

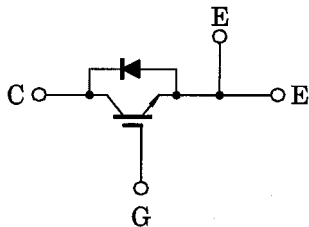
TOSHIBA GTR Module Silicon N Channel IGBT

# MG600Q1US51

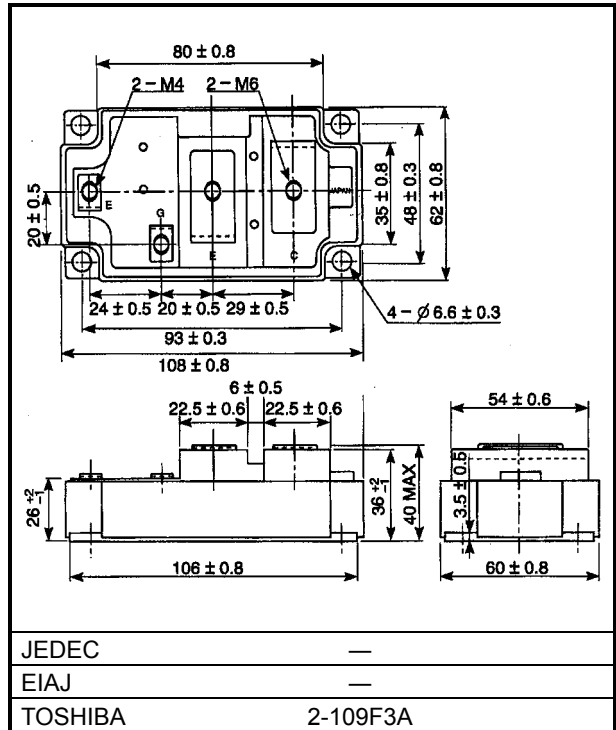
High Power Switching Applications  
 Motor Control Applications

- 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 onepackage.
- The electrodes are isolated from case.

## Equivalent Circuit



Unit: mm



Weight: 465g

## 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
	1ms	$I_{CP}$	1200 A
Forward current	DC	$I_F$	600 A
	1ms	$I_{FM}$	1200 A
Collector power dissipation (Tc = 25°C)	$P_C$	4100	W
Junction temperature	$T_j$	150	°C
Storage temperature range	$T_{stg}$	-40 ~ 125	°C
Isolation voltage	$V_{isol}$	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		$I_{GES}$	$V_{GE} = \pm 20V, V_{CE} = 0$	—	—	$\pm 500$	nA	
Collector cut-off current		$I_{CES}$	$V_{CE} = 1200V, V_{GE} = 0$	—	—	4.0	mA	
Gate-emitter cut-off voltage		$V_{GE (off)}$	$I_C = 600mA, V_{CE} = 5V$	3.0	—	6.0	V	
Collector-emitter saturation voltage		$V_{CE (sat)}$	$I_C = 600A, V_{GE} = 15V$	$T_j = 25^\circ C$	—	2.8	3.6	V
				$T_j = 125^\circ C$	—	3.1	4.0	
Input capacitance		$C_{ies}$	$V_{CE} = 10V, V_{GE} = 0, f = 1MHz$	—	60.0	—	nF	
Switching time	Turn-on delay time	$t_{d (on)}$	Inductive load $V_{CC} = 600V$ $I_C = 600A$ $V_{GE} = \pm 15V$ $R_G = 2.0\Omega$  (Note 1)	—	0.3	—	$\mu s$	
	Rise time	$t_r$		—	0.3	—		
	Turn-on time	$t_{on}$		—	0.6	—		
	Turn-off delay time	$t_{d (off)}$		—	1.0	—		
	Fall time	$t_f$		—	0.15	0.3		
	Turn-off time	$t_{off}$		—	1.2	—		
Forward voltage		$V_F$	$I_F = 600 A, V_{GE} = 0$	—	2.4	3.5	V	
Reverse recovery time		$t_{rr}$	$I_F = 600 A, V_{GE} = -10 V, di / dt = 1000 A / \mu s$ (Note 1)	—	0.25	0.4	$\mu s$	
Thermal resistance		$R_{th (j-c)}$	Transistor stage	—	—	0.03	$^\circ C / W$	
			Diode stage	—	—	0.12		

Note 1: Switching time and reverse recovery time test circuit & timing chart

