

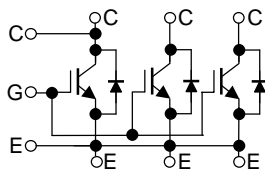
TOSHIBA GTR Module Silicon N-Channel IGBT

MG1200FXF1US51

High Power Switching Applications
 Motor Control Applications

- High input impedance
- Enhancement mode
- Electrodes are isolated from case.

Equivalent Circuit



Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Collector-emitter voltage		V_{CES}	3300	V
Gate-emitter voltage		V_{GES}	± 20	V
Collector current	RMS	I_C	1200 (Note 1)	A
	Peak turn off current	I_{CP}	2400 (Note 2)	A
Peak 1 cycle surge current	10 ms (half sine)	I_{FSM}	10	kA
Collector power dissipation		P_C	4000	W
Operating junction temperature		T_j	-40~125	°C
Storage temperature range		T_{stg}	-40~125	°C
Isolation voltage		V_{Isol}	6000 (AC 1 min)	V
Screw torque	Terminal: M4/M8	—	2/7	Nm
	Mounting		4	

Caution: MG1200FXF1US51 has no short-circuit capability.

Note 1: 50 Hz (half sine). $T_C = 75^\circ\text{C}$, switching loss is not contained.

Note 2: $V_{CC} \leq 2200\text{ V}$, $V_{CP} \leq 2700\text{ V}$, $LS \approx 160\text{ nH}$, $CGE = 0.1\text{ }\mu\text{F}$, $RG = 3.3\text{ }\Omega$, $V_{GE} = \pm 15\text{ V}$, $T_j \leq 125^\circ\text{C}$

