



**THE DATASHEET OF  
ZTX689BSTZ**



# ZTX689B

# NPN SILICON PLANAR MEDIUM GAIN TRANSISTOR

ISSUE 1 - MAY 94

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Transition Frequency	$f_T$	150			MHz	$I_C=50mA, V_{CE}=5V$ $f=50MHz$
Input Capacitance	$C_{ibo}$		200		pF	$V_{EB}=0.5V, f=1MHz$
Output Capacitance	$C_{obo}$		16		pF	$V_{CB}=10V, f=1MHz$
Switching Times	$t_{on}$		30		ns	$I_C=500mA, I_B=50mA$ $I_B=50mA, V_{CC}=10V$
	$t_{off}$		800		ns	

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

## FEATURES

- \* 20 Volt  $V_{CEO}$
- \* Gain of 400 at  $I_C=2$  Amps
- \* Very low saturation voltage

## APPLICATIONS

- \* Darlington replacement
- \* Flash gun converters
- \* Battery powered circuits
- \* Motor drivers

## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MAX.	UNIT
Collector-Base Voltage	$V_{CB}$	175	$^{\circ}C/W$
Collector-Emitter Voltage	$V_{CE}$	116	$^{\circ}C/W$
Emitter-Base Voltage	$V_{EB}$	70	$^{\circ}C/W$
Peak Pulse Current	$I_{CP}$		
Continuous Collector Current	$I_C$		
Practical Power Dissipation*	$P_D$		
Power Dissipation	$P_D$		at $T_{amb}=25^{\circ}C$ derate above $25^{\circ}C$
Operating and Storage Temperature Range	$T_{op}$		

\*The power which can be dissipated as P.C.B. with copper equal to 1 inch square

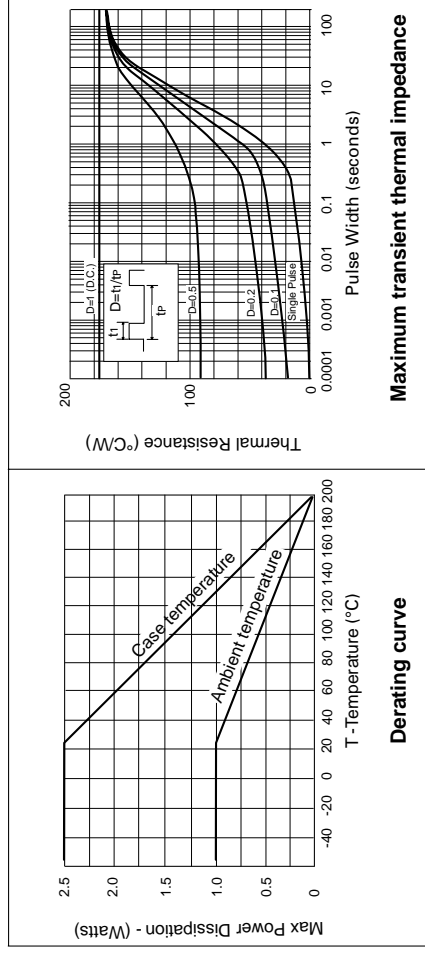
## ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	MAX.	UNIT
Collector-Base Breakdown Voltage	$V_{CB}$	175	$^{\circ}C/W$
Collector-Emitter Breakdown Voltage	$V_{CE}$	116	$^{\circ}C/W$
Emitter-Base Breakdown Voltage	$V_{EB}$	70	$^{\circ}C/W$
Collector Cut-Off Current	$I_{CBO}$		
Emitter Cut-Off Current	$I_{EBO}$		
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		
Base-Emitter Saturation Voltage	$V_{BE(sat)}$		
Base-Emitter Turn-On Voltage	$V_{BE(on)}$		
Static Forward Current Transfer Ratio	$h_{FE}$		

## THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	MAX.	UNIT
Thermal Resistance: Junction to Ambient <sub>1</sub>	$R_{th(j-amb)1}$	175	$^{\circ}C/W$
Junction to Ambient <sub>2</sub>	$R_{th(j-amb)2}$	116	$^{\circ}C/W$
Junction to Case	$R_{th(j-case)}$	70	$^{\circ}C/W$

† Device mounted on P.C.B. with copper equal to 1 sq. Inch minimum.



