TOSHIBA Insulated Gate Bipolar Transistor Silicon N Channel IGBT

GT10Q101

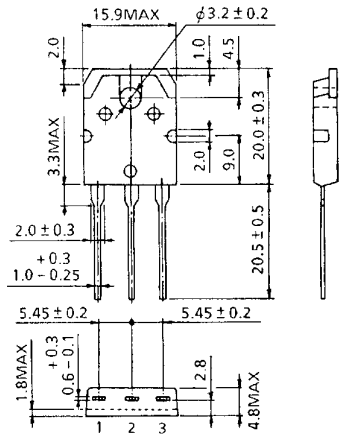
High Power Switching Applications

- The 3rd Generation
- Enhancement-Mode
- High Speed: t_f = 0.32 μs (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}	1200	V
Gate-emitter voltage		V_{GES}	±20	V
Collector current	DC	I_C	10	A
	1 ms	I_{CP}	20	
Collector power dissipation (Tc = 25°C)		P_C	140	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

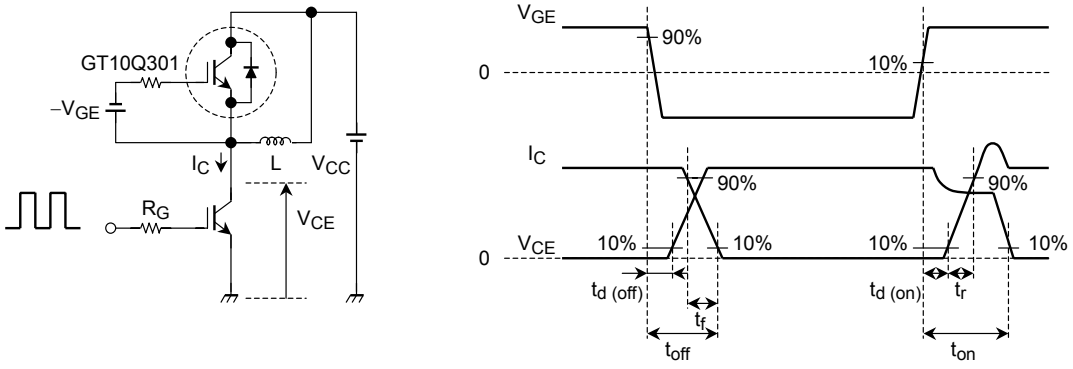
JEDEC	—
JEITA	—
TOSHIBA	2-16C1C

Weight: 4.6 g (typ.)

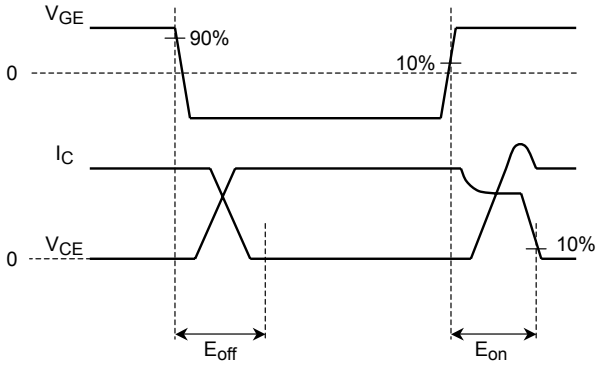
Electrical Characteristics (Ta = 25°C)

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} = 1200 V, V_{GE} = 0	—	—	1.0	mA
Gate-emitter cut-off voltage		$V_{GE\ (OFF)}$	I_C = 1 mA, V_{CE} = 5 V	4.0	—	7.0	V
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = 10 A, V_{GE} = 15 V	—	2.1	2.7	V
Input capacitance		C_{ies}	V_{CE} = 50 V, V_{GE} = 0, f = 1 MHz	—	600	—	pF
Switching time	Rise time	t_r	Inductive Load V_{CC} = 600 V, I_C = 10 A V_{GG} = ±15 V, R_G = 75 Ω (Note1)	—	0.07	—	μs
	Turn-on time	t_{on}		—	0.30	—	
	Fall time	t_f		—	0.16	0.32	
	Turn-off time	t_{off}		—	0.50	—	
Thermal resistance		$R_{th\ (j\text{-}c)}$	—	—	—	0.89	°C/W

