

# TTC012

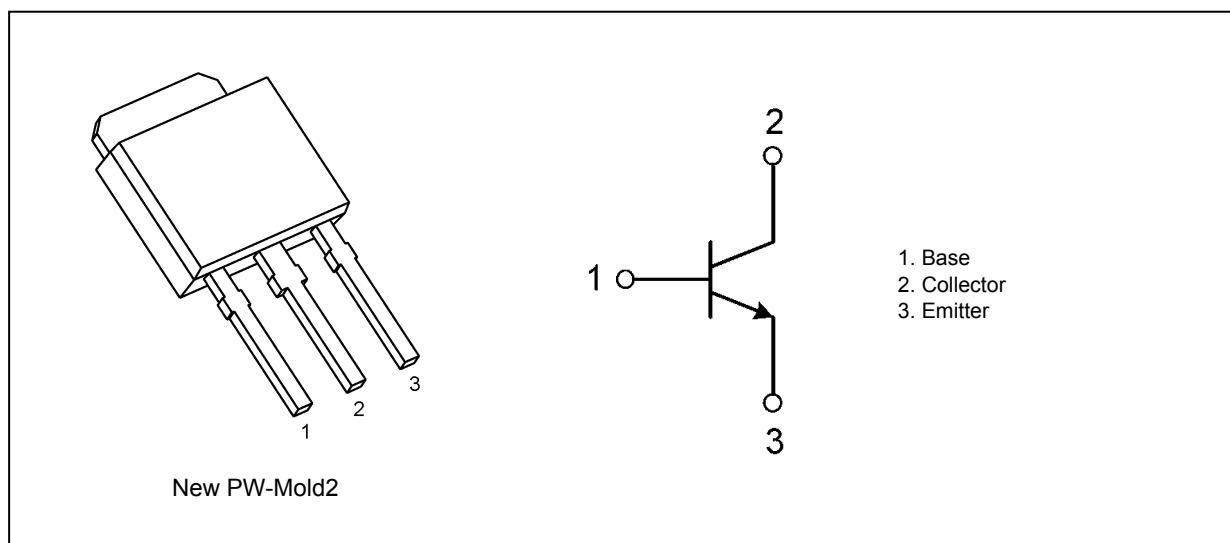
## 1. Applications

- High-Speed High-Voltage Switching
- Switching Voltage Regulators
- High-Speed DC-DC Converters

## 2. Features

- (1) High speed switching :  $t_f = 0.15 \mu s$  (typ.) ( $I_C = 0.5 A$ )
- (2) High collector breakdown voltage:  $V_{CES} = 800 V$ ,  $V_{CEO} = 375 V$

## 3. Packaging and Internal Circuit



## 4. Absolute Maximum Ratings (Note) (Unless otherwise specified, $T_a = 25^\circ C$ )

Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	800	V
Collector-emitter voltage	$V_{CES}$	800	
Collector-emitter voltage	$V_{CEO}$	375	
Emitter-base voltage	$V_{EBO}$	8	
Collector current (DC)	(Note 1) $I_C$	2.0	A
Collector current (pulsed)	(Note 1) $I_{CP}$	3.0	
Base current	$I_B$	1.0	
Collector power dissipation	( $T_a = 25^\circ C$ ) $P_C$	1.1	W
Junction temperature	$T_j$	150	$^\circ C$
Storage temperature	$T_{stg}$	-55 to 150	

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).

Note 1: Ensure that the junction temperature does not exceed  $150^\circ C$ .

Start of commercial production  
2010-08

5. Electrical Characteristics

5.1. Static Characteristics (Unless otherwise specified,  $T_a = 25^\circ\text{C}$ )

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	$I_{CBO}$	$V_{CB} = 800\text{ V}, I_E = 0\text{ A}$	—	—	10	$\mu\text{A}$
Emitter cut-off current	$I_{EBO}$	$V_{EB} = 8\text{ V}, I_C = 0\text{ A}$	—	—	100	nA
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = 1\text{ mA}, I_E = 0\text{ A}$	800	—	—	V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 10\text{ mA}, I_B = 0\text{ A}$	375	—	—	
DC current gain	$h_{FE(1)}$	$V_{CE} = 5\text{ V}, I_C = 1\text{ mA}$	80	—	250	—
DC current gain	$h_{FE(2)}$	$V_{CE} = 5\text{ V}, I_C = 0.3\text{ A}$	100	—	200	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 0.5\text{ A}, I_B = 62.5\text{ mA}$	—	—	0.5	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = 0.5\text{ A}, I_B = 62.5\text{ mA}$	—	—	1.3	

