

Device Modeling Report

COMPONENTS:
DIODE/ GENERAL PURPOSE RECTIFIER / PROFESSIONAL
PART NUMBER: 1SR139-400
MANUFACTURER: ROHM
REMARK: TC=25C

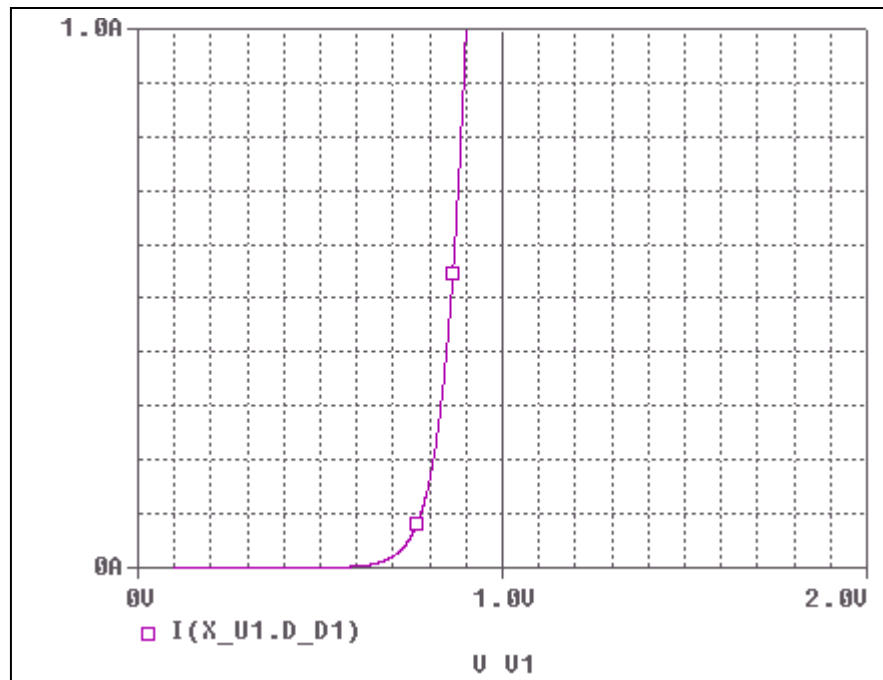


Bee Technologies Inc.

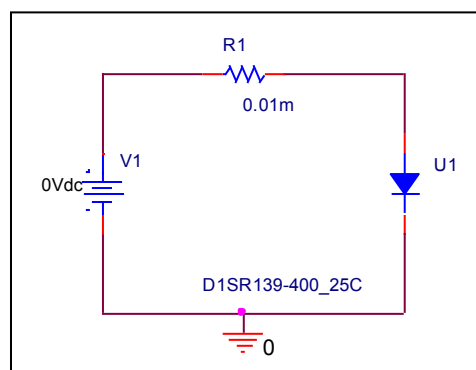
PSpice model parameter	Model description
IS	Saturation Current
N	Emission Coefficient
RS	Series Resistance
IKF	High-injection Knee Current
CJO	Zero-bias Junction Capacitance
M	Junction Grading Coefficient
VJ	Junction Potential
ISR	Recombination Current Saturation Value
BV	Reverse Breakdown Voltage(a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

