

TOSHIBA INTEGRATED IGBT MODULE SILICON N CHANNEL IGBT

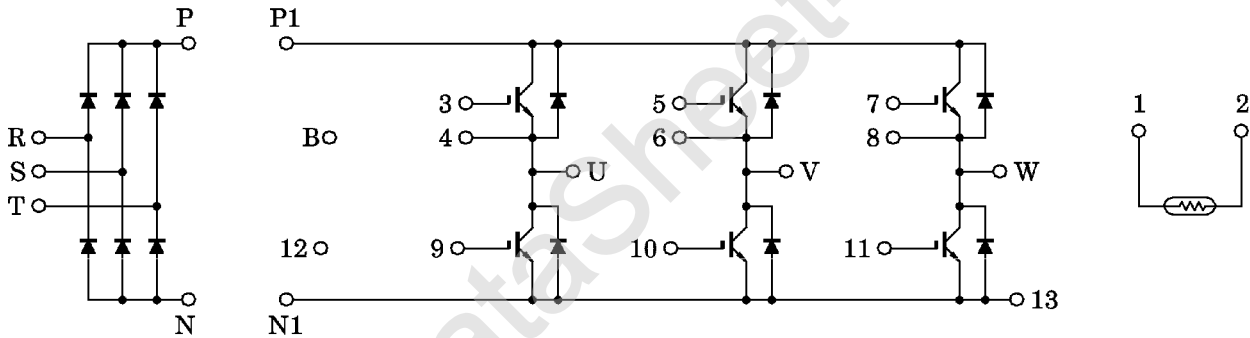
# MIG10Q806H, MIG10Q806HA

HIGH POWER SWITCHING APPLICATIONS

MOTOR CONTROL APPLICATIONS

- Integrates Inverter, Converter Power Circuits and Thermistor in One Package.
- Output (Inverter Stage) : 3 $\phi$  10 A / 1200 V IGBT
- Input (Converter Stage) : 3 $\phi$  15 A / 1600 V Silicon Rectifier
- The Electrodes are Isolated from Case.
- Outline
  - MIG10Q806H : 2-108E5A
  - MIG10Q806HA : 2-108E6A
- Weight : 190 g

