

TENTATIVE

TOSHIBA GTR MODULE SILICON N CHANNEL IGBT

# MG50Q2YS50A

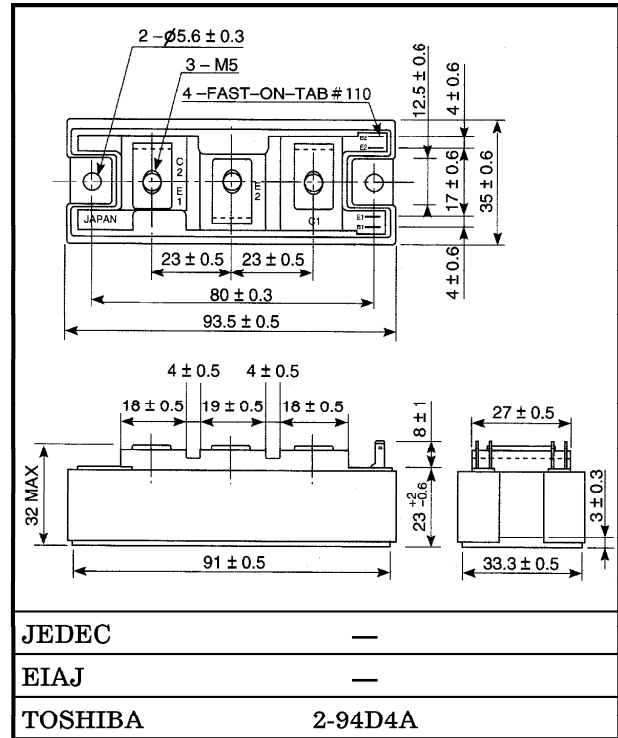
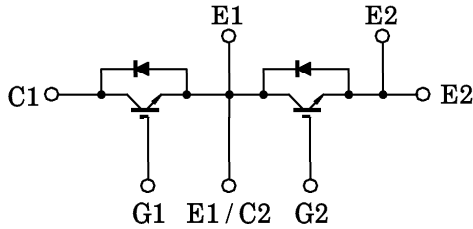
HIGH POWER SWITCHING APPLICATIONS

Unit in mm

MOTOR CONTROL APPLICATIONS

- High Input Impedance
- High Speed :  $t_f = 0.3 \mu s$  (Max.)  
@Inductive Load
- Low Saturation Voltage  
:  $V_{CE(sat)} = 3.6V$  (Max.)
- Enhancement-Mode
- Includes a Complete Half Bridge in One Package.
- The Electrodes are Isolated from Case.

EQUIVALENT CIRCUIT



Weight : 202g

961001FAA1

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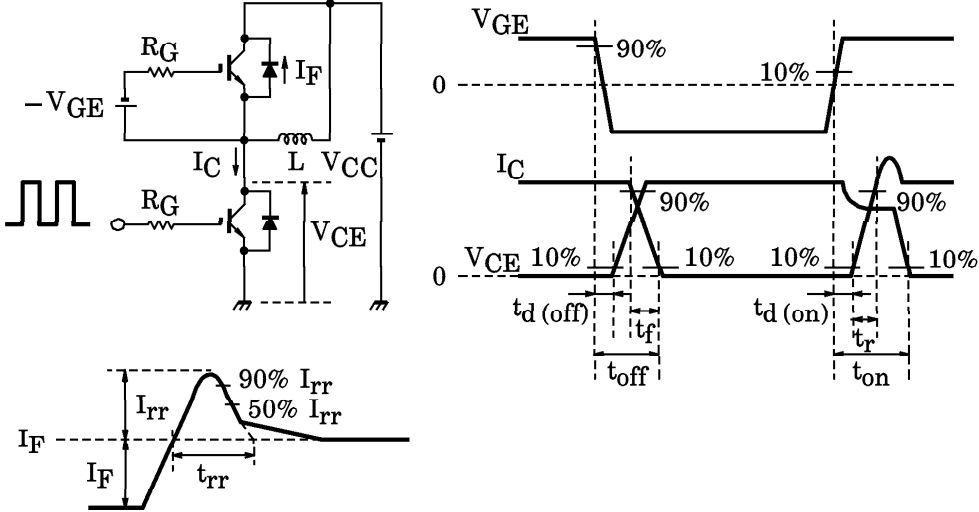
MAXIMUM RATINGS (Ta = 25°C)

