

Device Modeling Report

COMPONENTS:
DIODE/ GENERAL PURPOSE RECTIFIER / PROFESSIONAL
PART NUMBER: 1SR139-600
MANUFACTURER: ROHM
REMARK: TC=25C

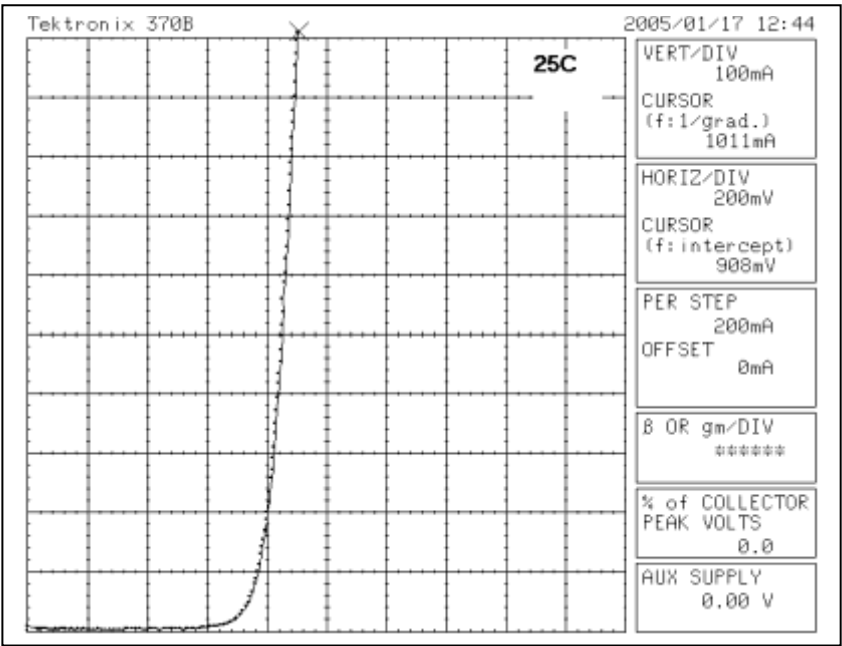


Bee Technologies Inc.