EQUIVALENT CIRCUIT



961001EAA2

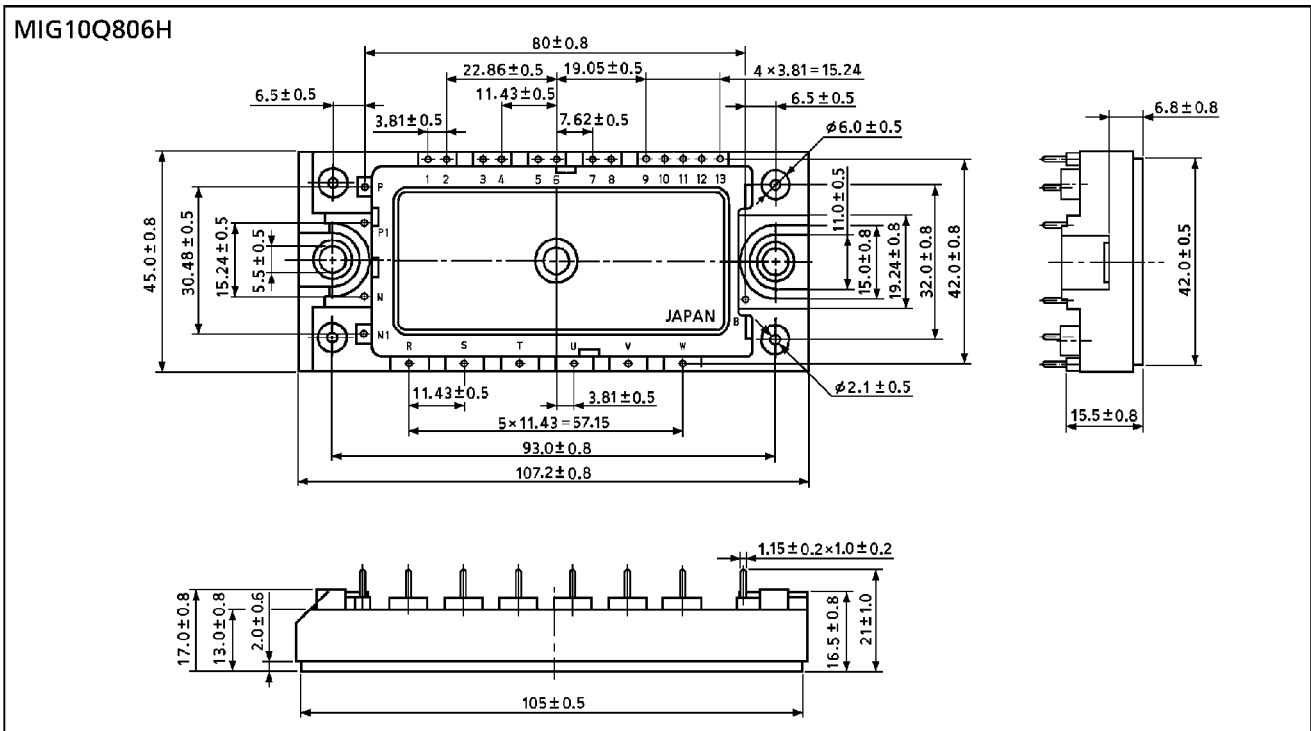
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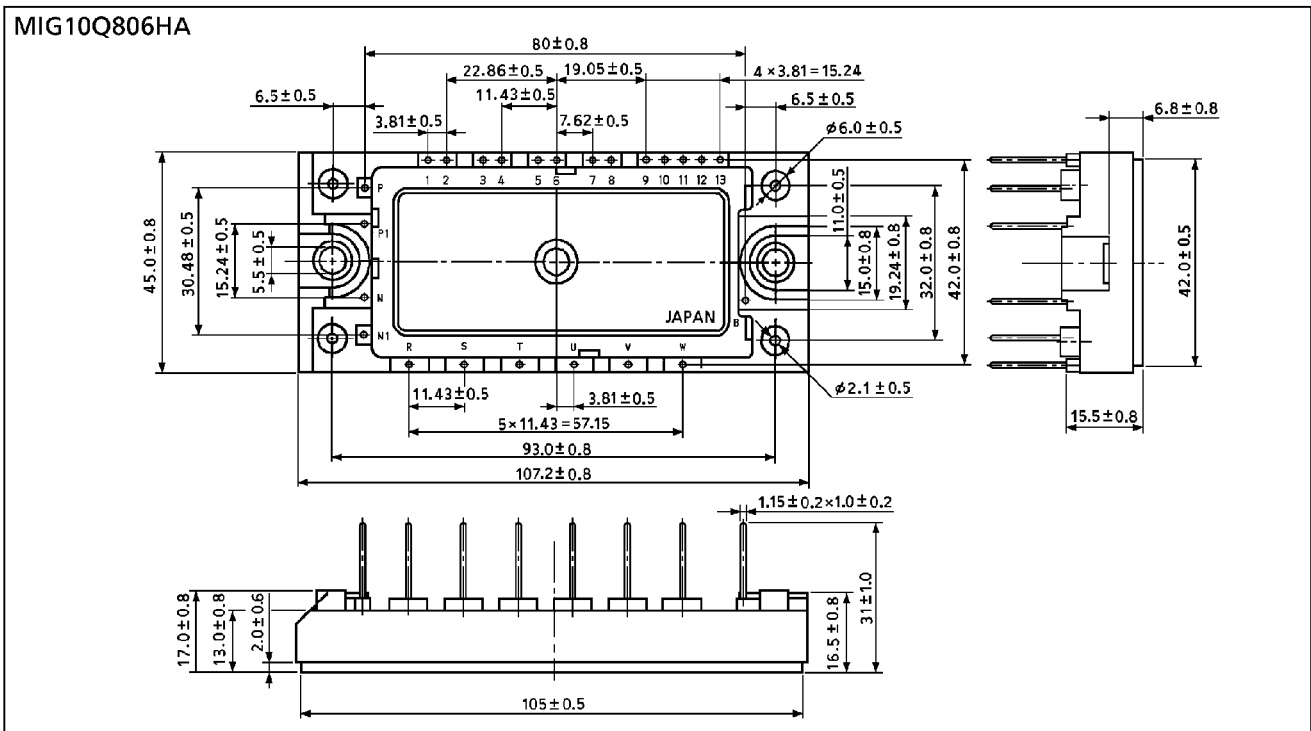
**Package Dimension**

