

TOSHIBA Insulated Gate Bipolar Transistor Silicon N Channel IGBT

# GT8G136

## Strobe Flash Applications

- Compact and Thin (TSSOP-8) package
- Enhancement-mode
- Peak collector current:  $I_C = 150\text{ A (max)}$   
 (@ $V_{GE}=3.0\text{V(min)}$ ,  $T_a=70^\circ\text{C(max)}$ )

## 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<br>(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                       | $T_{stg}$         | -55~150   | $^\circ\text{C}$ |

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.

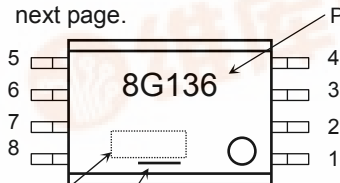
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

## 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    | $^\circ\text{C/W}$ |

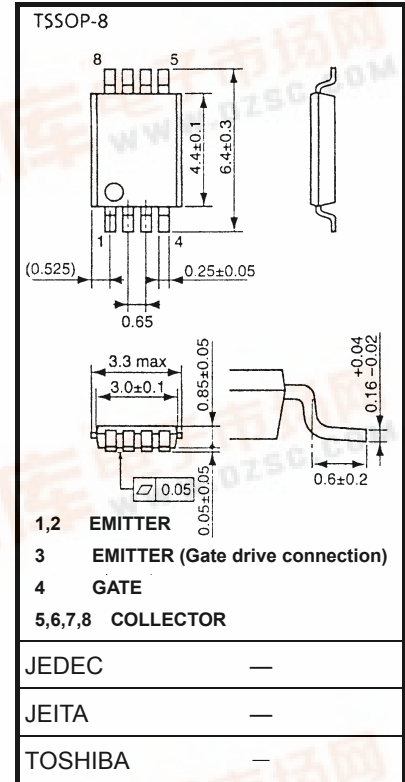
## Marking (Note 3)

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



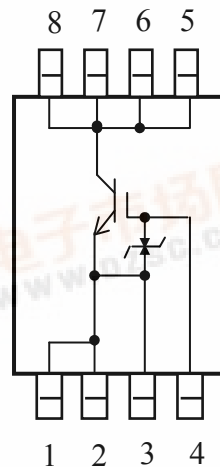
Lot No. A line indicates lead (Pb)-free package or lead (Pb)-free finish.

Unit: mm

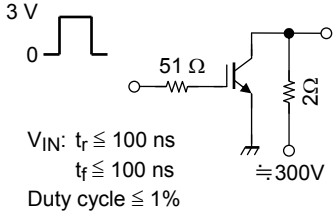


Weight: 0.035 g (typ.)

## Circuit Configuration



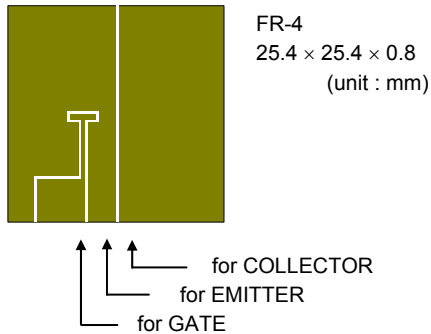
## Electrical Characteristics (Ta = 25°C)

| 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         |               | $V_{GE(\text{OFF})}$ | $I_C = 1\text{ mA}, V_{CE} = 5\text{ V}$   | 0.65 | 1.0  | 1.35     | V             |
| Collector-emitter saturation voltage |               | $V_{CE(\text{sat})}$ | $I_C = 150\text{ A}, V_{GE} = 3\text{ V}$  | —    | 3.5  | —        | V             |
| Input capacitance                    |               | $C_{ies}$            | $V_{CE} = 10\text{ V}, V_{GE} = 0, f = 1\text{ MHz}$                               | —    | 2500 | —        | pF            |
| Switching time                       | Rise time     | $t_r$                |  | —    | 1.5  | —        | $\mu\text{s}$ |
|                                      | Turn-on time  | $t_{on}$             |  | —    | 1.7  | —        |               |
|                                      | Fall time     | $t_f$                |  | —    | 1.6  | —        |               |
|                                      | Turn-off time | $t_{off}$            |  | —    | 1.9  | —        |               |

