

Device Modeling Report

COMPONENTS: Light-Emitting Diode (LED) STANDARD
PART NUMBER: OSWT5111A
MANUFACTURER: OPTO SUPPLY
REMARK: 25 degree C

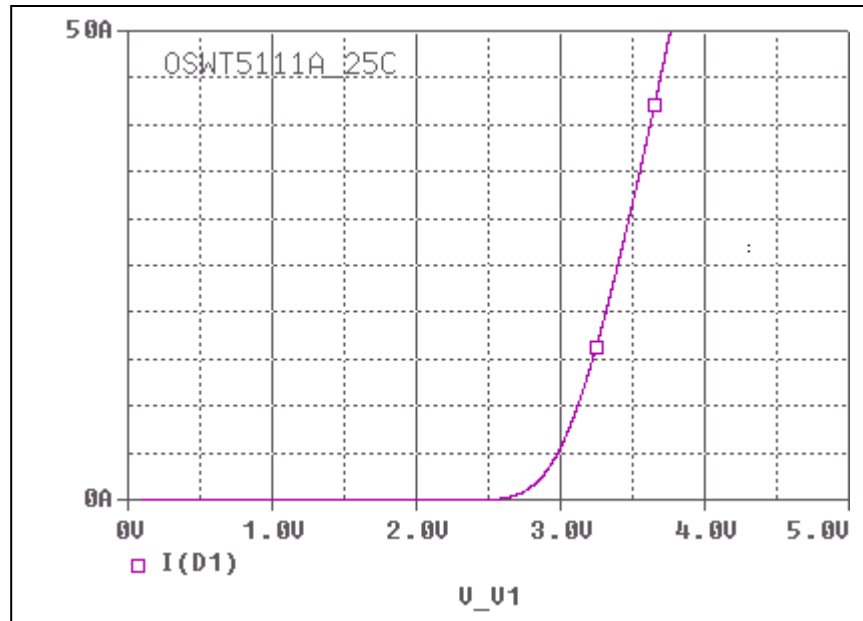


Bee Technologies Inc.

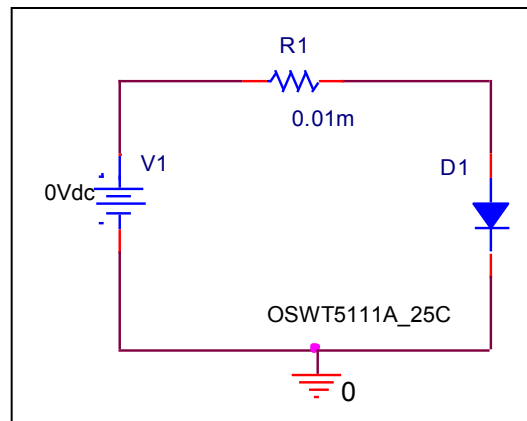
PSpice model parameter	Model description
IS	Saturation Current
N	Emission Coefficient
RS	Series Resistance
IKF	High-injection Knee Current
CJO	Zero-bias Junction Capacitance
M	Junction Grading Coefficient
VJ	Junction Potential
ISR	Recombination Current Saturation Value
BV	Reverse Breakdown Voltage(a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

