Device Modeling Report

COMPONENTS: PHOTOCOUPLER
PART NUMBER: PC829
MANUFACTURER: SHARP

Bee Technologies Inc.

DIODE MODEL

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

BIPOLAR JUNCTION TRANSISTOR MODEL

Pspice model parameter	Model description
NR	Reverse Emission Coefficient
RB	Base Resistance
RC	Series Collector Resistance
CJE	Zero-bias Emitter-Base Junction Capacitance
CJC	Zero-bias Collector-Base Junction Capacitance
TF	Forward Transit Time
TR	Reverse Transit Time

VOLTAGE CONTROLLED VOLTAGE SOURCE MODEL(VCVS)

E<Name><(+)Node><(－)Node>VALUE={Expression}

E<Name><(+)Node><(－)Node>TABLE={Expression}

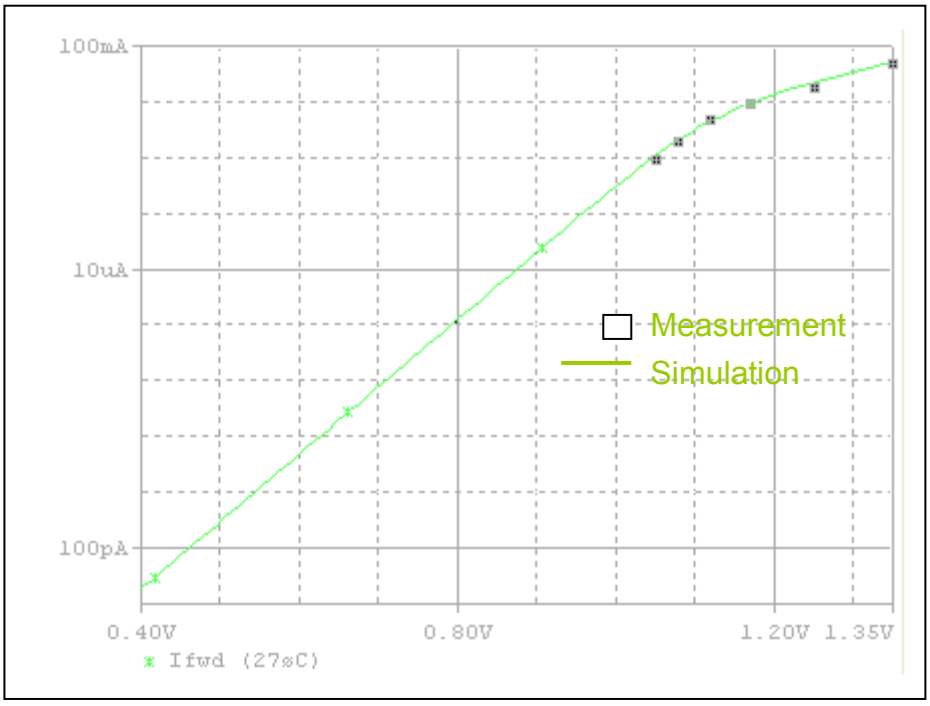
VOLTAGE CONTROLLED CURRENT SOURCE MODEL(VCCS)

