Evaluation Report

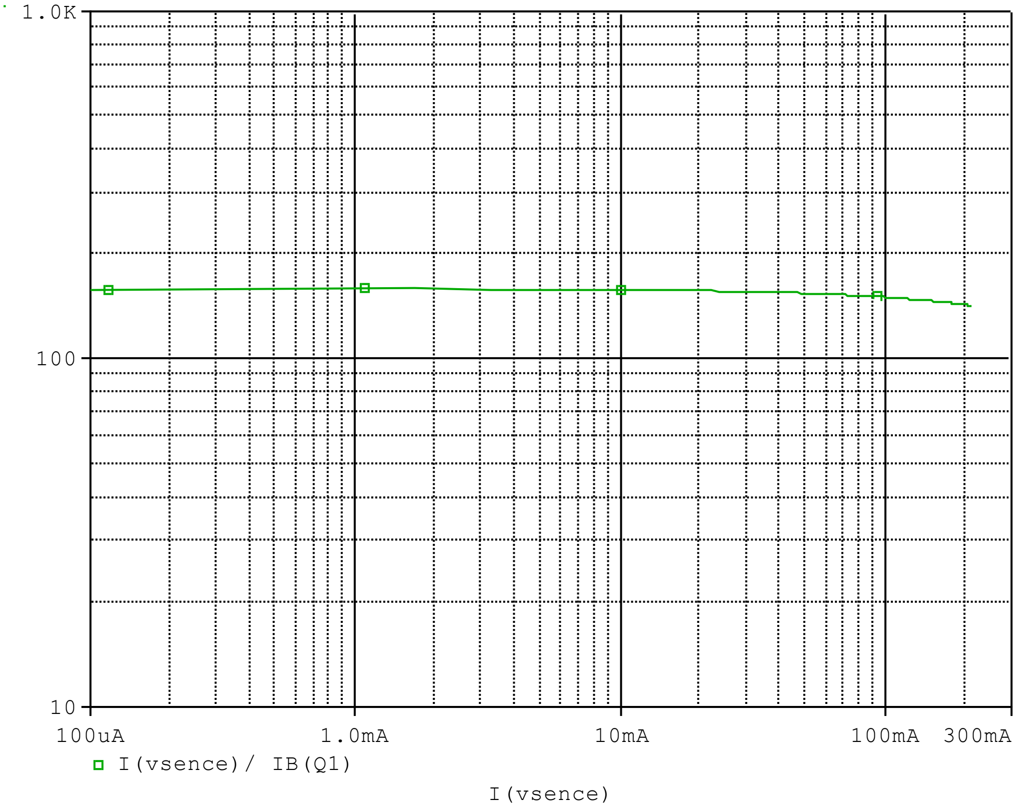
COMPONENTS: TRANSISTOR
PART NUMBER: 2SC2712
MANUFACTURER: TOSHIBA

Bee Technologies Inc.

