

Device Modeling Report

COMPONENTS:
DIODE/ GENERAL PURPOSE RECTIFIER / STANDARD
PART NUMBER: 1SR139-600
MANUFACTURER: ROHM
REMARK: TC=110C

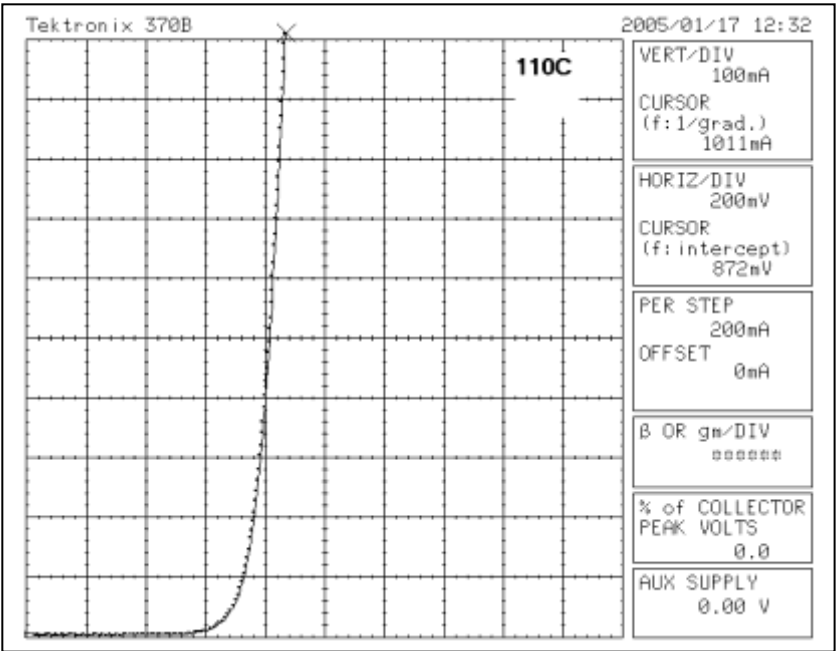


Bee Technologies Inc.

