

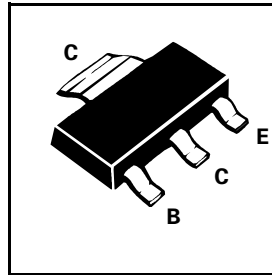
# SOT223 PNP SILICON PLANAR HIGH CURRENT (HIGH PERFORMANCE) TRANSISTORS

**FZT948**  
**FZT949**

ISSUE 2 - NOVEMBER 1995

## FEATURES

- \* Extremely low equivalent on-resistance;  $R_{CE(sat)}$
- \* 6 Amps continuous current
- \* Up to 20 Amps peak current
- \* Very low saturation voltage
- \* Excellent  $h_{FE}$  characteristics specified upto 20 Amps



PARTMARKING DETAILS — DEVICE TYPE IN FULL

## ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	FZT948	FZT949	UNIT
Collector-Base Voltage	$V_{CBO}$	-40	-50	V
Collector-Emitter Voltage	$V_{CEO}$	-20	-30	V
Emitter-Base Voltage	$V_{EBO}$	-6		V
Peak Pulse Current	$I_{CM}$	-20		A
Continuous Collector Current	$I_C$	-6	-5.5	A
Power Dissipation at $T_{amb}=25^{\circ}C$	$P_{tot}$	3		W
Operating and Storage Temperature Range	$T_j; T_{stg}$	-55 to +150		$^{\circ}C$

\*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

 **ZETEX**

# FZT948

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-40	-55		V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{(BR)CER}$	-40	-55		V	$I_C = -1\mu\text{A}$ , $R_B \leq 1\text{k}\Omega$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-20	-30		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 $\mu\text{A}$	$V_{CB} = -30\text{V}$ $V_{CB} = -30\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$
Collector Cut-Off Current	$I_{CER}$ $R \leq 1\text{k}\Omega$			-50 -1	nA $\mu\text{A}$	$V_{CB} = -30\text{V}$ $V_{CB} = -30\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$
Emitter Cut-Off Current	$I_{EBO}$			-10	nA	$V_{EB} = -6\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		-60 -110 -200 -360	-130 -180 -280 -450	mV mV mV mV	$I_C = -0.5\text{A}$ , $I_B = -10\text{mA}^*$ $I_C = -2\text{A}$ , $I_B = -200\text{mA}^*$ $I_C = -4\text{A}$ , $I_B = -400\text{mA}^*$ $I_C = -6\text{A}$ , $I_B = -250\text{mA}^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$		-1050	-1200	mV	$I_C = -5\text{A}$ , $I_B = -300\text{mA}^*$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$		-870	-1050	mV	$I_C = -6\text{A}$ , $V_{CE} = -1\text{V}^*$
Static Forward Current Transfer Ratio	$h_{FE}$	100 100 75 60 15	200 200 160 130 40	300		$I_C = -10\text{mA}$ , $V_{CE} = -1\text{V}$ $I_C = -1\text{A}$ , $V_{CE} = -1\text{V}^*$ $I_C = -5\text{A}$ , $V_{CE} = -1\text{V}^*$ $I_C = -10\text{A}$ , $V_{CE} = -1\text{V}^*$ $I_C = -20\text{A}$ , $V_{CE} = -2\text{V}^*$
Transition Frequency	$f_T$		80		MHz	$I_C = -100\text{mA}$ , $V_{CE} = -10\text{V}$ $f = 50\text{MHz}$
Output Capacitance	$C_{obo}$		163		pF	$V_{CB} = -10\text{V}$ , $f = 1\text{MHz}$
Switching Times	$t_{on}$ $t_{off}$		120 126		ns ns	$I_C = -4\text{A}$ , $I_{B1} = -400\text{mA}$ $I_{B2} = 400\text{mA}$ , $V_{CC} = -10\text{V}$

\*Measured under pulsed conditions. Pulse width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$

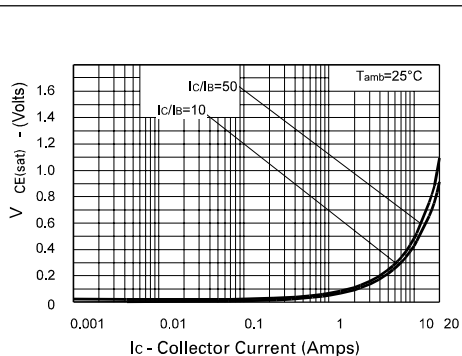
Spice parameter data is available upon request for this device

