

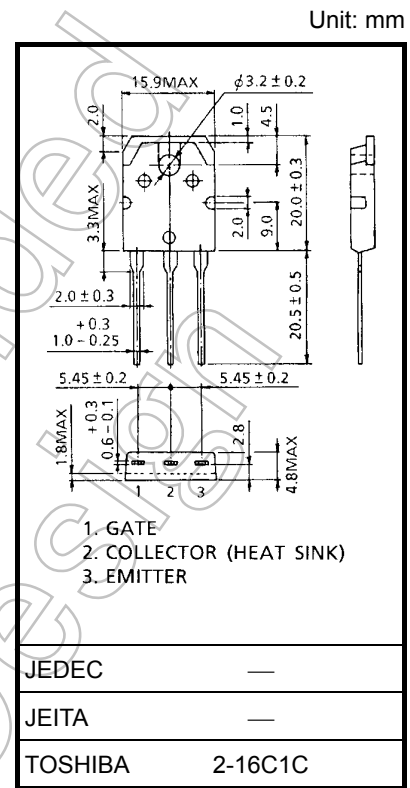
GT40T321

Consumer Application
Voltage Resonance Inverter Switching Application
Sixth Generation IGBT

- FRD included between emitter and collector
- Enhancement mode type
- High speed IGBT: $t_f = 0.24 \mu s$ (typ.) ($I_C = 40 A$)
FRD: $t_{rr} = 0.7 \mu s$ (typ.) ($di/dt = -20 A/\mu s$)
- Low saturation voltage $V_{CE(sat)} = 2.15 V$ (typ.) ($I_C = 40 A$)
- High Junction temperature $T_j = 175^\circ C$ (max)

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

Characteristics	Symbol	Rating	Unit
Collector-emitter voltage	V_{CES}	1500	V
Gate-emitter voltage	V_{GES}	± 25	V
Collector current	DC	I_C	40
	1ms	I_{CP}	80
Diode forward current	DC	I_F	30
	1ms	I_{FP}	80
Collector power dissipation ($T_c = 25^\circ C$)	P_C	230	W
Junction temperature	T_j	175	$^\circ C$
Storage temperature	T_{stg}	-55 to 175	$^\circ C$



Weight: 4.6 g (typ.)

Note 1: Ensure that the channel temperature does not exceed $175^\circ C$ during use of the device.

Note 2: 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).

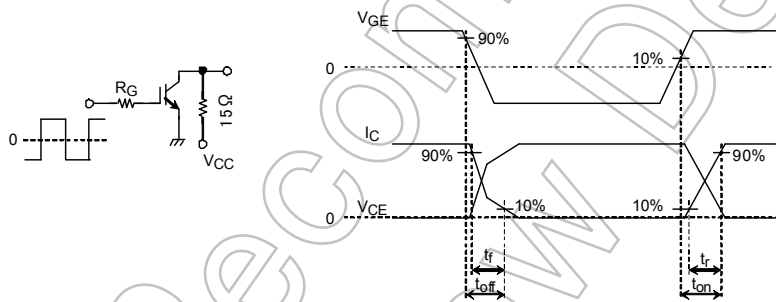
In general, loss of IGBT increases more when it has positive temperature coefficient and gets higher temperature. In case that the temperature rise due to loss of IGBT exceeds the heat release capacity of a device, it leads to thermorunaway and results in destruction. Therefore, please design heat release of a device with due consideration to the temperature rise of IGBT.

