

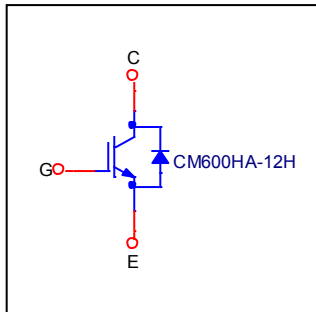
Device Modeling Report

COMPONENTS: Insulated Gate Bipolar Transistor (IGBT)
PART NUMBER: CM600HA-12H
MANUFACTURER: MITSUBISHI
*REMARK: Free-Wheeling Diode Standard Model

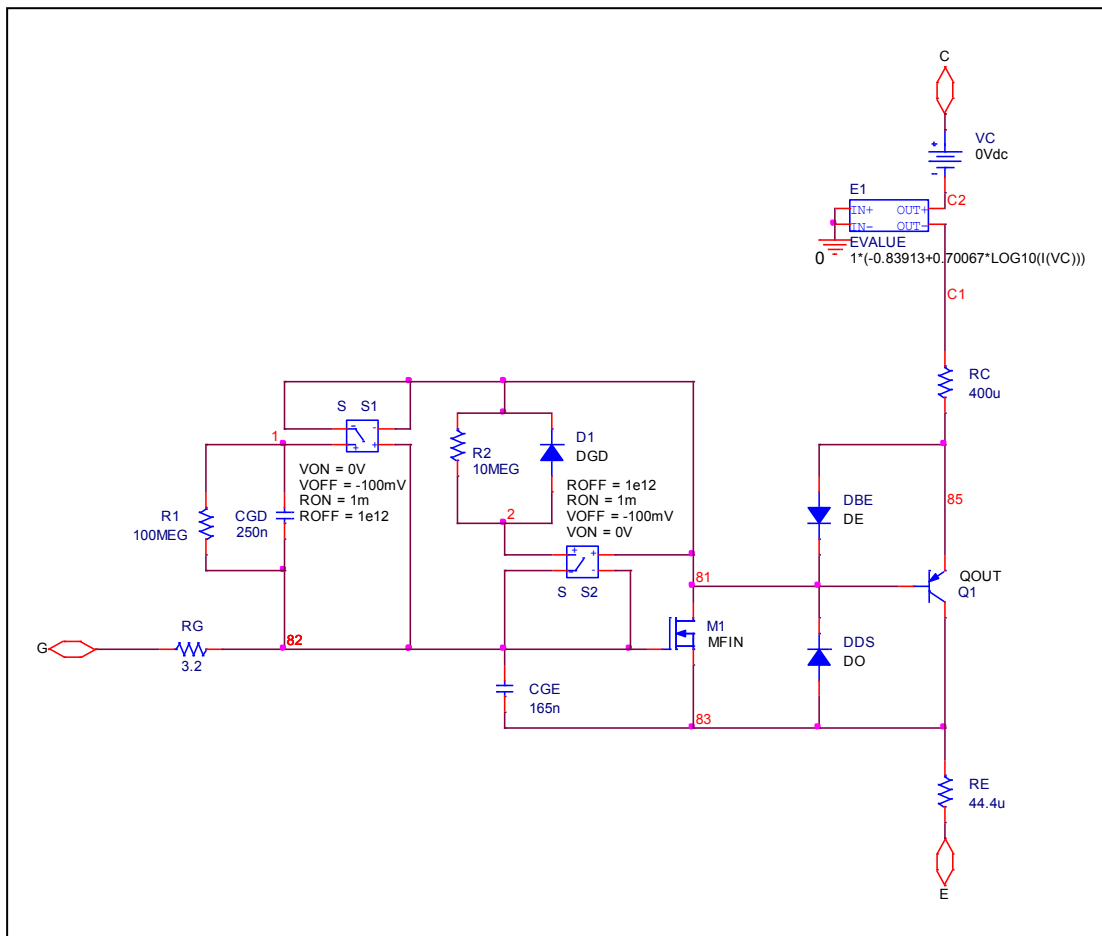


Bee Technologies Inc.

