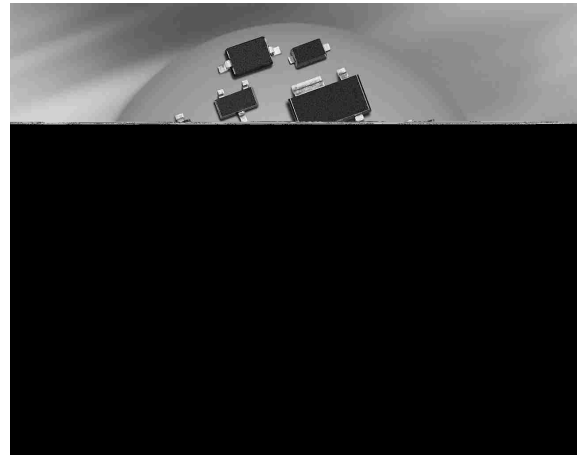


**Ultra-Low Capacitance ESD Diode Array**

- Rail-to-rail diodes with internal TVS diode
- ESD / transient protection of four I/O lines and one Vcc line exceeding:
  - IEC61000-4-2 (ESD):  $\pm 15$  kV (contact)
  - IEC61000-4-4 (EFT): 2.5 kV / 50 A (5/50 ns)
  - IEC61000-4-5 (surge): 3 A (8/20  $\mu$ s)
- Reverse working voltage data lines: 5.3 V max.
- Reverse working voltage Vcc: 6 V max.
- Very low capacitance: 0.4 pF typ.
- Very low reverse current < 10 nA typ.
- Very low clamping voltage:
  - 12 V typ. at positive transients
  - 4 V typ. at negative transients
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101

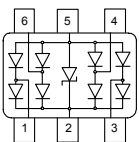


**Applications**

- USB 2.0 ports and future USB 3.0 ports
- Ethernet port: 10/100/1000 Mb/s
- IEEE 1394 FireWire ports
- Mobile communications e.g. high-speed SIM card protection
- Consumer products (STB, DVD, DSC, DVC...)
- Notebooks and desktop computers, peripherals



**ESD5V3U4RRS**



Type	Package	Configuration	Marking
ESD5V3U4RRS	SOT363	6 pins, uni-directional	E8s

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

Parameter	Symbol	Value	Unit
ESD contact discharge <sup>1)</sup>	$V_{\text{ESD}}$	15	kV
Peak pulse current ( $t_p = 8 / 20 \mu\text{s}$ ) <sup>2)</sup>	$I_{\text{pp}}$	3	A
Peak pulse power ( $t_p = 8 / 20 \mu\text{s}$ ) <sup>2)</sup>	$P_{\text{pk}}$	50	W
Operating temperature range	$T_{\text{op}}$	-55...125	°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.	

**Characteristics** <sup>3)</sup>

Reverse working voltage I/O pin <sup>4)</sup> to pin 5 pin 2 to pin 5	$V_{\text{RWM}}$	-	-	5.3 6	V
Breakdown voltage $I_{\text{(BR)}} = 1 \text{ mA}$ , any pin to pin 5	$V_{\text{(BR)}}$	6.3	-	-	
Reverse current $V_{\text{R}} = 5.3 \text{ V}$ , any pin to pin 5	$I_{\text{R}}$	-	< 10	100	nA
Clamping voltage $I_{\text{PP}} = 1 \text{ A}$ , $t_p = 8/20 \mu\text{s}^2$ , any pin to pin 5 $I_{\text{PP}} = 3 \text{ A}$ , $t_p = 8/20 \mu\text{s}^2$ , any pin to pin 5	$V_{\text{CL}}$	-	10 12	13 15	V
Forward clamping voltage $I_{\text{PP}} = 1 \text{ A}$ , $t_p = 8/20 \mu\text{s}^2$ , any pin to pin 5 $I_{\text{PP}} = 3 \text{ A}$ , $t_p = 8/20 \mu\text{s}^2$ , any pin to pin 5	$V_{\text{FC}}$	-	2 4	4 6	
Line capacitance <sup>5)4)</sup> $V_{\text{R}} = 0 \text{ V}$ , $f = 1 \text{ MHz}$ , any I/O pin to pin 5	$C_{\text{T}}$	-	0.4	0.6	pF

