

Device Modeling Report

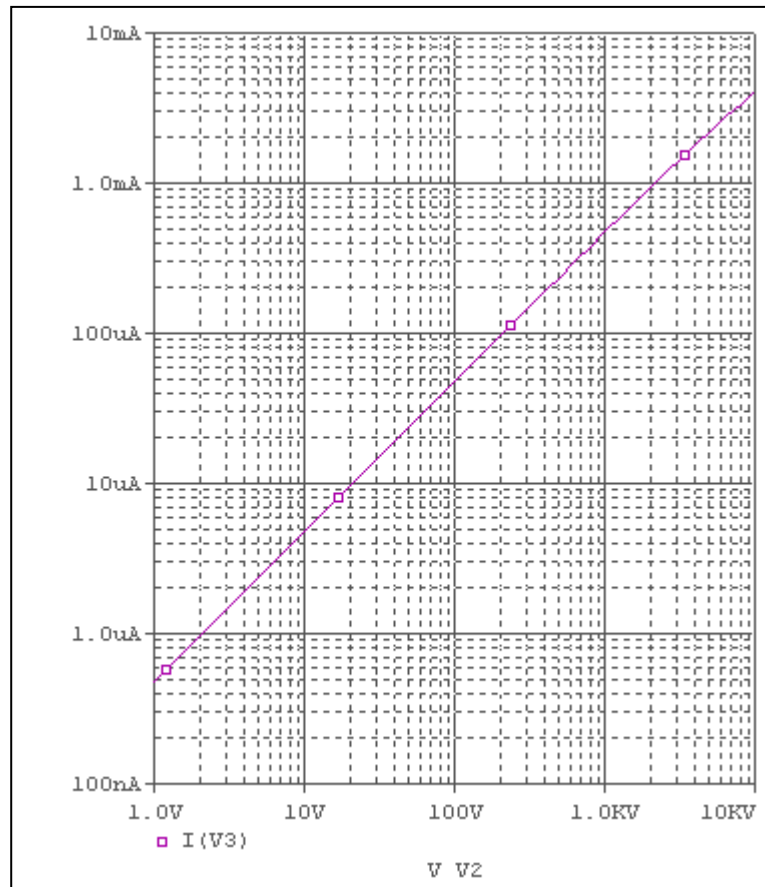
COMPONENTS: Photo IC
PART NUMBER: TPS852
MANUFACTURER: TOSHIBA



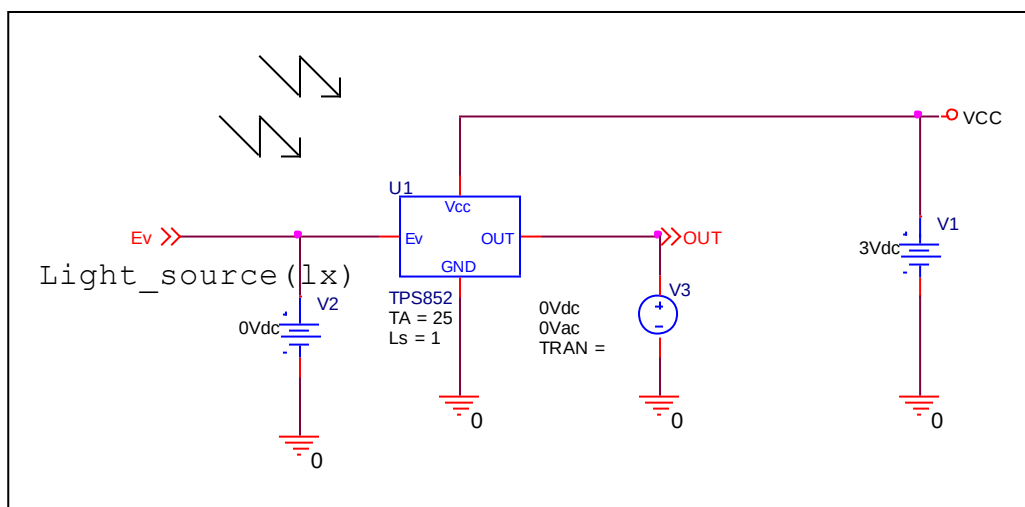
Bee Technologies Inc.

Light current characteristic ($I_L - E_V$)

