

TOSHIBA IGBT Module Silicon N Channel IGBT

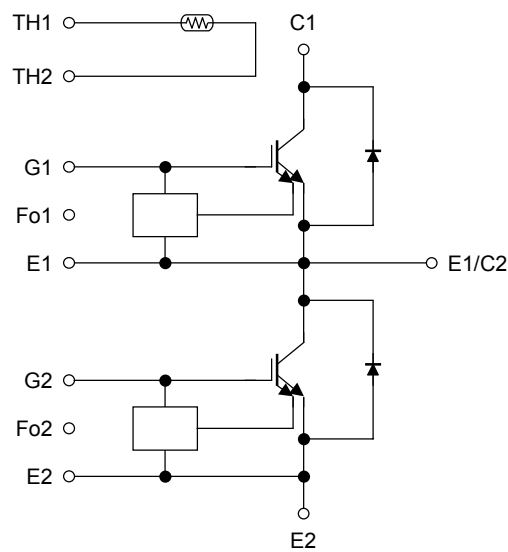
MG600Q2YS60A

High Power Switching Applications

Motor Control Applications

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

Equivalent Circuit



Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
Collector-emitter voltage		V_{CES}	1200	V
Gate-emitter voltage		V_{GES}	± 20	V
Collector current	DC	I_C	600	A
Forward current	DC	I_F	600	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}	2500 (AC 1 min)	V
Screw torque	Terminal: M8	—	10	N·m
	Mounting: M5	—	3	N·m

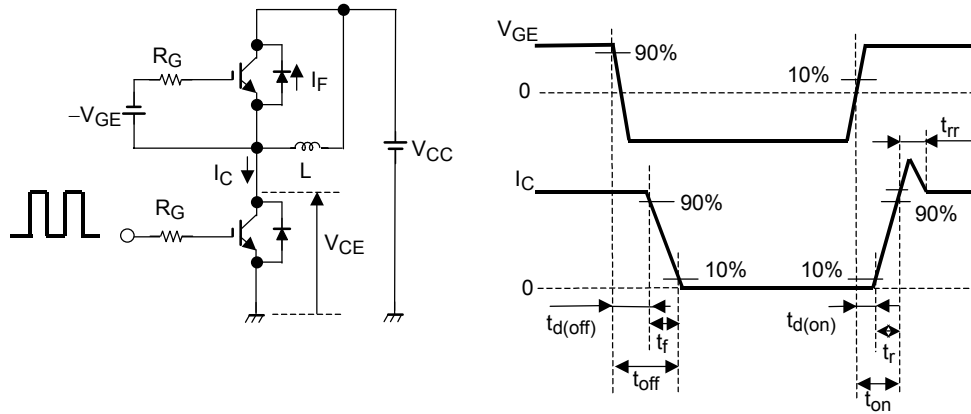
Electrical Characteristics (Ta = 25°C)