Start of commercial production
2009-10

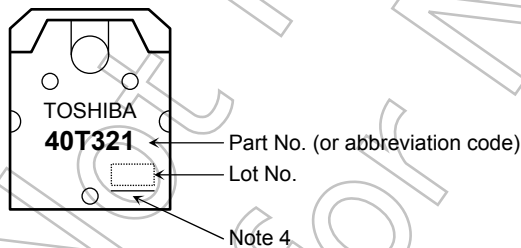
Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GES}	$V_{GE} = \pm 25 \text{ V}, V_{CE} = 0$	—	—	± 100	nA
Collector cut-off current	I_{CES}	$V_{CE} = 1500 \text{ V}, V_{GE} = 0$	—	—	1	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	$V_{CE (sat)}$	$I_C = 5 \text{ A}, V_{GE} = 15 \text{ V}$	—	1.25	1.90	V
		$I_C = 40 \text{ A}, V_{GE} = 15 \text{ V}$	—	2.15	2.50	
Input capacitance	C_{ies}	$V_{CE} = 10 \text{ V}, V_{GE} = 0, f = 1 \text{ MHz}$	—	2400	—	pF
Switching time	Rise time	See Note 3 circuit diagram. $V_{CC} = 600 \text{ V}, I_C = 40 \text{ A}$ $V_{GG} = \pm 15 \text{ V}, R_G = 51 \Omega$	—	0.15	—	μs
	Turn-on time		—	0.24	—	
	Fall time		—	0.24	0.40	
	Turn-off time		—	0.54	—	
Diode forward voltage	V_F	$I_F = 30 \text{ A}, V_{GE} = 0$	—	1.7	2.3	V
Reverse recovery time	t_{rr}	$I_F = 30 \text{ A}, V_{GE} = 0, di/dt = -20 \text{ A}/\mu\text{s}$	—	0.7	—	μs
Thermal Resistance (IGBT)	$R_{th(j-c)}$	—	—	—	0.65	$^{\circ}\text{C}/\text{W}$
Thermal Resistance (Diode)	$R_{th(j-c)}$	—	—	—	1.25	$^{\circ}\text{C}/\text{W}$

Note 3: Switching time measurement circuit and input/output waveforms



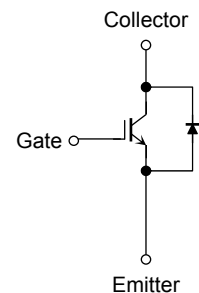
Marking



Note 4: A line under a Lot No. identifies the indication of product Labels.

