TOSHIBA Insulated Gate Bipolar Transistor Silicon N Channel IGBT

GT50J325

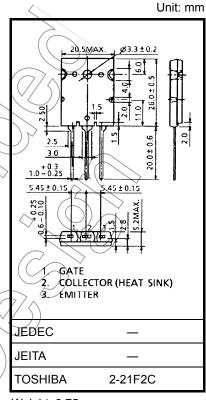
High Power Switching Applications

Fast Switching Applications

- Fourth generation IGBT
- Enhancement mode type
- Fast switching (FS): Operating frequency up to 50 kHz (reference)
 - High speed: $t_f = 0.05 \mu s$ (typ.)
 - Low switching loss: $E_{on} = 1.30 \text{ mJ (typ.)}$
 - $: E_{off} = 1.34 \text{ mJ (typ.)}$
- Low saturation Voltage: $V_{CE (sat)} = 2.0 \text{ V (typ.)}$
- FRD included between emitter and collector

Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit	
Collector-emitter voltage		V _{CES}	600	> v	
Gate-emitter voltage		V _{GES}	+20	V	
Collector current	DC	IC	50	A	
	1 ms	I _{CP}	100		
Emitter-collector forward current	DC	l _F	50	A	
	1 ms	IFM	100		
Collector power dissipation (Tc = 25°C)		PG	240	w	
Junction temperature		(T_j)	150	//°C	
Storage temperature range		T _{stg}	-55 to 150	~°C	



Weight: 9.75 g

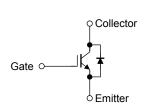
Note: Using continuously under neavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

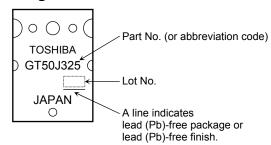
Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance (IGBT)	Rth (j-c)	0.521	°C/W
Thermal resistance (diode)	R _{th (j-c)}	2.30	°C/W

Equivalent Circuit



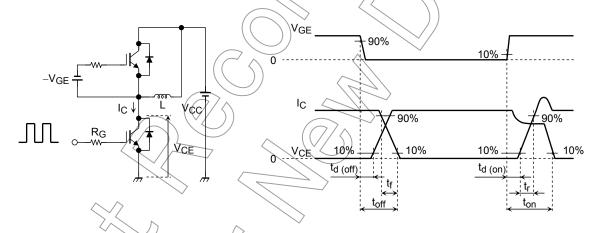
Marking



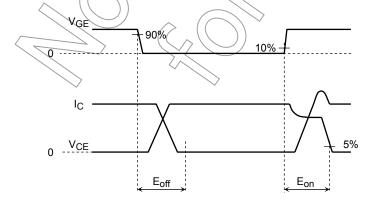
Electrical Characteristics (Ta = 25°C)

