Discrete IGBTs Silicon N-Channel IGBT

GT30J122A

1. Applications

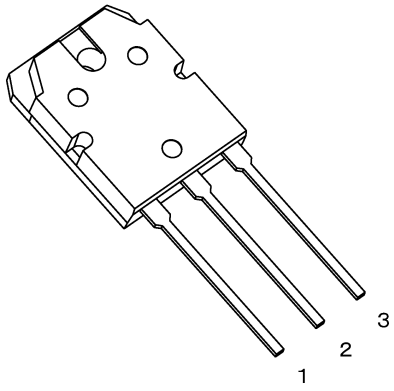
- Dedicated to Current-Resonant Inverter Switching Applications
- Dedicated to Partial-Switching Power Factor Correction (PFC) Applications

Note: The product(s) described herein should not be used for any other application.

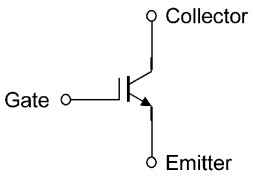
2. Features

(1) 4th generation
(2) Enhancement mode
(3) High-speed switching : t_f = 0.20 μs (typ.) (I_C = 50 A)
(4) Low saturation voltage : $V_{CE(sat)}$ = 1.7 V (typ.) (I_C = 50 A)

3. Packaging and Internal Circuit



TO-3P(N)



1 : Gate
2 : Collector
3 : Emitter

4. Absolute Maximum Ratings (Note) (T_a = 25°C, unless otherwise specified)

Characteristics	Symbol	Rating	Unit
Collector-emitter voltage	V_{CES}	600	V
Gate-emitter voltage	V_{GES}	±25	
Collector current (DC)	I_C	30	A
Collector current (1 ms)	I_{CP}	100	
Collector power dissipation (T_c = 25°C)	P_C	120	W
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-55 to 150	
Mounting torque	TOR	0.8	N · m

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).

In general, loss of IGBT increases more when it has positive temperature coefficient and gets higher temperature.
In case that the temperature rise due to loss of IGBT exceeds the heat release capacity of a device, it leads to thermorunaway and results in destruction.
Therefore, please design heat release of a device with due consideration to the temperature rise of IGBT.

5. Thermal Characteristics

Characteristics	Symbol	Max	Unit
Junction-to-case thermal resistance	$R_{th(j-c)}$	1.04	°C/W

6. Electrical Characteristics

6.1. Static Characteristics (T_a = 25°C, unless otherwise specified)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GES}	V_{GE} = ±25 V, V_{CE} = 0 V	—	—	±100	nA
Collector cut-off current	I_{CES}	V_{CE} = 600 V, V_{GE} = 0 V	—	—	1.0	mA
Gate-emitter cut-off voltage	$V_{GE(OFF)}$	I_C = 50 mA, V_{CE} = 5 V	3.0	—	6.0	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	I_C = 50 A, V_{GE} = 15 V	—	1.7	2.8	

6.2. Dynamic Characteristics (T_a = 25°C, unless otherwise specified)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Input capacitance	C_{ies}	V_{CE} = 10 V, V_{GE} = 0 V, f = 1 MHz	—	2500	—	pF
Switching time (rise time)	t_r	Resistive load V_{CC} = 300 V, I_C = 50 A, V_{GG} = ±15 V, R_G = 39 Ω See Fig. 6.2.1, 6.2.2.	—	0.20	—	μs
Switching time (turn-on time)	t_{on}		—	0.30	—	
Switching time (fall time)	t_f		—	0.20	0.40	
Switching time (turn-off time)	t_{off}		—	0.50	—	

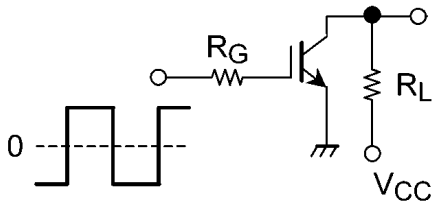


Fig. 6.2.1 Test Circuit of Switching Time

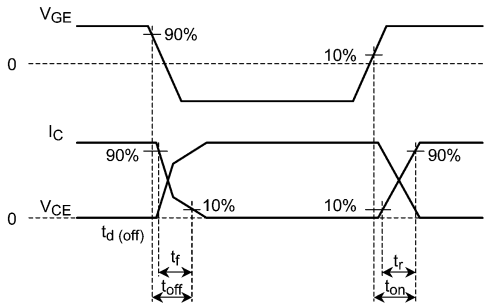


Fig. 6.2.2 Timing Chart of Switching Time

7. Marking (Note)

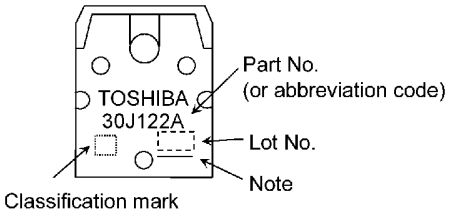


Fig. 7.1 Marking

Note: A line under a Lot No. identifies the indication of product Labels.
[[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]
Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product.
The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Note: This transistor is sensitive to electrostatic discharge and should be handled with care.