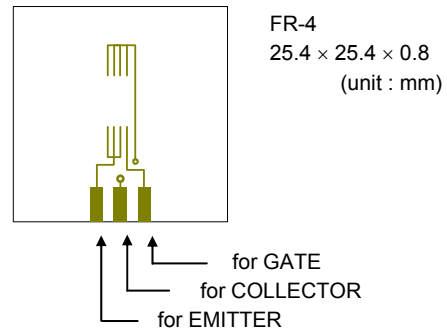
### Note

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)

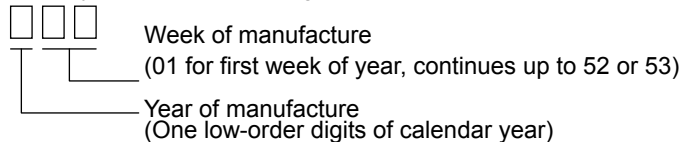


Note 2b : Device mounted on a glass-epoxy board (b)



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 under  $I_{cp}=150A$  is below  $400 V/\mu s$  when IGBT turn off under  $T_a=70^{\circ}C$  .  
 You should be design to don't flow collector current through terminal number 3 .

●definition of  $dv/dt$

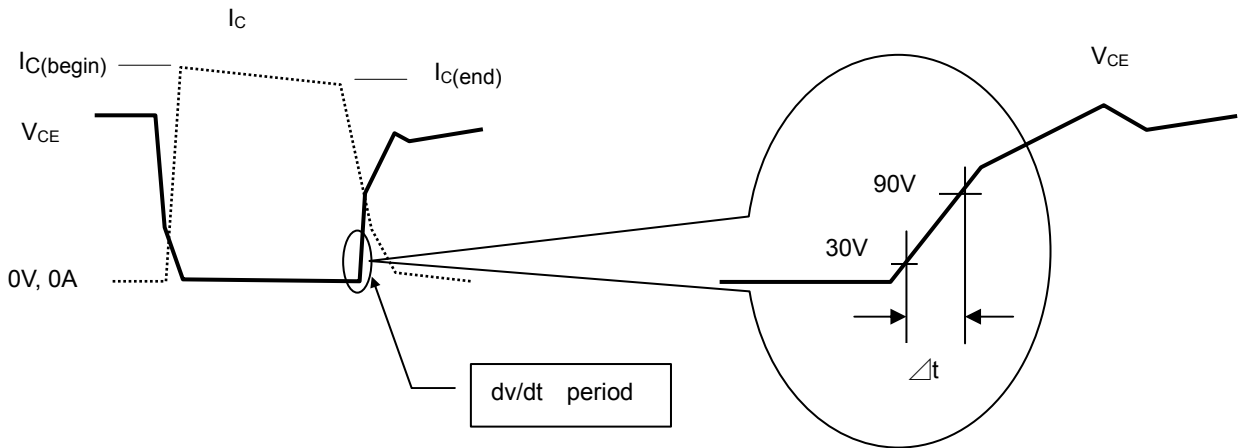
The slope of  $V_{CE}$  from 30v to 90v (attached figure.1)

