

Device Modeling Report

COMPONENTS:
DIODE/ GENERAL PURPOSE RECTIFIER/STANDARD
PART NUMBER: 1R5GZ41
MANUFACTURER: TOSHIBA
REMARK: TC=25C



Bee Technologies Inc.

SPICE MODEL

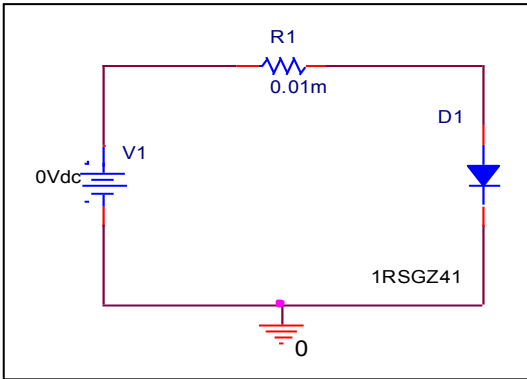
PSpice model parameter	Model description
IS	Saturation Current
N	Emission Coefficient
RS	Series Resistance
IKF	High-injection Knee Current
CJO	Zero-bias Junction Capacitance
M	Junction Grading Coefficient
VJ	Junction Potential
ISR	Recombination Current Saturation Value
BV	Reverse Breakdown Voltage(a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

