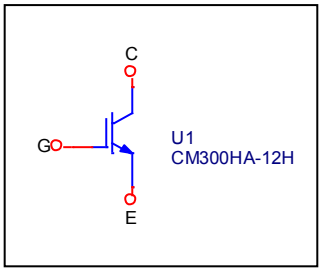
Device Modeling Report

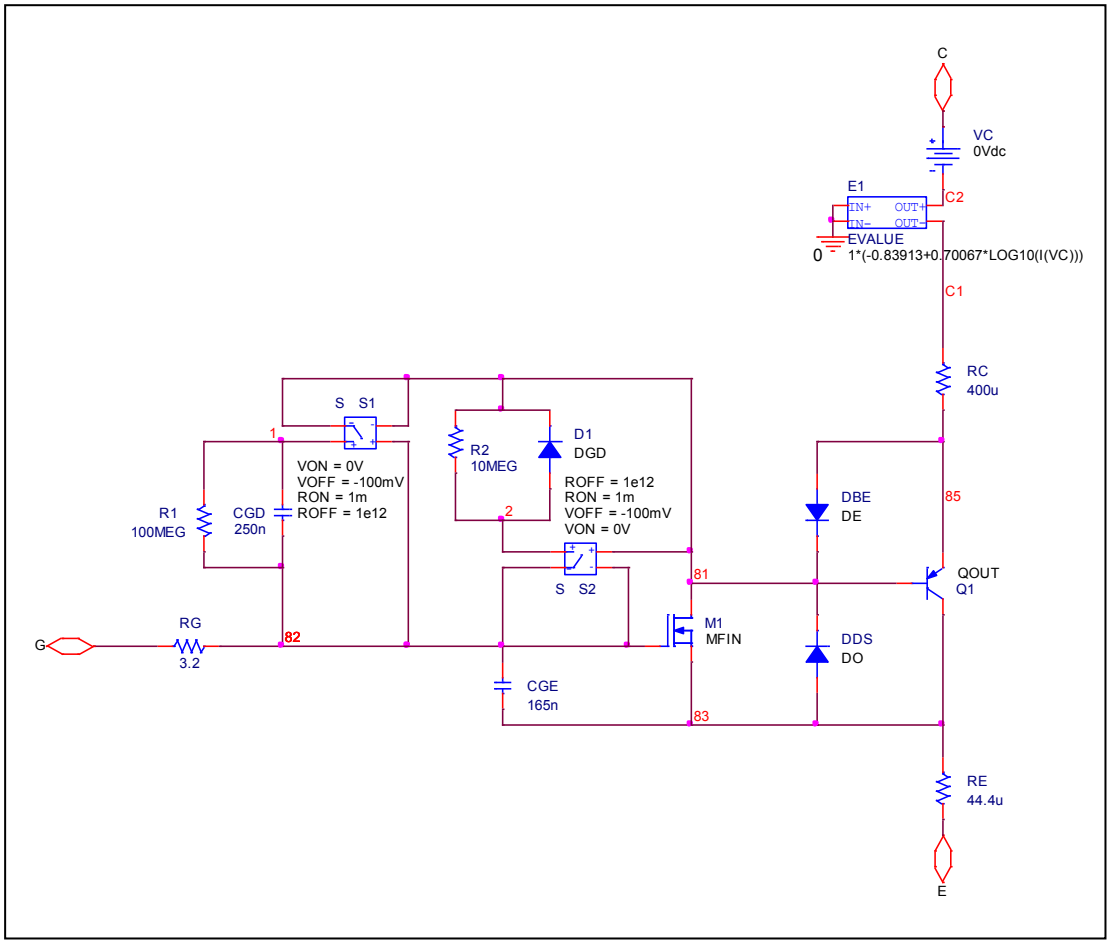
COMPONENTS: Insulated Gate Bipolar Transistor (IGBT)
PART NUMBER: CM300HA-12H
MANUFACTURER: MITSUBISHI
*REMARK: Free-Wheeling Diode Professional Model

Bee Technologies Inc.

