

Device Modeling Report

COMPONENTS:
DIODE/ GENERAL PURPOSE RECTIFIER/ STANDARD
PART NUMBER: 5GLZ47A
MANUFACTURER: TOSHIBA
REMARK: TC=110C



Bee Technologies Inc.

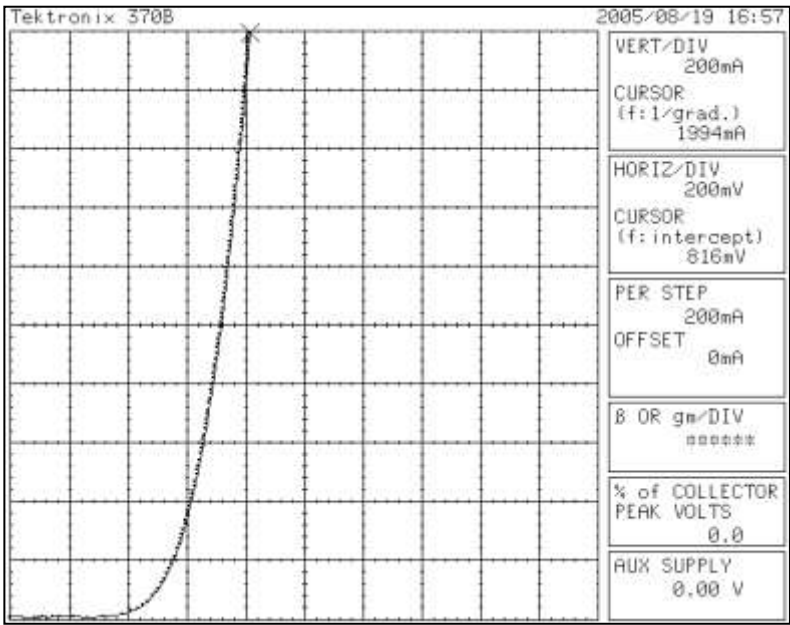
SPICE MODEL

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*$  
* PART NUMBER: 5GLZ47A  
* MANUFACTURER: TOSHIBA  
* REMARK: TC=110C  
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.MODEL 5GLZ47A_110s D  
+ IS=58.757E-6  
+ N=2.5772  
+ RS=20.641E-3  
+ IKF=.67233  
+ ISR=0  
+ CJO=144.18E-12  
+ M=.43076  
+ VJ=.25376  
+ BV=400  
+ IBV=50.000E-6  
+ TT=159.35E-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

