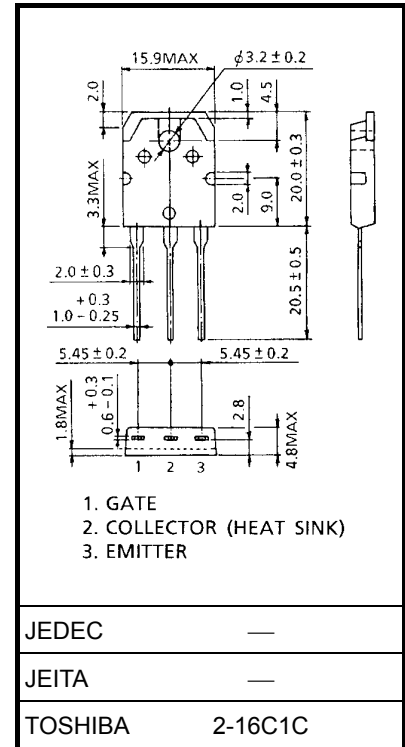


## GT50N322A

### Voltage Resonance Inverter Switching Application Fifth Generation IGBT

Unit: mm

- FRD included between emitter and collector
- Enhancement mode type
- High speed IGBT :  $t_f = 0.10 \mu s$  (typ.) ( $I_C = 60 A$ )  
FRD :  $t_{rr} = 0.8 \mu s$  (typ.) ( $di/dt = -20 A/\mu s$ )
- Low saturation voltage:  $V_{CE(sat)} = 2.2 V$  (typ.) ( $I_C = 60 A$ )



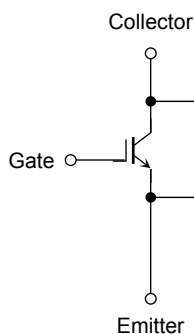
Weight: 4.6 g (typ.)

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

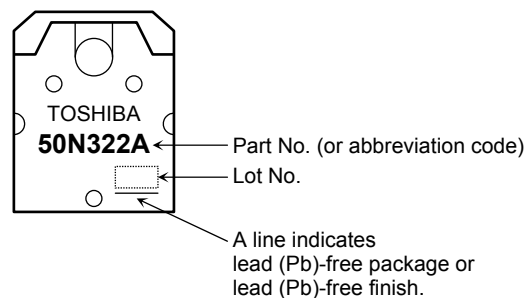
Characteristics		Symbol	Rating	Unit
Collector-emitter voltage		$V_{CES}$	1000	V
Gate-emitter voltage		$V_{GES}$	$\pm 25$	V
Collector current	DC	$I_C$	50	A
	1ms	$I_{CP}$	120	
Diode forward current	DC	$I_F$	15	A
	1ms	$I_{FP}$	120	
Collector power dissipation ( $T_c = 25^\circ C$ )		$P_C$	156	W
Junction temperature		$T_j$	150	$^\circ C$
Storage temperature		$T_{stg}$	-55 to 150	$^\circ C$

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.).