E<Name><(+)Node><(－)Node>VALUE={Expression}

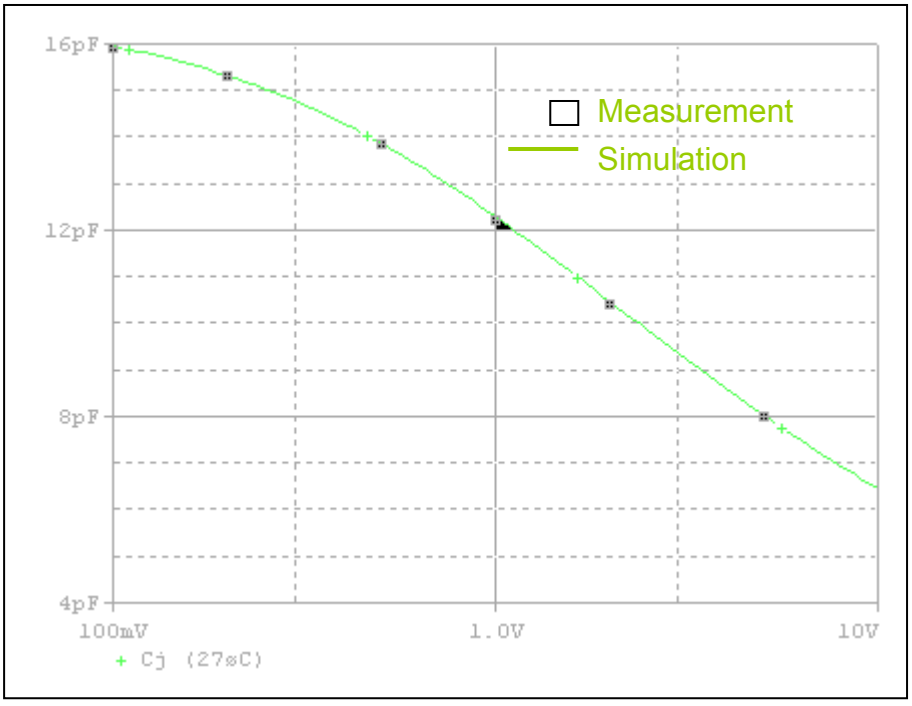
CURRENT CONTROLLED MODEL(W)

Pspice model parameter	Model description
IOFF	Controlling current to Off state
ION	Controlling current to On state
ROFF	Off Resistance
RON	On Resistance

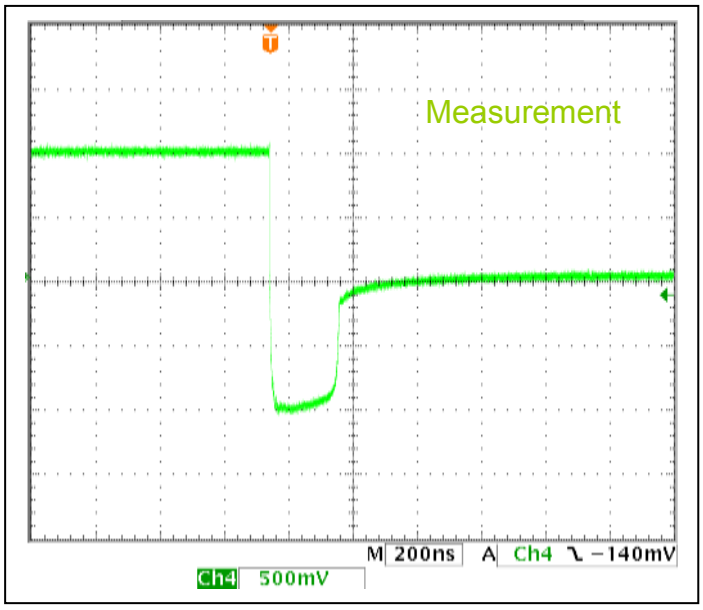
Input Device Forward Current Characteristics



Input Device Junction Capacitance Characteristics



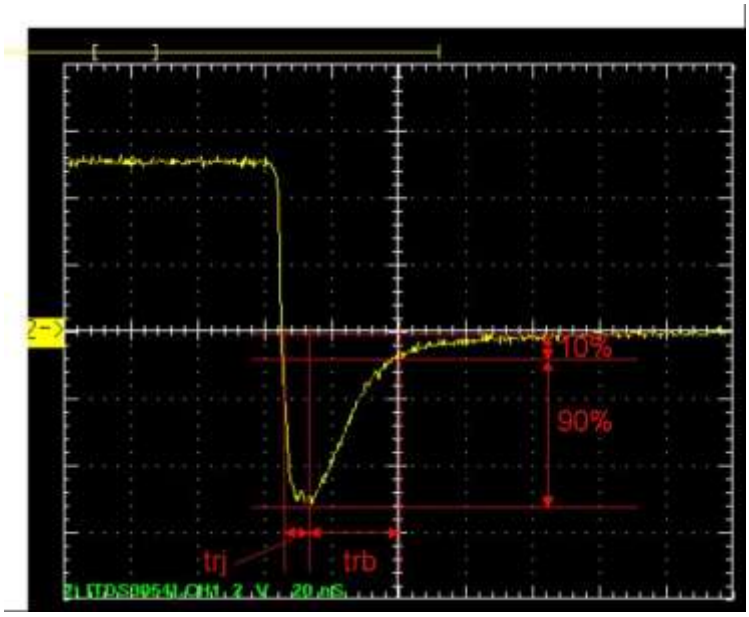
Input Device Reverse Recovery Characteristics



trj=196n(s)

trb=60n(s)

