

# Device Modeling Report

COMPONENTS: Light-Emitting Diode (LED) STANDARD  
PART NUMBER: SLP-WB89A-51  
MANUFACTURER: SANYO  
REMARK: TA= - 40 degree C

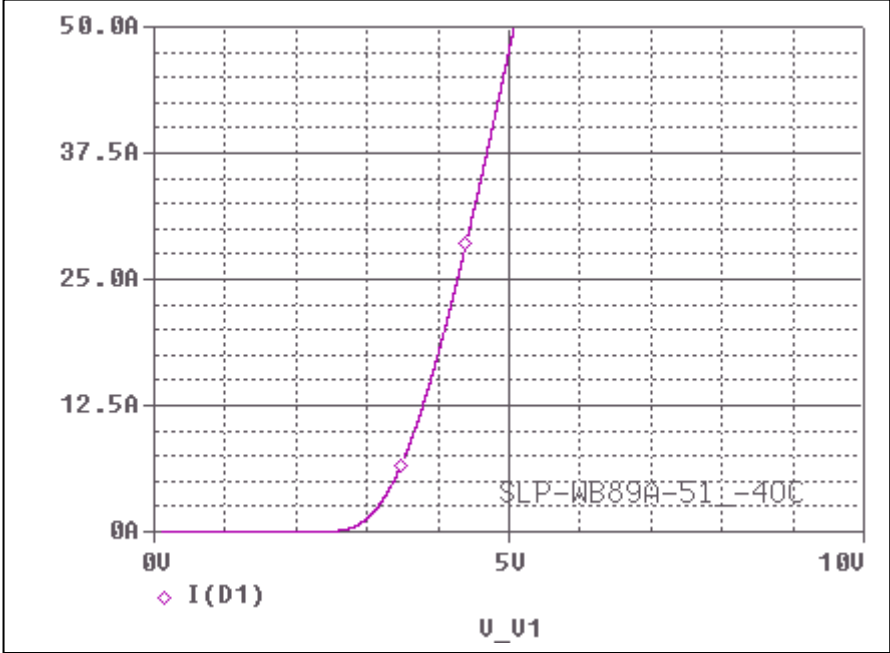


**Bee Technologies I**

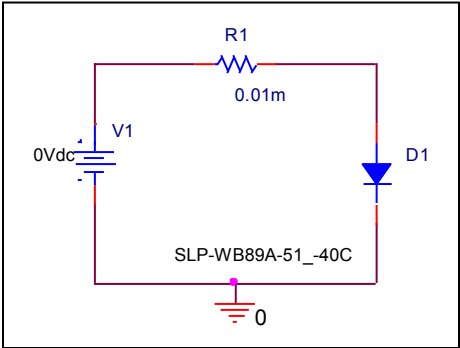
PSpice model parameter	Model description
IS	Saturation Current
N	Emission Coefficient
RS	Series Resistance
IKF	High-injection Knee Current
CJO	Zero-bias Junction Capacitance
M	Junction Grading Coefficient
VJ	Junction Potential
ISR	Recombination Current Saturation Value
BV	Reverse Breakdown Voltage(a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