### Equivalent Circuit



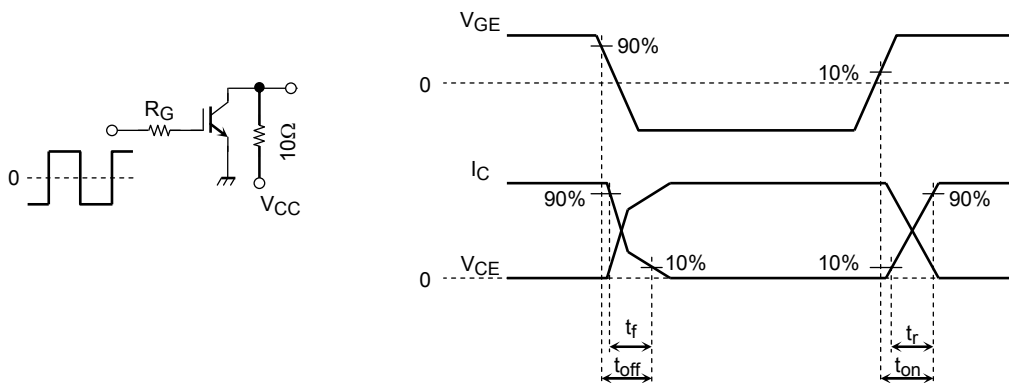
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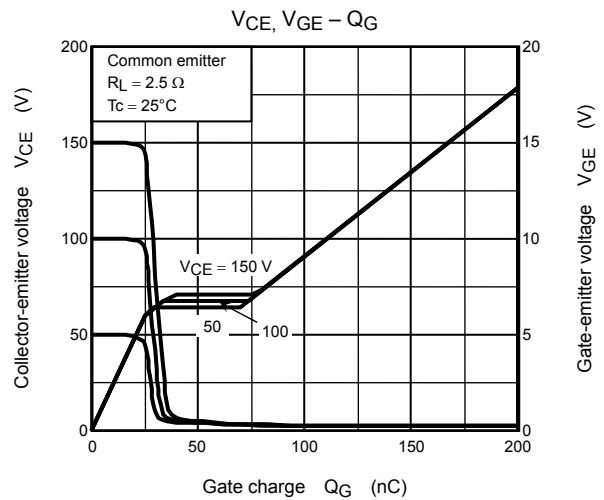
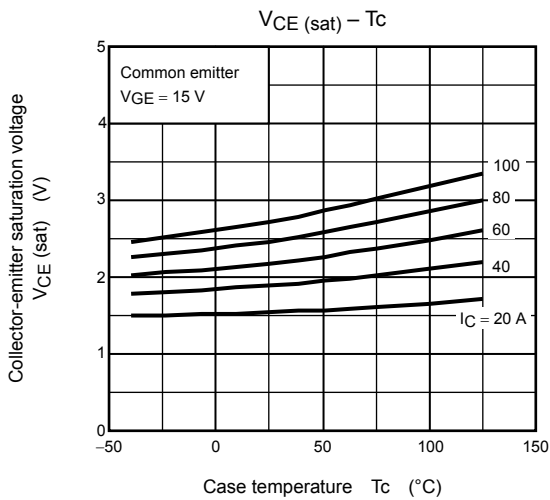
