Multi-Channel TVS Diode Array

- ESD / transient protection of
  data and power lines
  in 3.3 V / 5 V application according to:
  IEC61000-4-2 (ESD): ± 30 KV (contact)
  IEC61000-4-4 (EFT): 80 A (5/50 ns)
  IEC61000-4-5 (Surge): 10 A (8/20 µs)

- Working voltage: 5 V (5.3 V max.)

- Low clamping voltage

- Low reverse current < 5 µA
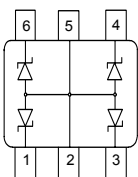
- Pb-free (RoHS compliant) package
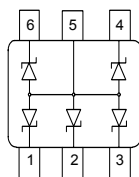
Applications

- Uni or bi-directional operation possible
  (see application example page 5)

- Mobile communication

- Consumer products (STB, MP3, DVD, DSC...)

- LCD displays, camera

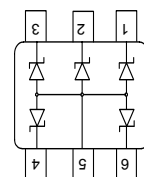- Notebooks and desktop computers, peripherals

RoHS ✓

ESD5V0S4US

ESD5V0S5US

ESD5V0S5US E6727
180° rotated in reel

Type	Package	Configuration	Marking
ESD5V0S4US	SOT363	4 lines, uni-directional	E4s
ESD5V0S5US	SOT363	5 lines, uni-directional	E5s
ESD5V3S5US E6727*	SOT363	5 lines, uni-directional	on request

* Preliminary data

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Maximum Ratings at T_A = 25°C, unless otherwise specified

Parameter	Symbol	Value	Unit
ESD contact discharge per diode[1]	V_{ESD}	30	kV
Peak pulse current (t_p = 8 / 20 µs) per diode[2]	I_{pp}	10	A
Peak pulse power (t_p = 8 / 20 µs) per diode	P_{pk}	130	W
Operating temperature range	T_{op}	-55...125	°C
Storage temperature	T_{stg}	-65...150	

Electrical Characteristics at T_A = 25°C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics -					
Reverse working voltage	V_{RWM}	-	5	5.3	V
Breakdown voltage $I_{(BR)}$ = 1 mA	$V_{(BR)}$	5.7	6.7	7.7	
Reverse current	I_R				µA
V_R = 3.3 V		-	-	1	
V_R = 5 V		-	-	5	
Clamping voltage (positive transients)	V_{CL}				V
I_{PP} = 1 A, t_p = 8/20 µs[2]		-	7	9	
I_{PP} = 10 A, t_p = 8/20 µs[2]		-	10.5	13	
Forward clamping voltage (negative transients)	V_{FC}				
I_{PP} = 1 A, t_p = 8/20 µs[2]		-	1	3	
I_{PP} = 10 A, t_p = 8/20 µs[2]		-	3.5	6	
Diode capacitance	C_T				pF
V_R = 0 V, f = 1 MHz		-	70	90	
V_R = 5 V, f = 1 MHz		-	35	55	

