

Device Modeling Report

COMPONENTS: Light-Emitting Diode (LED) STANDARD
PART NUMBER: OSWT5161A
MANUFACTURER: OPTO SUPPLY
REMARK: TA=0 degree C

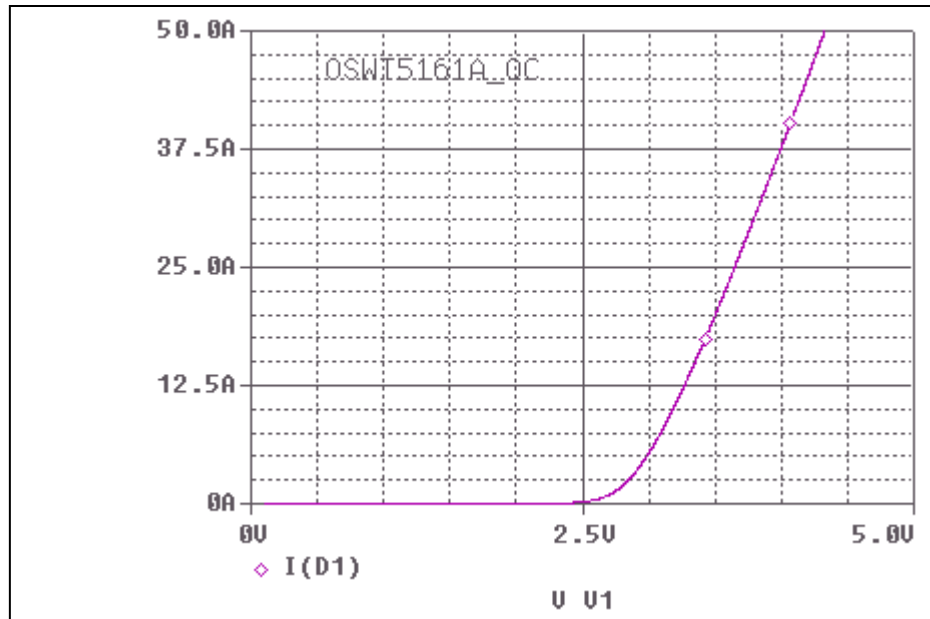


Bee Technologies Inc.

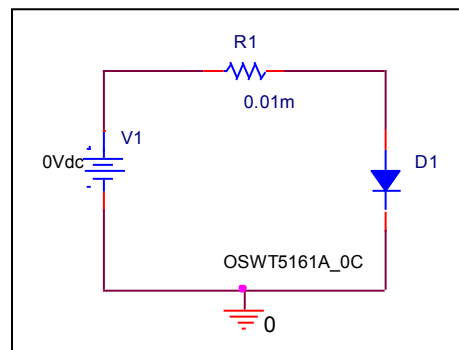
PSpice model parameter	Model description
IS	Saturation Current
N	Emission Coefficient
RS	Series Resistance
IKF	High-injection Knee Current
CJO	Zero-bias Junction Capacitance
M	Junction Grading Coefficient
VJ	Junction Potential
ISR	Recombination Current Saturation Value
BV	Reverse Breakdown Voltage(a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