8. Characteristics Curves (Note)

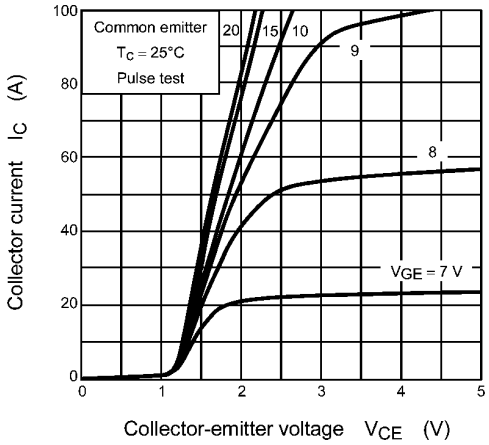


Fig. 8.1 I_C - V_{CE}

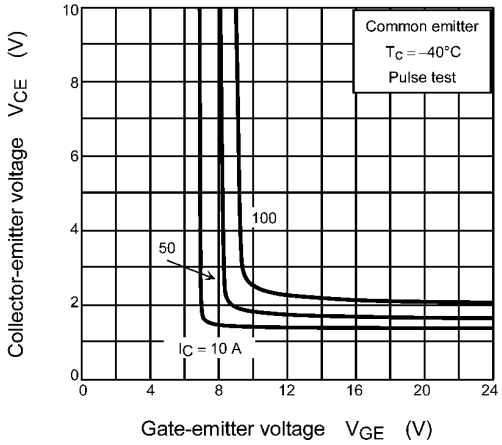


Fig. 8.2 V_{CE} - V_{GE}

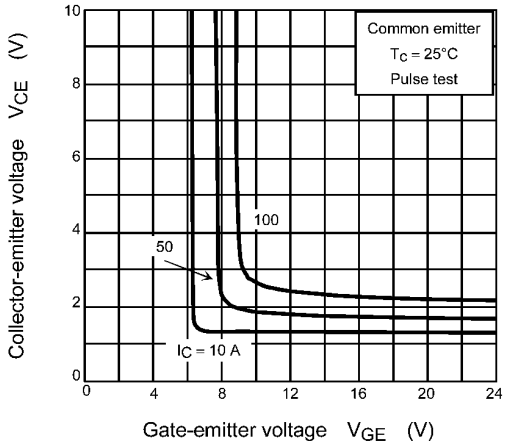


Fig. 8.3 V_{CE} - V_{GE}

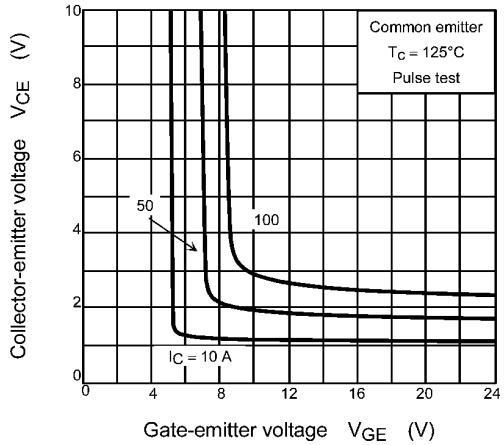


Fig. 8.4 V_{CE} - V_{GE}

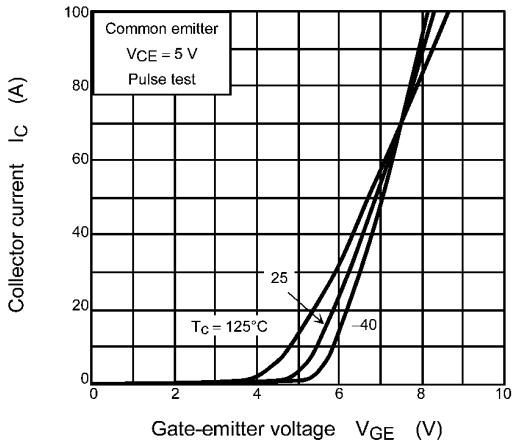


Fig. 8.5 I_C - V_{GE}

