

Device Modeling Report

COMPONENTS:

DIODE/ GENERAL PURPOSE RECTIFIER / PROFESSIONAL

PART NUMBER: 1SR139-600

MANUFACTURER: ROHM

REMARK: TC=150C

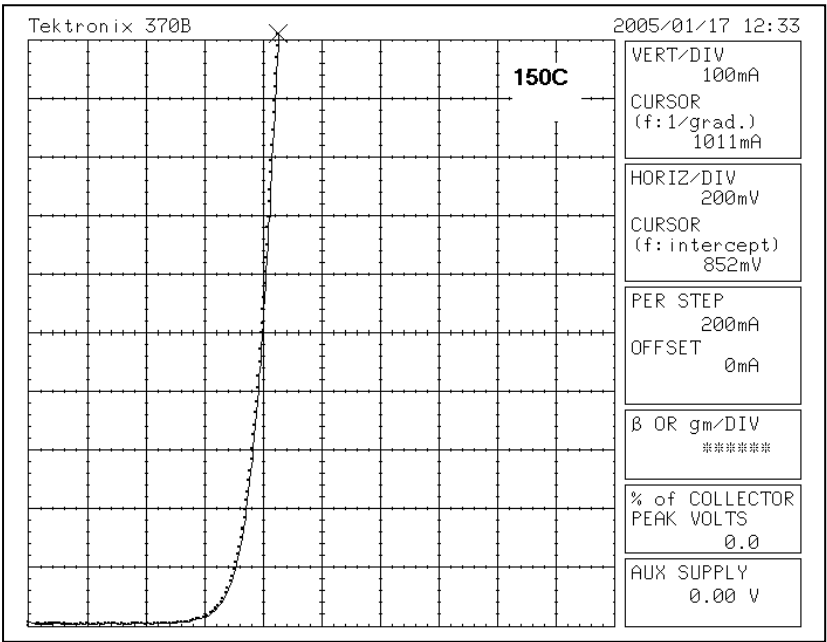


Bee Technologies Inc.