Unit : mm



2-108E5A

Unit : mm



2-108E6A

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>	15 / 10	A
		1 ms	I <sub>CP</sub>	30 / 20	A
	Forward Current	DC	I <sub>F</sub>	10	A
		1 ms	I <sub>FM</sub>	20	A
Collector Power Dissipation (Tc = 25°C)		P <sub>C</sub>	82	W	
Converter	Repetitive Peak Reverse Voltage	V <sub>R</sub> RM	1600	V	
	Average Output Rectified Current	I <sub>O</sub>	15	A	
	Peak One Cycle Surge Forward Current (50 Hz, Non-Repetitive)	I <sub>F</sub> SM	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> = 10 mA, V <sub>CE</sub> = 5 V	—	6.0	—	V
Collector-Emitter Saturation Voltage		V <sub>CE (sat)</sub>	I <sub>C</sub> = 10 A	—	2.8	3.2	V
			V <sub>GE</sub> = 15 V	—	3.1	3.7	
Input Capacitance		C <sub>ies</sub>	V <sub>CE</sub> = 10 V, V <sub>GE</sub> = 0, f = 1 MHz	—	1200	—	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> = 10 A	—	0.15	0.30	
	Fall Time	t <sub>f</sub>	V <sub>GE</sub> = ±15 V R <sub>G</sub> = 120 Ω	—	0.07	0.10	
	Turn-Off Time	t <sub>off</sub>	T <sub>j</sub> = 125°C (Note 1)	—	0.60	0.90	
Forward Voltage		V <sub>F</sub>	I <sub>F</sub> = 10 A, V <sub>GE</sub> = 0	—	2.0	2.8	V
Reverse Recovery Time		t <sub>rr</sub>	I <sub>F</sub> = 10 A, V <sub>GE</sub> = -10 V di/dt = 200 A/μs	—	0.10	0.25	μs
Thermal Resistance		R <sub>th (j-c)</sub>	Transistor	—	—	1.52	°C/W
			Diode	—	—	1.5	

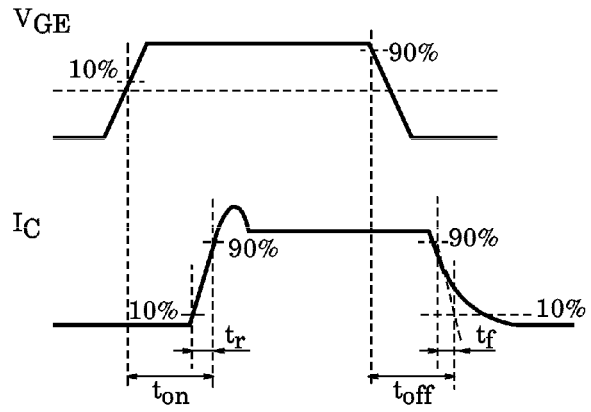
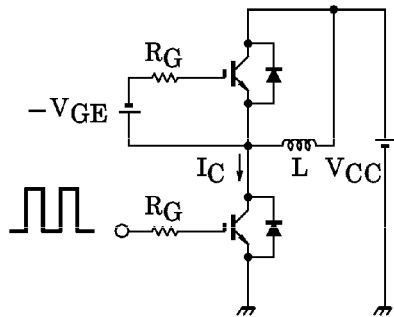
## b. Converter stage

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Repetitive Peak Reverse Current		I <sub>RRM</sub>	V <sub>RRM</sub> = 1600 V	—	—	50	μA
Peak Forward Voltage		V <sub>FM</sub>	I <sub>FM</sub> = 15 A	—	1.05	1.20	V
Peak One Cycle Surge Forward Current		I <sub>FSM</sub>	50 Hz sine-half-wave	250	—	—	A
Thermal Resistance		R <sub>th (j-c)</sub>	—	—	—	1.90	°C/W

