

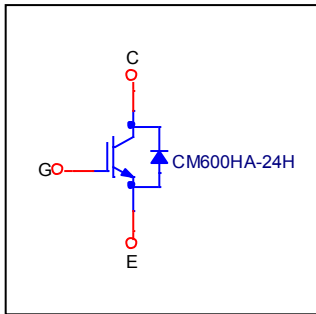
Device Modeling Report

COMPONENTS: Insulated Gate Bipolar Transistor (IGBT)
PART NUMBER: CM600HA-24H
MANUFACTURER: MITSUBISHI
*REMARK: Free-Wheeling Diode Standard Model

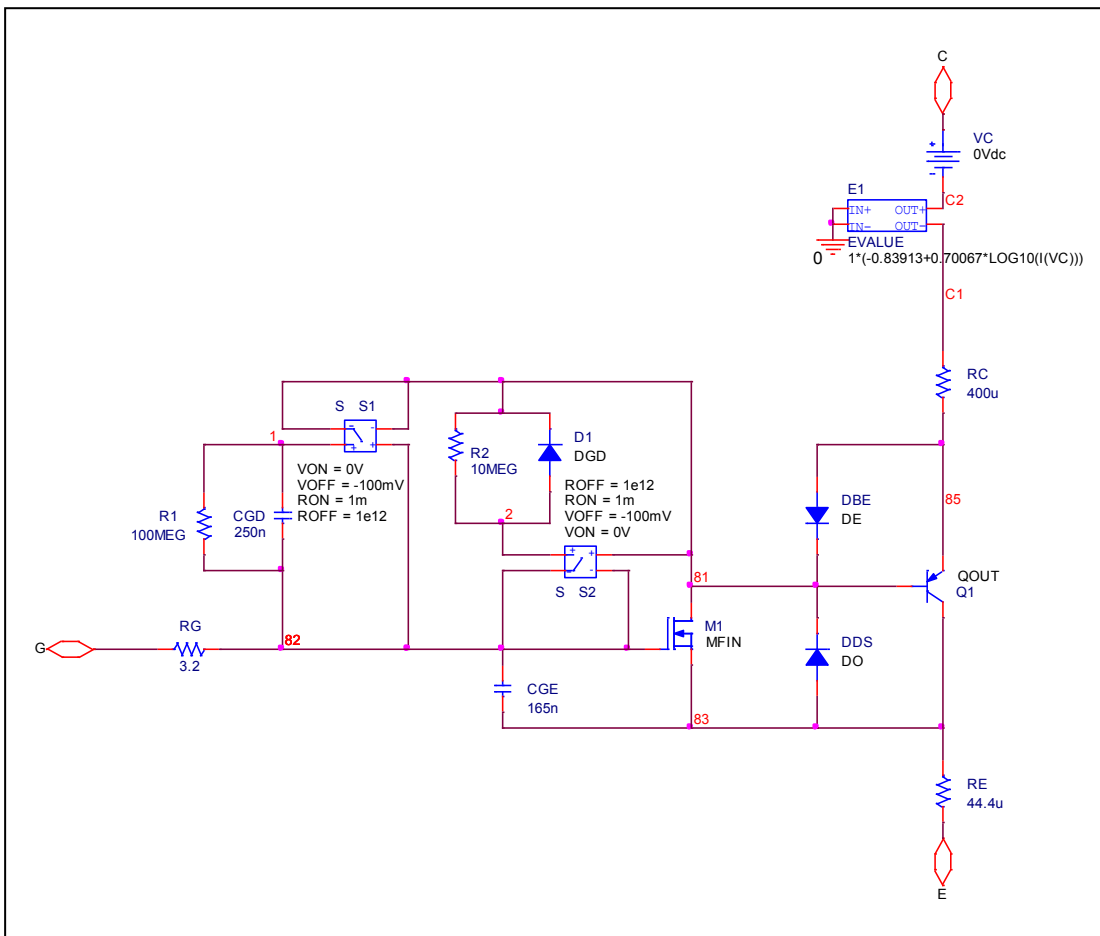


Bee Technologies Inc.

