

TOSHIBA Insulated Gate Bipolar Transistor Silicon N Channel IGBT

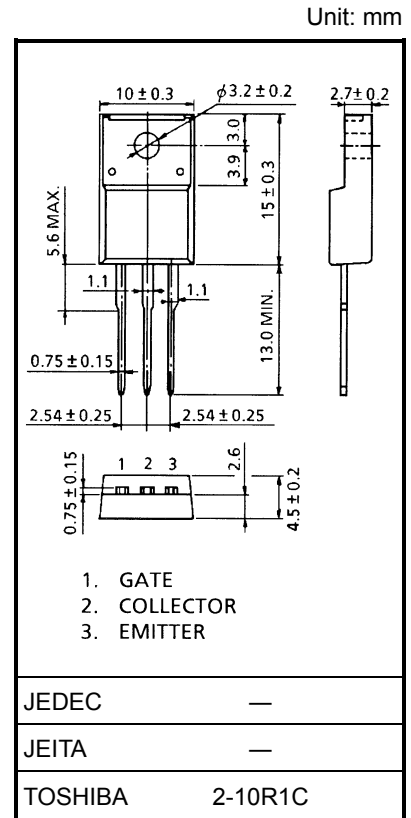
GT15J321

High Power Switching Applications
Fast Switching Applications

- The 4th generation
- FS (fast switching)
- Enhancement-mode
- High speed: $t_f = 0.03 \mu\text{s}$ (typ.)
- Low saturation Voltage: $V_{CE(sat)} = 1.90 \text{ V}$ (typ.)
- FRD included between emitter and collector.

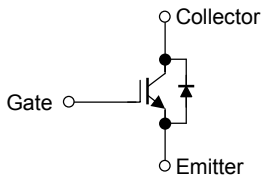
Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristics		Symbol	Rating	Unit
Collector-emitter voltage		V_{CES}	600	V
Gate-emitter voltage		V_{GES}	± 20	V
Collector current	DC	I_C	15	A
	1 ms	I_{CP}	30	
Emitter-collector forward current	DC	I_F	15	A
	1 ms	I_{FM}	30	
Collector power dissipation ($T_c = 25^\circ\text{C}$)		P_C	30	W
Junction temperature		T_j	150	$^\circ\text{C}$
Storage temperature range		T_{stg}	-55~150	$^\circ\text{C}$



