

TOSHIBA INTEGRATED IGBT MODULE SILICON N CHANNEL IGBT

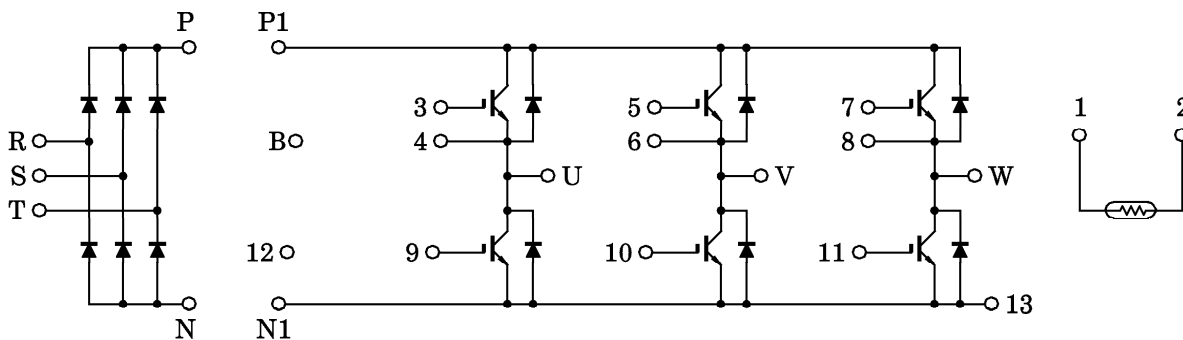
# MIG15Q806H, MIG15Q806HA

HIGH POWER SWITCHING APPLICATIONS

MOTOR CONTROL APPLICATIONS

- Integrates Inverter, Converter Power Circuits and Thermistor in One Package.
- Output (Inverter Stage) : 3 $\phi$  15 A / 1200 V IGBT
- Input (Converter Stage) : 3 $\phi$  15 A / 1600 V Silicon Rectifier
- The Electrodes are Isolated from Case.
- Weight : 190 g
- Outline
  - MIG15Q806H : 2-108E5A
  - MIG15Q806HA : 2-108E6A

