

Device Modeling Report

COMPONENTS:
DIODE/ GENERAL PURPOSE RECTIFIER/ STANDARD
PART NUMBER: 5GLZ47A
MANUFACTURER: TOSHIBA
REMARK: TC=150C



Bee Technologies Inc.

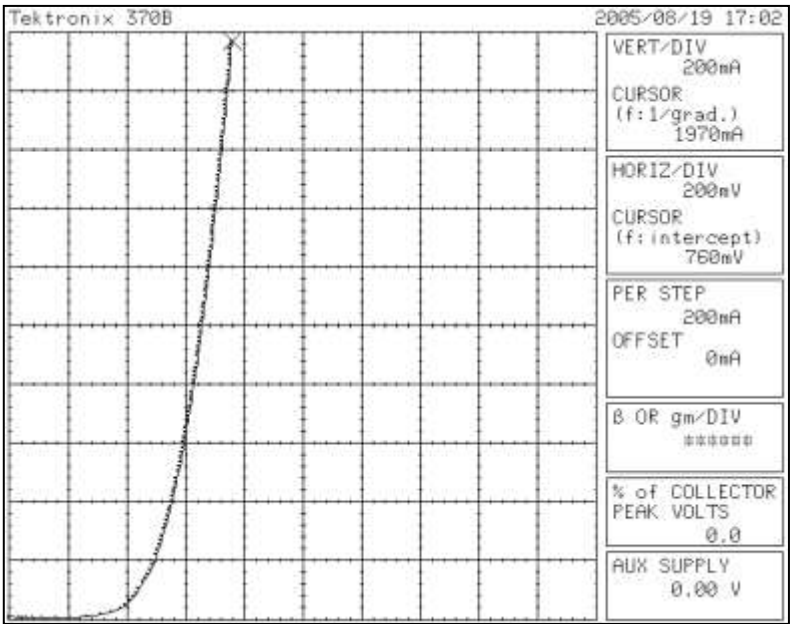
SPICE MODEL

```
*$  
* PART NUMBER: 5GLZ47A  
* MANUFACTURER: TOSHIBA  
* REMARK: TC=150C  
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.MODEL 5GLZ47A_150s D  
+ IS=92.497E-6  
+ N=2.4144  
+ RS=30.460E-3  
+ IKF=.65306  
+ ISR=0  
+ CJO=221.81E-12  
+ M=.43401  
+ VJ=92.180E-3  
+ BV=400  
+ IBV=50.000E-6  
