

# NPN SILICON PLANAR MEDIUM POWER HIGH CURRENT TRANSISTOR

## ZTX857

ISSUE 1 – APRIL 94

### FEATURES

- \* 300 Volt  $V_{CE0}$
- \* 3 Amps continuous current
- \* Up to 5 Amps peak current
- \* Very low saturation voltage
- \*  $P_{tot} = 1.2$  Watt



**E-Line  
TO92 Compatible**

### ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	$V_{CBO}$	330	V
Collector-Emitter Voltage	$V_{CEO}$	300	V
Emitter-Base Voltage	$V_{EBO}$	6	V
Peak Pulse Current	$I_{CM}$	5	A
Continuous Collector Current	$I_C$	3	A
Practical Power Dissipation*	$P_{totp}$	1.58	W
Power Dissipation at $T_{amb}=25^{\circ}C$	$P_{tot}$	1.2	W
Operating and Storage Temperature Range	$T_j; T_{stg}$	-55 to +200	$^{\circ}C$

\*The power which can be dissipated assuming the device is mounted in a typical manner on a P.C.B. with copper equal to 1 inch square minimum

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	330	475		V	$I_C=100\mu A$
Collector-Emitter Breakdown Voltage	$V_{(BR)CER}$	330	475		V	$I_C=1\mu A, R_B \leq 1K\Omega$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	300	350		V	$I_C=10mA^*$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	6	8		V	$I_E=100\mu A$
Collector Cut-Off Current	$I_{CBO}$			50 1	nA $\mu A$	$V_{CB}=300V$ $V_{CB}=300V, T_{amb}=100^{\circ}C$
Collector Cut-Off Current	$I_{CER}$ $R \leq 1K\Omega$			50 1	nA $\mu A$	$V_{CB}=300V$ $V_{CB}=300V, T_{amb}=100^{\circ}C$
Emitter Cut-Off Current	$I_{EBO}$			10	nA	$V_{EB}=6V$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		50 80 140 170	100 140 200 250	mV mV mV mV	$I_C=0.5A, I_B=50mA^*$ $I_C=1A, I_B=100mA^*$ $I_C=2A, I_B=200mA^*$ $I_C=3A, I_B=600mA^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$		870	1000	mV	$I_C=2A, I_B=200mA^*$

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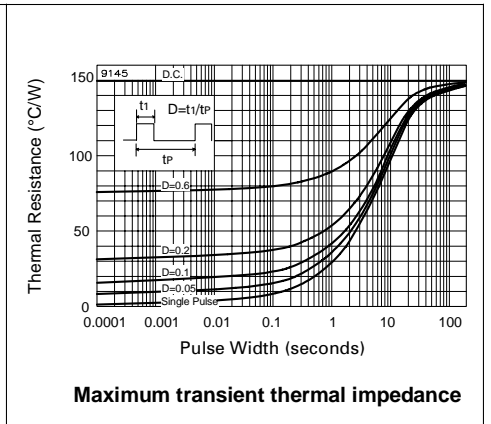
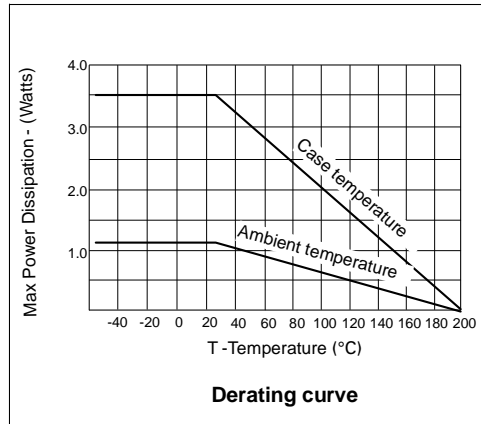
## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ )