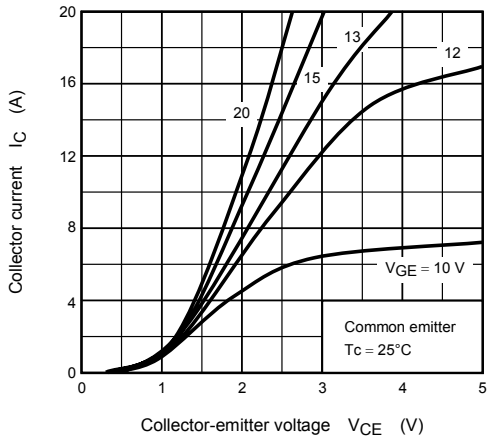
Note1: Switching time measurement circuit and input/output waveforms



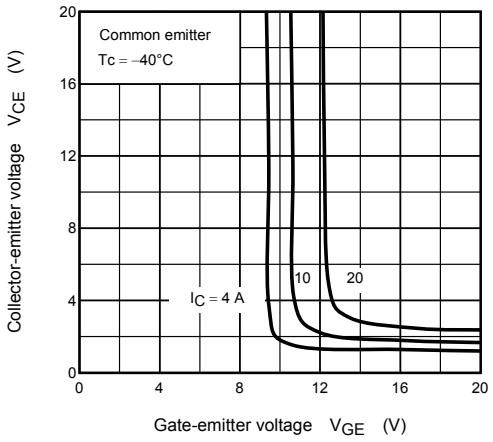
Note2: Switching loss measurement waveforms