Forward Current Characteristic

Circuit Simulation Result

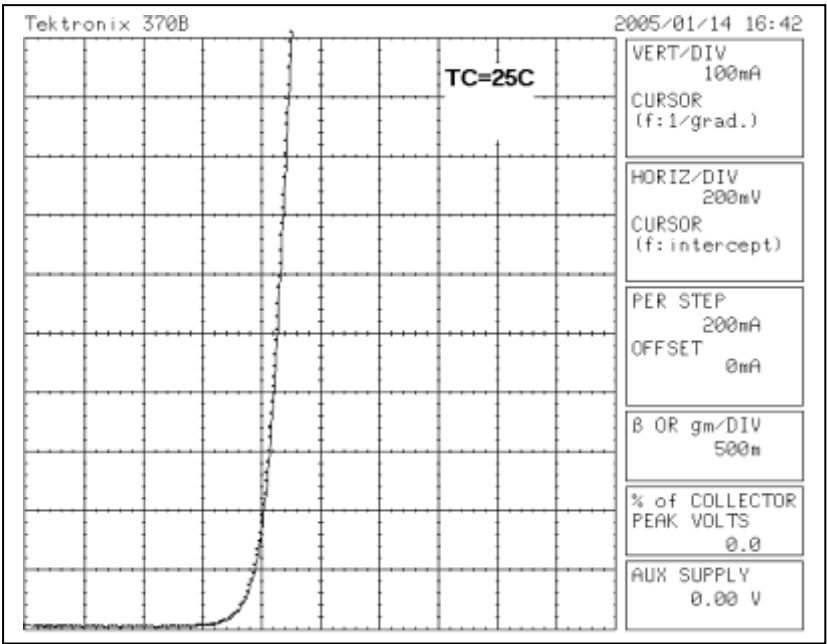


Evaluation Circuit



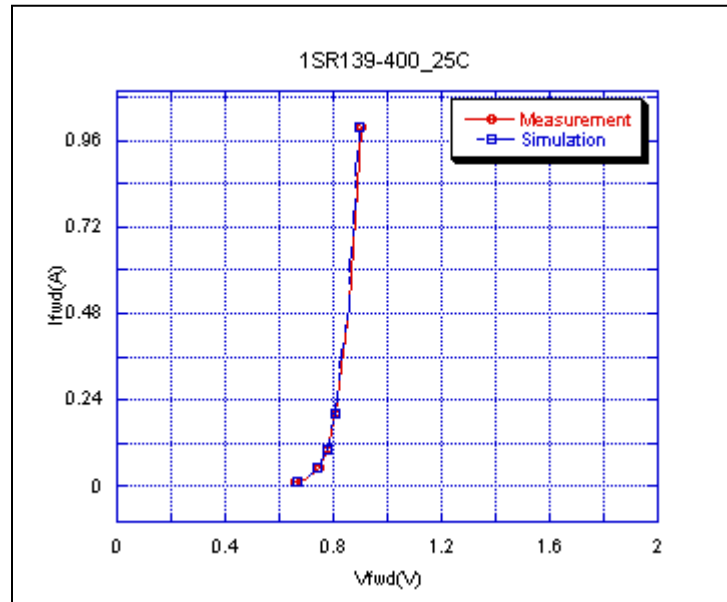
Forward Current Characteristic

Reference



Comparison Graph

Circuit Simulation Result

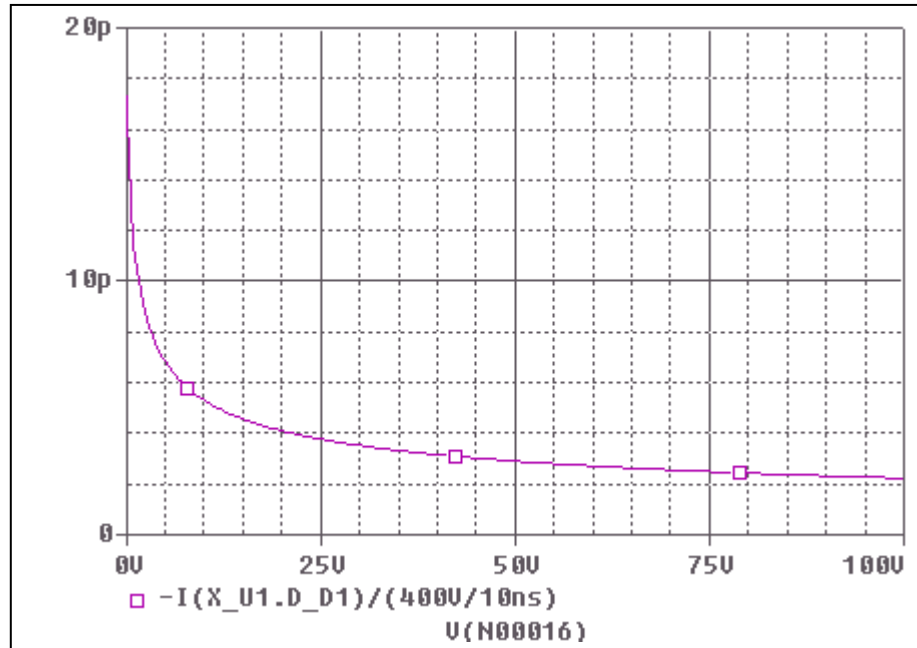


Simulation Result

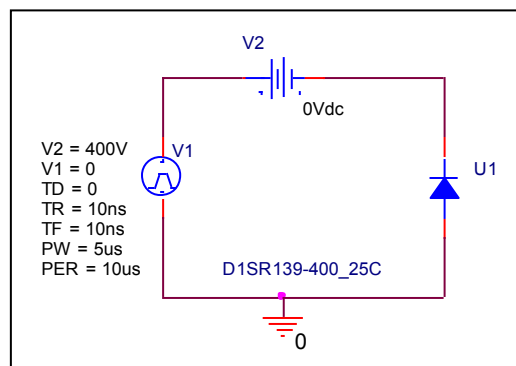
Ifwd(A)	Vfwd(V) Measurement	Vfwd(V) Simulation	%Error
0.01	0.660	0.664	-0.61
0.02	0.698	0.697	0.14
0.05	0.750	0.741	1.20
0.1	0.776	0.775	0.13
0.2	0.806	0.810	-0.50
0.5	0.856	0.858	-0.23
1	0.902	0.900	0.22

