TOSHIBA Insulated Gate Bipolar Transistor Silicon N Channel IGBT

GT5G131

Strobe Flash Applications

- 3-V gate drive voltage: V_{GE} = 3.0 V (min) (@I_C = 130 A)
- Supplied in compact and thin package requires only a small mounting area
- 5th generation (trench gate structure) IGBT
- Enhancement-mode
- Peak collector current: I_C = 130 A (max)

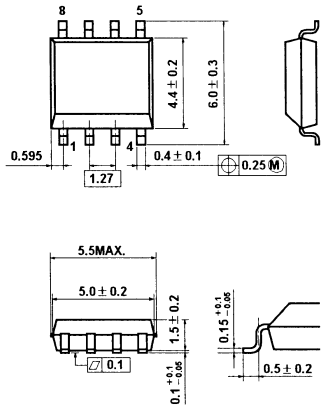
Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Collector-emitter voltage		V_{CES}	400	V
Gate-emitter voltage	DC	V_{GES}	±6	V
	Pulse	V_{GES}	±8	
Collector current	DC	I_C	5	A
	1 ms	I_{CP}	130	
Collector power dissipation	(Note 1)	P_C	1.1	W
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55~150	°C

Note 1: Drive operation: Mount on glass epoxy board [1 $inch^2$ × 1.5 t]

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).

Unit: mm

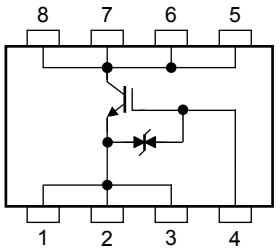


1, 2, 3 EMITTER
4 GATE
5, 6, 7, 8 COLLECTOR

JEDEC	—
JEITA	—
TOSHIBA	2-6J1C

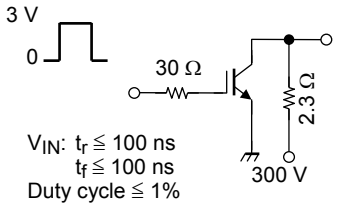
Weight: 0.080 g (typ.)

Equivalent Circuit



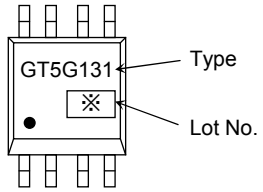
These devices are MOS type. Users should follow proper ESD handling procedures.
Operating condition of turn-off dv/dt should be lower than 400 V/μs.

Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GES}	V_{GE} = ±6 V, V_{CE} = 0	—	—	±10	μA
Collector cut-off current		I_{CES}	V_{CE} = 400 V, V_{GE} = 0	—	—	10	μA
Gate-emitter cut-off voltage		$V_{GE\ (OFF)}$	I_C = 1 mA, V_{CE} = 5 V	0.5	—	1.0	V
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = 130 A, V_{GE} = 3 V	—	2.2	7.0	V
Input capacitance		C_{ies}	V_{CE} = 10 V, V_{GE} = 0, f = 1 MHz	—	2800	—	pF
Switching time	Rise time	t_r		—	1.3	—	μs
	Turn-on time	t_{on}		—	1.4	—	
	Fall time	t_f		—	1.5	—	
	Turn-off time	t_{off}		—	1.8	—	
Thermal resistance	(Note 2)	$R_{th\ (j\text{-}a)}$	—	—	—	114	°C/W

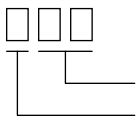
Note 2: Drive operation: Mount on glass epoxy board [1 $inch^2$ × 1.5 t]

