

Device Modeling Report

COMPONENTS:

DIODE/ GENERAL PURPOSE RECTIFIER/ PROFESSIONAL

PART NUMBER: 1SS370

MANUFACTURER: TOSHIBA



Bee Technologies Inc.

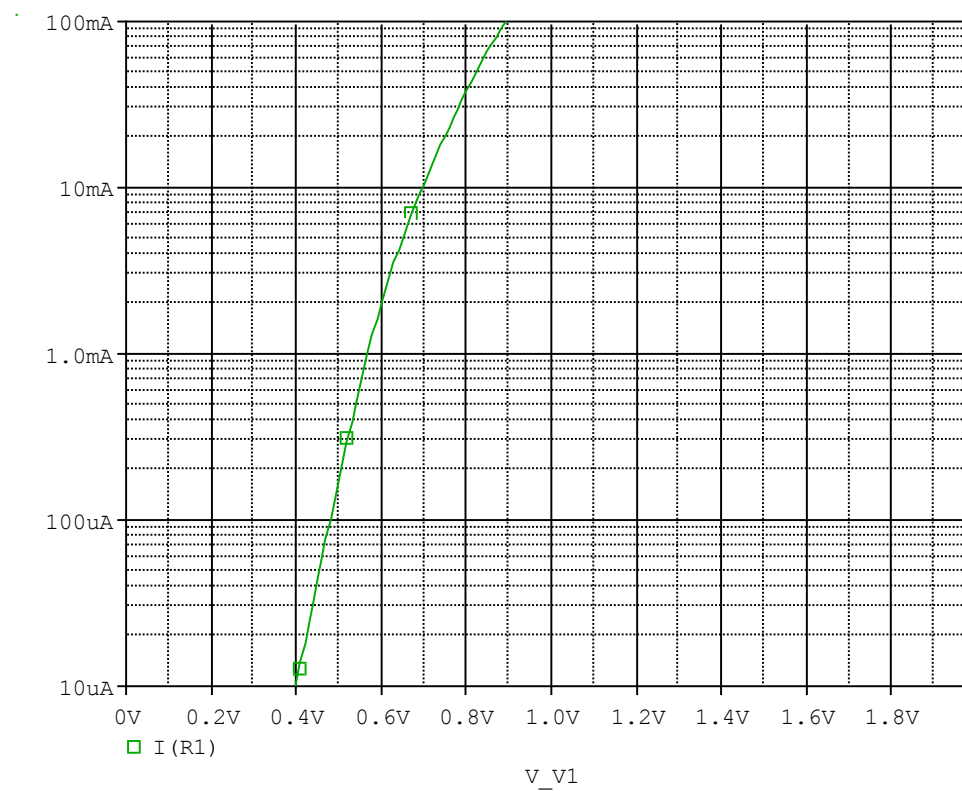
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DIODE MODEL PARAMETERS

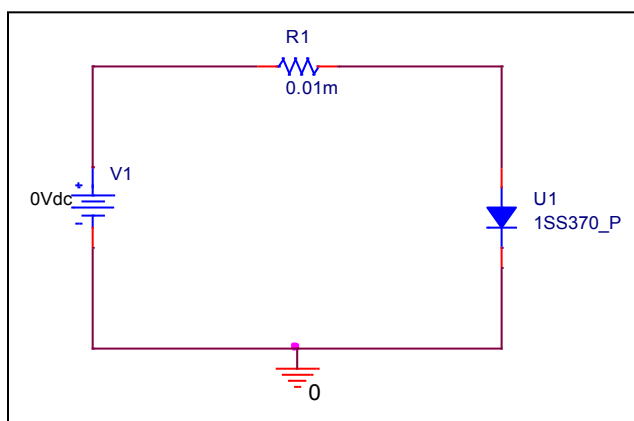
PSpice model parameter	Model description
IS	Saturation Current
N	Emission Coefficient
RS	Series Resistance
IKF	High-injection Knee Current
CJO	Zero-bias Junction Capacitance
M	Junction Grading Coefficient
VJ	Junction Potential
ISR	Recombination Current Saturation Value
BV	Reverse Breakdown Voltage(a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

