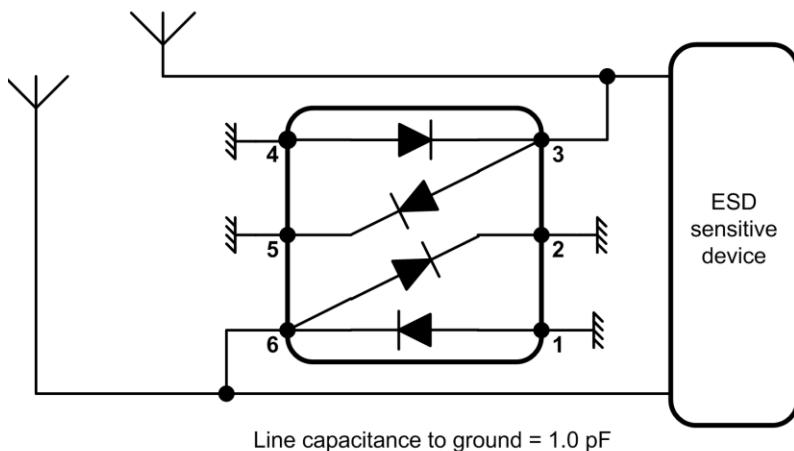
2. Application example ESD1P0RFW

1 channel, rail-to-rail configuration



3. Application example ESD1P0RFS 2 channel, anti-parallel configuration

2 protected signal lines,
superimposed DC voltage up to
 $\pm VF$ (diode forward voltage)

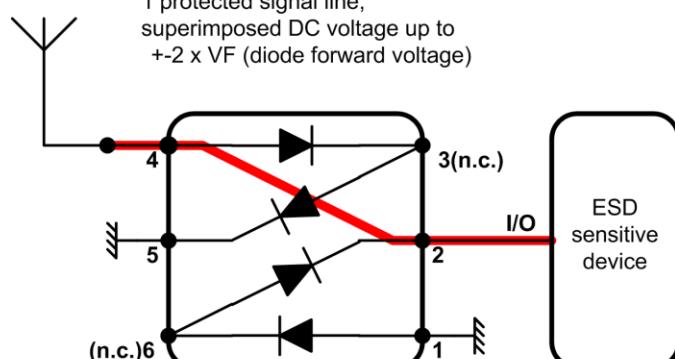


Line capacitance to ground = 1.0 pF

Pins 1, 2 and 4, 5 should be connected in parallel directly to a ground plane on the board. Clamped input voltage at I/O port is limited to $\pm VCL$ (clamping voltage) at positive resp. negative transients.

4. Application example ESD1P0RFS 1 channel, low capacitance anti-parallel configuration

1 protected signal line,
superimposed DC voltage up to
 $\pm 2 \times VF$ (diode forward voltage)



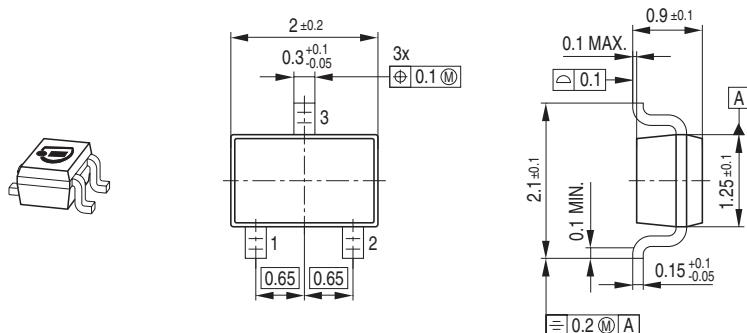
Line capacitance to ground = 0.5 pF

Pins 1 and 5 should be connected directly to a ground plane on the board. Pins 3, 6 are not connected. Clamped input voltage at I/O port is limited to $\pm 2 \times VCL$ (clamping voltage) at positive resp. negative transients.

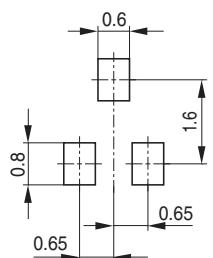
RF line on PCB

=
S=

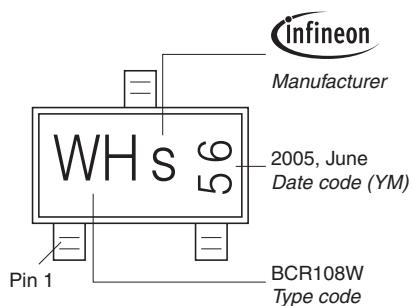
Package Outline



Foot Print

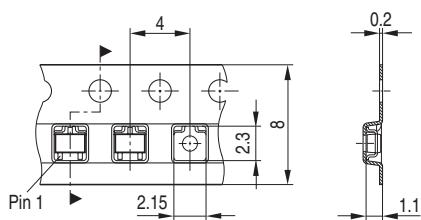


Marking Layout (Example)

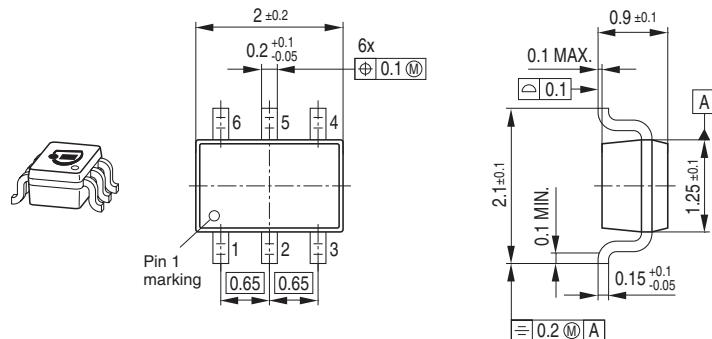


Standard Packing

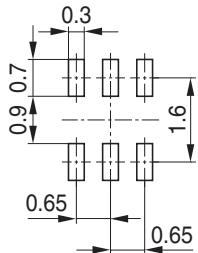
Reel ø180 mm = 3.000 Pieces/Reel
 Reel ø330 mm = 10.000 Pieces/Reel



Package Outline

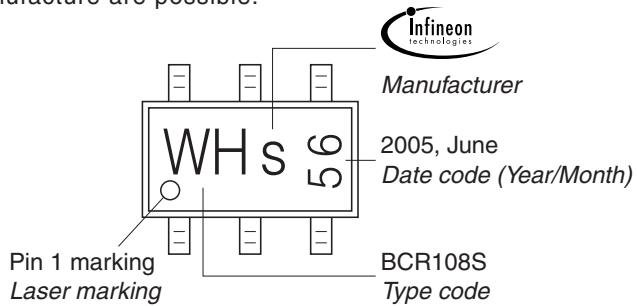


Foot Print



Marking Layout (Example)

Small variations in positioning of Date code, Type code and Manufacture are possible.

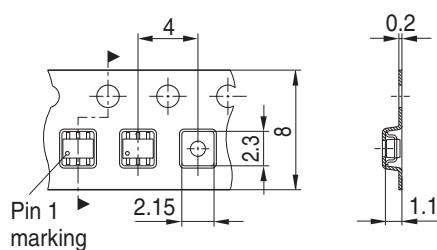


Standard Packing

Reel ø180 mm = 3.000 Pieces/Reel

Reel ø330 mm = 10.000 Pieces/Reel

For symmetric types no defined Pin 1 orientation in reel.



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