

TOSHIBA Insulated Gate Bipolar Transistor Silicon N Channel IGBT

GT10G131

Strobe Flash Applications

- Supplied in compact and thin package requires only a small mounting area
- 5th generation (trench gate structure) IGBT
- Enhancement-mode
- 4-V gate drive voltage: $V_{GE} = 4.0 \text{ V (min)}$ (@ $I_C = 200 \text{ A}$)
- Peak collector current: $I_C = 200 \text{ A (max)}$
- Built-in zener diode between gate and emitter
- SOP-8 package

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

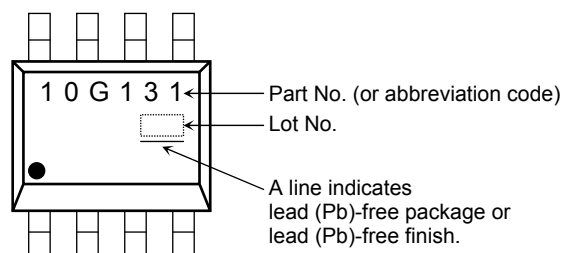
Characteristics	Symbol	Rating	Unit
Collector-emitter voltage	V_{CES}	400	V
Gate-emitter voltage	DC	V_{GES}	± 6
	Pulse	V_{GES}	± 8
Collector current	Pulse (Note 1)	I_{CP}	200
Collector power dissipation($t=10 \text{ s}$)	(Note 2a)	$P_C (1)$	1.9
	(Note 2b)	$P_C (2)$	1.0
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature range	T_{stg}	$-55 \sim 150$	$^\circ\text{C}$

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.).

Thermal Characteristics

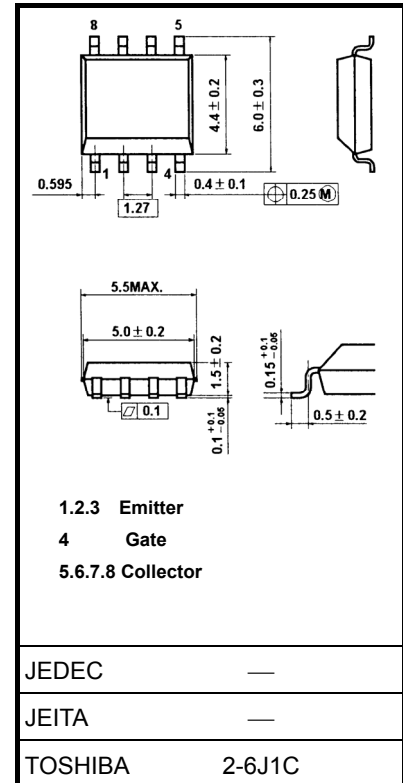
Characteristics	Symbol	Rating	Unit
Thermal resistance, junction to ambient ($t = 10 \text{ s}$) (Note2a)	$R_{th(j-a)} (1)$	65.8	$^\circ\text{C/W}$
Thermal resistance, junction to ambient ($t = 10 \text{ s}$) (Note2b)	$R_{th(j-a)} (2)$	125	$^\circ\text{C/W}$

Marking (Note 3)



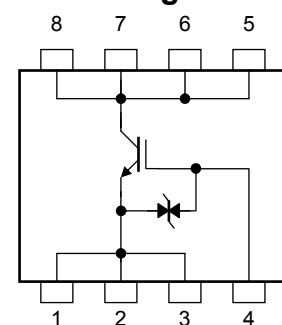
Note : For (Note 1) , (Note 2a) , (Note 2b) and (Note 3) , Please refer to the next page.

Unit: mm

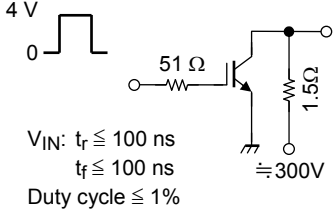


Weight: 0.08 g (typ.)

