

TOSHIBA INSULATED GATE BIPOLAR TRANSISTOR SILICON N CHANNEL IGBT

GT50J301

HIGH POWER SWITCHING APPLICATIONS

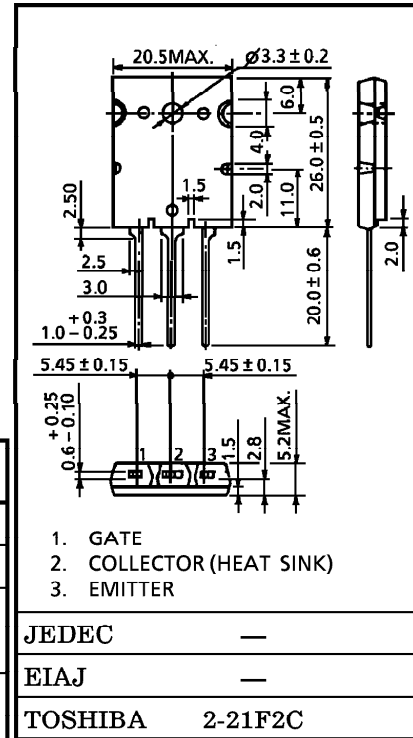
MOTOR CONTROL APPLICATIONS

- 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)

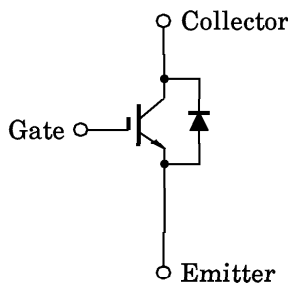
CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Emitter Voltage		V_{CES}	600	V
Gate-Emitter Voltage		V_{GES}	± 20	V
Collector Current	DC	I_C	50	A
	1ms	I_{CP}	100	
Forward Current	DC	I_F	50	A
	1ms	I_{FM}	100	
Collector Power Dissipation (Tc = 25°C)		P_C	200	W
Junction Temperature		T_j	150	°C
Storage Temperature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

