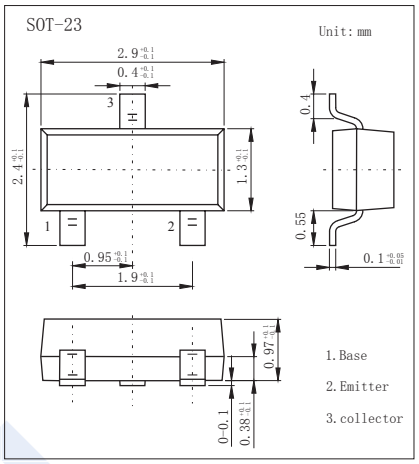
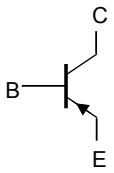
# PNP Transistors

# PBSS5160T (KBSS5160T)




## ■ Features

- Low collector-emitter saturation voltage $V_{CEsat}$
- High collector current capability: $I_C$ and $I_{CM}$
- High efficiency, reduces heat generation
- Reduces printed-circuit board area required




## ■ Absolute Maximum Ratings Ta = 25℃

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Collector - Base Voltage | | $V_{CBO}$ | -80 | V |
| Collector - Emitter Voltage | | $V_{CEO}$ | -60 | |
| Emitter - Base Voltage | | $V_{EBO}$ | -5 | |
| Collector Current - Continuous | Note.1 | $I_C$ | -0.9 | A |
| | Note.2 | | -1 | |
| Collector Current - Pulse | | $I_{CP}$ | -2 | |
| Base Current | | $I_B$ | -0.3 | |
| Base Current - Pulse | | $I_{BP}$ | -1 | |
| Collector Power Dissipation | Note.1 | $P_C$ | 270 | mW |
| | Note.2 | | 400 | |
| | Note.3 | | 1.25 | W |
| Tthermal Resistance From Junction to Ambient | Note.1 | $R_{\theta JA}$ | 465 | ℃/W |
| | Note.2 | | 312 | |
| | Note.3 | | 100 | |
| Junction Temperature | | $T_J$ | 150 | ℃ |
| Storage Temperature range | | $T_{stg}$ | -65 to 150 | |

Note.1 : Device mounted on an FR4 printed-circuit board, single-sided copper, tin-plated and standard footprint.

Note.2 : Device mounted on an FR4 printed-circuit board, single-sided copper, tin-plated and 1 $cm^2$ collector mounting pad.

Note.3 : Operated under pulsed conditions: duty cycle $\delta \leqslant 20$ %, pulse width tp $\leqslant$ 10 ms.

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## ■ Electrical Characteristics Ta = 25℃

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Collector- base breakdown voltage | $V_{CBO}$ | $I_C$= -100 μA, $I_E$=0 | -80 | | | V |
| Collector- emitter breakdown voltage | $V_{CEO}$ | $I_C$= -1 mA, $I_B$=0 | -60 | | | |
| Emitter - base breakdown voltage | $V_{EBO}$ | $I_E$= -100 uA, $I_C$=0 | -5 | | | |
| Collector-base cut-off current | $I_{CBO}$ | $V_{CB}$= -60 V , $I_E$=0 | | | -100 | nA |
| | | $V_{CB}$= -60 V , $I_E$=0 , $T_J$=150℃ | | | -50 | uA |
| Collector- emittercut-off current | $I_{CES}$ | $V_{CE}$= -60 V , $I_E$=0 | | | -100 | nA |
| Emitter cut-off current | $I_{EBO}$ | $V_{EB}$= -5V , $I_C$=0 | | | -100 | |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C$=-100 mA, $I_B$=-1mA | | | -160 | mV |
| | | $I_C$=-500 mA, $I_B$=-50mA | | | -175 | |
| | | $I_C$=-1 A, $I_B$=-100mA (Note.1) | | | -330 | |
| Base - emitter saturation voltage | $V_{BE(sat)}$ | $I_C$=-1 A, $I_B$=-50mA | | | -1.1 | V |
| Base - emitter turn-on voltage | $V_{BE(on)}$ | $V_{CE}$= -5V, $I_C$= -1A | | | -0.9 | |
| Equivalent on-resistance | $R_{CE(sat)}$ | $I_C$=-1 A, $I_B$=-100mA (Note.1) | | | 330 | mΩ |
| DC current gain | $h_{FE}$ | $V_{CE}$= -5V, $I_C$= -1mA | 200 | 350 | | |
| | | $V_{CE}$= -5V, $I_C$= -500mA | 150 | 250 | | |
| | | $V_{CE}$= -5V, $I_C$= -1A | 100 | 160 | | |
| Collector output capacitance | $C_{ob}$ | $V_{CB}$= -10V, $I_E$=$i_e$=0,f=1MHz | | | 15 | pF |
| Transition frequency | $f_T$ | $V_{CE}$= -10V, $I_C$= -50mA,f=100MHz | 150 | 220 | | MHz |