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Output Capacitance	$C_{obo}$		16		pF	$V_{CB}=10\text{V}$ , $f=1\text{MHz}$
Switching Times	$t_{on}$		30		ns	$I_C=500\text{mA}$ , $I_B=50\text{mA}$ $I_B=50\text{mA}$ , $V_{CC}=10\text{V}$
	$t_{off}$		800		ns	

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

## FEATURES

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## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	UNIT
Collector-Base Voltage	$V_{(BR)CBO}$	V
Collector-Emitter Voltage	$V_{(BR)CEO}$	V
Emitter-Base Voltage	$V_{(BR)EBO}$	V
Peak Pulse Current	$I_{CP}$	A
Continuous Collector Current	$I_C$	A
Practical Power Dissipation*	$P_D$	W
Power Dissipation	$P_D$	W
Operating and Storage Temperature Range	$T_{amb}$	$^{\circ}\text{C}$

\*The power which can be dissipated as P.C.B. with copper equal to 1 inch square

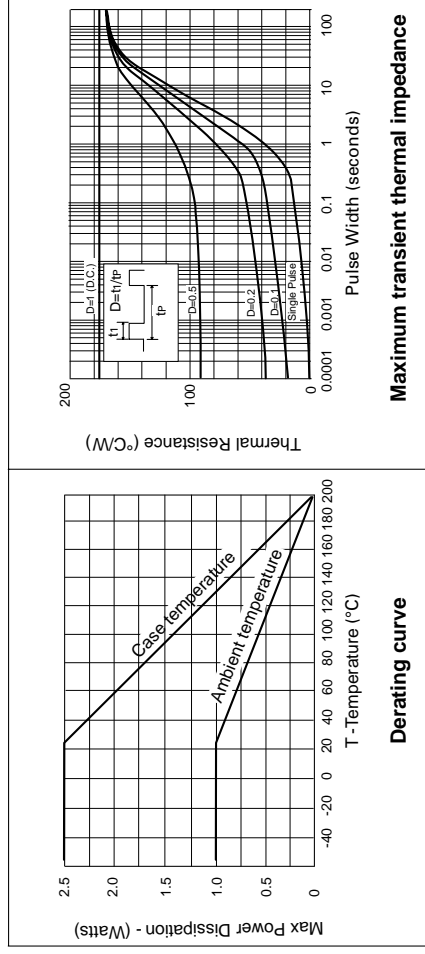
## ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	UNIT
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	V
Collector Cut-Off Current	$I_{CBO}$	$\mu\text{A}$
Emitter Cut-Off Current	$I_{EBO}$	$\mu\text{A}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	V
Base-Emitter Turn-On Voltage	$V_{BE(on)}$	V
Static Forward Current Transfer Ratio	$h_{FE}$	