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

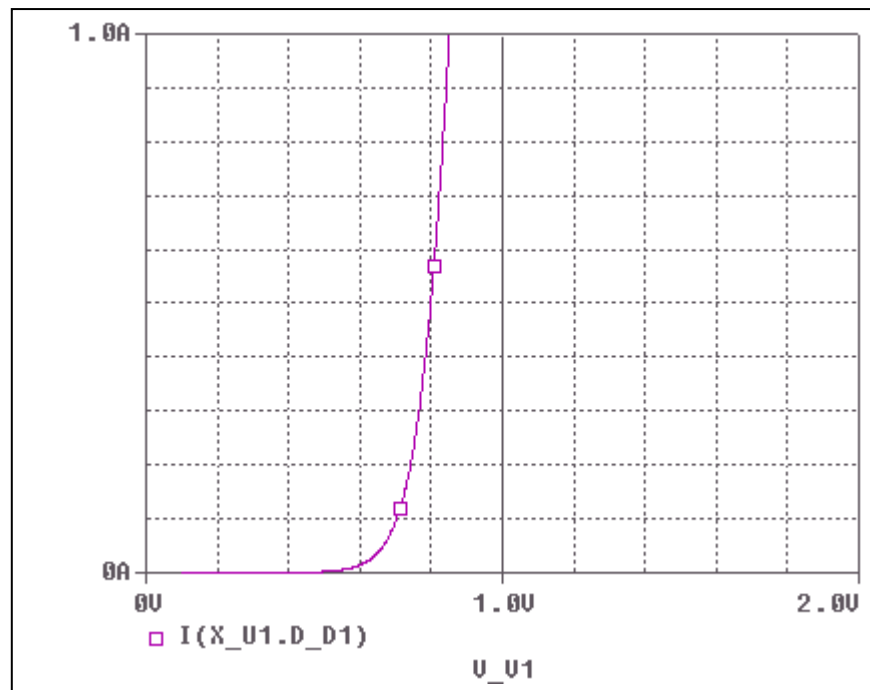
Forward Current Characteristic

Reference

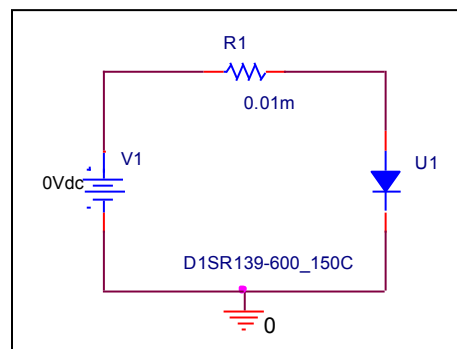


Forward Current Characteristic

Circuit Simulation Result

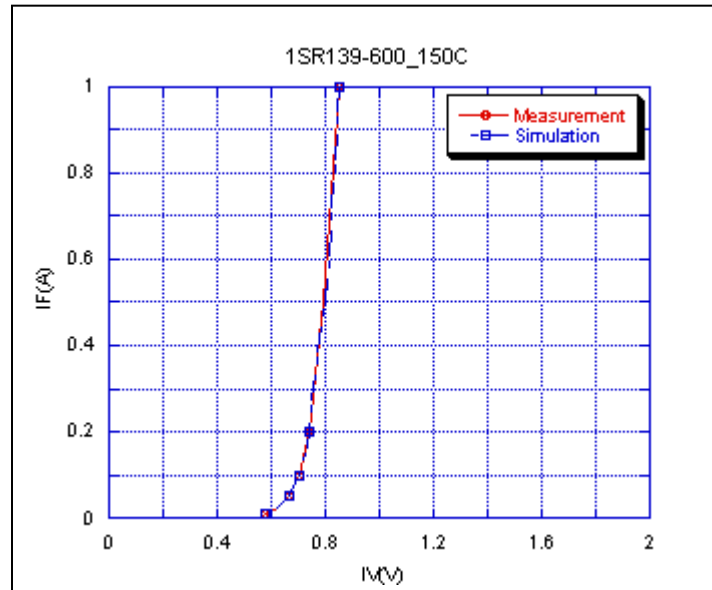


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

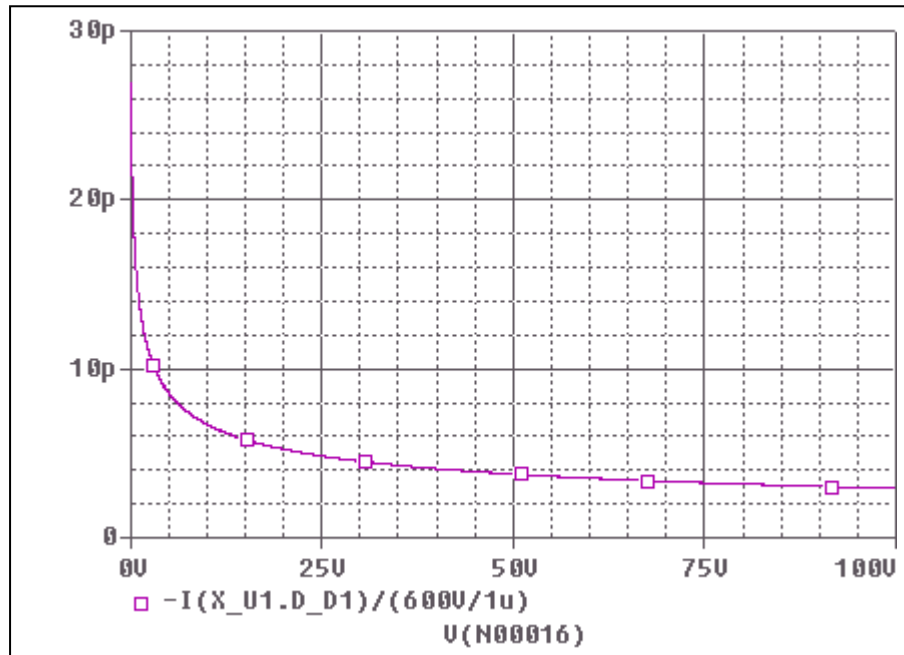


Simulation Result

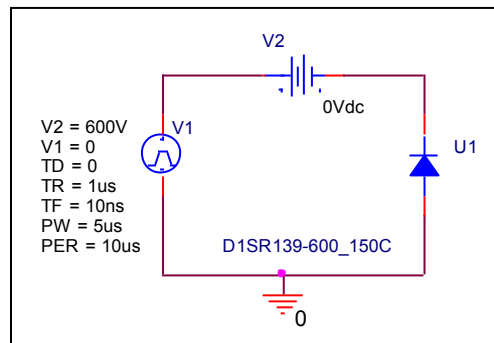
Ifwd(A)	Vfwd(V) Measurement	Vfwd(V) Simulation	%Error
0.01	0.580	0.581	-0.17
0.02	0.618	0.617	0.16
0.05	0.666	0.665	0.15
0.1	0.704	0.702	0.28
0.2	0.742	0.741	0.13
0.5	0.796	0.798	-0.25
1	0.852	0.850	0.23

