

Device Modeling Report

COMPONENTS:
DIODE/ GENERAL PURPOSE RECTIFIER/ STANDARD
PART NUMBER: MA2YF80
MANUFACTURER: PANASONIC



Bee Technologies Inc.

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SPICE MODEL

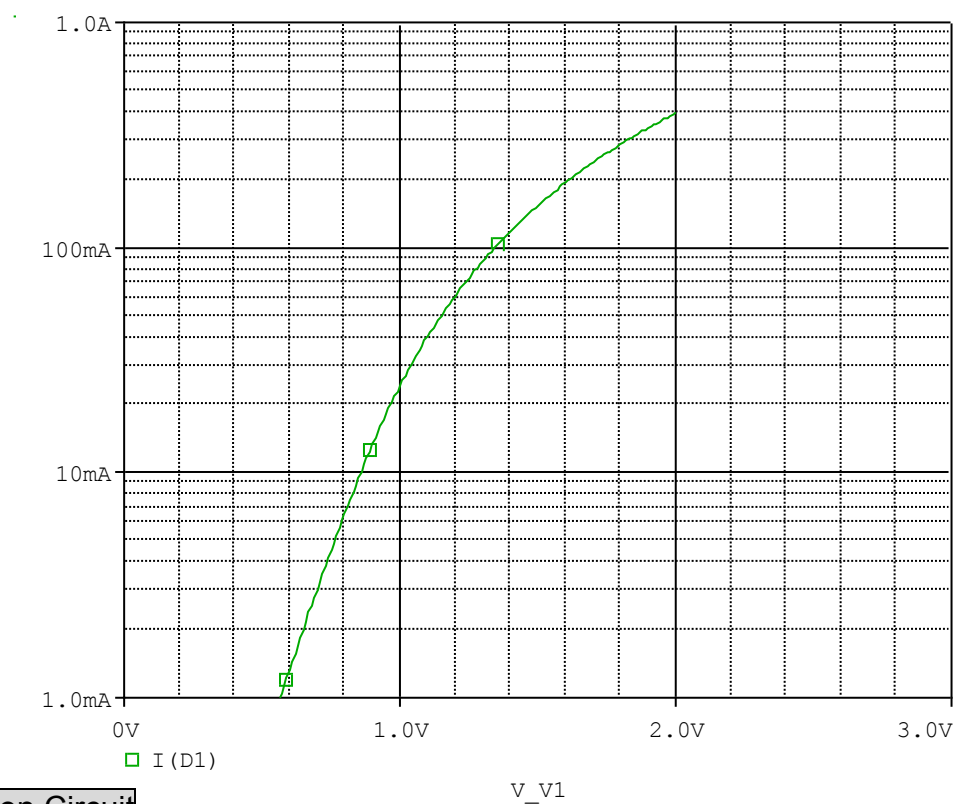
```
*$  
* PART NUMBER: MA2YF80  
* MANUFACTURER: PANASONIC  
* VRRM=800, IF=200mA, IFSM=1A  
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.MODEL DMA2YF80 D  
+ IS=8.1008E-6  
+ N=4.5108  
+ RS=1.1772  
+ IKF=37.578E-3  
+ CJO=8.1914E-12  
+ M=.23944  
+ VJ=1.0007E-3  
+ BV=800  
+ IBV=20.000E-6  
+ TT=.668E-9  
*$
```

DIODE MODEL PARAMETERS

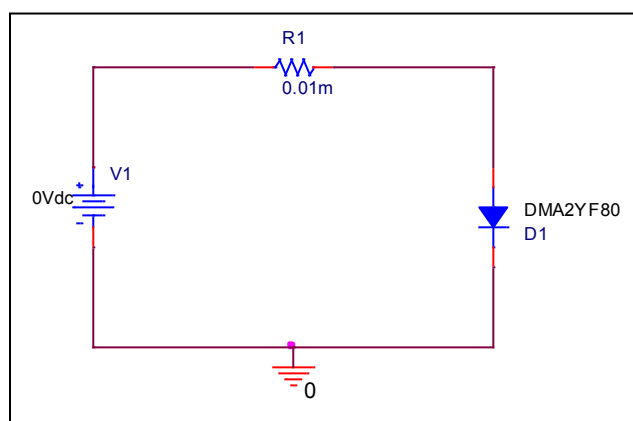
PSpice model parameter	Model description
IS	Saturation Current
N	Emission Coefficient
RS	Series Resistance
IKF	High-injection Knee Current
CJO	Zero-bias Junction Capacitance
M	Junction Grading Coefficient
VJ	Junction Potential
ISR	Recombination Current Saturation Value
BV	Reverse Breakdown Voltage(a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

