

Device Modeling Report

COMPONENTS:
DIODE/ GENERAL PURPOSE RECTIFIER / STANDARD
PART NUMBER: 1SR159-200
MANUFACTURER: ROHM
REMARK: TC=80C



Bee Technologies Inc.

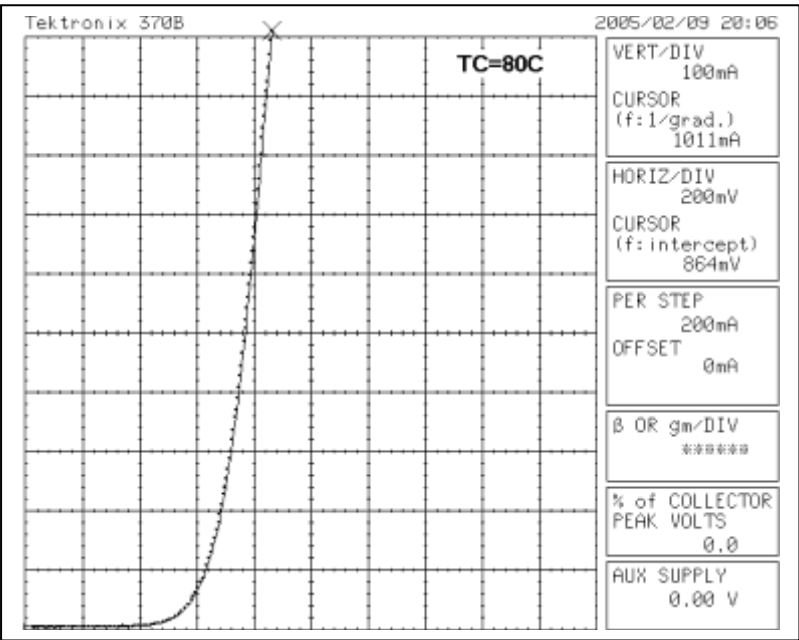
SPICE MODEL

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*$  
* PART NUMBER: 1SR159-200  
* MANUFACTURER: ROHM  
* VRM=200,TC=80C ,IO=1.0A,IFSM=20A  
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.MODEL 1sr159-200_80C D  
+ IS=13.976E-9  
+ N=1.2461  
+ RS=96.292E-3  
+ IKF=3.2184E-3  
+ ISR=0  
+ CJO=25.592E-12  
+ M=.3483  
+ VJ=.32352  
+ BV=200  
+ IBV=10.000E-6  
+ TT=22.472E-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

