TOSHIBA Insulated Gate Bipolar Transistor Silicon N Channel IGBT

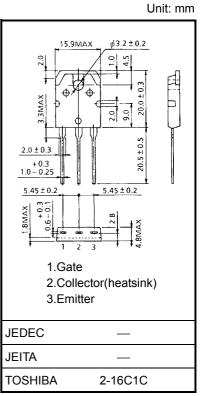
# GT50J327

Current Resonance Inverter Switching Application

- Enhancement mode type
- High speed :  $t_f = 0.19 \ \mu s$  (typ.) (I<sub>C</sub> = 50A)
- Low saturation voltage: VCE (sat) = 1.9 V (typ.) (IC = 50A)
- FRD included between emitter and collector
- Fourth generation IGBT
- TO-3P(N) (Toshiba package name)

#### Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit	
Collector-emitter voltage		V <sub>CES</sub>	600	V	
Gate-emitter voltage		V <sub>GES</sub>	±25	V	
Continuous collector current	@ Tc = 100°C	la	29	A	
	@ Tc = 25°C	IC	50		
Pulsed collector current		I <sub>CP</sub>	100	А	
Diode forward current	DC	١ <sub>F</sub>	20	A	
	Pulsed	I <sub>FP</sub>	40		
Collector power dissipation	@ Tc = 100°C	Da	56	W	
	@ Tc = 25°C	P <sub>C</sub>	140		
Junction temperature		Tj	150	°C	
Storage temperature range		T <sub>stg</sub>	-55 to 150	°C	

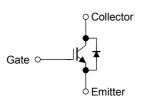


Weight: 4.6 g (typ.)

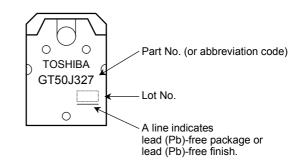
### **Thermal Characteristics**

Characteristics	Symbol	Max	Unit
Thermal resistance (IGBT)	R <sub>th (j-c)</sub>	0.89	°C/W
Thermal resistance (diode)	R <sub>th (j-c)</sub>	2.7	°C/W

### **Equivalent Circuit**



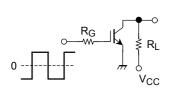
#### Marking

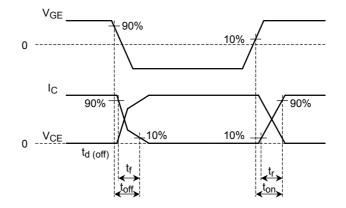


Electrical Characteristics (Ta = 25°C)

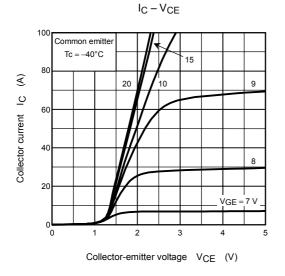
Chara	acteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Gate leakage current		I <sub>GES</sub>	V <sub>GE</sub> = ±25 V, V <sub>CE</sub> = 0	_	_	±500	nA
Collector cut-off current		I <sub>CES</sub>	V <sub>CE</sub> = 600 V, V <sub>GE</sub> = 0			1.0	mA
Gate-emitter cut-	off voltage	V <sub>GE (OFF)</sub>	I <sub>C</sub> = 50 mA, V <sub>CE</sub> = 5 V	3.0	_	6.0	V
Collector-emitter	saturation voltage	V <sub>CE (sat)</sub>	I <sub>C</sub> = 50 A, V <sub>GE</sub> = 15 V		1.9	2.3	V
Input capacitance		Cies	V <sub>CE</sub> = 10 V, V <sub>GE</sub> = 0, f = 1 MHz		2500	_	pF
Switching time	Rise time	t <sub>r</sub>	Resistive Load		0.20	_	μs
	Turn-on time	t <sub>on</sub>	V <sub>CC</sub> = 300 V, I <sub>C</sub> = 50 A		0.27	_	
	Fall time	t <sub>f</sub>	$V_{GG}$ = ±15 V, R <sub>G</sub> = 39 $\Omega$		0.19	0.32	
	Turn-off time	t <sub>off</sub>	(Note 1)		0.44		
Diode forward voltage V <sub>F</sub>		V <sub>F</sub>	I <sub>F</sub> = 15 A, V <sub>GE</sub> = 0			2.0	V
Reverse recovery time		t <sub>rr</sub>	I <sub>F</sub> = 15 A, di/dt = –100 A/μs	_	_	0.2	μs

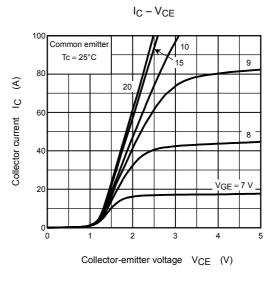
Note 1: Switching time measurement circuit and input/output waveforms



