

TOSHIBA INTEGRATED IGBT MODULE SILICON N CHANNEL IGBT

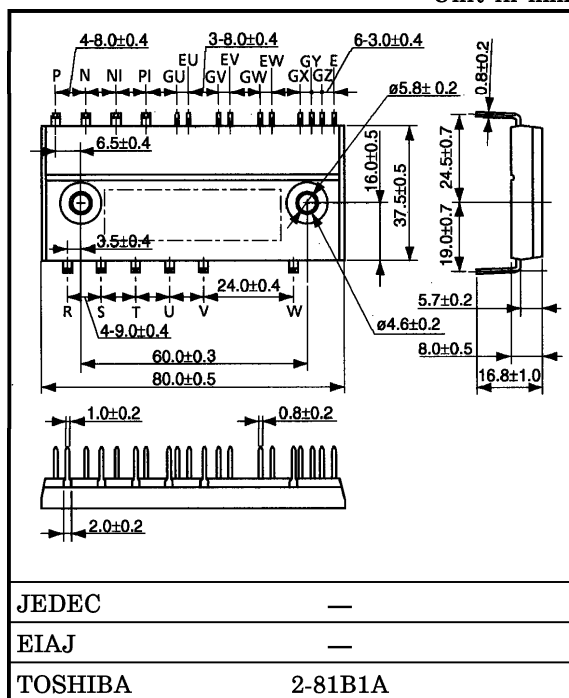
# MIG20J805H

HIGH POWER SWITCHING APPLICATIONS

Unit in mm

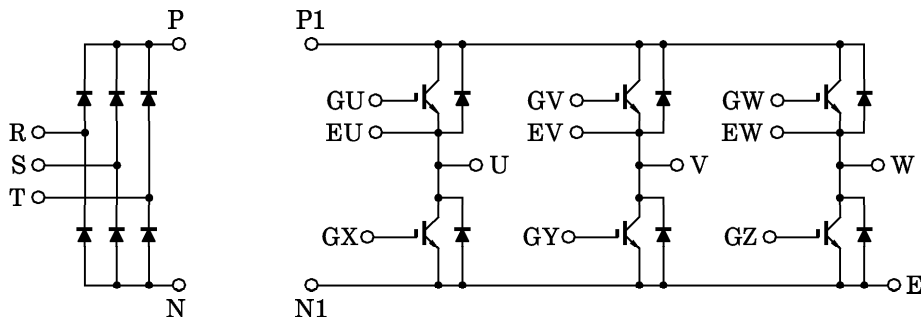
MOTOR CONTROL APPLICATIONS

- Integrates Inverter, Converter Power Circuits in One Package.
- Output (Inverter Stage)  
: 3φ 20A/600V IGBT
- Input (Converter Stage)  
: 3φ 20A/800V Silicon Rectifier
- The Electrodes are Isolated from Case.



Weight : 66g

EQUIVALENT CIRCUIT



961001EAA1

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## MAXIMUM RATINGS (Ta = 25°C)

STAGE	CHARACTERISTIC	SYMBOL	RATING	UNIT	
Inverter	Collector-Emitter Voltage	V <sub>CES</sub>	600	V	
	Gate-Emitter Voltage	V <sub>GES</sub>	±20	V	
	Collector Current	DC	I <sub>C</sub>	20	A
		1ms	I <sub>CP</sub>	40	A
	Forward Current	DC	I <sub>F</sub>	20	A
		1ms	I <sub>FM</sub>	40	A
Collector Power Dissipation (T <sub>c</sub> =25°C)		P <sub>C</sub>	60	W	
Converter	Repetitive Peak Reverse Voltage	V <sub>RRM</sub>	800	V	
	Average Output Rectified Current	I <sub>O</sub>	20	A	
	Peak One Cycle Surge Forward Current (50Hz, 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	—	1.5	N·m	

## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

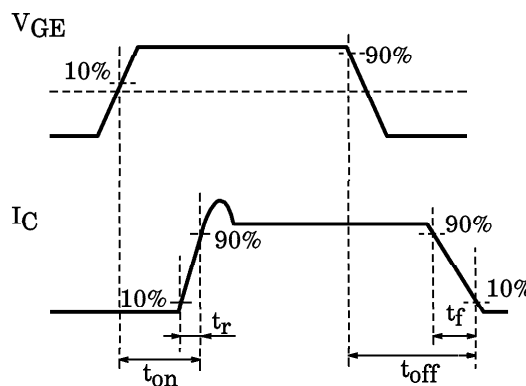
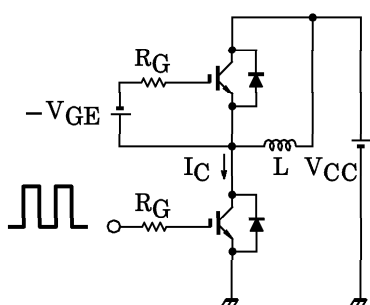
## a. Inverter stage

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I <sub>GES</sub>	V <sub>GE</sub> = ±20V, V <sub>CE</sub> = 0	—	—	±500	nA
Collector Cut-off Current		I <sub>CES</sub>	V <sub>CE</sub> = 600V, V <sub>GE</sub> = 0	—	—	1.0	mA
Gate-Emitter Cut-off Voltage		V <sub>GE (off)</sub>	I <sub>C</sub> = 2mA, V <sub>CE</sub> = 5V	5.0	—	8.0	V
Collector-Emitter Saturation Voltage		V <sub>CE (sat)</sub>	I <sub>C</sub> = 20A, V <sub>GE</sub> = 15V	—	2.10	2.60	V
Input Capacitance		C <sub>ies</sub>	V <sub>CE</sub> = 10V, V <sub>GE</sub> = 0, f = 1MHz	—	1850	—	pF
Switching Time	Rise Time	t <sub>r</sub>	V <sub>CC</sub> = 300V I <sub>C</sub> = 20A V <sub>GE</sub> = ±15V R <sub>G</sub> = 62Ω (Note 1)	—	0.10	0.20	μs
	Turn-on Time	t <sub>on</sub>		—	0.25	0.50	
	Fall Time	t <sub>f</sub>		—	0.15	0.30	
	Turn-off Time	t <sub>off</sub>		—	0.50	0.80	
Forward Voltage		V <sub>F</sub>	I <sub>F</sub> = 20A, V <sub>GE</sub> = 0	—	1.7	2.7	V
Reverse Recovery Time		t <sub>rr</sub>	I <sub>F</sub> = 20A, V <sub>GE</sub> = -10V di / dt = 50A / μs	—	0.08	0.15	μs
Thermal Resistance		R <sub>th (j-c)</sub>	Transistor	—	—	2.08	°C / W
			Diode	—	—	3.09	

