

Device Modeling Report

COMPONENTS:
DIODE/ GENERAL PURPOSE RECTIFIER/ PROFESSIONAL
PART NUMBER: 1SS187
MANUFACTURER: TOSHIBA



Bee Technologies Inc.

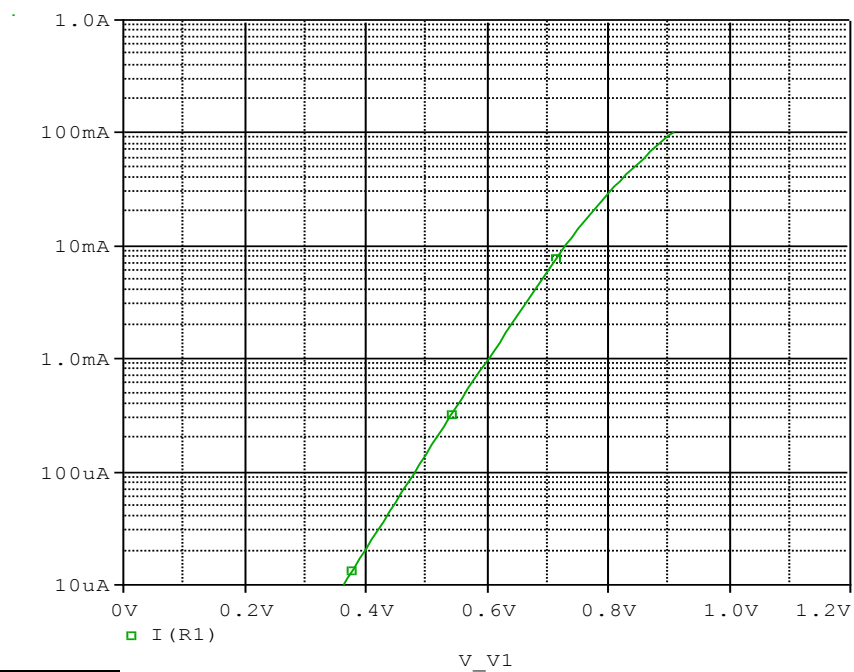
All Rights Reserved Copyright (C) Bee Technologies Inc. 2008

DIODE MODEL PARAMETERS

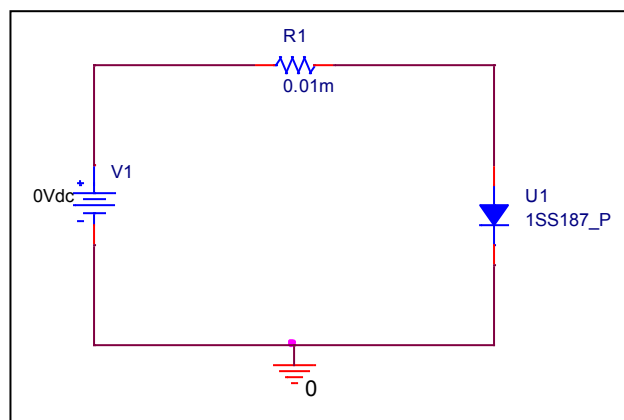
PSpice model parameter	Model description
IS	Saturation Current
N	Emission Coefficient
RS	Series Resistance
IKF	High-injection Knee Current
CJO	Zero-bias Junction Capacitance
M	Junction Grading Coefficient
VJ	Junction Potential
ISR	Recombination Current Saturation Value
BV	Reverse Breakdown Voltage(a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

