

TOSHIBA Insulated Gate Bipolar Transistor Silicon N Channel IGBT

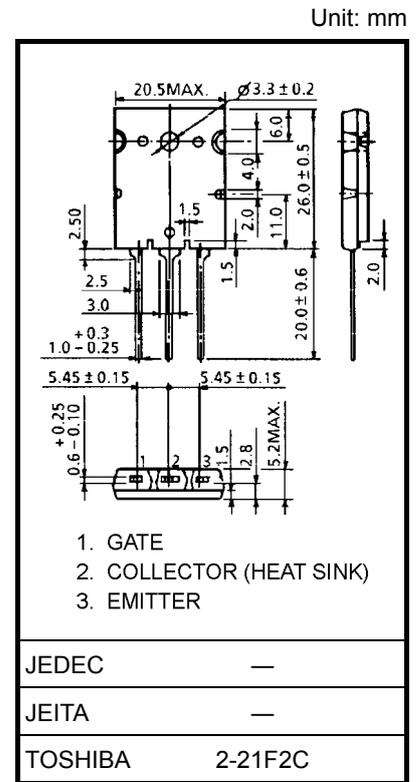
# GT25Q301

High Power Switching Applications  
Motor Control Applications

- Third-generation IGBT
- Enhancement mode type
- High speed:  $t_f = 0.32 \mu s$  (max)
- Low saturation voltage:  $V_{CE(sat)} = 2.7 V$  (max)
- FRD included between emitter and collector

## Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Collector-emitter voltage		$V_{CES}$	1200	V
Gate-emitter voltage		$V_{GES}$	$\pm 20$	V
Collector current	DC	$I_C$	25	A
	1 ms	$I_{CP}$	50	
Diode forward current	DC	$I_F$	25	A
	1 ms	$I_{FP}$	50	
Collector power dissipation (Tc = 25°C)		$P_C$	200	W
Junction temperature		$T_j$	150	°C
Storage temperature range		$T_{stg}$	-55 to 150	°C

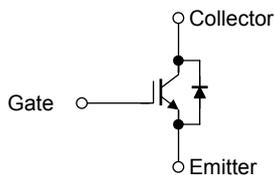


Weight: 9.75 g (typ.)

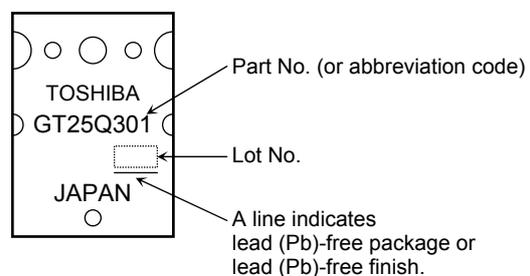
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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



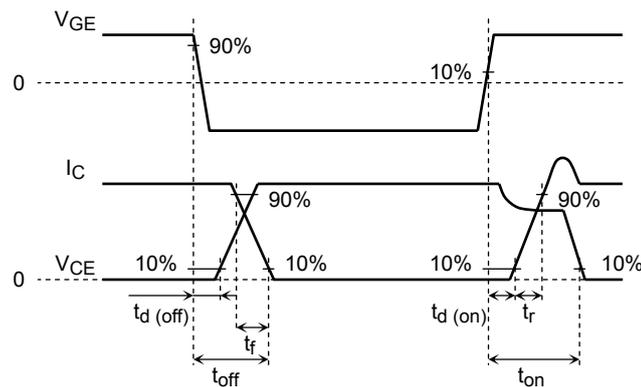
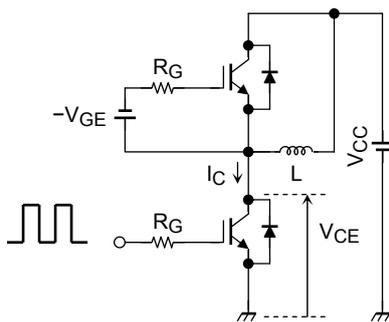
## Marking

