

Device Modeling Report

COMPONENTS:
DIODE/ GENERAL PURPOSE RECTIFIER / STANDARD
PART NUMBER: 1SR159-200
MANUFACTURER: ROHM
REMARK: TC=110 C



Bee Technologies Inc.

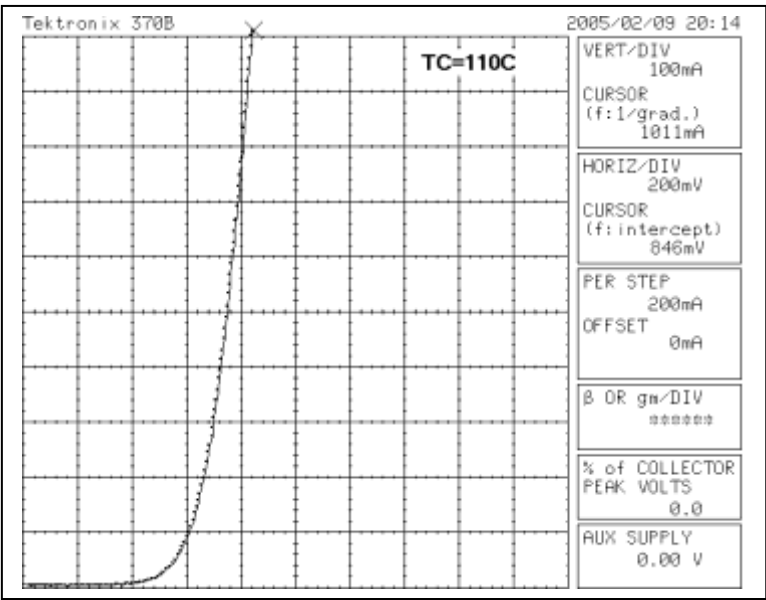
SPICE MODEL

```
*$  
* PART NUMBER: 1SR159-200  
* MANUFACTURER: ROHM  
* VRM=200,TC=110C ,IO=1.0A,IFSM=20A  
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.MODEL 1sr159-200_110C D  
+ IS=1.0000E-6  
+ N=1.9442  
+ RS=38.541E-3  
+ IKF=.11374  
+ ISR=0  
+ CJO=27.667E-12  
+ M=.34242  
+ VJ=.25067  
+ BV=200  
+ IBV=10.000E-6  
