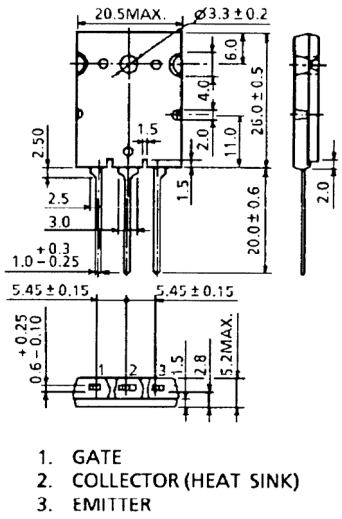
TOSHIBA Insulated Gate Bipolar Transistor Silicon N Channel IGBT

GT60J321

Fourth Generation IGBT
Soft Switching Applications

- Enhancement mode type
- High speed: t_f = 0.30 μs (typ.) (I_C = 60 A)
- Low saturation voltage: $V_{CE\ (sat)}$ = 1.55 V (typ.) (I_C = 60 A)

Unit: mm



1. GATE
2. COLLECTOR (HEAT SINK)
3. EMITTER

JEDEC	—
JEITA	—
TOSHIBA	2-21F2C

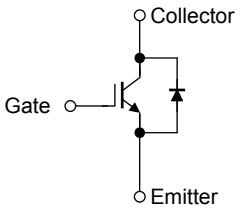
Weight: 9.75 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

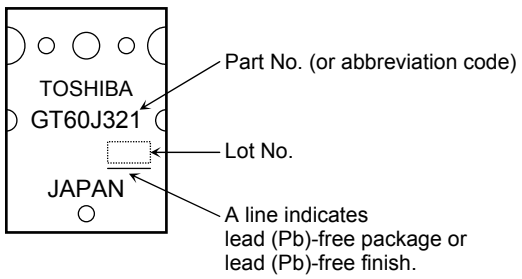
Characteristics		Symbol	Rating	Unit
Collector-emitter voltage		V_{CES}	600	V
Gate-emitter voltage		V_{GES}	±25	V
Collector current	DC	I_C	60	A
	1 ms	I_{CP}	120	
Emitter-collector forward current	DC	I_{ECF}	60	A
	1 ms	I_{ECPF}	120	
Collector power dissipation (Tc = 25°C)		P_C	200	W
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55~150	°C
Screw torque		—	0.8	N·m

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).

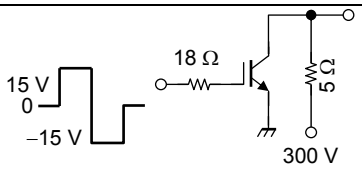
Equivalent Circuit



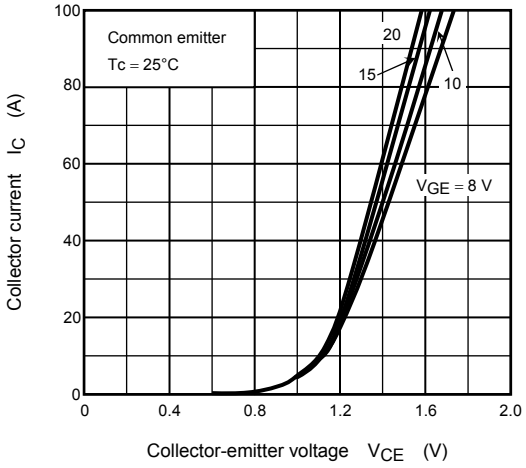
Marking



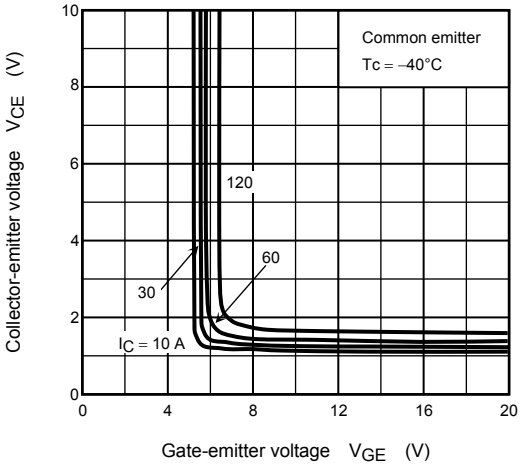
Electrical Characteristics (Ta = 25°C)