# Forward Current Characteristic

## Circuit Simulation Result

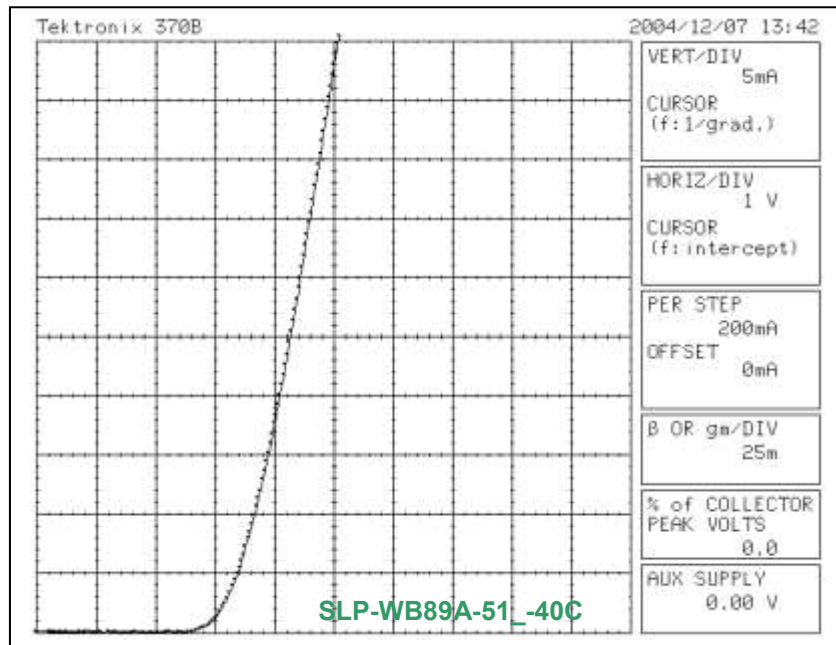


## Evaluation Circuit



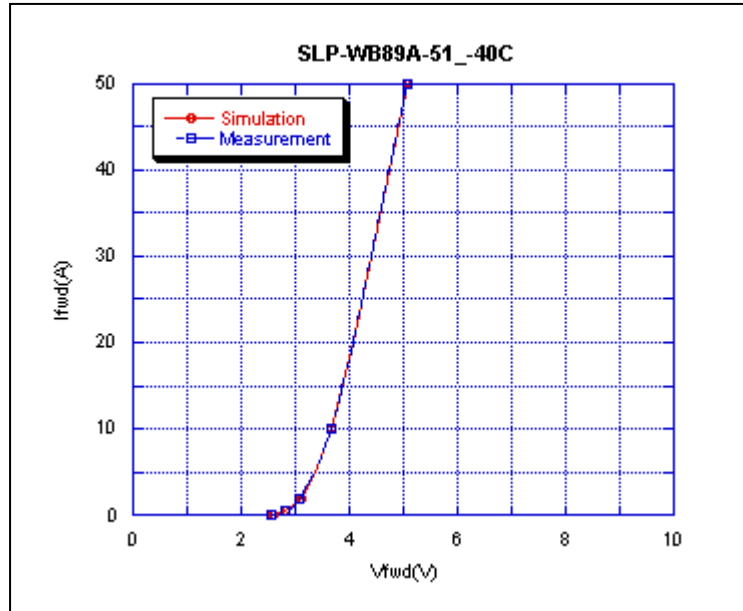
# Forward Current Characteristic

# Reference



## Comparison Graph

### Circuit Simulation Result

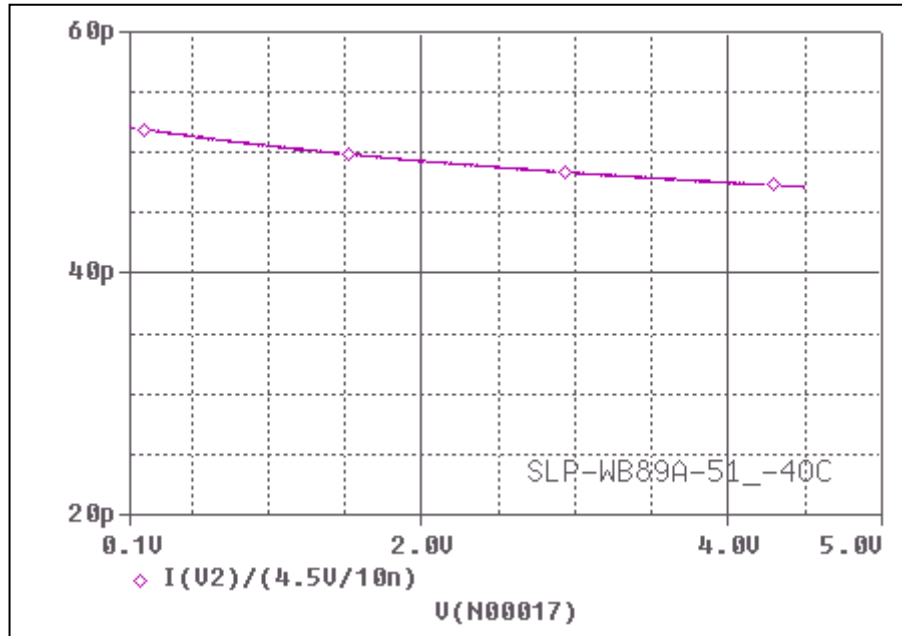


### Simulation Result

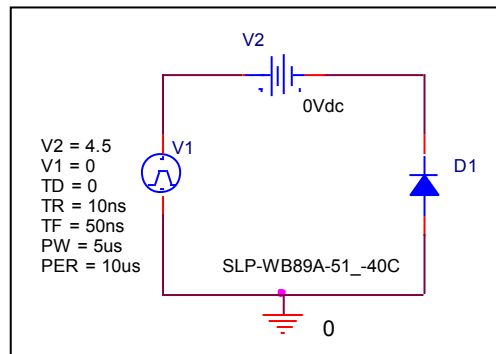
Ifwd(A)	Vfwd(V) Measurement	Vfwd(V) Simulation	%Error
0.1	2.57	2.586	0.62256
0.2	2.68	2.682	0.07462
0.5	2.83	2.821	0.31802
1	2.97	2.943	0.90909
2	3.08	3.095	0.48701
5	3.38	3.372	0.23668
10	3.66	3.667	0.19125
20	4.09	4.092	0.04889
50	5.07	5.068	0.03944

