Device Modeling Report

COMPONENTS: PHOTOCOUPLER
PART NUMBER: PC825
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}

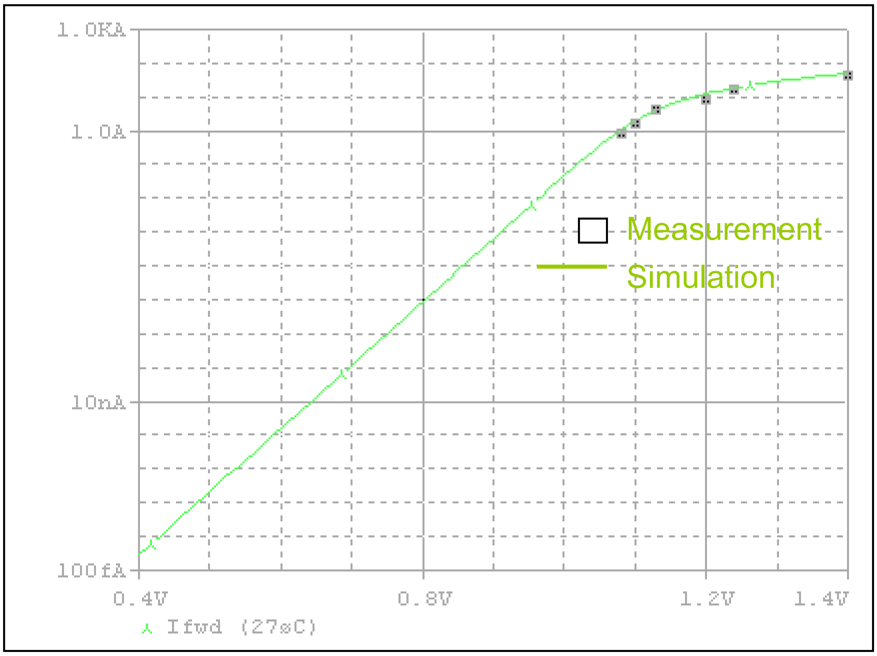
VOLTAGE CONTROLLED CURRENT SOURCE MODEL(VCCS)

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

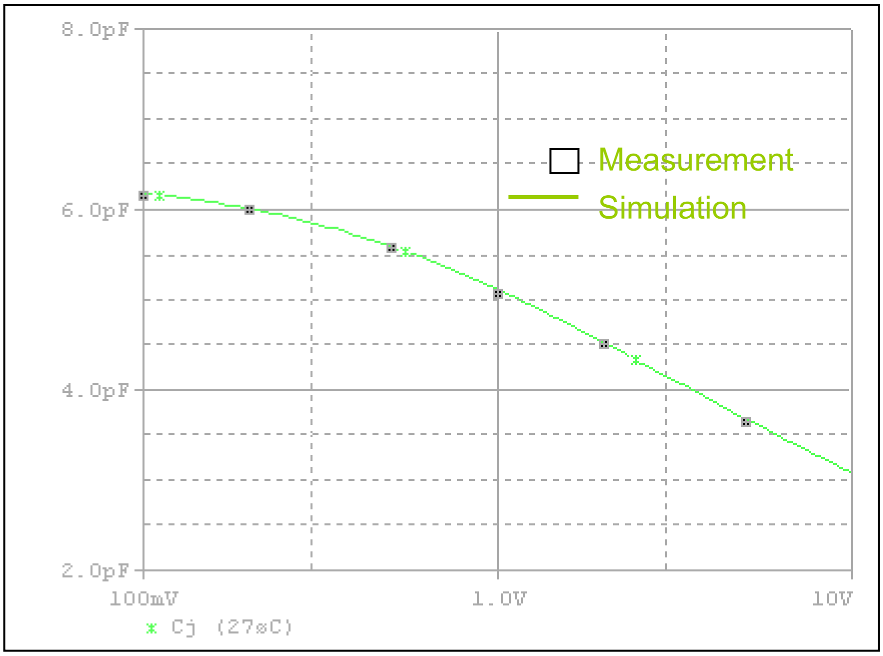
CURRENT CONTROLLED MODEL(W)