Circuit Configuration

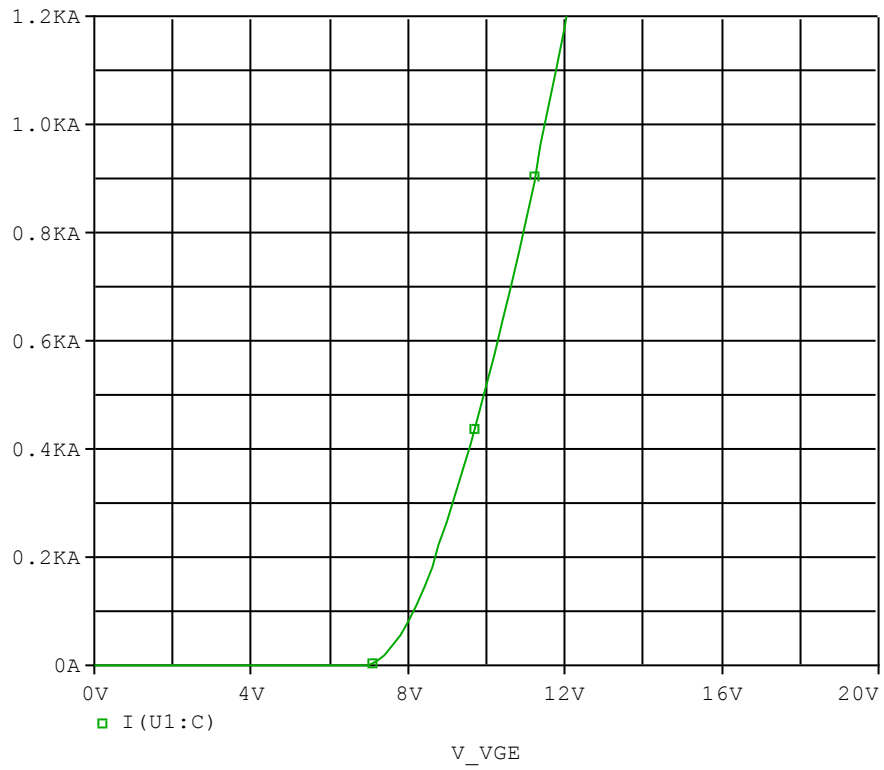


IGBT Subcircuit

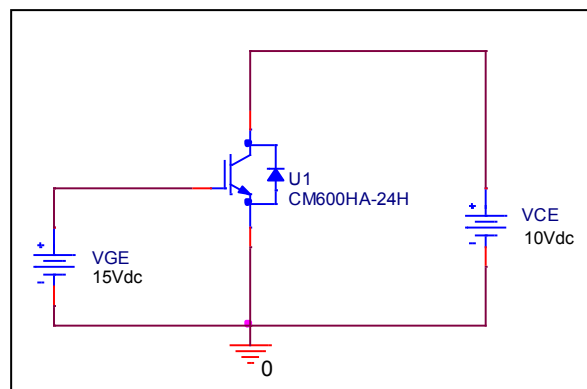


Transfer Characteristics

Circuit Simulation result

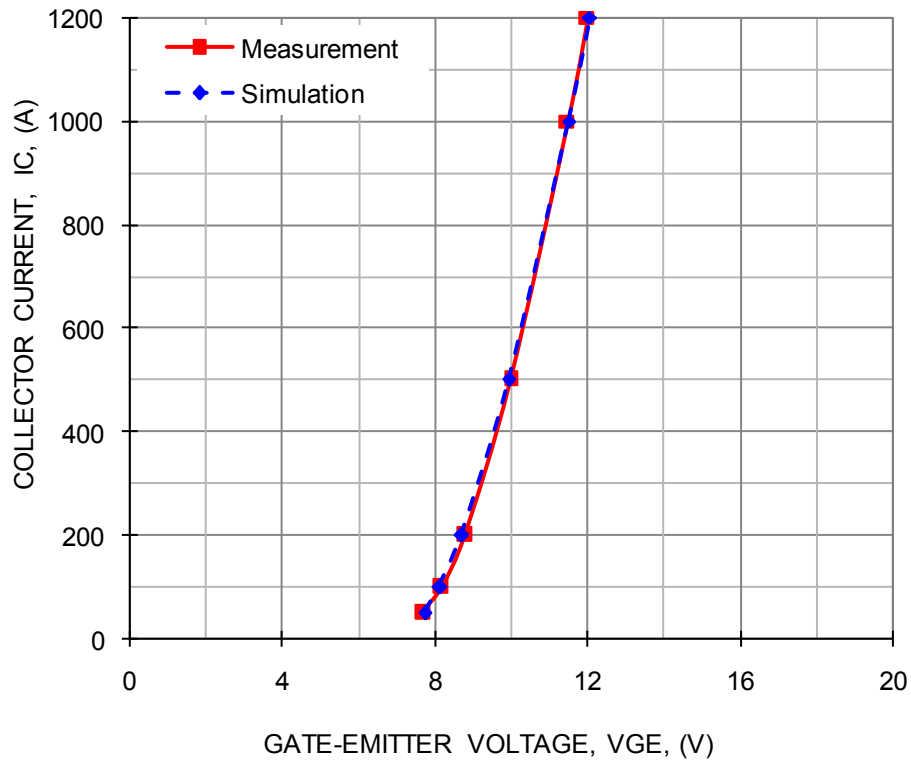


Evaluation circuit



Comparison Graph

Circuit Simulation Result



