

Device Modeling Report

COMPONENTS:
DIODE/ GENERAL PURPOSE RECTIFIER/ PROFEIONAL
PART NUMBER: 20DL2C41A
MANUFACTURER: TOSHIBA

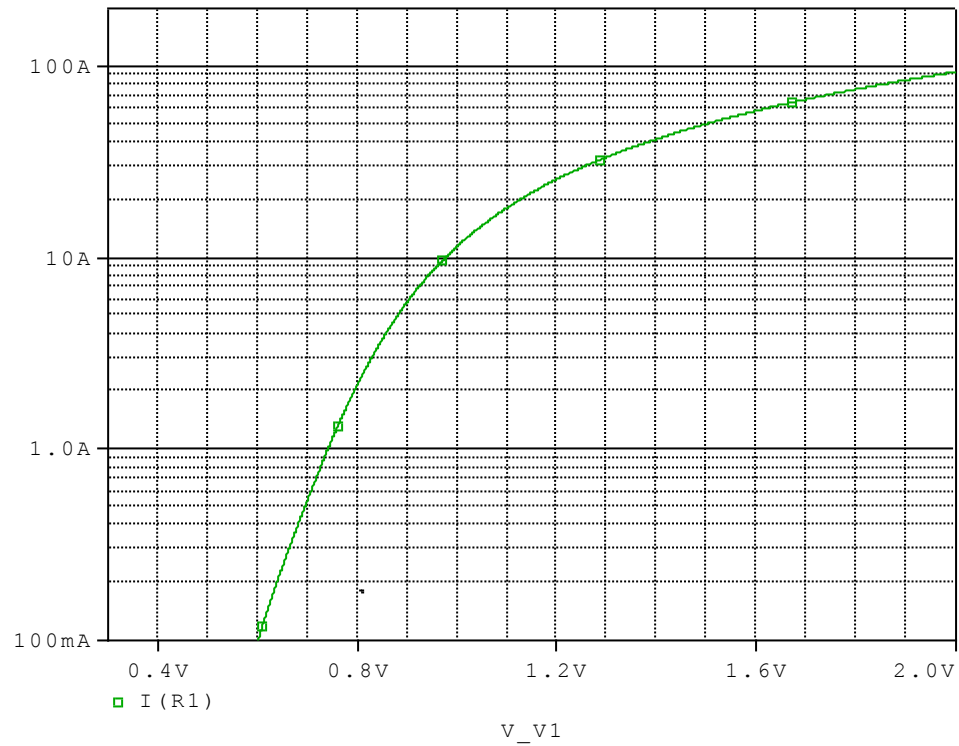


Bee Technologies Inc.

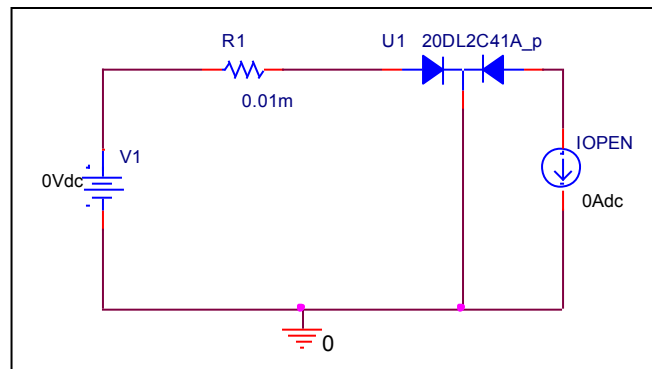
PSpice model parameter	Model description
IS	Saturation Current
N	Emission Coefficient
RS	Series Resistance
IKF	High-injection Knee Current
CJO	Zero-bias Junction Capacitance
M	Junction Grading Coefficient
VJ	Junction Potential
ISR	Recombination Current Saturation Value
BV	Reverse Breakdown Voltage(a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