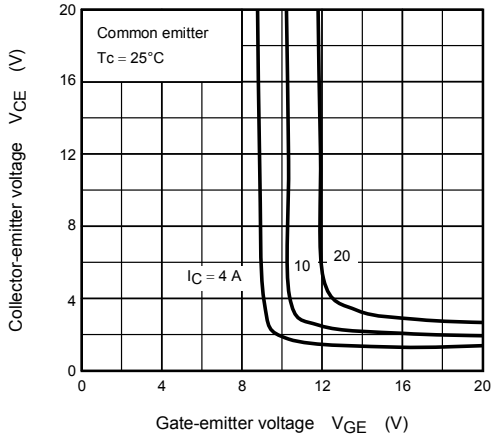
$I_C - V_{CE}$



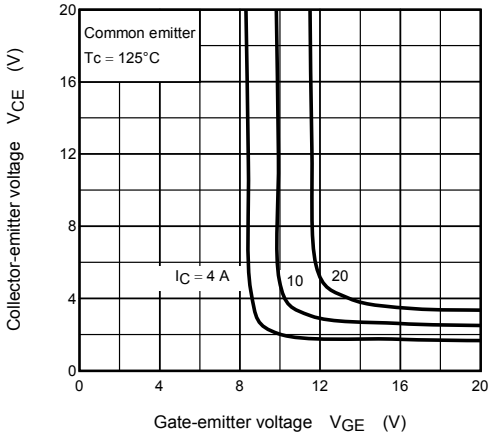
$V_{CE} - V_{GE}$



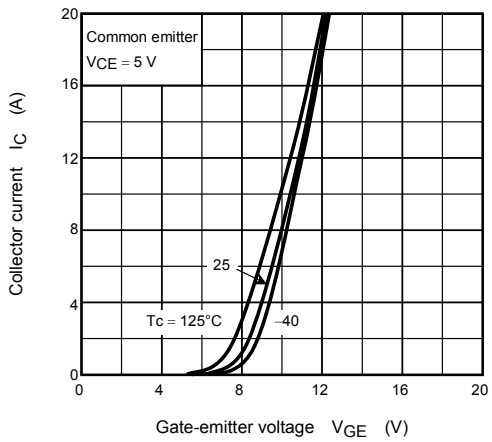
$V_{CE} - V_{GE}$



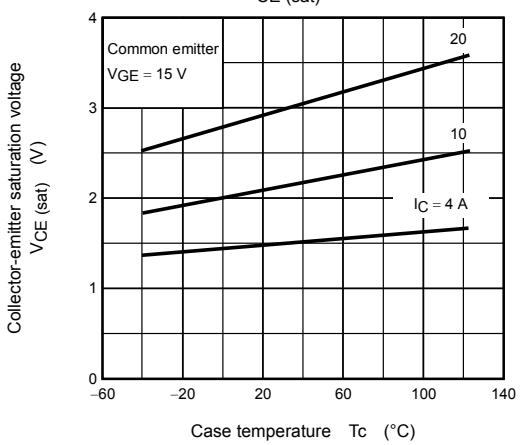
$V_{CE} - V_{GE}$



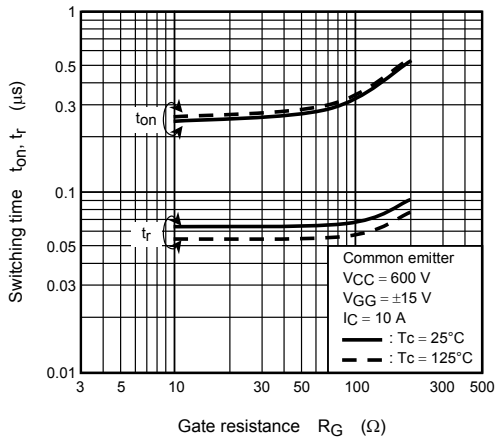
$I_C - V_{GE}$



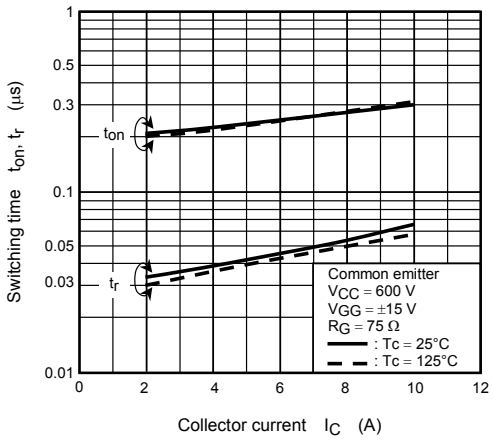
$V_{CE\ (sat)} - Tc$



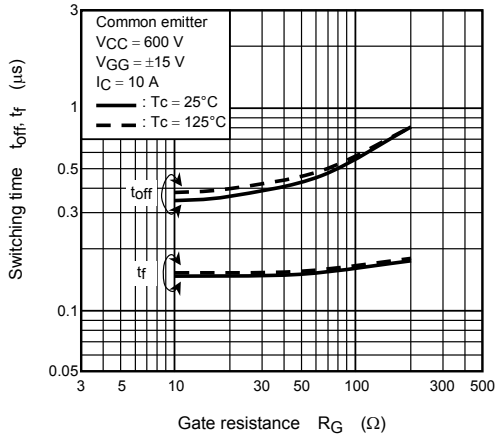
Switching time t_{on}, t_r – R_G



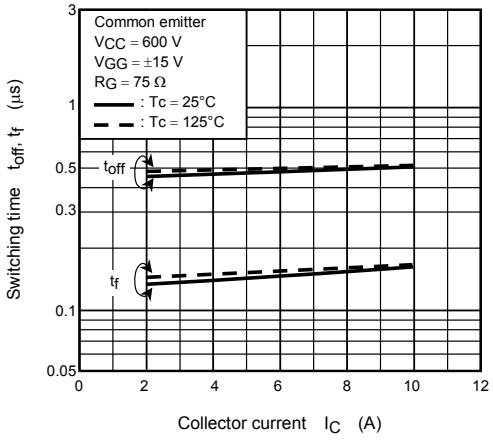
Switching time t_{on}, t_r – I_C



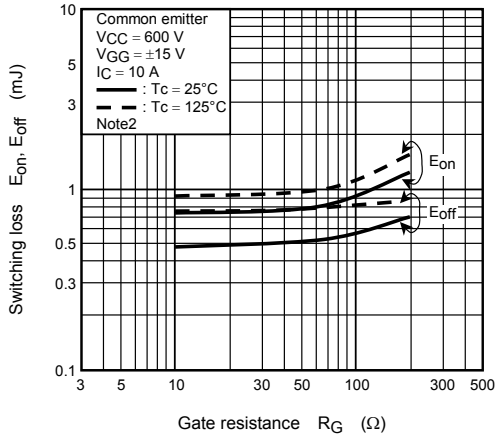