Circuit Configuration



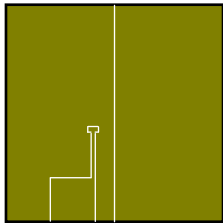
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GES}	$V_{GE} = \pm 6\text{ V}, V_{CE} = 0$	—	—	± 10	μA
Collector cut-off current		I_{CES}	$V_{CE} = 400\text{ V}, V_{GE} = 0$	—	—	10	μA
Gate-emitter cut-off voltage		$V_{GE(\text{OFF})}$	$I_C = 1\text{ mA}, V_{CE} = 5\text{ V}$	0.6	0.9	1.2	V
Collector-emitter saturation voltage		$V_{CE(\text{sat})}$	$I_C = 200\text{ A}, V_{GE} = 4\text{ V}$	—	2.3	—	V
Input capacitance		C_{ies}	$V_{CE} = 10\text{ V}, V_{GE} = 0, f = 1\text{ MHz}$	—	2800	—	pF
Switching time	Rise time	t_r	 $V_{IN}: t_r \leq 100\text{ ns}$ $t_f \leq 100\text{ ns}$ Duty cycle $\leq 1\%$	—	2.8	—	μs
	Turn-on time	t_{on}		—	3.1	—	
	Fall time	t_f		—	1.8	—	
	Turn-off time	t_{off}		—	2.0	—	

Note

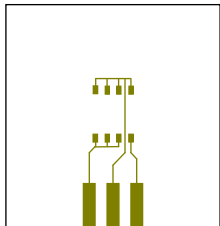
Note 1: Please use devices on condition that the junction temperature is below 150°C.
Repetitive rating: pulse width limited by maximum junction temperature.

Note 2a : Device mounted on
a glass-epoxy board (a)



for COLLECTOR
for EMITTER
for GATE

Note 2b : Device mounted on
a glass-epoxy board (b)



for GATE
for COLLECTOR
for EMITTER

Note 3: ○ on lower right of the marking indicates Pin 1.

※ Weekly code: (Three digits)



Week of manufacture
(01 for first week of year, continues up to 52 or 53)
Year of manufacture
(One low-order digits of calendar year)

※ Pb-Free Finish (Only a coating lead terminal) :
It is marking about an underline to a week of manufacture mark.



Caution on handling

This device is MOS gate type. Therefore , please care of a protection from ESD in your handling .

Caution in design

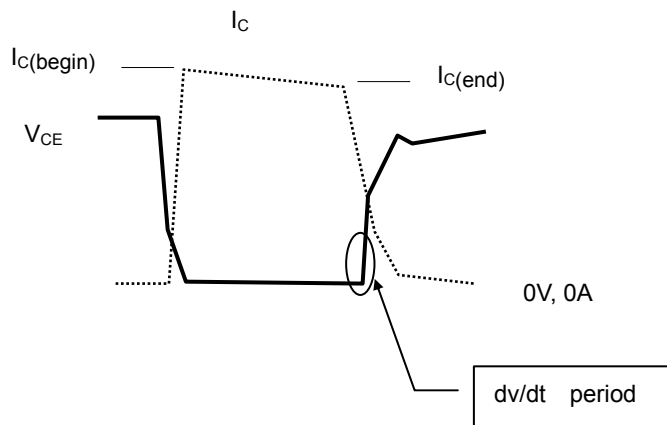
You should be design dV/dt value is below 400 V/μs when IGBT turn off.

●definition of dv/dt

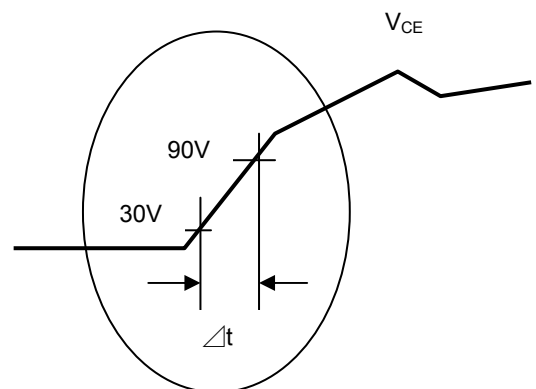
The slope of vce from 30v to 90v (attached figure.1)

