TOSHIBA INSULATED GATE BIPOLAR TRANSISTOR SILICON N CHANNEL IGBT

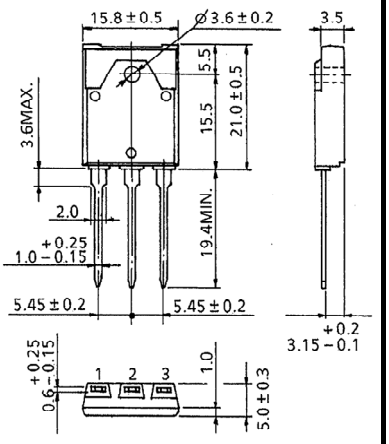
GT35J321

Fourth-generation IGBT

Current Resonance Inverter Switching Applications

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

Unit: mm



1. GATE
2. COLLECTOR
3. EMITTER

JEDEC	—
JEITA	—
TOSHIBA	2-16F1A

Weight: 5.8 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

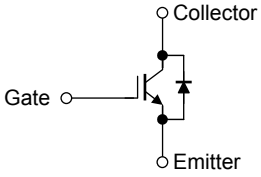
Characteristics		Symbol	Rating	Unit
Collector−emitter voltage		V_{CES}	600	V
Gate−emitter voltage		V_{GES}	±25	V
Collector current (DC)	@ Tc = 100°C	I_C	18	A
	@ Tc = 25°C		37	
Collector current (pulse)		I_{CP}	100	A
Diode forward current	DC	I_F	20	A
	Pulse	I_{FP}	40	
Collector power dissipation	@ Tc = 100°C	P_C	30	W
	@ Tc = 25°C		75	
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55 to 150	°C

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).

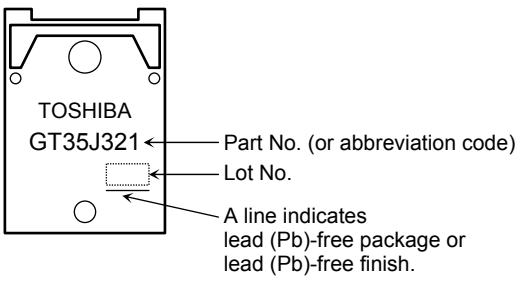
Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance (IGBT)	$R_{th\ (j\text{-}c)}$	1.67	°C/W
Thermal resistance (diode)	$R_{th\ (j\text{-}c)}$	3.2	°C/W

Equivalent Circuit



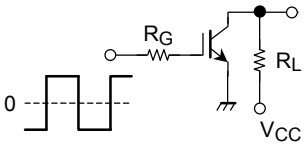
Marking

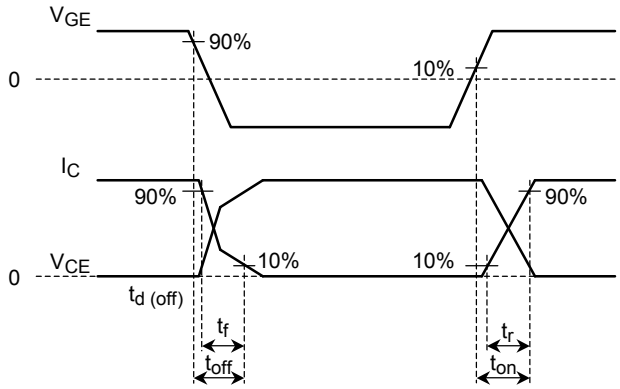


Electrical Characteristics (Ta = 25°C)

