

Device Modeling Report

COMPONENTS:
DIODE/ GENERAL PURPOSE RECTIFIER / STANDARD
PART NUMBER: 1SR159-200
MANUFACTURER: ROHM
REMARK: TC=150C



Bee Technologies Inc.

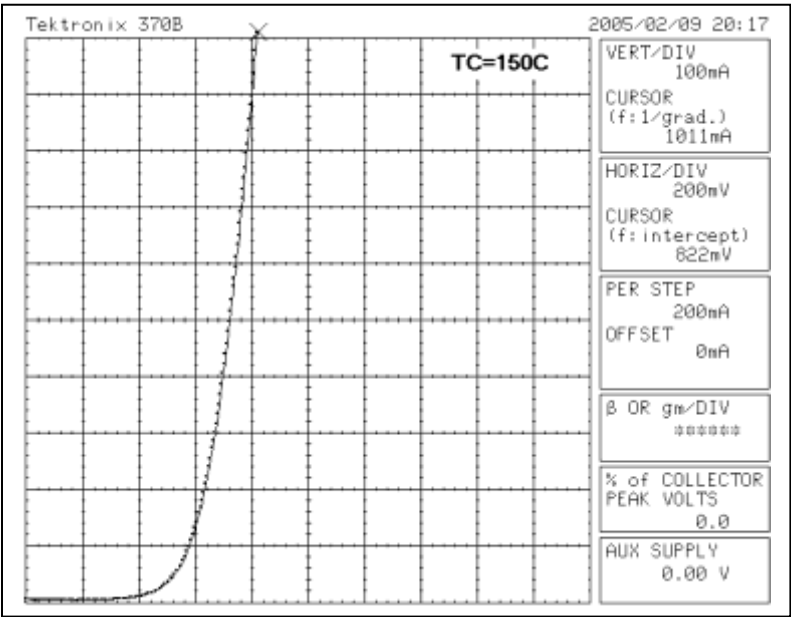
SPICE MODEL

```
*$  
* PART NUMBER: 1SR159-200  
* MANUFACTURER: ROHM  
* VRM=200,TC=150C,IO=1.0A,IFSM=20A  
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.MODEL 1sr159-200_150C D  
+ IS=1.0000E-6  
+ N=1.2915  
+ RS=.10159  
+ IKF=451.13E-6  
+ ISR=0  
+ CJO=31.166E-12  
+ M=.34781  
+ VJ=.1905  
+ BV=200  
+ IBV=10.000E-6  
+ TT=40.395E-9  
*$
```

