

Device Modeling Report

COMPONENTS:
DIODE/ GENERAL PURPOSE RECTIFIER / STANDARD
PART NUMBER: 1SR139-600
MANUFACTURER: ROHM
REMARK: TC=80C

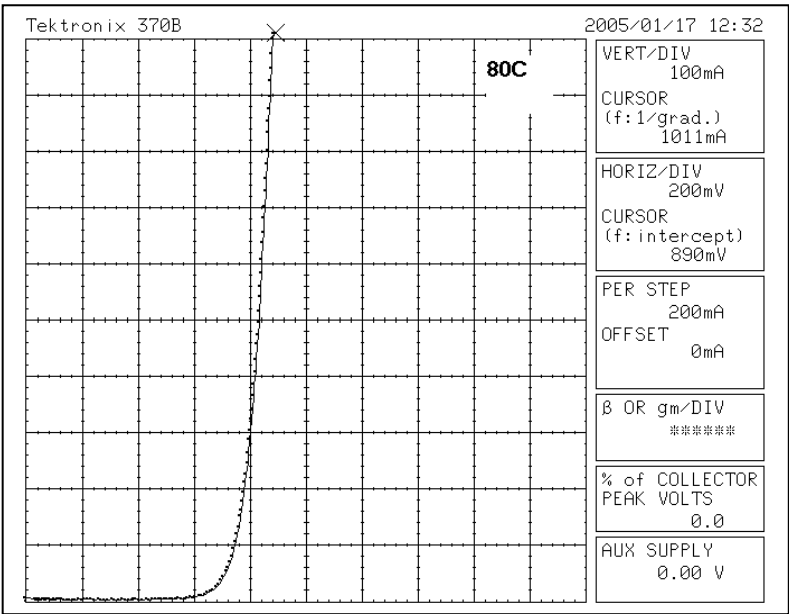


Bee Technologies Inc.

