

TOSHIBA Insulated Gate Bipolar Transistor Silicon N Channel IGBT

# GT8G133

## Strobe Flash Applications

- Compact and Thin (TSSOP-8) package
- Enhancement-mode
- 4-V gate drive voltage:  $V_{GE} = 4.0 \text{ V (min)}$  (@ $I_C = 150 \text{ A}$ )
- Peak collector current:  $I_C = 150 \text{ A (max)}$

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

Characteristics	Symbol	Rating	Unit
Collector-emitter voltage	$V_{CES}$	400	V
Gate-emitter voltage	DC	$V_{GES}$	$\pm 6$
	Pulse	$V_{GES}$	$\pm 8$
Collector current	Pulse (Note 1)	$I_{CP}$	150
Collector power dissipation ( $t = 10 \text{ s}$ )	(Note 2a)	$P_C (1)$	1.1
	(Note 2b)	$P_C (2)$	0.6
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	$-55 \sim 150$	$^\circ\text{C}$

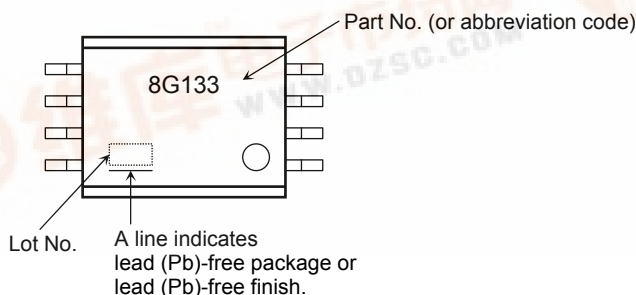
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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).

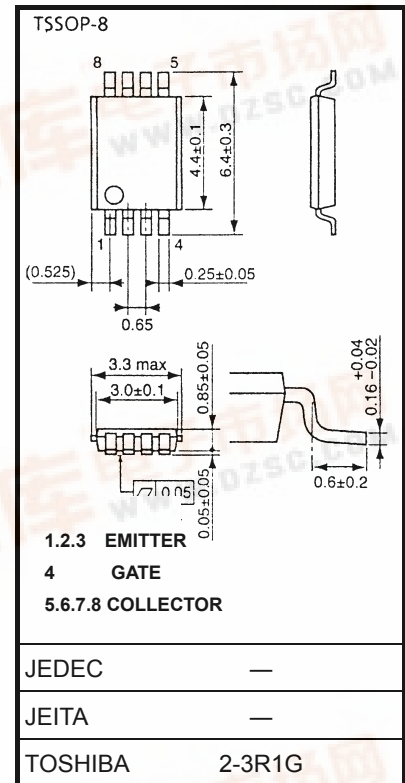
## Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal resistance, junction to ambient ( $t = 10 \text{ s}$ ) (Note2a)	$R_{th(j-a)} (1)$	114	$^\circ\text{C/W}$
Thermal resistance, junction to ambient ( $t = 10 \text{ s}$ ) (Note2b)	$R_{th(j-a)} (2)$	208	$^\circ\text{C/W}$

## Marking (Note 3)

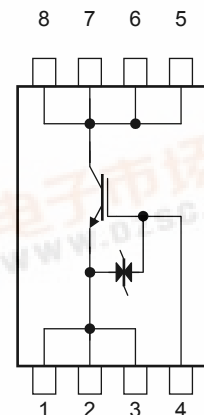


Unit: mm

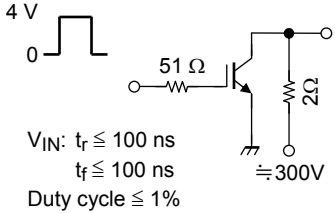


Weight: 0.035 g (typ.)

