

Device Modeling Report

COMPONENTS: Light-Emitting Diode (LED) Professional
PART NUMBER: SLP-WB89A-51
MANUFACTURER: SANYO
REMARK: TA=25 degree C

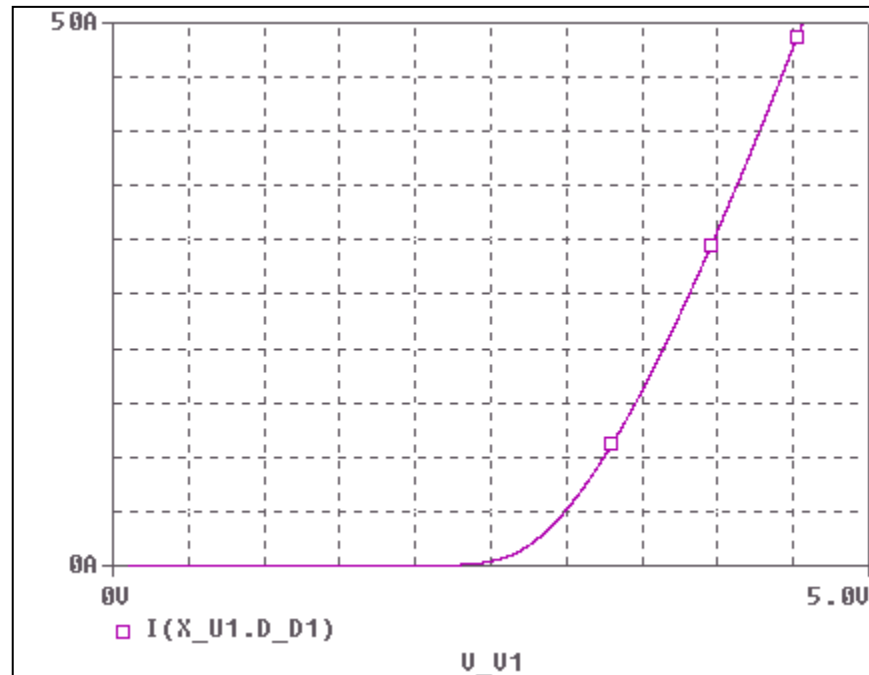


Bee Technologies Inc.

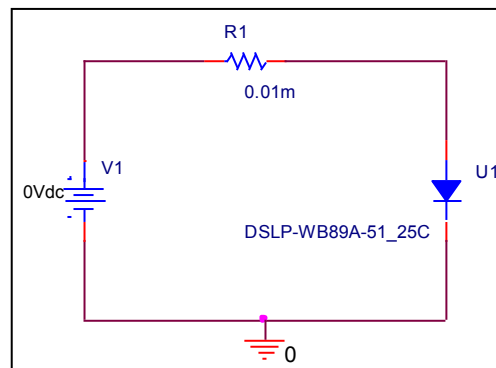
PSpice model parameter	Model description
IS	Saturation Current
N	Emission Coefficient
RS	Series Resistance
IKF	High-injection Knee Current
CJO	Zero-bias Junction Capacitance
M	Junction Grading Coefficient
VJ	Junction Potential
ISR	Recombination Current Saturation Value
BV	Reverse Breakdown Voltage(a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

