Preliminary

TOSHIBA Insulated Gate Bipolar Transistor
Silicon N Channel IGBT

GT20J101

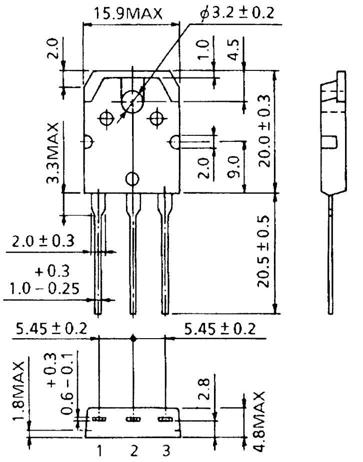
High Power Switching Applications

- The 3rd Generation
- Enhancement-Mode
- High Speed: $t_f = 0.30\ \mu s$ (max)
- Low Saturation Voltage: $V_{CE\ (sat)} = 2.7\ V$ (max)

Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
Collector-emitter voltage		V_{CES}	600	V
Gate-emitter voltage		V_{GES}	±20	V
Collector current	DC	I_C	20	A
	1 ms	I_{CP}	40	
Collector power dissipation (Tc = 25°C)		P_C	130	W
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55~150	°C

Unit: mm



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

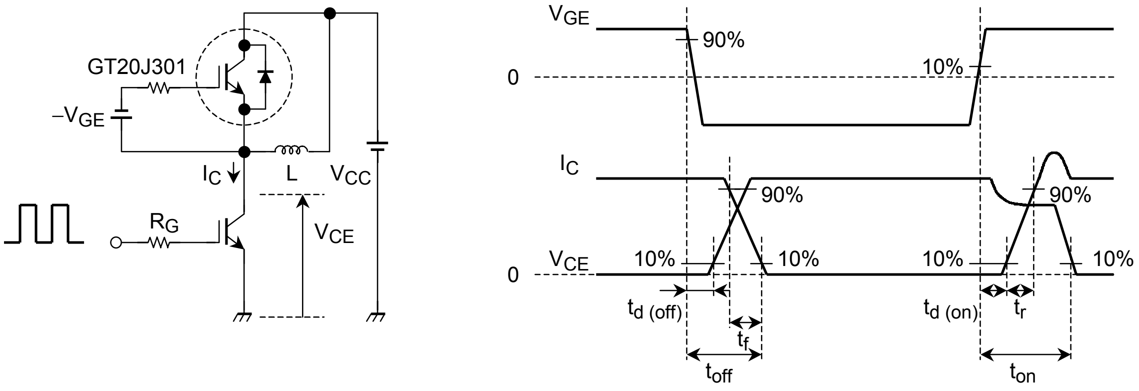
JEDEC	—
JEITA	—
TOSHIBA	2-16C1C

Weight: 4.6 g

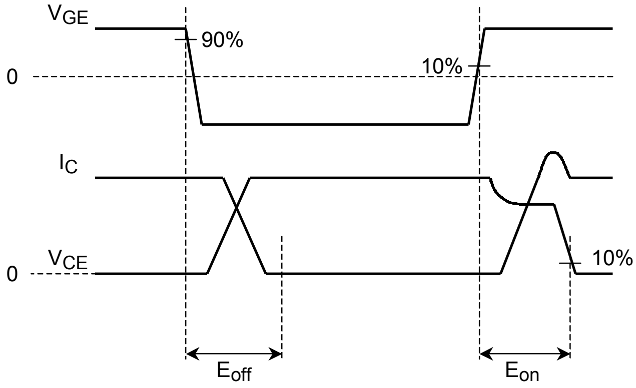
Electrical Characteristics (Ta = 25°C)

