

TOSHIBA Insulated Gate Bipolar Transistor Silicon N Channel IGBT

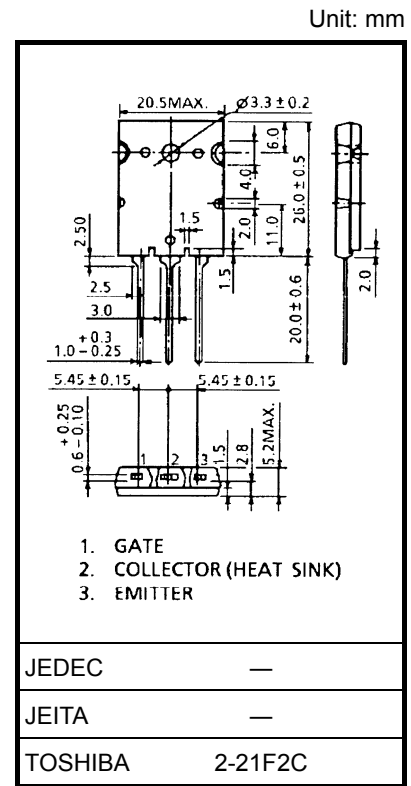
GT60M323

Voltage Resonance Inverter Switching Application

- Enhancement mode type
- High speed : $t_f = 0.09 \mu\text{s}$ (typ.) ($I_C = 60 \text{ A}$)
- Low saturation voltage : $V_{CE(sat)} = 2.3 \text{ V}$ (typ.) ($I_C = 60 \text{ A}$)
- FRD included between emitter and collector
- TO-3P(LH) (Toshiba package name)

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Rating	Unit
Collector-emitter voltage	V_{CES}	900	V
Gate-emitter voltage	V_{GES}	± 25	V
Continuous collector current	@ $T_c = 100^\circ\text{C}$	31	A
	@ $T_c = 25^\circ\text{C}$	60	
Pulsed collector current	I_{CP}	120	A
Diode forward current	DC	I_F	A
	Pulsed	I_{FP}	
Collector power dissipation	@ $T_c = 100^\circ\text{C}$	P_C	W
	@ $T_c = 25^\circ\text{C}$	200	
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55 to 150	$^\circ\text{C}$



Weight: 9.75 g (typ.)

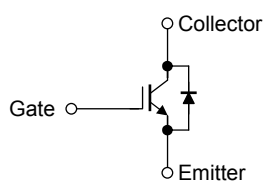
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

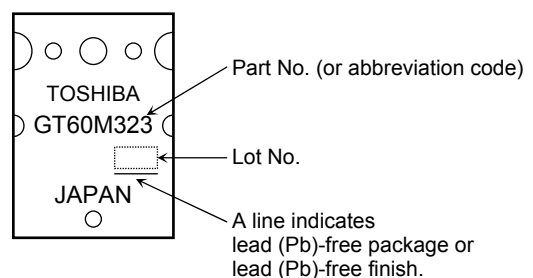
Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance (IGBT)	$R_{th(j-c)}$	0.625	$^\circ\text{C/W}$
Thermal resistance (diode)	$R_{th(j-c)}$	4.0	$^\circ\text{C/W}$