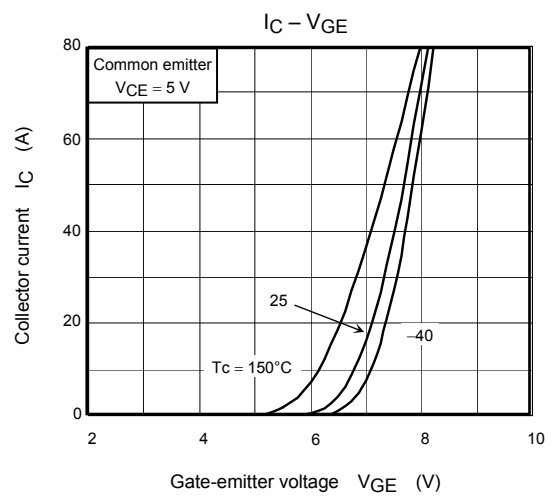
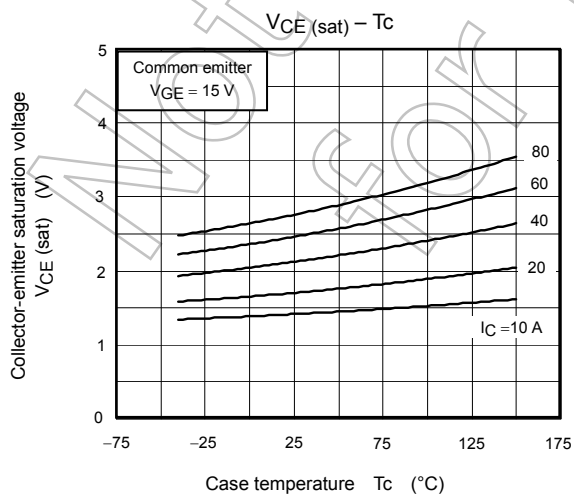
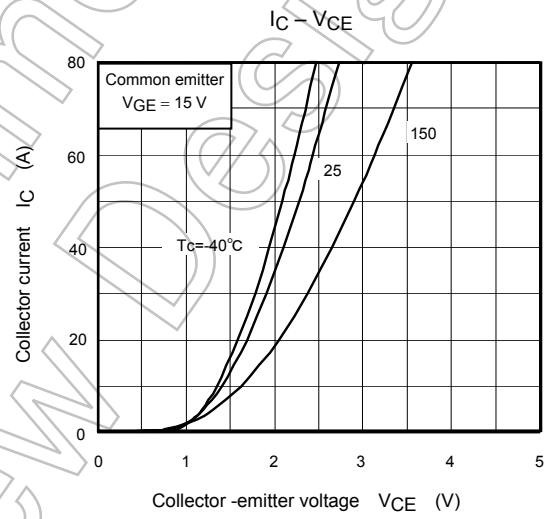
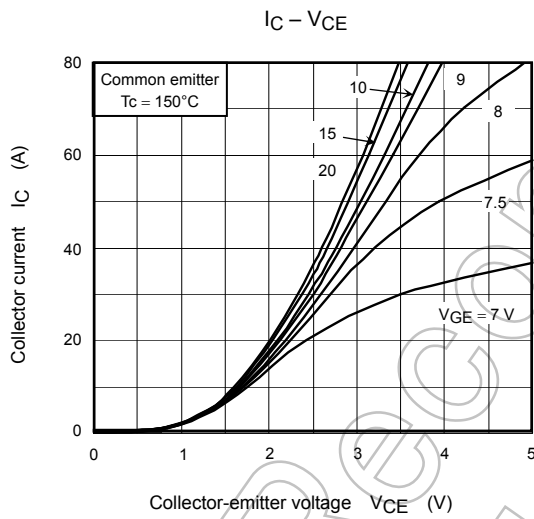
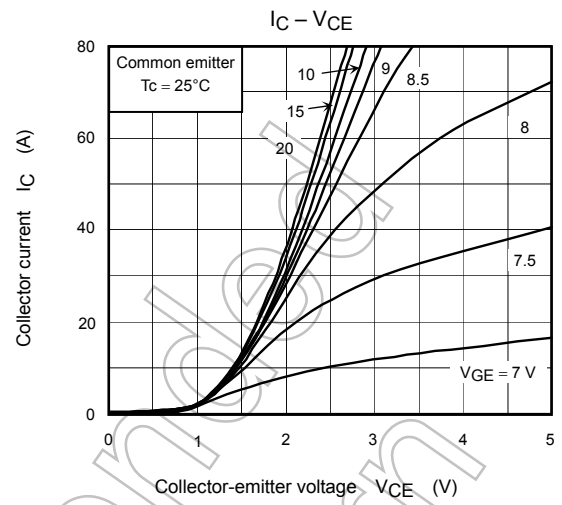
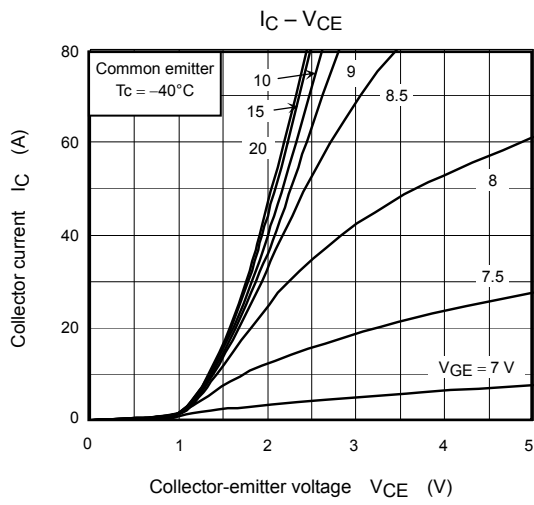
[[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