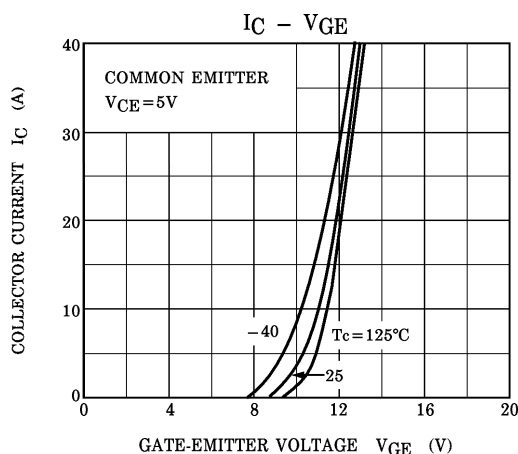
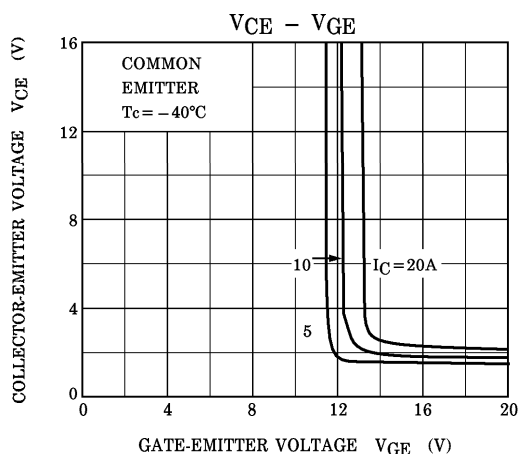
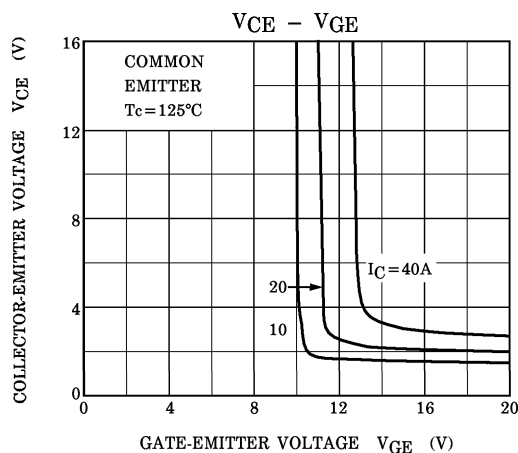
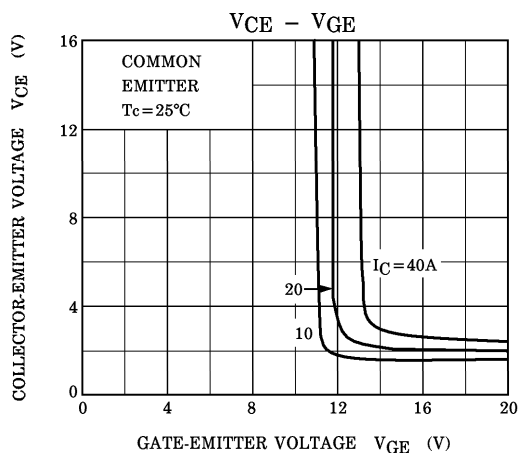
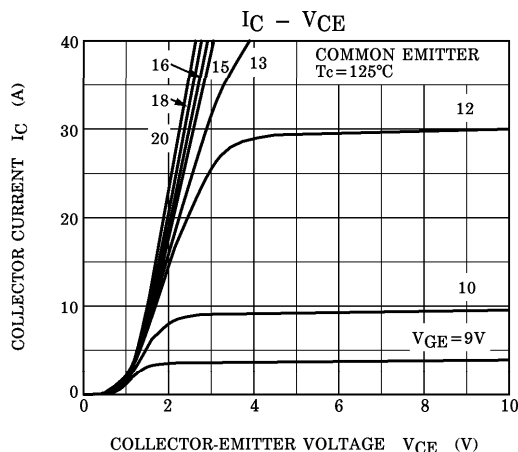
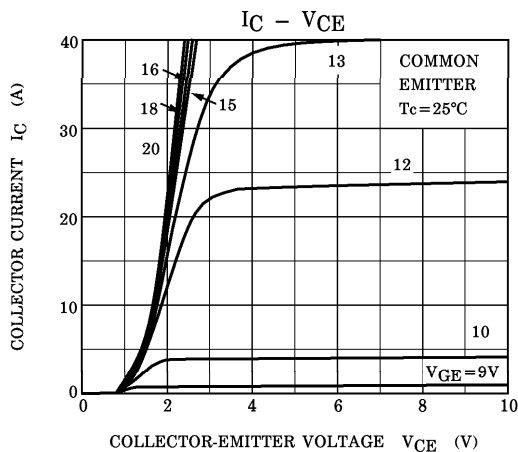
b. Converter stage