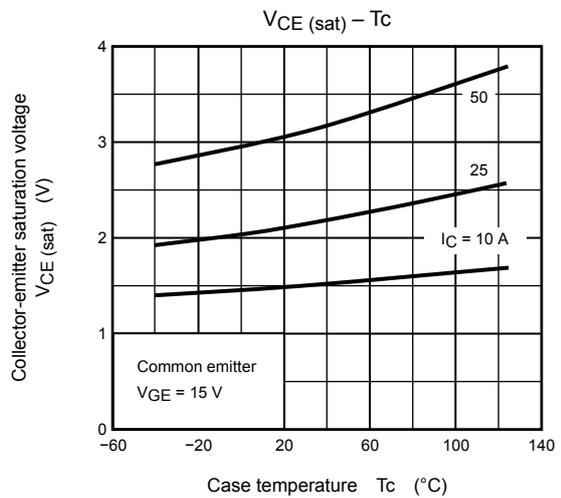
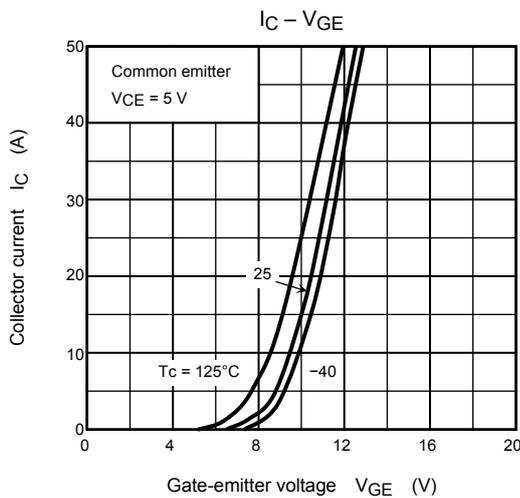
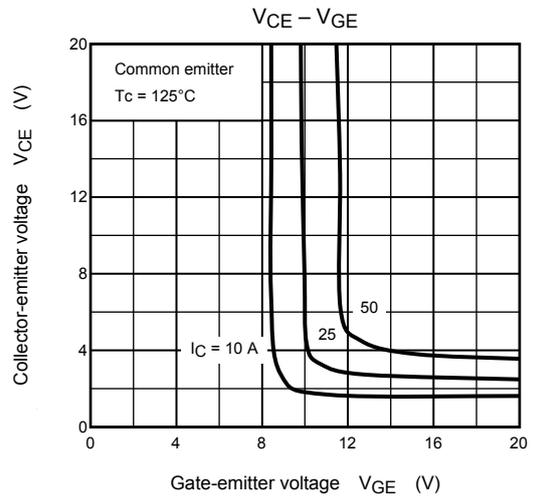
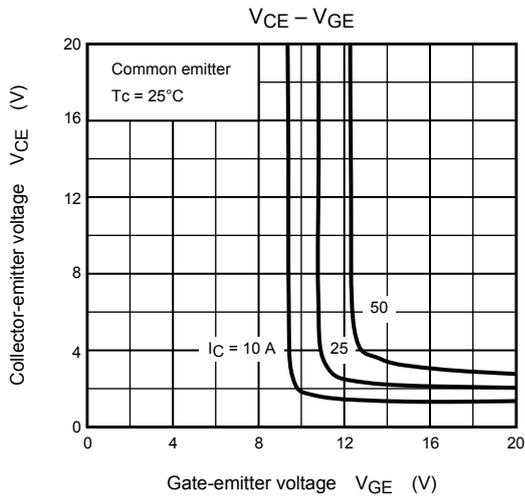
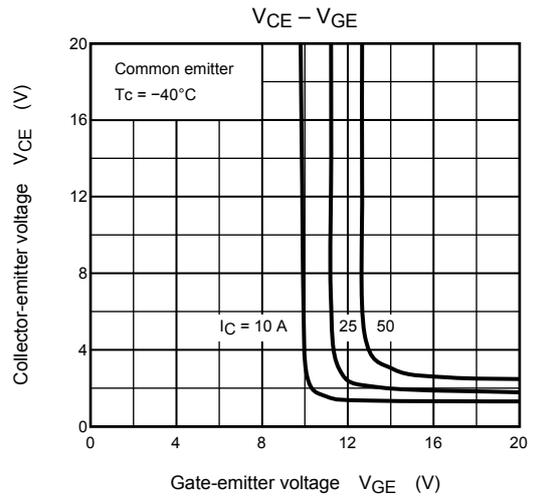
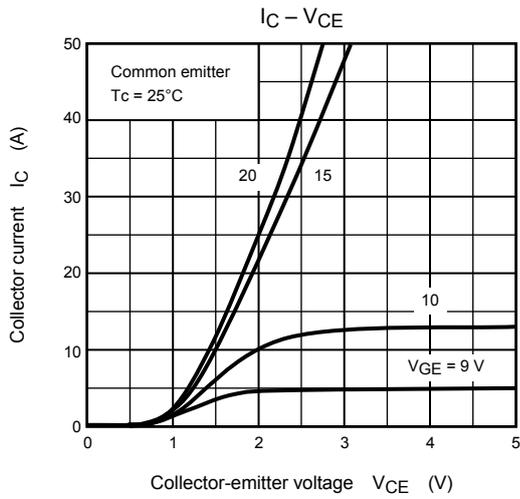


