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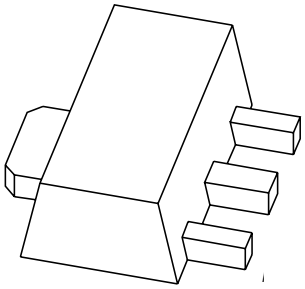
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# DATA SHEET



# PXT4403
## PNP switching transistor

Product data sheet
Supersedes data of 1999 Apr 14

2004 Nov 22

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# PNP switching transistor PXT4403

## FEATURES

- High current (max. 600 mA)
- Low voltage (max. 40 V).

## APPLICATIONS

- Switching and linear amplification.

## DESCRIPTION

PNP switching transistor in a SOT89 plastic package.
NPN complement: PXT4401.

## MARKING

| TYPE NUMBER | MARKING CODE(1) |
|---|---|
| PXT4403 | *2T |

**Note**

1. * = p: Made in Hong Kong.
   * = t: Made in Malaysia.
   * = W: Made in China.

## PINNING

| PIN | DESCRIPTION |
|---|---|
| 1 | emitter |
| 2 | collector |
| 3 | base |

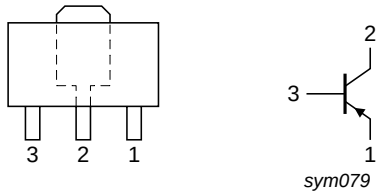



Fig.1 Simplified outline (SOT89) and symbol.

## ORDERING INFORMATION

| TYPE NUMBER | PACKAGE | | |
|---|---|---|---|
| | NAME | DESCRIPTION | VERSION |
| PXT4403 | SC-62 | plastic surface mounted package; collector pad for good heat transfer; 3 leads | SOT89 |



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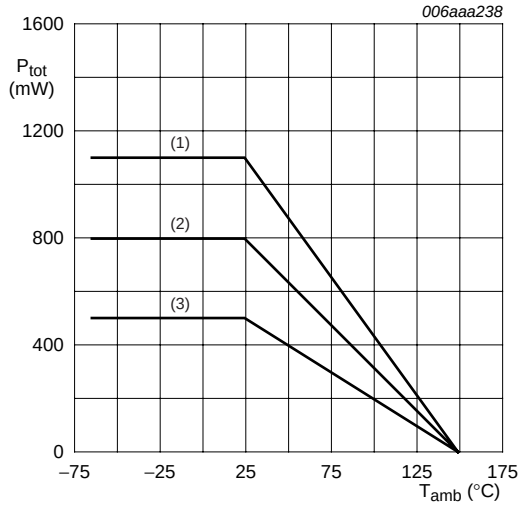
## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| $V_{CBO}$ | collector-base voltage | open emitter | – | –40 | V |
| $V_{CEO}$ | collector-emitter voltage | open base | – | –40 | V |
| $V_{EBO}$ | emitter-base voltage | open collector | – | –5 | V |
| $I_C$ | collector current (DC) | | – | –600 | mA |
| $I_{CM}$ | peak collector current | | – | –800 | mA |
| $I_{BM}$ | peak base current | | – | –200 | mA |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq 25$ °C | | | |
| | | note 1 | – | 0.5 | W |
| | | note 2 | – | 0.8 | W |
| | | note 3 | – | 1.1 | W |
| $T_{stg}$ | storage temperature | | –65 | +150 | °C |
| $T_j$ | junction temperature | | – | 150 | °C |
| $T_{amb}$ | ambient temperature | | –65 | +150 | °C |

**Notes**

1. Device mounted on a printed-circuit board, single-sided copper, tin-plated and standard footprint.
2. Device mounted on a printed-circuit board, single-sided copper, tin-plated and mounting pad for collector 1 $cm^2$.
3. Device mounted on a printed-circuit board, single-sided copper, tin-plated and mounting pad for collector 6 $cm^2$.




(1) FR4 PCB; 6 $cm^2$ mounting pad for collector.
(2) FR4 PCB; 1 $cm^2$ mounting pad for collector.
(3) FR4 PCB; standard footprint.

Fig.2 Power derating curves.



