

Device Modeling Report

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

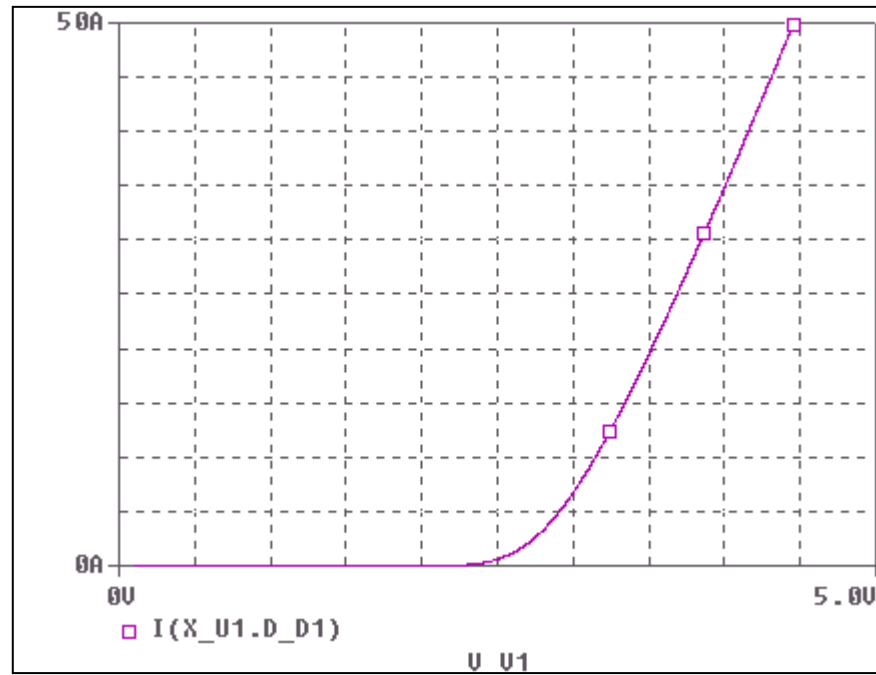


Bee Technologies Inc.

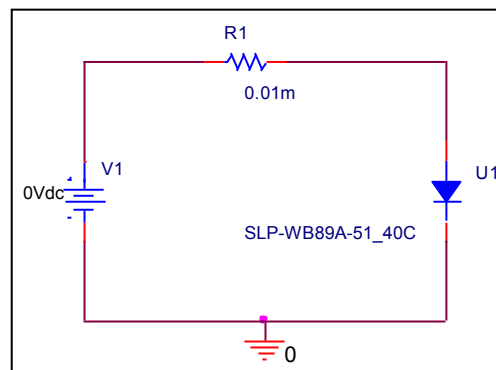
PSpice model parameter	Model description
IS	Saturation Current
N	Emission Coefficient
RS	Series Resistance
IKF	High-injection Knee Current
CJO	Zero-bias Junction Capacitance
M	Junction Grading Coefficient
VJ	Junction Potential
ISR	Recombination Current Saturation Value
BV	Reverse Breakdown Voltage(a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

