

# Device Modeling Report

COMPONENTS:  
DIODE/ GENERAL PURPOSE RECTIFIER / PROFESSIONAL  
PART NUMBER: 1SR139-600  
MANUFACTURER: ROHM  
REMARK: TC=80C

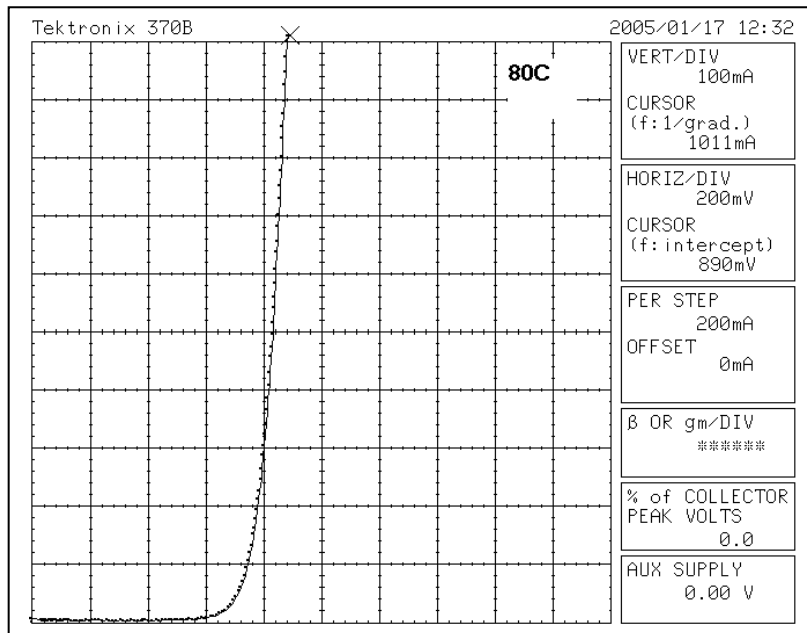


**Bee Technologies Inc.**

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

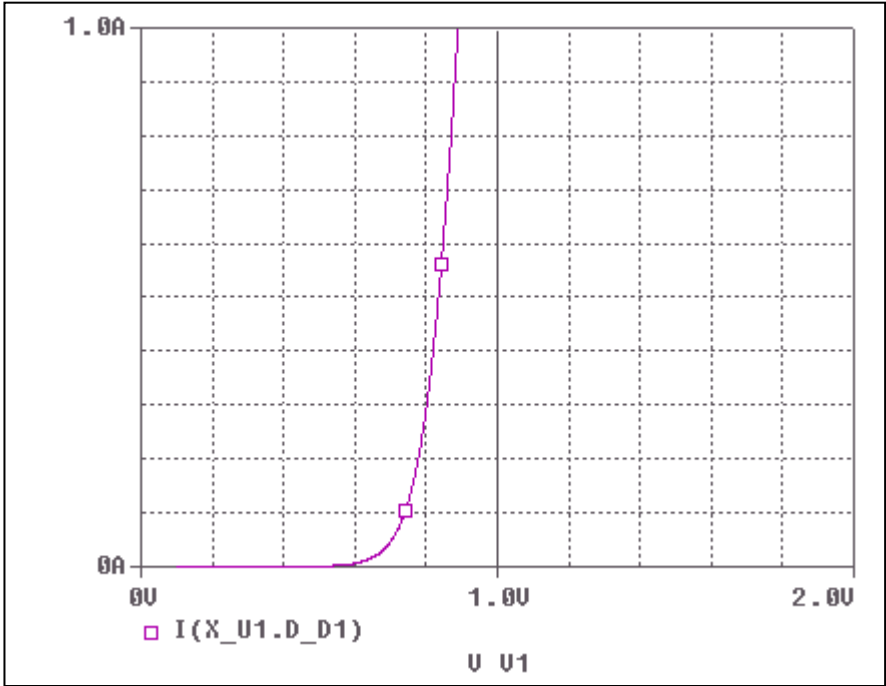
# Forward Current Characteristic

# Reference

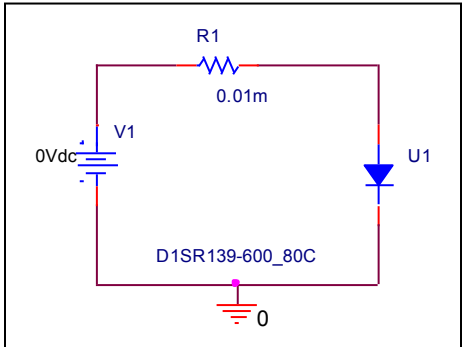