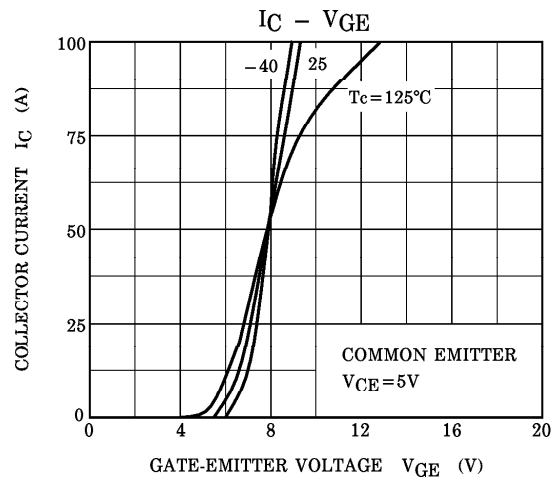
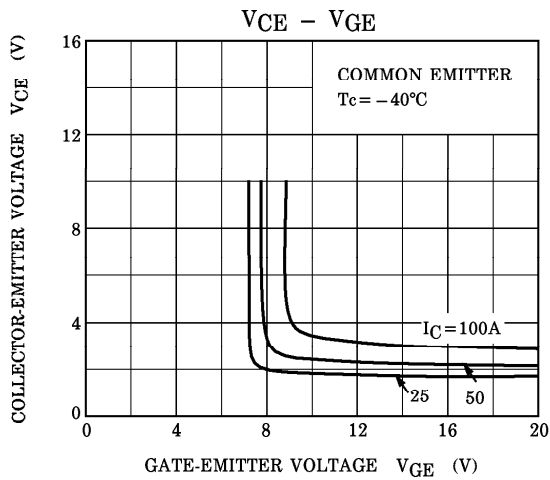
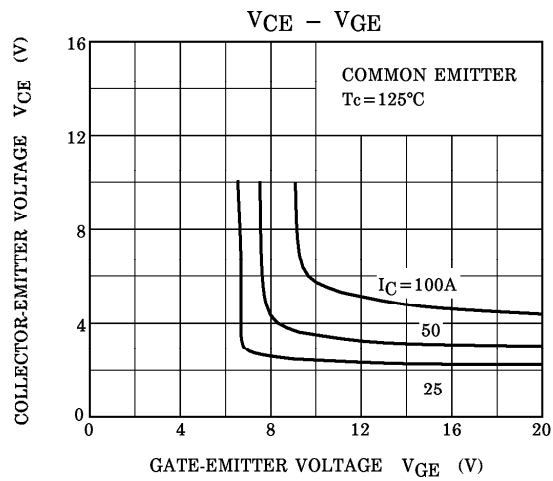
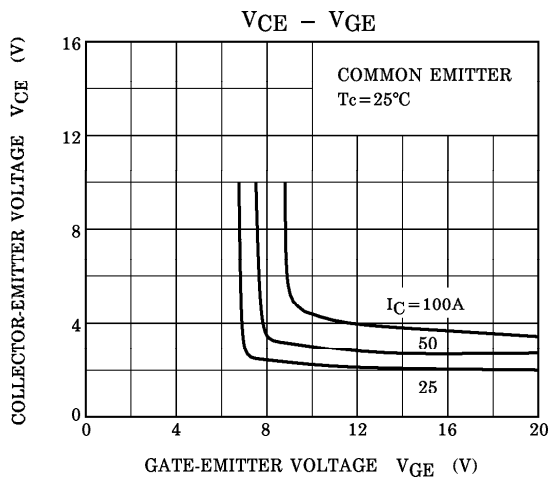
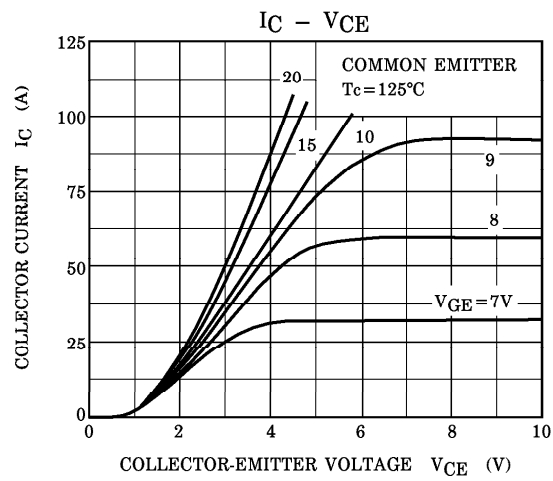
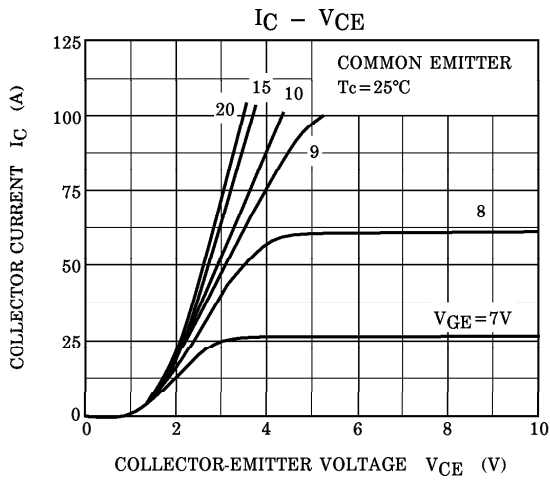
CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Emitter Voltage		V <sub>CES</sub>	1200	V
Gate-Emitter Voltage		V <sub>GES</sub>	±20	V
Collector Current	DC	I <sub>C</sub> (25°C / 80°C)	78 / 50	A
	1ms	I <sub>CP</sub> (25°C / 80°C)	156 / 100	
Forward Current	DC	I <sub>F</sub>	50	A
	1ms	I <sub>FM</sub>	100	
Collector Power Dissipation (T <sub>c</sub> = 25°C)		P <sub>C</sub>	400	W
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 (Terminal / Mounting)		—	3 / 3	N·m