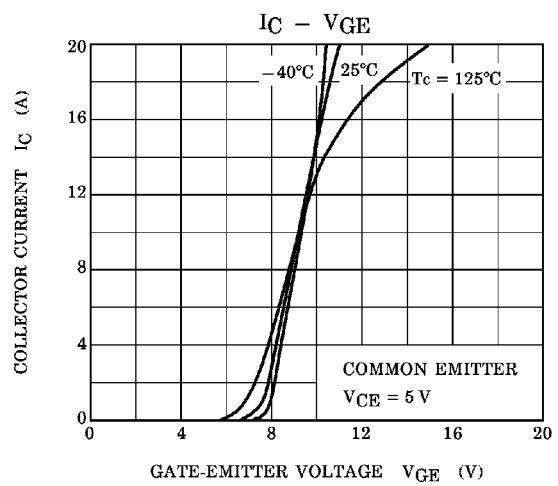
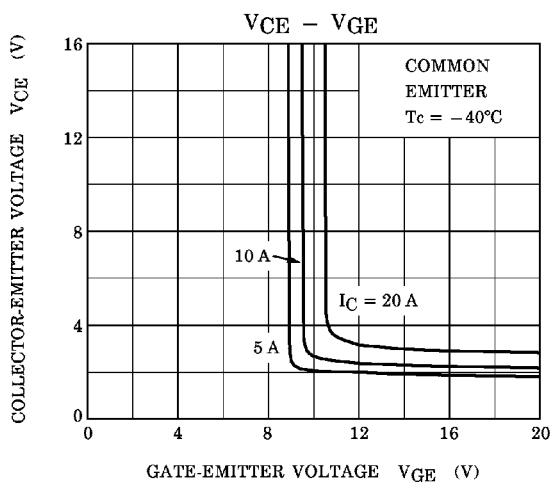
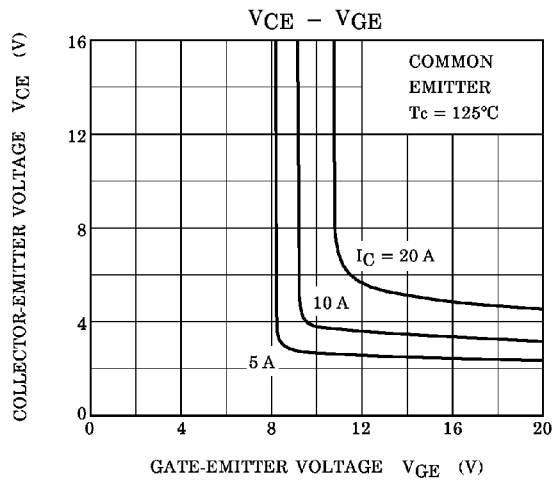
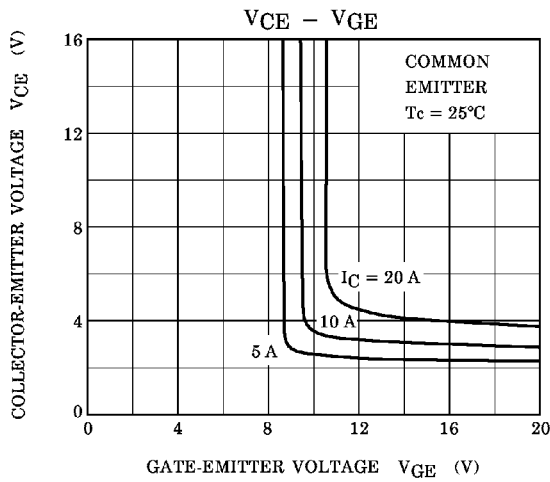
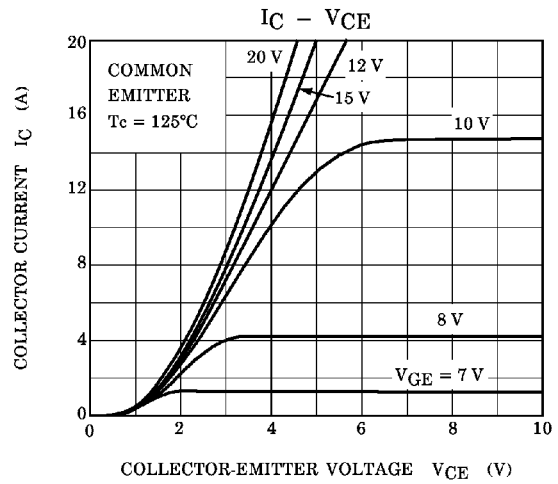
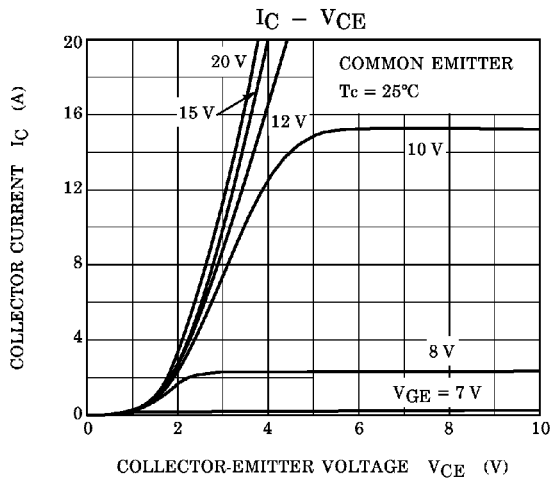
## c. Thermistor