[1] V_{ESD} according to IEC61000-4-2

[2] I_{pp} according to IEC61000-4-5

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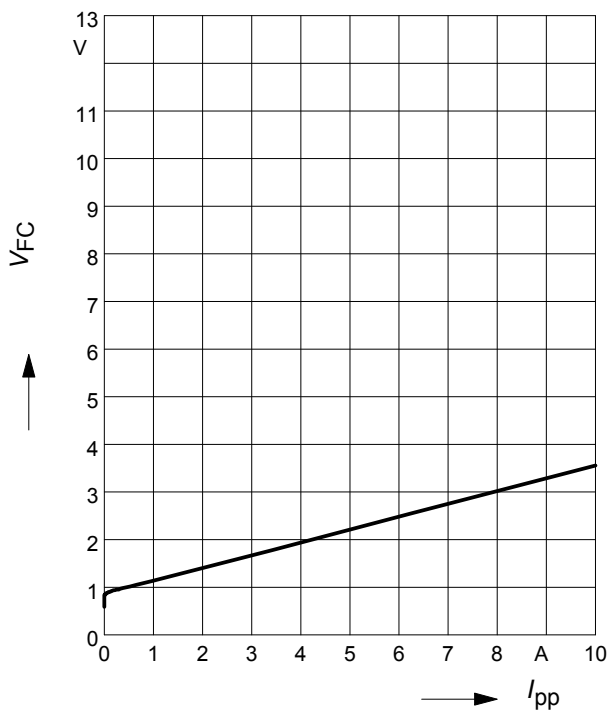**Power derating curve** $P_{pk} = f\,(T_A)$
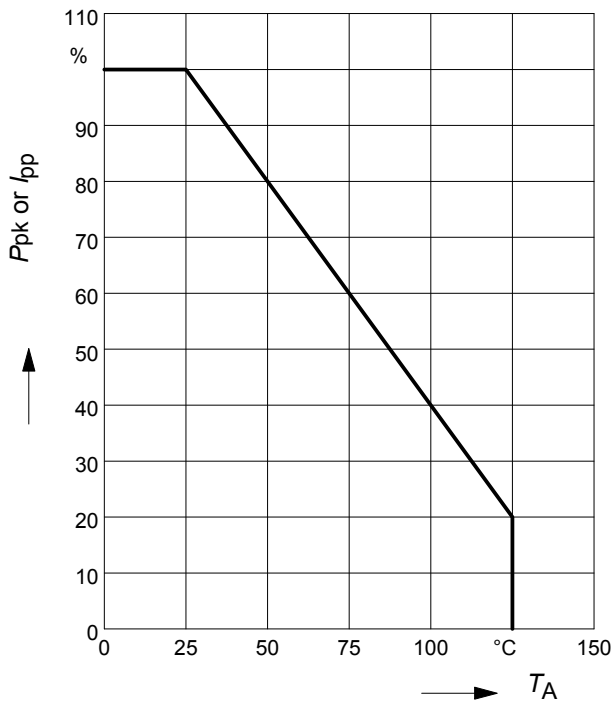
Clamping voltage, $V_{cl} = f(I_{pp})$
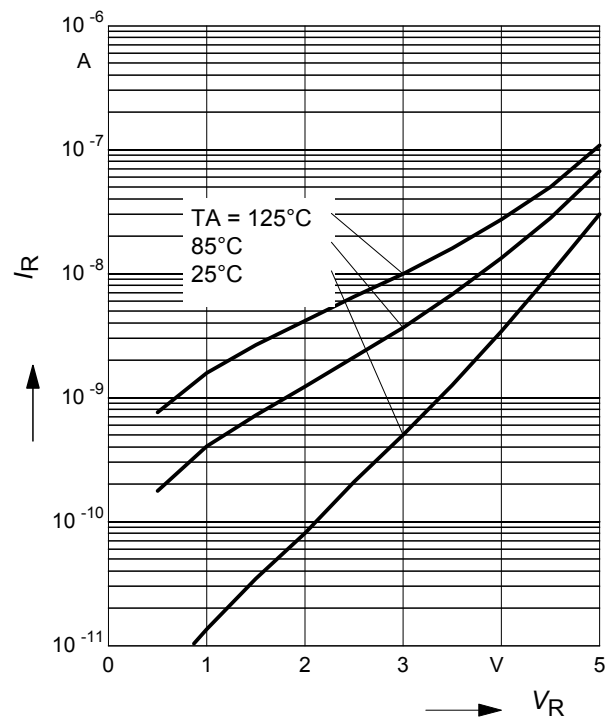
t_p = 8 / 20 µs (positive transients)
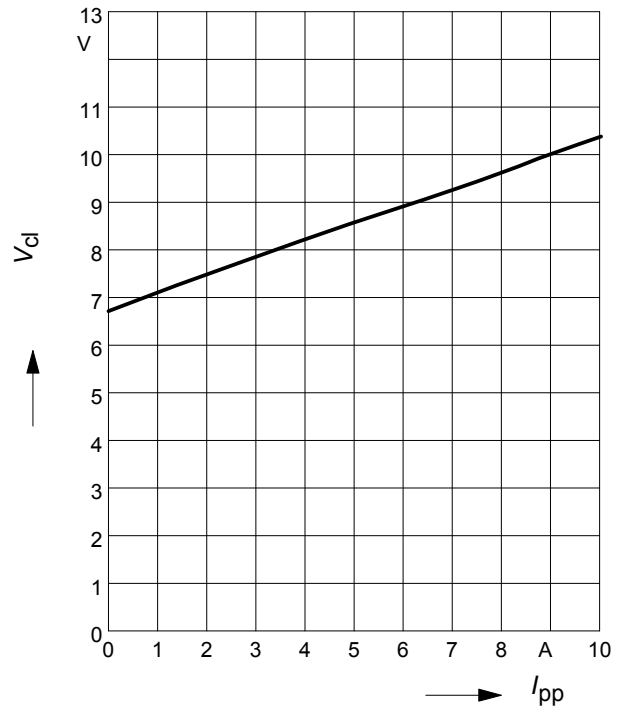
Forward clamping voltage $V_{FC} = f\,(I_{pp})$

t_p = 8 / 20 µs (negative transients)