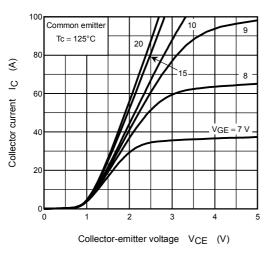


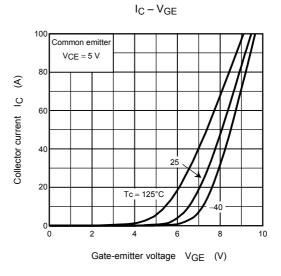
# **TOSHIBA**



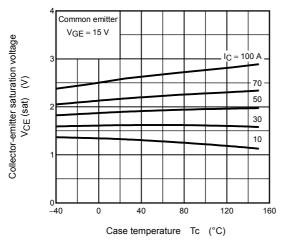




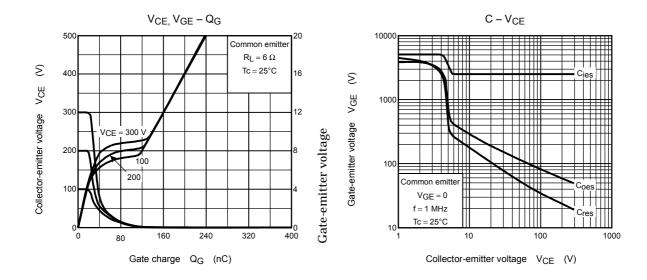




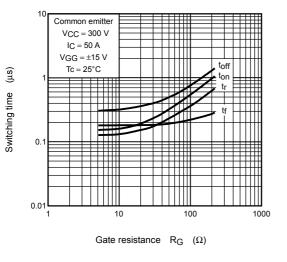




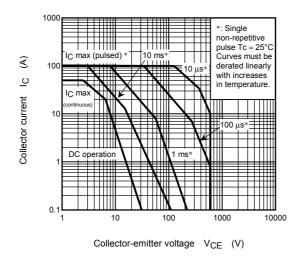
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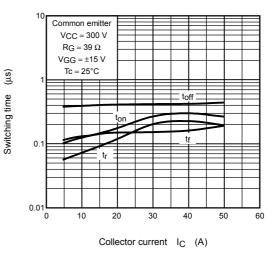
Switching Time – RG



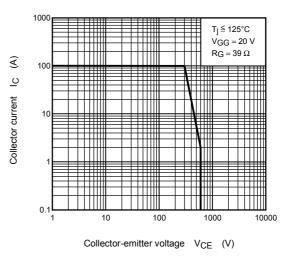




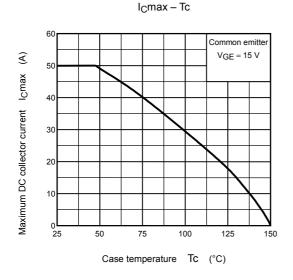
Switching Time –  $I_C$ 

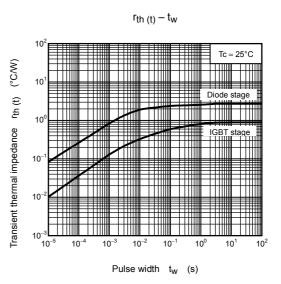


**Reverse Bias SOA** 

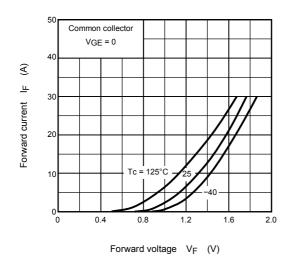


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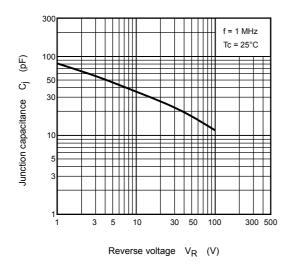




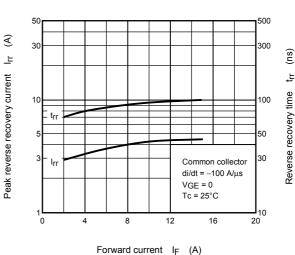
 $\mathsf{I}_\mathsf{F}-\mathsf{V}_\mathsf{F}$ 





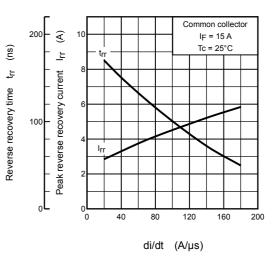












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