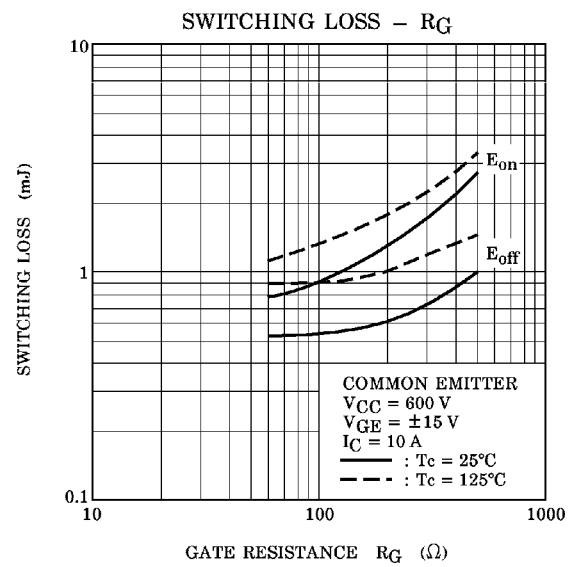
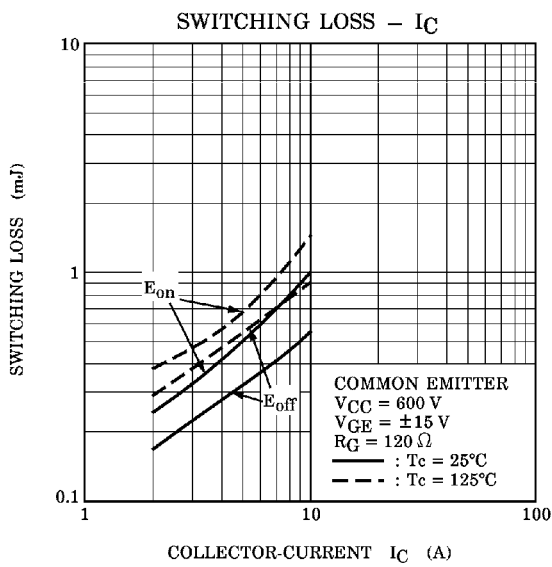
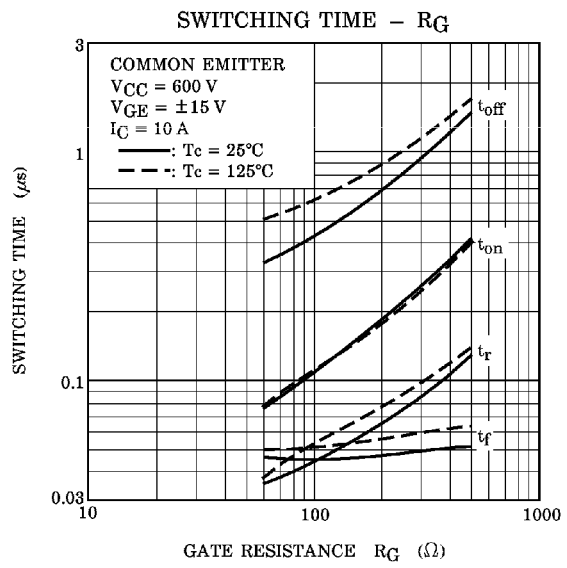
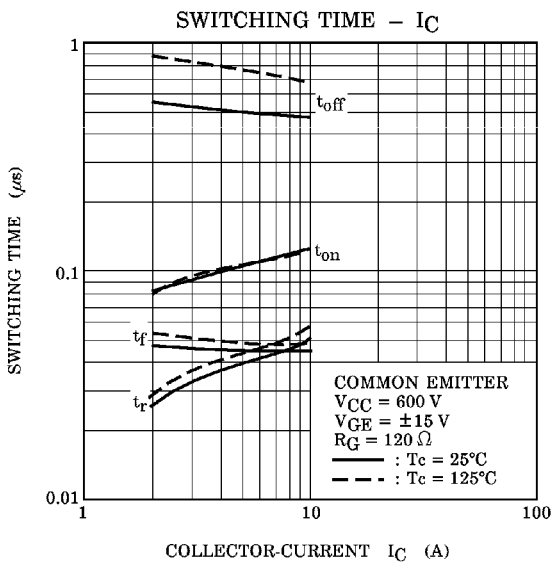
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Zero-power Resistance		R <sub>25</sub>	I <sub>TM</sub> = 0.2 mA, T <sub>c</sub> = 25°C	17.31	20	23.14	kΩ
B Value		B <sub>25/85</sub>	T <sub>c</sub> = 25°C / T <sub>c</sub> = 85°C	—	3760	—	K