<sup>1)</sup>  $V_{\text{ESD}}$  according to IEC61000-4-2

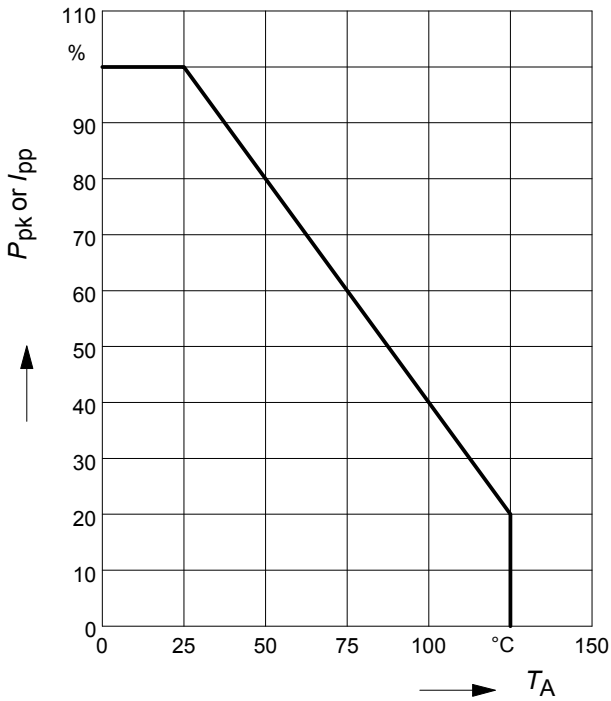
<sup>2)</sup>  $I_{\text{pp}}$  according to IEC61000-4-5

<sup>3)</sup> It is strongly recommended that pin 5 is connected to ground for proper functionality.

<sup>4)</sup> I/O pins are pin 1, 3, 4, 6

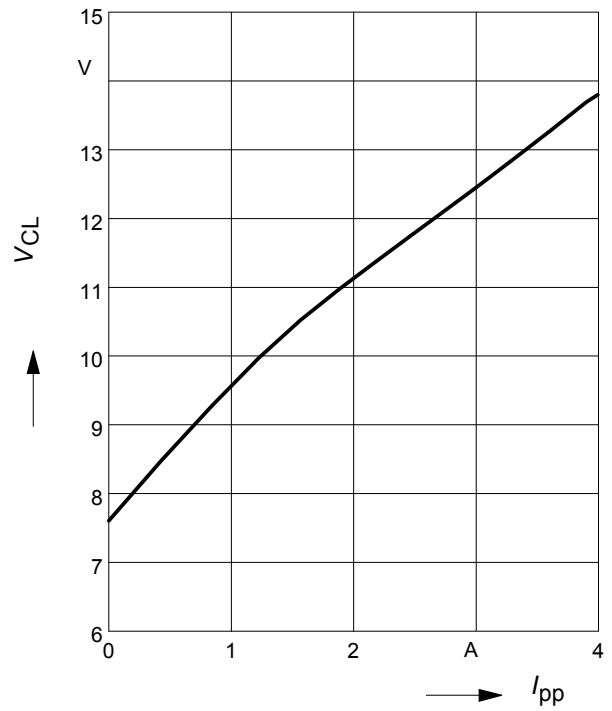
<sup>5)</sup> Total capacitance line to ground