+ TT=37.587E-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

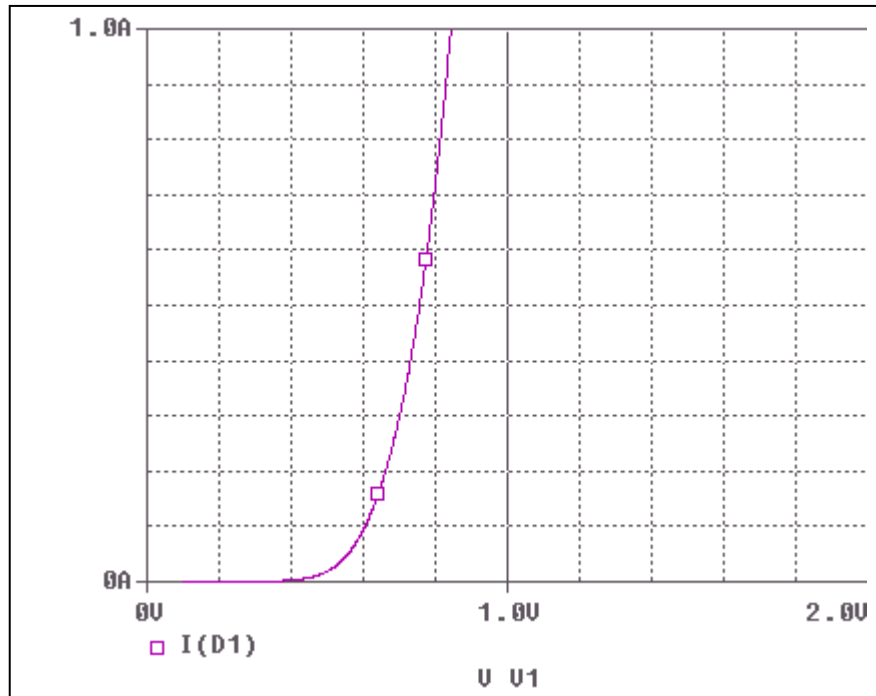
Forward Current Characteristic

Reference

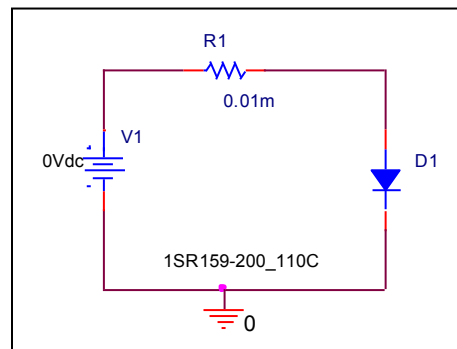


Forward Current Characteristic

Circuit Simulation Result

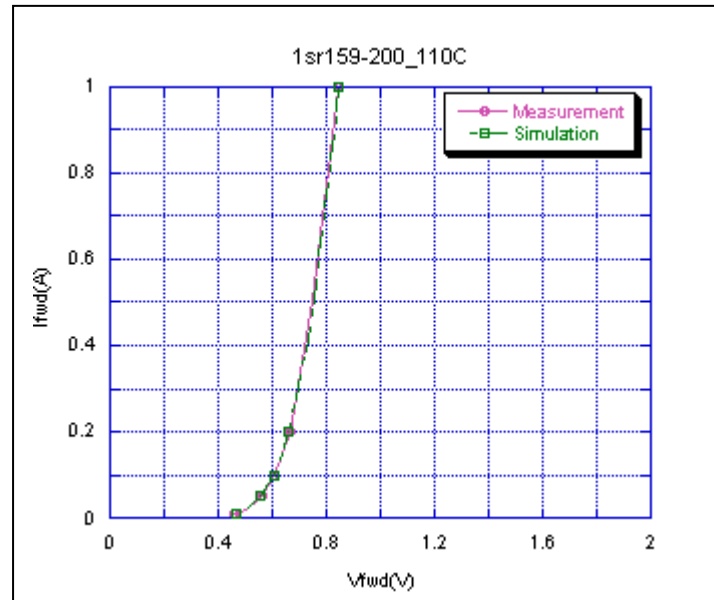


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

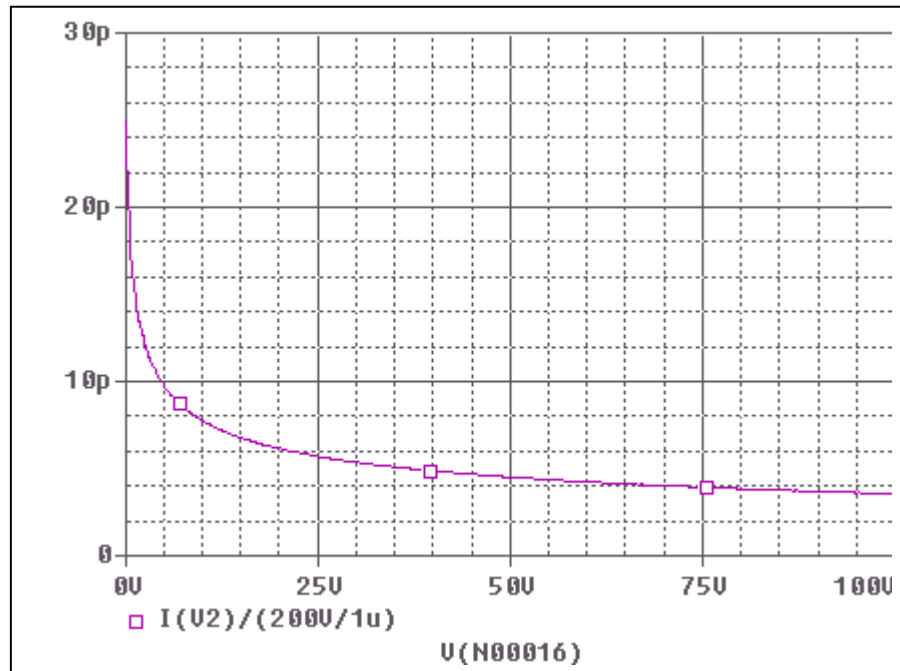


Simulation Result

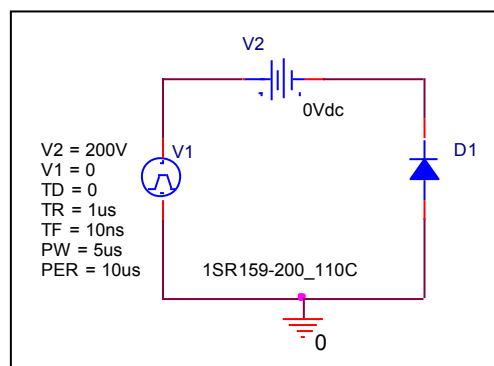
Ifwd(A)	Vfwd(V) Measurement	Vfwd(V) Simulation	%Error
0.01	0.460	0.465	-1.09
0.02	0.500	0.503	-0.60