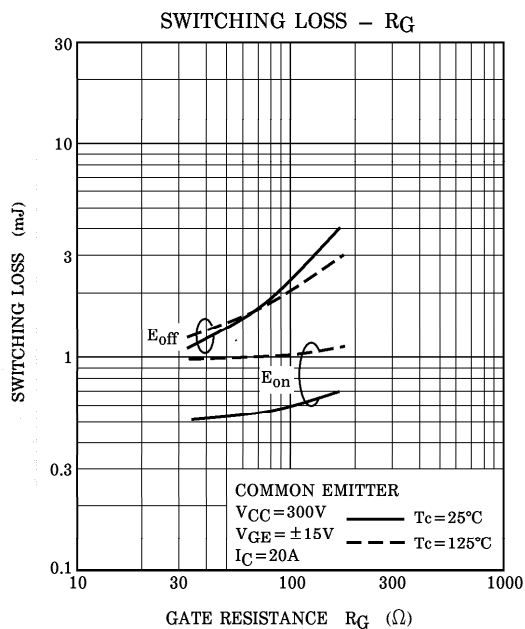
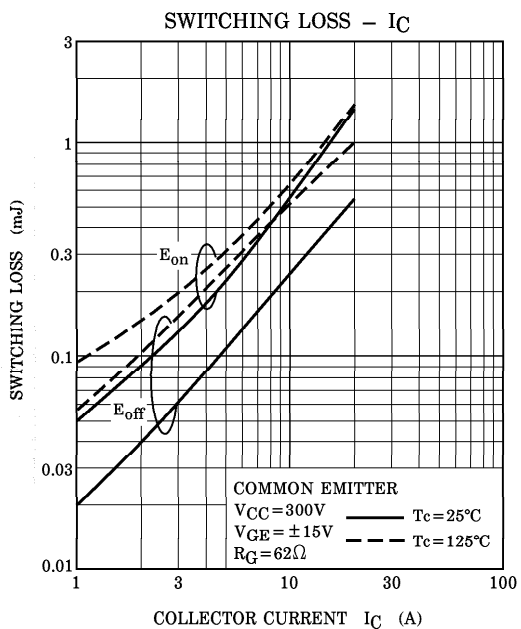
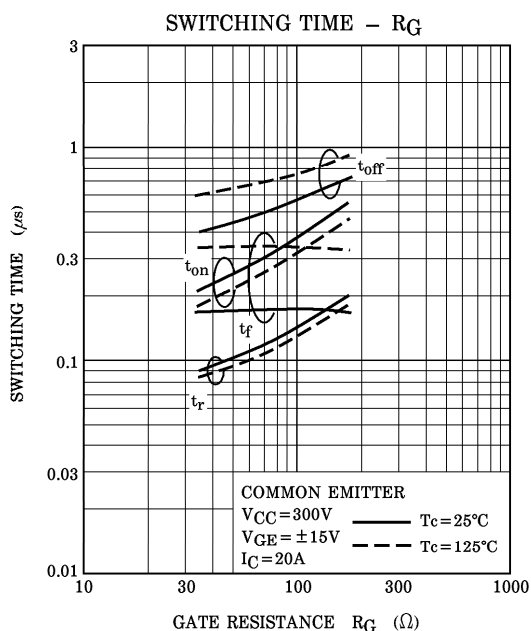
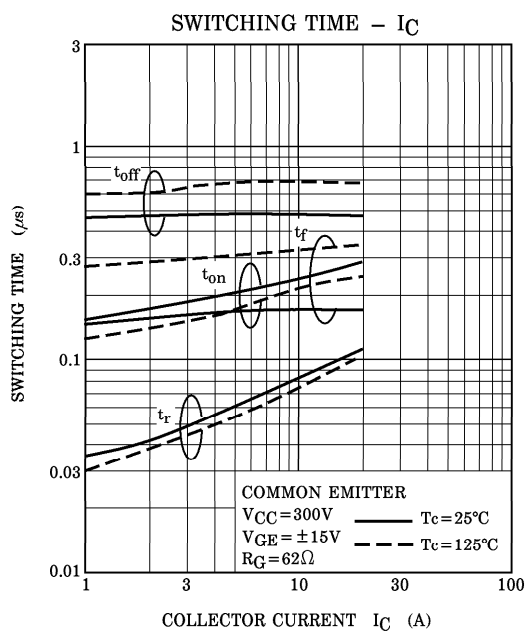
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Repetitive Peak Reverse Current	$I_{RRM}$	$V_{RRM} = 800V$	—	—	50	$\mu A$
Peak Forward Voltage	$V_{FM}$	$I_{FM} = 20A$	—	1.05	1.20	V
Peak One Cycle Surge Forward Current	$I_{FSM}$	50Hz sine-half-wave	250	—	—	A
Thermal Resistance	$R_{th(j-c)}$	—	—	—	2.80	$^{\circ}C/W$