Forward Current Characteristic

Circuit Simulation Result

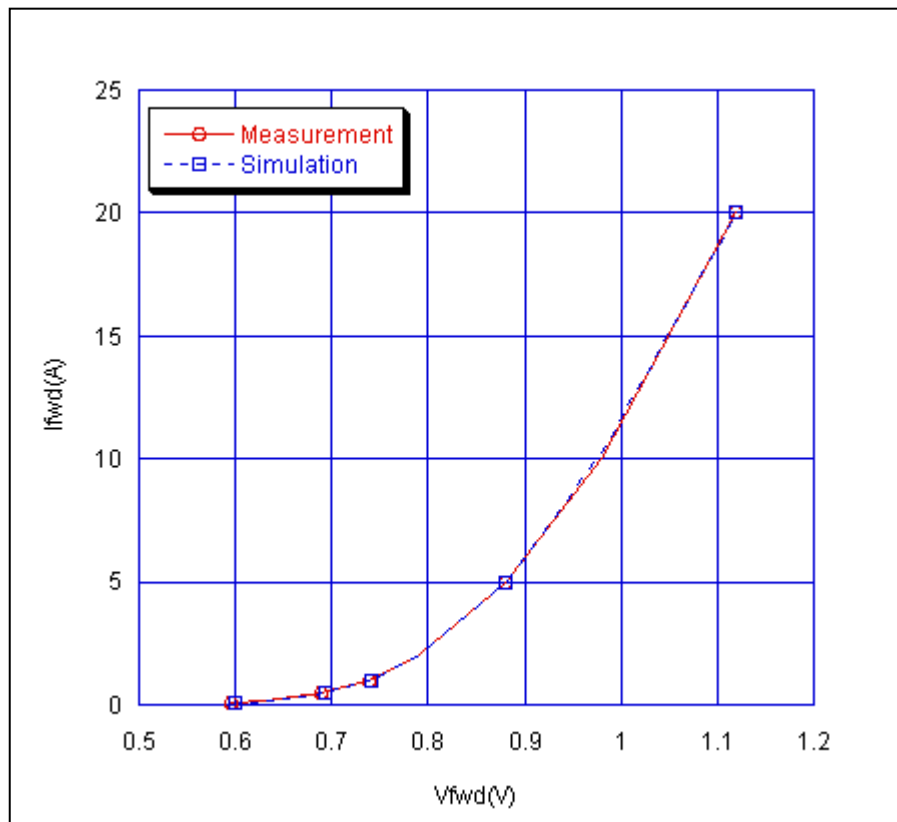


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

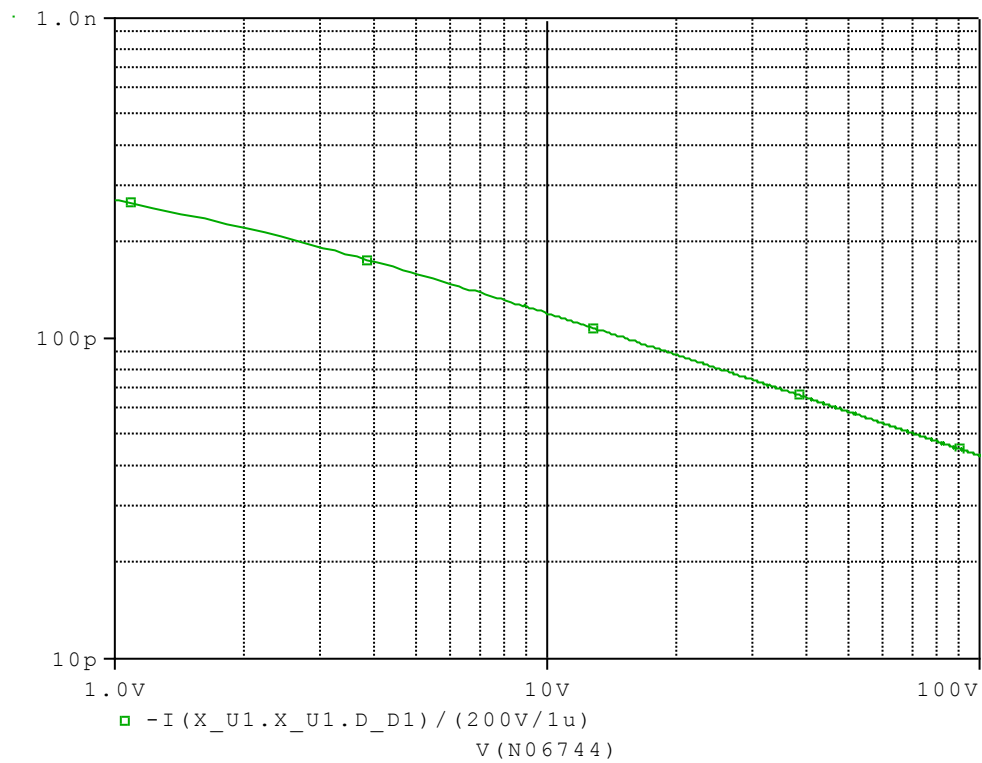


Simulation Result

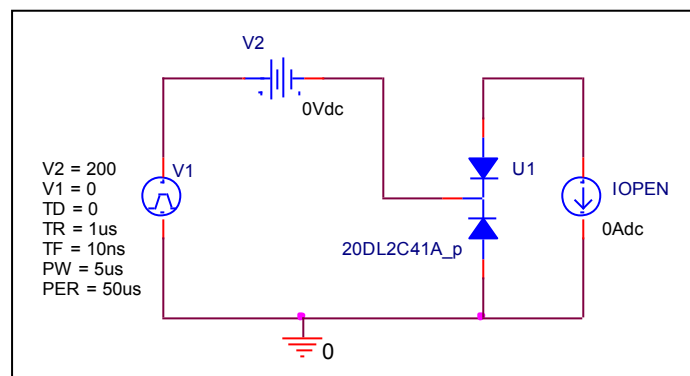
Ifwd(A)	Vfwd(V)		%Error
	Measurement	Simulation	
0.1	0.595	0.600	-0.840
0.2	0.630	0.637	-1.111
0.5	0.690	0.693	-0.435
1	0.740	0.741	-0.135
2	0.790	0.793	-0.380
5	0.880	0.878	0.227
10	0.980	0.977	0.306
20	1.120	1.115	0.446

