

Preliminary

TOSHIBA Insulated Gate Bipolar Transistor
Silicon N Channel IGBT

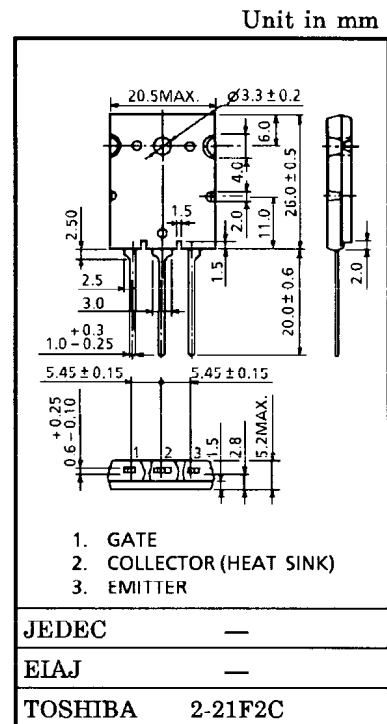
GT40T301

High Power Switching Applications

- FRD included between emitter and collector
- Enhancement-mode
- High speed IGBT : $t_f = 0.25 \mu s$ (typ.) ($I_C = 40 A$)
FRD : $t_{rr} = 0.7 \mu s$ (typ.) ($di/dt = -20 A/\mu s$)
- Low saturation voltage: $V_{CE(sat)} = 3.7 V$ (typ.) ($I_C = 40 A$)

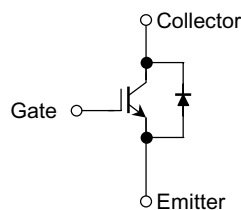
Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Collector-emitter voltage		V_{CES}	1500	V
Gate-emitter voltage		V_{GES}	± 25	V
Collector current	DC	I_C	40	A
	1 ms	I_{CP}	80	
Emitter-collector forward current	DC	I_{ECF}	30	A
	1 ms	I_{ECPF}	80	
Collector power dissipation (Tc = 25°C)		P_C	200	W
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	-55~150	°C



Weight : 9.75g

Equivalent Circuit



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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}	$V_{CE} = 1500 \text{ V}, V_{GE} = 0$	—	—	1.0	mA
Gate-emitter cut-off voltage		$V_{GE} \text{ (OFF)}$	$I_C = 40 \text{ mA}, V_{CE} = 5 \text{ V}$	4.0	—	7.0	V
Collector-emitter saturation voltage		$V_{CE} \text{ (sat)}$	$I_C = 40 \text{ A}, V_{GE} = 15 \text{ V}$	—	3.7	5.0	V
Input capacitance		C_{ies}	$V_{CE} = 10 \text{ V}, V_{GE} = 0, f = 1 \text{ MHz}$	—	2900	—	pF
Switching time	Rise time	t_r		—	0.40	—	μs
	Turn-on time	t_{on}		—	0.50	—	
	Fall time	t_f		—	0.25	0.40	
	Turn-off time	t_{off}		—	0.65	—	
Emitter-collector forward voltage		V_{ECF}	$I_{ECF} = 30 \text{ A}, V_{GE} = 0$	—	1.9	2.5	V
Reverse recovery time		t_{rr}	$I_{ECF} = 30 \text{ A}, V_{GE} = 0, di/dt = -20 \text{ A}/\mu\text{s}$	—	0.7	3.0	μs
Thermal resistance		$R_{th} \text{ (j-c)}$	IGBT	—	—	0.625	$^{\circ}\text{C}/\text{W}$
			Diode	—	—	1.25	