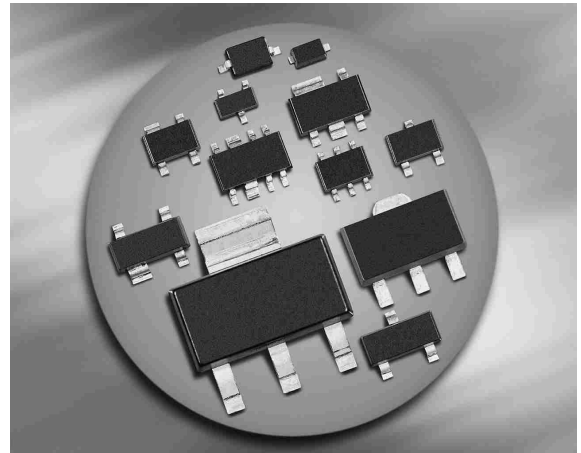


**RF ESD Protection Diodes**

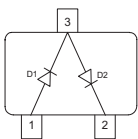
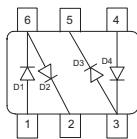
- ESD / transient protection of RF antenna / interfaces or ultra high speed data lines acc. to:  
IEC61000-4-2 (ESD):  $\pm 20$  kV (contact)  
IEC61000-4-4 (EFT): 40 A (5/50 ns)  
IEC61000-4-5 (surge): 10 A (8/20  $\mu$ s)
- Ultra low capacitance of 1 pF typ.  
(0.5 pF per diode)
- Low clamping voltage
- 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 <sup>1)</sup>	$V_{\text{ESD}}$	20	kV
Peak pulse current ( $t_p = 8 / 20 \mu\text{s}$ ) <sup>2)</sup>	$I_{\text{pp}}$	10	A
Operating temperature range	$T_{\text{op}}$	-55...150	°C
Storage temperature	$T_{\text{stg}}$	-65...150	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Characteristics</b>					
Reverse working voltage <sup>3)</sup>	$V_{\text{RWM}}$	-	-	70	V
Reverse current $V_R = 70 \text{ V}$	$I_R$	-	-	100	nA
Forward clamping voltage <sup>2)</sup> $I_{\text{pp}} = 3 \text{ A}, t_p = 8/20 \mu\text{s}$ $I_{\text{pp}} = 10 \text{ A}, t_p = 8/20 \mu\text{s}$	$V_{\text{FC}}$	-	4 12	7 15	V
Line capacitance <sup>4)</sup> $V_R = 0 \text{ V}, f = 1 \text{ MHz}$ $V_R = 0 \text{ V}, f = 1 \text{ MHz}$ , for Application example 4	$C_T$	-	1 0.5	1.5 0.75	pF
Series inductance (per diode) SOT323 SOT363	$L_S$	-	1.4 1.6	- -	nH

<sup>1)</sup> $V_{\text{ESD}}$  according to IEC61000-4-2, only valid in anti-parallel or rail-to-rail connection.

Please refer to the application examples.

<sup>2)</sup> $I_{\text{pp}}$  according to IEC61000-4-5, only valid in anti-parallel or rail-to-rail connection.

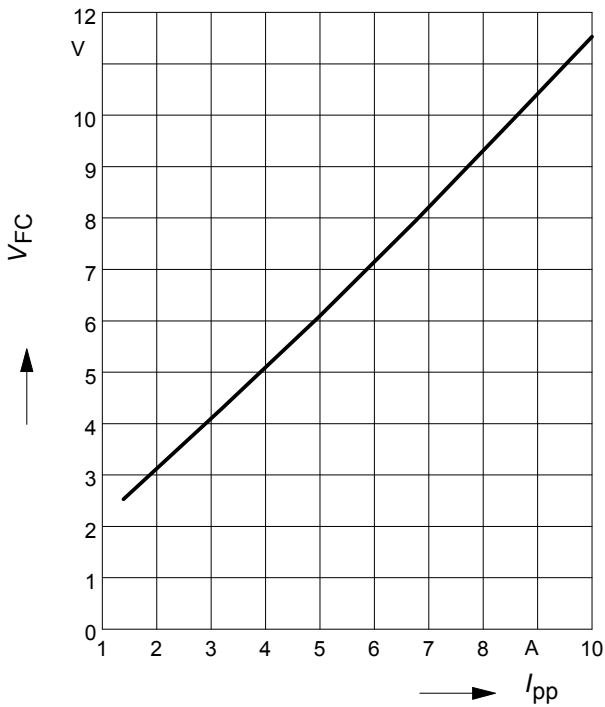
Please refer to the application examples.

