

# Device Modeling Report

COMPONENTS:  
DIODE/ GENERAL PURPOSE RECTIFIER/ STANDARD  
PART NUMBER: 1S1887A  
MANUFACTURER: TOSHIBA  
REMARK: TC=25C

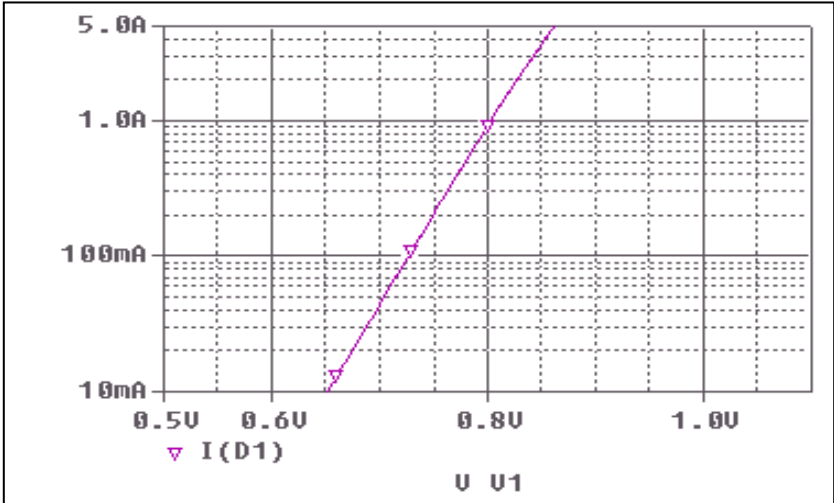


**Bee Technologies Inc.**

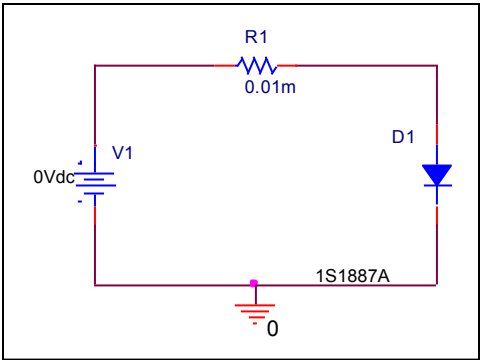
PSpice model parameter	Model description
IS	Saturation Current
N	Emission Coefficient
RS	Series Resistance
IKF	High-injection Knee Current
CJO	Zero-bias Junction Capacitance
M	Junction Grading Coefficient
VJ	Junction Potential
ISR	Recombination Current Saturation Value
BV	Reverse Breakdown Voltage(a positive value)
IBV	Reverse Breakdown Current(a positive value)
TT	Transit Time
EG	Energy-band Gap