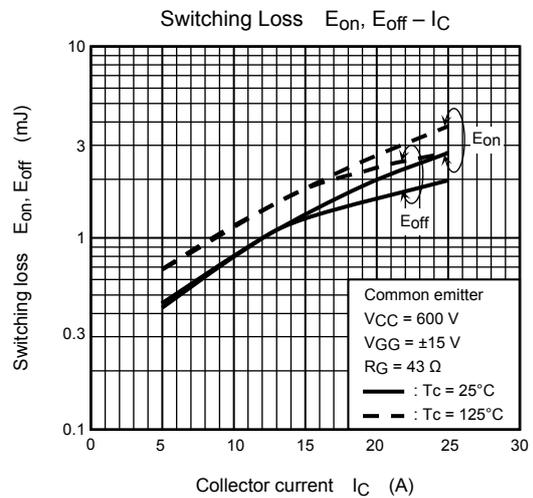
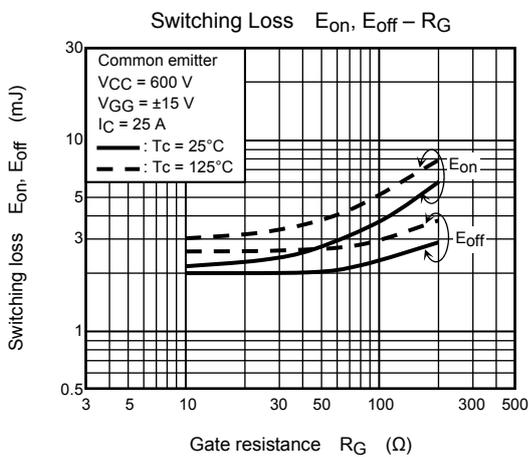
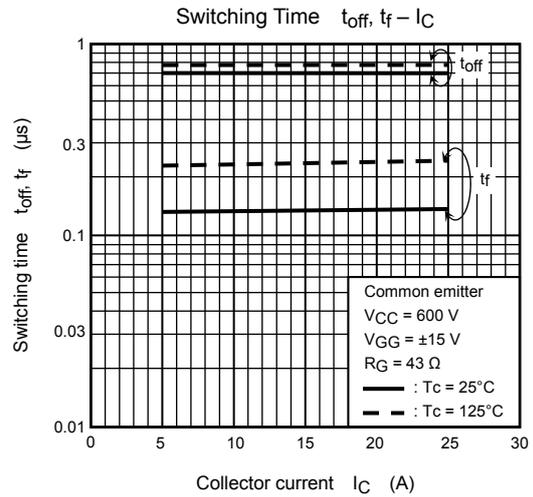
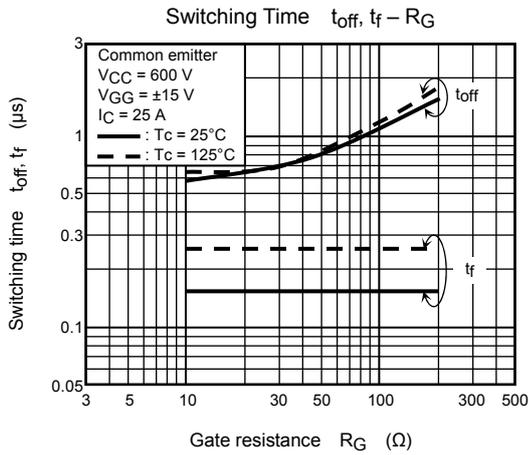
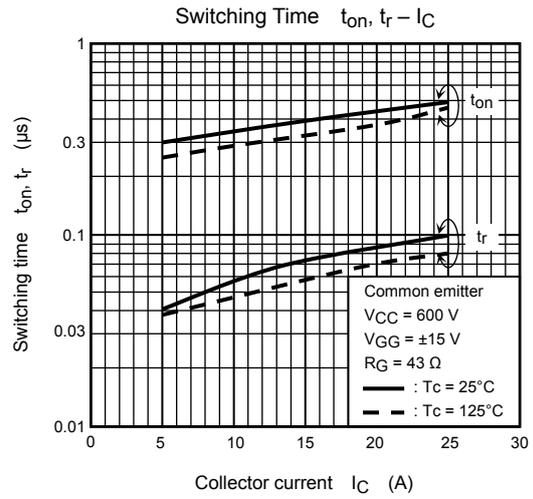
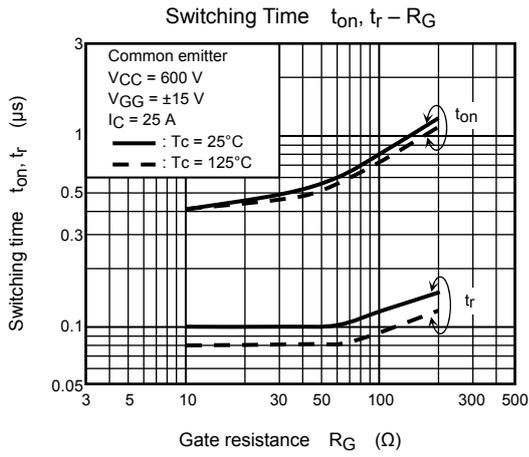
## Electrical Characteristics (Ta = 25°C)