Circuit simulation result

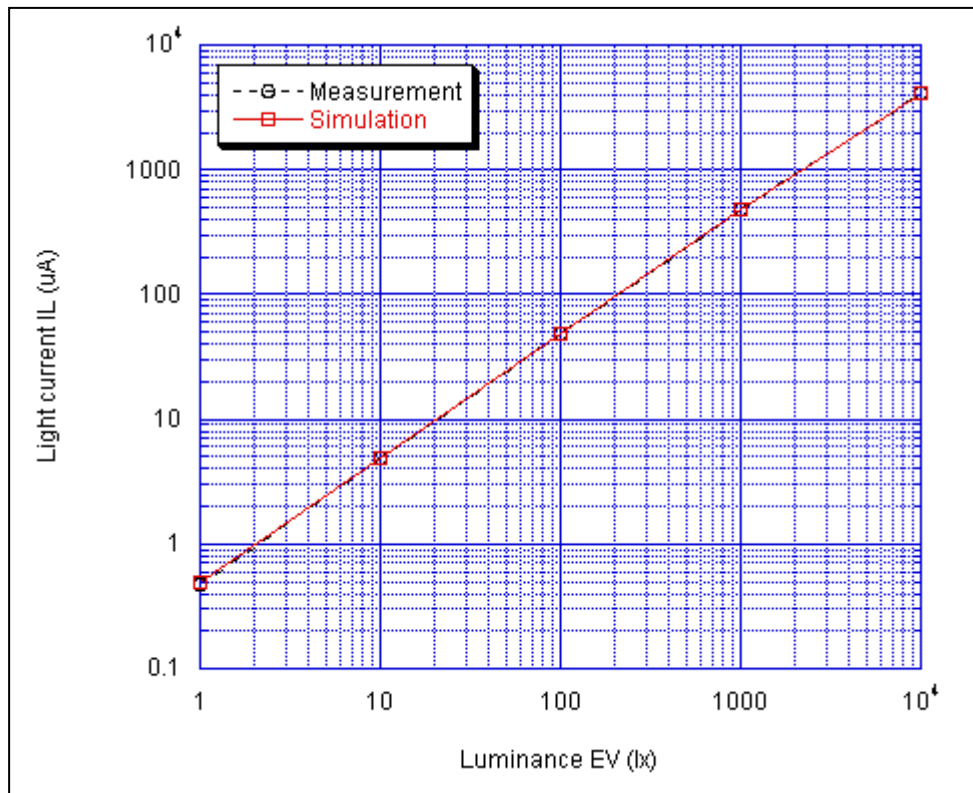


Evaluation circuit



Circuit simulation result

Comparison graph

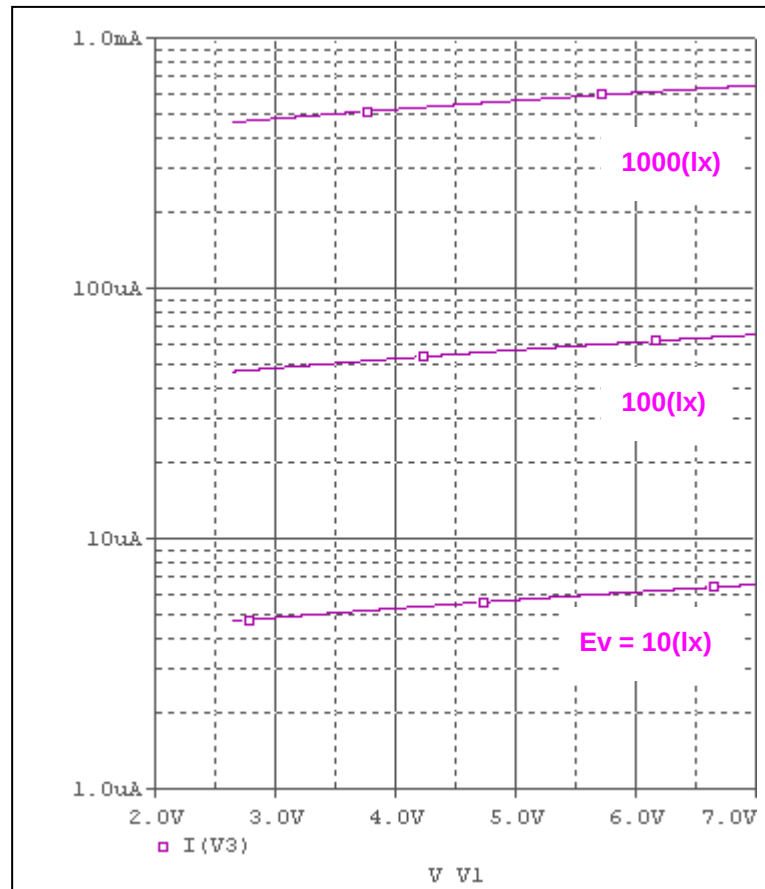


Simulation Result

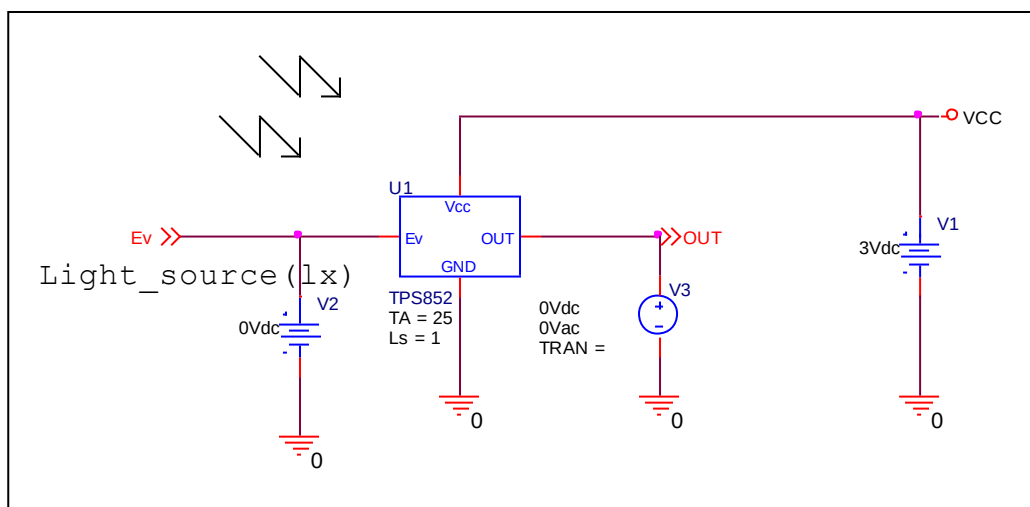
Ev(lx)	Light current IL (uA)		Error (%)
	Measurement	Simulation	
1	0.48000	0.48400	0.833
10	4.8000	4.8290	0.604
100	48.000	47.995	-0.010
1000	475.00	476.19	0.250
10000	4100.0	4095.5	-0.110