<sup>3)</sup>Only valid in rail-to-rail configuration  $V_{\text{CC}} \geq V_{\text{RWM}}$

<sup>4)</sup>Total capacitance line to ground (2 diodes in parallel)

**Forward clamping voltage**  $V_{FC} = f(I_{PP})$

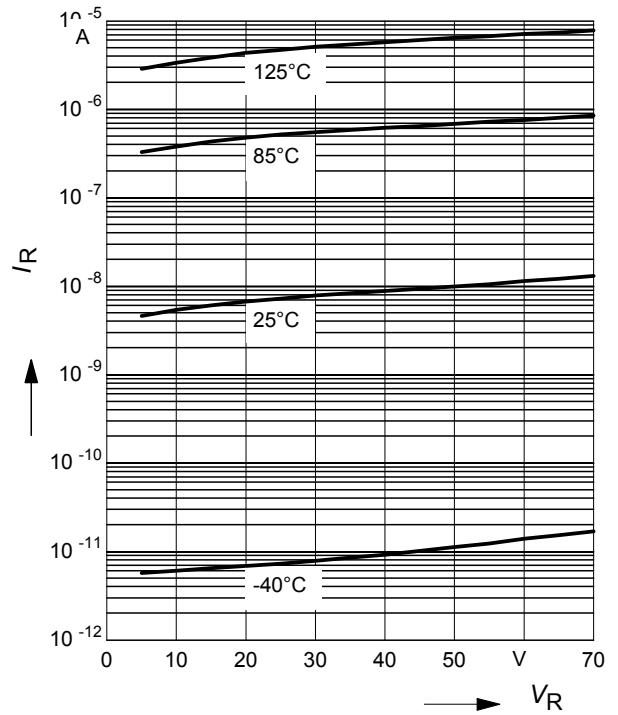
$t_p = 8 / 20 \mu s$



**Reverse current**  $I_R = f(V_R)$

$T_A = \text{Parameter}$

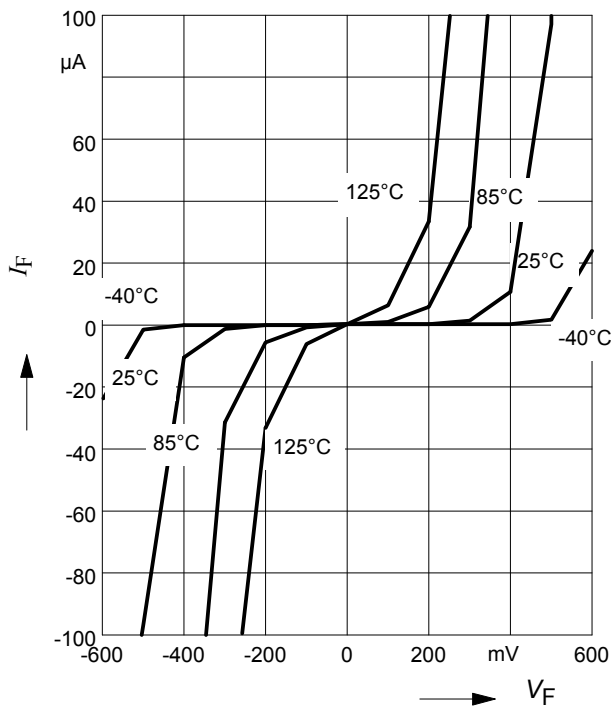
in rail-to-rail configuration



**Forward current**  $I_F = f(V_F)$

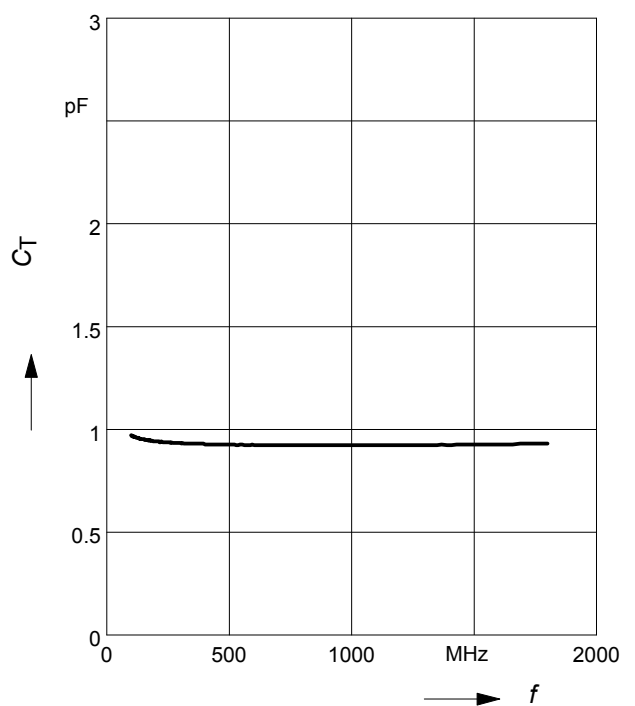
$T_A = \text{Parameter}$

