

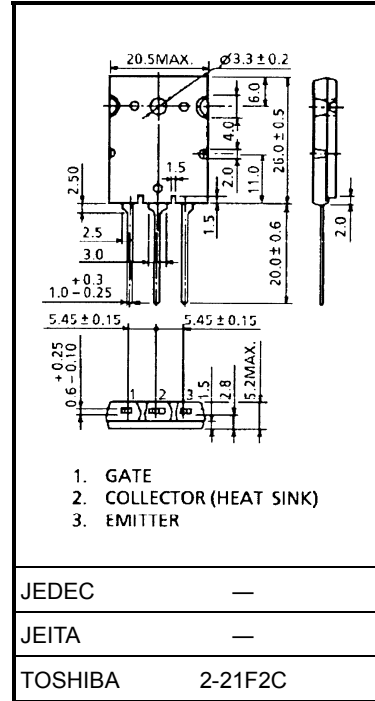
TOSHIBA Insulated Gate Bipolar Transistor Silicon N Channel IGBT

# GT60M323

## Voltage Resonance Inverter Switching Application

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

Unit: mm



Weight: 9.75 g (typ.)

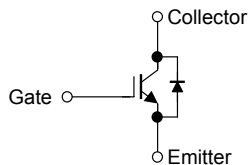
## Maximum Ratings ( $T_a = 25^\circ C$ )