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

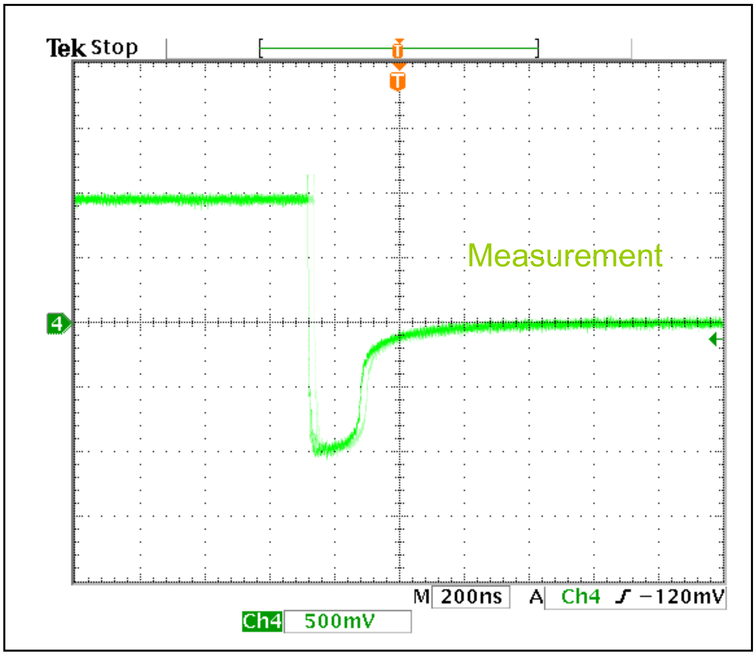
Input Device Forward Current Characteristics



Input Device Junction Capacitance Characteristics



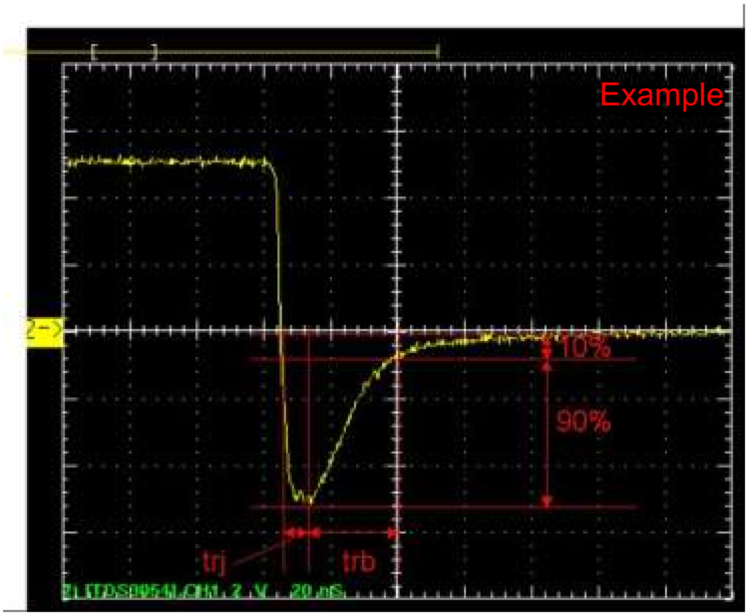
Input Device Reverse Recovery Characteristics



trj=120n(s)

trb=152n(s)