Forward Current Characteristic

Circuit Simulation Result

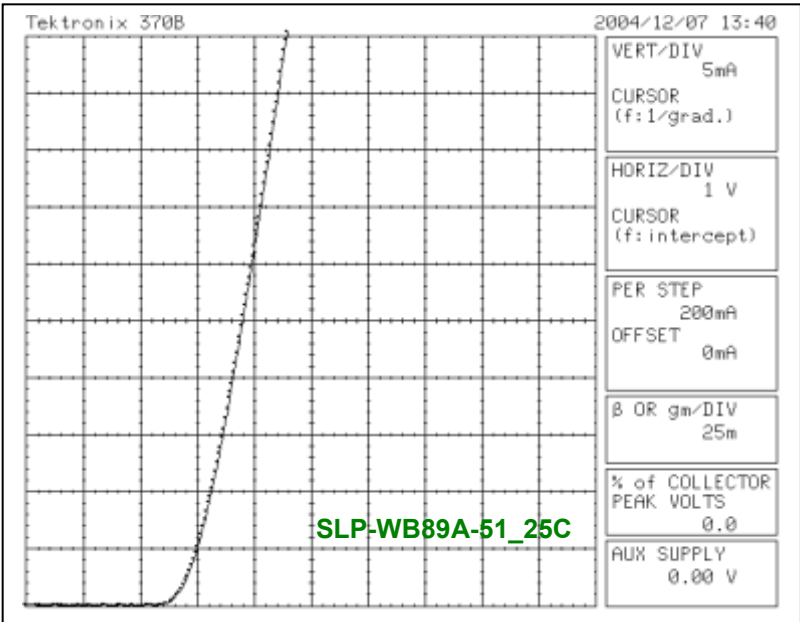


Evaluation Circuit



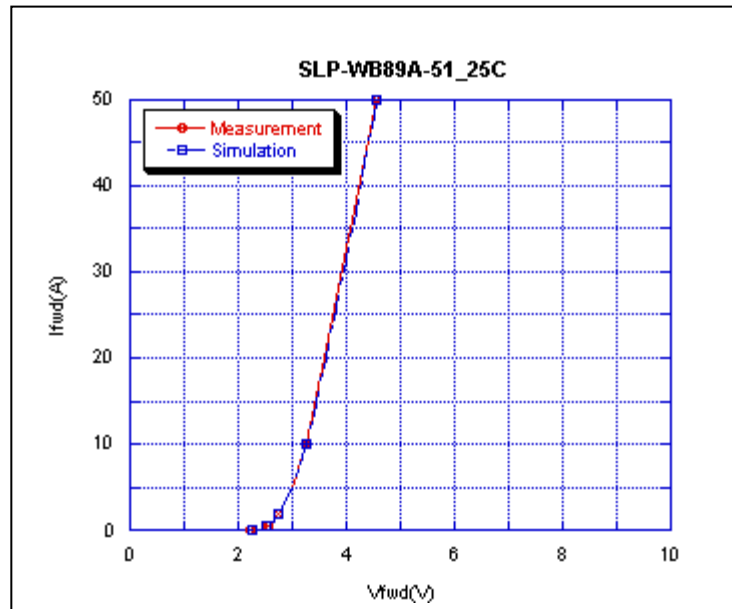
Forward Current Characteristic

Reference



Comparison Graph

Circuit Simulation Result

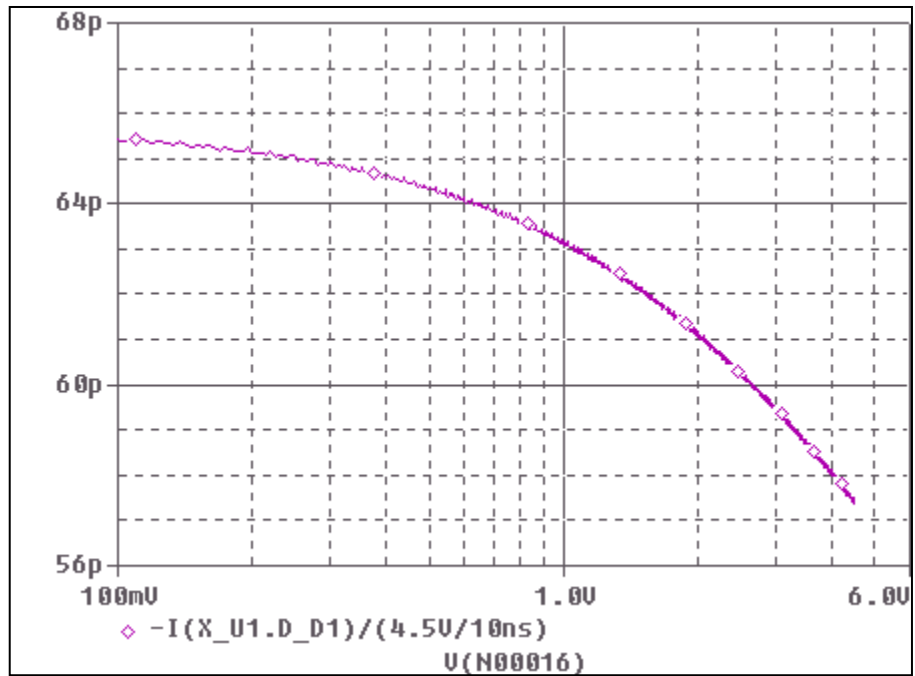


Simulation Result

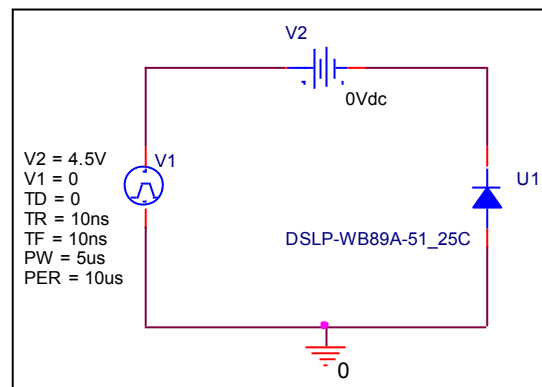
I_{fwd} (A)	V_{fwd} (V) Measurement	V_{fwd} (V) Simulation	%Error
0.1	2.21	2.25	1.80995
0.2	2.44	2.4	1.63934
0.5	2.57	2.52	1.94552
1	2.65	2.65	0
2	2.76	2.76	0
5	3.01	2.99	0.66445
10	3.26	3.248	0.36809
20	3.61	3.64	0.83102
50	4.57	4.56	0.21881