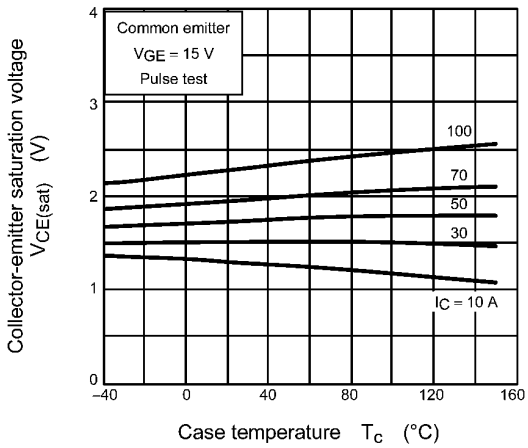


Fig. 8.6 $V_{CE(sat)}$ - T_C

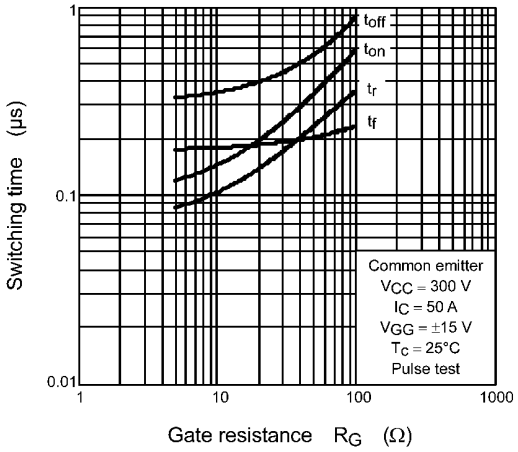


Fig. 8.7 Switching Time - R_G

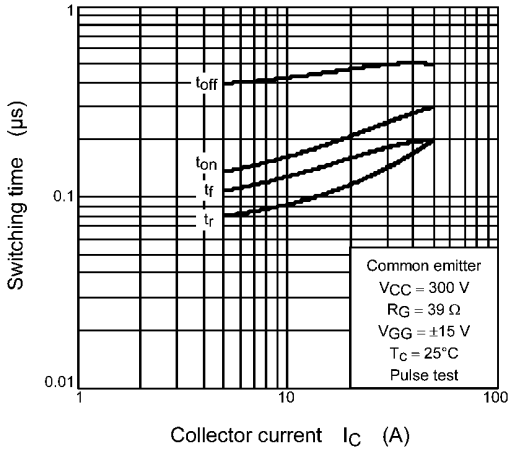


Fig. 8.8 Switching Time - I_C

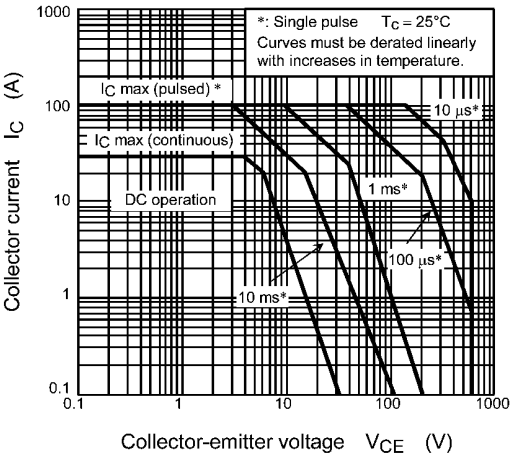


Fig. 8.9 Safe Operating Area (Guaranteed Maximum)

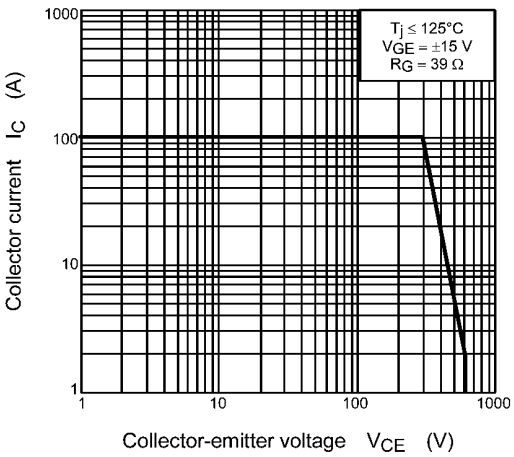


Fig. 8.10 Reverse Bias SOA (Guaranteed Maximum)