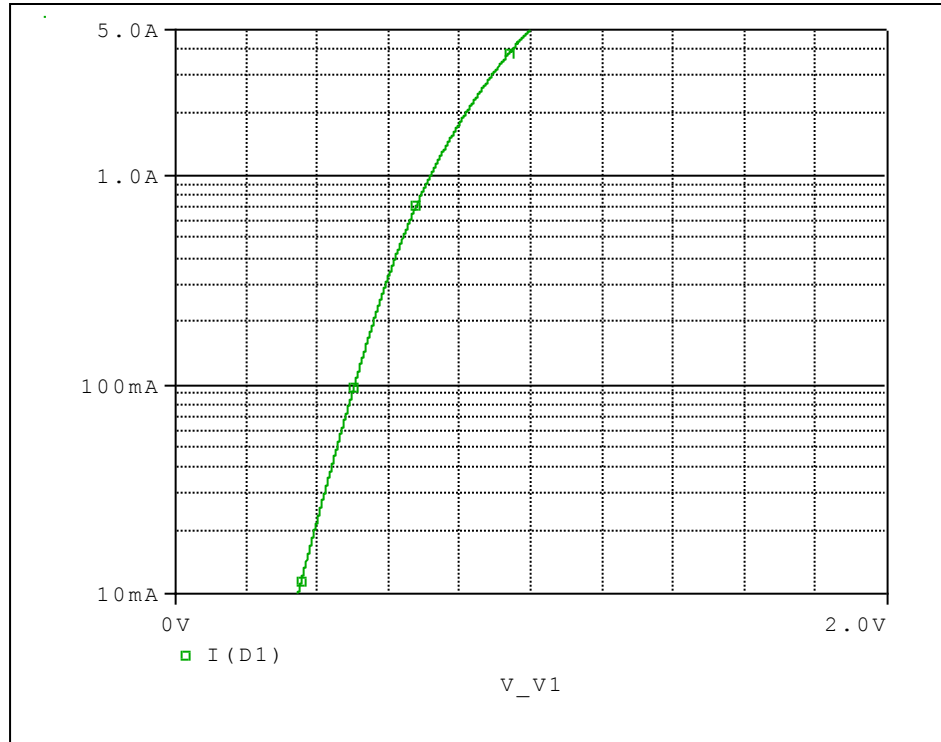
Forward Current Characteristic

Reference

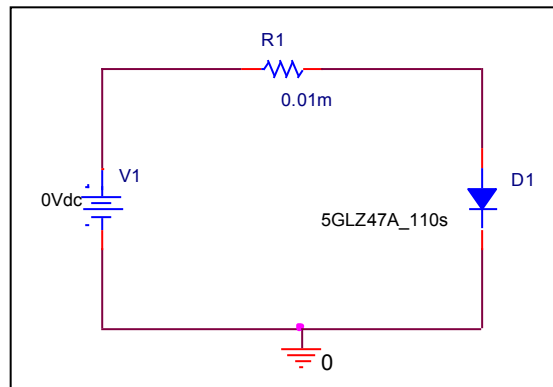


Forward Current Characteristic

Circuit Simulation Result

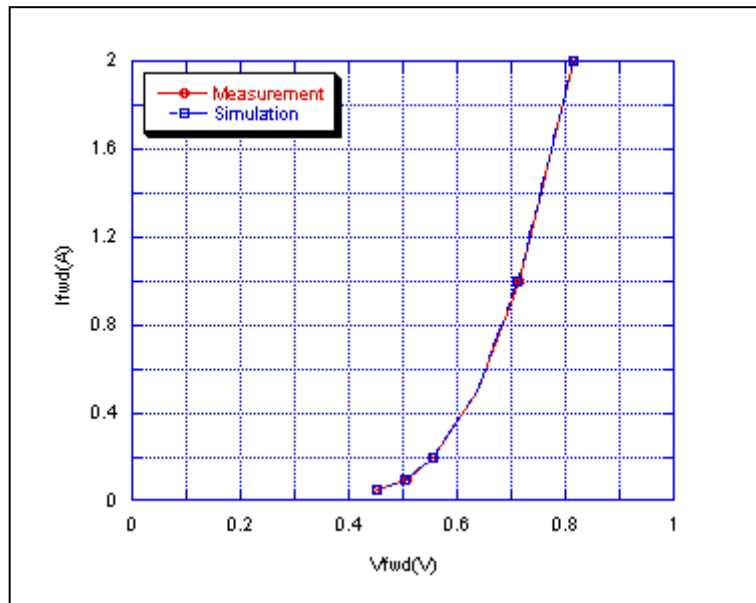


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