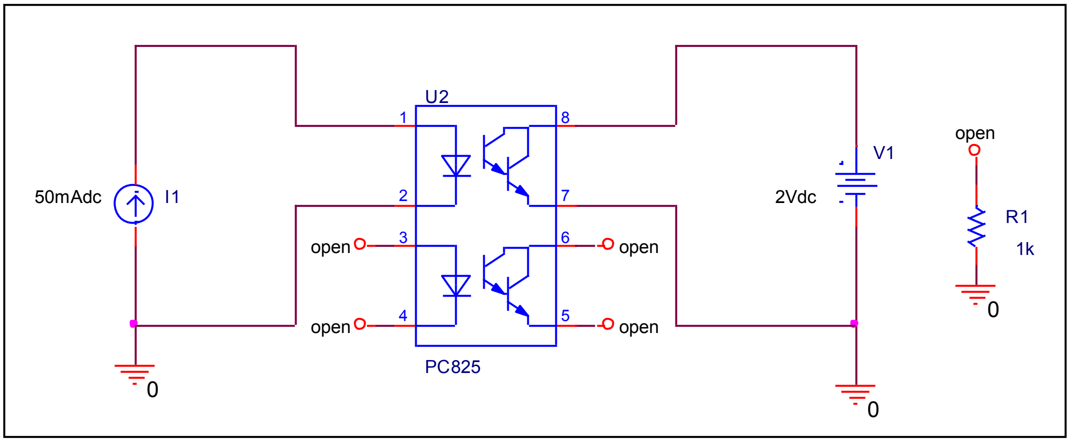
Conditions:Ifwd=Irev=0.04(A),Rl=50



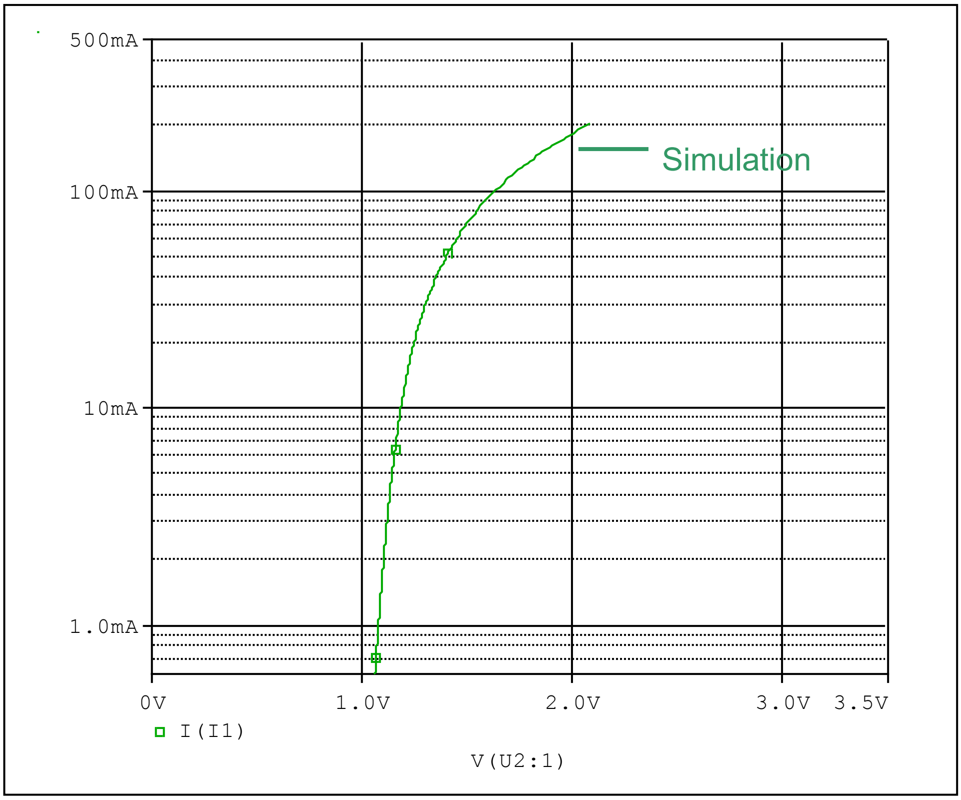
Relation between trj and trb

LED IV Curve Characteristics

Evaluation Circuit



Simulation result

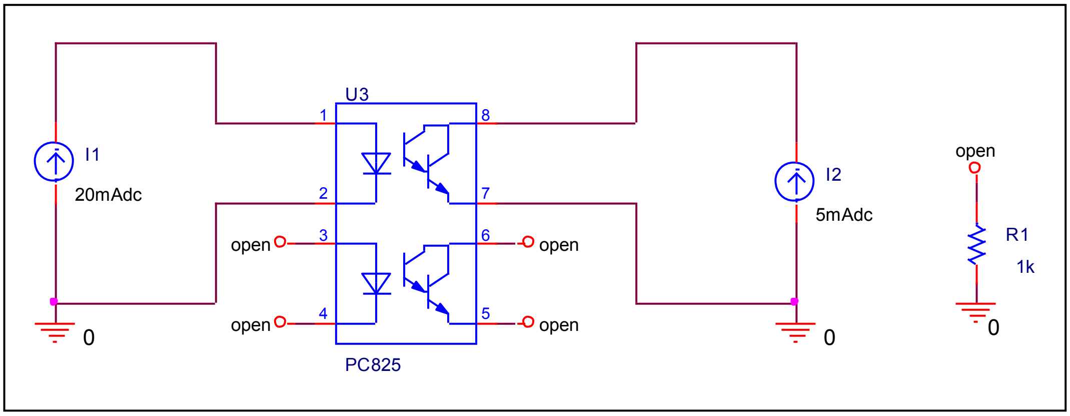


