

TTC014

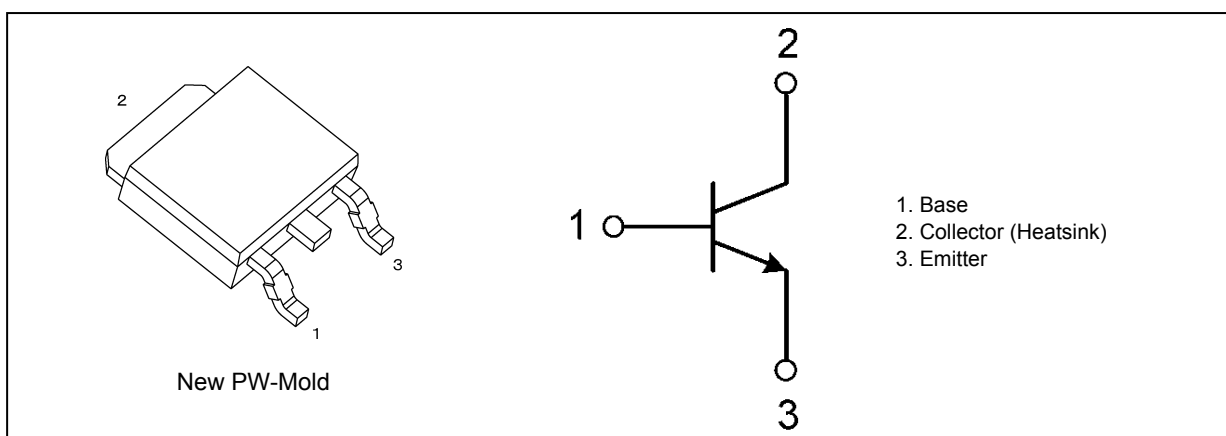
1. Applications

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

2. Features

- (1) High DC current gain : $h_{FE} = 100$ to 200 ($I_C = 0.1$ A)
- (2) High collector breakdown voltage : $V_{CEO} = 800$ V, $V_{CBO} = 900$ V
- (3) High-speed switching : $t_r = 0.2$ μ s (typ.), $t_f = 0.4$ μ s (typ.) ($I_C = 0.3$ A)

3. Packaging and Internal Circuit



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

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	900	V
Collector-emitter voltage	V_{CES}	900	
Collector-emitter voltage	V_{CEO}	800	
Emitter-base voltage	V_{EBO}	8	
Collector current (DC) (Note 1)	I_C	1	A
Collector current (pulsed) (Note 1)	I_{CP}	2	
Base current	I_B	0.5	
Collector power dissipation ($T_a = 25$ °C)	P_C	1	W
Collector power dissipation ($T_c = 25$ °C)		40	
Junction temperature	T_j	150	°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 °C.

Start of commercial production

2013-06

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}	$V_{CB} = 900\text{ V}, I_E = 0\text{ A}$	—	—	100	nA
Emitter cut-off current	I_{EBO}	$V_{EB} = 8\text{ V}, I_C = 0\text{ A}$	—	—	100	nA
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = 1\text{ mA}, I_E = 0\text{ A}$	900	—	—	V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 10\text{ mA}, I_B = 0\text{ A}$	800	—	—	V
DC current gain	$h_{FE(1)}$	$V_{CE} = 5\text{ V}, I_C = 1\text{ mA}$	80	—	—	—
	$h_{FE(2)}$	$V_{CE} = 5\text{ V}, I_C = 0.1\text{ A}$	100	—	200	—
	$h_{FE(3)}$	$V_{CE} = 5\text{ V}, I_C = 0.2\text{ A}$	80	—	—	—
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 0.5\text{ A}, I_B = 50\text{ mA}$	—	—	1.0	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = 0.5\text{ A}, I_B = 50\text{ mA}$	—	—	1.3	V

