

Preliminary

TOSHIBA Insulated Gate Bipolar Transistor Silicon N Channel IGBT

GT5J321

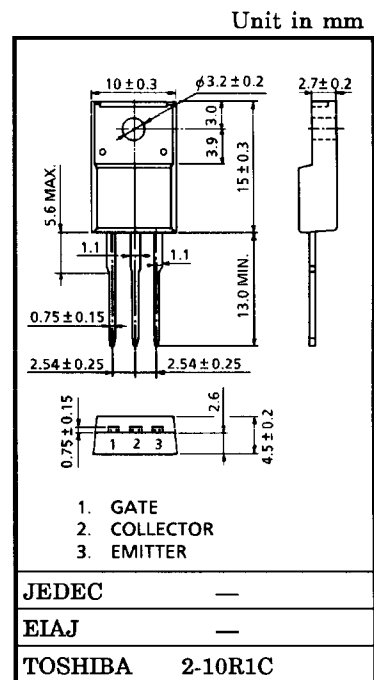
High Power Switching Applications

Fast Switching Applications

- The 4th generation
- Enhancement-mode
- Fast Switching(FS) :Operating frequency up to 150kHz(Reference)
 - High speed : $t_f=0.05 \mu s$ (typ.)
 - Low switching loss : $E_{on}=0.12mJ$ (typ.)
: $E_{off}=0.10mJ$ (typ.)
- Low saturation voltage : $V_{CE(sat)}=2.0V$ (typ.)
- FRD included between emitter and collector

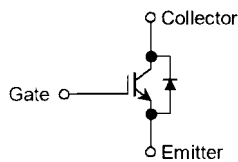
Maximum Ratings (Ta=25°C)

Characteristic	Symbol	Ratings	Unit
Collector-emitter voltage	V_{CES}	600	V
Gate-emitter voltage	V_{GES}	± 20	V
Collector current	DC	I_C	5
	1ms	I_{CP}	10
Emitter-collector forward current	DC	I_F	5
	1ms	I_{FM}	10
Collector power dissipation (Tc=25°C)	P_C	28	W
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	-55~150	°C



Weight : 1.7g

Equivalent Circuit



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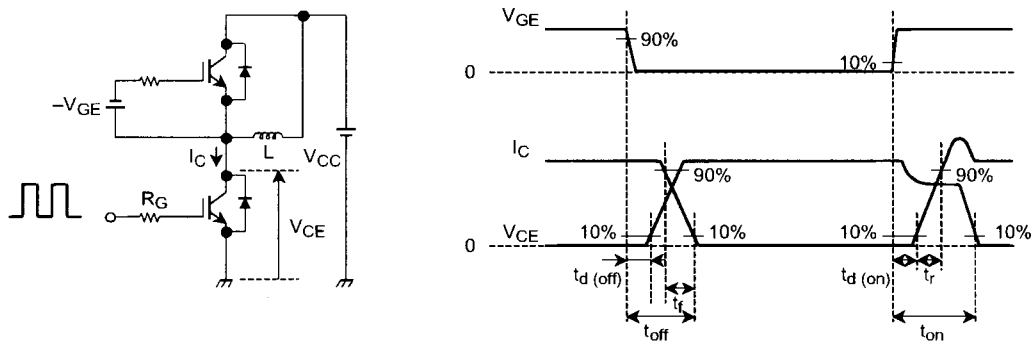
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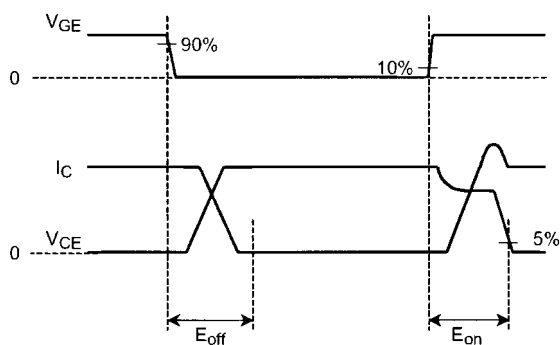
Electrical Characteristics(Ta=25°C)