Circuit Configuration

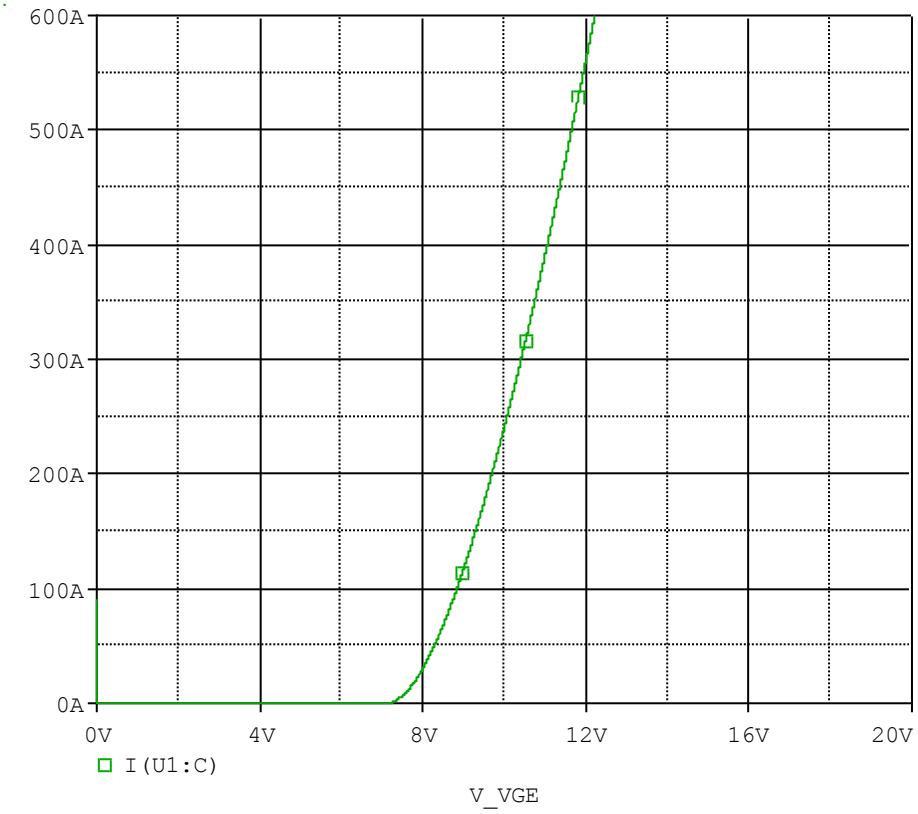


IGBT Subcircuit

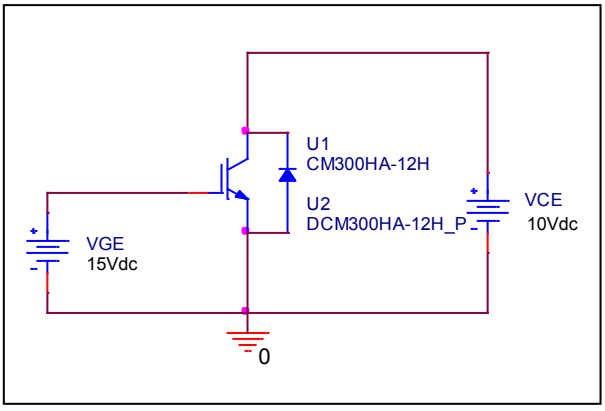


Transfer Characteristics

Circuit Simulation result

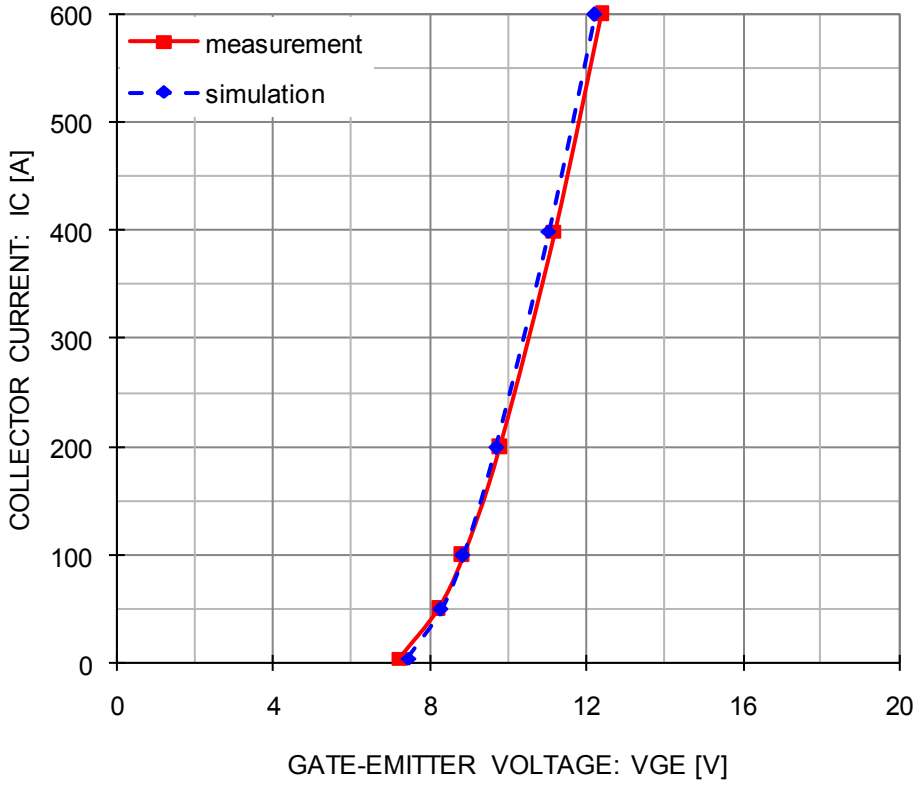


Evaluation circuit



Comparison Graph

Circuit Simulation Result



