Device Modeling Report

COMPONENTS: SiC Schottky Barrier Diode
PART NUMBER: SCS205KGHR
MANUFACTURER: ROHM
REMARK: Professional Model

Bee Technologies Inc.

SPICE MODEL

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*$
* PART NUMBER: SCS205KGHR
* MANUFACTURER: ROHM
* REMARK: VR=1200V, IF=5A
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.SUBCKT SCS205KGHR 1 2 3
X_U1 3 2 DSCS205KGHR_p
R_R1 2 1 1u
.ENDS
.SUBCKT DSCS205KGHR_p   A K
V_V_I            A N00040 0Vdc
V_V_Ifwd          IN2 K 0Vdc
E_E1          VREV 0 VALUE { IF(V(A,K)>0, 0,V(A,K)) }
E_E3  I_REV0 0     VALUE {+
1.195e-10*exp(0.0078097*(-V(Vrev)))+1e-12}
E_E4          I_REV 0 VALUE { V(I_rev0)*V(Vr_small)-(-I(V_V_Irev)) }
E_E6          IN K VALUE { IF(V(A,K)>0, V(A,K),0) }
V_V_Irev        VREV1 VREV 0Vdc
G_ABMI1          N00040 K VALUE { I(V_V_Ifwd)-V(I_rev)     }
E_E2          VR_SMALL 0 TABLE { V(Vrev) }
+ ( (-0.1,1.0) (0,0) )
R_R1          0 VR_SMALL   10MEG
R_R2          0 I_REV0    10MEG
R_R3          0 I_REV   10MEG
D_D4          IN IN2 DSCS205KGHR
D_D5          VREV1 0 DSCS205KGHR
C_CP          K A   16.5pF
.MODEL DSCS205KGHR D
+ IS=172.11E-18 RS=81.492E-3 IKF=7.8890E3 EG=3
+ CJO=342.52E-12 M=.715 VJ=1.8951
+ BV=1250 IBV=5.00E-6
+ N=1 ISR=0 TT=0
.ENDS
*$
```

## Circuit Configuration
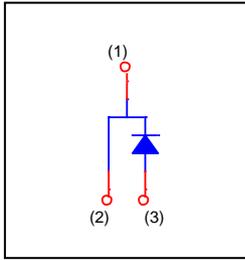
DIODE MODEL PARAMETERS

PSpice model parameter	Model description
IS	Saturation Current
N	Emission Coefficient
RS	Series Resistance
IKF	High-injection Knee Current
CJO	Zero-bias Junction Capacitance
M	Junction Grading Coefficient
