TOSHIBA Insulated Gate Bipolar Transistor Silicon N Channel IGBT

GT30J121

High Power Switching Applications Fast Switching Applications

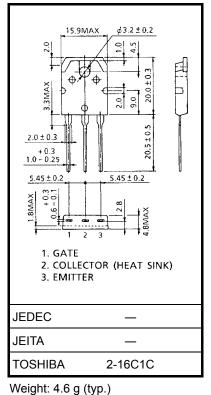
- Fourth-generation IGBT
- Enhancement mode type
- Fast switching (FS): Operating frequency up to 50 kHz (reference) High speed: $t_f = 0.05 \ \mu s$ (typ.) Low switching loss: $E_{on} = 1.00 \ mJ$ (typ.)

 $E_{off} = 0.80 \text{ mJ (typ.)}$

• Low saturation voltage: VCE (sat) = 2.0 V (typ.)

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	Ι _C	30	A	
	1 ms	I _{CP}	60		
Collector power dissipation (Tc = 25°C)		P _C	170	W	
Junction temperature		Tj	150	°C	
Storage temperature range		T _{stg}	-55 to 150	°C	



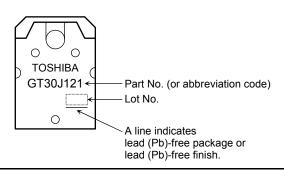
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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	R _{th (j-c)}	0.735	°C/W

Marking

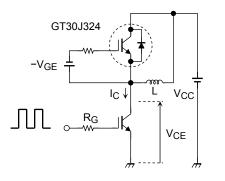


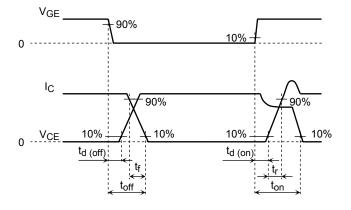
Unit: mm

Electrical Characteristics (Ta = 25°C)

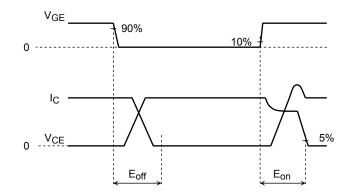
Cha	racteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Gate leakage cu	urrent	I _{GES}	V_{GE} = ±20 V, V_{CE} = 0	—	_	±500	nA
Collector cut-off current		ICES	V _{CE} = 600 V, V _{GE} = 0	_	_	1.0	mA
Gate-emitter cut-off voltage		V _{GE (OFF)}	I_C = 3 mA, V_{CE} = 5 V	3.5	—	6.5	V
Collector-emitte	r saturation voltage	V _{CE (sat)}	I _C = 30 A, V _{GE} = 15 V	_	2.0	2.45	V
Input capacitance		Cies	V _{CE} = 10 V, V _{GE} = 0, f = 1 MHz	_	4650	—	pF
Switching time	Turn-on delay time	t _{d (on)}	Inductive Load V_{CC} = 300 V, I _C = 30 A V_{GG} = +15 V, R _G = 24 Ω (Note 1) (Note 2)	_	0.09	—	μs
	Rise time	tr		_	0.07	_	
	Turn-on time	t _{on}		_	0.24	_	
	Turn-off delay time	^t d (off)		_	0.30	_	
	Fall time	t _f		_	0.05	_	
	Turn-off time	t _{off}		_	0.43	_	
Switching loss	Turn-on switching loss	E _{on}		_	1.00	_	- mJ
	Turn-off switching loss	E _{off}		_	0.80	_	

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

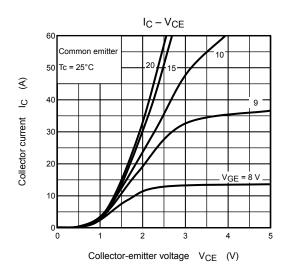


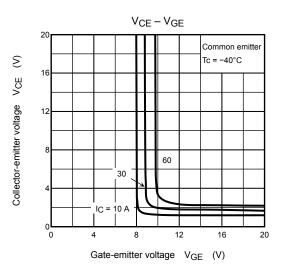


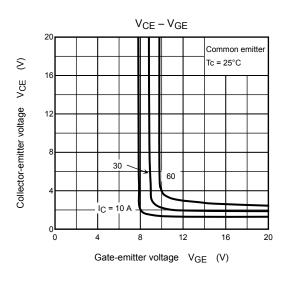
Note 2: Switching loss measurement waveforms