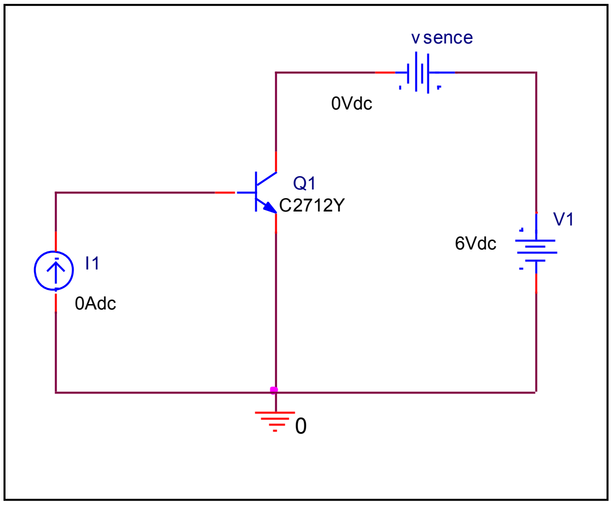
Pspice model parameter	Model description
IS	Saturation Current
BF	Ideal Maximum Forward Beta
NF	Forward Current Emission Coefficient
VAF	Forward Early Voltage
IKF	Forward Beta Roll-off Knee Current
ISE	Non-ideal Base-Emitter Diode Saturation Current
NE	Non-ideal Base-Emitter Diode Emission Coefficient
BR	Ideal Maximum Reverse Beta
NR	Reverse Emission Coefficient
VAR	Reverse Early Voltage
IKR	Reverse Beta Roll-off Knee Current
ISC	Non-ideal Base-Collector Diode Saturation Current
NC	Non-ideal Base-Collector Diode Emission Coefficient
NK	Forward Beta Roll-off Slope Exponent
RE	Emitter Resistance
RB	Base Resistance
RC	Series Collector Resistance
CJE	Zero-bias Emitter-Base Junction Capacitance
VJE	Emitter-Base Junction Potential
MJE	Emitter-Base Junction Grading Coefficient
CJC	Zero-bias Collector-Base Junction Capacitance
VJC	Collector-base Junction Potential
MJC	Collector-base Junction Grading Coefficient
FC	Coefficient for Onset of Forward-bias Depletion Capacitance
TF	Forward Transit Time
XTF	Coefficient for TF Dependency on Vce
VTF	Voltage for TF Dependency on Vce
ITF	Current for TF Dependency on Ic
PTF	Excess Phase at f=1/2pi*TF
TR	Reverse Transit Time
EG	Activation Energy
XTB	Forward Beta Temperature Coefficient
XTI	Temperature Coefficient for IS

