Device Modeling Report

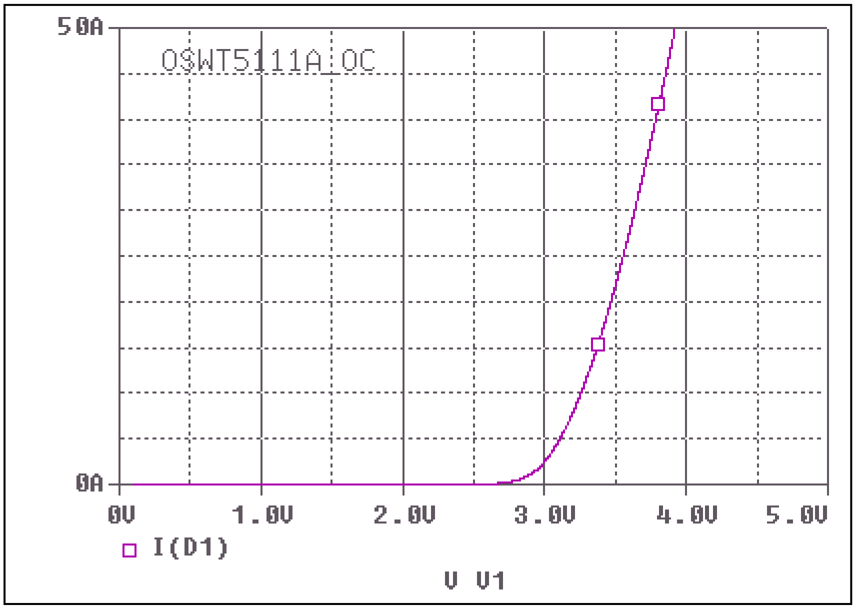
COMPONENTS: Light-Emitting Diode (LED) STANDARD
PART NUMBER: OSWT5111A
MANUFACTURER: OPTO SUPPLY
REMARK: TA=0 degree C

Bee Technologies Inc.

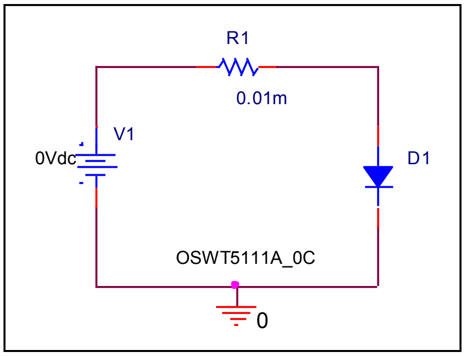
PSpice model parameter	Model description
IS	Saturation Current
N	Emission Coefficient
RS	Series Resistance
IKF	High-injection Knee Current
CJO	Zero-bias Junction Capacitance
M	Junction Grading Coefficient
VJ	Junction Potential
ISR	Recombination Current Saturation Value
BV	Reverse Breakdown Voltage(a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

Forward Current Characteristic

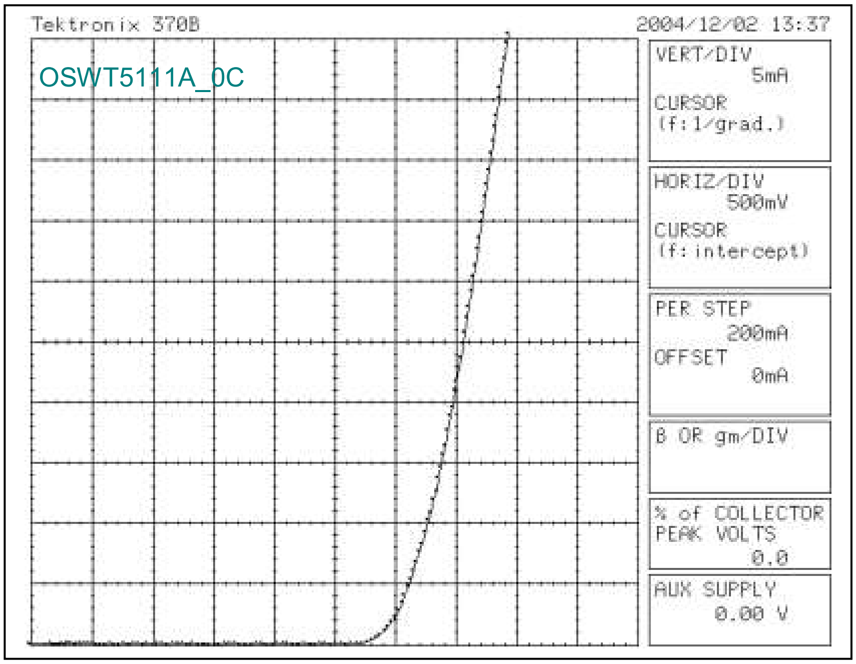
Circuit Simulation Result



Evaluation Circuit



Forward Current Characteristic Reference



VERT/DIV
5mA
CURSOR
(f:1/grad.)

