

TOSHIBA INSULATED GATE BIPOLAR TRANSISTOR SILICON N CHANNEL IGBT

# GT50J301

HIGH POWER SWITCHING APPLICATIONS

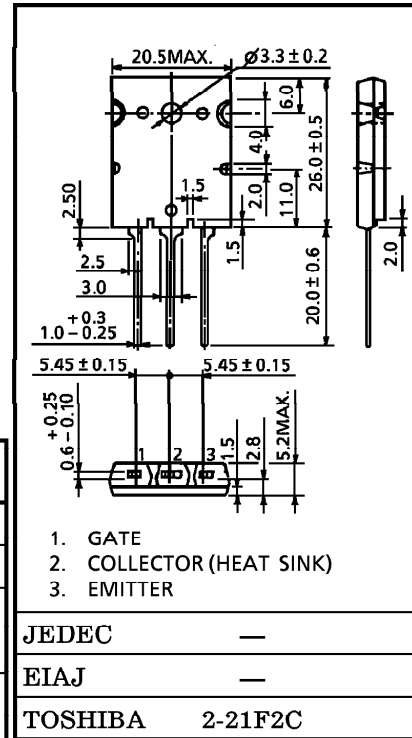
MOTOR CONTROL APPLICATIONS

- The 3rd Generation
- Enhancement-Mode
- High Speed :  $t_f = 0.30\mu s$  (Max.)
- Low Saturation Voltage :  $V_{CE(sat)} = 2.7V$  (Max.)
- FRD Induded Between Emitter and Collector

MAXIMUM RATINGS (Ta = 25°C)

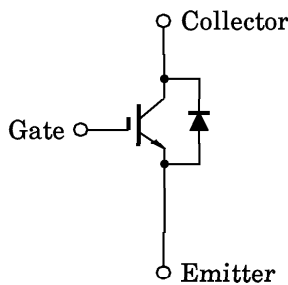
CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Emitter Voltage		$V_{CES}$	600	V
Gate-Emitter Voltage		$V_{GES}$	$\pm 20$	V
Collector Current	DC	$I_C$	50	A
	1ms	$I_{CP}$	100	
Forward Current	DC	$I_F$	50	A
	1ms	$I_{FM}$	100	
Collector Power Dissipation (Tc = 25°C)		$P_C$	200	W
Junction Temperature		$T_j$	150	°C
Storage Temperature		$T_{stg}$	-55~150	°C
Screw Torque		—	0.8	N·m