Forward Current Characteristic

Circuit Simulation Result

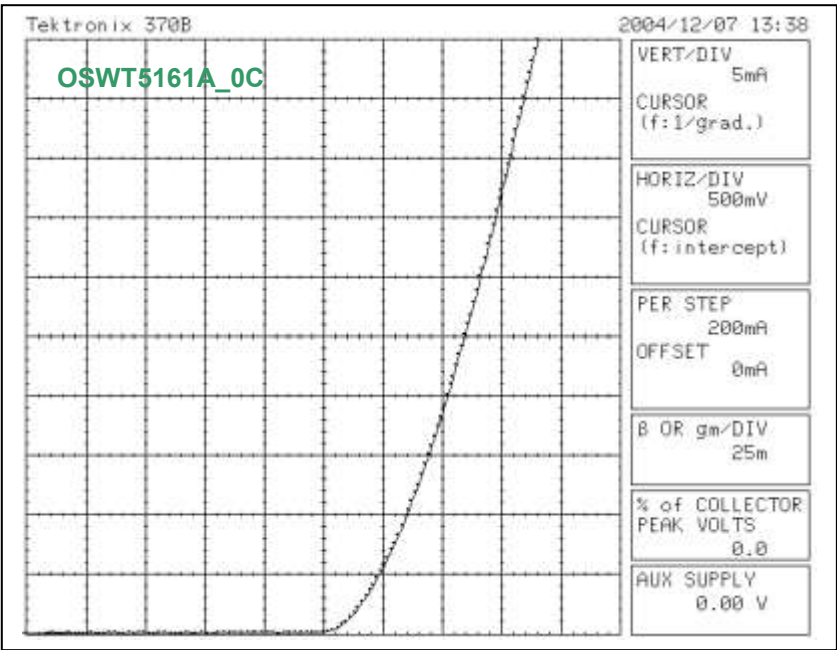


Evaluation Circuit



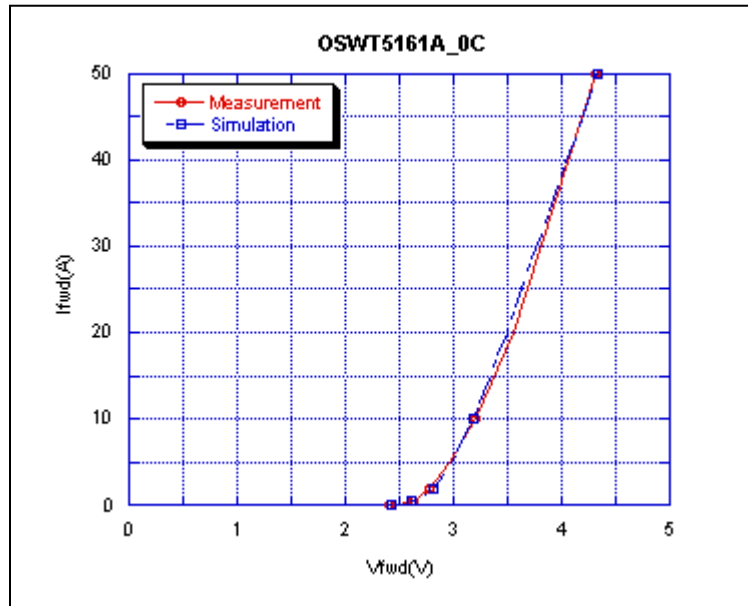
Forward Current Characteristic

Reference



Comparison Graph

Circuit Simulation Result

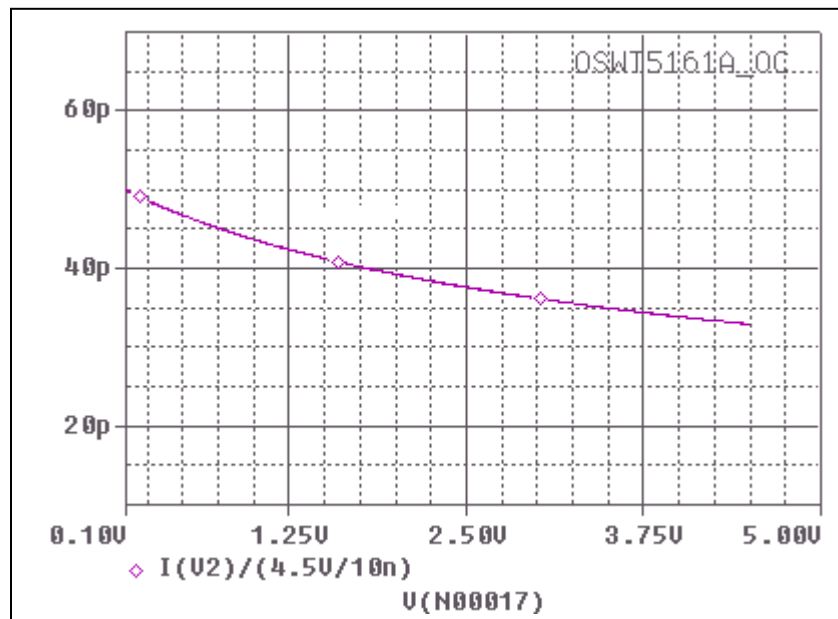


Simulation Result

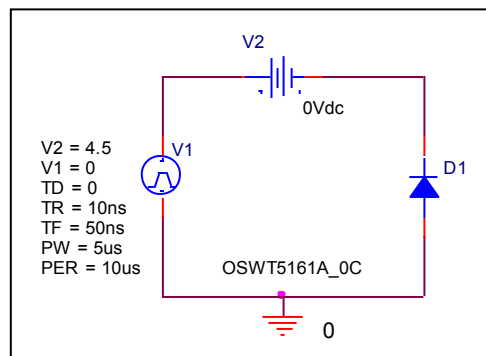
I_{fwd} (A)	V_{fwd} (V) Measurement	V_{fwd} (V) Simulation	%Error
0.1	2.41	2.427	0.705
0.2	2.545	2.505	1.5717
0.5	2.63	2.616	0.5323
1	2.69	2.706	0.5947
2	2.77	2.808	1.3718
5	2.955	2.984	0.9813
10	3.2	3.183	0.5312
20	3.55	3.503	1.3239
50	4.31	4.327	0.3944

