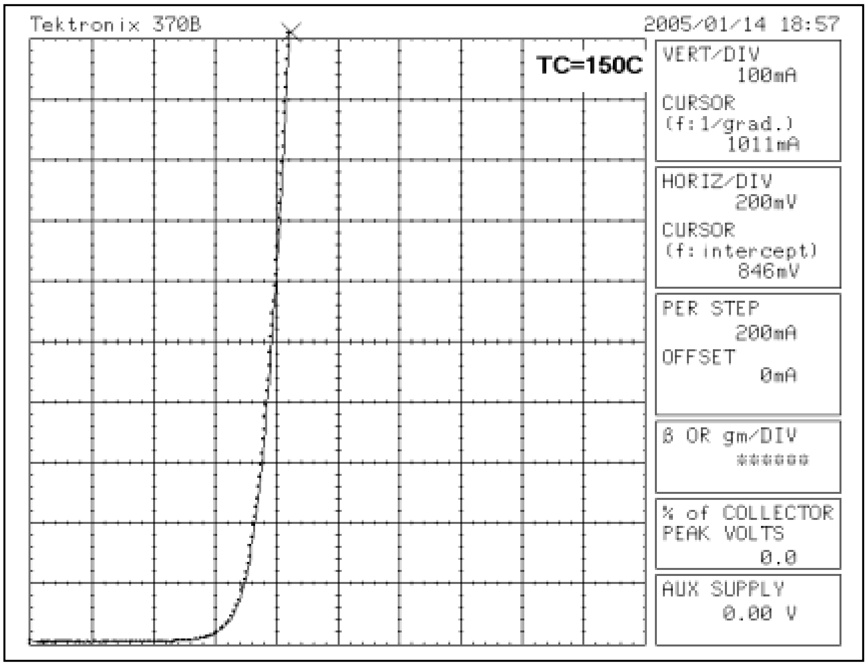
Device Modeling Report

COMPONENTS:
DIODE/ GENERAL PURPOSE RECTIFIER / PROFESSIONAL
PART NUMBER: 1SR139-400
MANUFACTURER: ROHM
REMARK: TC=150C

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 **Reference**



VERT/DIV
100mA
CURSOR
(f:1/grad.)
1011mA

HORIZ/DIV
200mV
CURSOR
(f:intercept)
846mV

PER STEP
200mA
OFFSET
0mA

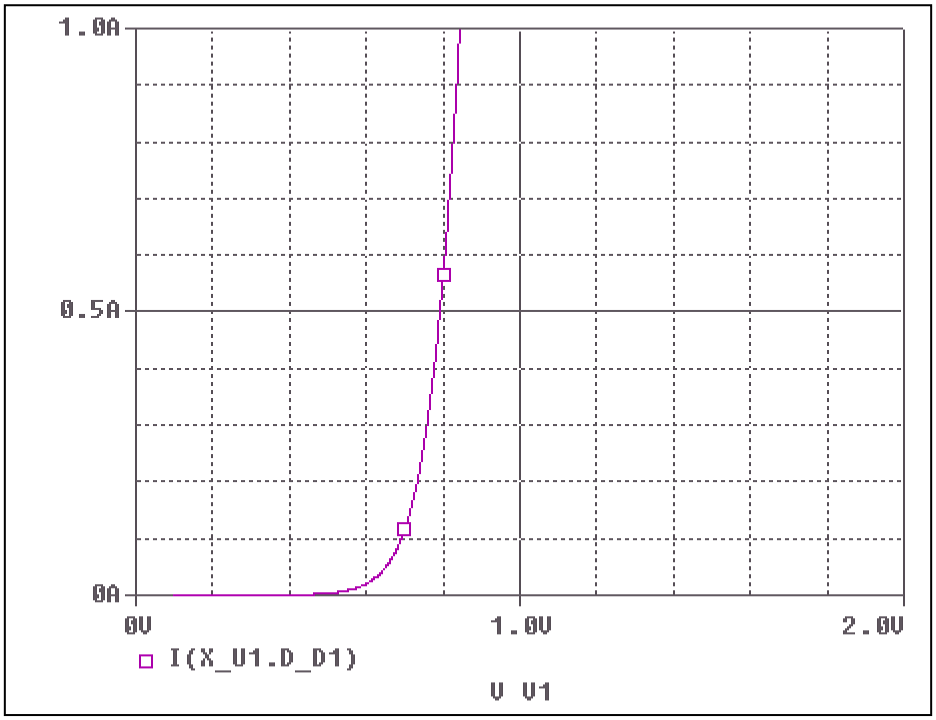
β OR gm/DIV
******

% of COLLECTOR
PEAK VOLTS
0.0

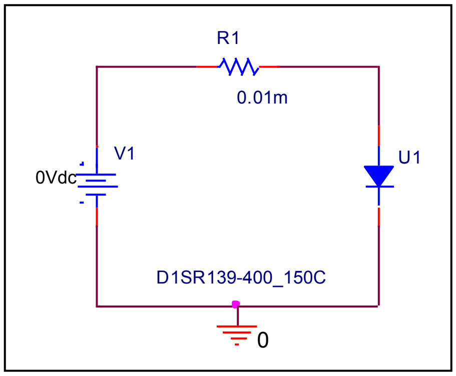