Unit in mm



Weight : 9.75g

EQUIVALENT CIRCUIT



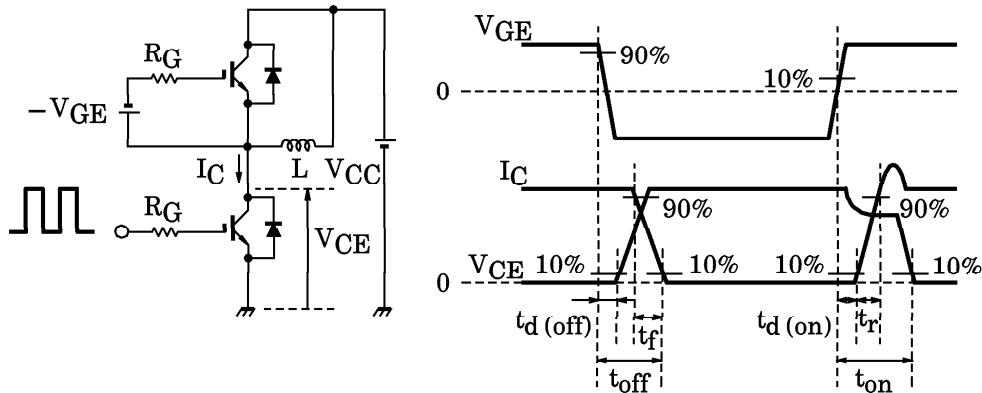
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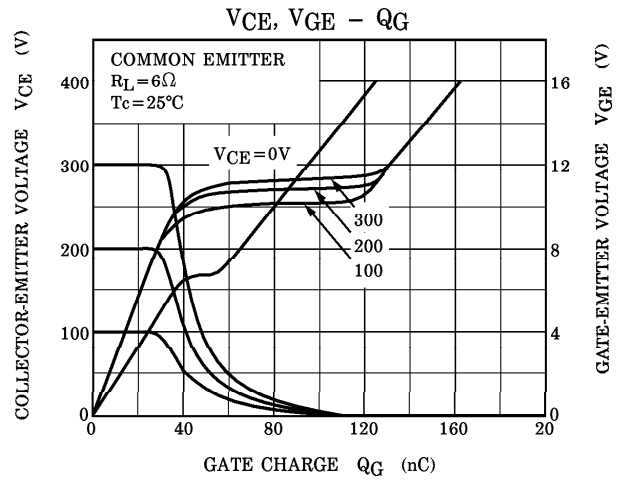
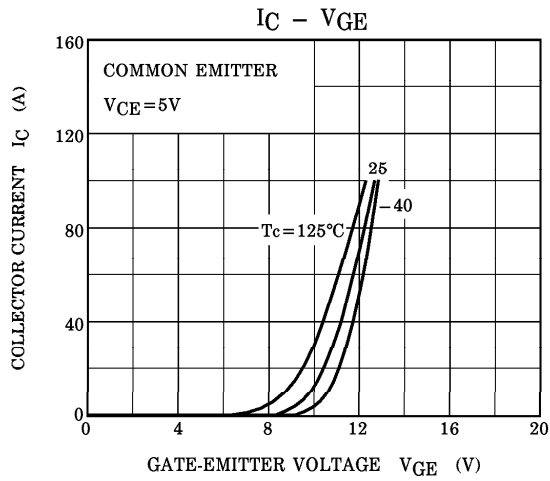
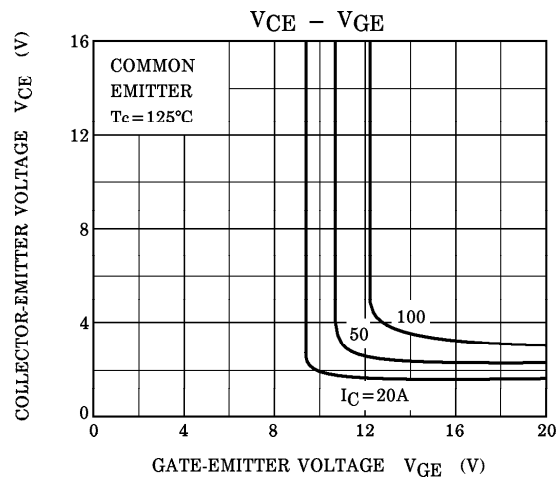
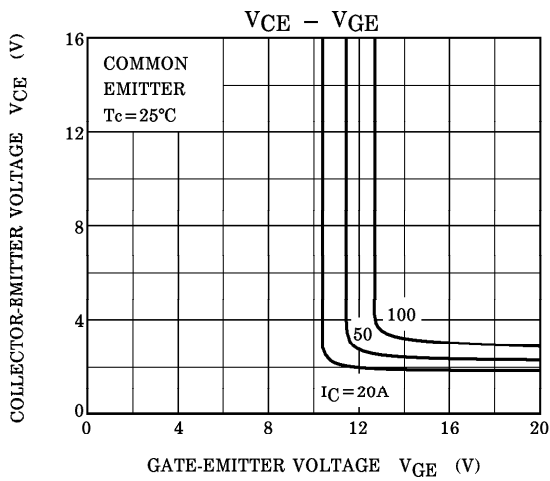
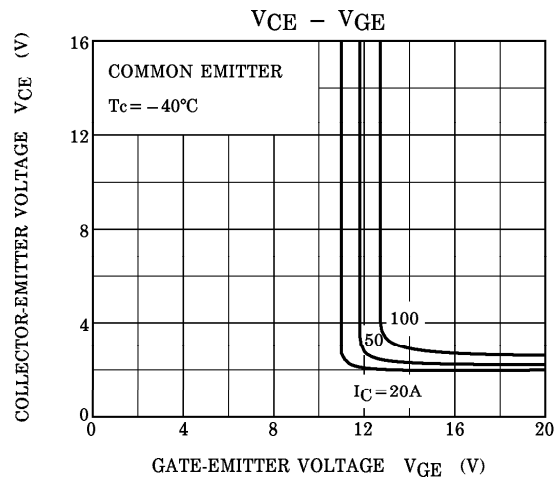
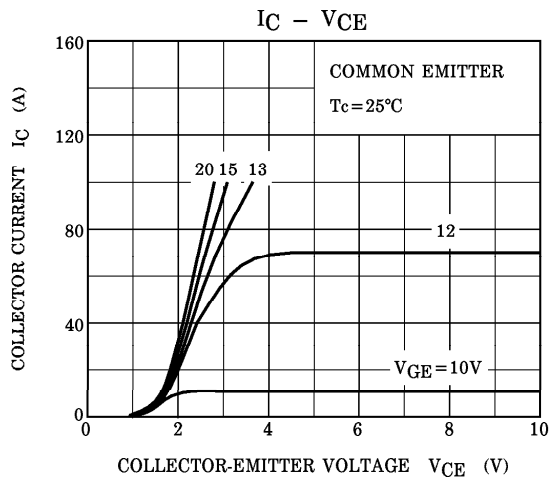
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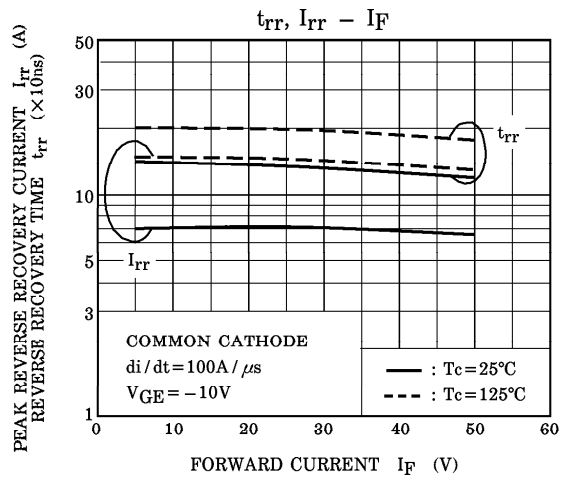
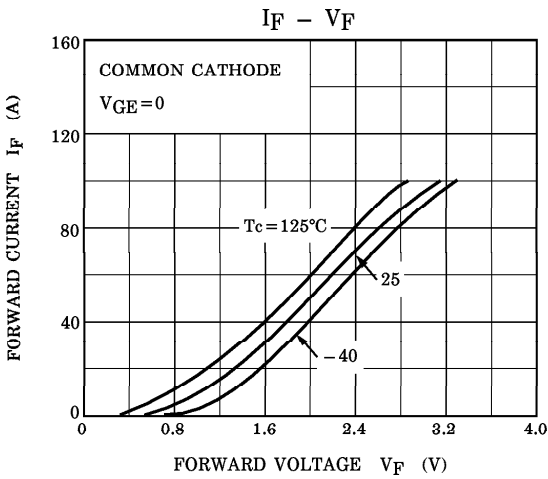