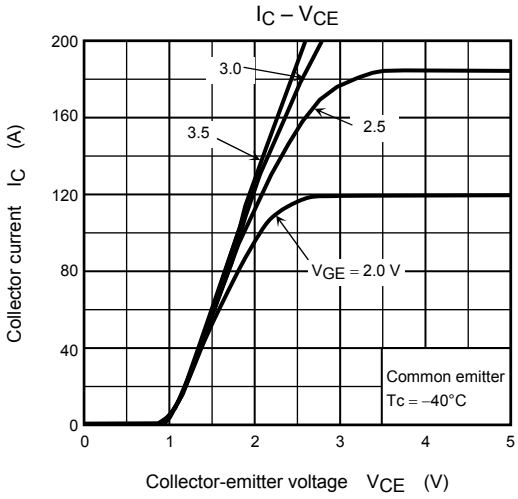
Marking

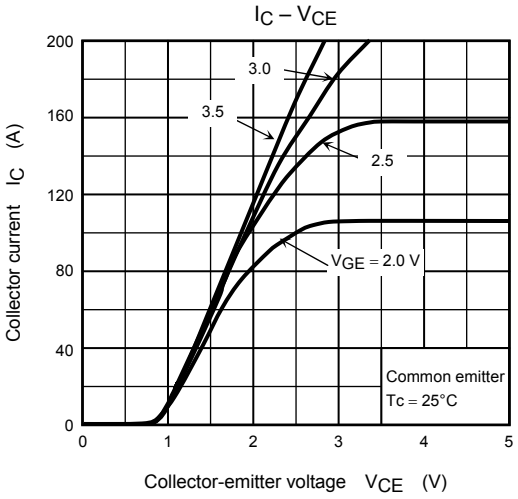


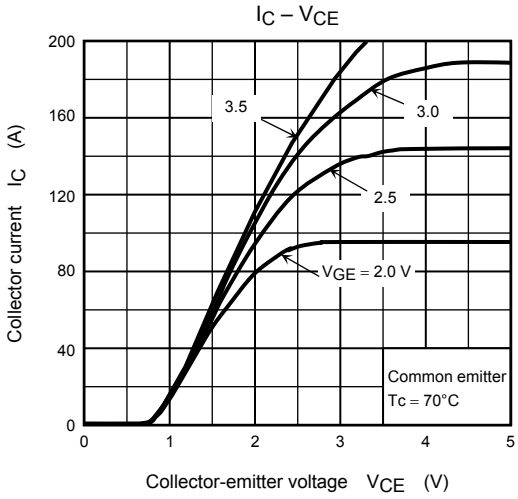
● on lower left of the marking indicates Pin 1.

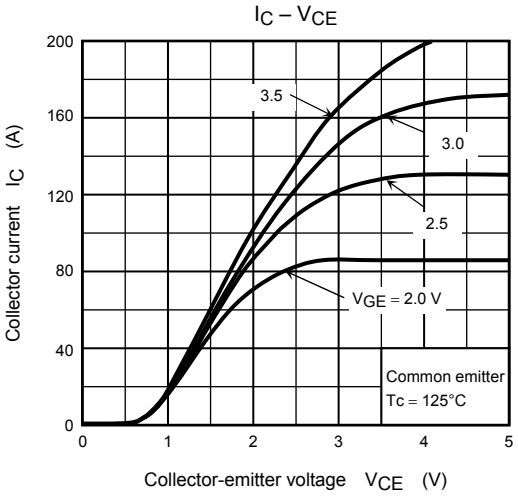
※ Weekly code: (Three digits)

