

TTC005

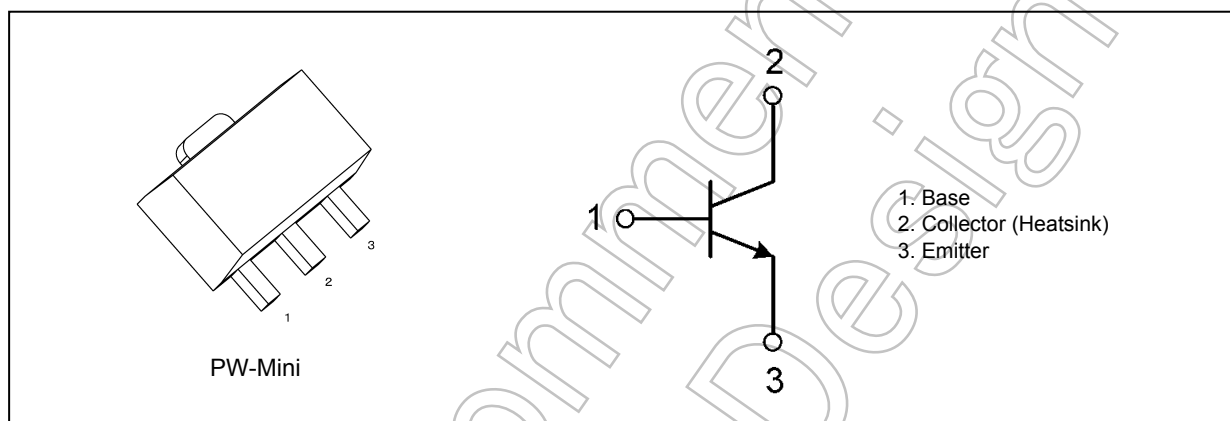
1. Applications

- 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-speed switching: $t_f = 0.13$ μ s (typ.) ($I_C = 0.3$ A)

3. Packaging and Internal Circuit



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

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	600	V
Collector-emitter voltage	V_{CEX}	600	
Collector-emitter voltage	V_{CEO}	285	
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 = 10 s) (Note 2) P_C	2.8	W
Collector power dissipation	DC (Note 2)	1.1	
Junction temperature	T_j	150	$^\circ\text{C}$
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 .

Note 2: Device mounted on a 25.4 mm x 25.4 mm x 1.6 mm FR-4 glass epoxy board (with a dissipating copper surface of 645 mm²)

Start of commercial production
2009-01

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}	$V_{CB} = 600\text{ V}, I_E = 0\text{ A}$	—	—	100	nA
Emitter cut-off current	I_{EBO}	$V_{EB} = 8\text{ V}, I_C = 0\text{ A}$	—	—	100	nA
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = 1\text{ mA}, I_E = 0\text{ A}$	600	—	—	V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 10\text{ mA}, I_B = 0\text{ A}$	285	—	—	V
DC current gain	$h_{FE(1)}$	$V_{CE} = 5\text{ V}, I_C = 1\text{ mA}$	80	—	200	—
	$h_{FE(2)}$	$V_{CE} = 5\text{ V}, I_C = 0.1\text{ A}$	100	—	200	—
	$h_{FE(3)}$	$V_{CE} = 5\text{ V}, I_C = 0.2\text{ A}$	60	—	—	—
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 0.6\text{ A}, I_B = 75\text{ mA}$	—	—	1	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = 0.6\text{ A}, I_B = 75\text{ mA}$	—	—	1.3	V

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Switching time (rise time)	t_r	See Figure 5.2.1	—	0.2	—	μs
Switching time (storage time)	t_{stg}	$V_{CC} \approx 200\text{ V}, R_L = 667\ \Omega,$ $I_{B1} = 20\text{ mA}, I_{B2} = -50\text{ mA},$	—	2	—	μs
Switching time (fall time)	t_f	Duty cycle $\leq 1\%$	—	0.13	—	μs

