

TOSHIBA Insulated Gate Bipolar Transistor Silicon N Channel IGBT

GT50J327

Current Resonance Inverter Switching Application

- Enhancement mode type
- High speed : $t_f = 0.19 \mu s$ (typ.) ($I_C = 50A$)
- Low saturation voltage: $V_{CE(sat)} = 1.9 V$ (typ.) ($I_C = 50A$)
- FRD included between emitter and collector
- Fourth generation IGBT
- TO-3P(N) (Toshiba package name)

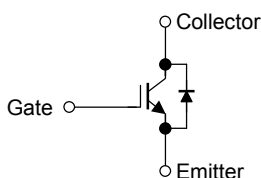
Maximum Ratings ($T_a = 25^\circ C$)

Characteristics	Symbol	Rating	Unit
Collector-emitter voltage	V_{CES}	600	V
Gate-emitter voltage	V_{GES}	± 25	V
Continuous collector current	I_C	@ $T_c = 100^\circ C$	29
		@ $T_c = 25^\circ C$	50
Pulsed collector current	I_{CP}	100	A
Diode forward current	DC	I_F	20
	Pulsed	I_{FP}	40
Collector power dissipation	P_C	@ $T_c = 100^\circ C$	56
		@ $T_c = 25^\circ C$	140
Junction temperature	T_j	150	$^\circ C$
Storage temperature range	T_{stg}	-55 to 150	$^\circ C$

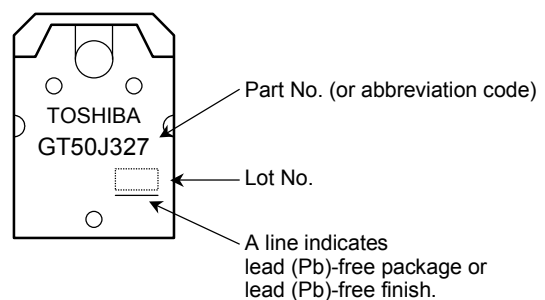
Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance (IGBT)	$R_{th(j-c)}$	0.89	$^\circ C/W$
Thermal resistance (diode)	$R_{th(j-c)}$	2.7	$^\circ C/W$