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

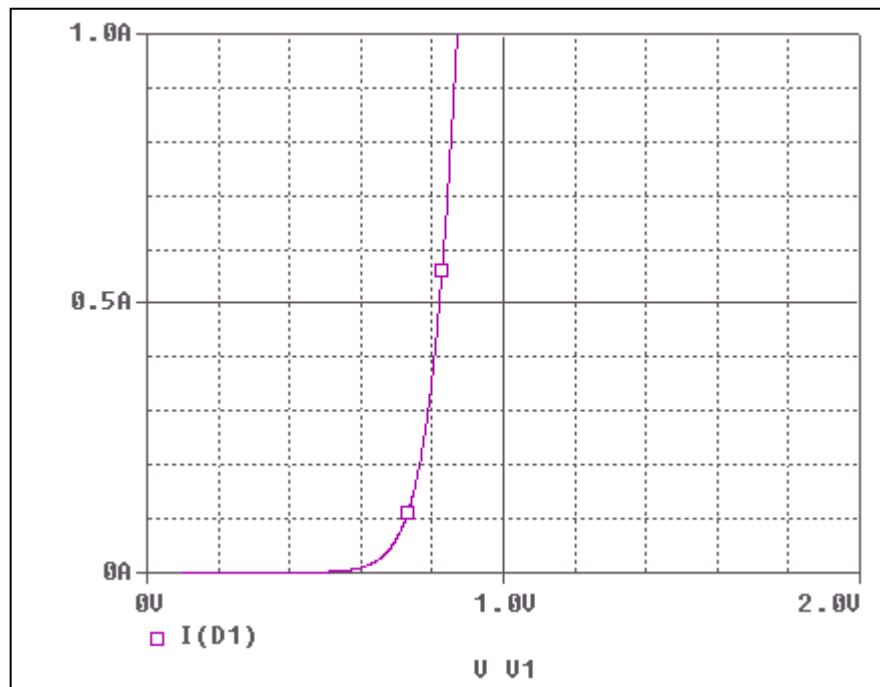
Forward Current Characteristic

Reference

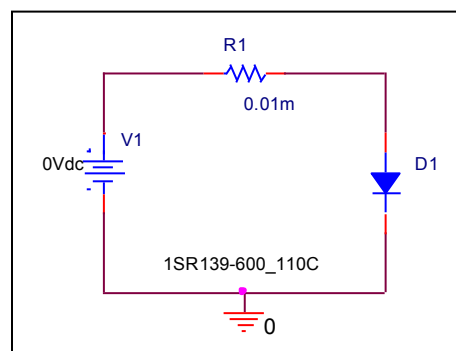


Forward Current Characteristic

Circuit Simulation Result

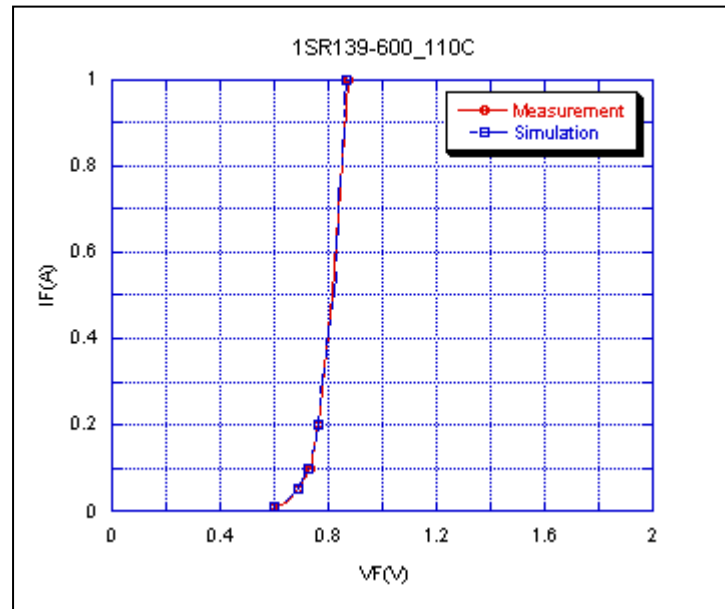


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

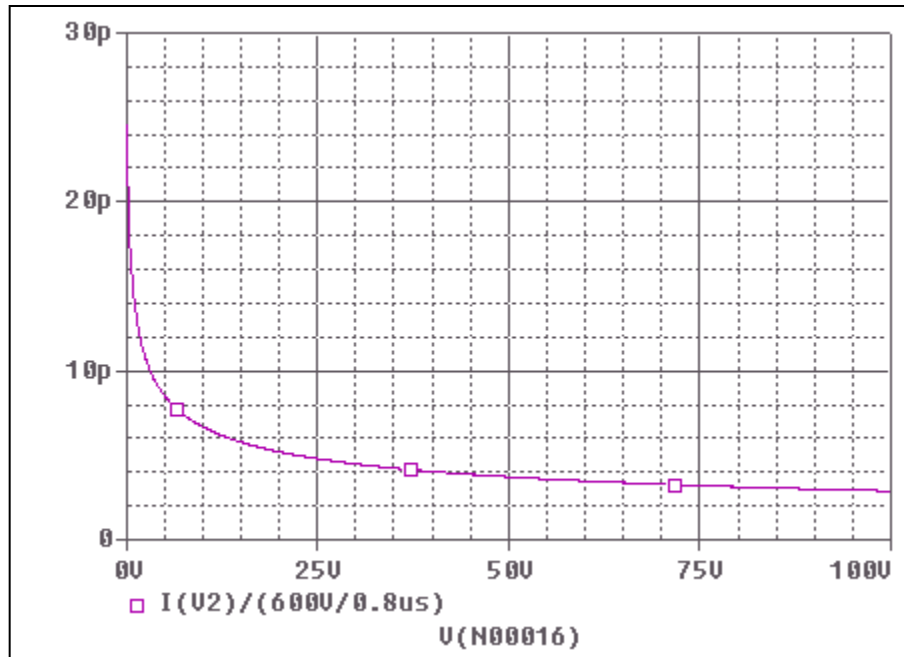


Simulation Result

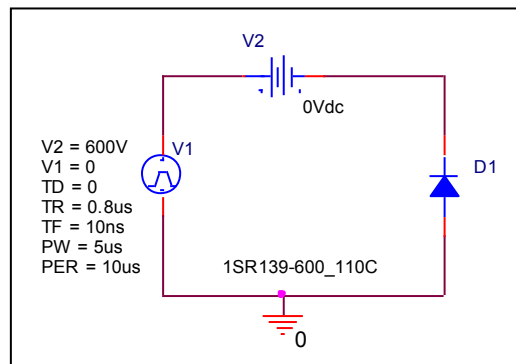
Ifwd(A)	Vfwd(V) Measurement	Vfwd(V) Simulation	%Error
0.01	0.598	0.602	-0.67
0.02	0.642	0.638	0.62
0.05	0.688	0.687	0.15
0.1	0.730	0.725	0.68
0.2	0.762	0.764	-0.26
0.5	0.816	0.820	-0.49
1	0.872	0.870	0.23

