

TOSHIBA INSULATED GATE BIPOLAR TRANSISTOR SILICON N CHANNEL IGBT

GT10Q301

Unit in mm

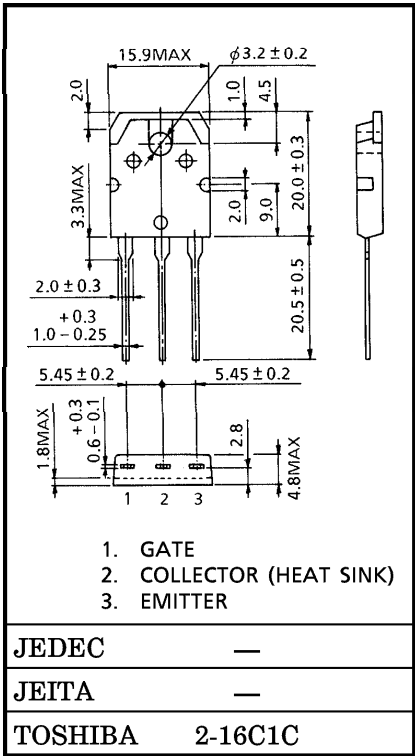
HIGH POWER SWITCHING APPLICATIONS

MOTOR CONTROL APPLICATIONS

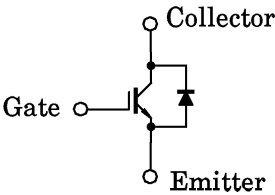
- The 3rd Generation
- Enhancement-Mode
- High Speed : $t_f = 0.32 \mu s$ (Max.)
- Low Saturation Voltage : $V_{CE(sat)} = 2.7 V$ (Max.)
- FRD included between Emitter and Collector

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	A
Emitter-Collector Forward Current	DC	I_F	10	A
	1 ms	I_{FM}	20	A
Collector Power Dissipation (Tc = 25°C)		P_C	140	W
Junction Temperature		T_j	150	°C
Storage Temperature Range		T_{stg}	-55~150	°C