AUX SUPPLY
0.00 V

Forward Current Characteristic

Circuit Simulation Result

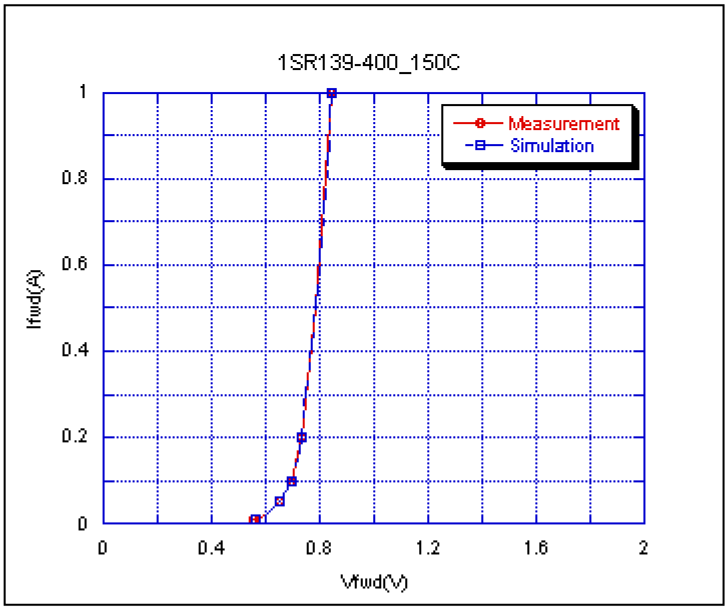


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

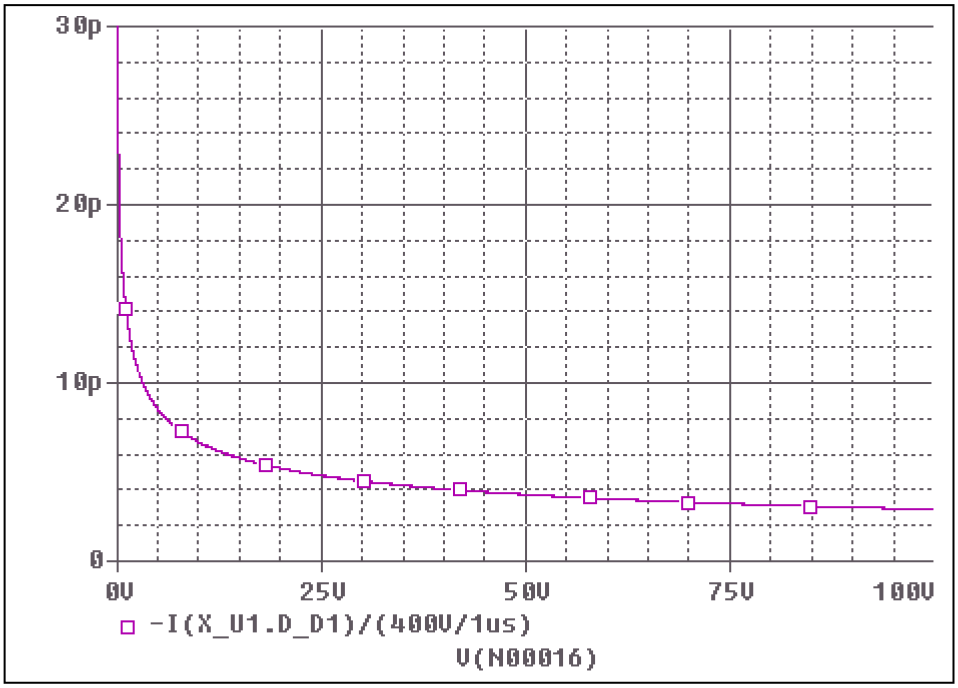


Simulation Result

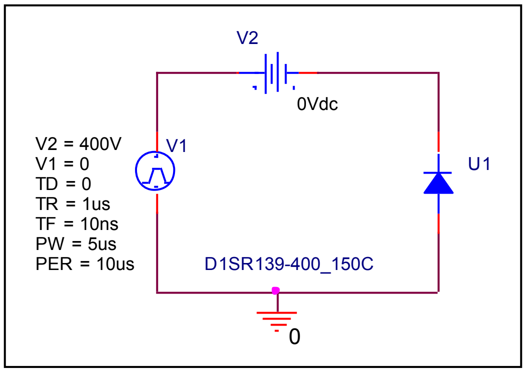
Ifwd(A)	Vfwd(V) Measurement	Vfwd(V) Simulation	%Error
0.01	0.558	0.564	-1.08
0.02	0.600	0.603	-0.50
0.05	0.650	0.655	-0.77
0.1	0.695	0.694	0.14
0.2	0.734	0.735	-0.14
0.5	0.786	0.783	0.38
1	0.846	0.843	0.35