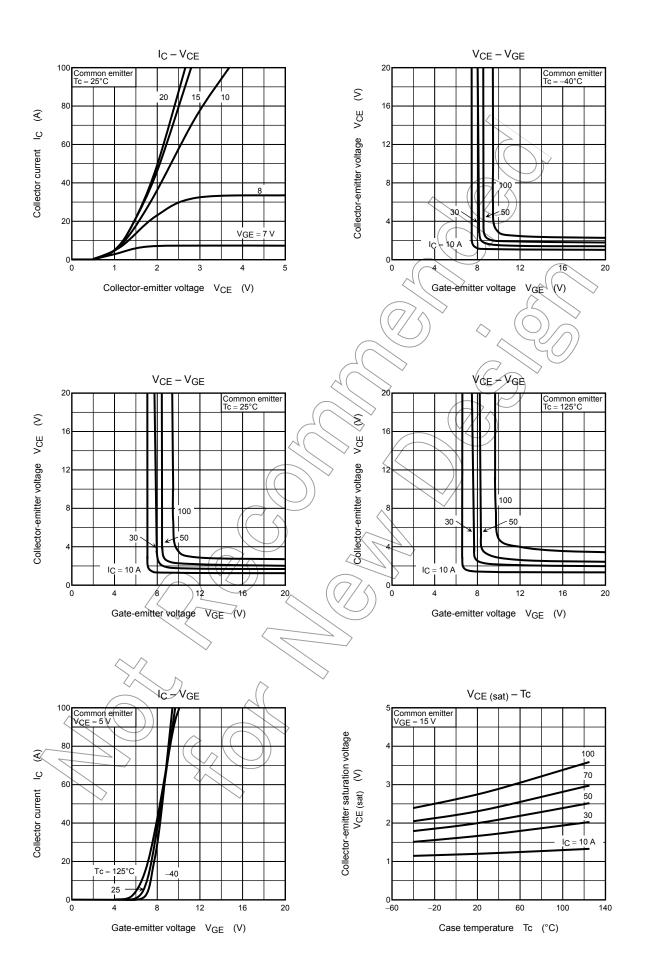
Cha	racteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Gate leakage cu	ırrent	I _{GES}	$V_{GE} = \pm 20 \text{ V}, V_{CE} = 0$	_	_	±500	nA
Collector cut-off	current	I _{CES}	V _{CE} = 600 V, V _{GE} = 0	_	_	1.0	mA
Gate-emitter cu	t-off voltage	V _{GE} (OFF)	$I_C = 5 \text{ mA}, V_{CE} = 5 \text{ V}$	3.5	_	6.5	V
Collector-emitte	r saturation voltage	V _{CE} (sat)	I _C = 50 A, V _{GE} = 15 V		2.0	2.45	V
Input capacitano	ce	C _{ies}	$V_{CE} = 10 \text{ V}, V_{GE} = 0, f = 1 \text{ MHz}$	(F	7900		pF
Switching time	Turn-on delay time	t _{d (on)}	Inductive load V _{CC} = 300 V, I _C = 50 A V _{GG} = +15 V, R _G = 13·Ω (Note 1)) 	0.09		- μ s
	Rise time	t _r		<i>)</i>	0.07		
	Turn-on time	t _{on}		· —	0.24	_	
	Turn-off delay time	t _d (off)		_	0.30	_	
	Fall time	t _f		_	0.05	\forall	
	Turn-off time	t _{off}		-	0.43	> —	
Switching loss loss	Turn-on switching loss	E _{on}	(Note 2)) —	- mJ		
	Turn-off switching loss	E _{off}		7	1.34		IIIJ
Peak forward vo	oltage	V _F	I _F = 50 A, V _{GE} = 0			4.2	V
Reverse recove	ry time	t _{rr}	I _F = 50 A, di/dt = -100 A/μs	\ _	65	_	ns

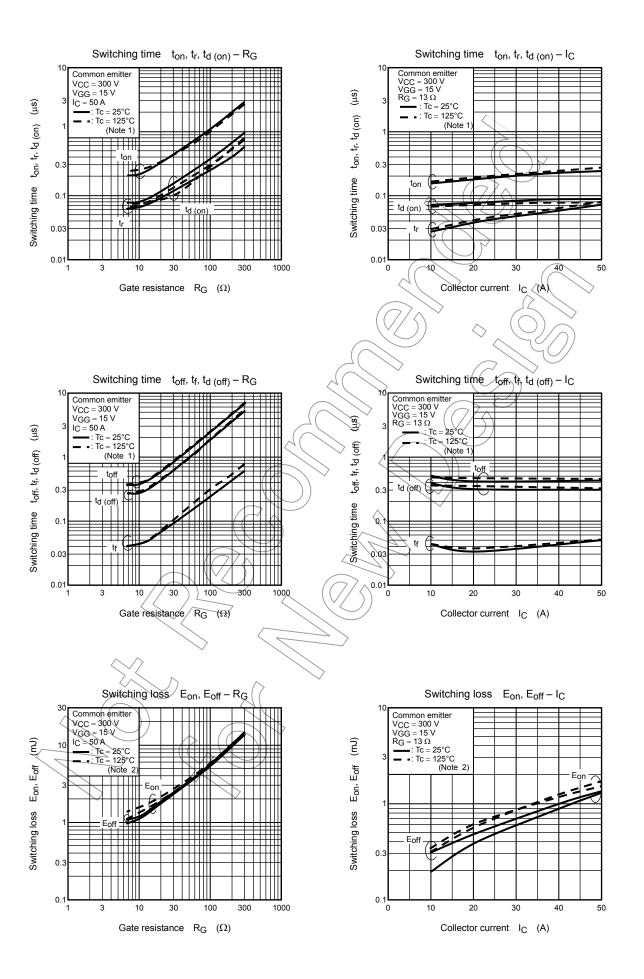
Note 1: Switching time measurement circuit and input/output waveforms