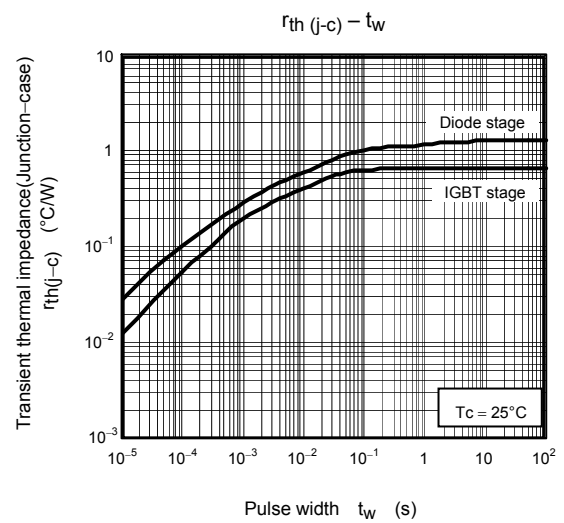
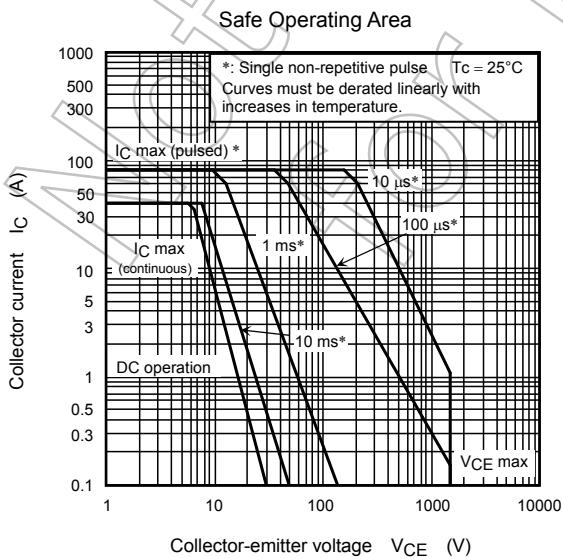
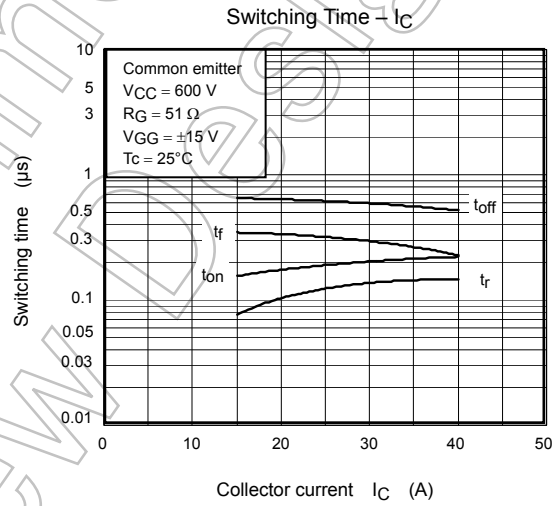
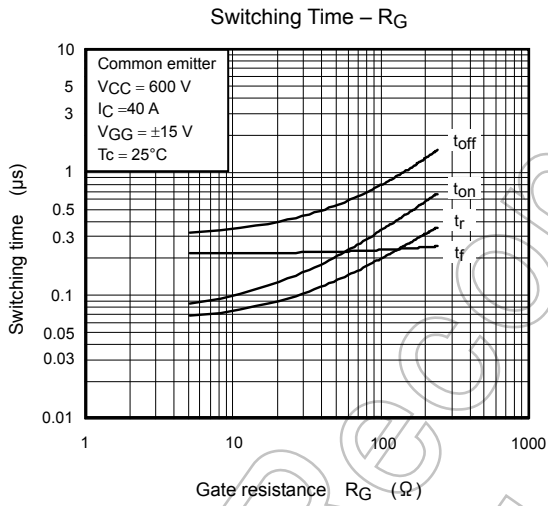
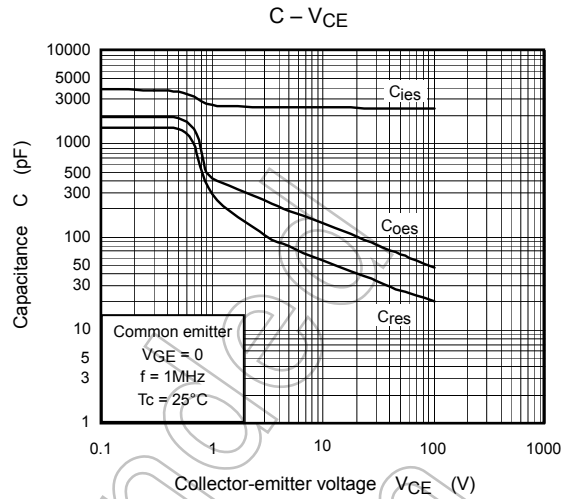
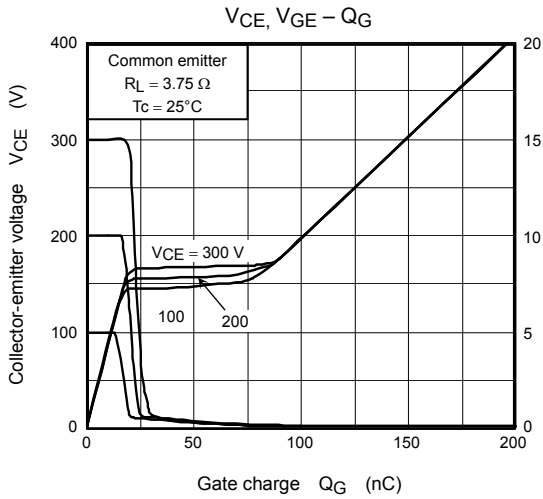
Equivalent Circuit