Capacitance Characteristic

Circuit Simulation Result

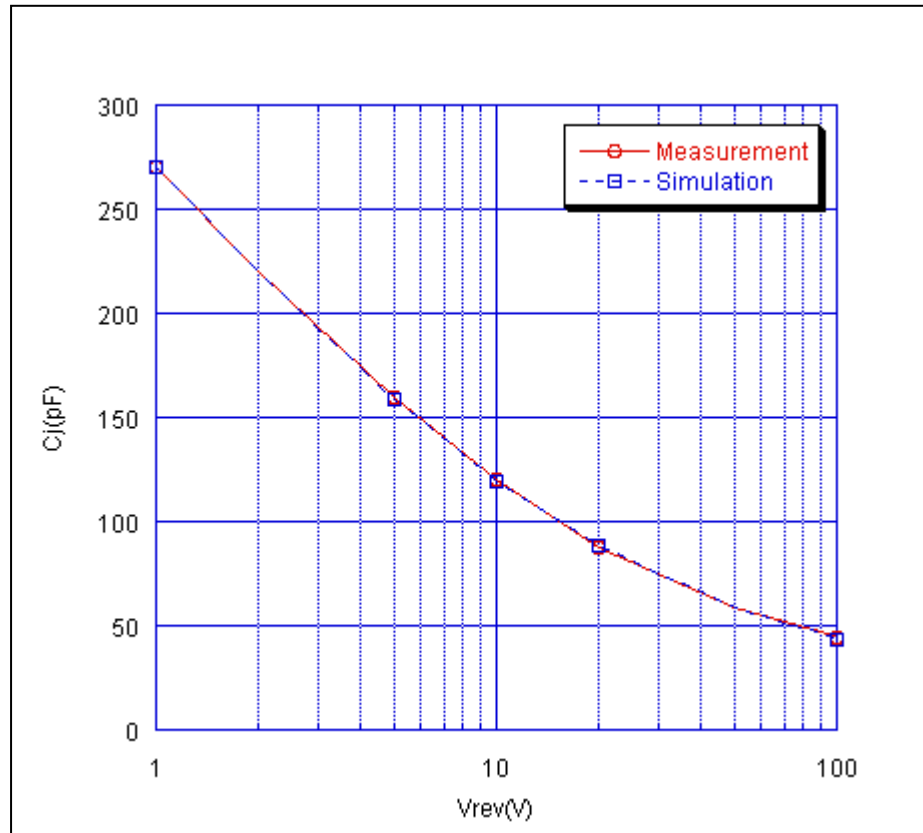


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

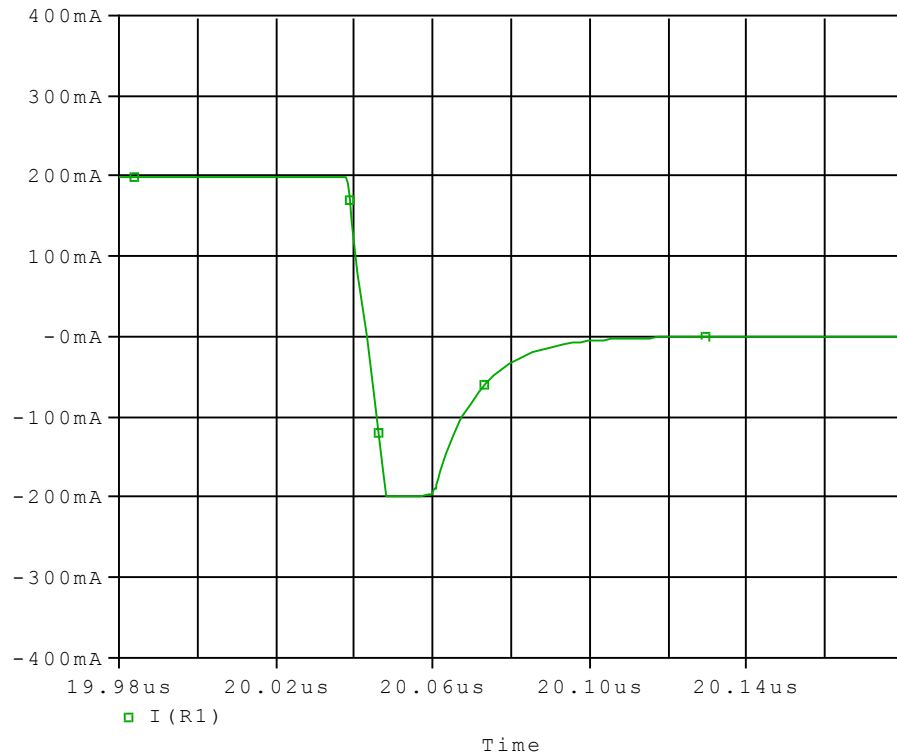


Simulation Result

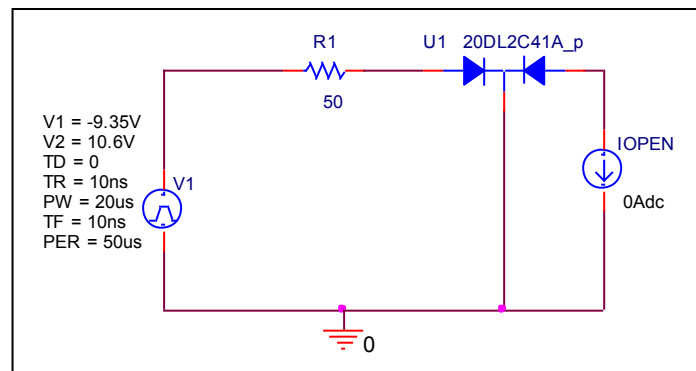
Vrev(V)	Cj(pF)		%Error
	Measurement	Simulation	
1	270.000	269.959	0.015
2	220.000	220.564	-0.256
5	160.000	158.997	0.627
10	120.000	119.648	0.293
20	88.000	88.832	-0.945
50	59.000	58.926	0.125
100	44.000	43.081	2.089