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

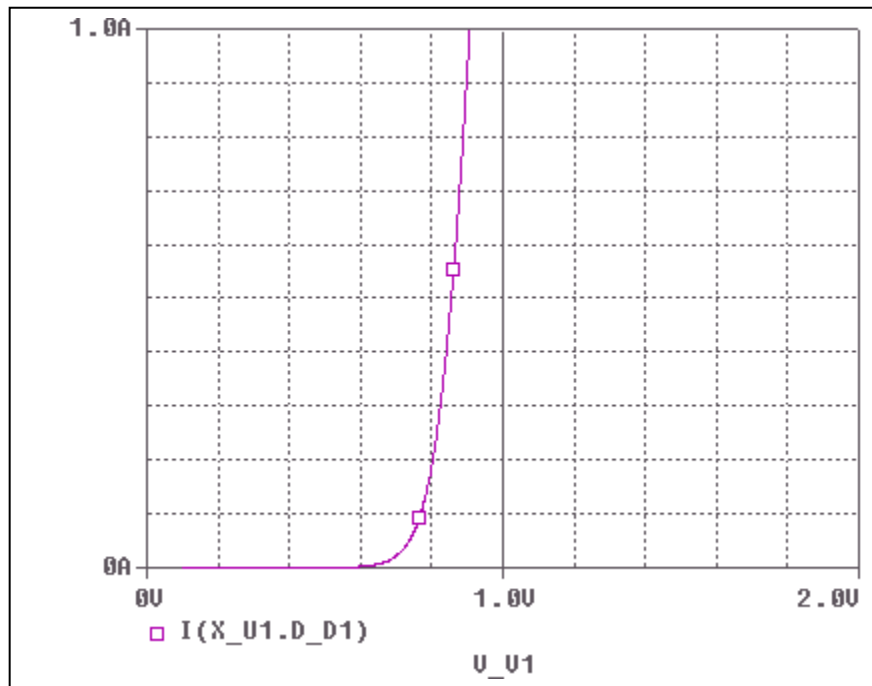
Forward Current Characteristic

Reference

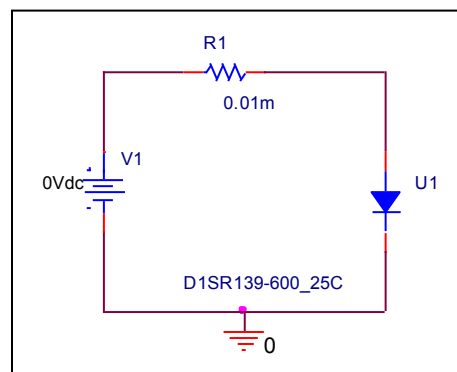


Forward Current Characteristic

Circuit Simulation Result

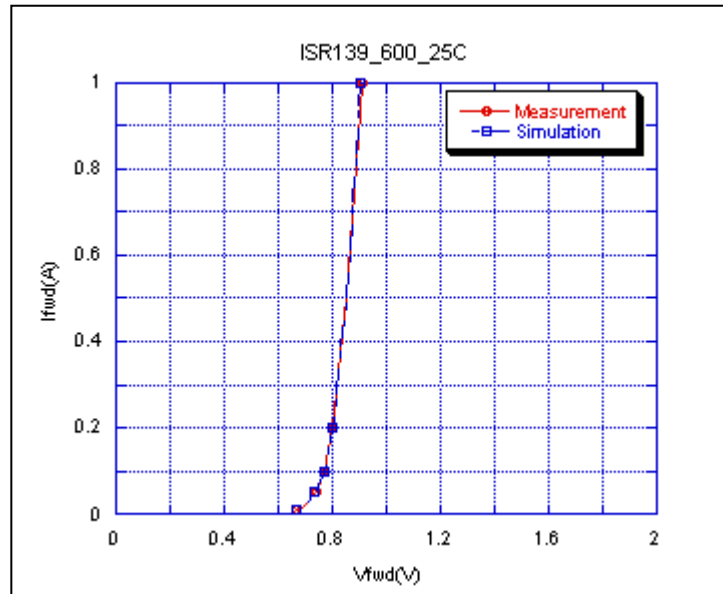


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

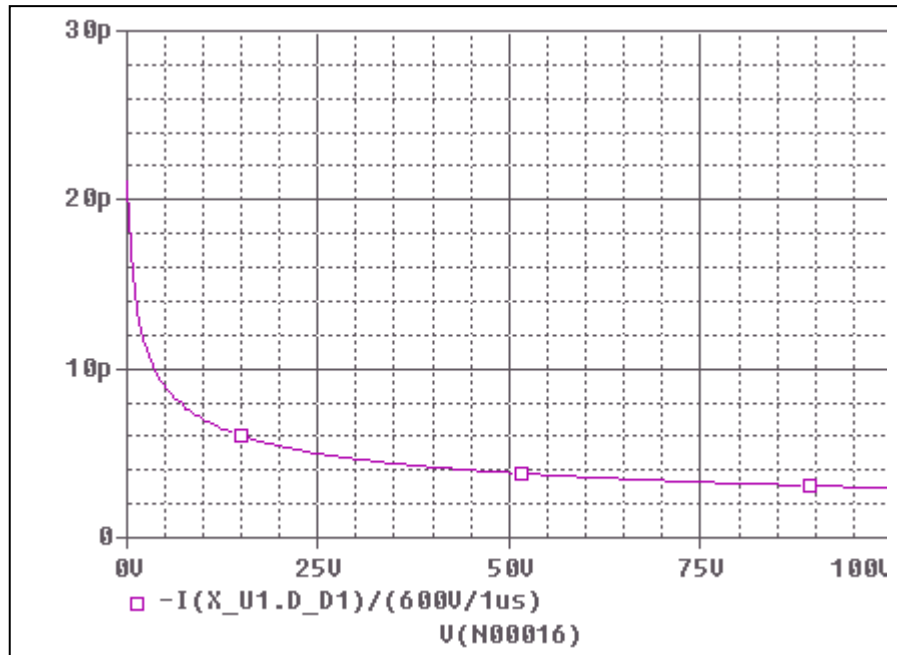


Simulation Result

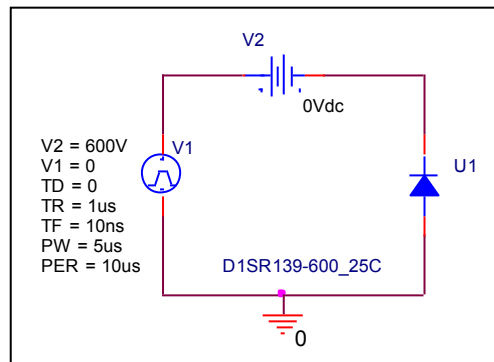
I_{fwd} (A)	V_{fwd} (V) Measurement	V_{fwd} (V) Simulation	%Error
0.01	0.665	0.666	-0.15
0.02	0.696	0.696	0.00
0.05	0.740	0.736	0.54
0.1	0.770	0.768	0.26
0.2	0.802	0.802	0.00
0.5	0.852	0.855	-0.35
1	0.908	0.906	0.22

