

TOSHIBA IGBT Module Silicon N Channel IGBT

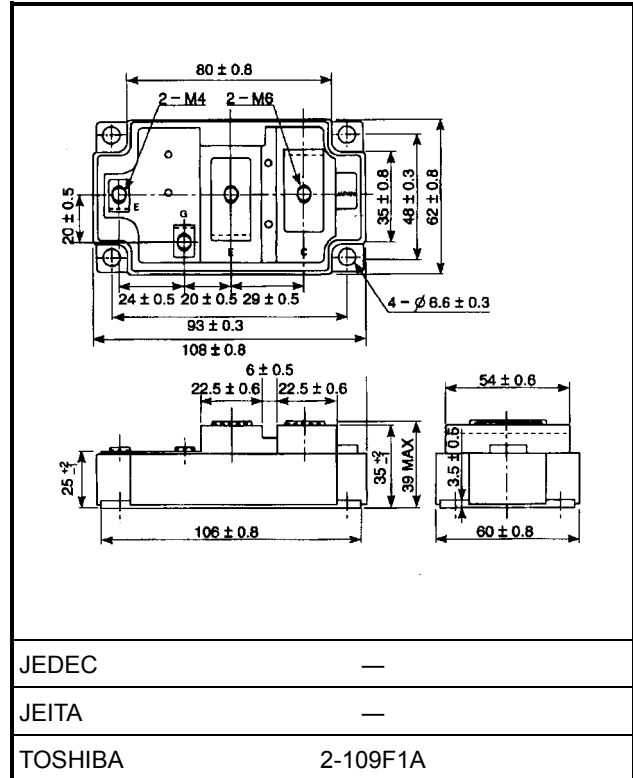
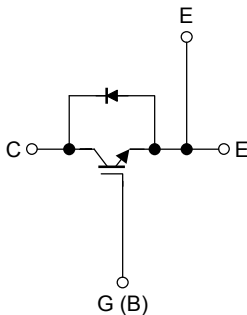
# MG400Q1US65H

High Power & High Speed Switching Applications

Unit: mm

- High input impedance
- Enhancement-mode
- The electrodes are isolated from case.

## Equivalent Circuit



Weight: 465 g (typ.)

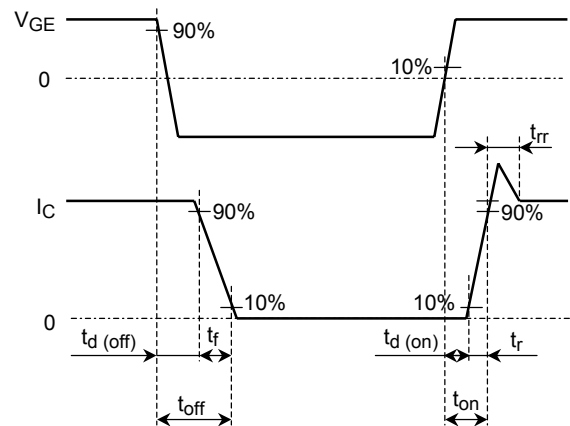
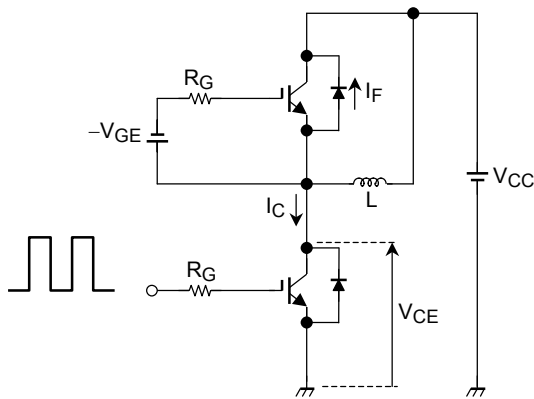
## Maximum Ratings (Ta = 25°C)