Forward Current Characteristic

Circuit Simulation Result

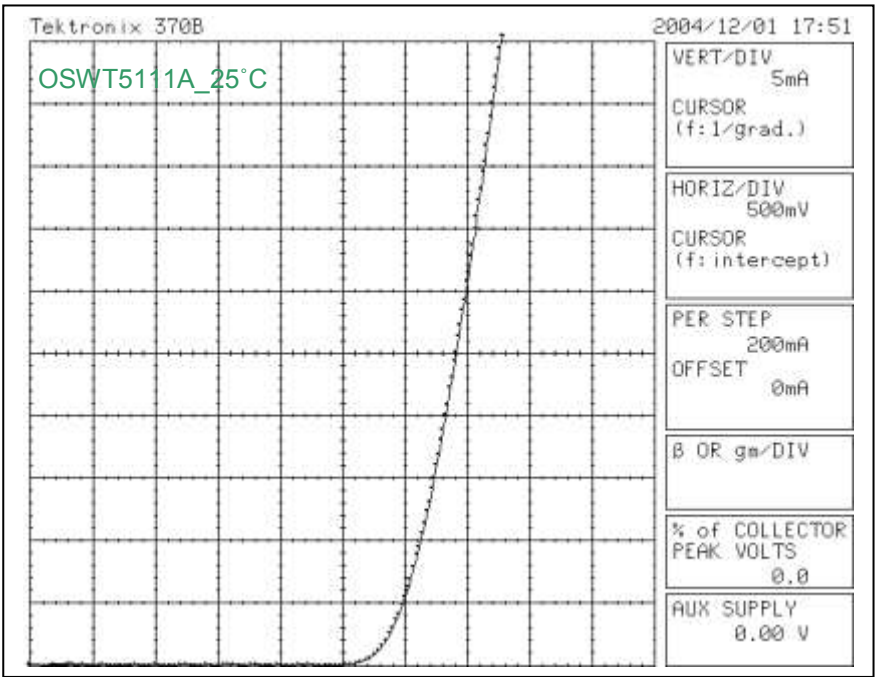


Evaluation Circuit



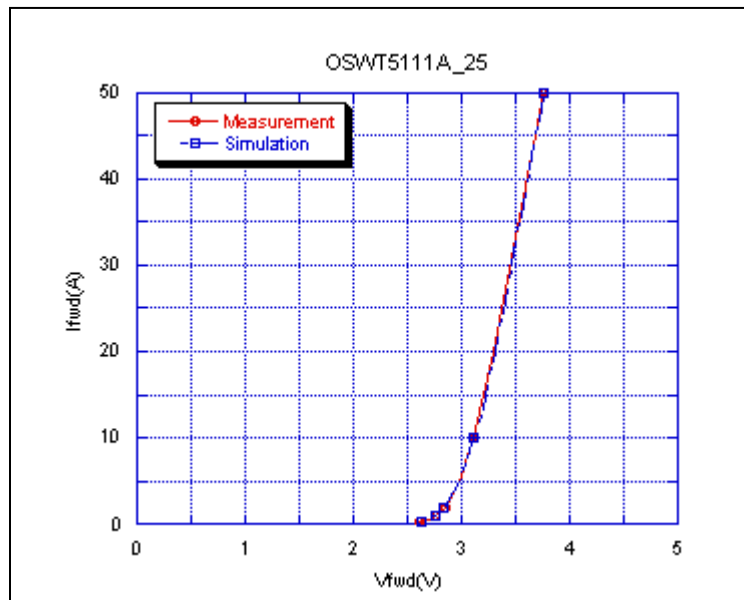
Forward Current Characteristic

Reference



Comparison Graph

Circuit Simulation Result

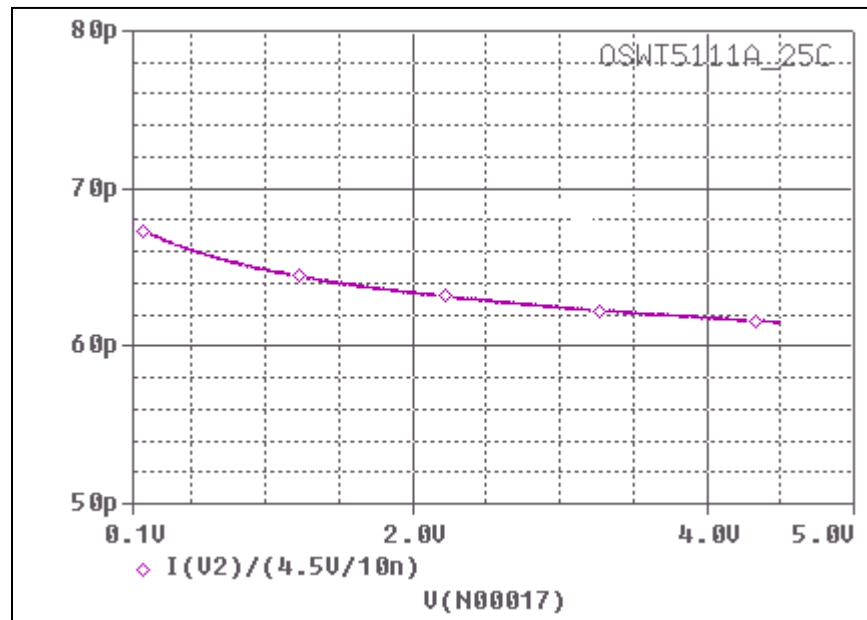


Simulation Result

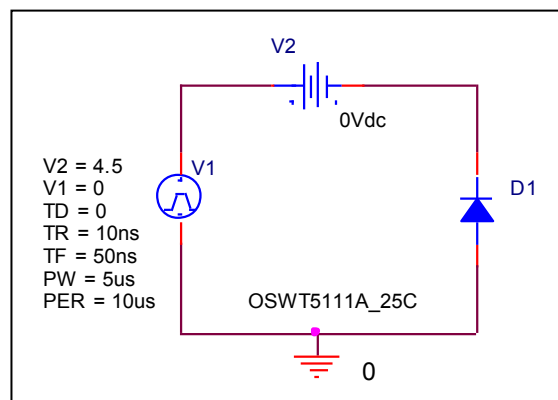
Ifwd(A)	Vfwd(V) Measurement	Vfwd(V) Simulation	%Error
0.2	2.62	2.623	0.1145
0.5	2.695	2.694	0.0371
1	2.765	2.76	0.1808
2	2.85	2.843	0.2456
5	2.98	2.98	0
10	3.115	3.117	0.0642
20	3.305	3.313	0.2420
50	3.765	3.757	0.2124