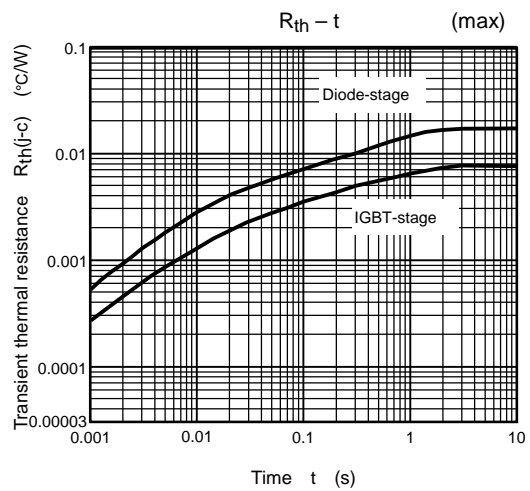
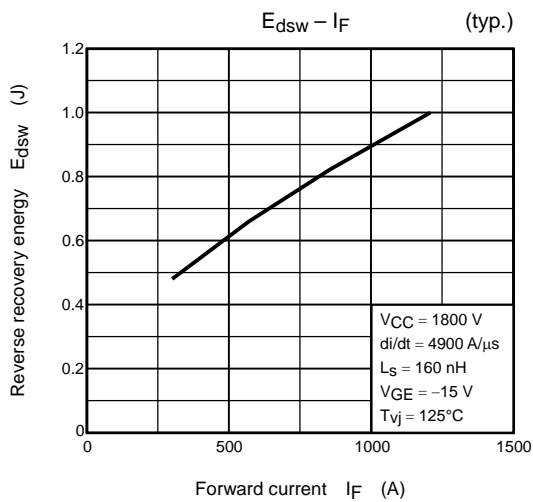
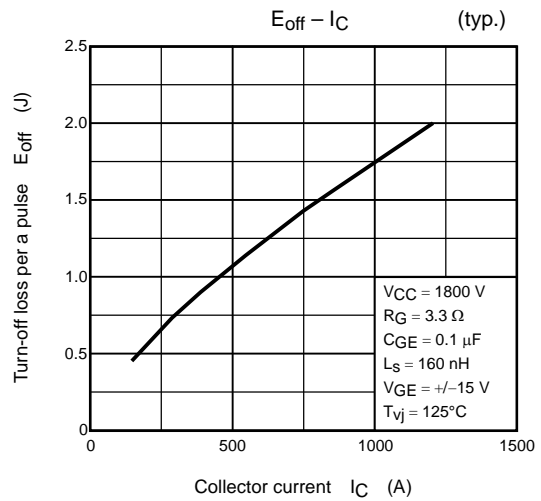
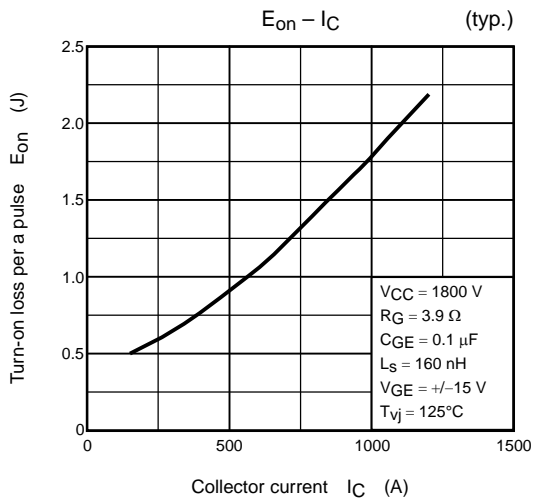
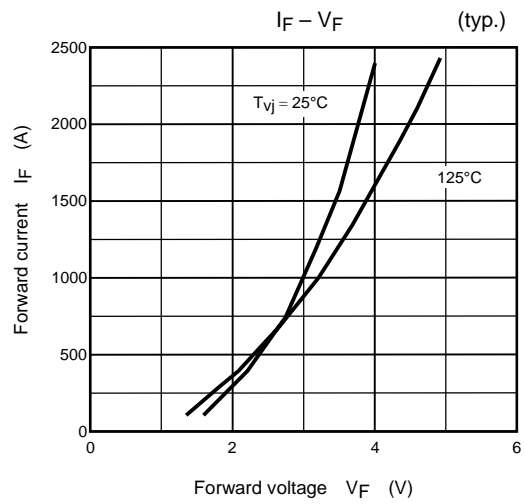
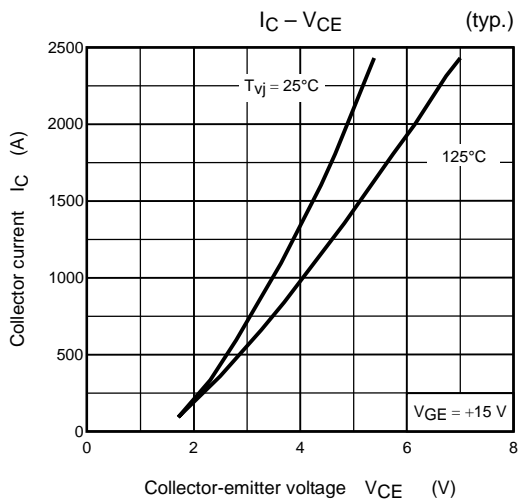
Electrical Characteristics (T_{vj} = 125°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I _{GES}	V _{GE} = ±20 V, V _{CE} = 0 V	—	—	±50	nA
Collector cut-off current		I _{CES}	V _{CE} = 3300 V, V _{GE} = 0 V	—	75	100	mA
Gate-emitter cut-off voltage		V _{GE (off)}	V _{CE} = 5 V, I _C = 1.2 A	—	4.4	—	V
Collector-emitter saturation voltage		V _{CE (sat)}	I _C = 1200 A, V _{GE} = 15 V	—	4.6	5.3	V
Input capacitance		C _{ies}	V _{CE} = 10 V, V _{GE} = 0 V, f = 100 kHz	—	230	—	nF
Switching time	Rise time	t _r	V _{CC} = 1800 V, I _C = 1200 A,	—	0.3	—	μs
	Turn-on time	t _{on}	V _{GG} = ±15 V, C _{GE} = 0.1 μF,	—	2.1	—	μs
	Fall time	t _f	R _G (on)/(off) = 3.9/3.3 Ω	—	1.8	—	μs
	Turn-off time	t _{off}	(dic/dt (on) ≈ 4900 A/μs) (Inductive load, L _S ≈ 160 nH)	—	4.0	—	μs
Forward voltage of diode		V _F	I _F = 1200 A, V _{GE} = 0 V	—	3.5	4.0	V
Reverse recovery charge		Q _{rr}	I _F = 1200 A, V _{GG} = -15 V, di _F /dt ≈ 4900 A/μs,	—	1000	—	μC
Peak reverse recovery current		I _{rr}	V _{CC} = 1800 V	—	1500	—	A
Switching dissipation	turn-on loss	E _{on}	V _{CC} = 1800 V, I _C = 1200 A, V _{GG} = ±15 V, C _{GE} = 0.1 μF, R _G (on)/(off) = 3.9/3.3 Ω	—	2.2	2.8	J
	turn-off loss	E _{off}	(dic/dt (on) ≈ 4900 A/μs) (Inductive load, L _S ≈ 160 nH)	—	2.0	3.0	J
	Diode reverse recovery loss	E _{dsw}	I _F = 1200 A, V _{GG} = -15 V, di _F /dt ≈ 4900 A/μs, V _{CC} = 1800 V	—	1.0	1.5	J