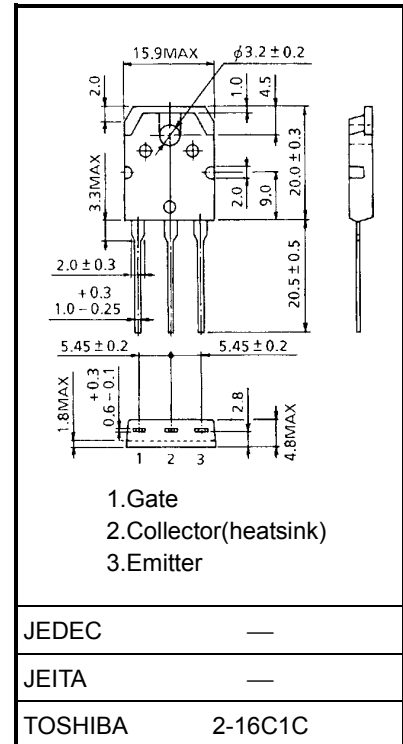
Equivalent Circuit



Marking



Unit: mm

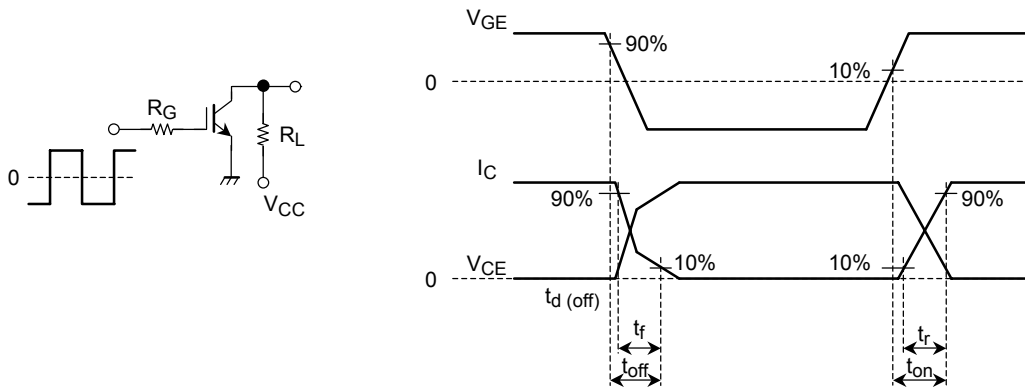


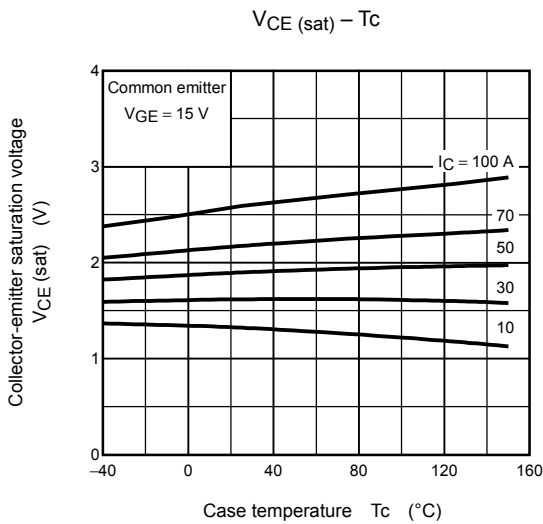
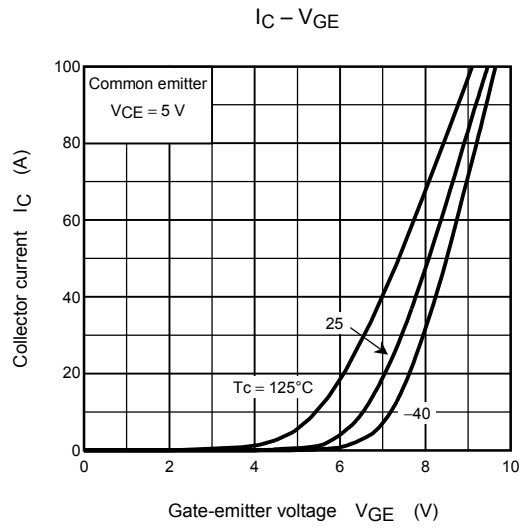
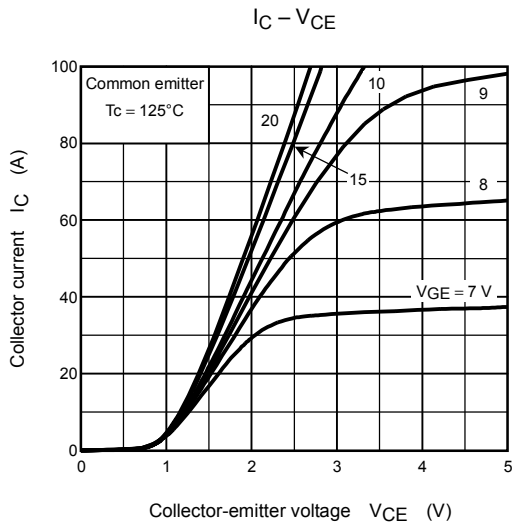
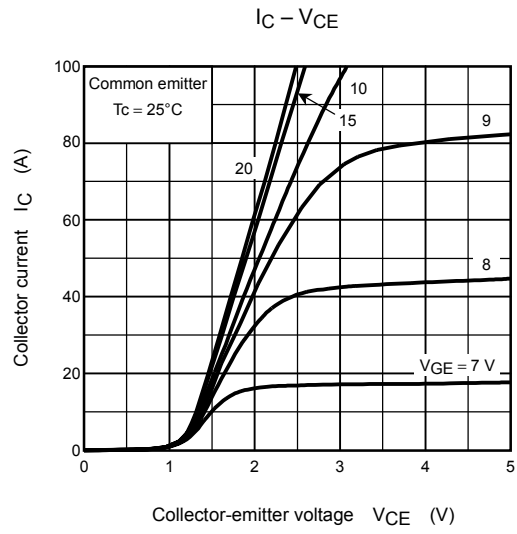
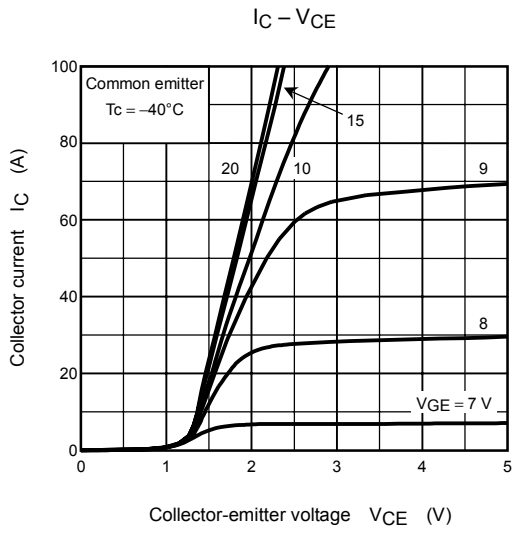
Weight: 4.6 g (typ.)