**$R_{CE(sat)}$  46m $\Omega$  at 5A**

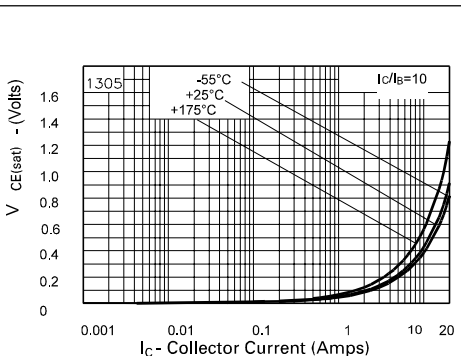


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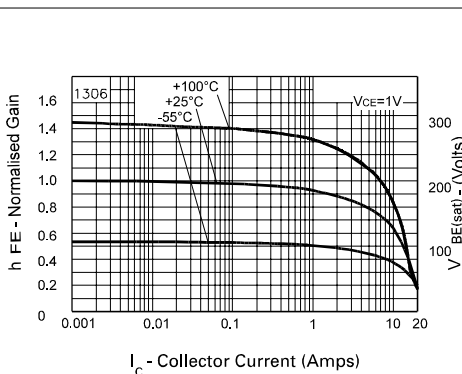
## TYPICAL CHARACTERISTICS



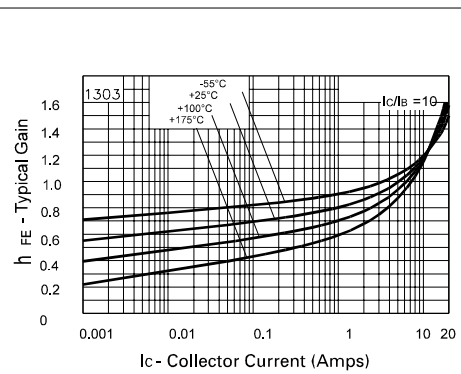
$V_{CE(sat)}$  v  $I_C$



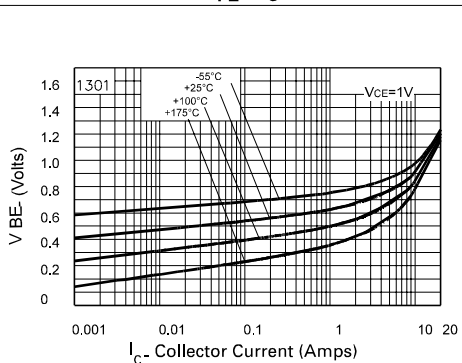
$V_{CE(sat)}$  v  $I_C$



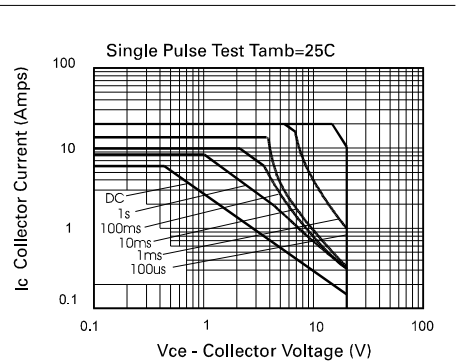
$h_{FE}$  v  $I_C$



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



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



Safe Operating Area

# FZT949

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-50	-80		V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{(BR)CER}$	-50	-80		V	$I_C = -1\mu\text{A}$ , $R_B \leq 1\text{k}\Omega$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-30	-45		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 $\mu\text{A}$	$V_{CB} = -40\text{V}$ $V_{CB} = -40\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$
Collector Cut-Off Current	$I_{CER}$ $R \leq 1\text{k}\Omega$			-50 -1	nA $\mu\text{A}$	$V_{CB} = -40\text{V}$ $V_{CB} = -40\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$
Emitter Cut-Off Current	$I_{EBO}$			-10	nA	$V_{EB} = -6\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		-50 -85 -190 -350	-75 -140 -270 -440	mV mV mV mV	$I_C = -0.5\text{A}$ , $I_B = -20\text{mA}^*$ $I_C = -1\text{A}$ , $I_B = -20\text{mA}^*$ $I_C = -2\text{A}$ , $I_B = -200\text{mA}^*$ $I_C = -5.5\text{A}$ , $I_B = -500\text{mA}^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$		-1100	-1250	mV	$I_C = -5.5\text{A}$ , $I_B = -500\text{mA}^*$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$		-900	-1060	mV	$I_C = -5.5\text{A}$ , $V_{CE} = -1\text{V}^*$
Static Forward Current Transfer Ratio	$h_{FE}$	100 100 75	200 200 140 35	300		$I_C = -10\text{mA}$ , $V_{CE} = -1\text{V}$ $I_C = -1\text{A}$ , $V_{CE} = -1\text{V}^*$ $I_C = -5\text{A}$ , $V_{CE} = -1\text{V}^*$ $I_C = -20\text{A}$ , $V_{CE} = -2\text{V}^*$
Transition Frequency	$f_T$		100		MHz	$I_C = -100\text{mA}$ , $V_{CE} = -10\text{V}$ $f = 50\text{MHz}$
Output Capacitance	$C_{obo}$		122		pF	$V_{CB} = -10\text{V}$ , $f = 1\text{MHz}$
Switching Times	$t_{on}$ $t_{off}$		120 130		ns ns	$I_C = -4\text{A}$ , $I_{B1} = -400\text{mA}$ $I_{B2} = 400\text{mA}$ , $V_{CC} = -10\text{V}$

\*Measured under pulsed conditions. Pulse width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$

Spice parameter data is available upon request for this device

**$R_{CE(sat)}$  44m $\Omega$  at 4.5A**



# FZT949

## TYPICAL CHARACTERISTICS