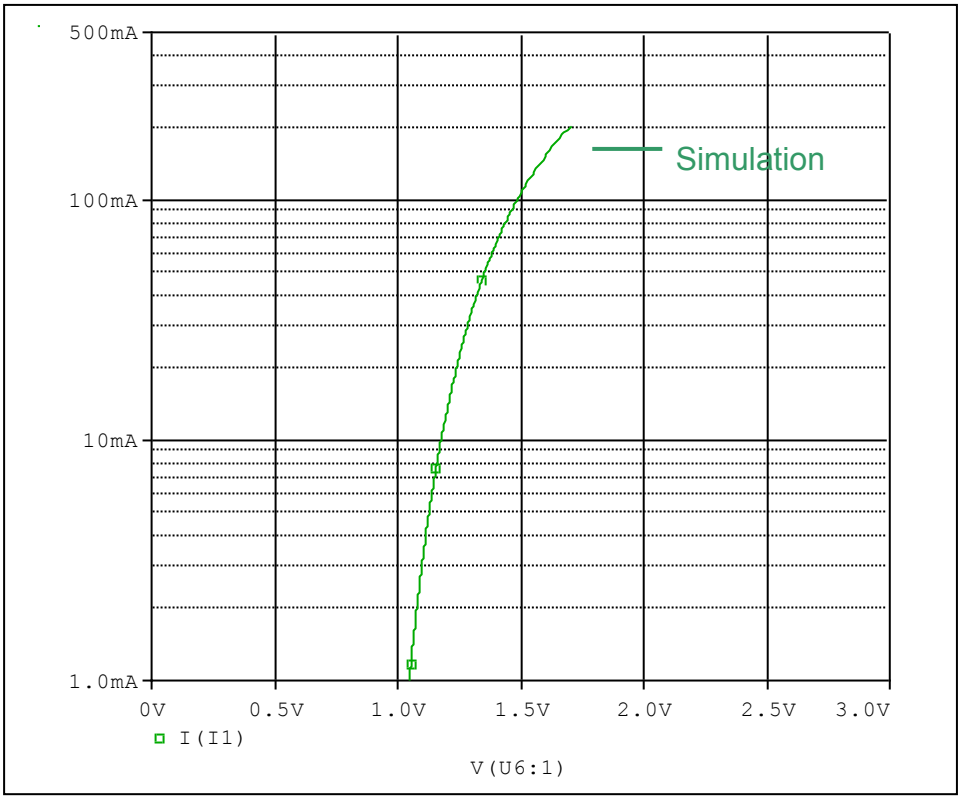
Conditions:Ifwd=Irev=0.04(A),Rl=50



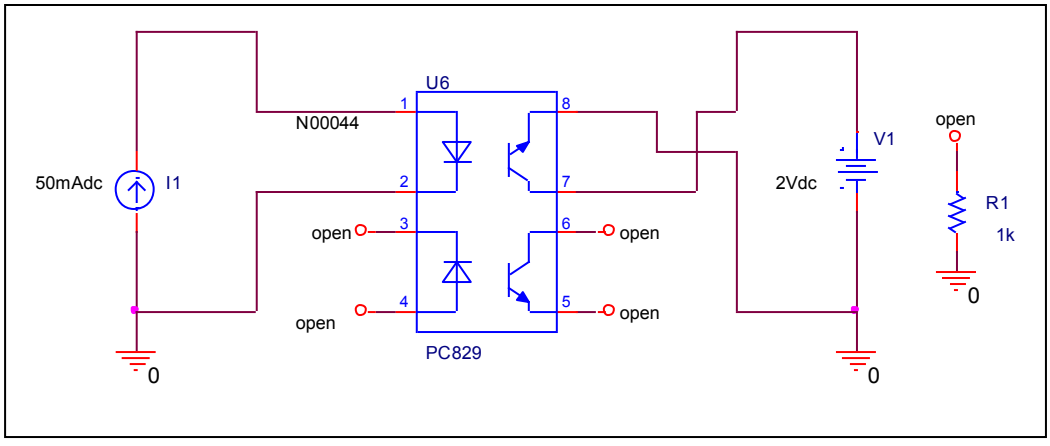
Relation between trj and trb

LED IV Curve Characteristics