# Capacitance Characteristic

## Circuit Simulation Result

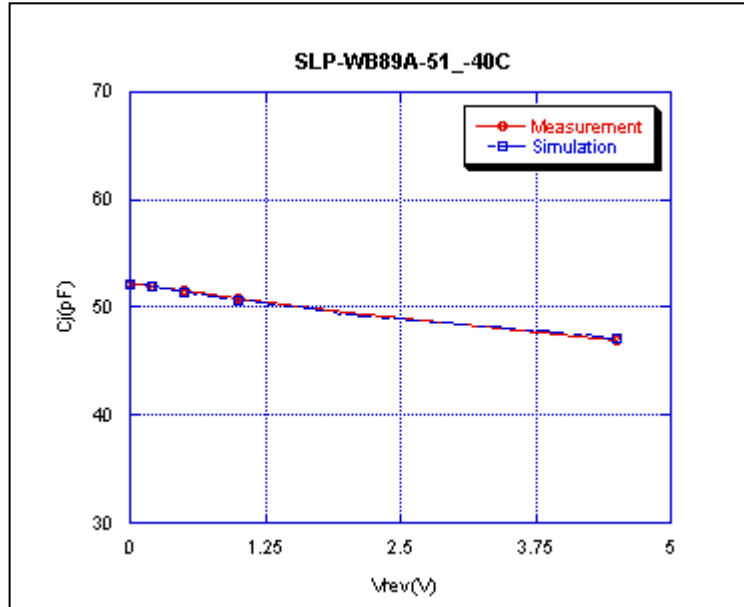


## Evaluation Circuit



## Comparison Graph

### Circuit Simulation Result

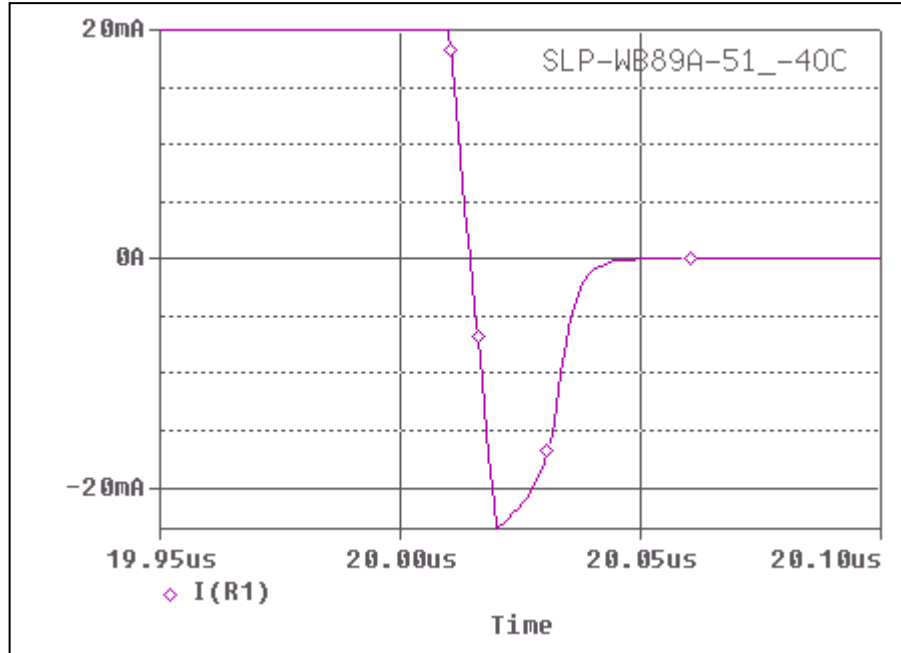


### Simulation Result

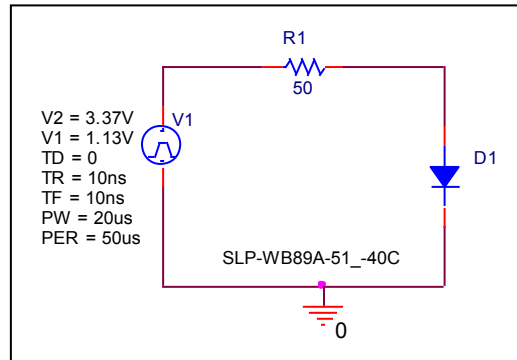
$V_{rev}$ (V)	$C_j$ (pF) Measurement	$C_j$ (pF) Simulation	%Error
0	52.14	52.14	0
0.1	52.05	52.11	0.1152
0.2	51.9	51.93	0.0578
0.5	51.5	51.33	0.3300
1	50.75	50.56	0.3743
2	49.5	49.28	0.4444