Transistor h_{FE}-I_C Characteristics

Circuit Simulation Result

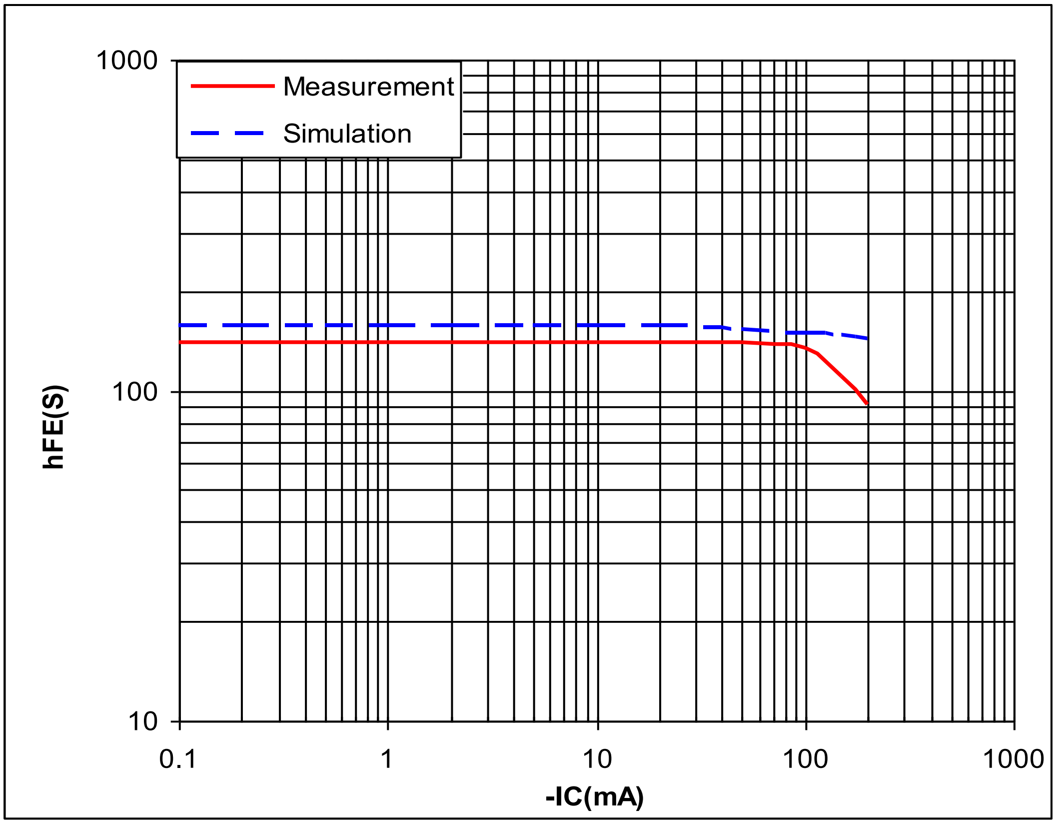


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

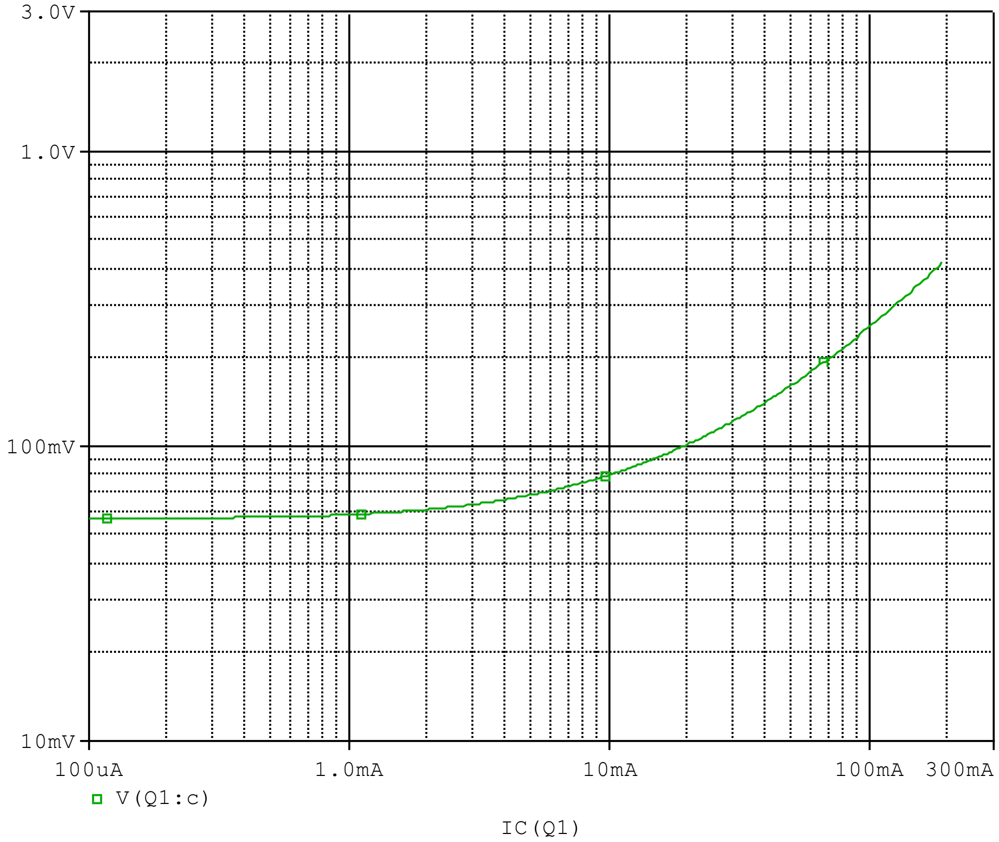


Simulation Result

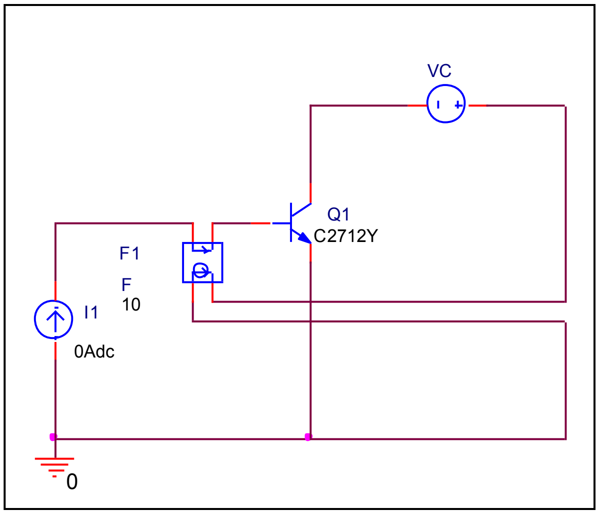
Ic(mA)	hFE		Error(%)
	Measurement	Simulation	
0.1	140.000	158.000	12.857
0.2	140.000	158.000	12.857
0.5	140.000	158.000	12.857
1	140.000	158.000	12.857
2	140.000	158.000	12.857
5	140.000	158.000	12.857
10	140.000	158.000	12.857
20	140.000	157.000	12.143
50	140.000	154.000	10.000
100	135.000	150.000	11.111
200	91.000	143.000	57.143