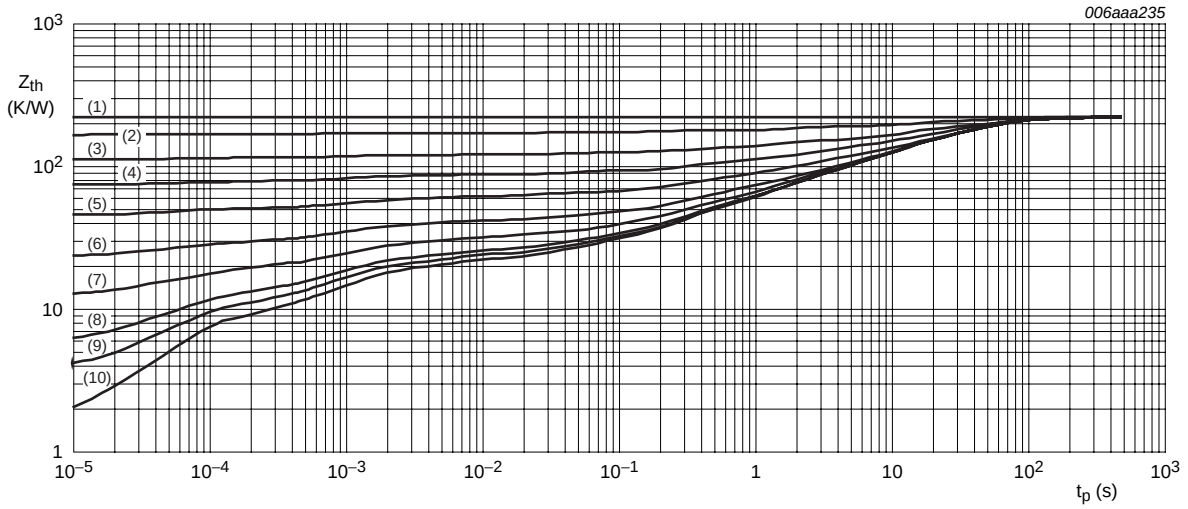
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## THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---|---|---|---|---|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | | |
| | | note 1 | 250 | K/W |
| | | note 2 | 156 | K/W |
| | | note 3 | 113 | K/W |
| $R_{th(j-s)}$ | thermal resistance from junction to soldering point | | 30 | K/W |

**Notes**

1. Device mounted on a printed-circuit board, single-sided copper, tin-plated and standard footprint.
2. Device mounted on a printed-circuit board, single-sided copper, tin-plated and mounting pad for collector 1 $cm^2$.
3. Device mounted on a printed-circuit board, single-sided copper, tin-plated and mounting pad for collector 6 $cm^2$.



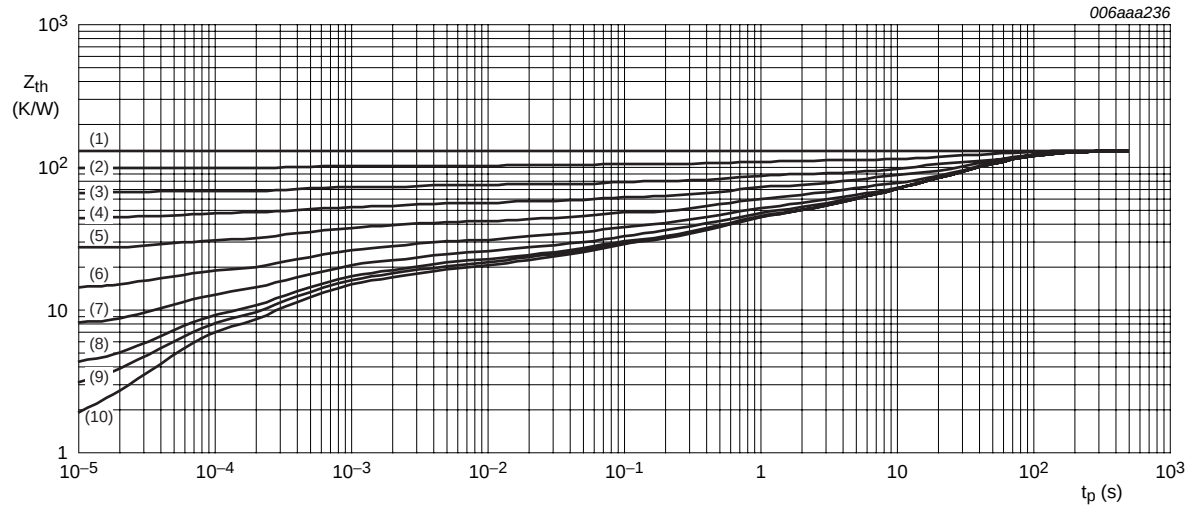

Mounted on FR4 printed-circuit board; standard footprint.