+ TT=210.35E-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

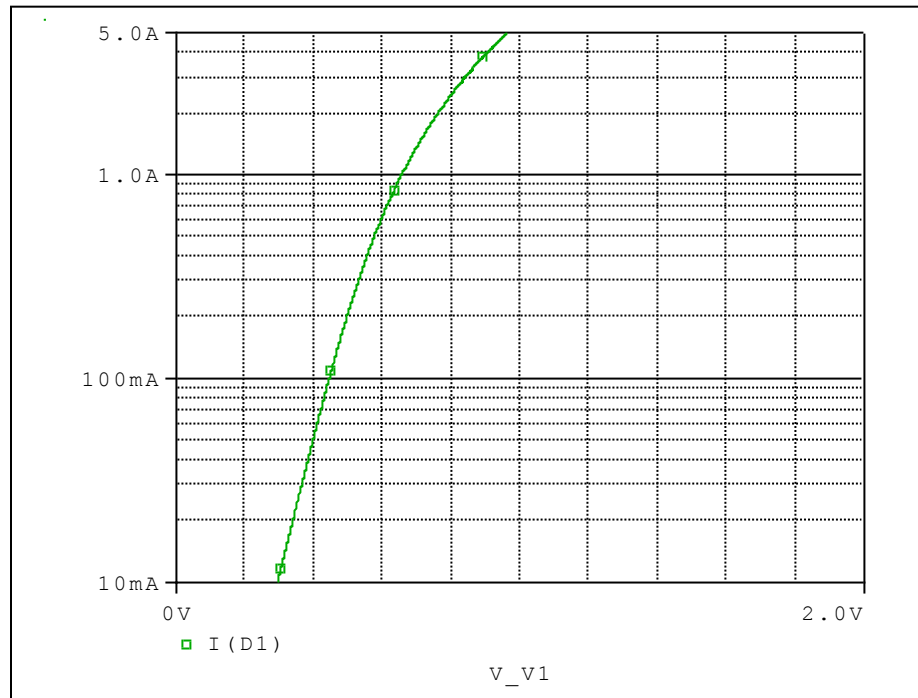
Forward Current Characteristic

Reference

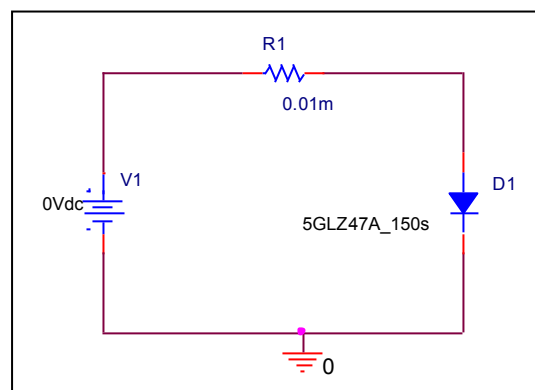


Forward Current Characteristic

Circuit Simulation Result

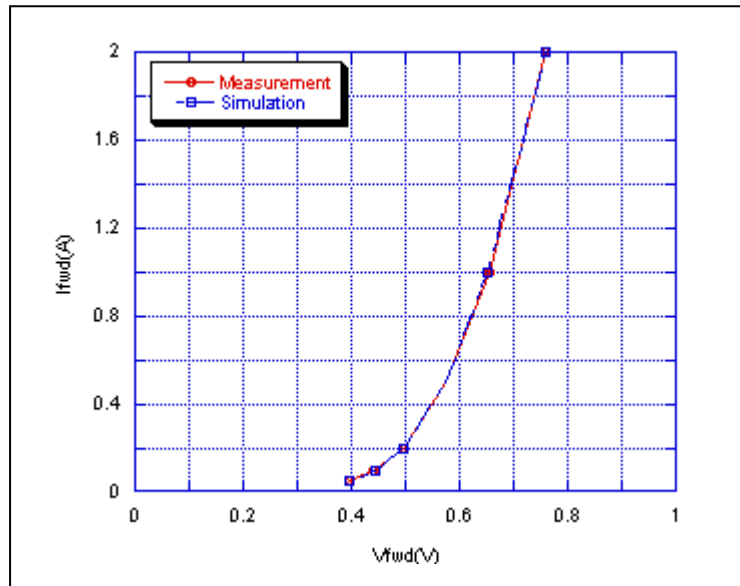


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

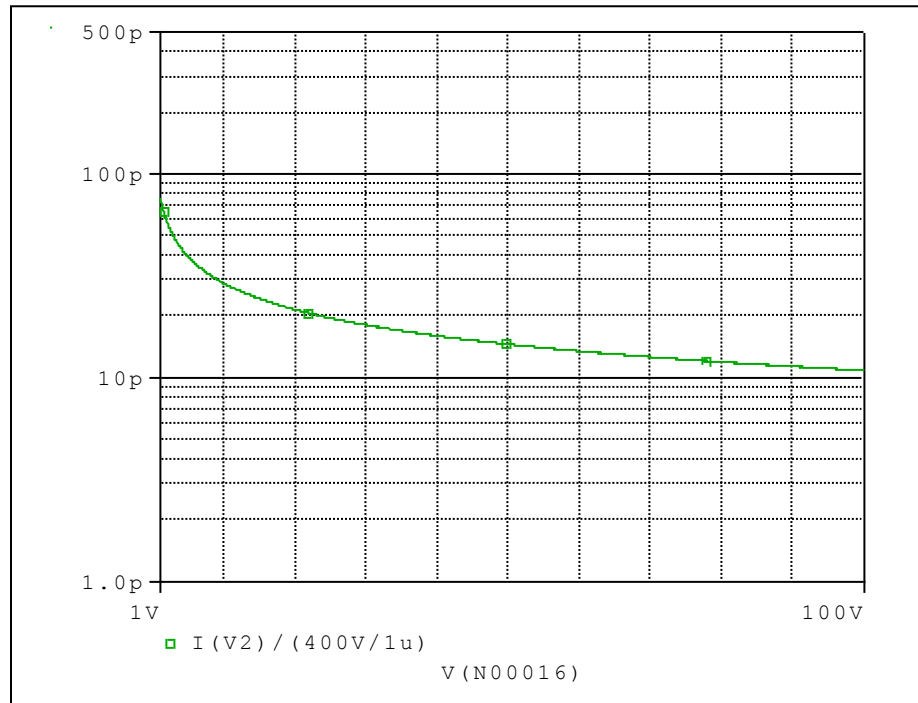


Simulation Result

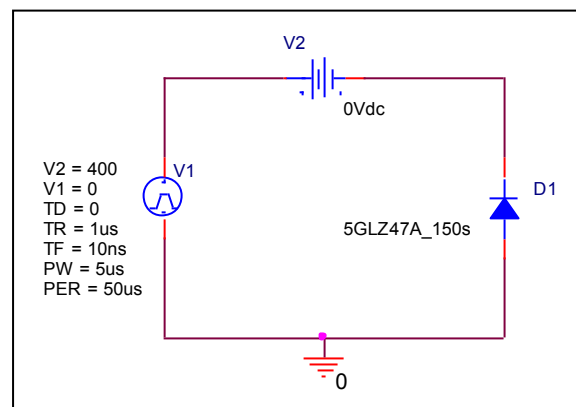
I_{fwd} (A)	V_{fwd} (V) Measurement	V_{fwd} (V) Simulation	%Error