Capacitance Characteristic

Circuit Simulation Result

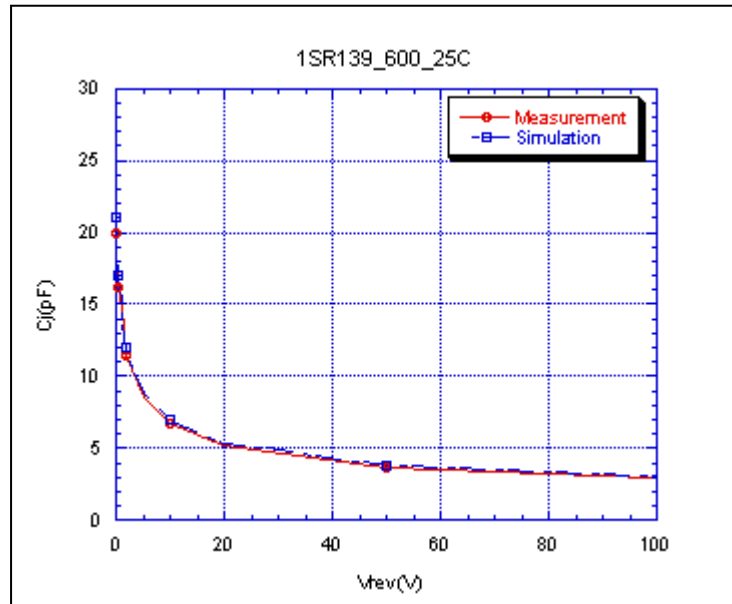


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

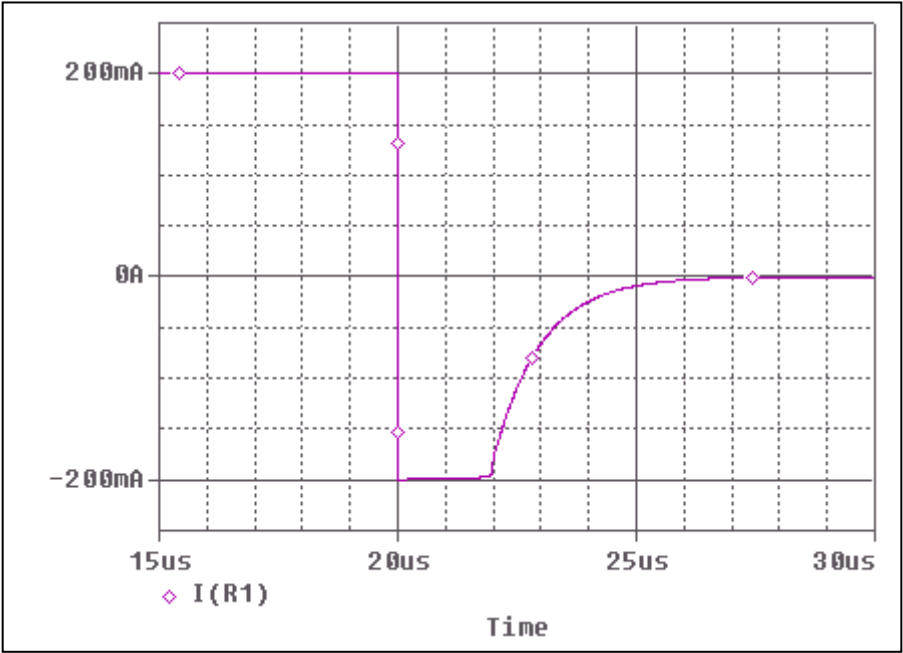


Simulation Result

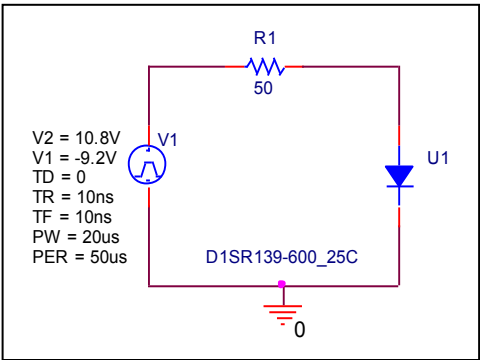
$V_{\text{rev}}(\text{V})$	$C_j(\text{pF})$ Measurement	$C_j(\text{pF})$ Simulation	%Error
0	21.847	21.847	0.00
0.1	19.950	21.000	-5.26
0.2	18.746	19.154	-2.18
0.5	16.163	17.050	-5.49
1	14.830	14.812	0.12
2	11.433	12.000	-4.96
5	8.559	8.782	-2.61
10	6.710	7.000	-4.32