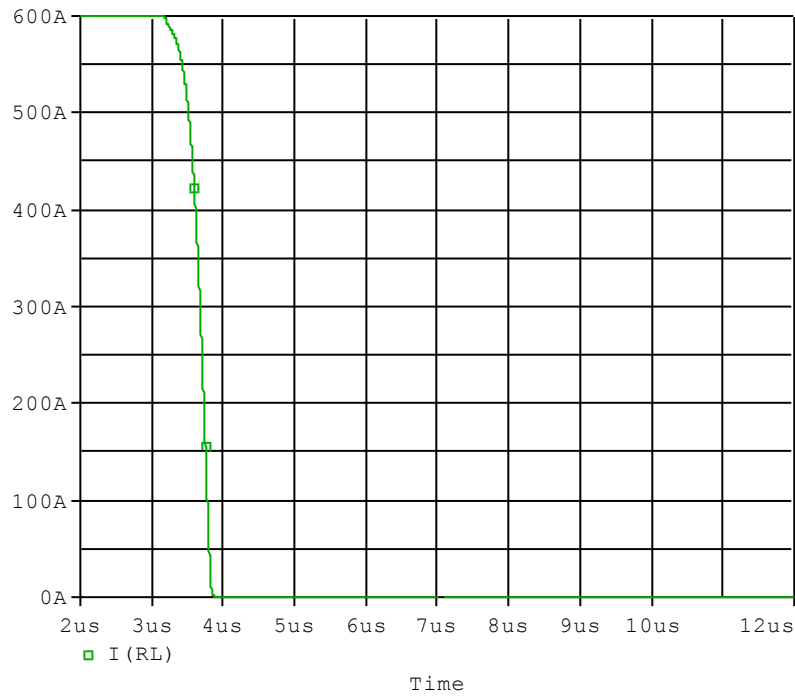
Simulation Result

Test condition: $V_{CE} = 10\text{ V}$

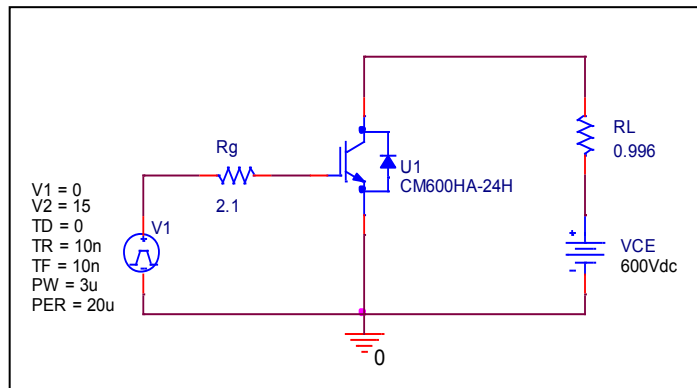
IC (A)	VGE (V)		Error (%)
	Measurement	Simulation	
50	7.700	7.736	0.47
100	8.200	8.121	-0.97
200	8.800	8.694	-1.21
500	10.000	9.936	-0.64
1000	11.500	11.509	0.08
1200	12.000	12.063	0.53