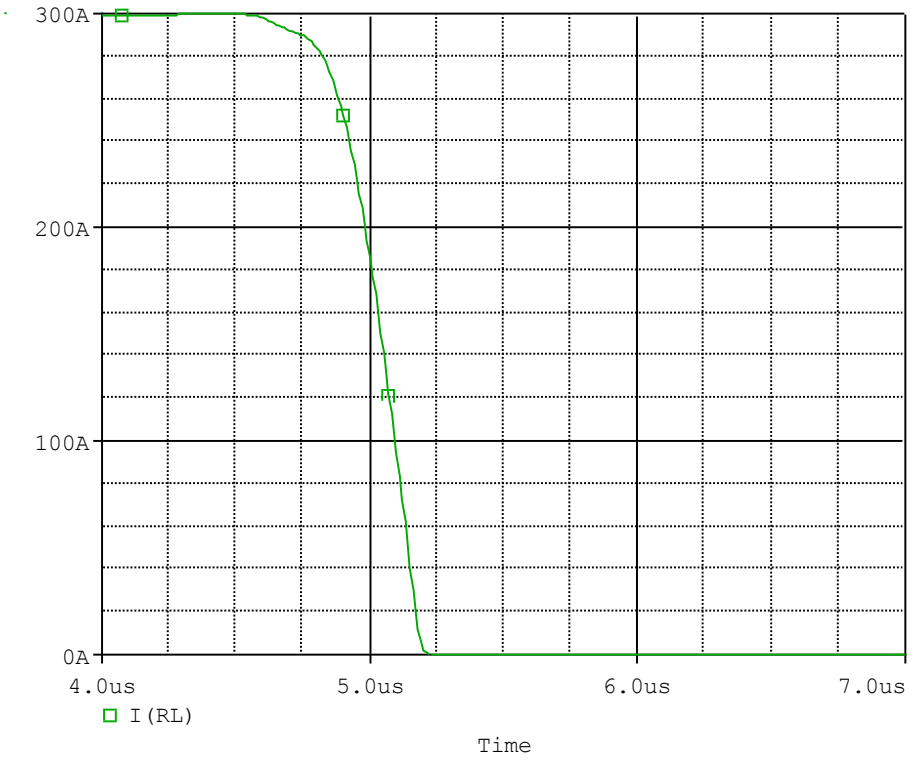
Simulation Result

Test condition: V_{CE} = 10 V

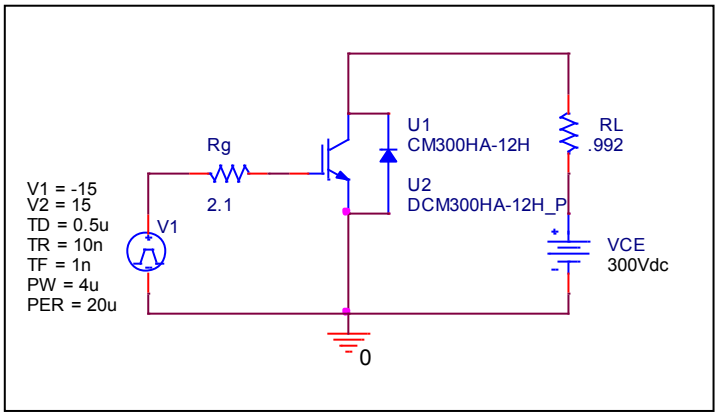
IC (A)	VGE (V)		Error (%)
	Measurement	Simulation	
5	7.250	7.448	2.73
50	8.200	8.280	0.98
100	8.850	8.837	-0.15
200	9.800	9.695	-1.07
400	11.200	11.053	-1.31
600	12.400	12.218	-1.47