Capacitance Characteristic

Circuit Simulation Result

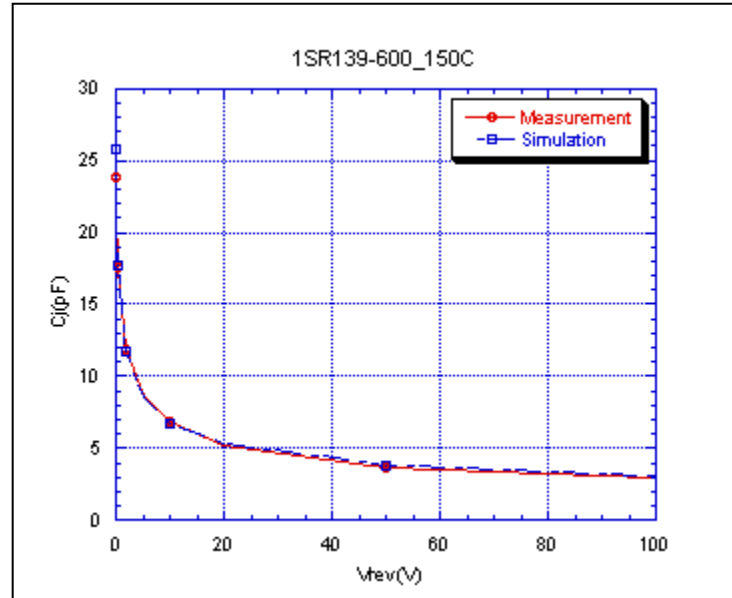


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

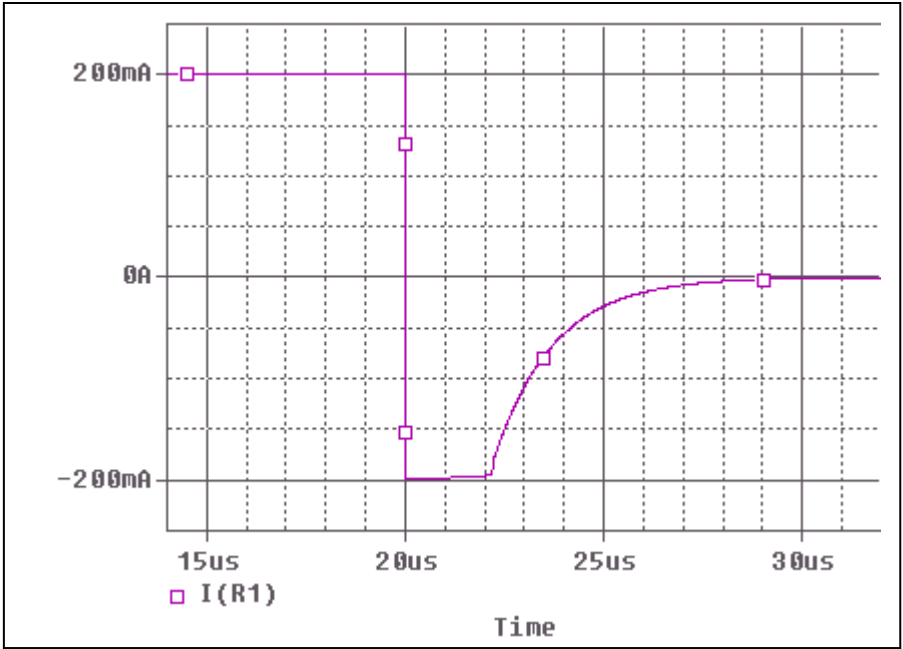


Simulation Result

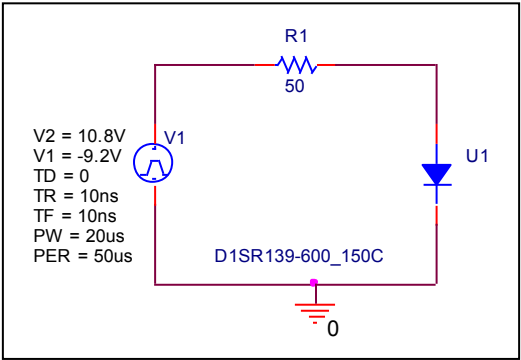
$V_{rev}(\text{V})$	$C_j(\text{pF})$ Measurement	$C_j(\text{pF})$ Simulation	%Error
0	27.677	27.667	0.04
0.1	23.859	25.710	-7.76
0.2	21.619	22.000	-1.76
0.5	17.613	17.700	-0.49
1	14.625	14.576	0.34
2	11.799	11.710	0.75
5	8.698	8.568	1.49
10	6.777	6.721	0.83
20	5.216	5.293	-1.48