Note.1: Pulse test: tp ⩽ 300 us; δ ⩽ 0.02.

## ■ Marking

| Marking | U6* |
|---|---|

## ■ Typical Characterisitics

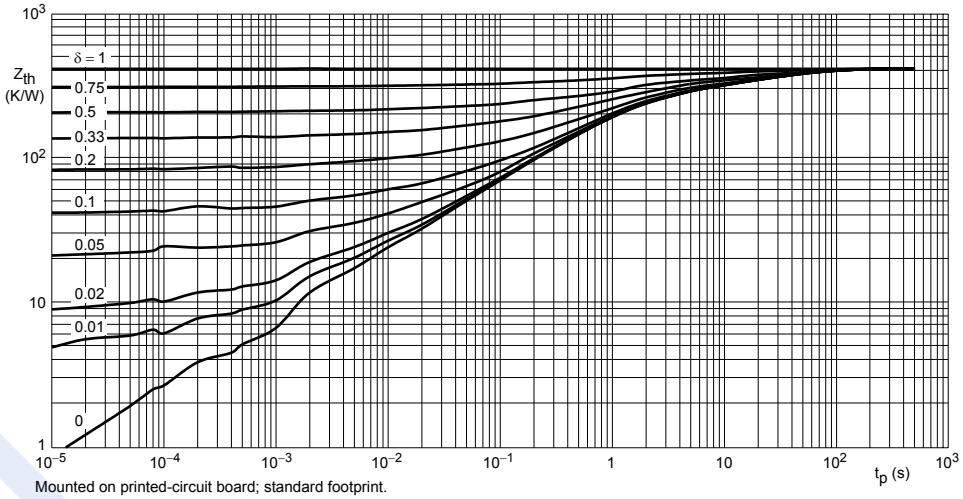


Fig.1 Transient thermal impedance as a function of pulse time; typical values.

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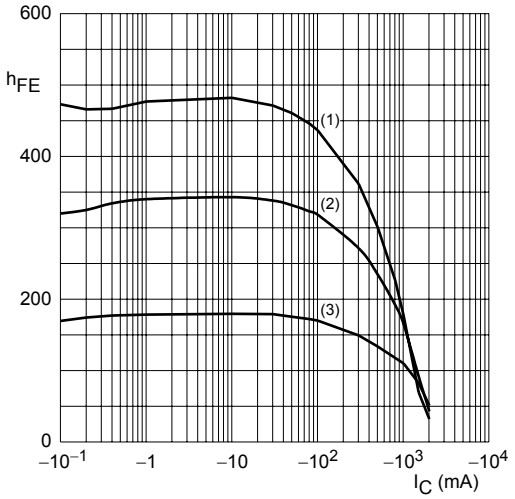
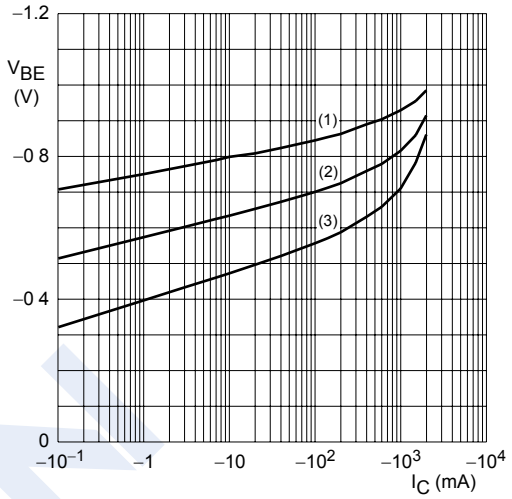