Relative $I_L - V_{CC}$ characteristics

Circuit simulation result

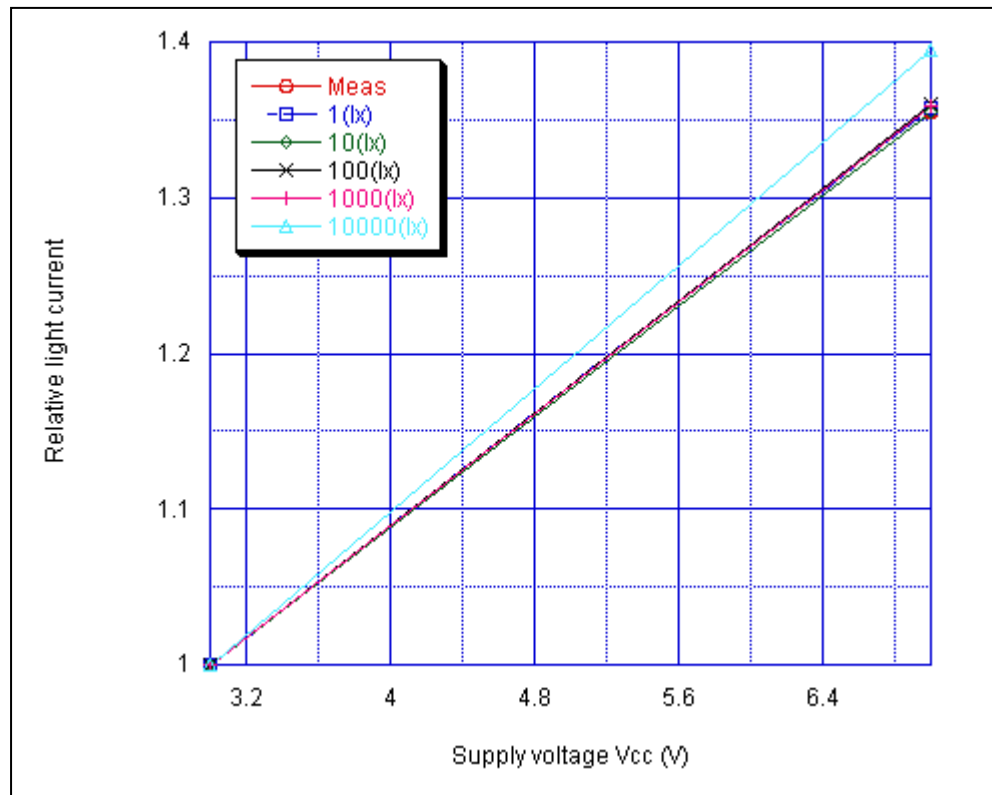


Evaluation circuit



Circuit simulation result

Comparison graph

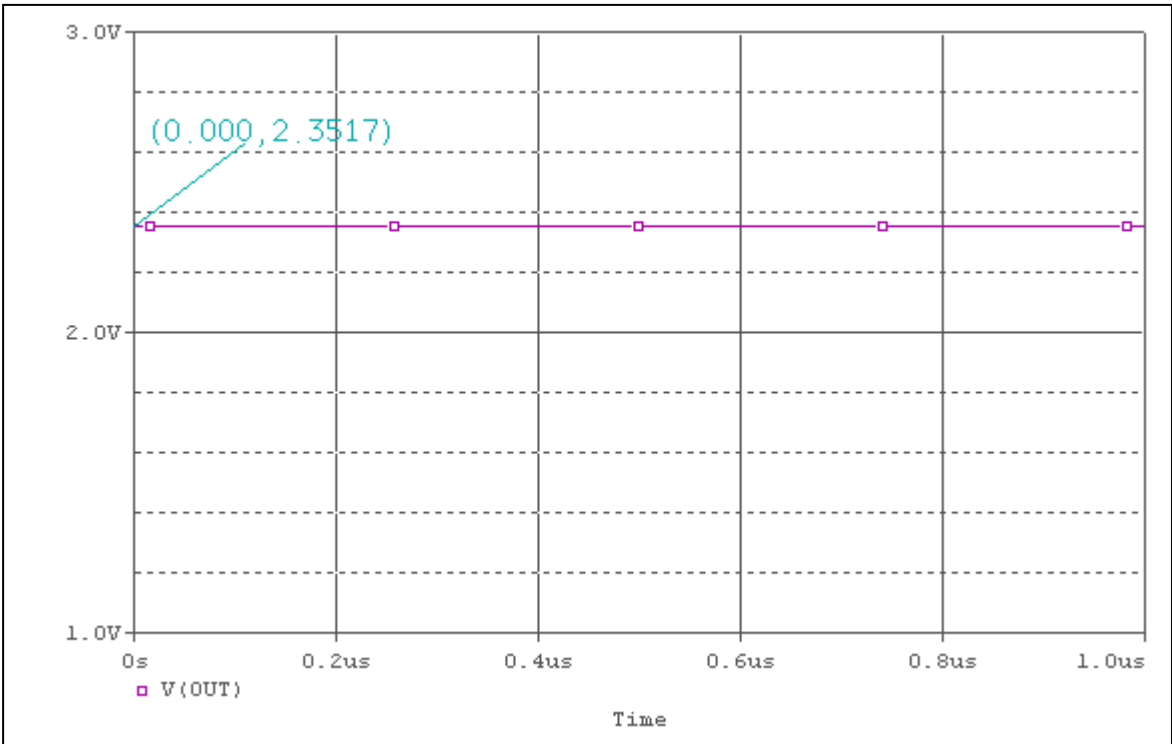


Simulation Result

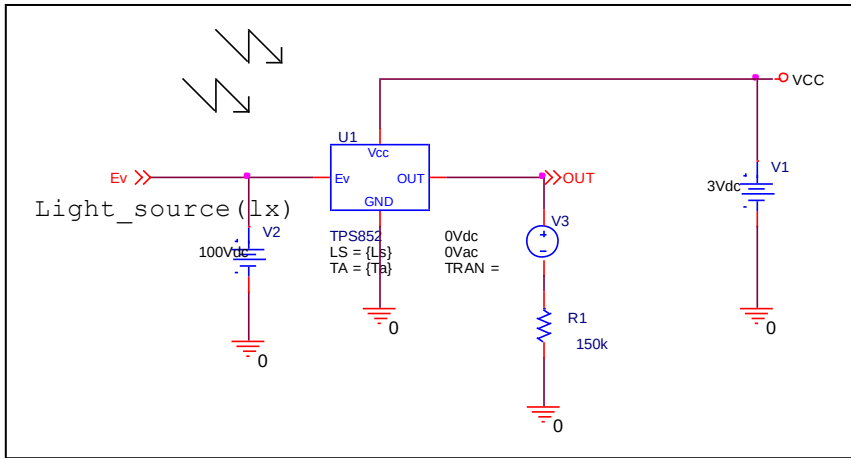
Ev (lx)	Relative light current @ Vcc = 7V		
	Measurement	Simulation	Error (%)
1	1.355	1.35703	0.1498