Equivalent Circuit



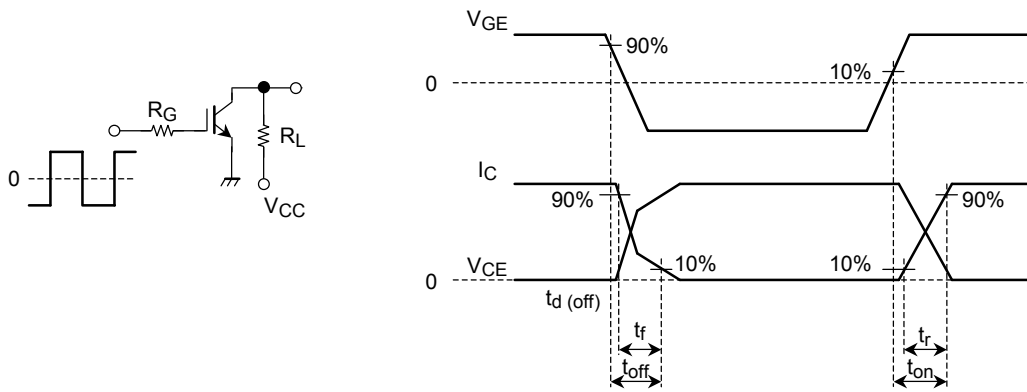
Marking

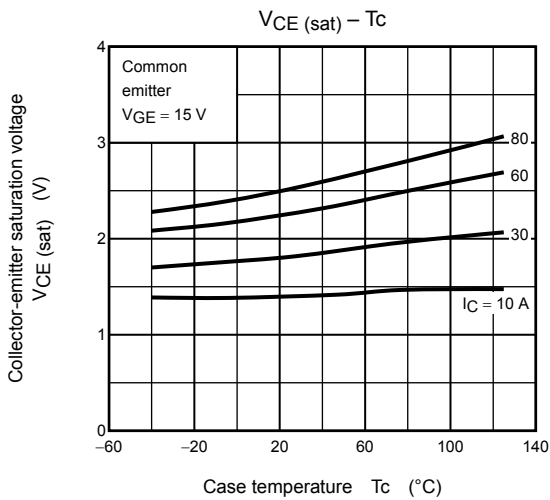
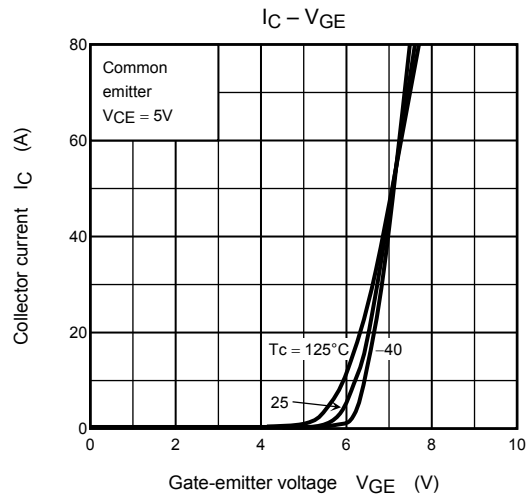
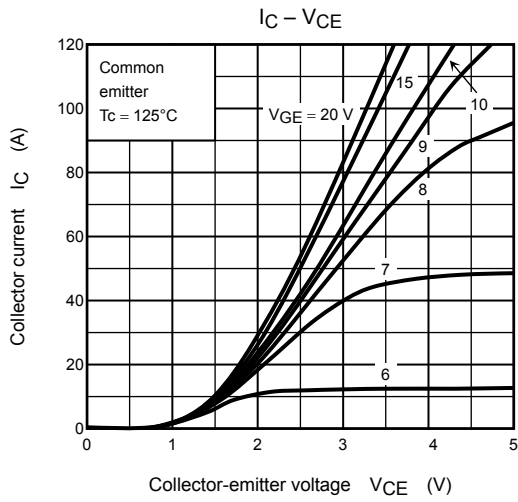
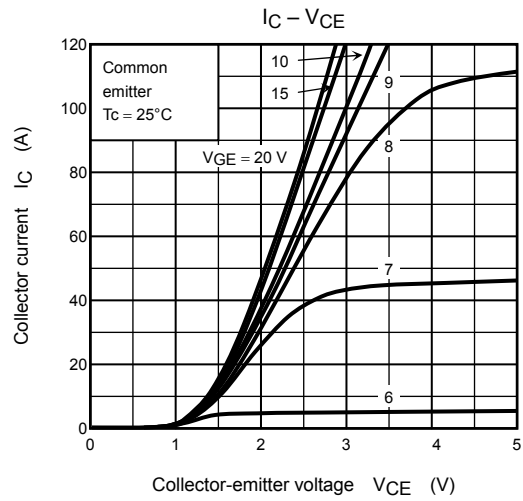
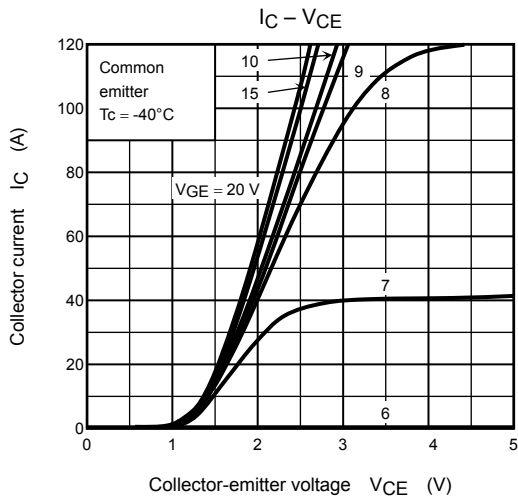