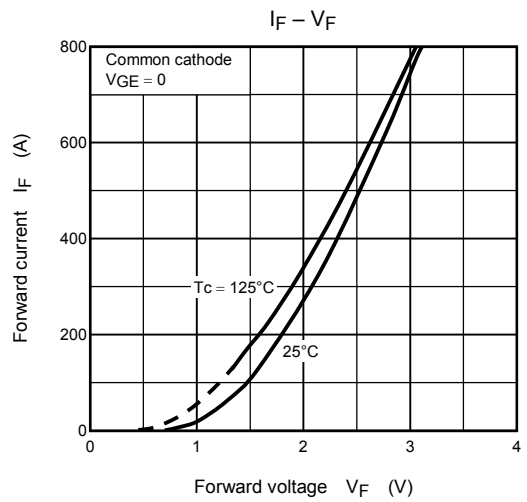
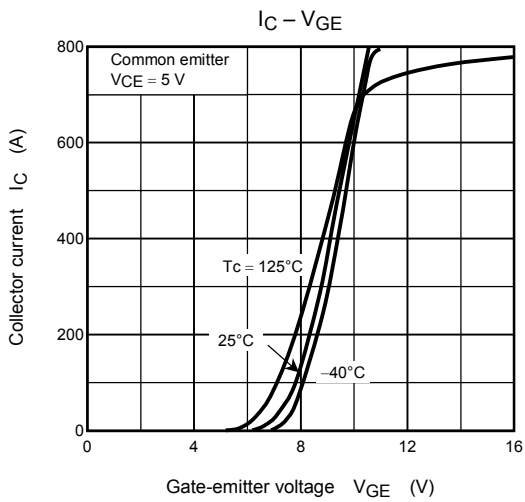
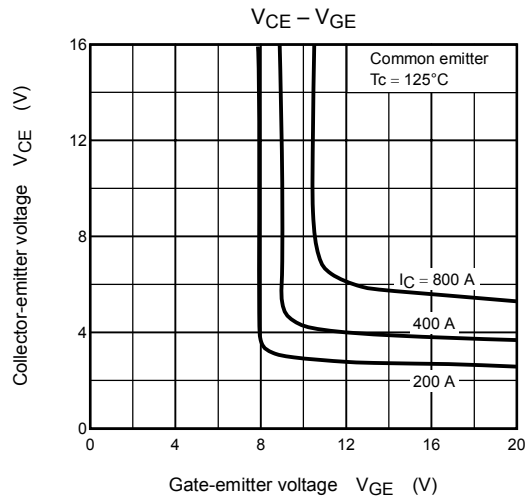
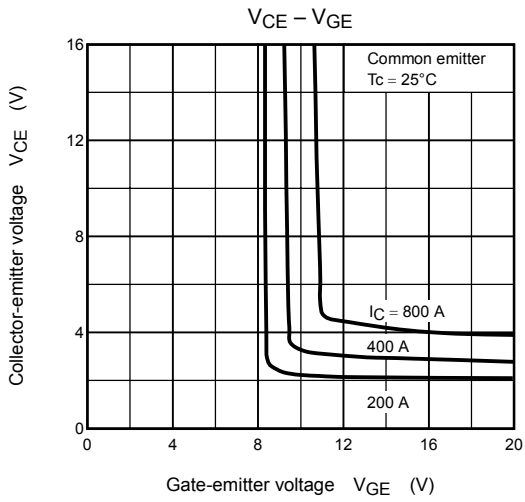
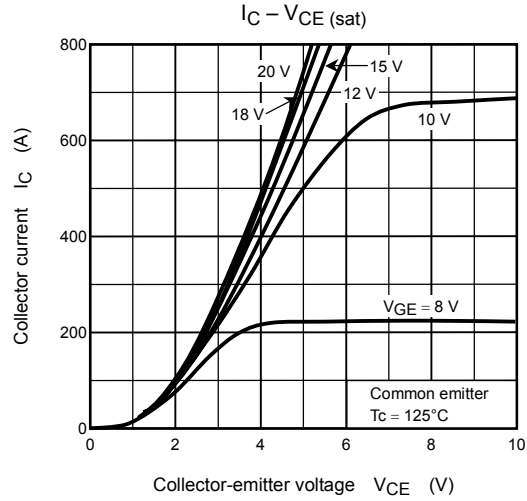
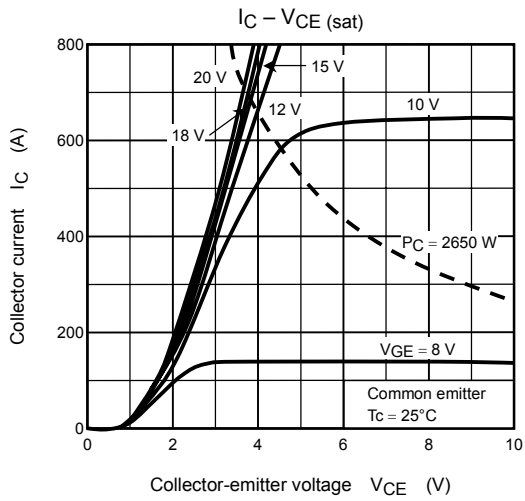
Characteristics		Symbol	Rating	Unit
Collector-emitter voltage		$V_{CES}$	1200	V
Gate-emitter voltage		$V_{GES}$	±20	V
Collector current	DC	$I_C$	400	A
	1 ms	$I_{CP}$	800	
Forward current	DC	$I_F$	400	A
	1 ms	$I_{FM}$	800	
Collector power dissipation (Tc = 25°C)		$P_C$	2650	W
Junction temperature		$T_j$	150	°C
Storage temperature range		$T_{stg}$	-40 to 125	°C
Isolation voltage		$V_{Isol}$	2500 (AC 1 minute)	V
Screw torque	Terminal	—	3	N•m
	Mounting	—	3	