10	1.355	1.35548	0.0354
100	1.355	1.35971	0.3476
1000	1.355	1.35843	0.2531
10000	1.355	1.39498	2.9506

Saturation output voltage characteristics

Circuit simulation result



Evaluation circuit



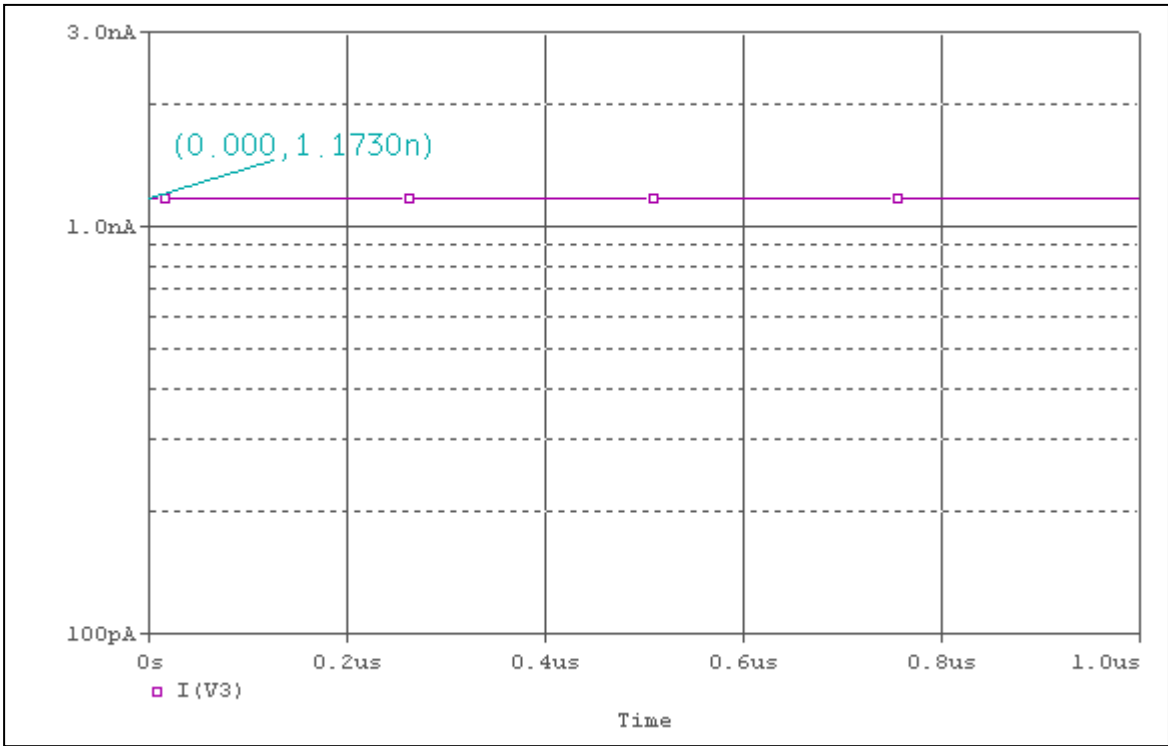
Simulation Result

Condition: Vcc=3V, RL=150kohm, Ev=100 lx

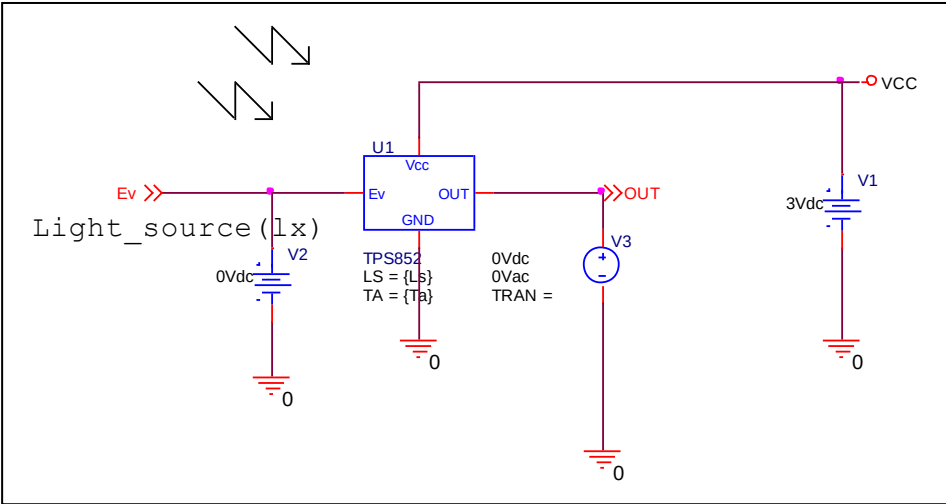
	Measurement		Simulation		Error(%)
Vo	2.35	V	2.3517	V	0.07234