5.2. Dynamic Characteristics (Unless otherwise specified,  $T_a = 25^\circ\text{C}$ )

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Switching time (rise time)	$t_r$	See Figure 5.2.1.	—	0.1	—	$\mu\text{s}$
Switching time (storage time)	$t_{stg}$	$V_{CC} \approx 200\text{ V}, R_L = 400\ \Omega,$ $I_{B1} = 62.5\text{ mA}, I_{B2} = 125\text{ mA},$ Duty cycle $\leq 1\%$	—	4.4	—	
Switching time (fall time)	$t_f$		—	0.15	—	

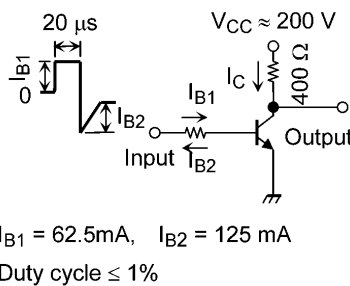


Fig. 5.2.1 Switching Time Test Circuit

6. Marking (Note)

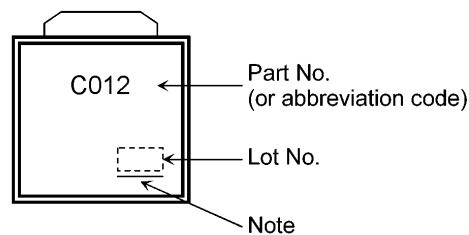


Fig. 6.1 Marking

Note: A line under a Lot No. identifies the indication of product Labels.

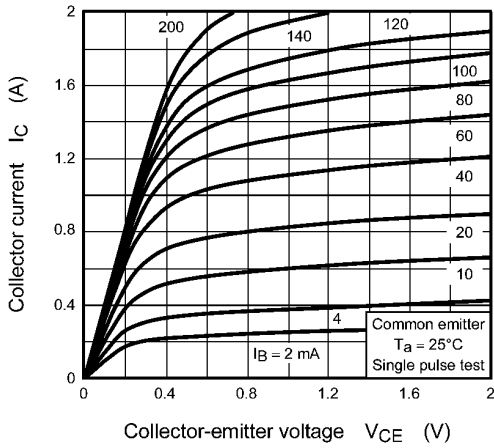
Not underlined:  $[[\text{Pb}]]/\text{INCLUDES} > \text{MCV}$

Underlined:  $[[\text{G}]]/\text{RoHS COMPATIBLE}$  or  $[[\text{G}]]/\text{RoHS } [[\text{Pb}]]$

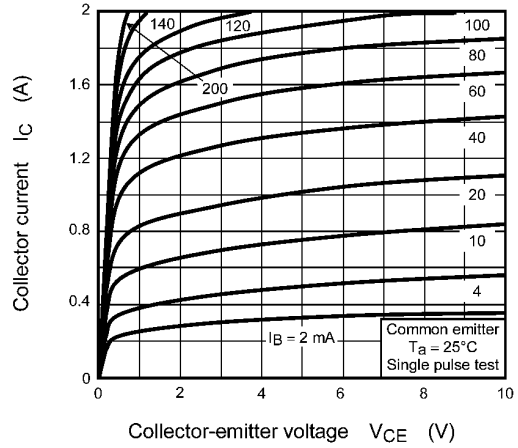
Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product.