Comparison Table

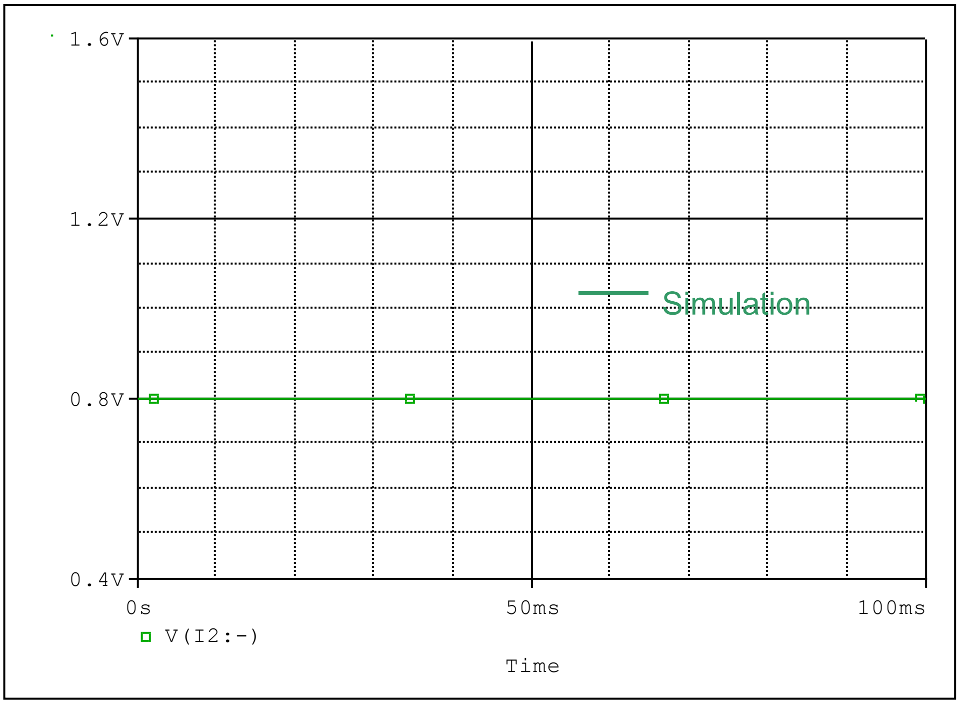
Ifwd(A)	Vfwd(V)		% Error
	Measurement	Simulation	
0.001	1.080	1.077	-0.306
0.002	1.100	1.102	0.145
0.005	1.130	1.145	1.319
0.01	1.200	1.184	-1.367
0.02	1.240	1.246	0.516
0.05	1.400	1.398	-0.114

