

TOSHIBA GTR MODULE SILICON N CHANNEL IGBT

MG400Q1US51

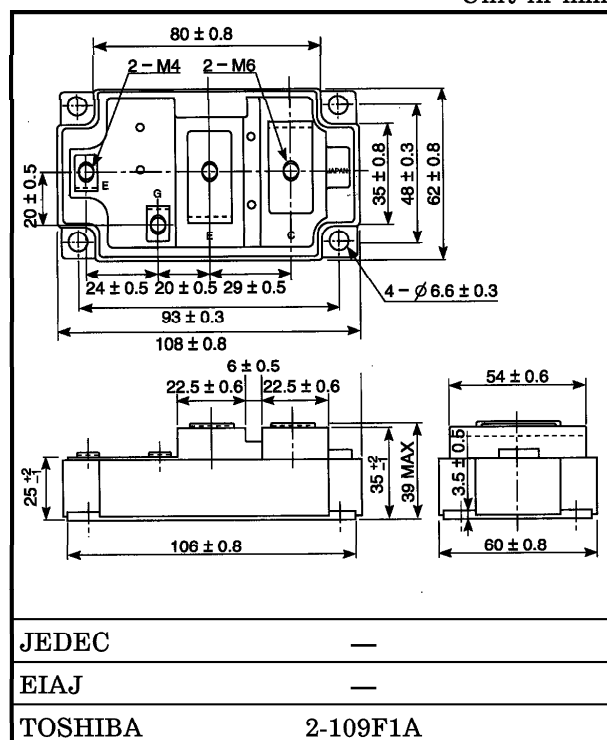
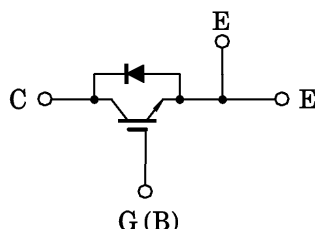
HIGH POWER SWITCHING APPLICATIONS

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
- The Electrodes are Isolated from Case.

EQUIVALENT CIRCUIT



Weight : 465g

MAXIMUM RATINGS ($T_a = 25^\circ C$)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Emitter Voltage		V_{CES}	1200	V
Gate-Emitter Voltage		V_{GES}	± 20	V
Collector Current	DC	I_C ($25^\circ C / 80^\circ C$)	520 / 400	A
	1ms	I_{CP} ($25^\circ C / 80^\circ C$)	1040 / 800	
Forward Current	DC	I_F	400	A
	1ms	I_{FM}	800	
Collector Power Dissipation ($T_c = 25^\circ C$)		P_C	3000	W
Junction Temperature		T_j	150	$^\circ C$
Storage Temperature Range		T_{stg}	$-40 \sim 125$	$^\circ C$
Isolation Voltage		V_{Isol}	2500 (AC 1 minute)	V
Screw Torque (Terminal : M4 / M6 / Mounting)		—	2 / 3 / 3	N·m

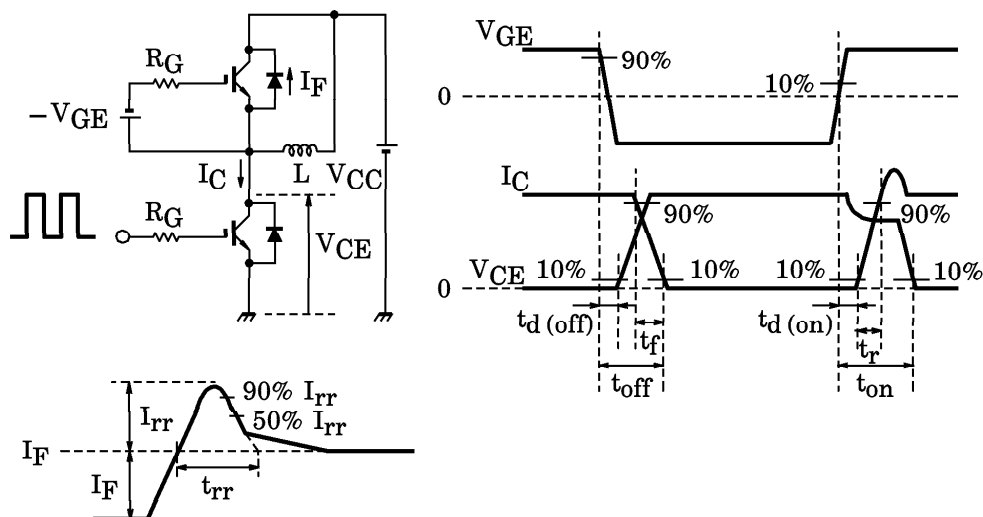
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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I _{GES}	V _{GE} = ±20V, V _{CE} = 0	—	—	±500	nA
Collector Cut-off Current		I _{CES}	V _{CE} = 1200V, V _{GE} = 0	—	—	4.0	mA
Gate-Emitter Cut-off Voltage		V _{GE} (off)	I _C = 400mA, V _{CE} = 5V	3.0	—	6.0	V
Collector-Emitter Saturation Voltage		V _{CE} (sat)	I _C = 400A, T _j = 25°C	—	2.8	3.6	V
			V _{GE} = 15V, T _j = 125°C	—	3.1	4.0	
Input Capacitance		C _{ies}	V _{CE} = 10V, V _{GE} = 0, f = 1MHz	—	44.0	—	nF
Switching Time	Turn-on Delay Time	t _d (on)	Inductive Load V _{CC} = 600V I _C = 400A V _{GE} = ±15V R _G = 2.4Ω (Note 1)	—	0.05	—	μs
	Rise Time	t _r		—	0.05	—	
	Turn-on Time	t _{on}		—	0.2	—	
	Turn-off Delay Time	t _d (off)		—	0.5	—	
	Fall Time	t _f		—	0.1	0.3	
	Turn-off Time	t _{off}		—	0.6	—	
Forward Voltage		V _F	I _F = 400A, V _{GE} = 0	—	2.4	3.5	V
Reverse Recovery Time		t _{rr}	I _F = 400A, V _{GE} = −10V di / dt = 1000A / μs (Note 1)	—	0.25	0.45	μs
Thermal Resistance		R _{th} (j-c)	Transistor Stage	—	—	0.042	°C / W
			Diode Stage	—	—	0.12	

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



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