Weight: 1.7 g

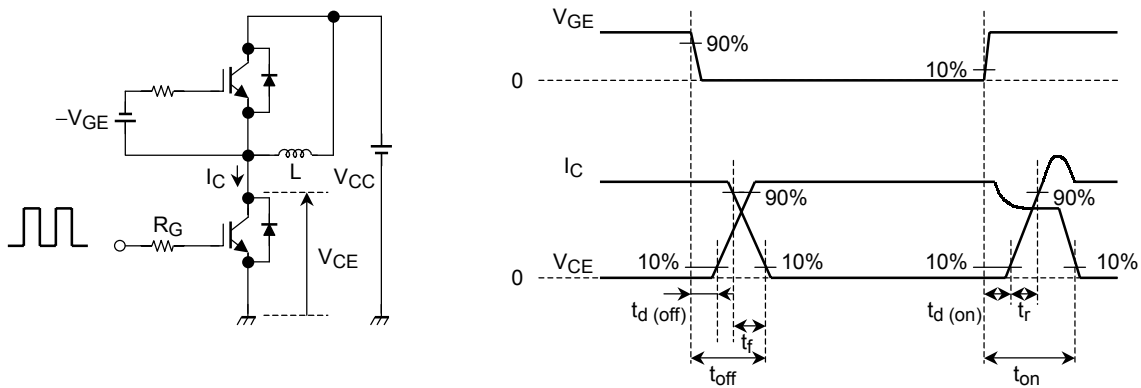
Equivalent Circuit



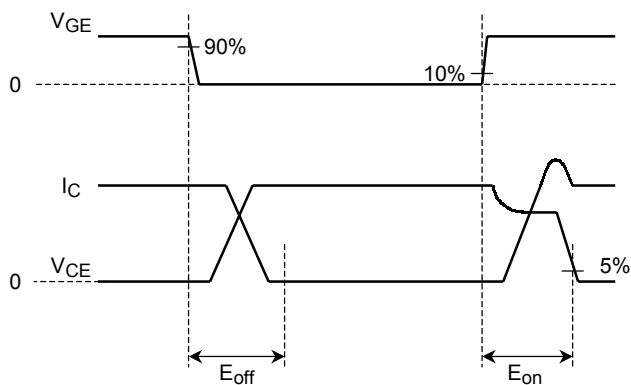
Electrical Characteristics (Ta = 25°C)