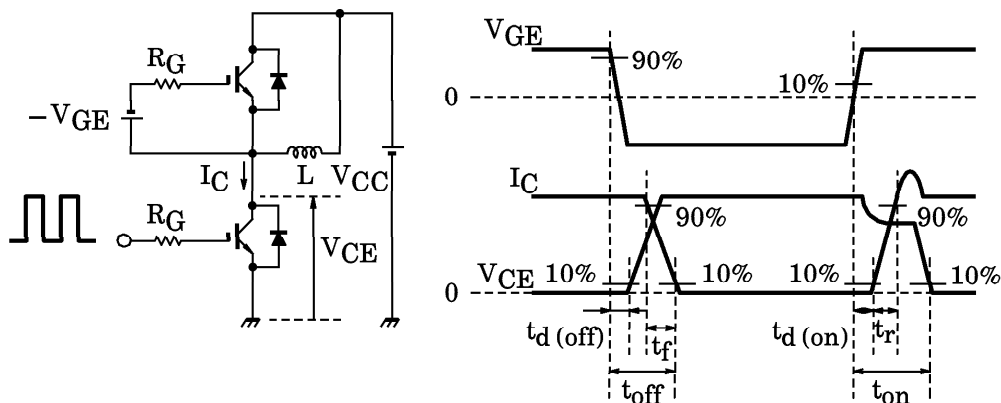
EQUIVALENT CIRCUIT

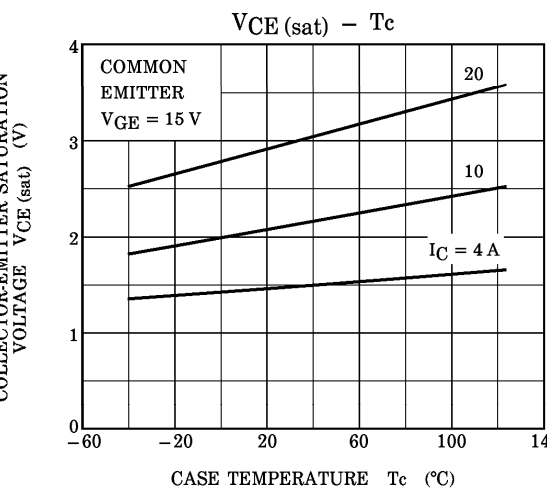
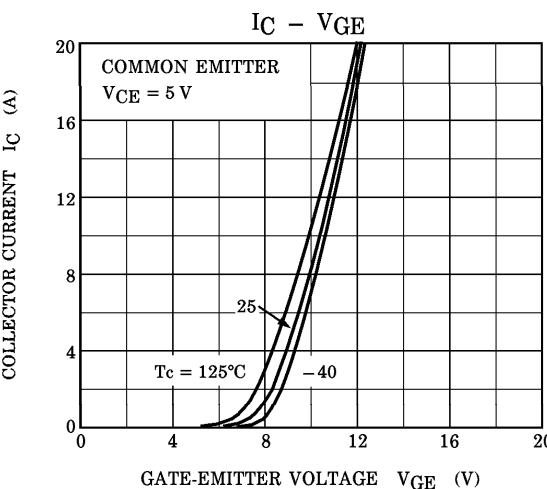