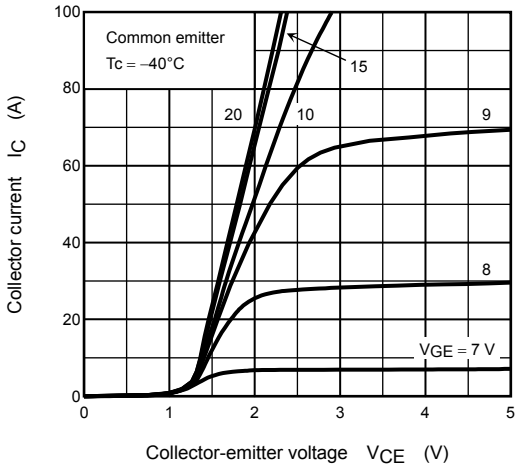
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GES}	V_{GE} = ±25 V, V_{CE} = 0 V	—	—	±500	nA
Collector cut−off current		I_{CES}	V_{CE} = 600 V, V_{GE} = 0 V	—	—	1.0	mA
Gate-emitter cut-off voltage		$V_{GE\ (OFF)}$	I_C = 50 mA, V_{CE} = 5 V	3.0	—	6.0	V
Collector-emitter 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 V, f = 1 MHz	—	2500	—	pF
Switching time	Rise time	t_r	Resistive Load	—	0.24	—	μs
	Turn-on time	t_{on}	V_{CC} = 300 V, I_C = 50 A	—	0.33	—	
	Fall time	t_f	V_{GG} = ±15 V, R_G = 39 Ω	—	0.19	0.32	
	Turn-off time	t_{off}	(Note 1)	—	0.51	—	
Diode forward voltage		V_F	I_F = 15 A, V_{GE} = 0 V	—	—	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





$I_C - V_{CE}$



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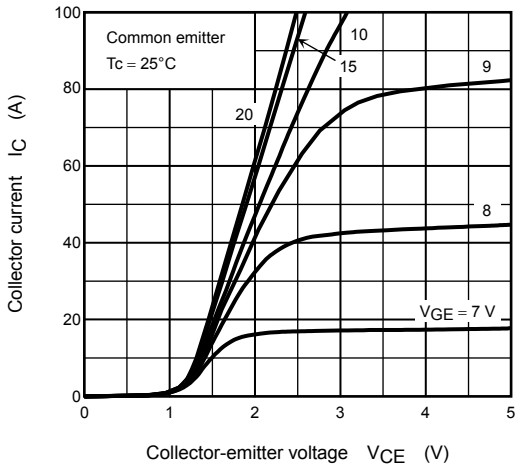
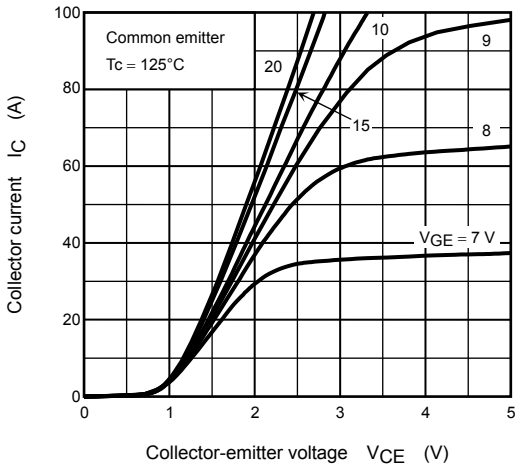
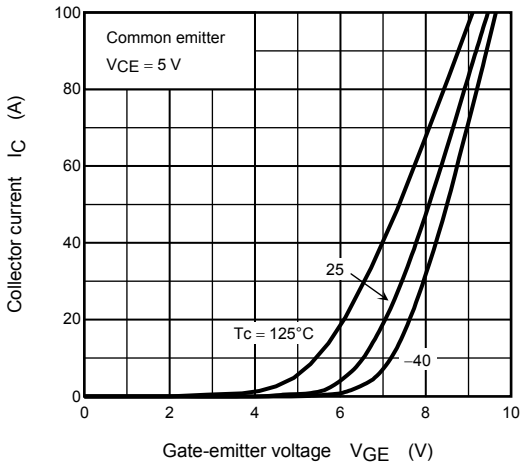