HORIZ/DIV
500mV
CURSOR
(f:intercept)

PER STEP
200mA
OFFSET
0mA

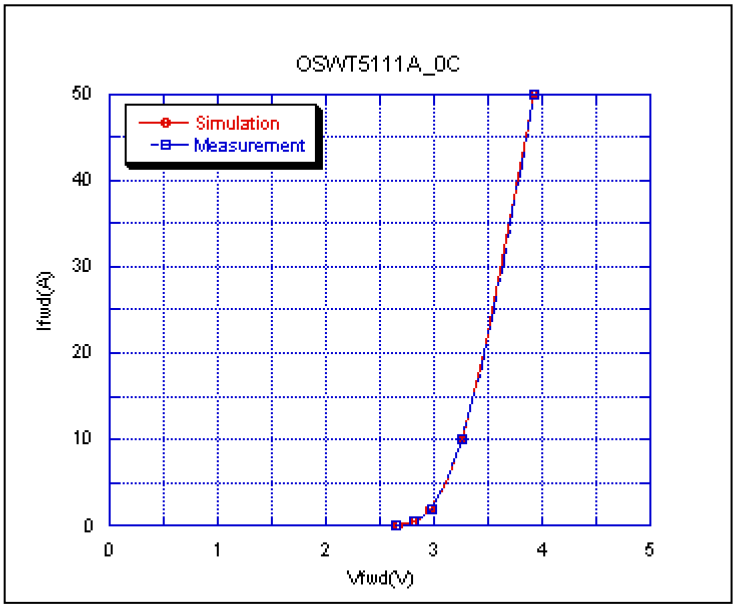
β OR gm/DIV

% of COLLECTOR
PEAK VOLTS
0.0

AUX SUPPLY
0.00 V

Comparison Graph

Circuit Simulation Result

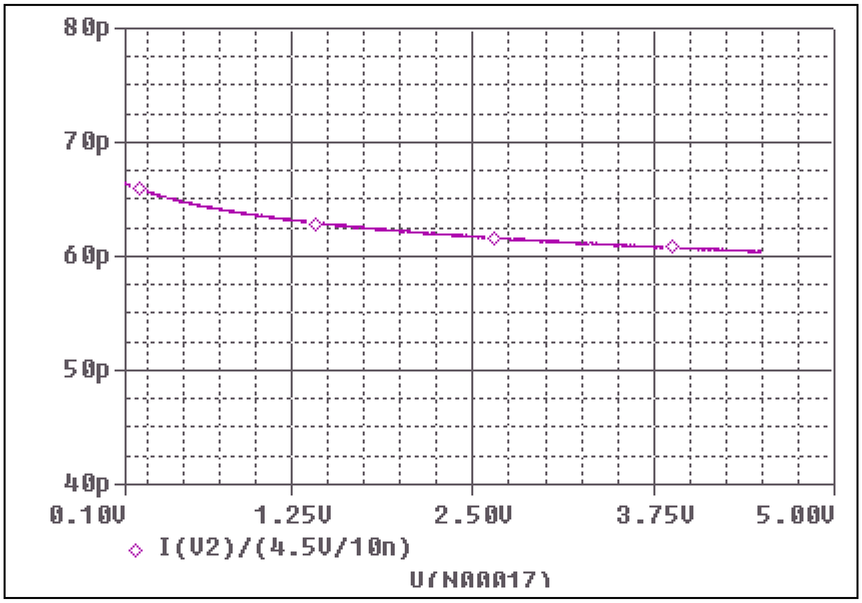


Simulation Result

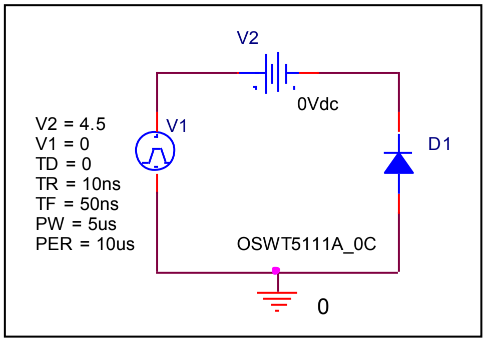
Ifwd(A)	Vfwd(V) Measurement	Vfwd(V) Simulation	%Error
0.1	2.645	2.661	0.6049
0.2	2.725	2.726	0.0366
0.5	2.81	2.815	0.1779
1	2.875	2.887	0.4173
2	2.975	2.969	0.2016
5	3.11	3.107	0.0964
10	3.25	3.255	0.1538
20	3.47	3.467	0.0864
50	3.92	3.923	0.0765