EQUIVALENT CIRCUIT

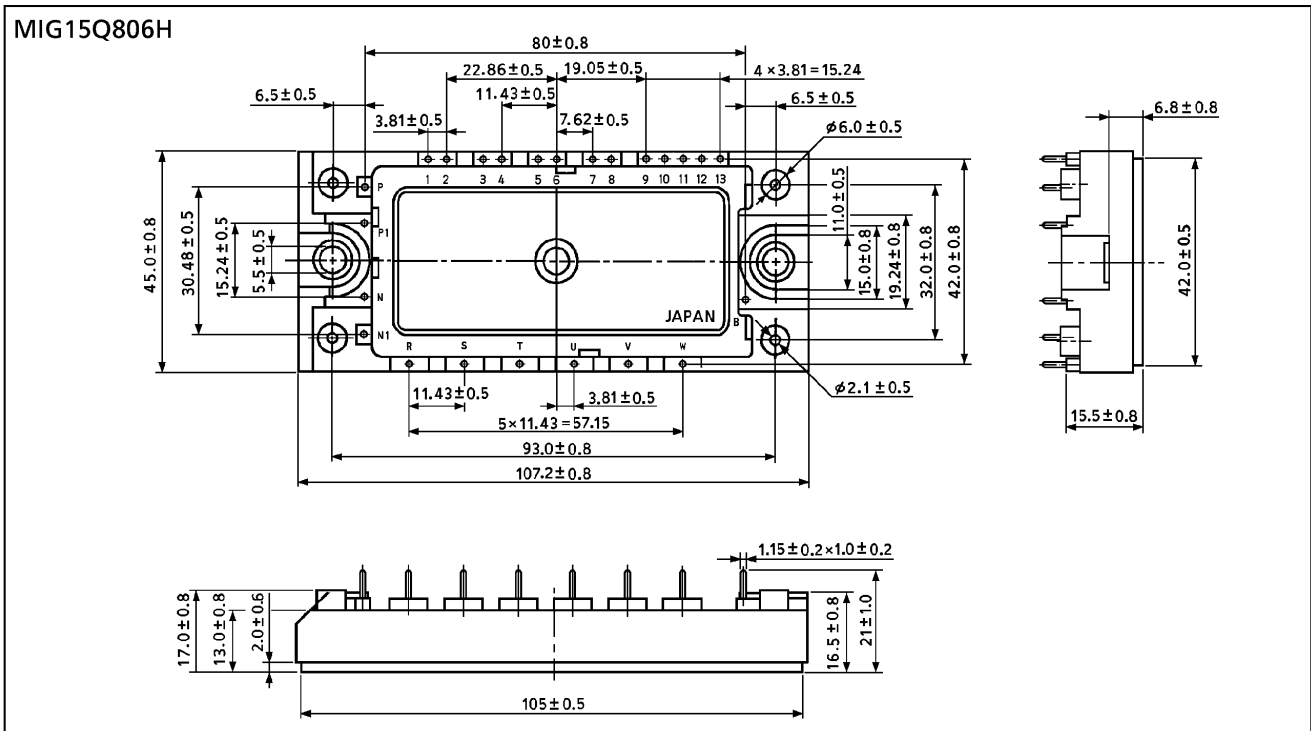


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**Package Dimension**

Unit : mm



MAXIMUM RATINGS (Ta = 25°C)

STAGE	CHARACTERISTIC		SYMBOL	RATING	UNIT
Inverter	Collector-Emitter Voltage		V <sub>CES</sub>	1200	V
	Gate-Emitter Voltage		V <sub>GES</sub>	±20	V
	Collector Current	DC	I <sub>C</sub>	25 / 15	A
		1 ms	I <sub>CP</sub>	50 / 30	A
	Forward Current	DC	I <sub>F</sub>	15	A
		1 ms	I <sub>FM</sub>	30	A
Collector Power Dissipation (T <sub>c</sub> = 25°C)			P <sub>C</sub>	145	W
Converter	Repetitive Peak Reverse Voltage		V <sub>RRM</sub>	1600	V
	Average Output Rectified Current		I <sub>O</sub>	15	A
	Peak One Cycle Surge Forward Current (50 Hz, Non-Repetitive)		I <sub>FSM</sub>	250	A
Module	Junction Temperature		T <sub>j</sub>	150	°C
	Storage Temperature Range		T <sub>stg</sub>	-40~125	°C
	Isolation Voltage		V <sub>Isol</sub>	2500 (AC 1 minute)	V
	Screw Torque		—	6	N·m

(25°C / 80°C)  
(25°C / 80°C)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

a. Inverter stage

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I <sub>GES</sub>	V <sub>GE</sub> = ±20 V, V <sub>CE</sub> = 0	—	—	±500	nA
Collector Cut-Off Current		I <sub>CES</sub>	V <sub>CE</sub> = 1200 V, V <sub>GE</sub> = 0	—	—	0.5	mA
Gate-Emitter Cut-Off Voltage		V <sub>GE (off)</sub>	I <sub>C</sub> = 15 mA, V <sub>CE</sub> = 5 V	—	6.0	—	V
Collector-Emitter Saturation Voltage		V <sub>CE (sat)</sub>	I <sub>C</sub> = 15 A    T <sub>j</sub> = 25°C	—	2.8	3.2	V
			V <sub>GE</sub> = 15 V    T <sub>j</sub> = 125°C	—	3.1	3.7	
Input Capacitance		C <sub>ies</sub>	V <sub>CE</sub> = 10 V, V <sub>GE</sub> = 0, f = 1 MHz	—	1850	—	pF
Switching Time	Rise Time	t <sub>r</sub>	V <sub>CC</sub> = 600 V	—	0.07	0.15	μs
	Turn-On Time	t <sub>on</sub>	I <sub>C</sub> = 15 A	—	0.15	0.30	
	Fall Time	t <sub>f</sub>	V <sub>GE</sub> = ±15 V	—	0.07	0.10	
	Turn-Off Time	t <sub>off</sub>	R <sub>G</sub> = 82 Ω T <sub>j</sub> = 125°C (Note 1)	—	0.60	0.90	
Forward Voltage		V <sub>F</sub>	I <sub>F</sub> = 15 A, V <sub>GE</sub> = 0	—	2.0	2.8	V
Reverse Recovery Time		t <sub>rr</sub>	I <sub>F</sub> = 15 A, V <sub>GE</sub> = -10 V, di / dt = 200 A / μs	—	0.10	0.25	μs
Thermal Resistance		R <sub>th (j-e)</sub>	Transistor	—	—	0.86	°C / W
			Diode	—	—	1.5	

