

Device Modeling Report

COMPONENTS: Light-Emitting Diode (LED) Professional
PART NUMBER: OSWT5161A
MANUFACTURER: OPTO SUPPLY
REMARK: TA=40 degree C

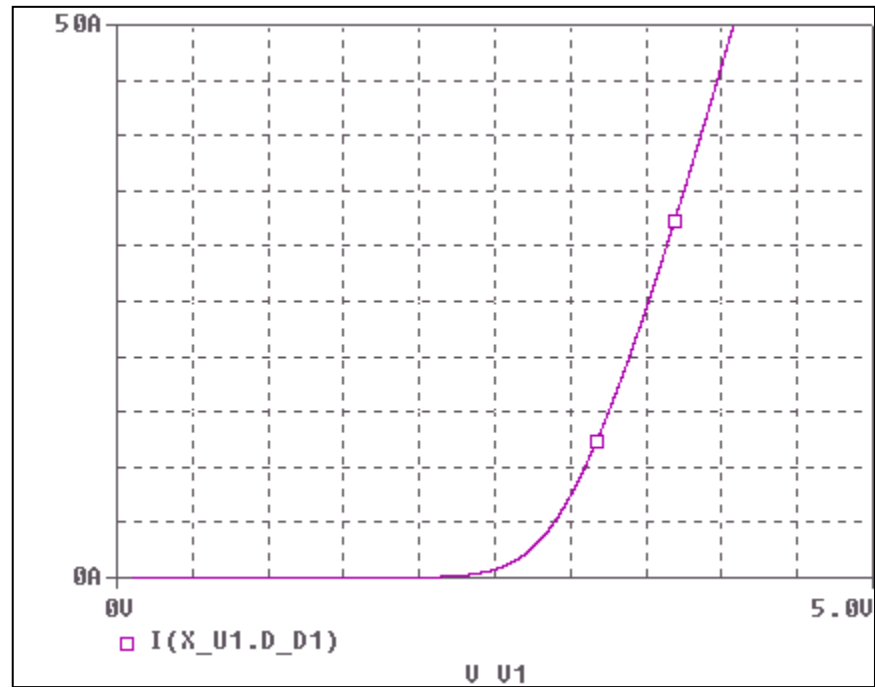


Bee Technologies Inc.

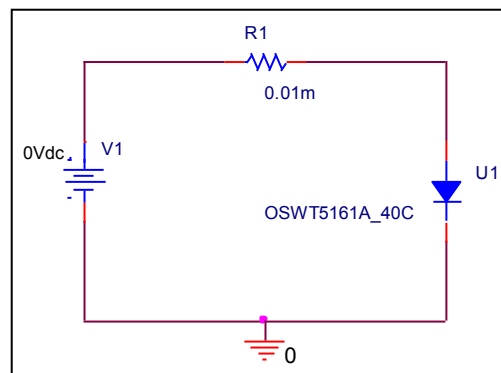
PSpice model parameter	Model description
IS	Saturation Current
N	Emission Coefficient
RS	Series Resistance
IKF	High-injection Knee Current
CJO	Zero-bias Junction Capacitance
M	Junction Grading Coefficient
VJ	Junction Potential
ISR	Recombination Current Saturation Value
BV	Reverse Breakdown Voltage(a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