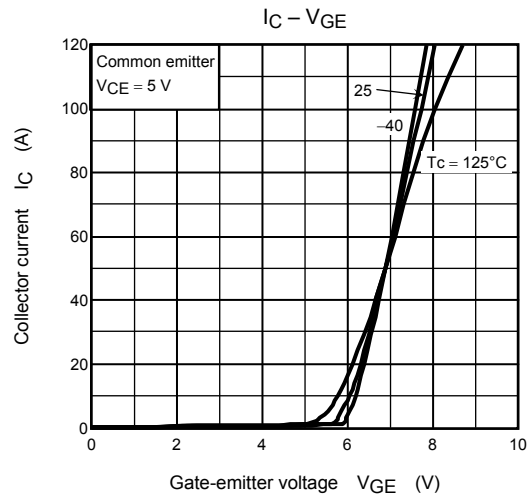
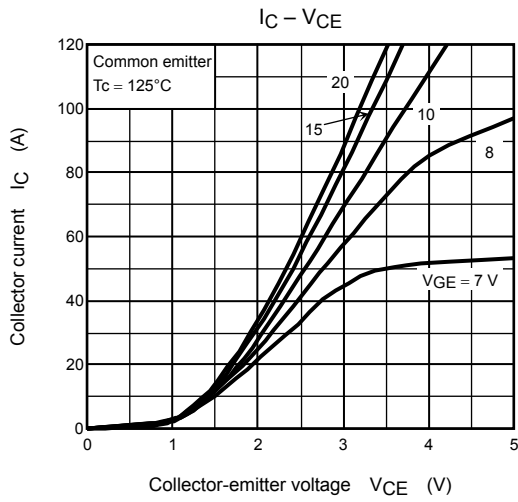
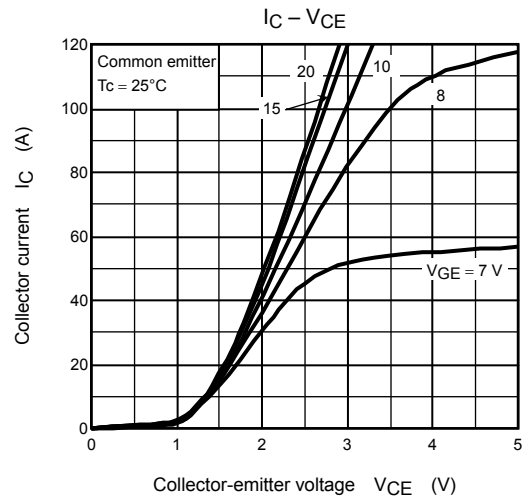
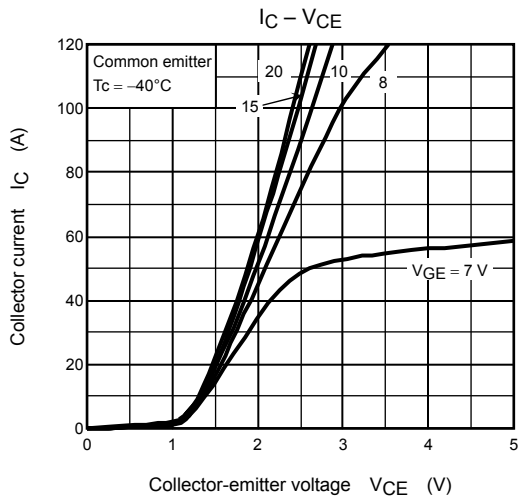