$$dv/dt = (90V-30V) / (\Delta t)$$

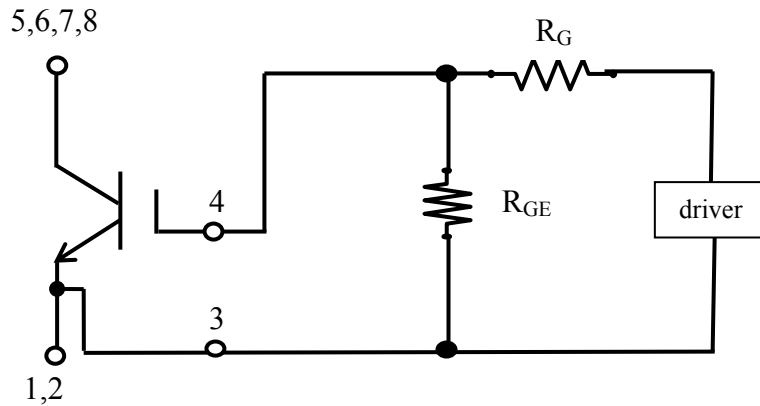
$$= 60V / \Delta t$$

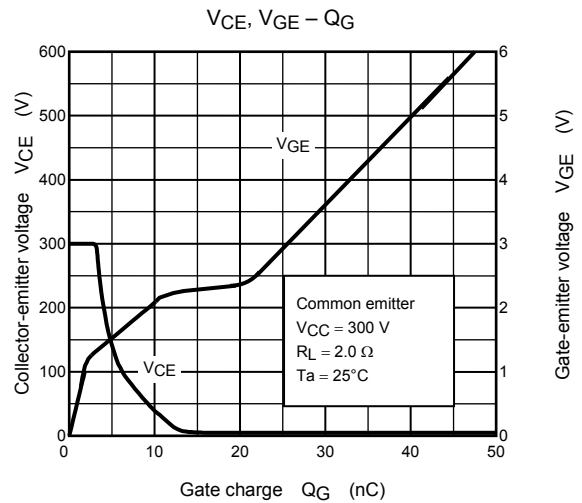
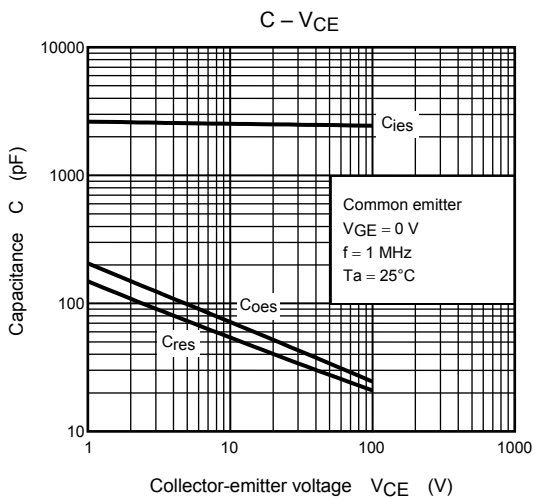
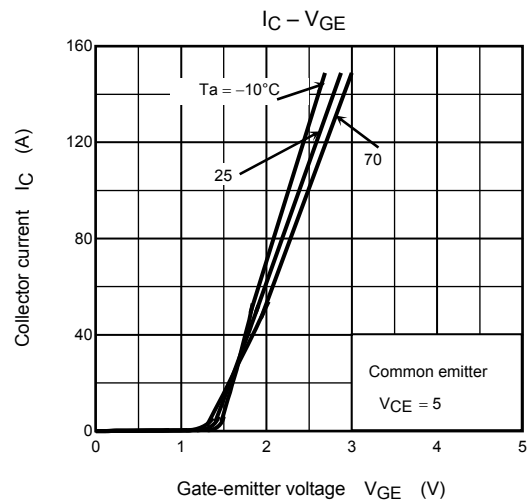
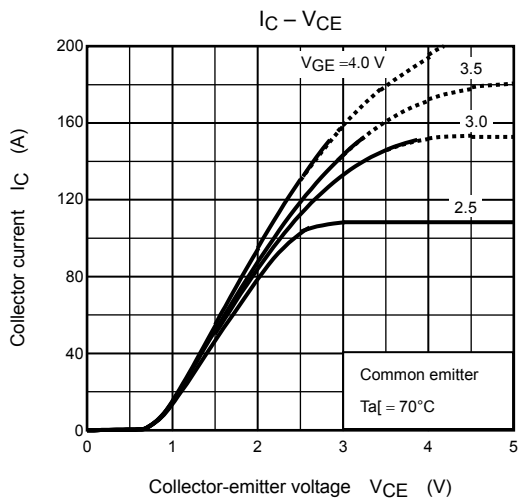
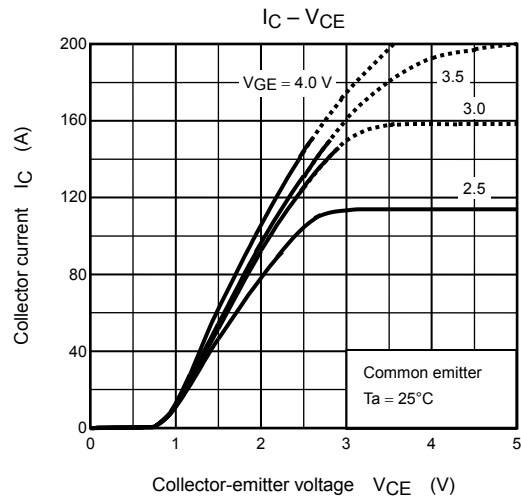
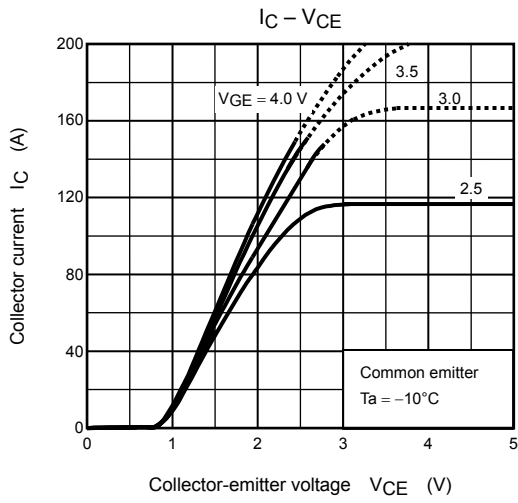
●waveform