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector output capacitance	C_{ob}	$V_{CB} = 10\text{ V}, I_E = 0\text{ A}, f = 1\text{ MHz}$	—	26	—	pF
Switching time (rise time)	t_r	See Figure 5.2.1	—	0.2	—	μs
Switching time (storage time)	t_{stg}	$V_{CC} \approx 200\text{ V}, R_L = 667\ \Omega,$ $I_{B1} = 30\text{ mA}, I_{B2} = 90\text{ mA},$	—	4.0	—	μs
Switching time (fall time)	t_f	Duty Cycle $\leq 1\%$	—	0.4	—	μs

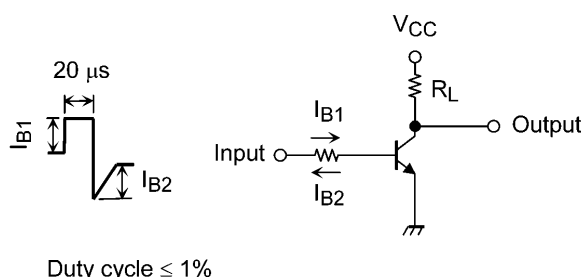


Fig. 5.2.1 Switching Time Test Circuit

6. Marking (Note)

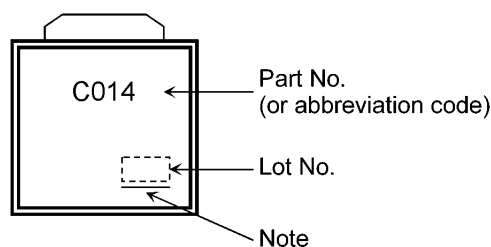


Fig. 6.1 Marking

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)