20	5.186	5.249	-1.21
50	3.642	3.850	-5.71
100	2.786	2.900	-4.09

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

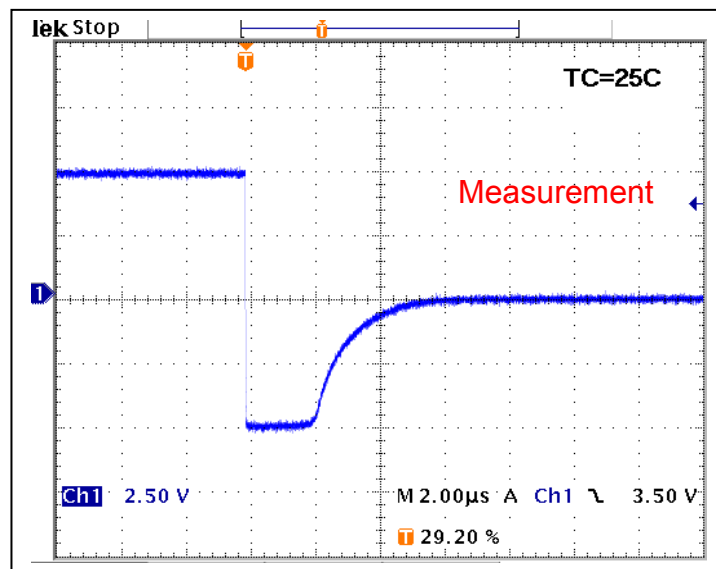


Compare Measurement vs. Simulation

	Measurement		Simulation		%Error
trj	1.96	us	1.956	us	0.204
trb	2.20	us	2.22	us	0.909

Reverse Recovery Characteristic

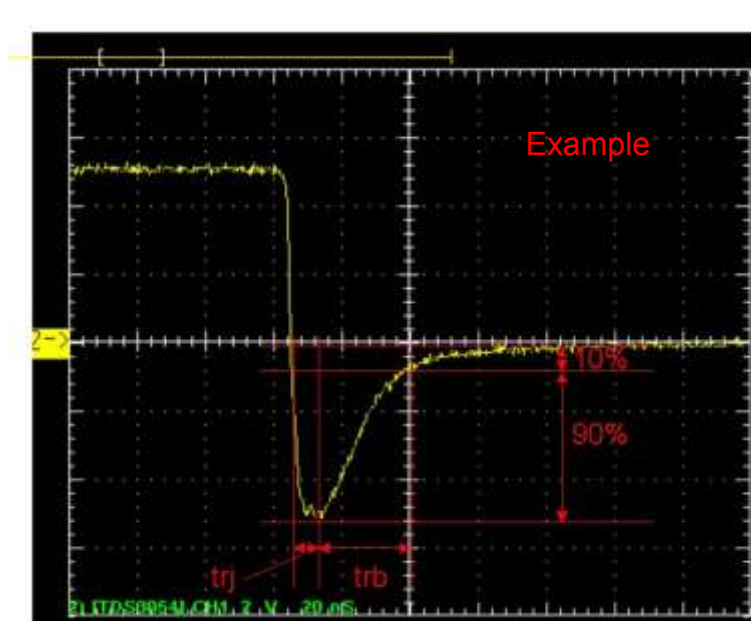
Reference



$T_{rj} = 1.96(\mu s)$

$T_{rb} = 2.20(\mu s)$

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



Relation between t_{rj} and t_{rb}