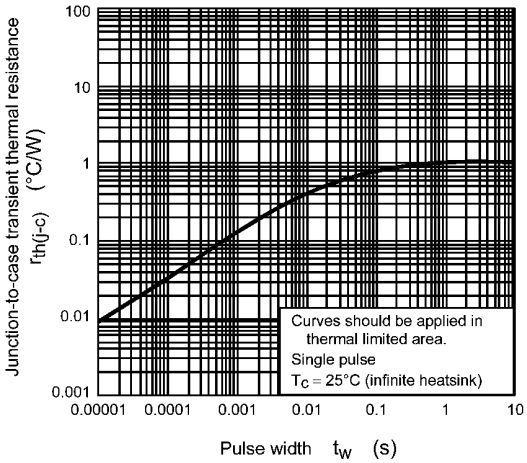
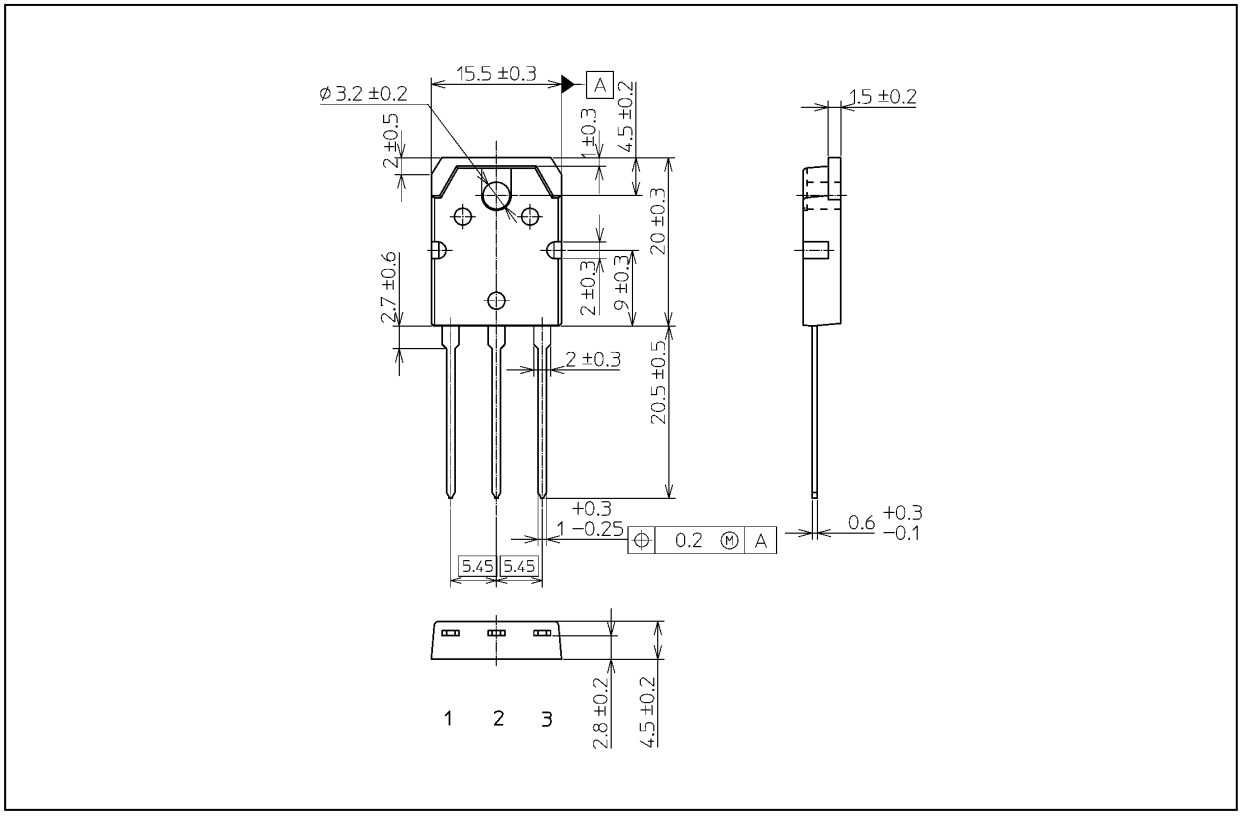


Fig. 8.11 $r_{th(j-c)}$ - t_w (Guaranteed Maximum)

Note: The above characteristics curves are presented for reference only and not guaranteed by production test.

Package Dimensions

Unit: mm



Weight: 4.6 g (typ.)

Package Name(s)
TOSHIBA: 2-16C1S
Nickname: TO-3P(N)

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