Forward Current Characteristic

Circuit Simulation Result

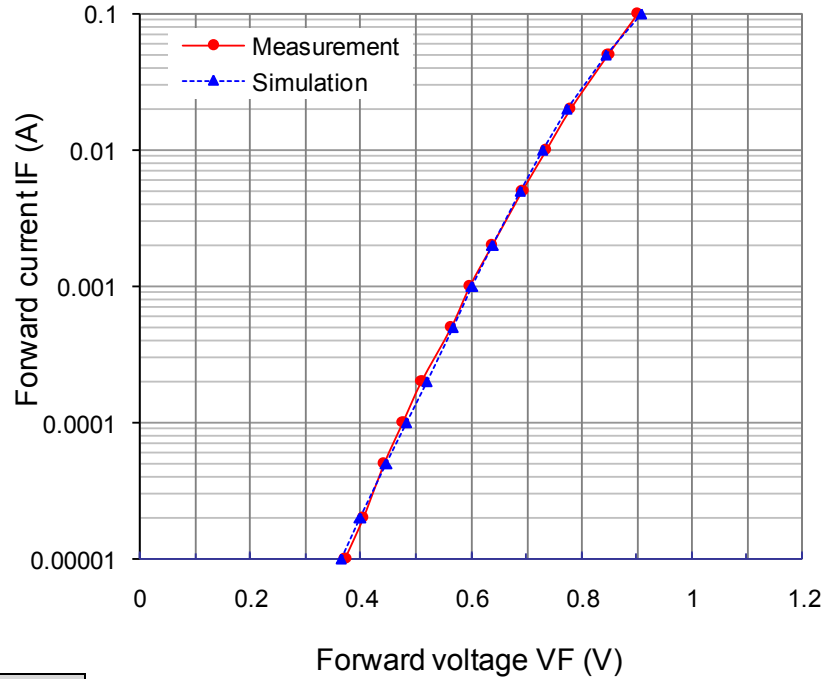


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

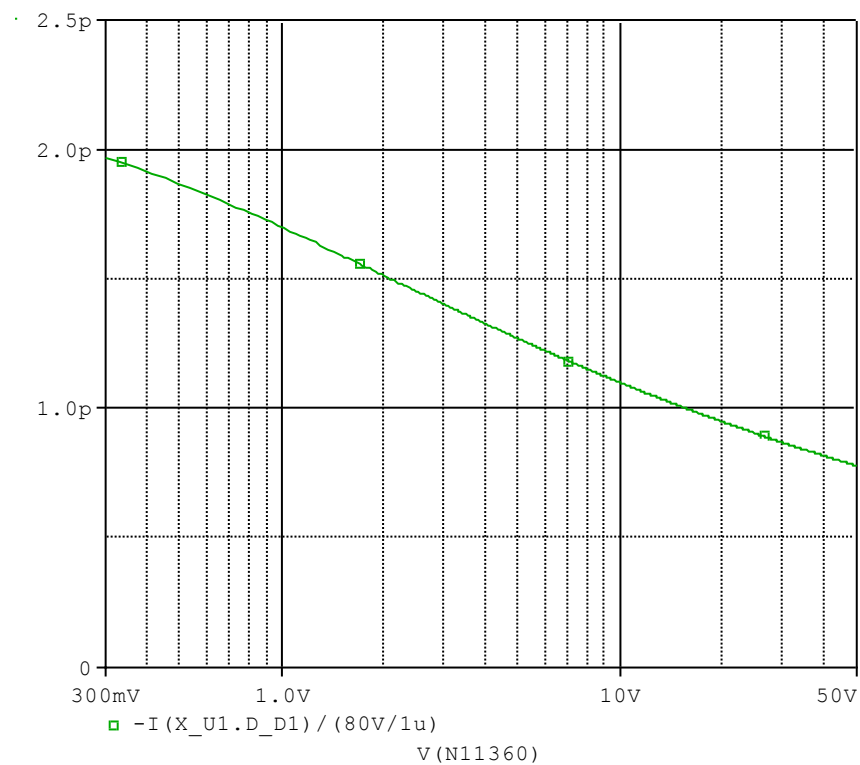


Simulation Result

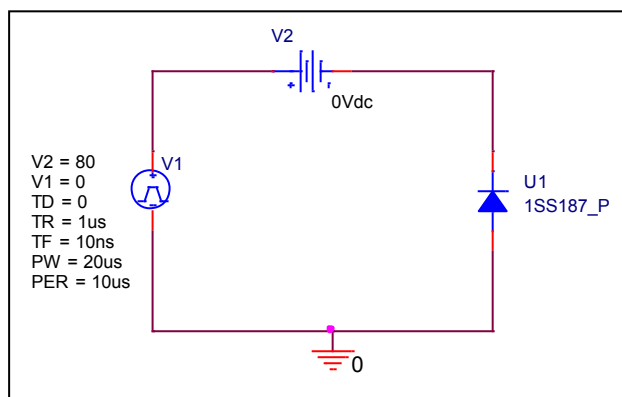
Ifwd (A)	Vfwd (V)		%Error
	Measurement	Simulation	
0.00001	0.372	0.362	-2.57
0.00002	0.403	0.398	-1.15
0.00005	0.442	0.446	0.84
0.0001	0.476	0.482	1.21
0.0002	0.510	0.518	1.51
0.0005	0.563	0.565	0.36
0.001	0.596	0.602	0.97
0.002	0.637	0.639	0.25
0.005	0.693	0.689	-0.62
0.01	0.735	0.729	-0.82
0.02	0.780	0.773	-0.90
0.05	0.848	0.844	-0.52
0.1	0.900	0.907	0.77