# Forward Current Characteristic

## Circuit Simulation Result

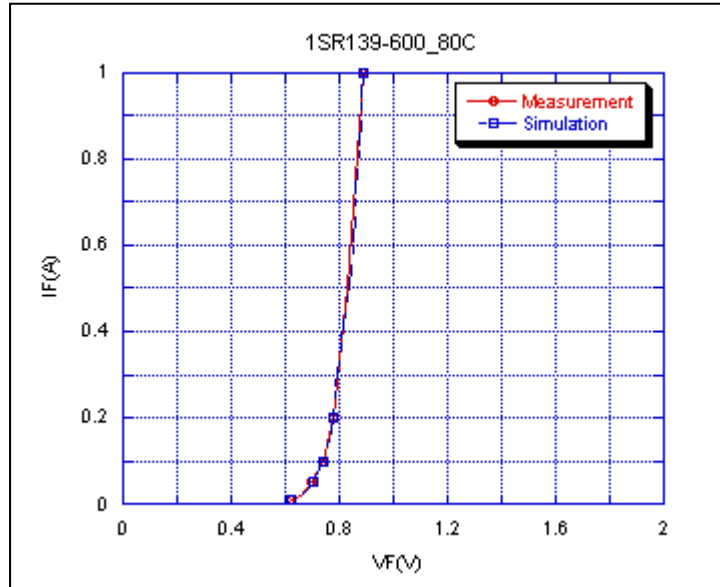


## Evaluation Circuit



## Comparison Graph

### Circuit Simulation Result

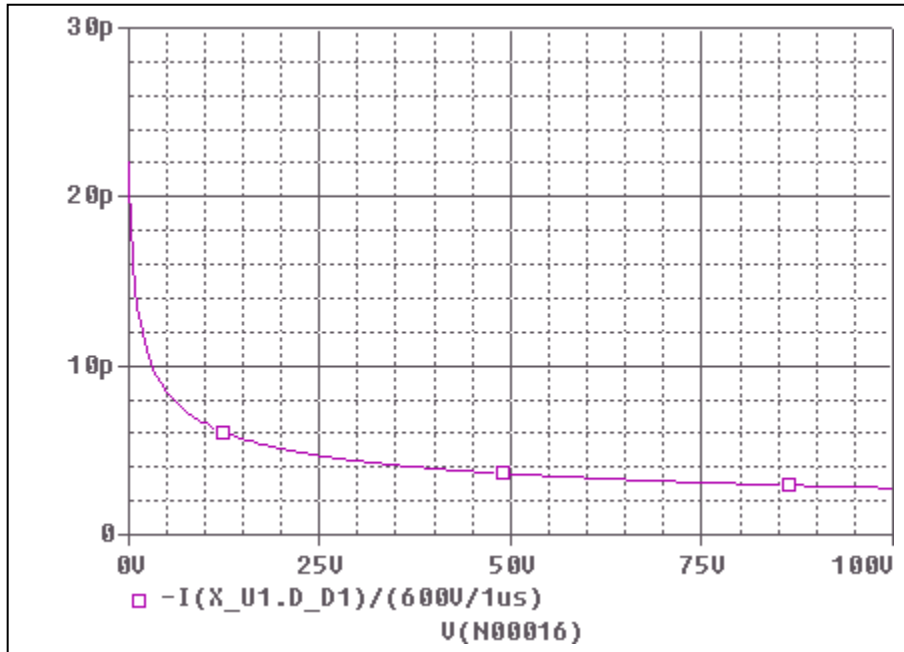


### Simulation Result

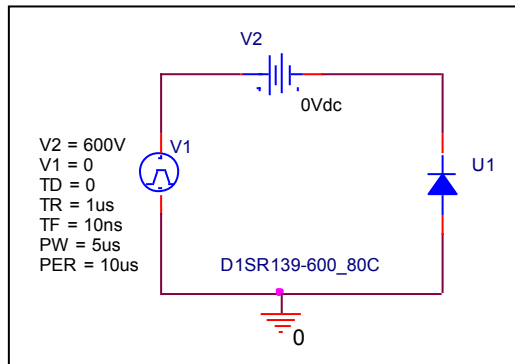
Ifwd(A)	Vfwd(V) Measurement	Vfwd(V) Simulation	%Error
0.01	0.620	0.622	-0.32
0.02	0.660	0.656	0.61
0.05	0.700	0.703	-0.43
0.1	0.742	0.738	0.54
0.2	0.778	0.777	0.13
0.5	0.832	0.834	-0.24
1	0.890	0.888	0.22