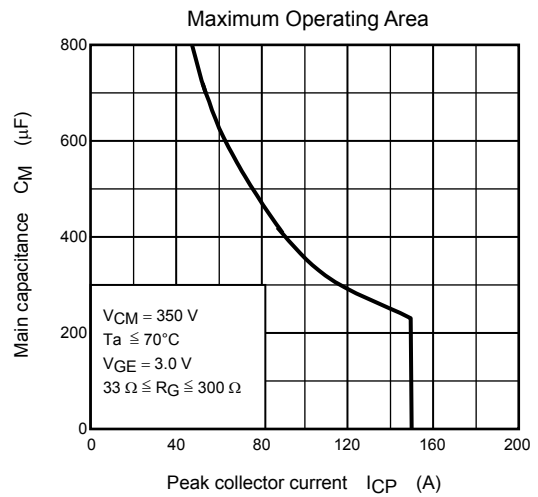
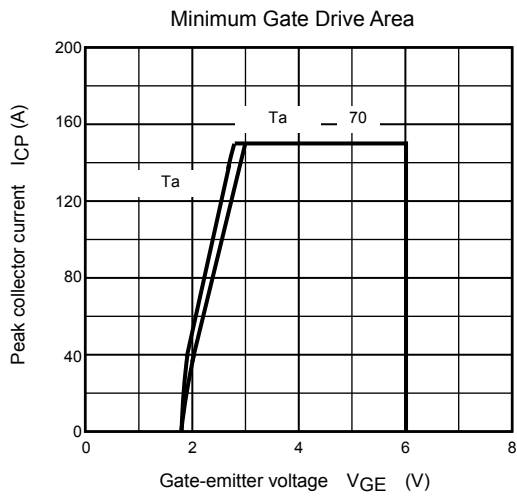
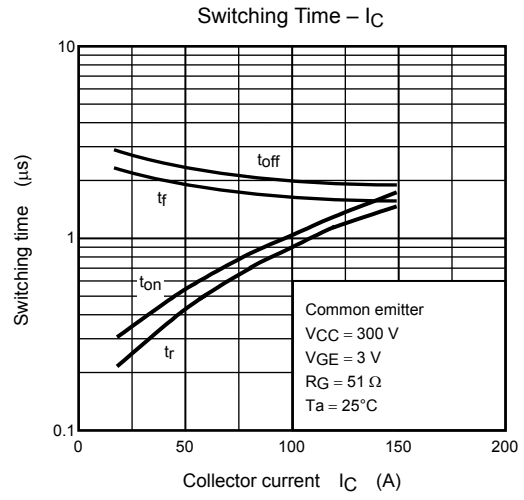
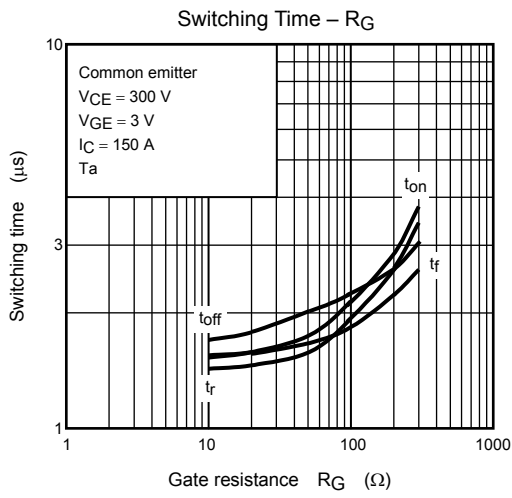
●waveform (expansion)



●Gate drive connection







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