

Device Modeling Report

COMPONENTS:
DIODE/ GENERAL PURPOSE RECTIFIER/ STANDARD
PART NUMBER: 5GLZ47A
MANUFACTURER: TOSHIBA
REMARK: TC=80C



Bee Technologies Inc.

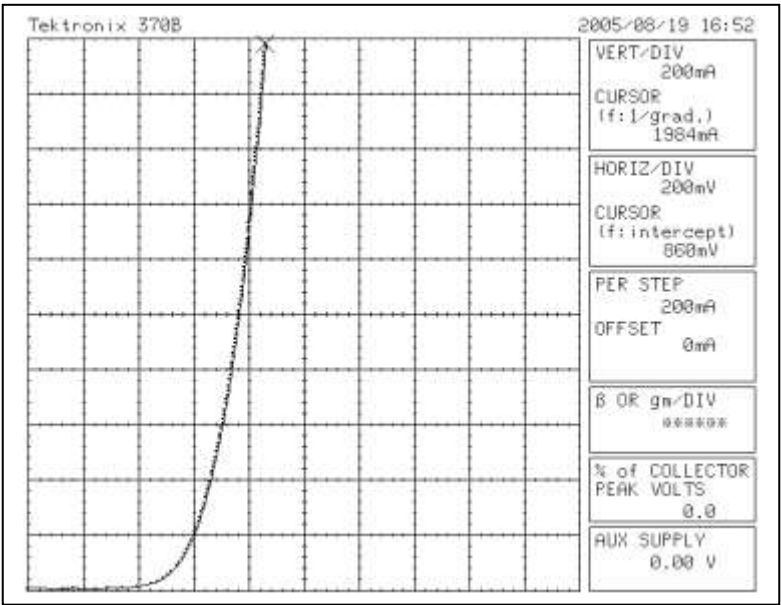
SPICE MODEL

```
*$  
* PART NUMBER: 5GLZ47A  
* MANUFACTURER: TOSHIBA  
* REMARK: TC=80C  
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.MODEL 5GLZ47A_80s D  
+ IS=18.819E-6  
+ N=2.4309  
+ RS=13.994E-3  
+ IKF=.39557  
+ ISR=0  
+ CJO=128.91E-12  
+ M=.43341  
+ VJ=.3241  
+ BV=400  
+ IBV=50.000E-6  