Capacitance Characteristic

Circuit Simulation Result

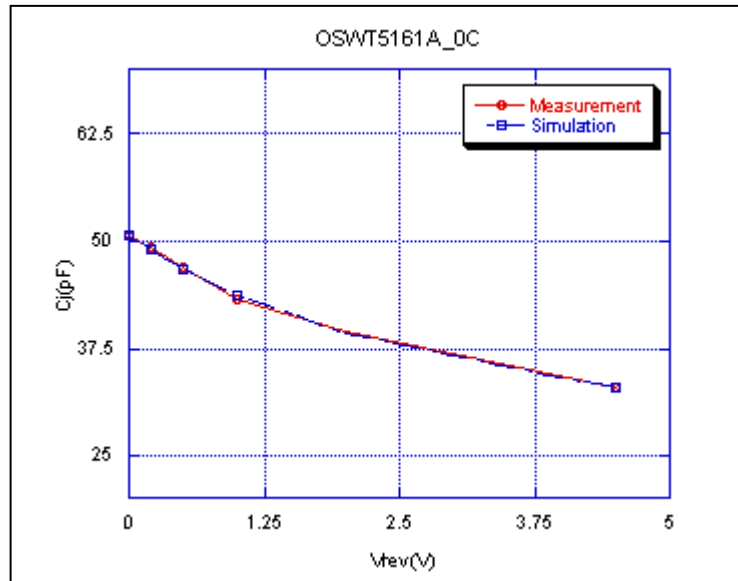


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

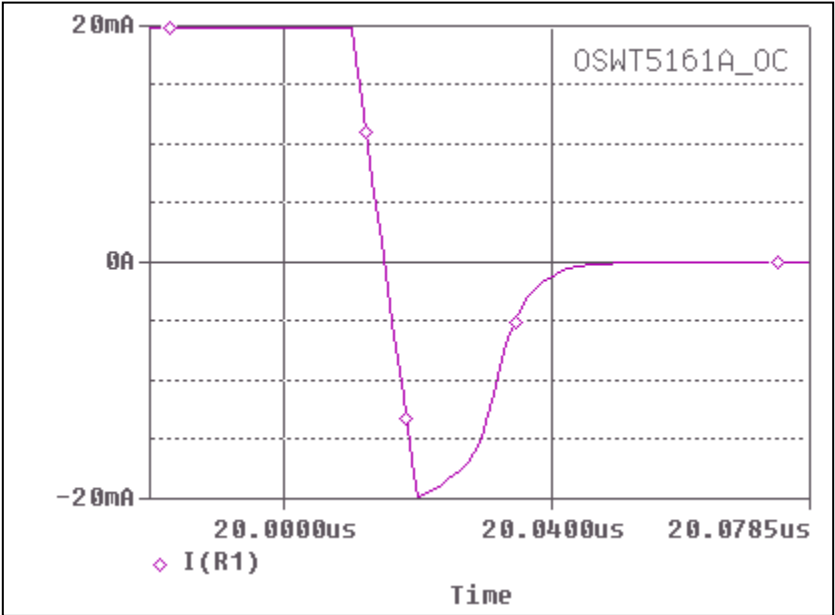


Simulation Result

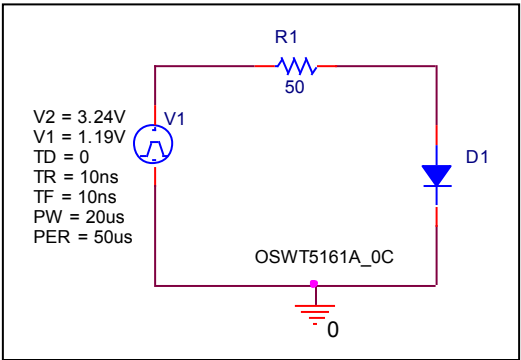
Vrev(V)	Cj(pF) Measurement	Cj(pF) Simulation	%Error
0	50.63	50.63	0
0.1	49.95	49.92	0.0600
0.2	49.25	49.07	0.3654
0.5	47.01	46.71	0.6381
1	43.15	43.65	1.1587
2	39.5	39.3	0.5063
4.5	32.86	32.9	0.1217