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		$V_{GE(OFF)}$	$I_C = 0.5mA, V_{CE} = 5V$	3.5	-	6.5	V
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 5A, V_{GE} = 15V$	-	2.0	2.45	V
Input capacitance		C_{ies}	$V_{CE} = 10V, V_{GE} = 0, f = 1MHz$	-	950	-	pF
Switching time	Turn-on delay time	$t_{d(on)}$	Inductive Load $V_{CC} = 300V, I_C = 5A$ $V_{GG} = +15V, R_G = 100\Omega$ (Note 1) (Note 2)	-	0.05	-	μs
	Rise Time	t_r		-	0.03	-	
	Turn-on Time	t_{on}		-	0.15	-	
	Turn-off delay time	$t_{d(off)}$		-	0.13	-	
	Fall Time	t_f		-	0.05	0.15	
	Turn-off Time	t_{off}		-	0.20	-	
Switching loss	Turn-on switching loss	E_{on}	-	0.12	-	mJ	
	Turn-off switching loss	E_{off}	-	0.10	-		
Peak forward voltage		V_F	$I_F = 5A, V_{GE} = 0$	-	-	2.0	V
Reverse recovery time		t_{rr}	$I_F = 5A, di/dt = -100A/\mu s$	-	-	200	ns
Thermal resistance(IGBT)		$R_{th(j-c)}$	—	-	-	4.46	°C/W
Thermal resistance(Diode)		$R_{th(j-c)}$	—	-	-	4.90	°C/W