Fall Time Characteristics

Circuit Simulation result



Evaluation circuit

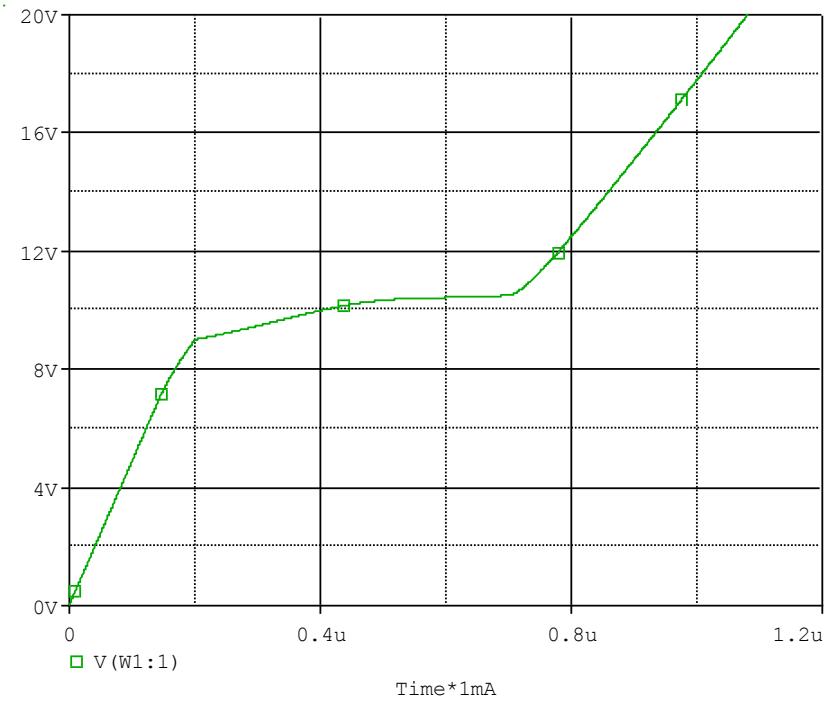


Test condition Ic=300 (A), Vcc=300(V)

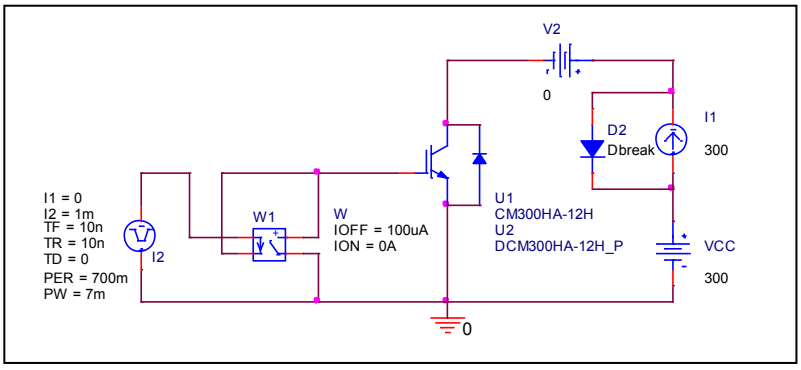
Parameter	Unit	Measurement	Simulation	Error
tf	ns	300.000	303.571	1.190