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 = 60 mA, V_{CE} = 5 V	3.0	—	6.0	V
Collector-emitter saturation voltage		$V_{CE\ (sat)}$ (1)	I_C = 10 A, V_{GE} = 15 V	—	1.2	1.7	V
		$V_{CE\ (sat)}$ (2)	I_C = 60 A, V_{GE} = 15 V	—	1.55	1.9	
Input capacitance		C_{ies}	V_{CE} = 10 V, V_{GE} = 0, f = 1 MHz	—	13500	—	pF
Switching time	Rise time	t_r		—	0.25	—	μs
	Turn-on time	t_{on}		—	0.35	—	
	Fall time	t_f		—	0.30	0.50	
	Turn-off time	t_{off}		—	0.80	—	
Forward voltage		V_F	I_F = 60 A, V_{GE} = 0	—	1.5	2.0	V
Reverse recovery time		t_{rr}	I_F = 60 A, V_{GE} = 0, di/dt = −100 A/μs	—	0.1	0.2	μs
Thermal resistance (IGBT)		$R_{th\ (j\text{-}c)}$	—	—	—	0.625	°C/W
Thermal resistance (Diode)		$R_{th\ (j\text{-}c)}$	—	—	—	0.96	°C/W

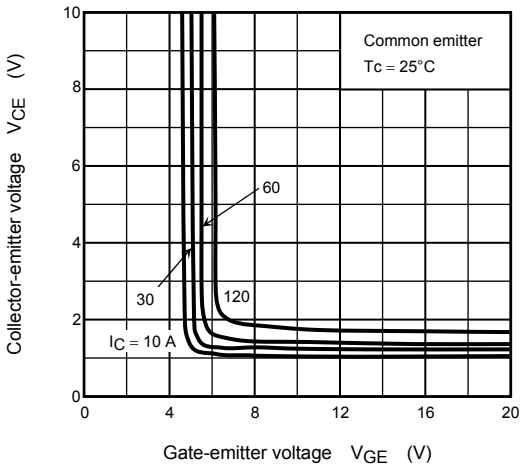
$I_C - V_{CE}$



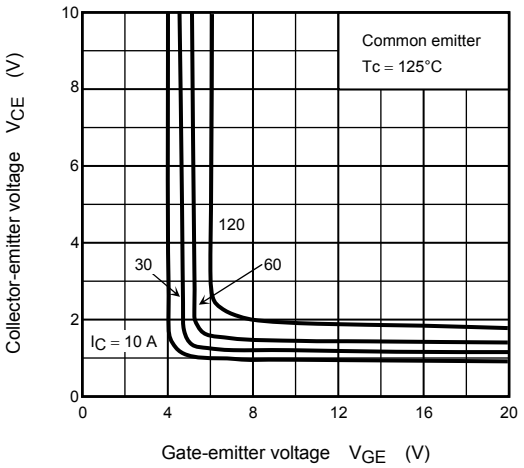
$V_{CE} - V_{GE}$



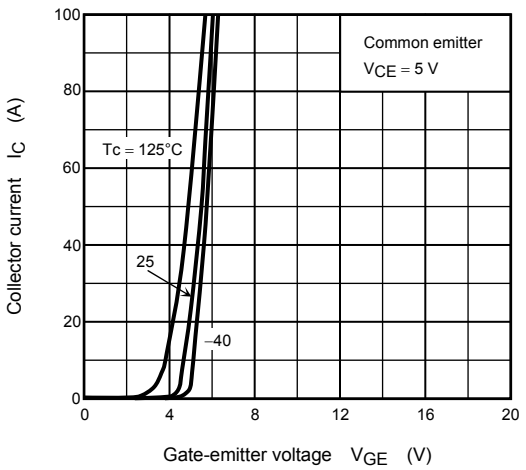
$V_{CE} - V_{GE}$



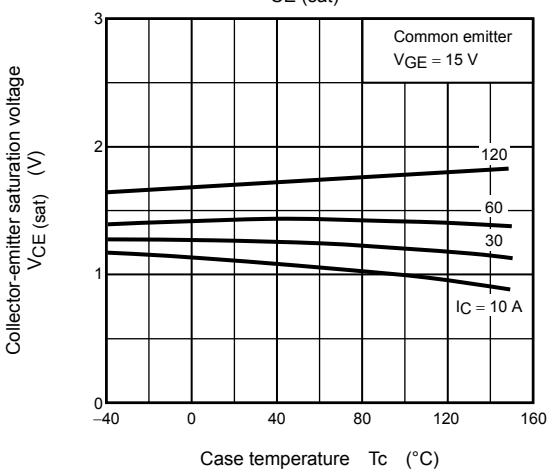
$V_{CE} - V_{GE}$



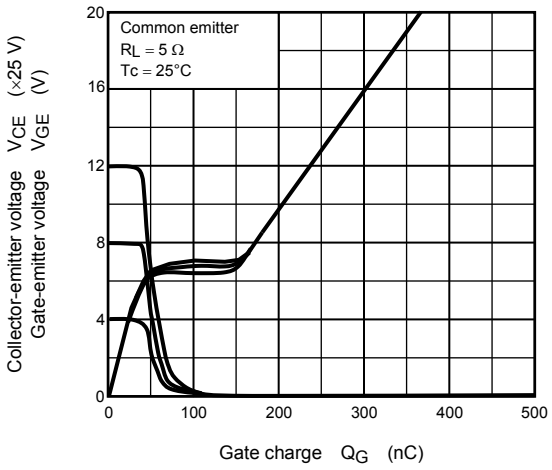
$I_C - V_{GE}$



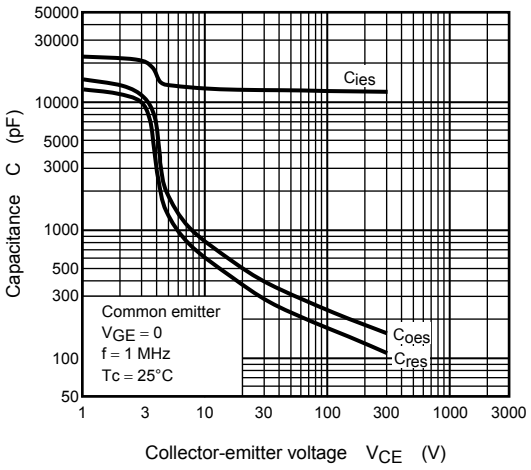
$V_{CE\ (sat)} - Tc$



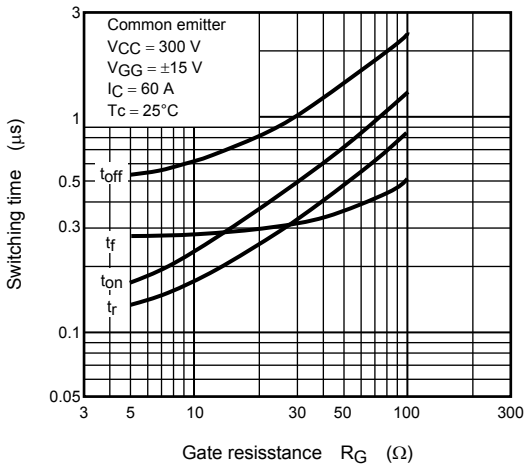
V_{CE}, V_{GE} – Q_G



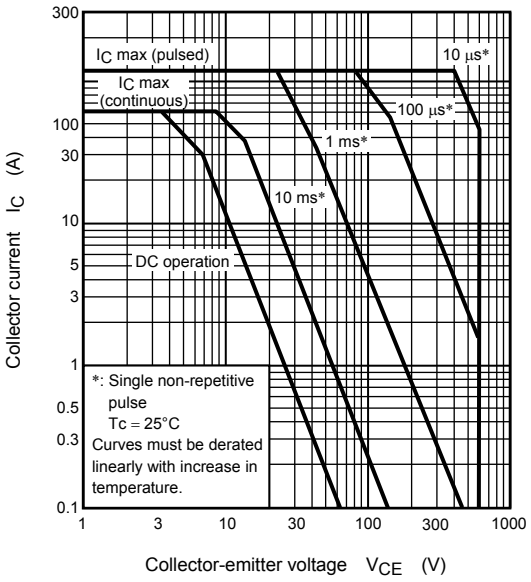
C – V_{CE}