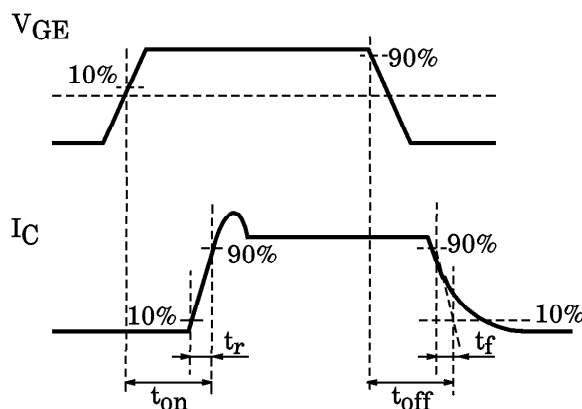
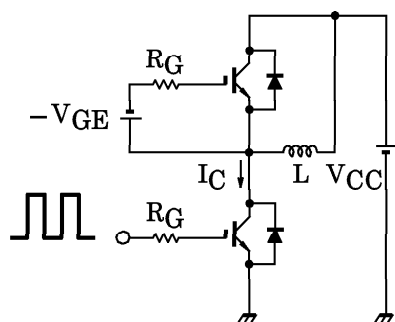
b. Converter stage

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Repetitive Peak Reverse Current	$I_{RRM}$	$V_{RRM} = 1600\text{ V}$	—	—	50	$\mu\text{A}$
Peak Forward Voltage	$V_{FM}$	$I_{FM} = 15\text{ A}$	—	1.05	1.20	V
Peak One Cycle Surge Forward Current	$I_{FSM}$	50 Hz sine-half-wave	250	—	—	A
Thermal Resistance	$R_{th(j-c)}$	—	—	—	1.90	$^{\circ}\text{C/W}$