## Circuit Configuration



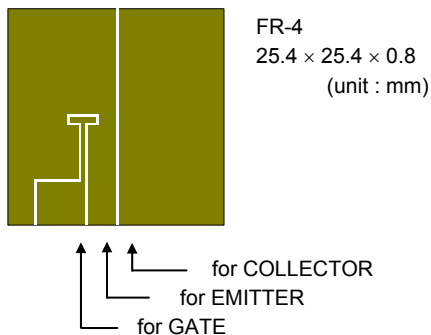
## Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		$I_{GES}$	$V_{GE} = \pm 6 \text{ V}, V_{CE} = 0$	—	—	$\pm 10$	$\mu\text{A}$
Collector cut-off current		$I_{CES}$	$V_{CE} = 400 \text{ V}, V_{GE} = 0$	—	—	10	$\mu\text{A}$
Gate-emitter cut-off voltage		$V_{GE}(\text{OFF})$	$I_C = 1 \text{ mA}, V_{CE} = 5 \text{ V}$	0.7	1.05	1.4	V
Collector-emitter saturation voltage		$V_{CE}(\text{sat})$	$I_C = 150 \text{ A}, V_{GE} = 4 \text{ V}$	—	2.9	—	V
Input capacitance		$C_{ies}$	$V_{CE} = 10 \text{ V}, V_{GE} = 0, f = 1 \text{ MHz}$	—	2500	—	pF
Switching time	Rise time	$t_r$		—	1.6	—	$\mu\text{s}$
	Turn-on time	$t_{on}$		—	1.7	—	
	Fall time	$t_f$		—	1.7	—	
	Turn-off time	$t_{off}$		—	2.0	—	

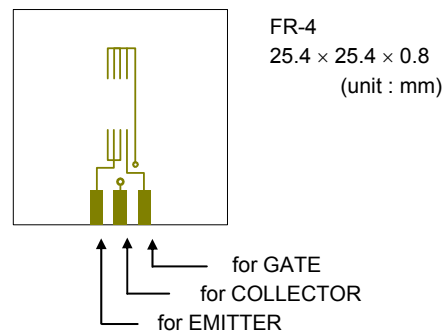
## Note

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)

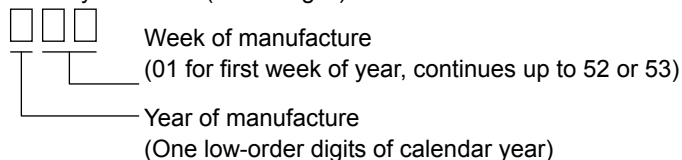


Note 2b : Device mounted on  
 a glass-epoxy board (b)



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

※ Weekly code: (Three digits)



※ 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

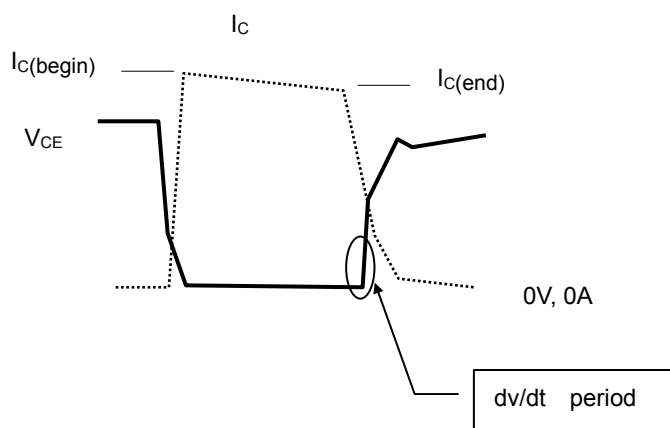
You should be design dV/dt value is below 400 V/μs when IGBT turn off.

### ●definition of dv/dt

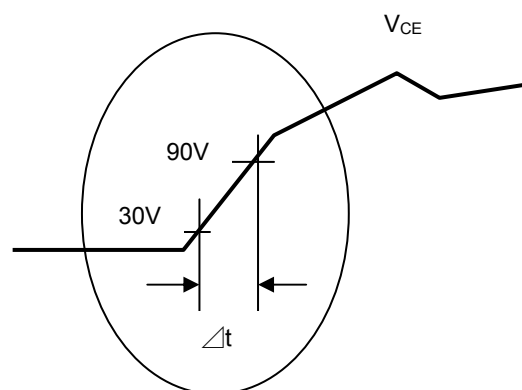
The slope of vce from 30v to 90v (attached figure.1)