Fall Time Characteristics

Circuit Simulation result



Evaluation circuit

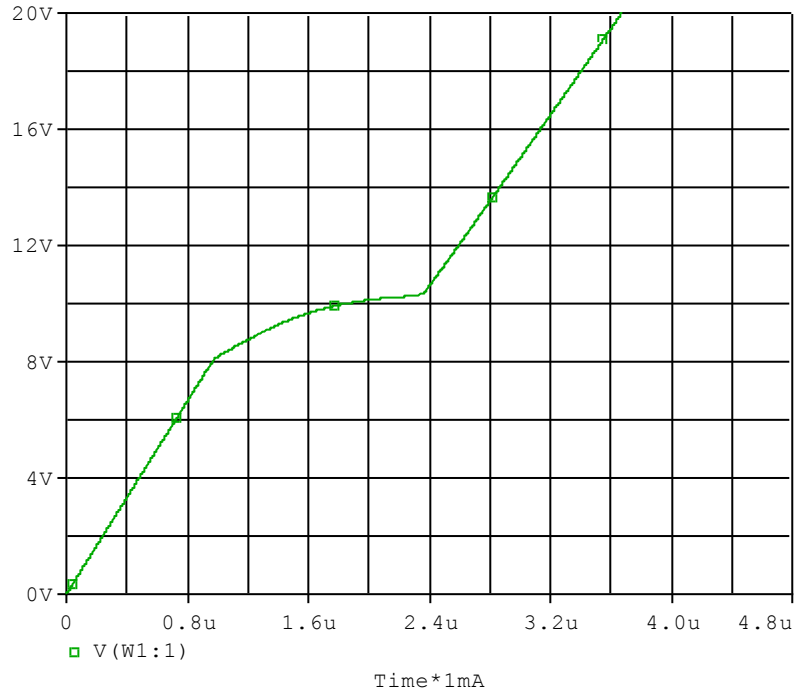


Test condition $I_c=600$ (A), $V_{cc}=600$ (V)

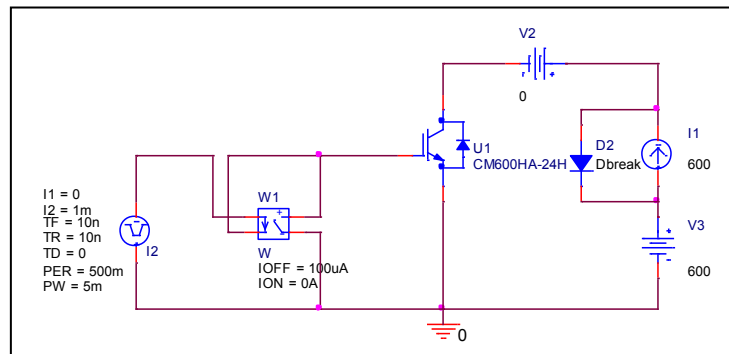
Parameter	Unit	Measurement	Simulation	Error
tf	ns	350.000	347.850	-0.614

Gate Charge Characteristics

Circuit Simulation result



Evaluation circuit

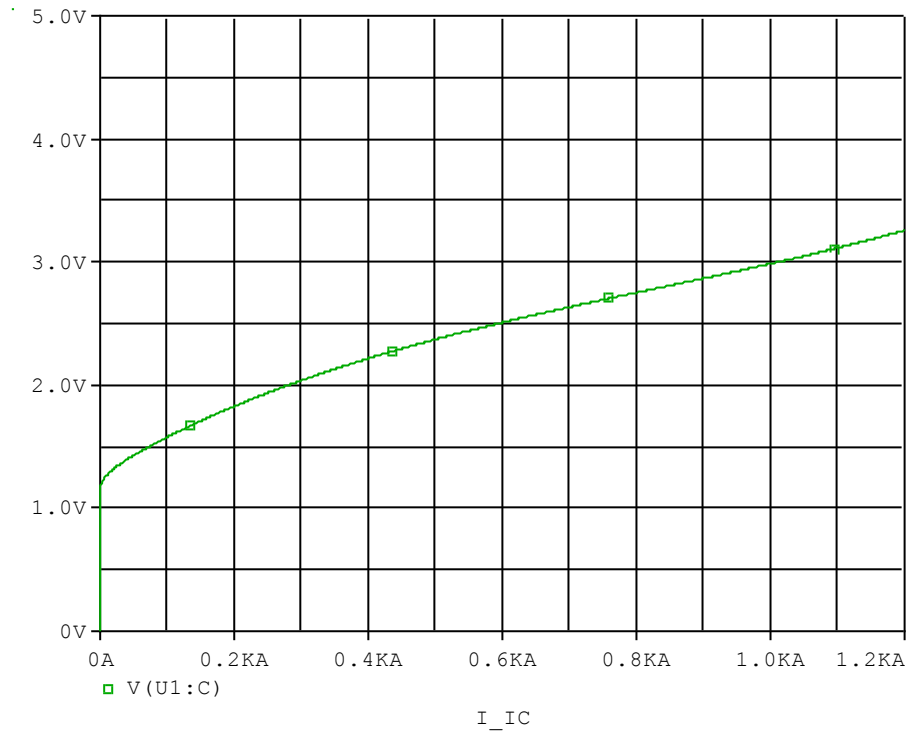


Test condition: $V_{CC}=600$ (V), $I_C=600$ (A) , $V_{GE}=15$ (V)

