Device Modeling Report

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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}

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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

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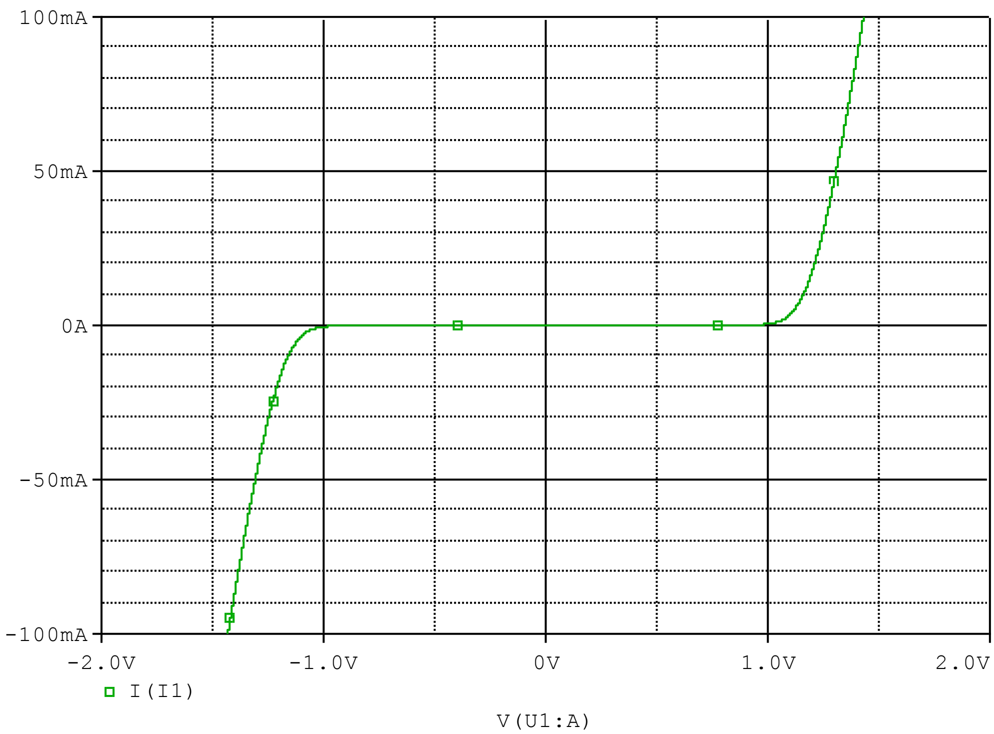
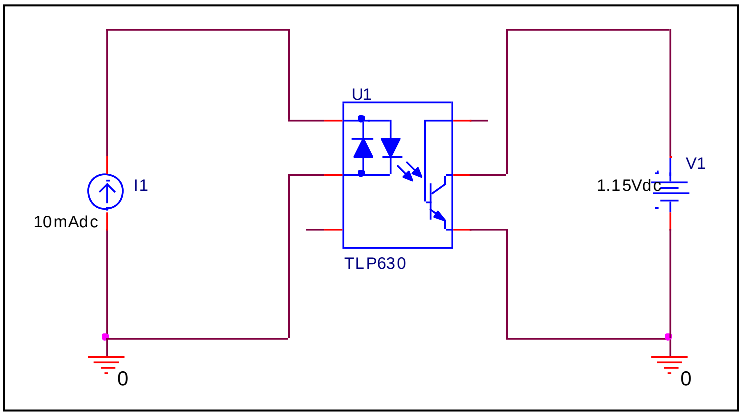
LED IV Curve Characteristics