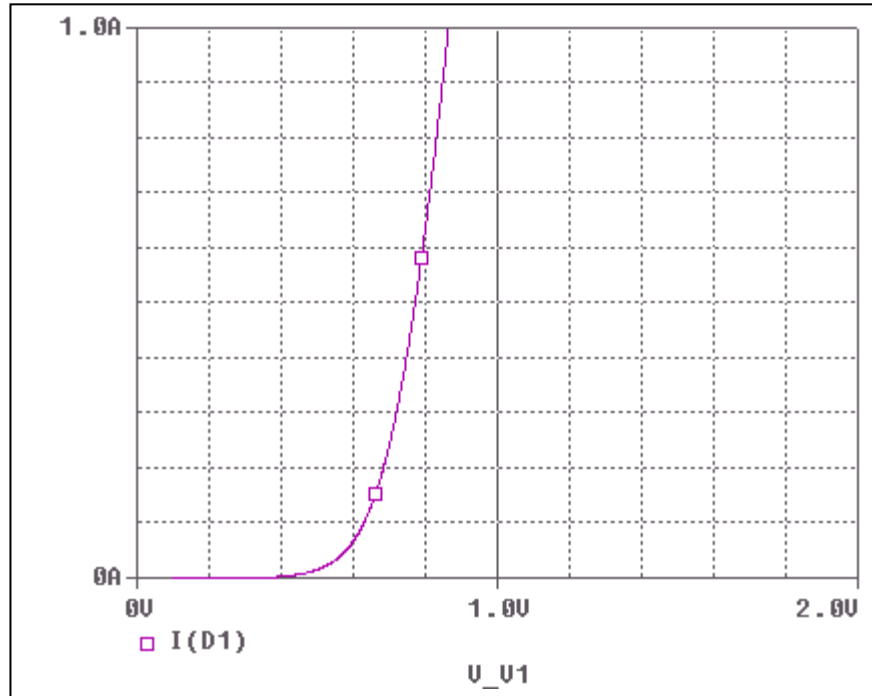
Forward Current Characteristic

Reference

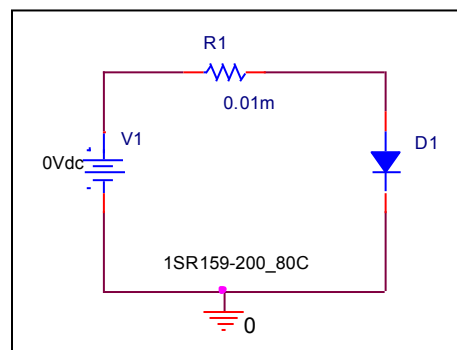


- **Forward Current Characteristic**

Circuit Simulation Result

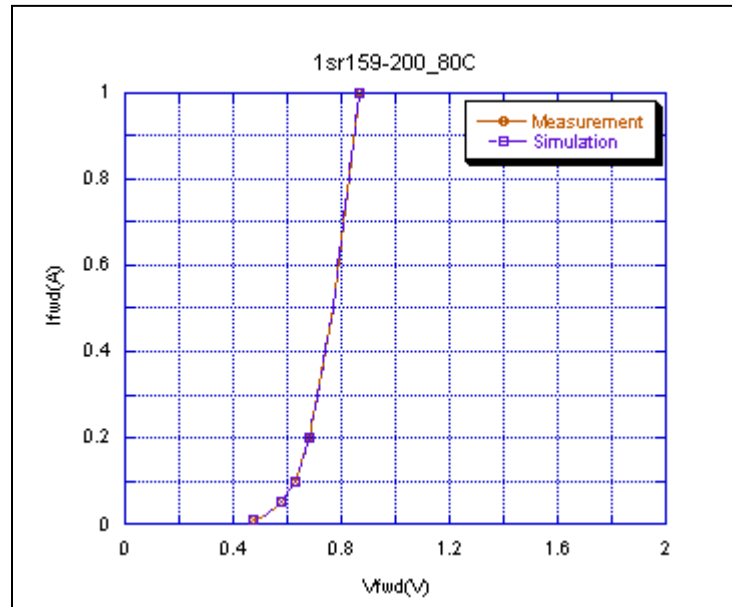


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

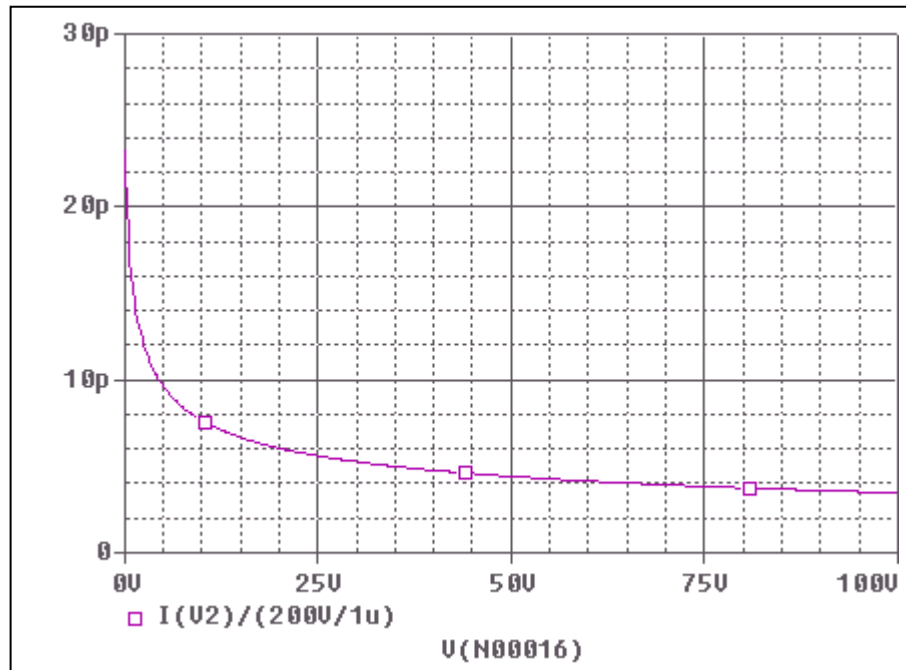


Simulation Result

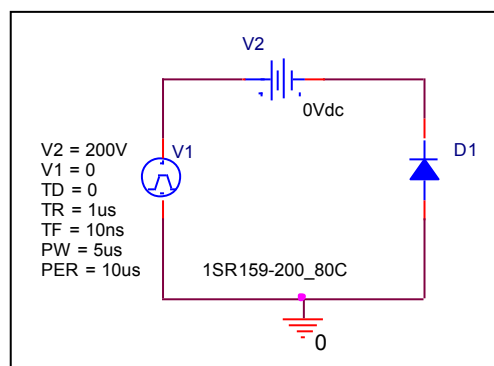
Ifwd(A)	Vfwd(V) Measurement	Vfwd(V) Simulation	%Error
0.01	0.475	0.474	0.21
0.02	0.518	0.518	0.00
0.05	0.580	0.580	0.00
0.1	0.630	0.629	0.16
0.2	0.682	0.683	-0.15
0.5	0.772	0.771	0.13
1	0.864	0.864	0.00