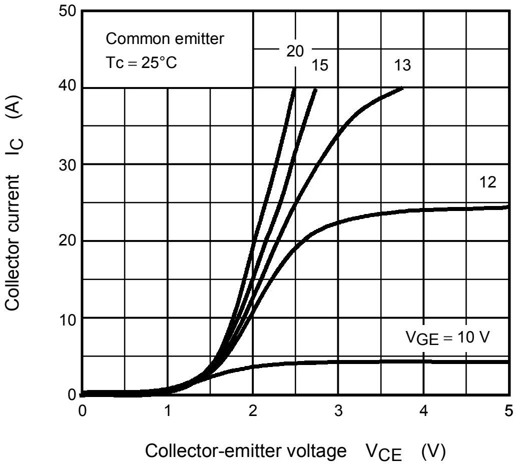
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GES}	V_{GE} = ±20 V, V_{CE} = 0	—	—	±500	nA
Collector cut-off current		I_{CES}	V_{CE} = 600 V, V_{GE} = 0	—	—	1.0	mA
Gate-emitter cut-off voltage		$V_{GE\ (OFF)}$	I_C = 2 mA, V_{CE} = 5 V	5.0	—	8.0	V
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = 20 A, V_{GE} = 15 V	—	2.1	2.7	V
Input capacitance		C_{ies}	V_{CE} = 20 V, V_{GE} = 0, f = 1 MHz	—	1450	—	pF
Switching time	Rise time	t_r	Inductive Load V_{CC} = 300 V, I_C = 20 A V_{GG} = ±15 V, R_G = 56 Ω (Note1)	—	0.12	—	µs
	Turn-on time	t_{on}		—	0.40	—	
	Fall time	t_f		—	0.15	0.30	
	Turn-off time	t_{off}		—	0.50	—	
Thermal resistance		$R_{th\ (j-c)}$	—	—	—	0.96	°C/W

