

Device Modeling Report

COMPONENTS:
DIODE/ GENERAL PURPOSE RECTIFIER / STANDARD
PART NUMBER: 1SR139-400
MANUFACTURER: ROHM
REMARK: TC=80 C

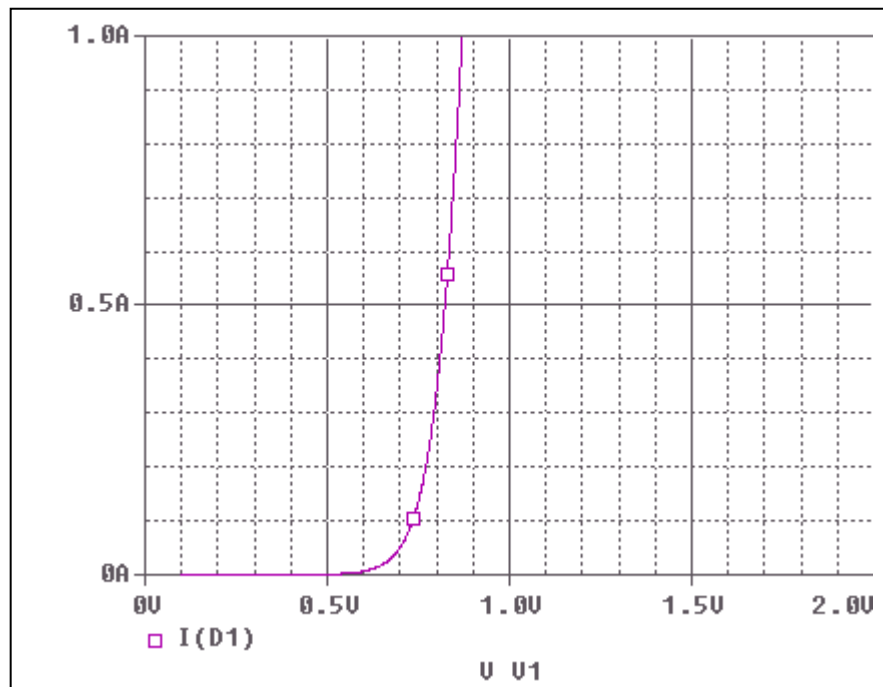


Bee Technologies Inc.

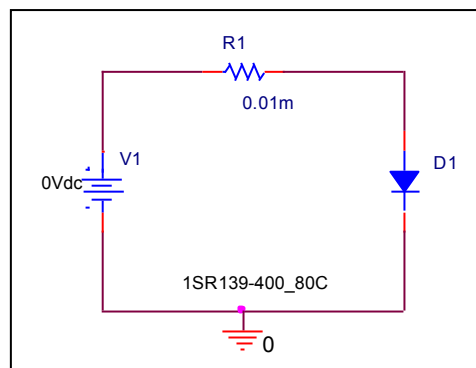
PSpice model parameter	Model description
IS	Saturation Current
N	Emission Coefficient
RS	Series Resistance
IKF	High-injection Knee Current
CJO	Zero-bias Junction Capacitance
M	Junction Grading Coefficient
VJ	Junction Potential
ISR	Recombination Current Saturation Value
BV	Reverse Breakdown Voltage(a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