in anti-parallel configuration



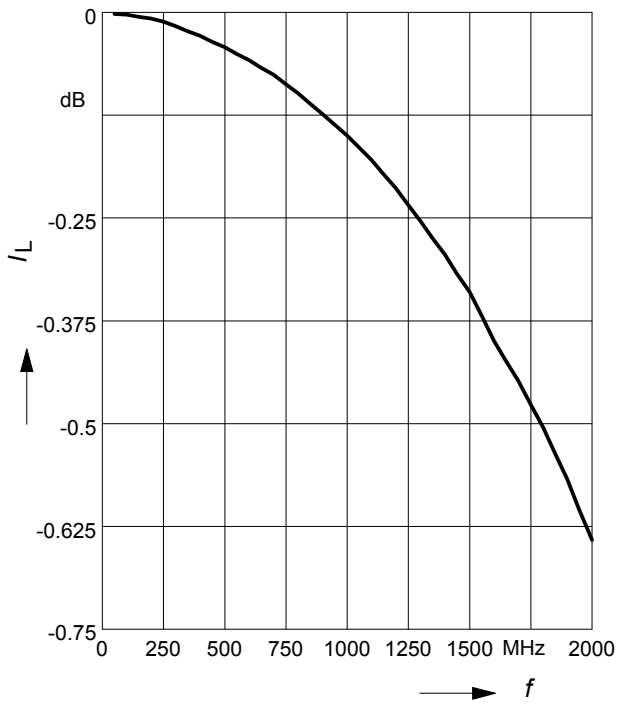
**Line capacitance**  $C_T = f(f)$

$V_R = 0 V$



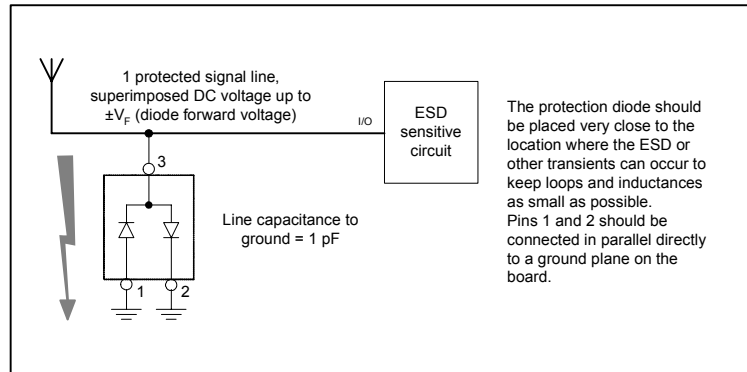
Insertion loss  $|S_{21}|^2 = f(f)$

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



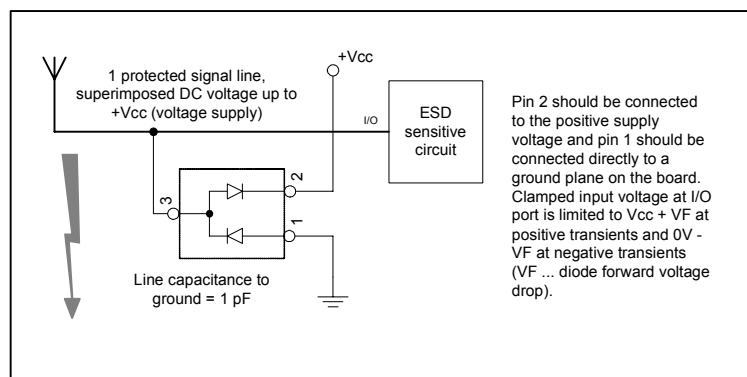
### 1. Application example ESD1P0RFW

1 channel, anti-parallel configuration



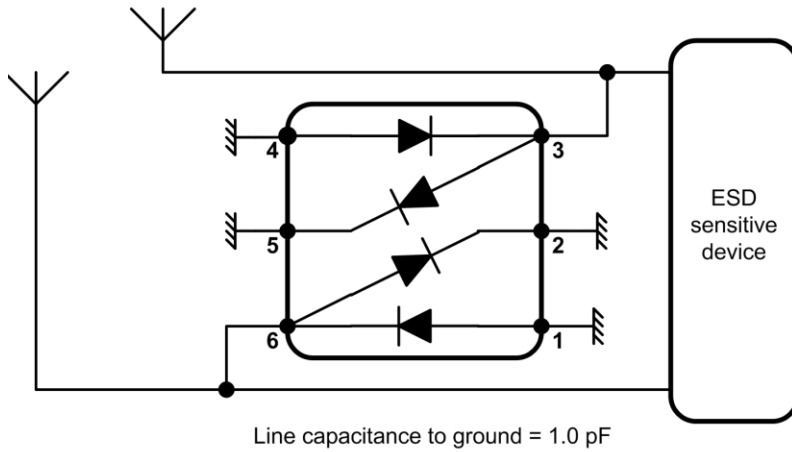
### 2. Application example ESD1P0RFW

1 channel, rail-to-rail configuration