Gate Charge Characteristics

Circuit Simulation result



Evaluation circuit

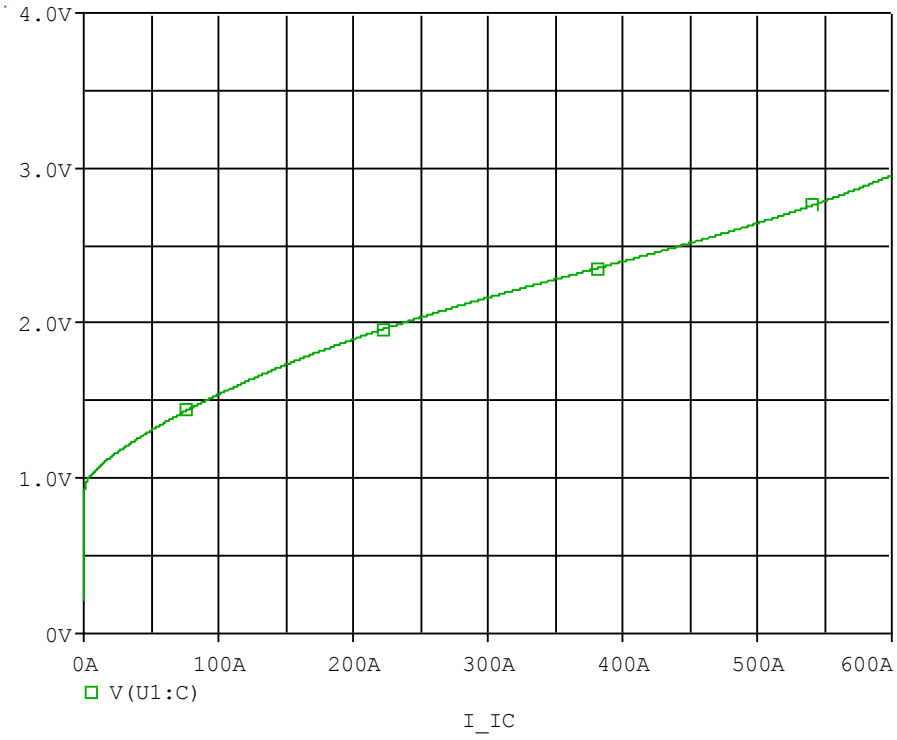


Test condition: V_{CC}=300 (V), I_C=300(A) ,V_{GE}=15(V)

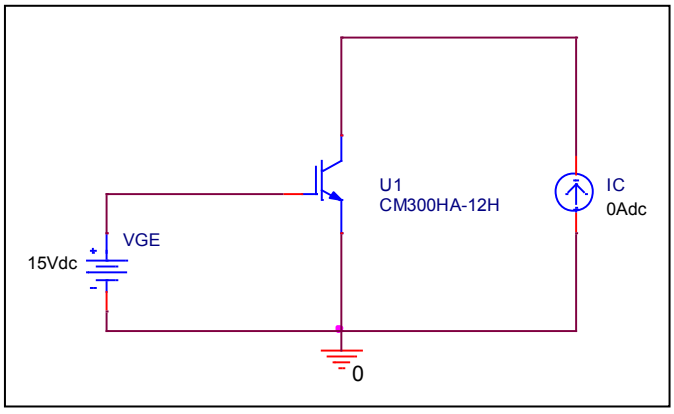
Parameter	Unit	Measurement	Simulation	Error(%)
Qge	nc	200.000	202.857	1.429
Qgc	nc	500.000	502.857	0.571
Qg	nc	900.000	897.655	-0.261

