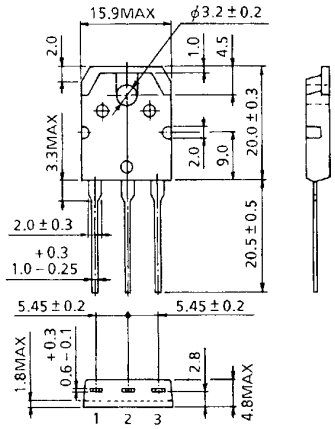
TOSHIBA Insulated Gate Bipolar Transistor Silicon N Channel IGBT

GT50J327

Current Resonance Inverter Switching Application

- Enhancement mode type
- High speed : t_f = 0.19 μs (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)

Unit: mm



1.Gate
2.Collector(heatsink)
3.Emitter

JEDEC	—
JEITA	—
TOSHIBA	2-16C1C

Weight: 4.6 g (typ.)

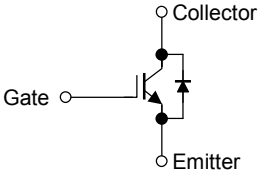
Maximum Ratings (Ta = 25°C)

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

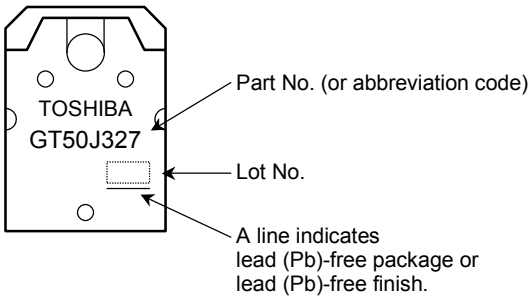
Thermal Characteristics

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

Equivalent Circuit



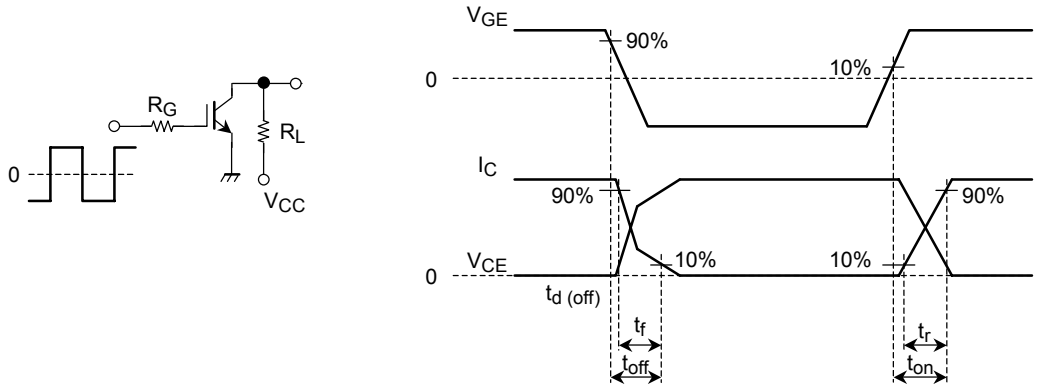
Marking



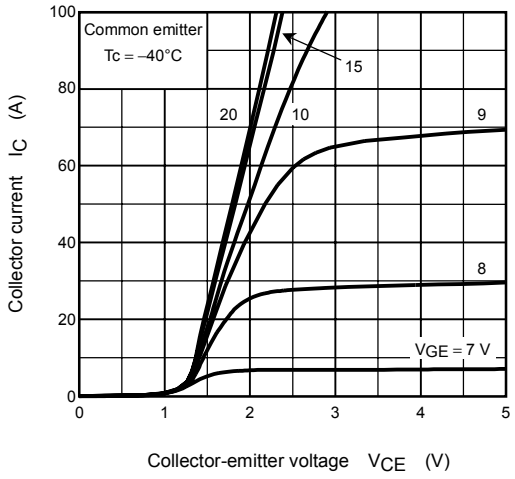
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GES}	V_{GE} = ±25 V, V_{CE} = 0	—	—	±500	nA
Collector cut-off current		I_{CES}	V_{CE} = 600 V, V_{GE} = 0	—	—	1.0	mA