Capacitance Characteristic

Circuit Simulation Result

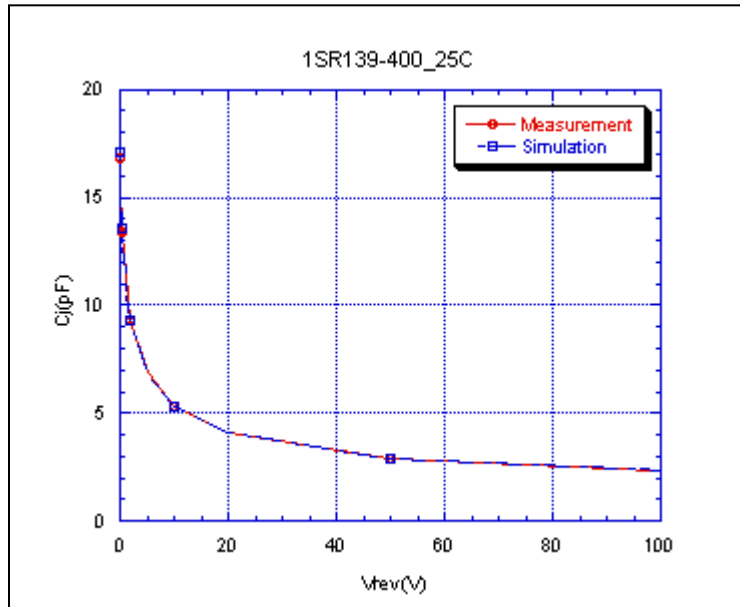


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

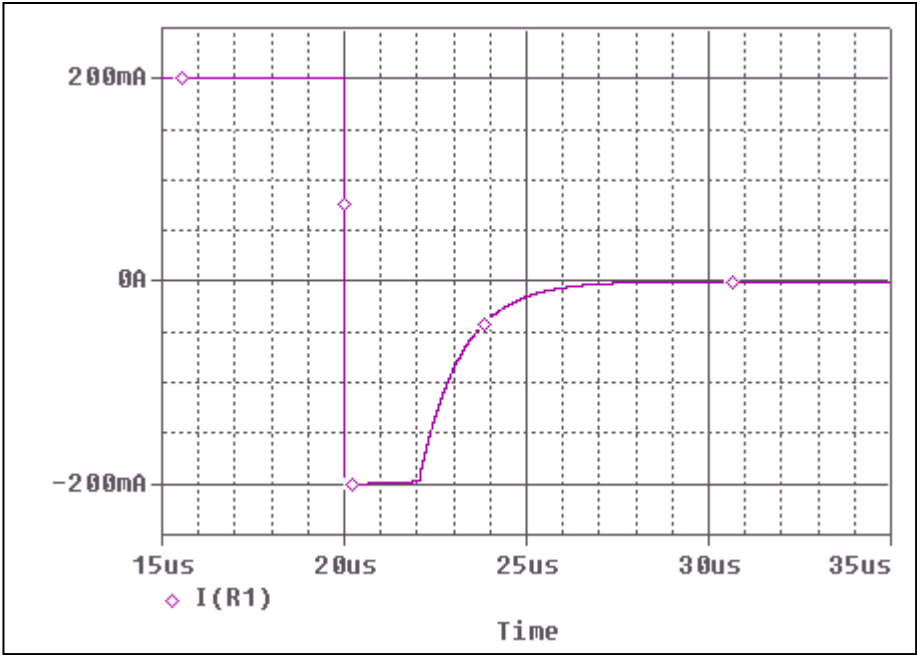


Simulation Result

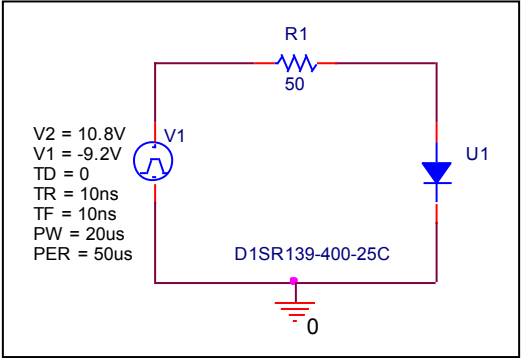
$V_{rev}(\text{V})$	$C_j(\text{pF})$ Measurement	$C_j(\text{pF})$ Simulation	%Error
0	18.214	18.214	0.00
0.1	16.790	17.134	-2.05
0.2	15.729	15.929	-1.27
0.5	13.413	13.557	-1.07
1	11.402	11.438	-0.32
2	9.321	9.325	-0.04
5	6.880	6.829	0.74
10	5.336	5.314	0.41
20	4.091	4.109	-0.44
