

TOSHIBA**MG400Q1US51**

TOSHIBA GTR MODULE SILICON N CHANNEL IGBT

MG400Q1US51

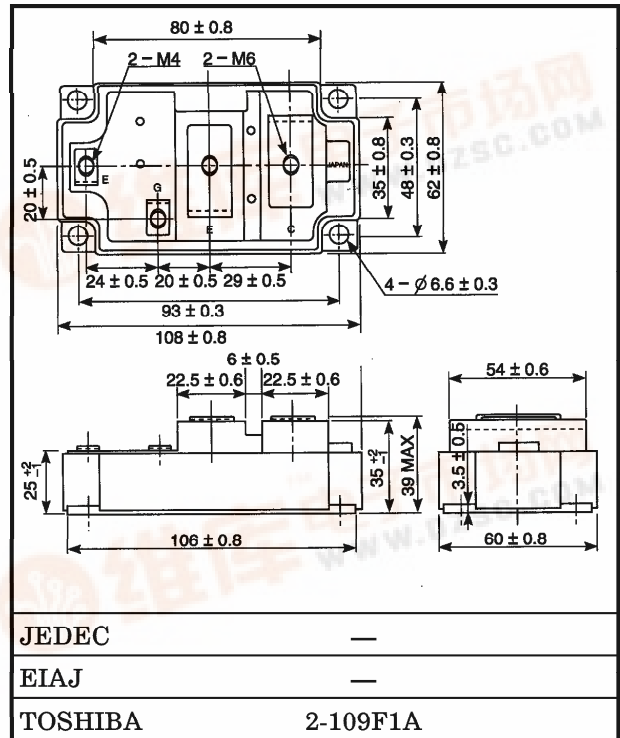
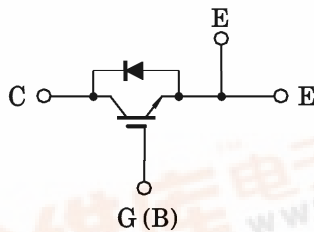
HIGH POWER SWITCHING APPLICATIONS

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

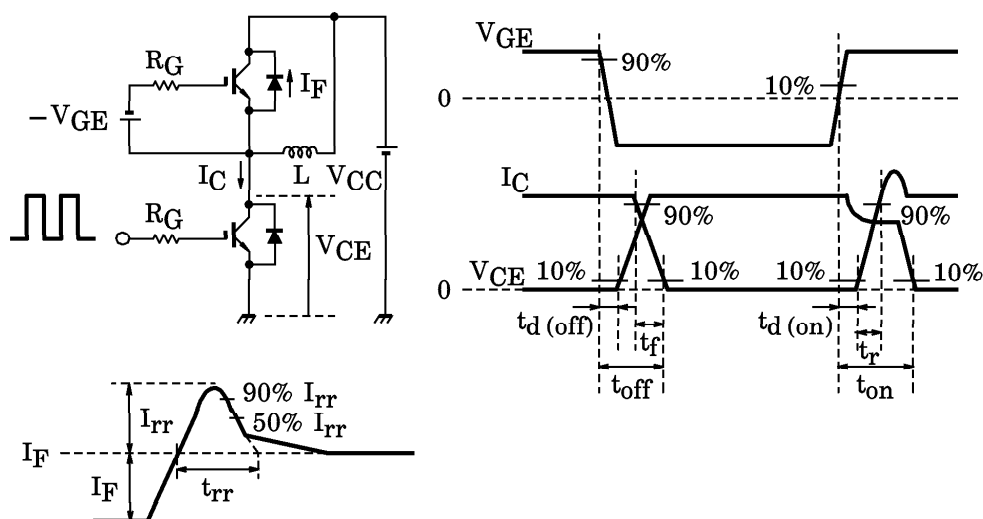
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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GES}	$V_{GE} = \pm 20V, V_{CE} = 0$	—	—	± 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		$V_{CE(sat)}$	$I_C = 400A, V_{GE} = 15V$	$T_j = 25^\circ C$	2.8	3.6	V
				$T_j = 125^\circ C$	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 $V_{CC} = 600V$ $I_C = 400A$ $V_{GE} = \pm 15V$ $R_G = 2.4\Omega$ (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}	$I_F = 400A, V_{GE} = -10V$ $di/dt = 1000A/\mu s$ (Note 1)	—	0.25	0.45	μs
Thermal Resistance		$R_{th(j-c)}$	Transistor Stage	—	—	0.042	$^\circ C/W$
			Diode Stage	—	—	0.12	

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



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