+ TT=107.42E-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

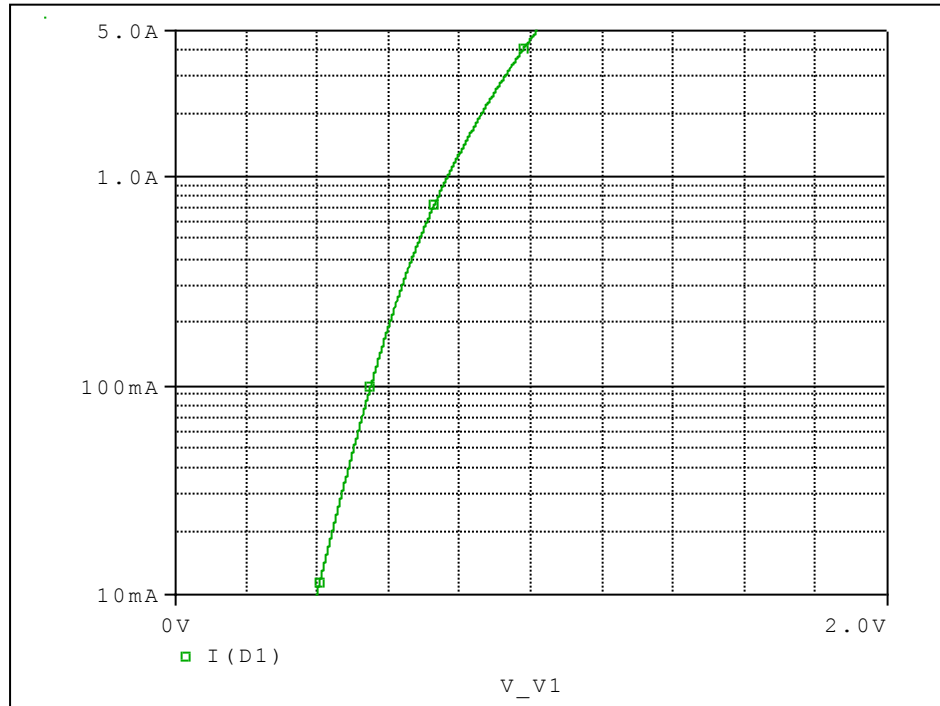
Forward Current Characteristic

Reference

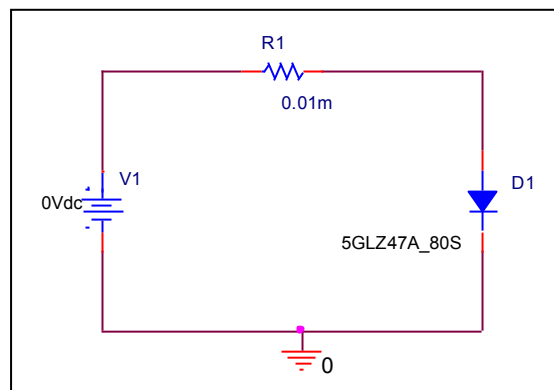


Forward Current Characteristic

Circuit Simulation Result

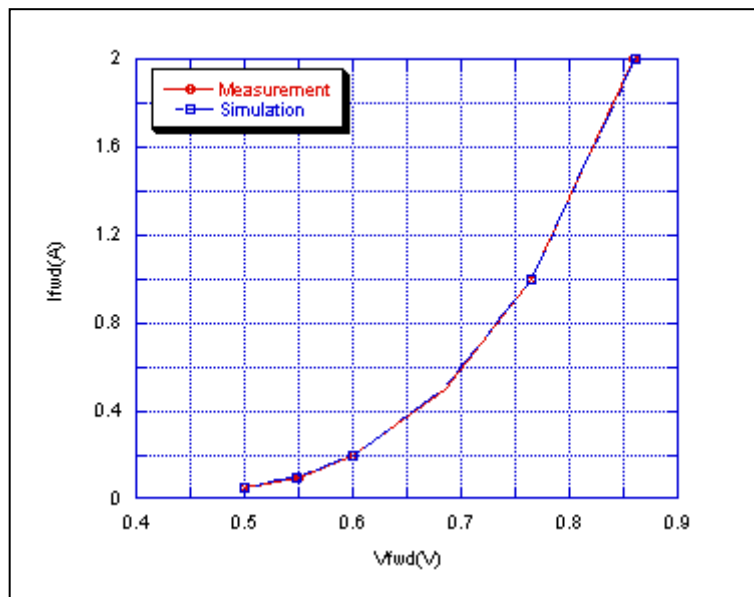


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

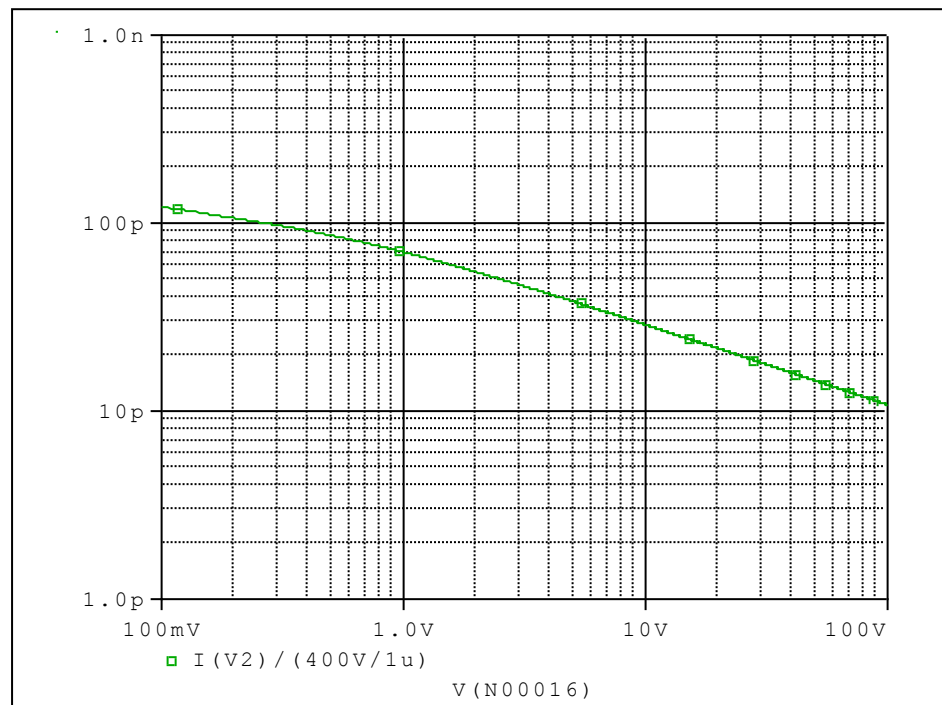


Simulation Result

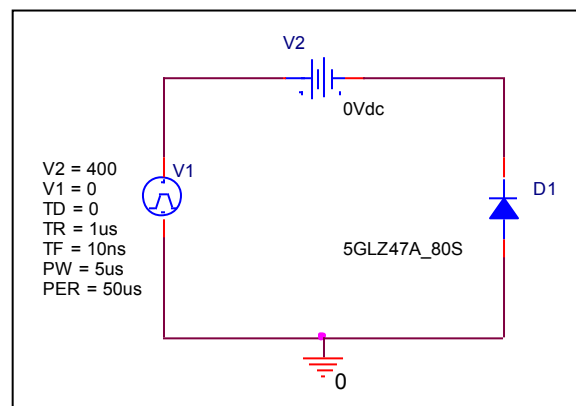
I_{fwd} (A)	V_{fwd} (V) Measurement	V_{fwd} (V) Simulation	%Error
0.05	0.500	0.499	0.200
0.1	0.550	0.548	0.364