# Forward Current Characteristic

## Circuit Simulation Result

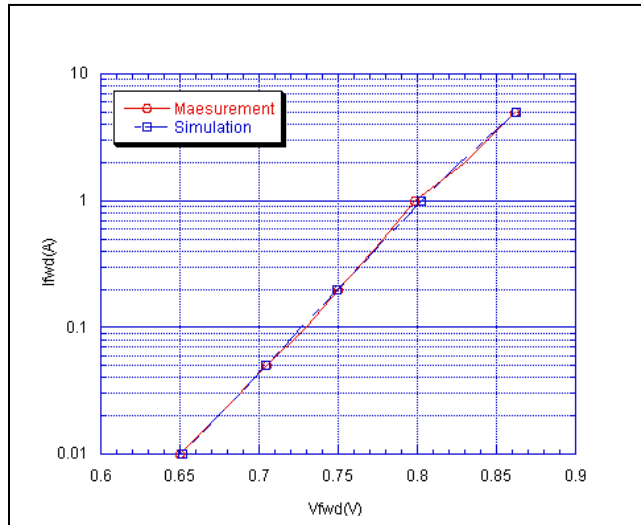


## Evaluation Circuit



# Comparison Graph

## Circuit Simulation Result

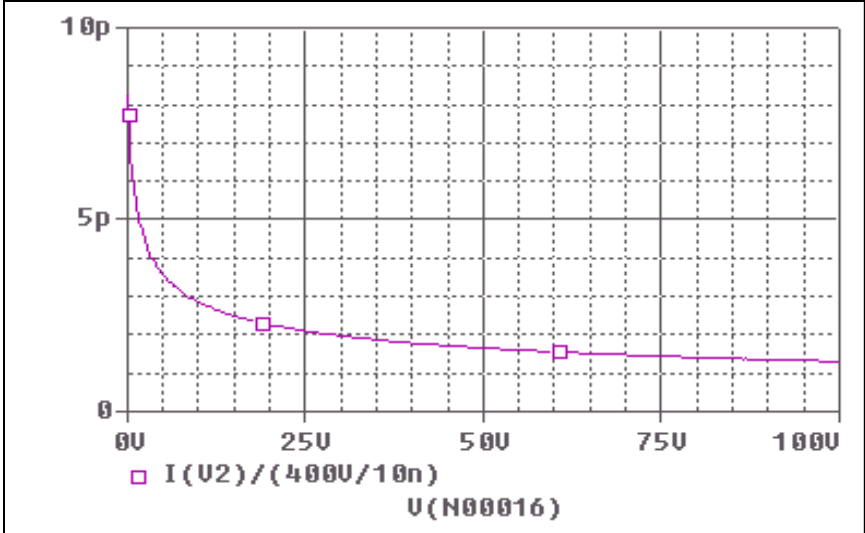


## Simulation Result

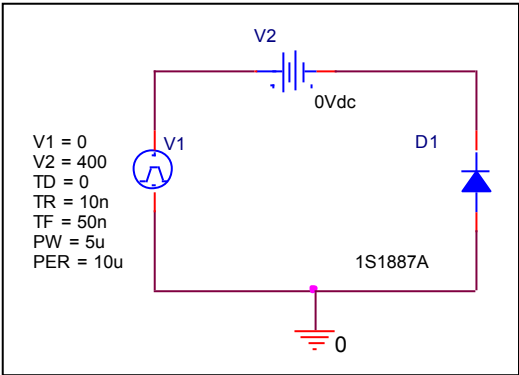
<b>Ifwd(A)</b>	<b>Vfwd(V) Measurement</b>	<b>Vfwd(V) Simulation</b>	<b>%Error</b>
<b>0.01</b>	<b>0.650</b>	<b>0.652</b>	<b>-0.277</b>
<b>0.02</b>	<b>0.674</b>	<b>0.674</b>	<b>-0.045</b>
<b>0.05</b>	<b>0.705</b>	<b>0.704</b>	<b>0.156</b>
<b>0.1</b>	<b>0.730</b>	<b>0.727</b>	<b>0.438</b>
<b>0.2</b>	<b>0.750</b>	<b>0.749</b>	<b>0.133</b>
<b>0.5</b>	<b>0.778</b>	<b>0.779</b>	<b>-0.154</b>
<b>1</b>	<b>0.798</b>	<b>0.803</b>	<b>-0.576</b>
<b>2</b>	<b>0.830</b>	<b>0.827</b>	<b>0.373</b>
<b>5</b>	<b>0.862</b>	<b>0.861</b>	<b>0.116</b>