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



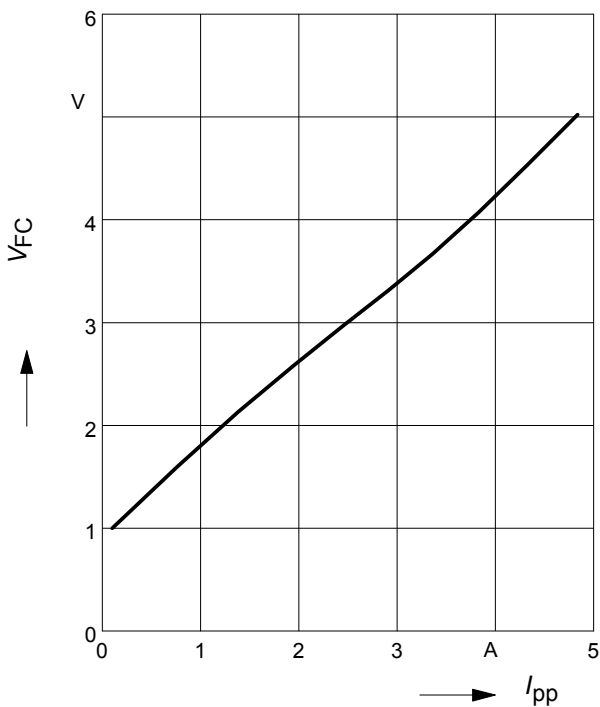
Clamping voltage,  $V_{cl} = f(I_{pp})$

$t_p = 8 / 20 \mu s$



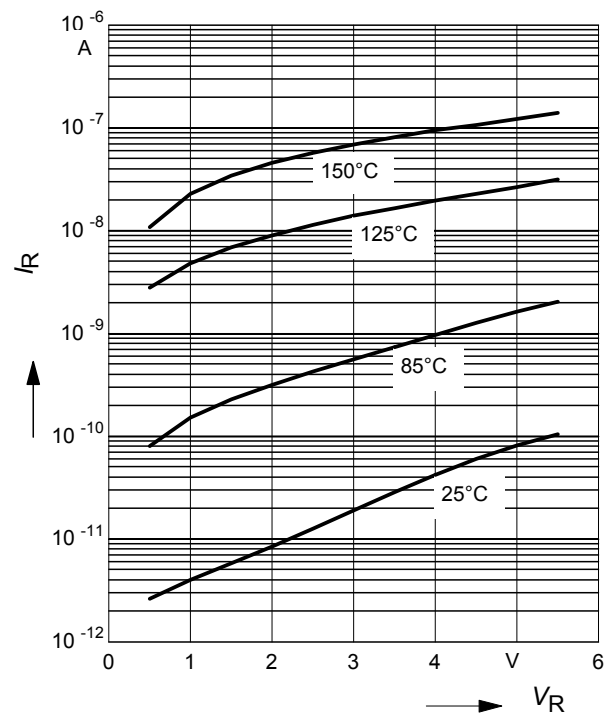
Forward clamping voltage  $V_{FC} = f(I_{PP})$