# Capacitance Characteristic

## Circuit Simulation Result

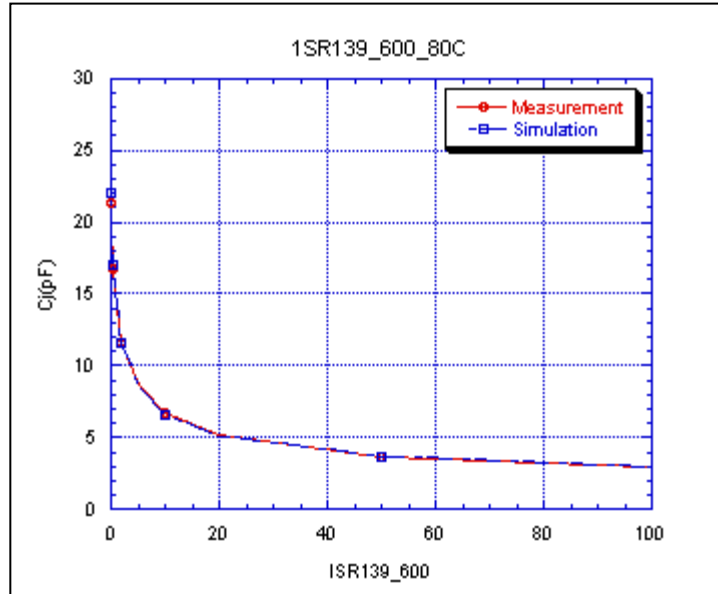


## Evaluation Circuit



## Comparison Graph

### Circuit Simulation Result

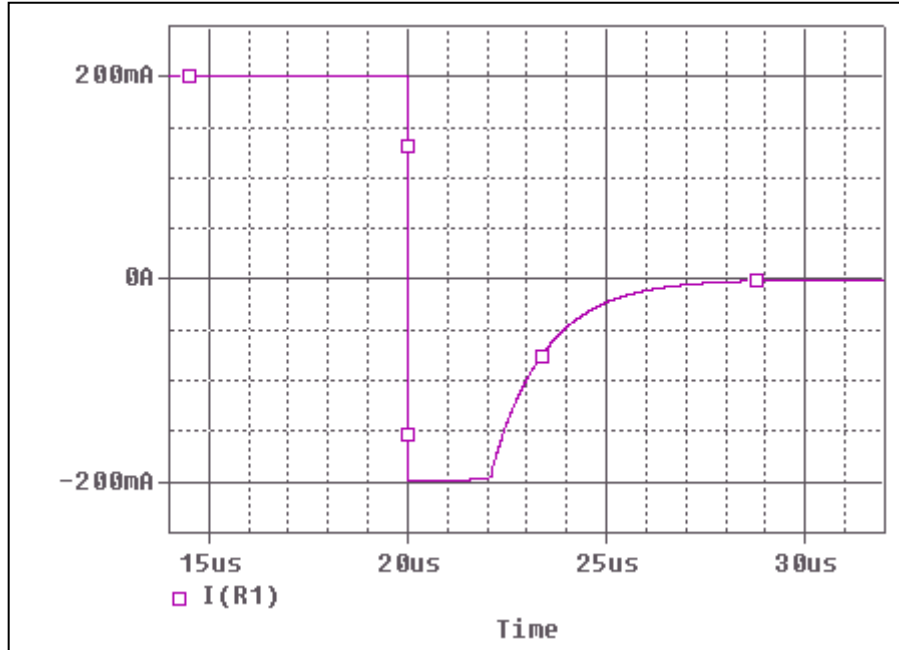


### Simulation Result

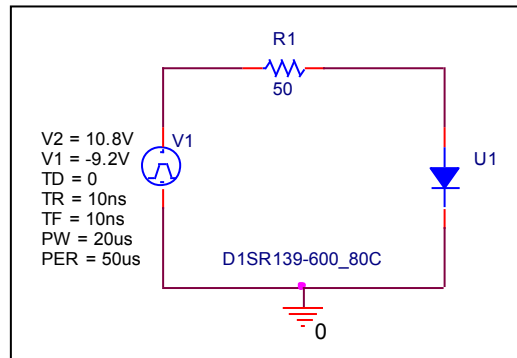
Vrev(V)	Cj(pF) Measurement	Cj(pF) Simulation	%Error
0	23.445	23.445	0.00
0.1	21.279	22.000	-3.39
0.2	19.775	19.924	-0.75
0.5	16.688	16.954	-1.59
1	14.106	14.313	-1.47
2	11.560	11.632	-0.62
5	8.596	8.467	1.50
10	6.727	6.621	1.58
20	5.187	5.101	1.66
