

Device Modeling Report

COMPONENTS:

DIODE/ GENERAL PURPOSE RECTIFIER/ PROFESSIONAL

PART NUMBER: TVR5G

MANUFACTURER: TOSHIBA

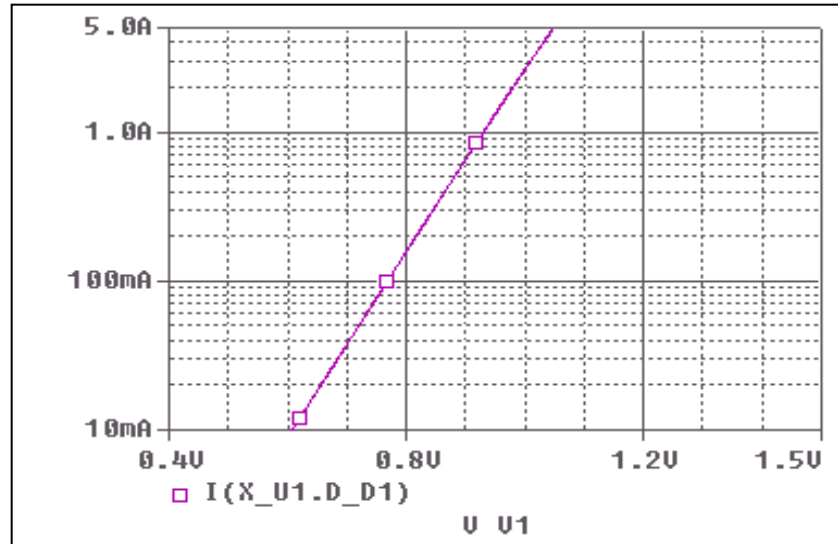


Bee Technologies Inc.

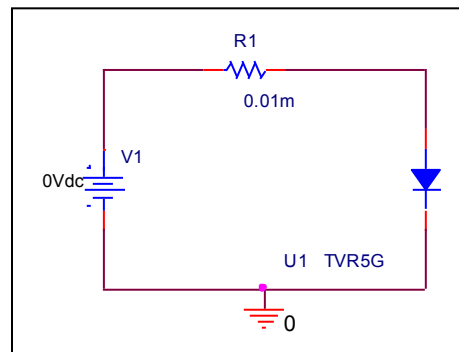
PSpice model parameter	Model description
IS	Saturation Current
N	Emission Coefficient
RS	Series Resistance
IKF	High-injection Knee Current
CJO	Zero-bias Junction Capacitance
M	Junction Grading Coefficient
VJ	Junction Potential
ISR	Recombination Current Saturation Value
BV	Reverse Breakdown Voltage(a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