4.5	46.9	47.15	0.5330

# Reverse Recovery Characteristic

## Circuit Simulation Result



## Evaluation Circuit

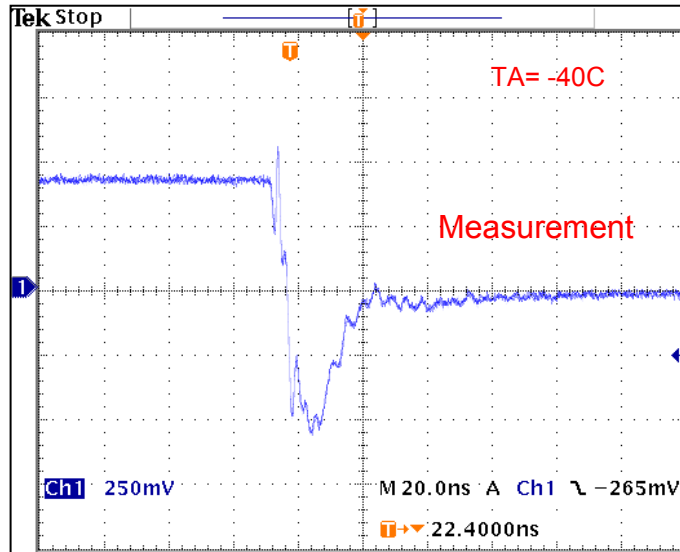


## Compare Measurement vs. Simulation

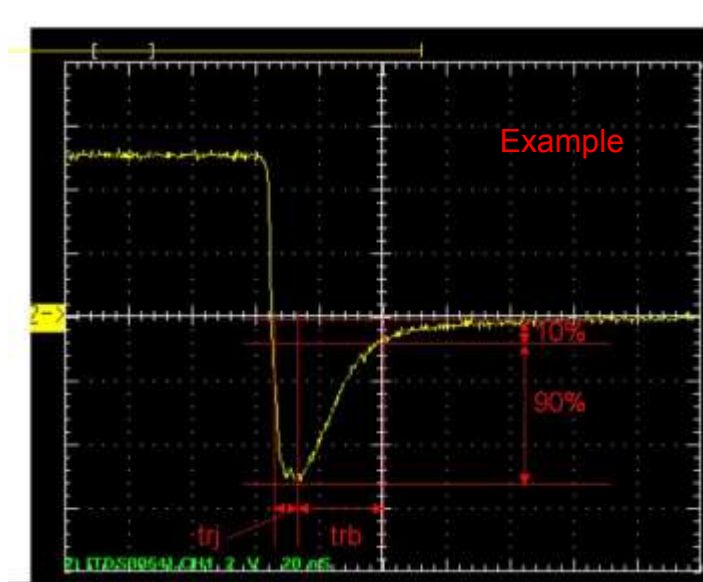
Symbol	Measurement	Unit	Simulation	Unit	%Error
Trr=trj+trb	23.2	ns	23.26	ns	0.258

# Reverse Recovery Characteristic

# Reference



Trj = 7.2(ns)  
Trb = 16(ns)  
Conditions: Ifwd = Irev = 0.02(A), RI = 50



Relation between trj and trb