Forward Current Characteristic

Circuit Simulation Result

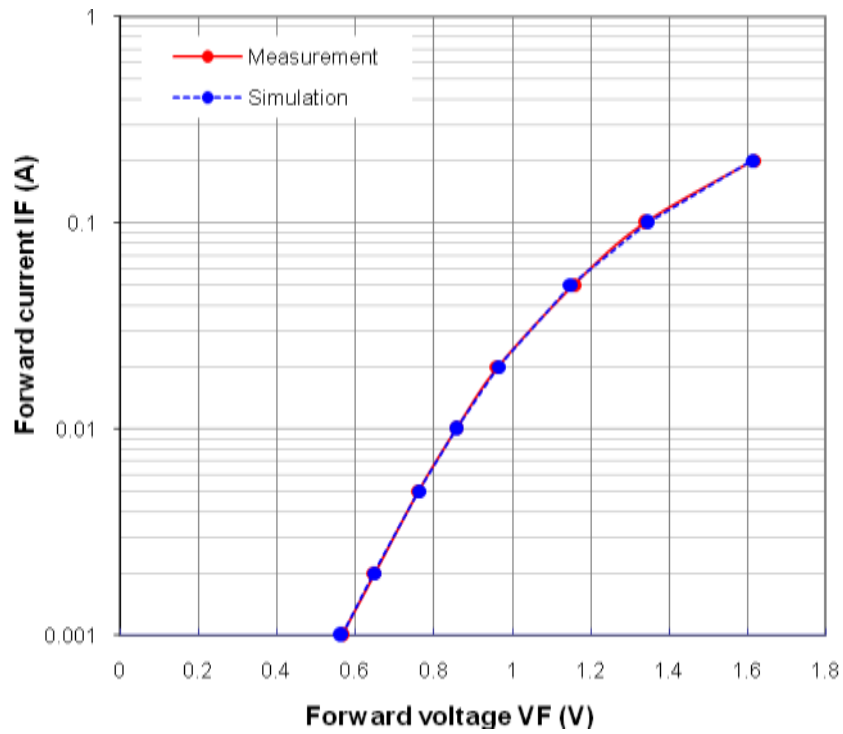


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

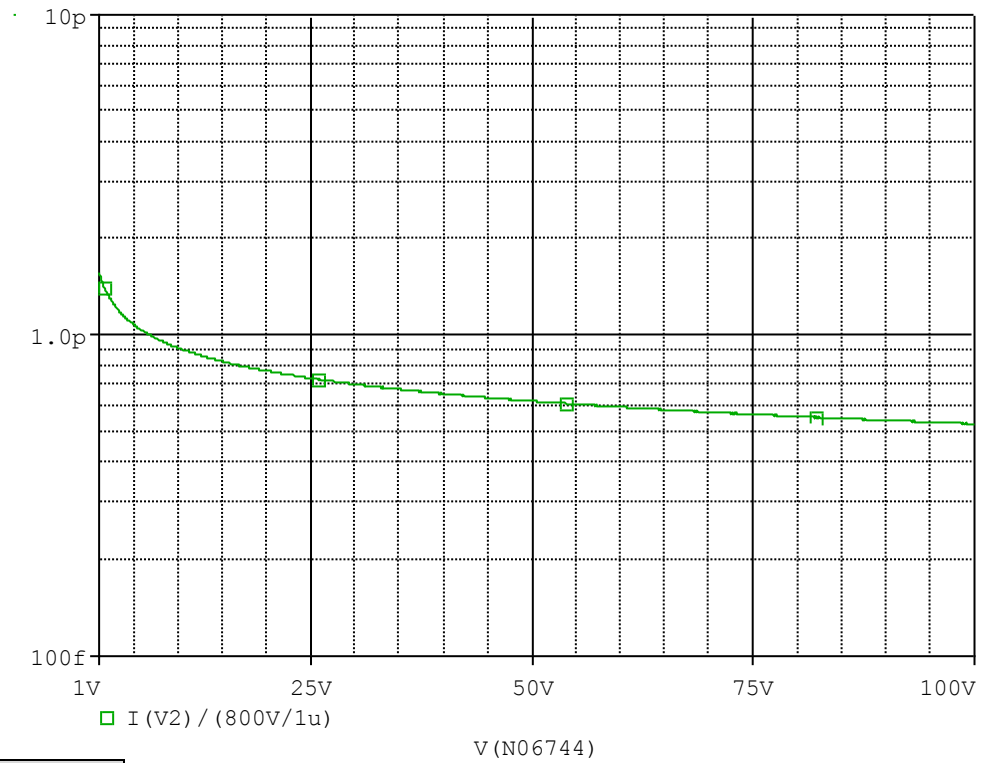


Simulation Result

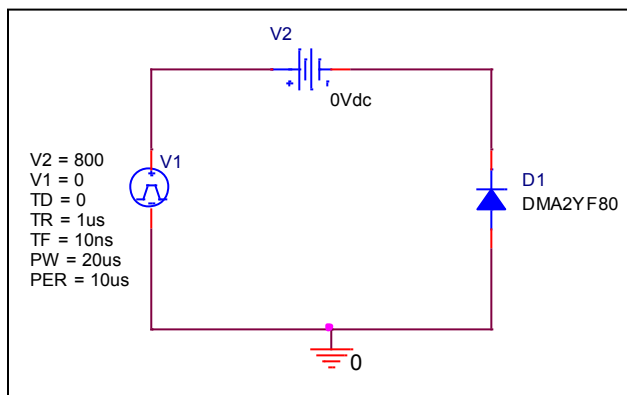
Ifwd (A)	Vfwd (V)		%Error
	Measurement	Simulation	
0.001	0.566	0.565	-0.18
0.002	0.650	0.648	-0.31
0.005	0.760	0.763	0.39
0.01	0.858	0.857	-0.12
0.02	0.964	0.965	0.10
0.05	1.158	1.150	-0.69
0.1	1.338	1.345	0.51
0.2	1.616	1.614	-0.12