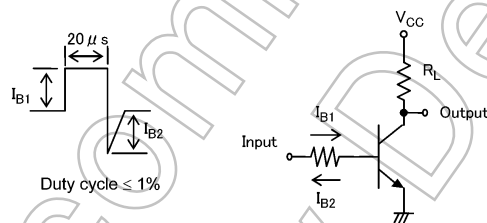


Fig. 5.2.1 Switching Time Test Circuit

6. Marking (Note)

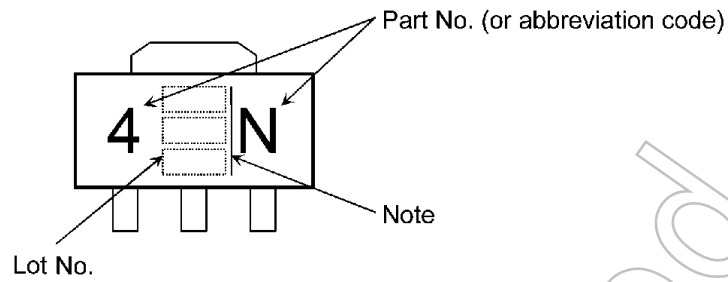
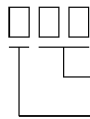


Fig. 6.1 Marking

Lot No. :

Weekly code (Three digits)



Week of manufacture

(01 for the first week of calendar year; sequential number up to 52 or 53)

Year of manufacture

(Last digit of calendar year)

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

Without a line: [[Pb]]/INCLUDES > MCV

With a line: [[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 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.

