

Device Modeling Report

COMPONENTS:
DIODE/ GENERAL PURPOSE RECTIFIER/ STANDARD
PART NUMBER: 5GLZ47A
MANUFACTURER: TOSHIBA
REMARK: TC=25C



Bee Technologies Inc.

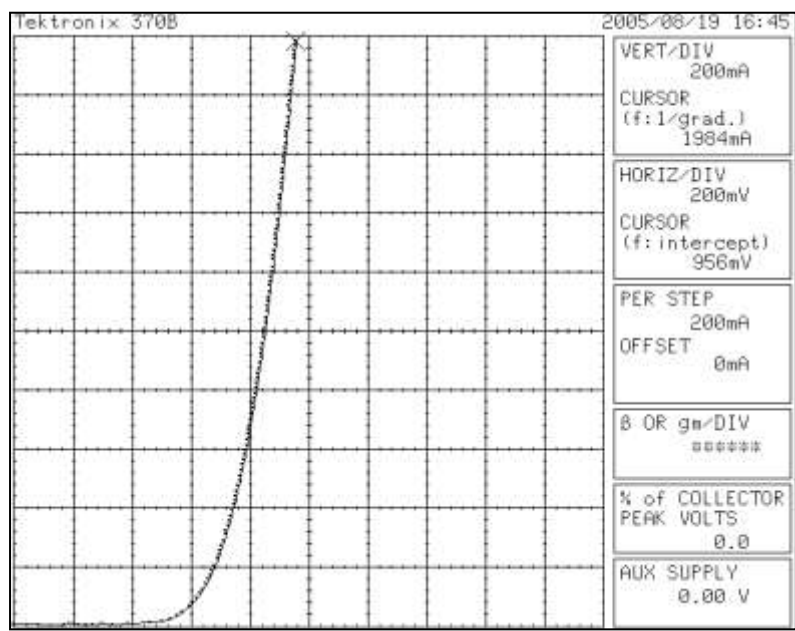
SPICE MODEL

```
*$  
* PART NUMBER: 5GLZ47A  
* MANUFACTURER: TOSHIBA  
* REMARK: TC=25C  
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.MODEL 5GLZ47_25s D  
+ IS=10.448E-6  
+ N=2.5903  
+ RS=17.404E-3  
+ IKF=.42756  
+ ISR=0  
+ CJO=112.64E-12  
+ M=.42005  
+ VJ=.40817  
+ ISR=100.00E-12  
+ BV=400  
+ IBV=50.000E-6  