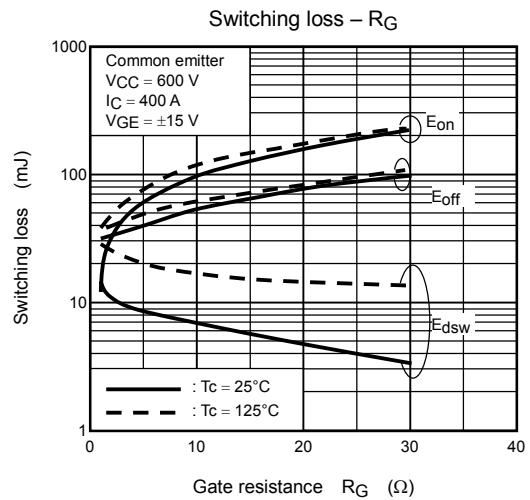
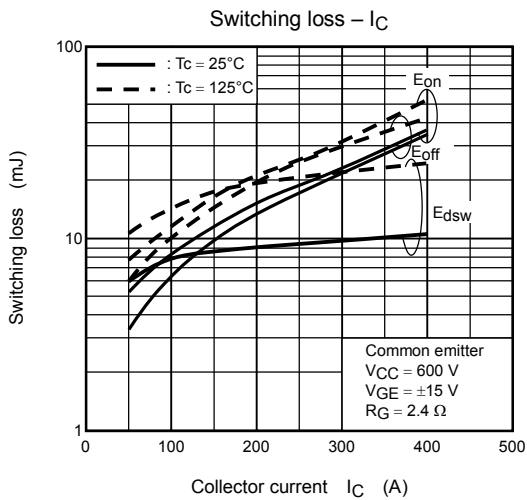
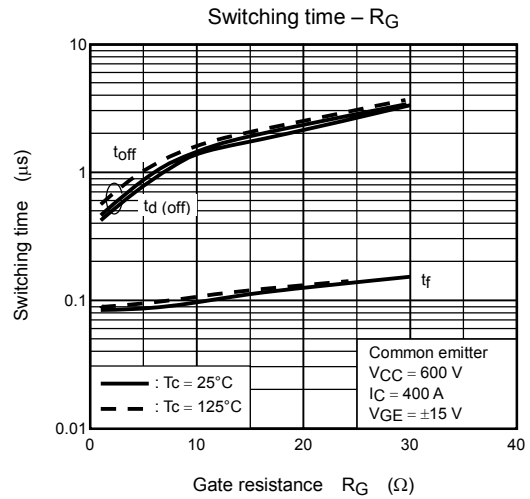
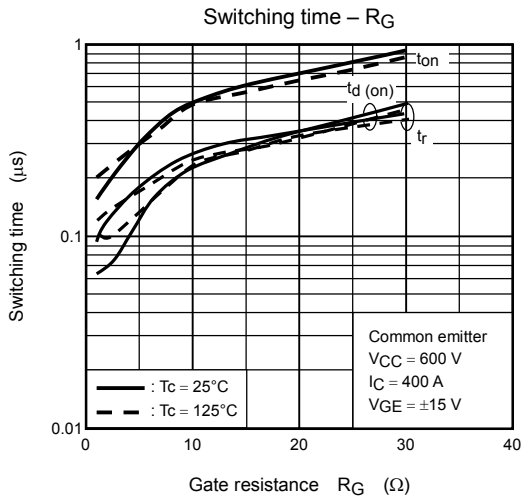
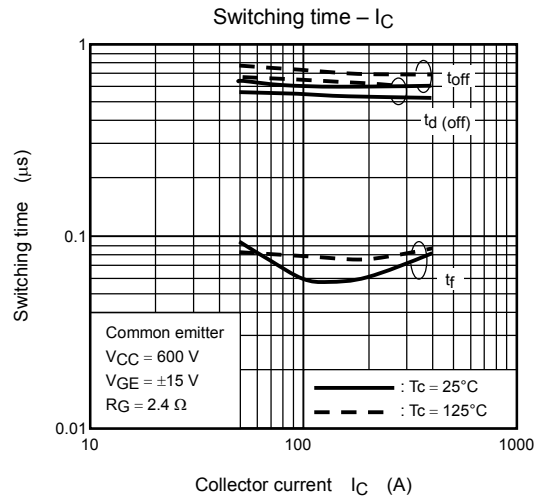
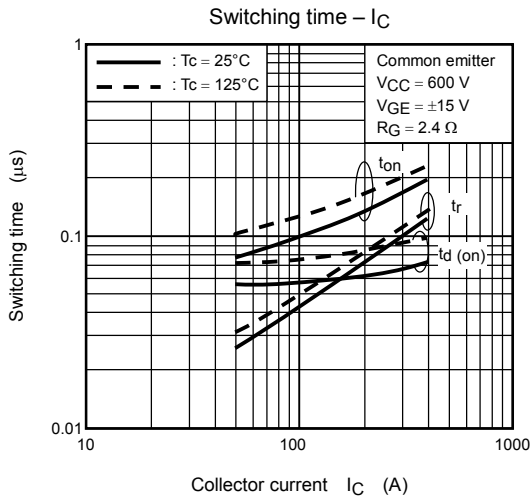
## Electrical Characteristics (Ta = 25°C)