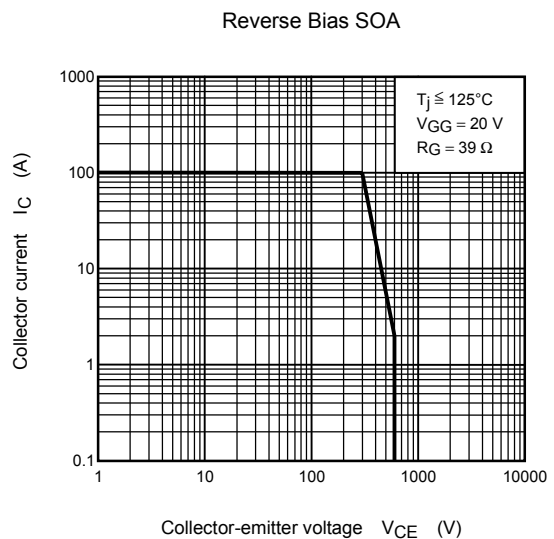
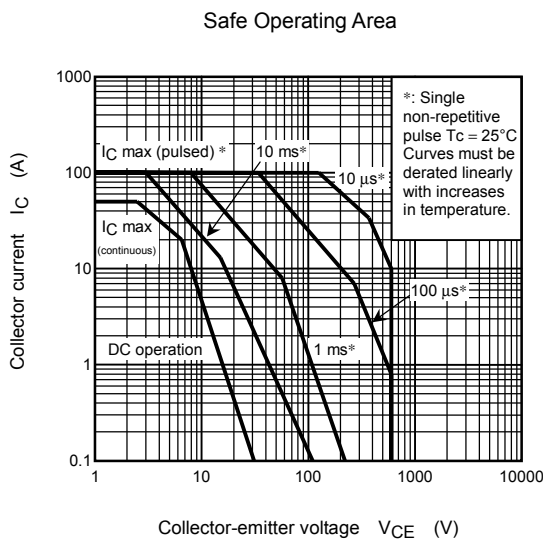
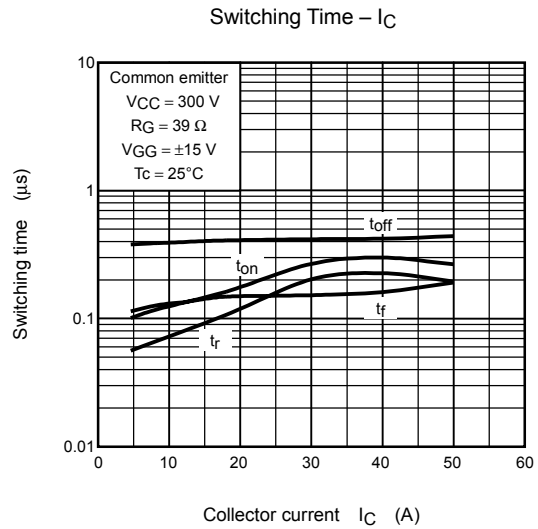
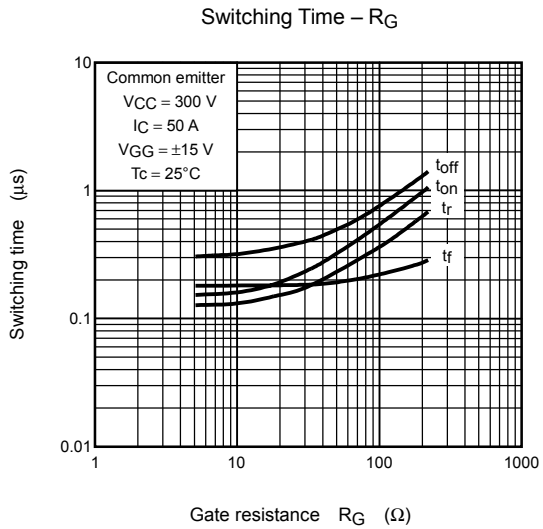
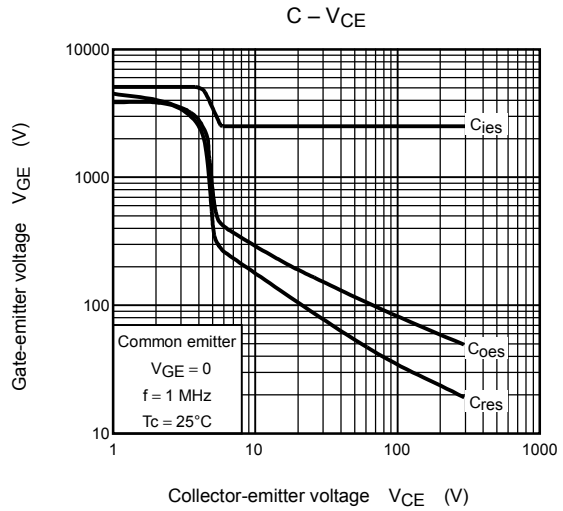
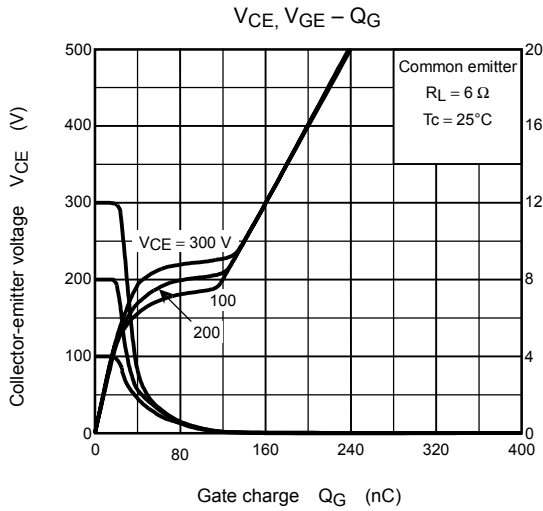
Electrical Characteristics (Ta = 25°C)