Dark current characteristics

Circuit simulation result



Evaluation circuit



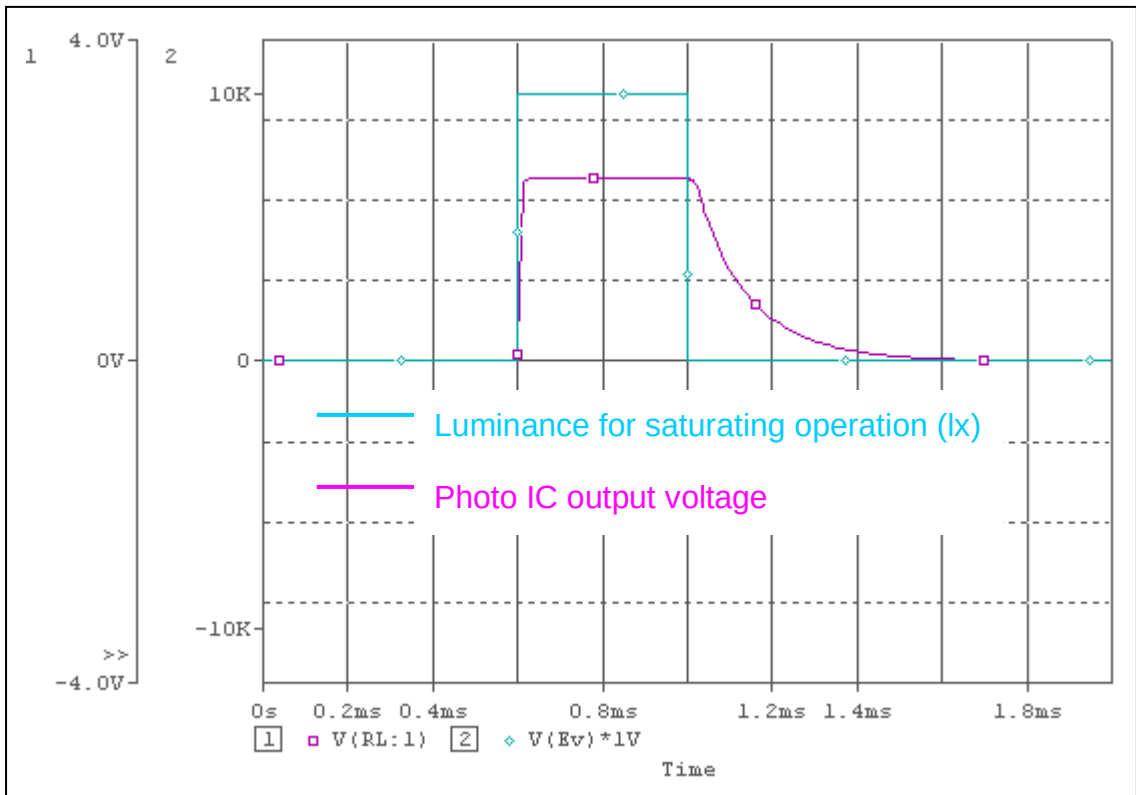
Simulation Result

Condition: Vcc=3V, Ev=0 lx

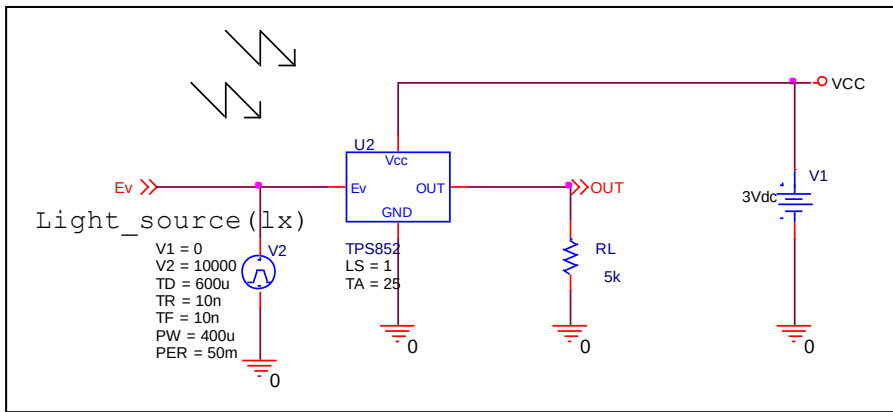
	Measurement		Simulation		Error(%)
I_{LEAK}	0.0017	uA	0.00173	uA	1.765

