

Device Modeling Report

COMPONENTS:
DIODE/ GENERAL PURPOSE RECTIFIER/ STANDARD
PART NUMBER: 1SS397
MANUFACTURER: TOSHIBA



Bee Technologies Inc.

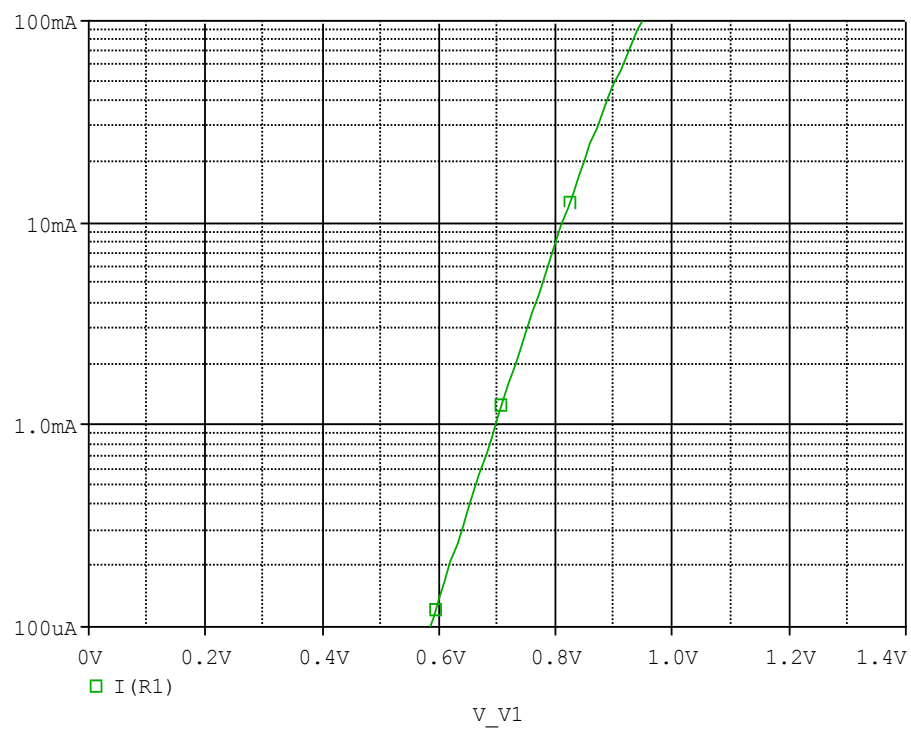
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DIODE MODEL PARAMETERS

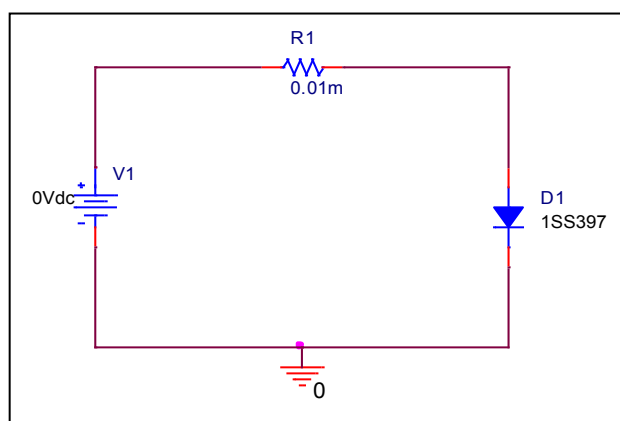
PSpice model parameter	Model description
IS	Saturation Current
N	Emission Coefficient
RS	Series Resistance
IKF	High-injection Knee Current
CJO	Zero-bias Junction Capacitance
M	Junction Grading Coefficient
VJ	Junction Potential
ISR	Recombination Current Saturation Value
BV	Reverse Breakdown Voltage(a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