Capacitance Characteristic

Circuit Simulation Result

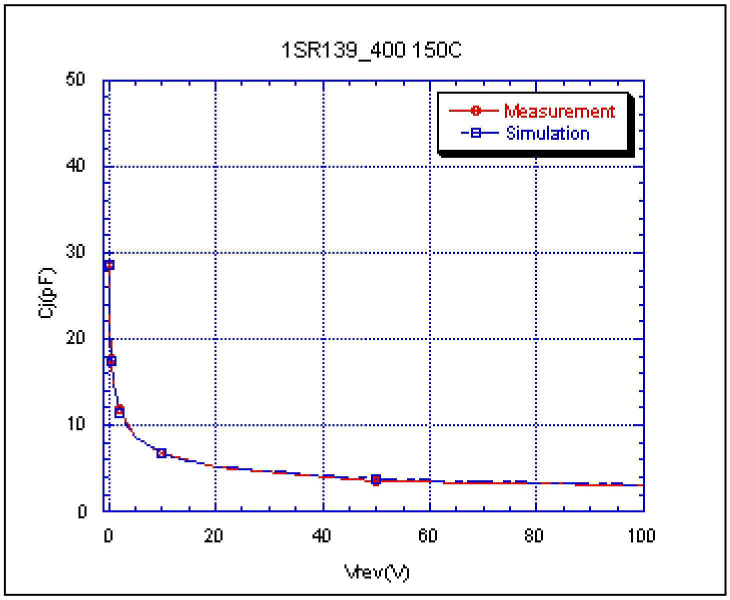


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

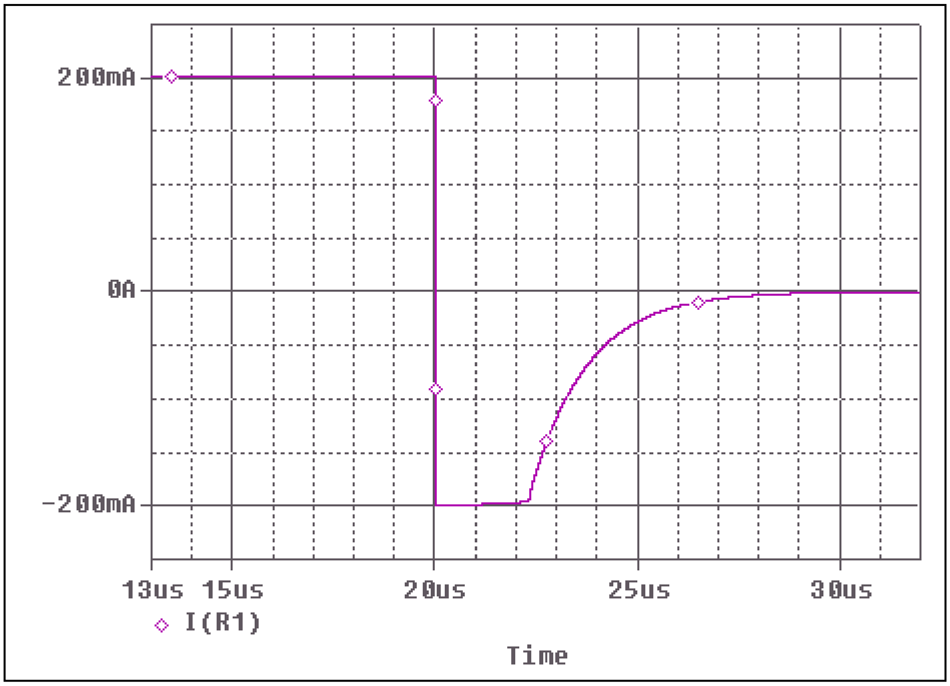


Simulation Result

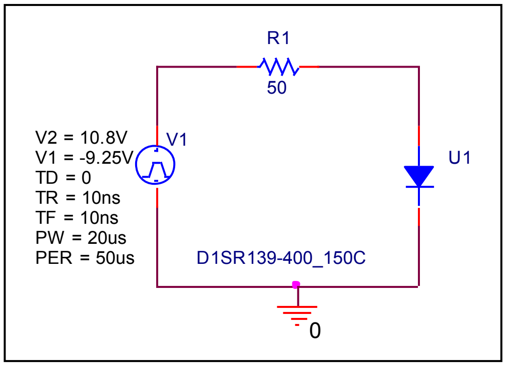
Vrev(V)	Cj(pF) Measurement	Cj(pF) Simulation	%Error
0	28.637	28.637	0.00
0.2	21.867	22.773	-4.14
0.5	17.718	17.392	1.84
1	14.669	15.000	-2.26
2	11.817	11.519	2.52
5	8.695	8.552	1.64
10	6.748	6.680	1.01
20	5.190	5.213	-0.44
