

TTA010

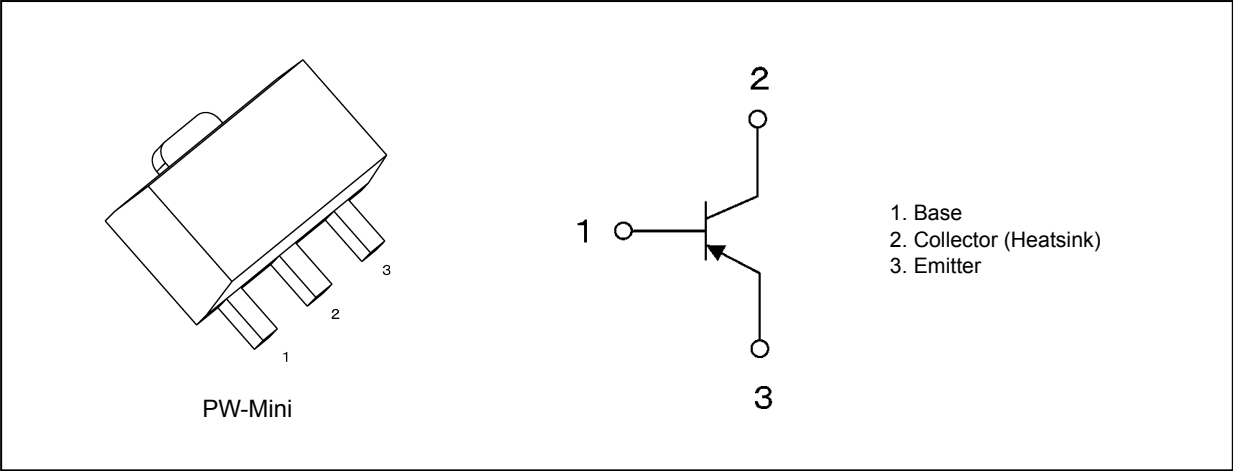
1. Applications

- High-Voltage Switching

2. Features

- (1) High collector voltage:  $V_{CEO} = -500\text{ V (min)}$
- (2) High DC current gain:  $h_{FE} = 100\text{ to }300\text{ (}V_{CE} = -10\text{ V, }I_C = -20\text{ mA)}$
- (3) Low collector-emitter saturation voltage:  $V_{CE(sat)} = -0.3\text{ V (max) (}I_C = -20\text{ mA, }I_B = -2\text{ mA)}$

3. Packaging and Internal Circuit



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

Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	-500	V
Collector-emitter voltage	$V_{CEO}$	-500	V
Emitter-base voltage	$V_{EBO}$	-7	V
Collector current (DC)	$I_C$	-100	mA
Collector current (pulsed)	$I_{CP}$	-200	mA
Base current	$I_B$	-50	mA
Collector power dissipation	$P_C$	1	W
Junction temperature	$T_j$	150	$^{\circ}\text{C}$
Storage temperature	$T_{stg}$	-55 to 150	$^{\circ}\text{C}$

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  $150\text{ }^{\circ}\text{C}$ .

Note 2: Device mounted on a  $25.4\text{ mm} \times 25.4\text{ mm} \times 1.6\text{ mm}$  FR-4 glass epoxy board (with a dissipating copper surface of  $645\text{ mm}^2$ )

Start of commercial production  
2019-07

## 5. Electrical Characteristics

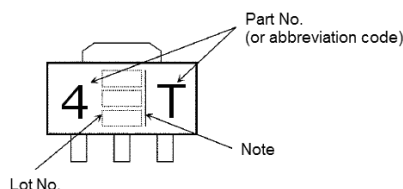
### 5.1. Static Characteristics (Unless otherwise specified, $T_a = 25\text{ }^{\circ}\text{C}$ )