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

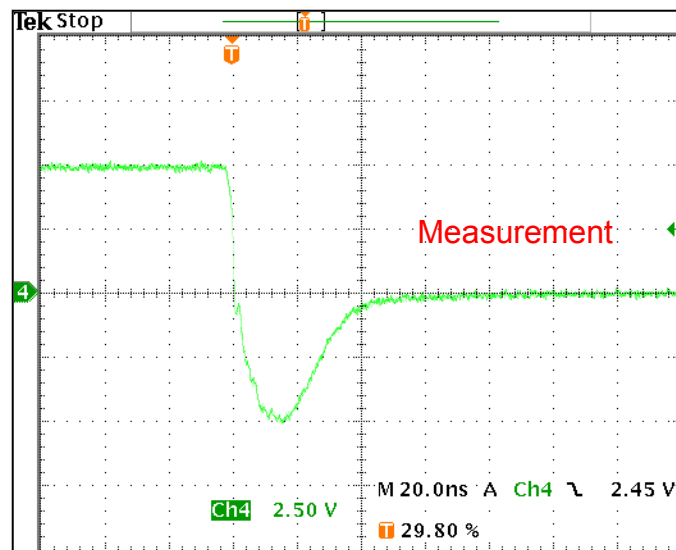


Compare Measurement vs. Simulation

	Measurement		Simulation		%Error
trj	16.400	ns	16.100	ns	0.610
trb	25.000	ns	25.110	ns	0.440

Reverse Recovery Characteristic

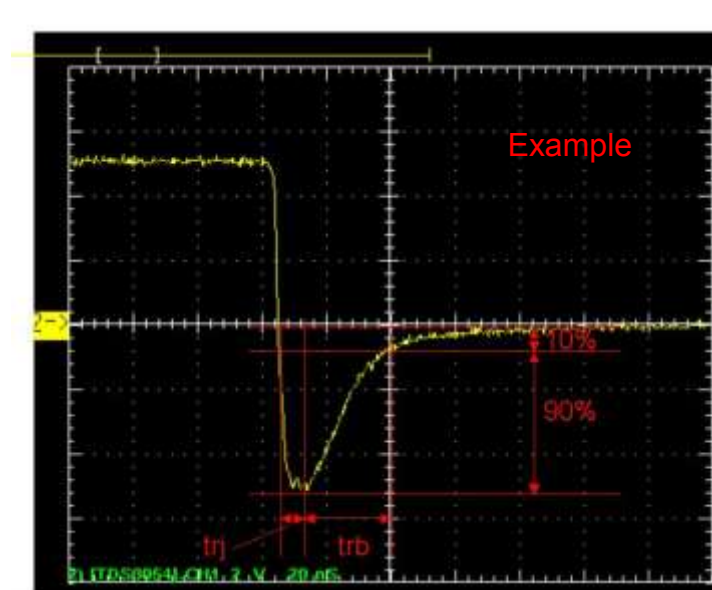
Reference



$T_{rj} = 16.4(\text{ns})$

$T_{rb} = 25(\text{ns})$

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



Relation between t_{rj} and t_{rb}