Capacitance Characteristic

Circuit Simulation Result

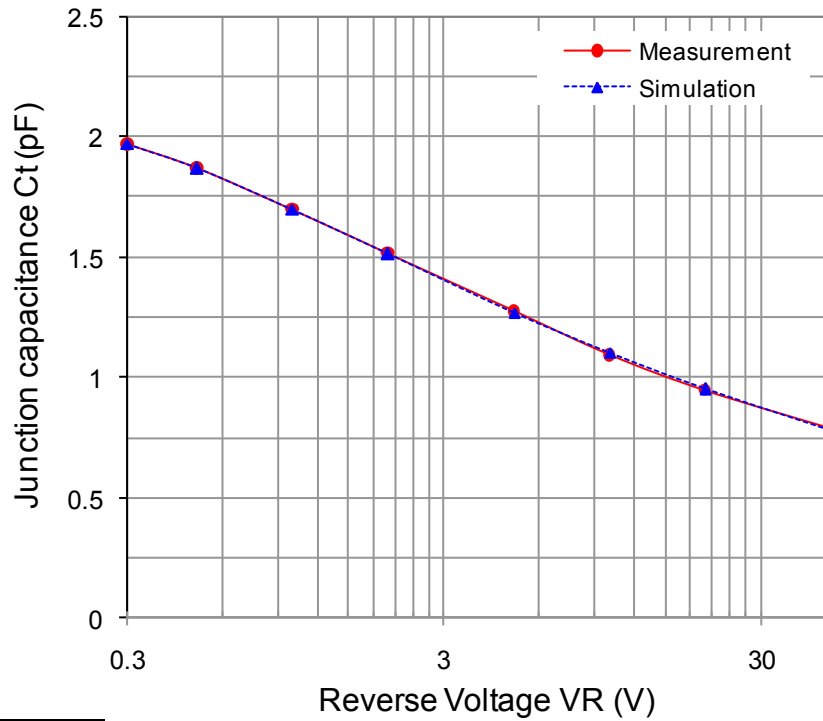


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

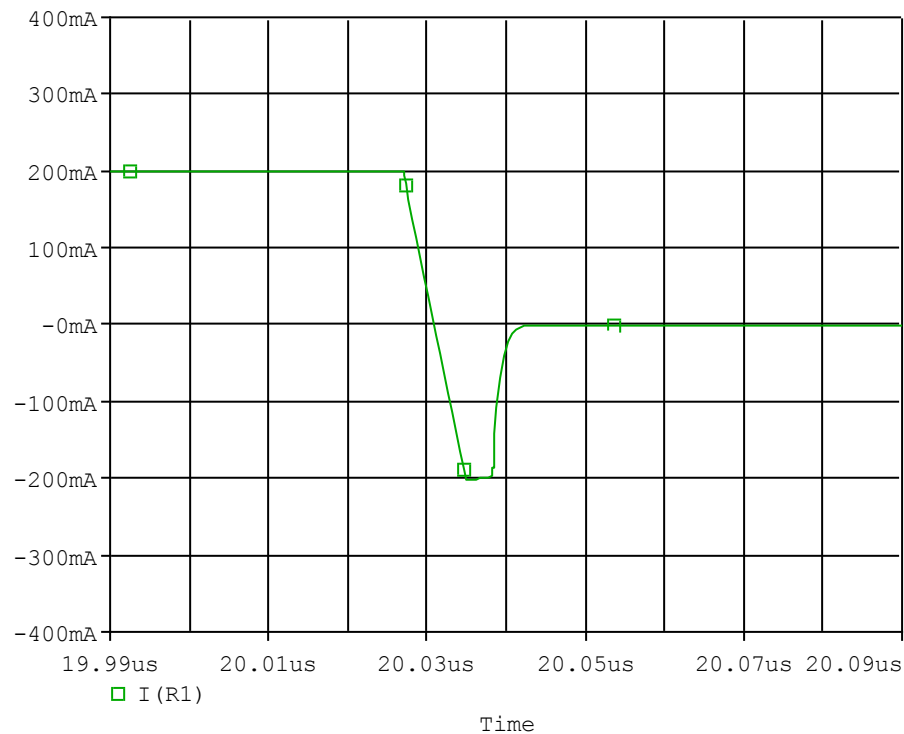


Simulation Result

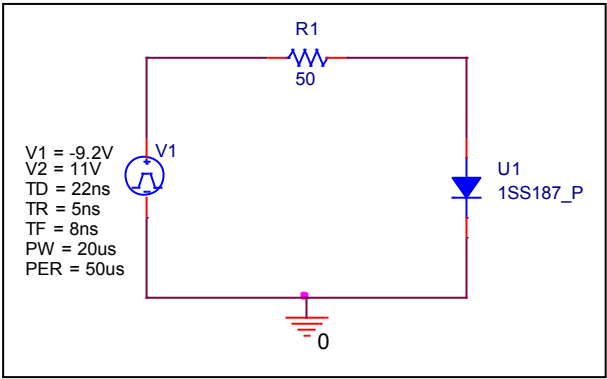
Vrev (V)	Cj (pF)		%Error
	Measurement	Simulation	
0.3	1.967	1.969	0.08
0.5	1.868	1.867	-0.07
1	1.697	1.699	0.11
2	1.518	1.513	-0.36
5	1.271	1.269	-0.19
10	1.089	1.100	0.99
20	0.945	0.949	0.42
50	0.787	0.779	-1.05