Forward Current Characteristic

Circuit Simulation Result

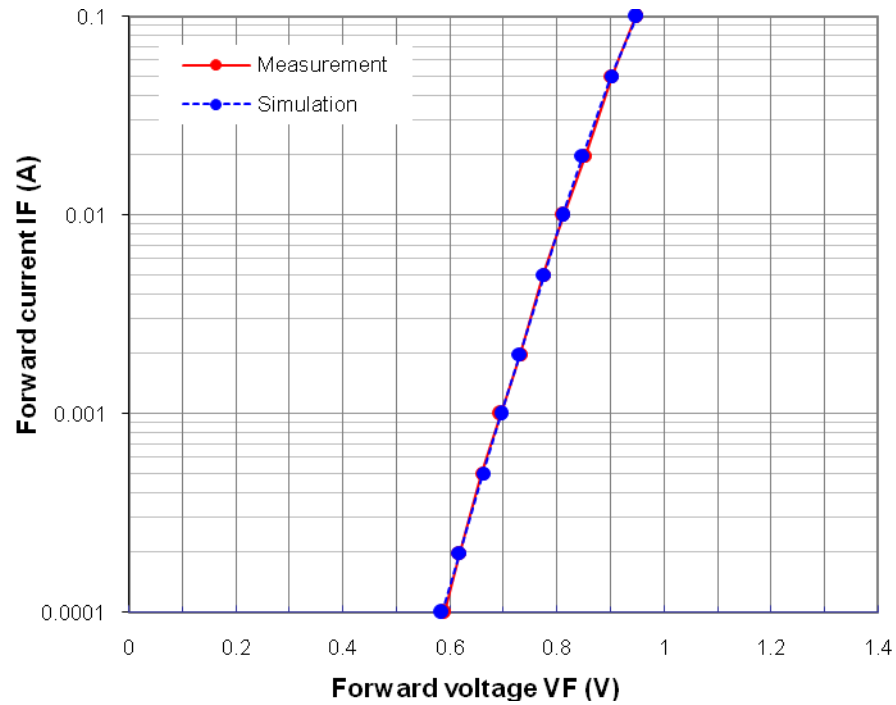


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

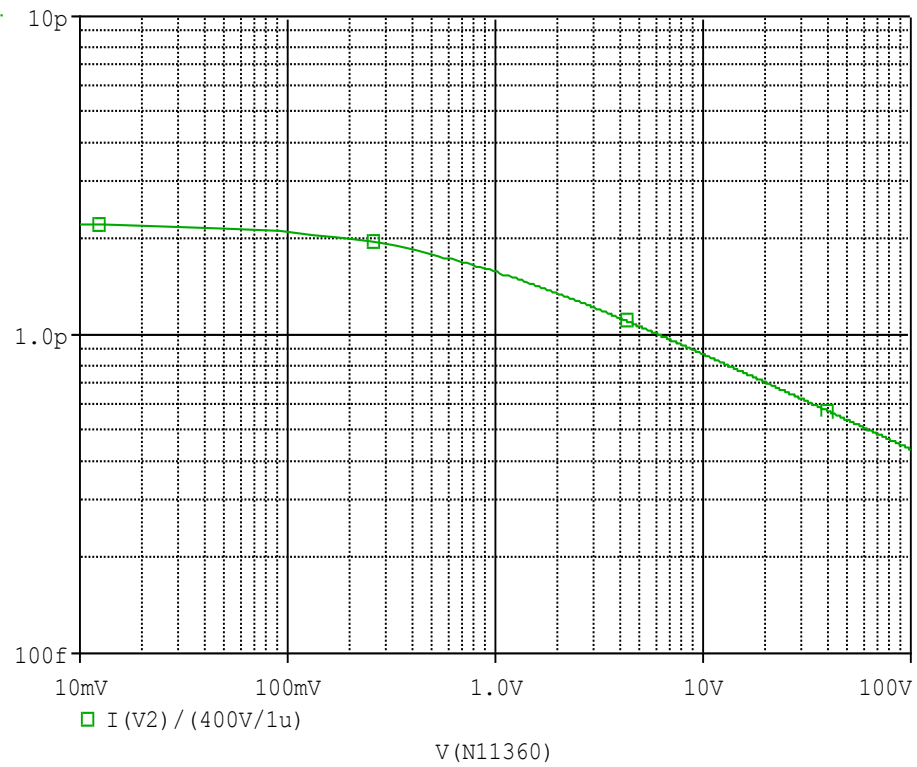


Simulation Result

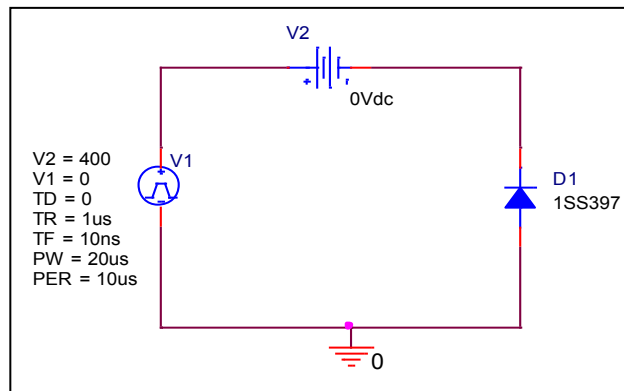
Ifwd (A)	Vfwd (V)		%Error
	Measurement	Simulation	
0.0001	0.589	0.584	-0.85
0.0002	0.618	0.618	0.00
0.0005	0.659	0.662	0.46
0.001	0.694	0.696	0.29
0.002	0.731	0.730	-0.14
0.005	0.775	0.776	0.13
0.01	0.812	0.811	-0.12
0.02	0.852	0.848	-0.47
0.05	0.903	0.901	-0.22
0.1	0.947	0.948	0.11