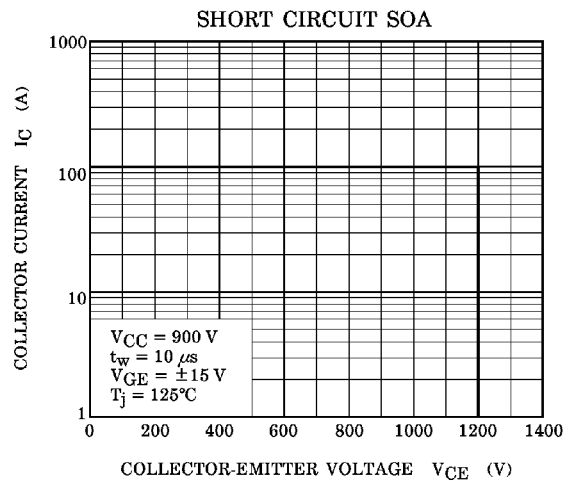
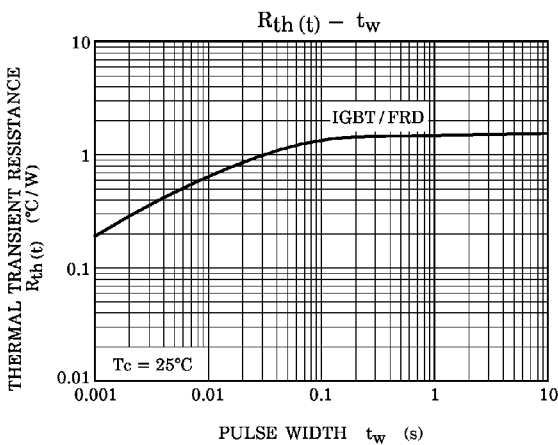
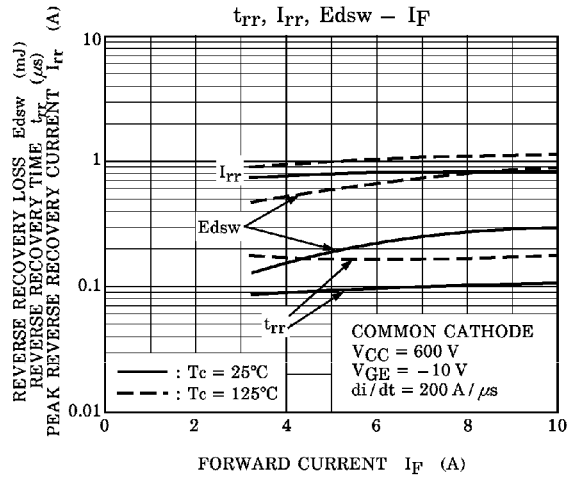
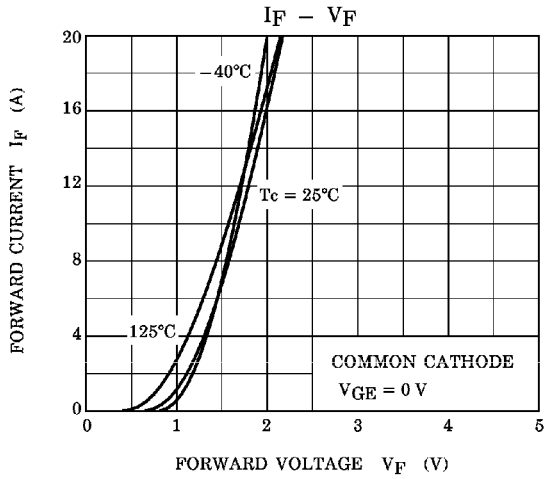
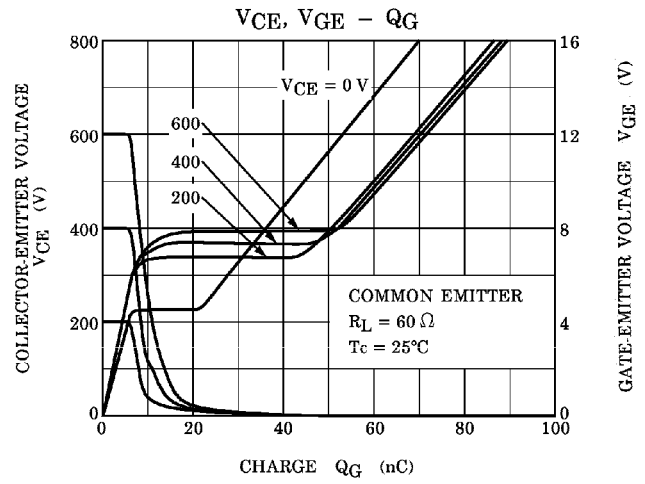