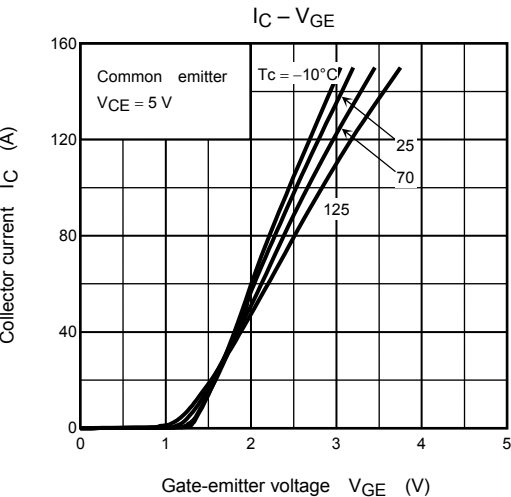
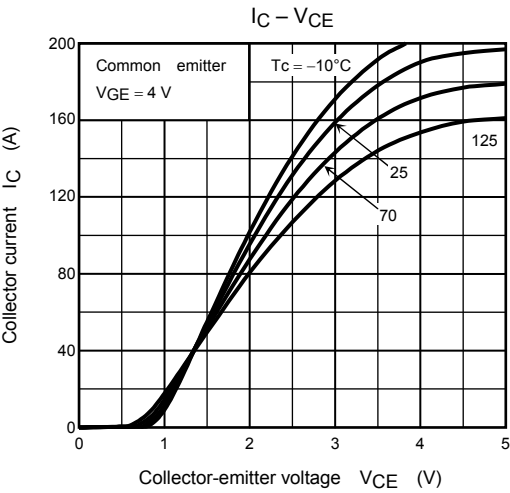
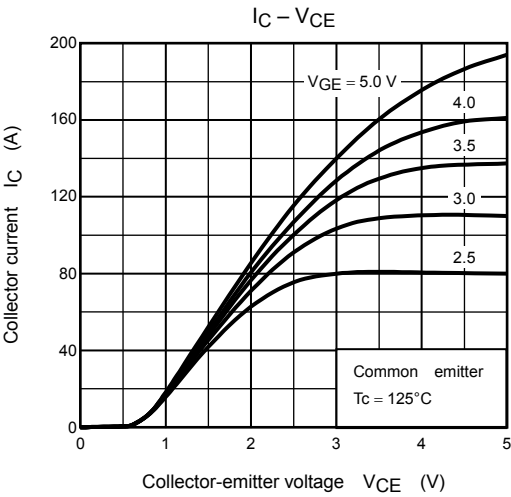
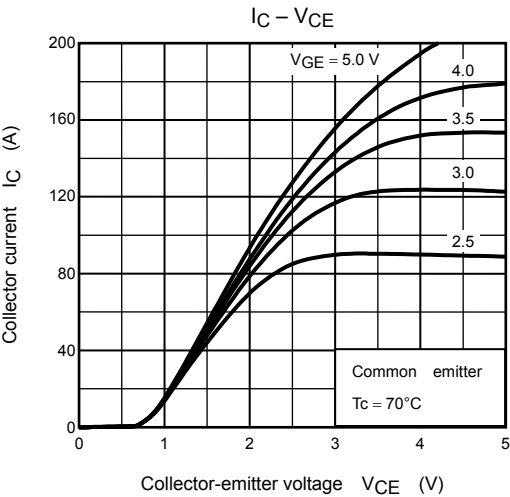
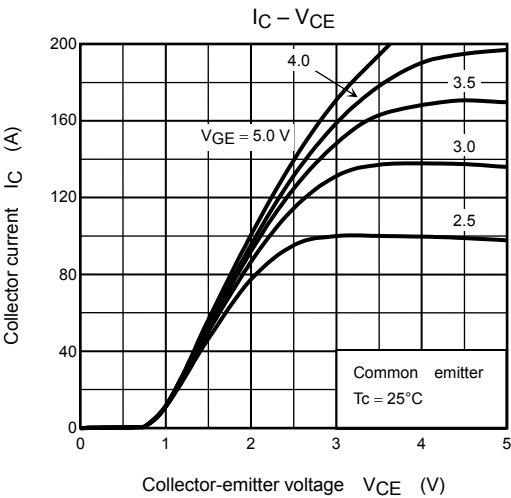
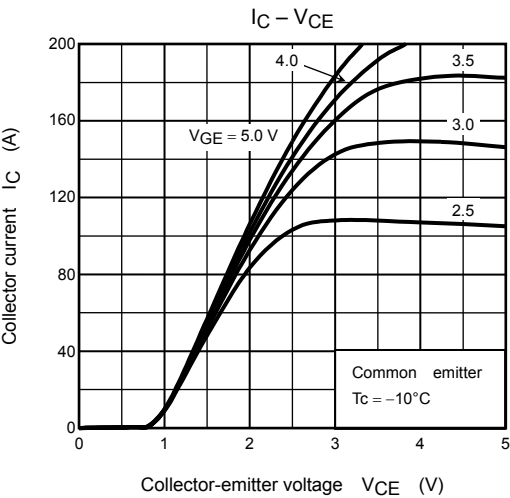
$$\begin{aligned} dv/dt &= (90V-30V) / (\Delta t) \\ &= 60V / \Delta t \end{aligned}$$