Circuit Configuration

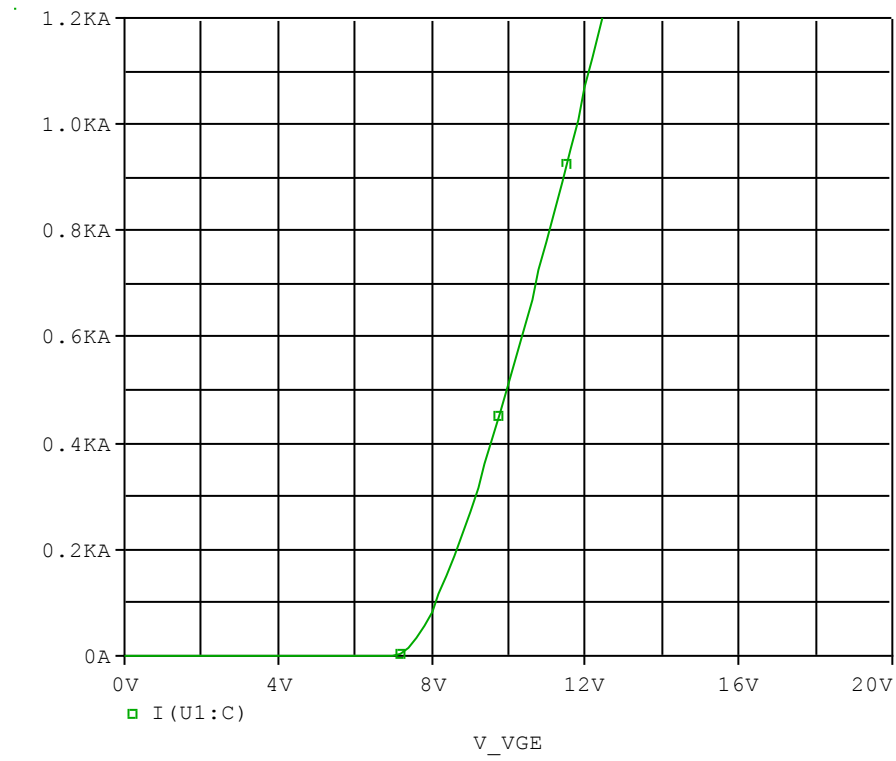


IGBT Subcircuit

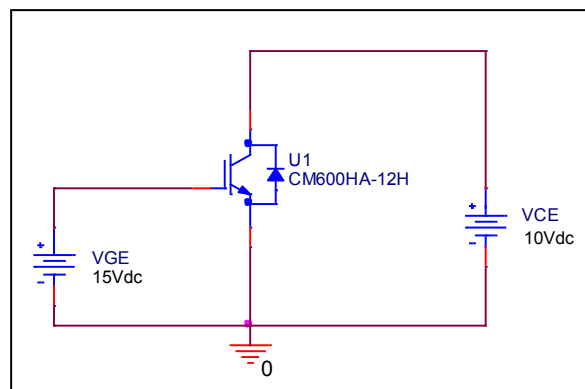


Transfer Characteristics

Circuit Simulation result

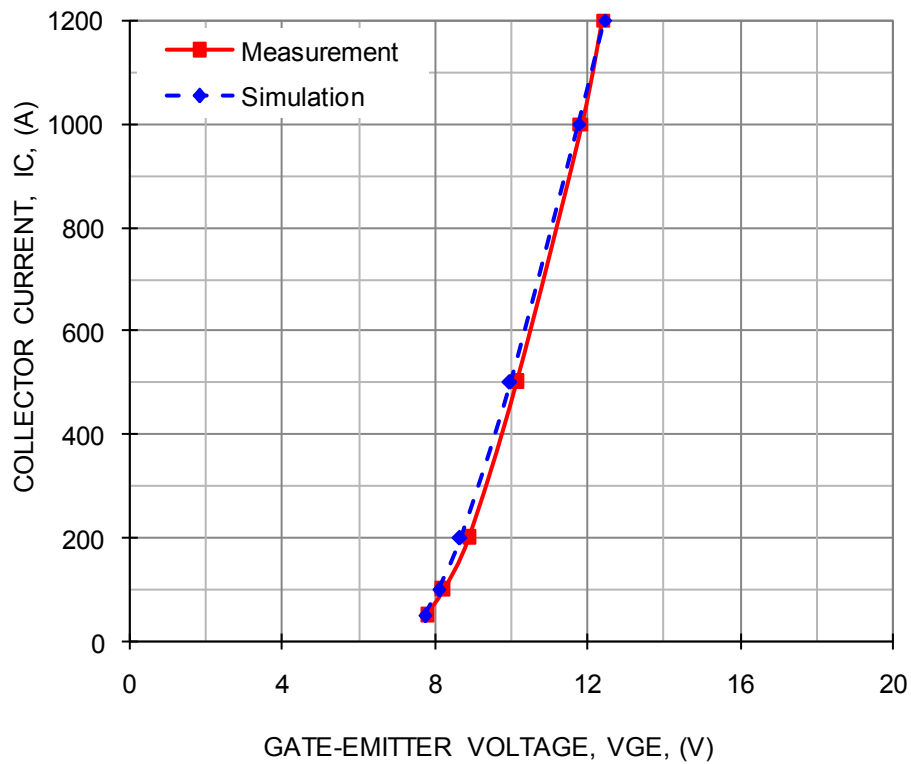


Evaluation circuit



Comparison Graph

Circuit Simulation Result



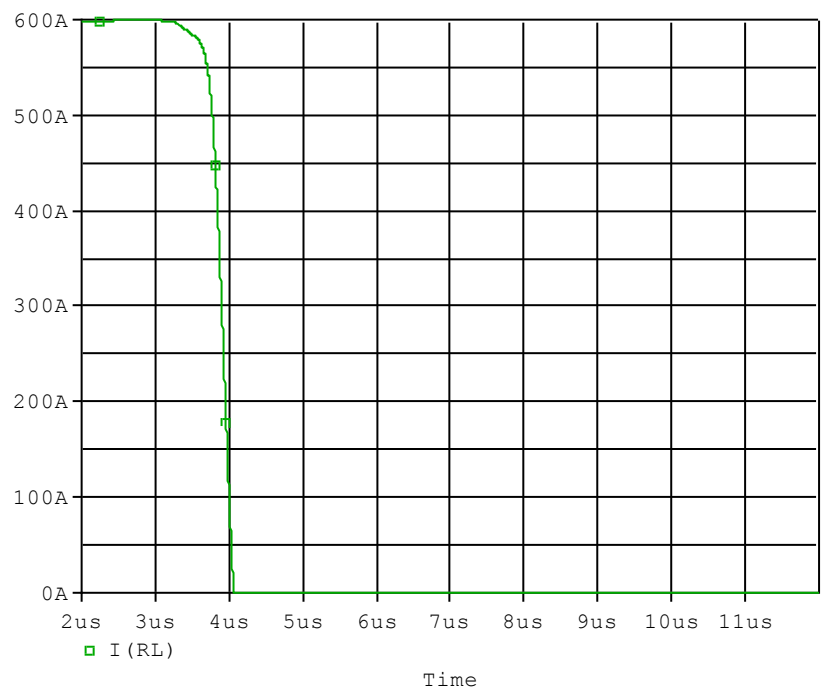
Simulation Result

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

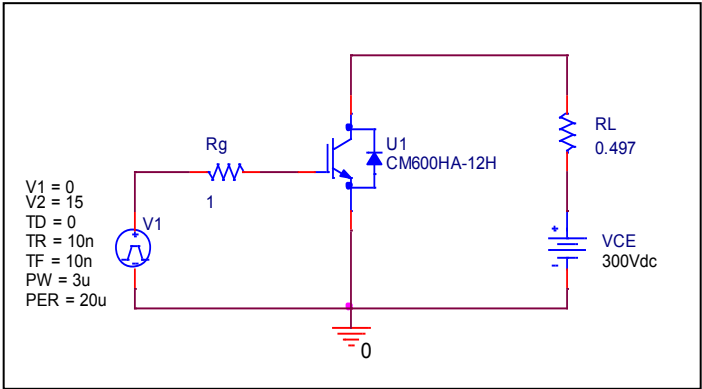
IC (A)	VGE (V)		Error (%)
	Measurement	Simulation	
50	7.800	7.743	-0.73
100	8.250	8.100	-1.81
200	8.900	8.658	-2.72
500	10.150	9.958	-1.89
1000	11.850	11.769	-0.68
1200	12.400	12.447	0.38