Simulation result



Evaluation Circuit



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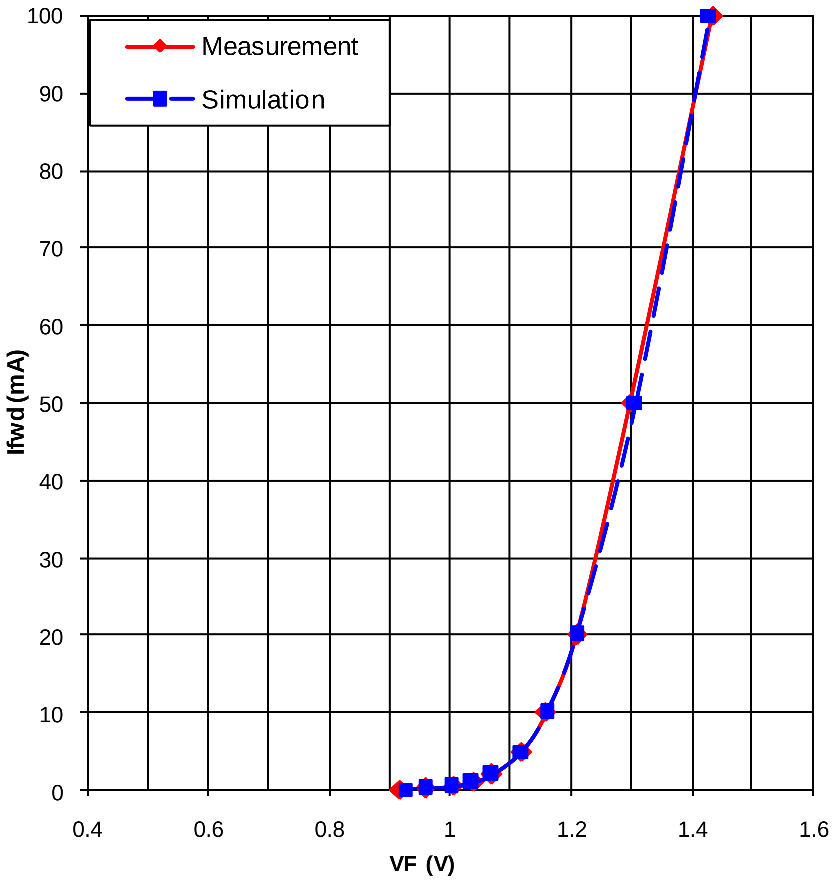
Comparison Graph



Comparison Table

Ifwd (mA)	Vfwd(V)		% Error
	Measurement	Simulation	
0.100	0.918	0.926	0.871
0.200	0.960	0.959	-0.073
0.500	1.005	1.002	-0.299
1.000	1.040	1.036	-0.365
2.000	1.070	1.070	0.000
5.000	1.120	1.119	-0.071
10.000	1.160	1.161	0.052
20.000	1.210	1.211	0.050
50.000	1.300	1.308	0.615
100.000	1.435	1.431	-0.279

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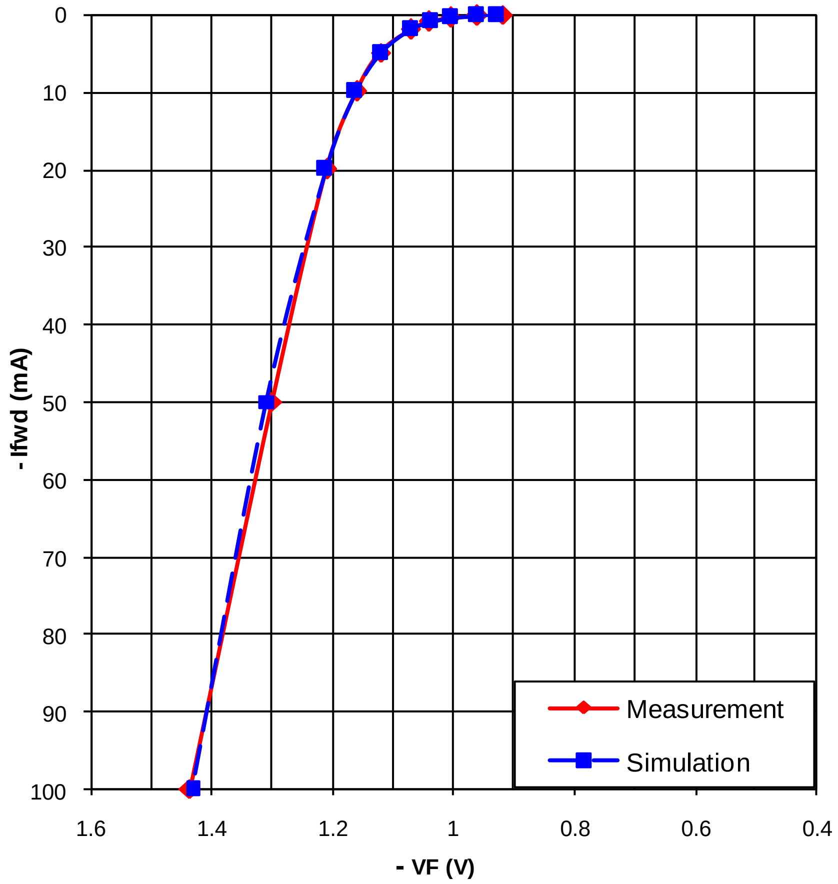
Comparison Graph



