

TOSHIBA Insulated Gate bipolar Transistor Silicon N Channel IGBT

Preliminary

GT40Q322

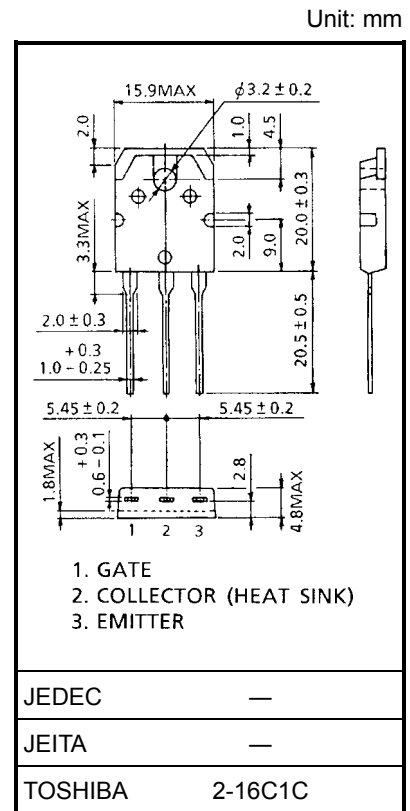
Voltage Resonance Inverter Switching Application

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- Enhancement-mode
- High speed : $t_f = 0.14 \mu s$ (typ.) ($I_C = 40A$)
- FRD included between emitter and collector
- The 4th generation
- TO-3P(N) (Toshiba package name)

Maximum Ratings ($T_a = 25^\circ C$)

Characteristics	Symbol	Rating	Unit	
Collector-emitter voltage	V_{CES}	1200	V	
Gate-emitter voltage	V_{GES}	± 25	V	
Continuous collector current	@ $T_c = 100^\circ C$	20	A	
	@ $T_c = 25^\circ C$	39		
Pulsed collector current	I_{CP}	80	A	
Diode forward current	DC	I_F	10	A
	Pulsed	I_{FP}	80	
Collector power dissipation	@ $T_c = 100^\circ C$	P_C	80	W
	@ $T_c = 25^\circ C$		200	
Junction temperature	T_j	150	$^\circ C$	
Storage temperature range	T_{stg}	-55 to 150	$^\circ C$	

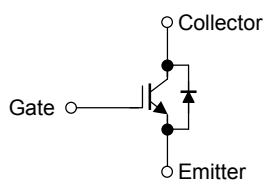


Weight: 4.6 g (typ.)

Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance (IGBT)	$R_{th(j-c)}$	0.625	$^\circ C/W$
Thermal resistance (diode)	$R_{th(j-c)}$	1.79	$^\circ C/W$

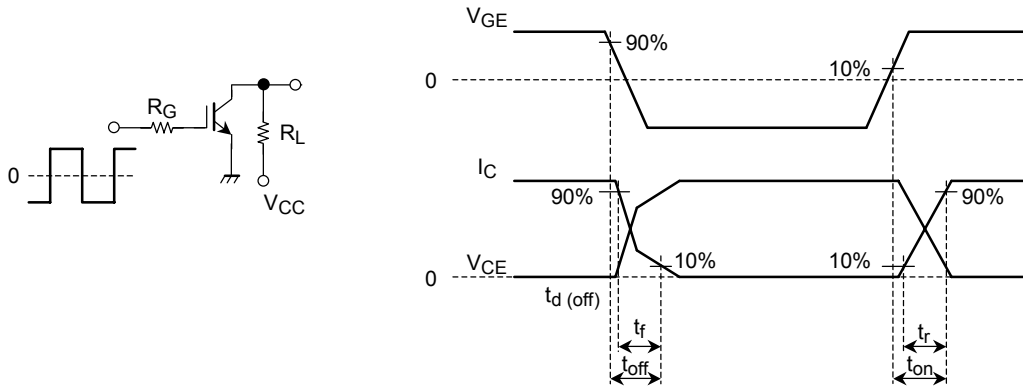
Equivalent Circuit



Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GES}	$V_{GE} = \pm 25\text{ V}, V_{CE} = 0$	—	—	± 500	nA
Collector cut-off current		I_{CES}	$V_{CE} = 1200\text{ V}, V_{GE} = 0$	—	—	5.0	mA
Gate-emitter cut-off voltage		$V_{GE(OFF)}$	$I_C = 40\text{ mA}, V_{CE} = 5\text{ V}$	4.0	—	7.0	V
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 40\text{ A}, V_{GE} = 15\text{ V}$	—	3.0	3.7	V
Input capacitance		C_{ies}	$V_{CE} = 10\text{ V}, V_{GE} = 0, f = 1\text{ MHz}$	—	5550	—	pF
Switching time	Rise time	t_r	Resistive Load $V_{CC} = 600\text{ V}, I_C = 40\text{ A}$ $V_{GG} = \pm 15\text{ V}, R_G = 39\ \Omega$ (Note 1)	—	0.18	—	μs
	Turn-on time	t_{on}		—	0.26	—	
	Fall time	t_f		—	0.14	0.21	
	Turn-off time	t_{off}		—	0.43	—	
Diode forward voltage		V_F	$I_F = 10\text{ A}, V_{GE} = 0$	—	—	2.0	V
Reverse recovery time		t_{rr}	$I_F = 10\text{ A}, di/dt = -20\text{ A}/\mu\text{s}$	—	0.6	—	μs

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



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