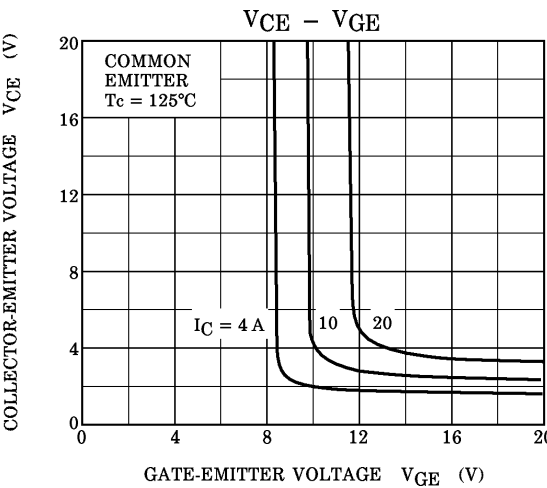
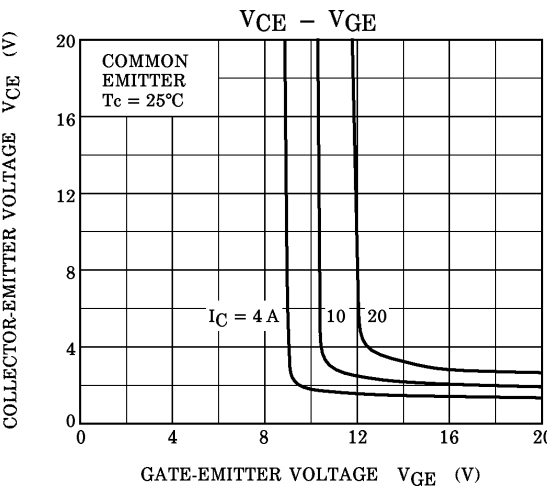
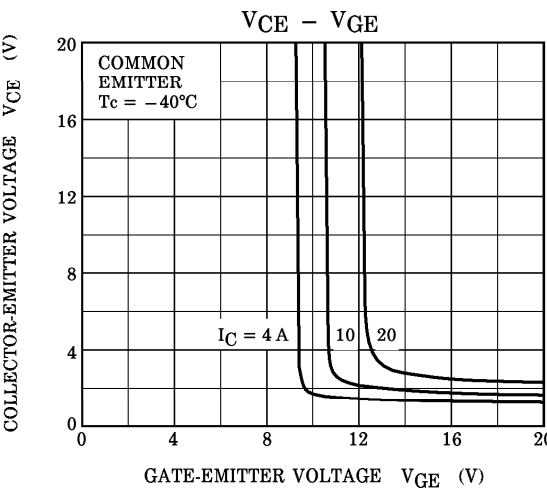
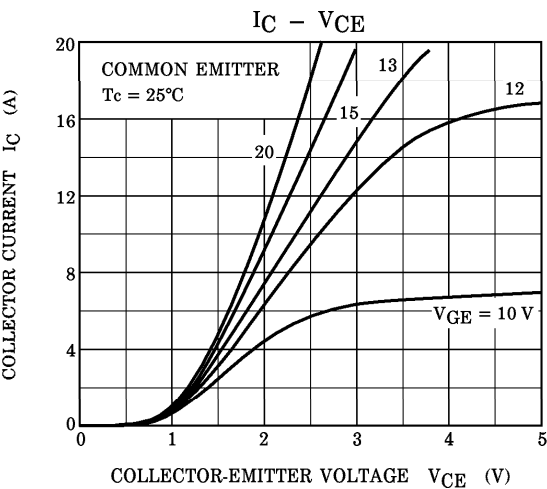