Note1: Switching time measurement circuit and input/output waveforms

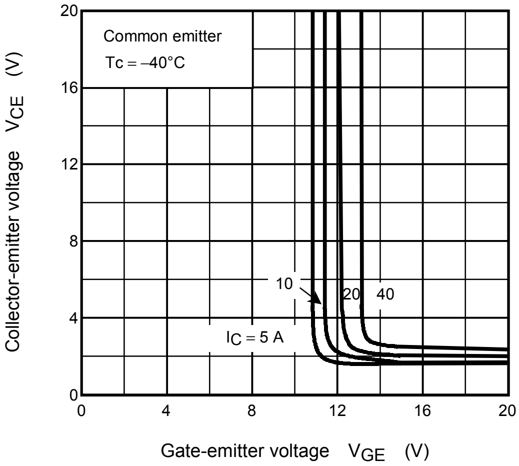


Note2: Switching loss measurement waveforms

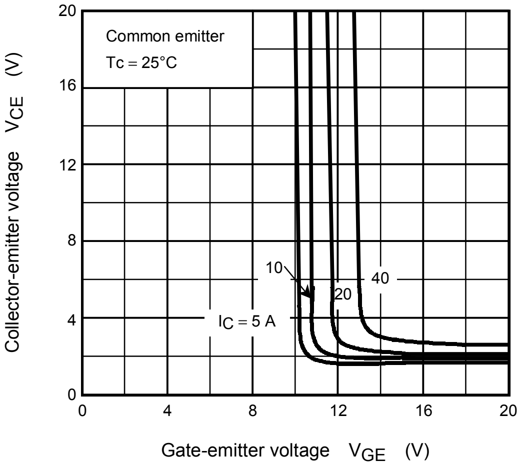




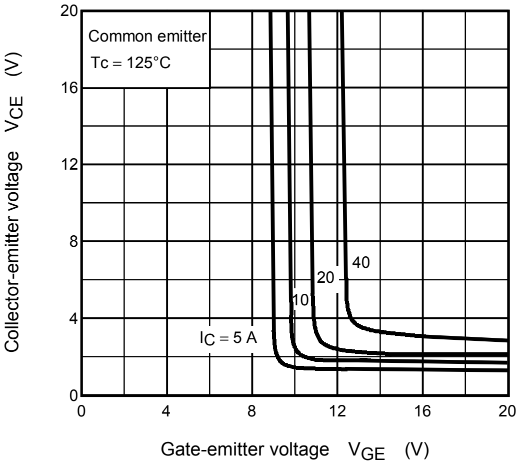
$I_C – V_{CE}$



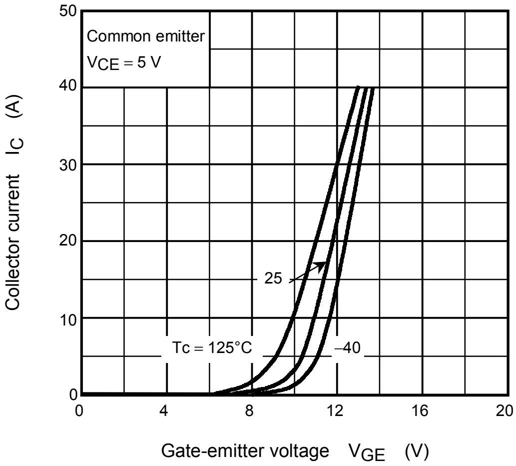
$V_{CE} – V_{GE}$



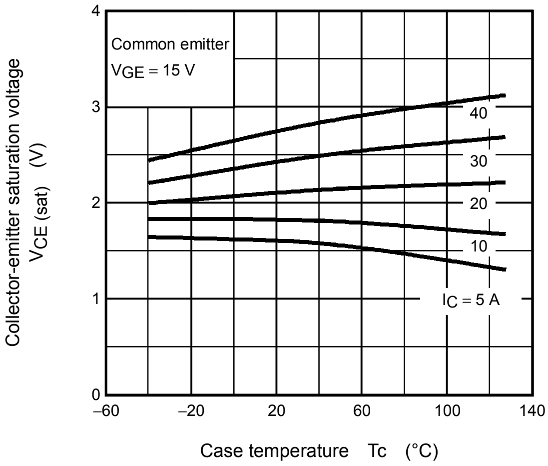
$V_{CE} – V_{GE}$



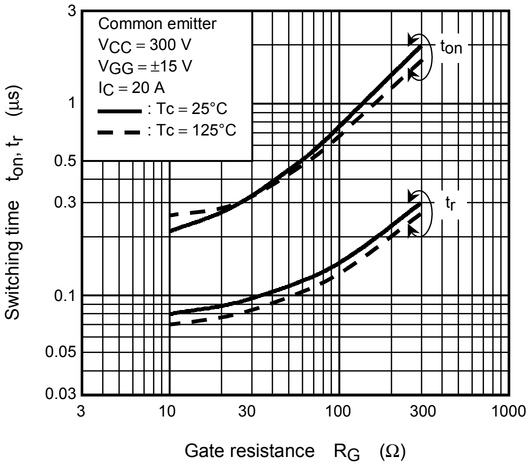