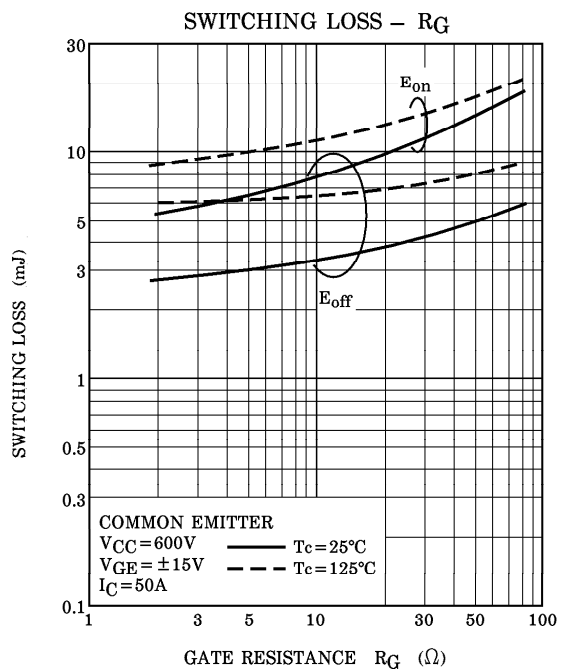
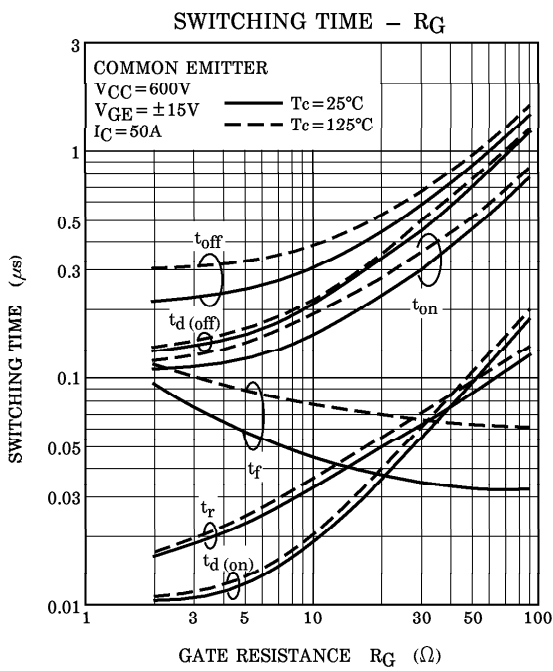
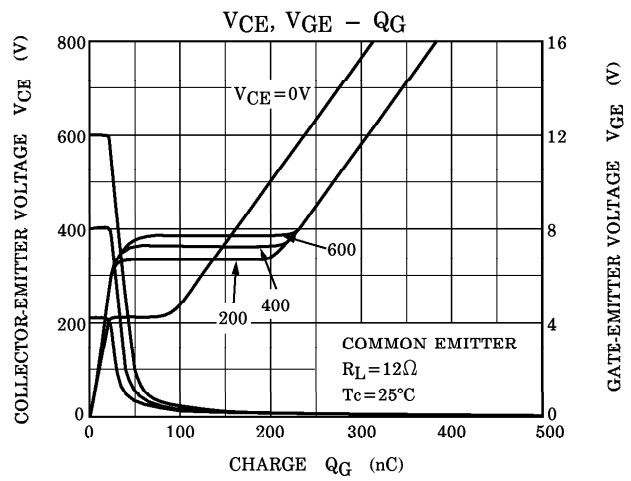
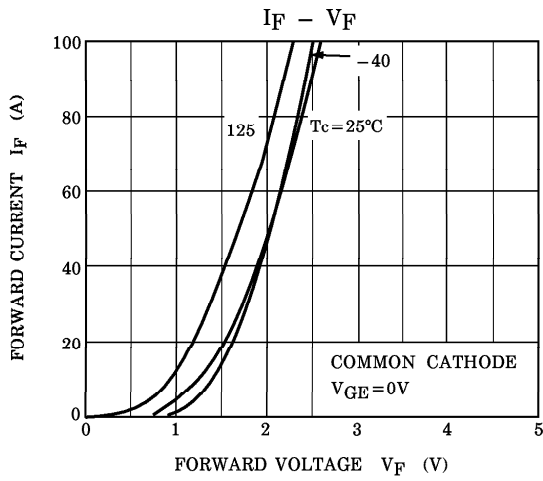
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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> = 1200V, V <sub>GE</sub> = 0	—	—	1.0	mA	
Gate-Emitter Cut-Off Voltage		V <sub>GE (off)</sub>	I <sub>C</sub> = 50mA, V <sub>CE</sub> = 5V	3.0	—	6.0	V	
Collector-Emitter Saturation Voltage		V <sub>CE (sat)</sub>	I <sub>C</sub> = 50A, V <sub>GE</sub> = 15V	T <sub>j</sub> = 25°C	—	2.8	3.6	V
				T <sub>j</sub> = 125°C	—	3.1	4.0	
Input Capacitance		C <sub>ies</sub>	V <sub>CE</sub> = 10V, V <sub>GE</sub> = 0, f = 1MHz	—	6.0	—	nF	
Switching Time	Turn-On Delay Time	t <sub>d (on)</sub>	Inductive Load V <sub>CC</sub> = 600V I <sub>C</sub> = 50A V <sub>GE</sub> = ±15V R <sub>G</sub> = 24Ω  (Note 1)	—	0.05	—	μs	
	Rise Time	t <sub>r</sub>		—	0.05	—		
	Turn-On Time	t <sub>on</sub>		—	0.2	—		
	Turn-Off Delay Time	t <sub>d (off)</sub>		—	0.5	—		
	Fall Time	t <sub>f</sub>		—	0.1	0.3		
	Turn-Off Time	t <sub>off</sub>		—	0.6	—		
Forward Voltage		V <sub>F</sub>	I <sub>F</sub> = 50A, V <sub>GE</sub> = 0	—	1.9	3.0	V	
Reverse Recovery Time		t <sub>rr</sub>	I <sub>F</sub> = 50A, V <sub>GE</sub> = -10V di / dt = 700A / μs (Note 1)	—	0.1	0.25	μs	
Thermal Resistance		R <sub>th (j-c)</sub>	Transistor Stage	—	—	0.31	°C / W	
			Diode Stage	—	—	0.47		