Gate-emitter cut-off voltage		$V_{GE\ (OFF)}$	I_C = 50 mA, V_{CE} = 5 V	3.0	—	6.0	V
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = 50 A, V_{GE} = 15 V	—	1.9	2.3	V
Input capacitance		C_{ies}	V_{CE} = 10 V, V_{GE} = 0, f = 1 MHz	—	2500	—	pF
Switching time	Rise time	t_r	Resistive Load	—	0.20	—	μs
	Turn-on time	t_{on}	V_{CC} = 300 V, I_C = 50 A	—	0.27	—	
	Fall time	t_f	V_{GG} = ±15 V, R_G = 39 Ω	—	0.19	0.32	
	Turn-off time	t_{off}	(Note 1)	—	0.44	—	
Diode forward voltage		V_F	I_F = 15 A, V_{GE} = 0	—	—	2.0	V
Reverse recovery time		t_{rr}	I_F = 15 A, di/dt = −100 A/μs	—	—	0.2	μs

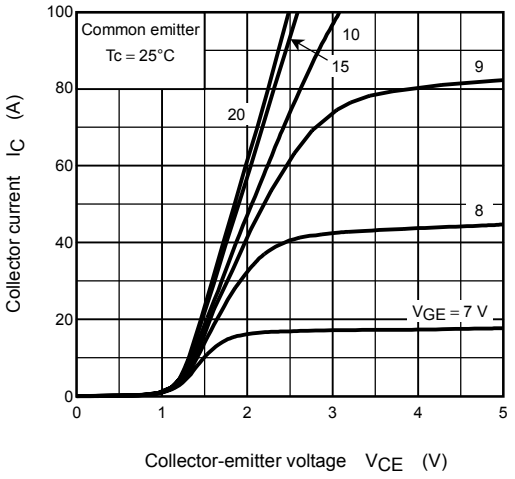
Note 1: Switching time measurement circuit and input/output waveforms



$I_C - V_{CE}$



$I_C - V_{CE}$



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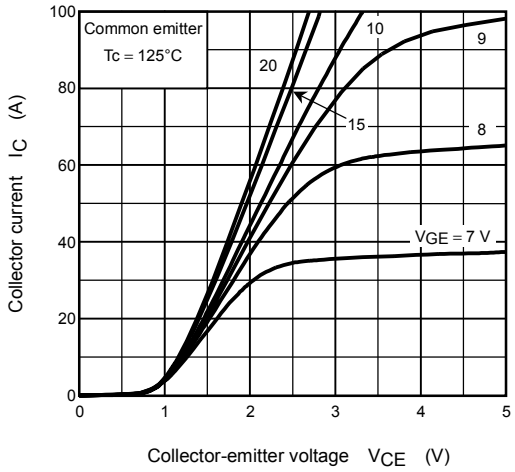
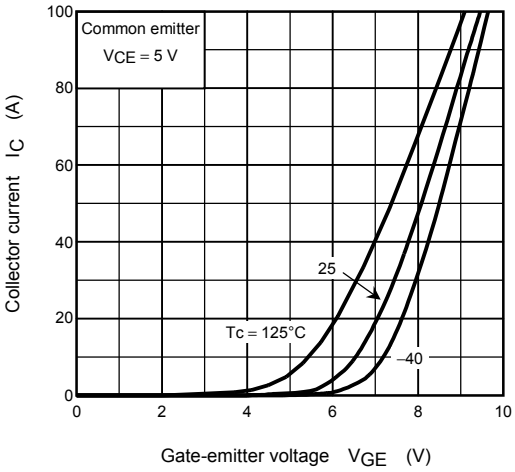
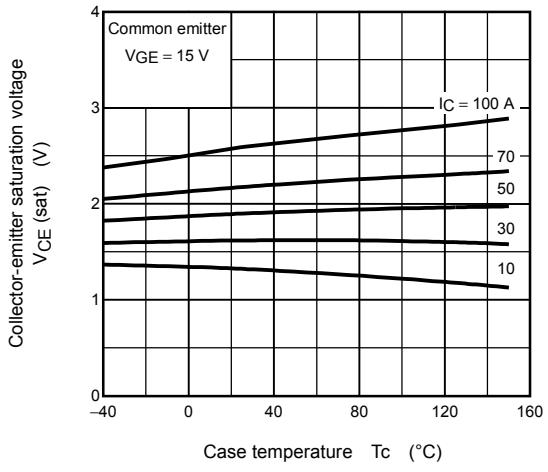


