

# SOT223 PNP SILICON PLANAR HIGH CURRENT (HIGH PERFORMANCE) TRANSISTORS

ISSUE 3 - APRIL 2000

**FZT951**  
**FZT953**

## FEATURES

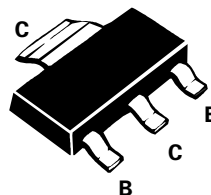
- \* 5 Amps continuous current , up to 15 Amps peak current
- \* Very low saturation voltages
- \* Excellent gain characteristics specified up to 10 Amps
- \*  **$P_{\text{tot}} = 3 \text{ watts}$**
- \* FZT951 exhibits extremely low equivalent on resistance;

**$R_{\text{CE(sat)}} = 55\text{m}\Omega \text{ at } 4\text{A}$**

COMPLEMENTARY TYPES - FZT951 = FZT851

FZT953 = FZT853

PARTMARKING DETAILS - DEVICE TYPE IN FULL



## ABSOLUTE MAXIMUM RATINGS.

| PARAMETER                                                | SYMBOL                         | FZT951      | FZT953 | UNIT               |
|----------------------------------------------------------|--------------------------------|-------------|--------|--------------------|
| Collector-Base Voltage                                   | $V_{\text{CBO}}$               | -100        | -140   | V                  |
| Collector-Emitter Voltage                                | $V_{\text{CEO}}$               | -60         | -100   | V                  |
| Emitter-Base Voltage                                     | $V_{\text{EBO}}$               | -6          |        | V                  |
| Peak Pulse Current                                       | $I_{\text{CM}}$                | -15         | -10    | A                  |
| Continuous Collector Current                             | $I_{\text{C}}$                 | -5          |        | A                  |
| Power Dissipation at $T_{\text{amb}}=25^{\circ}\text{C}$ | $P_{\text{tot}}$               | 3           |        | W                  |
| Operating and Storage Temperature Range                  | $T_{\text{j}}; T_{\text{stg}}$ | -55 to +150 |        | $^{\circ}\text{C}$ |

\*The power which can be dissipated assuming the device is mounted in a typical manner on a P.C.B. with copper equal to 4 square inch minimum