Fall Time Characteristics

Circuit Simulation result



Evaluation circuit

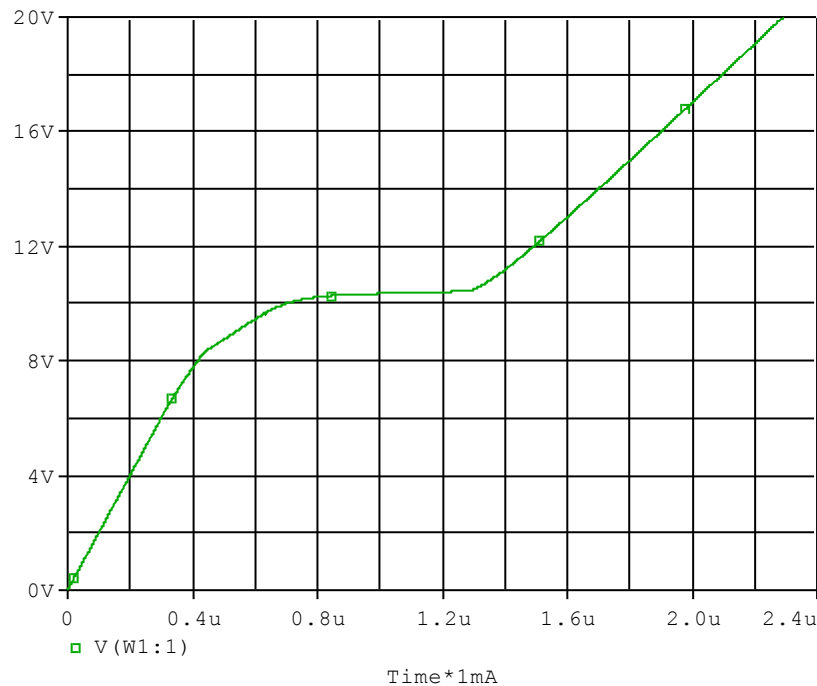


Test condition $I_c=600$ (A), $V_{cc}=300$ (V)

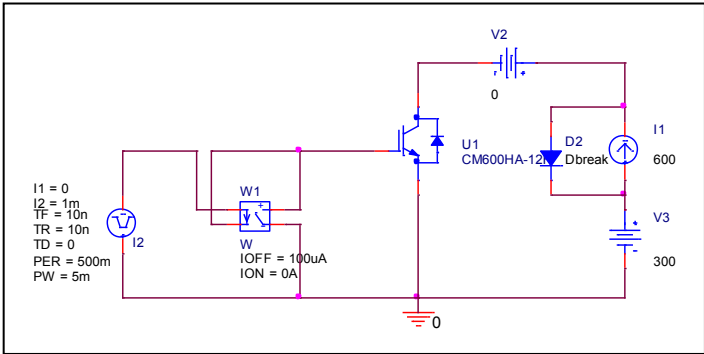
Parameter	Unit	Measurement	Simulation	Error
tf	ns	300.000	299.597	-0.134

Gate Charge Characteristics

Circuit Simulation result



Evaluation circuit

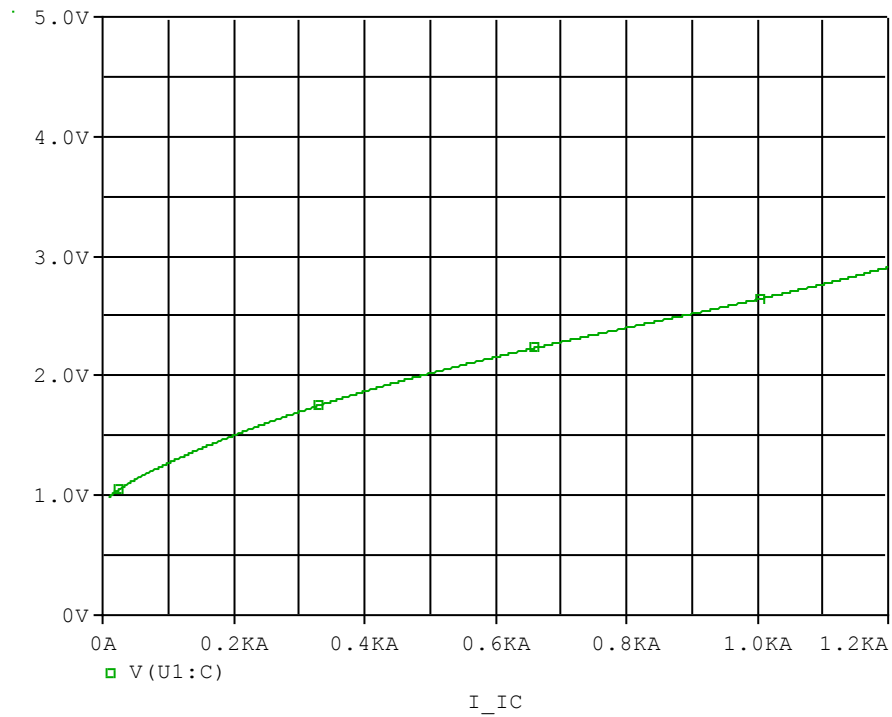


Test condition: $V_{CC}=300\text{ (V)}$, $I_C=600\text{ (A)}$, $V_{GE}=15\text{ (V)}$