VJ	Junction Potential
ISR	Recombination Current Saturation Value
BV	Reverse Breakdown Voltage(a positive value)
IBV	Reverse Breakdown Current(a positive value)
TT	Transit Time
EG	Energy-band Gap

Forward Current Characteristics

Comparison Graph
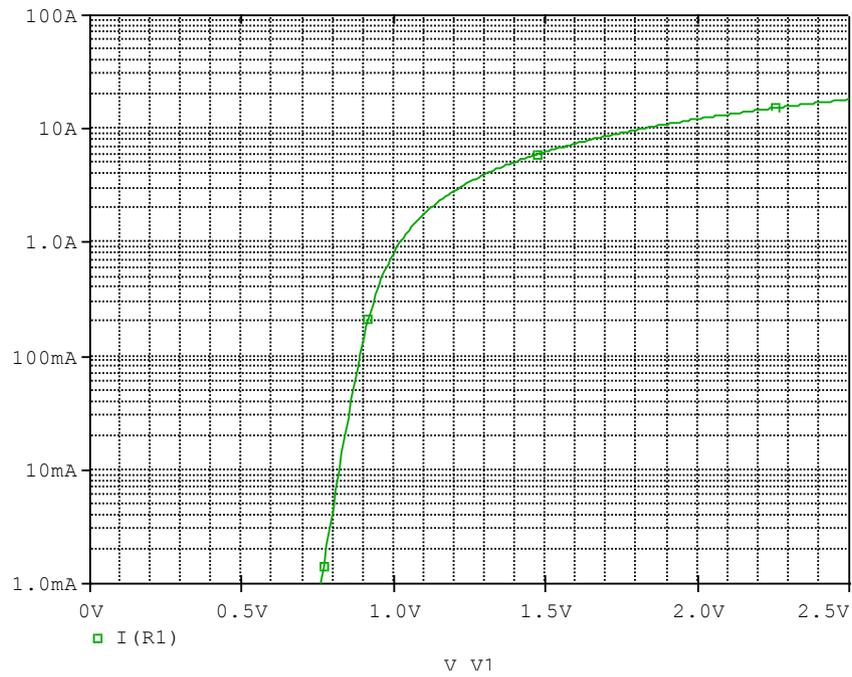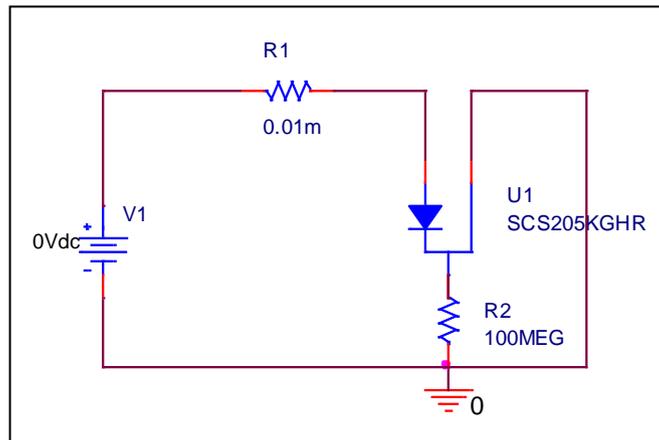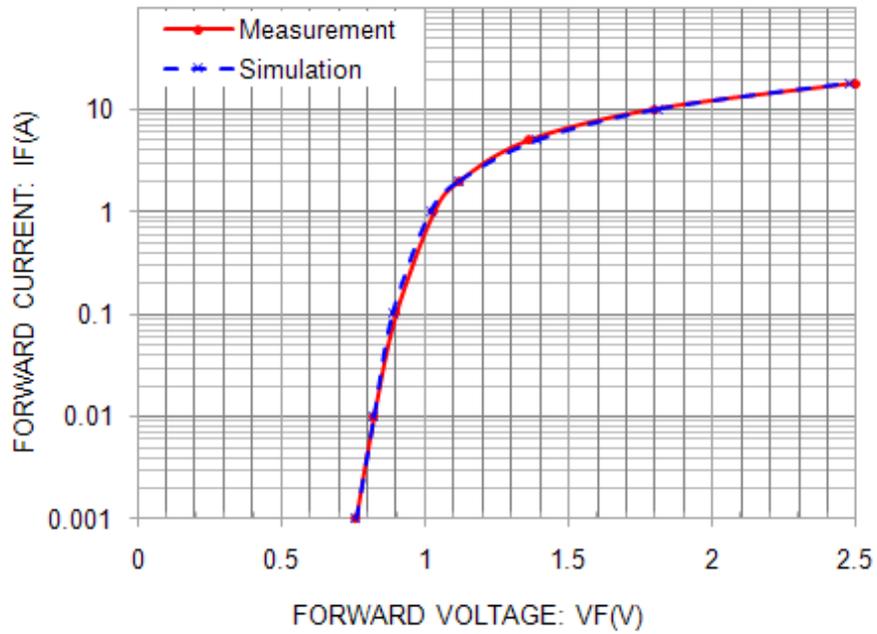
I_F (A)	V_F (V)		%Error
	Measurement	Simulation	
0.001	0.760	0.760	0.00
0.01	0.820	0.820	0.00
0.1	0.898	0.887	-1.22
1	1.030	1.020	-0.97
2	1.120	1.119	-0.09
5	1.360	1.388	2.06
10	1.800	1.813	0.72
18	2.500	2.480	-0.80

Junction Capacitance Characteristic

I(V2)/(1200V/100u)
V(R)
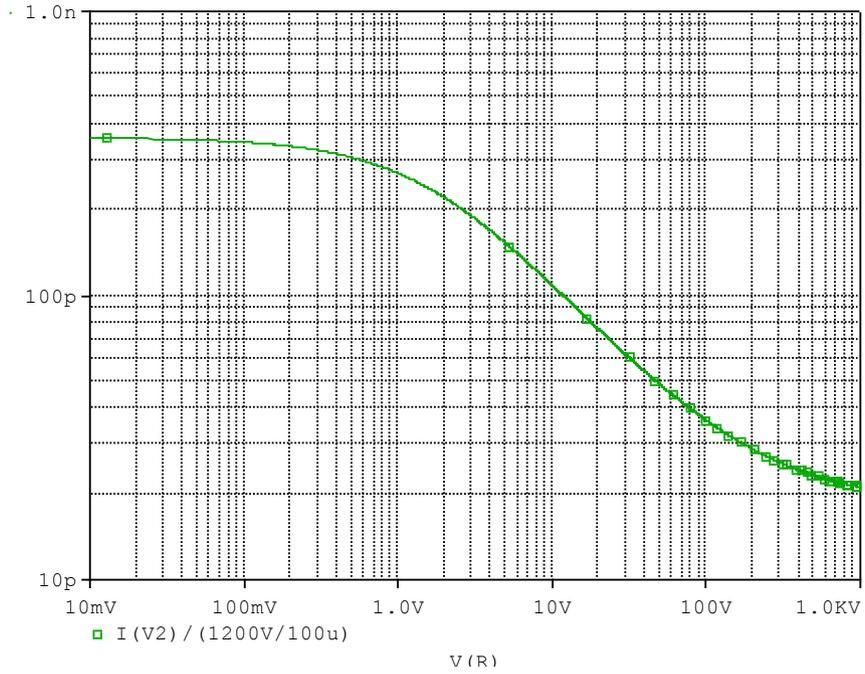
Evaluation circuit
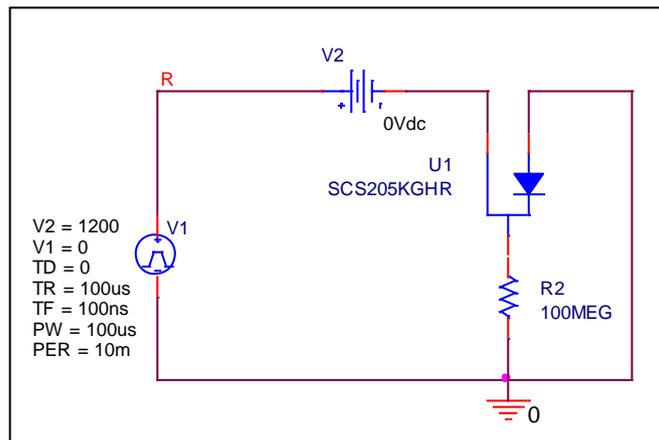
Comparison Graph
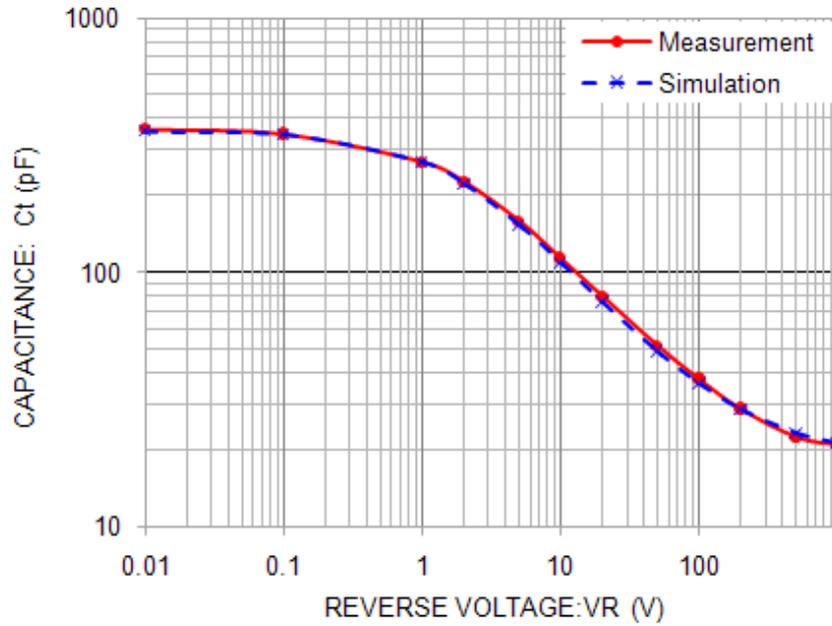