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

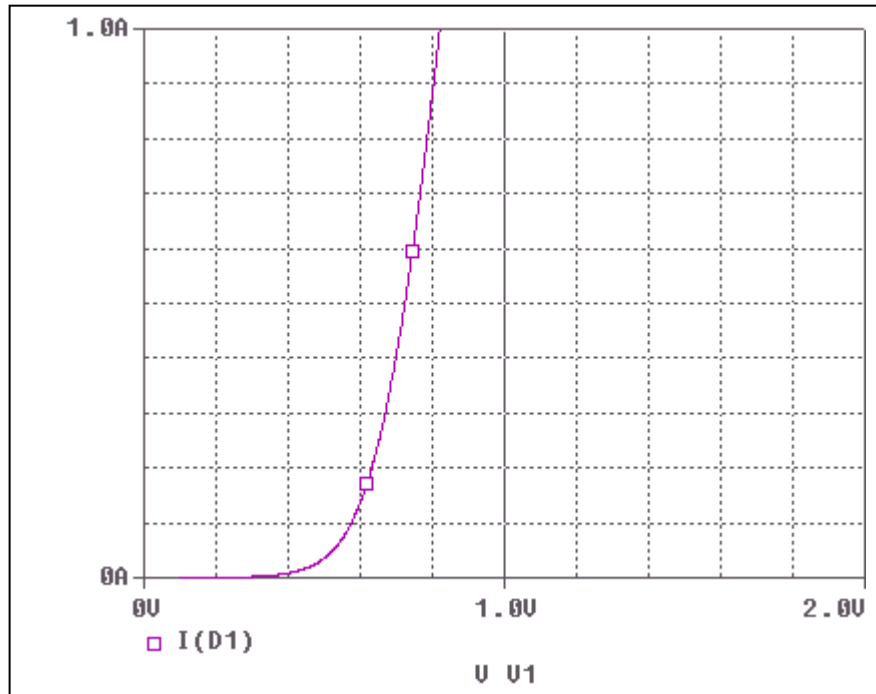
Forward Current Characteristic

Reference

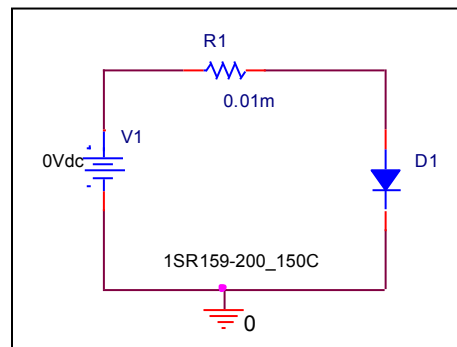


Forward Current Characteristic

Circuit Simulation Result

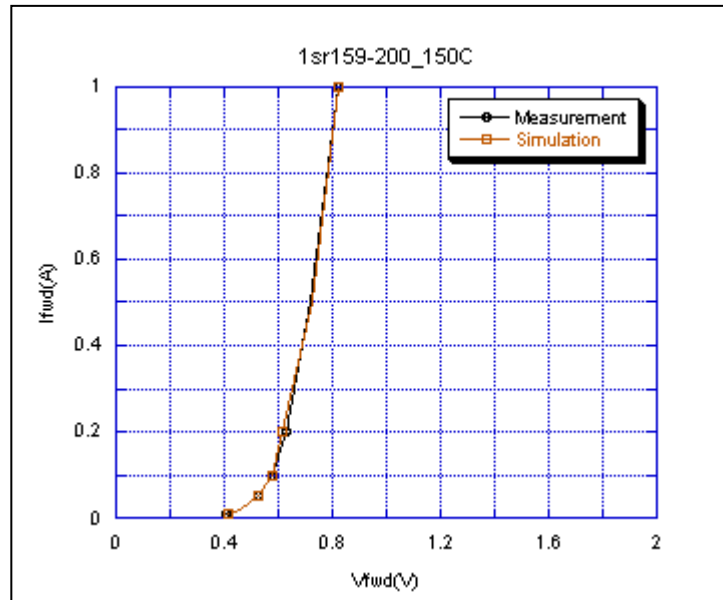


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

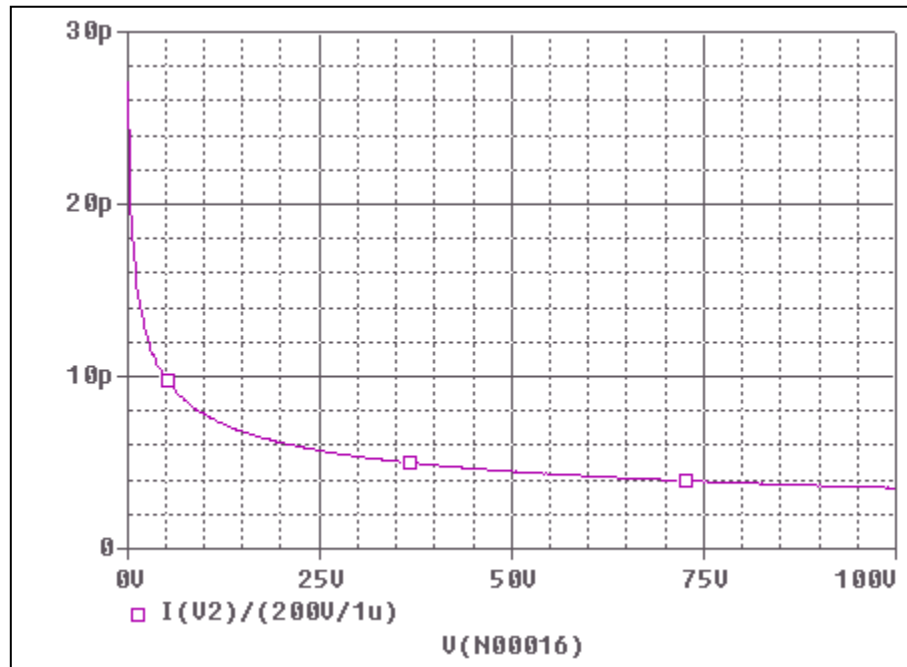


Simulation Result

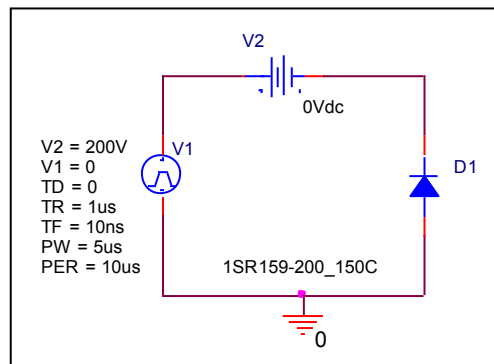
Ifwd(A)	Vfwd(V) Measurement	Vfwd(V) Simulation	%Error
0.01	0.41	0.412	0.4878
0.02	0.46	0.459	0.2173
0.05	0.526	0.523	0.5703
0.1	0.578	0.575	0.5190
0.2	0.63	0.613	2.6984
0.5	0.72	0.723	0.4166
1	0.822	0.82	0.2433