+ TT=44.937E-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

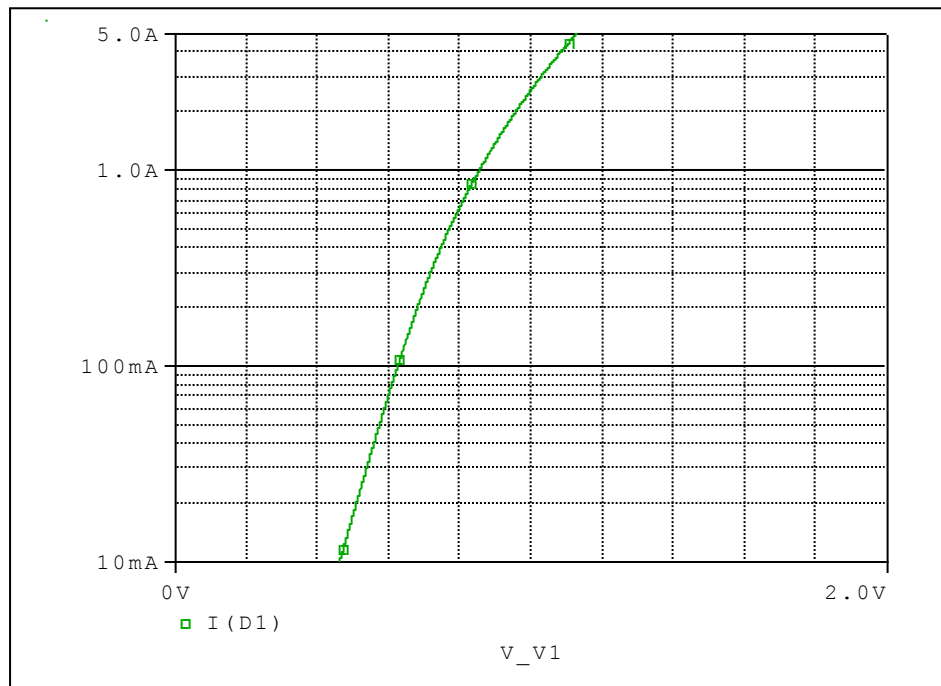
Forward Current Characteristic

Reference

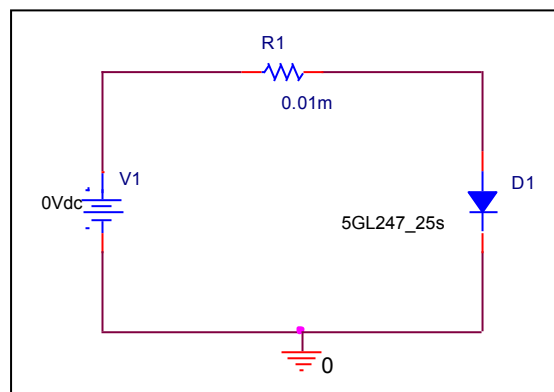


Forward Current Characteristic

Circuit Simulation Result

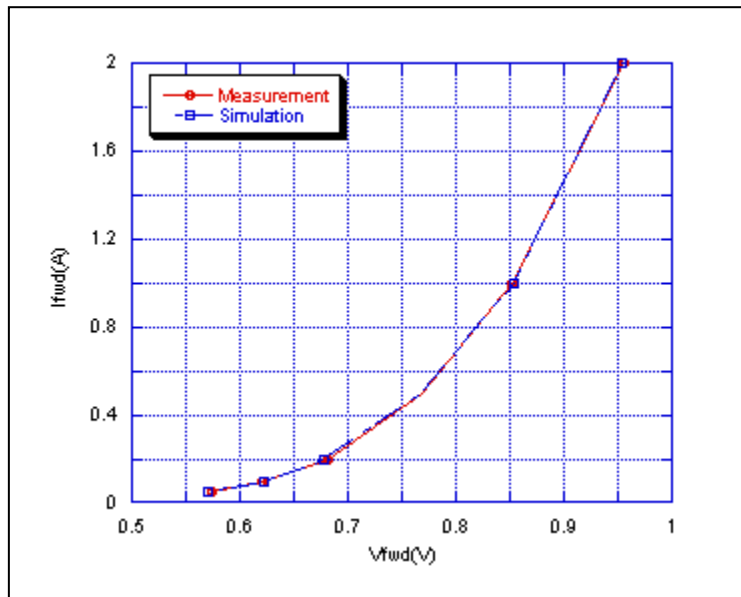


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

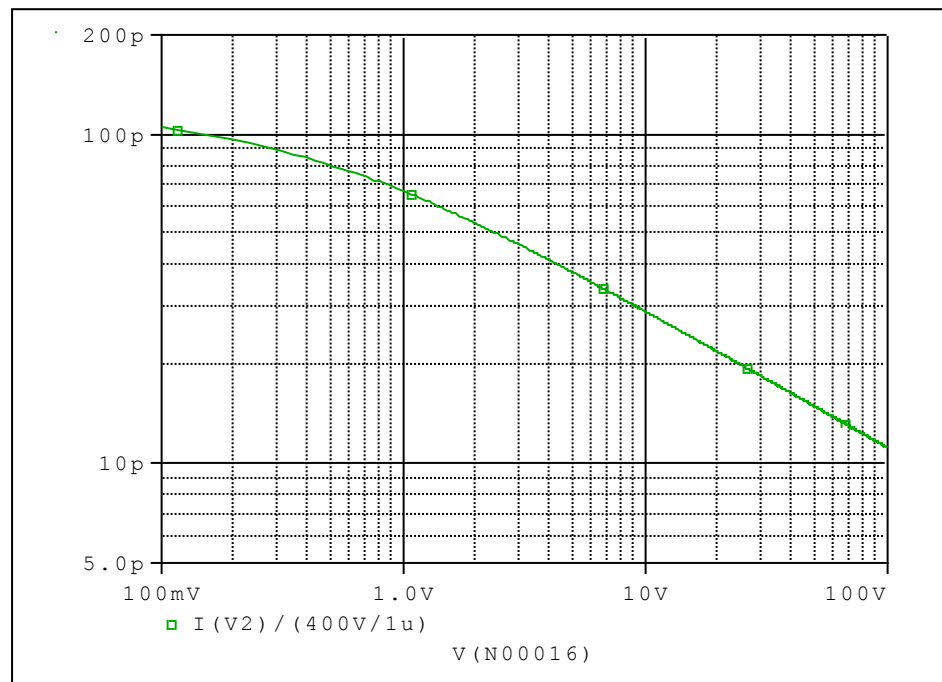


Simulation Result

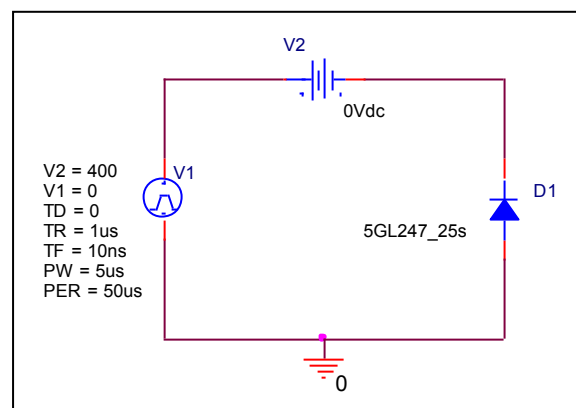
$I_{fwd}(A)$	$V_{fwd}(V)$ Measurement	$V_{fwd}(V)$ Simulation	%Error
0.05	0.574	0.571	0.523
0.1	0.620	0.623	-0.484
