ESD8V0R1B_02ELS

SPICE3 Model Documentation

Technical Report

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RF and Protection Devices

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Revision History

ESD8V0R1B_02ELS

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Previous Version:

Page	Subjects (major changes since last revision)
All	Creation of document.

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Last Trademarks Update 2009-10-19

1 Model Description

L1 is the inductance of the bond wire. Breakdown voltage is adjusted to the DC measurement. D1 and D2 have a low threshold voltage and do not influence the diode characteristics of the main diodes D3 and D4. D1 and D2 are used as a switch for the different forward and reverse resistances R1 and R2.

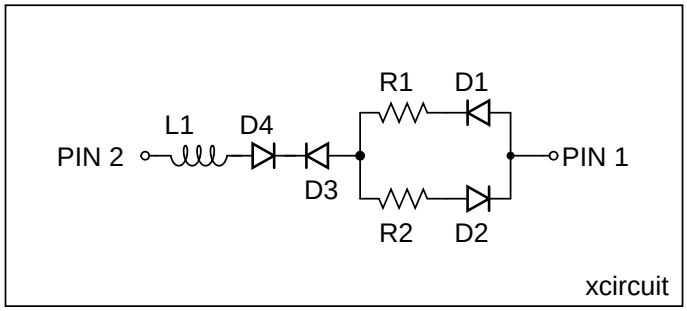


Figure 1: Subcircuit of ESD diode

2 Model Performance

The results of parameter extraction are shown in this chapter. Red boxes indicate measurement data. Blue lines indicate simulated data. Measurement temperature is 27 °C .