Not Recommended for New Design

7. Characteristics Curves (Note)

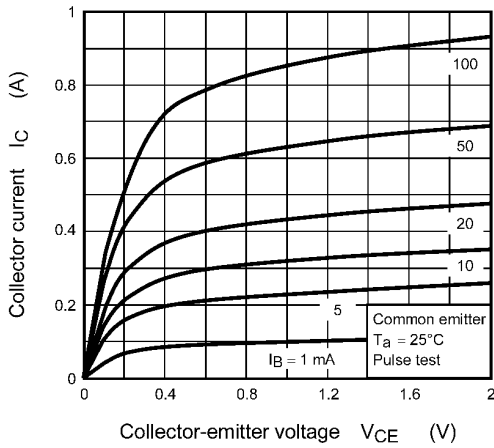


Fig. 7.1 $I_C - V_{CE}$

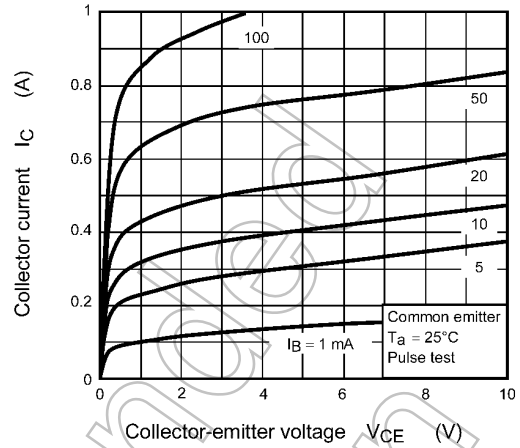


Fig. 7.2 $I_C - V_{CE}$

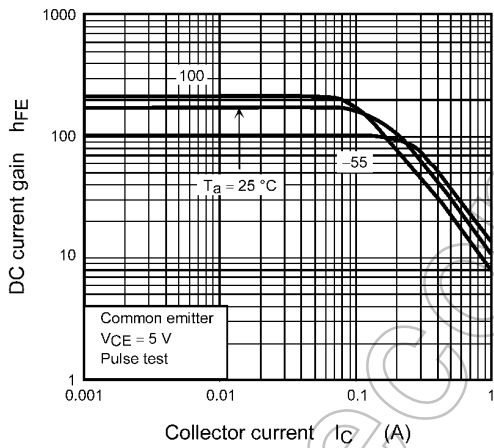


Fig. 7.3 $h_{FE} - I_C$

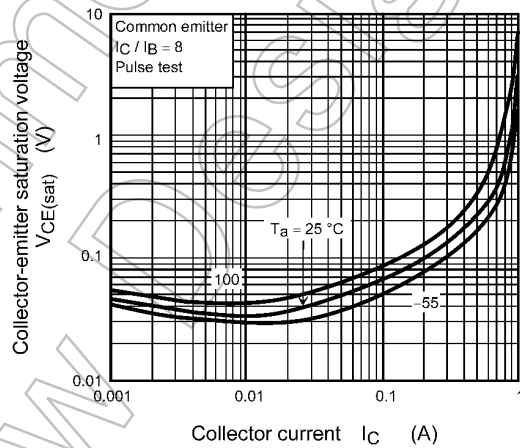


Fig. 7.4 $V_{CE(sat)} - I_C$

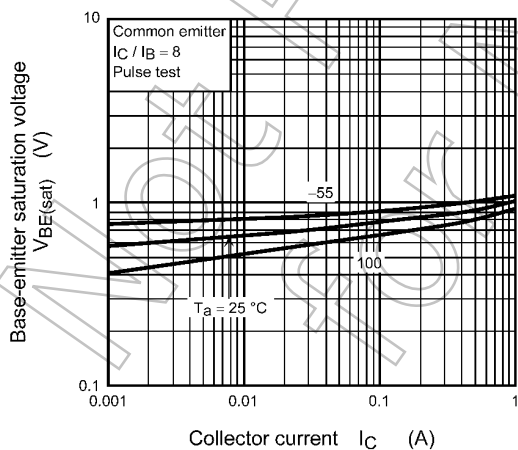


Fig. 7.5 $V_{BE(sat)} - I_C$

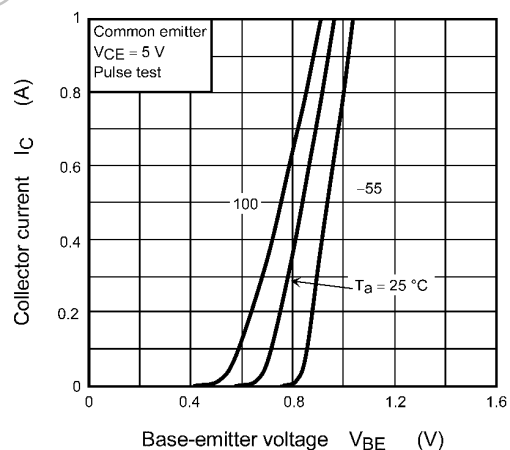


Fig. 7.6 $I_C - V_{BE}$

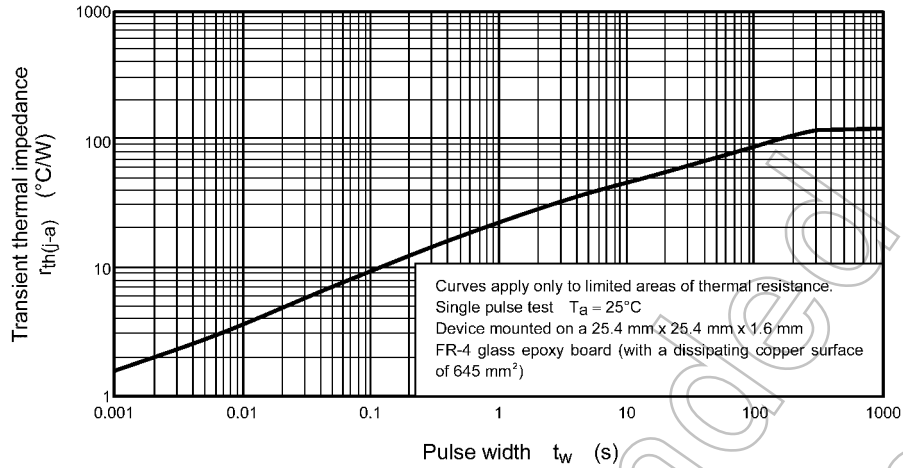


Fig. 7.7 $r_{th(j-a)} - t_w$ (Guaranteed Maximum)