Forward Current Characteristic

Circuit Simulation Result

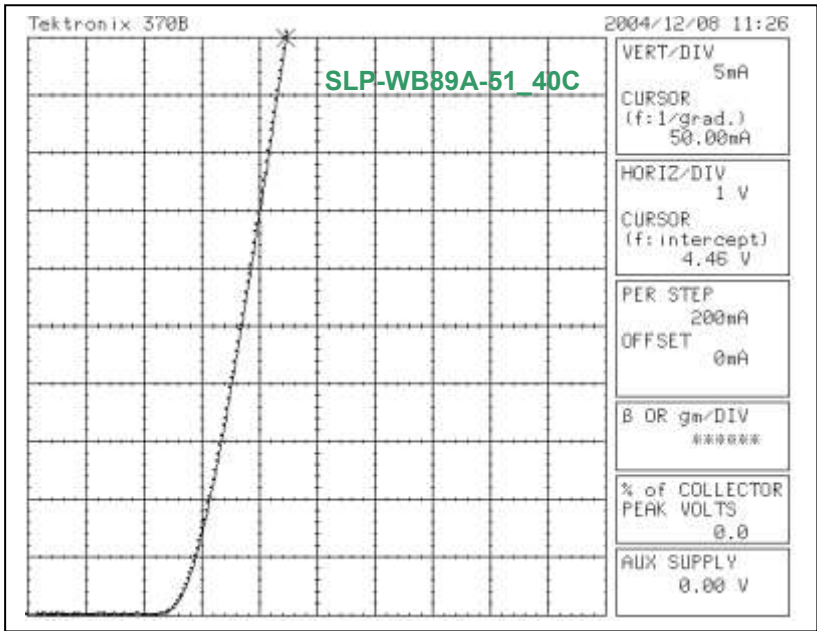


Evaluation Circuit



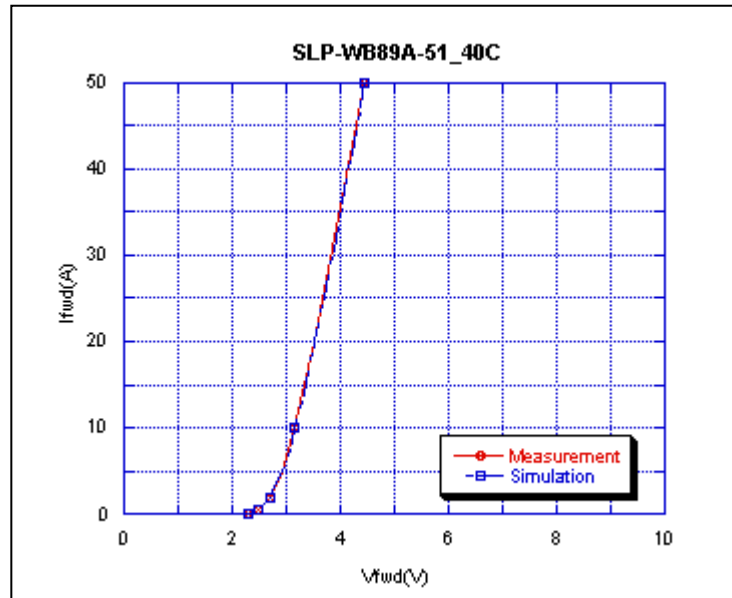
Forward Current Characteristic

Reference



Comparison Graph

Circuit Simulation Result

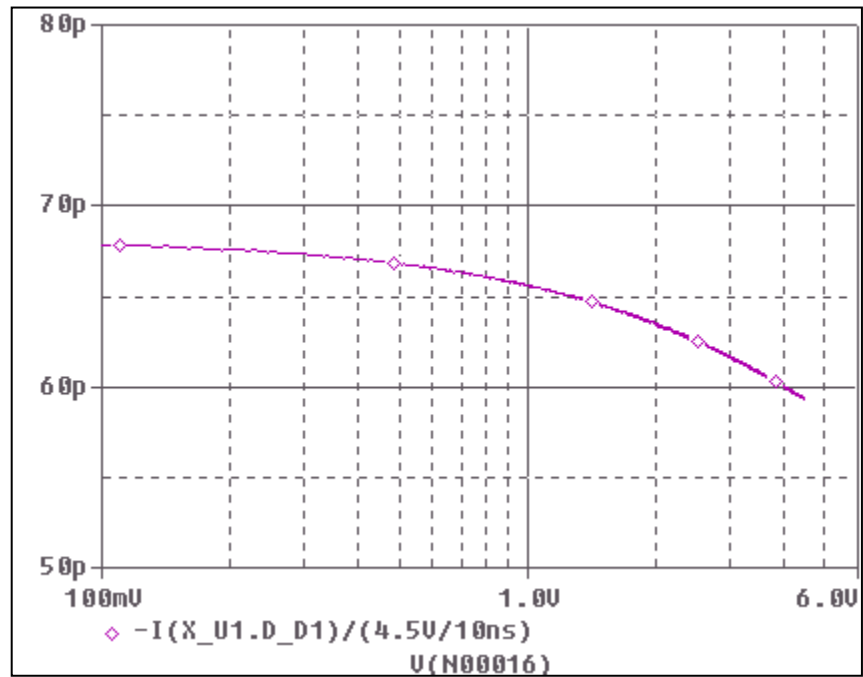


Simulation Result

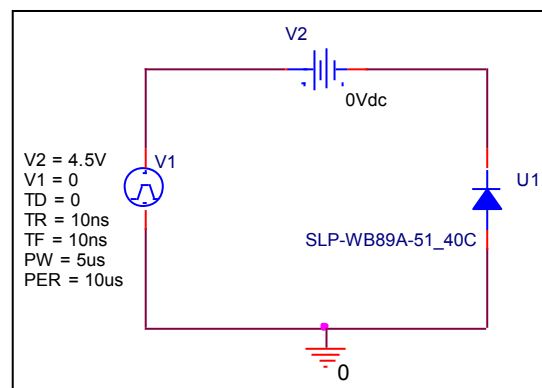
Ifwd(A)	Vfwd(V) Measurement	Vfwd(V) Simulation	%Error
0.1	2.3	2.314	0.6086
0.2	2.4	2.376	1
0.5	2.47	2.476	0.2429
1	2.56	2.574	0.5468
2	2.71	2.696	0.5166
5	2.91	2.91	0
10	3.15	3.147	0.0952
20	3.51	3.518	0.2279
50	4.46	4.458	0.0448