Switching time characteristics

Circuit simulation result



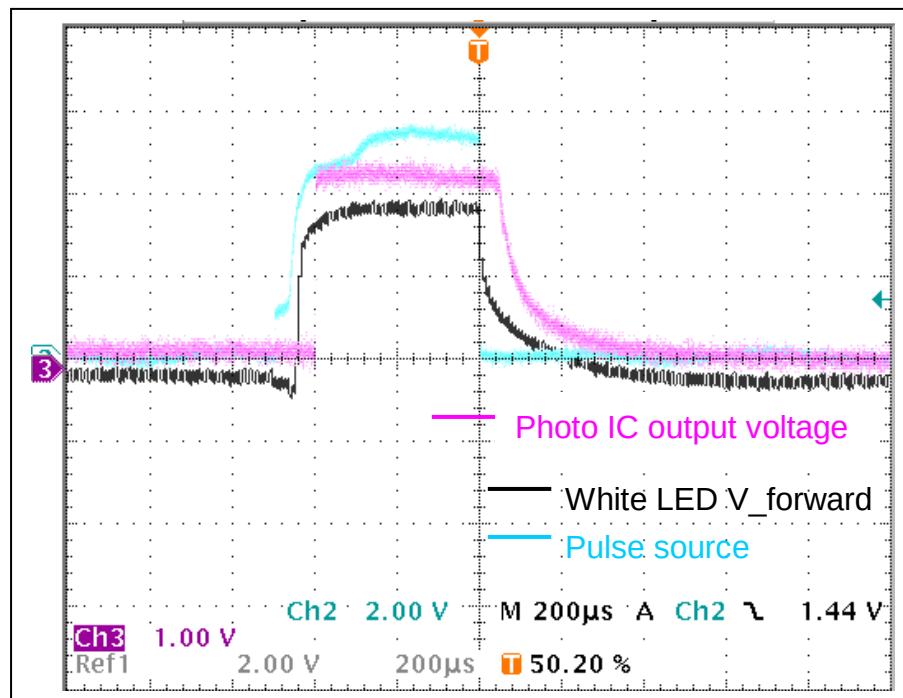
Evaluation circuit



Simulation Result

Condition: Vcc=3V, RL=5kohm

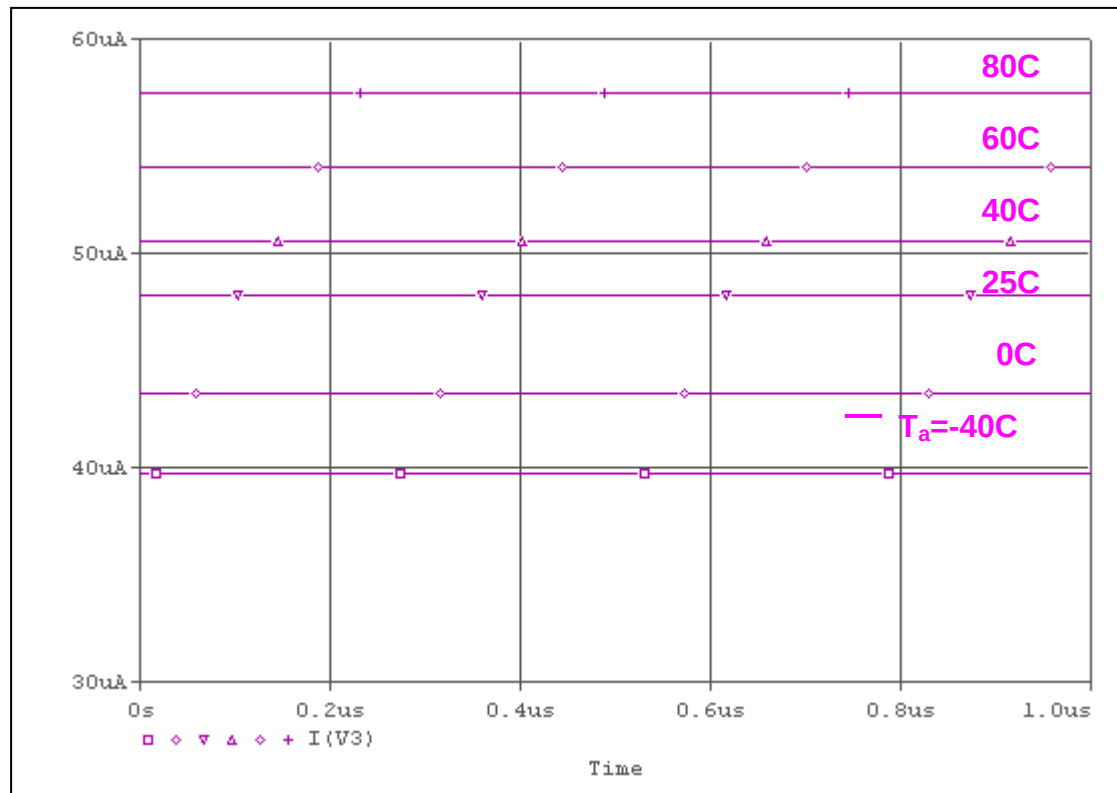
	Measurement		Simulation		Error(%)
tr	10	nsec.	11.054	nsec.	10.540
tf	295	nsec.	285.653	nsec.	-3.168
ts	30	nsec.	30.030	nsec.	0.100