(1) $\delta$ = 1. (3) $\delta$ = 0.5. (5) $\delta$ = 0.2. (7) $\delta$ = 0.05. (9) $\delta$ = 0.01.
(2) $\delta$ = 0.75. (4) $\delta$ = 0.33. (6) $\delta$ = 0.1. (8) $\delta$ = 0.02. (10) $\delta$ = 0.

Fig.3 Transient thermal impedance as a function of pulse time; typical values.



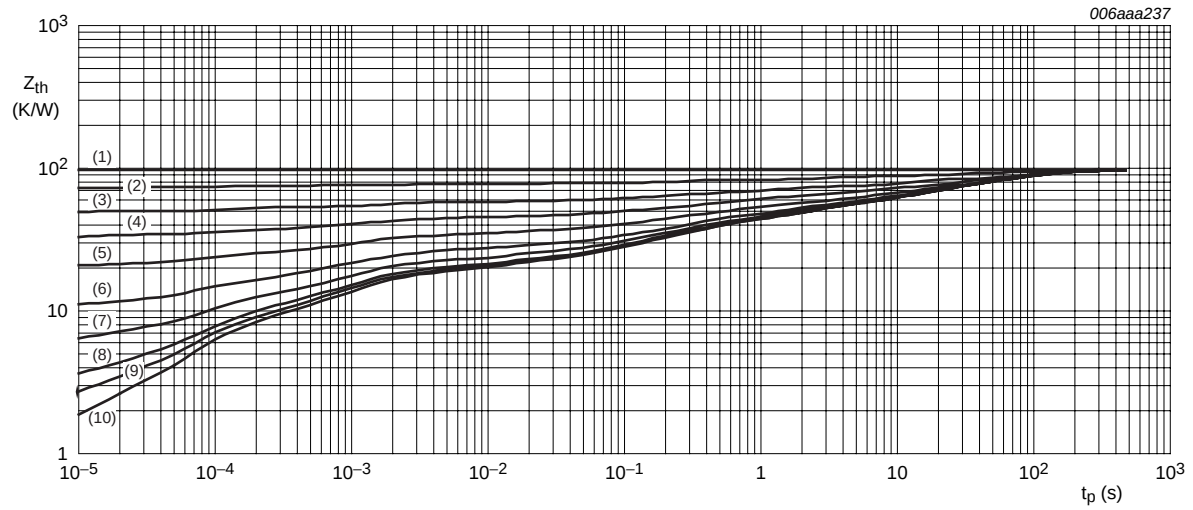
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Mounted on FR4 printed-circuit board; mounting pad for collector 1 $cm^2$.

(1) $\delta$ = 1. (3) $\delta$ = 0.5. (5) $\delta$ = 0.2. (7) $\delta$ = 0.05. (9) $\delta$ = 0.01.
(2) $\delta$ = 0.75. (4) $\delta$ = 0.33. (6) $\delta$ = 0.1. (8) $\delta$ = 0.02. (10) $\delta$ = 0.

Fig.4 Transient thermal impedance as a function of pulse time; typical values.




Mounted on FR4 printed-circuit board; mounting pad for collector 6 $cm^2$.

(1) $\delta$ = 1. (3) $\delta$ = 0.5. (5) $\delta$ = 0.2. (7) $\delta$ = 0.05. (9) $\delta$ = 0.01.
(2) $\delta$ = 0.75. (4) $\delta$ = 0.33. (6) $\delta$ = 0.1. (8) $\delta$ = 0.02. (10) $\delta$ = 0.

Fig.5 Transient thermal impedance as a function of pulse time; typical values.