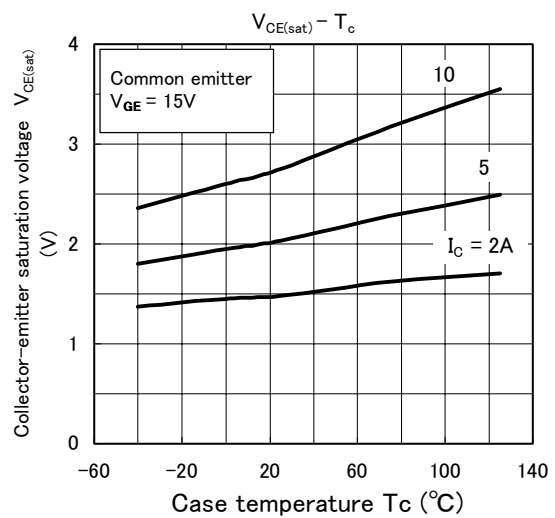
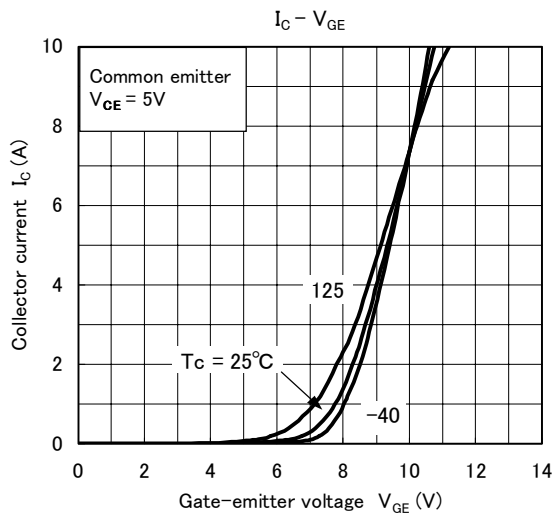
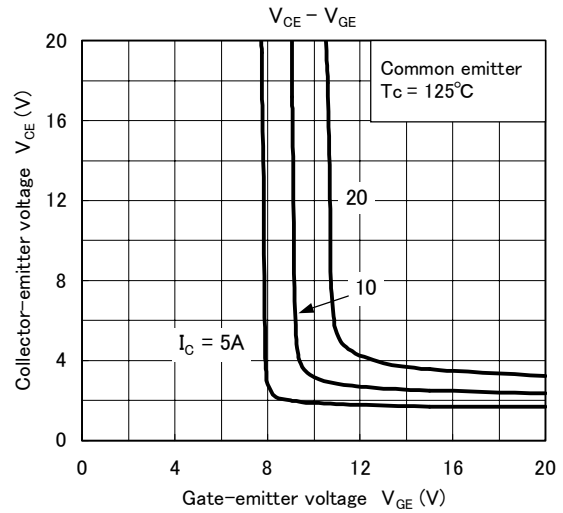
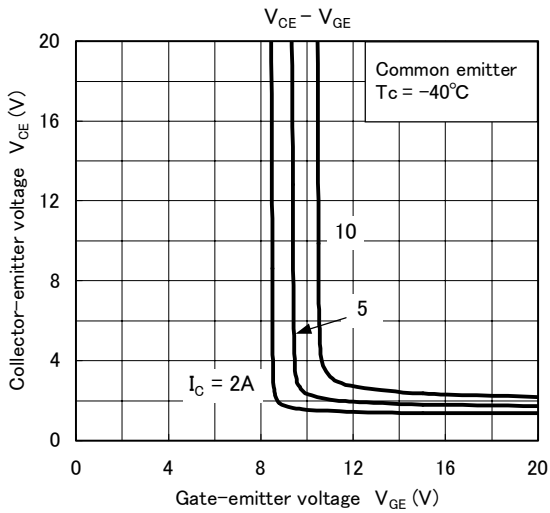