Forward Current Characteristic

Circuit Simulation Result

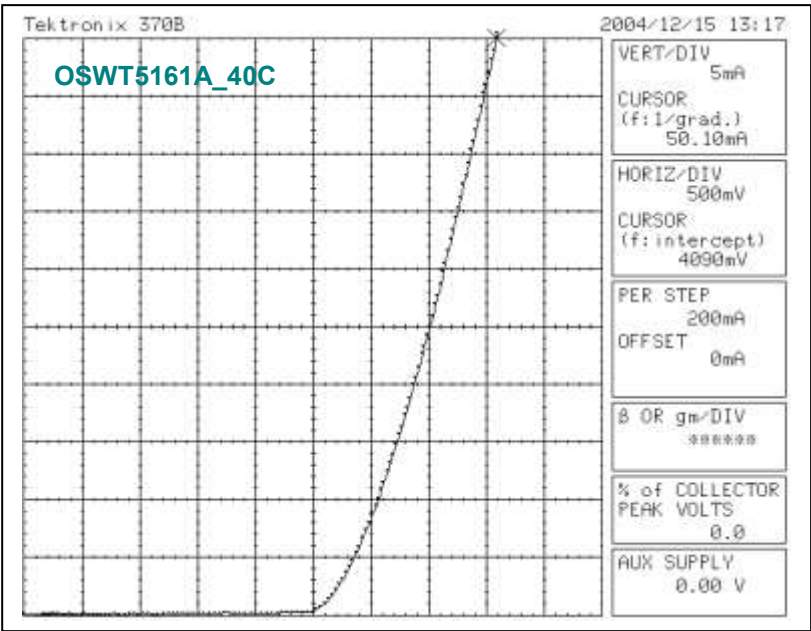


Evaluation Circuit



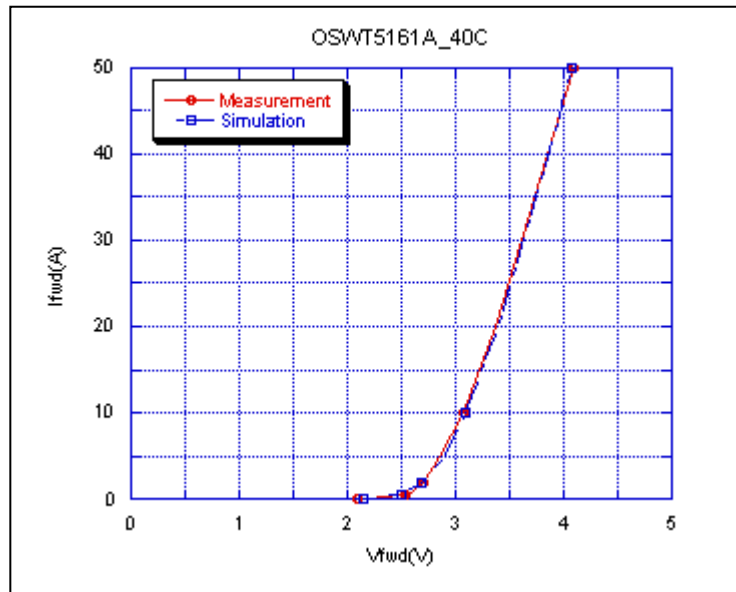
Forward Current Characteristic

Reference



Comparison Graph

Circuit Simulation Result

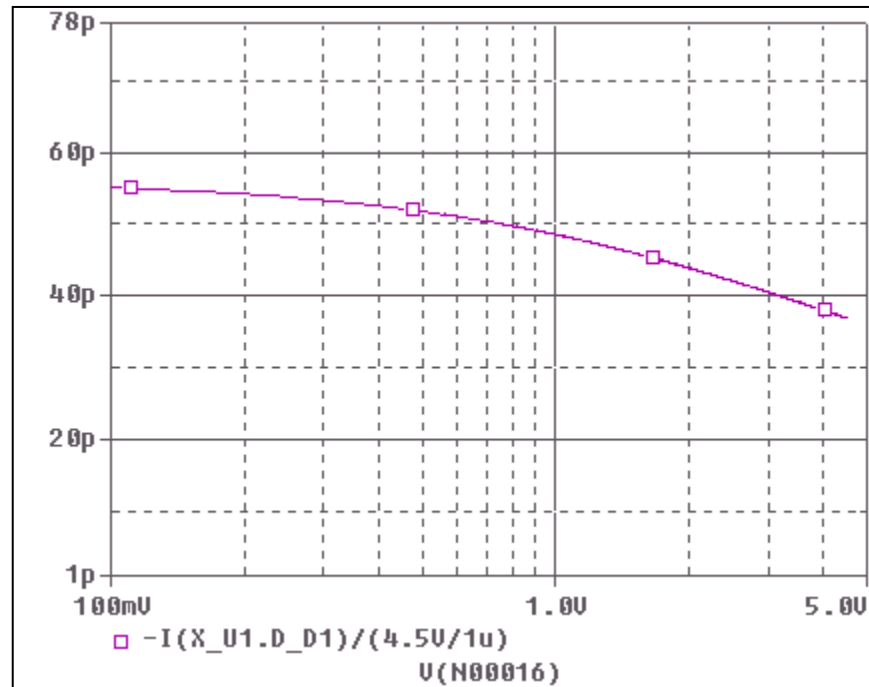


Simulation Result

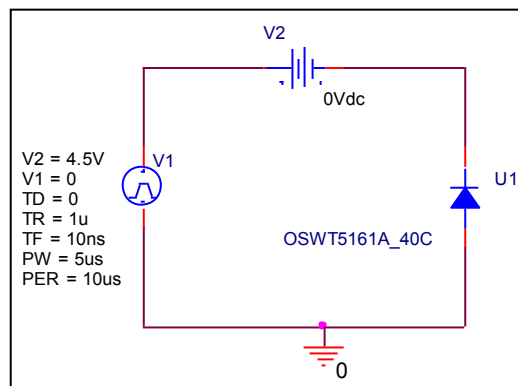
Ifwd(A)	Vfwd(V) Measurement	Vfwd(V) Simulation	%Error
0.1	2.1	2.156	2.666
0.2	2.285	2.272	0.568
0.5	2.535	2.499	1.420
1	2.61	2.552	2.222
2	2.7	2.686	0.518
5	2.845	2.891	1.616
10	3.075	3.094	0.617
20	3.375	3.388	0.385
50	4.09	4.077	0.317