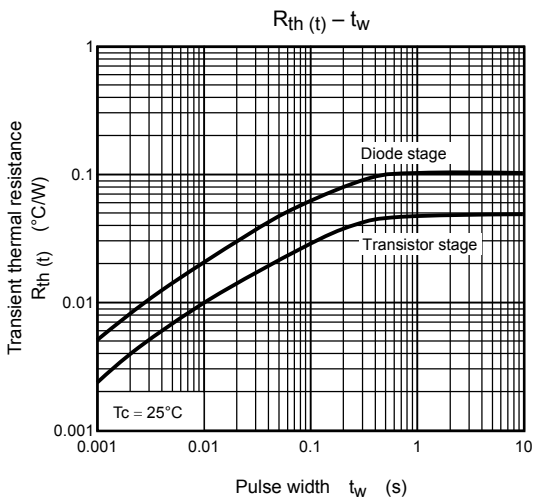
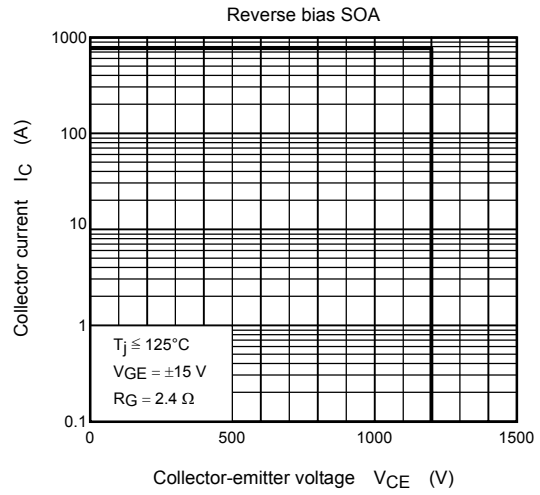
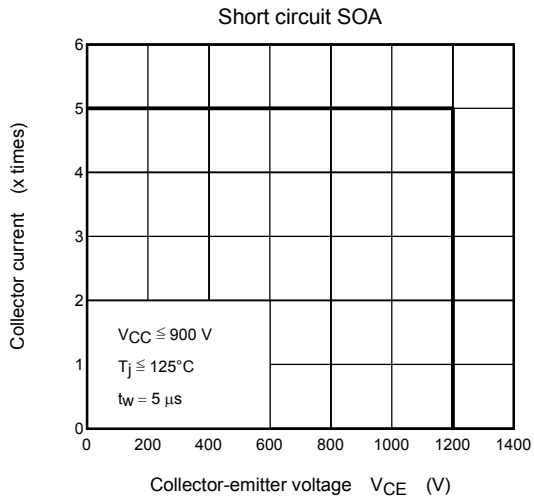
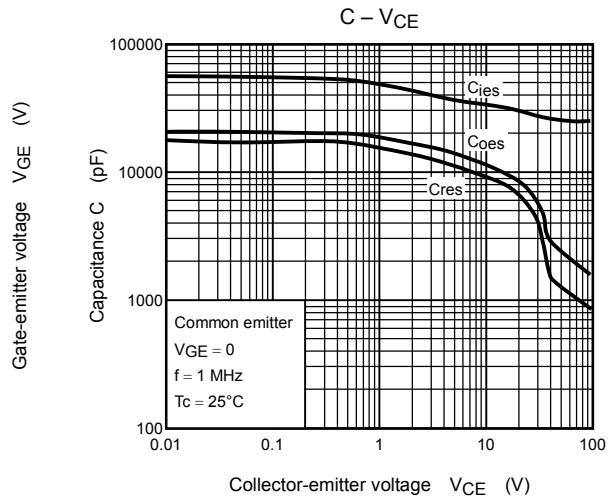
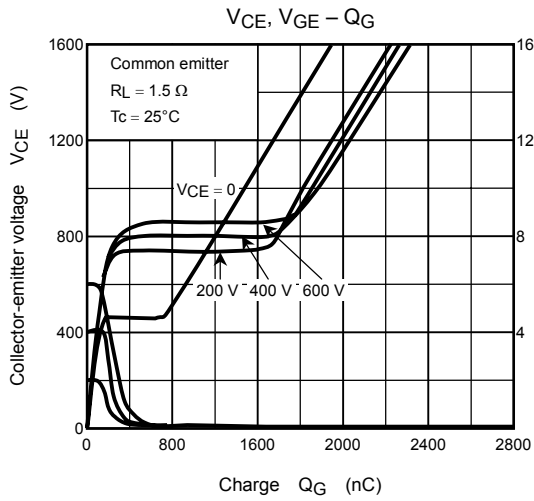
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit	
Gate leakage current		$I_{GES}$	$V_{GE} = \pm 20\text{ V}, V_{CE} = 0$	—	—	$\pm 500$	nA	
Collector cut-off current		$I_{CES}$	$V_{CE} = 1200\text{ V}, V_{GE} = 0$	—	—	4.0	mA	
Gate-emitter cut-off voltage		$V_{GE (off)}$	$I_C = 400\text{ mA}, V_{CE} = 5\text{ V}$	4.0	—	7.0	V	
Collector-emitter saturation voltage		$V_{CE (sat)}$	$I_C = 400\text{ A}, V_{GE} = 15\text{ V}$	$T_c = 25^\circ\text{C}$	—	3.0	4.0	V
				$T_c = 125^\circ\text{C}$	—	3.6	—	
Input capacitance		$C_{ies}$	$V_{CE} = 10\text{ V}, V_{GE} = 0, f = 1\text{ MHz}$	—	34000	—	pF	