Transistor Saturation Characteristics

Evaluation Circuit



Simulation result

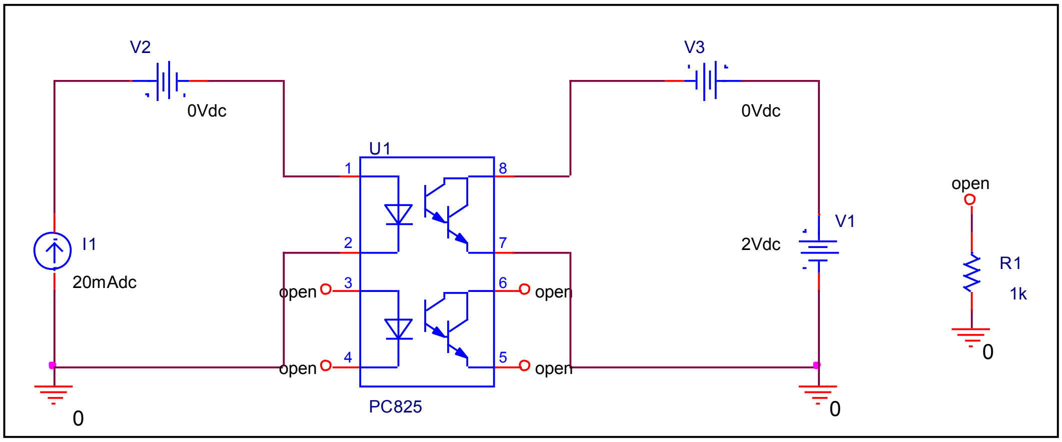


Comparison Table

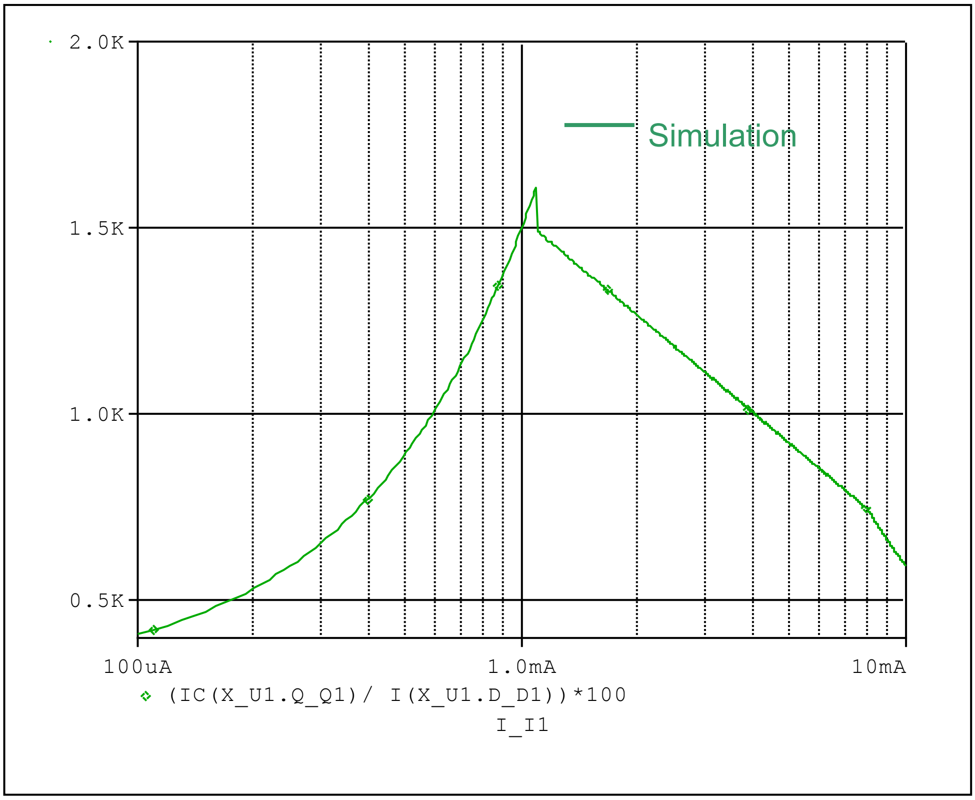
	Measurement	Simulation	% Error
Vce(sat) (V)	0.800	0.802	0.250