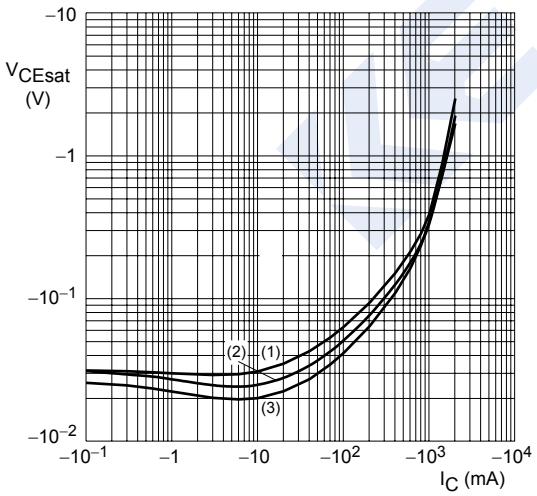

$V_{CE}$ = −5 V. (2) $T_{amb}$ = 25 °C.
(1) $T_{amb}$ = 100 °C. (3) $T_{amb}$ = −55 °C.

Fig.2 DC current gain as a function of collector current; typical values.



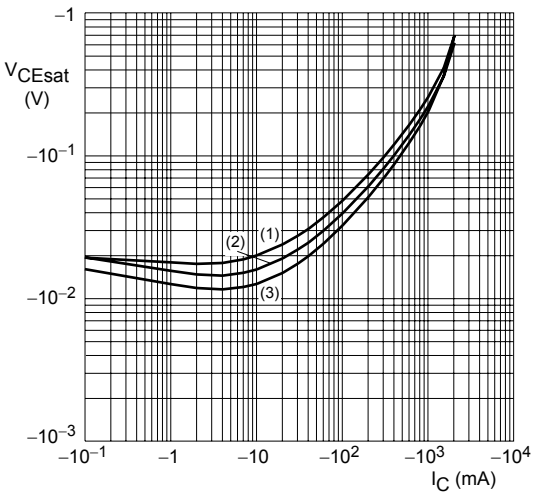

$V_{CE}$ = −5 V. (2) $T_{amb}$ = 25 °C.
(1) $T_{amb}$ = −55 °C. (3) $T_{amb}$ = 100 °C.

Fig.3 Base-emitter voltage as a function of collector current; typical values.




$I_C/I_B$ = 20. (2) $T_{amb}$ = 25 °C.
(1) $T_{amb}$ = 100 °C. (3) $T_{amb}$ = −55 °C.

Fig.4 Collector-emitter saturation voltage as a function of collector current; typical values.




$I_C/I_B$ = 10. (2) $T_{amb}$ = 25 °C.
(1) $T_{amb}$ = 100 °C. (3) $T_{amb}$ = −55 °C.

Fig.5 Collector-emitter saturation voltage as a function of collector current; typical values.

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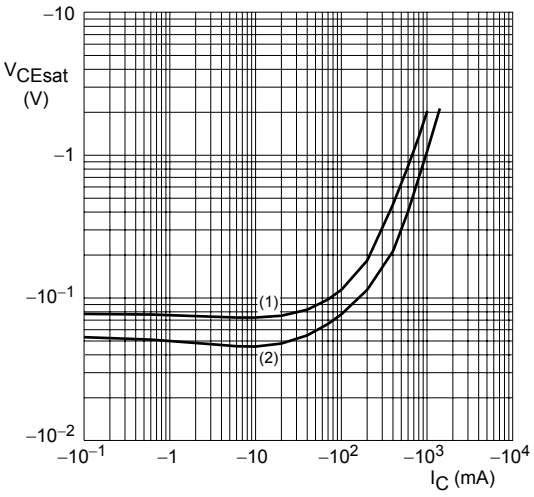
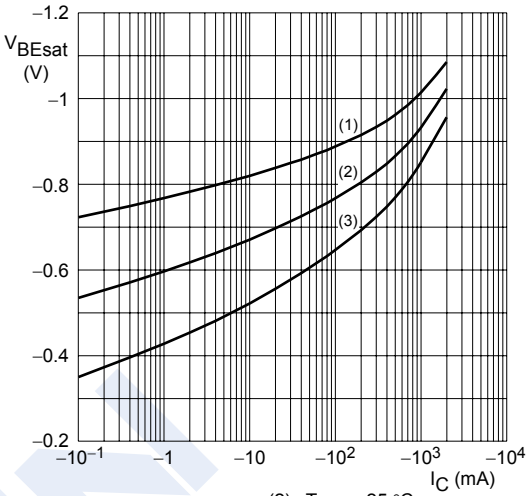
■ Typical Characterisitics