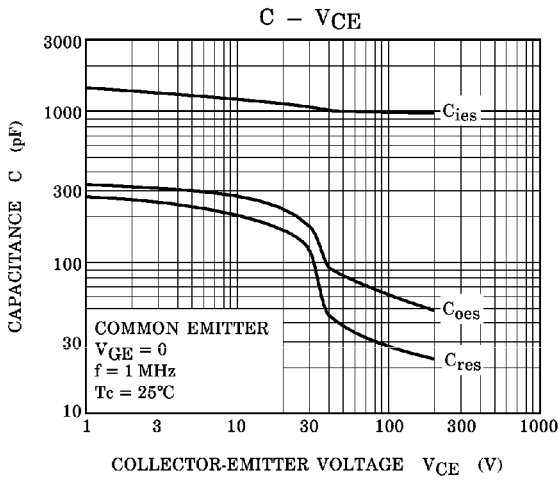
(Note 1) Switching Time Test Circuit & Timing Chart



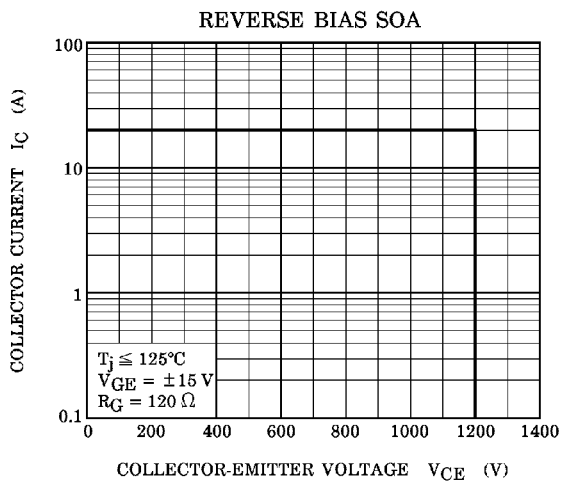
a. Inverter stage











**b. Converter stage**