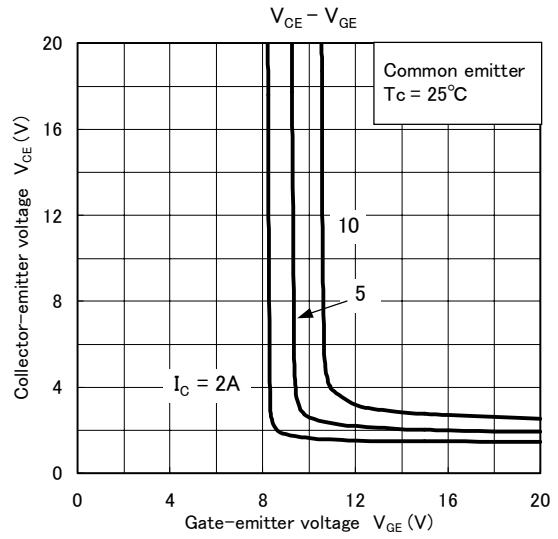
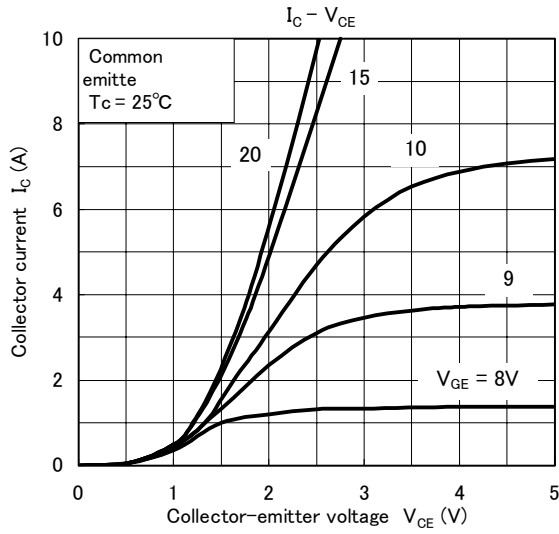
Note1: Switching time measurement circuit and input/output waveforms