Capacitance Characteristic

Circuit Simulation Result

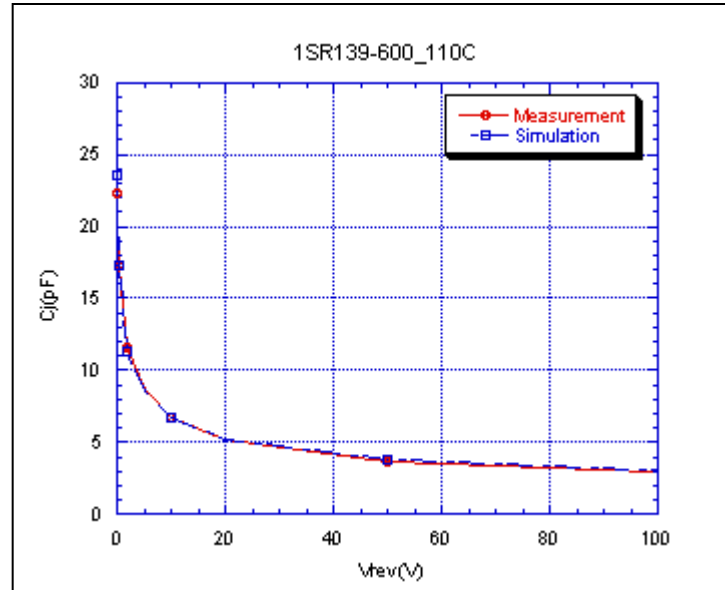


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

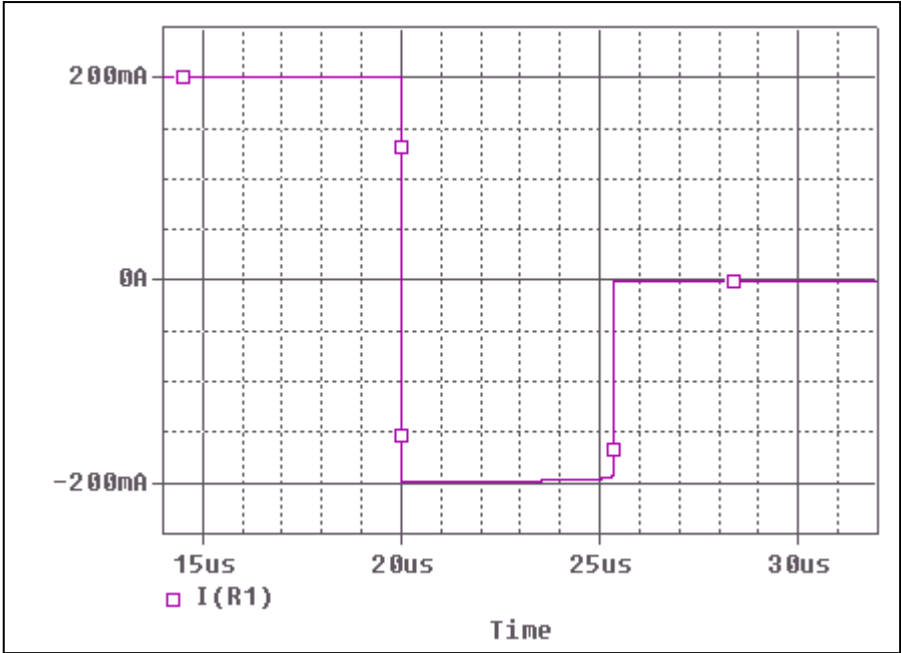


Simulation Result

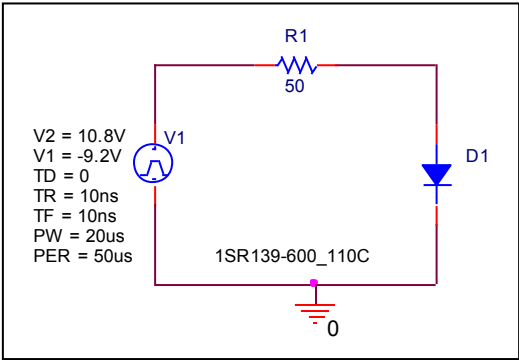
$V_{\text{rev}}(\text{V})$	$C_j(\text{pF})$ Measurement	$C_j(\text{pF})$ Simulation	%Error
0	25.052	25.052	0.00
0.1	22.307	23.500	-5.35
0.2	20.545	20.940	-1.92
0.5	17.305	17.240	0.38
1	14.307	14.440	-0.93
2	11.644	11.367	2.38
5	8.654	8.542	1.29
