

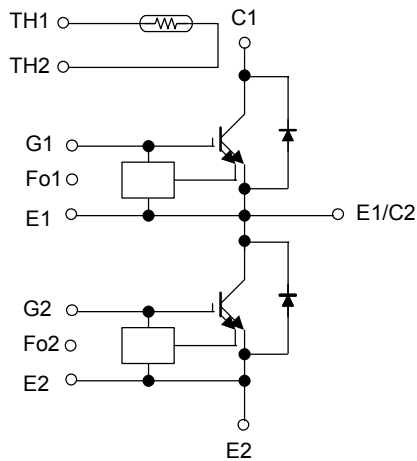
TOSHIBA IGBT Module Silicon N Channel IGBT

# MG400V2YS60A

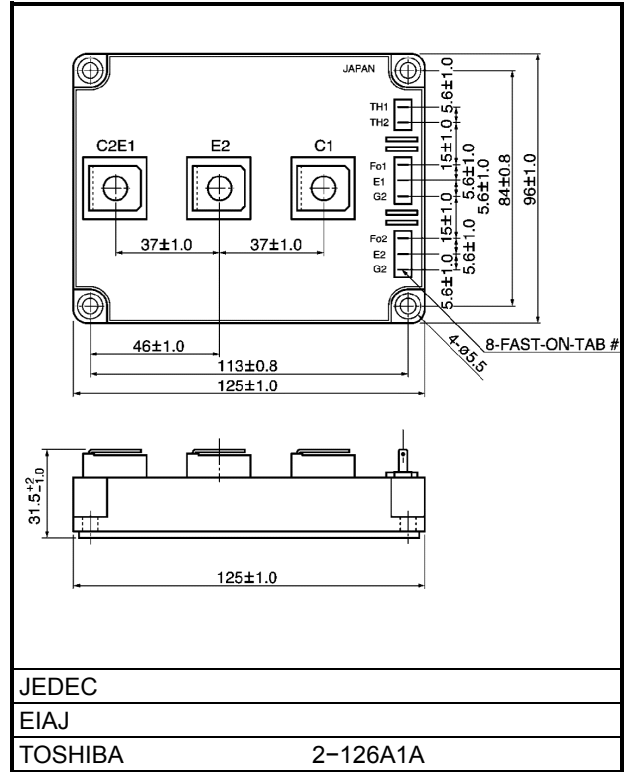
High Power Switching Applications  
 Motor Control Applications

- The electrodes are isolated from case.
- Enhancement-mode
- Thermal output terminal (TH)

### Equivalent Circuit



Unit in mm



Weight : 680 g

## Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
Collector-emitter voltage		$V_{CES}$	1700	V
Gate-emitter voltage		$V_{GES}$	±20	V
Collector current	DC	$I_C$	400	A
Forward current	DC	$I_F$	400	A
Collector power dissipation (Tc = 25°C)		$P_C$	4300	W
Junction temperature		$T_j$	150	°C
Storage temperature range		$T_{stg}$	-40~125	°C
Isolation voltage		$V_{isol}$	4000 (AC 1 min)	V
Screw torque	Terminal: M8	—	10	N·m
	Mounting: M5	—	3	N·m

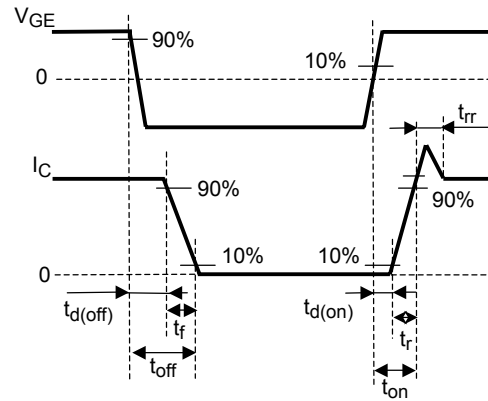
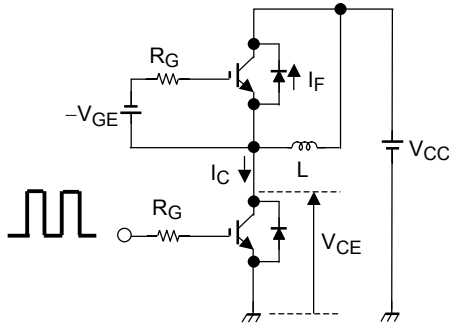
## Electrical Characteristics (Ta = 25°C)