CTR(Current Transfer Ratio) Characteristics

Evaluation Circuit



Simulation result



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Rise Curve Table

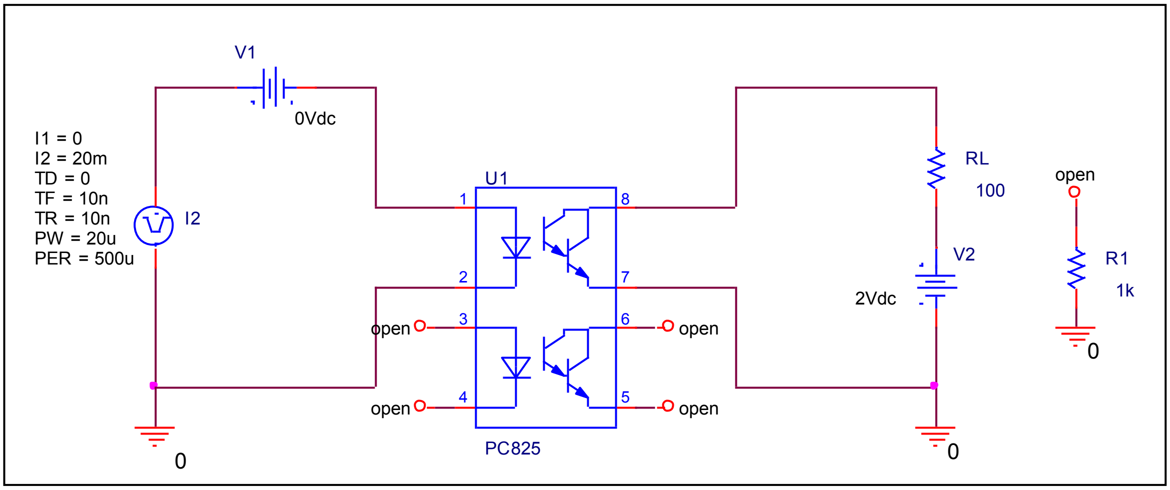
If(mA)	CTR(%)		% Error
	Measurement	Simulation	
0.200	520.000	532.684	2.439
0.500	930.000	900.767	-3.143
1.000	1570.000	1500.700	-4.414
1.100	1600.000	1609.900	0.619

Fall Curve Table

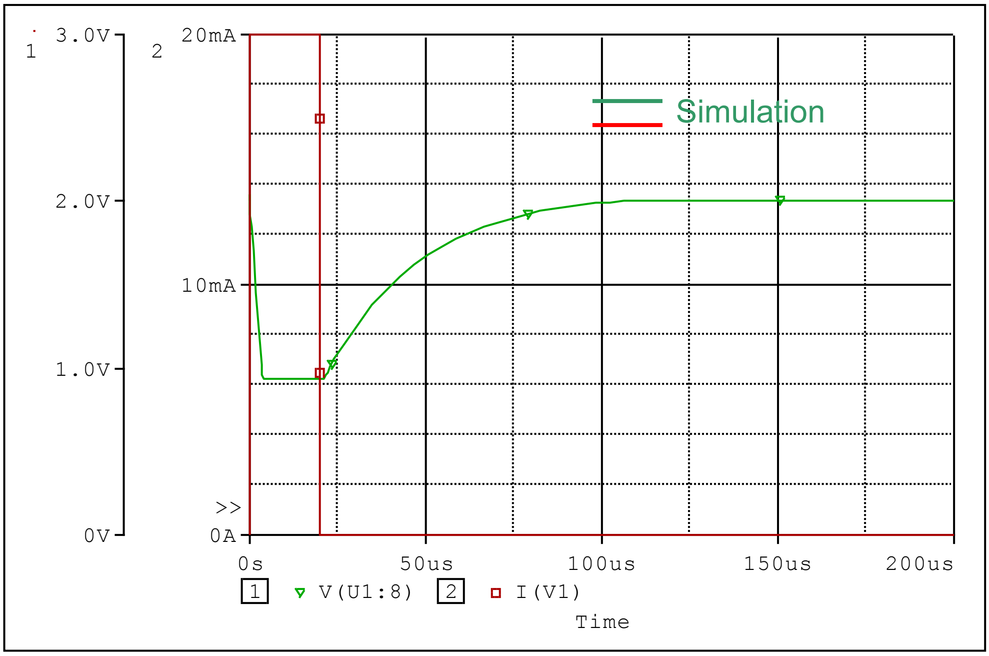
If(mA)	CTR(%)		% Error
	Measurement	Simulation	
1.100	1600.000	1609.900	0.619
2.000	1310.000	1261.800	-3.679
3.000	1100.000	1120.400	1.855
5.000	900.000	920.052	2.228

Switching Time Characteristics

Evaluation Circuit



Simulation result



Comparison Table

Vce=2V,RL=100Ω	Measurement	Simulation	% Error
ts (us)	3.600	3.7583	4.397
tf (us)	52.000	49.801	-4.229