Capacitance Characteristic

Circuit Simulation Result

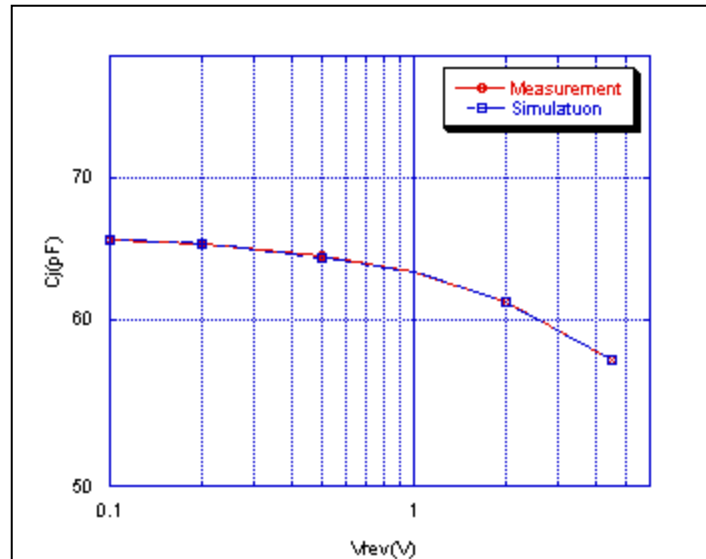


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

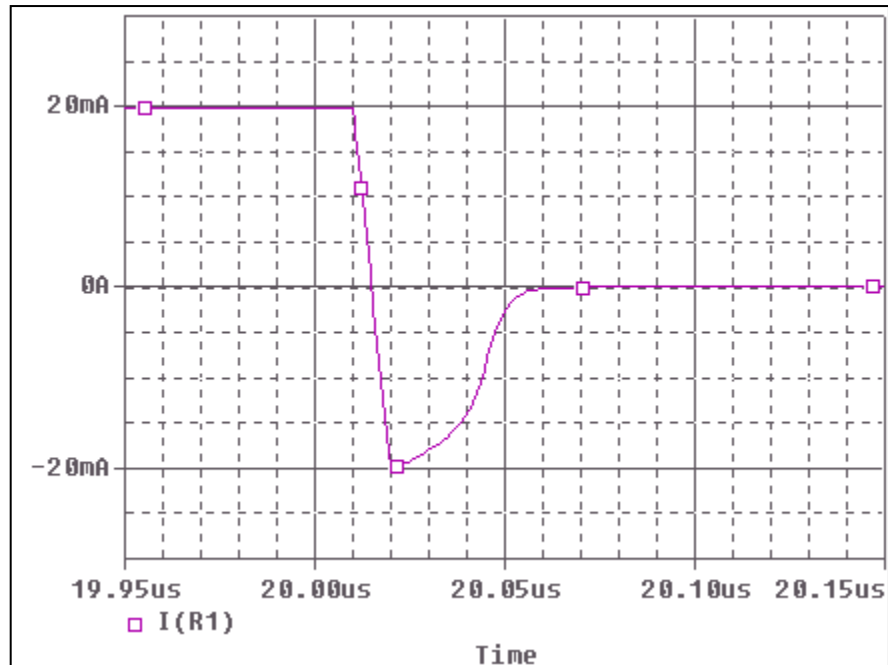


Simulation Result

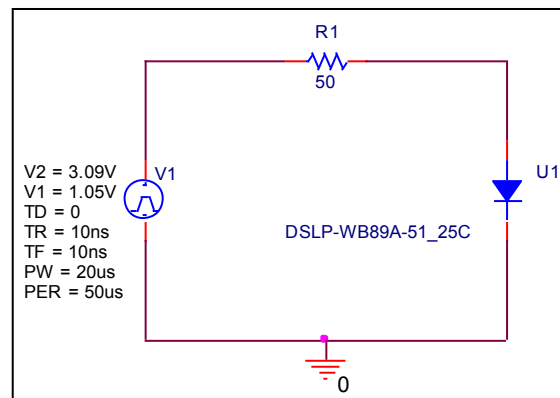
$V_{rev}(V)$	$C_j(pF)$ Measurement	$C_j(pF)$ Simulation	%Error
0	65.73	65.73	0
0.1	65.46	65.4	0.09165
0.2	65.12	65.11	0.01535
0.5	64.3	64.14	0.24883
1	63.12	63.14	0.03168
2	61.16	61.11	0.08175
4.5	57.39	57.39	0