0.2	0.600	0.601	-0.167
0.5	0.686	0.684	0.292
1	0.764	0.763	0.131
2	0.860	0.861	-0.116

Capacitance Characteristic

Circuit Simulation Result

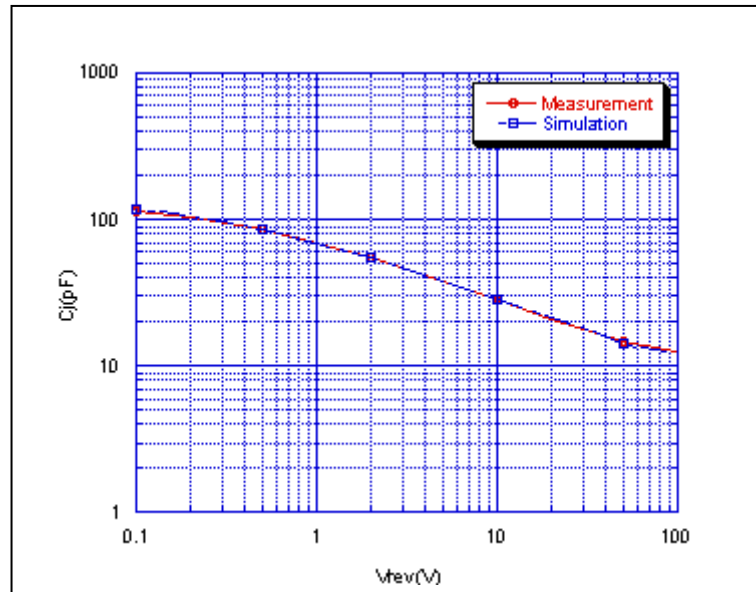


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

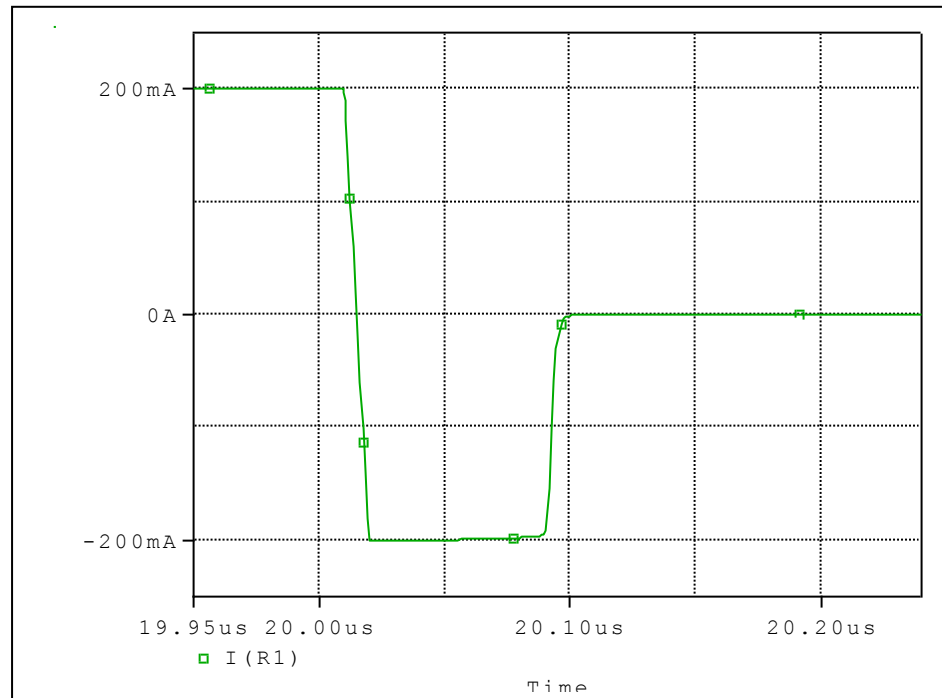


Simulation Result

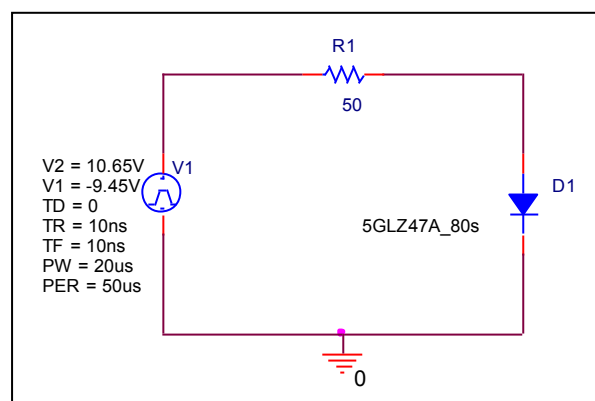
V_{rev} (V)	C_j (pF) Measurement	C_j (pF) Simulation	%Error
0	128.400	128.400	0.000
0.1	115.200	119.000	-3.299
0.2	105.200	106.400	-1.141
0.5	85.800	85.700	0.117
1	70.200	70.000	0.285
2	54.600	54.800	-0.366