50	3.635	3.604	0.85
100	2.778	2.765	0.47

# Reverse Recovery Characteristic

## Circuit Simulation Result



## Evaluation Circuit

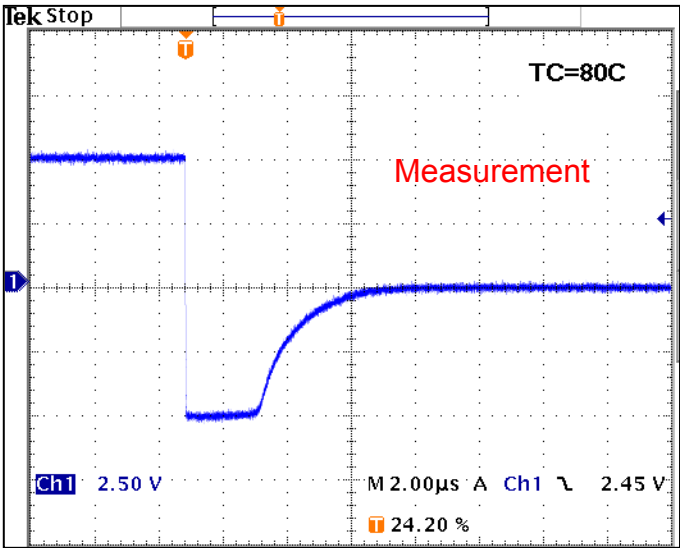


## Compare Measurement vs. Simulation

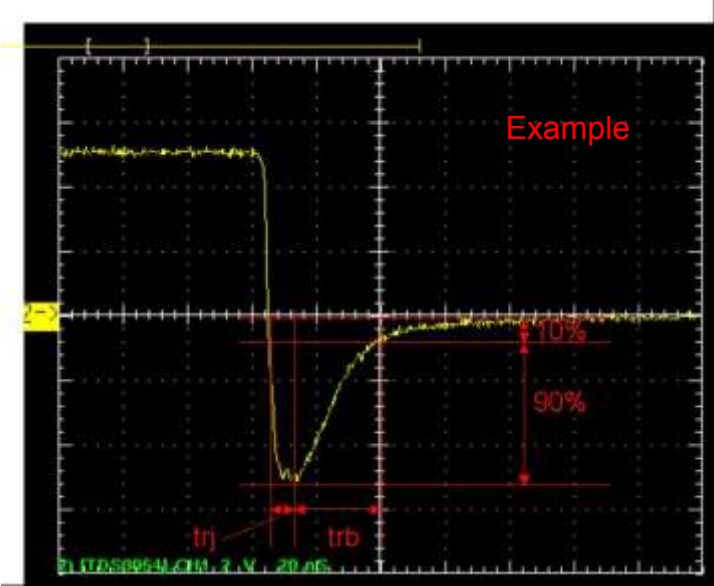
	Measurement		Simulation		%Error
trj	2.04	us	2.06	us	0.980
trb	3.08	us	3.10	us	0.649

# Reverse Recovery Characteristic

# Reference



$Trj = 2.04(\mu s)$   
 $Trb = 3.08(\mu s)$   
Conditions:  $I_{fwd} = I_{rev} = 0.2(A)$ ,  $R_I = 50$



Relation between  $trj$  and  $trb$