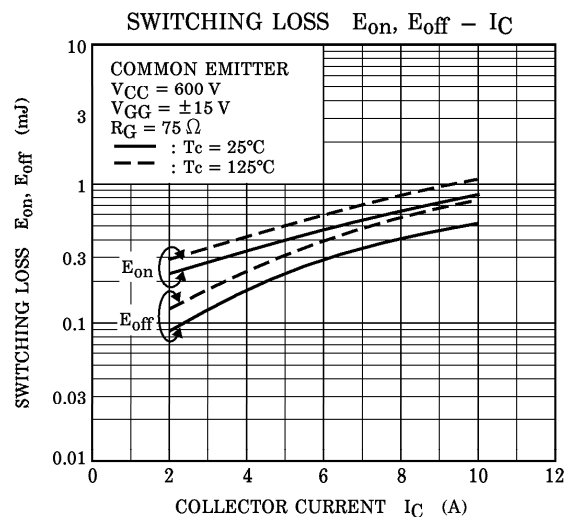
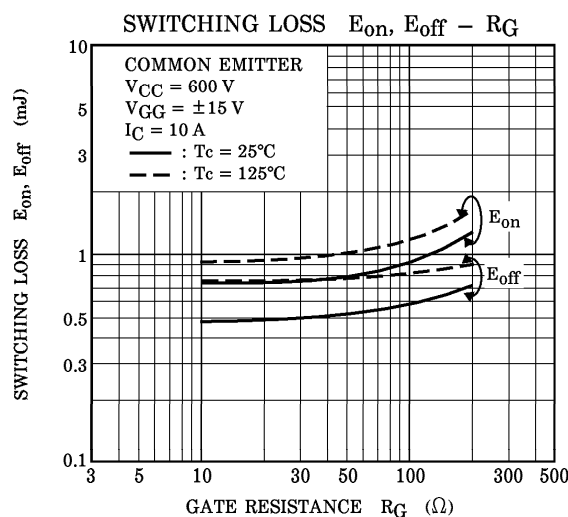
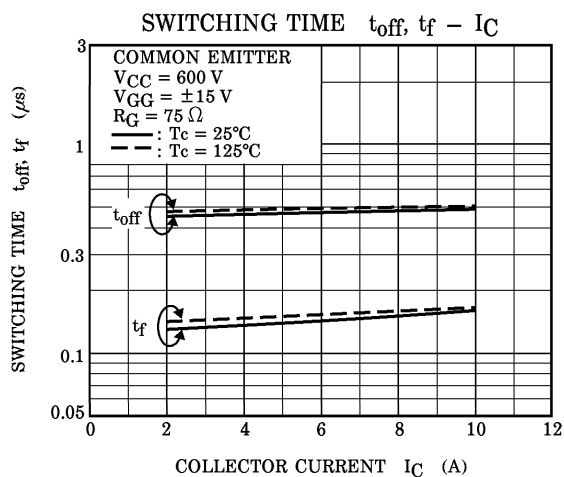
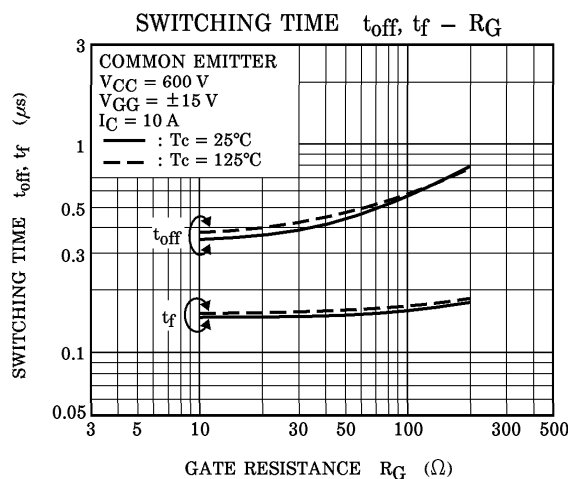
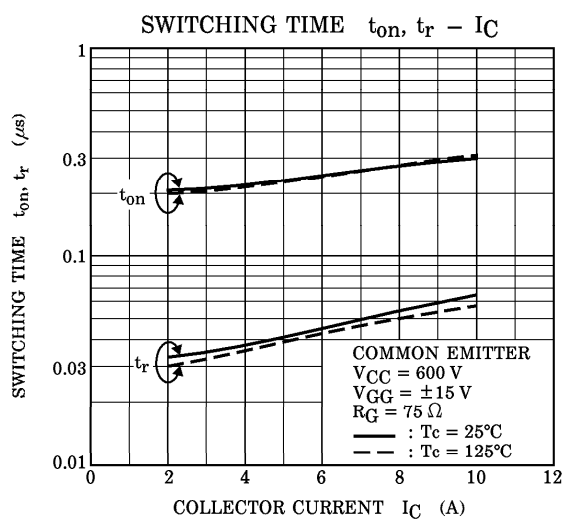
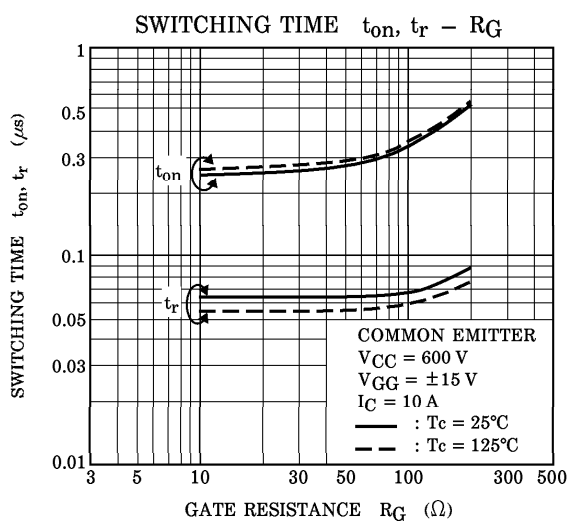
ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