Unit in mm



Weight : 9.75g

EQUIVALENT CIRCUIT



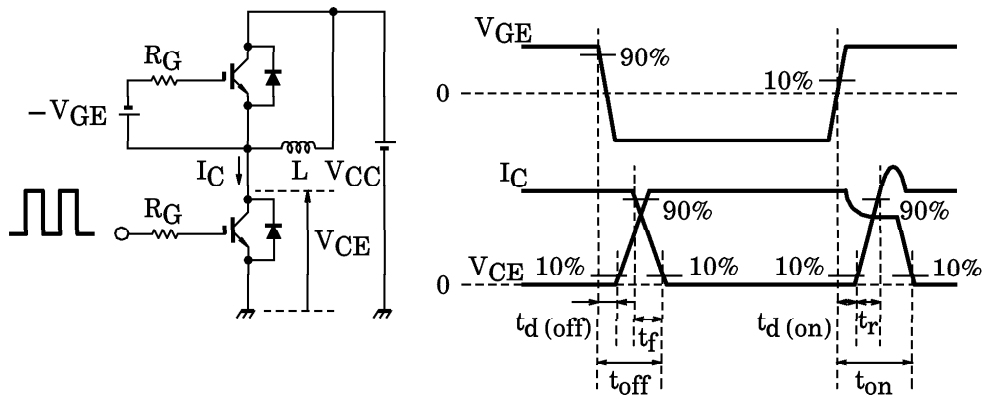
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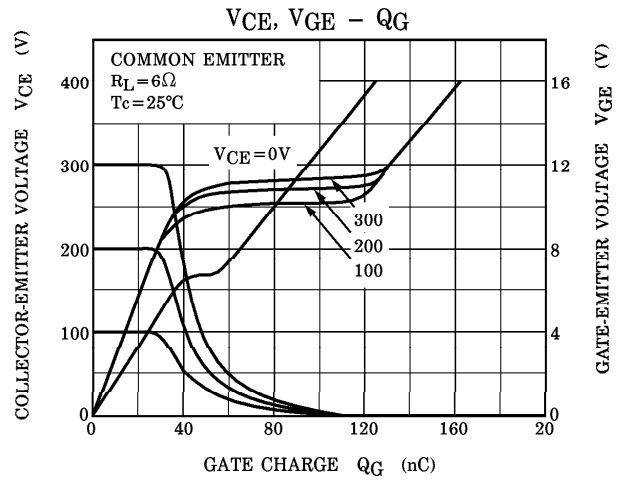
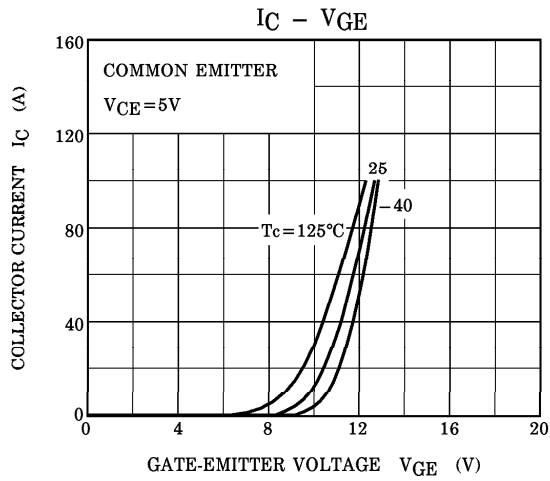
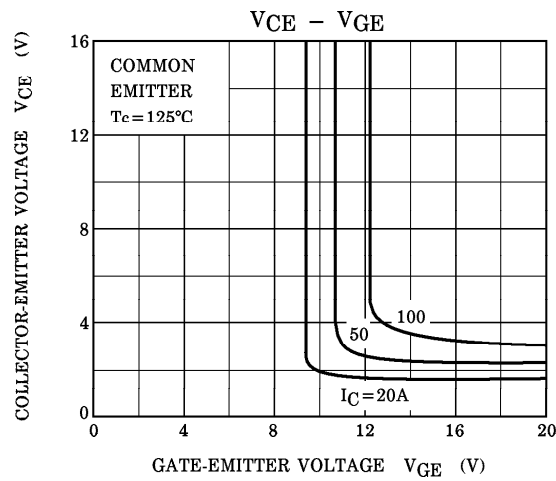
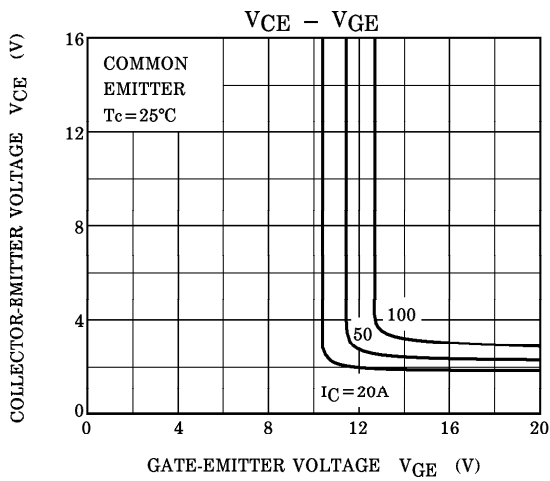
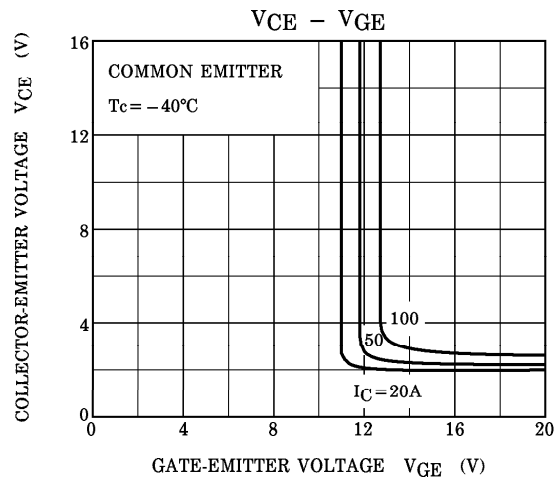
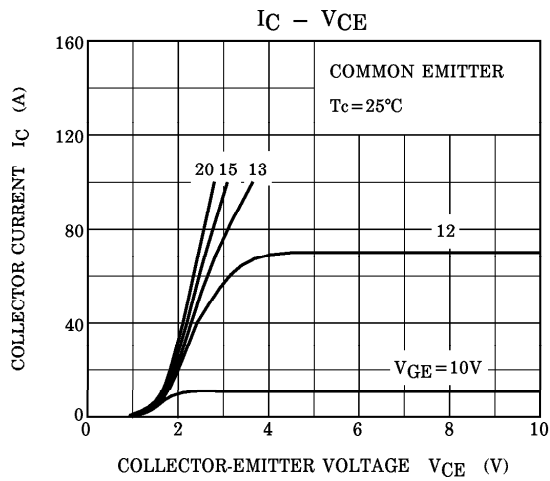
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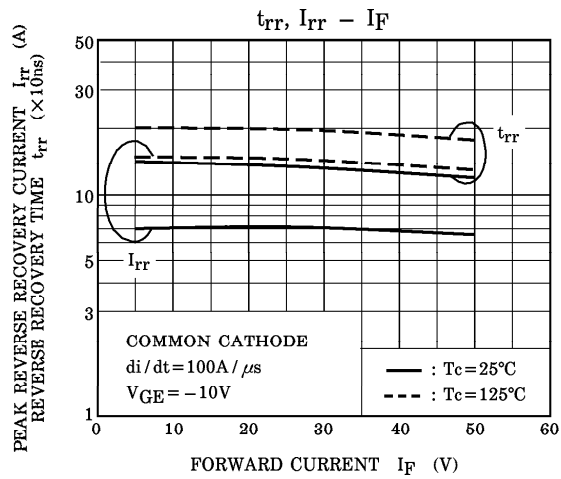
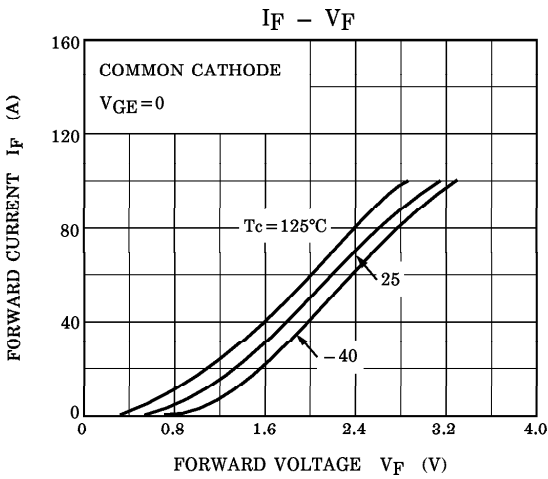
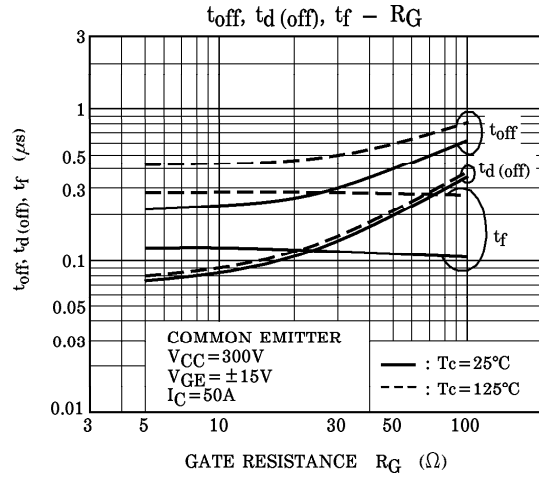