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	$I_{CBO}$	$V_{CB} = -500\text{ V}$ , $I_E = 0\text{ A}$	—	—	-1	$\mu\text{A}$
Emitter cut-off current	$I_{EBO}$	$V_{EB} = -7\text{ V}$ , $I_C = 0\text{ A}$	—	—	-100	nA
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = -1\text{ mA}$ , $I_B = 0\text{ A}$	-500	—	—	V
DC current gain	$h_{FE(1)}$	$V_{CE} = -10\text{ V}$ , $I_C = -20\text{ mA}$	100	—	300	—
	$h_{FE(2)}$	$V_{CE} = -10\text{ V}$ , $I_C = -100\text{ mA}$	50	—	—	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = -20\text{ mA}$ , $I_B = -2\text{ mA}$	—	—	-0.3	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = -20\text{ mA}$ , $I_B = -2\text{ mA}$	—	—	-1.0	V

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector output capacitance	$C_{ob}$	$V_{CB} = -10\text{ V}$ , $I_E = 0\text{ A}$ , $f = 1\text{ MHz}$	—	15	—	pF

## 6. Marking (Note)



**Fig. 6.1 Marking (Note)**

Note: A line beside 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 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)

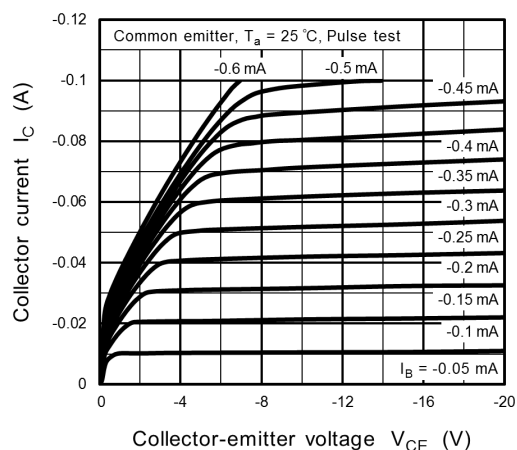


Fig. 7.1  $I_C - V_{CE}$

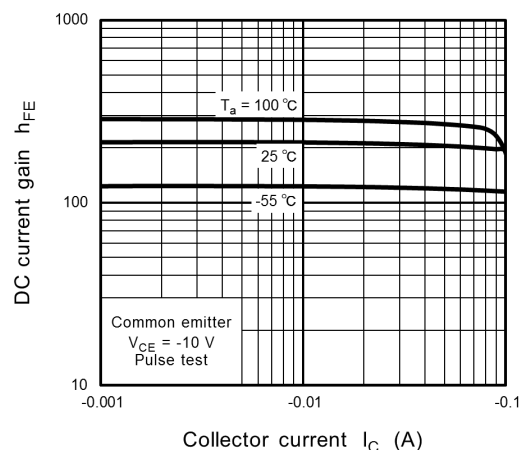


Fig. 7.2  $h_{FE} - I_C$

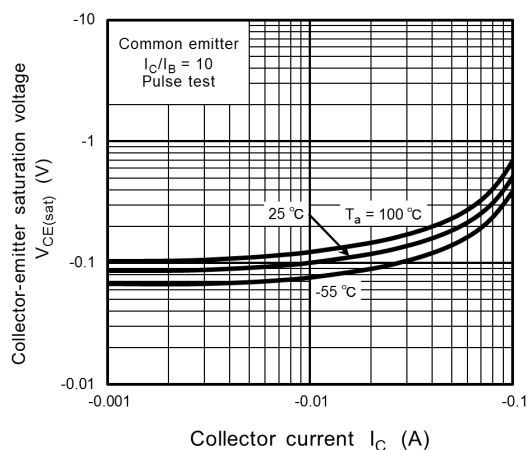


Fig. 7.3  $V_{CE(sat)} - I_C$

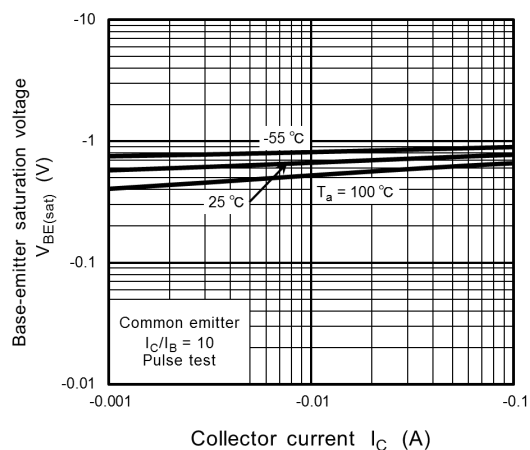


Fig. 7.4  $V_{BE(sat)} - I_C$

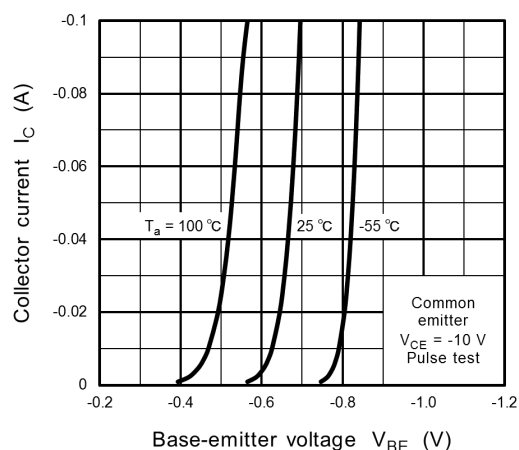


Fig. 7.5  $I_C - V_{BE}$

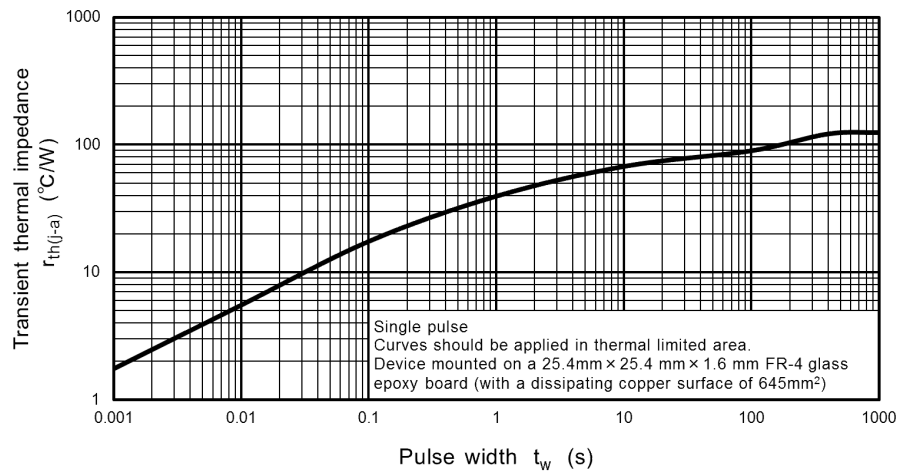


Fig. 7.6  $r_{th} - t_w$   
(Guaranteed Maximum)