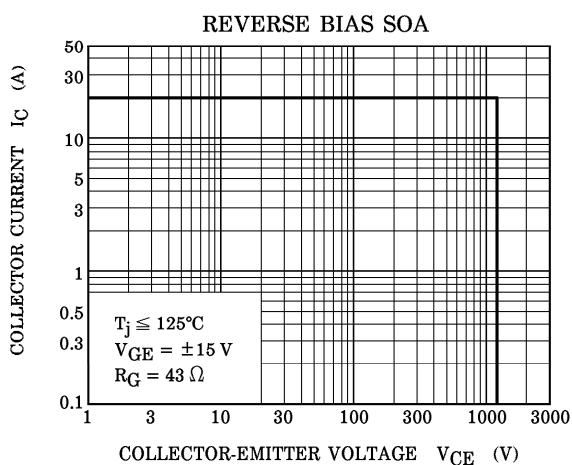
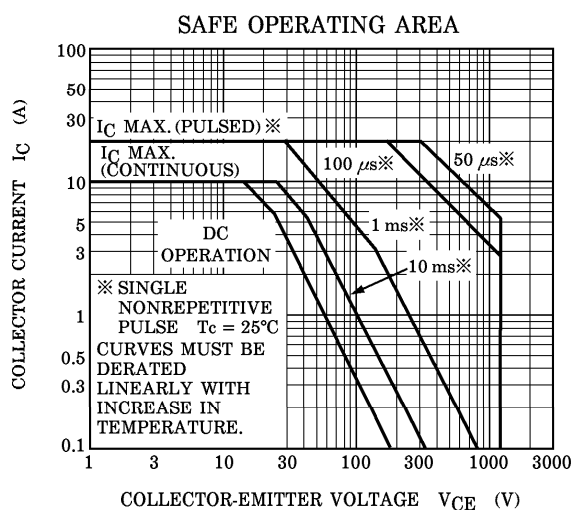
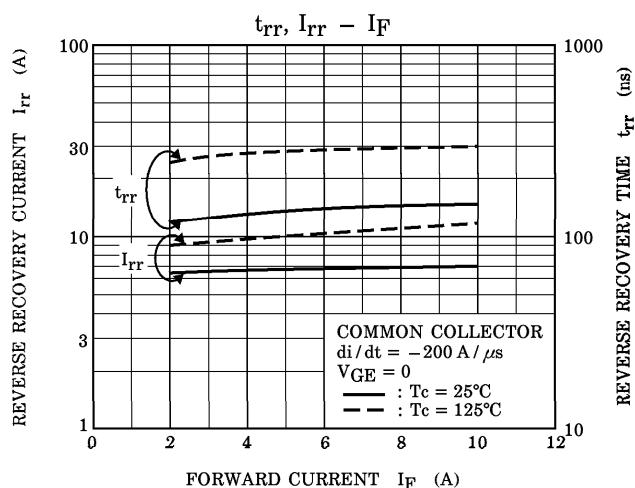
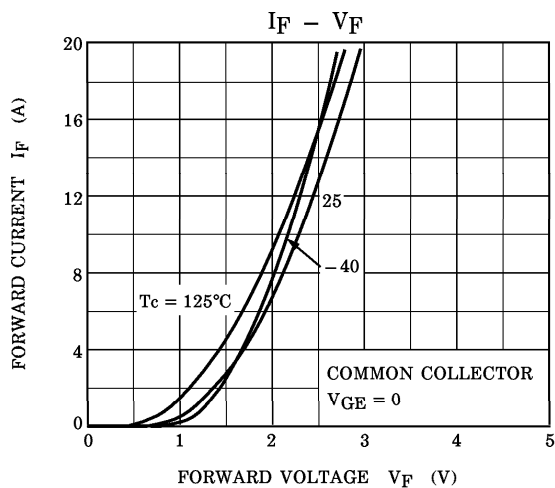
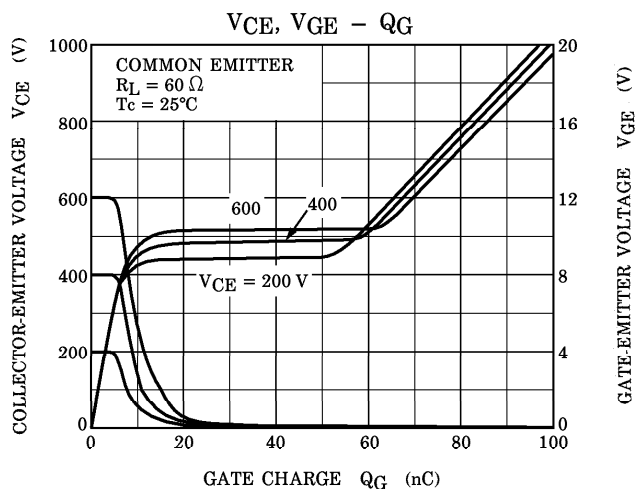
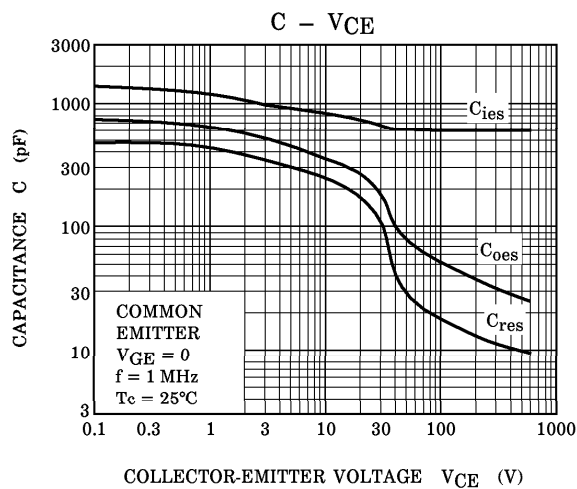
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GES}	$V_{GE} = \pm 20\text{ V}, V_{CE} = 0$	—	—	± 500	nA
Collector Cut-Off Current		I_{CES}	$V_{CE} = 1200\text{ V}, V_{GE} = 0$	—	—	1.0	mA
Gate-Emitter Cut-Off Voltage		$V_{GE}(\text{OFF})$	$I_C = 1\text{ mA}, V_{CE} = 5\text{ V}$	4.0	—	7.0	V
Collector-Emitter Saturation Voltage		$V_{CE}(\text{sat})$	$I_C = 10\text{ A}, V_{GE} = 15\text{ V}$	—	2.1	2.7	V
Input Capacitance		C_{ies}	$V_{CE} = 50\text{ V}, V_{GE} = 0,$ $f = 1\text{ MHz}$	—	600	—	pF