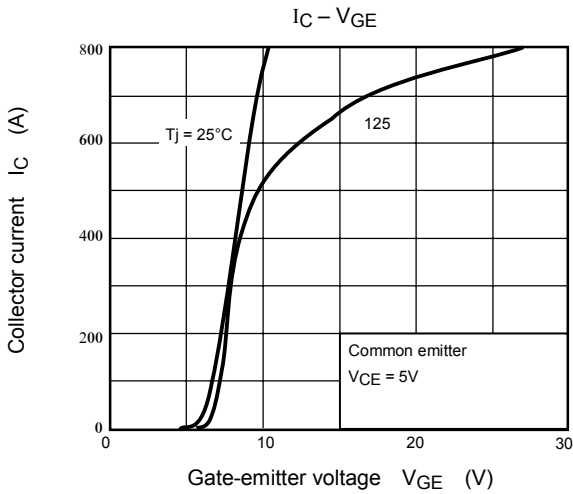
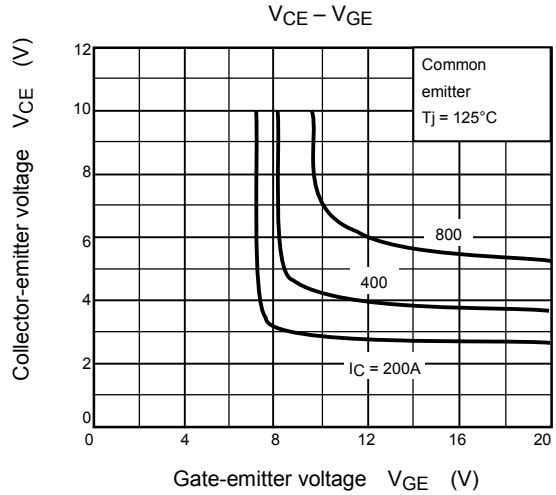
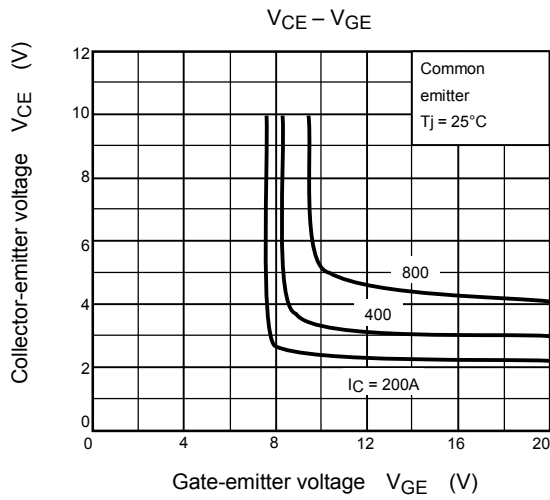
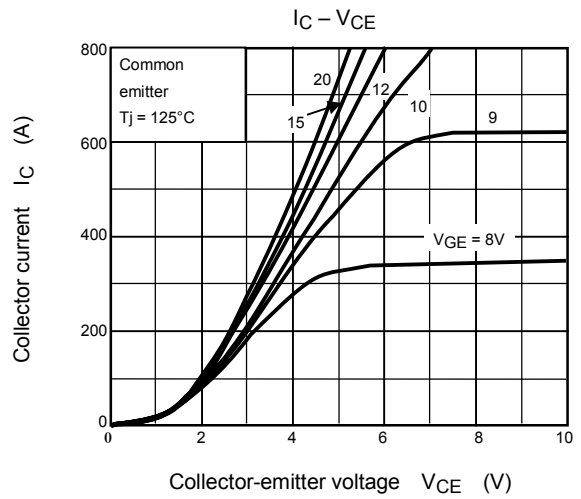
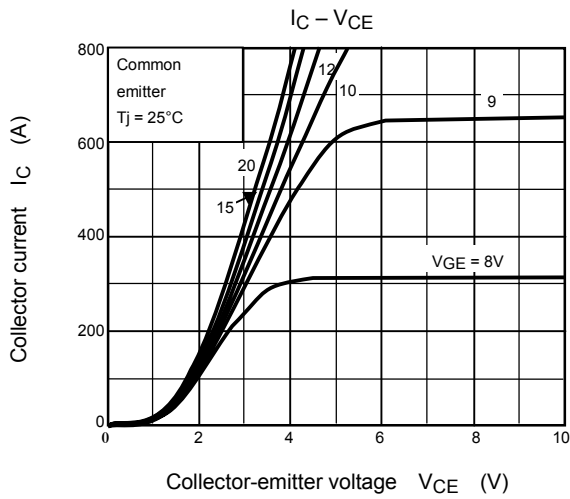
Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit	
Gate leakage current		$I_{GES}$	$V_{GE} = \pm 20V, V_{CE} = 0V$	—	—	±10	µA	
Collector cut-off current		$I_{CES}$	$V_{CE} = 1700V, V_{GE} = 0V$	—	—	1	mA	
Gate-emitter cut-off voltage		$V_{GE(off)}$	$I_C = 400mA, V_{CE} = 5V$	—	5.5	—	V	
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 400A$ $V_{GE} = 15V$	$T_j = 25^\circ C$	—	3.0	3.4	V
				$T_j = 125^\circ C$	—	3.8	4.2	
Input capacitance		$C_{ies}$	$V_{CE} = 10V, V_{GE} = 0V,$ $f = 1MHz$	—	45000	—	pF	
Gate-emitter voltage		$V_{GE}$	—	13	15	17	V	
Gate resistance		$R_G$	—	8.2	—	15	Ω	
Switching time	Turn-on delay time	$t_{d(on)}$	Inductive load $V_{CC} = 900V$ $I_C = 400A$ $V_{GE} = \pm 15V$ $R_G = 8.2\Omega$  (Note)	—	0.35	—	µs	
	Rise time	$t_r$		—	0.2	—		
	Turn-on time	$t_{on}$		—	0.55	—		
	Turn-off delay time	$t_{d(off)}$		—	0.9	—		
	Fall time	$t_f$		—	0.4	0.6		
	Turn-off time	$t_{off}$		—	1.3	—		
Forward voltage		$V_F$	$I_F = 400A,$ $V_{GE} = 0V$	$T_j = 25^\circ C$	—	3.2	4.2	V
				$T_j = 125^\circ C$	—	2.4	—	
Reverse recovery time		$t_{rr}$	$I_F = 400A, V_{GE} = -15V$ $di/dt = 2000A/\mu s$	—	0.20	0.40	µs	
Thermal resistance		$R_{th(j-c)}$	Transistor stage	—	—	0.029	°C / W	
			Diode stage	—	—	0.056		
RTC operating current		$I_{rtc}$	$T_j = 25^\circ C$	800	—	—	A	

