

TOSHIBA Insulated Gate Bipolar Transistor Silicon N Channel IGBT

GT15Q311

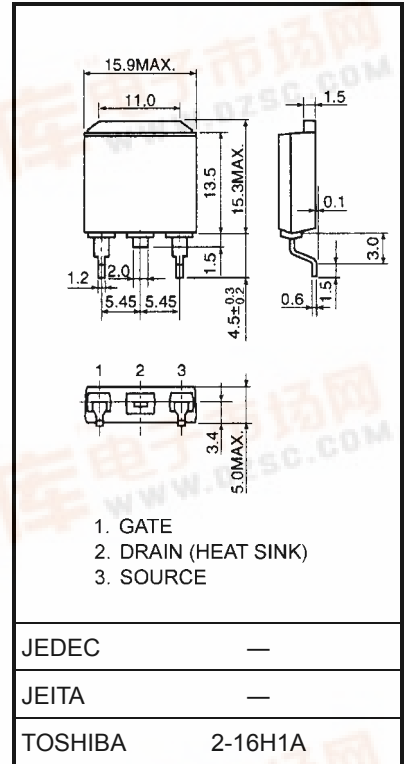
High Power Switching Applications
Motor Control Applications

Unit: mm

- 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

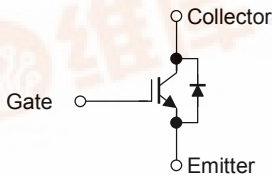
Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Collector-emitter voltage	V_{CES}	1200	V
Gate-emitter voltage	V_{GES}	± 20	V
Collector current	DC	I_C	15
	1 ms	I_{CP}	30
Emitter-collector forward current	DC	I_F	15
	1 ms	I_{FM}	30
Collector power dissipation (Tc = 25°C)	P_C	160	W
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	-55 to 150	°C



Weight: 3.65 g (typ.)

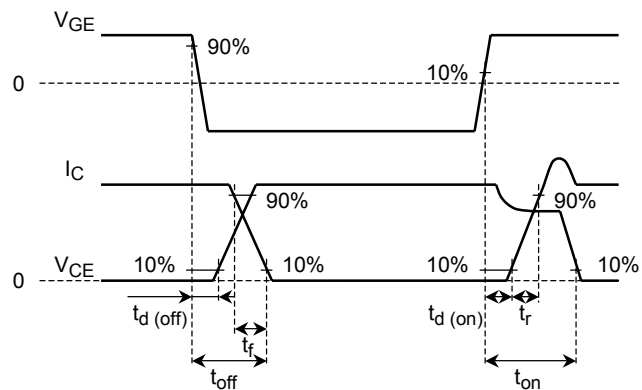
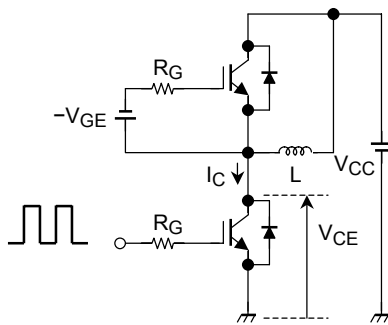
Equivalent Circuit