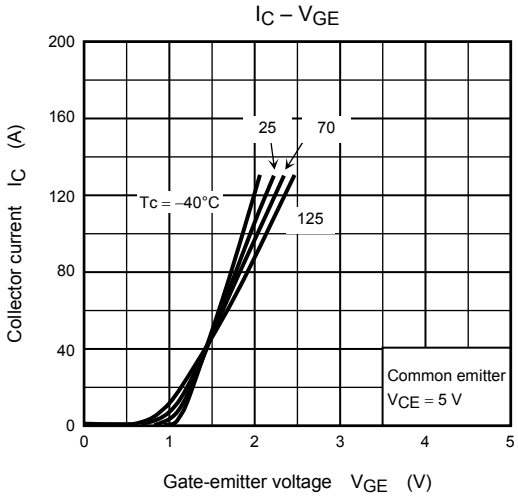


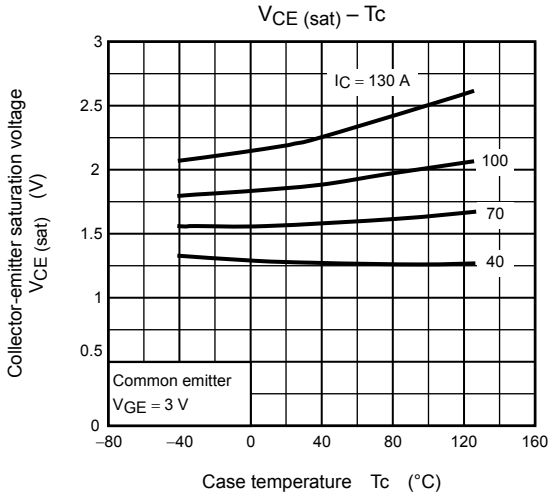

$I_C - V_{CE}$
Collector current I_C (A)
Collector-emitter voltage V_{CE} (V)
3.0
3.5
2.5
V_{GE} = 2.0 V
Common emitter
Tc = −40°C


$I_C - V_{CE}$
Collector current I_C (A)
Collector-emitter voltage V_{CE} (V)
3.0
3.5
2.5
V_{GE} = 2.0 V
Common emitter
Tc = 25°C

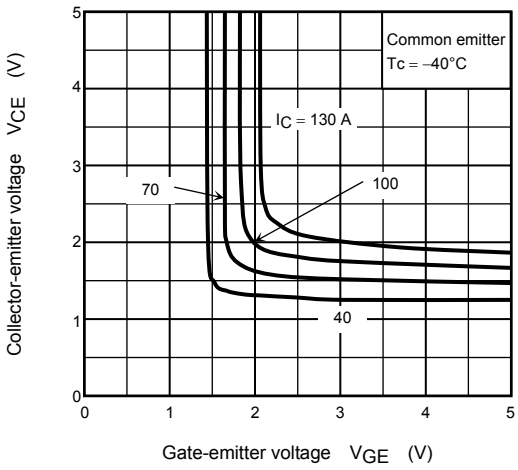

$I_C - V_{CE}$
Collector current I_C (A)
Collector-emitter voltage V_{CE} (V)
3.5
3.0
2.5
V_{GE} = 2.0 V
Common emitter
Tc = 70°C


$I_C - V_{CE}$
Collector current I_C (A)
Collector-emitter voltage V_{CE} (V)
3.5
3.0
2.5
V_{GE} = 2.0 V
Common emitter
Tc = 125°C

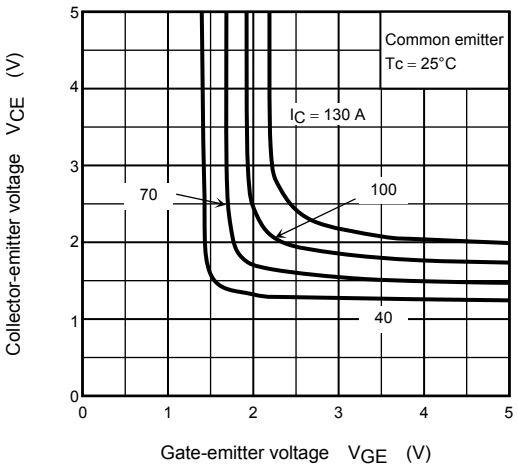

$I_C - V_{GE}$
Collector current I_C (A)
Gate-emitter voltage V_{GE} (V)
25
70
125
Tc = −40°C
Common emitter
V_{CE} = 5 V


$V_{CE\ (sat)} - Tc$
Collector-emitter saturation voltage $V_{CE\ (sat)}$ (V)
Case temperature Tc (°C)
I_C = 130 A
100
70
40
Common emitter
V_{GE} = 3 V