50	2.870	2.910	-1.39
100	2.224	2.233	-0.40

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

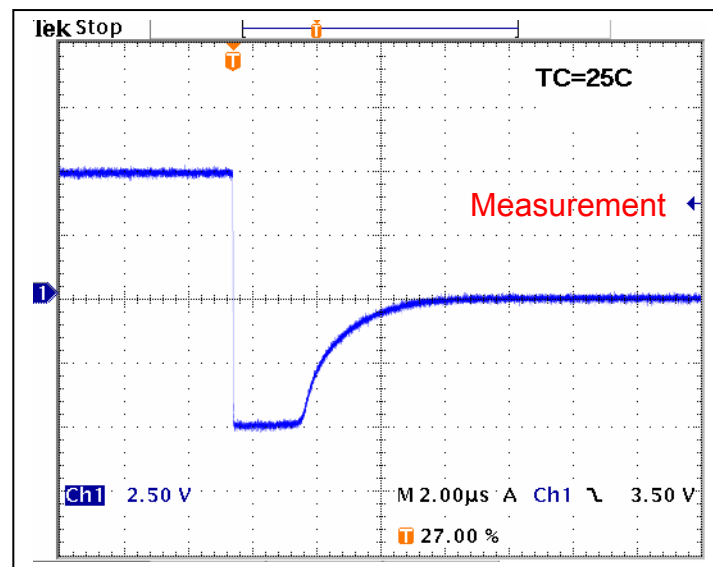


Compare Measurement vs. Simulation

	Measurement		Simulation		%Error
trj	2.04	us	2.07	us	1.47
trb	2.52	us	2.54	us	0.79

Reverse Recovery Characteristic

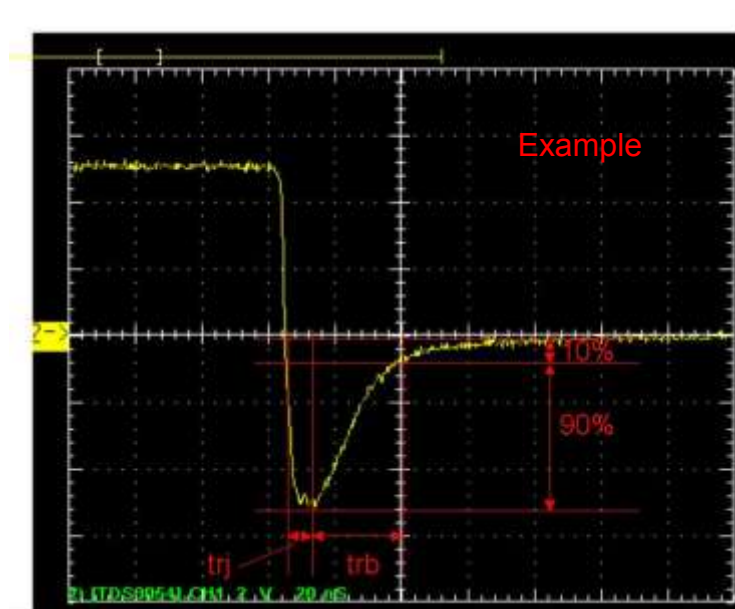
Reference



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

$T_{rb} = 2.52(\mu s)$

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



Relation between t_{rj} and t_{rb}