Capacitance Characteristic

Circuit Simulation Result

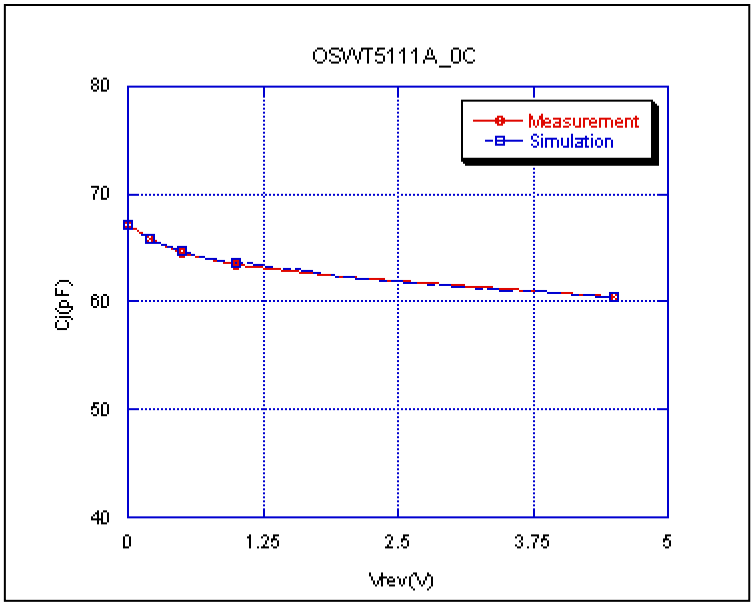


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

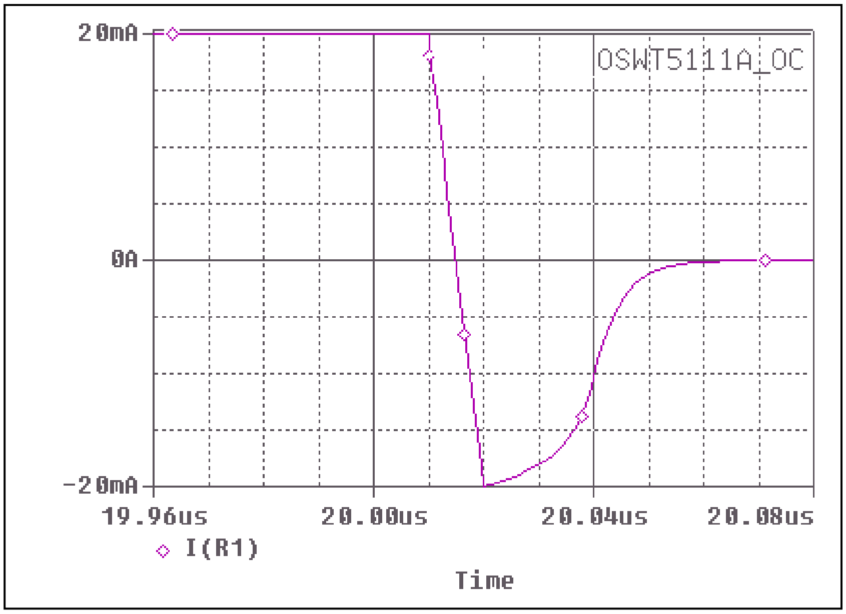


Simulation Result

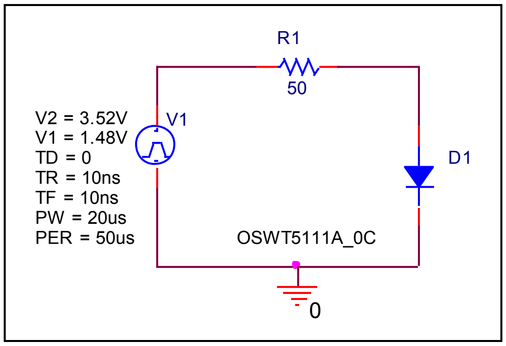
Vrev(V)	Cj(pF) Measurement	Cj(pF) Simulation	%Error
0	67.1	67.1	0
0.1	66.55	66.428	0.1833
0.2	65.88	65.851	0.0440
0.5	64.5	64.807	0.4759
1	63.46	63.544	0.1323
2	62.33	62.297	0.0529