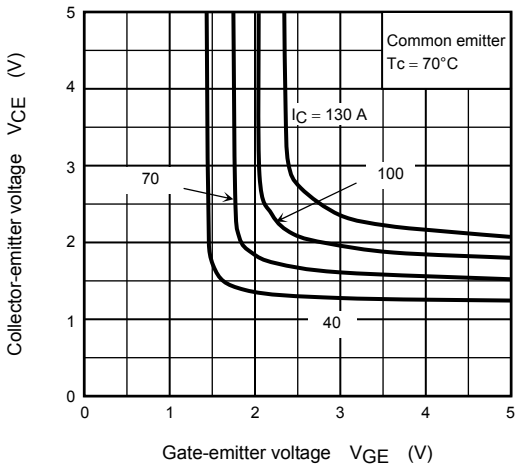
$V_{CE} - V_{GE}$



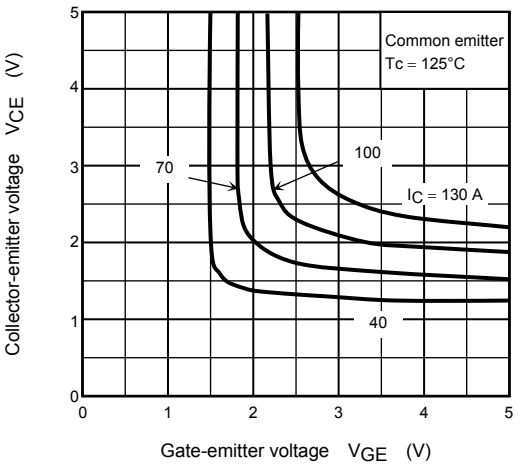
$V_{CE} - V_{GE}$



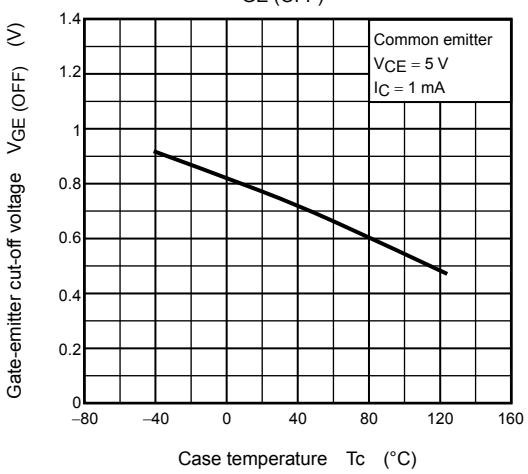
$V_{CE} - V_{GE}$



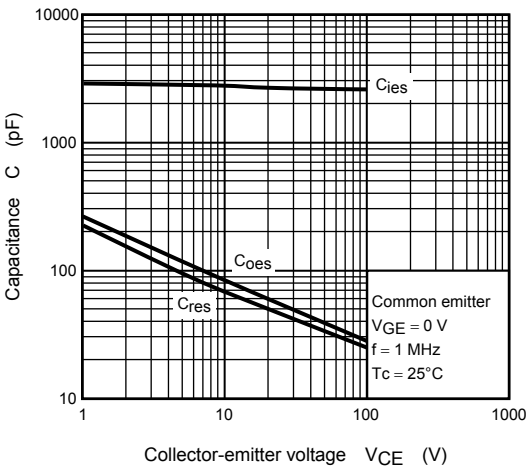
$V_{CE} - V_{GE}$



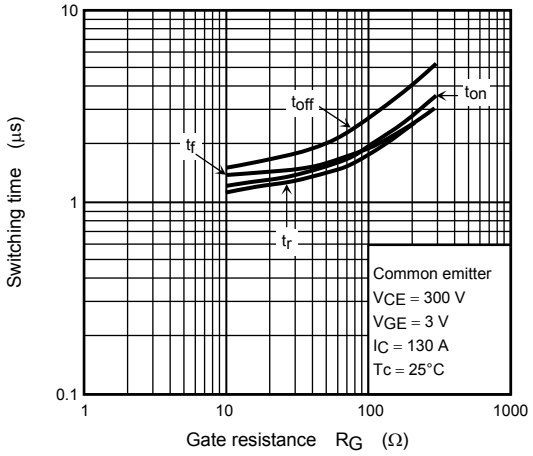
$V_{GE\ (OFF)} - Tc$



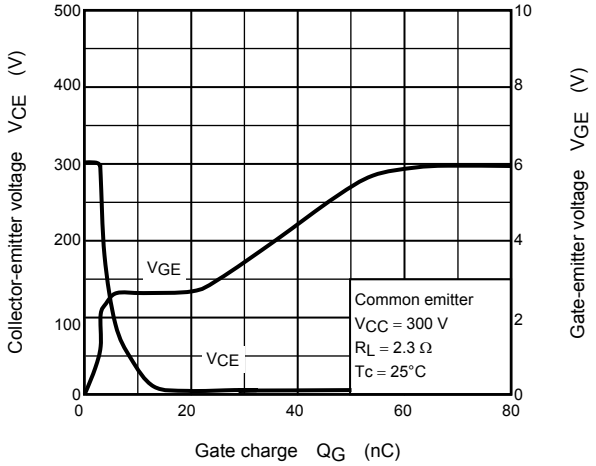
$C - V_{CE}$