Forward Current Characteristic

Circuit Simulation Result

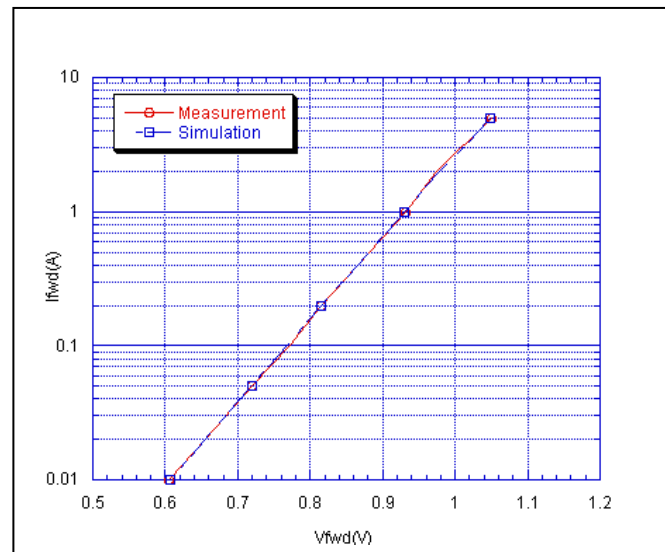


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

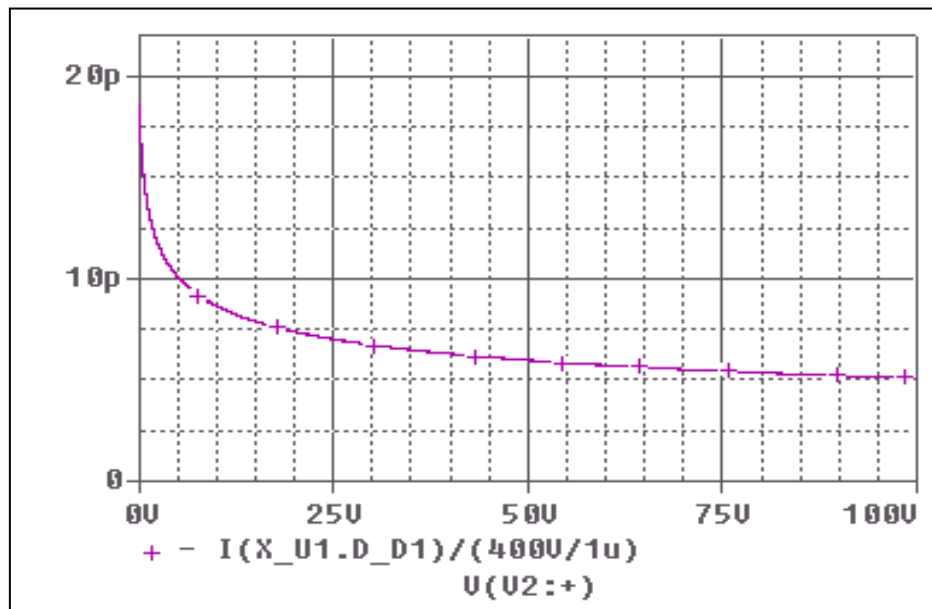


Simulation Result

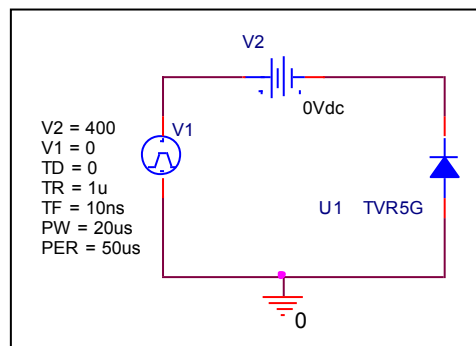
Ifwd(A)	Vfwd(V) Measurement	Vfwd(V) Simulation	%Error
0.01	0.606	0.608	-0.281
0.02	0.656	0.655	0.152
0.05	0.720	0.720	0.014
0.1	0.772	0.768	0.466
0.2	0.816	0.815	0.123
0.5	0.882	0.881	0.091
1	0.932	0.930	0.193
2	0.975	0.979	-0.441
5	1.050	1.048	0.210