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## CHARACTERISTICS

$T_{amb}$ = 25 °C unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| $I_{CBO}$ | collector-base cut-off current | $I_E$ = 0 A; $V_{CB}$ = –40 V | – | –50 | nA |
| $I_{EBO}$ | emitter-base cut-off current | $I_C$ = 0 A; $V_{EB}$ = –5 V | – | –50 | nA |
| $h_{FE}$ | DC current gain | $I_C$ = –0.1 mA; $V_{CE}$ = –1 V | 30 | – | |
| | | $I_C$ = –1 mA; $V_{CE}$ = –1 V | 60 | – | |
| | | $I_C$ = –10 mA; $V_{CE}$ = –1 V | 100 | – | |
| | | $I_C$ = –150 mA; $V_{CE}$ = –2 V | 100 | 300 | |
| | | $I_C$ = –500 mA; $V_{CE}$ = –2 V | 20 | – | |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C$ = –150 mA; $I_B$ = –15 mA | – | –400 | mV |
| | | $I_C$ = –500 mA; $I_B$ = –50 mA | – | –750 | mV |
| $V_{BEsat}$ | base-emitter saturation voltage | $I_C$ = –150 mA; $I_B$ = –15 mA | – | –950 | mV |
| | | $I_C$ = –500 mA; $I_B$ = –50 mA | – | –1.3 | V |
| $C_c$ | collector capacitance | $I_E$ = $i_e$ = 0 A; $V_{CB}$ = –10 V; f = 1 MHz | – | 8.5 | pF |
| $C_e$ | emitter capacitance | $I_C$ = $i_c$ = 0 A; $V_{EB}$ = –500 mV; f = 1 MHz | – | 35 | pF |
| $f_T$ | transition frequency | $I_C$ = –20 mA; $V_{CE}$ = –10 V; f = 100 MHz | 200 | – | MHz |
| **Switching times (between 10% and 90% levels);** (see Fig.7) | | | | | |
| $t_{on}$ | turn-on time | $I_{Con}$ = –150 mA; $I_{Bon}$ = –15 mA; $I_{Boff}$ = 15 mA | – | 40 | ns |
| $t_d$ | delay time | | – | 15 | ns |
| $t_r$ | rise time | | – | 30 | ns |
| $t_{off}$ | turn-off time | | – | 350 | ns |
| $t_s$ | storage time | | – | 300 | ns |
| $t_f$ | fall time | | – | 50 | ns |



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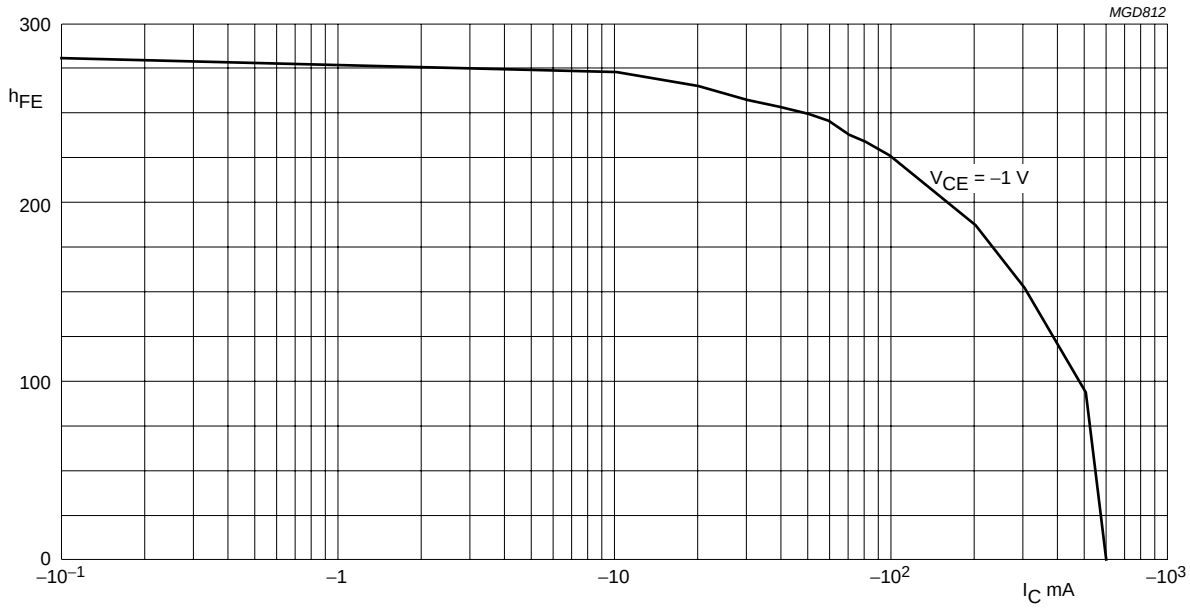
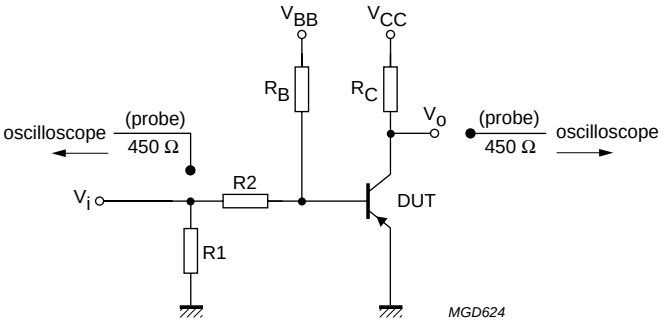



Fig.6 DC current gain; typical values.