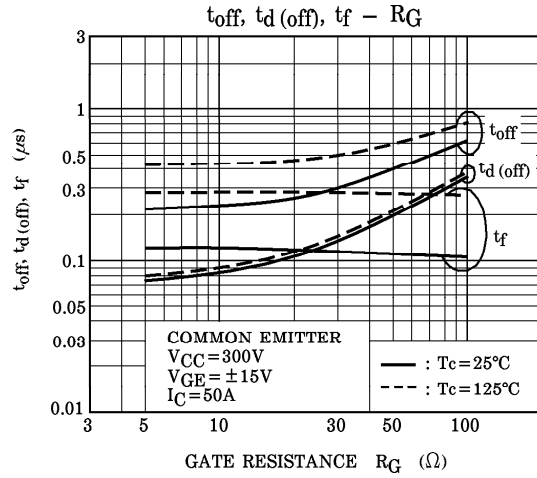
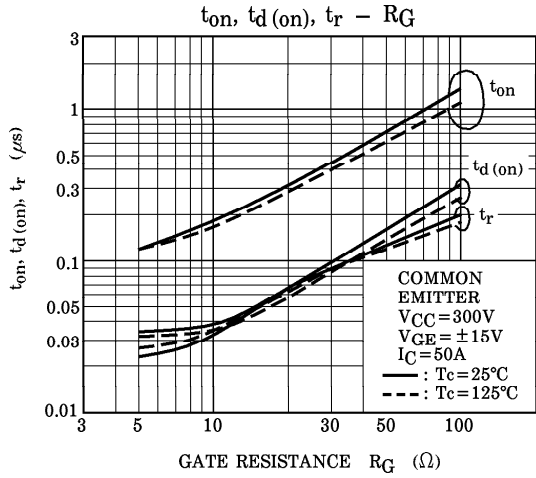
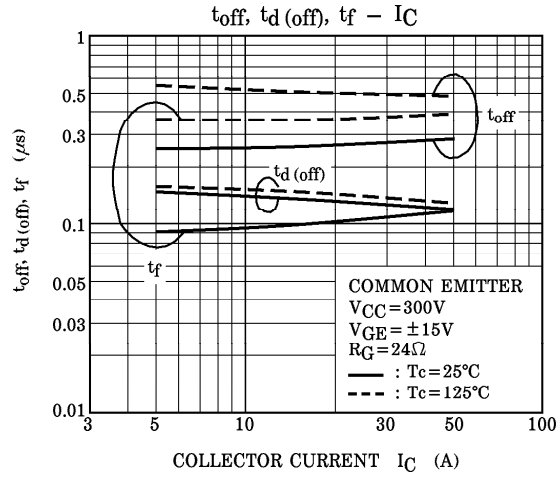
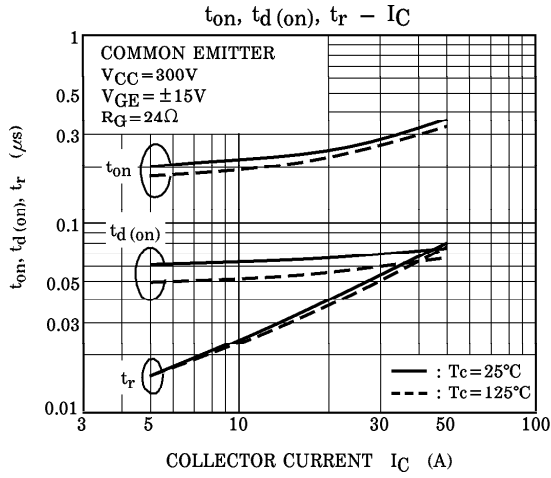
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GES}	$V_{GE} = \pm 20V, V_{CE} = 0$	—	—	± 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	—	μs
	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	μs
Thermal Resistance		$R_{th(j-c)}$	IGBT	—	—	0.625	$^{\circ}C/W$
Thermal Resistance		$R_{th(j-e)}$	DIODE	—	—	2.50	$^{\circ}C/W$