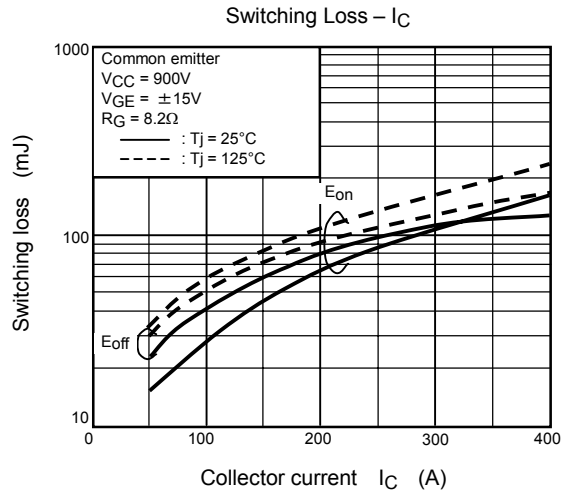
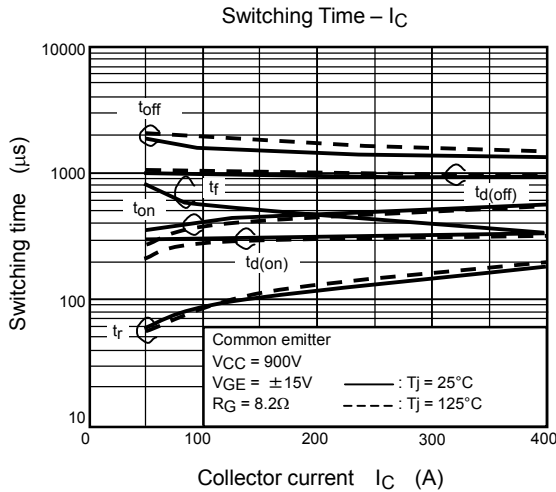
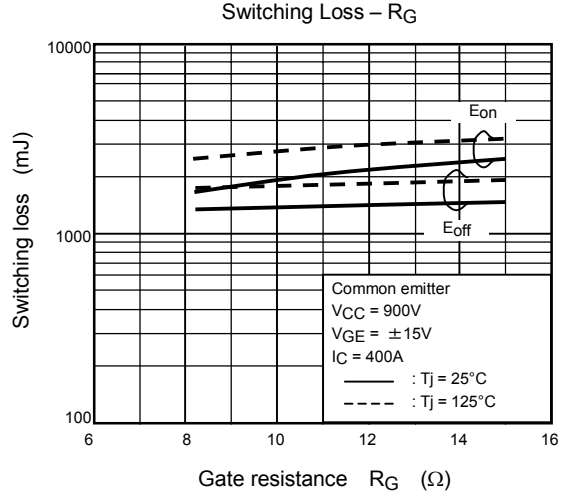
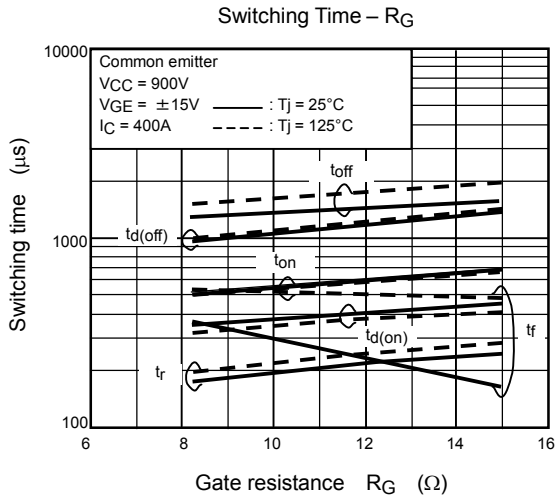
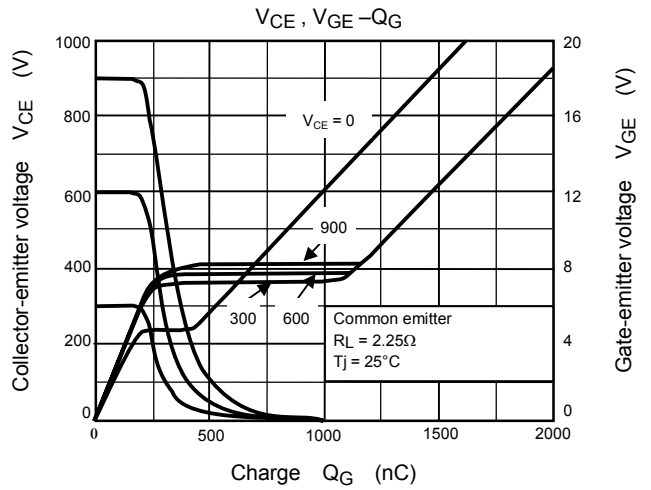
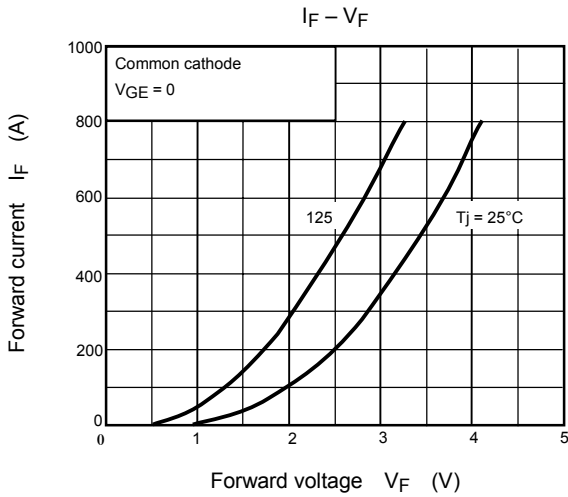
**Thermistor**