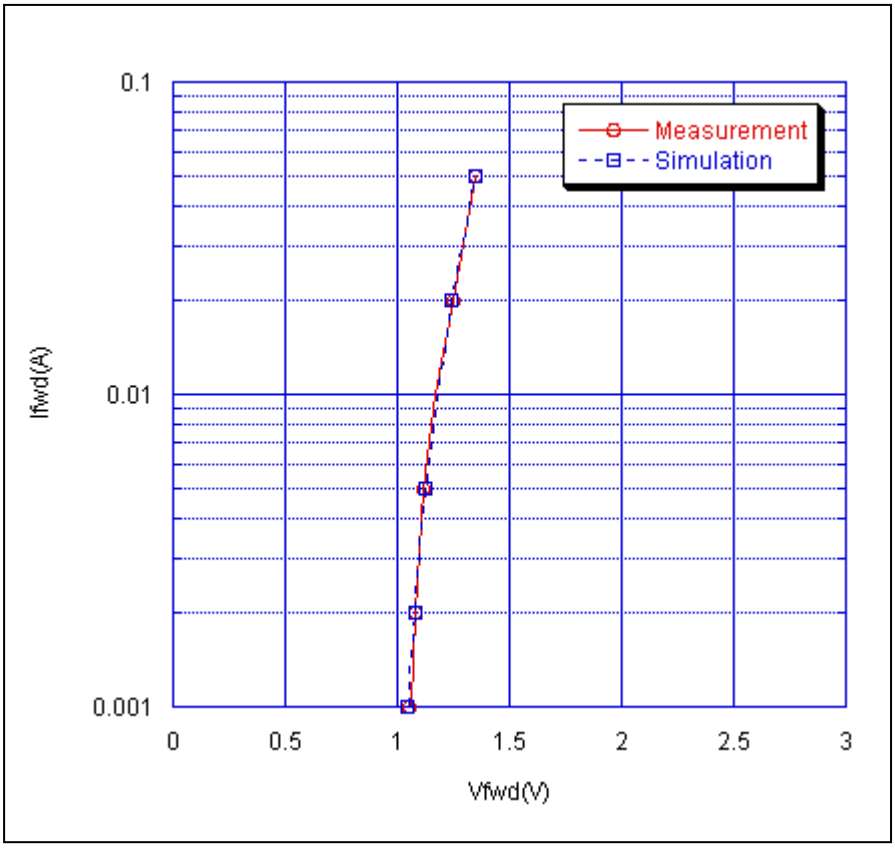
Simulation result



Evaluation Circuit



Comparison Graph

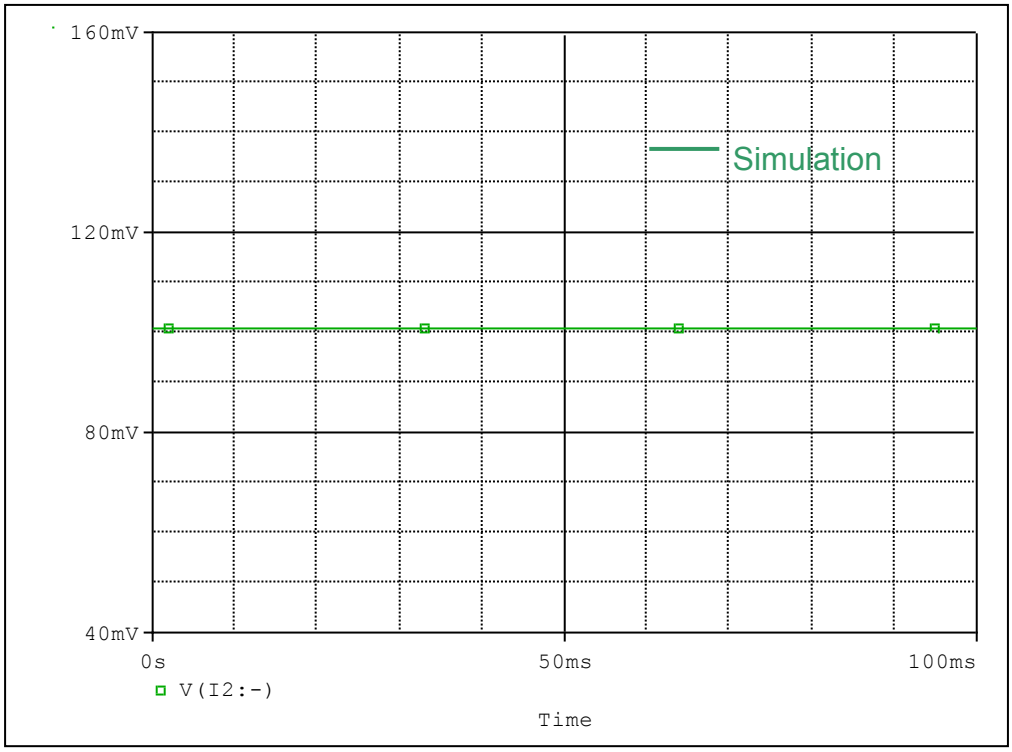


Comparison Table

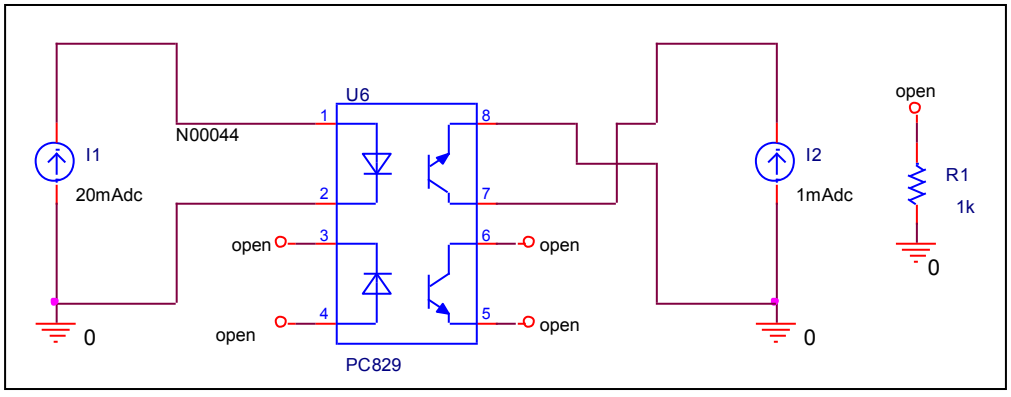
Ifwd(A)	Vfwd(V)		% Error
	Measurement	Simulation	
0.001	1.050	1.047	-0.286
0.002	1.080	1.078	-0.185
0.005	1.120	1.126	0.536
0.01	1.170	1.176	0.513
0.02	1.250	1.238	-0.960
0.05	1.350	1.352	0.148