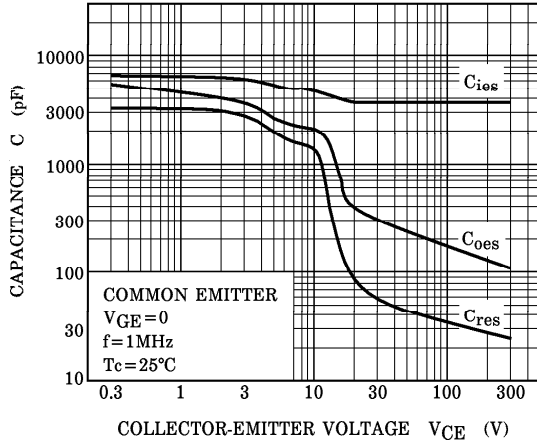
Note 1 Switching time measurement circuit and input/output waveforms



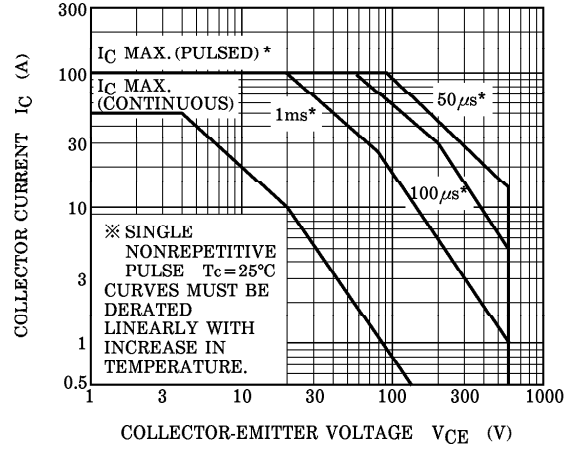




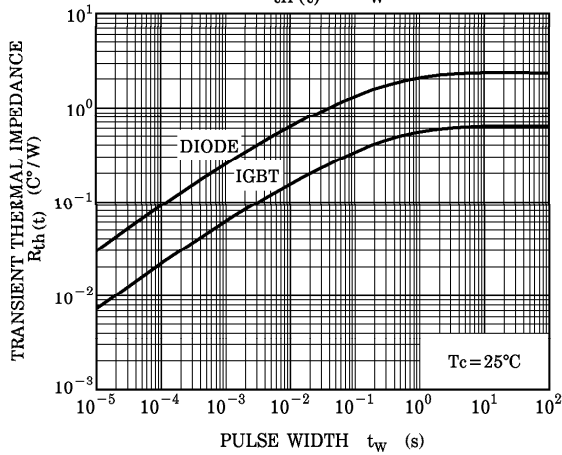
C - V_{CE}



SAFE OPERATING AREA



$R_{th}(t) - t_w$



REVERSE BIAS SOA