Switching Time	Rise Time	t_r	Inductive Load $V_{CC} = 600\text{ V}, I_C = 10\text{ A}$ $V_{GG} = \pm 15\text{ V}, R_G = 75\ \Omega$ (Note)	—	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	—	
Peak Forward Voltage		V_F	$I_F = 10\text{ A}, V_{GE} = 0$	—	—	3.0	V
Reverse Recovery Time		t_{rr}	$I_F = 10\text{ A}, di/dt = -200\text{ A}/\mu\text{s}$	—	—	350	ns
Thermal Resistance (IGBT)		$R_{th(j-c)}$	—	—	—	0.89	$^\circ\text{C}/\text{W}$
Thermal Resistance (Diode)		$R_{th(j-c)}$	—	—	—	1.79	$^\circ\text{C}/\text{W}$

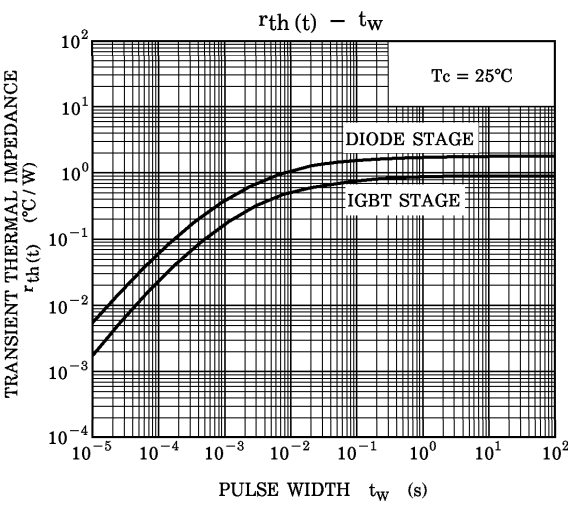
(Note) : Switching time measurement circuit and input/output waveforms











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