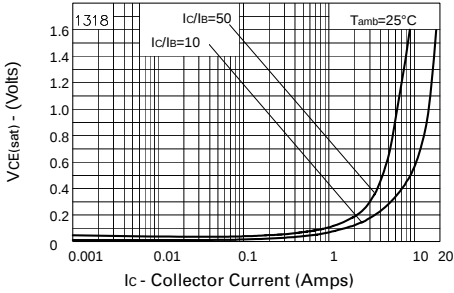
# FZT951

## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

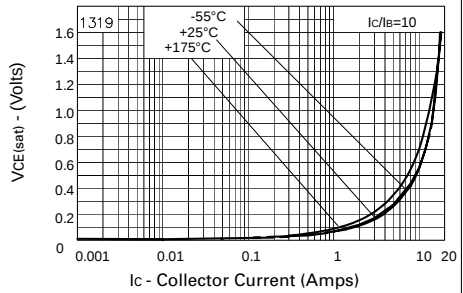
| PARAMETER                             | SYMBOL                                | MIN.                   | TYP.                       | MAX.                        | UNIT                 | CONDITIONS.                                                                                                                                                                                     |
|---------------------------------------|---------------------------------------|------------------------|----------------------------|-----------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage      | $V_{(BR)CBO}$                         | -100                   | -140                       |                             | V                    | $I_C = -100\mu\text{A}$                                                                                                                                                                         |
| Collector-Emitter Breakdown Voltage   | $V_{(BR)CER}$                         | -100                   | -140                       |                             | V                    | $I_C = -1\mu\text{A}$ , $R_B \leq 1\text{k}\Omega$                                                                                                                                              |
| Collector-Emitter Breakdown Voltage   | $V_{(BR)CEO}$                         | -60                    | -90                        |                             | V                    | $I_C = -10\text{mA}^*$                                                                                                                                                                          |
| Emitter-Base Breakdown Voltage        | $V_{(BR)EBO}$                         | -6                     | -8                         |                             | V                    | $I_E = -100\mu\text{A}$                                                                                                                                                                         |
| Collector Cut-Off Current             | $I_{CBO}$                             |                        |                            | -50<br>-1                   | nA<br>$\mu\text{A}$  | $V_{CB} = -80\text{V}$<br>$V_{CB} = -80\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$                                                                                                              |
| Collector Cut-Off Current             | $I_{CER}$<br>$R \leq 1\text{k}\Omega$ |                        |                            | -50<br>-1                   | nA<br>$\mu\text{A}$  | $V_{CB} = -80\text{V}$<br>$V_{CB} = -80\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$                                                                                                              |
| Emitter Cut-Off Current               | $I_{EBO}$                             |                        |                            | -10                         | nA                   | $V_{EB} = -6\text{V}$                                                                                                                                                                           |
| Collector-Emitter Saturation Voltage  | $V_{CE(sat)}$                         |                        | -20<br>-85<br>-155<br>-370 | -50<br>-140<br>-210<br>-460 | mV<br>mV<br>mV<br>mV | $I_C = -100\text{mA}$ , $I_B = -10\text{mA}^*$<br>$I_C = -1\text{A}$ , $I_B = -100\text{mA}^*$<br>$I_C = -2\text{A}$ , $I_B = -200\text{mA}^*$<br>$I_C = -5\text{A}$ , $I_B = -500\text{mA}^*$  |
| Base-Emitter Saturation Voltage       | $V_{BE(sat)}$                         |                        | -1080                      | -1240                       | mV                   | $I_C = -5\text{A}$ , $I_B = -500\text{mA}^*$                                                                                                                                                    |
| Base-Emitter Turn-On Voltage          | $V_{BE(on)}$                          |                        | -935                       | -1070                       | mV                   | $I_C = -5\text{A}$ , $V_{CE} = -1\text{V}^*$                                                                                                                                                    |
| Static Forward Current Transfer Ratio | $h_{FE}$                              | 100<br>100<br>75<br>10 | 200<br>200<br>90<br>25     | 300                         |                      | $I_C = -10\text{mA}$ , $V_{CE} = -1\text{V}^*$<br>$I_C = -2\text{A}$ , $V_{CE} = -1\text{V}^*$<br>$I_C = -5\text{A}$ , $V_{CE} = -1\text{V}^*$<br>$I_C = -10\text{A}$ , $V_{CE} = -1\text{V}^*$ |
| Transition Frequency                  | $f_T$                                 |                        | 120                        |                             | MHz                  | $I_C = -100\text{mA}$ , $V_{CE} = -10\text{V}$<br>$f = 50\text{MHz}$                                                                                                                            |
| Output Capacitance                    | $C_{obo}$                             |                        | 74                         |                             | pF                   | $V_{CB} = -10\text{V}$ , $f = 1\text{MHz}$                                                                                                                                                      |
| Switching Times                       | $t_{on}$<br>$t_{off}$                 |                        | 82<br>350                  |                             | ns<br>ns             | $I_C = -2\text{A}$ , $I_{B1} = -200\text{mA}$<br>$I_{B2} = 200\text{mA}$ , $V_{CC} = -10\text{V}$                                                                                               |

\* Measured under pulsed conditions. Pulse width = 300 $\mu\text{s}$ . duty cycle  $\leq 2\%$   
Spice parameter data is available upon request for this device