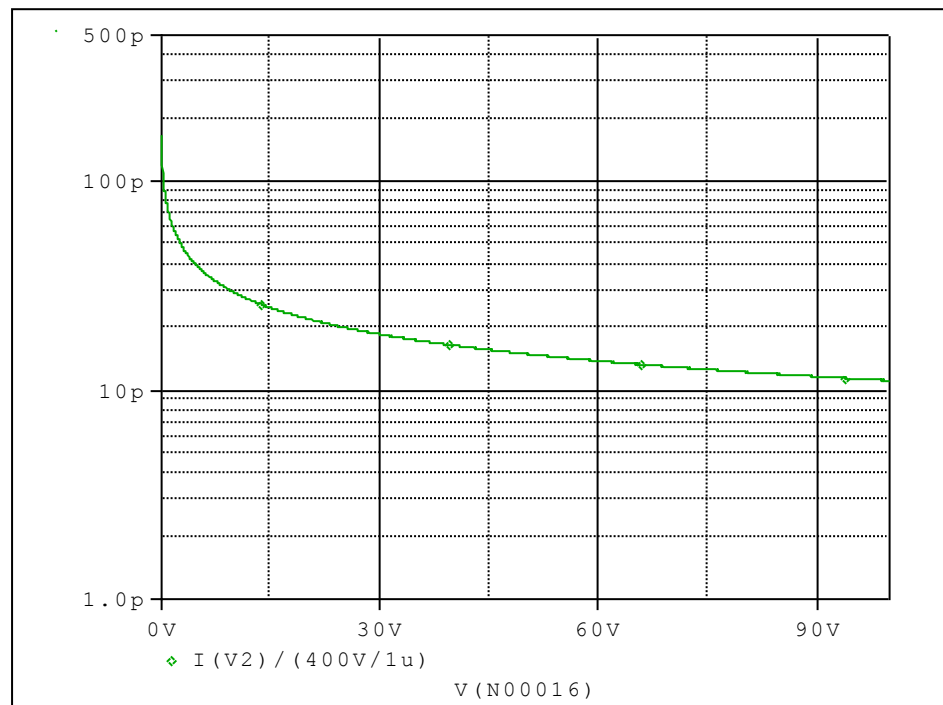


Simulation Result

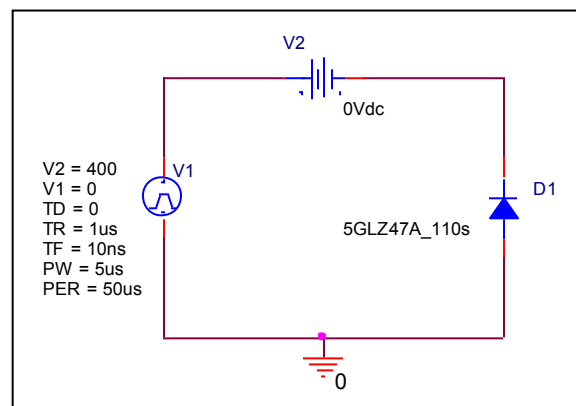
Ifwd(A)	Vfwd(V) Measurement	Vfwd(V) Simulation	%Error
0.05	0.452	0.451	0.221
0.1	0.506	0.503	0.593
0.2	0.554	0.556	-0.361
0.5	0.638	0.637	0.157
1	0.716	0.712	0.559
2	0.816	0.815	0.123