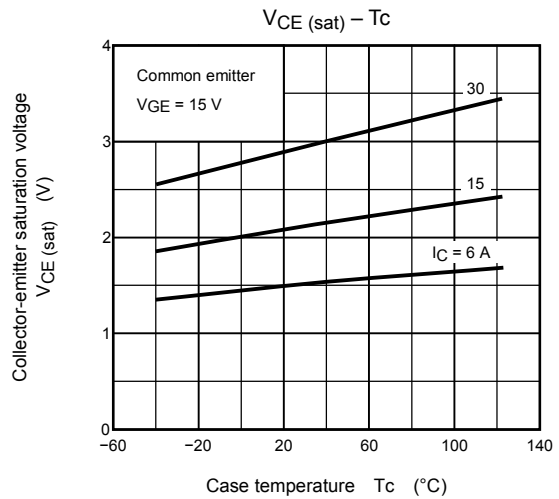
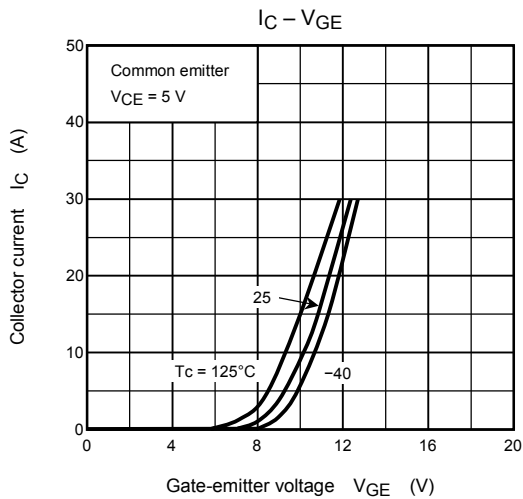
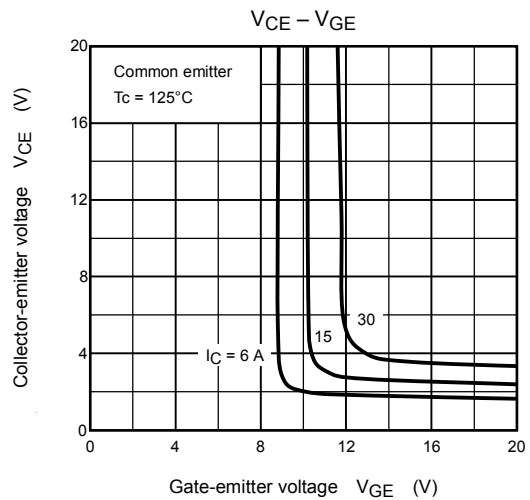
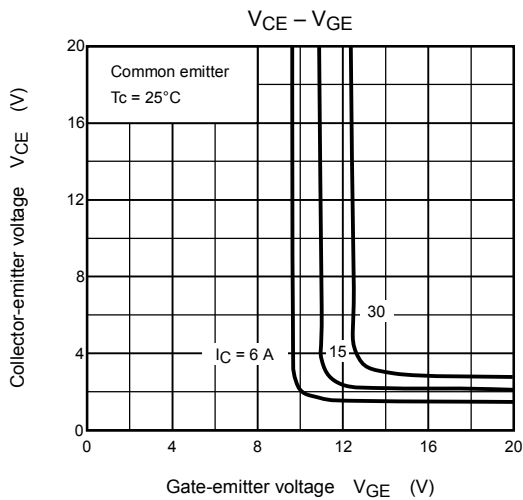
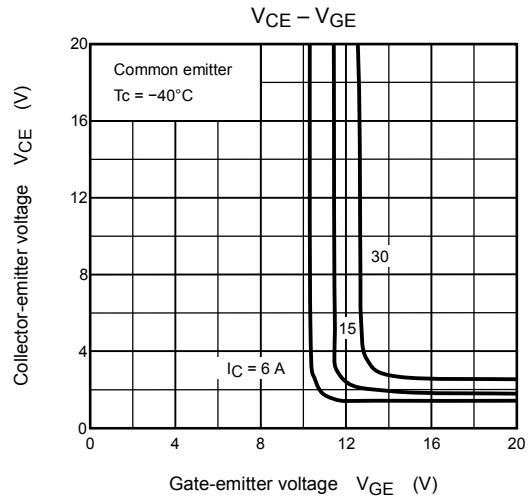
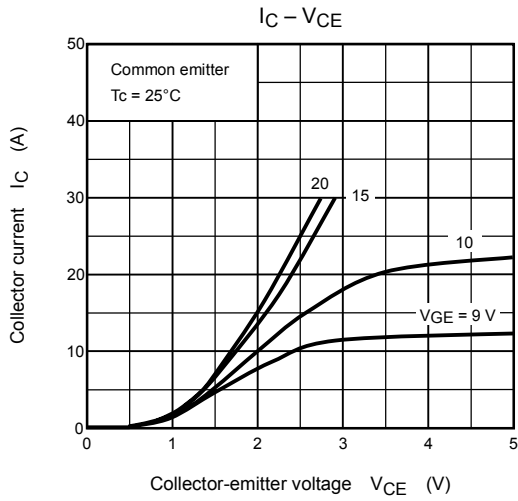