Capacitance Characteristic

Circuit Simulation Result

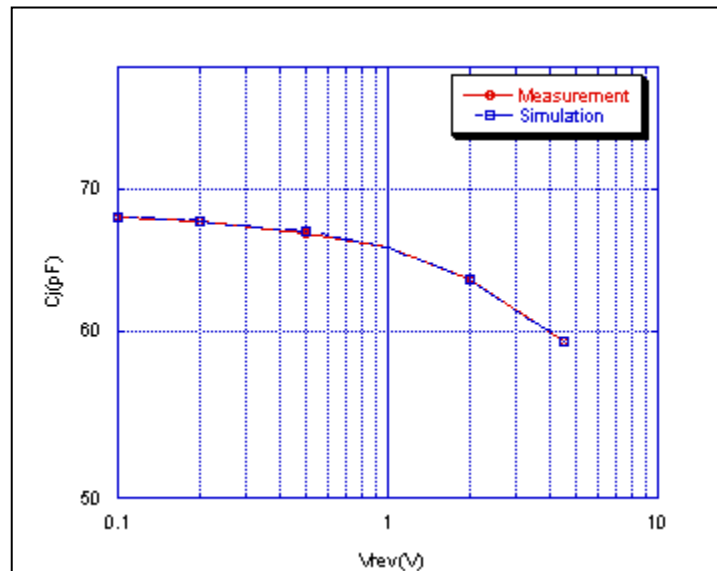


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

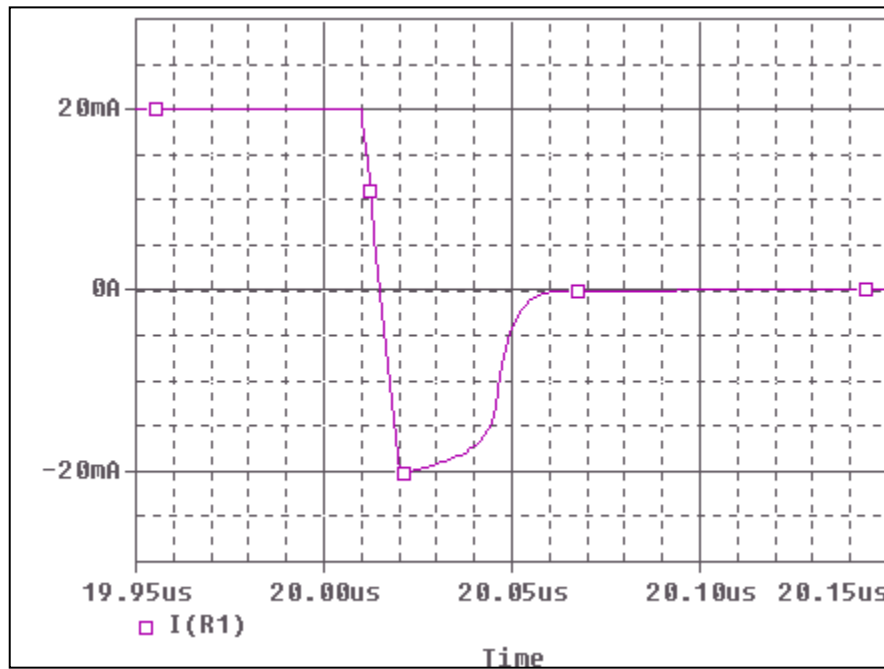


Simulation Result

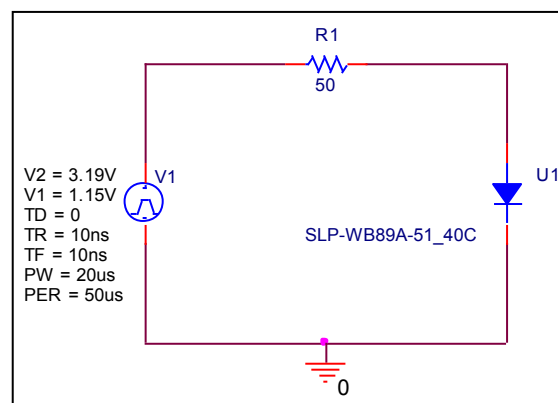
$V_{rev}(V)$	$C_j(pF)$ Measurement	$C_j(pF)$ Simulation	%Error
0	68.15	68.15	0
0.1	67.85	67.89	0.0589
0.2	67.56	67.58	0.0296
0.5	66.66	66.82	0.2400
1	65.75	65.66	0.1368
2	63.45	63.45	0
4.5	59.305	59.34	0.0590