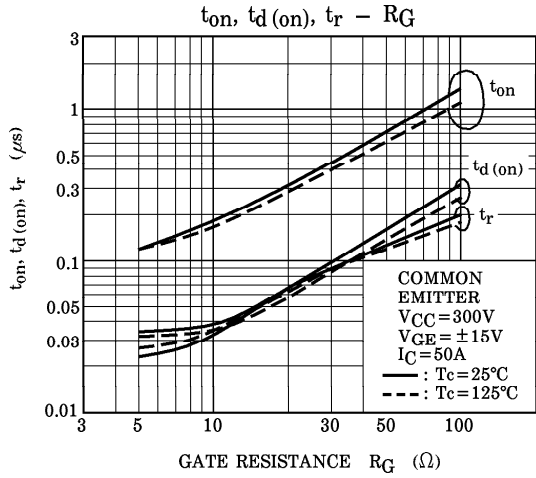
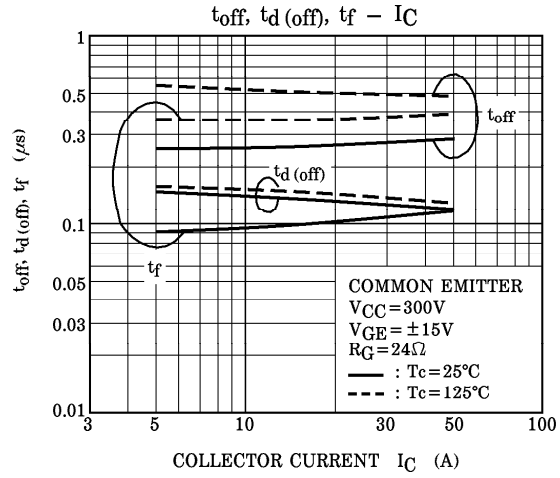
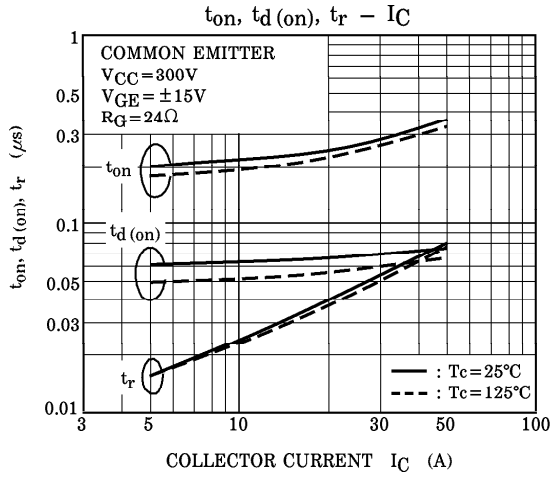
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		$I_{GES}$	$V_{GE} = \pm 20V, V_{CE} = 0$	—	—	$\pm 500$	nA
Collector Cut-off Current		$I_{CES}$	$V_{CE} = 600V, V_{GE} = 0$	—	—	1.0	mA
Gate-Emitter Cut-off Voltage		$V_{GE(OFF)}$	$I_C = 5mA, V_{CE} = 5V$	5.0	7.0	8.0	V
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	$I_C = 50A, V_{GE} = 15V$	—	2.1	2.7	V
Input Capacitance		$C_{ies}$	$V_{CE} = 10V, V_{GE} = 0$ $f = 1MHz$	—	4500	—	pF
Switching Time	Turn-on delay Time	$t_{d(on)}$	Inductive Load $V_{CC} = 300V$ $V_{GE} = \pm 15V$ $I_C = 50A$ $R_G = 24\Omega$ (Note 1)	—	0.08	—	$\mu s$
	Rise Time	$t_r$		—	0.12	—	
	Turn-on Time	$t_{on}$		—	0.40	—	
	Turn-off delay Time	$t_{d(off)}$		—	0.20	—	
	Fall Time	$t_f$		—	0.15	0.30	
	Turn-off Time	$t_{off}$		—	0.50	—	
Forward Voltage		$V_F$	$I_F = 50A, V_{GE} = 0$	—	2.4	3.5	V
Reverse Recovery Time		$t_{rr}$	$I_F = 50A, V_{GE} = 10V$ $di/dt = 100A/\mu s$	—	0.1	0.2	$\mu s$
Thermal Resistance		$R_{th(j-c)}$	IGBT	—	—	0.625	$^{\circ}C/W$
Thermal Resistance		$R_{th(j-e)}$	DIODE	—	—	2.50	$^{\circ}C/W$