Capacitance Characteristic

Circuit Simulation Result

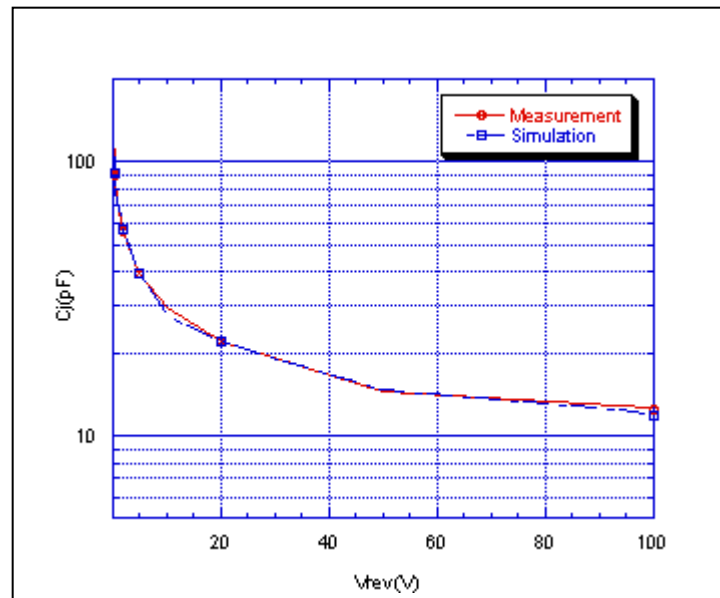


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

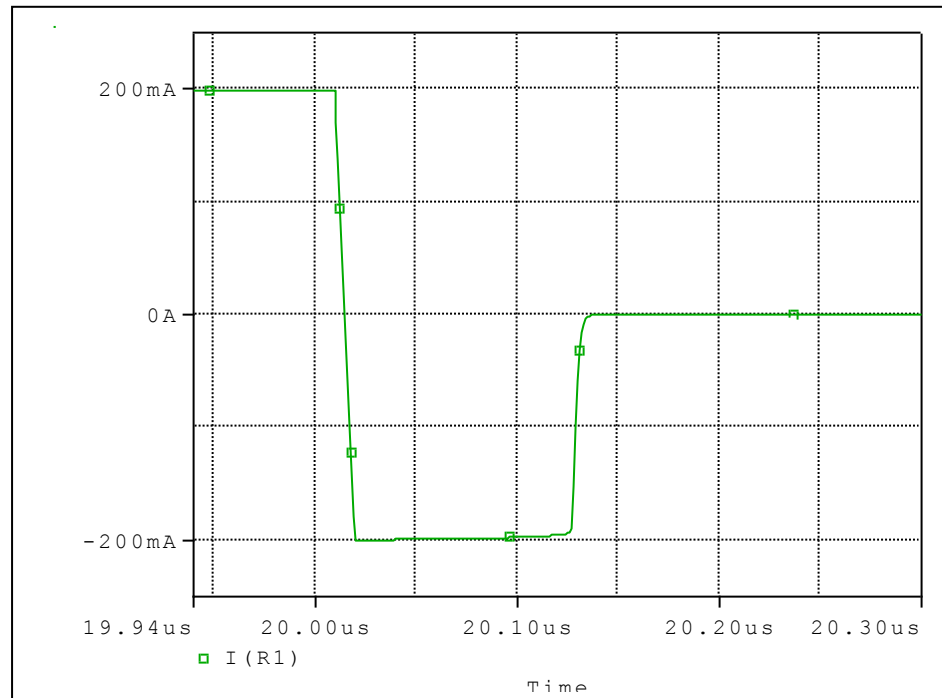


Simulation Result

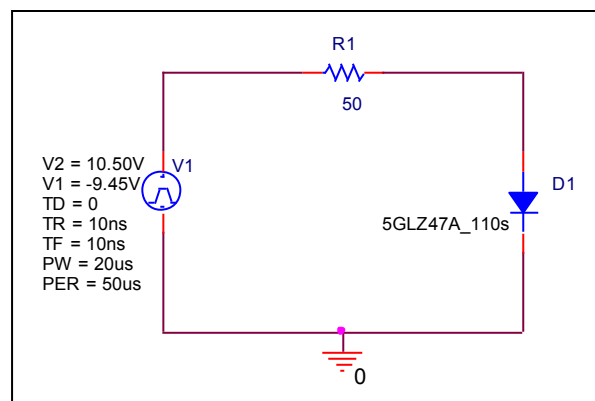
Vrev(V)	Cj(pF) Measurement	Cj(pF) Simulation	%Error
0	143.500	143.500	0.000
0.5	89.800	90.200	-0.445
1	72.100	72.600	-0.693
2	55.600	56.400	-1.439
5	38.900	39.000	-0.257
10	29.300	29.000	1.024
20	22.000	22.000	0.000
50	14.600	14.900	-2.055
100	12.500	11.900	4.800

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

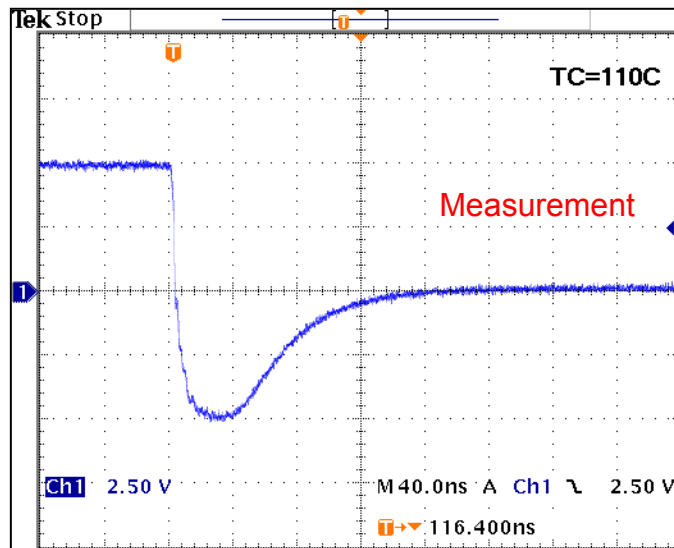


Compare Measurement vs. Simulation

	Measurement		Simulation		%Error
trr	116.00	ns	115.73	ns	0.233

Reverse Recovery Characteristic

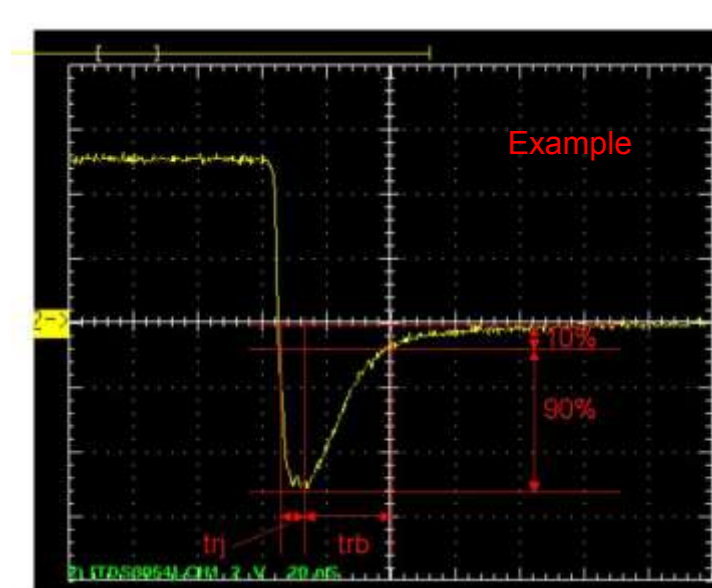
Reference



$T_{rj} = 36 \text{ (ns)}$

$T_{rb} = 80 \text{ (ns)}$

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



Relation between t_{rj} and t_{rb}