4.5	60.515	60.402	0.1867

Reverse Recovery Characteristic

Circuit Simulation Result



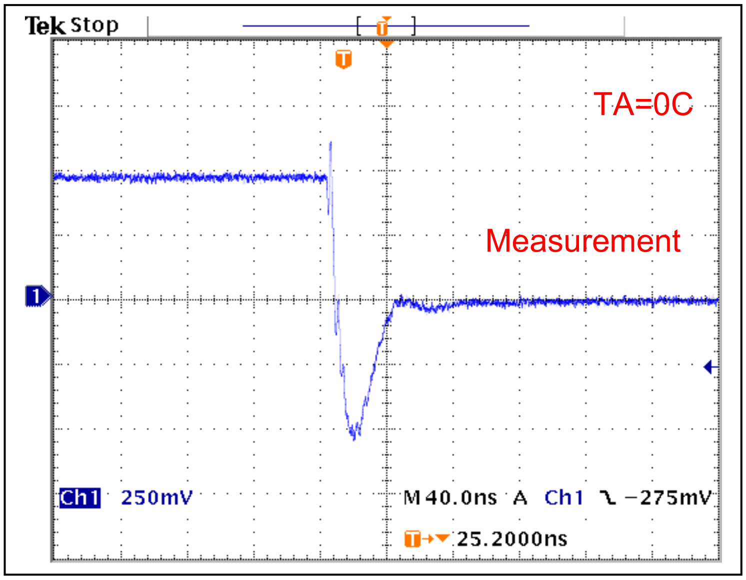
Evaluation Circuit



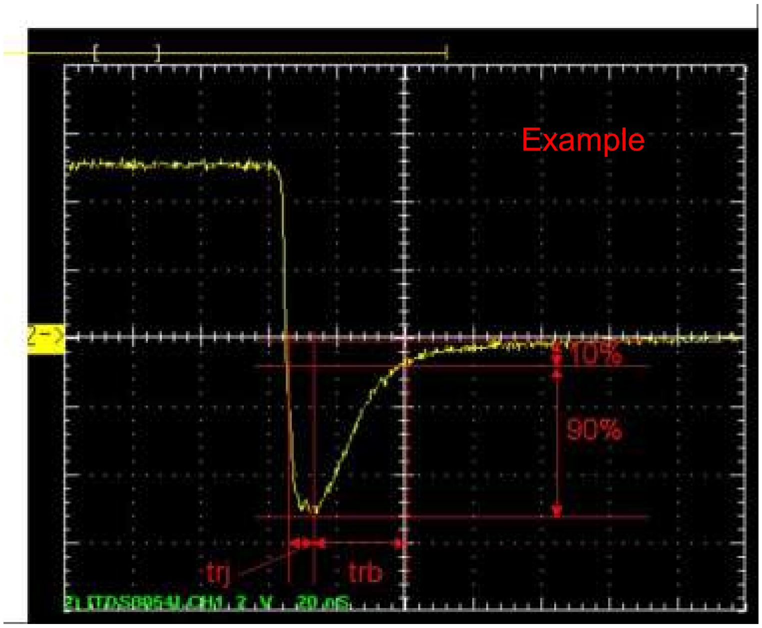
Compare Measurement vs. Simulation

Symbol	Measurement	Unit	Simulation	Unit	%Error
Trr=trj+trb	32	ns	32.1	ns	0.312

Reverse Recovery Characteristic   Reference



Trj =8.8(ns)
Trb=23.2(ns)
Conditions: Ifwd=Irev=0.02(A), Rl=50



Relation between trj and trb