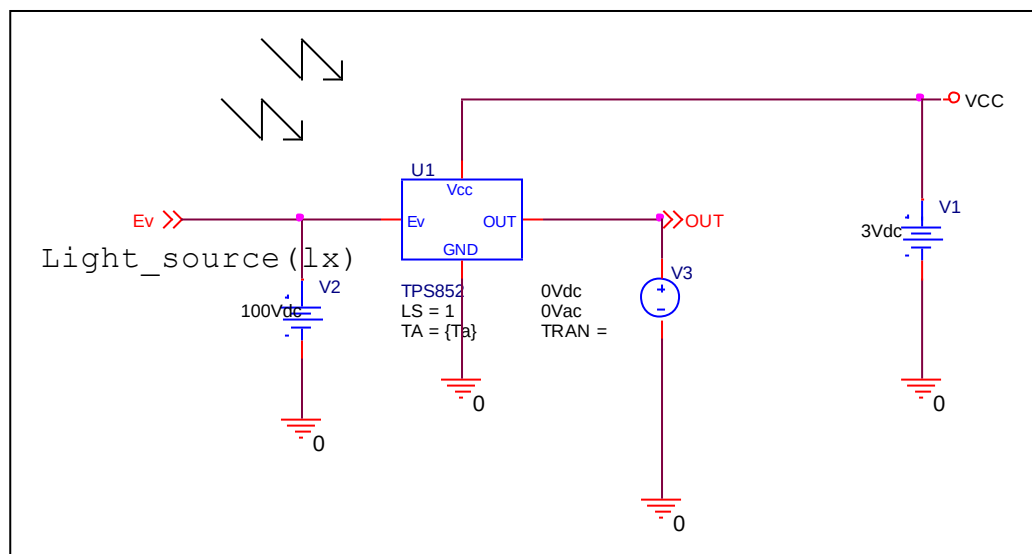
Note: Pulse source - microcontroller ATMEL: AT89S8252
White LED – OptoSupply: OSWT5161A