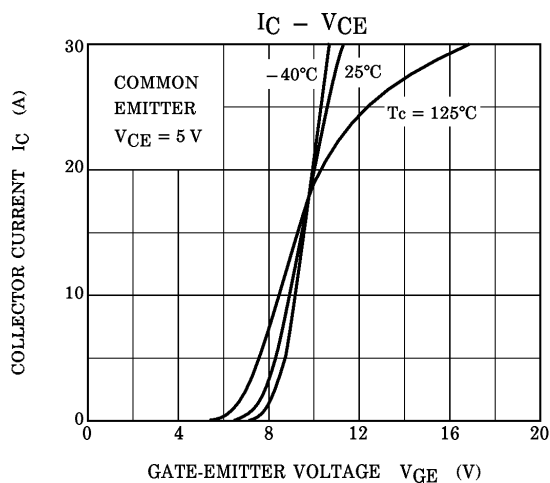
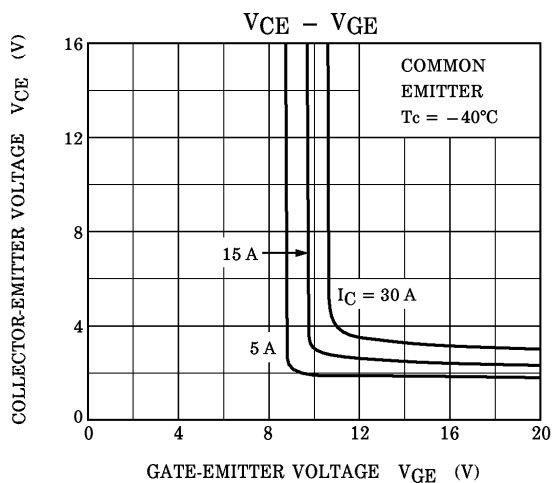
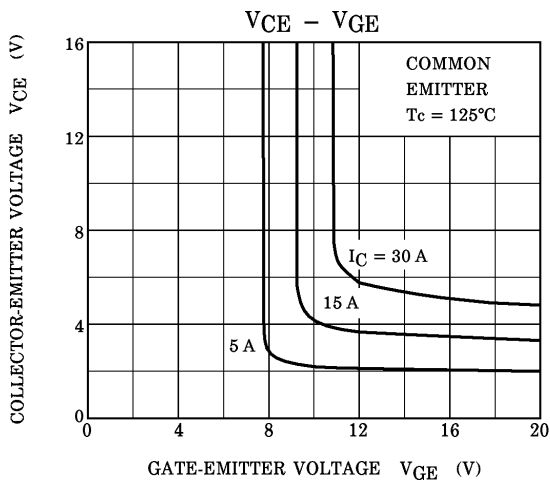
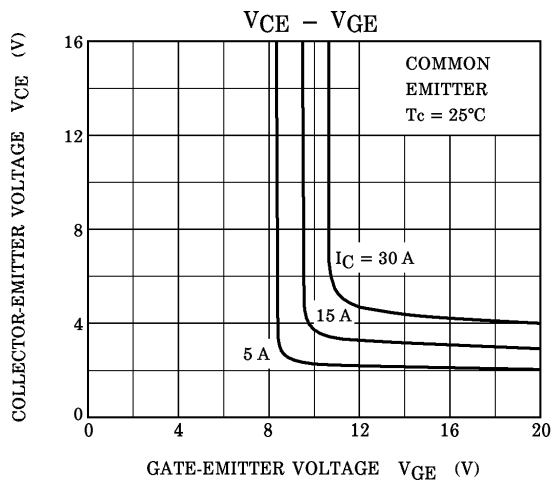
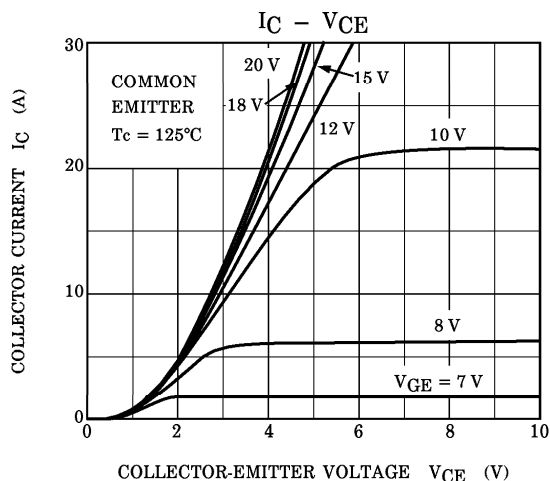
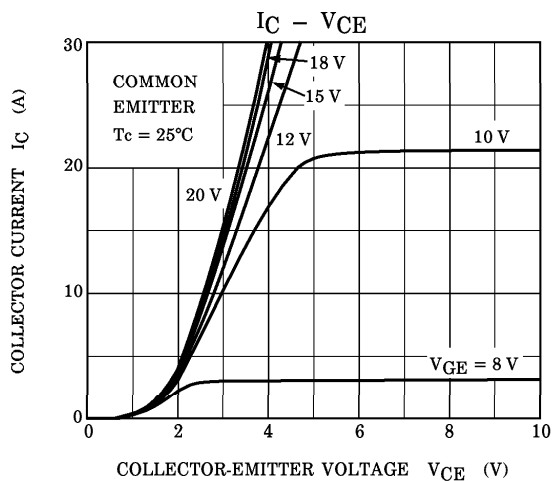
c. Thermistor