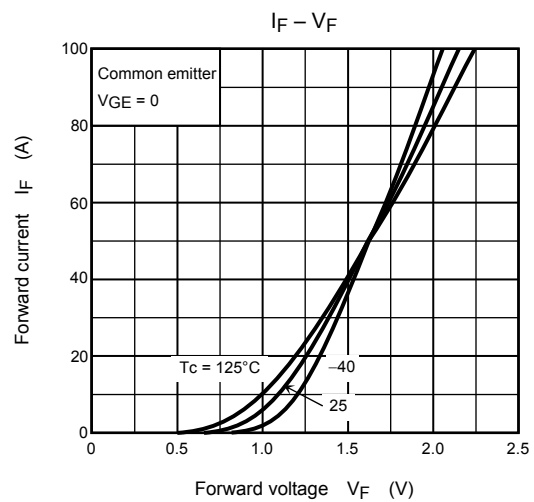
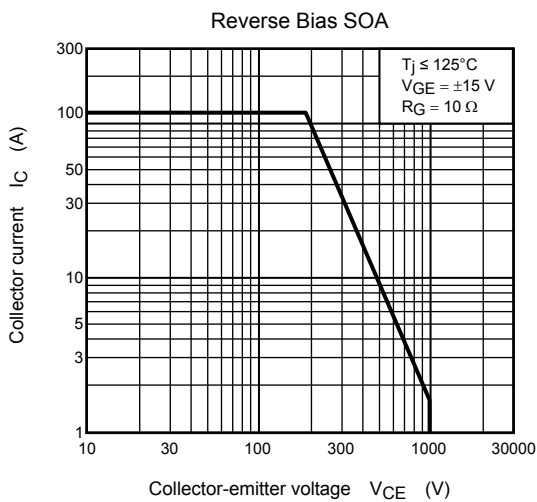
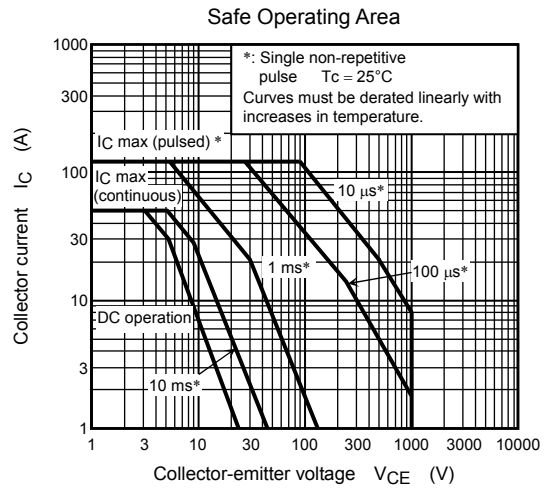
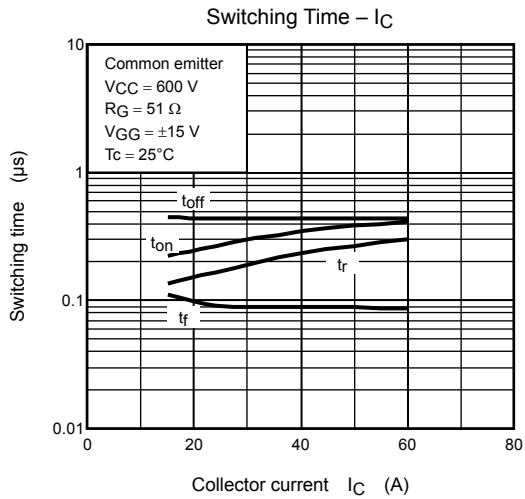
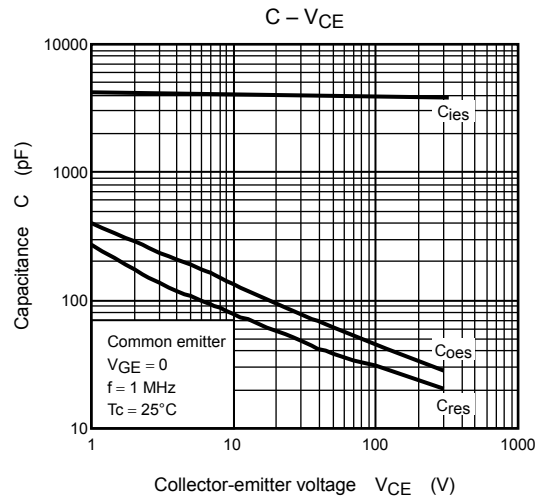
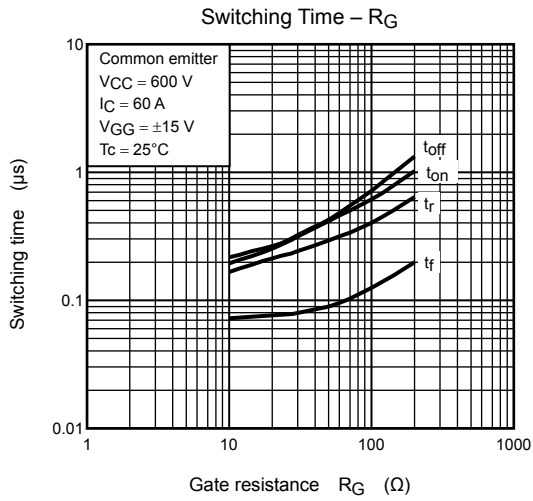
## Electrical Characteristics (Ta = 25°C)