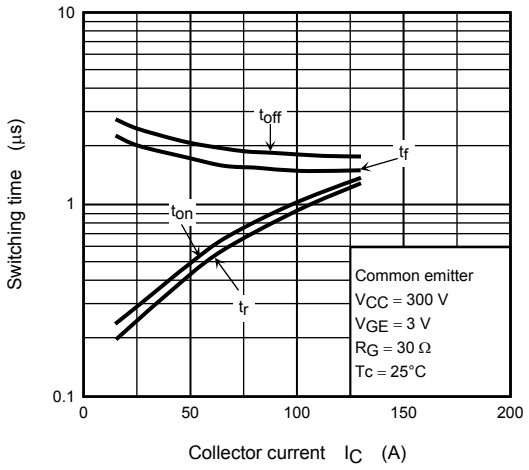
Switching Time – R_G



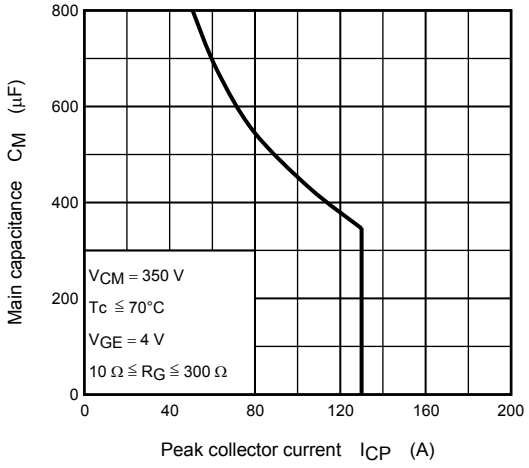
V_{CE}, V_{GE} – Q_G



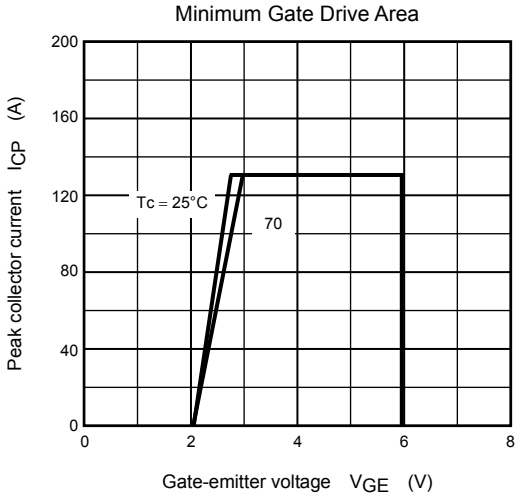
Switching Time – I_{CP}



Maximum Operating Area



Minimum Gate Drive Area



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20070701-EN

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