Forward Current Characteristic

Circuit Simulation Result

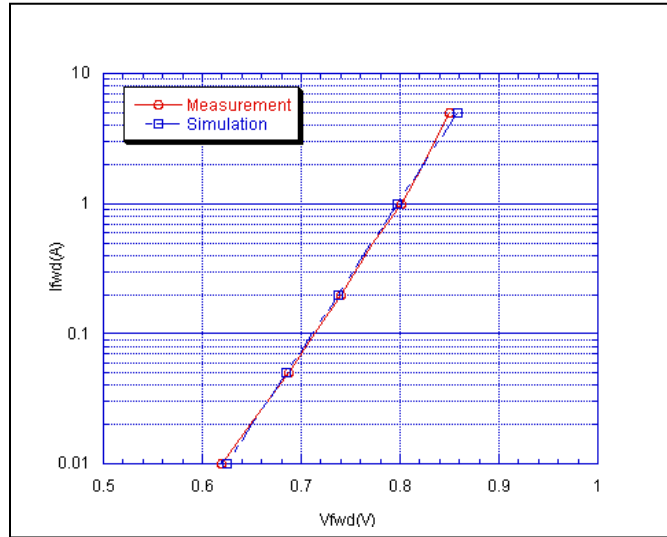


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

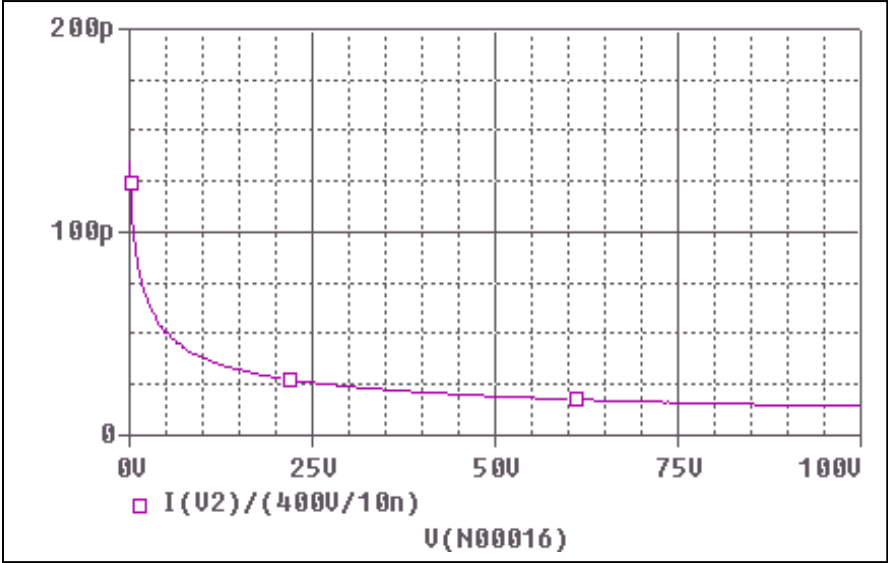


Simulation Result

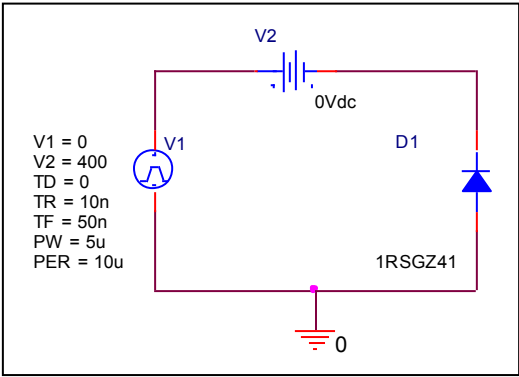
Ifwd(A)	Vfwd(V) Measurement	Vfwd(V) Simulation	%Error
0.01	0.620	0.625	-0.76
0.02	0.648	0.651	-0.42
0.05	0.688	0.685	0.44
0.1	0.714	0.711	0.43
0.2	0.740	0.737	0.42
0.5	0.772	0.771	0.10
1	0.802	0.797	0.60
2	0.824	0.823	0.10
5	0.850	0.858	-0.99