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

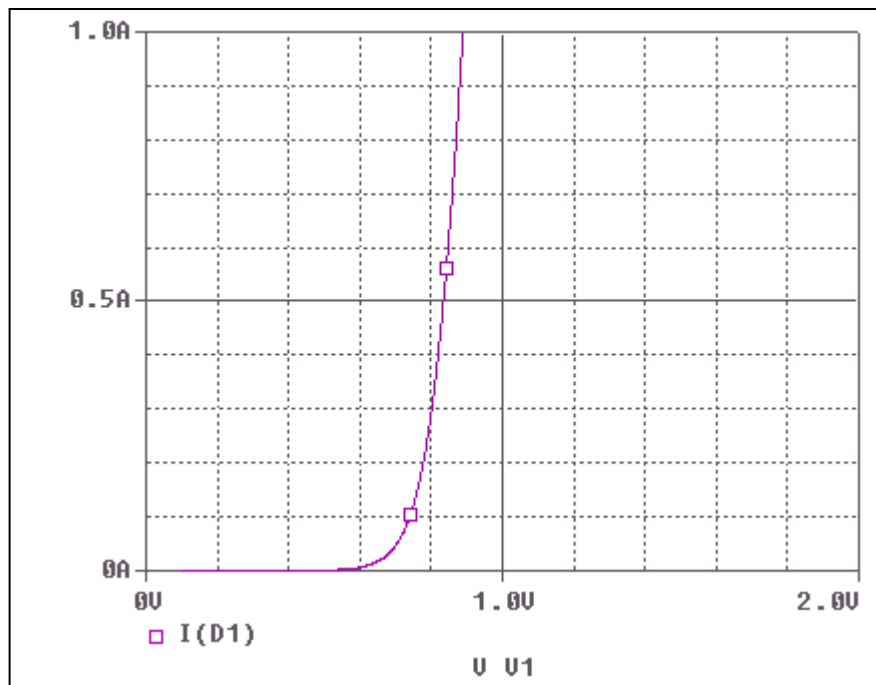
Forward Current Characteristic

Reference

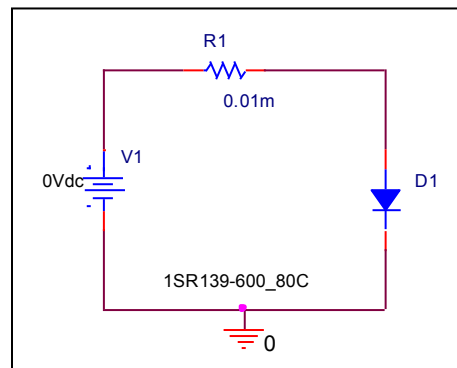


Forward Current Characteristic

Circuit Simulation Result

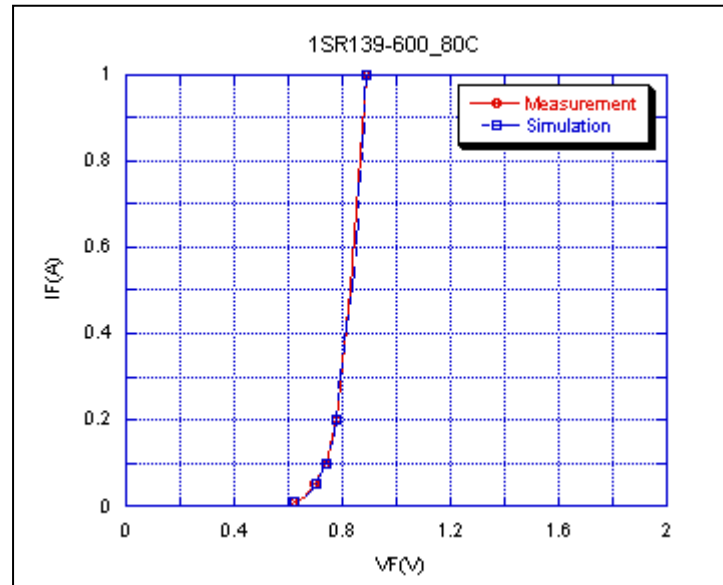


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

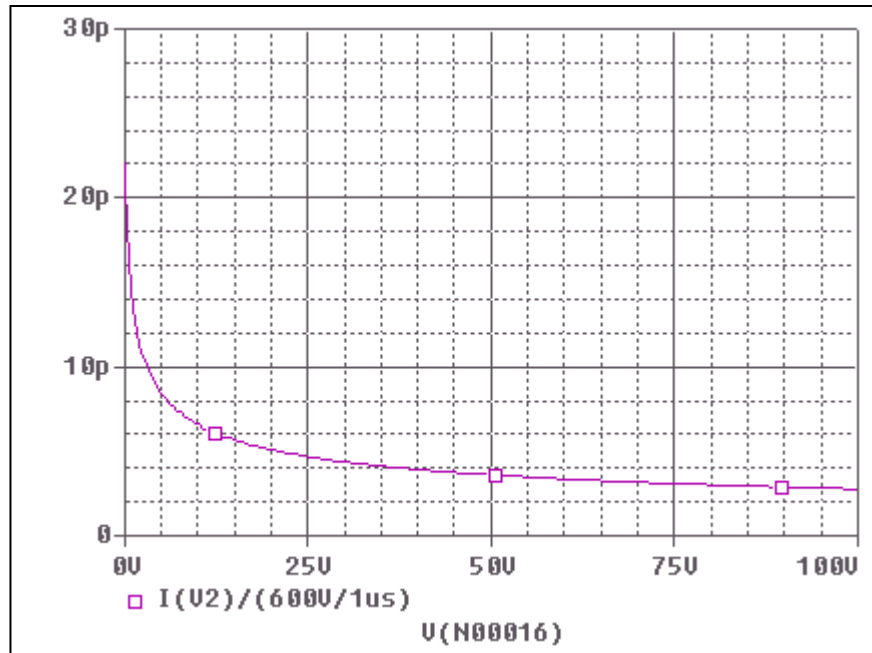


Simulation Result

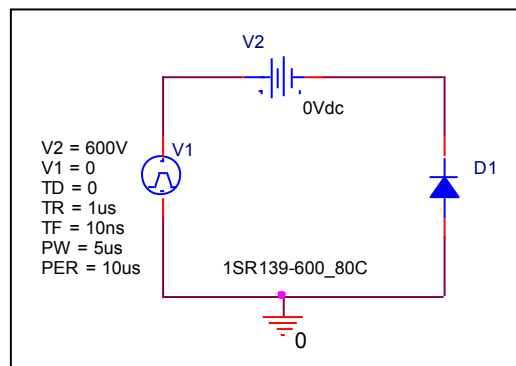
Ifwd(A)	Vfwd(V) Measurement	Vfwd(V) Simulation	%Error
0.01	0.620	0.622	-0.32
0.02	0.660	0.656	0.61
0.05	0.700	0.703	-0.43
0.1	0.742	0.738	0.54
0.2	0.778	0.777	0.13
0.5	0.832	0.834	-0.24
1	0.890	0.888	0.22