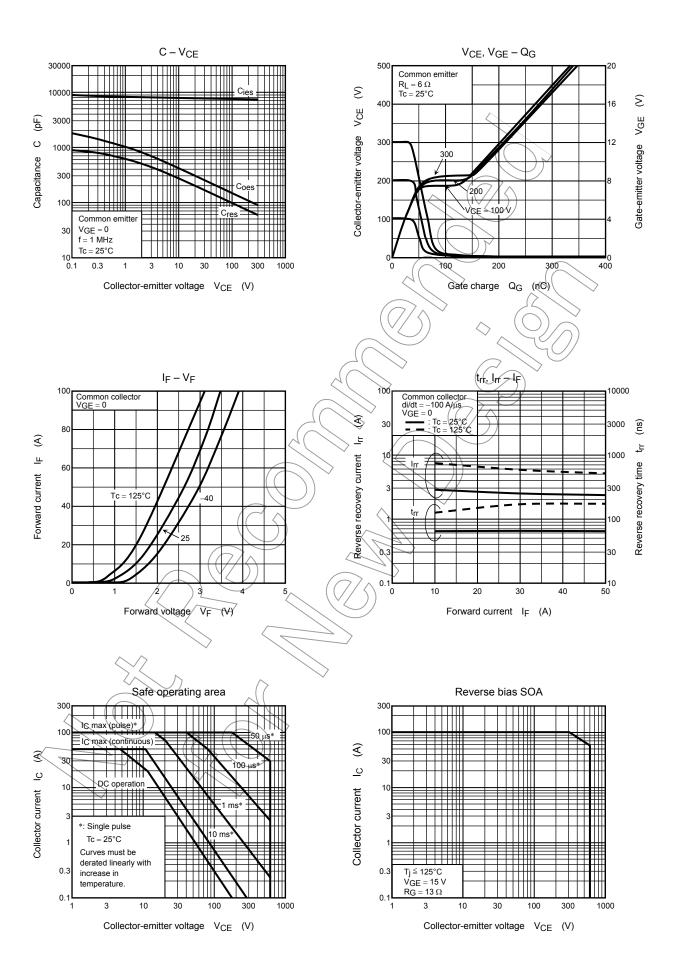


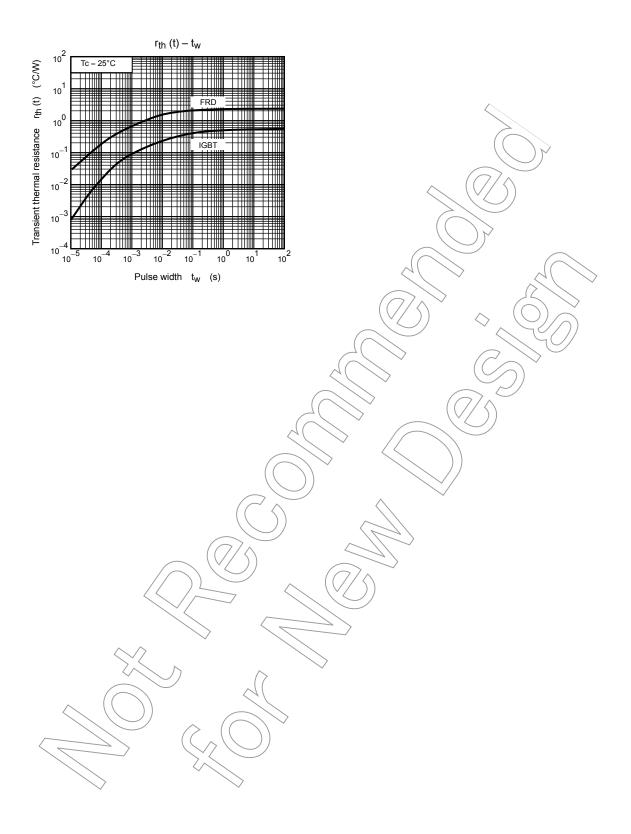
Note 2: Switching loss measurement waveforms











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