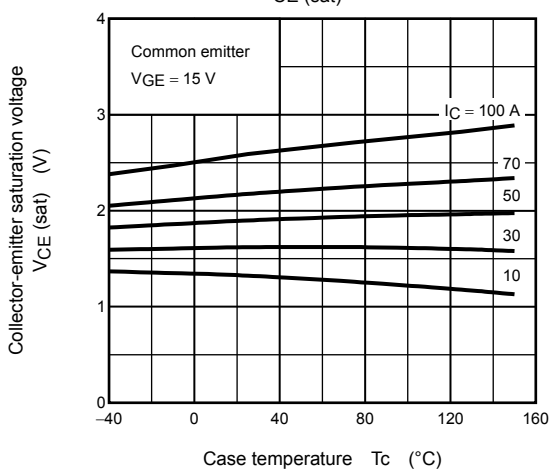
$I_C - V_{CE}$



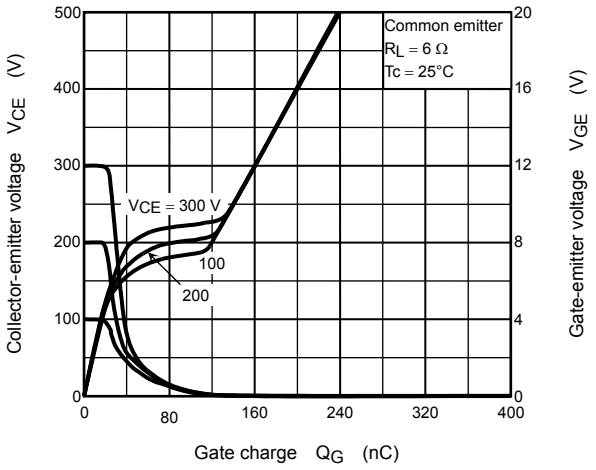
$I_C - V_{GE}$



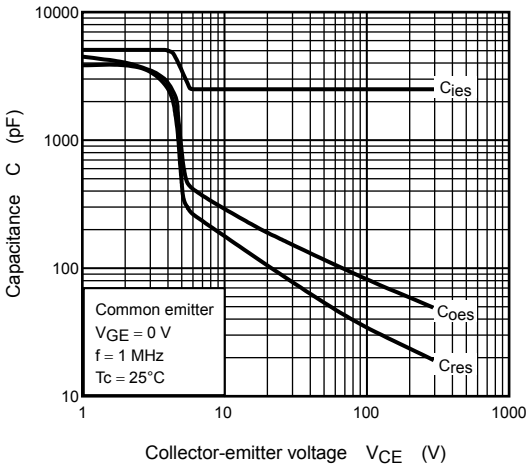
$V_{CE\ (sat)} - Tc$



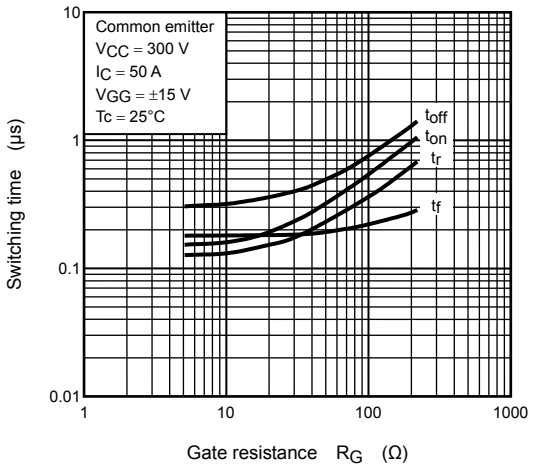
V_{CE}, V_{GE} – Q_G



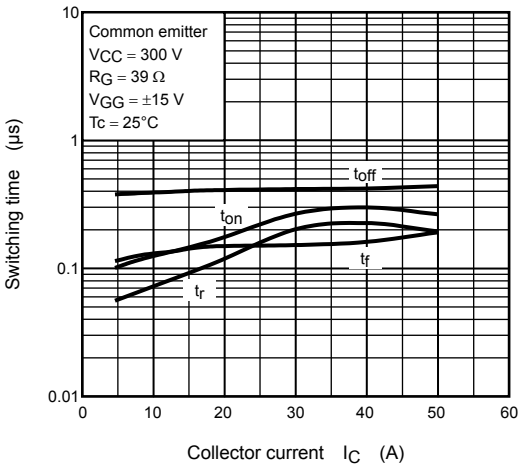
C – V_{CE}