Thermal Resistance (T_c = 25°C)

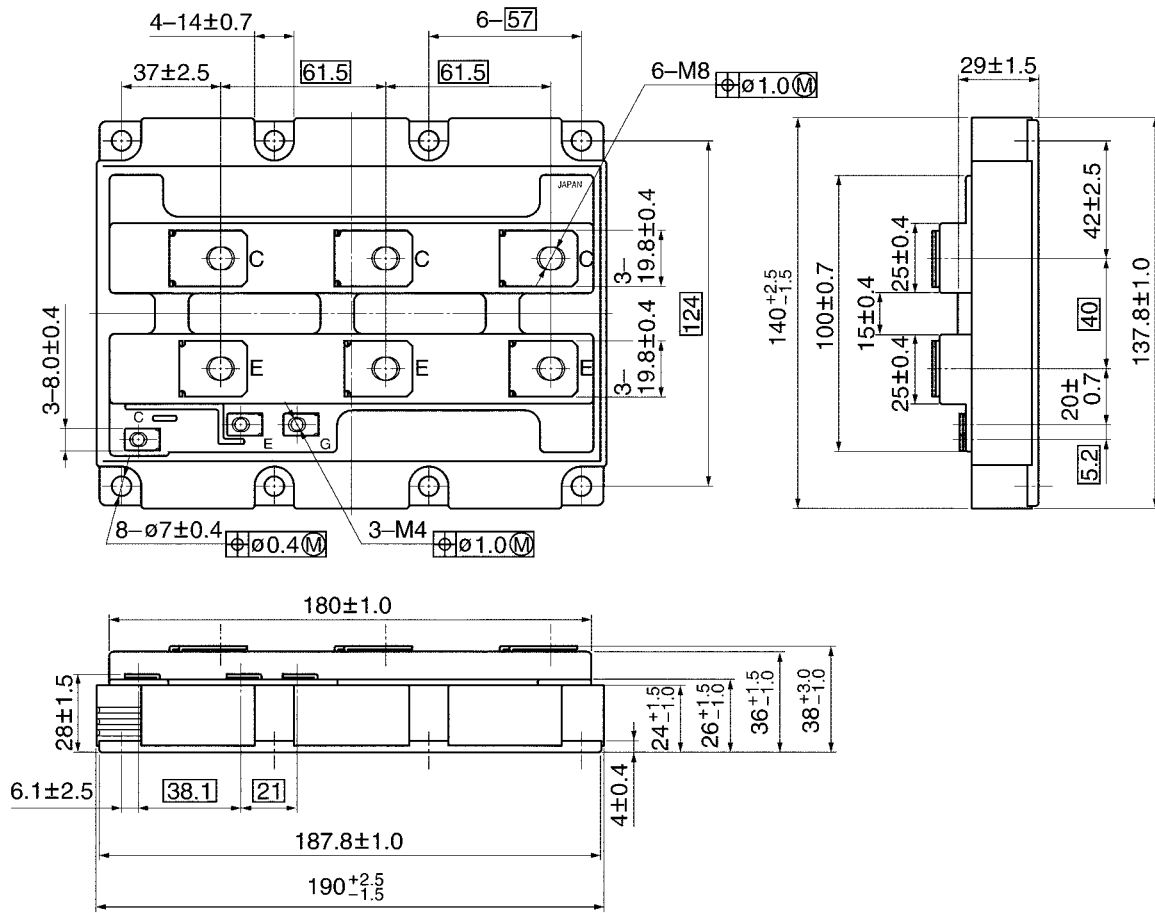
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Thermal Resistance	R _{th (j-c)}	Transistor (IGBT) stage	—	—	8.0	°C/kW
		Diode stage	—	—	16.0	
	R _{th (c-f)}	Per module (Note 3)	—	6.0	—	

Note 3: Toshiba silicone's YG6260 heat radiation grease is recommended for use with semiconductor devices. Apply a thin, even (100-to-200-μm) coating of grease.



Package Dimensions: 2-193A1A

Unit: mm



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