

TOSHIBA GTR MODULE SILICON N CHANNEL IGBT

MG50Q1ZS50

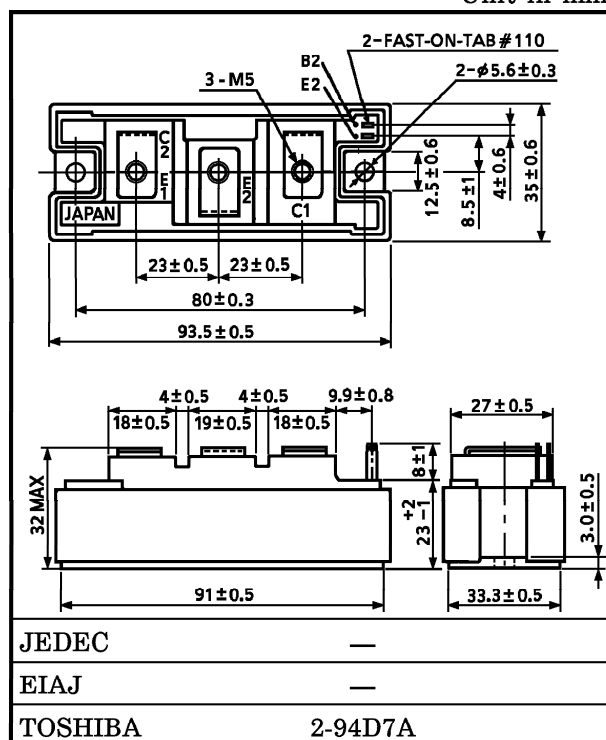
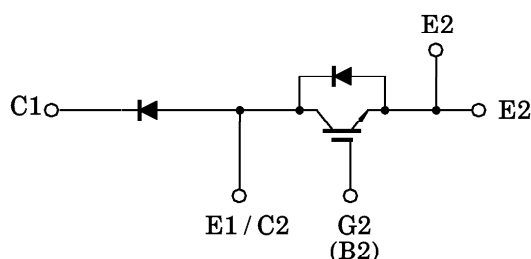
HIGH POWER SWITCHING APPLICATIONS

MOTOR CONTROL APPLICATIONS

Unit in mm

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

EQUIVALENT CIRCUIT



Weight : 202 g

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 ($25^\circ C / 80^\circ C$)	78 / 50	A
	1 ms	I_{CP} ($25^\circ C / 80^\circ C$)	156 / 100	
Forward Current	DC	I_F	50	A
	1 ms	I_{FM}	100	
Collector Power Dissipation ($T_c = 25^\circ C$)		P_C	400	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 / Mounting)		—	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}	$V_{GE} = \pm 20 \text{ V}, V_{CE} = 0$	—	—	± 500	nA
Collector Cut-off Current		I_{CES}	$V_{CE} = 1200 \text{ V}, V_{GE} = 0$	—	—	1.0	mA
Gate-Emitter Cut-off Voltage		$V_{GE}(\text{off})$	$I_C = 50 \text{ mA}, V_{CE} = 5 \text{ V}$	3.0	—	6.0	V
Collector-Emitter Saturation Voltage		$V_{CE}(\text{sat})$	$I_C = 50 \text{ A}, V_{GE} = 15 \text{ V}$	—	2.8	3.6	V
			$T_j = 125^\circ\text{C}$	—	3.1	4.0	
Input Capacitance		C_{ies}	$V_{CE} = 10 \text{ V}, V_{GE} = 0, f = 1 \text{ MHz}$	—	6.0	—	nF
Switching Time	Turn-on Delay Time	$t_d(\text{on})$	Inductive Load $V_{CC} = 600 \text{ V}$ $I_C = 50 \text{ A}$ $V_{GE} = \pm 15 \text{ V}$ $R_G = 24 \Omega$ (Note 1)	—	0.05	—	μs
	Rise Time	t_r		—	0.05	—	
	Turn-on Time	t_{on}		—	0.2	—	
	Turn-off Delay Time	$t_d(\text{off})$		—	0.5	—	
	Fall Time	t_f		—	0.1	0.3	
	Turn-off Time	t_{off}		—	0.6	—	
Forward Voltage		V_F	$I_F = 50 \text{ A}, V_{GE} = 0$	—	2.4	3.5	V
Reverse Recovery Time		t_{rr}	$I_F = 50 \text{ A}, V_{GE} = -10 \text{ V}$ $di/dt = 700 \text{ A}/\mu\text{s}$ (Note 1)	—	0.1	0.25	μs
Thermal Resistance		$R_{th(j-c)}$	Transistor Stage	—	—	0.31	$^\circ\text{C}/\text{W}$
			Diode Stage	—	—	0.94	

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