$V_{CE(Sat)}$-I_C Characteristics

Circuit Simulation Result

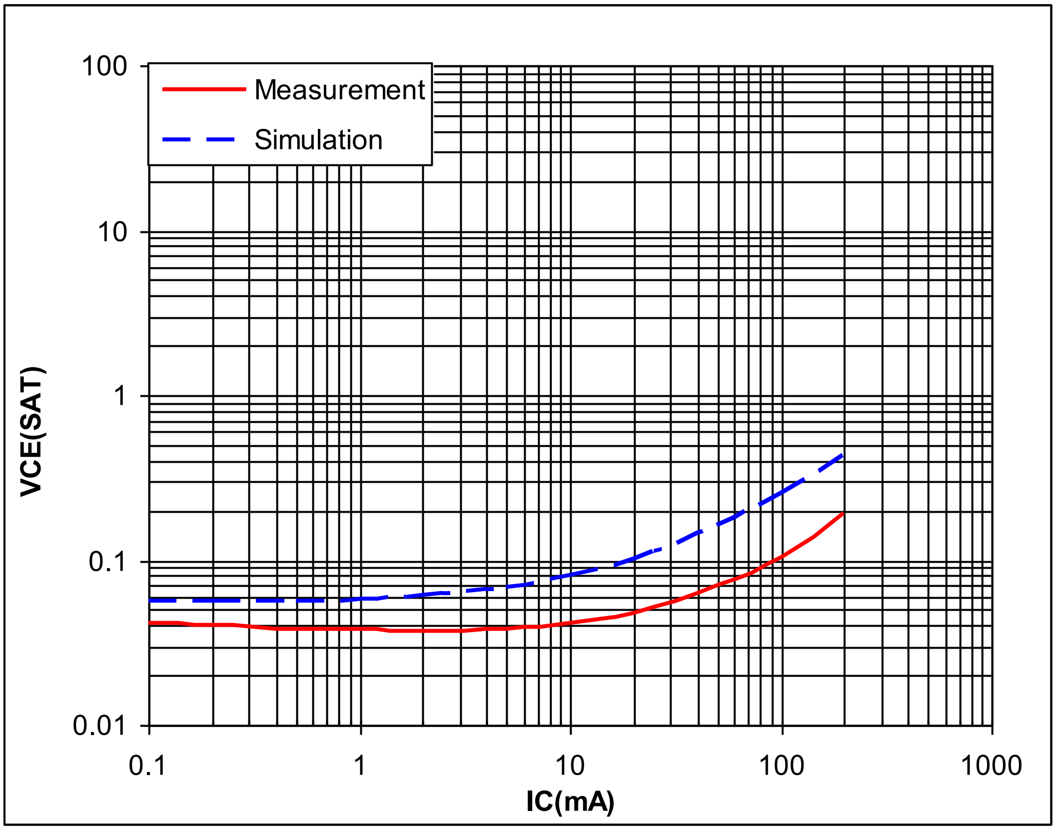


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

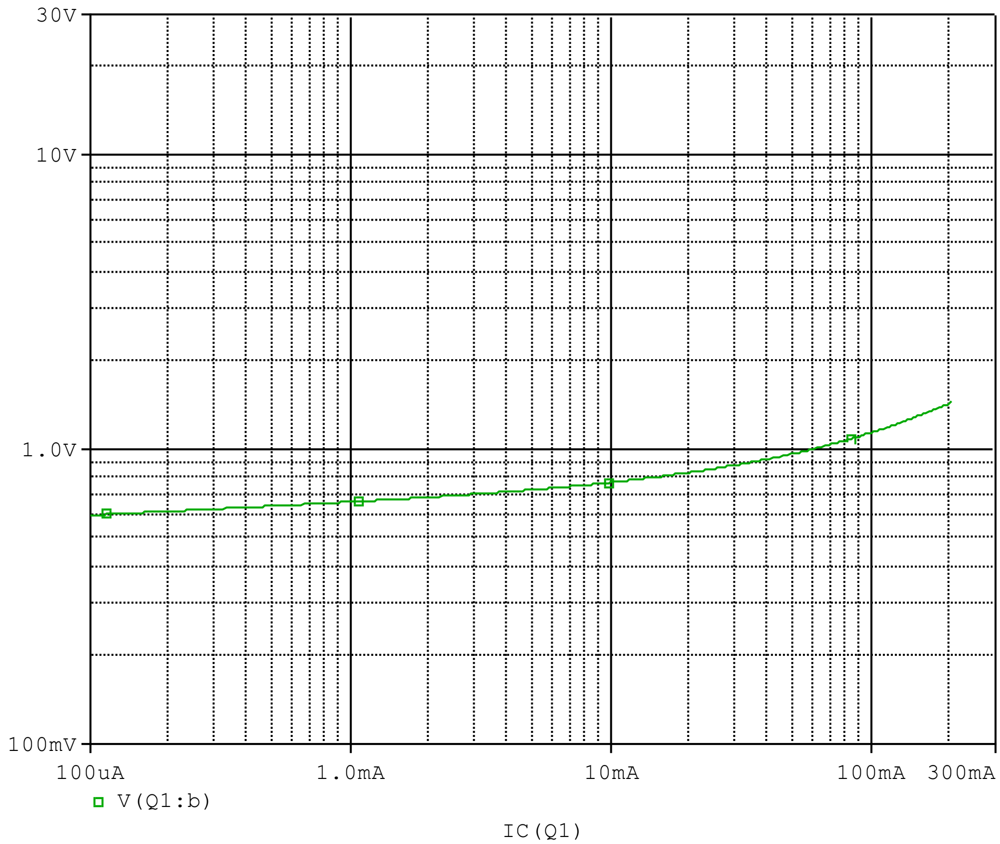


Simulation Result

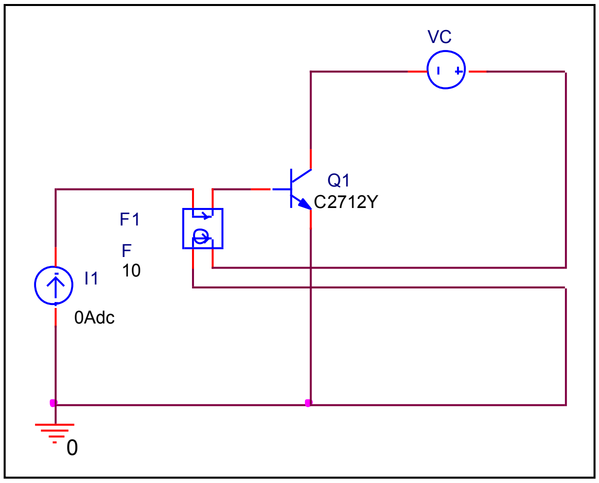
IC(mA)	VCE(sat)		Error(%)
	Measurement	Simulation	
0.1	0.042	0.057	35.714
0.2	0.040	0.057	42.500
0.5	0.038	0.057	50.000
1	0.038	0.058	52.632
2	0.037	0.061	64.865
5	0.038	0.068	78.947
10	0.041	0.080	95.122
20	0.048	0.101	110.417
50	0.070	0.161	130.000
100	0.105	0.255	142.857
200	0.195	0.435	123.077

