

# NPN SILICON PLANAR MEDIUM POWER HIGH CURRENT TRANSISTOR

## ZTX851

ISSUE 2 – AUGUST 94

### FEATURES

- \* 60 Volt  $V_{CEO}$
- \* 5 Amps continuous current
- \* Up to 20 Amps peak current
- \* Very low saturation voltage
- \*  $P_{tot}=1.2$  Watts

### APPLICATIONS

- \* Emergency lighting circuits



**E-Line**  
**TO92 Compatible**

### ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	$V_{CBO}$	150	V
Collector-Emitter Voltage	$V_{CEO}$	60	V
Emitter-Base Voltage	$V_{EBO}$	6	V
Peak Pulse Current	$I_{CM}$	20	A
Continuous Collector Current	$I_C$	5	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	$V_{(BR)CBO}$	150	220		V	$I_C=100\mu A$
Collector-Emitter Breakdown Voltage	$V_{(BR)CER}$	150	220		V	$I_C=1\mu A, R_B \leq 1K\Omega$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	60	85		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 $\mu A$	$V_{CB}=120V$ $V_{CB}=120V, T_{amb}=100^{\circ}C$
Collector Cut-Off Current	$I_{CER}$ $R \leq 1K\Omega$			50 1	nA $\mu A$	$V_{CB}=120V$ $V_{CB}=120V, T_{amb}=100^{\circ}C$
Emitter Cut-Off Current	$I_{EBO}$			10	nA	$V_{EB}=6V$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		10 50 100 200	50 100 150 250	mV mV mV mV	$I_C=0.1A, I_B=5mA^*$ $I_C=1A, I_B=50mA^*$ $I_C=2A, I_B=50mA^*$ $I_C=5A, I_B=200mA^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$		920	1050	mV	$I_C=4A, I_B=200mA^*$

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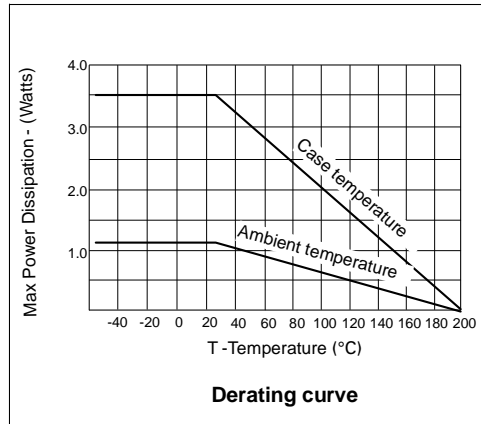
## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ )

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Base-Emitter Turn-On Voltage	$V_{BE(on)}$		840	950	mV	$I_C=4A, V_{CE}=1V^*$
Static Forward Current Transfer Ratio	$h_{FE}$	100 100 75 25	200 200 120 50	300		$I_C=10mA, V_{CE}=1V$ $I_C=2A, V_{CE}=1V^*$ $I_C=5A, V_{CE}=1V^*$ $I_C=10A, V_{CE}=1V^*$
Transition Frequency	$f_T$		130		MHz	$I_C=100mA, V_{CE}=10V$ $f=50MHz$
Output Capacitance	$C_{obo}$		45		pF	$V_{CB}=10V, f=1MHz$
Switching Times	$t_{on}$ $t_{off}$		45 1100		ns ns	$I_C=1A, I_B=100mA$ $I_B=100mA, V_{CC}=10V$

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

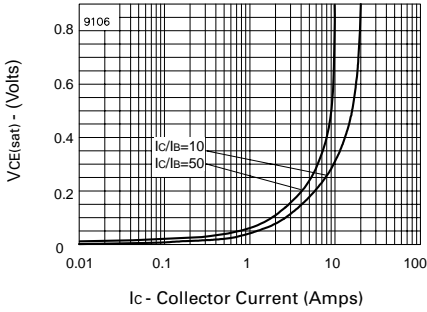
## THERMAL CHARACTERISTICS

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

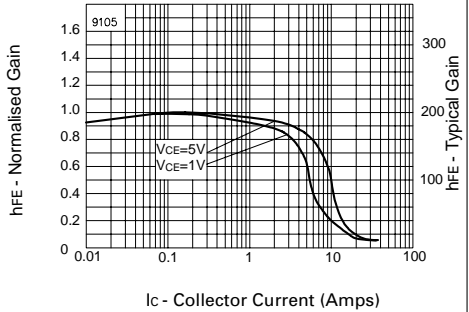


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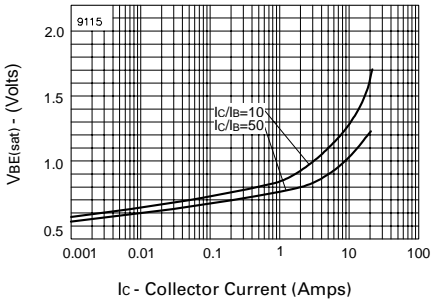
## TYPICAL CHARACTERISTICS



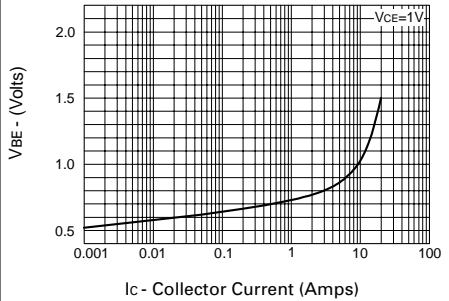
**$V_{CE(sat)}$  v  $I_C$**



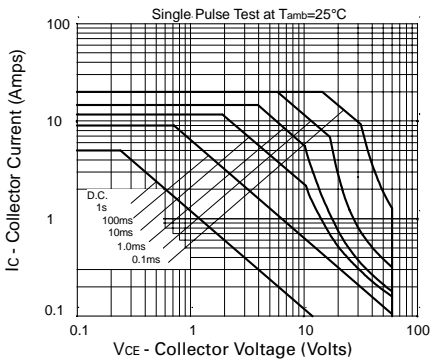
**hFE v  $I_C$**



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



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



**Safe Operating Area**