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

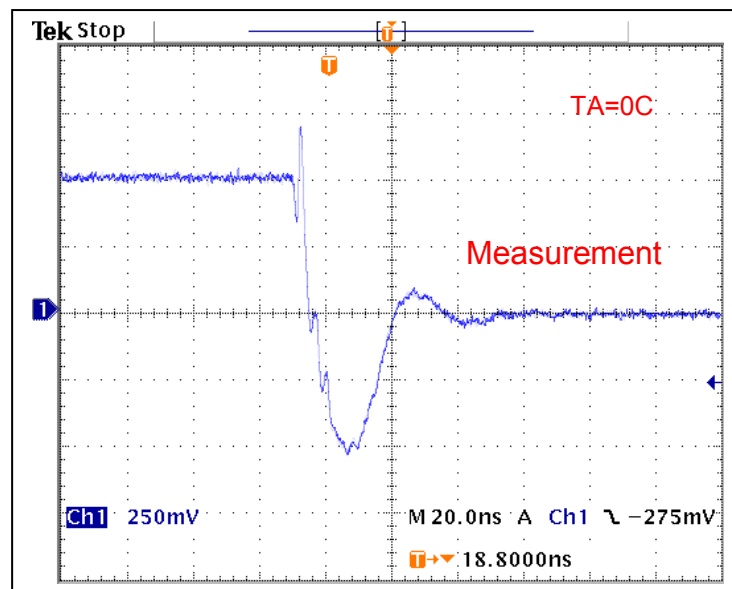


Compare Measurement vs. Simulation

Symbol	Measurement	Unit	Simulation	Unit	%Error
$T_{rr}=t_{rj}+t_{rb}$	22.4	ns	22.6	ns	0.982

Reverse Recovery Characteristic

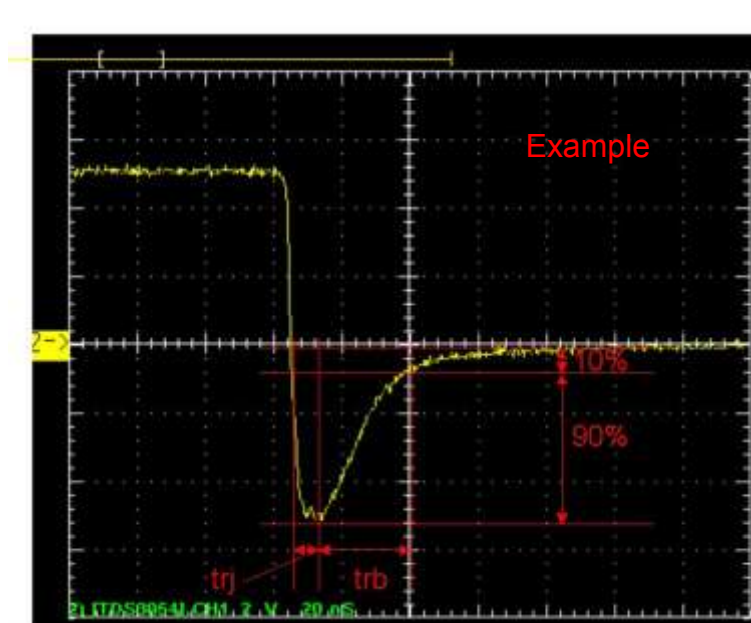
Reference



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

$\text{Trb} = 13.2(\text{ns})$

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



Relation between trj and trb