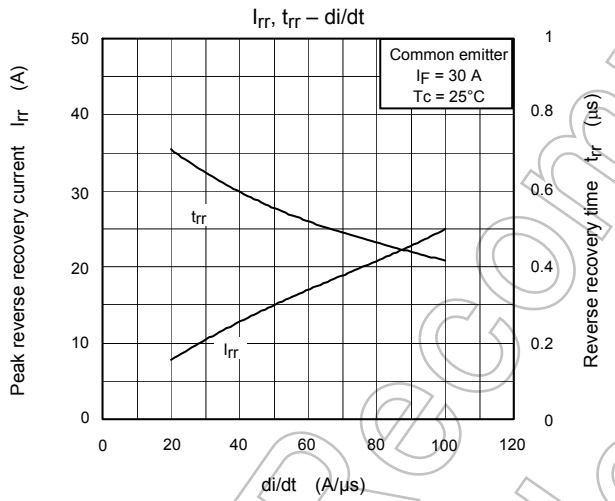
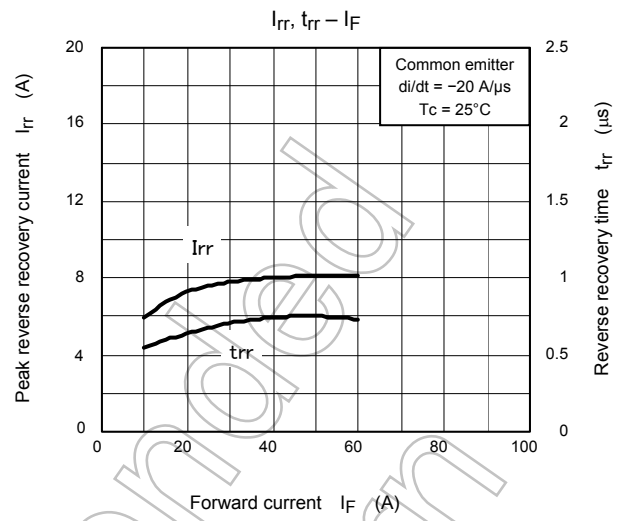
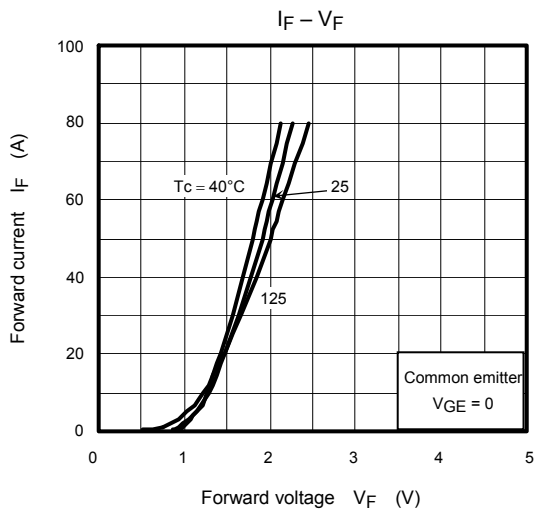


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