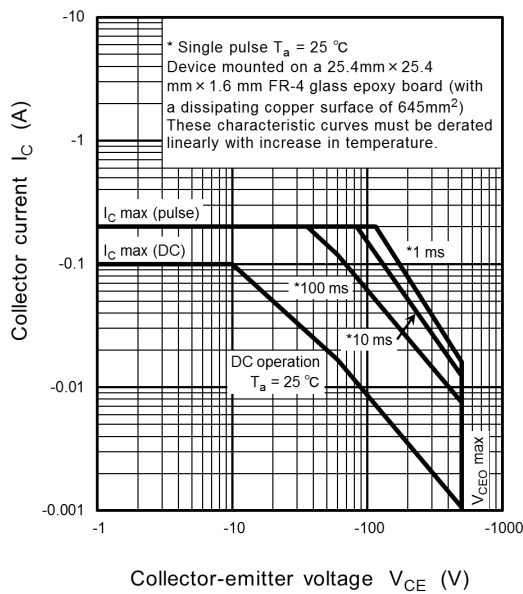
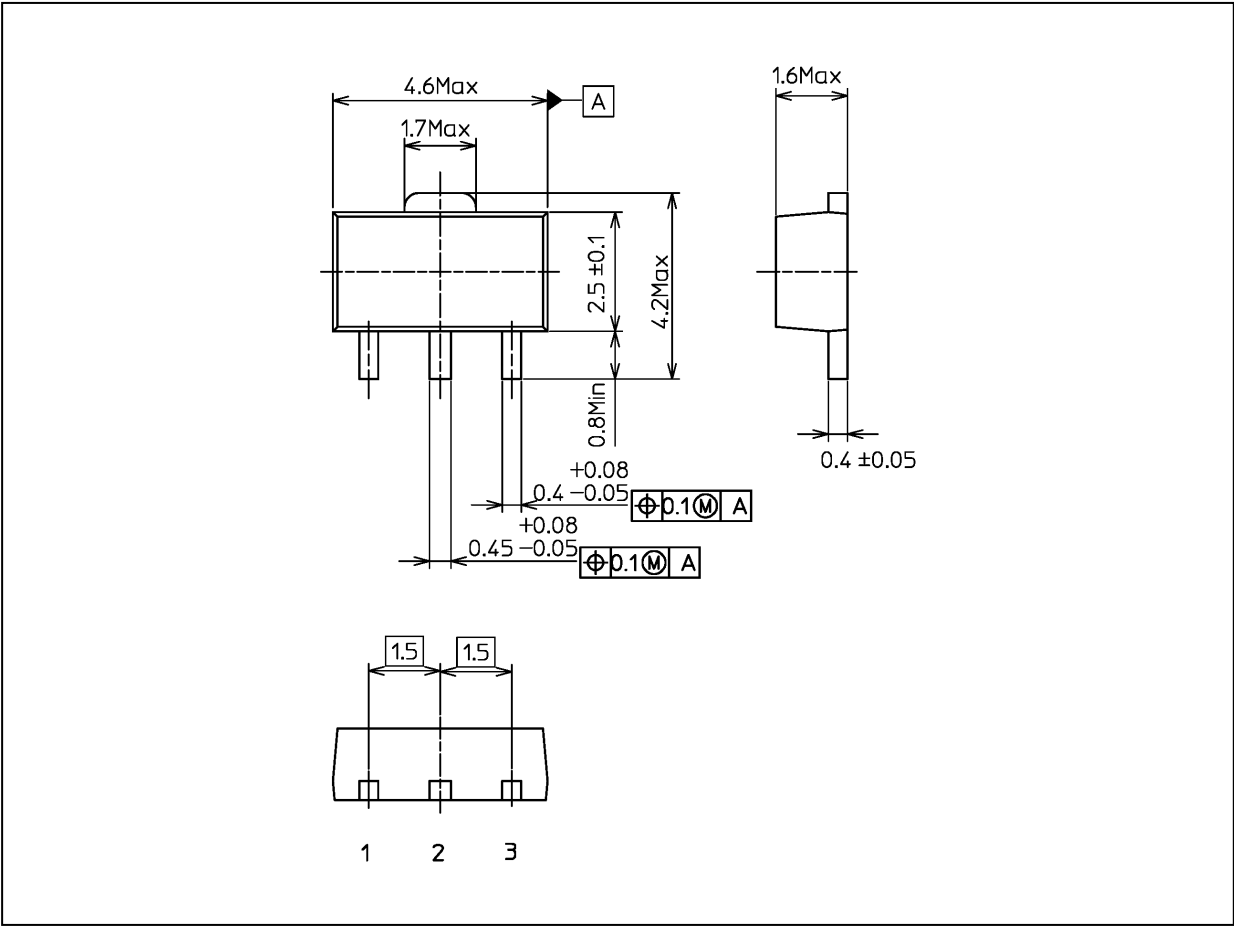


Fig. 7.7 Safe Operating Area  
(Guaranteed Maximum)

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

Package Dimensions

Unit: mm



Weight: 0.05 g (typ.)

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

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