Capacitance Characteristic

Circuit Simulation Result

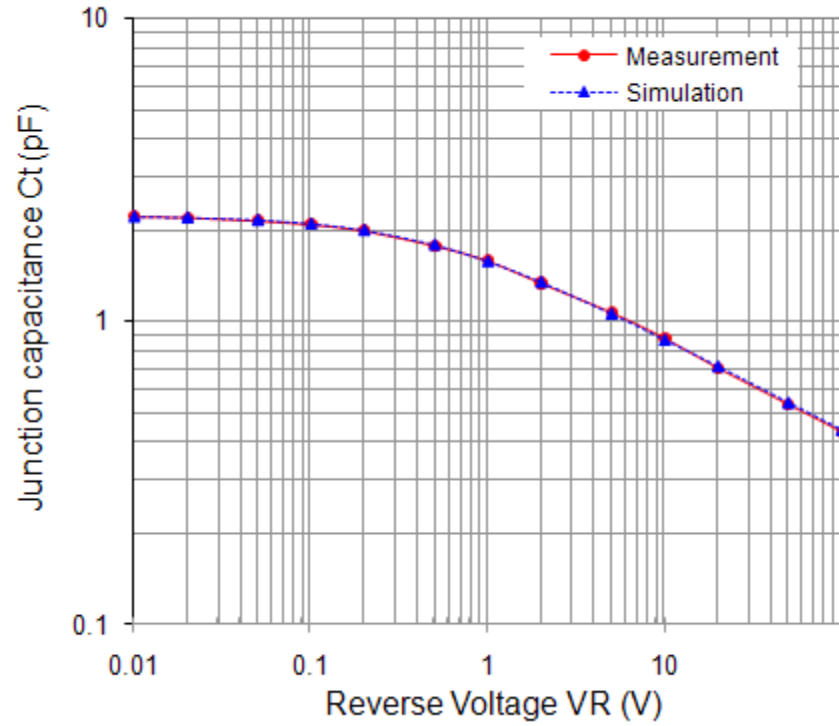


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

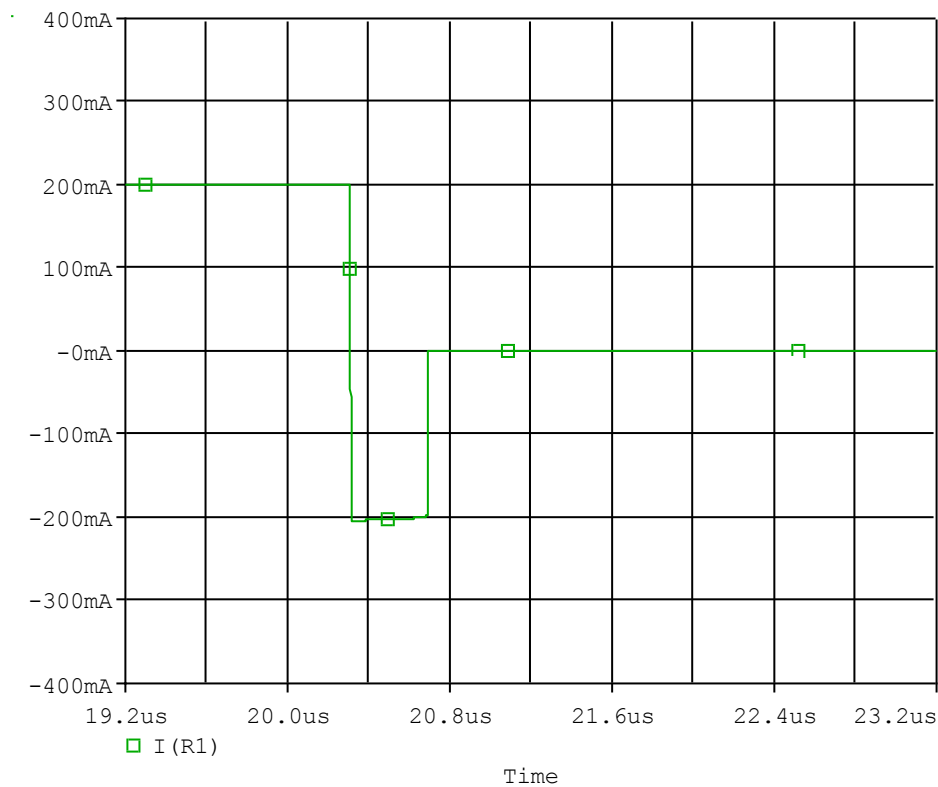


Simulation Result

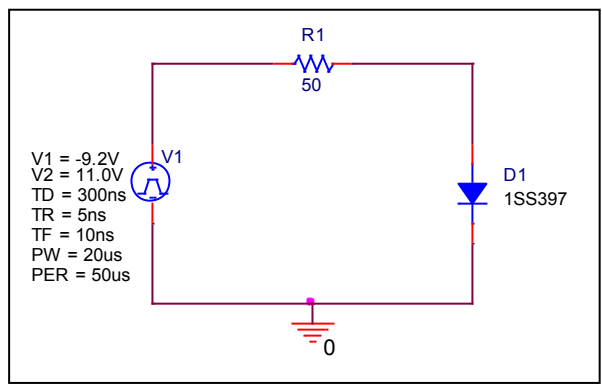
Vrev (V)	Ct (pF)		%Error
	Measurement	Simulation	
0.01	2.221	2.215	-0.27
0.02	2.203	2.201	-0.09
0.05	2.151	2.159	0.37
0.1	2.091	2.099	0.38
0.2	1.993	1.999	0.30
0.5	1.78	1.788	0.45
1	1.588	1.577	-0.69
2	1.338	1.347	0.67
5	1.072	1.059	-1.21