Comparison Table

Ifwd (mA)	Vfwd(V)		% Error
	Measurement	Simulation	
-100.000	-1.435	-1.431	-0.279
-50.000	-1.300	-1.308	0.615
-20.000	-1.210	-1.211	0.050
-10.000	-1.160	-1.161	0.052
-5.000	-1.120	-1.119	-0.071
-2.000	-1.070	-1.070	0.000
-1.000	-1.040	-1.036	-0.365
-0.500	-1.005	-1.002	-0.299
-0.200	-0.960	-0.959	-0.073
-0.100	-0.918	-0.926	0.871

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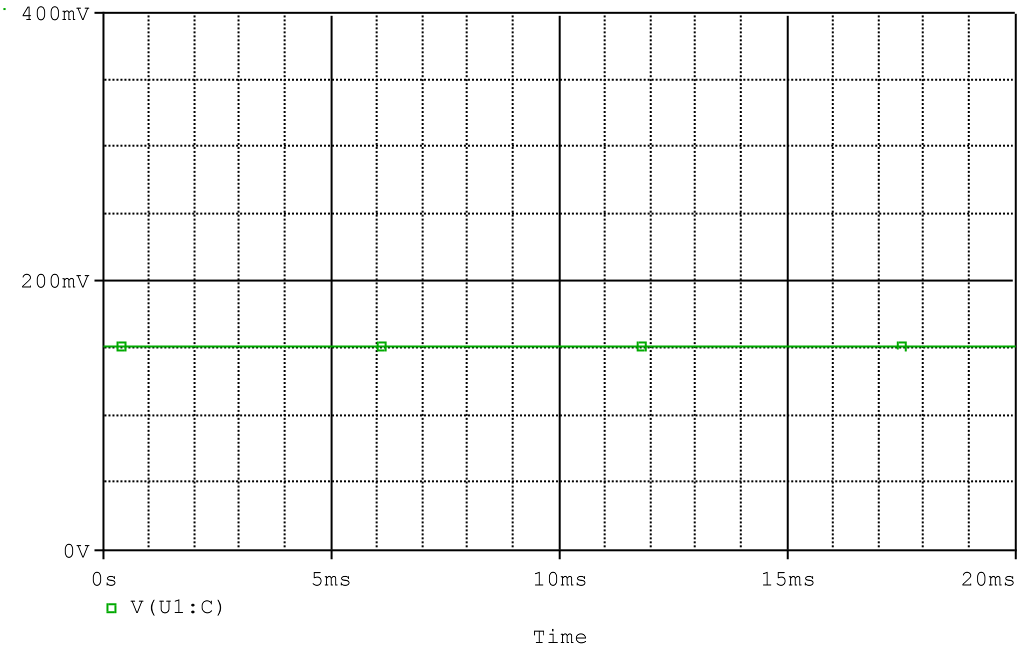
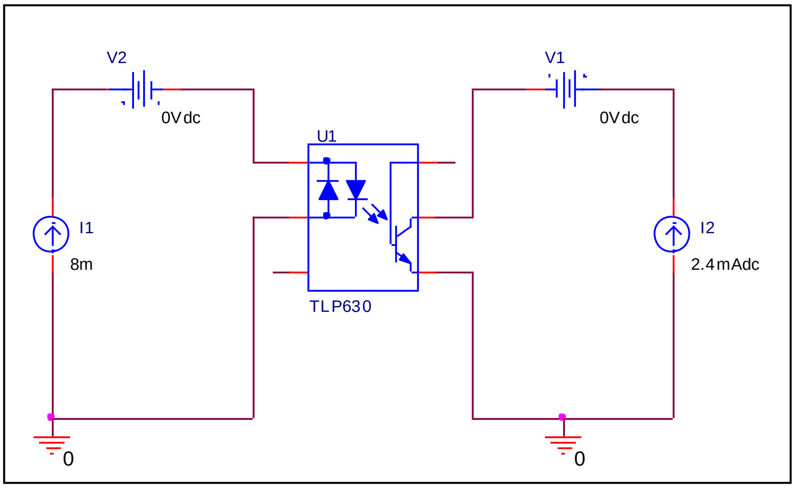
Transistor Saturation Characteristics