Ambient temperature Characteristics – Relative I_L - T_a

Circuit simulation result

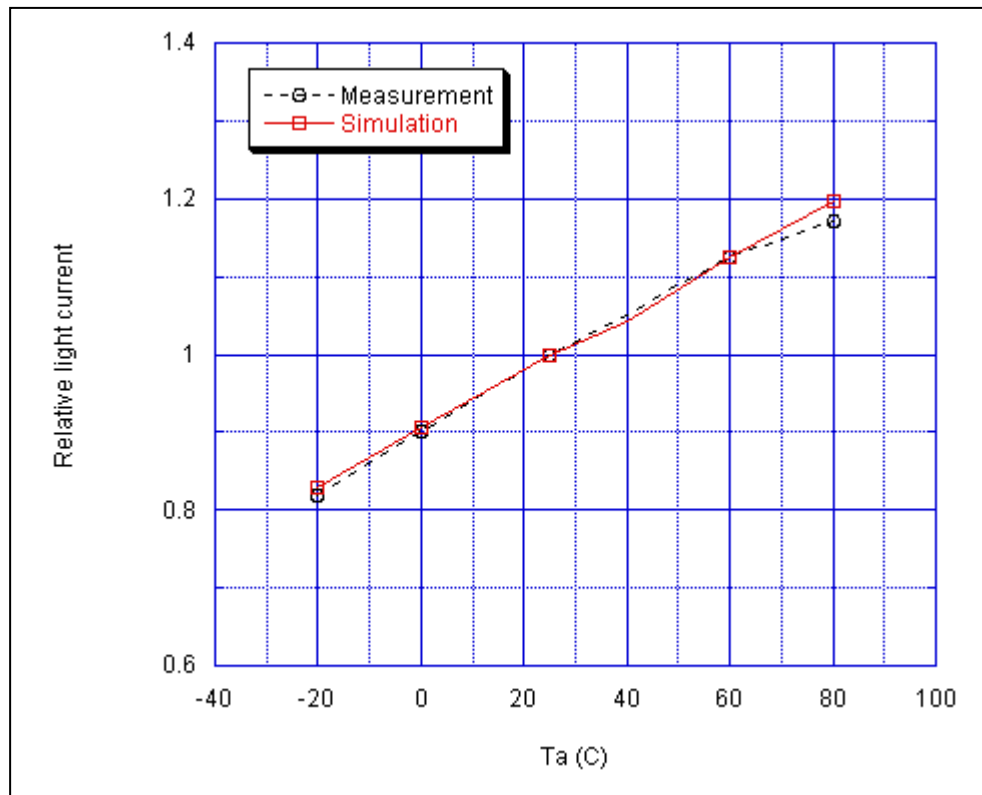


Evaluation circuit



Circuit simulation result

Comparison graph



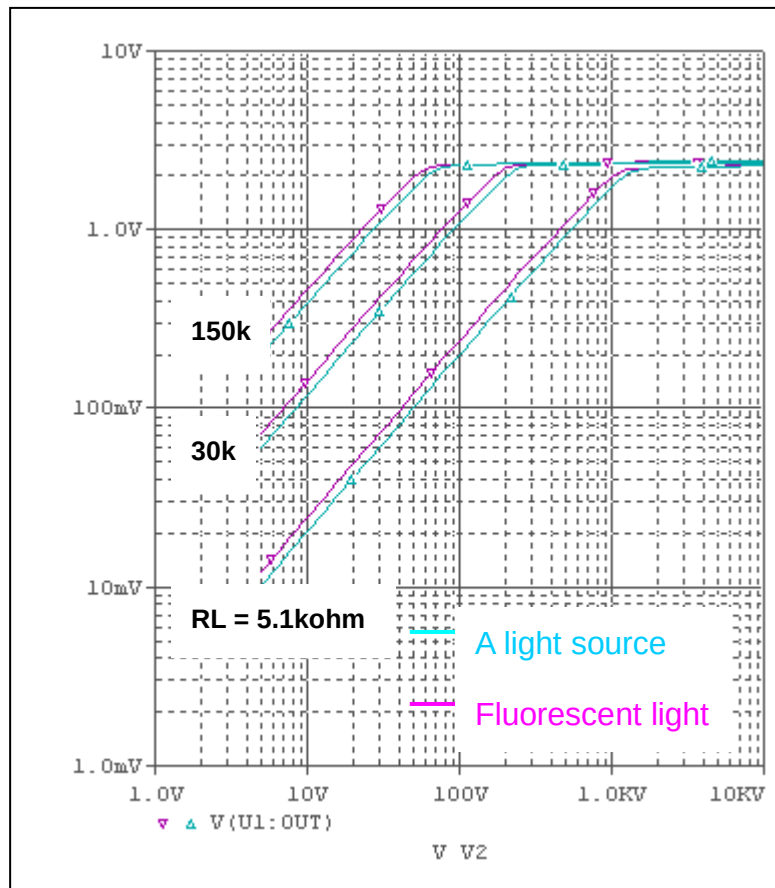
Simulation Result

T_a (C)	Relative light current @ $V_{cc} = 3V$, $E_v = 100 \text{ lx}$		
	Measurement	Simulation	Error (%)
-20	0.82	0.828	0.976
0	0.90	0.906	0.667
25	1.00	1.000	0.000
40	1.05	1.043	-0.667
60	1.125	1.125	0.000
80	1.17	1.198	2.393

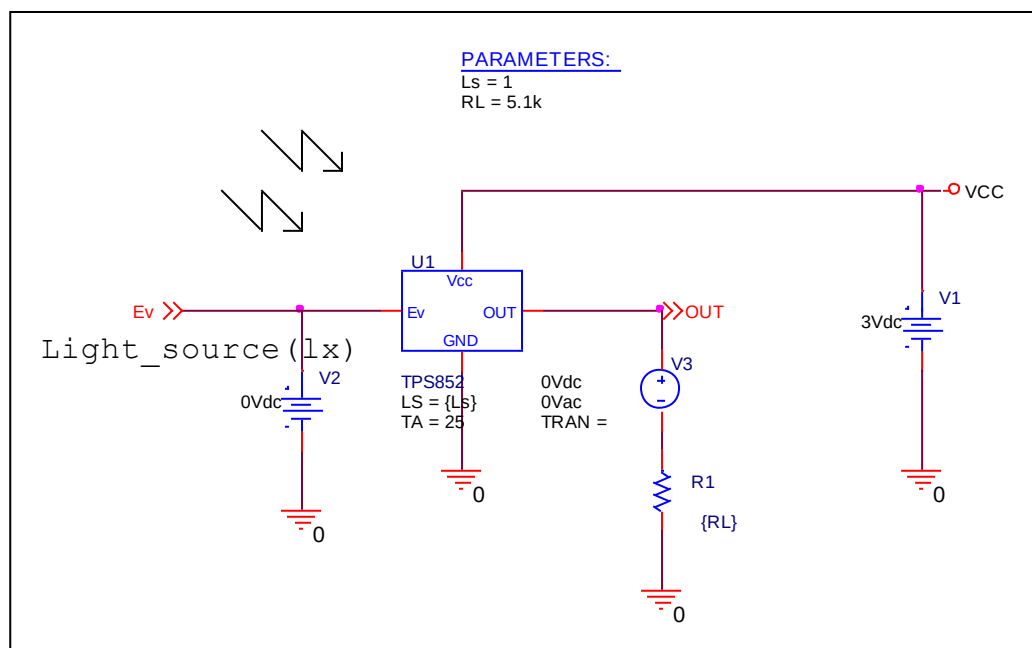
Output Voltage Simulation

Reference

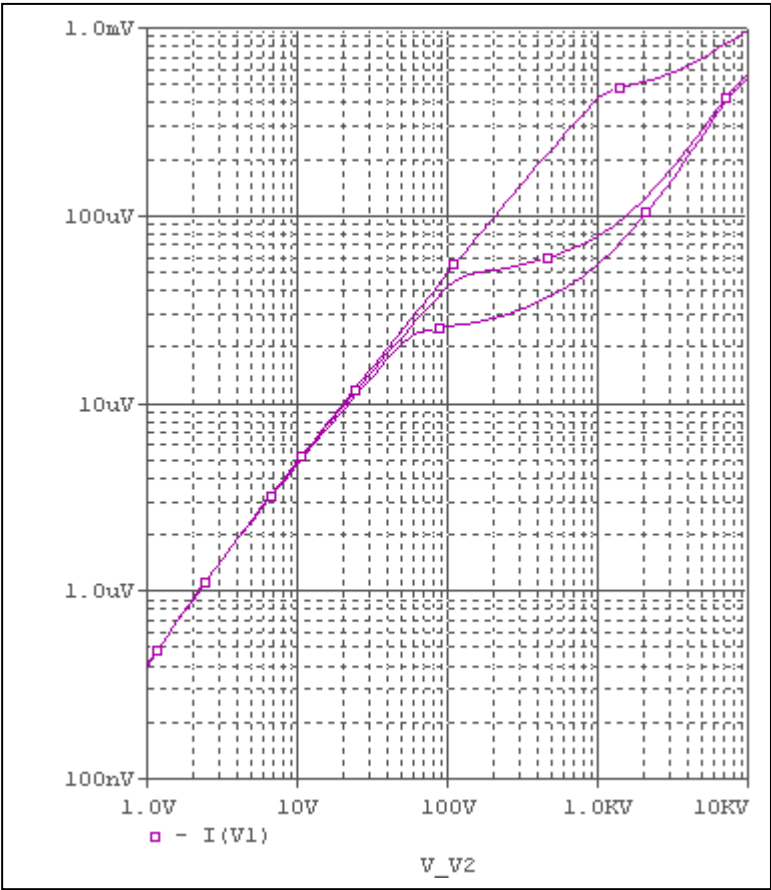
Circuit simulation result



Evaluation circuit



Circuit simulation result



Evaluation circuit