10	0.881	0.869	-1.36
20	0.702	0.709	1.00
50	0.532	0.538	1.13
100	0.432	0.437	1.16

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

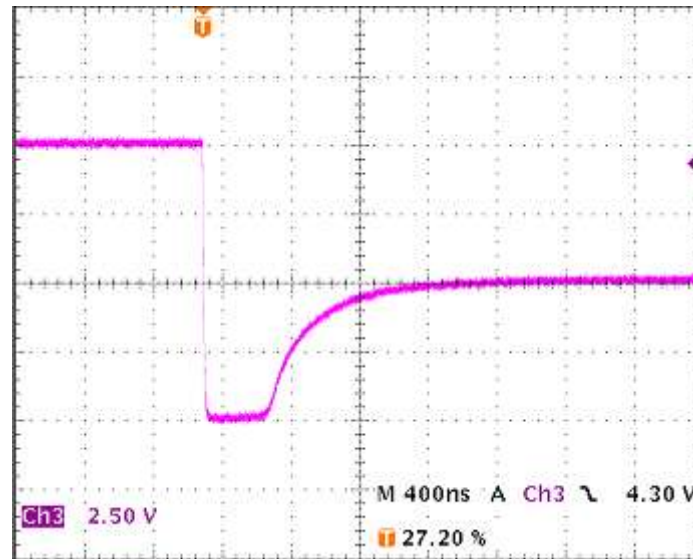


Compare Measurement vs. Simulation

		Measurement	Simulation	%Error
trj	ns	320.00	319.69	-0.10

Reverse Recovery Characteristic

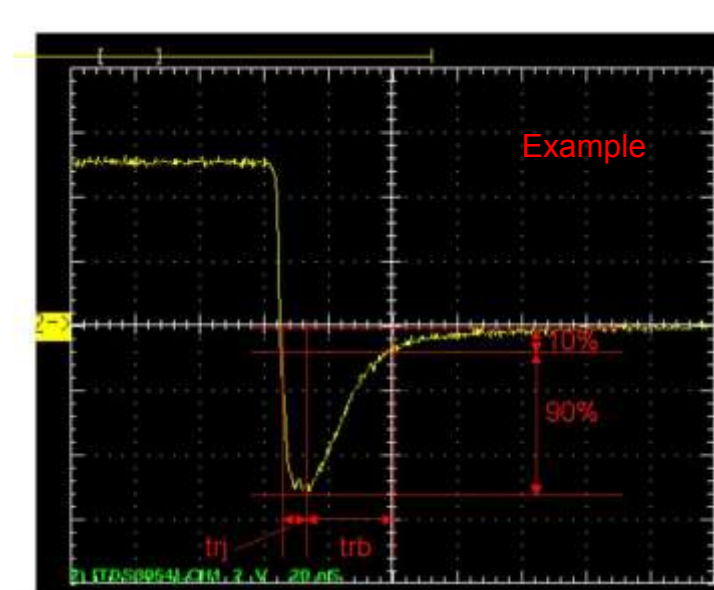
Reference



$T_{rj} = 320(\text{ns})$

$T_{rb} = 584(\text{ns})$

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



Relation between t_{rj} and t_{rb}