Capacitance Characteristic

Circuit Simulation Result

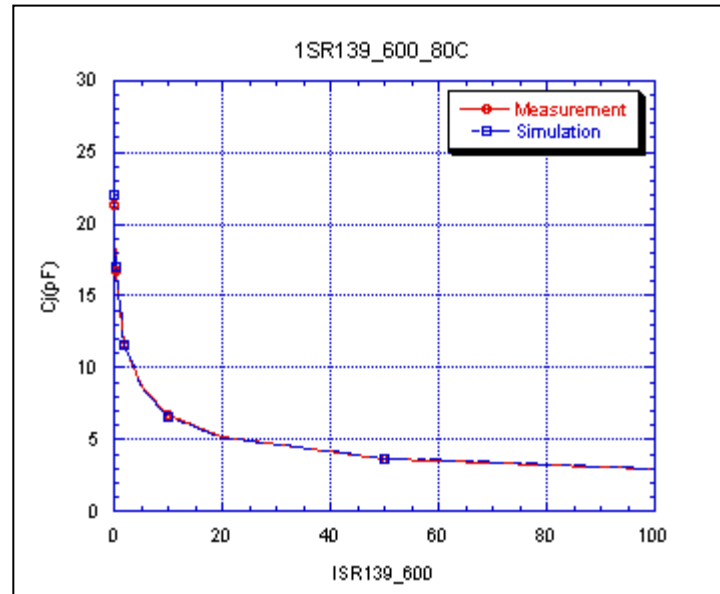


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

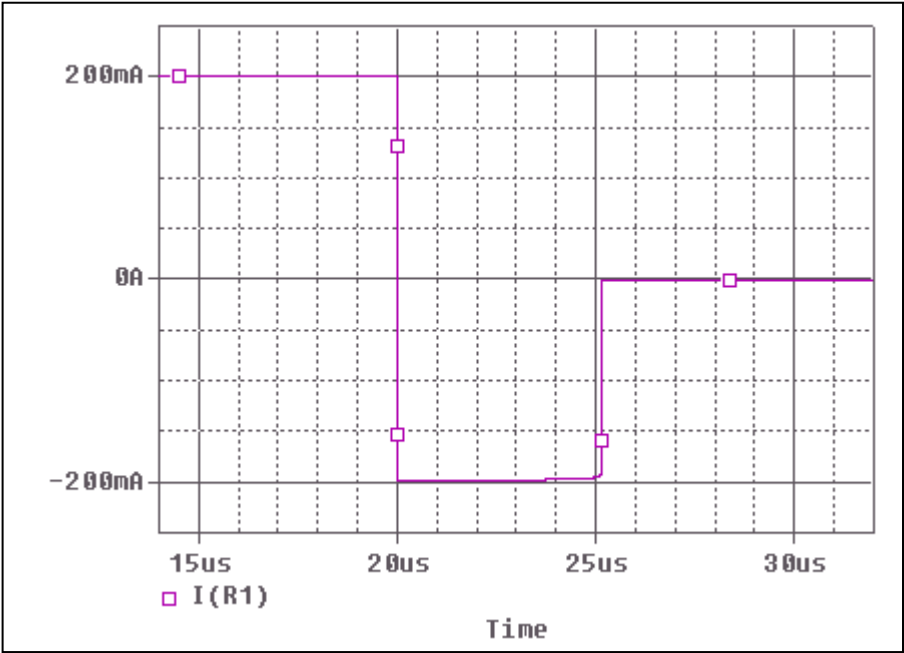


Simulation Result

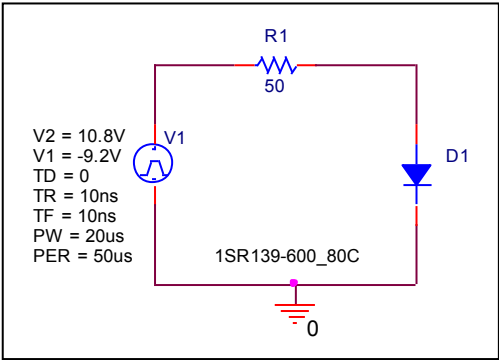
Vrev(V)	Cj(pF) Measurement	Cj(pF) Simulation	%Error
0	23.445	23.445	0.00
0.1	21.279	22.000	-3.39
0.2	19.775	19.924	-0.75
0.5	16.688	16.954	-1.59
1	14.106	14.313	-1.47
2	11.560	11.632	-0.62
5	8.596	8.467	1.50
10	6.727	6.621	1.58