Transistor Saturation Characteristics

Simulation result



Evaluation Circuit

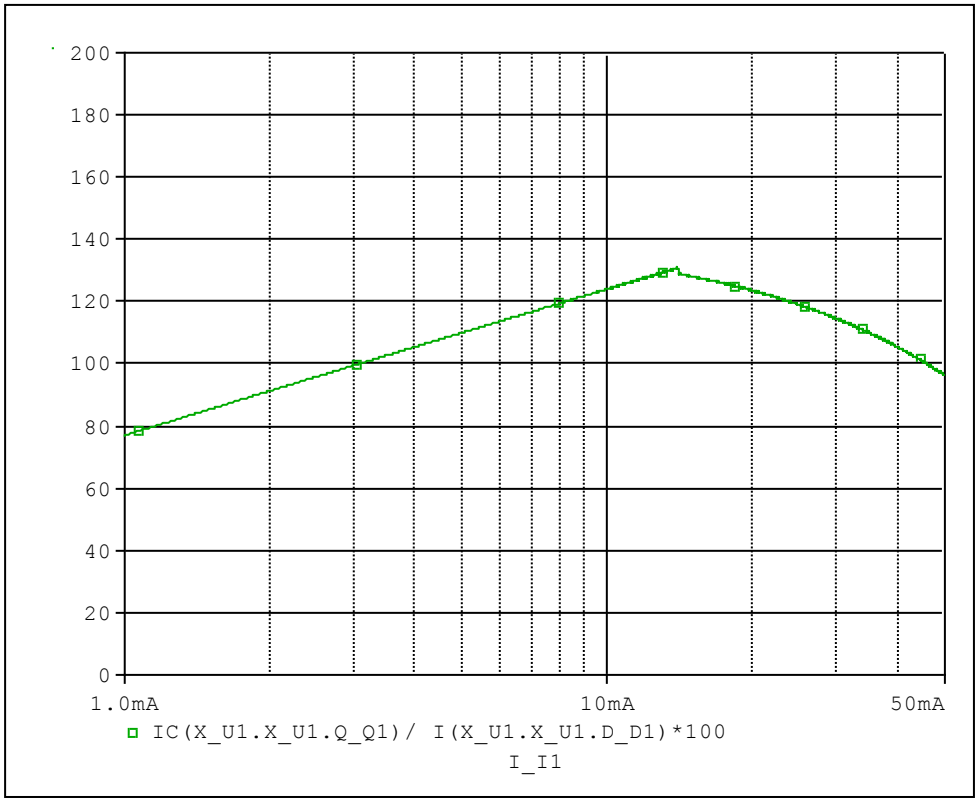


Comparison Table

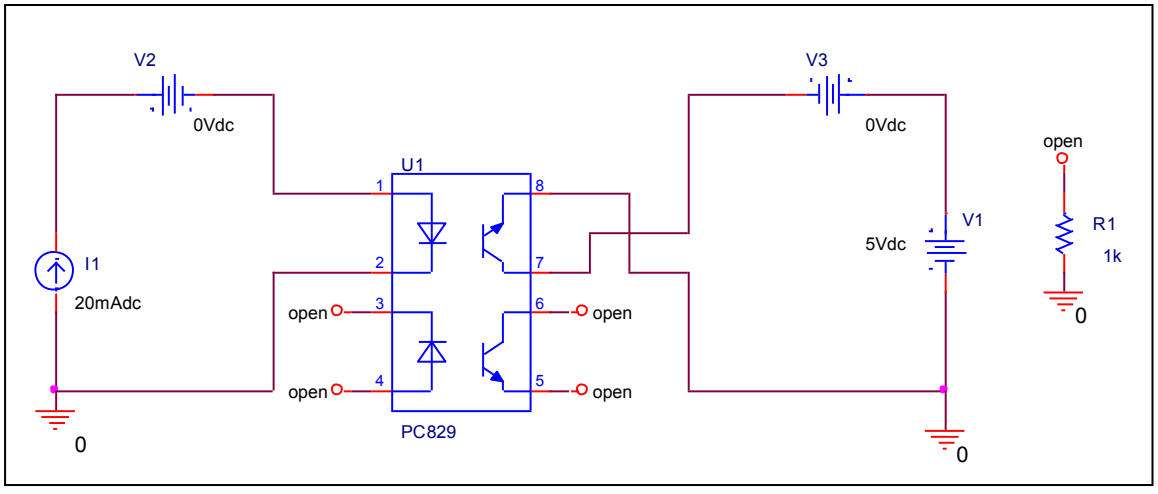
	Measurement	Simulation	% Error
Vce(sat) (V)	**0.100**	**0.100**	**0.000**

