

Preliminary

TOSHIBA Insulated Gate Bipolar Transistor Silicon N Channel IGBT

GT10J321

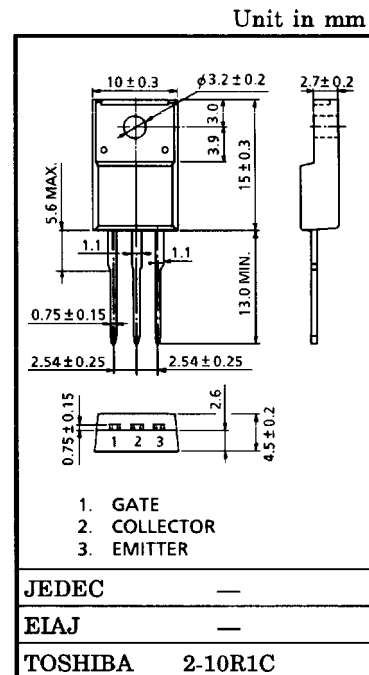
High Power Switching Applications

Fast Switching Applications

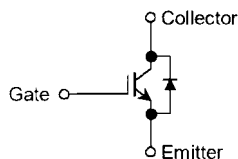
- The 4th generation
- Enhancement-mode
- Fast Switching(FS) :Operating frequency up to 150kHz(Reference)
 - High speed : $t_f=0.03 \mu s$ (typ.)
 - Low switching loss : $E_{on}=0.26mJ$ (typ.)
: $E_{off}=0.18mJ$ (typ.)
- Low saturation voltage : $V_{CE(sat)}=2.0V$ (typ.)
- FRD included between emitter and collector

Maximum Ratings (Ta=25°C)

Characteristic	Symbol	Ratings	Unit
Collector-emitter voltage	V_{CES}	600	V
Gate-emitter voltage	V_{GES}	± 20	V
Collector current	DC	I_C	10
	1ms	I_{CP}	20
Emitter-collector forward current	DC	I_F	10
	1ms	I_{FM}	20
Collector power dissipation (Tc=25°C)	P_C	29	W
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	-55~150	°C



Equivalent Circuit



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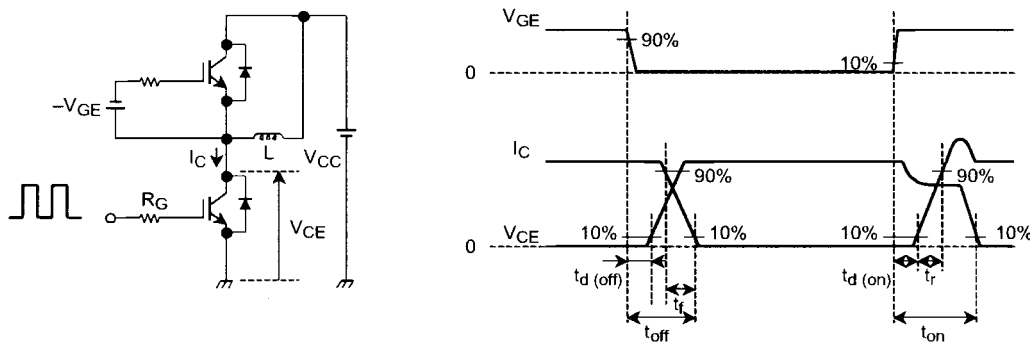
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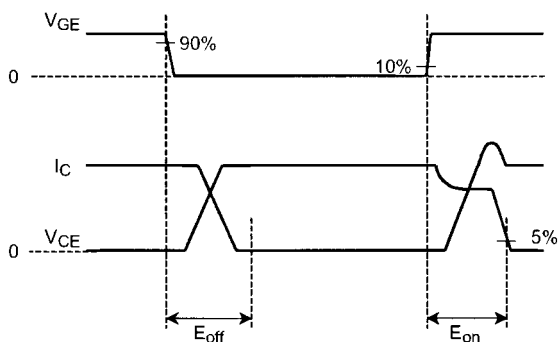
Electrical Characteristics(Ta=25°C)