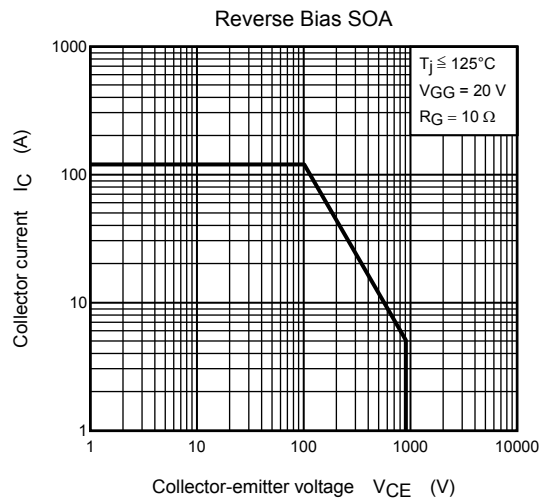
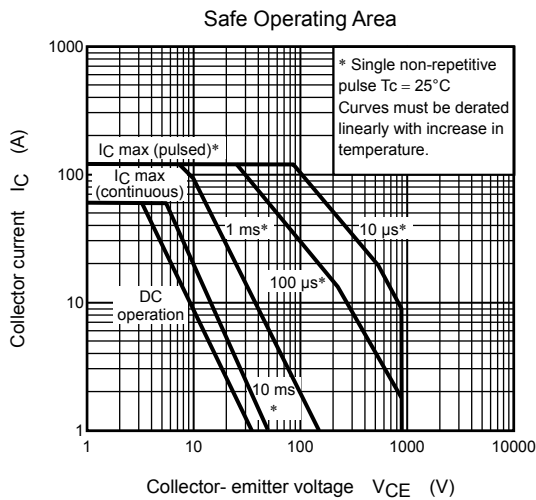
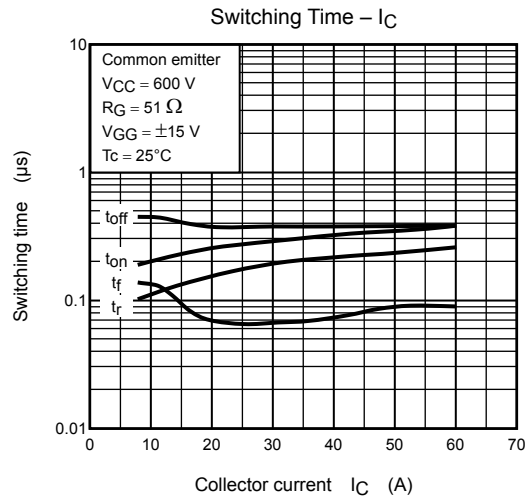
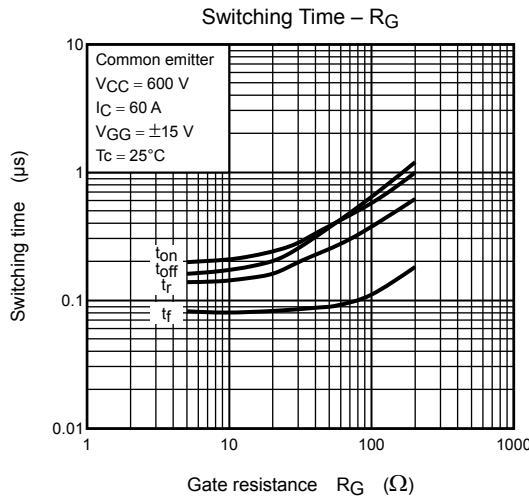
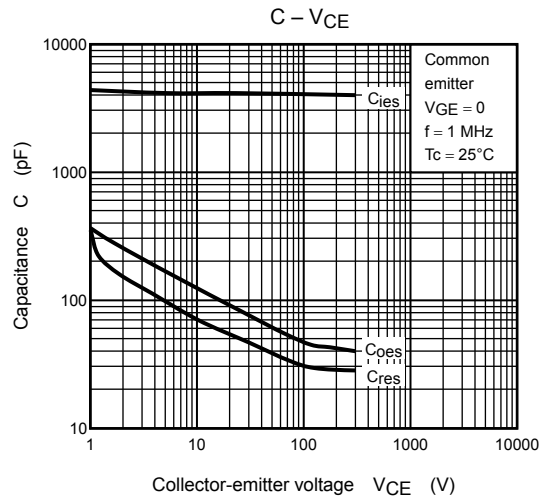
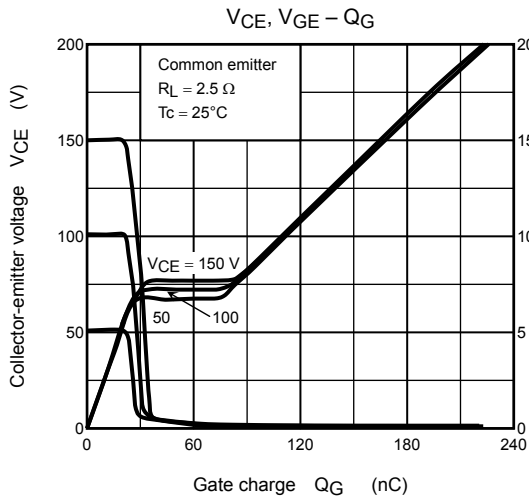
Electrical Characteristics (Ta = 25°C)