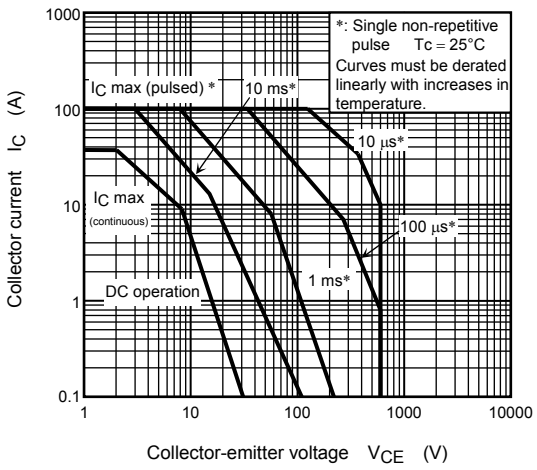
Switching Time – R_G



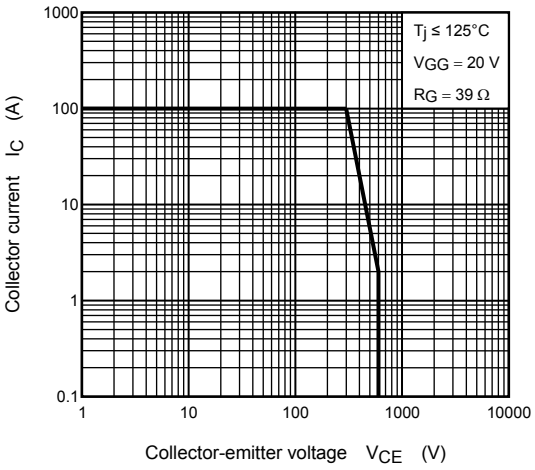
Switching Time – I_C



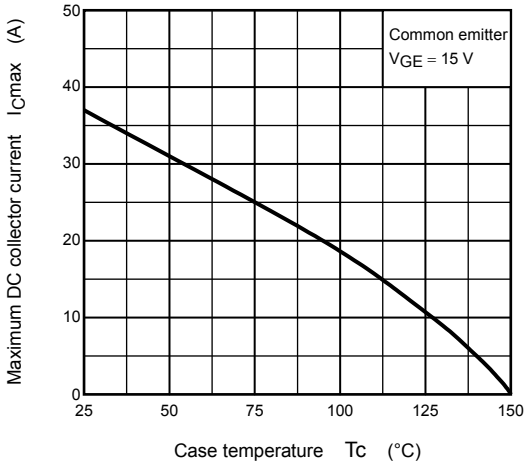
Safe Operating Area



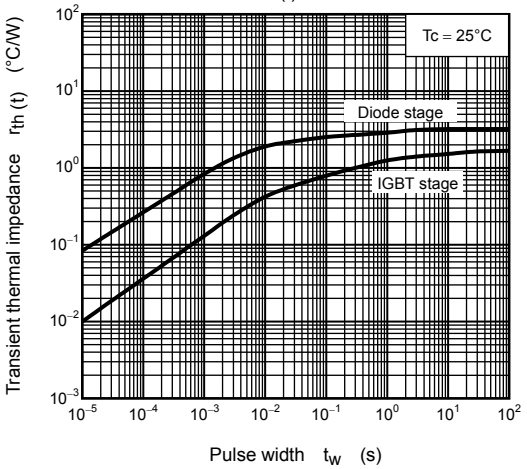
Reverse Bias SOA



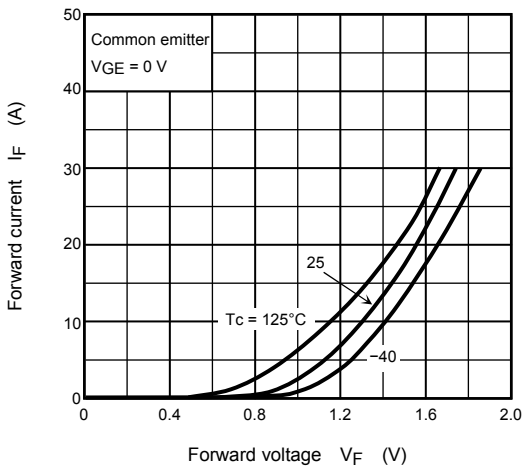
$I_C$max – Tc



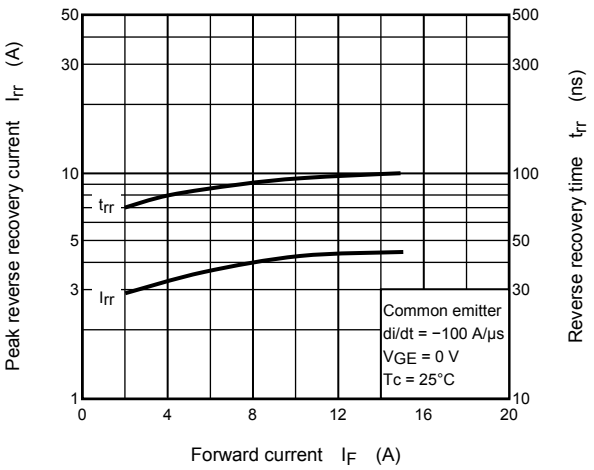