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		$V_{GE(OFF)}$	$I_C = 1mA, V_{CE} = 5V$	3.5	-	6.5	V
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 10A, V_{GE} = 15V$	-	2.0	2.45	V
Input capacitance		C_{ies}	$V_{CE} = 10V, V_{GE} = 0, f = 1MHz$	-	1500	-	pF
Switching time	Turn-on delay time	$t_{d(on)}$	Inductive Load $V_{CC} = 300V, I_C = 10A$ $V_{GG} = +15V, R_G = 68\Omega$ (Note 1) (Note 2)	-	0.06	-	μs
	Rise Time	t_r		-	0.03	-	
	Turn-on Time	t_{on}		-	0.17	-	
	Turn-off delay time	$t_{d(off)}$		-	0.24	-	
	Fall Time	t_f		-	0.03	0.15	
	Turn-off Time	t_{off}		-	0.30	-	
Switching loss	Turn-on switching loss	E_{on}	-	0.26	-	mJ	
	Turn-off switching loss	E_{off}	-	0.18	-		
Peak forward voltage		V_F	$I_F = 10A, V_{GE} = 0$	-	-	2.0	V
Reverse recovery time		t_{rr}	$I_F = 10A, di/dt = -100A/\mu s$	-	-	200	ns
Thermal resistance(IGBT)		$R_{th(j-c)}$	—	-	-	4.31	°C/W
Thermal resistance(Diode)		$R_{th(j-c)}$	—	-	-	4.90	°C/W