The RoHS is the Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

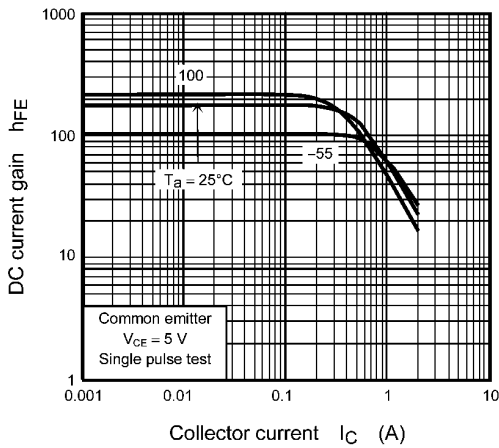
**7. Characteristics Curves (Note)**



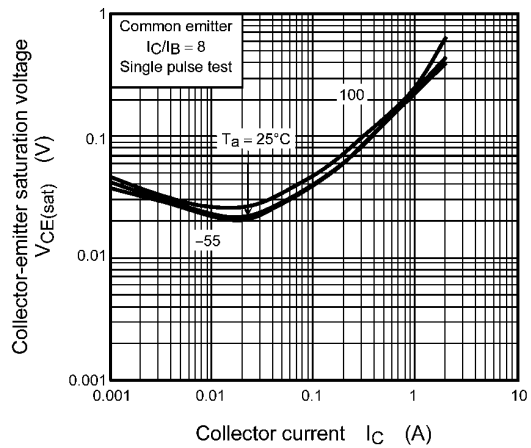
**Fig. 7.1 IC - VCE**



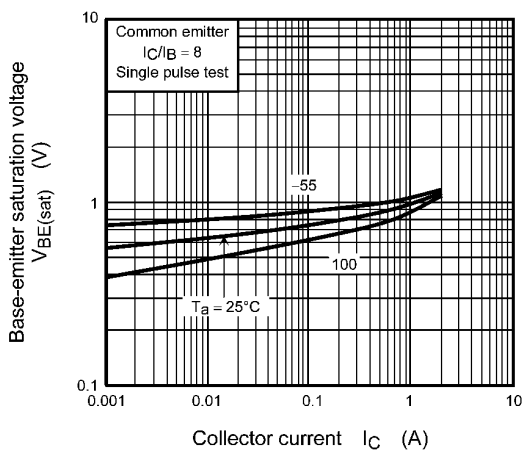
**Fig. 7.2 IC - VCE**



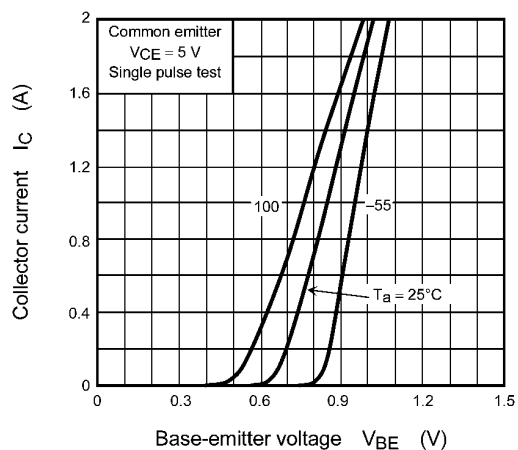
**Fig. 7.3 hFE - IC**



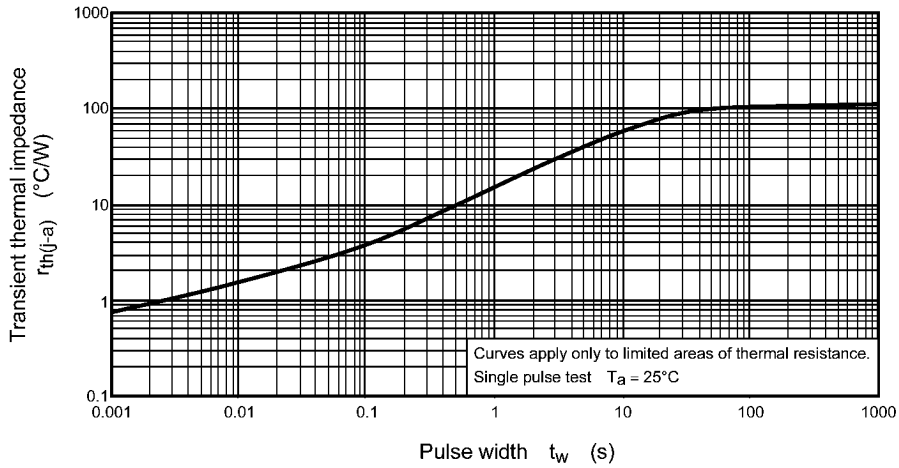
**Fig. 7.4 VCE(sat) - IC**



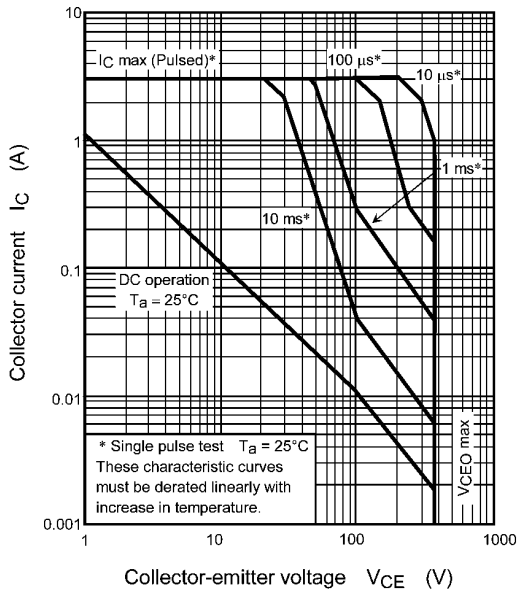