CTR(Current Transfer Ratio) Characteristics

Simulation result



Evaluation Circuit



Rise Curve Table

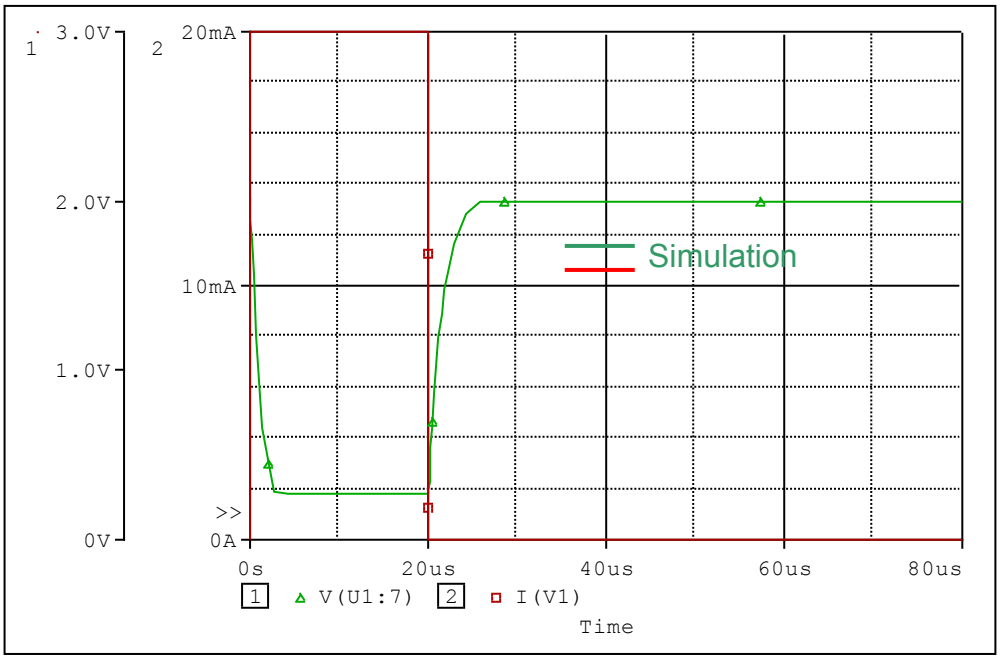
If(mA)	CTR(%)		% Error
	Measurement	Simulation	
1.000	77.000	76.993	-0.009
2.000	94.000	91.228	-2.949
5.000	115.000	110.149	-4.218
10.000	128.000	124.382	-2.827
14.000	130.000	130.955	0.735

Fall Curve Table

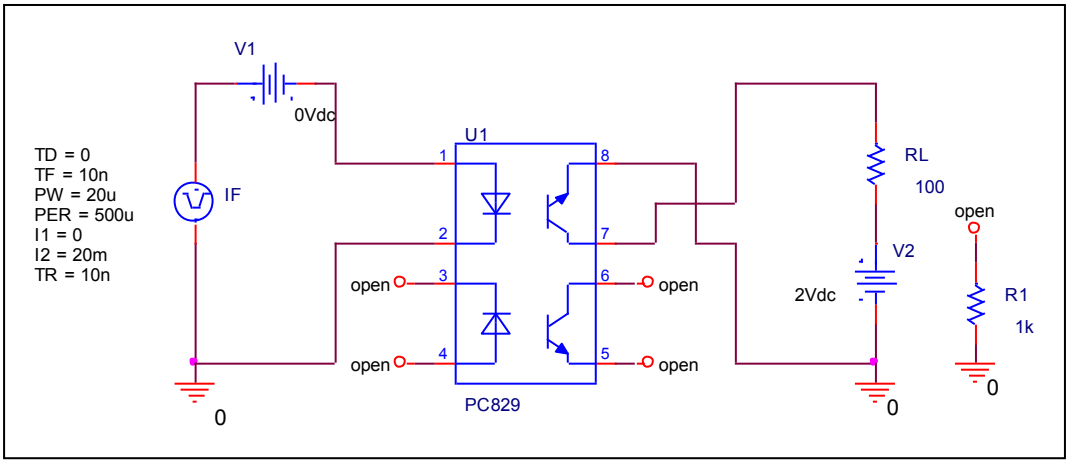
If(mA)	CTR(%)		% Error
	Measurement	Simulation	
14.000	130.000	130.955	0.735
20.000	128.000	123.214	-3.739
30.000	120.000	114.436	-4.637
40.000	107.000	104.994	-1.875
47.000	101.000	98.619	-2.357

Switching Time Characteristics

Simulation result



Evaluation Circuit



Comparison Table

Vce=2V,RL=100Ω	Measurement	Simulation	% Error
ts (us)	0.210	0.209	-0.476
tf (us)	3.200	3.195	-0.156