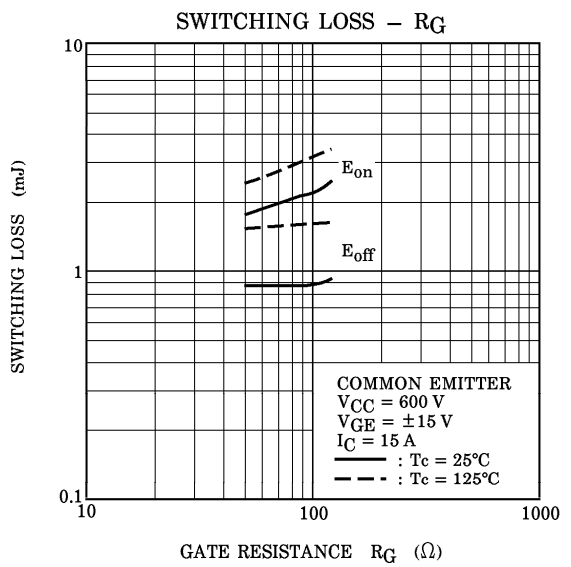
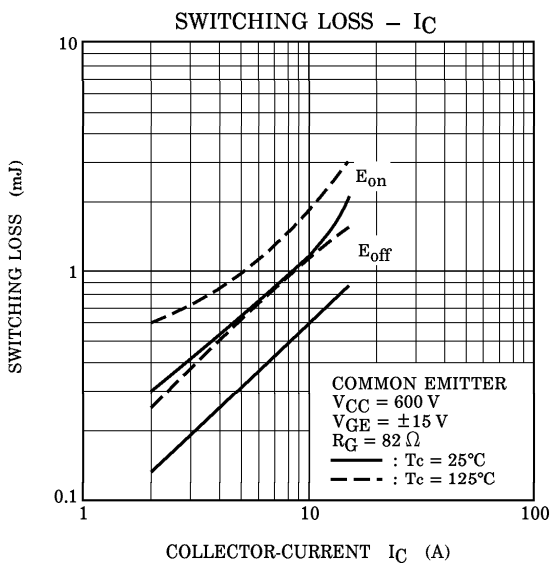
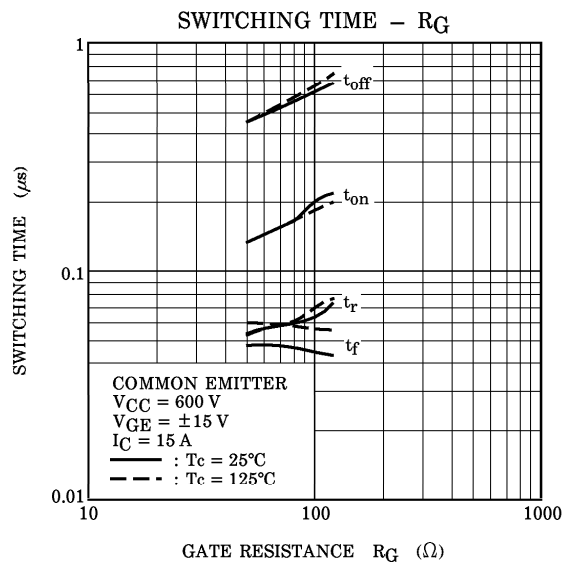
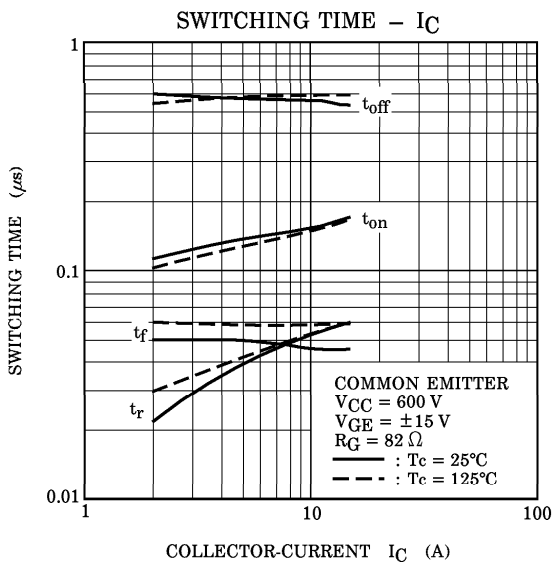
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Zero-Power Resistance	$R_{25}$	$I_{TM} = 0.2\text{ mA}$ , $T_c = 25^{\circ}\text{C}$	17.31	20	23.14	$\text{k}\Omega$
B Value	$B_{25/85}$	$T_c = 25^{\circ}\text{C} / T_c = 85^{\circ}\text{C}$	—	3760	—	K