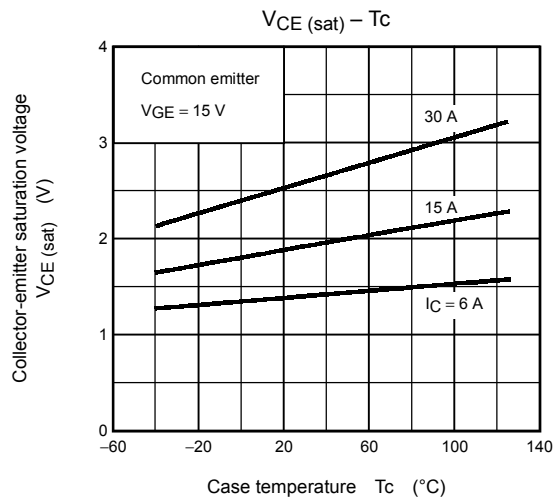
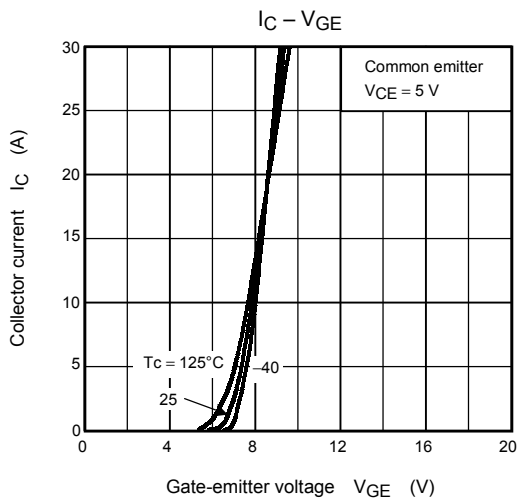
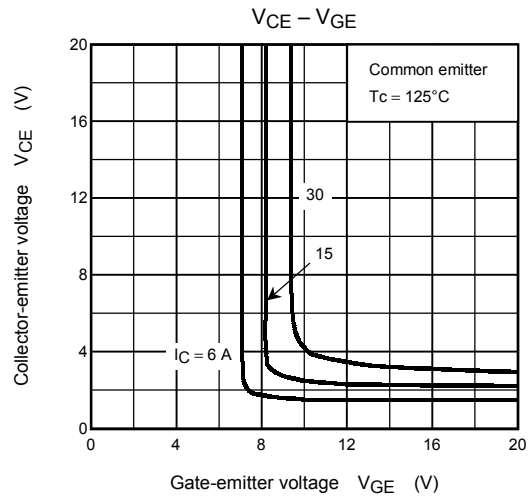
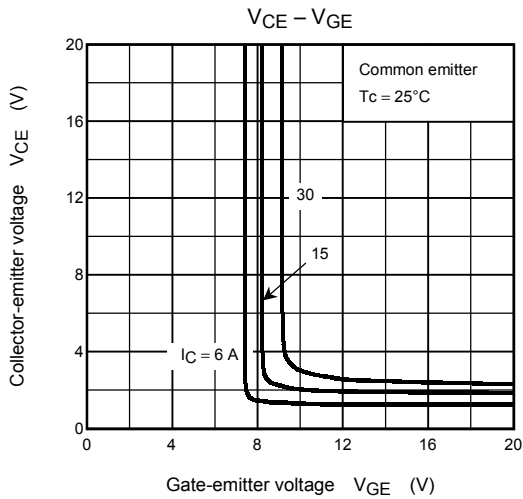
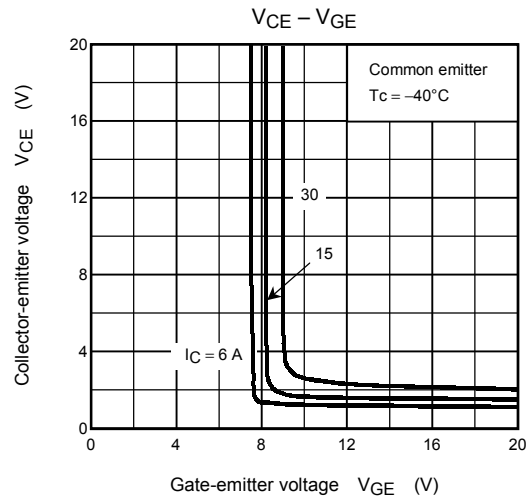
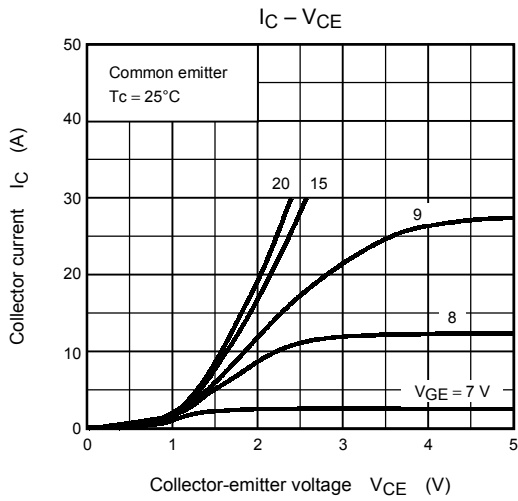
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GES}	$V_{GE} = \pm 20\text{ V}, V_{CE} = 0$	—	—	± 500	nA
Collector cut-off current		I_{CES}	$V_{CE} = 600\text{ V}, V_{GE} = 0$	—	—	1.0	mA
Gate-emitter cut-off voltage		$V_{GE (OFF)}$	$I_C = 1.5\text{ mA}, V_{CE} = 5\text{ V}$	3.5	—	6.5	V
Collector-emitter saturation voltage		$V_{CE (sat)}$	$I_C = 15\text{ A}, V_{GE} = 15\text{ V}$	—	1.90	2.45	V
Input capacitance		C_{ies}	$V_{CE} = 20\text{ V}, V_{GE} = 0, f = 1\text{ MHz}$	—	2300	—	pF
Switching time	Rise time	t_r	Inductive Load $V_{CC} = 300\text{ V}, I_C = 15\text{ A}$ $V_{GG} = 15\text{ V}, R_G = 43\ \Omega$ (Note 1)	—	0.04	—	μs
	Turn-on time	t_{on}		—	0.17	—	
	Fall time	t_f		—	0.03	0.15	
	Turn-off time	t_{off}		—	0.34	—	
Peak forward voltage		V_F	$I_F = 15\text{ A}, V_{GE} = 0$	—	—	2.0	V
Reverse recovery time		t_{rr}	$I_F = 15\text{ A}, di/dt = -100\text{ A}/\mu\text{s}$	—	—	200	ns
Thermal resistance (IGBT)		$R_{th (j-c)}$	—	—	—	4.16	$^{\circ}\text{C}/\text{W}$
Thermal resistance (Diode)		$R_{th (j-c)}$	—	—	—	4.63	$^{\circ}\text{C}/\text{W}$