Forward Current Characteristic

Circuit Simulation Result

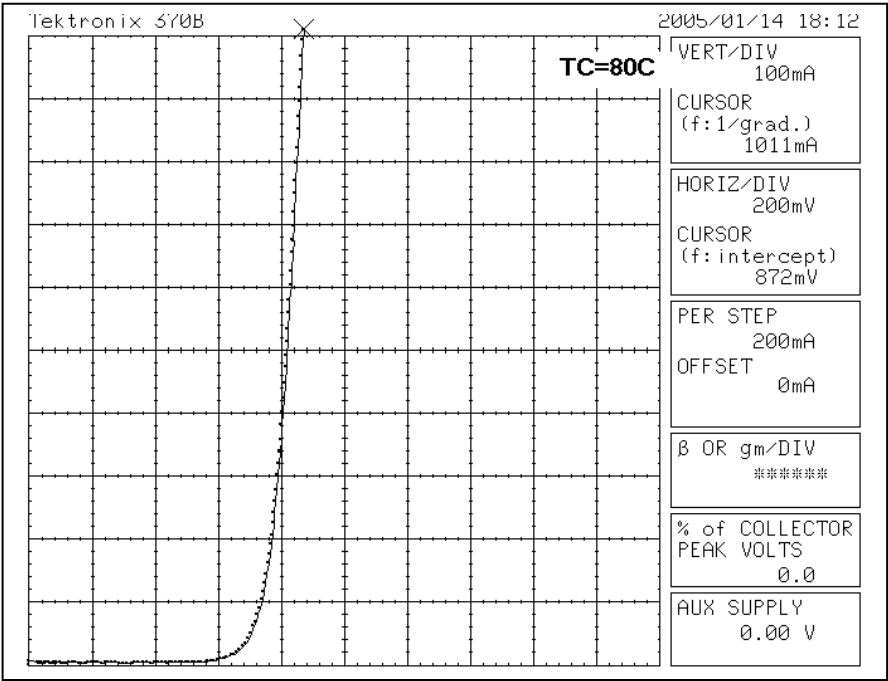


Evaluation Circuit



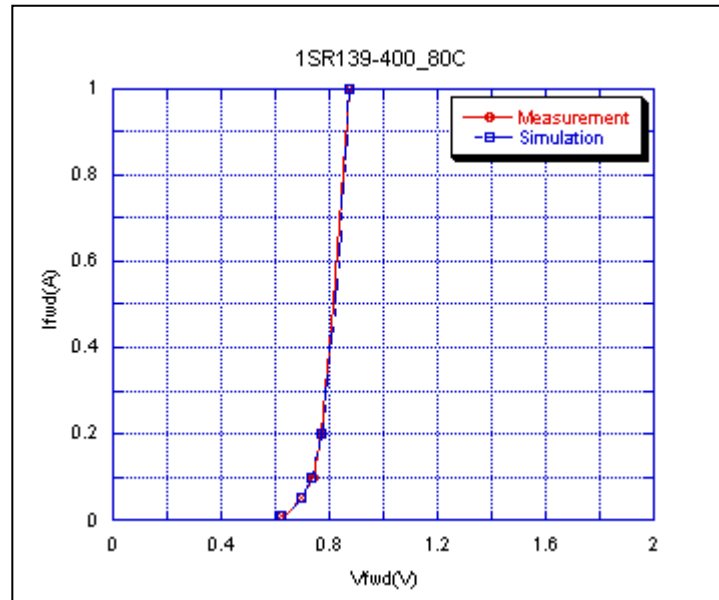
Forward Current Characteristic

Reference



Comparison Graph

Circuit Simulation Result

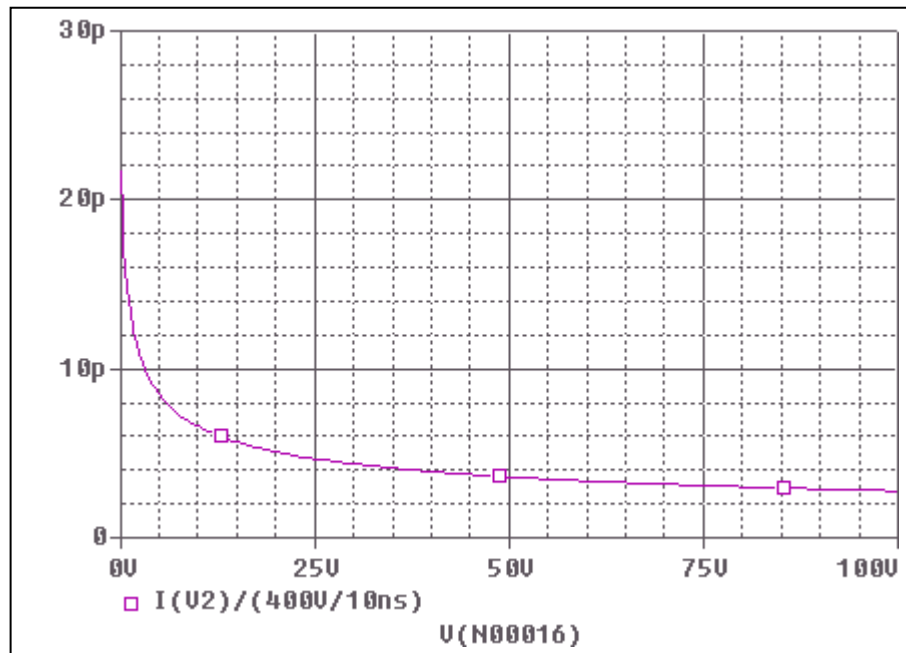


Simulation Result

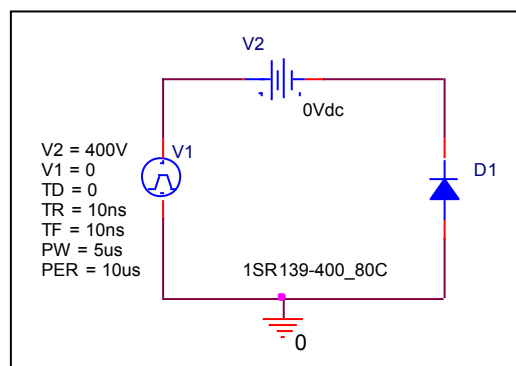
Ifwd(A)	Vfwd(V) Measurement	Vfwd(V) Simulation	%Error
0.01	0.620	0.620	0.00
0.02	0.652	0.654	-0.31
0.05	0.700	0.699	0.14
0.1	0.740	0.733	0.95
0.2	0.768	0.770	-0.26
0.5	0.818	0.822	-0.49
1	0.872	0.871	0.11