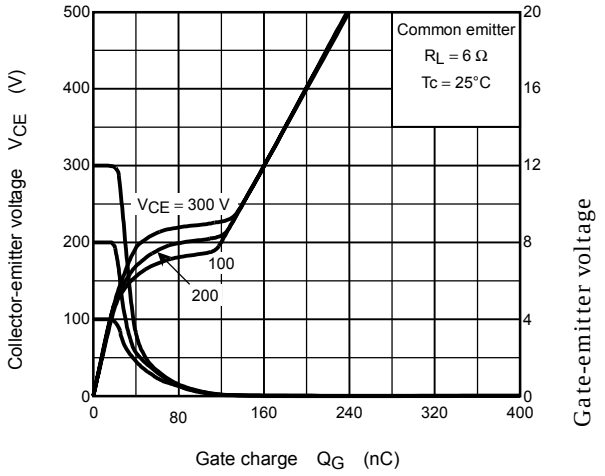
$I_C - V_{GE}$



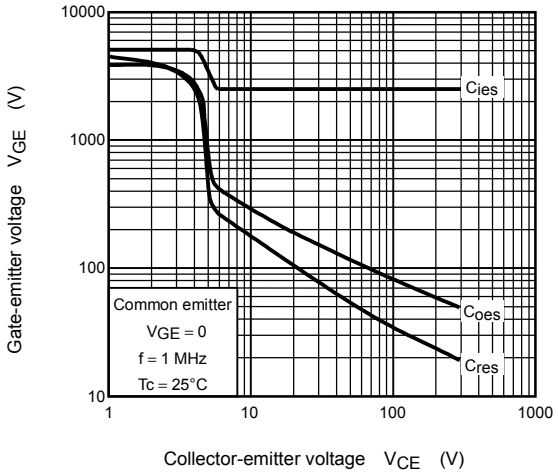
$V_{CE\ (sat)} - Tc$



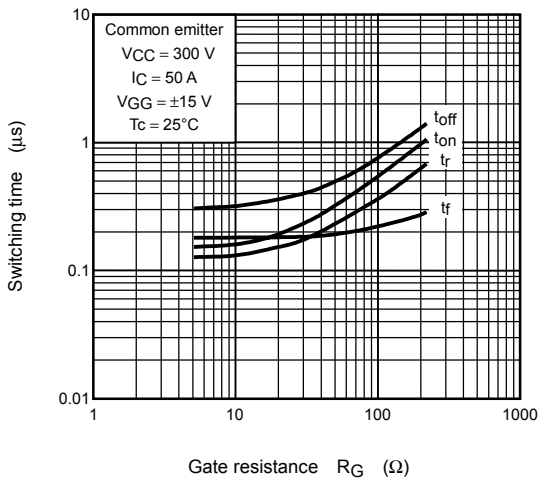
V_{CE}, V_{GE} – Q_G



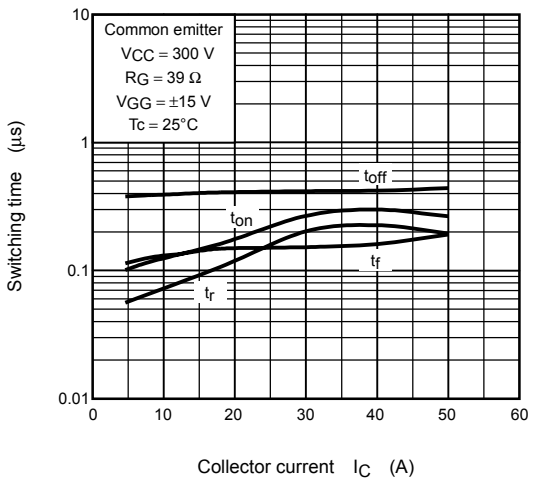
C – V_{CE}



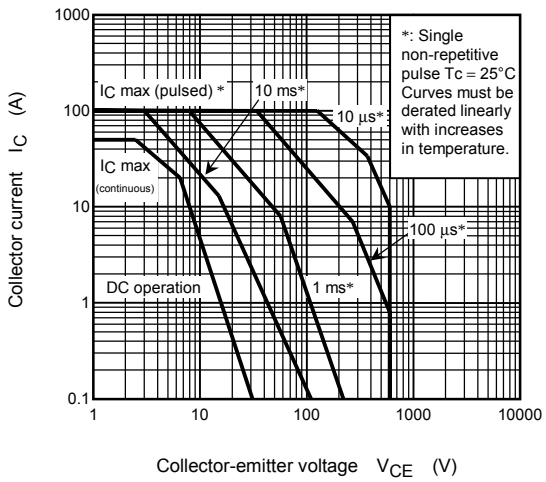