Capacitance Characteristic

Circuit Simulation Result

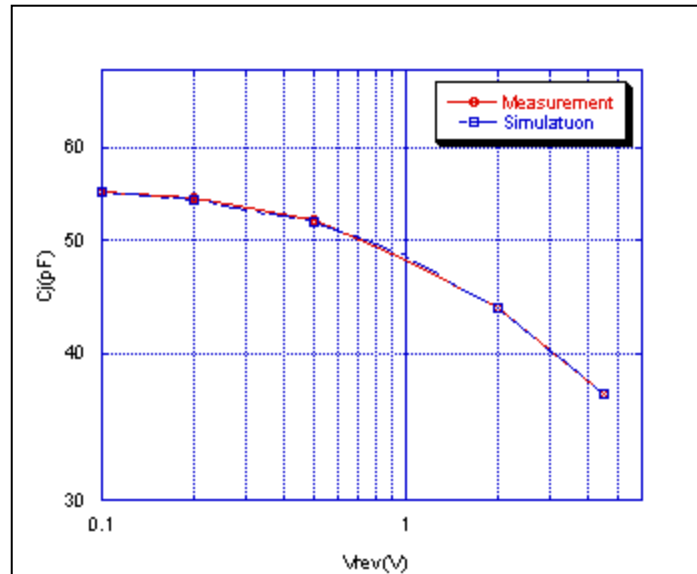


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

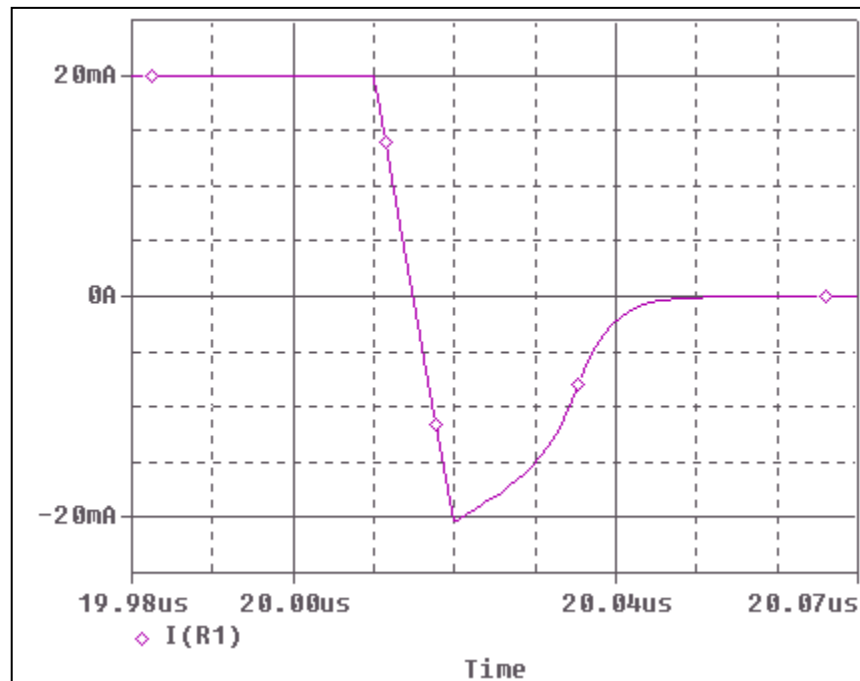


Simulation Result

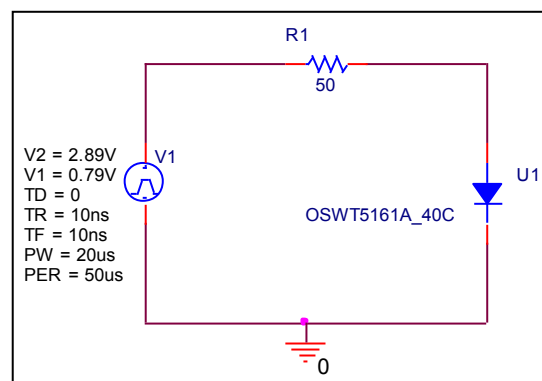
$V_{rev}(V)$	$C_j(pF)$ Measurement	$C_j(pF)$ Simulation	%Error
0	55.72	55.72	0
0.1	55.09	55.085	0.0090
0.2	54.44	54.222	0.4004
0.5	52.09	51.777	0.6008
1	48.16	48.536	0.7807
2	43.83	43.842	0.0273
4.5	36.94	36.919	0.0568