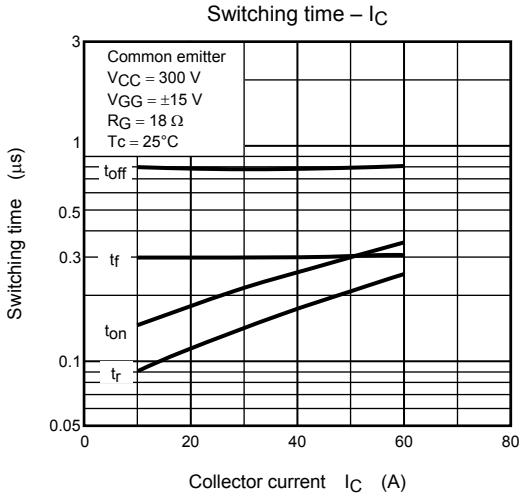
Switching time – R_G



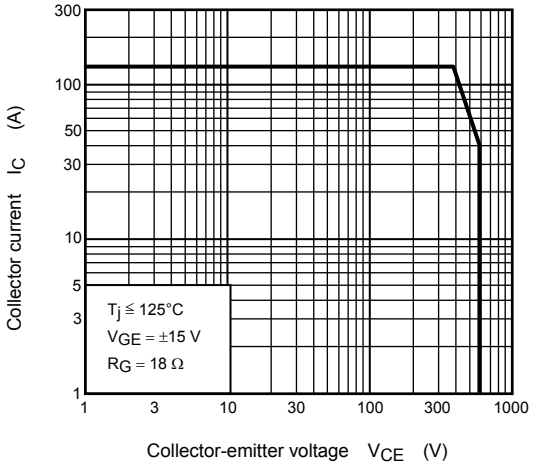
Safe operating area



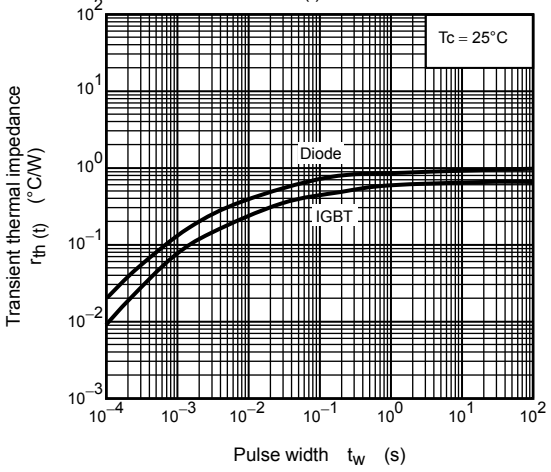
Switching time – I_C



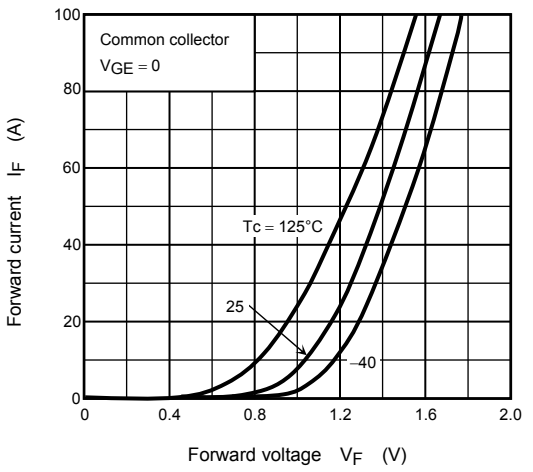
Reverse bias SOA



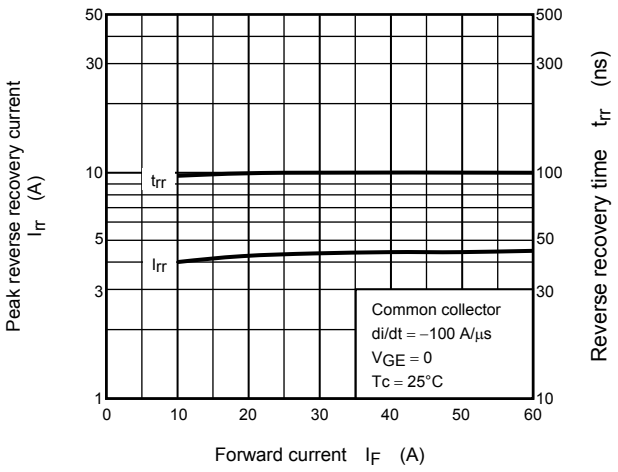
$r_{th\ (t)} - t_w$



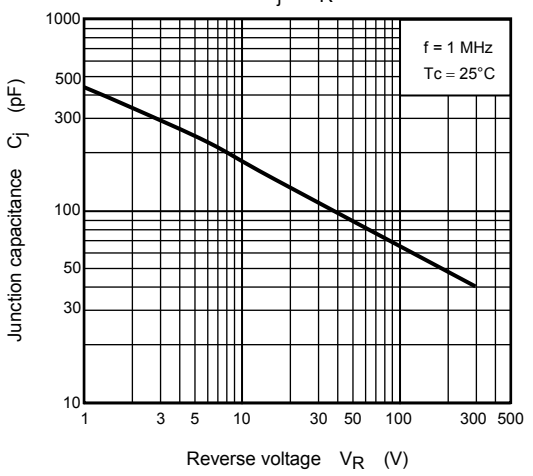
$I_F - V_F$



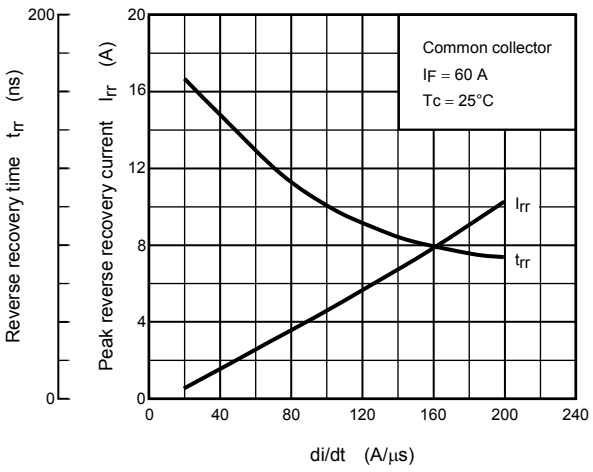
$I_{rr}, t_{rr} - I_F$



$C_j - V_R$



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



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20070701-EN

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