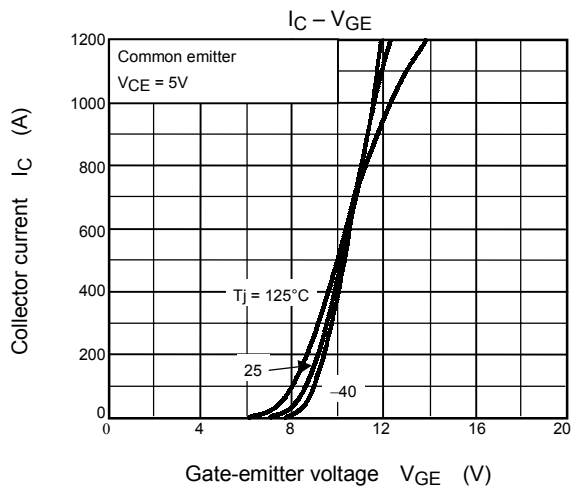
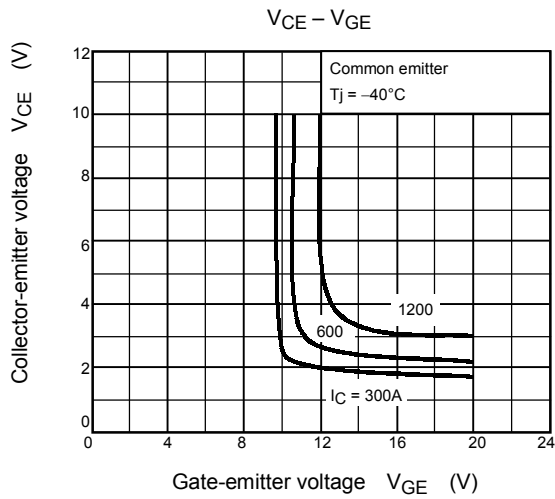
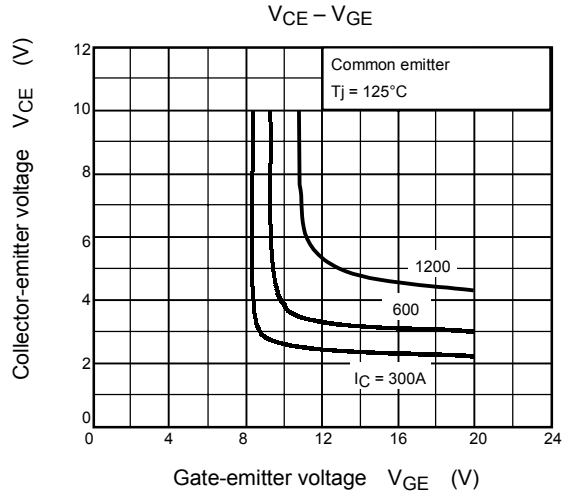
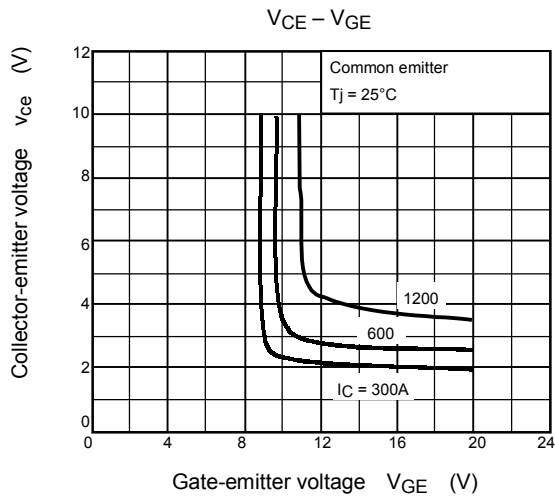
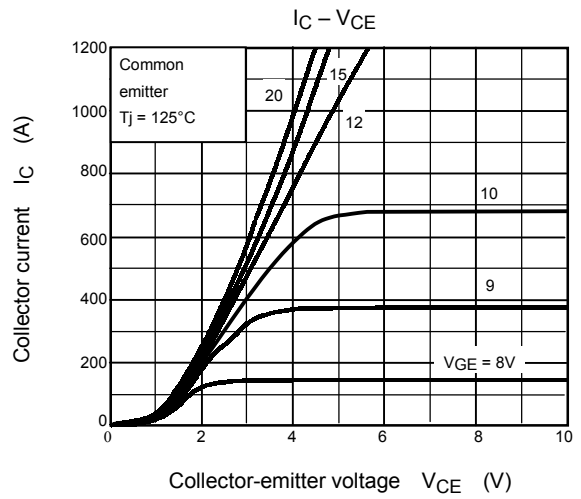
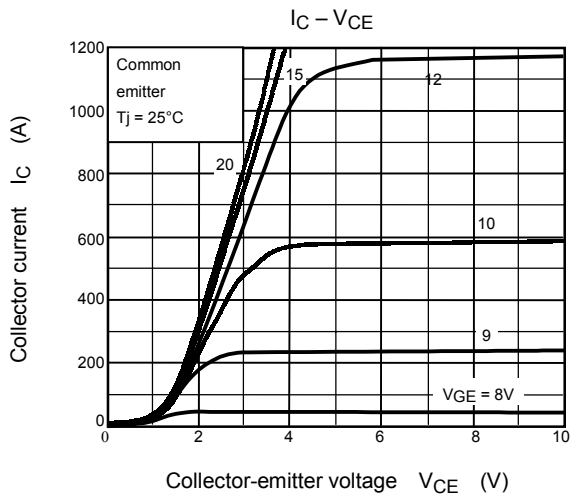
Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit	
Gate leakage current		I_{GES}	$V_{GE} = \pm 20V, V_{CE} = 0V$	—	—	± 10	μA	
Collector cut-off current		I_{CES}	$V_{CE} = 1200V, V_{GE} = 0$	—	—	1	mA	
Gate-emitter cut-off voltage		$V_{GE(off)}$	$I_C = 600mA, V_{CE} = 5V$	6.0	6.7	8.0	V	
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 600A$ $V_{GE} = 15V$	$T_j = 25^\circ C$	—	2.7	3.1	V
				$T_j = 125^\circ C$	—	3.2	3.5	
Input capacitance		C_{ies}	$V_{CE} = 10V, V_{GE} = 0V,$ $f = 1MHz$	—	41000	—	pF	