0.05	0.562	0.557	0.89
0.1	0.610	0.605	0.82
0.2	0.664	0.661	0.45
0.5	0.748	0.756	-1.07
1	0.846	0.843	0.35

Capacitance Characteristic

Circuit Simulation Result

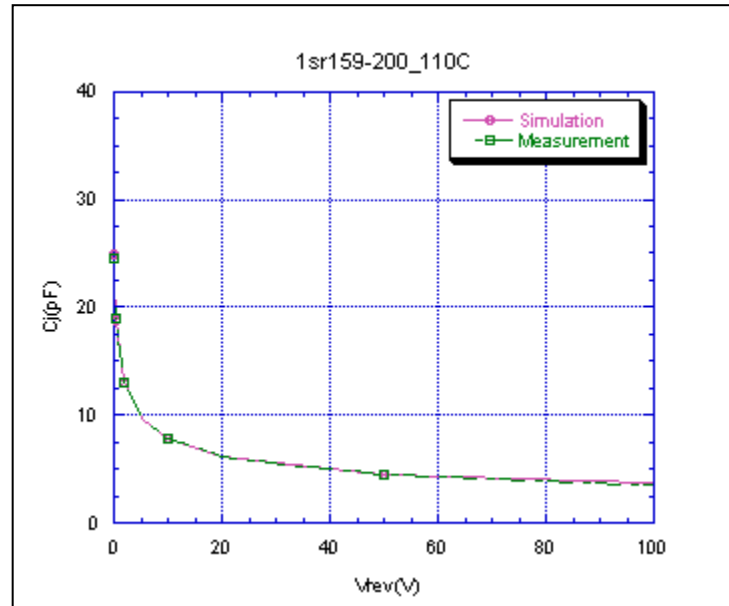


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

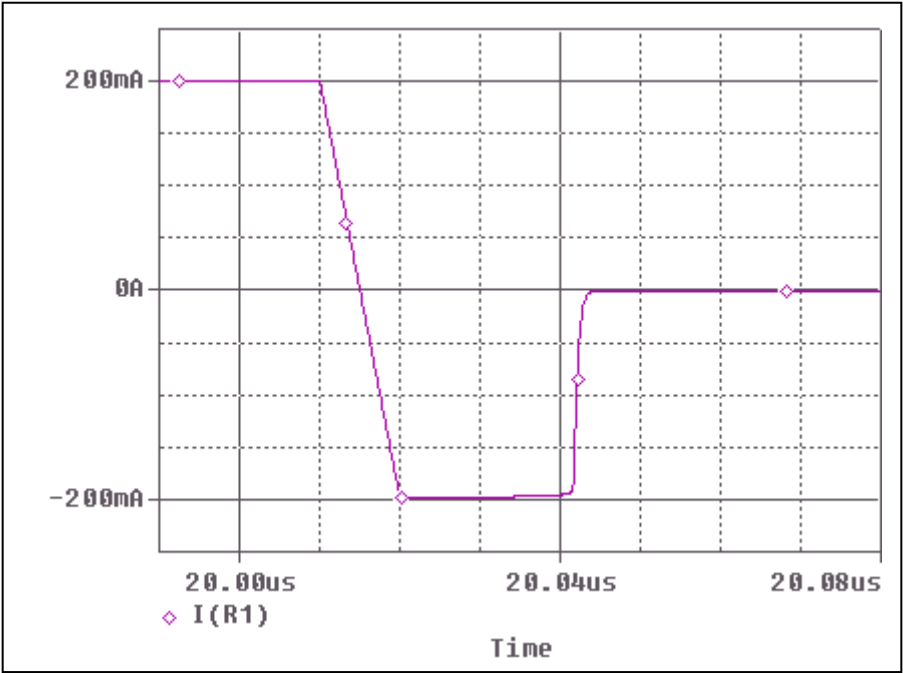


Simulation Result

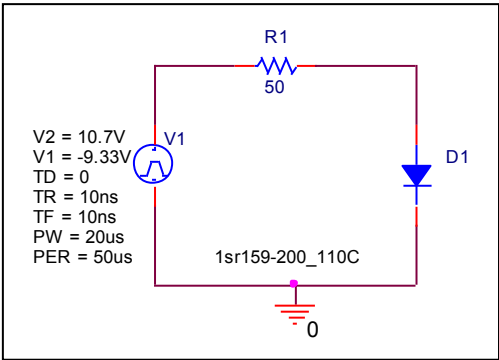
$V_{rev}(\text{V})$	$C_j(\text{pF})$ Measurement	$C_j(\text{pF})$ Simulation	%Error
0	27.795	27.795	0.00
0.1	24.465	24.921	-1.86
0.2	22.616	22.607	0.04
0.5	18.968	18.838	0.69
1	16.038	15.952	0.54