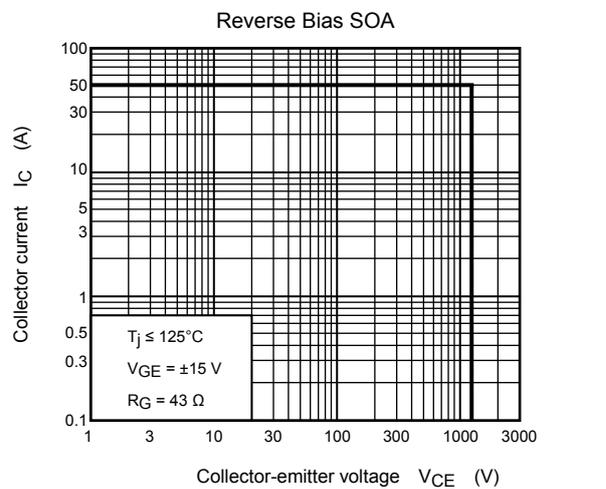
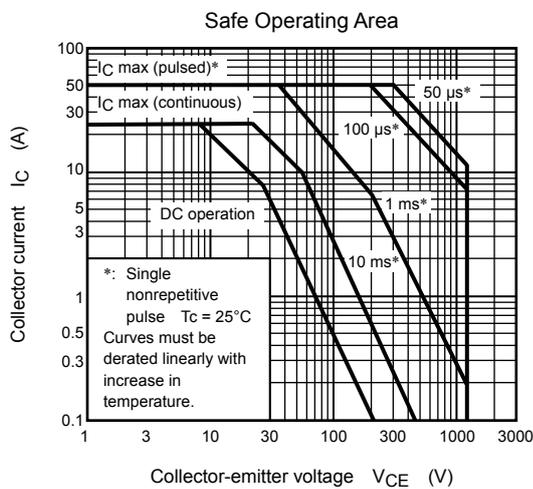
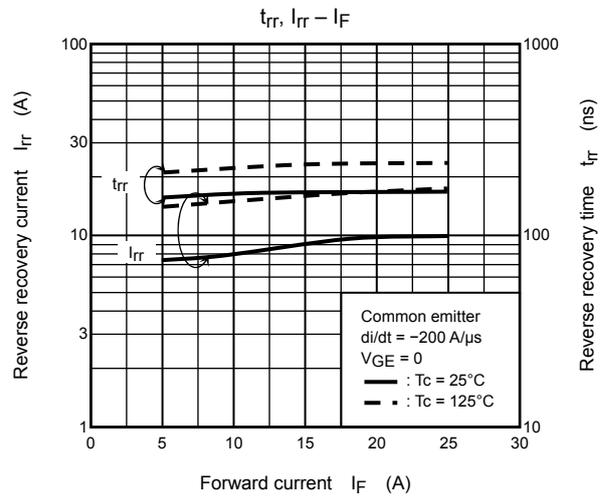
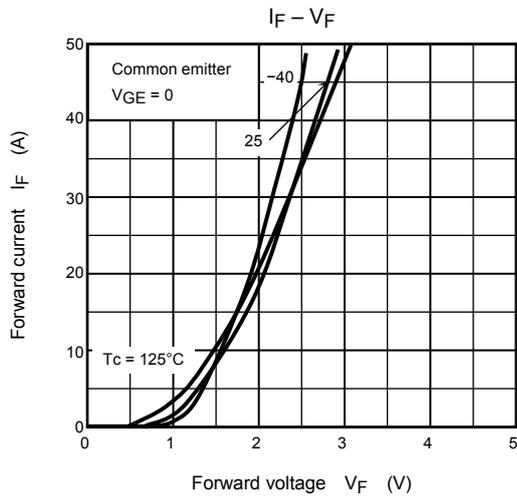
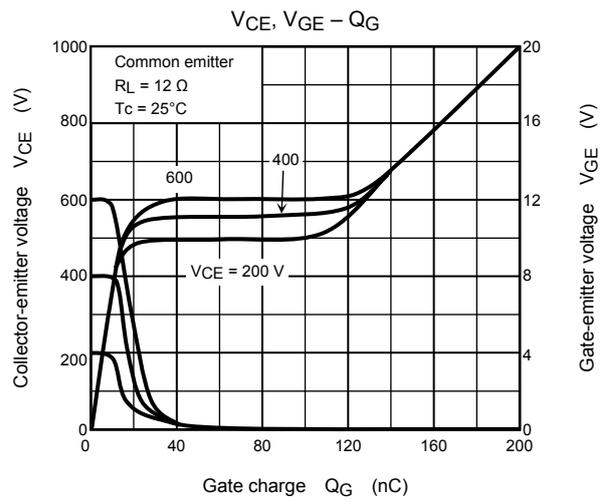
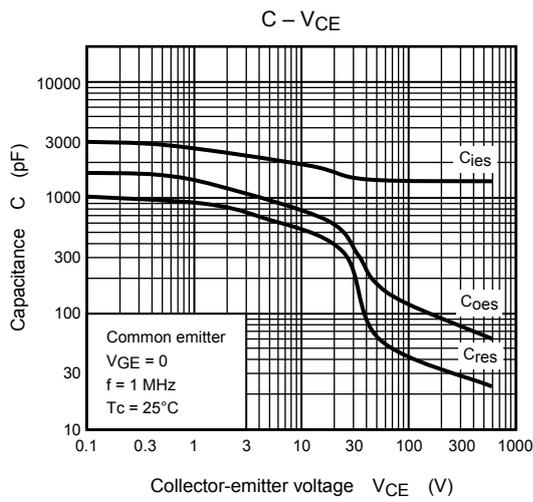
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		$I_{GES}$	$V_{GE} = \pm 20\text{ V}, V_{CE} = 0$	—	—	$\pm 500$	nA
Collector cut-off current		$I_{CES}$	$V_{CE} = 1200\text{ V}, V_{GE} = 0$	—	—	1.0	mA
Gate-emitter cut-off voltage		$V_{GE(OFF)}$	$I_C = 2.5\text{ mA}, V_{CE} = 5\text{ V}$	4.0	—	7.0	V
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 25\text{ A}, V_{GE} = 15\text{ V}$	—	2.1	2.7	V
Input capacitance		$C_{ies}$	$V_{CE} = 50\text{ V}, V_{GE} = 0, f = 1\text{ MHz}$	—	1360	—	pF