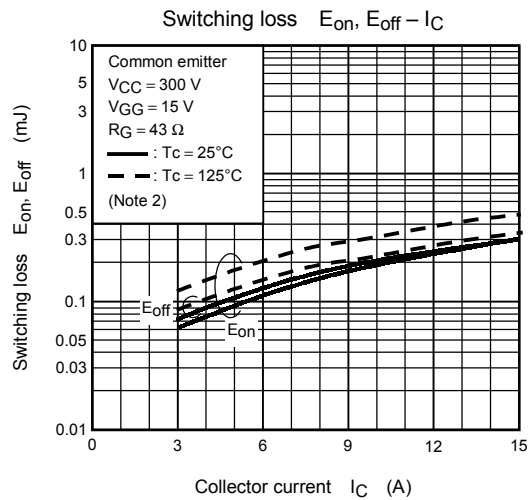
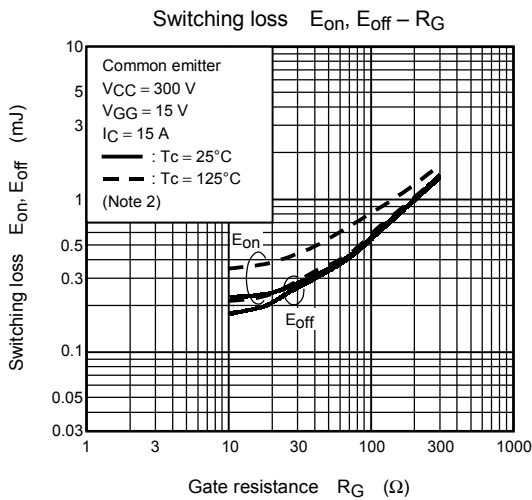
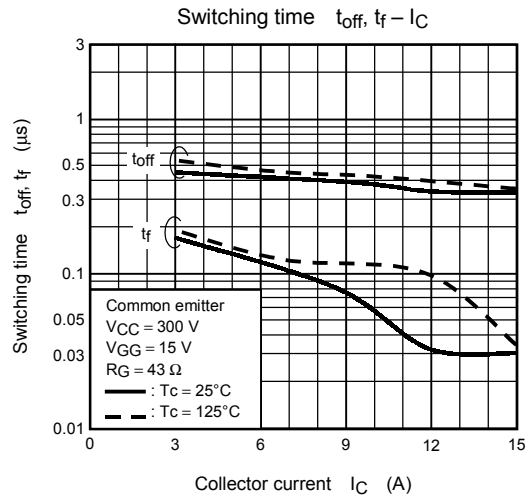
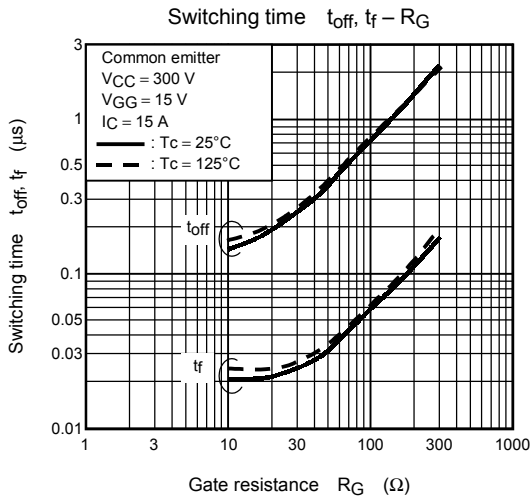
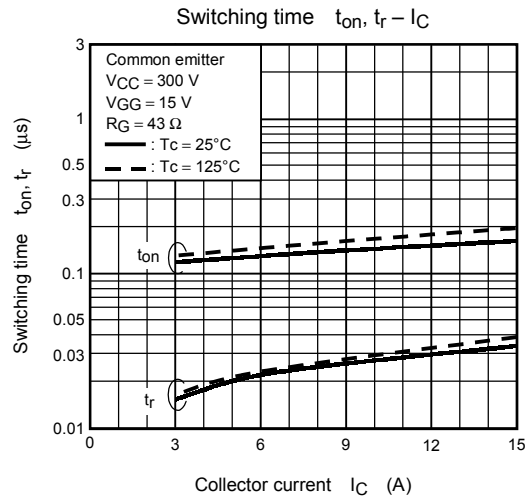
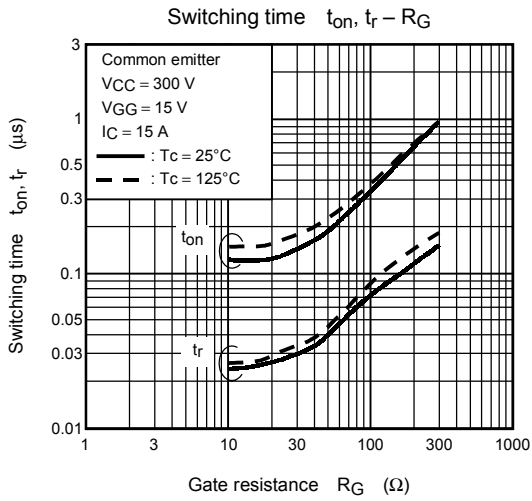
Note 1: Switching time measurement circuit and input/output waveforms