0.05	0.398	0.397	0.251
0.1	0.442	0.444	-0.452
0.2	0.496	0.495	0.202
0.5	0.576	0.575	0.174
1	0.654	0.653	0.153
2	0.760	0.759	0.132

Capacitance Characteristic

Circuit Simulation Result

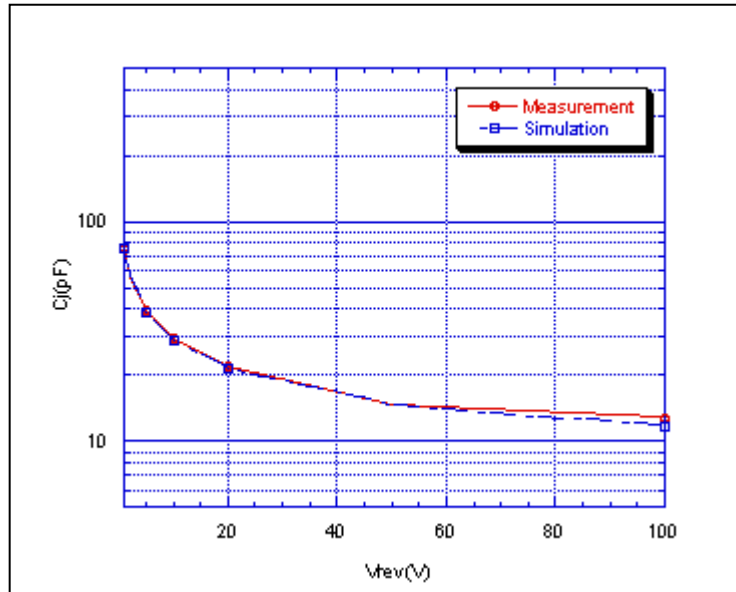


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

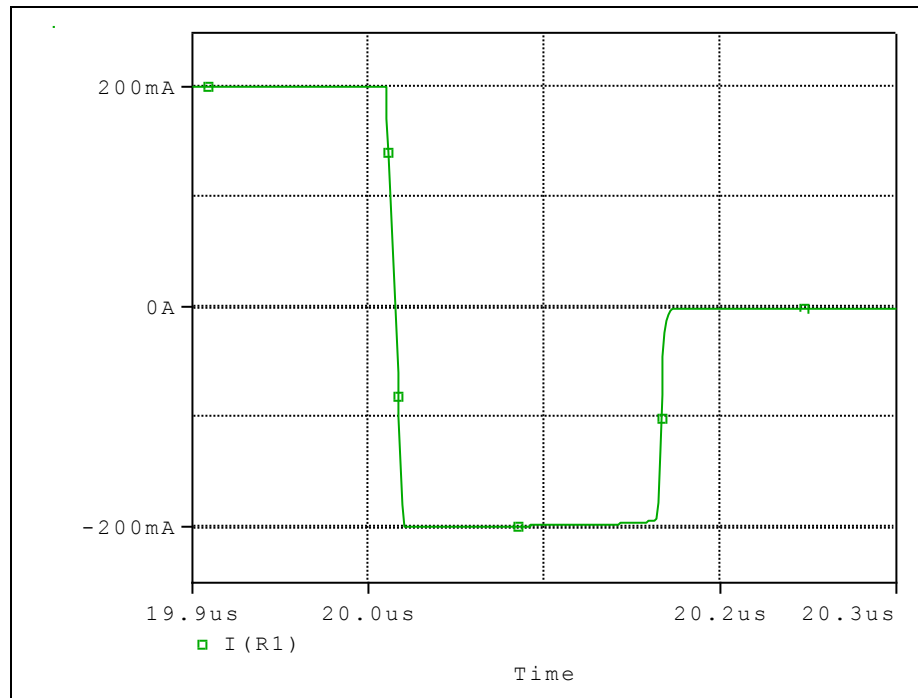


Simulation Result

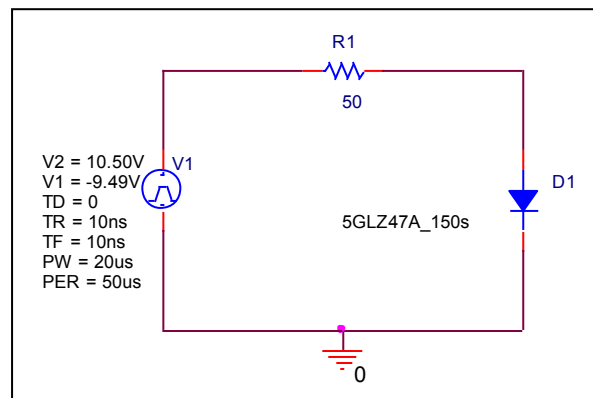
V_{rev} (V)	C_j (pF) Measurement	C_j (pF) Simulation	%Error
0	215.800	215.800	0.000
1	76.400	76.090	0.406
2	57.000	57.400	-0.702