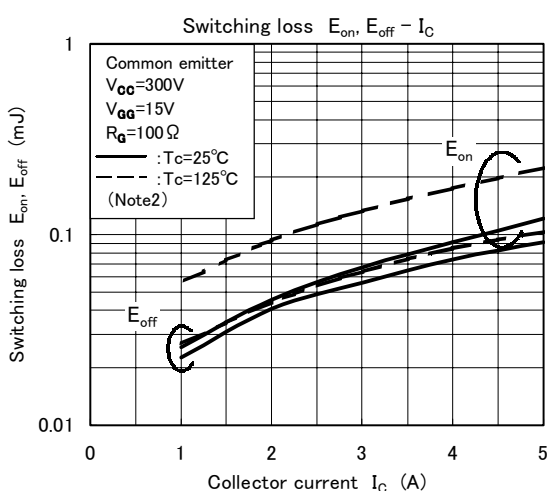
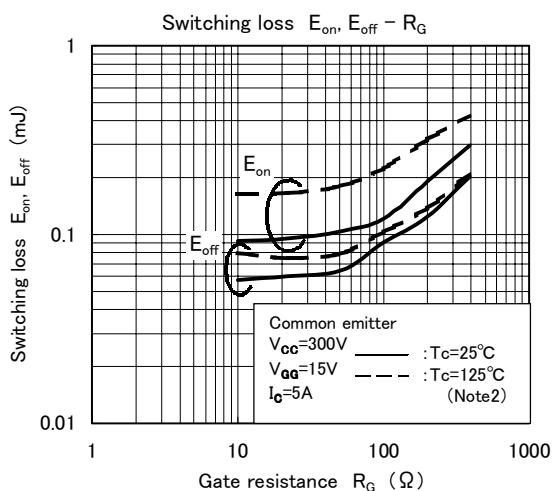
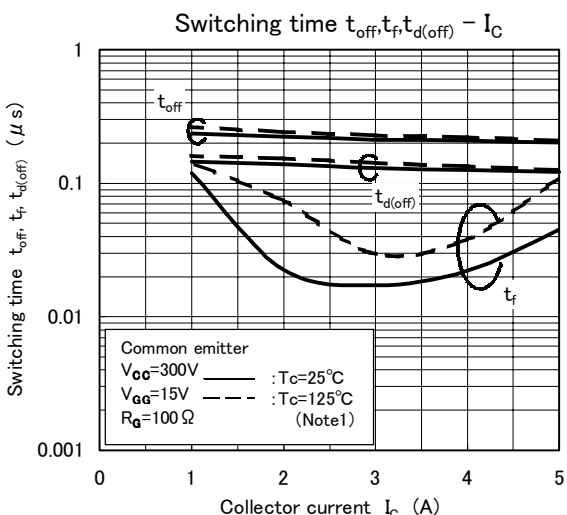
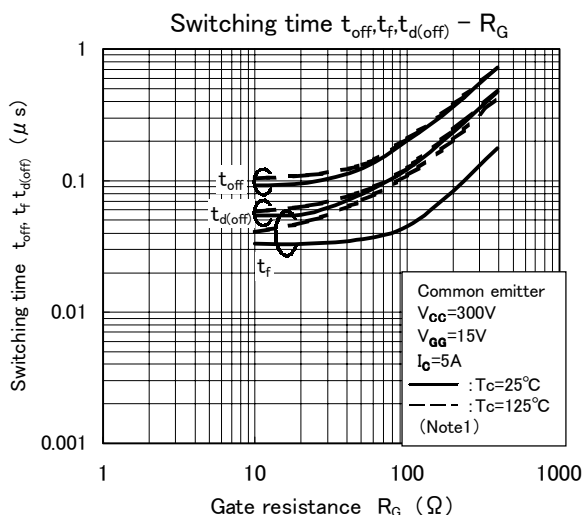
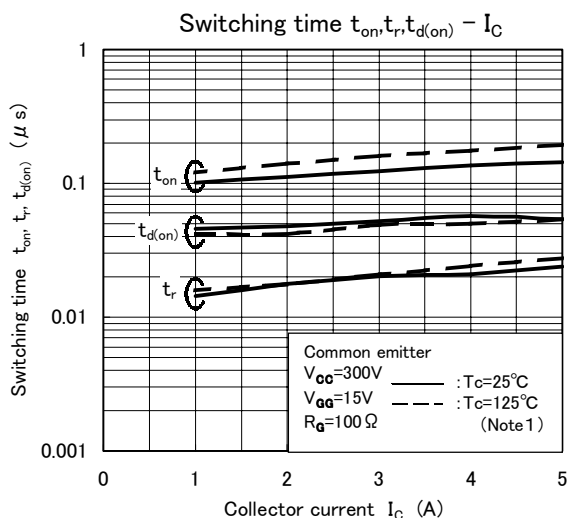
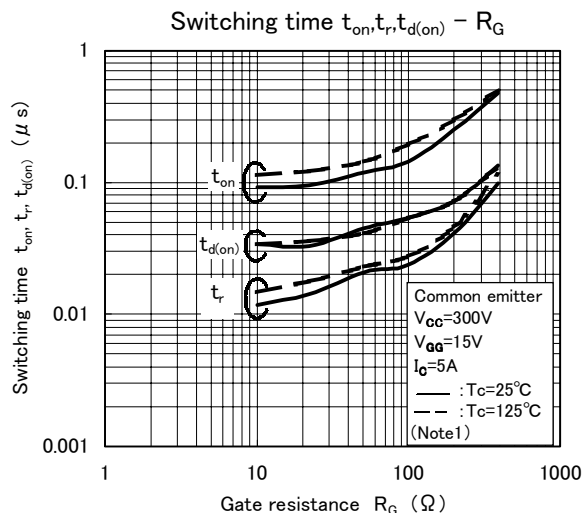
Note 2: Switching loss measurement waveforms