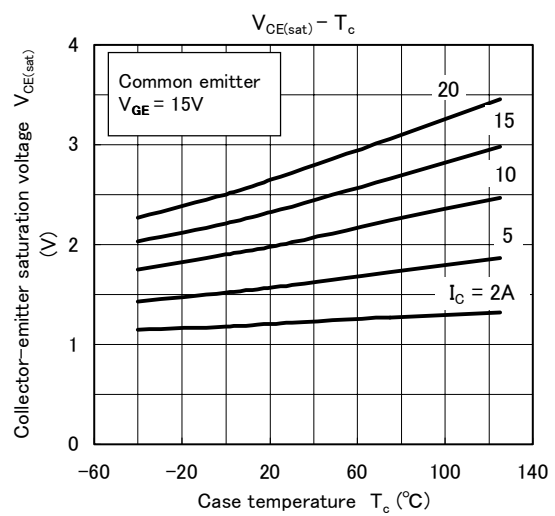
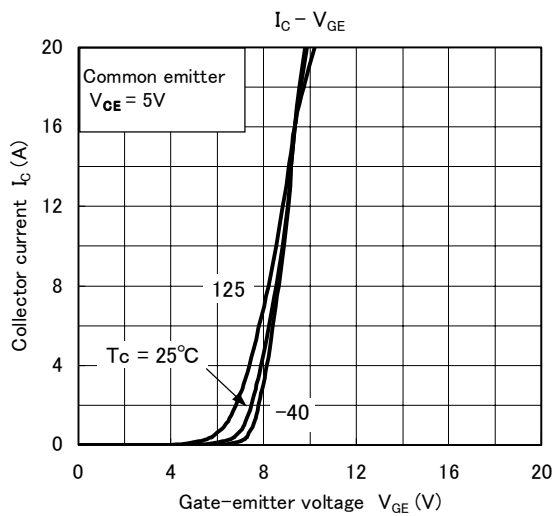
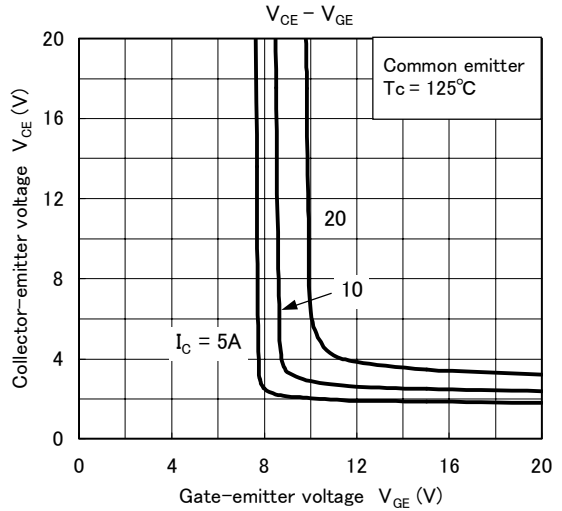
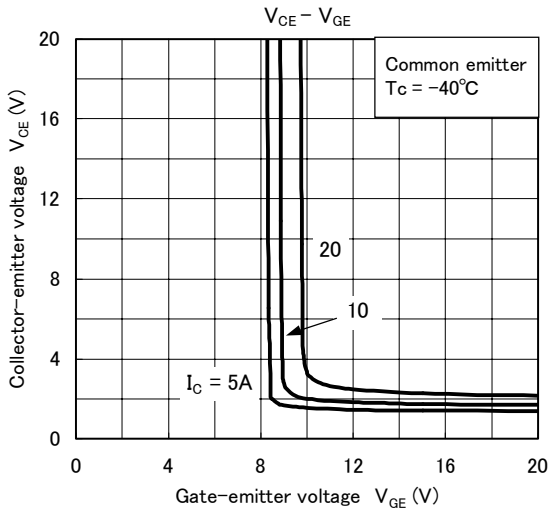