# Junction Capacitance Characteristic

## Circuit Simulation Result

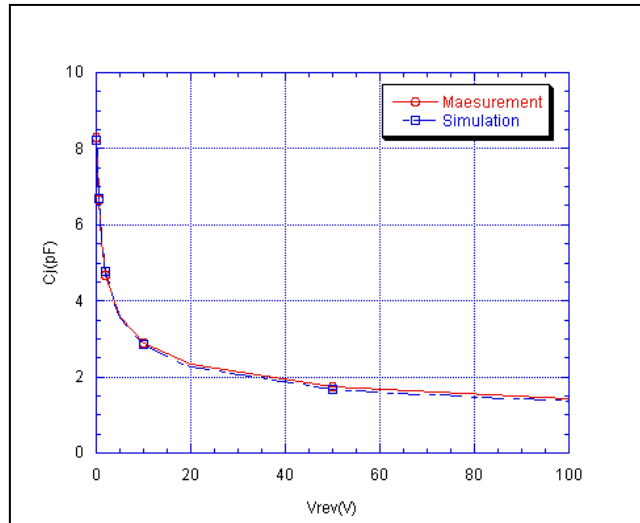


## Evaluation Circuit



## Comparison Graph

### Circuit Simulation Result

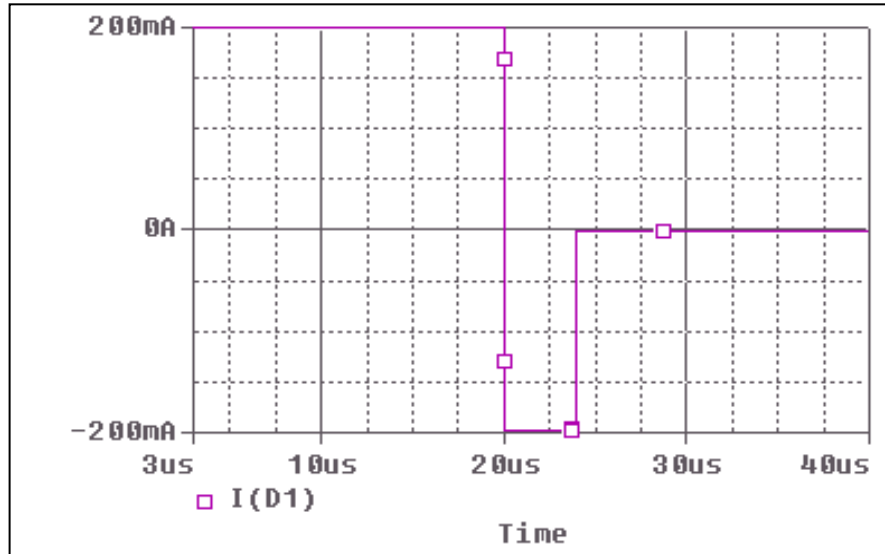


### Simulation Result

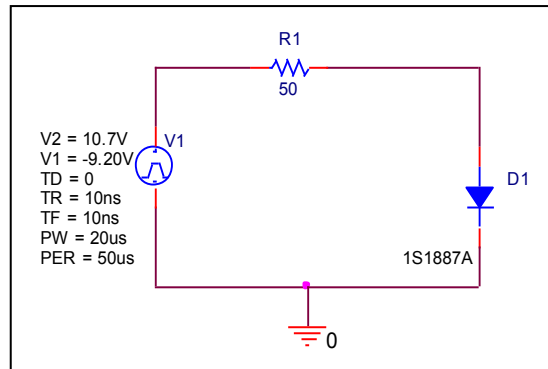
Vrev(V)	Cj(pF) Measurement	Cj(pF) Simulation	%Error
0	8.925	8.925	0.000
0.1	8.312	8.240	0.858
0.2	7.783	7.728	0.704
0.5	6.660	6.684	-0.354
1	5.568	5.732	-2.945
2	4.681	4.777	-2.040
5	3.584	3.571	0.352
10	2.895	2.860	1.206
20	2.323	2.272	2.179
50	1.734	1.690	2.498
100	1.387	1.338	3.518

# Reverse Recovery Characteristic

## Circuit Simulation Result



## Evaluation Circuit

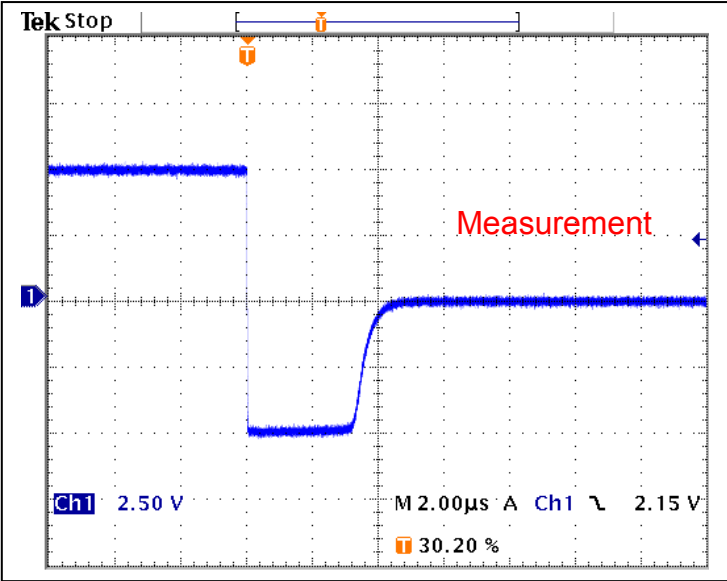


## Compare Measurement vs. Simulation

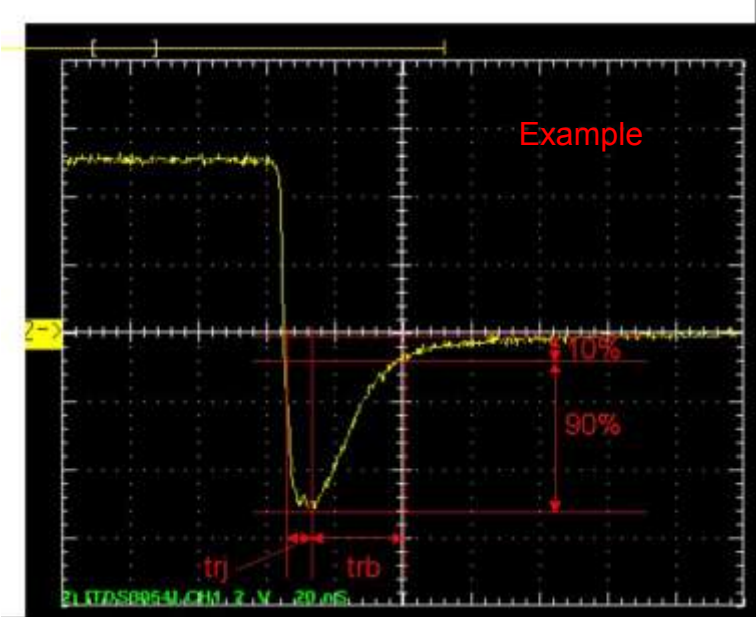
	Measurement		Simulation		%Error
trr	4.000	us	3.92	us	1.825

# Reverse Recovery Characteristic

# Reference



$Trj = 3.12(\mu s)$   
 $Trb = 0.88(\mu s)$   
Conditions:  $I_{fwd} = I_{rev} = 0.2(A)$ ,  $R_I = 50$



Relation between  $trj$  and  $trb$