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

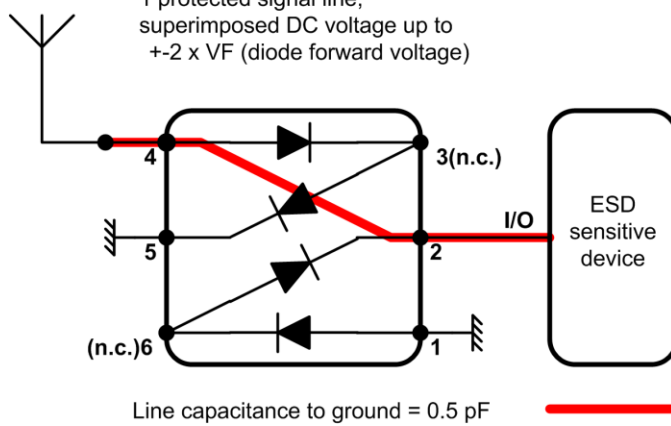
2 protected signal lines,  
superimposed DC voltage up to  
 $\pm V_F$  (diode forward voltage)



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  $\pm V_{CL}$  (clamping voltage) at positive resp. negative transients.

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

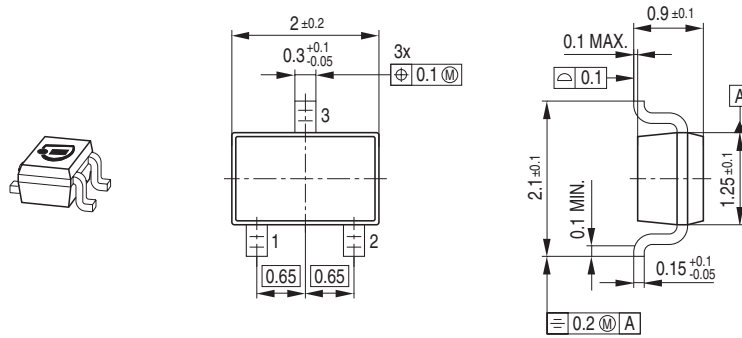
1 protected signal line,  
superimposed DC voltage up to  
 $\pm 2 \times V_F$  (diode forward voltage)