5	39.500	39.100	1.013
10	29.500	29.100	1.356
20	22.100	21.600	2.262
50	14.700	14.600	0.680

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

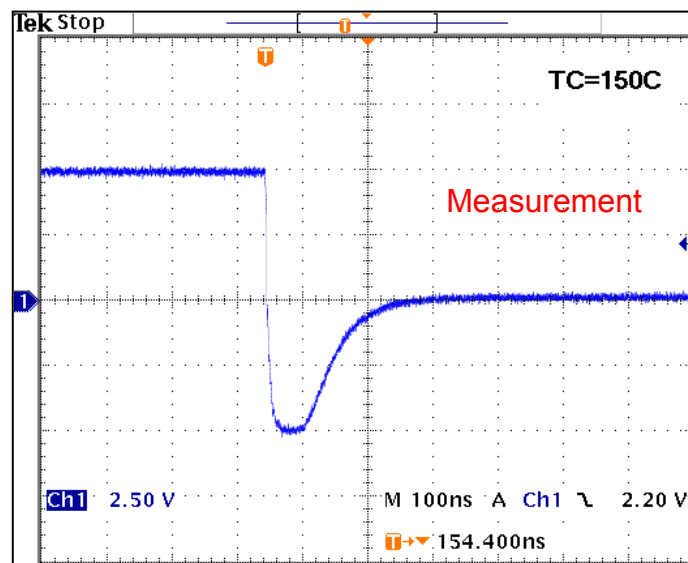


Compare Measurement vs. Simulation

	Measurement		Simulation		%Error
trr	154.00	ns	153.35	ns	0.422

Reverse Recovery Characteristic

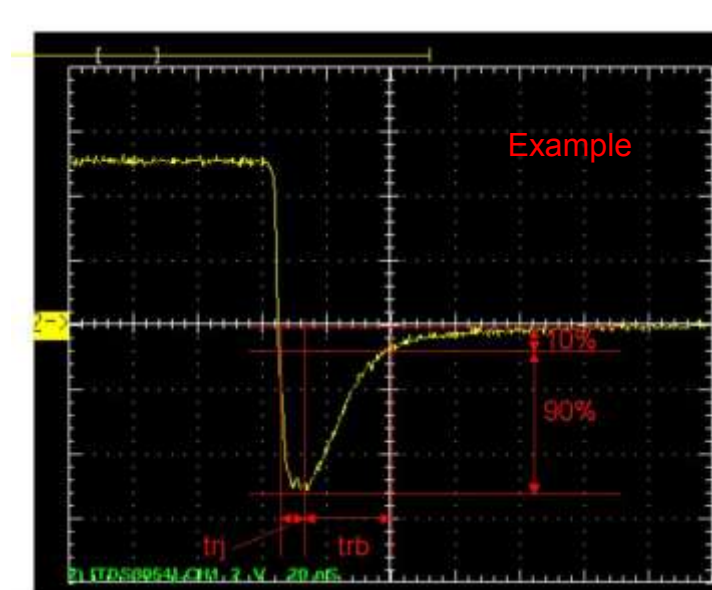
Reference



$T_{rj} = 54 \text{ (ns)}$

$T_{rb} = 100 \text{ (ns)}$

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



Relation between t_{rj} and t_{rb}