$V_i$ = −9.5 V; T = 500 μs; $t_p$ = 10 μs; $t_r$ = $t_f$ ≤ 3 ns.
R1 = 68 Ω; R2 = 325 Ω; $R_B$ = 325 Ω; $R_C$ = 160 Ω.
$V_{BB}$ = 3.5 V; $V_{CC}$ = −29.5 V.
Oscilloscope input impedance $Z_i$ = 50 Ω.

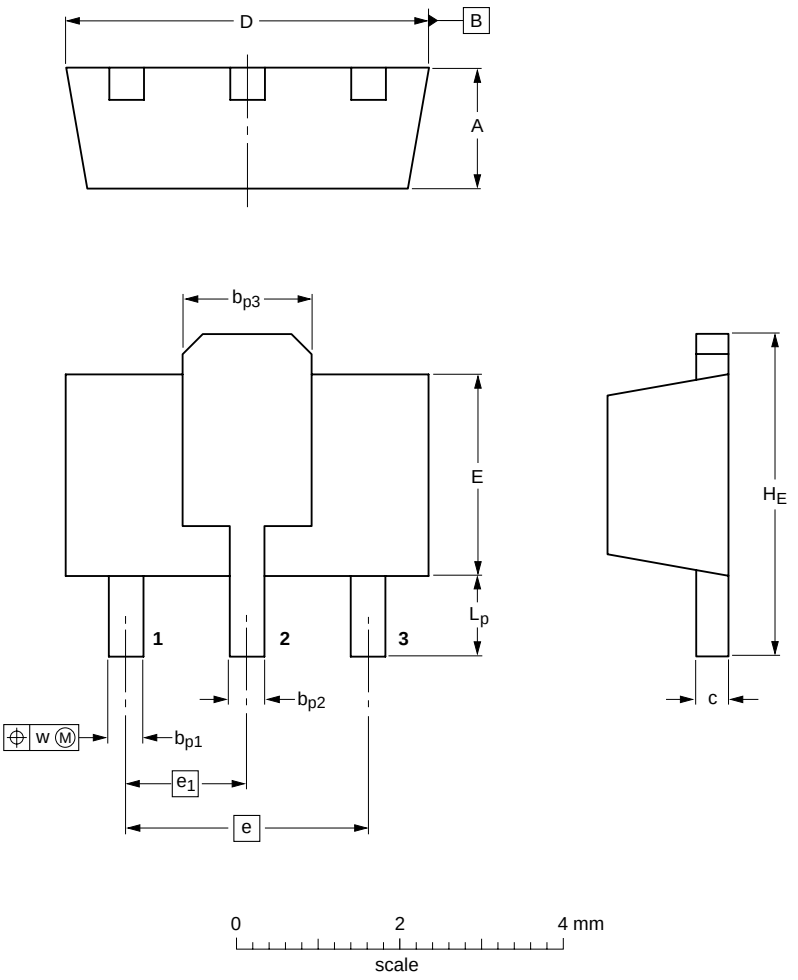
Fig.7 Test circuit for switching times.



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## PACKAGE OUTLINE

**Plastic surface-mounted package; collector pad for good heat transfer; 3 leads** **SOT89**




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A | $b_{p1}$ | $b_{p2}$ | $b_{p3}$ | c | D | E | e | $e_1$ | $H_E$ | $L_p$ | w |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.6<br>1.4 | 0.48<br>0.35 | 0.53<br>0.40 | 1.8<br>1.4 | 0.44<br>0.23 | 4.6<br>4.4 | 2.6<br>2.4 | 3.0 | 1.5 | 4.25<br>3.75 | 1.2<br>0.8 | 0.13 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT89 | | TO-243 | SC-62 | | | ~~04-08-03~~<br>06-03-16 |



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|---|---|---|
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