$V_{CE} – V_{GE}$

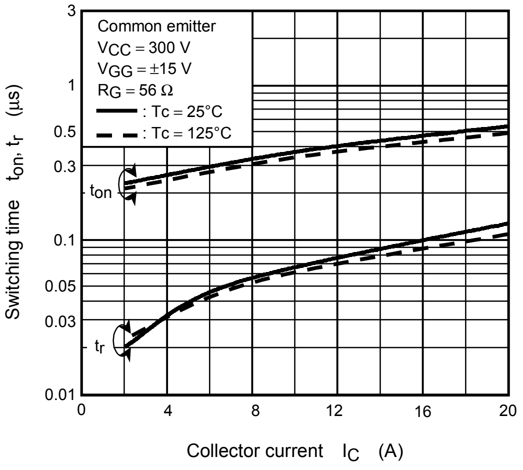


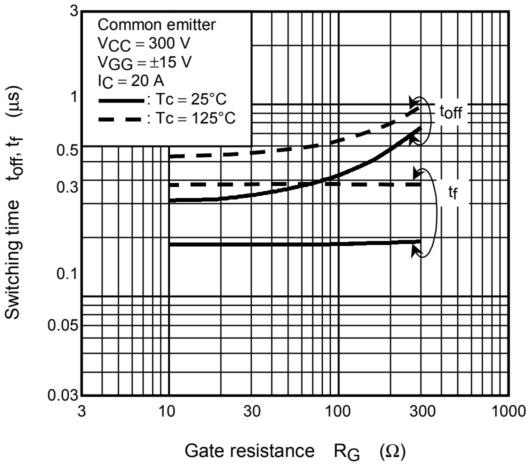
$I_C – V_{GE}$

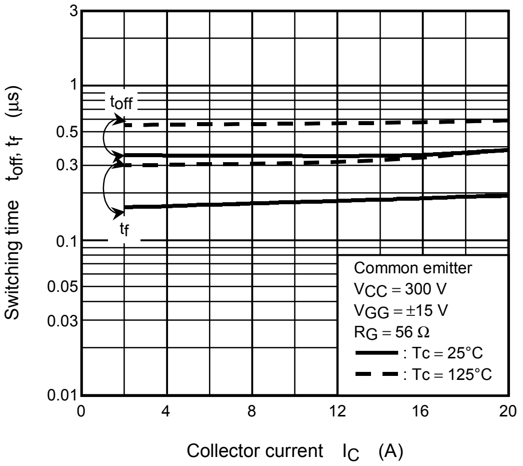


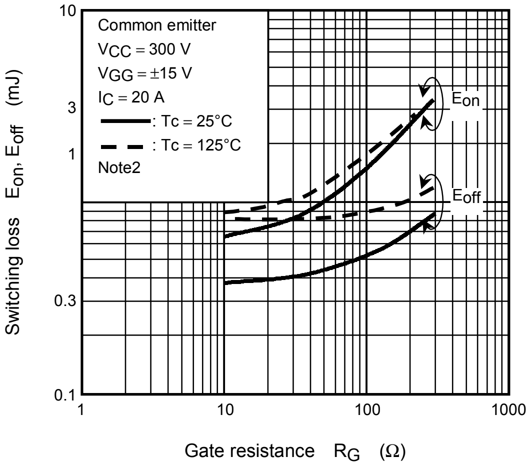
$V_{CE\ (sat)} – Tc$

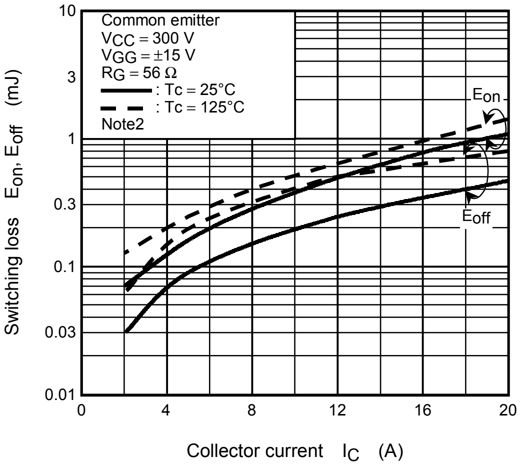

Switching time t_{on}, t_r – R_G


Switching time t_{on}, t_r – I_C

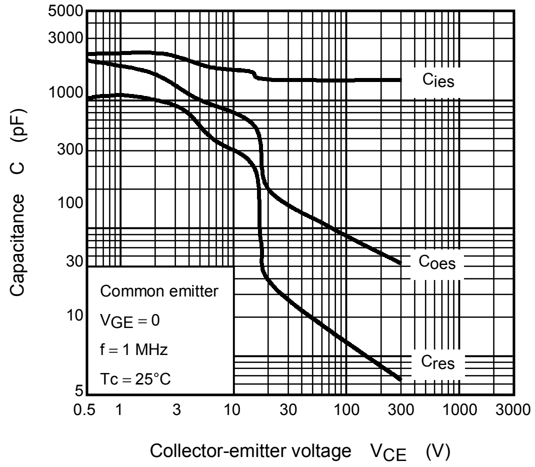

Switching time t_{off}, t_f – R_G