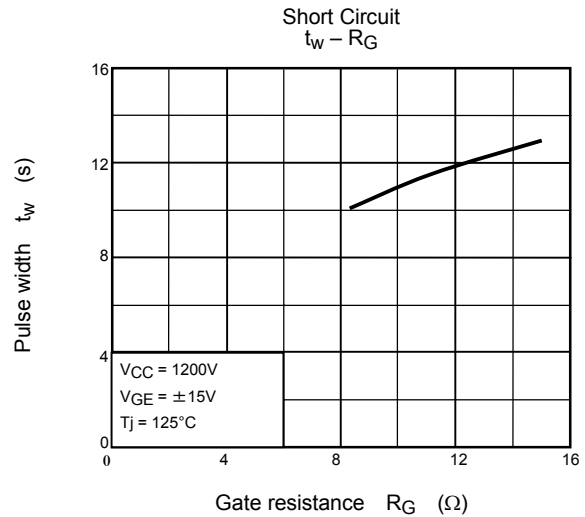
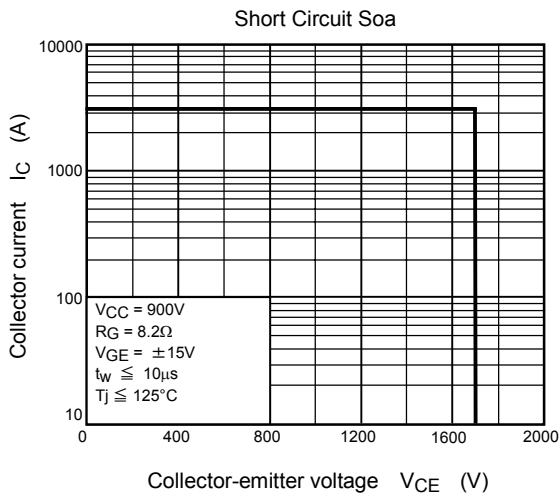
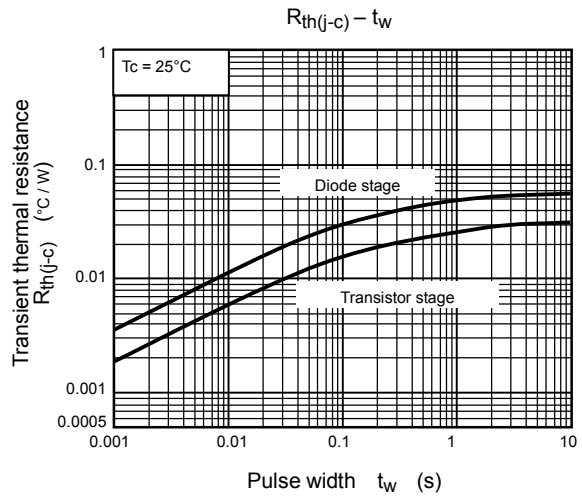
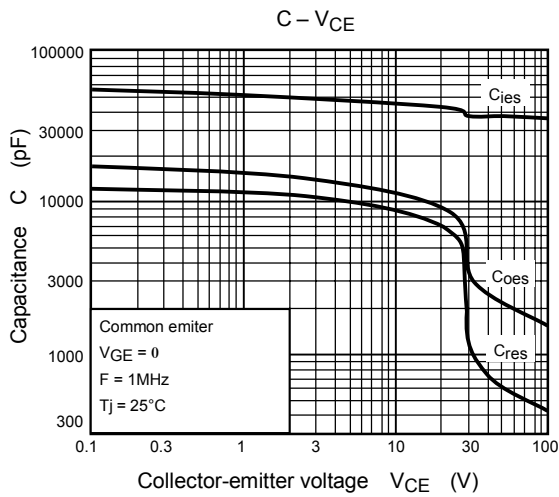
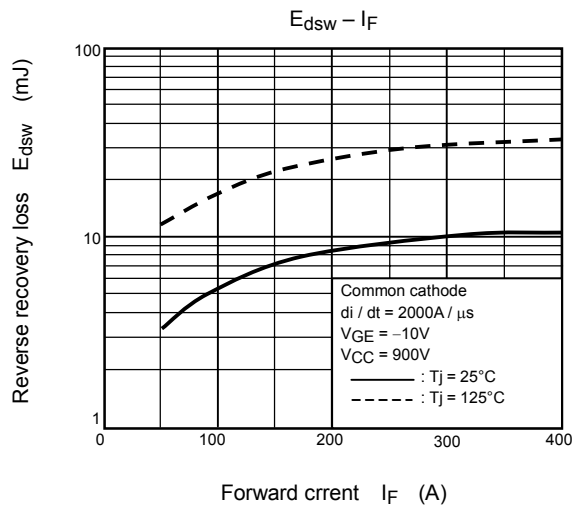
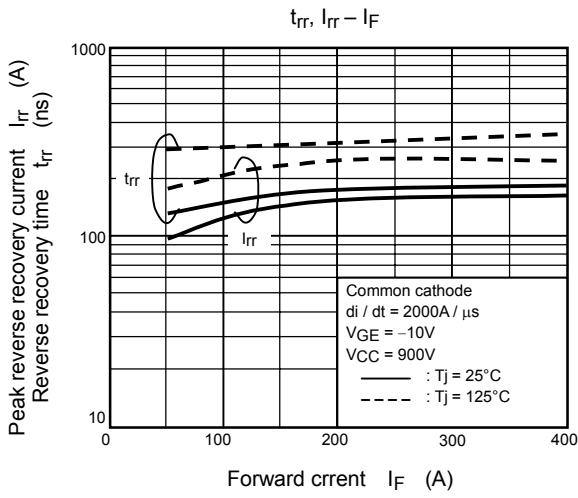
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Zero power resistance	R25	$T_c = 25^\circ\text{C}$	—	100	—	$\text{k}\Omega$
B value	R25 / 85	$T_c = 25^\circ\text{C} / T_c = 85^\circ\text{C}$	—	4390	—	K
Isolation voltage		$T_c = 25^\circ\text{C}$	2500	—	—	Vrms