Simulation result



Evaluation Circuit



Comparison Table

	Measurement	Simulation	% Error
$V_{CE(sat)}$ (V)	0.4 (Max)	0.152	-

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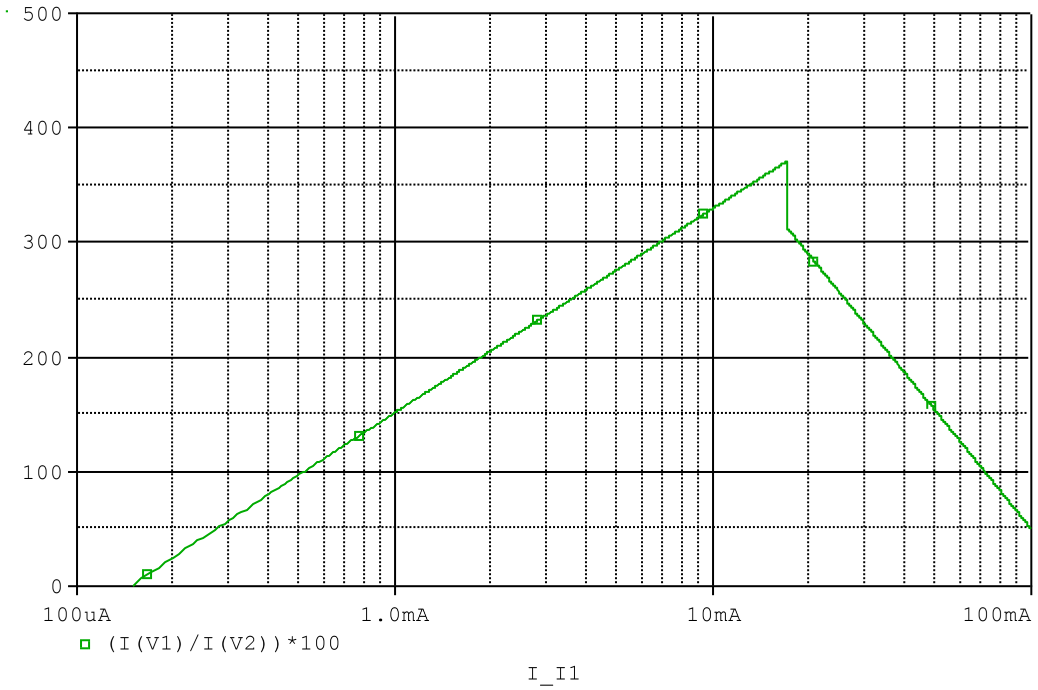
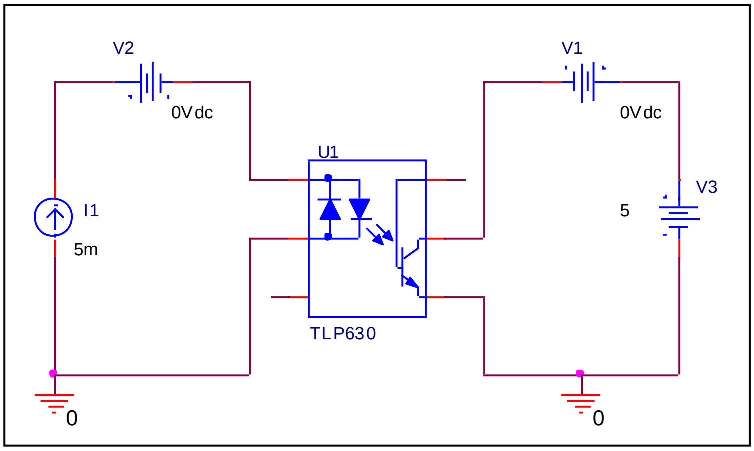
CTR(Current Transfer Ratio) Characteristics