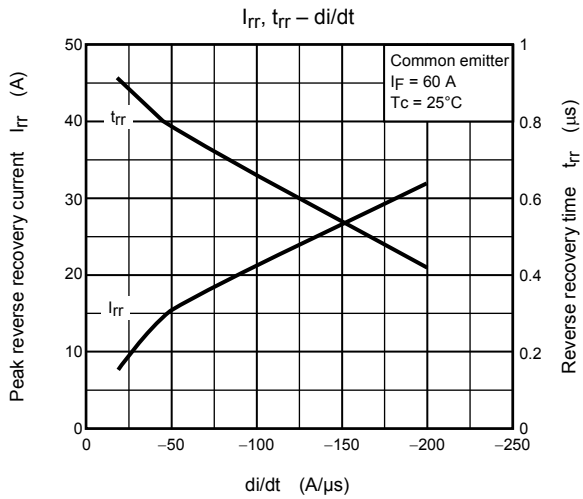
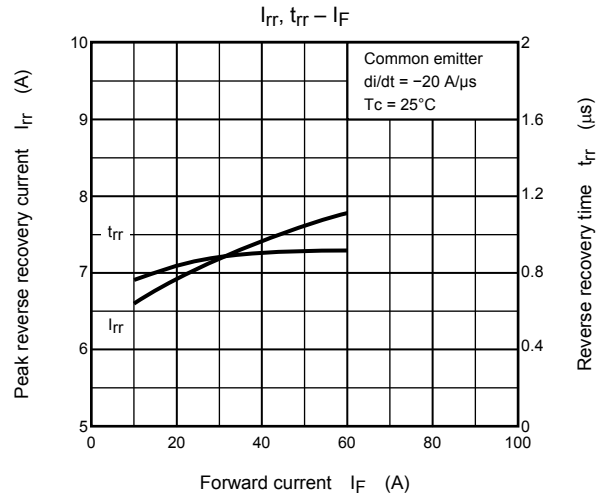
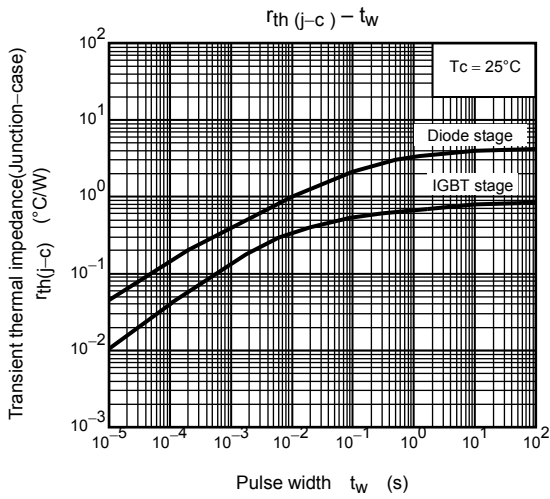
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		$I_{GES}$	$V_{GE} = \pm 25 \text{ V}, V_{CE} = 0$	—	—	$\pm 500$	nA
Collector cut-off current		$I_{CES}$	$V_{CE} = 1000 \text{ V}, V_{GE} = 0$	—	—	1.0	mA
Gate-emitter cut-off voltage		$V_{GE}(\text{OFF})$	$I_C = 60 \text{ mA}, V_{CE} = 5 \text{ V}$	3.0	—	6.0	V
Collector-emitter saturation voltage		$V_{CE}(\text{sat})$	$I_C = 60 \text{ A}, V_{GE} = 15 \text{ V}$	—	2.2	2.8	V
Input capacitance		$C_{ies}$	$V_{CE} = 10 \text{ V}, V_{GE} = 0, f = 1 \text{ MHz}$	—	4000	—	pF
Switching time	Rise time	$t_r$	Resistive Load $V_{CC} = 600 \text{ V}, I_C = 60 \text{ A}$ $V_{GG} = \pm 15 \text{ V}, R_G = 51 \Omega$  (Note 1)	—	0.23	—	$\mu\text{s}$
	Turn-on time	$t_{on}$		—	0.33	—	
	Fall time	$t_f$		—	0.10	0.25	
	Turn-off time	$t_{off}$		—	0.70	—	
Diode forward voltage		$V_F$	$I_F = 15 \text{ A}, V_{GE} = 0$	—	1.2	1.9	V
Reverse recovery time		$t_{rr}$	$I_F = 15 \text{ A}, V_{GE} = 0, di/dt = -20 \text{ A}/\mu\text{s}$	—	0.8	—	$\mu\text{s}$
Thermal Resistance		$R_{th(j-c)}$	—	—	—	0.8	$^{\circ}\text{C}/\text{W}$
Thermal Resistance		$R_{th(j-c)}$	—	—	—	4.0	$^{\circ}\text{C}/\text{W}$

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









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20070701-EN

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