0.2	0.682	0.678	0.587
0.5	0.768	0.766	0.260
1	0.852	0.853	-0.117
2	0.956	0.954	0.209

Capacitance Characteristic

Circuit Simulation Result

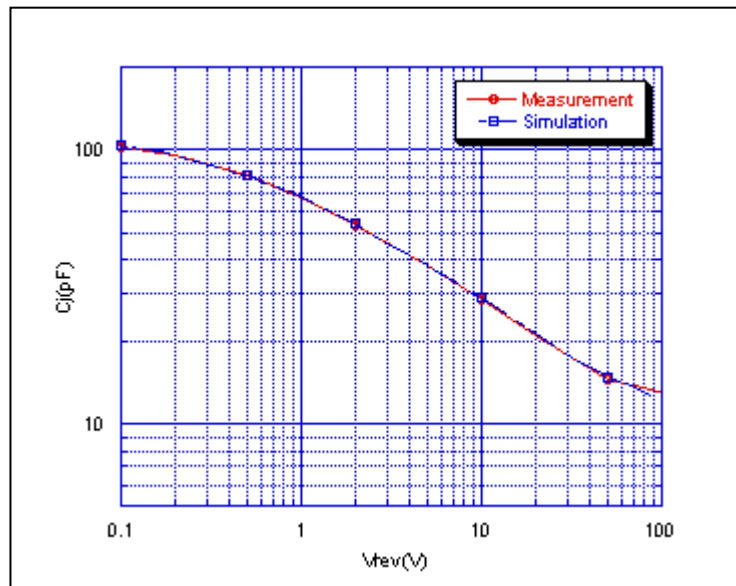


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

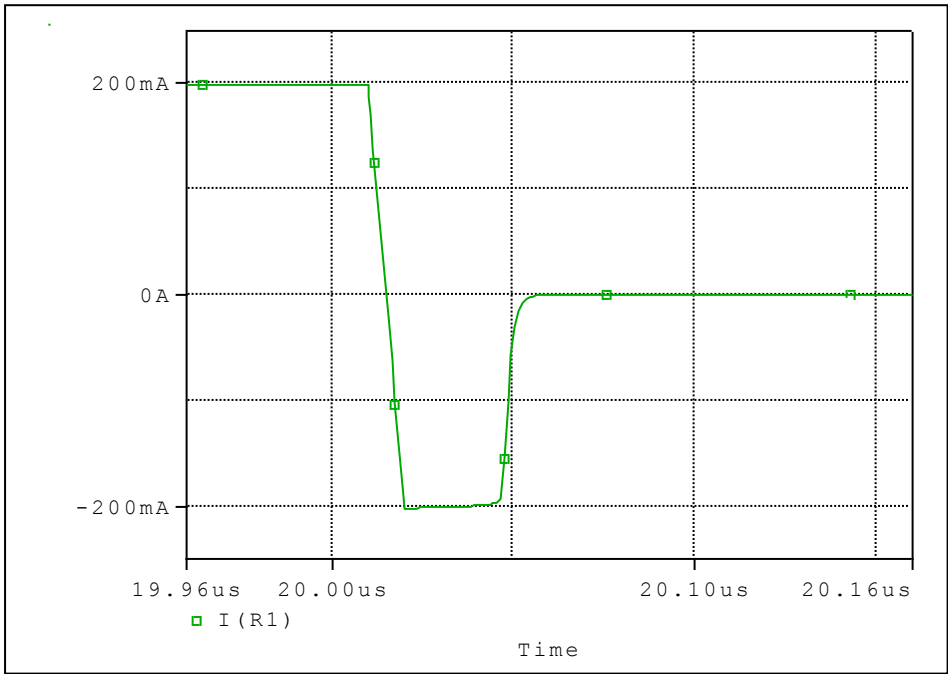


Simulation Result

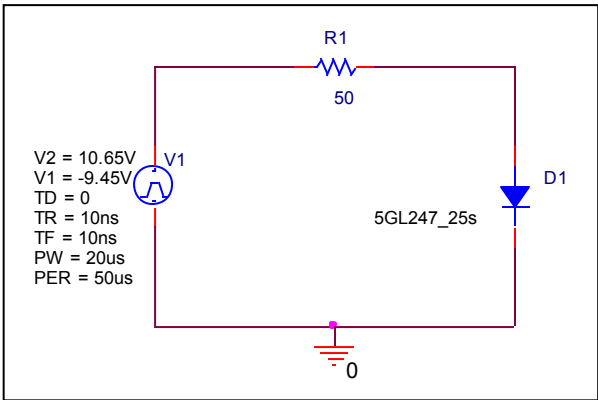
Vrev(V)	Cj(pF) Measurement	Cj(pF) Simulation	%Error
0	112.200	112.200	0.000
0.1	103.200	104.100	-0.872
0.2	95.600	95.800	-0.209
0.5	80.200	80.400	-0.249
1	67.000	66.900	0.149
2	53.500	53.600	-0.187