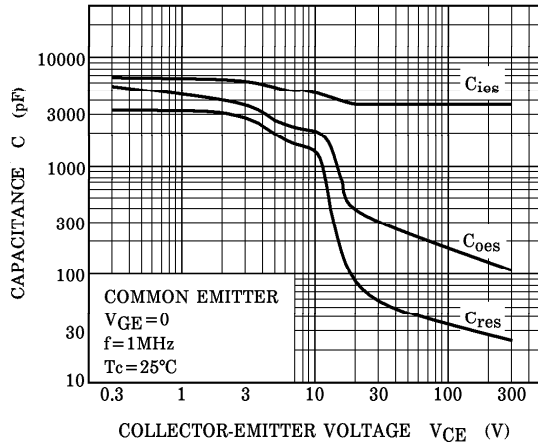
Note 1 Switching time measurement circuit and input/output waveforms



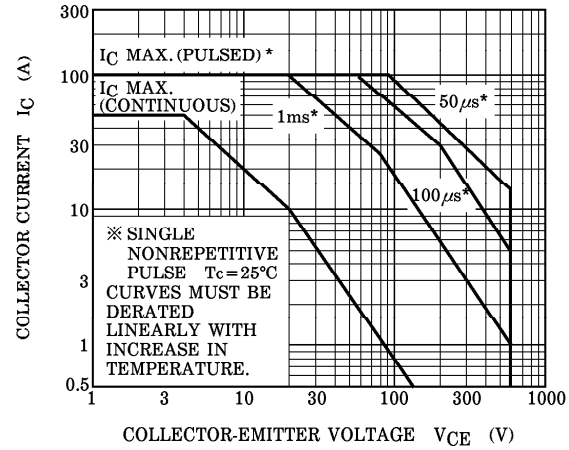




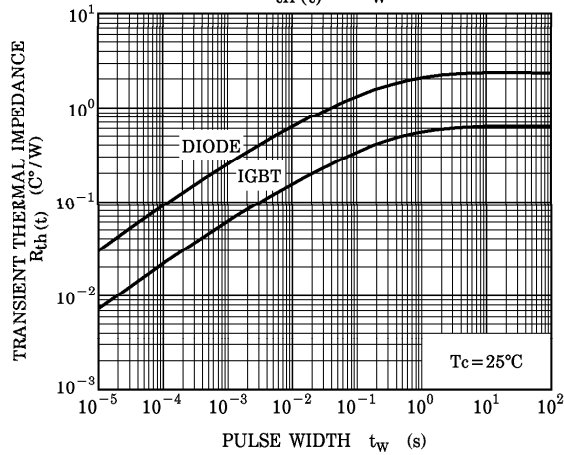
C - V<sub>CE</sub>



SAFE OPERATING AREA



R<sub>th</sub>(t) - t<sub>w</sub>



REVERSE BIAS SOA