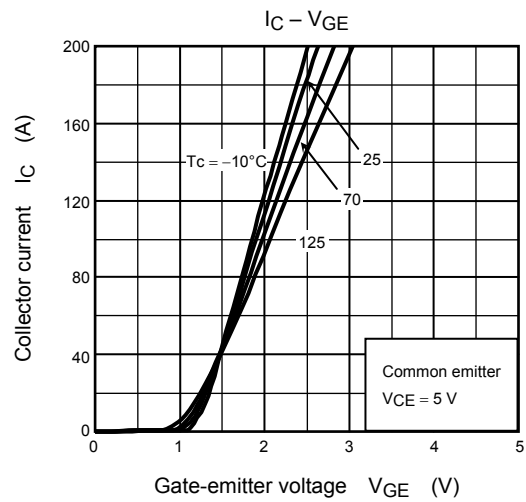
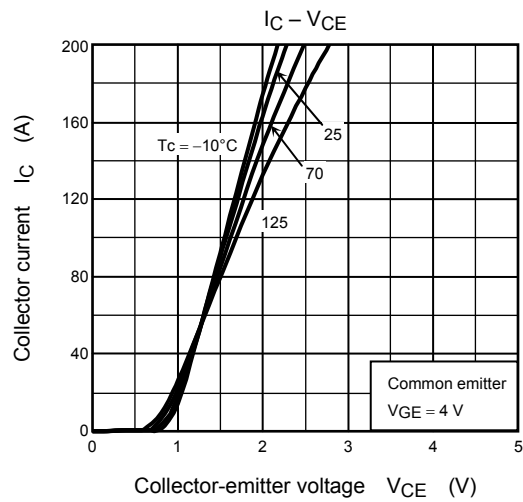
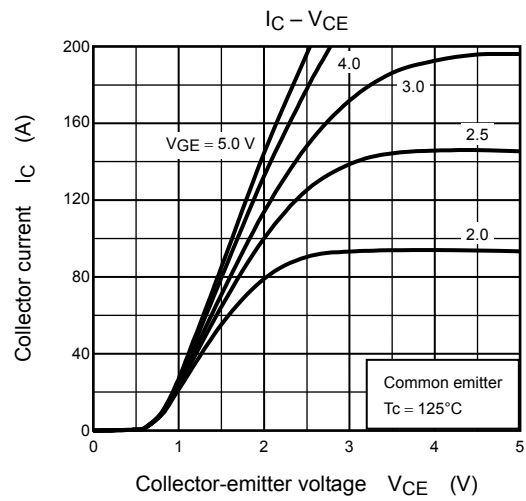
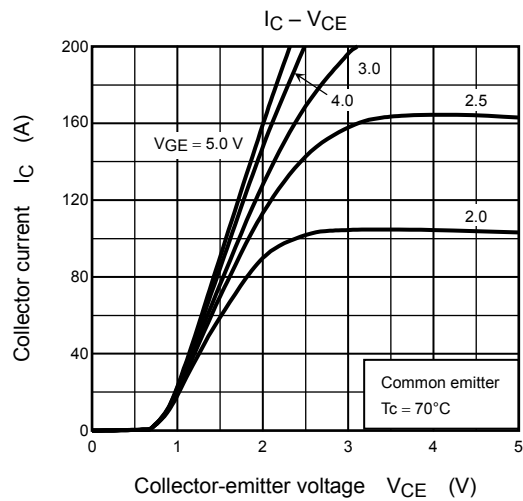
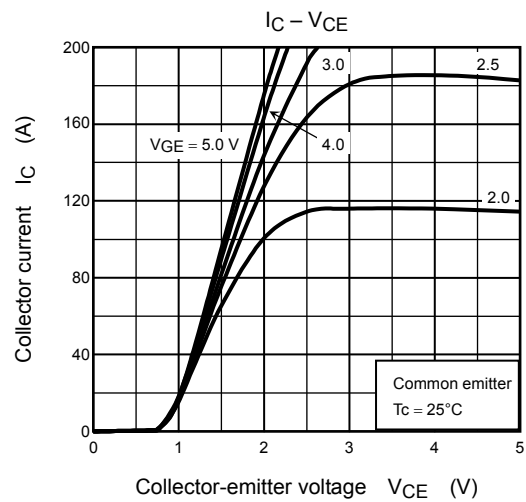
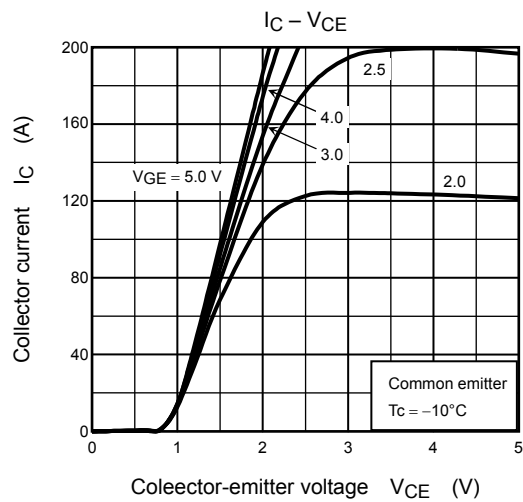
$$\begin{aligned} dv/dt &= (90V-30V) / (\Delta t) \\ &= 60V / \Delta t \end{aligned}$$