Forward Current Characteristic

Circuit Simulation Result

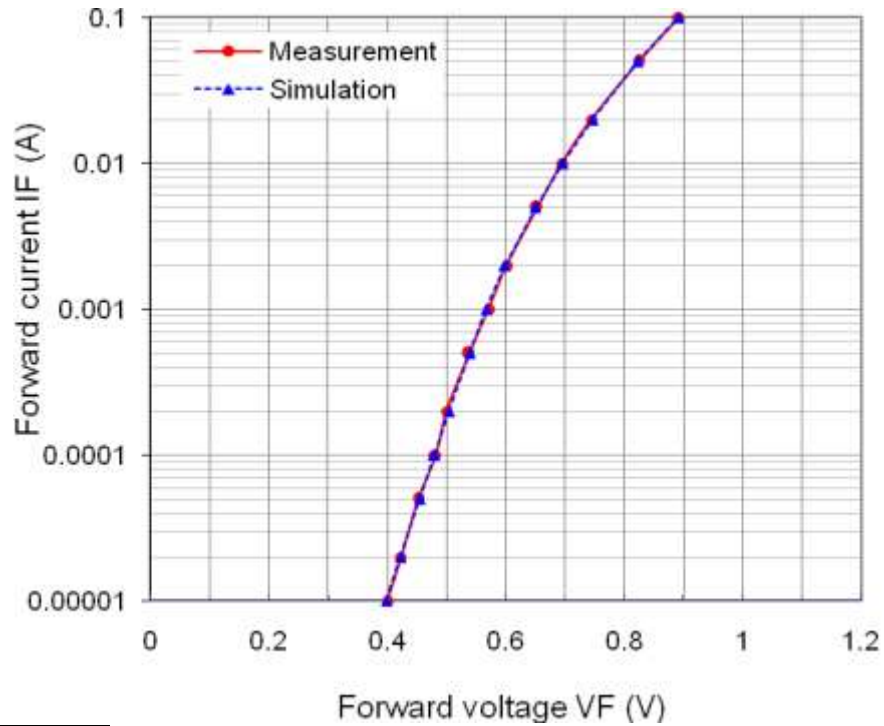


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

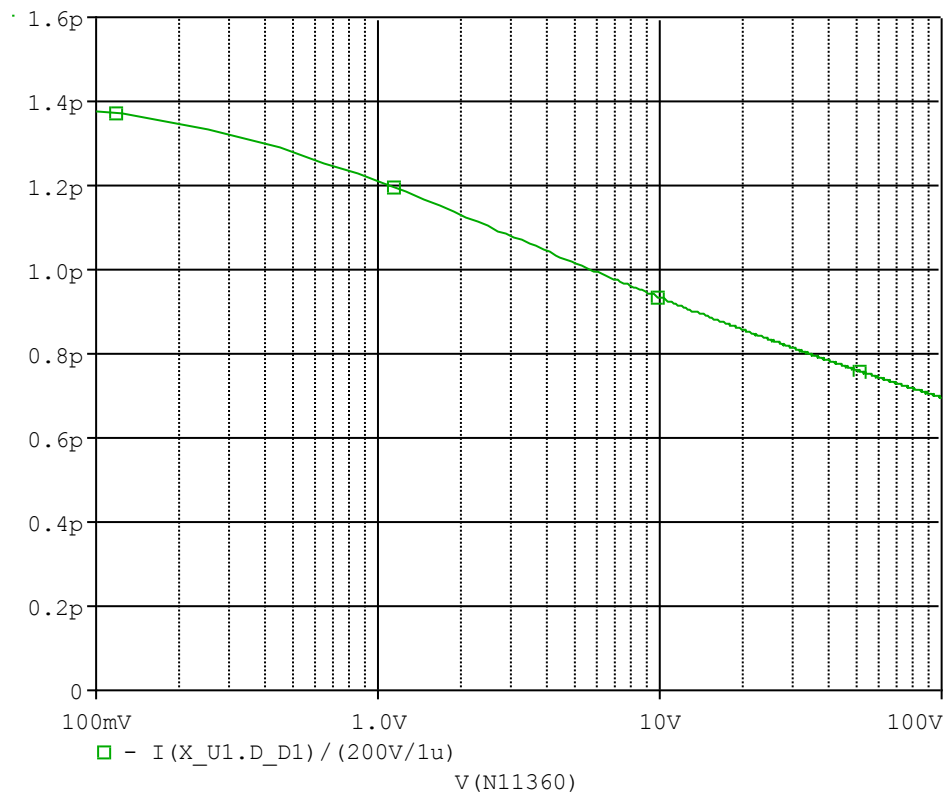


Simulation Result

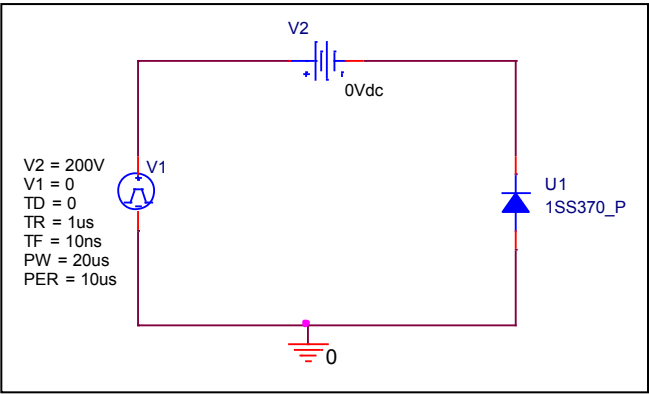
Ifwd (A)	Vfwd (V)		%Error
	Measurement	Simulation	
0.00001	0.401	0.398	-0.75
0.00002	0.423	0.422	-0.24
0.00005	0.452	0.455	0.66
0.0001	0.482	0.480	-0.41
0.0002	0.500	0.504	0.80
0.0005	0.538	0.539	0.19
0.001	0.572	0.567	-0.87
0.002	0.602	0.599	-0.50
0.005	0.653	0.650	-0.46
0.01	0.695	0.696	0.14
0.02	0.745	0.7470	0.27
0.05	0.825	0.8230	-0.24
0.1	0.893	0.8920	-0.11