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

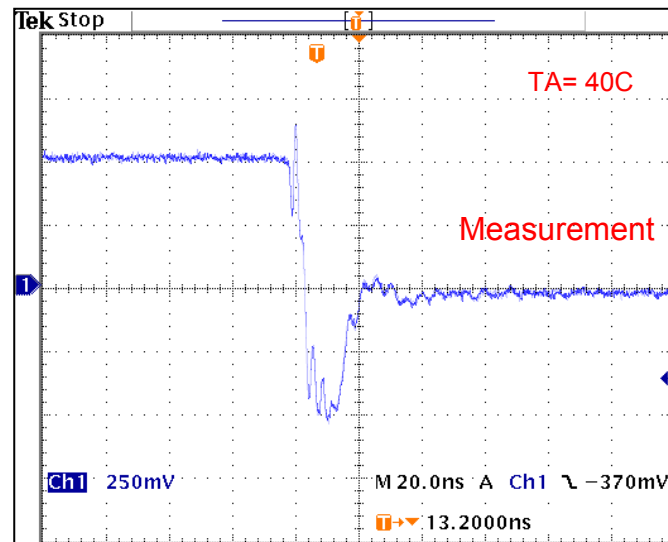


Compare Measurement vs. Simulation

Symbol	Measurement	Unit	Simulation	Unit	%Error
trj	10	ns	9.95	ns	- 0.05
trb	15.2	ns	15	ns	- 0.2

Reverse Recovery Characteristic

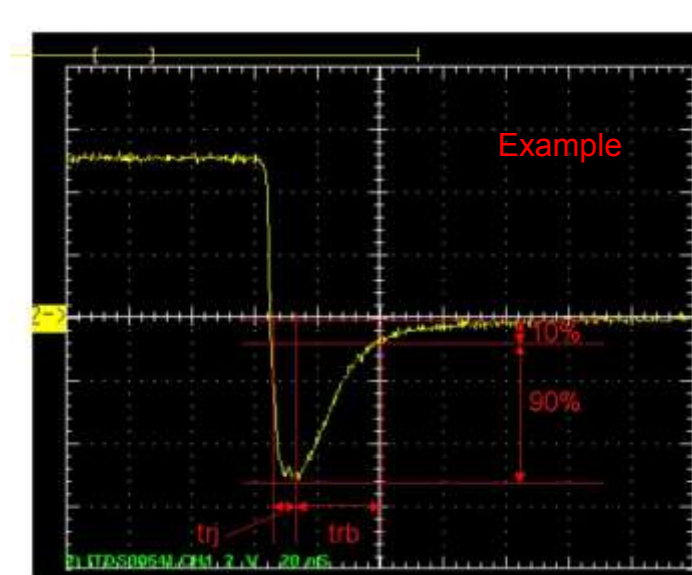
Reference



$T_{rj} = 10(\text{ns})$

$T_{rb} = 15.2(\text{ns})$

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



Relation between t_{rj} and t_{rb}