Capacitance Characteristic

Circuit Simulation Result

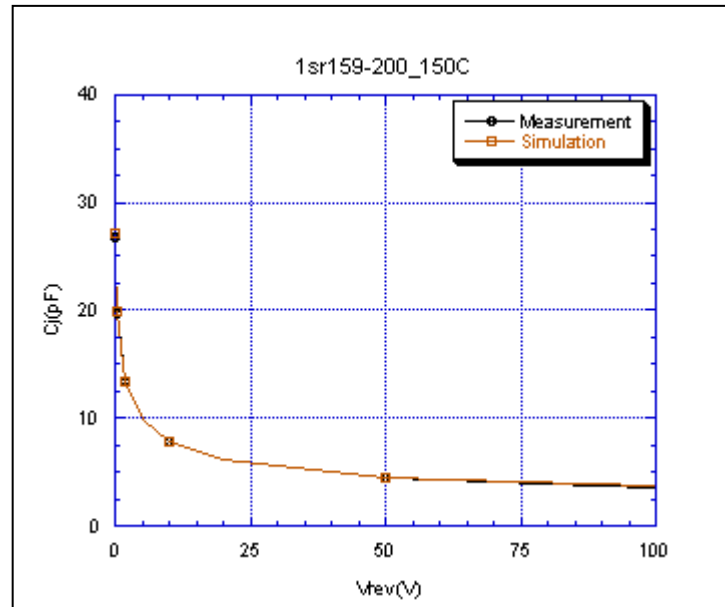


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

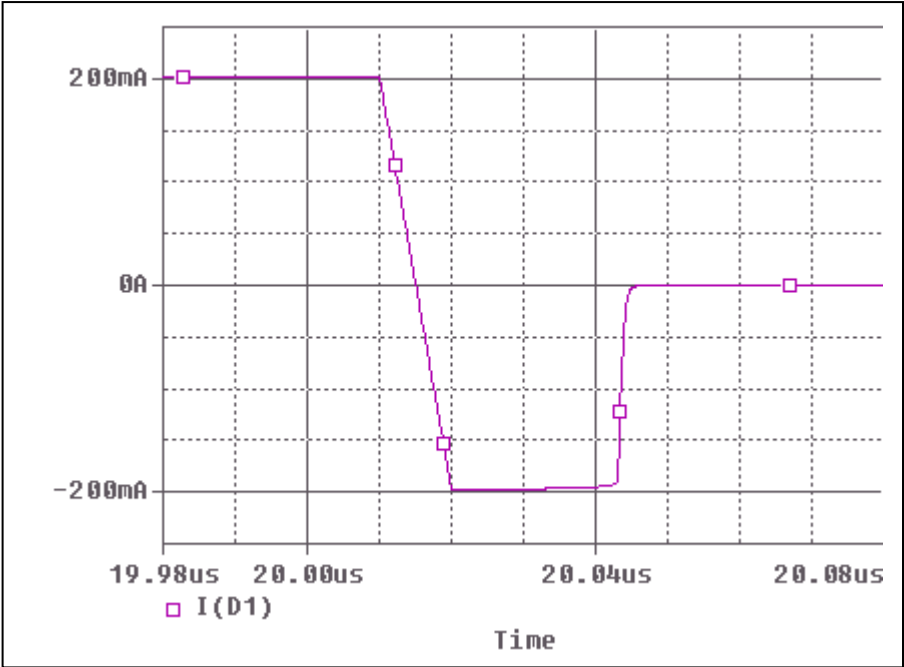


Simulation Result

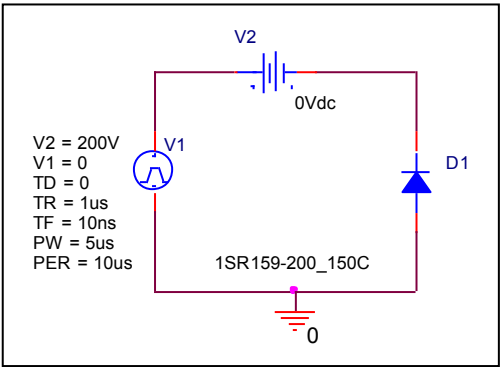
Vrev(V)	Cj(pF) Measurement	Cj(pF) Simulation	%Error
0	31.291	31.291	0.00
0.1	26.679	27.044	-1.37
0.2	24.313	24.368	-0.23
0.5	19.791	19.844	-0.27
1	16.740	16.531	1.25
2	13.327	13.308	0.14
5	9.918	9.886	0.32
10	7.816	7.812	0.05