Capacitance Characteristic

Circuit Simulation Result

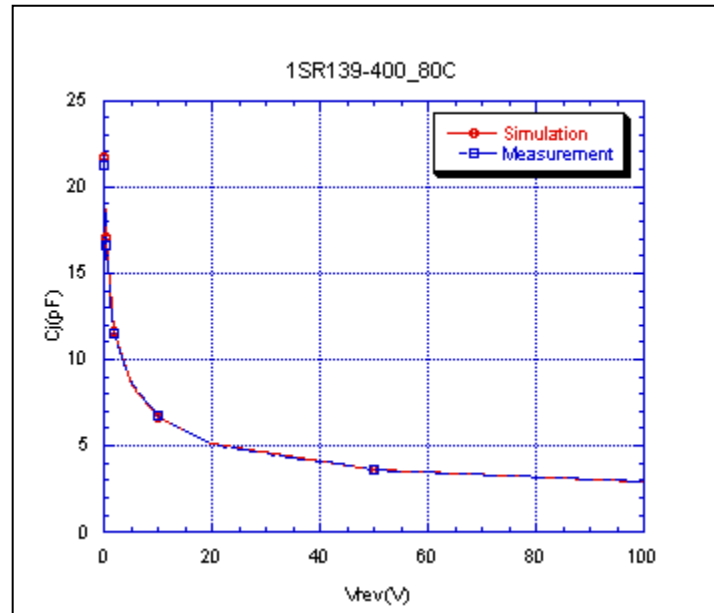


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

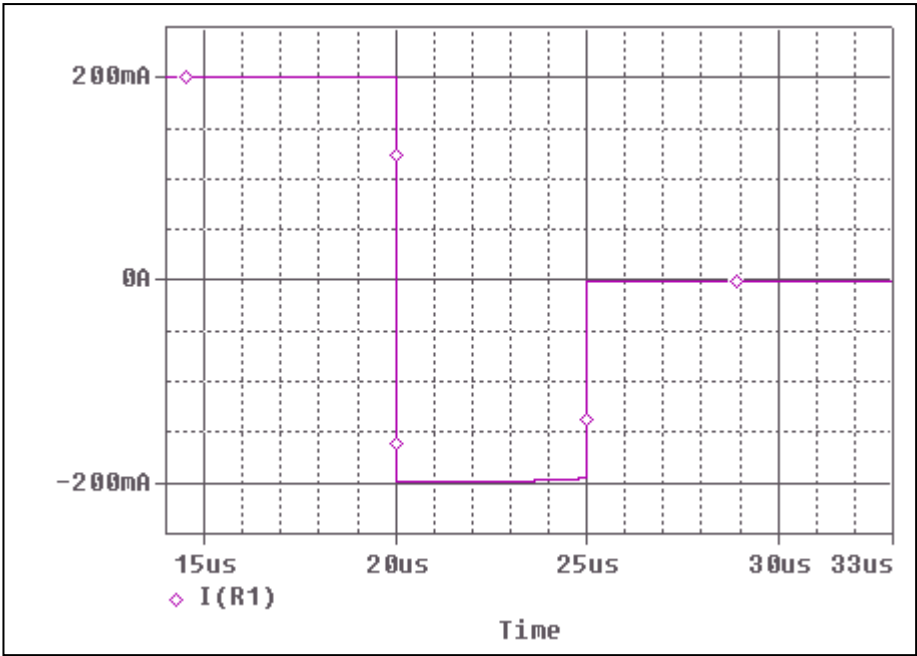


Simulation Result

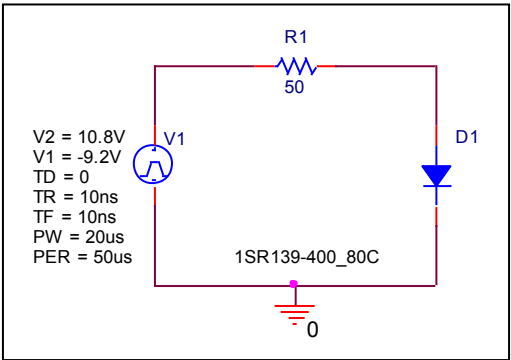
Vrev(V)	Cj(pF) Measurement	Cj(pF) Simulation	%Error
0	23.314	23.314	0.00
0.1	21.207	21.739	-2.51
0.2	19.708	20.421	-3.62
0.5	16.663	17.106	-2.66
1	14.088	14.333	-1.74
2	11.544	11.639	-0.82
5	8.577	8.477	1.17
10	6.704	6.607	1.45