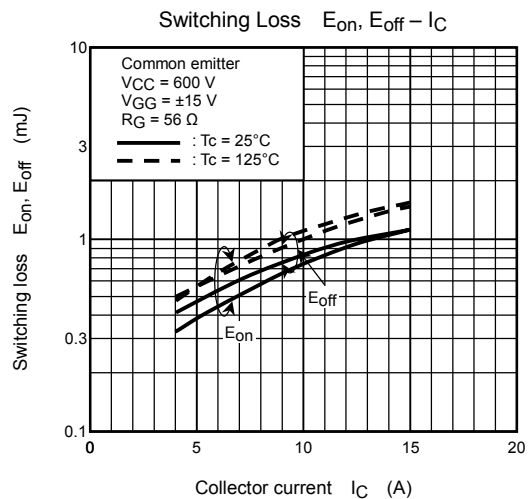
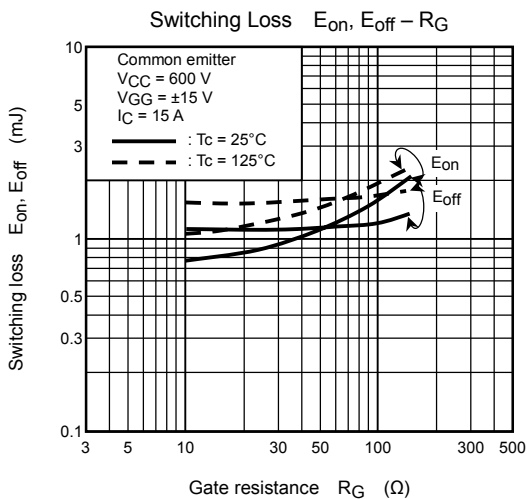
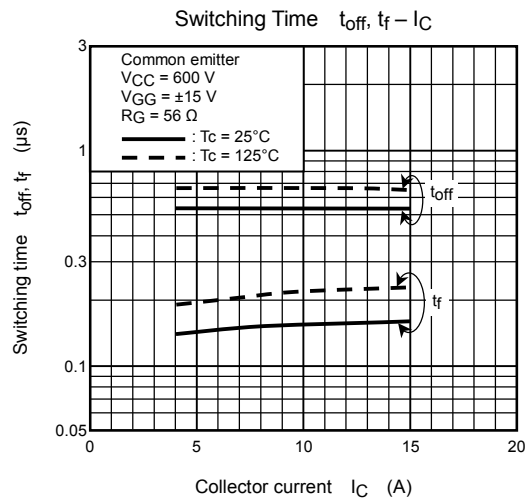
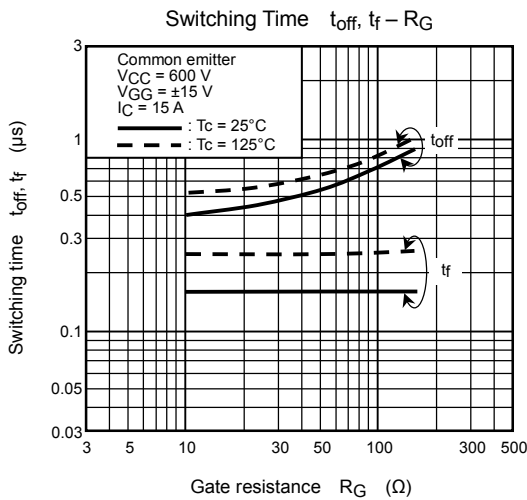
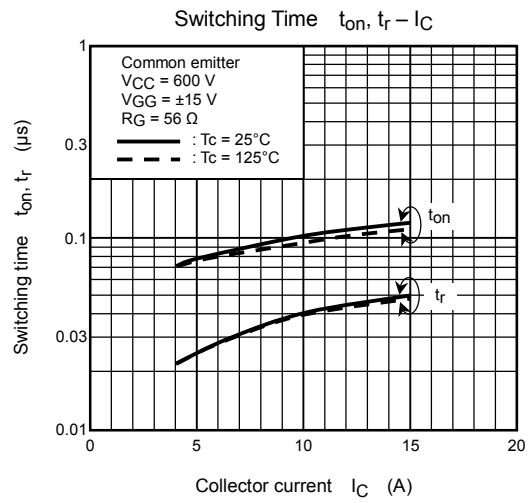
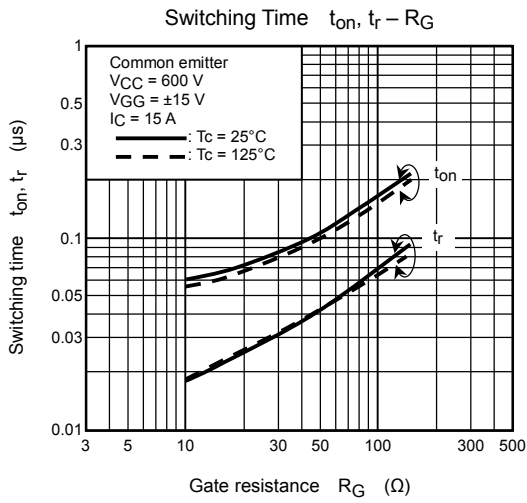
Electrical Characteristics (Ta = 25°C)