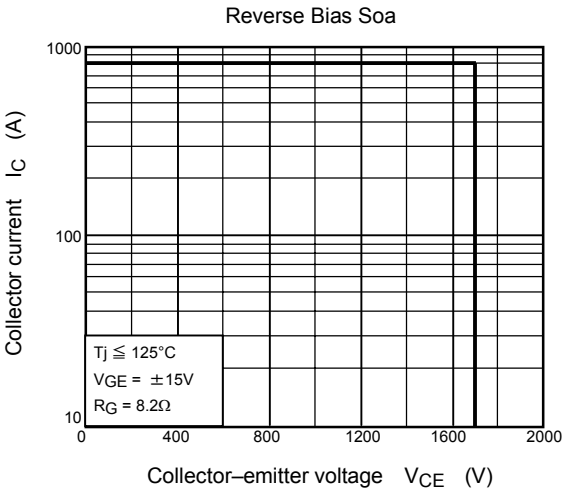
(Note) : Switching time measurement circuit and input / output waveforms











### <V<sub>CE(sat)</sub> Rank>

V<sub>CE(sat)</sub>

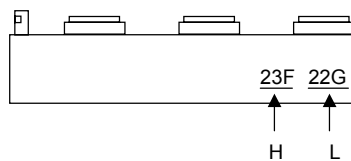
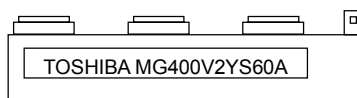
Rank Symbol	Min.	Max.
29	2.6	2.9
30	2.7	3.0
31	2.8	3.1
32	2.9	3.2
33	3.0	3.3
34	3.1	3.4

### <V<sub>F</sub> Rank>

V<sub>F</sub>

Rank Symbol	Min	Max.
G	2.5	2.8
H	2.7	3.0
I	2.9	3.2
J	3.1	3.4
K	3.3	3.6
L	3.5	3.8
M	3.7	4.0
N	3.9	4.2

### <Mark Position>





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