Switching time t_{off}, t_f – R_G



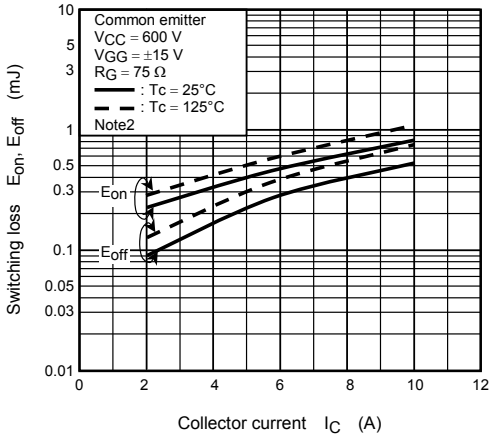
Switching time t_{off}, t_f – I_C



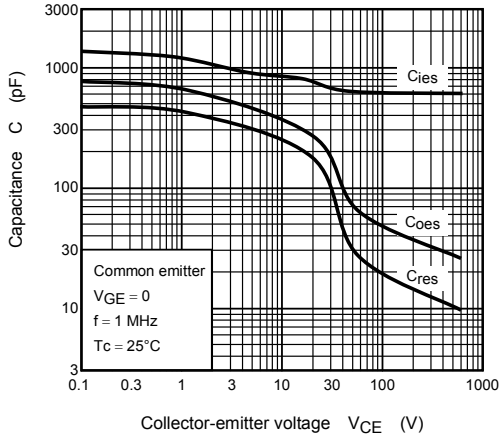
Switching loss E_{on}, E_{off} – R_G



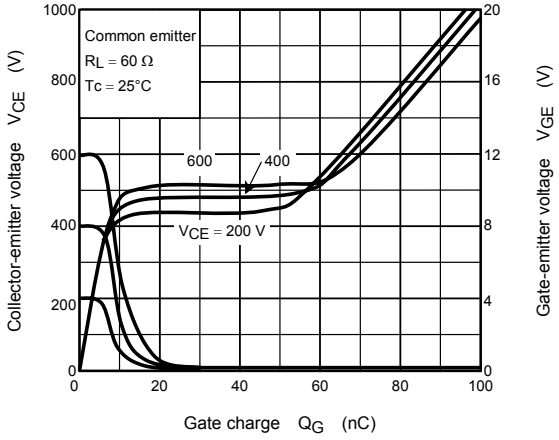
Switching loss E_{on}, E_{off} – I_C



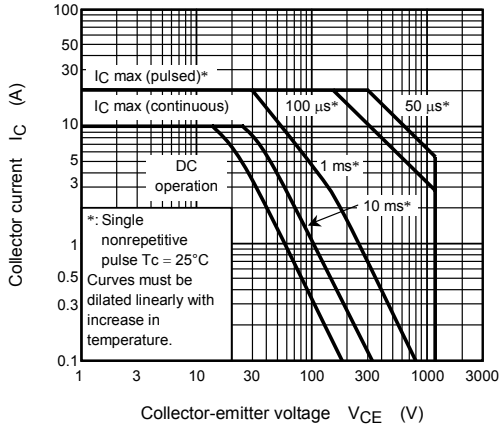
C – V_{CE}



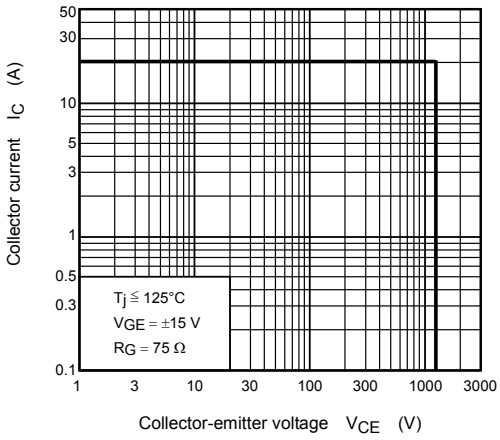
V_{CE}, V_{GE} – Q_G



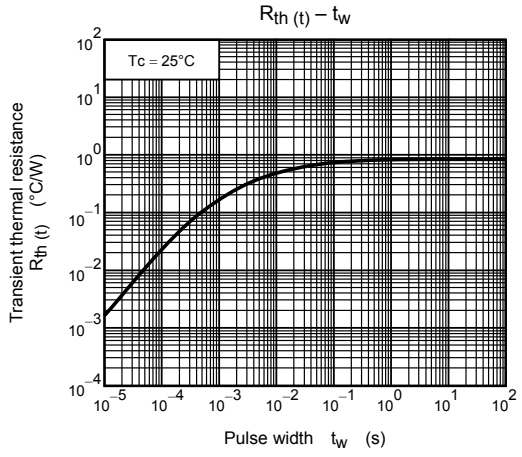
Safe operating area



Reverse bias SOA



$R_{th\ (t)}$ – t_w



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