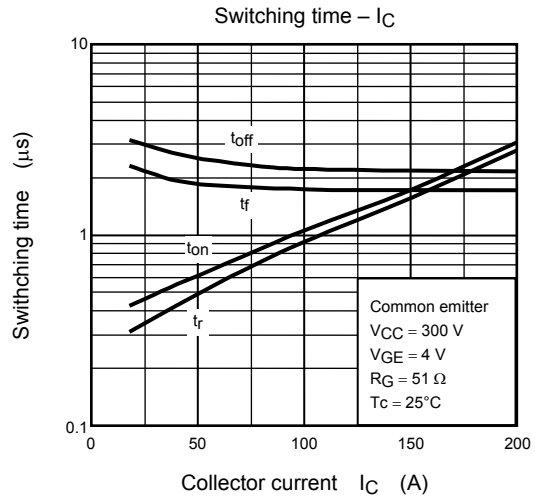
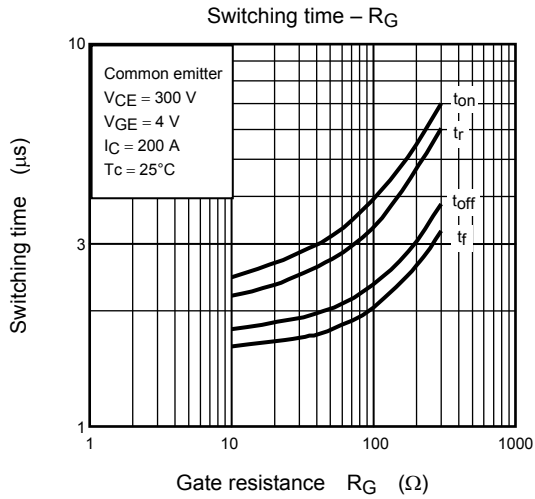
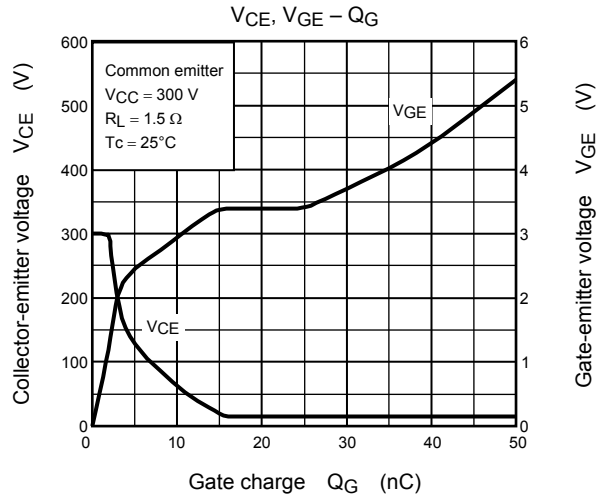
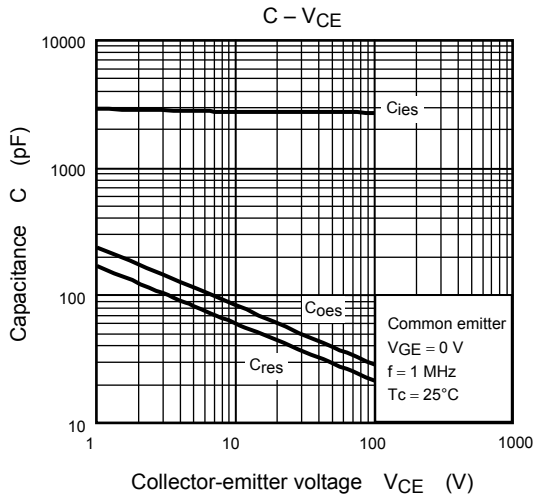
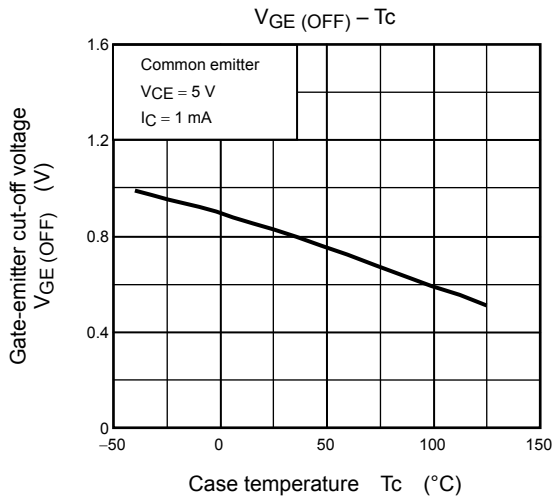
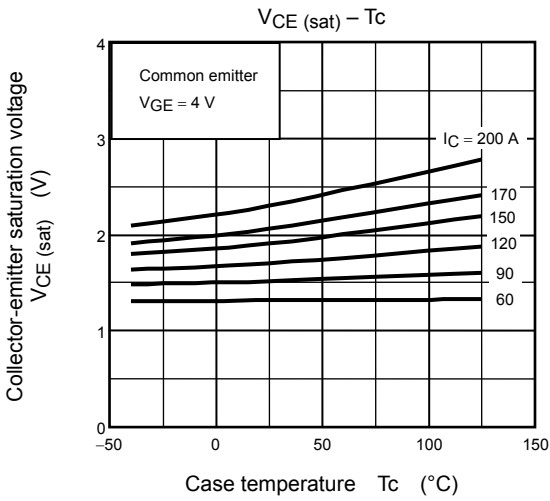
●waveform