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Base-Emitter Turn-On Voltage	$V_{BE(on)}$		810	950	mV	$I_C=2\text{A}, V_{CE}=5\text{V}^*$
Static Forward Current Transfer Ratio	$h_{FE}$	100 100 15	200 200 25	300		$I_C=10\text{mA}, V_{CE}=5\text{V}$ $I_C=500\text{mA}, V_{CE}=10\text{V}^*$ $I_C=2\text{A}, V_{CE}=10\text{V}^*$ $I_C=3\text{A}, V_{CE}=10\text{V}^*$
Transition Frequency	$f_T$		80		MHz	$I_C=100\text{mA}, V_{CE}=10\text{V}$ $f=100\text{MHz}$
Output Capacitance	$C_{obo}$		11		pF	$V_{CB}=20\text{V}, f=1\text{MHz}$
Switching Times	$t_{on}$ $t_{off}$		100 5300		ns ns	$I_C=250\text{mA}, I_{B1}=25\text{mA}$ $I_{B2}=25\text{mA}, V_{CC}=50\text{V}$

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

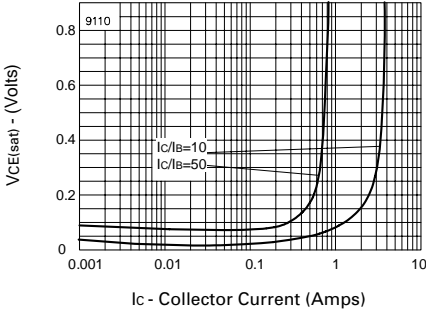
## THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	MAX.	UNIT
Thermal Resistance: Junction to Ambient Junction to Case	$R_{th(j-amb)}$ $R_{th(j-case)}$	150 50	$^{\circ}\text{C}/\text{W}$ $^{\circ}\text{C}/\text{W}$

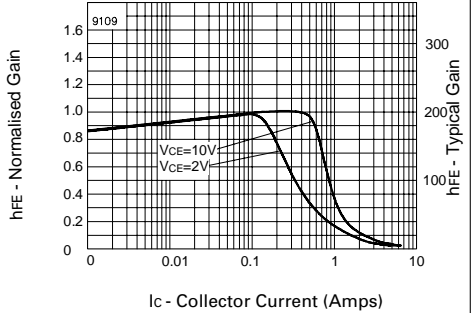


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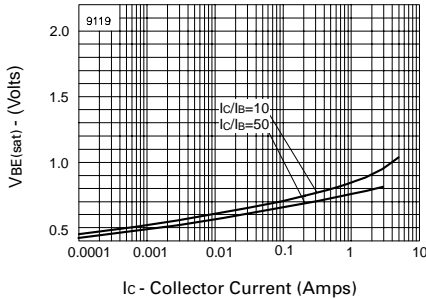
## TYPICAL CHARACTERISTICS



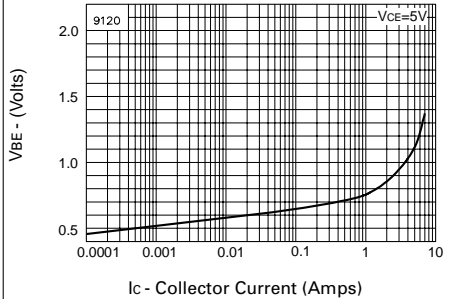
**$V_{CE(sat)}$  v  $I_C$**



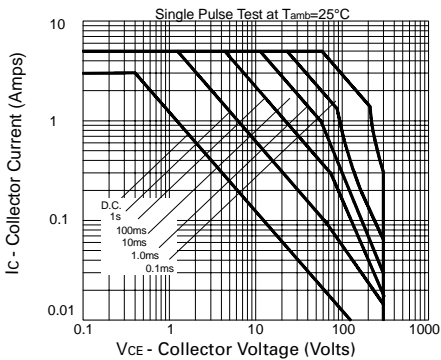
**hFE v  $I_C$**



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



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



**Safe Operating Area**