Capacitance Characteristic

Circuit Simulation Result

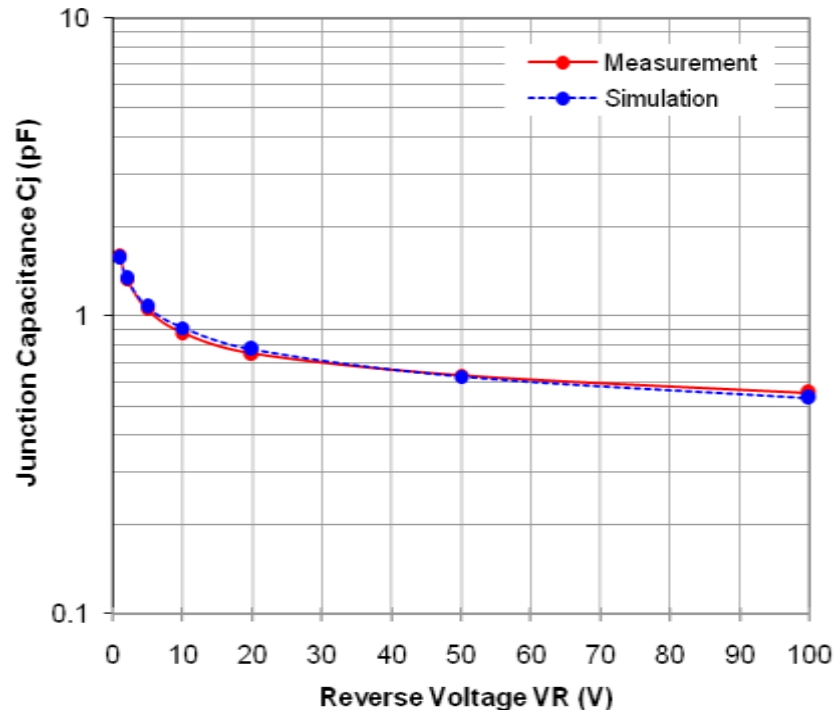


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

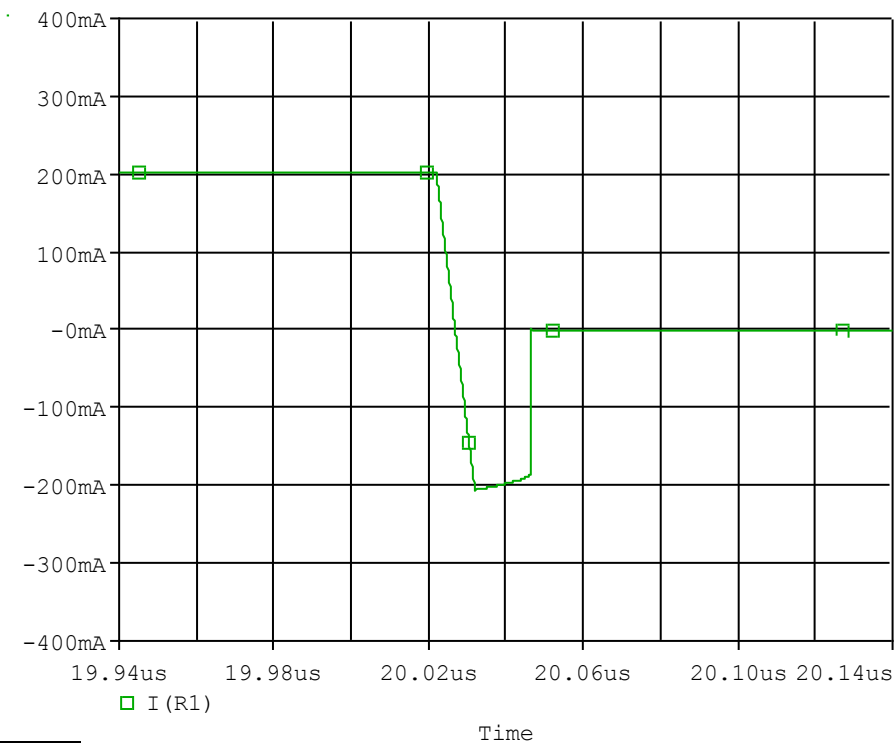


Simulation Result

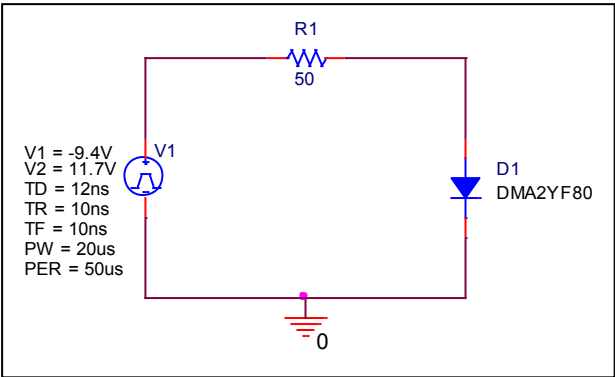
Vrev (V)	Cj (pF)		%Error
	Measurement	Simulation	
1	1.581	1.566	-0.95
2	1.329	1.337	0.59
5	1.054	1.075	1.99
10	0.876	0.913	4.28
20	0.746	0.774	3.75
50	0.631	0.624	-1.11
100	0.553	0.530	-4.16