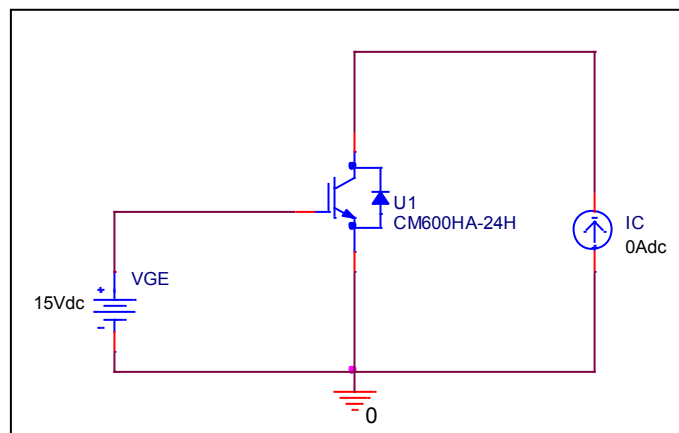
Parameter	Unit	Measurement	Simulation	Error(%)
Qge	nc	1000.000	1000.400	0.040
Qgc	nc	1400.000	1368.400	-2.257
Qg	nc	3000.000	3001.100	0.037

Saturation Characteristics

Circuit Simulation result

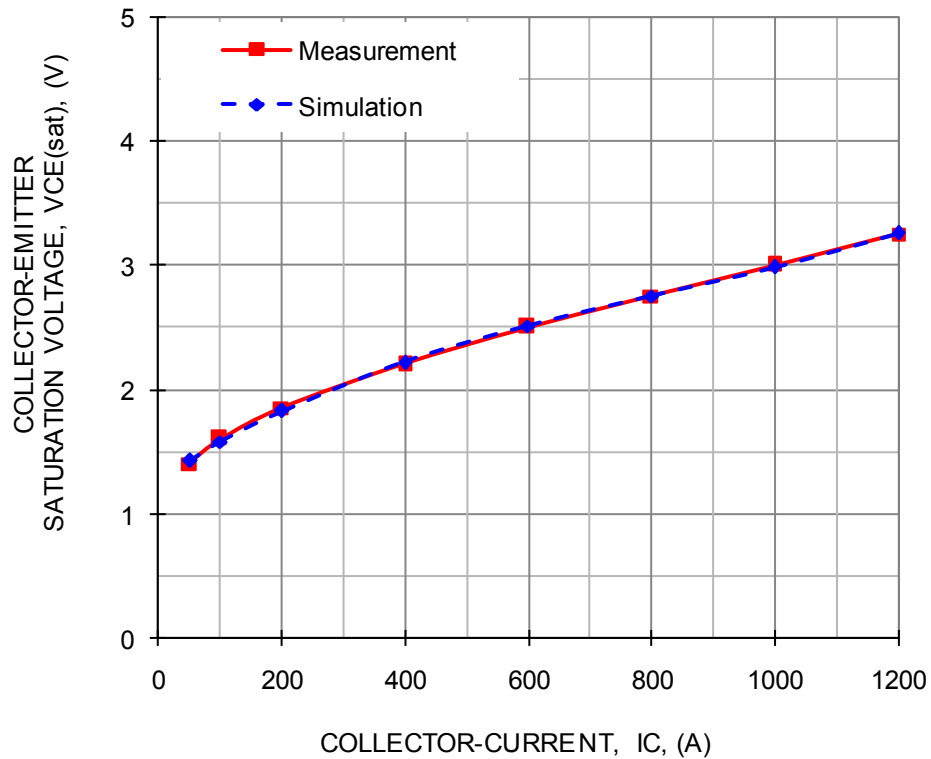


Evaluation circuit



Comparison Graph

Circuit Simulation Result