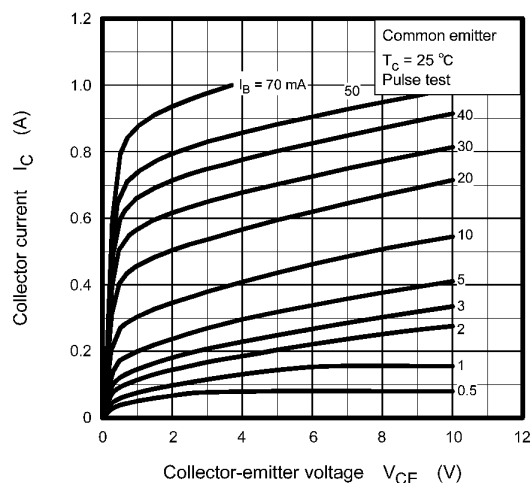


Fig. 7.1 $I_C - V_{CE}$

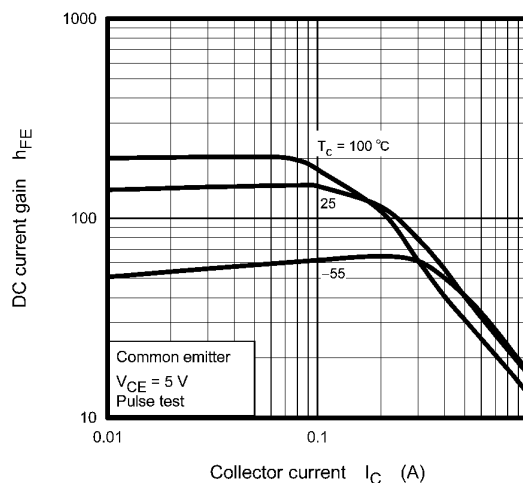


Fig. 7.2 $h_{FE} - I_C$

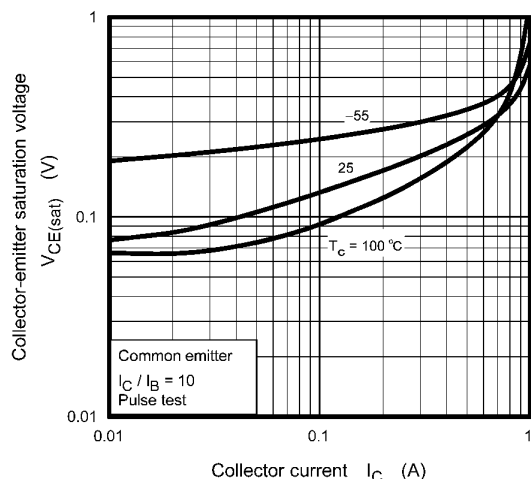


Fig. 7.3 $V_{CE(sat)} - I_C$

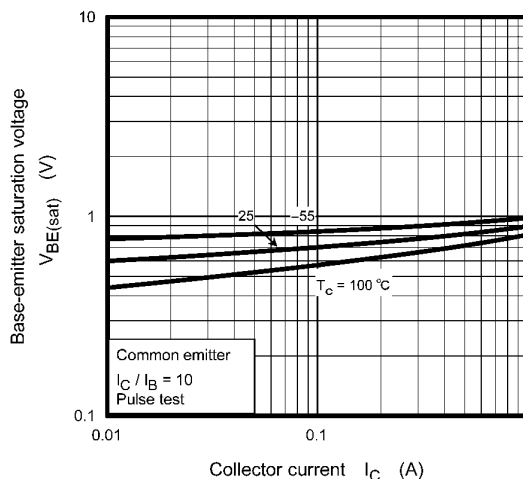


Fig. 7.4 $V_{BE(sat)} - I_C$

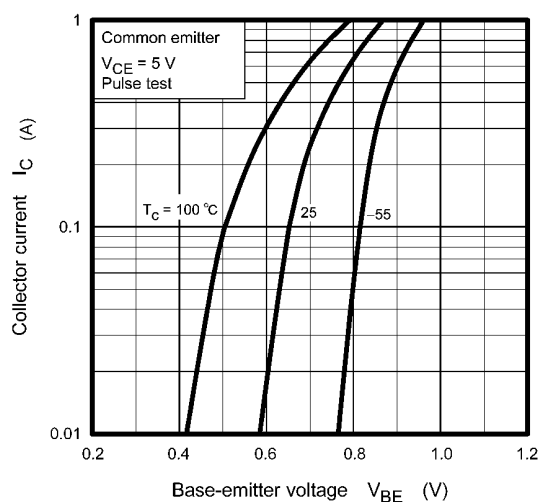


Fig. 7.5 $I_C - V_{BE}$

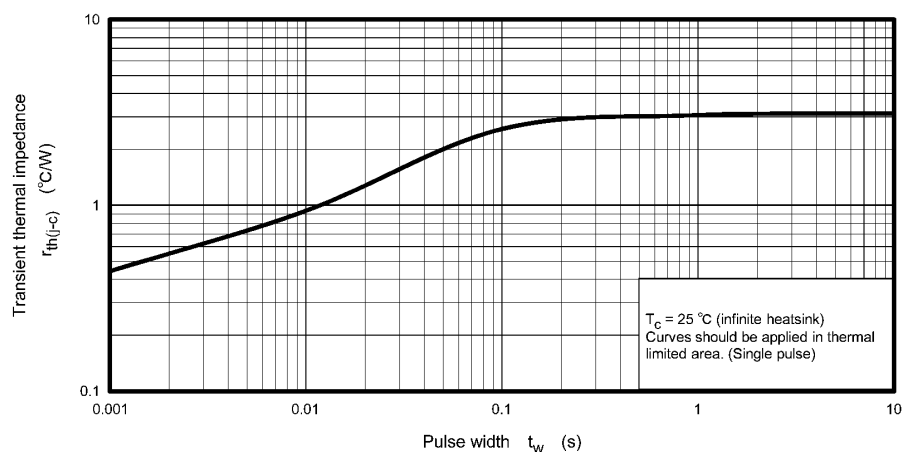


Fig. 7.6 $r_{th(j-c)} - t_w$ (Guaranteed Maximum)