20	6.120	6.163	-0.70
50	4.409	4.480	-1.61
100	3.460	3.530	-2.02

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

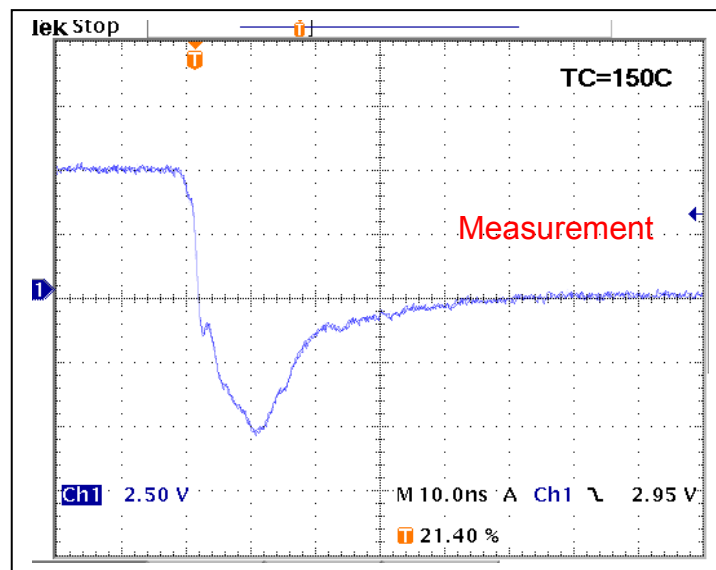


Compare Measurement vs. Simulation

	Measurement		Simulation		%Error
trr	28.0	ns	28.5	ns	1.785

Reverse Recovery Characteristic

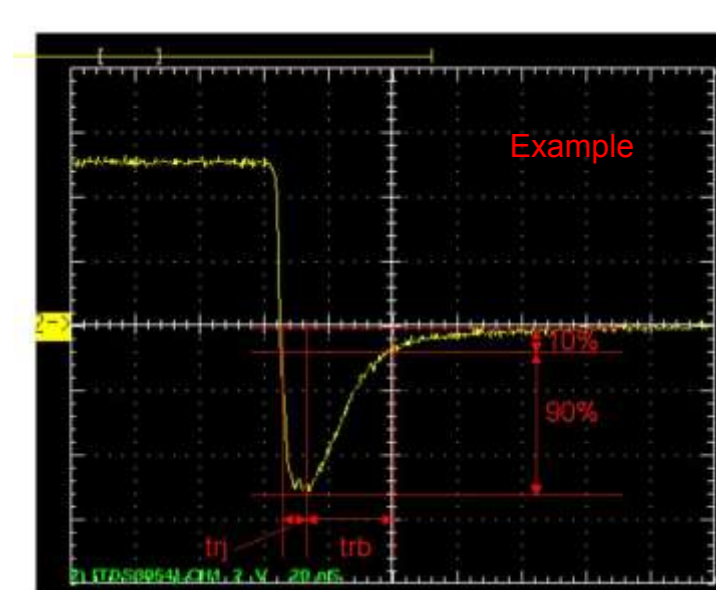
Reference



$T_{rr} = 9.8(\text{ns})$

$T_{rb} = 18.2(\text{ns})$

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



Relation between t_{rr} and t_{rb}