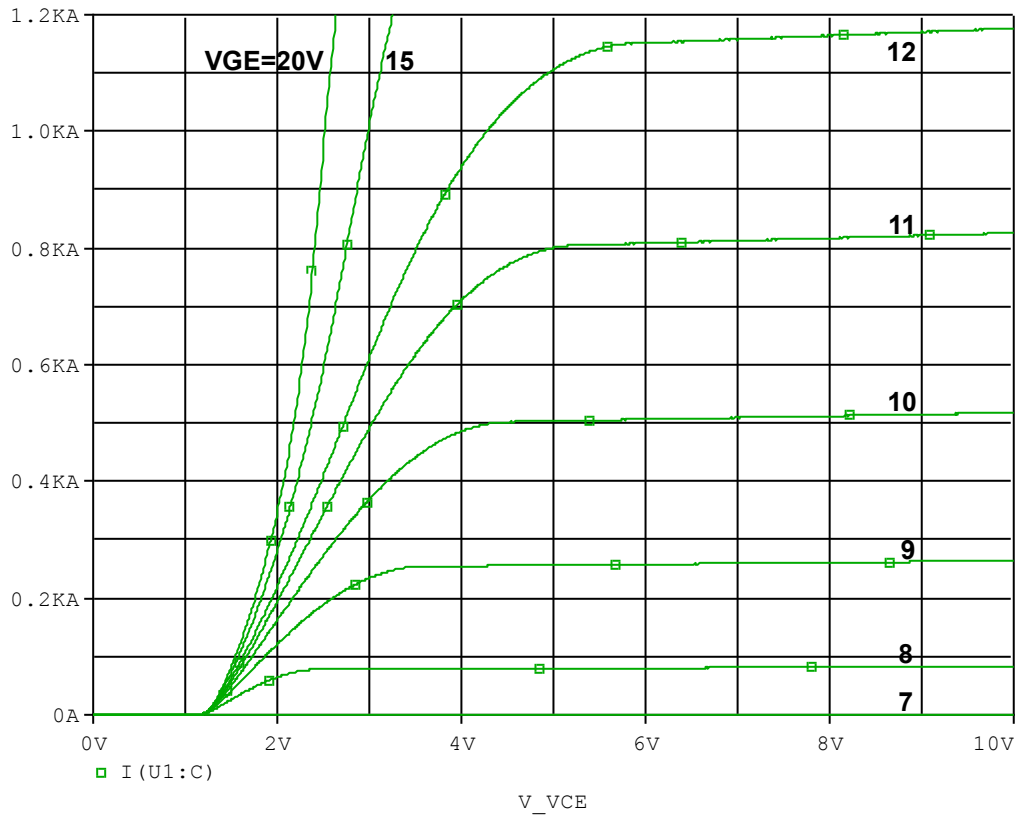
Simulation Result

Test condition: $V_{GE} = 15\text{ V}$

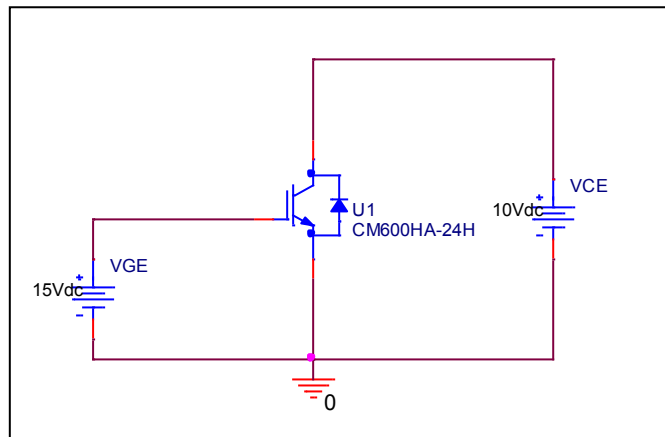
I_C (A)	VCE (V)		Error (%)
	Measurement	Simulation	
50	1.400	1.428	2.00
100	1.600	1.577	-1.42
200	1.850	1.828	-1.22
400	2.200	2.216	0.73
600	2.500	2.509	0.35
800	2.750	2.751	0.03
1000	3.000	2.986	-0.48
1200	3.250	3.257	0.21