$t_p = 8 / 20 \mu s$



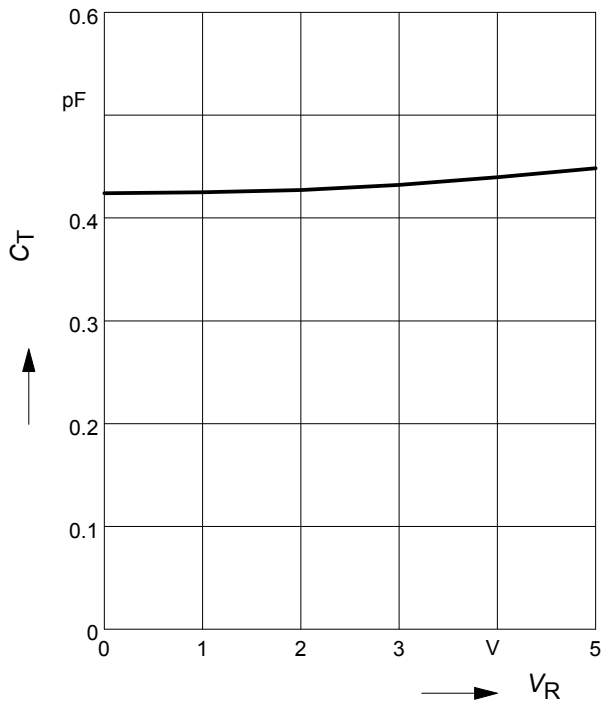
Reverse current  $I_R = f(V_R)$

T<sub>A</sub> = Parameter



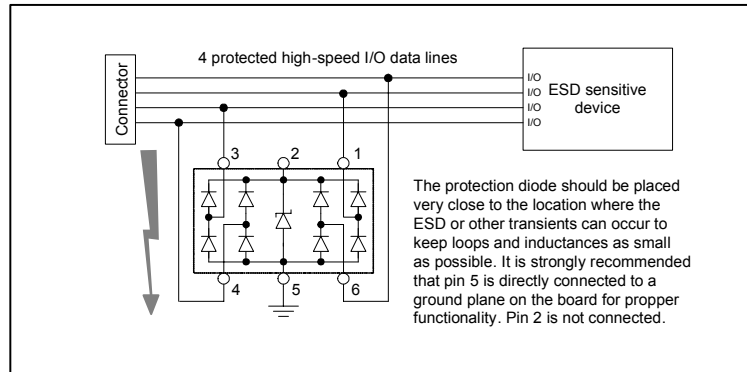
Diode capacitance  $C_T = f(V_R)$

$f = 1\text{MHz}$



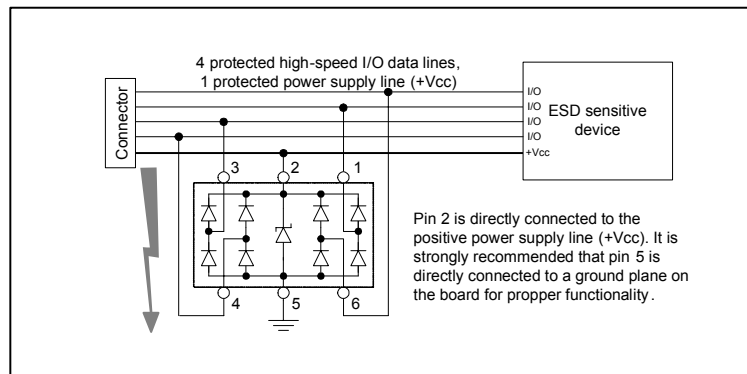
**Application example ESD5V3U4RRS**

4 data lines, uni-directional

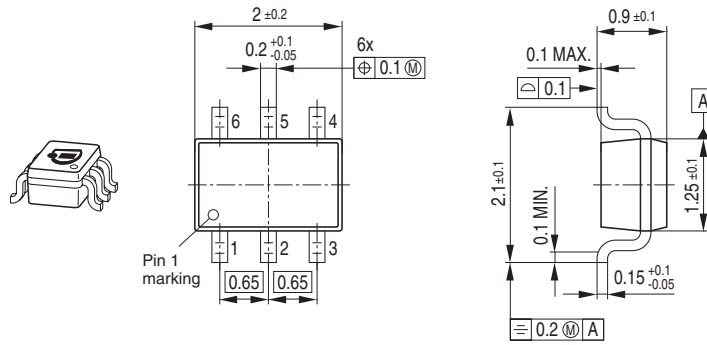


**Application example ESD5V3U4RRS**

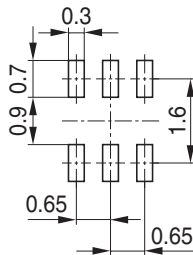
4 data lines and 1 power supply line, uni-directional



Package Outline

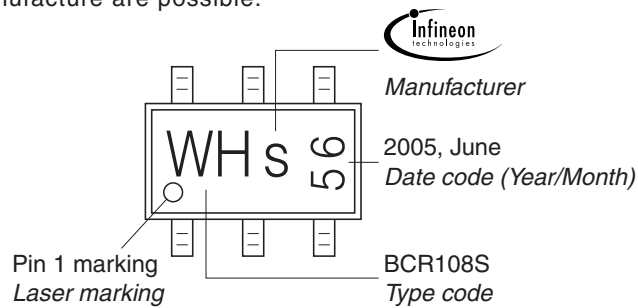


Foot Print



Marking Layout (Example)

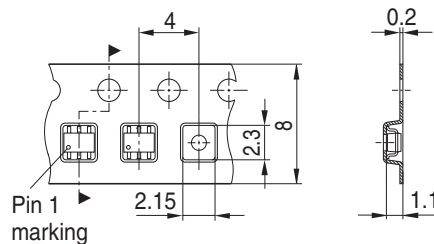
Small variations in positioning of Date code, Type code and Manufacture are possible.



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.



Edition 2006-02-01  
Published by  
Infineon Technologies AG  
81726 München, Germany  
© Infineon Technologies AG 2007.  
All Rights Reserved.

### **Attention please!**

The information given in this dokument shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffenheitsgarantie"). With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

### **Information**

For further information on technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies Office ([www.infineon.com](http://www.infineon.com)).

### **Warnings**

Due to technical requirements components may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies Office.

Infineon Technologies Components may only be used in life-support devices or systems with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system, or to affect the safety or effectiveness of that device or system.

Life support devices or systems are intended to be implanted in the human body, or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.