

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

ISSUE 3 - APRIL 2000

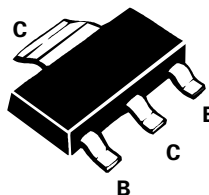
**FZT951**  
**FZT953**

## 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

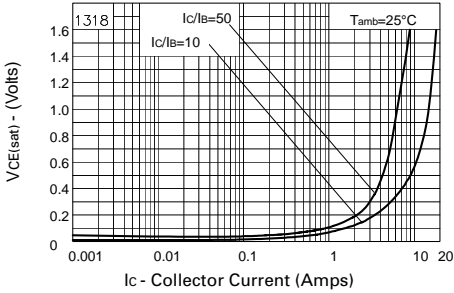
# FZT951

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

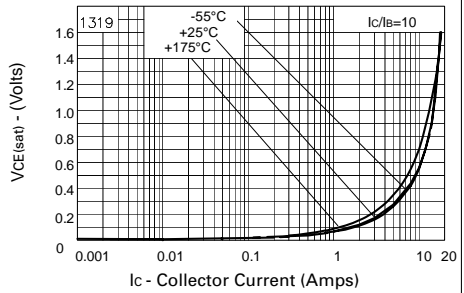
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-100	-140		V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{(BR)CER}$	-100	-140		V	$I_C = -1\mu\text{A}$ , $R_B \leq 1\text{k}\Omega$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-60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

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

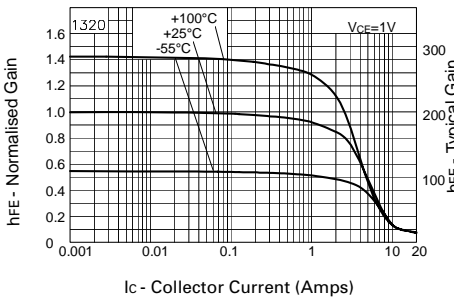
## TYPICAL CHARACTERISTICS



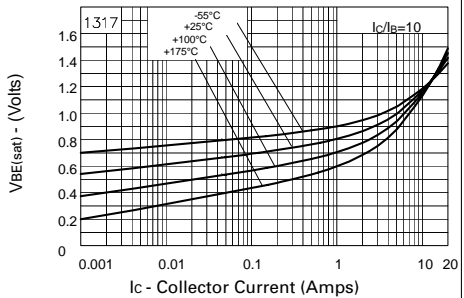
**$V_{CE(sat)}$  v  $I_C$**



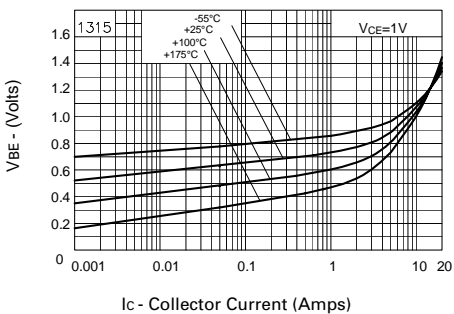
**$V_{CE(sat)}$  v  $I_C$**



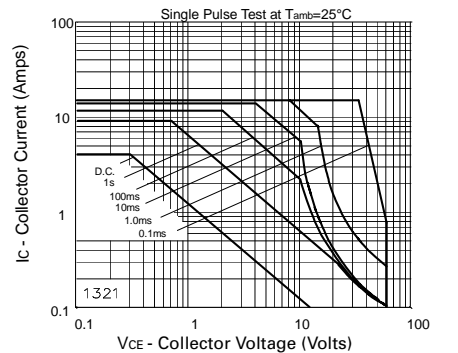
**$h_{FE}$  v  $I_C$**



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



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



**Safe Operating Area**

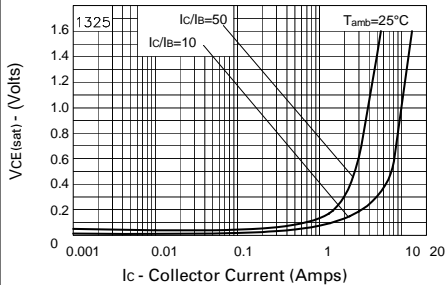
# FZT953

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

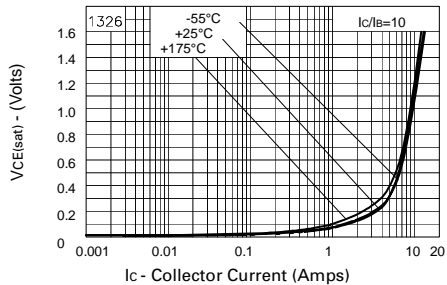
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-140	-170		V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{(BR)CER}$	-140	-170		V	$I_C = -1\mu\text{A}$ , $R_B \leq 1\text{k}\Omega$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-100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

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

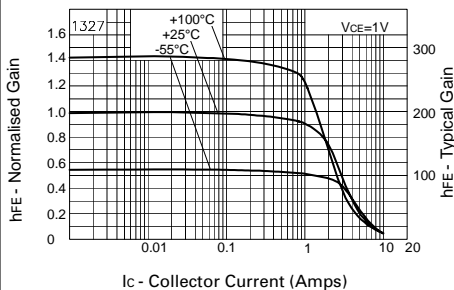
## TYPICAL CHARACTERISTICS



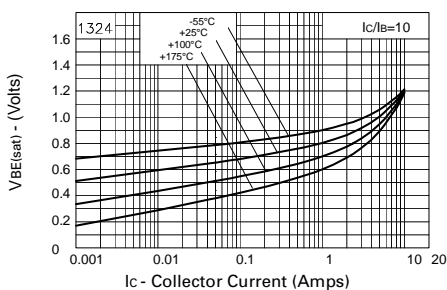
**$V_{CE(sat)}$  v  $I_C$**



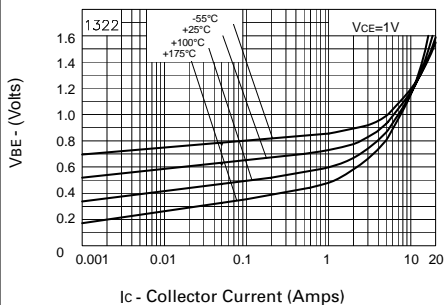
**$V_{CE(sat)}$  v  $I_C$**



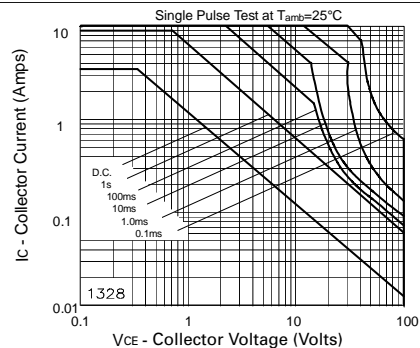
**$hFE$  v  $I_C$**



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



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



**Safe Operating Area**

# Mouser Electronics

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