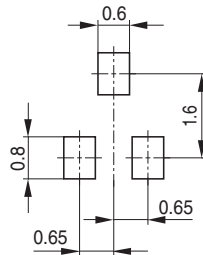
Pins 1 and 5 should be connected directly to a ground plane on the board. Pins 3, 6 are not connected. Clamped input voltage at I/O port is limited to  $\pm 2 \times V_{CL}$  (clamping voltage) at positive resp. negative transients.

RF line on PCB

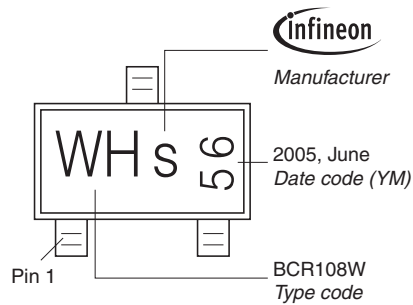
Package Outline



Foot Print

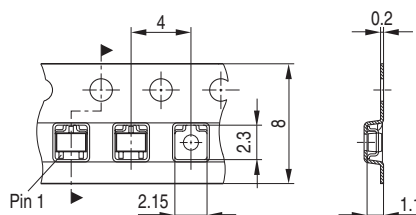


Marking Layout (Example)

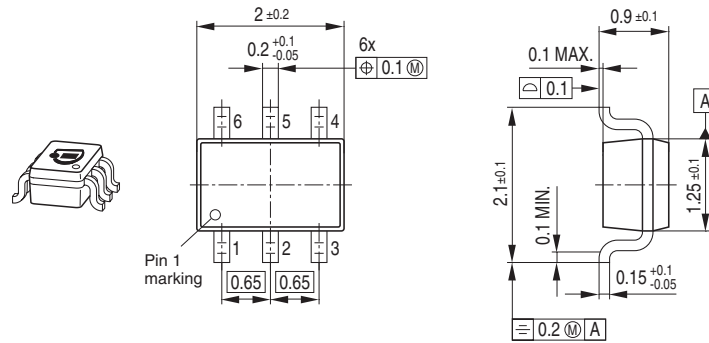


Standard Packing

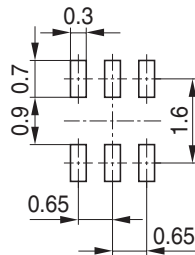
Reel ø180 mm = 3.000 Pieces/Reel  
 Reel ø330 mm = 10.000 Pieces/Reel



### Package Outline

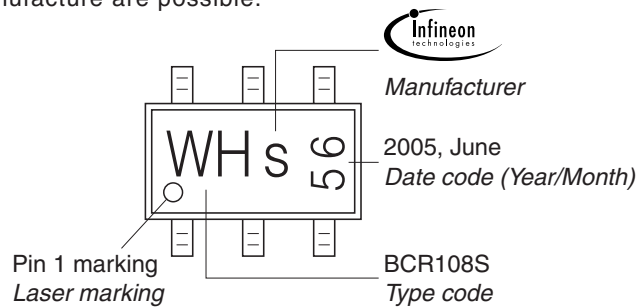


### Foot Print



### Marking Layout (Example)

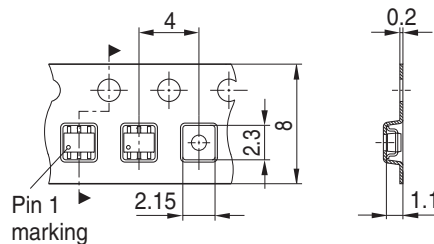
Small variations in positioning of Date code, Type code and Manufacture are possible.



### Standard Packing

Reel  $\varnothing$ 180 mm = 3.000 Pieces/Reel  
 Reel  $\varnothing$ 330 mm = 10.000 Pieces/Reel

For symmetric types no defined Pin 1 orientation in reel.





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