Switching time	Turn-on delay time	$t_{d (on)}$	Inductive load $V_{CC} = 600\text{ V}, I_C = 400\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 2.4\ \Omega$	—	0.05	—	$\mu\text{s}$	
	Rise time	$t_r$		—	0.05	—		
	Turn-on time	$t_{on}$		—	0.10	—		
	Turn-off delay time	$t_{d (off)}$		—	0.55	—		
	Fall time	$t_f$		—	0.05	0.15		
	Turn-off time	$t_{off}$		—	0.60	—		
Forward voltage		$V_F$	$I_F = 400\text{ A}, V_{GE} = 0$	—	2.4	3.5	V	
Reverse recovery time		$t_{rr}$	$I_F = 400\text{ A}, V_{GE} = -10\text{ V}$	—	0.25	—	$\mu\text{s}$	
Thermal resistance		$R_{th (j-c)}$	Transistor stage	—	—	0.047	$^\circ\text{C/W}$	
			Diode stage	—	—	0.1		
Switching loss	Turn-on	$E_{on}$	Inductive load $V_{CC} = 600\text{ V}, I_C = 400\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 2.4\ \Omega$ $T_c = 125^\circ\text{C}$	—	40	—	mJ	
	Turn-off	$E_{off}$		—	40	—		

Note: Switching time measurement circuit and input/output waveforms









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