Gate-emitter voltage		V_{GE}	—	13	15	17	V	
Gate resistance		R_G	—	7.5	—	15	Ω	
Switching time	Turn-on delay time	$t_{d(on)}$	Inductive load $V_{CC} = 600V$ $I_C = 600A$ $V_{GE} = \pm 15V$ $R_G = 7.5\Omega$	—	0.3	—	μs	
	Rise time	t_r		—	0.2	—		
	Turn-on time	t_{on}		—	0.5	—		
	Turn-off delay time	$t_{d(off)}$		—	1.3	—		
	Fall time	t_f		—	0.1	0.3		
	Turn-off time	t_{off}		(Note)	—	1.4		—
Forward voltage		V_F	$I_F = 600A,$ $V_{GE} = 0V$	$T_j = 25^\circ C$	—	2.2	3.2	V
				$T_j = 125^\circ C$	—	2.0	—	
Reverse recovery time		t_{rr}	$I_F = 600A, V_{GE} = -15V$ $di / dt = 2000A / \mu s$	—	0.3	0.5	μs	
Thermal resistance		$R_{th(j-c)}$	Transistor stage	—	—	0.029	°C / W	
			Diode stage	—	—	0.056		
RTC operating current		I_{rtc}	$T_j = 25^\circ C$	1200	—	—	A	

