

Device Modeling Report

COMPONENTS: Light-Emitting Diode (LED) STANDARD
PART NUMBER: OSWT5111A
MANUFACTURER: OPTO SUPPLY
REMARK: 60 degree C

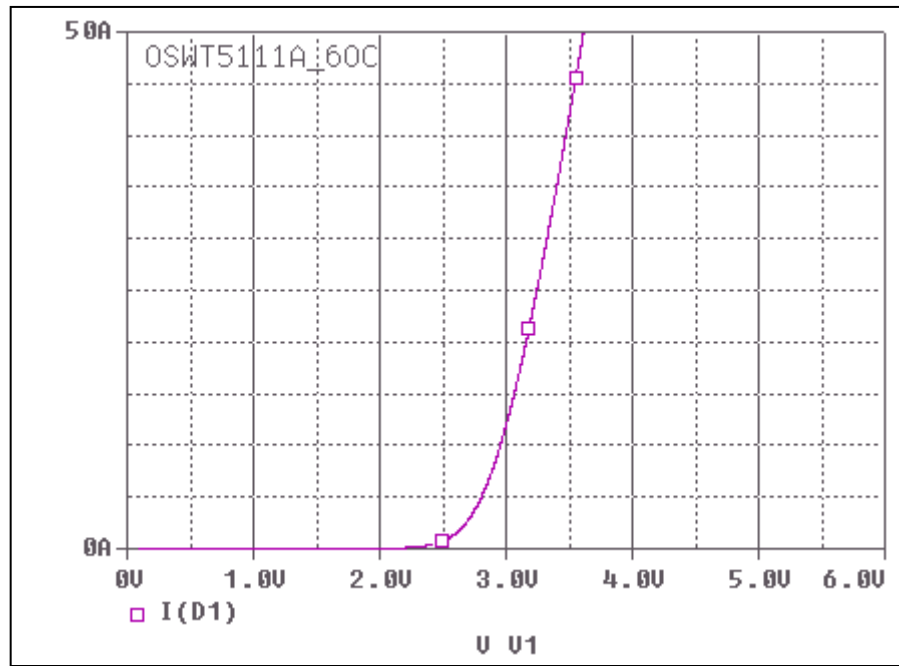


Bee Technologies Inc.

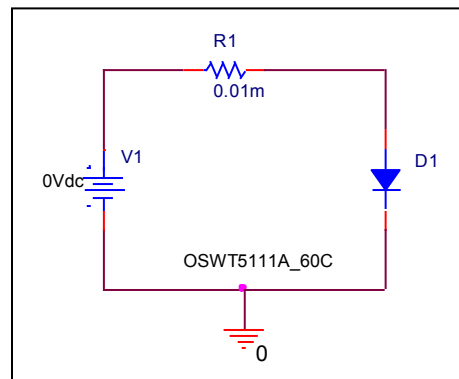
PSpice model parameter	Model description
IS	Saturation Current
N	Emission Coefficient
RS	Series Resistance
IKF	High-injection Knee Current
CJO	Zero-bias Junction Capacitance
M	Junction Grading Coefficient
VJ	Junction Potential
ISR	Recombination Current Saturation Value
BV	Reverse Breakdown Voltage(a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