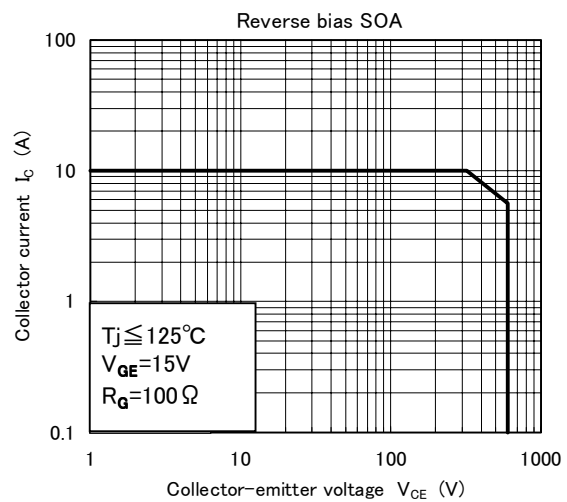
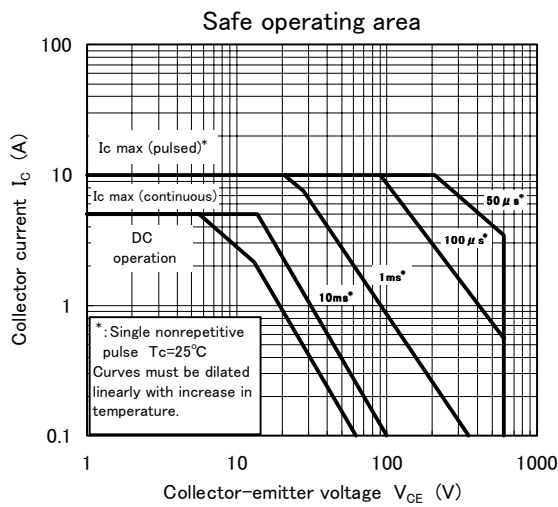
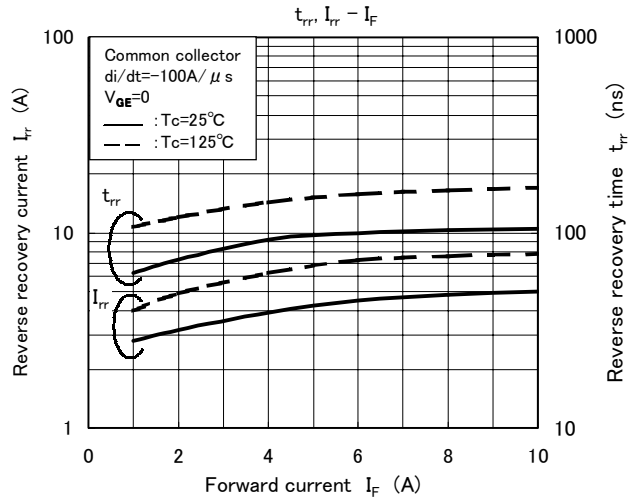
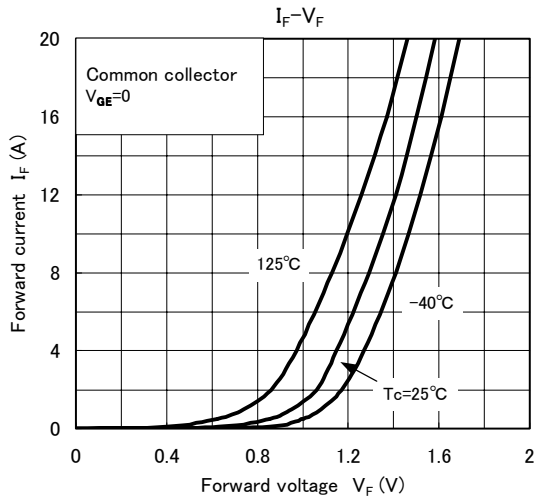
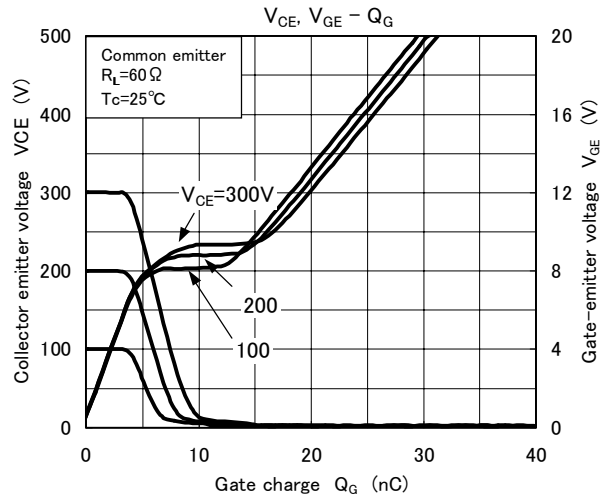
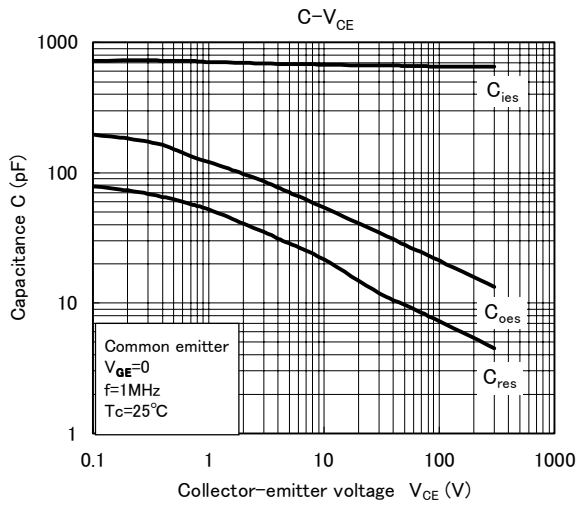
Reference



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