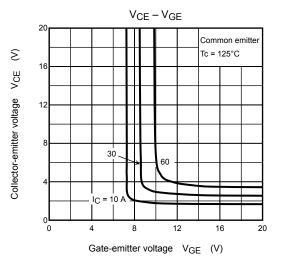


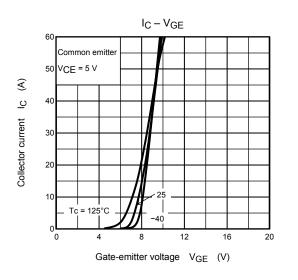
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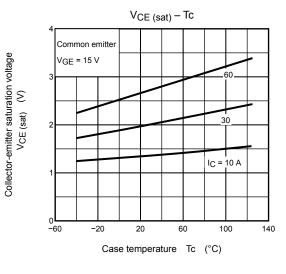




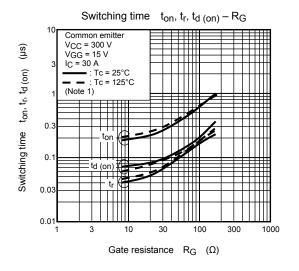


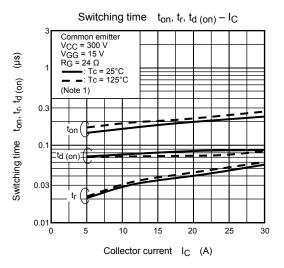


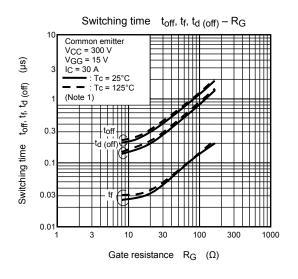


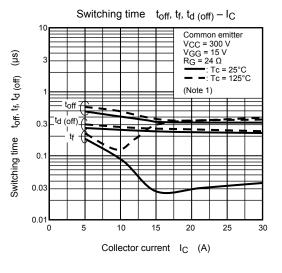


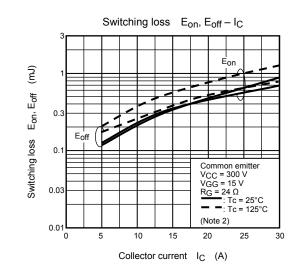
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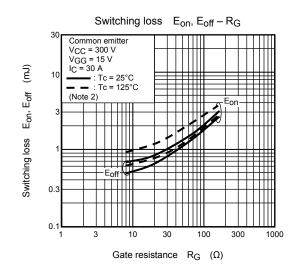




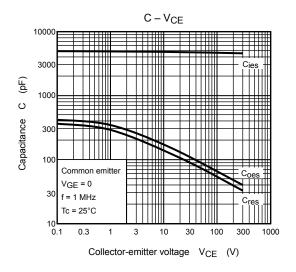


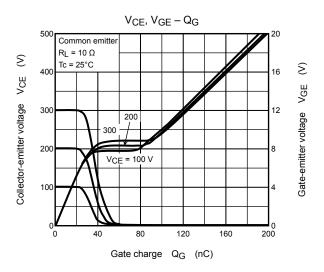




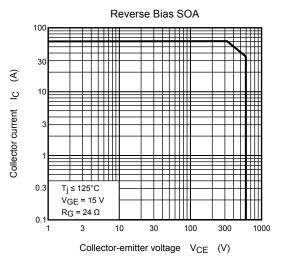


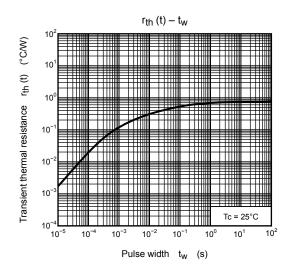
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Safe Operating Area 100 IC max (pulsed)* IC max (continuous) 30 100 E 10 <u>ں</u> DC operation Collector current Single pulse $Tc = 25^{\circ}C$ Curves must be derated linearly 0.3 with increase in 0 ms temperature. 0.1 3 30 300 10 1000 100 Collector-emitter voltage V_{CE} (V)





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20070701-EN

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