**Fig. 7.5 VBE(sat) - IC**



**Fig. 7.6 IC - VBE**



**Fig. 7.7  $r_{th(j-a)} - t_w$**   
(Guaranteed Maximum)

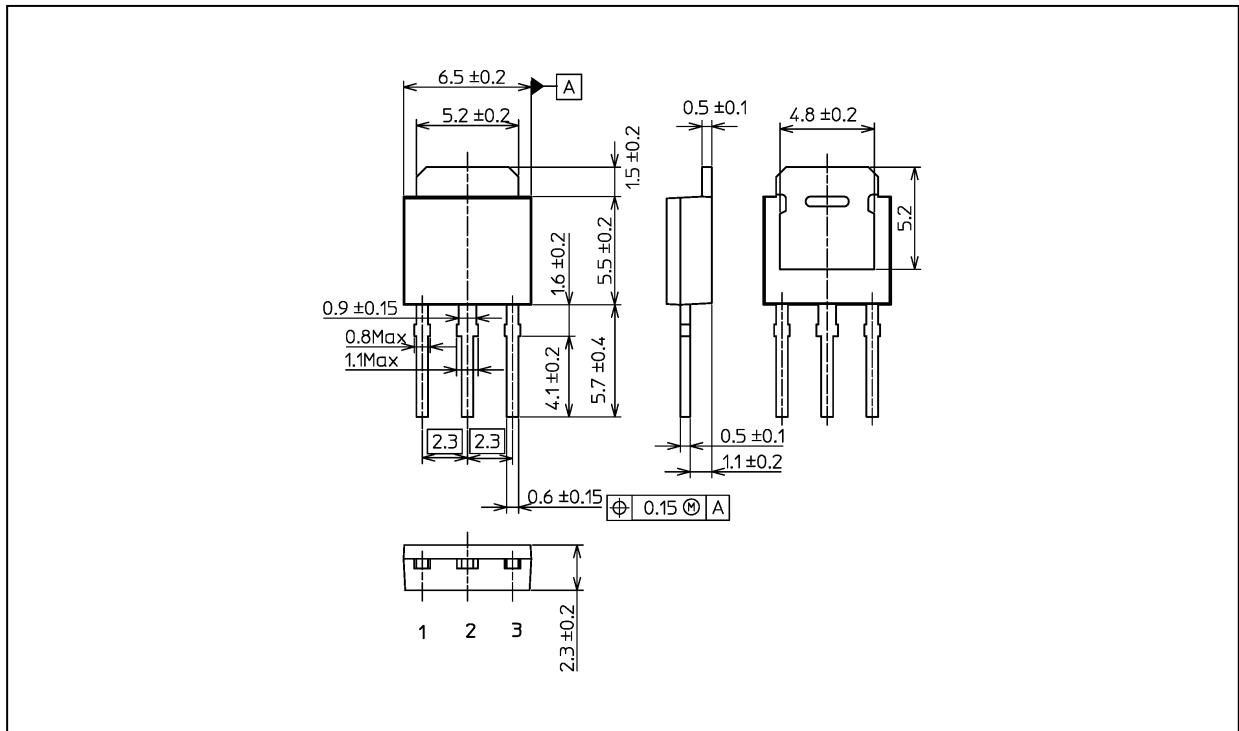


**Fig. 7.8 Safe Operating Area**  
(Guaranteed Maximum)

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

**Package Dimensions**

Unit: mm



Weight: 0.36 g (typ.)

Package Name(s)
TOSHIBA: 2-7J2S
Nickname: New PW-Mold2

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