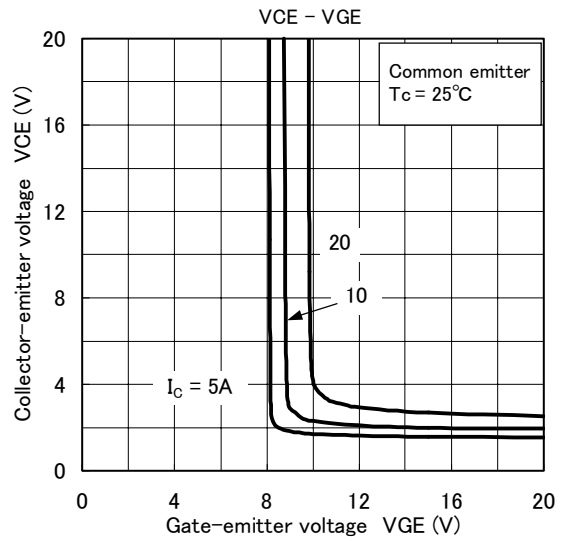
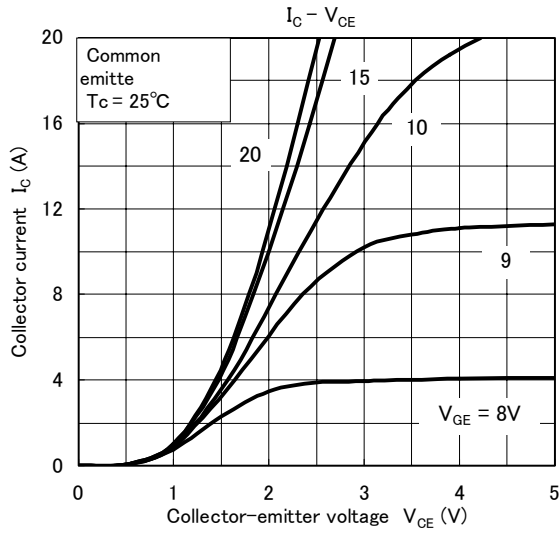
Note1: Switching time measurement circuit and input/output waveforms