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

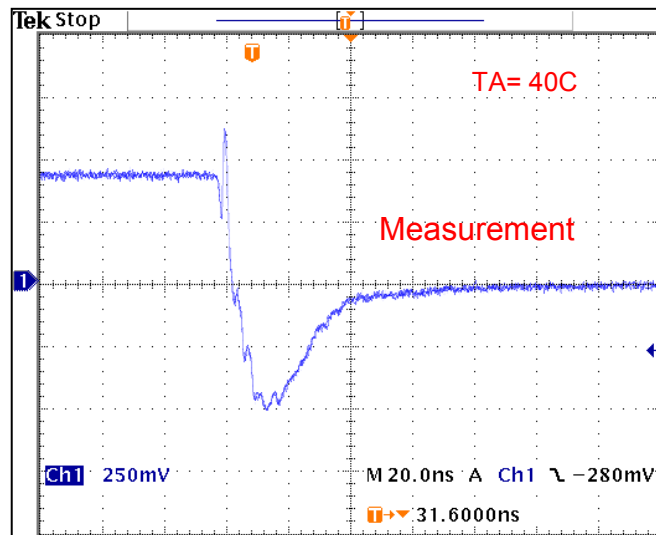


Compare Measurement vs. Simulation

Symbol	Measurement	Unit	Simulation	Unit	%Error
trj	9.2	ns	9.22	ns	0.2173
trb	27.6	ns	27.9	ns	1.0869

Reverse Recovery Characteristic

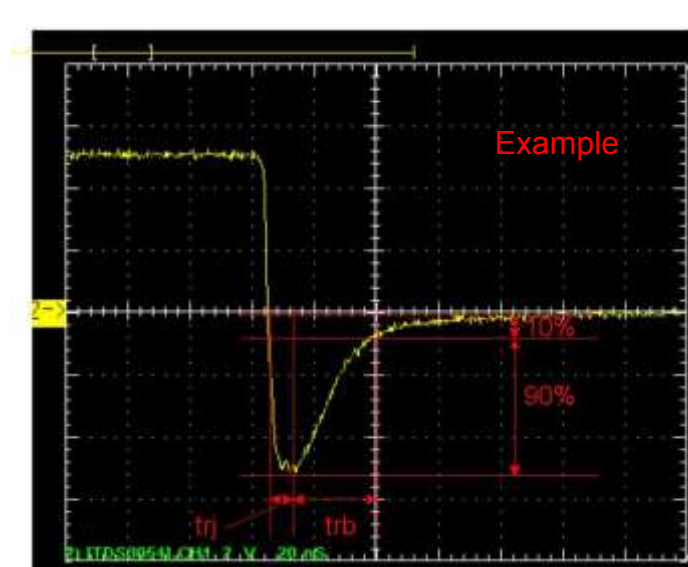
Reference



$\text{Trj} = 9.2(\text{ns})$

$\text{Trb} = 27.6(\text{ns})$

Conditions: $I_{\text{fwd}} = I_{\text{rev}} = 0.02(\text{A})$, $R_I = 50$



Relation between trj and trb