Capacitance Characteristic

Circuit Simulation Result

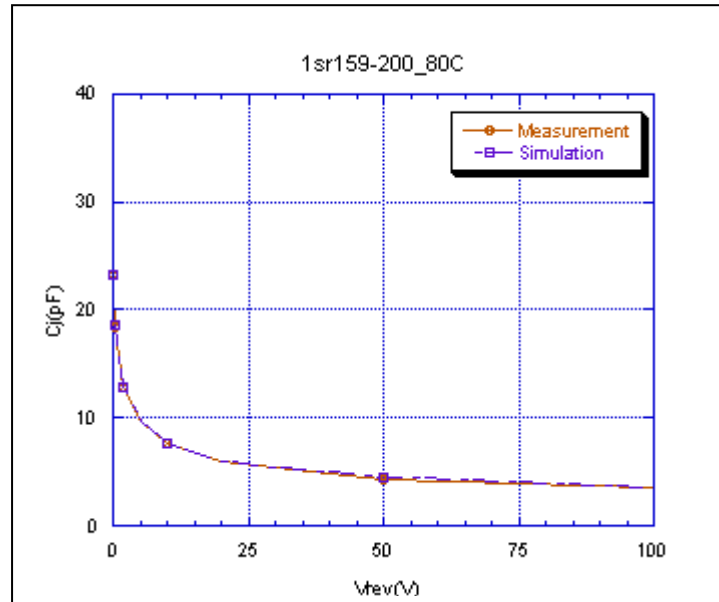


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

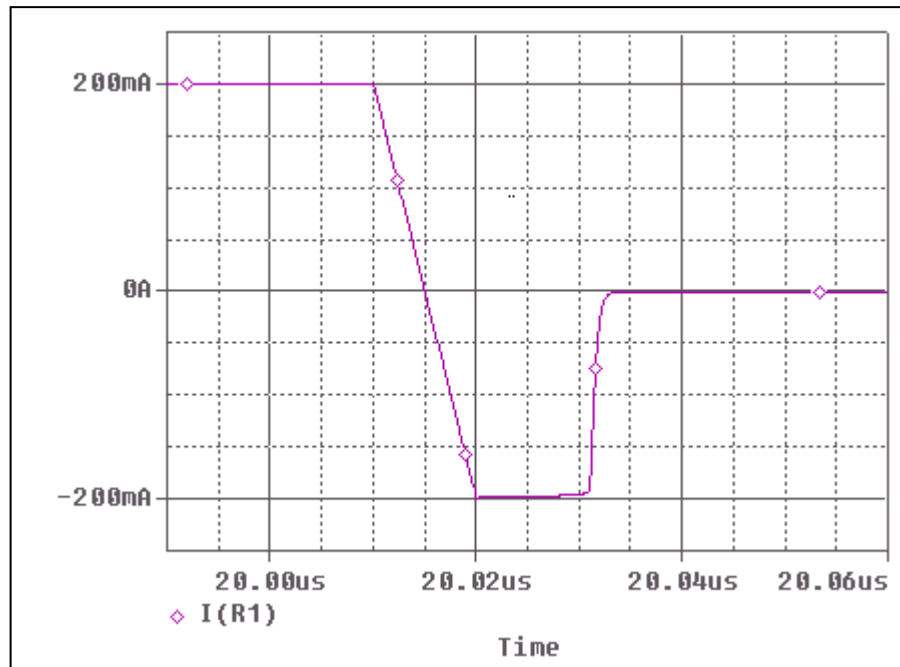


Simulation Result

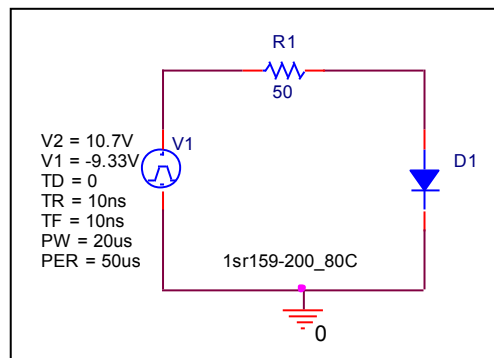
$V_{rev}(\text{V})$	$C_j(\text{pF})$ Measurement	$C_j(\text{pF})$ Simulation	%Error
0	25.593	25.593	0.00
0.1	23.299	23.273	0.11
0.2	21.684	21.704	-0.09
0.5	18.397	18.544	-0.80
1	15.670	15.700	-0.19
2	12.888	12.820	0.53
5	9.715	9.657	0.60
10	7.701	7.637	0.83