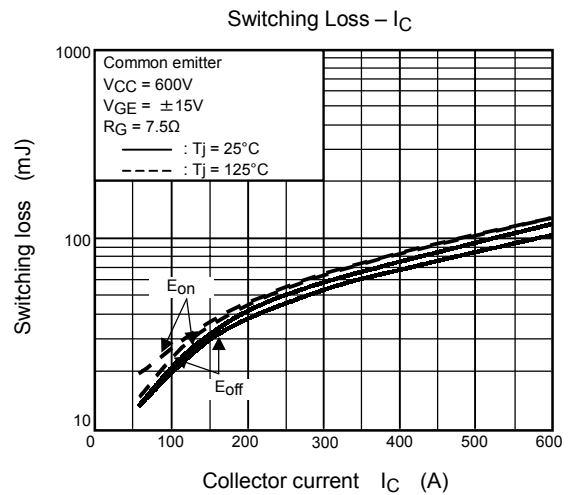
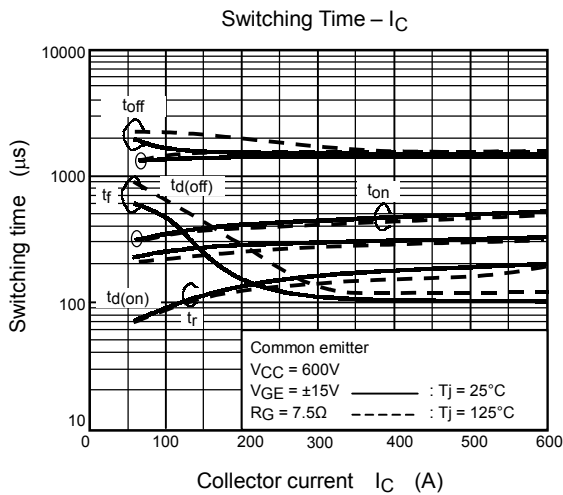
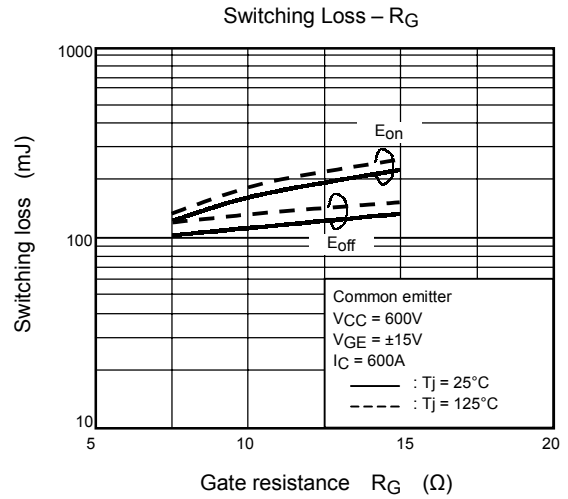
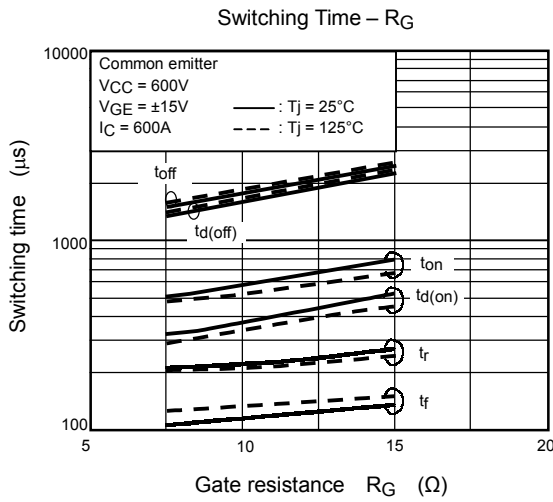
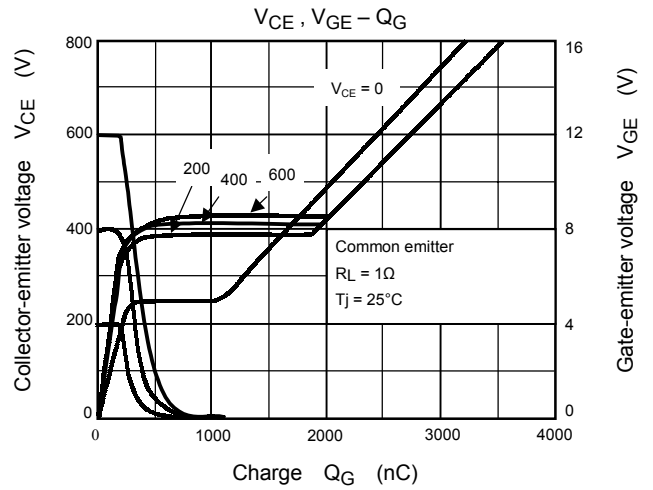
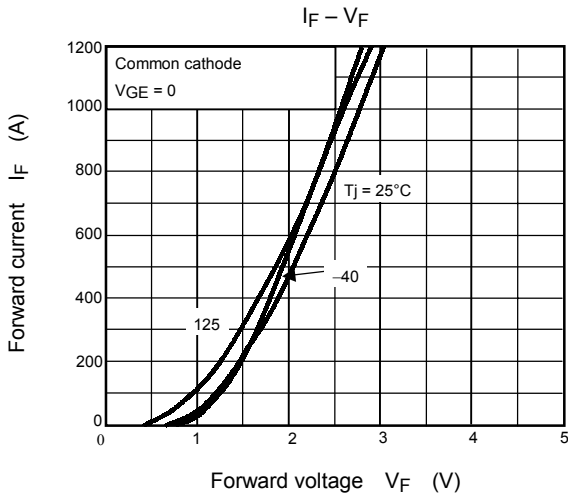
Thermistor