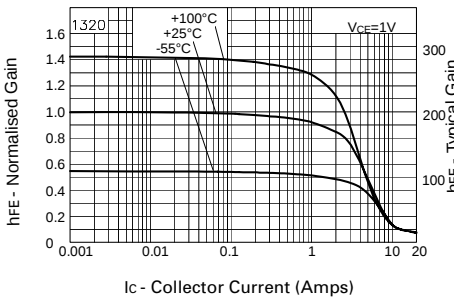
## TYPICAL CHARACTERISTICS



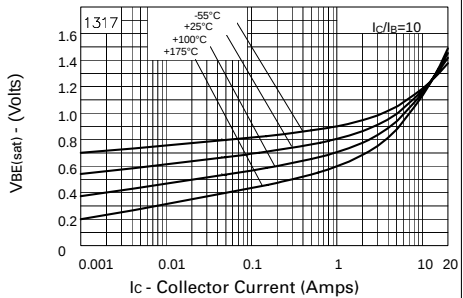
**$V_{CE(sat)}$  v  $I_C$**



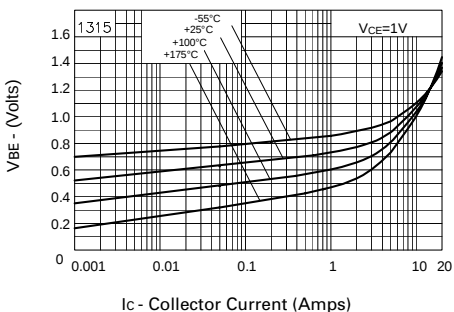
**$V_{CE(sat)}$  v  $I_C$**



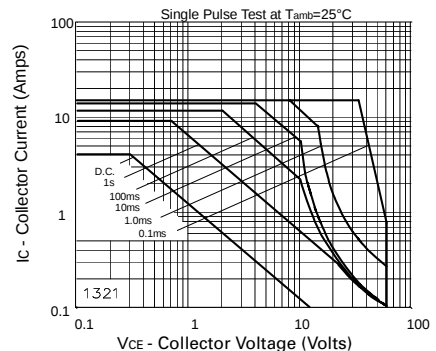
**$h_{FE}$  v  $I_C$**



**$V_{BE(sat)}$  v  $I_C$**



**$V_{BE(on)}$  v  $I_C$**



**Safe Operating Area**

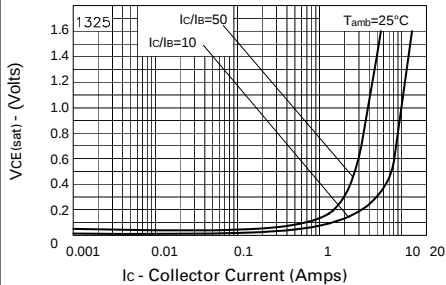
# FZT953

## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

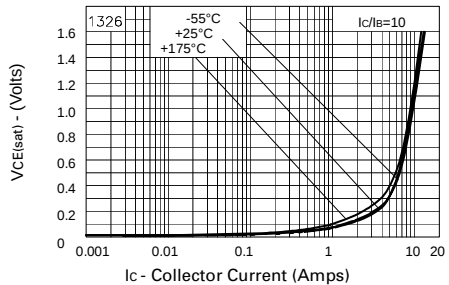
| PARAMETER                            | SYMBOL                                | MIN.                   | TYP.                         | MAX.                        | UNIT                 | CONDITIONS.                                                                                                                                                                                                                                     |
|--------------------------------------|---------------------------------------|------------------------|------------------------------|-----------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$                         | -140                   | -170                         |                             | V                    | $I_C = -100\mu\text{A}$                                                                                                                                                                                                                         |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CER}$                         | -140                   | -170                         |                             | V                    | $I_C = -1\mu\text{A}$ , $R_B \leq 1\text{k}\Omega$                                                                                                                                                                                              |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$                         | -100                   | -120                         |                             | V                    | $I_C = -10\text{mA}^*$                                                                                                                                                                                                                          |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$                         | -6                     | -8                           |                             | V                    | $I_E = -100\mu\text{A}$                                                                                                                                                                                                                         |
| Collector Cut-Off Current            | $I_{CBO}$                             |                        |                              | -50<br>-1                   | nA<br>$\mu\text{A}$  | $V_{CB} = -100\text{V}$<br>$V_{CB} = -100\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$                                                                                                                                                            |
| Collector Cut-Off Current            | $I_{CER}$<br>$R \leq 1\text{k}\Omega$ |                        |                              | -50<br>-1                   | nA<br>$\mu\text{A}$  | $V_{CB} = -100\text{V}$<br>$V_{CB} = -100\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$                                                                                                                                                            |
| Emitter Cut-Off Current              | $I_{EBO}$                             |                        |                              | -10                         | nA                   | $V_{EB} = -6\text{V}$                                                                                                                                                                                                                           |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$                         |                        | -20<br>-90<br>-160<br>-300   | -50<br>-115<br>-220<br>-420 | mV<br>mV<br>mV<br>mV | $I_C = -100\text{mA}$ , $I_B = -10\text{mA}^*$<br>$I_C = -1\text{A}$ , $I_B = -100\text{mA}^*$<br>$I_C = -2\text{A}$ , $I_B = -200\text{mA}^*$<br>$I_C = -4\text{A}$ , $I_B = -400\text{mA}^*$                                                  |
| Base-Emitter Saturation Voltage      | $V_{BE(sat)}$                         |                        | -1010                        | -1170                       | mV                   | $I_C = -4\text{A}$ , $I_B = -400\text{mA}^*$                                                                                                                                                                                                    |
| Base-Emitter Turn-On Voltage         | $V_{BE(on)}$                          |                        | -925                         | -1160                       | mV                   | $I_C = -4\text{A}$ , $V_{CE} = -1\text{V}^*$                                                                                                                                                                                                    |
| Static Forward Current Transfer      | $h_{FE}$                              | 100<br>100<br>50<br>30 | 200<br>200<br>90<br>50<br>15 | 300                         |                      | $I_C = -10\text{mA}$ , $V_{CE} = -1\text{V}^*$<br>$I_C = -1\text{A}$ , $V_{CE} = -1\text{V}^*$<br>$I_C = -3\text{A}$ , $V_{CE} = -1\text{V}^*$<br>$I_C = -4\text{A}$ , $V_{CE} = -1\text{V}^*$<br>$I_C = -10\text{A}$ , $V_{CE} = -1\text{V}^*$ |
| Transition Frequency                 | $f_T$                                 |                        | 125                          |                             | MHz                  | $I_C = -100\text{mA}$ , $V_{CE} = -10\text{V}$<br>$f = 50\text{MHz}$                                                                                                                                                                            |
| Output Capacitance                   | $C_{obo}$                             |                        | 65                           |                             | pF                   | $V_{CB} = -10\text{V}$ , $f = 1\text{MHz}$                                                                                                                                                                                                      |
| Switching Times                      | $t_{on}$<br>$t_{off}$                 |                        | 110<br>460                   |                             | ns<br>ns             | $I_C = -2\text{A}$ , $I_{B1} = -200\text{mA}$<br>$I_{B2} = 200\text{mA}$ , $V_{CC} = -10\text{V}$                                                                                                                                               |