Forward Current Characteristic

Circuit Simulation Result

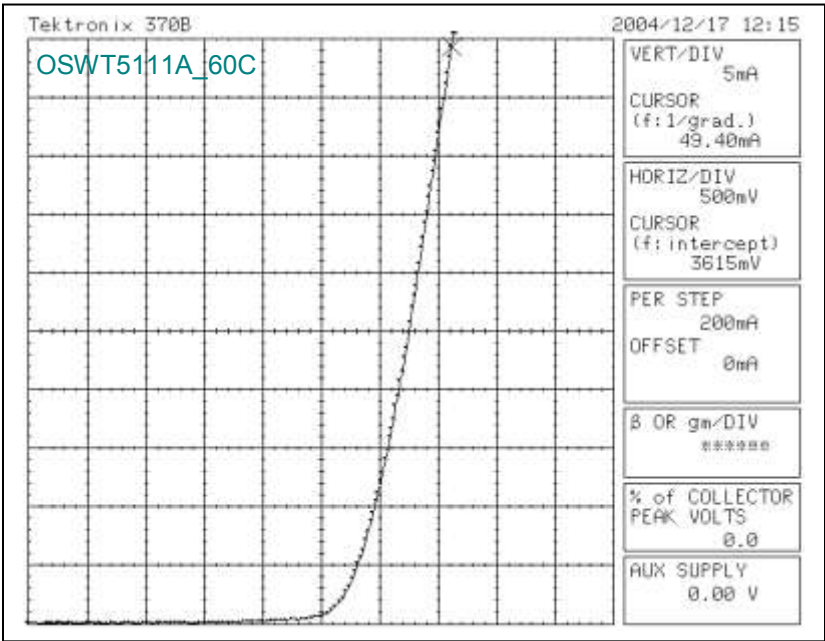


Evaluation Circuit



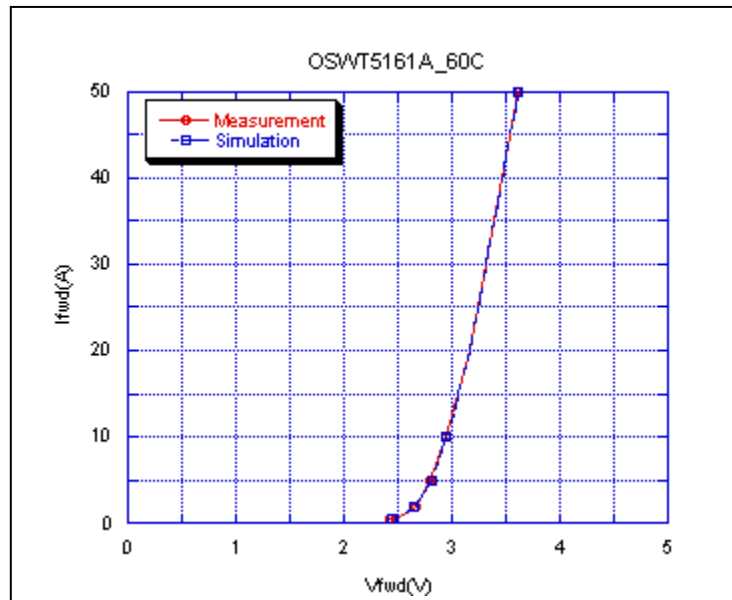
Forward Current Characteristic

Reference



Comparison Graph

Circuit Simulation Result

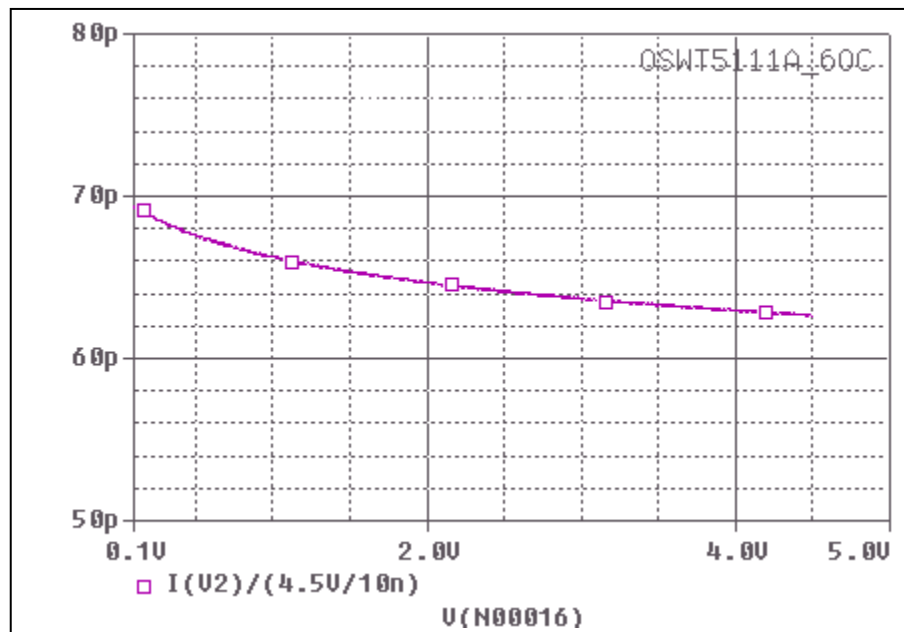


Simulation Result

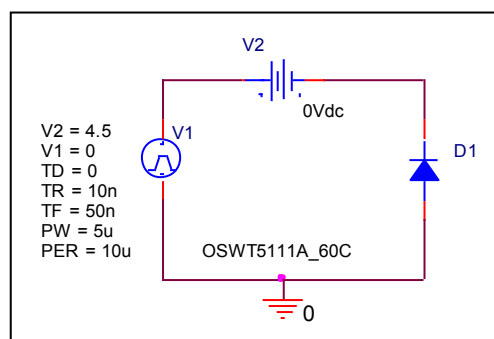
Ifwd(A)	Vfwd(V) Measurement	Vfwd(V) Simulation	%Error
0.5	2.42	2.441	0.8677
1	2.56	2.541	0.7421
2	2.665	2.646	0.7129
5	2.795	2.817	0.7871
10	2.945	2.954	0.3056
20	3.16	3.159	0.0316
50	3.615	3.614	0.0276