$V_{BE(Sat)}$-I_C Characteristics

Circuit Simulation Result



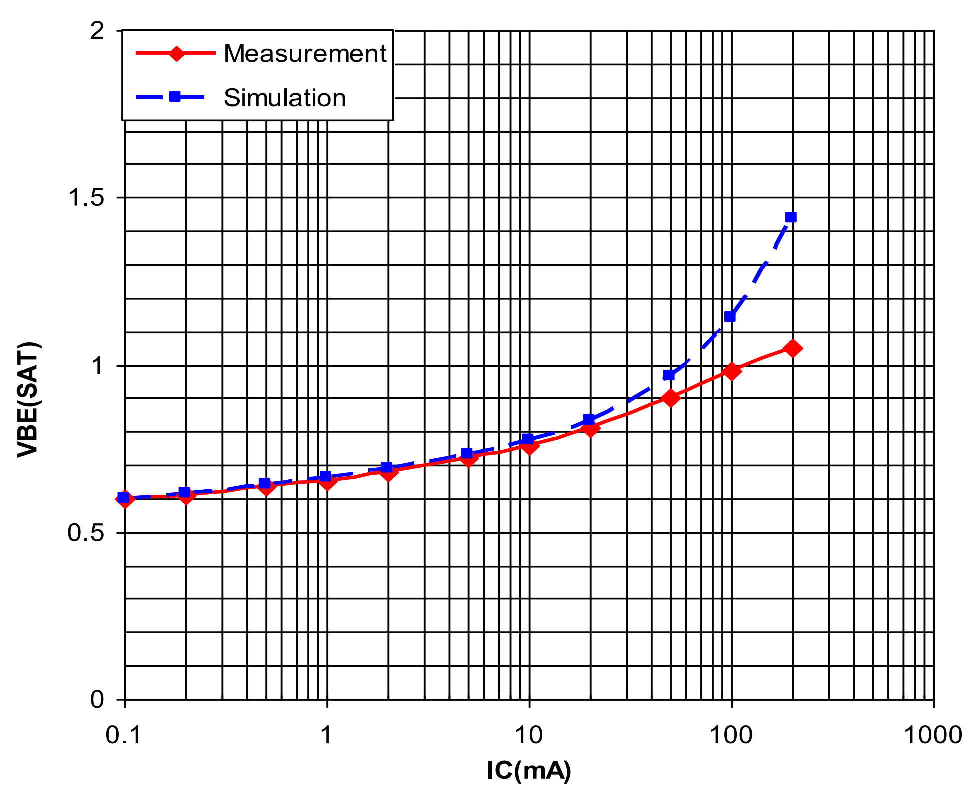
Evaluation Circuit



All Rights Reserved Copyright (c) Bee Technologies Inc. 2006

Comparison Graph

Circuit Simulation Result

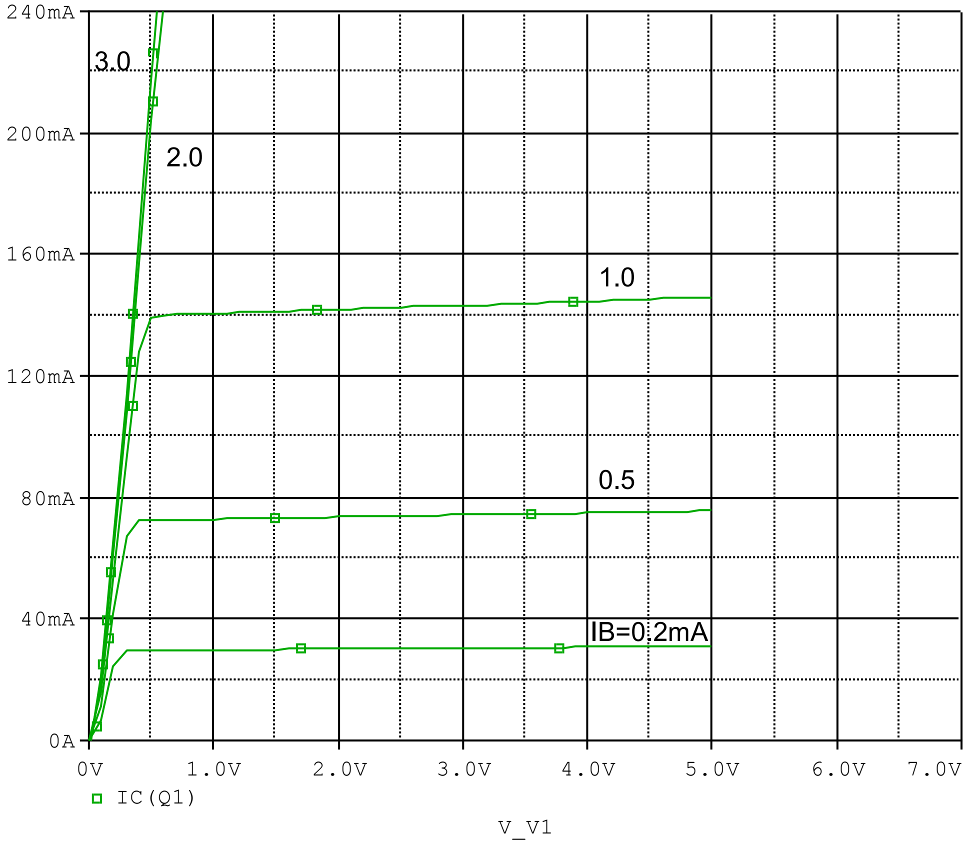


Simulation Result

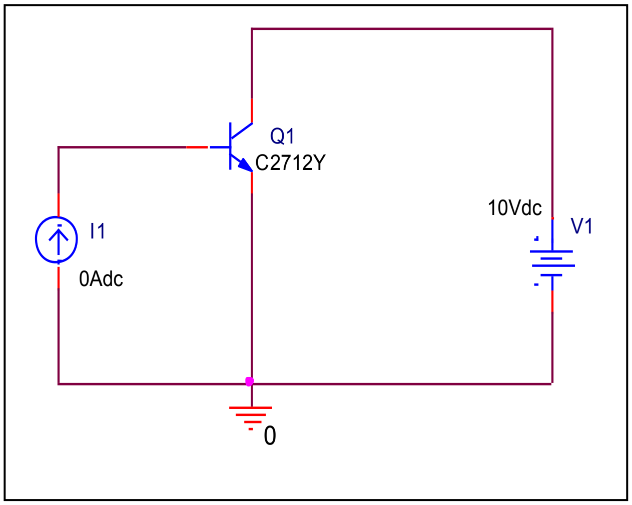
IC(A)	VBE(sat)		Error(%)
	Measurement	Simulation	
0.1	0.600	0.598	-0.333
0.2	0.610	0.616	0.984
0.5	0.635	0.642	1.102
1	0.650	0.664	2.154
2	0.680	0.688	1.176
5	0.720	0.730	1.389
10	0.760	0.773	1.711
20	0.810	0.835	3.086
50	0.900	0.968	7.556
100	0.980	1.140	16.327
200	1.050	1.437	36.857

Output Characteristics

Circuit Simulation Result



Evaluation Circuit



Output Characteristics Reference