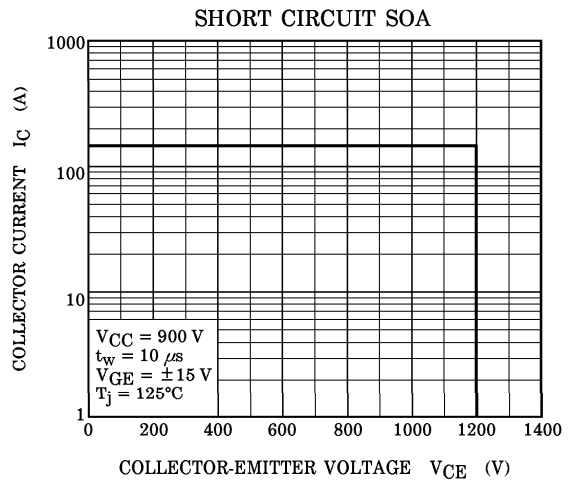
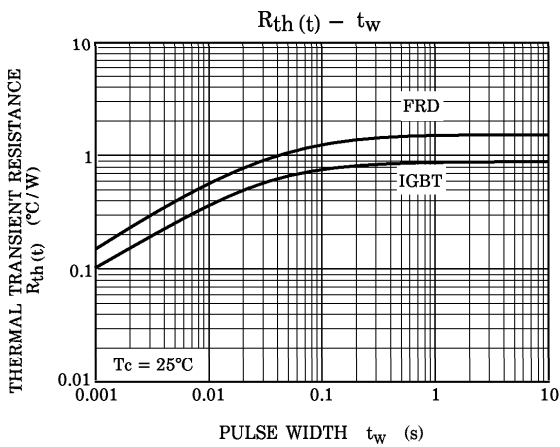
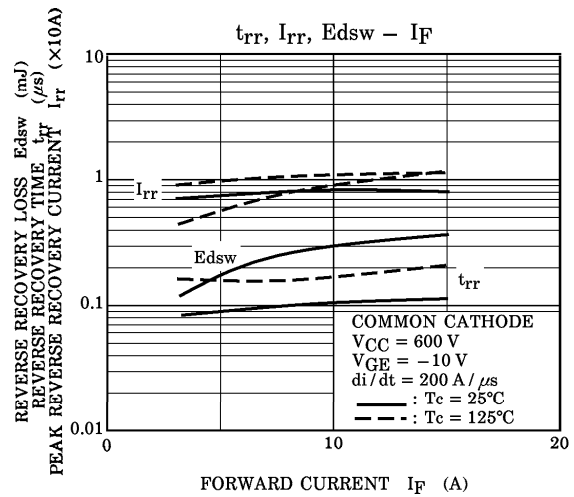
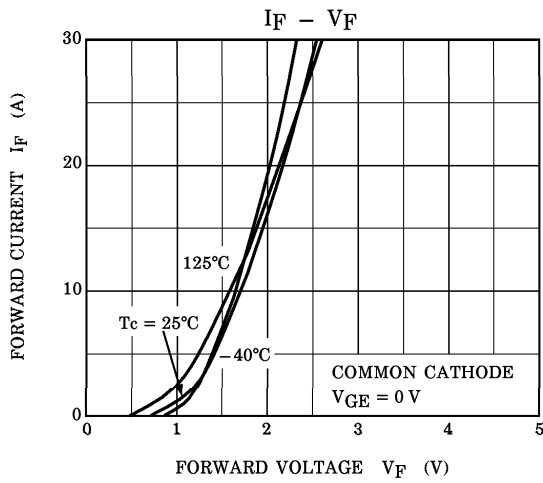
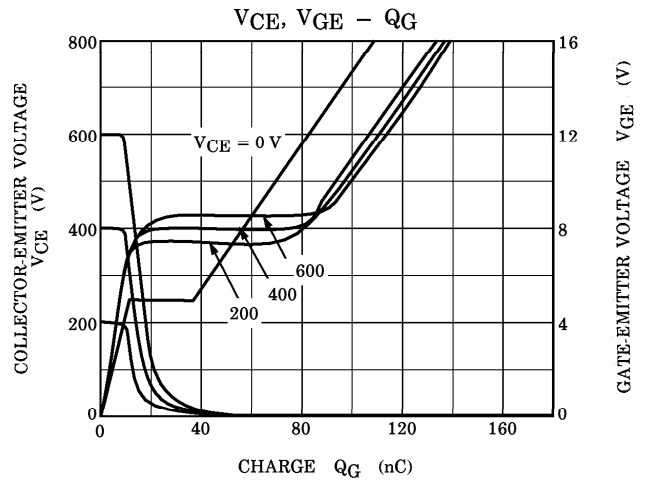