$r_{th\ (t)}$ – t_w



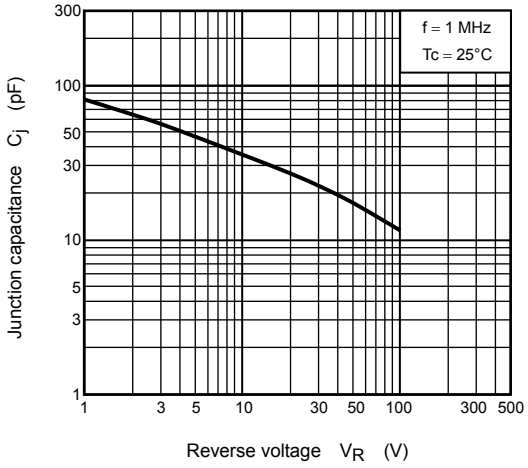
I_F – V_F



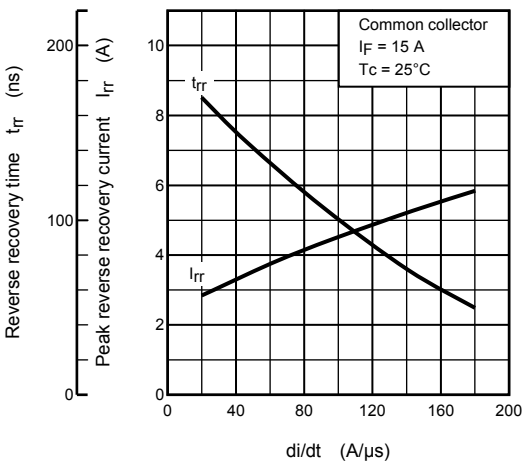
I_{rr}, t_{rr} – I_F



C_j – V_R



I_{rr}, t_{rr} – di/dt



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20070701-EN GENERAL

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