Capacitance Characteristic

Circuit Simulation Result

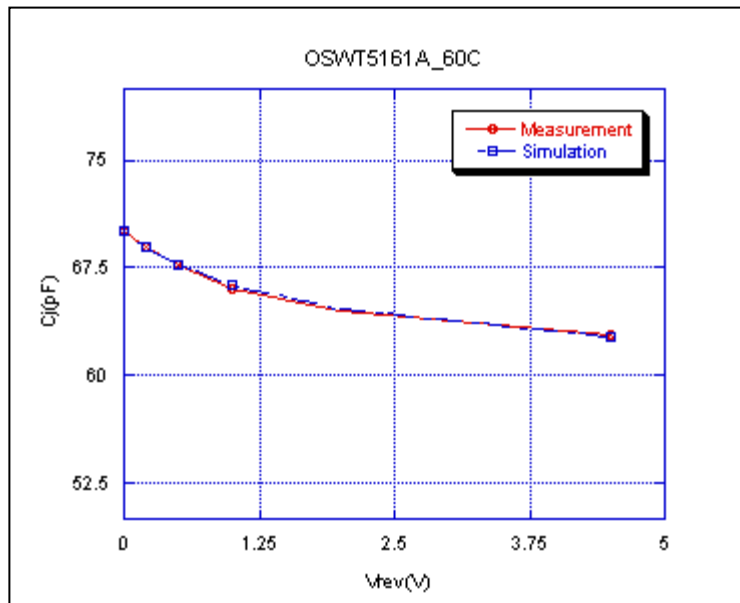


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

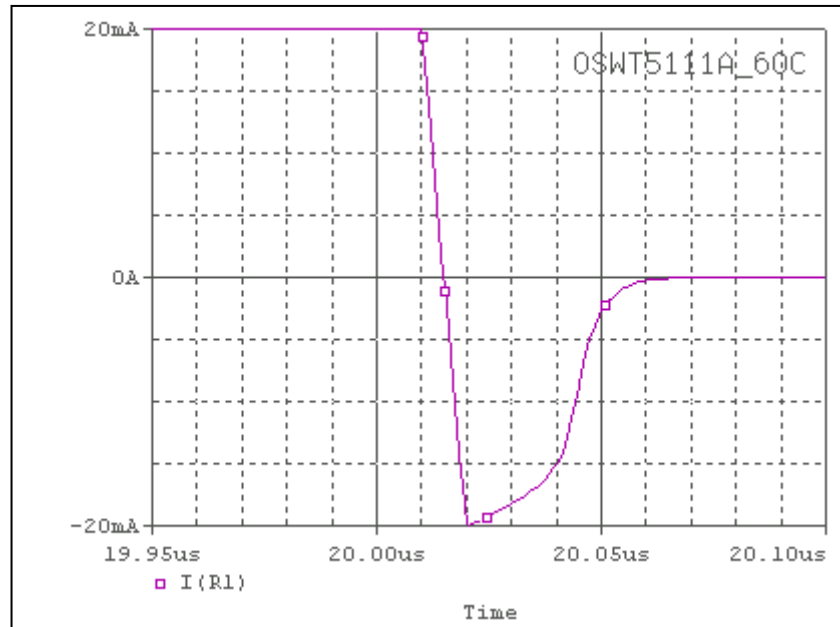


Simulation Result

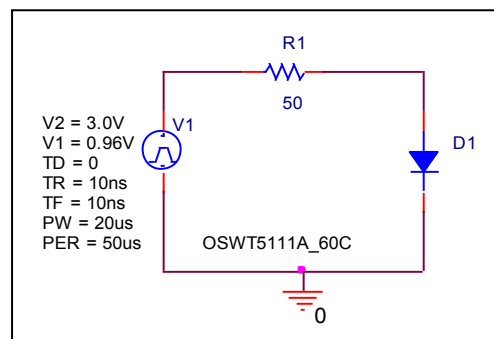
V_{rev} (V)	C_j (pF) Measurement	C_j (pF) Simulation	%Error
0	70.06	70.06	0
0.1	69.465	69.371	0.13531
0.2	68.91	68.883	0.03918
0.5	67.65	67.651	0.00147
1	66.1	66.285	0.27987
2	64.48	64.64	0.24813
4.5	62.85	62.692	0.25139