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

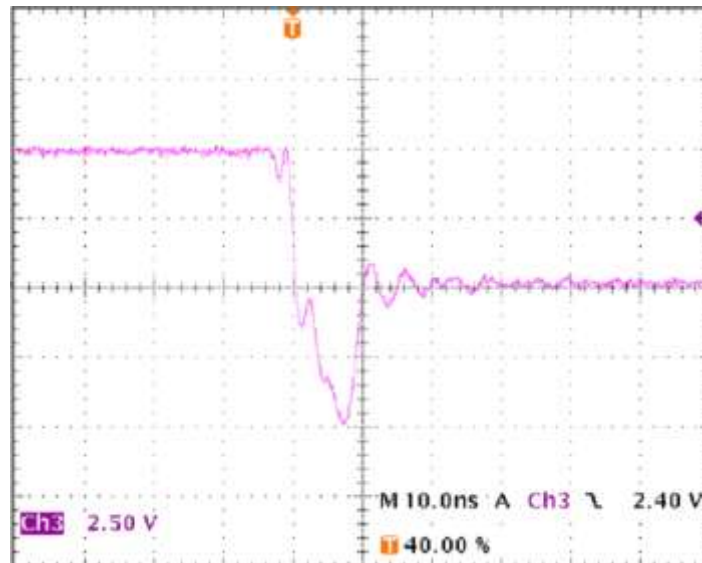


Compare Measurement vs. Simulation

		Measurement	Simulation	%Error
trj	ns	7.00	6.94	-0.86
trb	ns	2.40	2.38	-0.83
trr	ns	9.40	9.32	-0.85

Reverse Recovery Characteristic

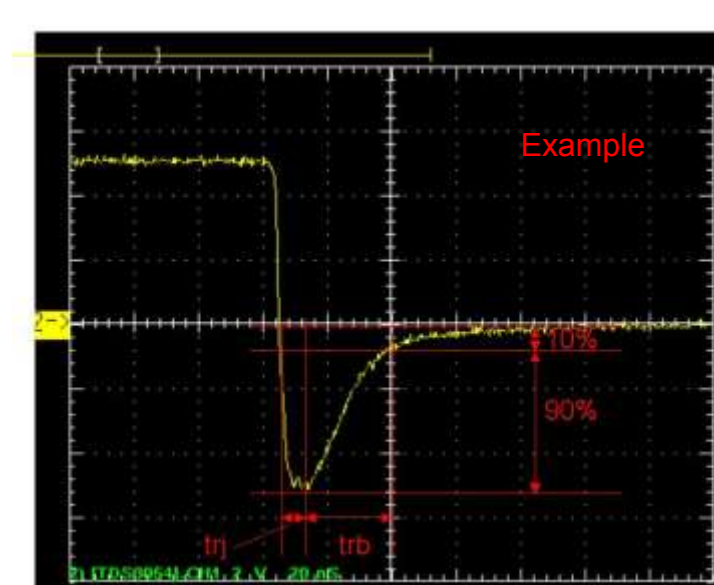
Reference



$T_{rj} = 7.00(\text{ns})$

$T_{rb} = 2.40(\text{ns})$

Conditions: $I_{fwd} = 0.2\text{A}$, $I_{rev} = 0.2\text{A}$, $R_I = 50$



Relation between t_{rj} and t_{rb}