Switching time	Rise time	$t_r$	Inductive load $V_{CC} = 600\text{ V}, I_C = 25\text{ A}$ $V_{GG} = \pm 15\text{ V}, R_G = 43\ \Omega$ (Note)	—	0.10	—	$\mu\text{s}$
	Turn-on time	$t_{on}$		—	0.30	—	
	Fall time	$t_f$		—	0.16	0.32	
	Turn-off time	$t_{off}$		—	0.68	—	
Diode forward voltage		$V_F$	$I_F = 25\text{ A}, V_{GE} = 0$	—	—	3.0	V
Reverse recovery time		$t_{rr}$	$I_F = 25\text{ A}, di/dt = -200\text{ A}/\mu\text{s}$	—	—	350	ns
Thermal resistance (IGBT)		$R_{th(j-c)}$	—	—	—	0.625	°C/W
Thermal resistance (diode)		$R_{th(j-c)}$	—	—	—	1.38	°C/W

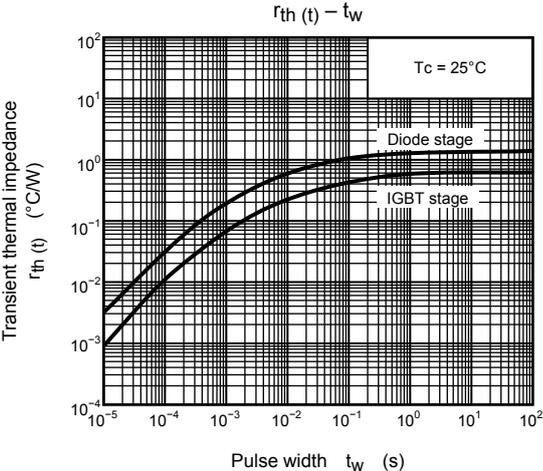
Note: Switching time measurement circuit and input/output waveforms











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