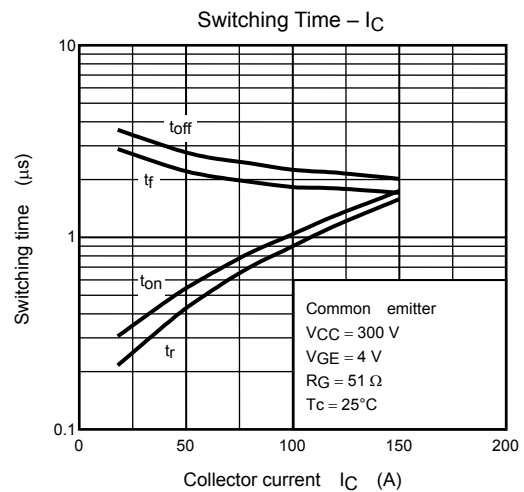
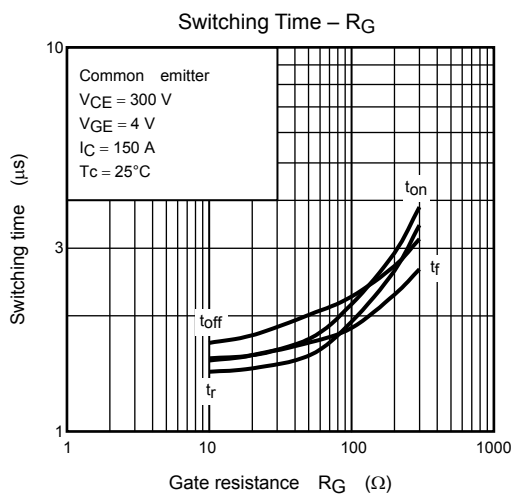
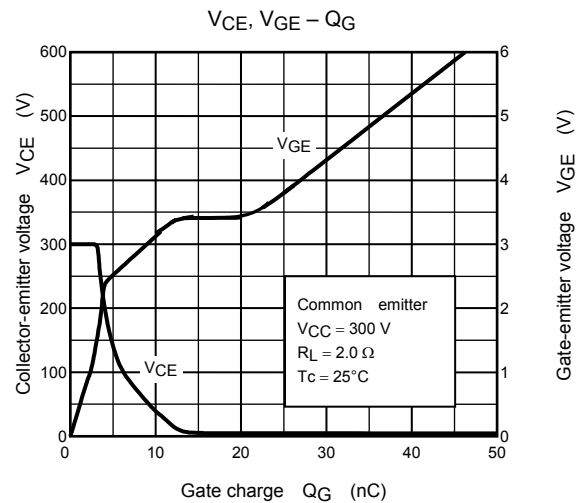
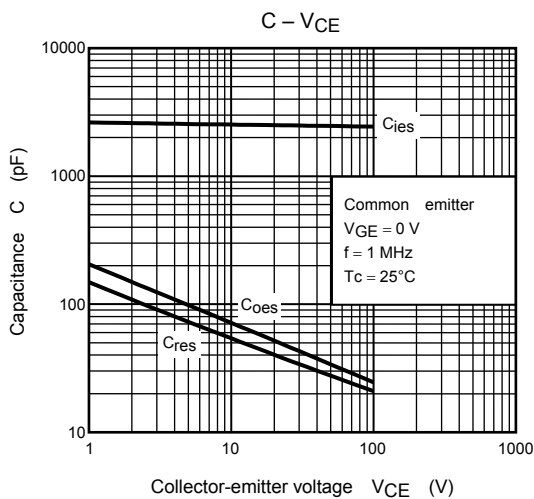
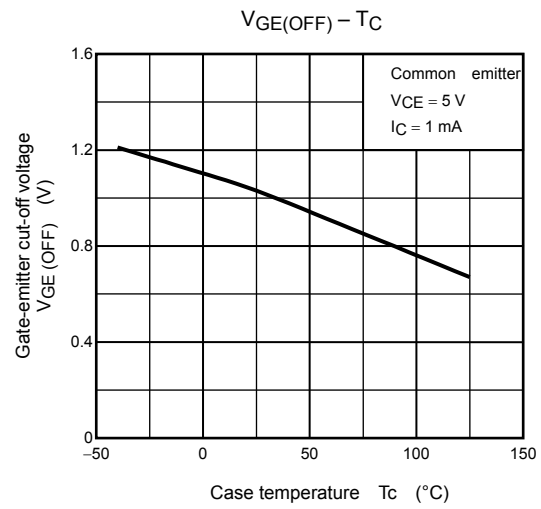
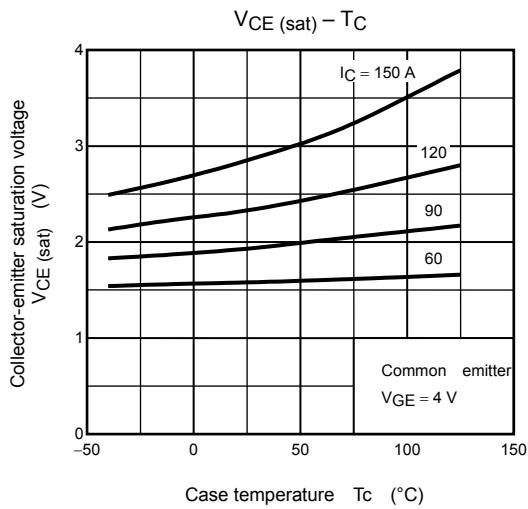
### ●waveform