Switching time t_{off}, t_f – I_C

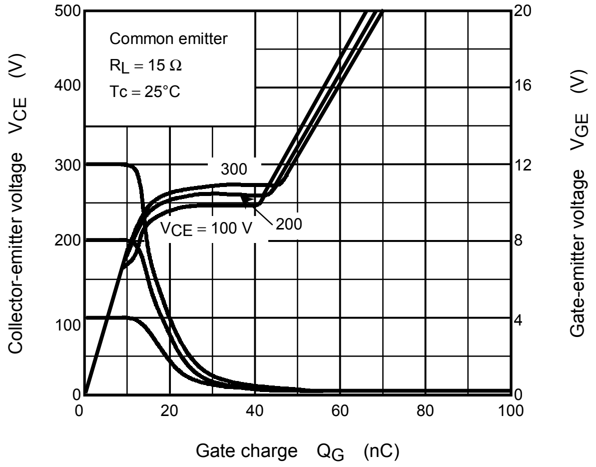

Switching loss E_{on}, E_{off} – R_G


Switching loss E_{on}, E_{off} – I_C

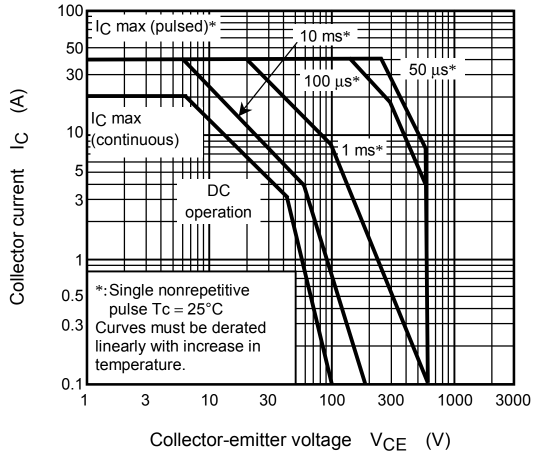
$C – V_{CE}$



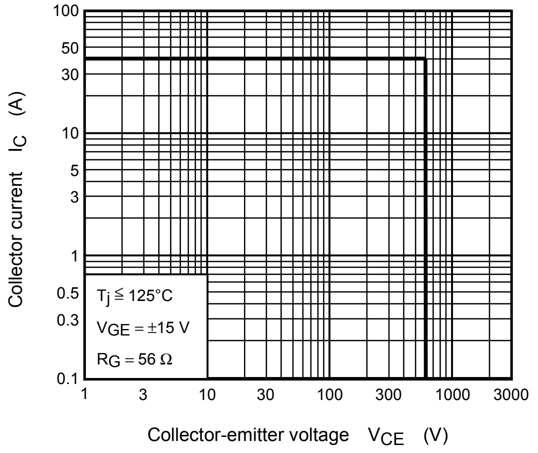
$V_{CE}, V_{GE} – Q_G$



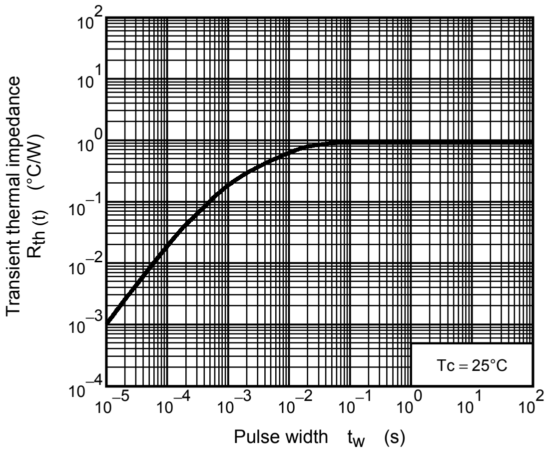
Safe operating area



Reverse bias SOA



$R_{th\,(t)} – t_w$



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