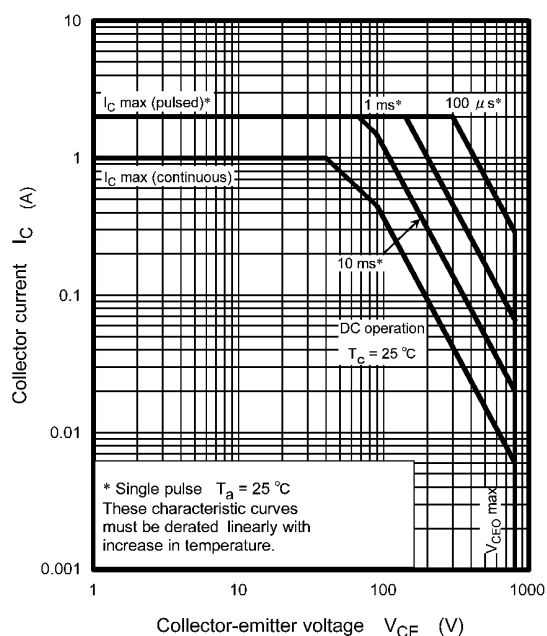
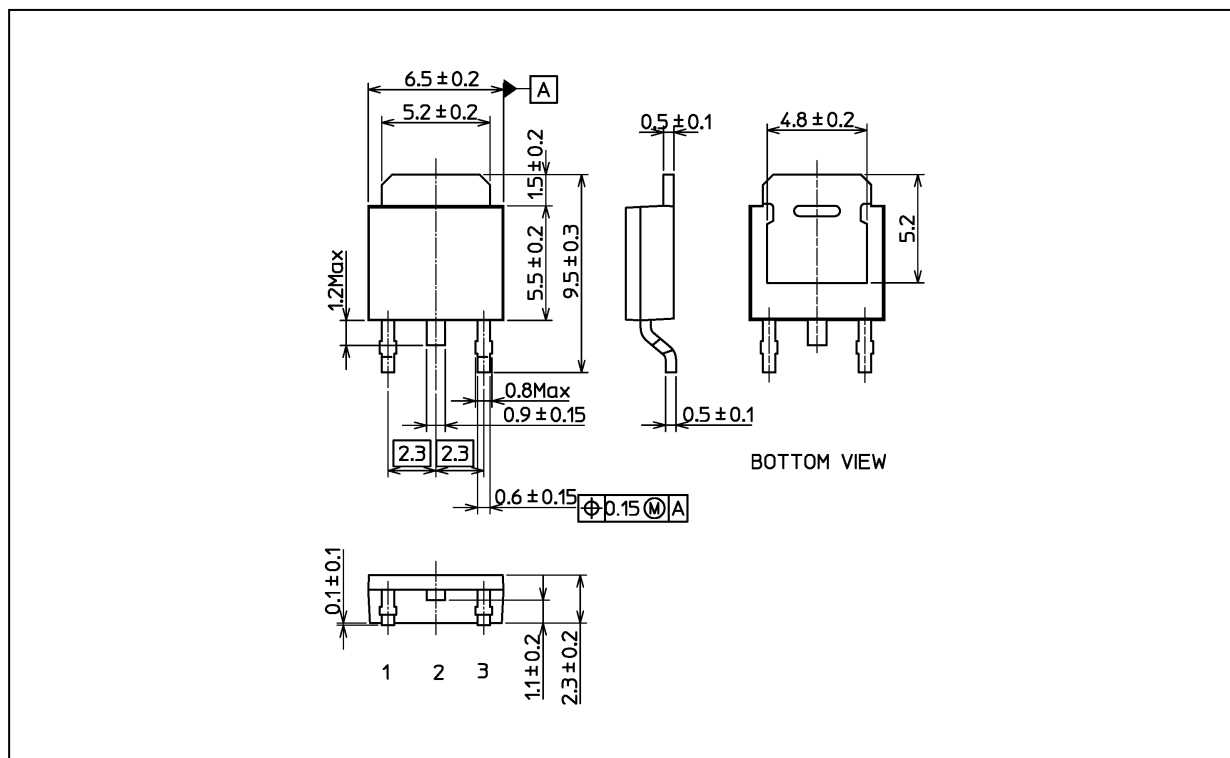


Fig. 7.7 Safe Operating Area (Guaranteed Maximum)

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: 2-7J1S
Nickname: New PW-Mold

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