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

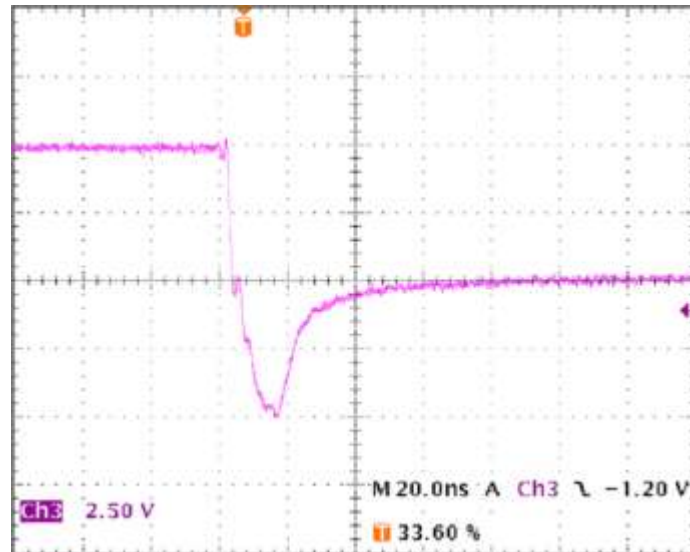


Compare Measurement vs. Simulation

		Measurement	Simulation	%Error
trj	ns	13.20	13.13	-0.53

Reverse Recovery Characteristic

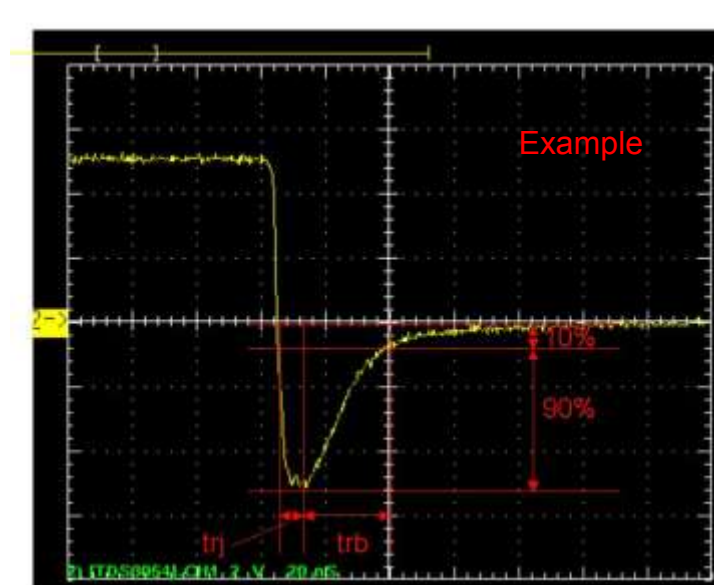
Reference



$T_{rj} = 13.2(\text{ns})$

$T_{rb} = 24.0(\text{ns})$

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



Relation between t_{rj} and t_{rb}