Reverse current $I_R = f(V_R)$

T_A = Parameter

TA = 125°C
85°C
25°C

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Normalized reverse voltage

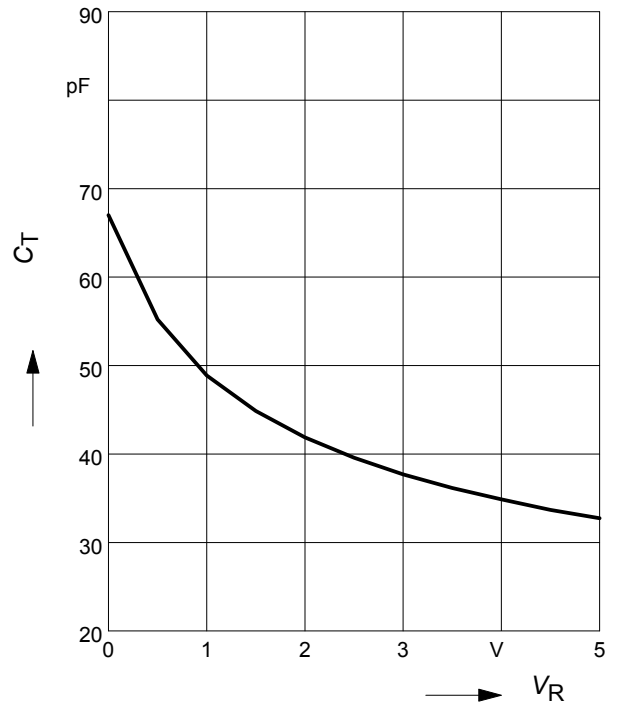$V_{BR}(T_A)/V_{BR}(25°C) = f(T_A)$

$I_R = 1 \text{ mA}$
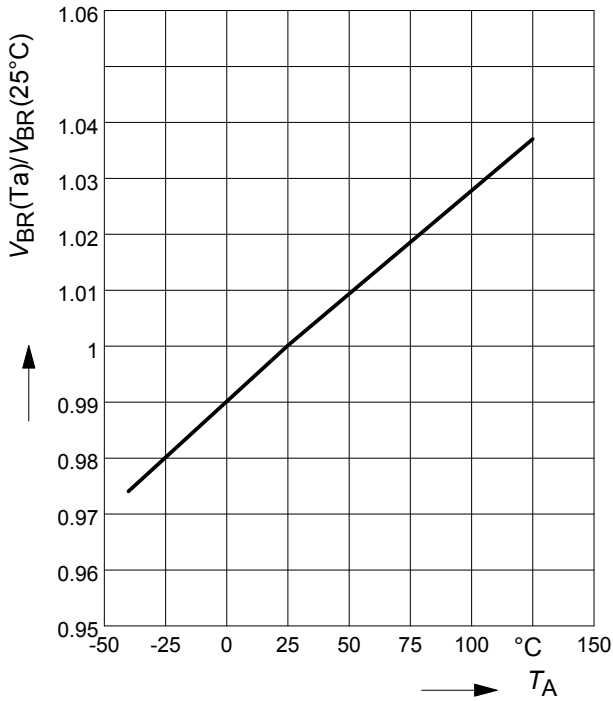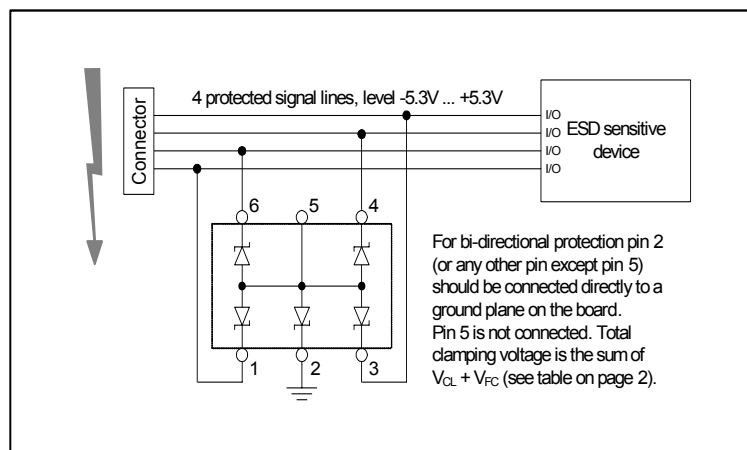