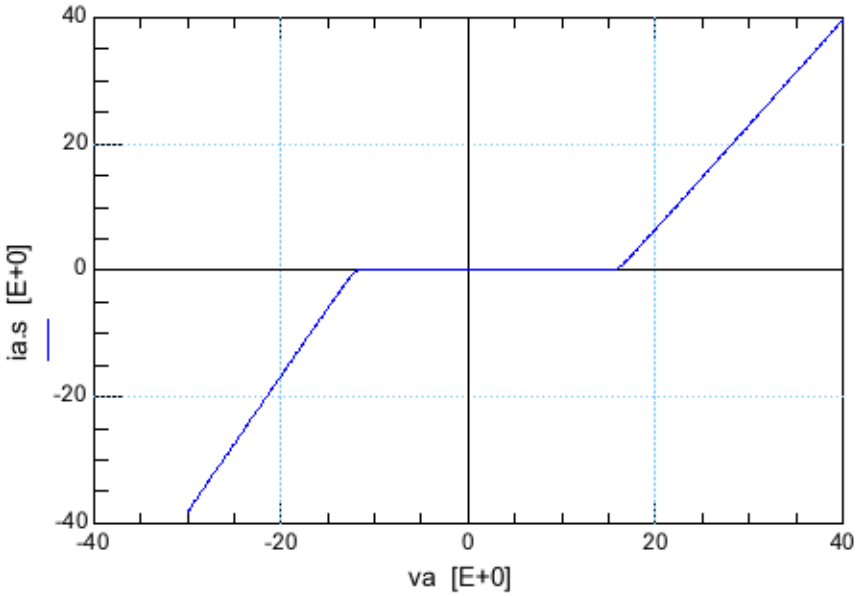


Figure 2: TLP characteristics

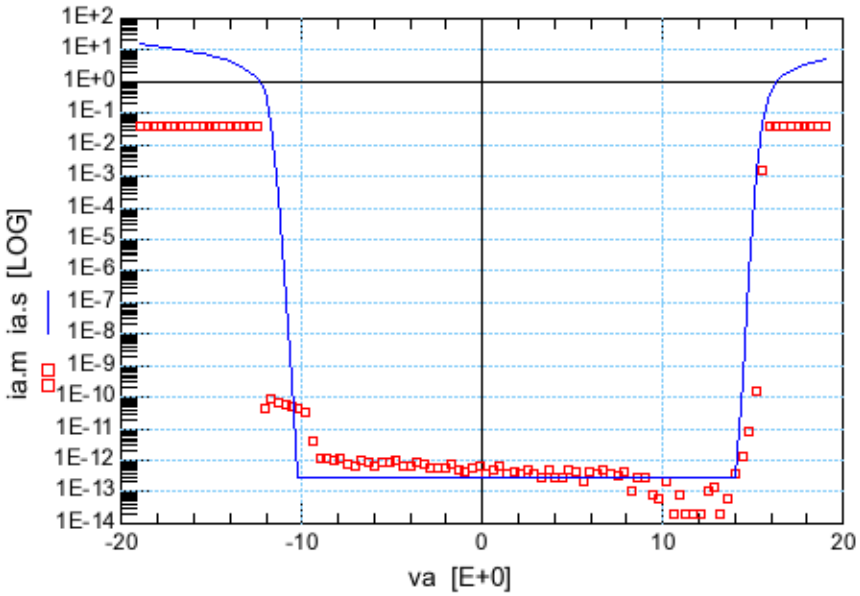


Figure 3: Leakage current

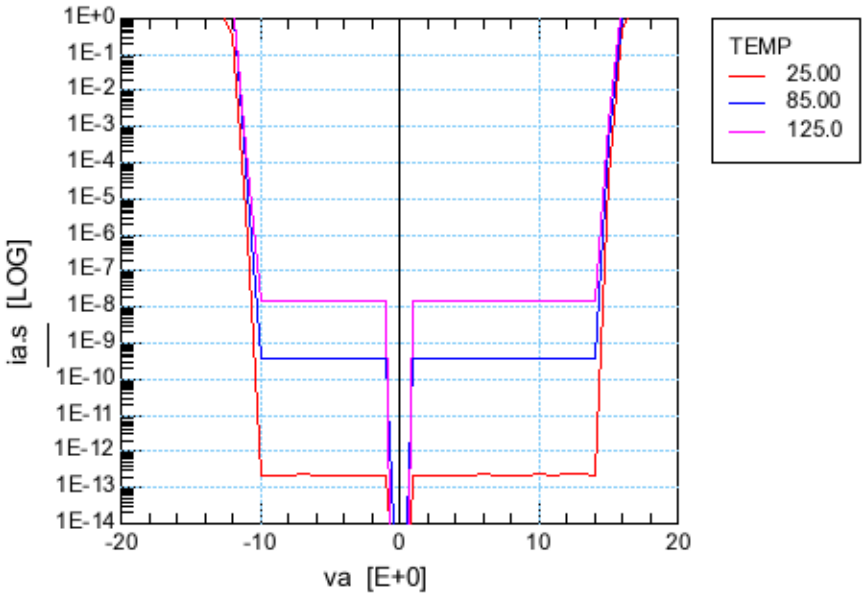


Figure 4: Temperature dependence of leakage current

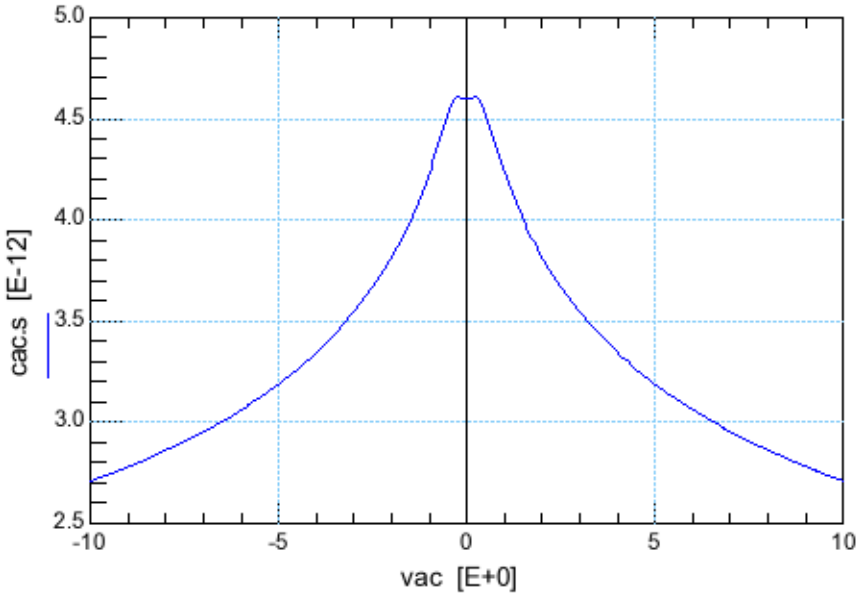


Figure 5: CV characterisitics

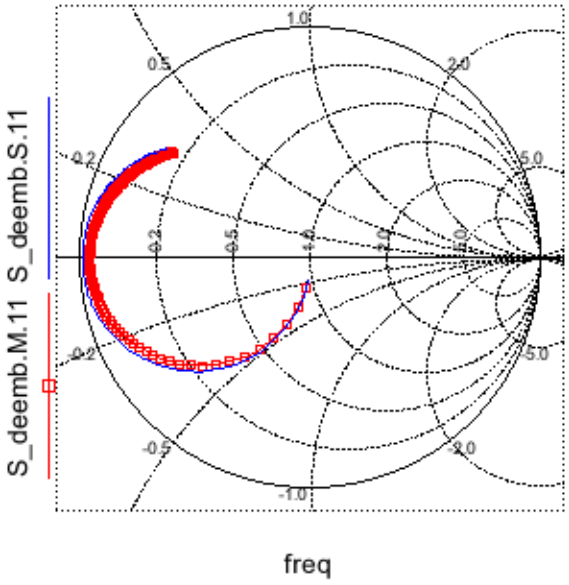


Figure 6: S11, VC=0V (VC=voltage at cathode)