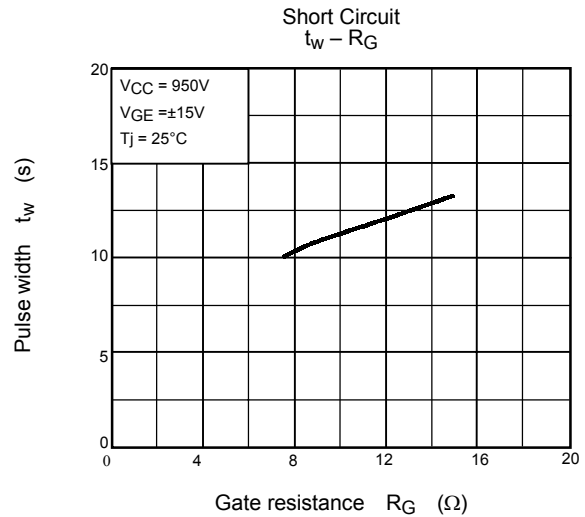
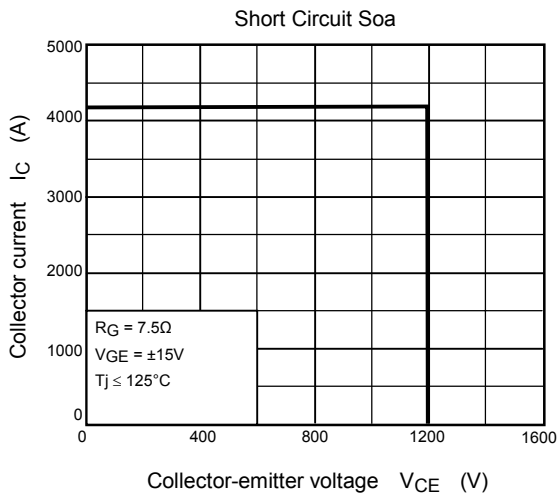
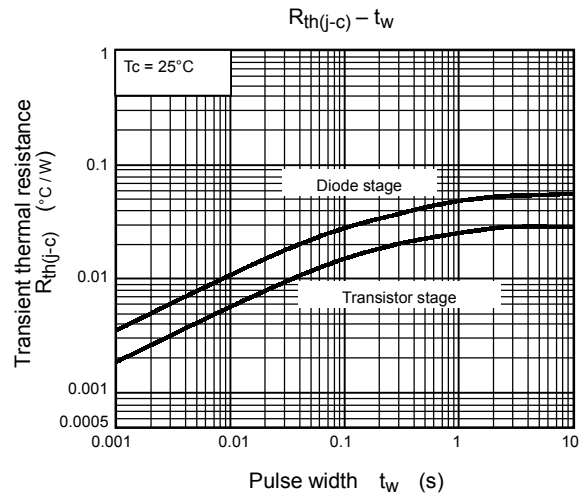
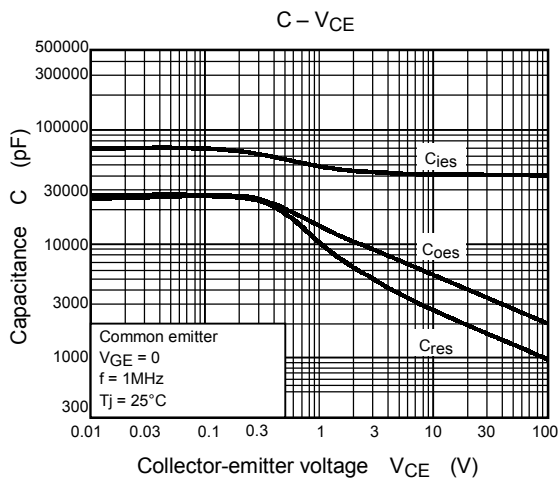
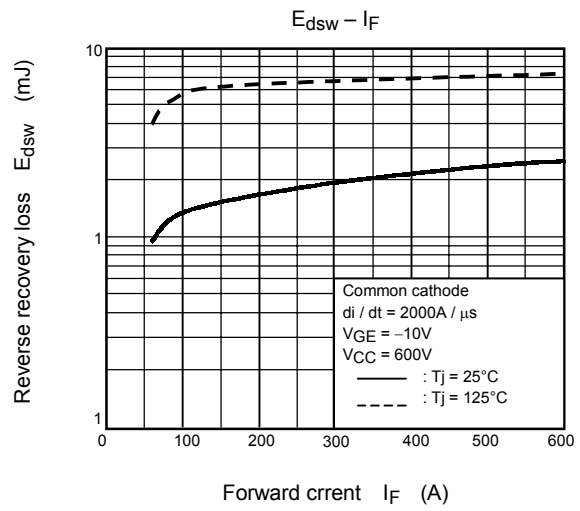
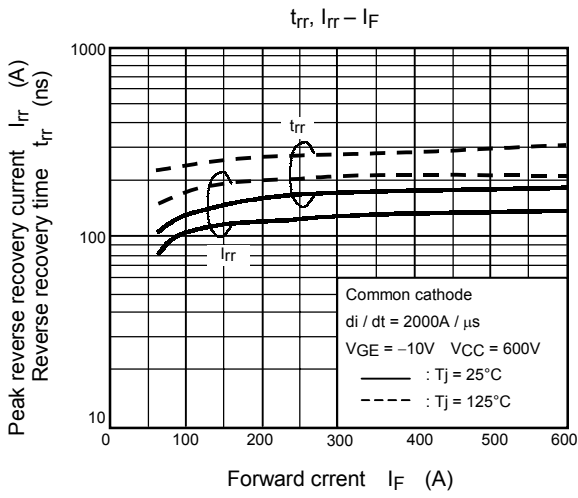
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Zero power resistance	R25	$T_c = 25^\circ\text{C}$	—	100	—	$\text{k}\Omega$
B value	B25 / 85	$T_c = 25^\circ\text{C} / T_c = 85^\circ\text{C}$	—	4390	—	K
Isolation voltage		$T_c = 25^\circ\text{C}$	2500	—	—	Vrms