Diode capacitance $C_T = f(V_R)$

$f = 1\text{MHz}$

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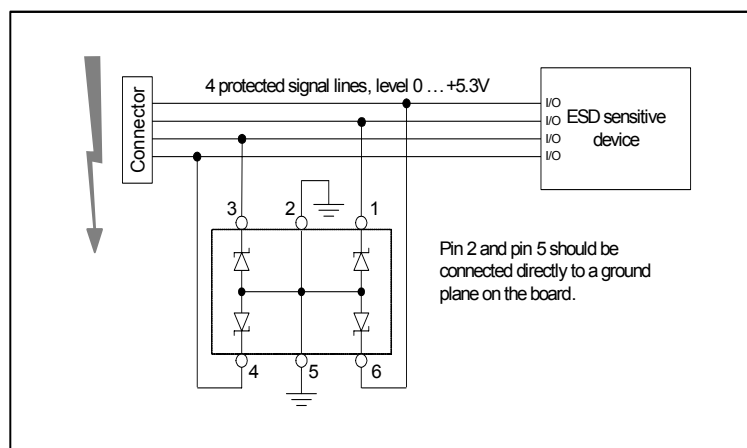## Application example ESD5V0S5US
5 channels, uni-directional

5 protected signal lines, level 0 ... +5.3V

Connector

I/O
I/O ESD sensitive
I/O device
I/O
I/O

3 2 1

4 5 6

The protection diode should be placed very close to the location where the ESD or other transients can occur to keep loops and inductances as small as possible.
Pin 5 should be connected directly to a ground plane on the board.
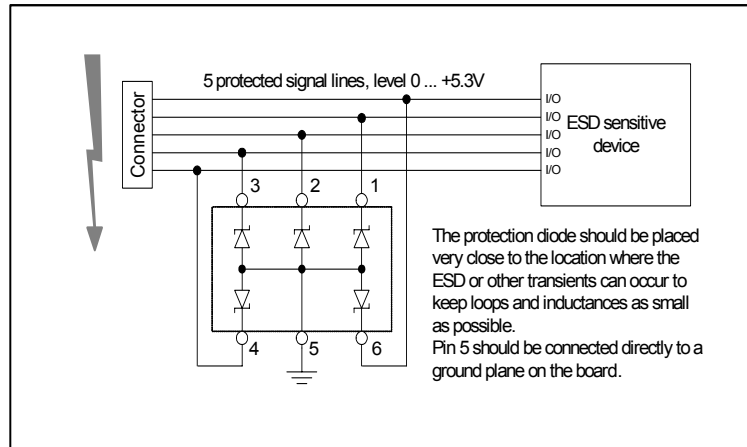
Application example ESD5V0S5US
4 channels, bi-directional

4 protected signal lines, level -5.3V ... +5.3V

Connector

I/O
I/O ESD sensitive
I/O device
I/O

6 5 4

1 2 3

For bi-directional protection pin 2 (or any other pin except pin 5) should be connected directly to a ground plane on the board.
Pin 5 is not connected. Total clamping voltage is the sum of $V_{CL} + V_{FC}$ (see table on page 2).

Application example ESD5V0S4US
4 channels, uni-directional

4 protected signal lines, level 0 … +5.3V

Connector

I/O
I/O ESD sensitive
I/O device
I/O

3 2 1

4 5 6

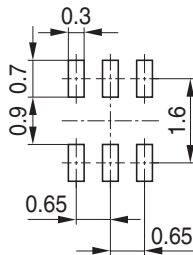Pin 2 and pin 5 should be connected directly to a ground plane on the board.

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Package Outline

Foot Print

Marking Layout (Example)

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

Manufacturer

2005, June
Date code (Year/Month)

BCR108S
Type code

Pin 1 marking
Laser marking

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.

Pin 1 marking

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