50	3.652	3.770	-3.23
100	2.788	2.900	-4.02

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

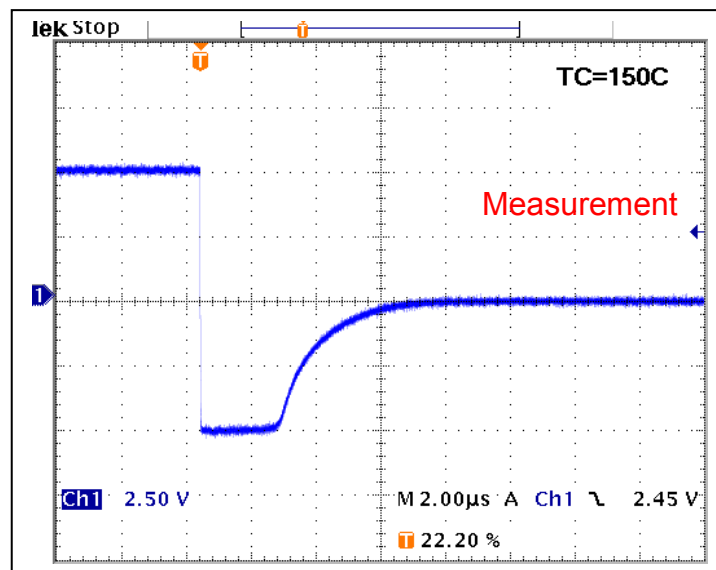


Compare Measurement vs. Simulation

	Measurement		Simulation		%Error
trj	2.16	us	2.159	us	0.04
trb	3.36	us	3.369	us	0.26

Reverse Recovery Characteristic

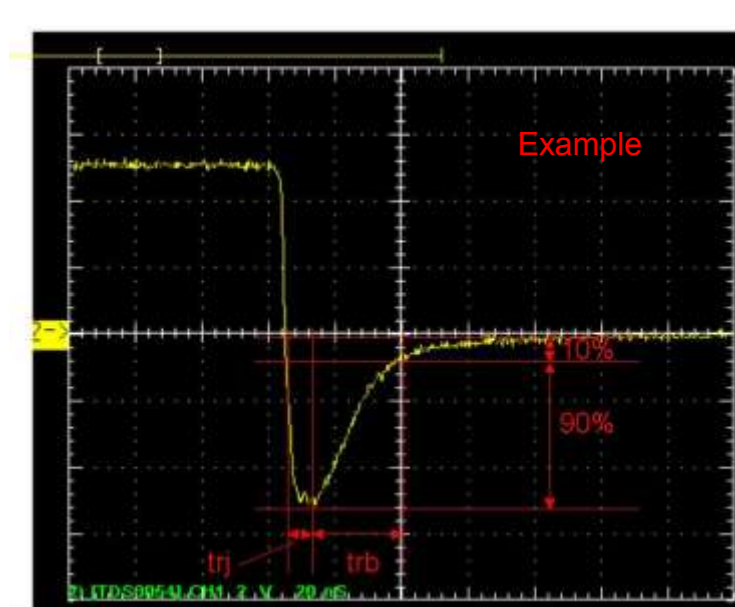
Reference



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

$T_{rb} = 3.36(\mu s)$

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



Relation between t_{rj} and t_{rb}