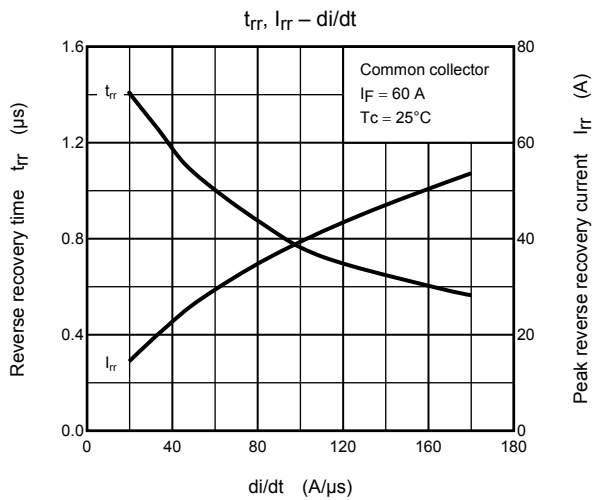
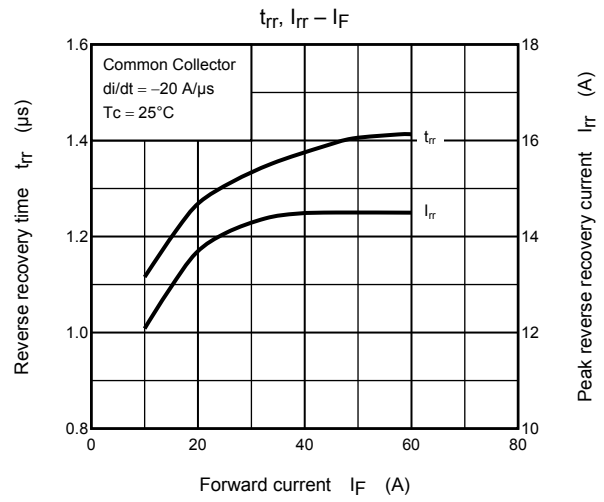
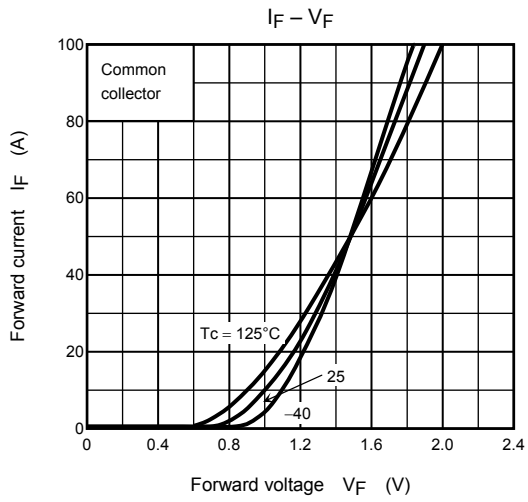
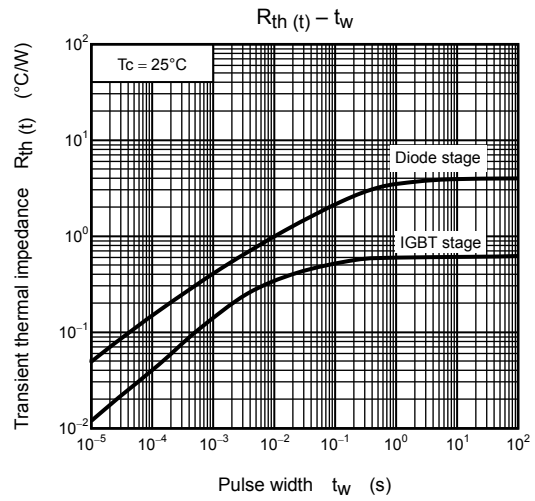
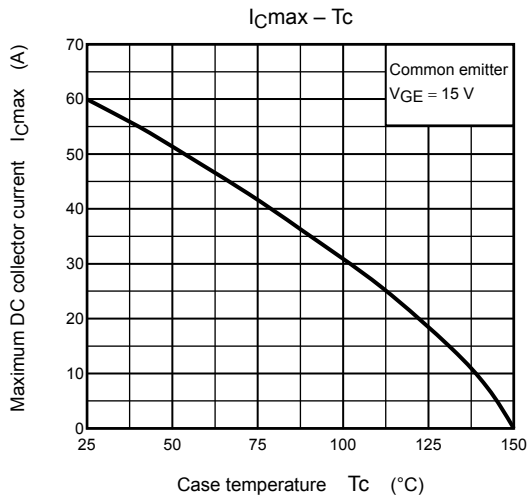
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GES}	$V_{GE} = \pm 25\text{ V}, V_{CE} = 0$	—	—	± 500	nA
Collector cut-off current		I_{CES}	$V_{CE} = 900\text{ V}, V_{GE} = 0$	—	—	0.1	mA
Gate-emitter cut-off voltage		$V_{GE(OFF)}$	$I_C = 60\text{ mA}, V_{CE} = 5\text{ V}$	4.0	—	7.0	V
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 60\text{ A}, V_{GE} = 15\text{ V}$	—	2.3	2.8	V
Input capacitance		C_{ies}	$V_{CE} = 10\text{ V}, V_{GE} = 0, f = 1\text{ MHz}$	—	4200	—	pF
Switching time	Rise time	t_r	Resistive Load $V_{CC} = 600\text{ V}, I_C = 60\text{ A}$ $V_{GG} = \pm 15\text{ V}, R_G = 51\ \Omega$ (Note 1)	—	0.25	—	μs
	Turn-on time	t_{on}		—	0.37	—	
	Fall time	t_f		—	0.09	0.20	
	Turn-off time	t_{off}		—	0.40	—	
Diode forward voltage		V_F	$I_F = 15\text{ A}, V_{GE} = 0$	—	1.1	1.9	V
Reverse recovery time		t_{rr}	$I_F = 60\text{ A}, di/dt = -20\text{ A}/\mu\text{s}$	—	1.4	3.0	μs

Note 1: Switching time measurement circuit and input/output waveforms









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