

TOSHIBA GTR Module Silicon N Channel IGBT

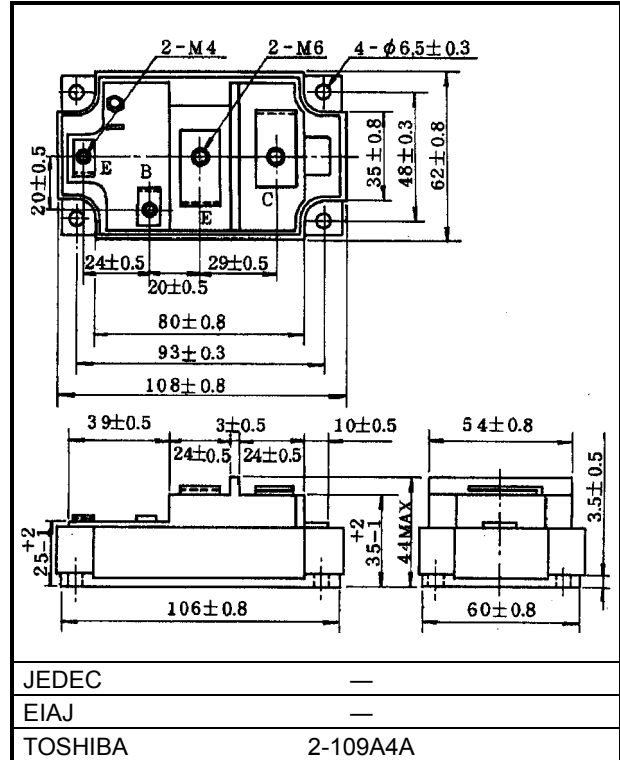
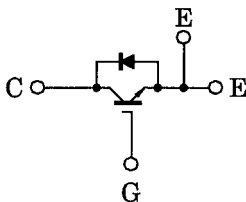
MG400J1US51

High Power Switching Applications
 Motor Control Applications

Unit: mm

- The electrodes are isolated from case.
- High input impedance
- Includes a complete half bridge in one package.
- Enhancement-mode
- High speed : $t_f = 0.30\mu s$ (Max.) ($I_C = 400A$)
 $t_{rr} = 0.15\mu s$ (Max.) ($I_F = 400A$)
- Low saturation voltage
 : $V_{CE(sat)} = 2.70V$ (Max.) ($I_C = 400A$)

Equivalent Circuit



Weight: 465g (Typ.)

Maximum Ratings ($T_a = 25^\circ C$)

Characteristic	Symbol	Rating	Unit
Collector-emitter voltage	V_{CES}	600	V
Gate-emitter voltage	V_{GES}	± 20	V
Collector current	DC	I_C	A
	1ms	I_{CP}	
Forward current	DC	I_F	A
	1ms	I_{FM}	
Collector power dissipation ($T_c = 25^\circ C$)	P_C	1500	W
Junction temperature	T_j	150	$^\circ C$
Storage temperature range	T_{stg}	-40 ~ 125	$^\circ C$
Isolation voltage	V_{isol}	2500 (AC 1 min.)	V
Screw torque (Terminal / M4 / M6 / mounting)	—	2 / 3 / 3	N·m

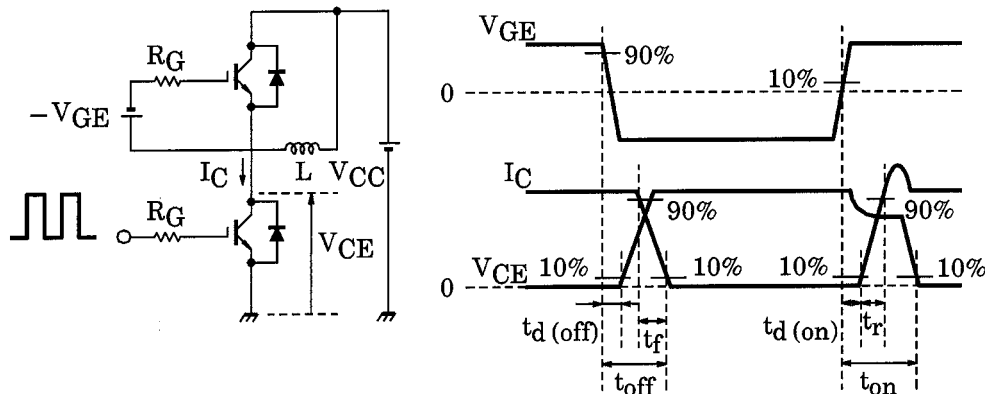
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Electrical Characteristics (Ta = 25°C)

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}	$V_{CE} = 600V, V_{GE} = 0$	—	—	4.0	mA
Gate-emitter cut-off voltage		$V_{GE (off)}$	$I_C = 40mA, V_{CE} = 5V$	5.0	7.0	8.0	V
Collector-emitter saturation voltage		$V_{CE (sat)}$	$I_C = 400A, V_{GE} = 15V$	—	2.10	2.70	V
Input capacitance		C_{ies}	$V_{CE} = 10V, V_{GE} = 0, f = 1MHz$	—	36000	—	pF
Switching time	Turn-on delay time	$t_{d (on)}$	Inductive load $V_{CC} = 300V$ $I_C = 400A$ $V_{GE} = \pm 15V$ $R_G = 2\Omega$ (Note 1)	—	0.20	0.40	μs
	Rise time	t_r		—	0.15	0.30	
	Turn-on time	t_{on}		—	0.60	1.20	
	Turn-off delay time	$t_{d (off)}$		—	0.20	0.40	
	Fall time	t_f		—	0.15	0.30	
	Turn-off time	t_{off}		—	0.50	1.00	
Forward voltage		V_F	$I_F = 400 A, V_{GE} = 0$	—	2.30	3.00	V
Reverse recovery time		t_{rr}	$I_F = 400 A, V_{GE} = -10 V,$ $di / dt = 400 A / \mu s$	—	0.08	0.15	μs
Thermal resistance		$R_{th (j-c)}$	Transistor stage	—	—	0.083	$^{\circ}C / W$
			Diode stage	—	—	0.20	

Note 1: Switching time test circuit & timing chart



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