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

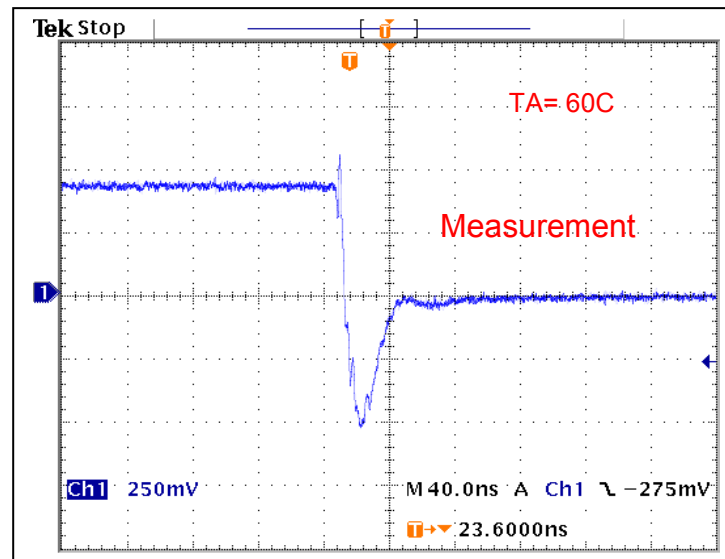


Compare Measurement vs. Simulation

Symbol	Measurement	Unit	Simulation	Unit	%Error
$T_{rr}=t_{rj}+t_{rb}$	36	ns	35.87	ns	0.3611

Reverse Recovery Characteristic

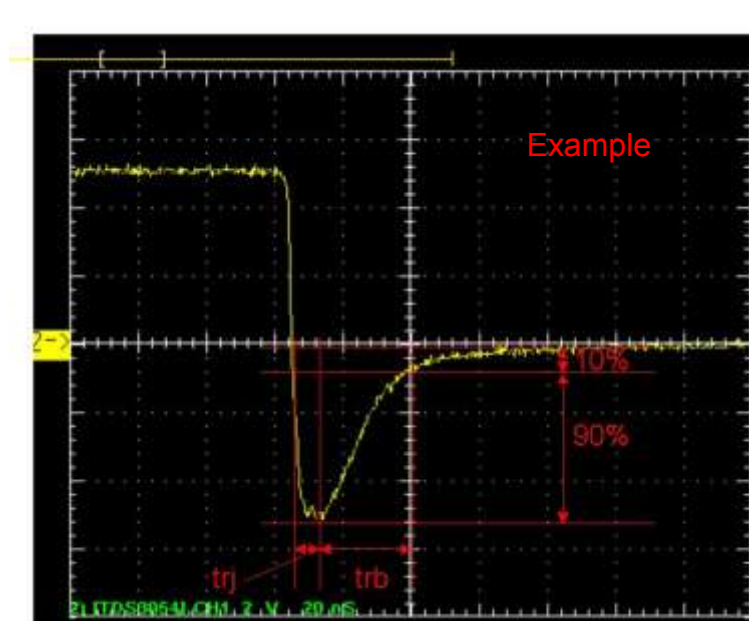
Reference



$T_{rj} = 12.4(\text{ns})$

$T_{rb} = 23.6(\text{ns})$

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



Relation between t_{rj} and t_{rb}