Comparison table

V_R(V)	Ct (pF)		%Error
	Measurement	Simulation	
0.01	365.000	358.022	-1.91
0.1	350.000	346.700	-0.94
1	270.000	269.500	-0.19
2	225.000	221.000	-1.78
5	158.000	152.500	-3.48
10	113.000	108.500	-3.98
20	80.000	76.060	-4.93
50	51.000	48.660	-4.59
100	38.000	36.420	-4.16
200	29.000	28.830	-0.59
500	22.500	23.257	3.36
1000	21.000	21.230	1.10

Reverse Characteristic

I(R1)

V V1
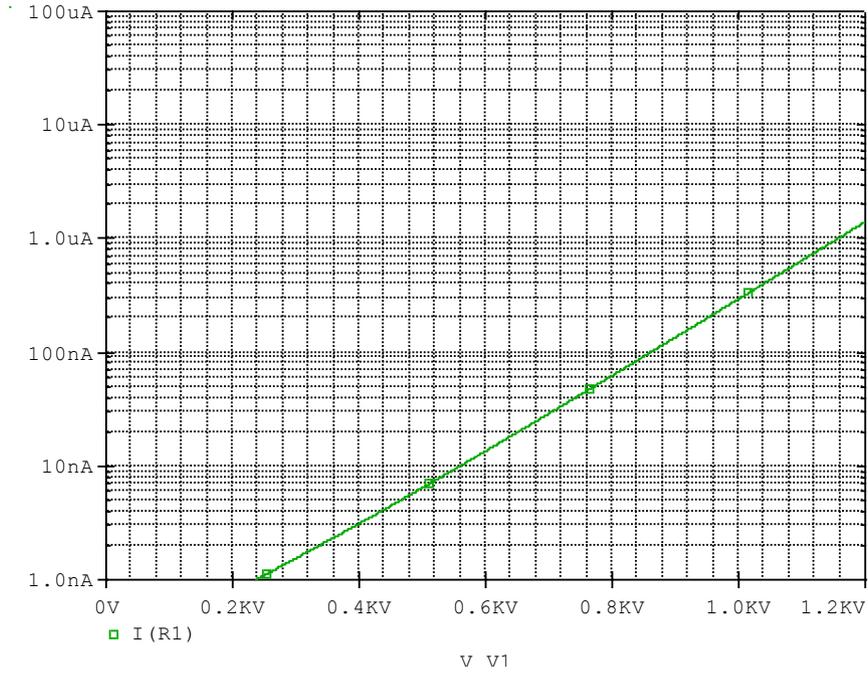
Evaluation circuit
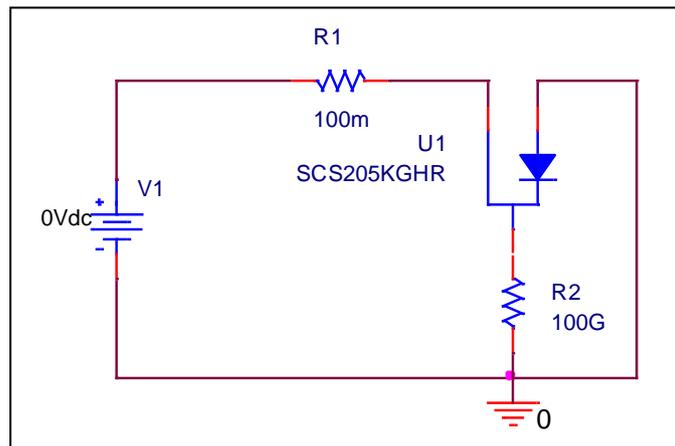
Comparison Graph
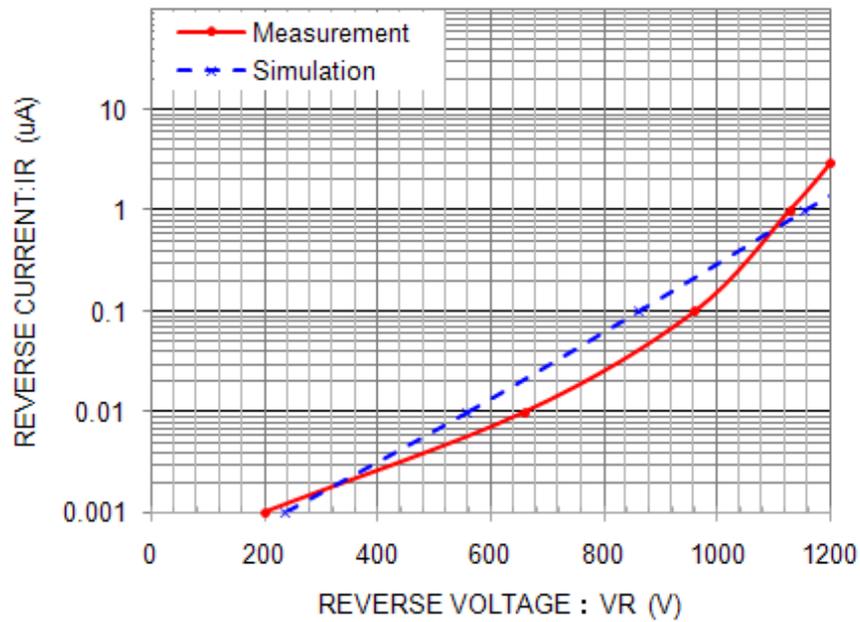
Comparison table

I$_R$ (uA)	V$_R$ (V)		%Error
	Measurement	Simulation	
0.001	200.000	237.180	18.59
0.01	660.000	559.470	-15.23
0.1	960.000	860.590	-10.36
1	1130.000	1156.000	2.30
2.9	1200.000	1294.000	7.83