Capacitance Characteristic

Circuit Simulation Result

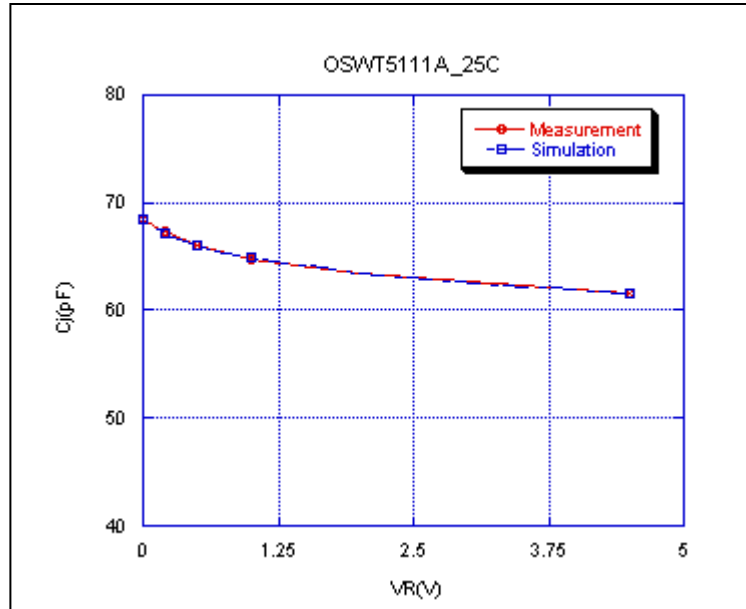


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

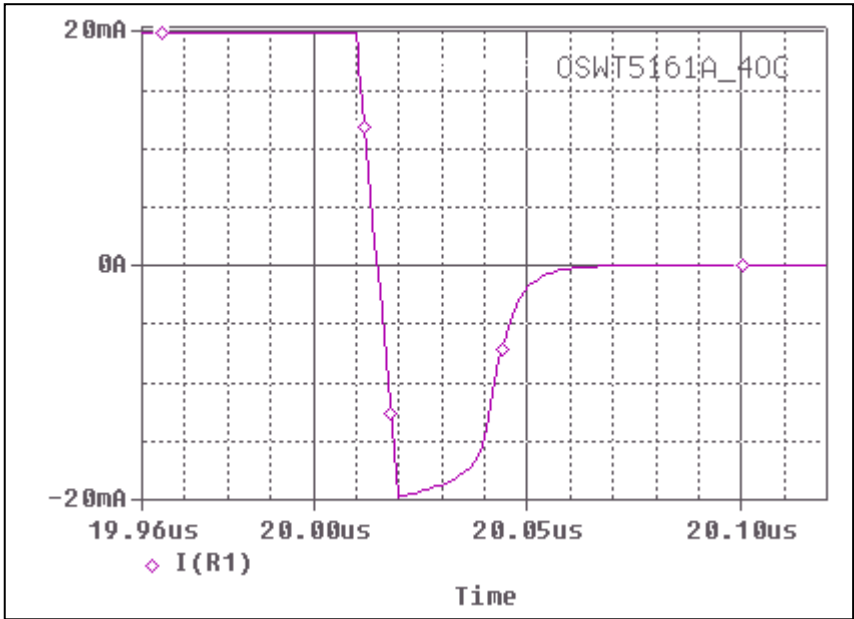


Simulation Result

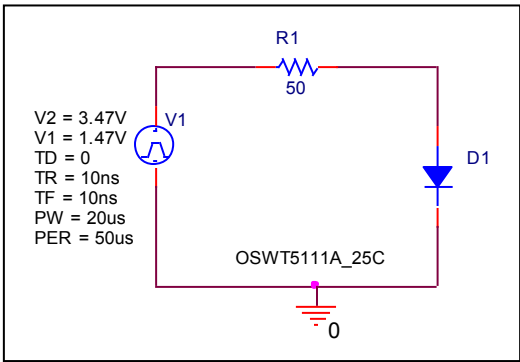
Vrev(V)	Cj(pF) Measurement	Cj(pF) Simulation	%Error
0	68.388	68.388	0
0.1	67.835	67.766	0.1017
0.2	67.33	67.199	0.1945
0.5	66	66.014	0.0212
1	64.64	64.893	0.3913
2	63.37	63.444	0.1167
4.5	61.65	61.49	0.2595