## THERMAL CHARACTERISTICS

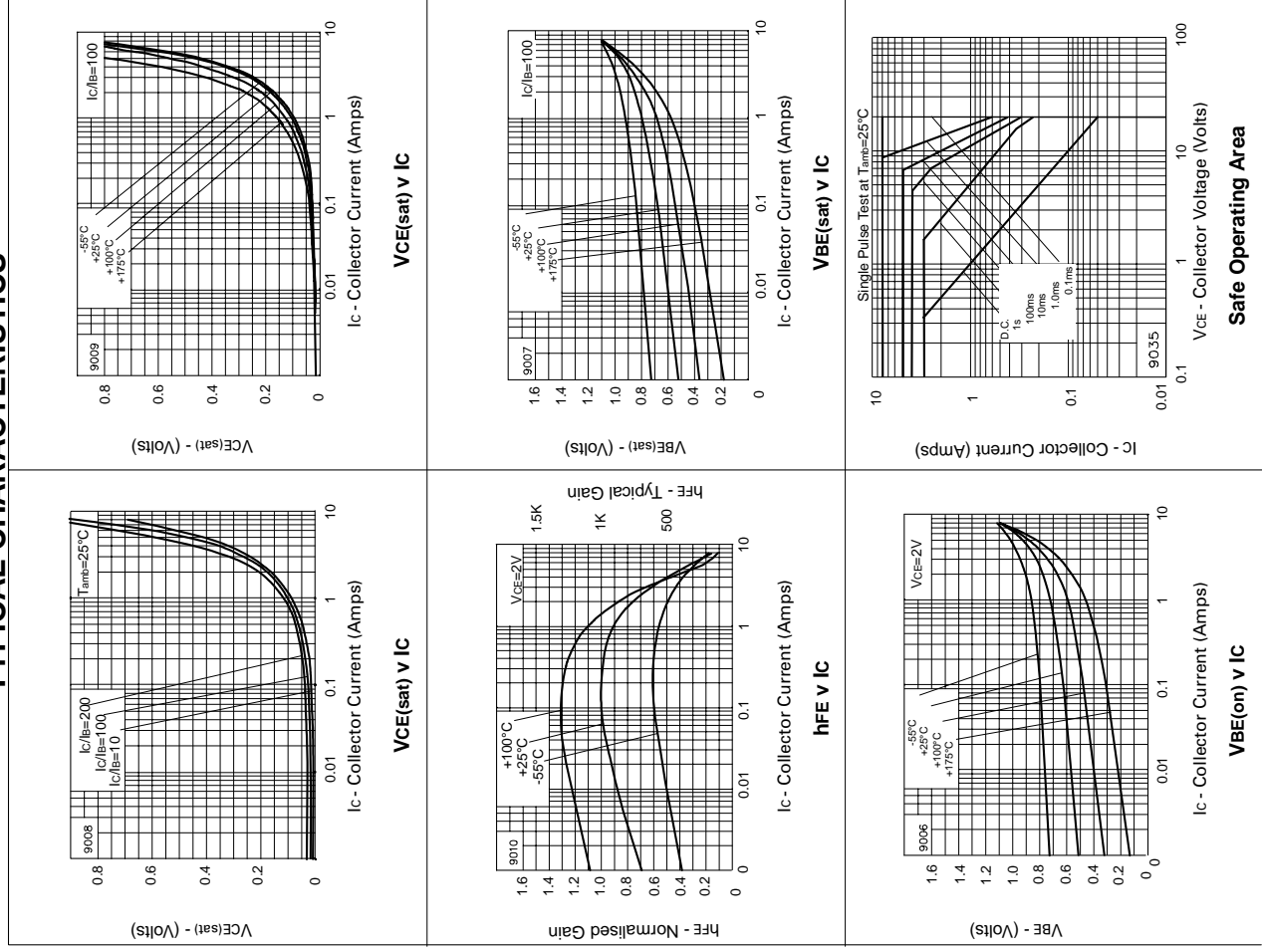
PARAMETER	SYMBOL	MAX.	UNIT
Thermal Resistance: Junction to Ambient <sub>1</sub> Junction to Ambient <sub>2</sub> Junction to Case	$R_{th(j-amb)1}$	175	$^{\circ}\text{C/W}$
	$R_{th(j-amb)2}^{\dagger}$	116	$^{\circ}\text{C/W}$
	$R_{th(j-case)}$	70	$^{\circ}\text{C/W}$

$\dagger$  Device mounted on P.C.B. with copper equal to 1 sq. Inch minimum.



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## TYPICAL CHARACTERISTICS



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