Junction Capacitance Characteristic

Circuit Simulation Result

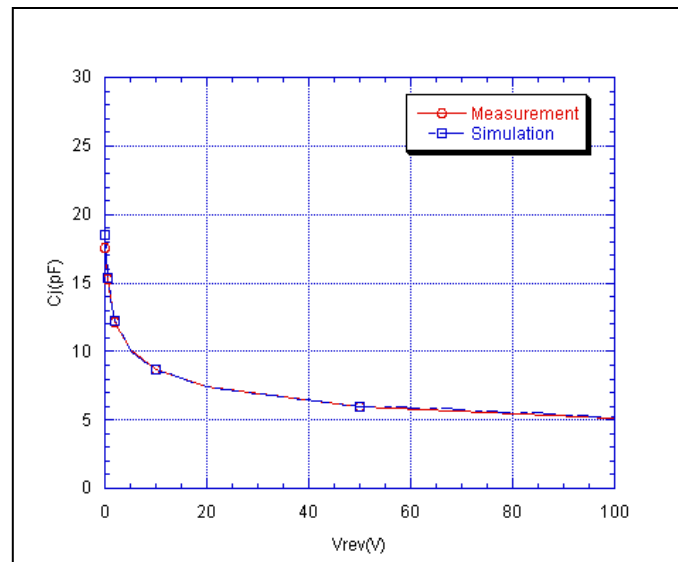


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

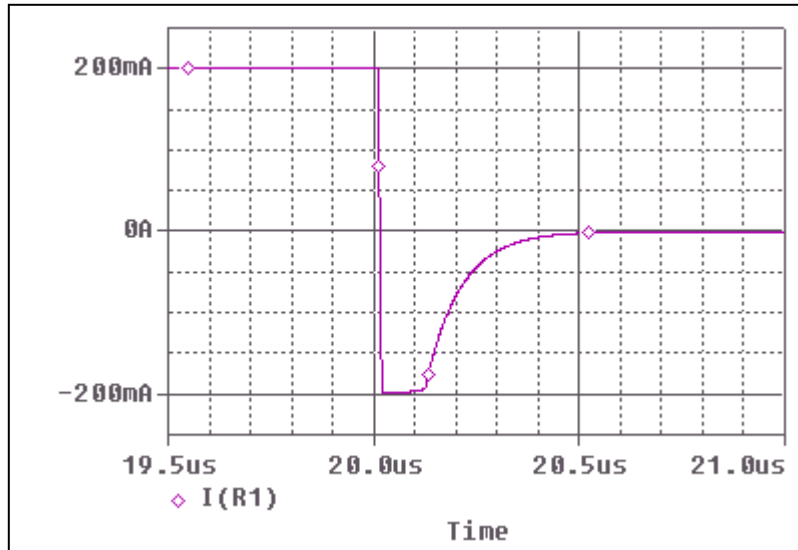


Simulation Result

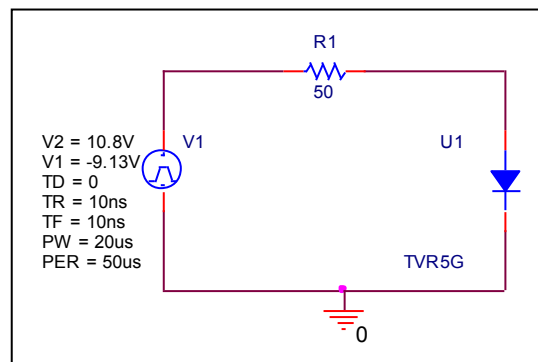
V_{rev} (V)	C_j (pF) Measurement	C_j (pF) Simulation	%Error
0	18.834	18.834	0.000
0.1	17.535	18.100	-3.222
0.2	16.800	17.222	-2.512
0.5	15.300	15.346	-0.301
1	13.900	13.839	0.439
2	12.100	12.221	-1.000
5	10.100	10.084	0.158
10	8.700	8.651	0.567
20	7.400	7.375	0.335
50	6.000	5.984	0.267
100	5.000	5.093	-1.864

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

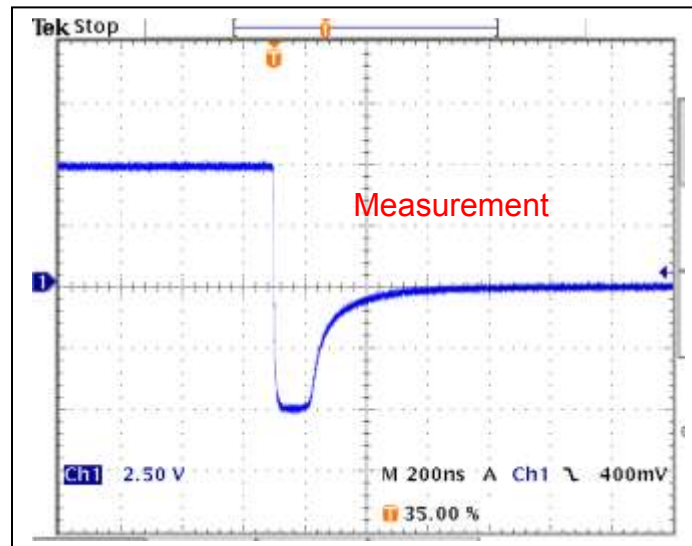


Compare Measurement vs. Simulation

	Measurement		Simulation		%Error
trj	108.000	ns	107.682	ns	0.294
trb	192.000	ns	191.782	ns	0.114

Reverse Recovery Characteristic

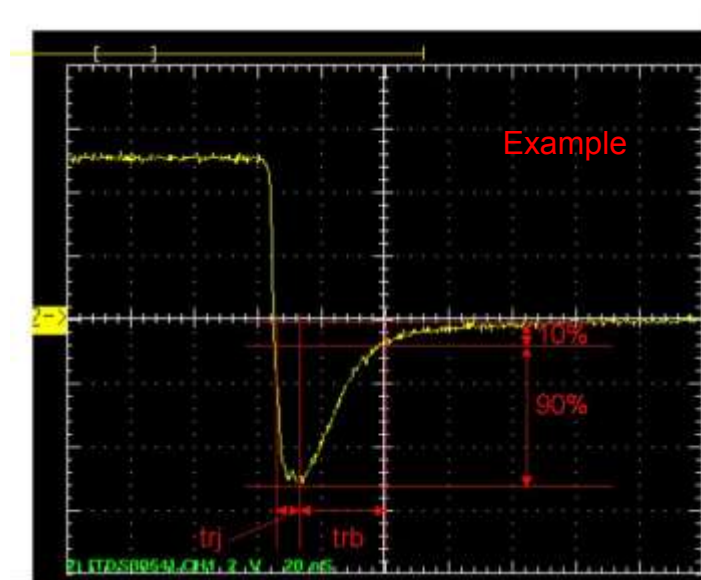
Reference



$T_{rj} = 108(\text{ns})$

$T_{rb} = 192(\text{ns})$

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



Relation between t_{rj} and t_{rb}