Saturation Characteristics

Circuit Simulation result

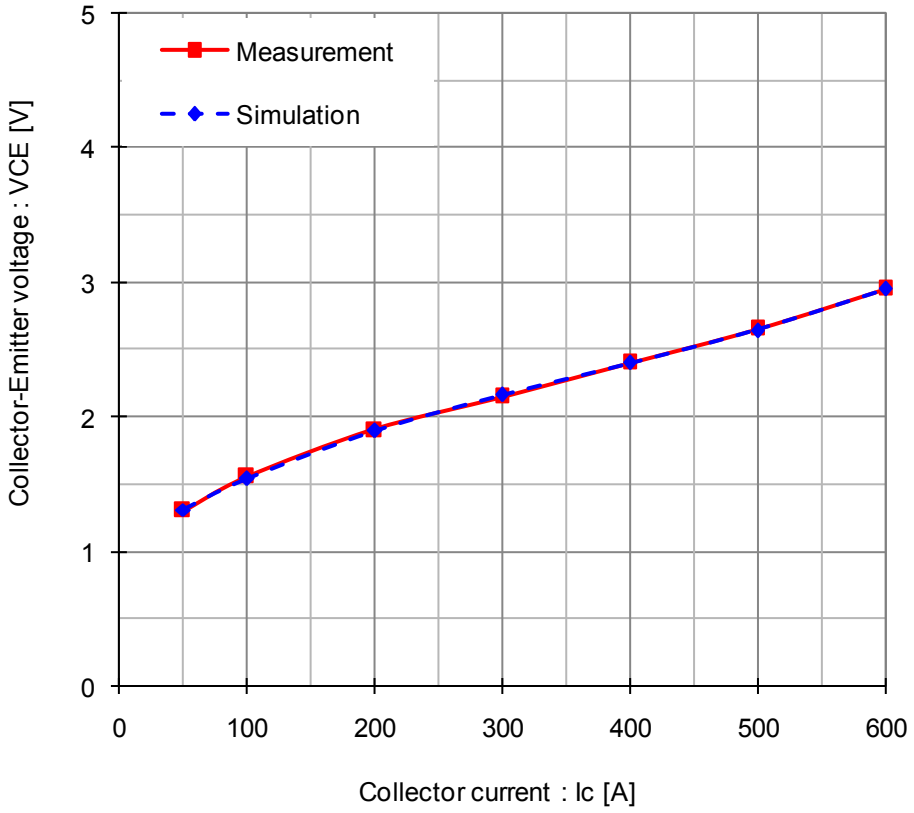


Evaluation circuit



Comparison Graph

Circuit Simulation Result



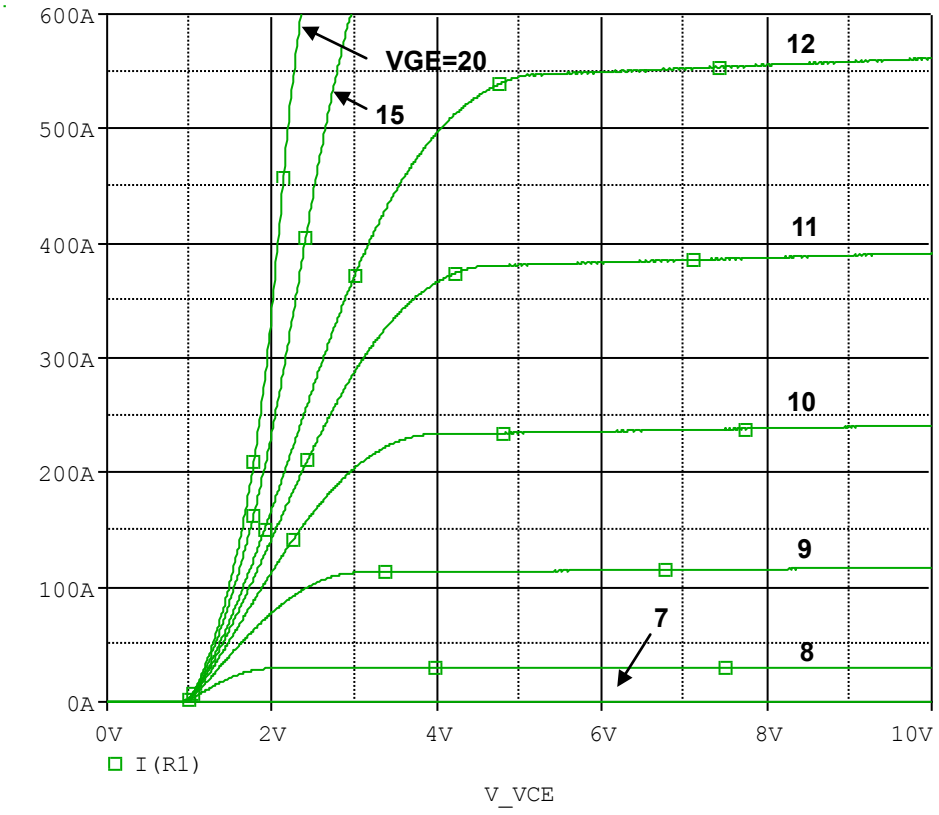
Simulation Result

Test condition: V_{GE} = 15 V

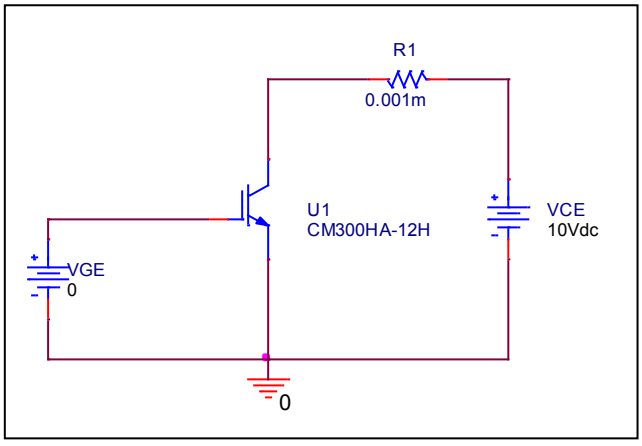
Ic(A)	VCE (V)		Error (%)
	Measurement	Simulation	
50	1.300	1.308	0.62
100	1.550	1.540	-0.65
200	1.900	1.896	-0.24
300	2.150	2.164	0.66
400	2.400	2.397	-0.12
500	2.650	2.643	-0.25
600	2.950	2.953	0.10