5	38.000	38.100	-0.263
10	28.700	28.900	-0.697
20	20.900	21.500	-2.871
50	14.500	14.800	-2.069
100	13.000	12.400	4.615

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

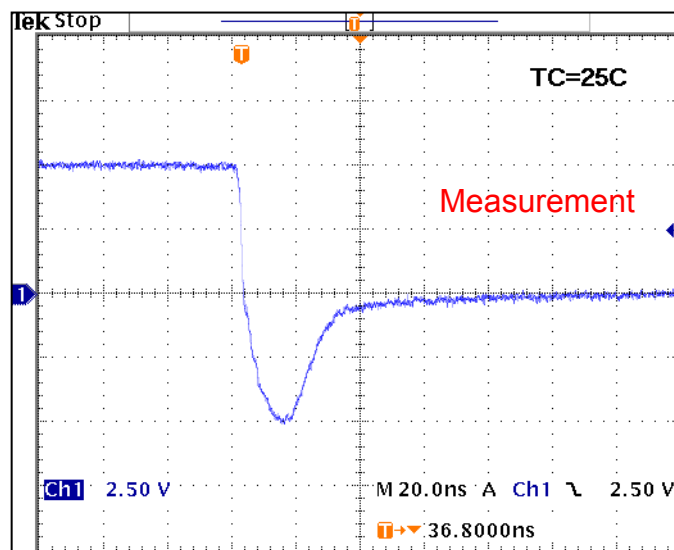


Compare Measurement vs. Simulation

	Measurement		Simulation		%Error
trr	36.00	ns	35.78	ns	0.611

Reverse Recovery Characteristic

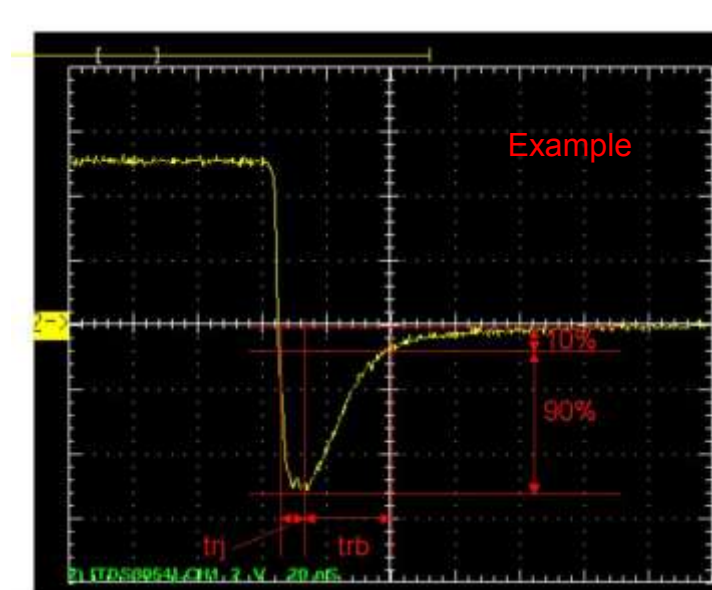
Reference



$T_{rj} = 12.8 \text{ (ns)}$

$T_{rb} = 23.2 \text{ (ns)}$

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



Relation between t_{rj} and t_{rb}