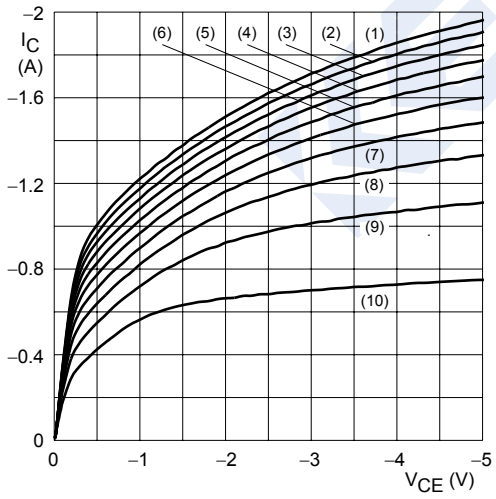

$T_{amb}$ = 25 °C.
(1) $I_C/I_B$ = 100. (2) $I_C/I_B$ = 50.

Fig.6 Collector-emitter saturation voltage as a function of collector current; typical values.




$I_C/I_B$ = 20.
(1) $T_{amb}$ = −55 °C. (2) $T_{amb}$ = 25 °C. (3) $T_{amb}$ = 100 °C.

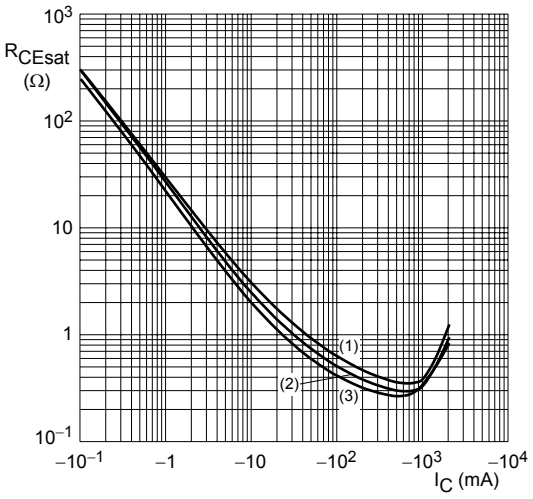
Fig.7 Base-emitter saturation voltage as a function of collector current; typical values.




$T_{amb}$ = 25 °C.

(1) $I_B$ = −40 mA.
(2) $I_B$ = −36 mA.
(3) $I_B$ = −32 mA.
(4) $I_B$ = −28 mA.
(5) $I_B$ = −24 mA.
(6) $I_B$ = −20 mA.
(7) $I_B$ = −16 mA.
(8) $I_B$ = −12 mA.
(9) $I_B$ = −8 mA.
(10) $I_B$ = −4 mA.

Fig.8 Collector current as a function of collector-emitter voltage; typical values.




$I_C/I_B$ = 20.

(1) $T_{amb}$ = 100 °C. (2) $T_{amb}$ = 25 °C. (3) $T_{amb}$ = −55 °C.

Fig.9 Equivalent on-resistance as a function of collector current; typical values.

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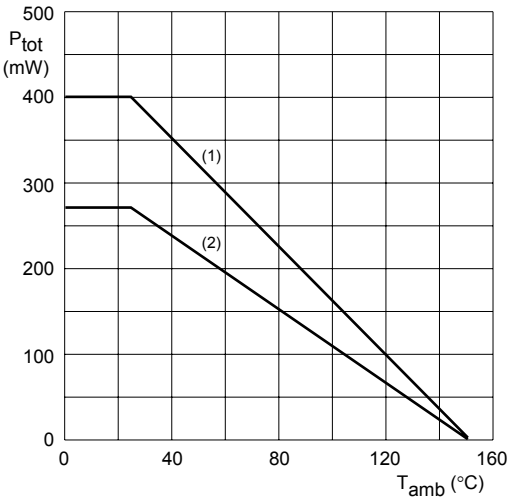


(1) Device mounted with 1 $cm^2$ collector tab.
(2) Device mounted on standard footprint.

Fig.10 Power derating curves.