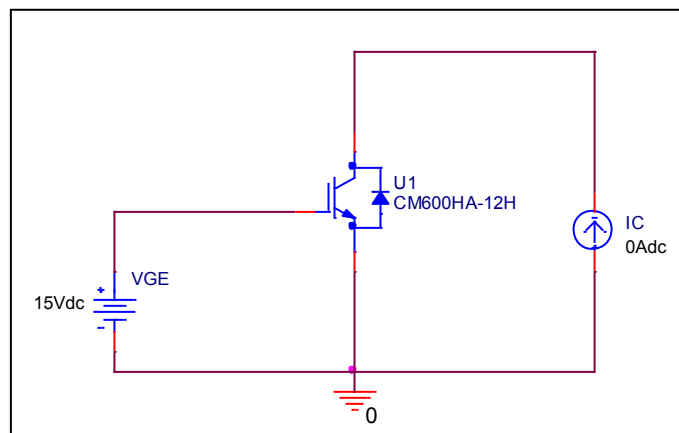
Parameter	Unit	Measurement	Simulation	Error(%)
Qge	nc	400.000	400.446	0.112
Qgc	nc	950.000	913.239	-3.870
Qg	nc	1800.000	1800.700	0.039

Saturation Characteristics

Circuit Simulation result

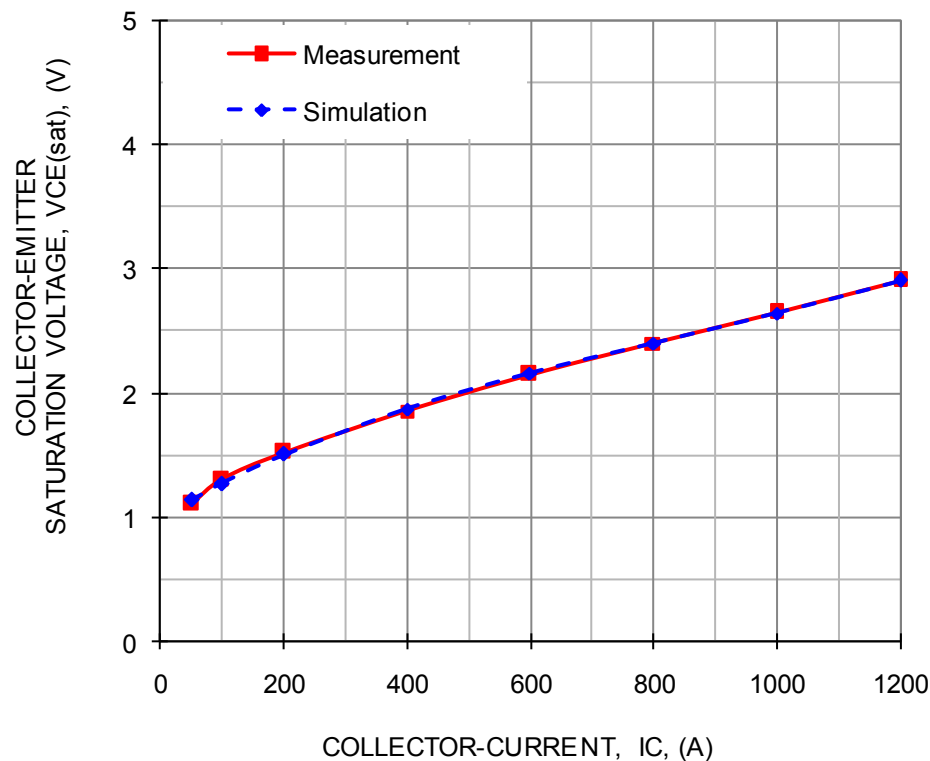


Evaluation circuit



Comparison Graph

Circuit Simulation Result