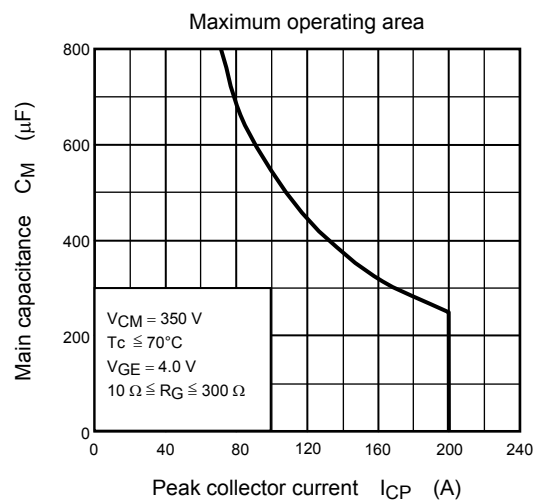
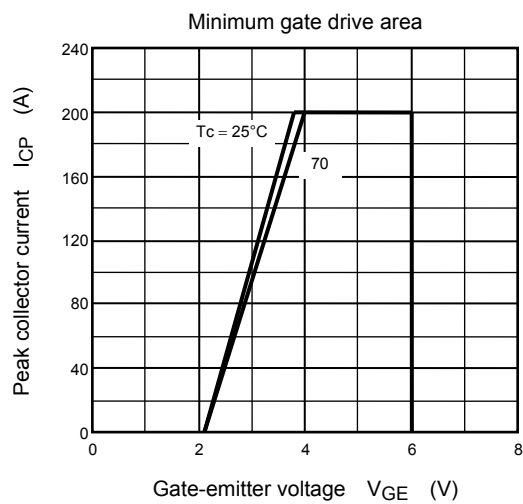


●waveform (expansion)









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