Switching Time – R_G



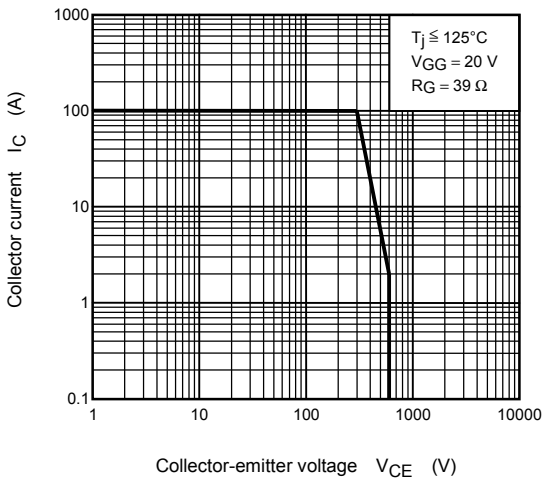
Switching Time – I_C



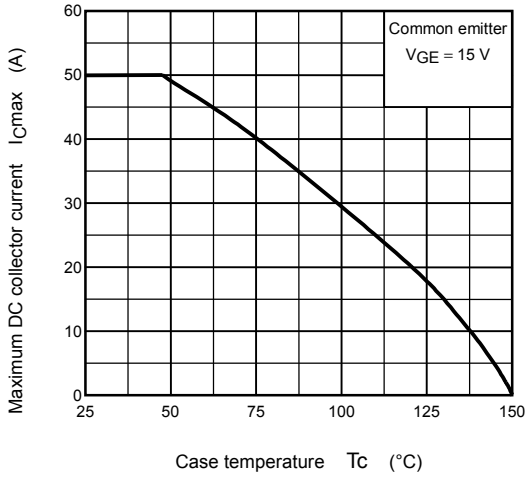
Safe Operating Area



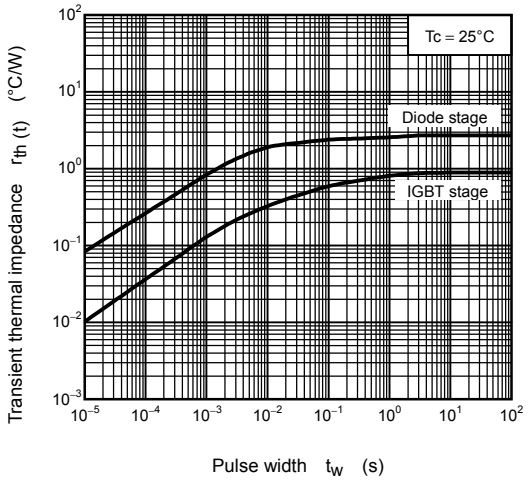
Reverse Bias SOA



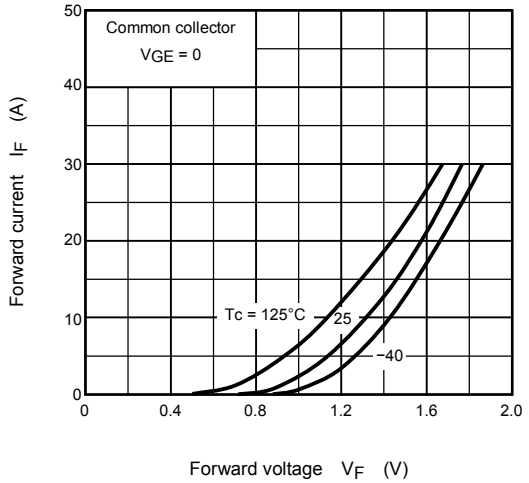
$I_C$max – Tc