5	37.400	38.300	-2.406
10	29.000	28.700	1.034
20	21.100	21.400	-1.422
50	14.600	14.500	0.685
100	12.200	11.700	4.098

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

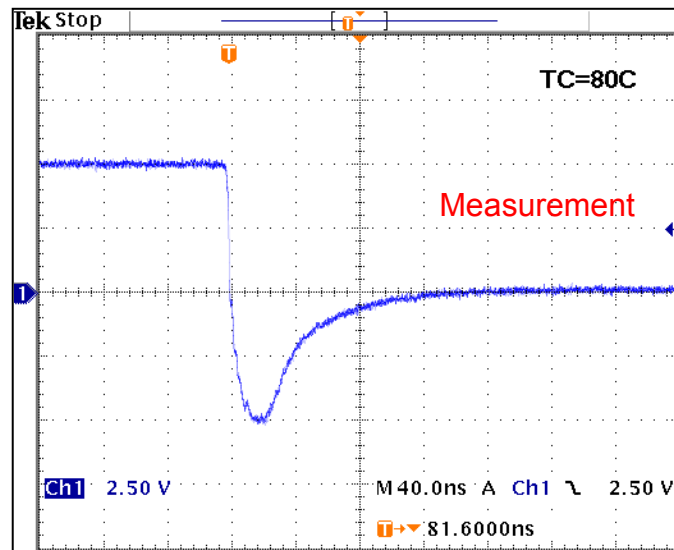


Compare Measurement vs. Simulation

	Measurement		Simulation		%Error
trr	80.00	ns	79.77	ns	0.287

Reverse Recovery Characteristic

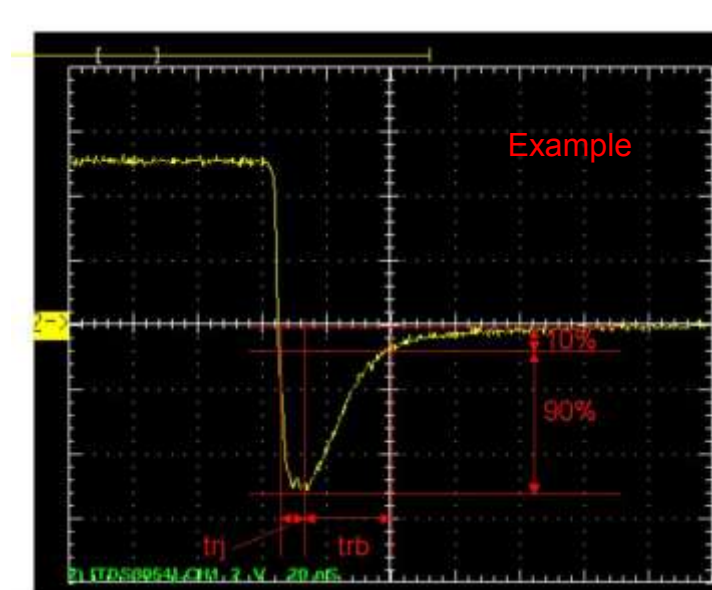
Reference



$T_{rj} = 19.2 \text{ (ns)}$

$T_{rb} = 60.8 \text{ (ns)}$

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



Relation between t_{rj} and t_{rb}