20	5.166	5.094	1.39
50	3.616	3.605	0.30
100	2.754	2.766	-0.44

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

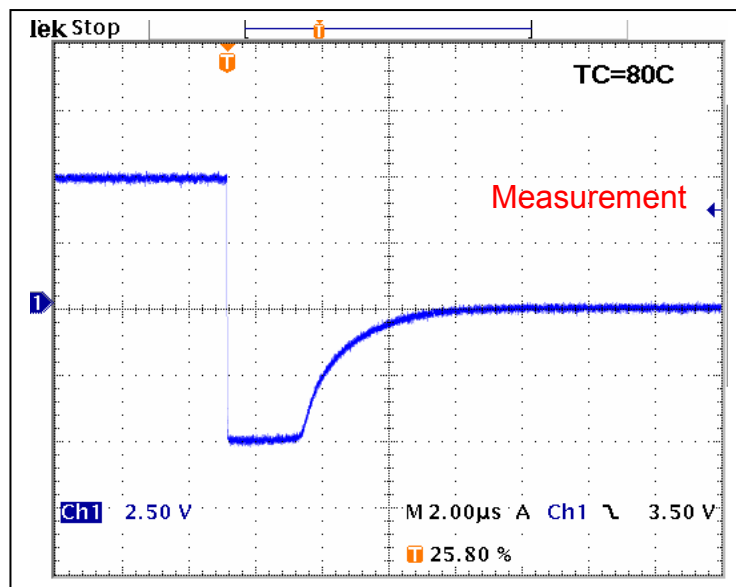


Compare Measurement vs. Simulation

	Measurement		Simulation		%Error
t _{rr}	5.04	us	4.97	us	1.388

Reverse Recovery Characteristic

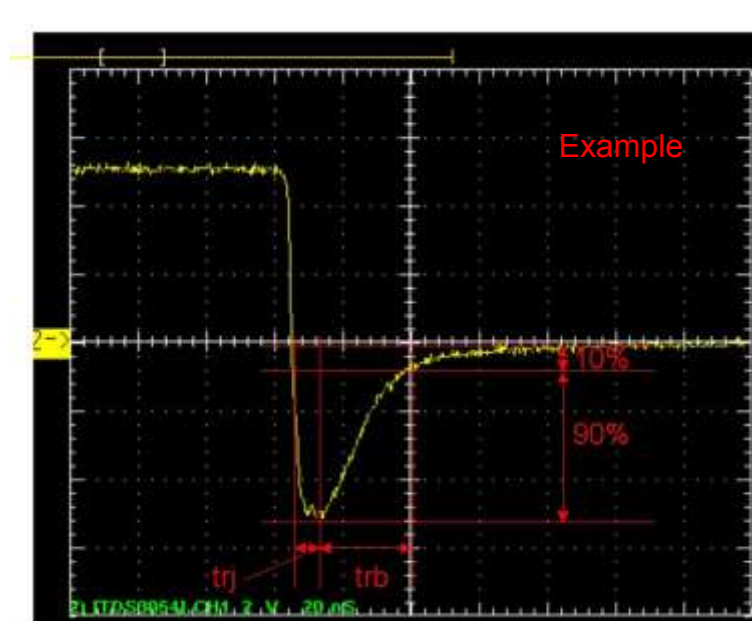
Reference



$T_{rj} = 2.16(\mu s)$

$T_{rb} = 2.88(\mu s)$

Conditions: $I_{fwd} = I_{rev} = 0.2(A)$, $R_I = 50$



Relation between t_{rj} and t_{rb}