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

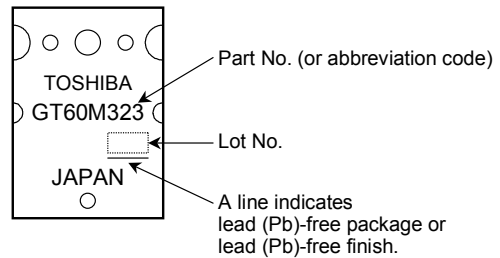
## Thermal Characteristics

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

## Equivalent Circuit



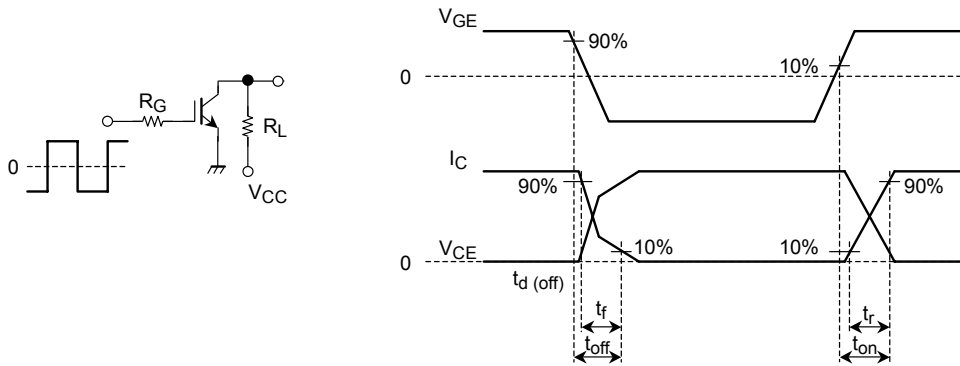
## Marking

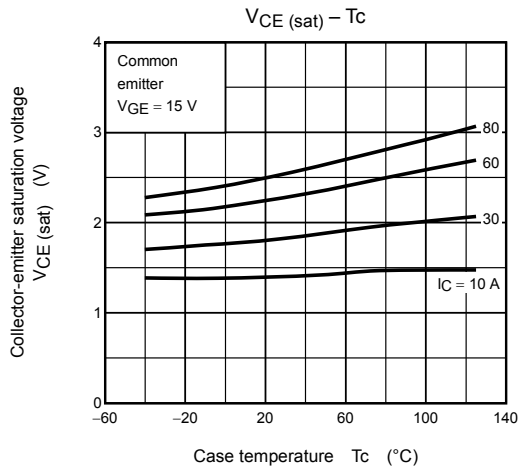
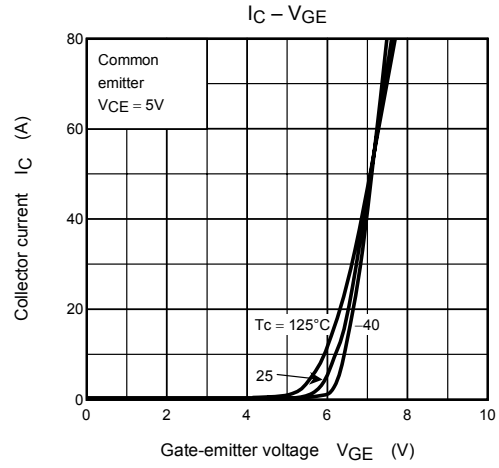
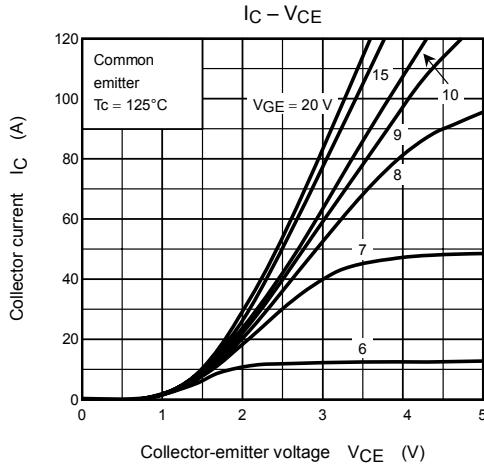
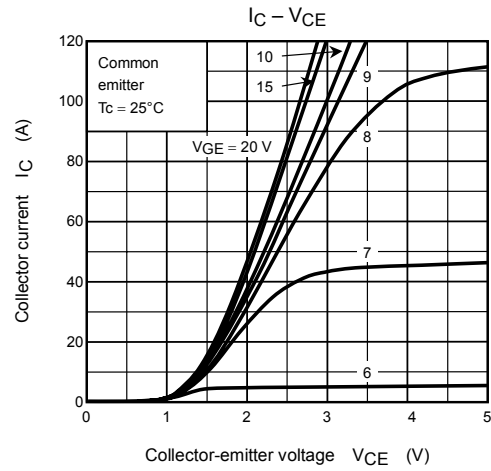
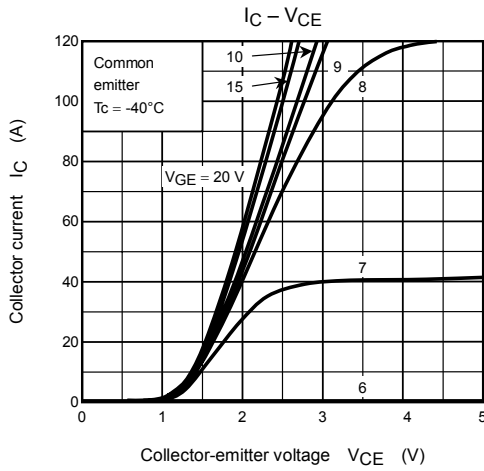