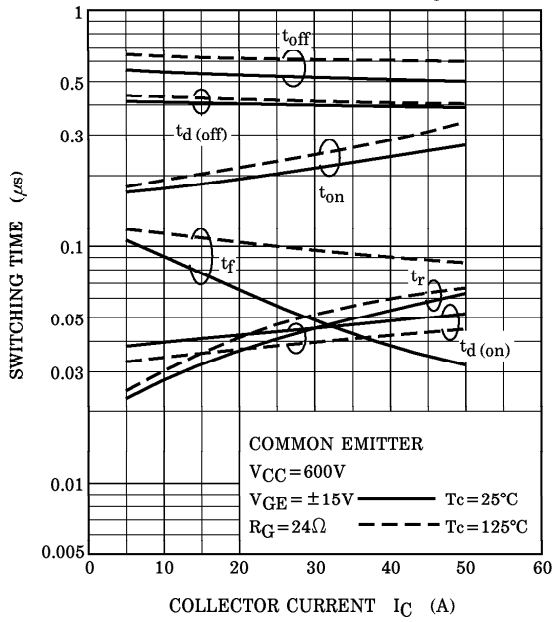
(Note 1) Switching Time and Reverse Recovery Time Test Circuit & Timing Chart



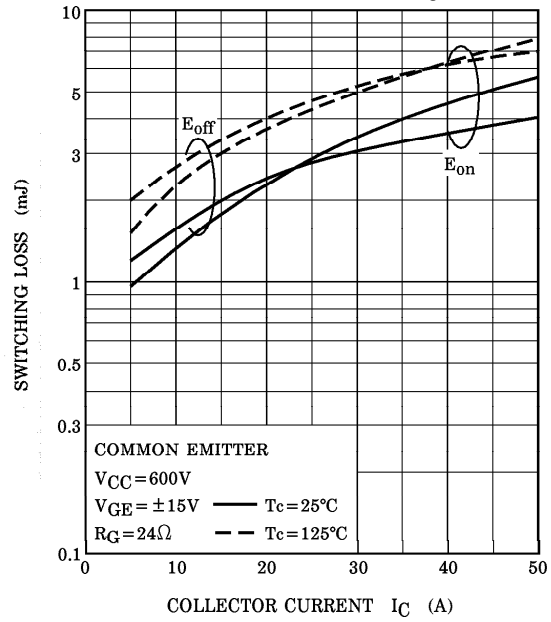




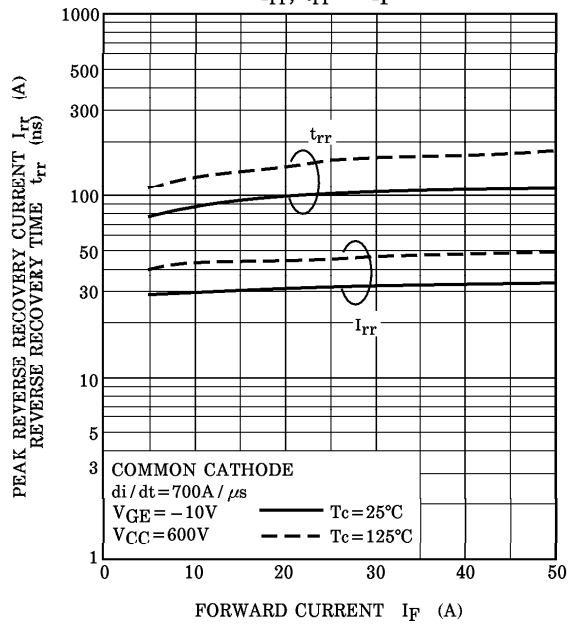
SWITCHING TIME -  $I_C$



SWITCHING LOSS -  $I_C$



$I_{rr}$ ,  $t_{rr}$  -  $I_F$



$E_{dsw}$  -  $I_F$