50	3.624	3.737	-3.12
100	2.760	2.858	-3.55

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

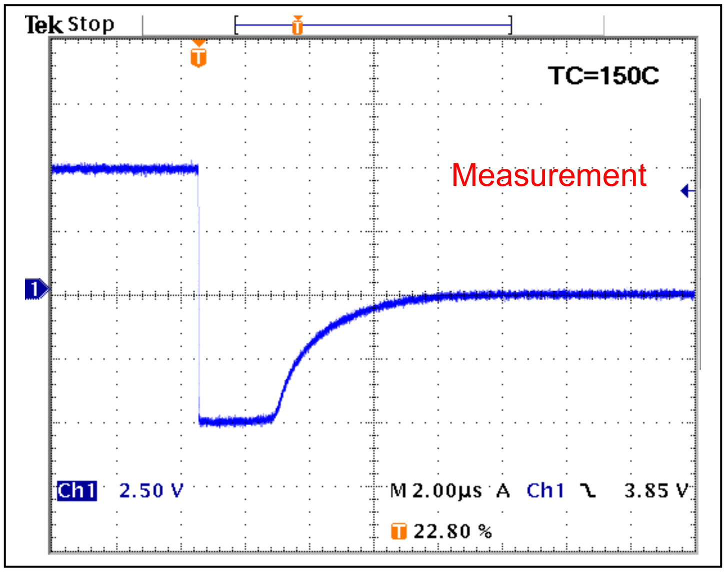


Compare Measurement vs. Simulation

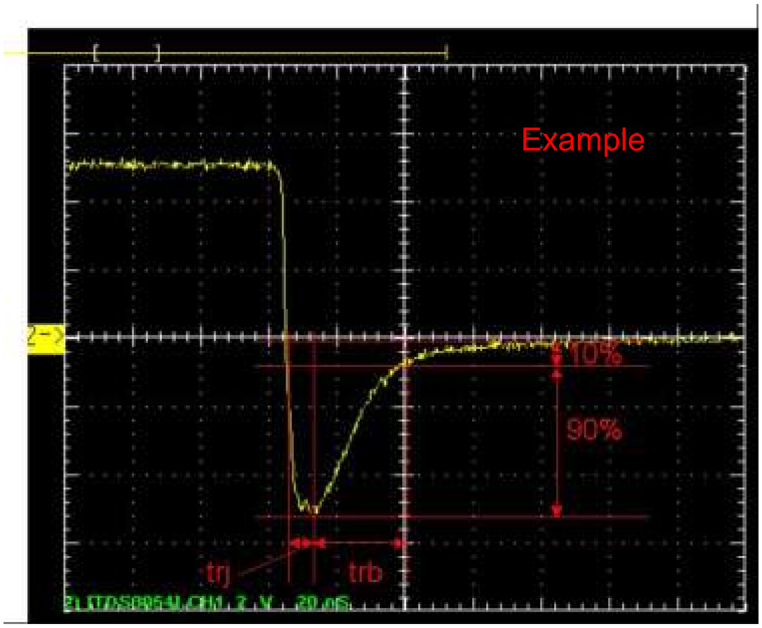
	Measurement		Simulation		%Error
trj	**2.32**	**us**	**2.33**	**us**	**0.431**
trb	**3.12**	**us**	**3.12**	**us**	**0.128**

Reverse Recovery Characteristic

Reference



Trj =2.32(us)
Trb=3.12(us)
Conditions: Ifwd=Irev=0.2(A), Rl=50



Relation between trj and trb