Simulation result



Evaluation Circuit



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Rise Curve Table

If (mA)	IO/IF		% Error
	Measurement	Simulation	
0.300	58.000	57.040	-1.655
0.500	92.800	97.286	4.834
1.000	150.000	151.527	1.018
2.000	215.000	205.332	-4.497
5.000	290.000	276.104	-4.792
10.000	328.000	329.707	0.520
17.000	334.000	350.552	4.956

Fall Curve Table

If(mA)	IO/IF		% Error
	Measurement	Simulation	
17.000	334.000	350.552	4.956
20.000	300.000	289.382	-3.539
50.000	150.000	153.261	2.174
60.000	127.000	126.294	-0.556

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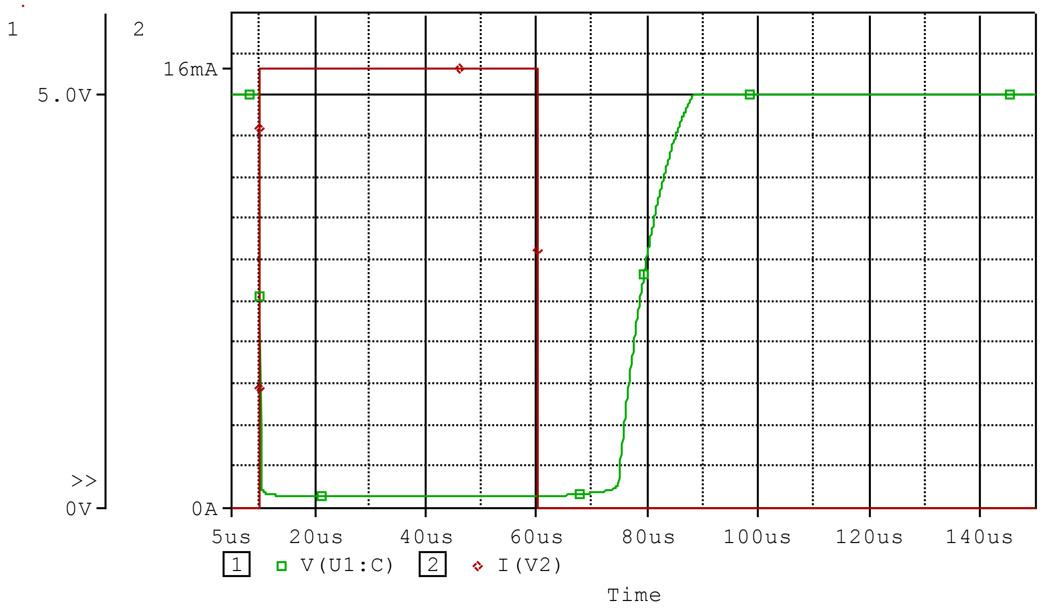
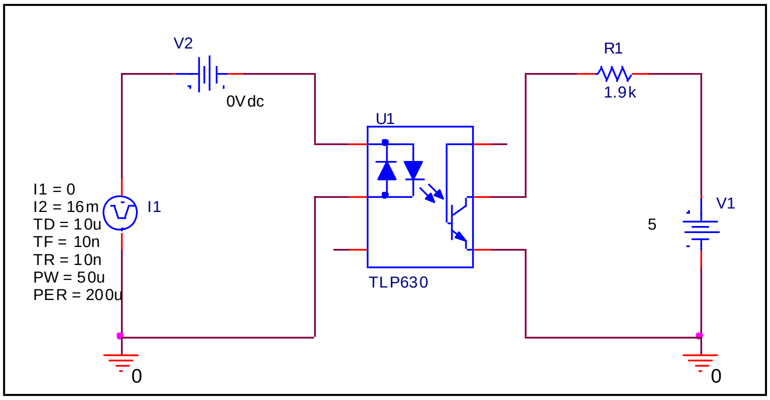
Switching Time Characteristics

Simulation result



Evaluation Circuit



Comparison Table

I_F=16mA, RL=1.9kΩ	Measurement	Simulation	% Error
t_S (us)	15.000	15.005	0.033
t_{OFF} (us)	25.000	25.006	0.024

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