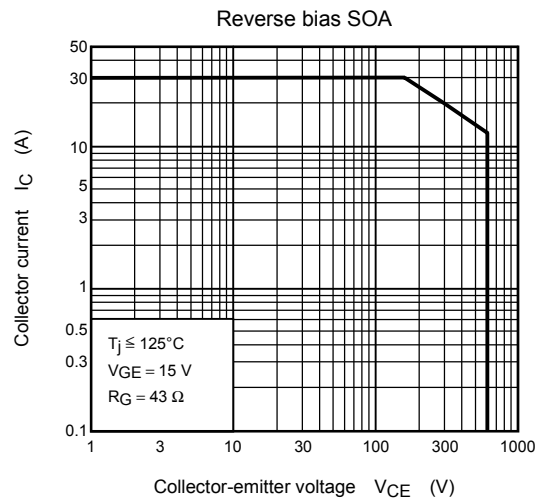
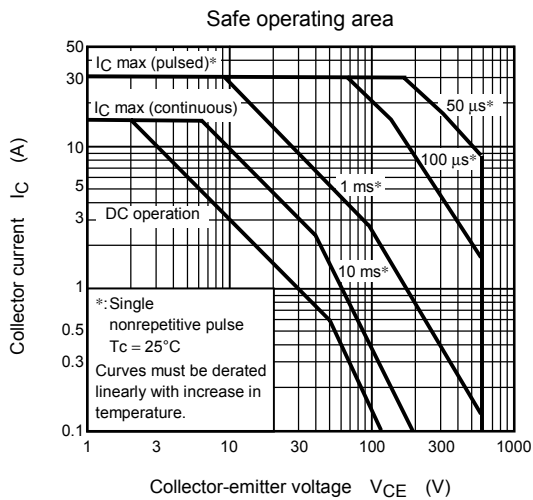
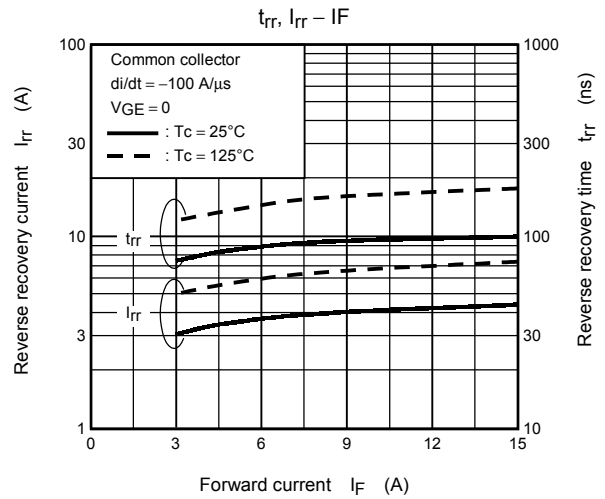
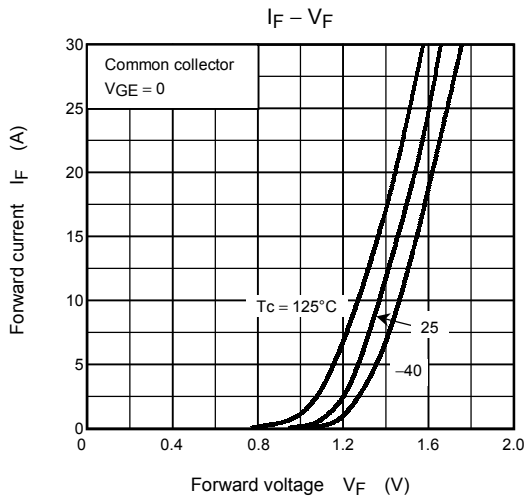
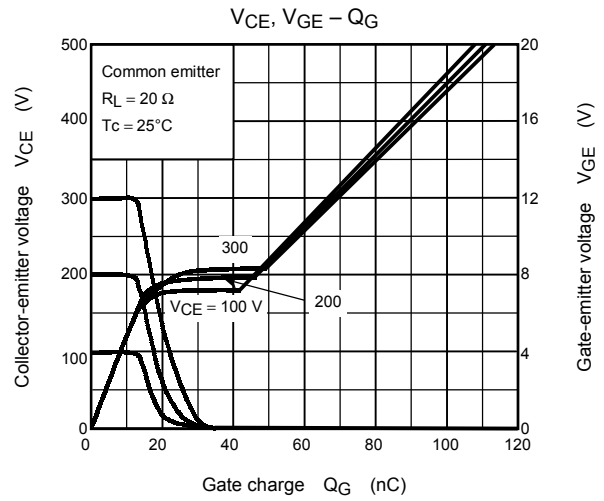
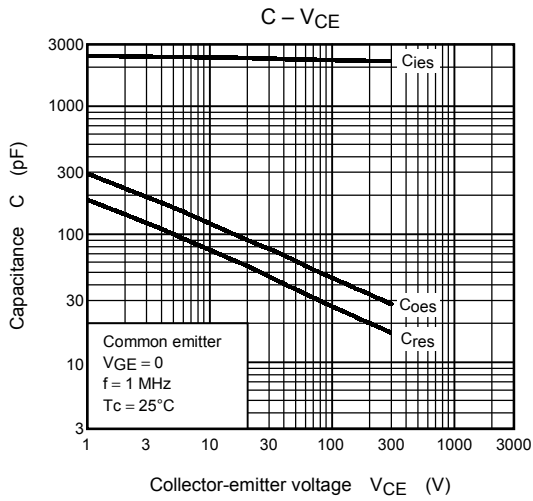


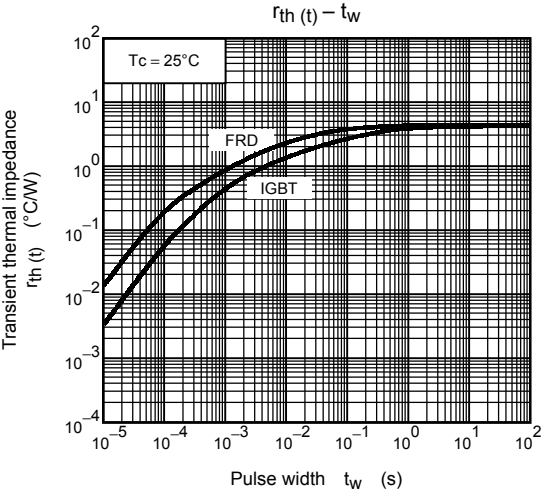
Note 2: Switching loss measurement waveforms











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