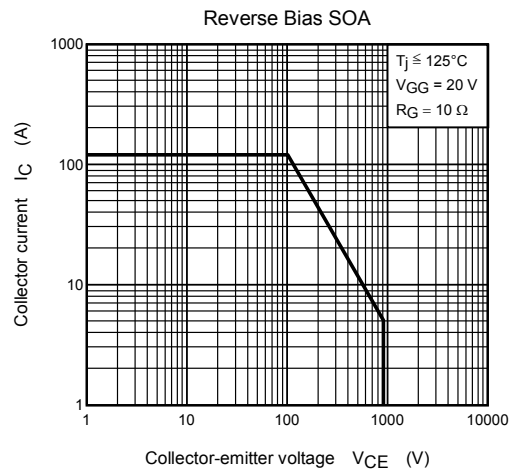
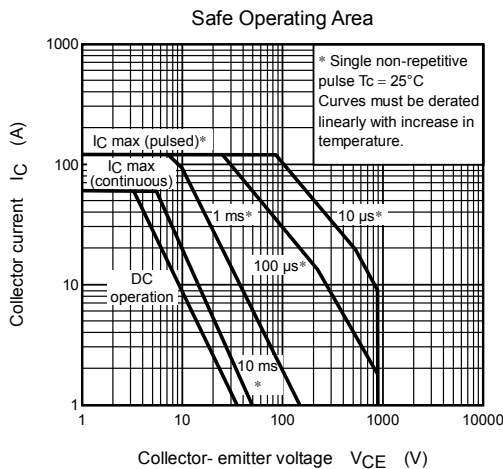
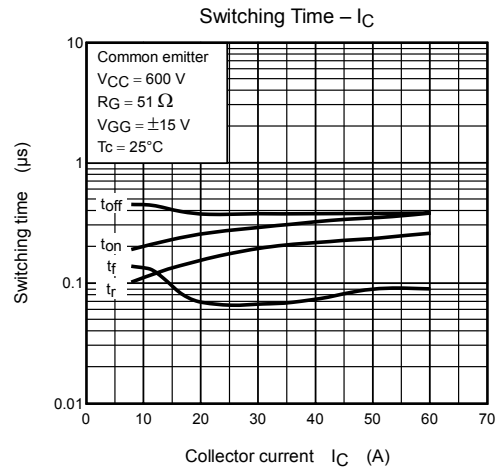
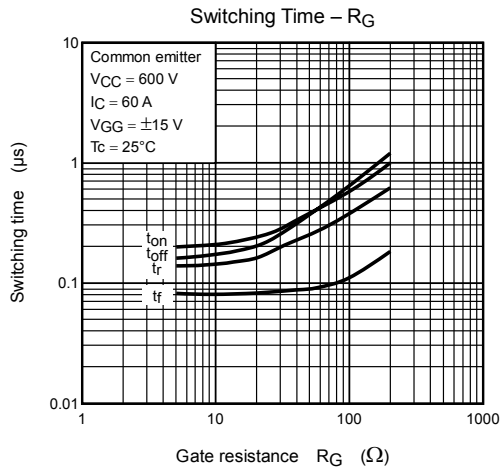
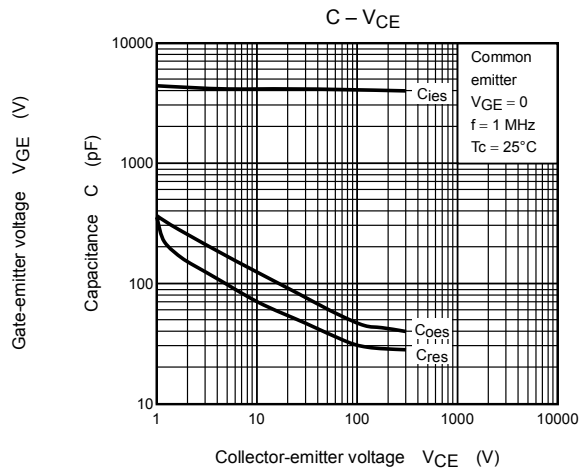
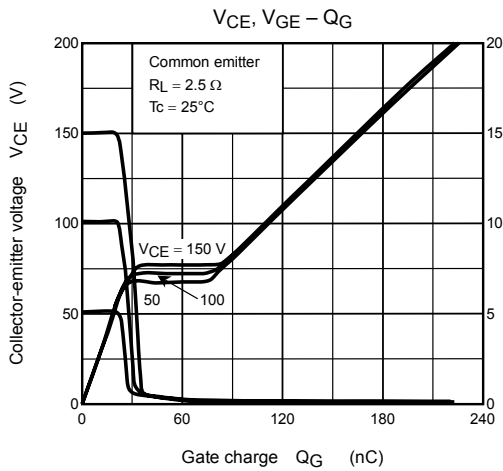
## Electrical Characteristics (Ta = 25°C)