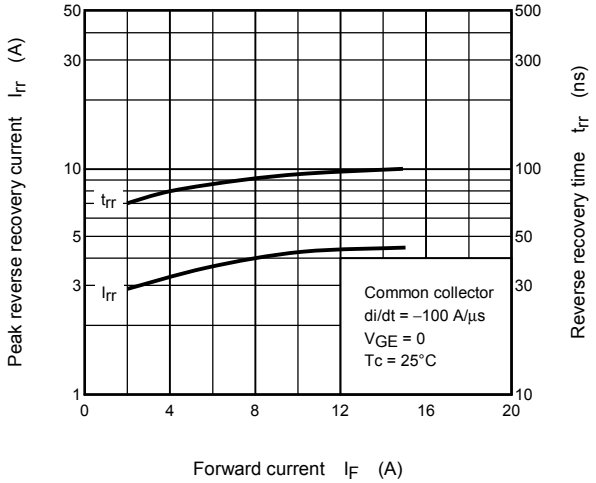
$r_{th\ (t)}$ – t_w



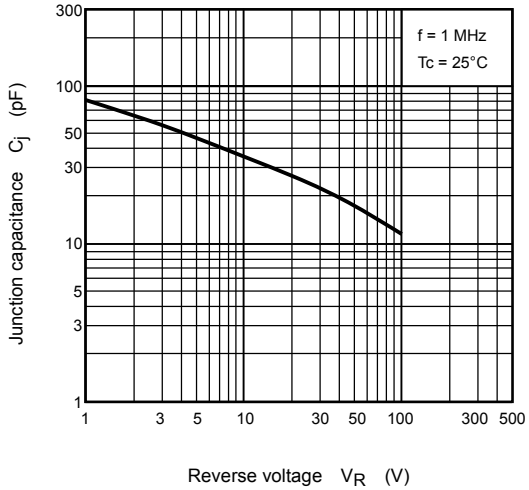
I_F – V_F



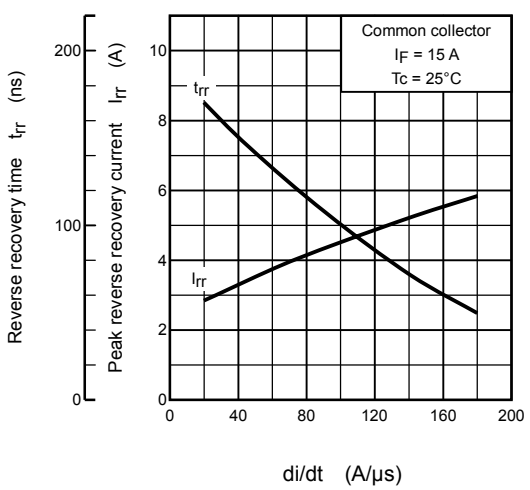
I_{rr}, t_{rr} – I_F



C_j – V_R



I_{rr}, t_{rr} – di/dt



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