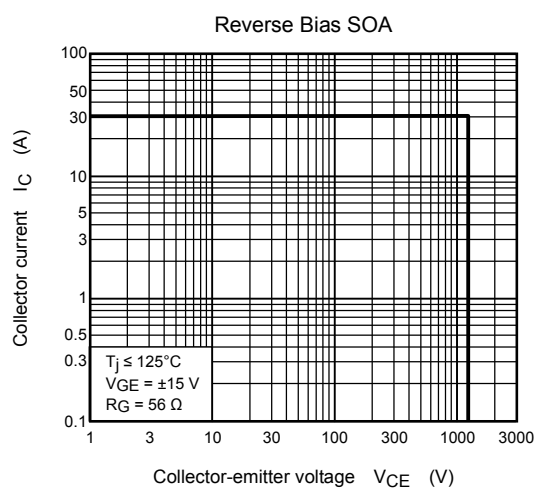
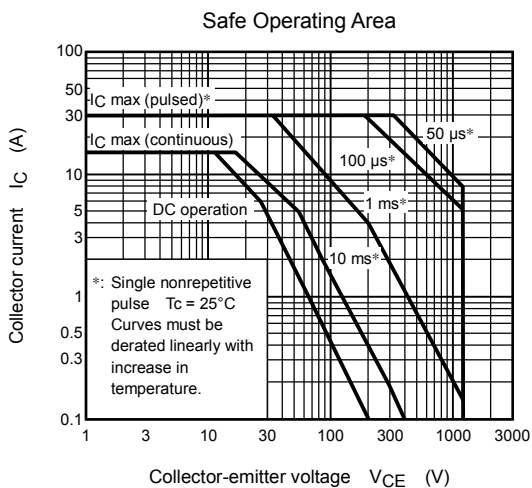
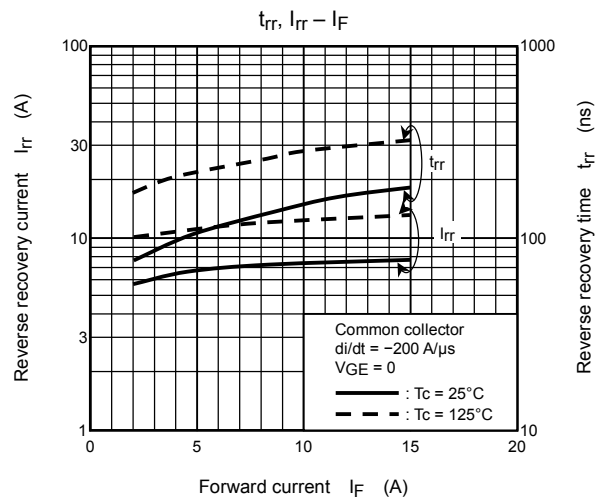
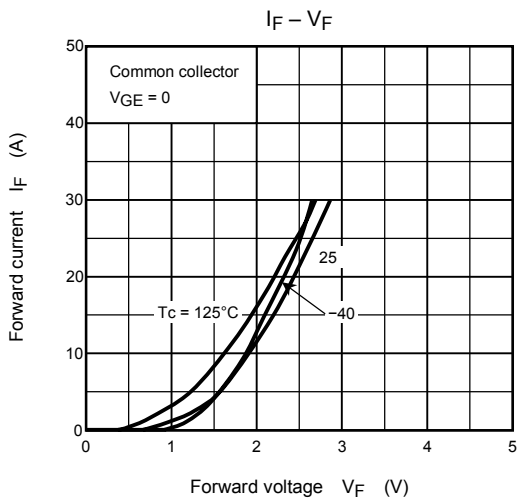
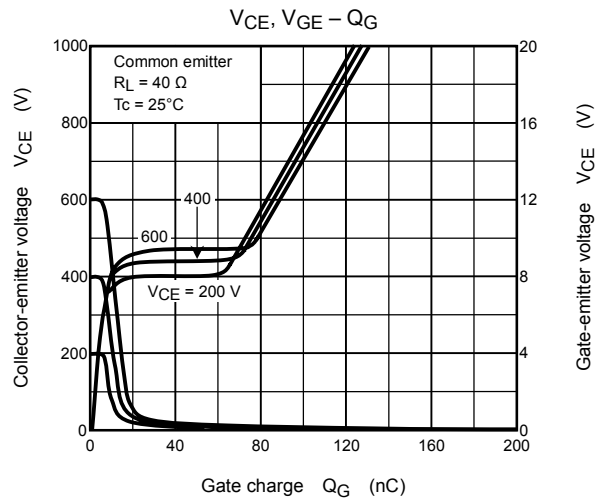
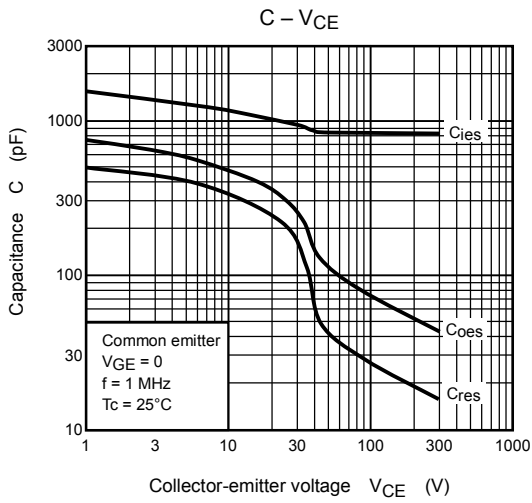
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit	
Gate leakage current	I_{GES}	$V_{GE} = \pm 20\text{ V}, V_{CE} = 0$	—	—	± 500	nA	
Collector cut-off current	I_{CES}	$V_{CE} = 1200\text{ V}, V_{GE} = 0$	—	—	1.0	mA	
Gate-emitter cut-off voltage	$V_{GE(OFF)}$	$I_C = 1.5\text{ mA}, V_{CE} = 5\text{ V}$	4.0	—	7.0	V	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 15\text{ A}, V_{GE} = 15\text{ V}$	—	2.1	2.7	V	
Input capacitance	C_{ies}	$V_{CE} = 50\text{ V}, V_{GE} = 0, f = 1\text{ MHz}$	—	950	—	pF	