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

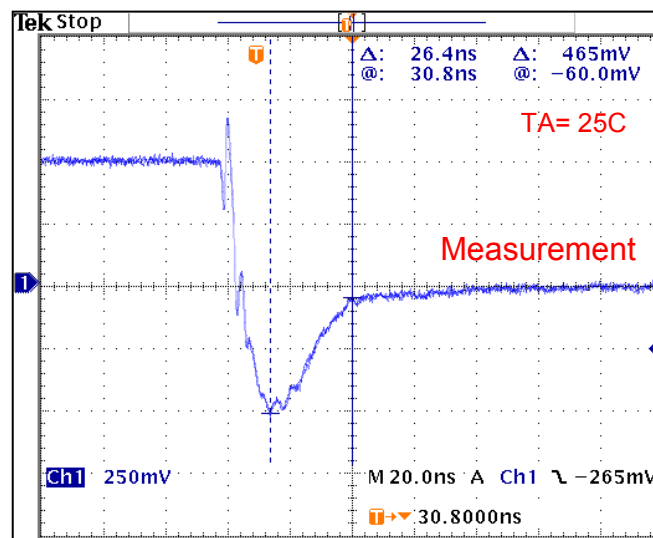


Compare Measurement vs. Simulation

Symbol	Measurement	Unit	Simulation	Unit	%Error
trj	8.4	ns	8.38	ns	0.23809
trb	26.4	ns	26.8	ns	1.51515

Reverse Recovery Characteristic

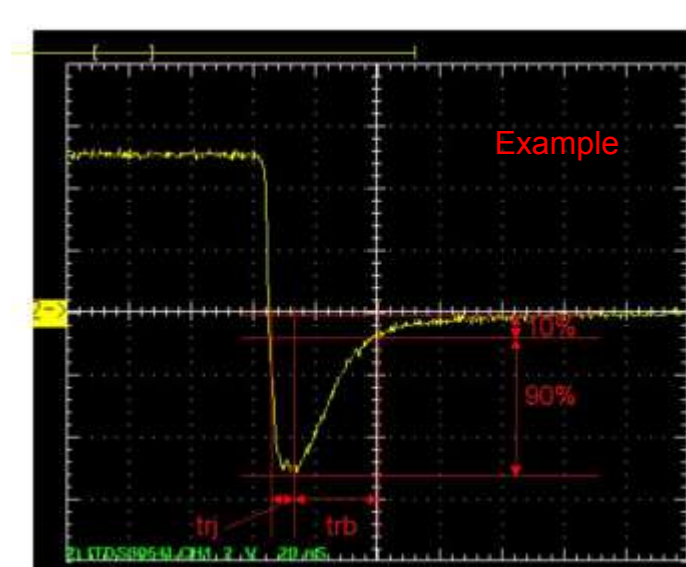
Reference



$T_{rj} = 8.4(\text{ns})$

$T_{rb} = 26.4(\text{ns})$

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



Relation between t_{rj} and t_{rb}