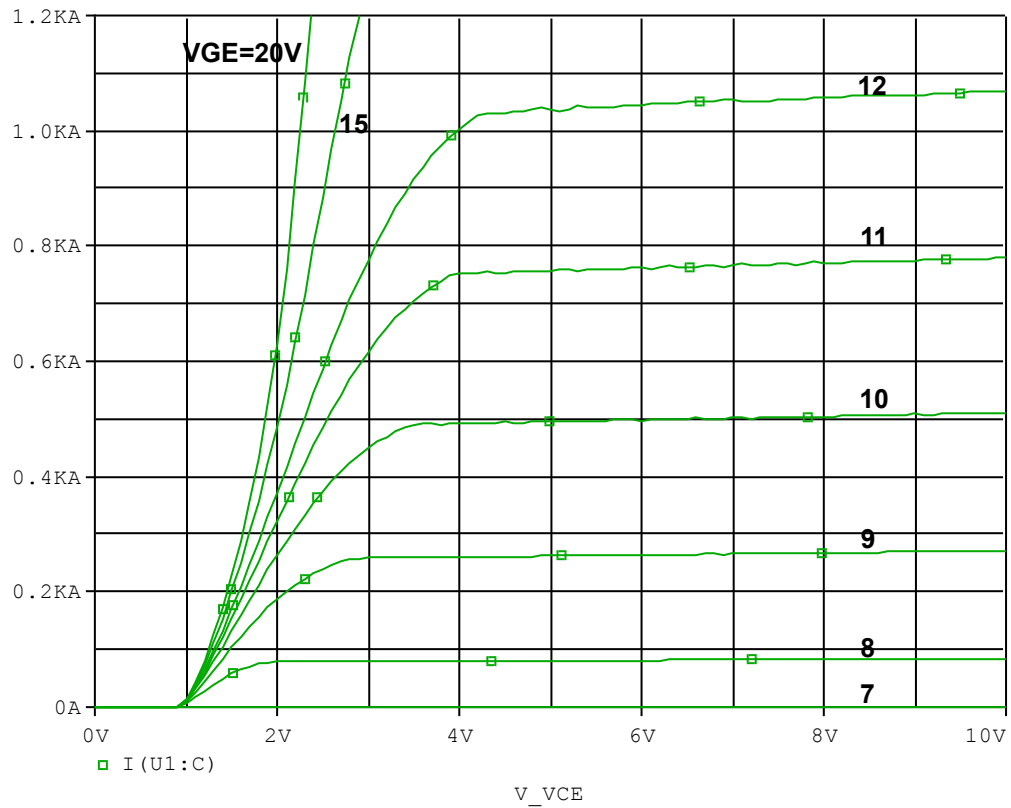
Simulation Result

Test condition: VGE = 15 V

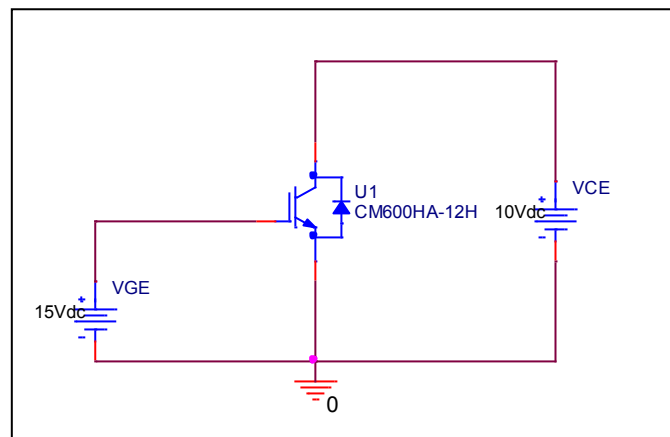
Ic(A)	VCE (V)		Error (%)
	Measurement	Simulation	
50	1.100	1.132	2.95
100	1.300	1.270	-2.35
200	1.520	1.501	-1.27
400	1.850	1.869	1.00
600	2.150	2.156	0.27
800	2.400	2.400	0.01
1000	2.650	2.638	-0.47
1200	2.900	2.906	0.22