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}	$V_{CE} = 600\text{ V}, V_{GE} = 0$	—	—	1.0	mA
Gate-emitter cut-off voltage		$V_{GE(OFF)}$	$I_C = 50\text{ mA}, V_{CE} = 5\text{ V}$	3.0	—	6.0	V
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 50\text{ A}, V_{GE} = 15\text{ V}$	—	1.9	2.3	V
Input capacitance		C_{ies}	$V_{CE} = 10\text{ V}, V_{GE} = 0, f = 1\text{ MHz}$	—	2500	—	pF
Switching time	Rise time	t_r	Resistive Load $V_{CC} = 300\text{ V}, I_C = 50\text{ A}$ $V_{GG} = \pm 15\text{ V}, R_G = 39\ \Omega$ (Note 1)	—	0.20	—	μs
	Turn-on time	t_{on}		—	0.27	—	
	Fall time	t_f		—	0.19	0.32	
	Turn-off time	t_{off}		—	0.44	—	
Diode forward voltage		V_F	$I_F = 15\text{ A}, V_{GE} = 0$	—	—	2.0	V
Reverse recovery time		t_{rr}	$I_F = 15\text{ A}, di/dt = -100\text{ A}/\mu\text{s}$	—	—	0.2	μs

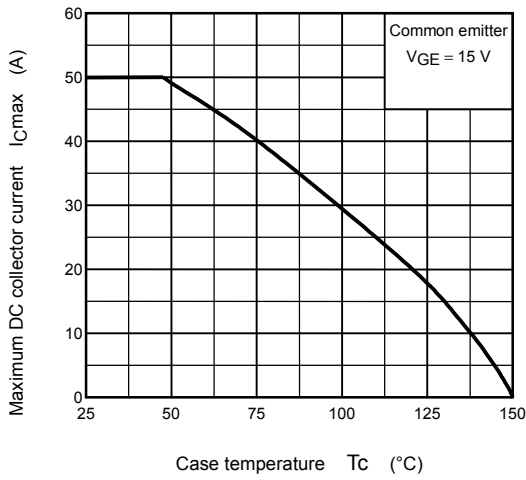
Note 1: Switching time measurement circuit and input/output waveforms