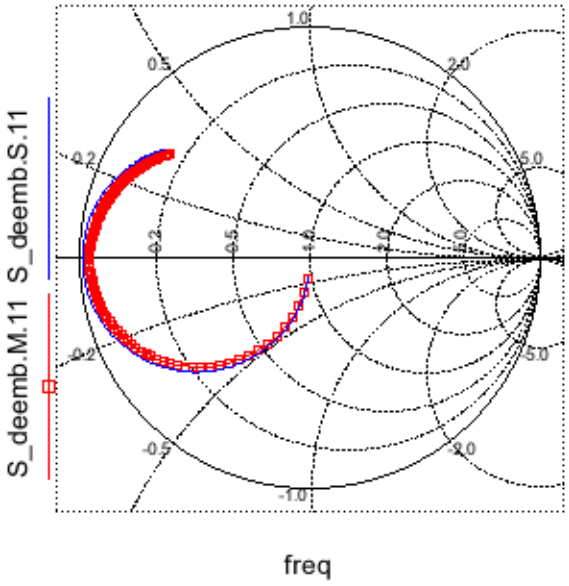


Figure 7: S11, VC=4V (VC=voltage at cathode)

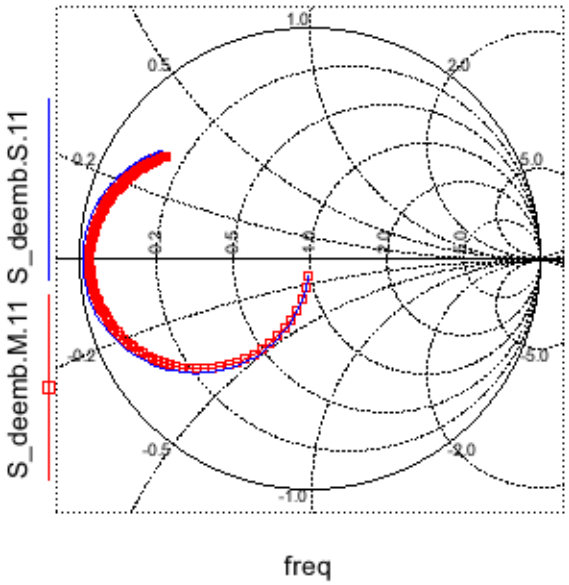


Figure 8: S11, VC=8V (VC=voltage at cathode)

3 Model Code

```
.SUBCKT ESD8V0R1B_02ELS 1 2
X1      1    12   resistor_switch_ESD8V0R1B
X2      12   13   diode_subckt_ESD8V0R1B
L02ELS 13 2 2.3E-10
.ENDS
.SUBCKT ESD8V0R1B_02EL 1 2
X1      1    12   resistor_switch_ESD8V0R1B
X2      12   13   diode_subckt_ESD8V0R1B
L02EL   13   2    4.0e-10
.ENDS
.SUBCKT resistor_switch_ESD8V0R1B 1 2
.MODEL D1 D
+ IS = 0.001
+ RS = 0
+ N = 1
+ TT = 1E-10
+ CJO = 1E-06
+ VJ = 0.7
+ M = 0.3
+ EG = 1.11
+ XTI = 3
+ KF = 0
+ AF = 1
+ FC = 0.5
+ BV = 100
+ IBV = 0.001
+ TNOM = 27
D1 1 12
+ D1
R1 12 2 0.6
D2 21 1
+ D1
R2 21 2 0.46
.ENDS
.SUBCKT diode_subckt_ESD8V0R1B 1  2
.MODEL D3 D
+ IS = 3E-13
+ RS = 0
+ N = 1
+ TT = 1E-10
+ CJO = 9.2E-12
+ VJ = 0.7
+ M = 0.35
+ EG = 1.11
+ XTI = 1
+ KF = 0
+ AF = 1
+ FC = 0.5
+ BV = 10.8
+ IBV = 0.001
+ TNOM = 27
.MODEL D4 D
+ IS = 3E-13
+ RS = 0
+ N = 1
+ TT = 1E-10
+ CJO = 9.2E-12
+ VJ = 0.7
+ M = 0.35
```

```
+ EG = 1.11
+ XTI = 1
+ KF = 0
+ AF = 1
+ FC = 0.5
+ BV = 14.6
+ IBV = 0.001
+ TNOM = 27
D3 1 12
+ D3
D4 2 12
+ D4
.ENDS
```

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