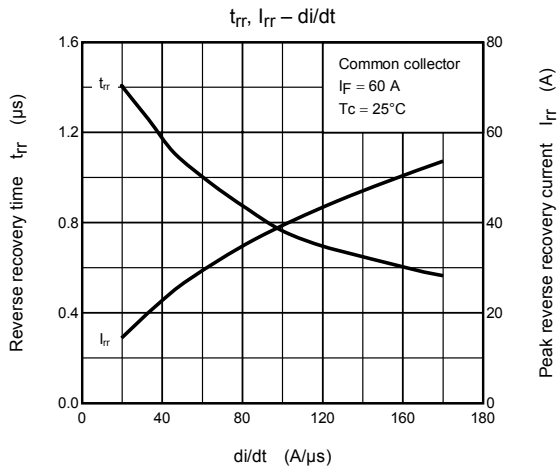
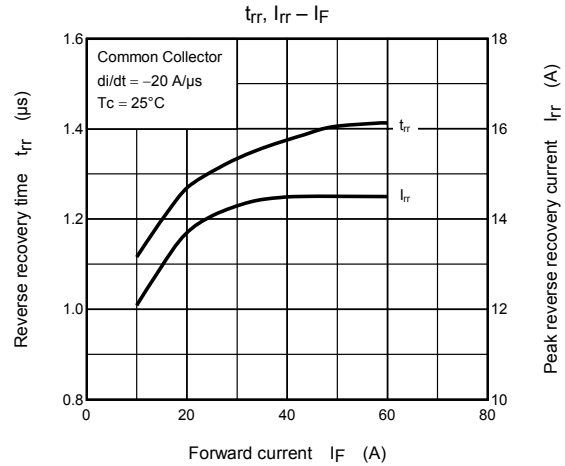
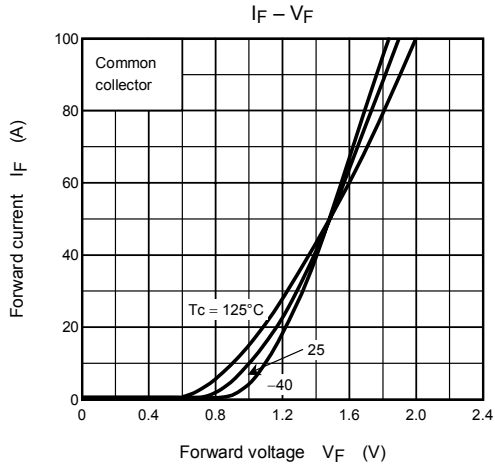
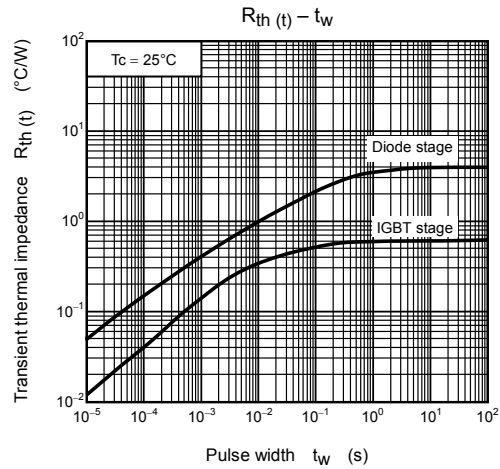
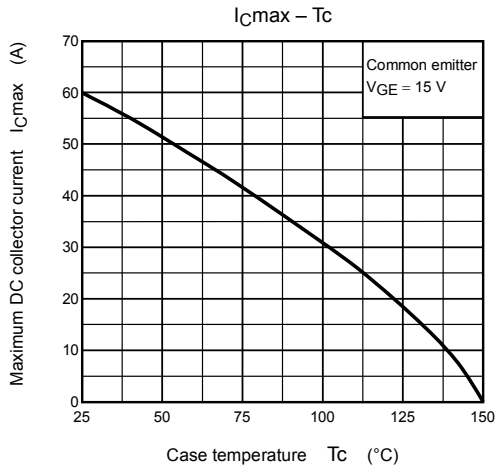
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	$I_{GES}$	$V_{GE} = \pm 25 \text{ V}, V_{CE} = 0$	—	—	$\pm 500$	nA
Collector cut-off current	$I_{CES}$	$V_{CE} = 900 \text{ V}, V_{GE} = 0$	—	—	0.1	mA
Gate-emitter cut-off voltage	$V_{GE(OFF)}$	$I_C = 60 \text{ mA}, V_{CE} = 5 \text{ V}$	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	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	—	$\mu\text{s}$
	Turn-on time		—	0.37	—	
	Fall time		—	0.09	0.20	
	Turn-off time		—	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	$\mu\text{s}$

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









**RESTRICTIONS ON PRODUCT USE**

030619EAA

- The information contained herein is subject to change without notice.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of TOSHIBA or others.
- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.  
In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- TOSHIBA products should not be embedded to the downstream products which are prohibited to be produced and sold, under any law and regulations.