Capacitance Characteristic

Circuit Simulation Result

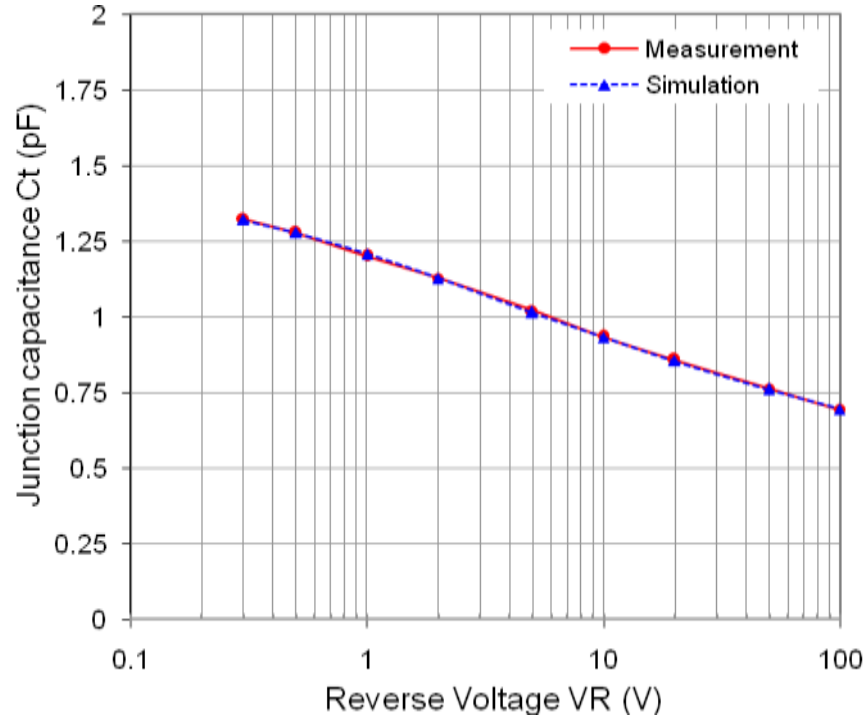


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

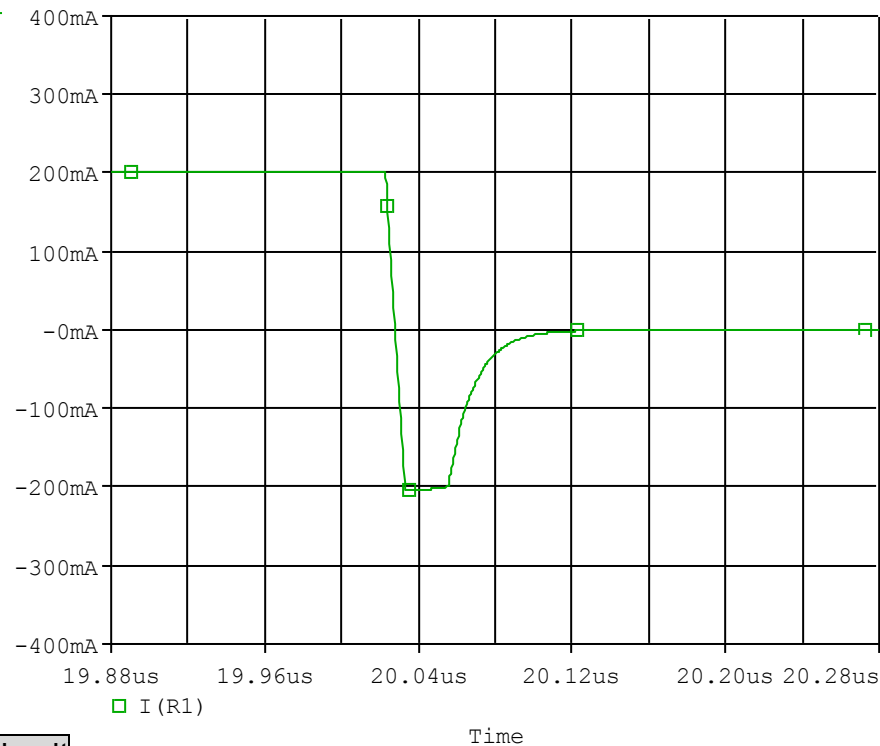


Simulation Result

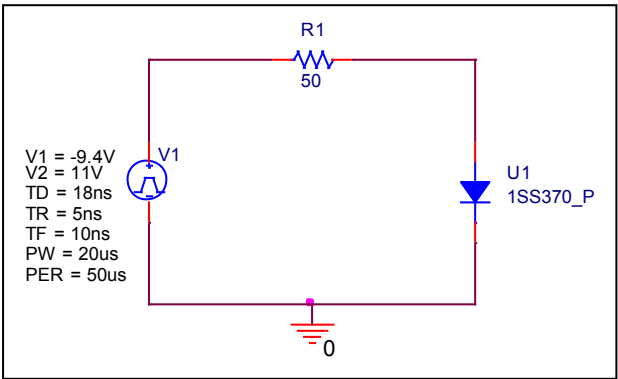
Vrev (V)	Ct (pF)		%Error
	Measurement	Simulation	
0.3	1.325	1.321	-0.30
0.5	1.278	1.279	0.08
1	1.202	1.208	0.50
2	1.127	1.127	0.00
5	1.021	1.015	-0.59
10	0.935	0.933	-0.21
20	0.858	0.855	-0.35
50	0.763	0.761	-0.26
100	0.694	0.696	0.29