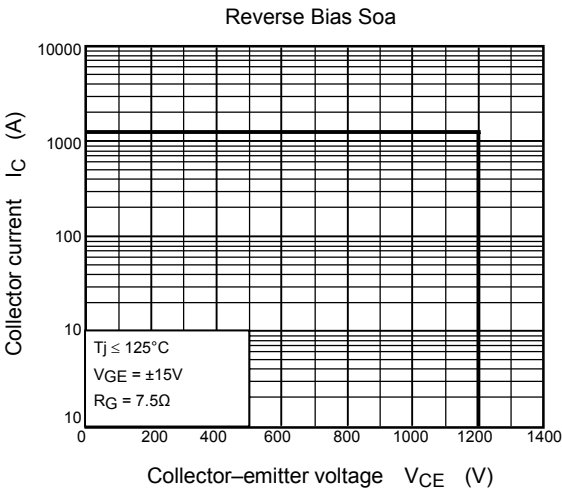
(Note): Switching time measurement circuit and input / output waveforms











<V_{CE(sat)} Rank>

V_{CE(sat)}

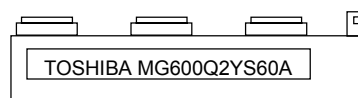
Rank Symbol	Min.	Max.
21	1.8	2.1
22	1.9	2.2
23	2.0	2.3
24	2.1	2.4
25	2.2	2.5
26	2.3	2.6
27	2.4	2.7
28	2.5	2.8
29	2.6	2.9
30	2.7	3.0
31	2.8	3.1
32	2.9	3.2
33	3.0	3.3

<V_F Rank>

V_F

Rank Symbol	Min.	Max.
B	1.5	1.8
C	1.7	2.0
D	1.9	2.2
E	2.1	2.4
F	2.3	2.6
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

<Mark Position>



High side
Low side

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