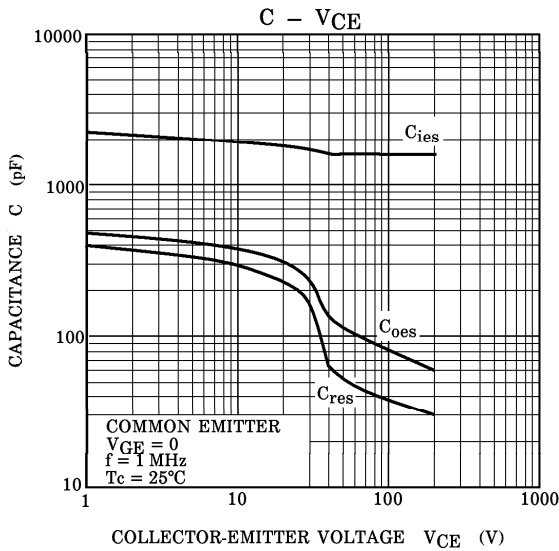
(Note 1) : Switching Time Test Circuit & Timing Chart

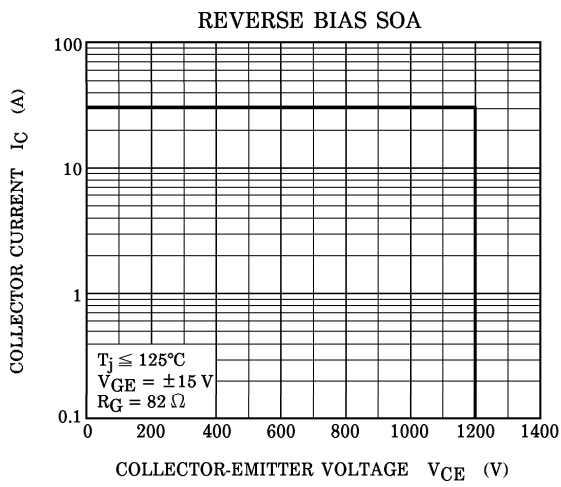


a. Inverter stage









**b. Converter stage**