Switching time	Rise time	t_r	—	0.05	—	μs	
	Turn-on time	t_{on}	Inductive load $V_{CC} = 600\text{ V}, I_C = 15\text{ A}$ $V_{GG} = \pm 15\text{ V}, R_G = 56\ \Omega$ (Note)	—	0.12		—
	Fall time	t_f		—	0.16		0.40
	Turn-off time	t_{off}		—	0.56		—
Peak forward voltage	V_F	$I_F = 15\text{ A}, V_{GE} = 0$		—	—	3.0	V
Reverse recovery time	t_{rr}	$I_F = 15\text{ A}, di/dt = -200\text{ A}/\mu\text{s}$	—	—	350	ns	
Thermal resistance (IGBT)	$R_{th(j-c)}$	—	—	—	0.78	°C/W	
Thermal resistance (diode)	$R_{th(j-c)}$	—	—	—	1.60	°C/W	

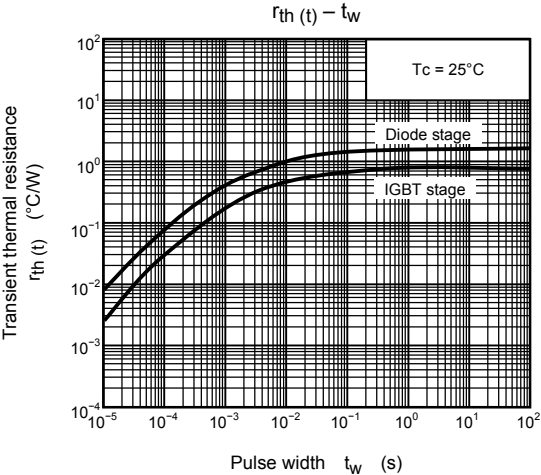
Note: Switching time measurement circuit and input/output waveforms











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