Output Characteristics

Circuit Simulation result

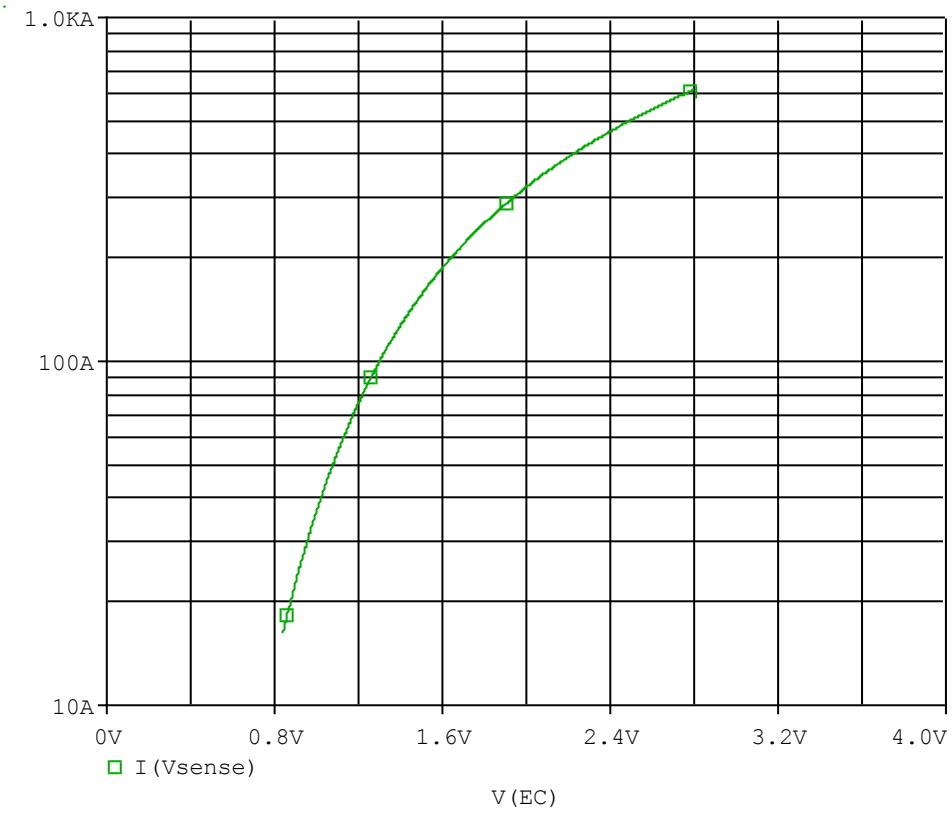


Evaluation circuit

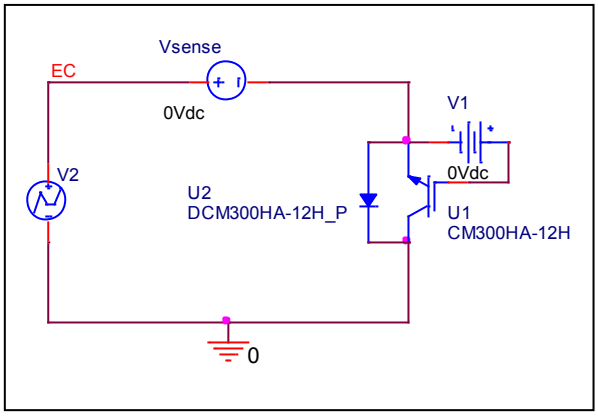


Forward Current Characteristic

Circuit Simulation Result

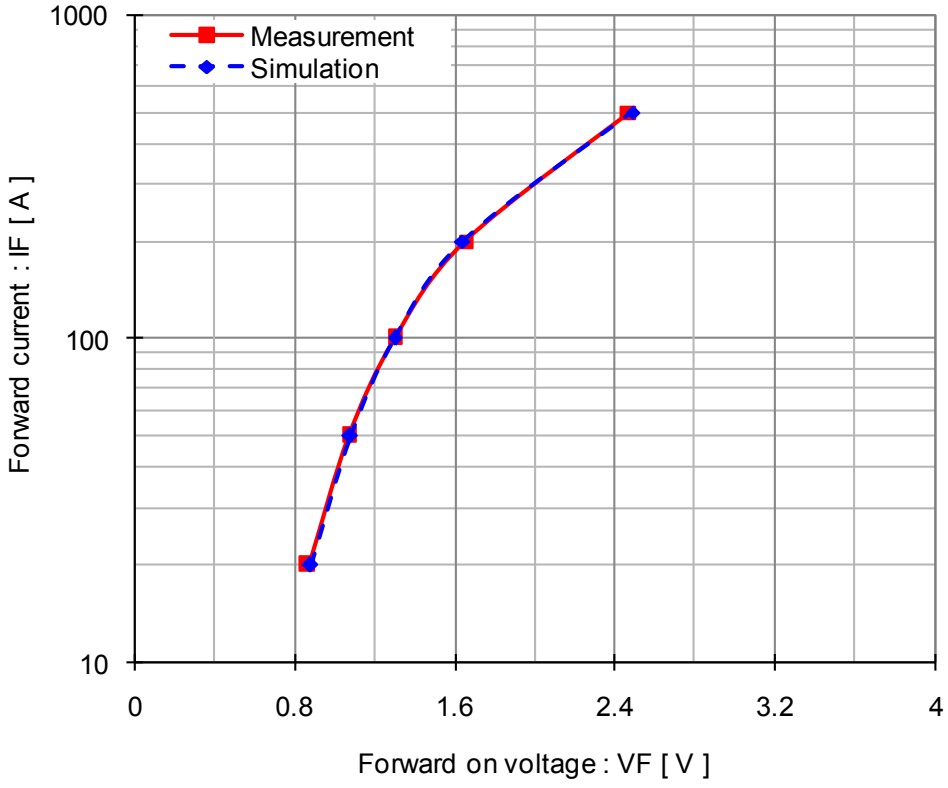


Evaluation Circuit



Comparison Graph

Circuit Simulation Result

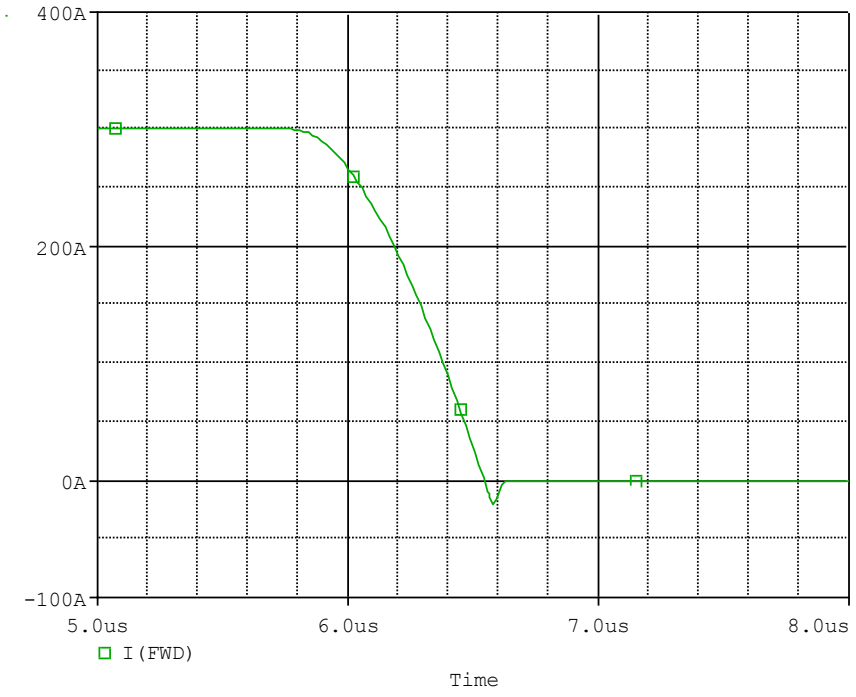


Simulation Result

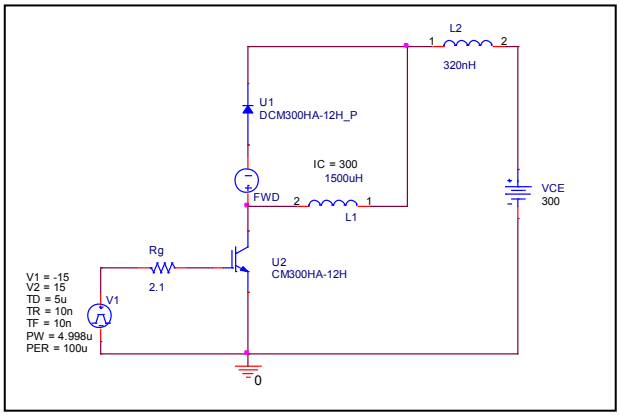
IE(A)	VEC(V)		%Error
	Measurement	Simulation	
20	0.865	0.876	1.27
50	1.070	1.077	0.65
100	1.300	1.299	-0.08
200	1.655	1.641	-0.85
500	2.475	2.491	0.63

Reverse Recovery Characteristics

Circuit Simulation result



Evaluation circuit



Test condition: V_{CC}=300 (V), I_C=300(A) ,V_{GE}=±15(V)

Parameter	Unit	Measurement	Simulation	Error(%)
trr	nsec	80	76.839	-3.95
Irr	A	20	19.965	-0.18