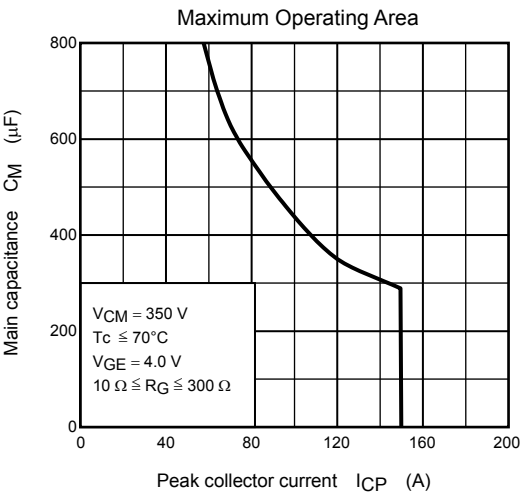
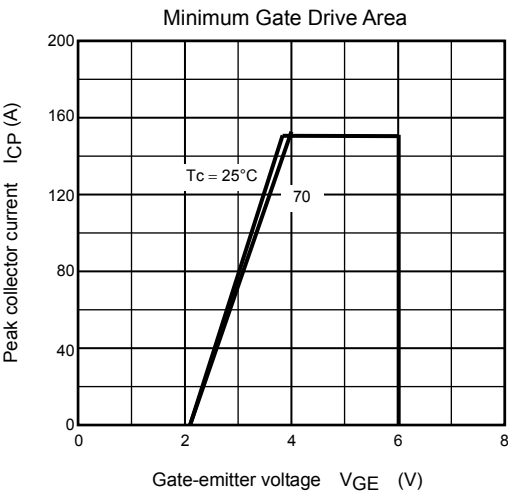


### ●waveform (expansion)









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