20	5.187	5.101	1.66
50	3.635	3.604	0.85
100	2.778	2.765	0.47

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

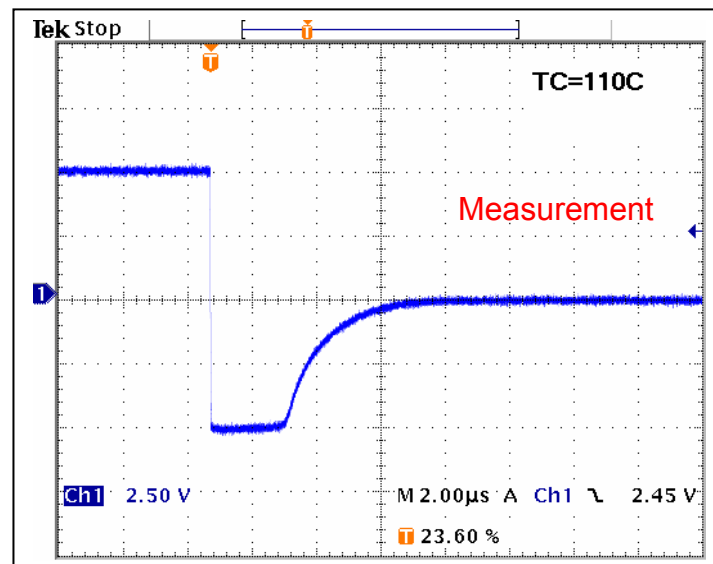


Compare Measurement vs. Simulation

	Measurement		Simulation		%Error
trr	5.12	us	5.11	us	0.195

Reverse Recovery Characteristic

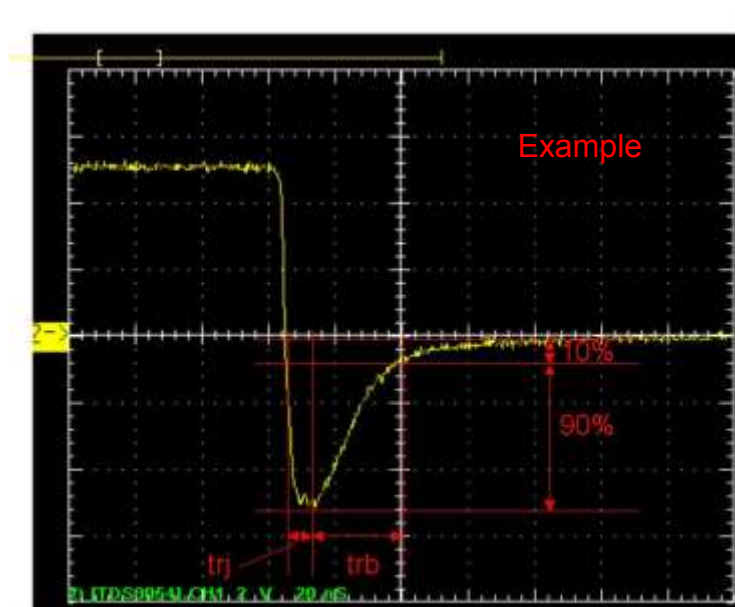
Reference



$T_{rj} = 2.04(\mu s)$

$T_{rb} = 3.08(\mu s)$

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



Relation between t_{rj} and t_{rb}