Output Characteristics

Circuit Simulation result

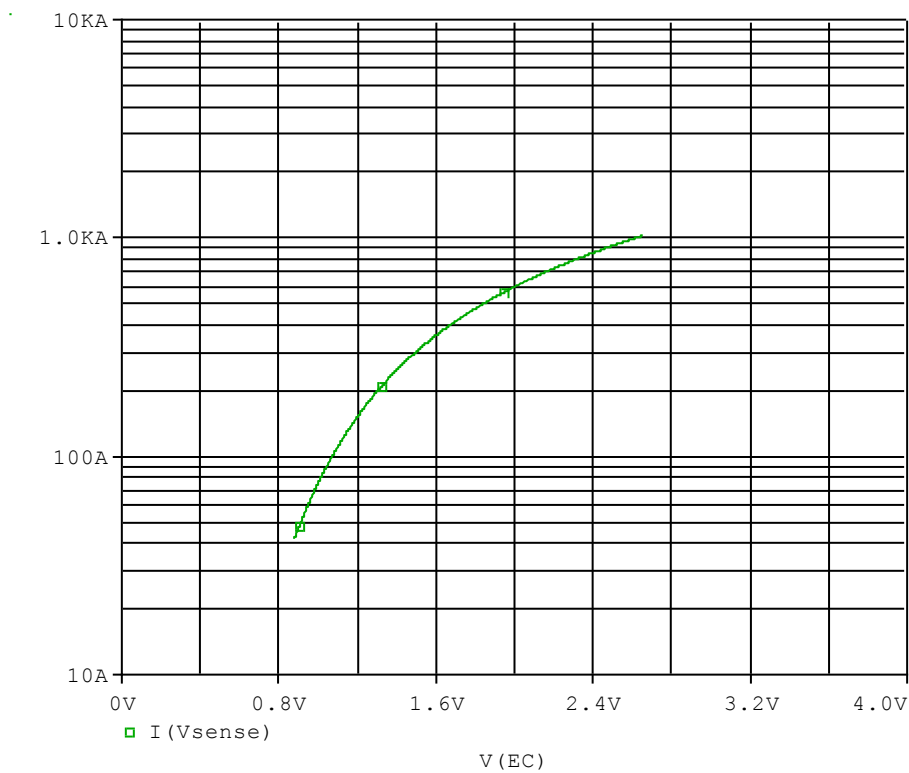


Evaluation circuit

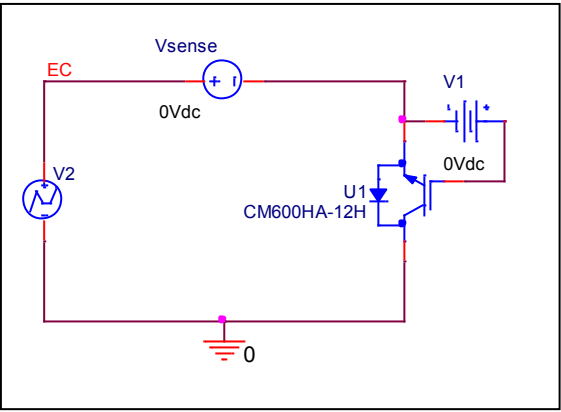


Forward Current Characteristic

Circuit Simulation Result

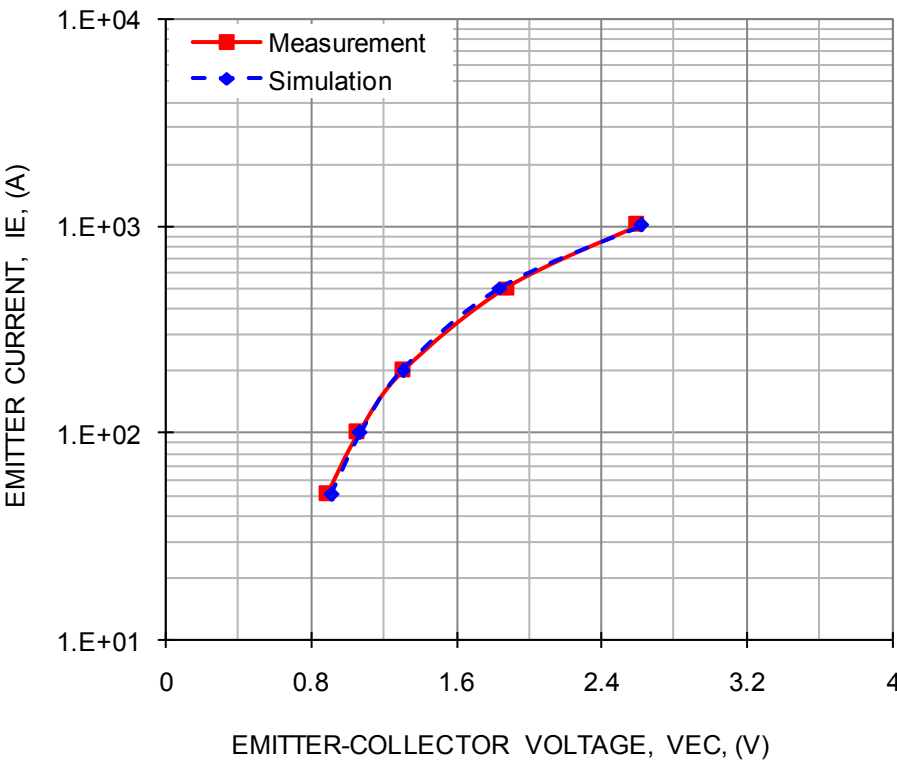


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

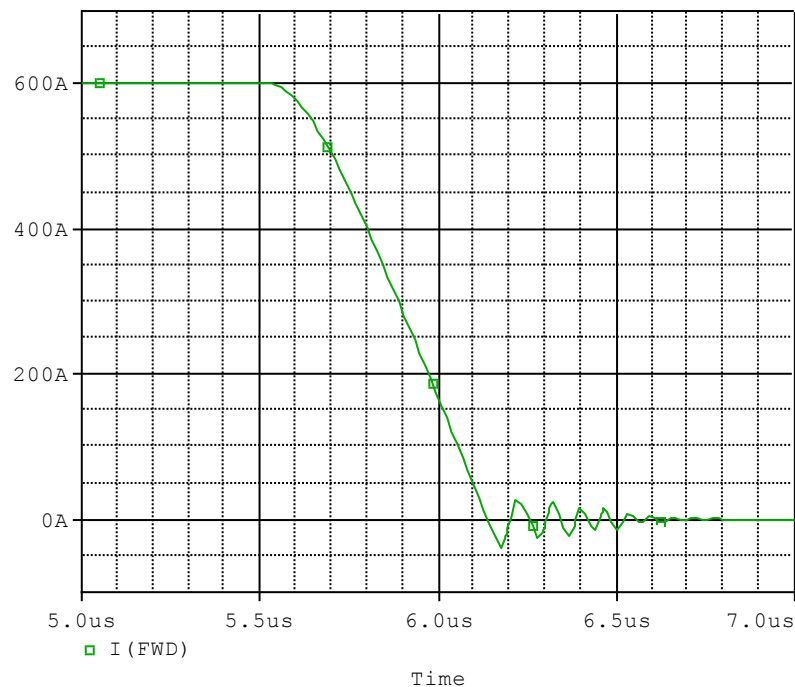


Simulation Result

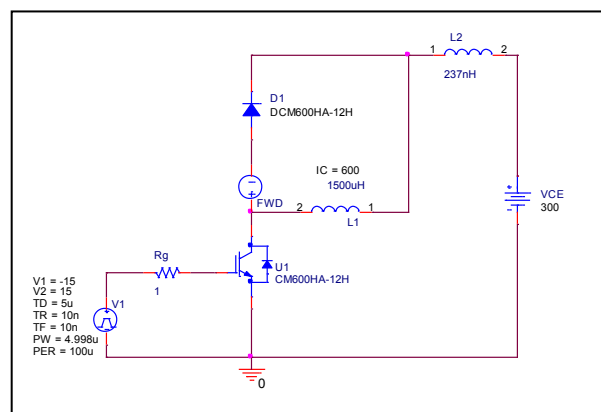
IE(A)	VEC(V)		%Error
	Measurement	Simulation	
50	0.890	0.912	2.50
100	1.060	1.072	1.11
200	1.310	1.304	-0.44
500	1.880	1.842	-2.04
1000	2.600	2.619	0.74

Reverse Recovery Characteristics

Circuit Simulation result



Evaluation circuit



Test condition: $V_{CC}=300$ (V), $I_C=600$ (A) , $V_{GE}=\pm 15$ (V)

Parameter	Unit	Measurement	Simulation	Error(%)
trr	nsec	41.000	40.429	-1.39
Irr	A	80.000	61.046	-23.69