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

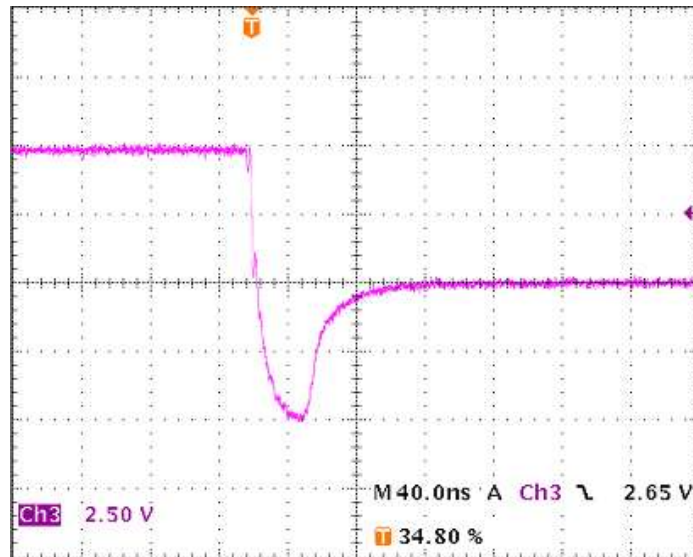


Compare Measurement vs. Simulation

		Measurement	Simulation	%Error
trj	ns	27.20	27.04	-0.58
trb	ns	29.60	29.82	0.74
trr	ns	56.80	56.86	0.11

Reverse Recovery Characteristic

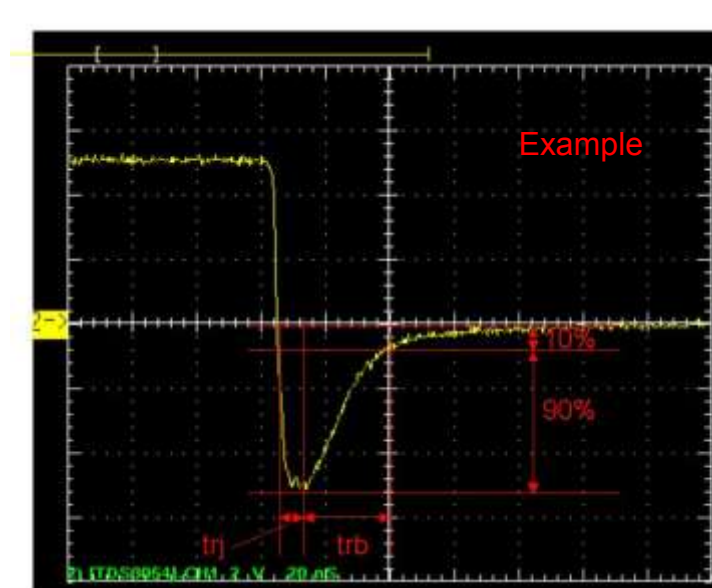
Reference



$T_{rj} = 27.2(\text{ns})$

$T_{rb} = 29.6(\text{ns})$

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



Relation between t_{rj} and t_{rb}