Output Characteristics

Circuit Simulation result

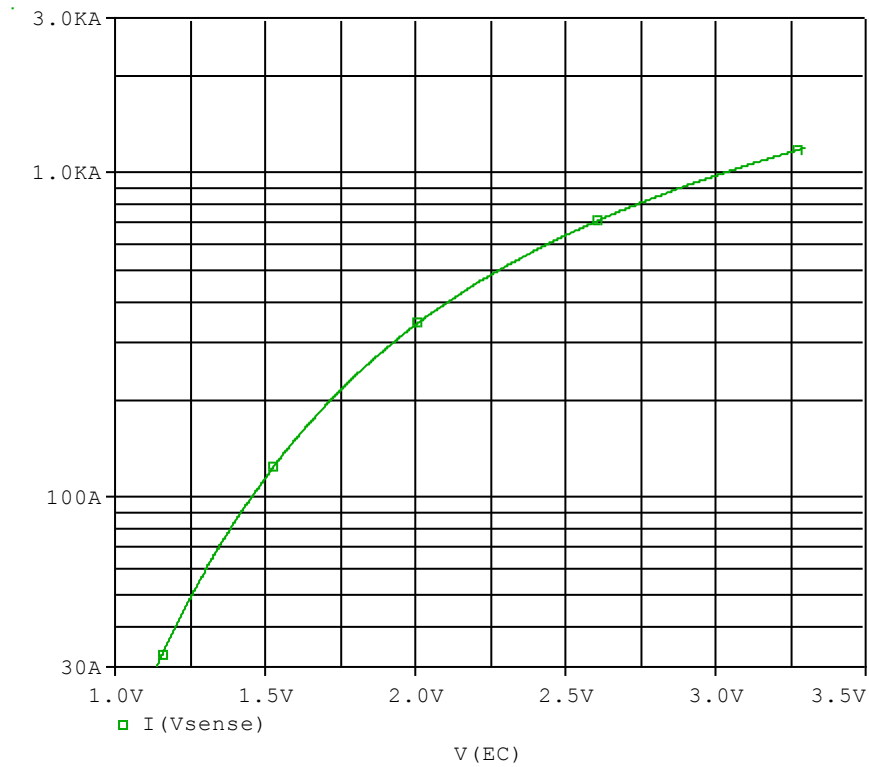


Evaluation circuit

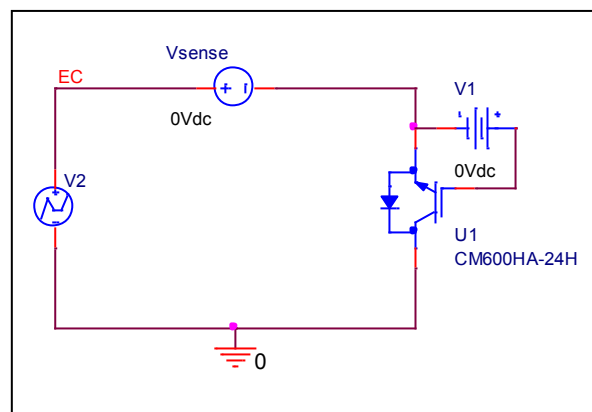


Forward Current Characteristic

Circuit Simulation Result

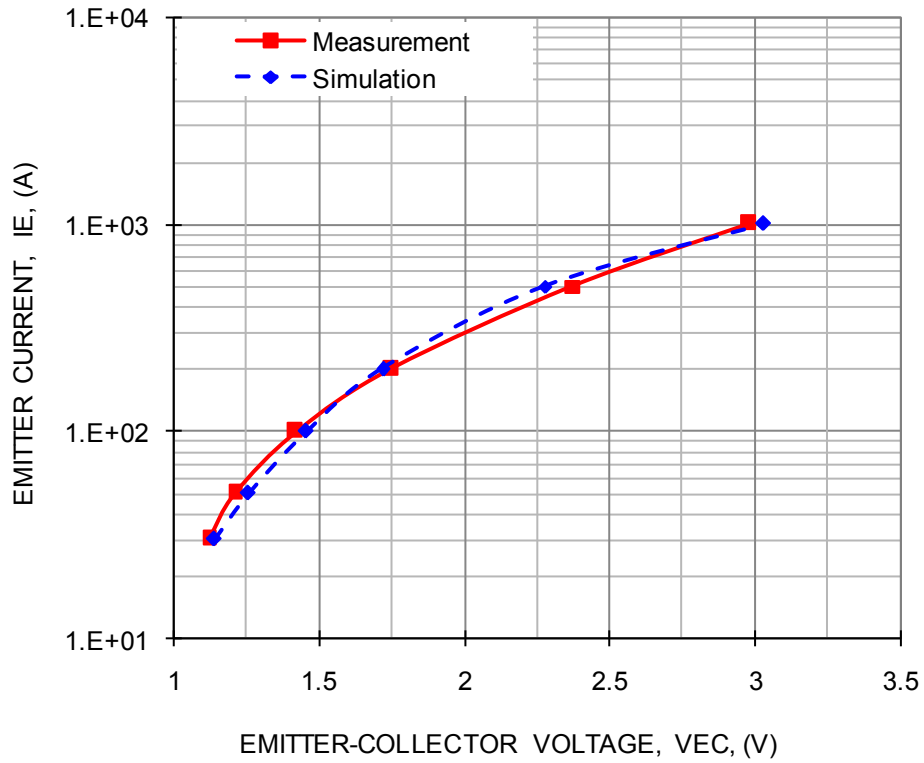


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

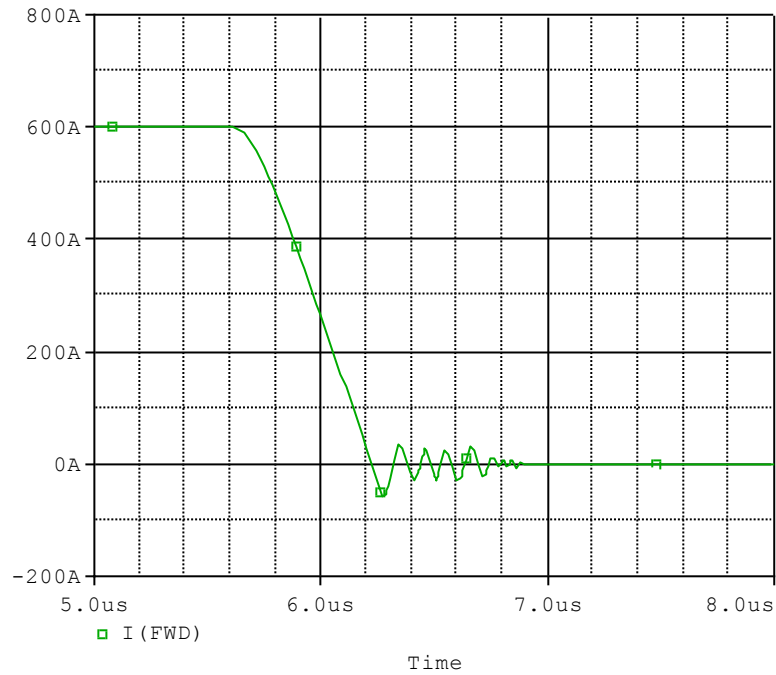


Simulation Result

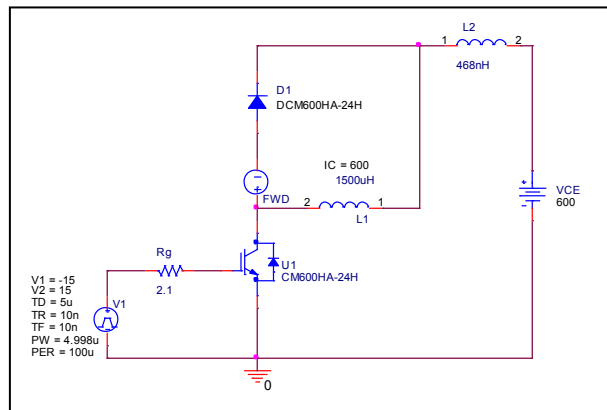
IE(A)	VEC(V)		%Error
	Measurement	Simulation	
30	1.120	1.139	1.68
50	1.210	1.256	3.79
100	1.420	1.455	2.43
200	1.750	1.720	-1.69
500	2.375	2.278	-4.10
1000	2.980	3.029	1.65

Reverse Recovery Characteristics

Circuit Simulation result



Evaluation circuit



Test condition: $V_{CC}=600 (V)$, $I_C=600(A)$, $V_{GE}=\pm 15(V)$

Parameter	Unit	Measurement	Simulation	Error(%)
trr	nsec	130.000	95.455	-26.57
Irr	A	58.000	58.571	0.98