Capacitance Characteristic

Circuit Simulation Result

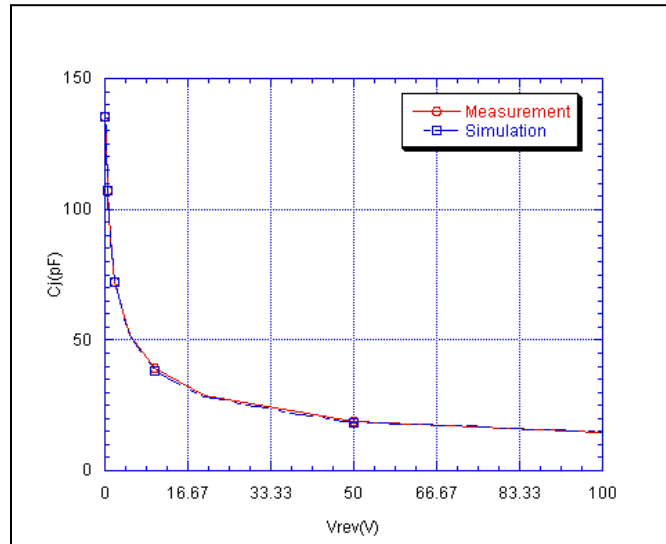


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

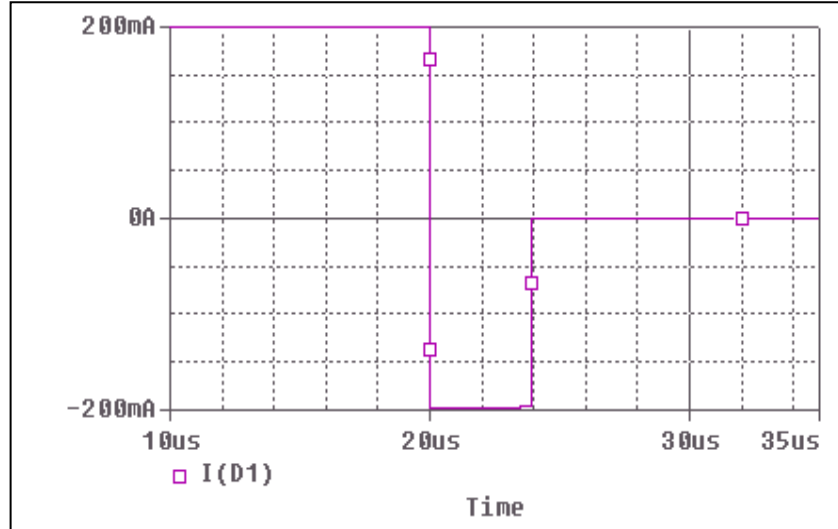


Simulation Result

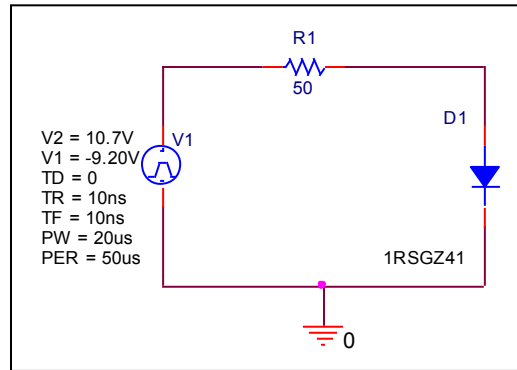
Vrev(V)	Cj(pF) Measurement	Cj(pF) Simulation	%Error
0	145.899	145.899	0.000
0.1	135.250	135.247	0.002
0.2	127.750	127.755	-0.004
0.5	107.210	107.207	0.003
1	89.175	89.147	0.031
2	72.147	72.147	0.000
5	51.744	51.744	0.000
10	39.000	38.416	1.497
20	28.610	28.416	0.678
50	18.891	18.391	2.647
100	13.900	14.265	-2.626

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

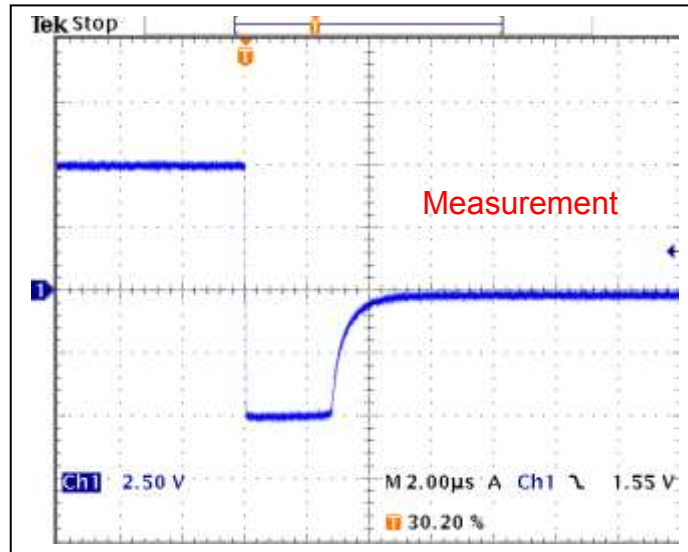


Compare Measurement vs. Simulation

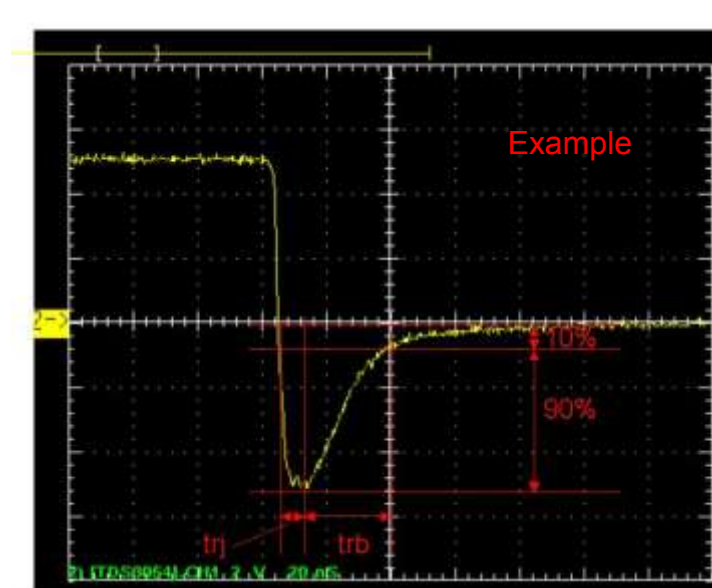
	Measurement		Simulation		%Error
trr	3.96	us	3.90	us	1.38

Reverse Recovery Characteristic

Reference



$T_{rj} = 1.28(\mu s)$
 $T_{rb} = 2.68(\mu s)$
Conditions: $I_{fwd} = I_{rev} = 0.2(A)$, $R_I = 50$



Relation between t_{rj} and t_{rb}