2	13.108	13.096	0.09
5	9.874	9.773	1.02
10	7.807	7.756	0.65
20	6.115	6.159	-0.72
50	4.402	4.505	-2.34
100	3.450	3.563	-3.28

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

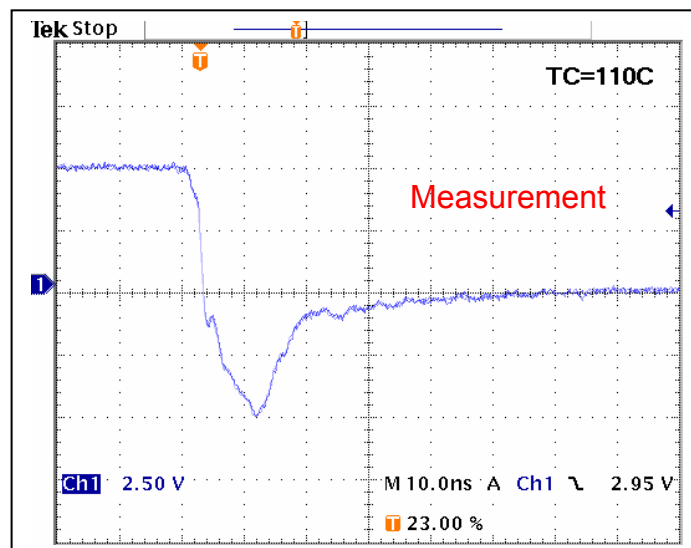


Compare Measurement vs. Simulation

	Measurement		Simulation		%Error
trr	26.40	ns	27.2	ns	3.03

Reverse Recovery Characteristic

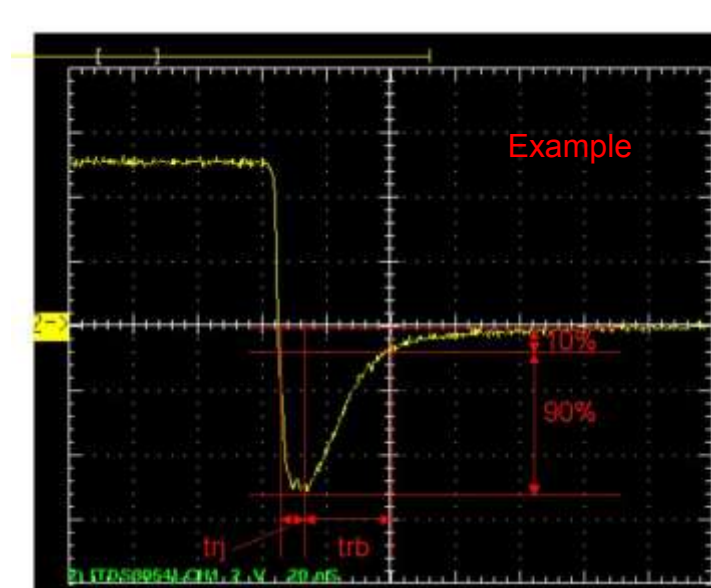
Reference



$T_{rr} = 8.80(\text{ns})$

$T_{rb} = 17.6(\text{ns})$

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



Relation between t_{rr} and t_{rb}