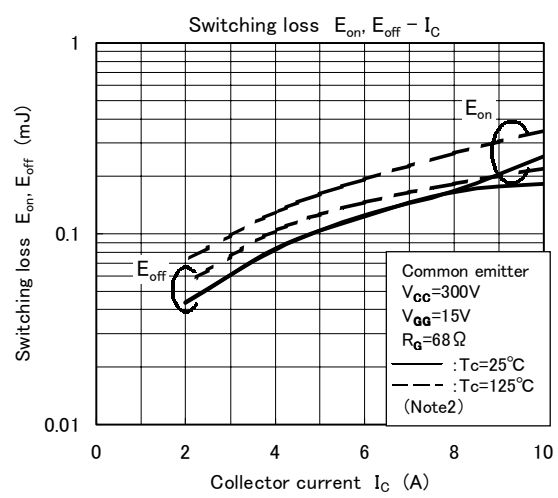
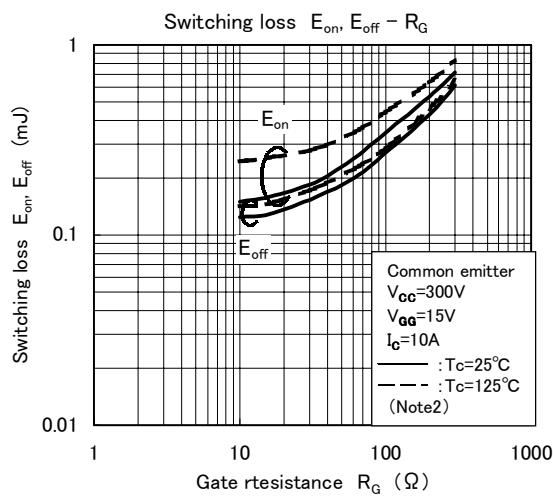
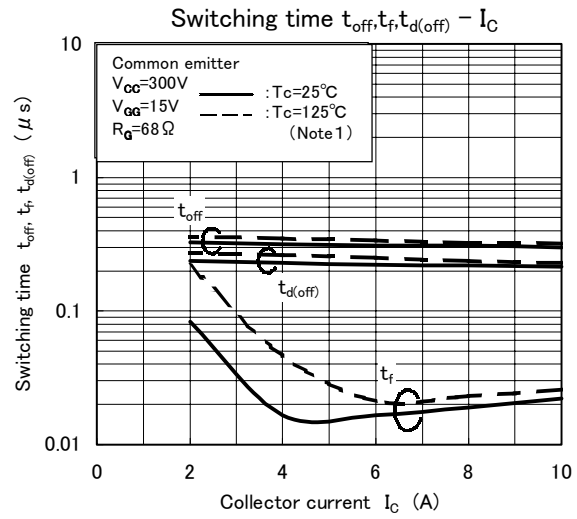
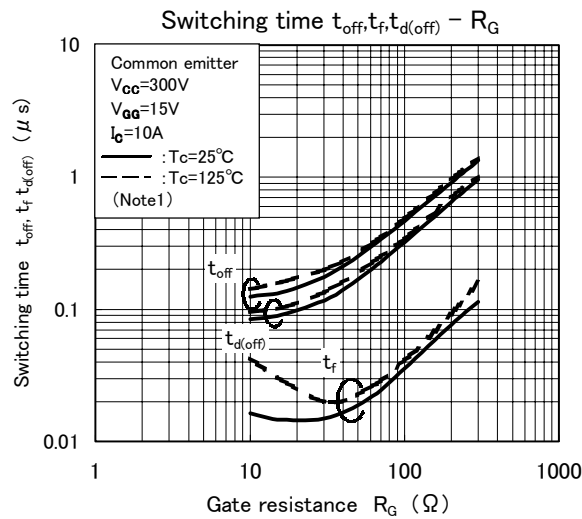
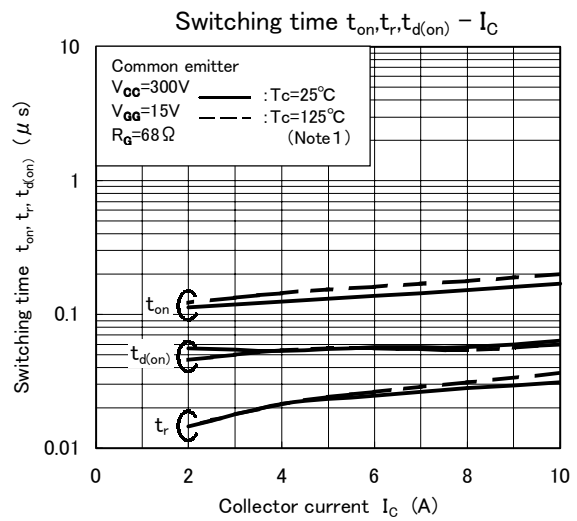
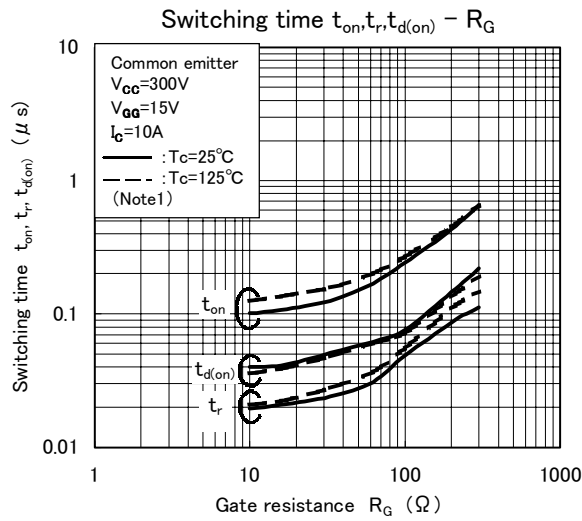
Note 2: Switching loss measurement waveforms