\*Measured under pulsed conditions. Pulse width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$   
Spice parameter data is available upon request for this device

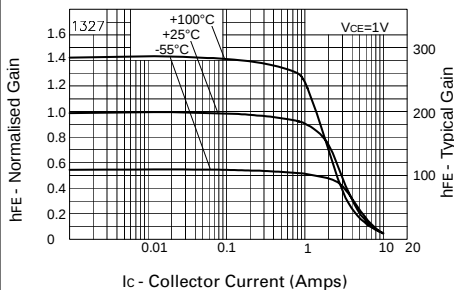
## TYPICAL CHARACTERISTICS



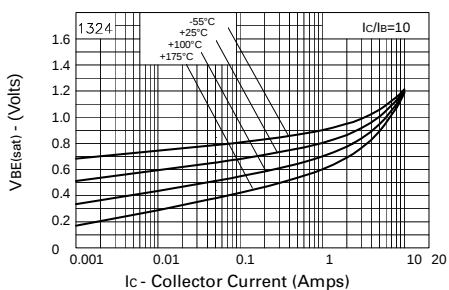
$V_{CE(sat)}$  v  $I_C$



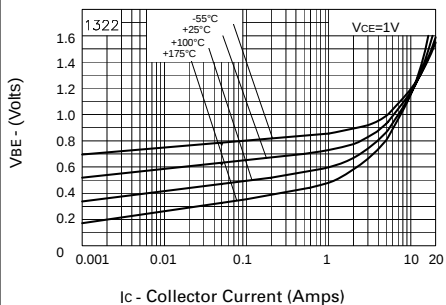
$V_{CE(sat)}$  v  $I_C$



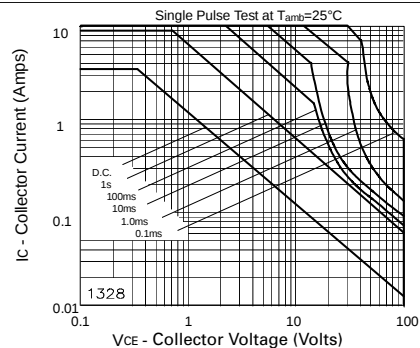
$hFE$  v  $I_C$



$V_{BE(sat)}$  v  $I_C$



$V_{BE(on)}$  v  $I_C$



Safe Operating Area

## Данный компонент на территории Российской Федерации

**Вы можете приобрести в компании MosChip.**

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

moschip.ru\_4

moschip.ru\_6

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