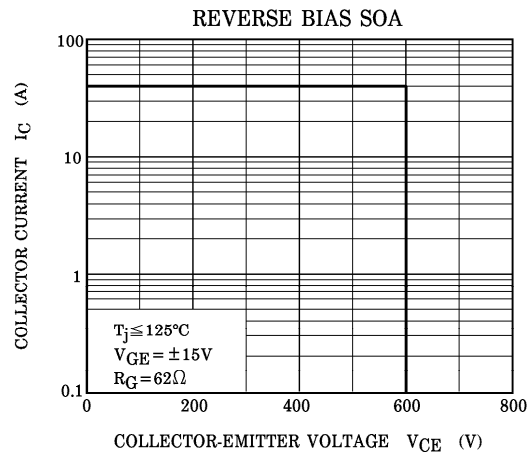
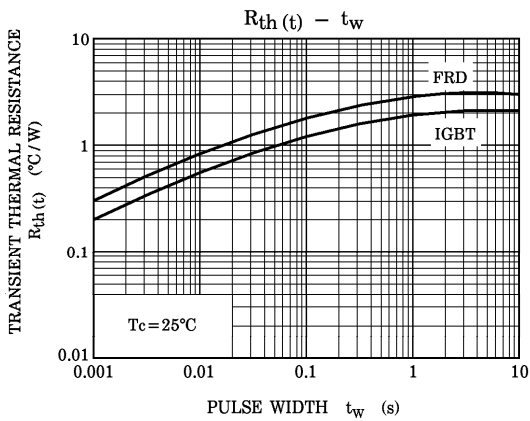
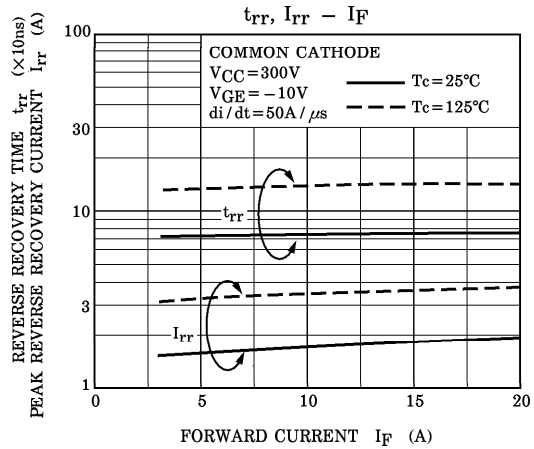
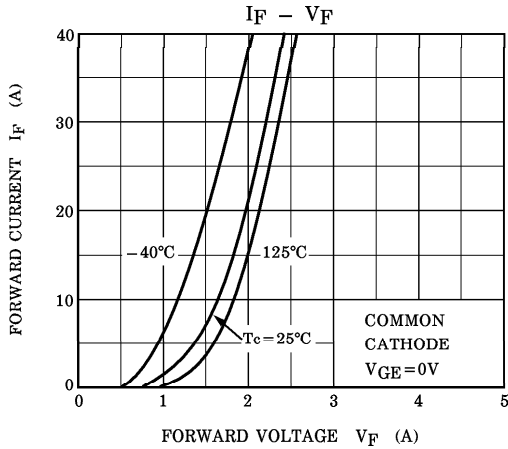
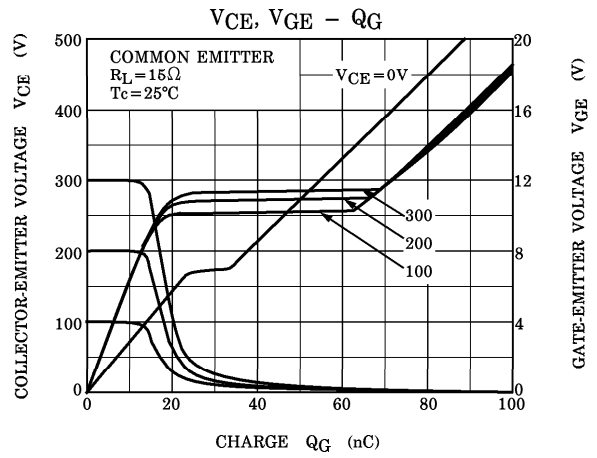
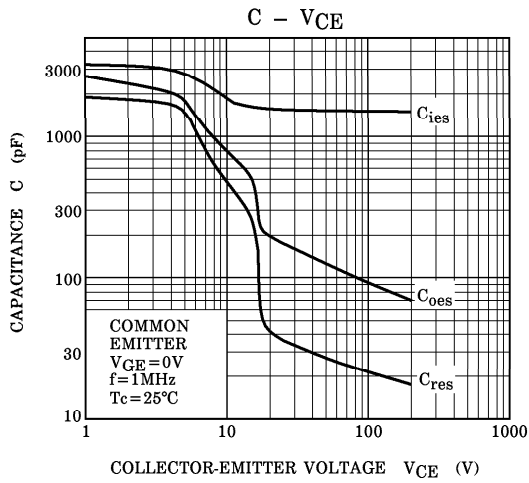
(Note 1) Switching Time Test Circuit & Timing Chart



a. INVERTER STAGE







b. CONVERTER STAGE