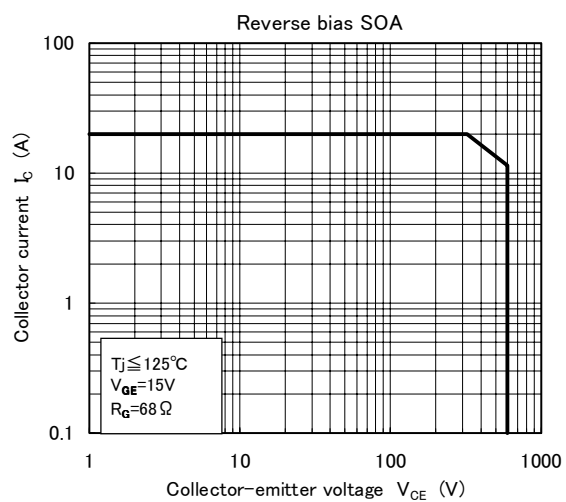
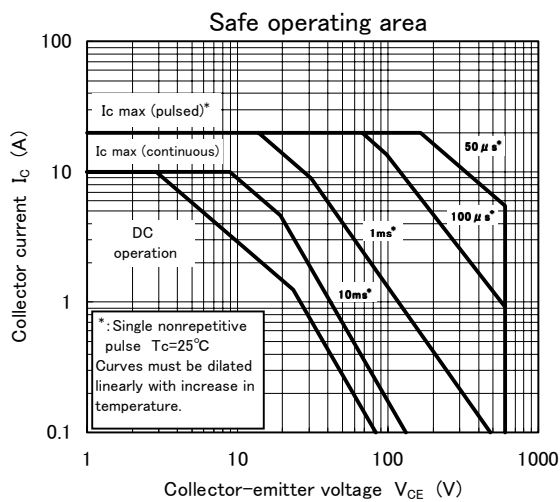
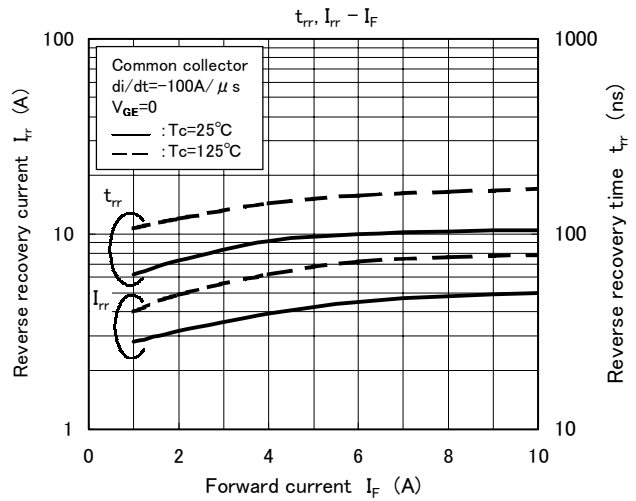
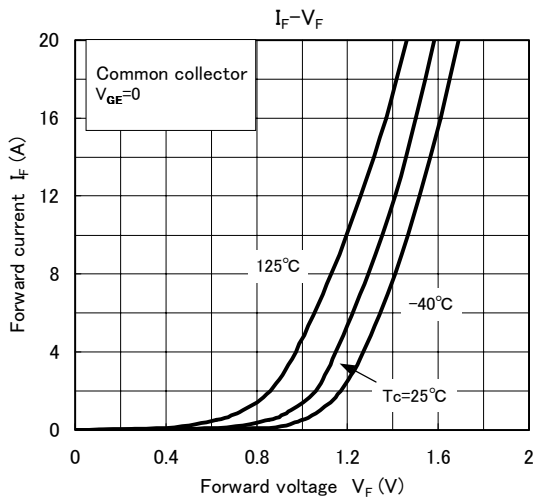
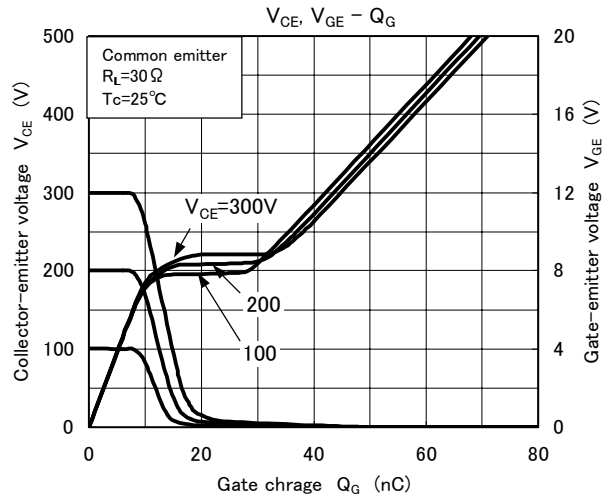
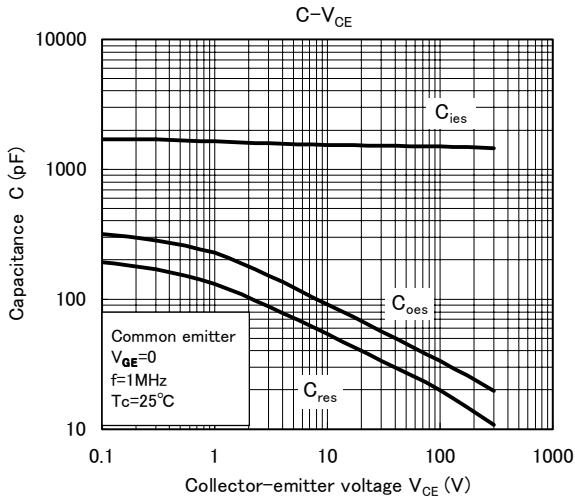
Reference



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