20	6.045	6.049	-0.07
50	4.363	4.409	-1.05
100	3.429	3.469	-1.17

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

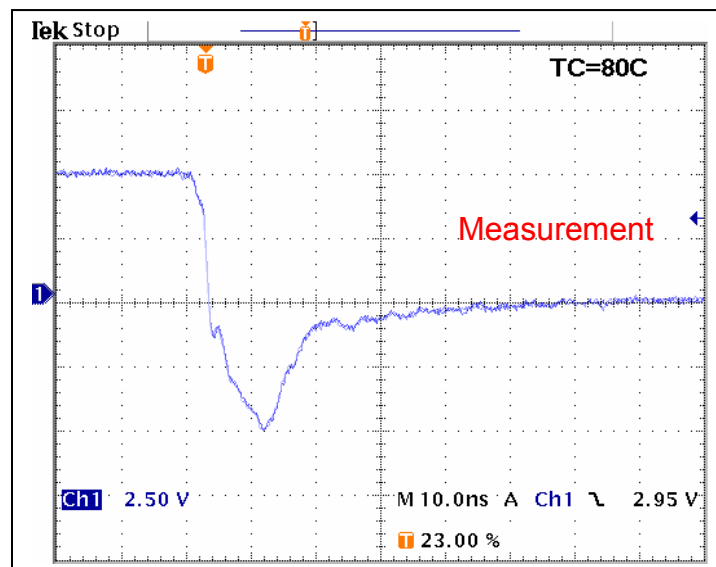


Compare Measurement vs. Simulation

	Measurement		Simulation		%Error
trr	16.20	ns	16.70	ns	3.08

Reverse Recovery Characteristic

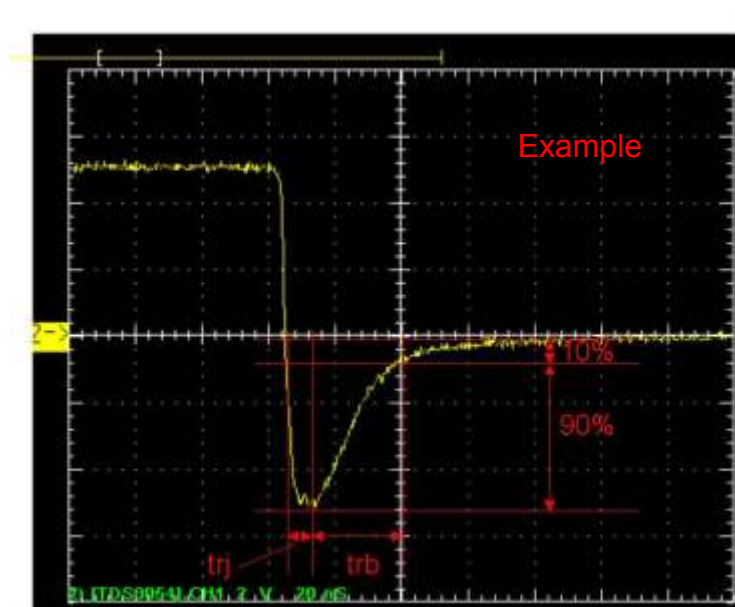
Reference



$T_{rj} = 7.40(\text{ns})$

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

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



Relation between t_{rj} and t_{rb}