10	6.749	6.676	1.08
20	5.200	5.203	-0.06
50	3.644	3.721	-2.11
100	2.782	2.880	-3.52

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

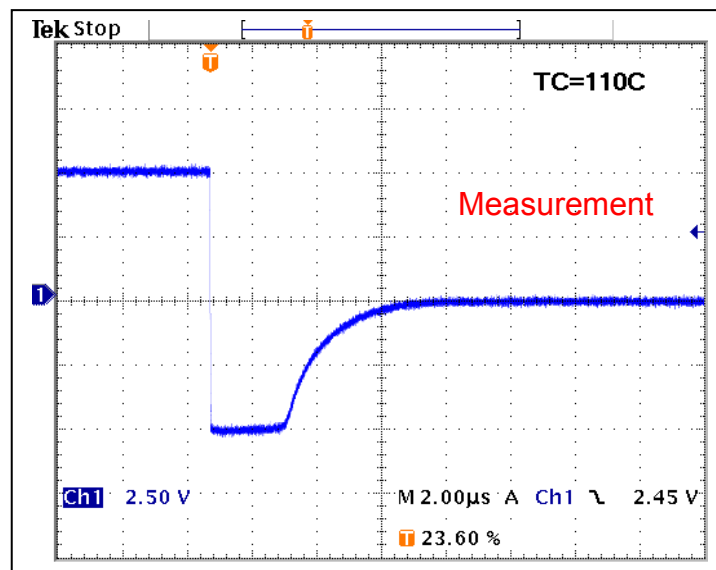


Compare Measurement vs. Simulation

	Measurement		Simulation		%Error
trr	5.32	us	5.322	us	0.03

Reverse Recovery Characteristic

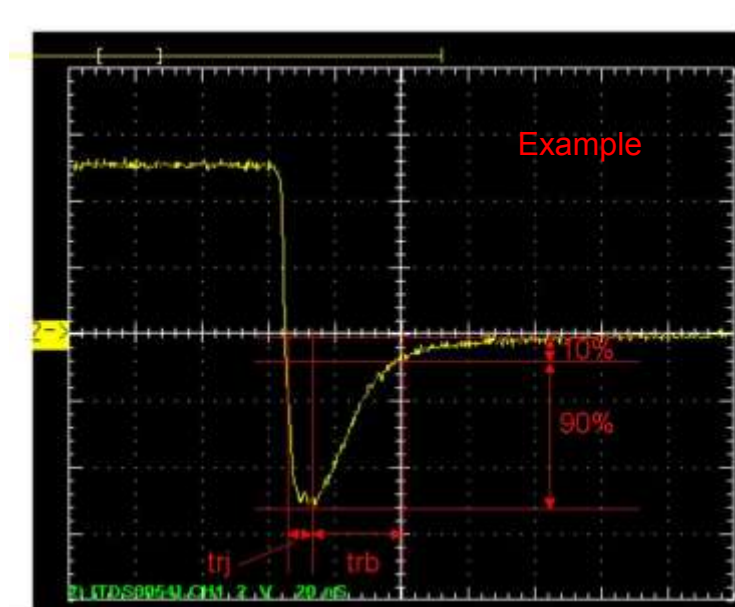
Reference



$T_{rj} = 2.12(\mu s)$

$T_{rb} = 3.20(\mu s)$

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



Relation between t_{rj} and t_{rb}