Reverse Recovery Characteristic

Circuit Simulation Result



Evaluation Circuit

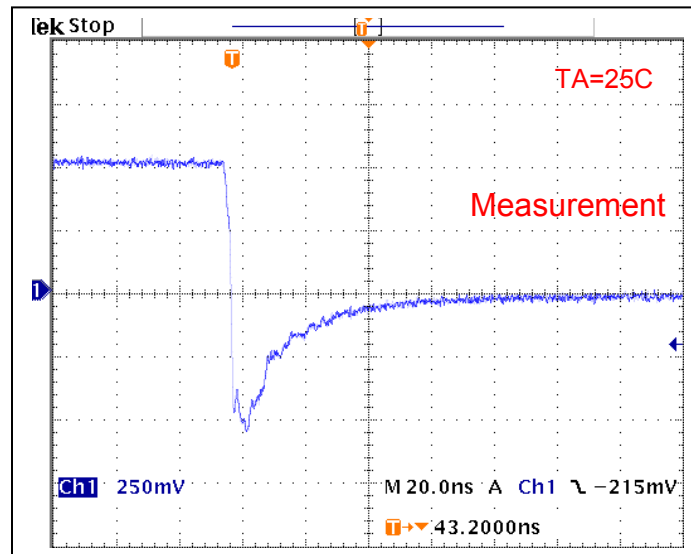


Compare Measurement vs. Simulation

Symbol	Measurement	Unit	Simulation	Unit	%Error
$T_{rr}=t_{rj}+t_{rb}$	34.4	ns	34.29	ns	0.32079

Reverse Recovery Characteristic

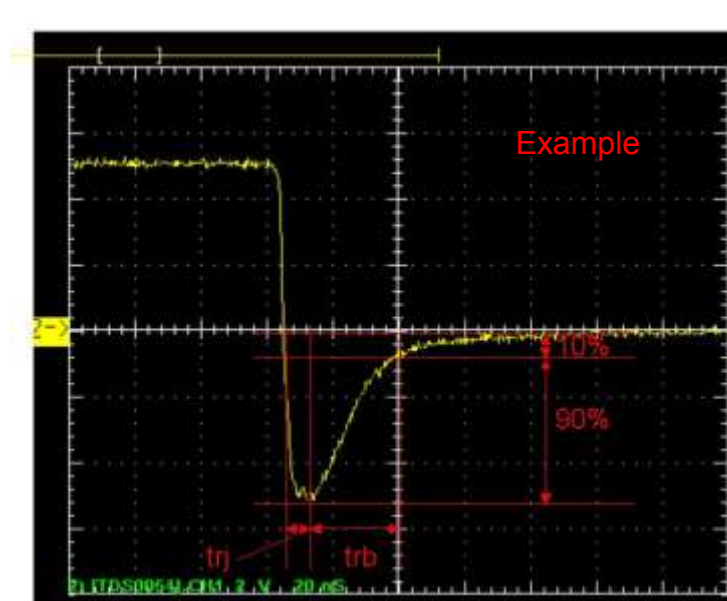
Reference



$T_{rj} = 11.2(\text{ns})$

$T_{rb} = 23.2(\text{ns})$

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



Relation between t_{rj} and t_{rb}