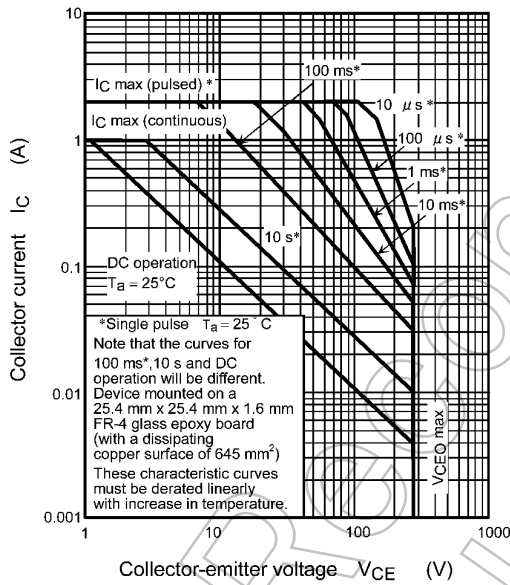
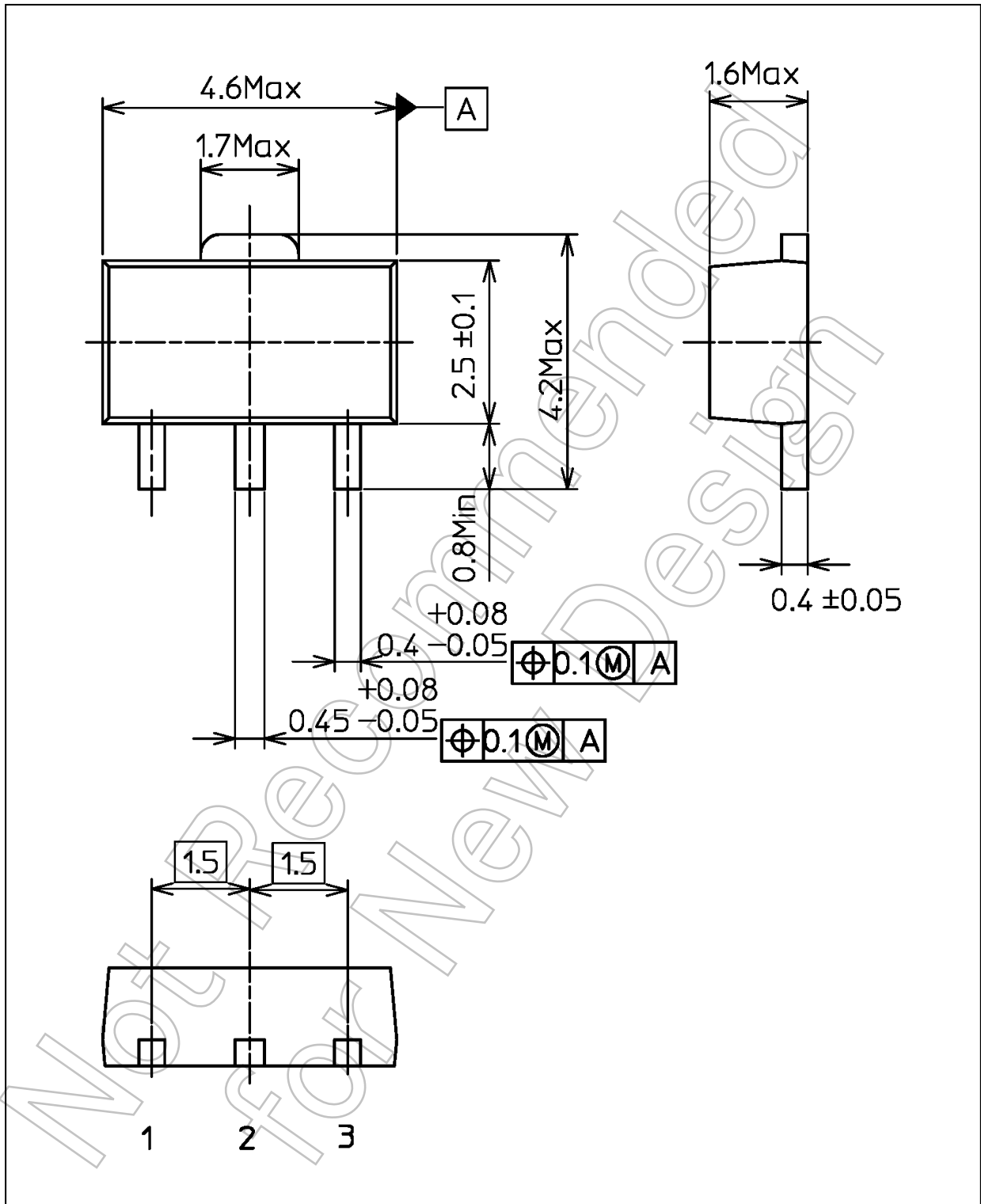


Fig. 7.8 Safe Operating Area
(Guaranteed Maximum)

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

Package Dimensions

Unit: mm



The drawings shown may not accurately represent the actual shape or dimensions.

Weight: 0.05 g (typ.)

Package Name(s)
TOSHIBA: 2-5K1S
Nickname: PW-Mini

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