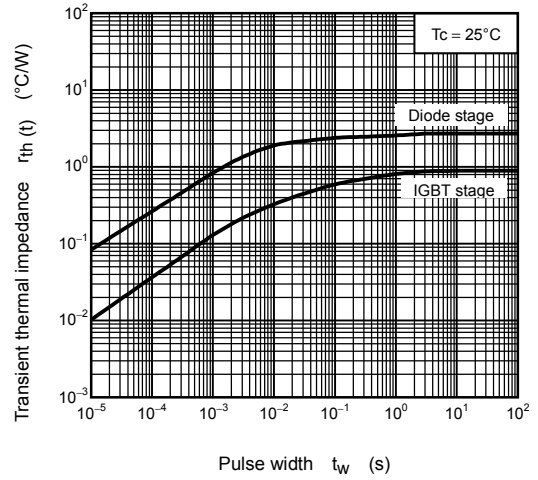




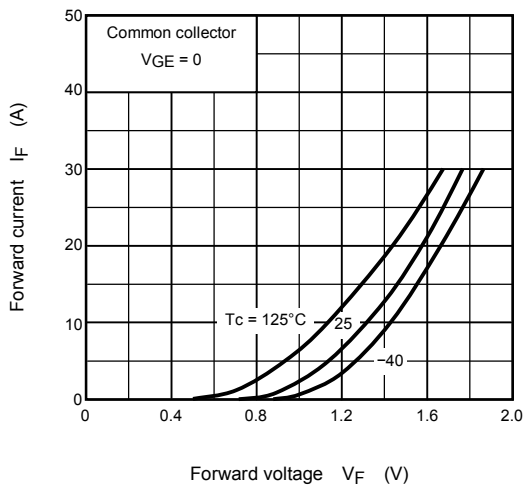
$I_{Cmax} - T_c$



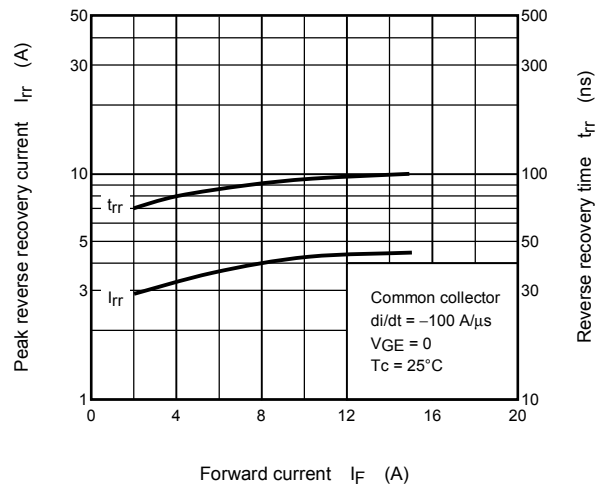
$r_{th}(t) - t_w$



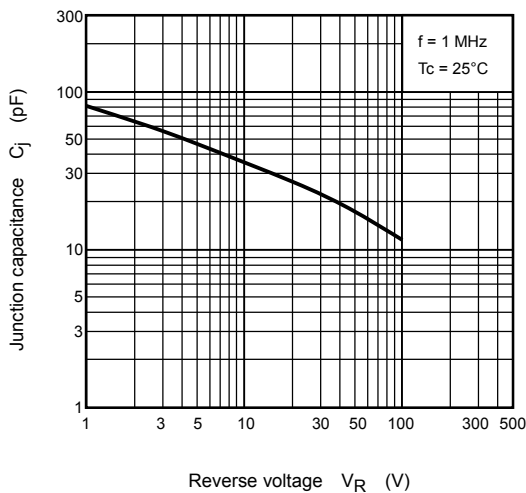
$I_F - V_F$



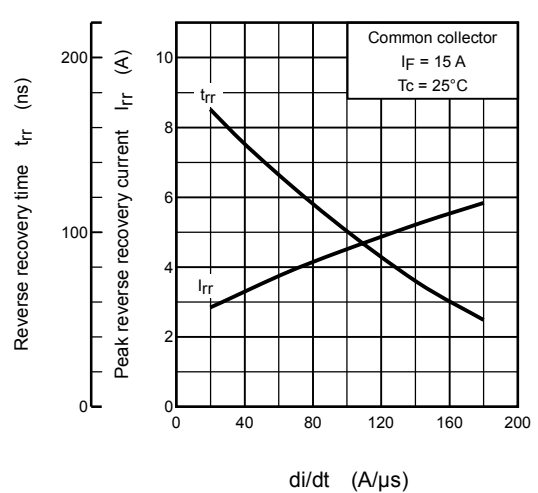
$I_{rr}, t_{rr} - I_F$



$C_j - V_R$



$I_{rr}, t_{rr} - di/dt$



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