

NPN SILICON PLANAR MEDIUM POWER HIGH VOLTAGE TRANSISTOR

ZTX658

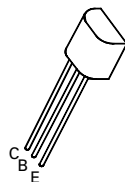
ISSUE 1 – APRIL 94

FEATURES

- * 400 Volt V_{CEO}
- * 0.5 Amp continuous current
- * $P_{tot}=1$ Watt

APPLICATIONS

- * Telephone dialler circuits



E-Line
TO92 Compatible

ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	V_{CBO}	400	V
Collector-Emitter Voltage	V_{CEO}	400	V
Emitter-Base Voltage	V_{EBO}	5	V
Peak Pulse Current	I_{CM}	1	A
Continuous Collector Current	I_C	500	mA
Power Dissipation at $T_{amb}=25^{\circ}C$ derate above $25^{\circ}C$	P_{tot}	1 5.7	W mW/ $^{\circ}C$
Operating and Storage Temperature Range	$T_j; T_{stg}$	-55 to +200	$^{\circ}C$

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	400			V	$I_C=100\mu A$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	400			V	$I_C=10mA^*$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5			V	$I_E=100\mu A$
Collector Cut-Off Current	I_{CBO}			100	nA	$V_{CB}=320V$
Collector Cut-Off Current	I_{CBO}			100	nA	$V_{CE}=320V$
Emitter Cut-Off Current	I_{EBO}			100	nA	$V_{EB}=4V$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			0.3 0.25 0.5	V V V	$I_C=20mA, I_B=1mA$ $I_C=50mA, I_B=5mA^*$ $I_C=100mA, I_B=10mA^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$			0.9	V	$I_C=100mA, I_B=10mA^*$
Base-Emitter Turn On Voltage	$V_{BE(on)}$			0.9	V	$I_C=100mA, V_{CE}=5V^*$
Static Forward Current Transfer Ratio	h_{FE}	50 50 40				$I_C=1mA, V_{CE}=5V^*$ $I_C=100mA, V_{CE}=5V^*$ $I_C=200mA, V_{CE}=10V^*$

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

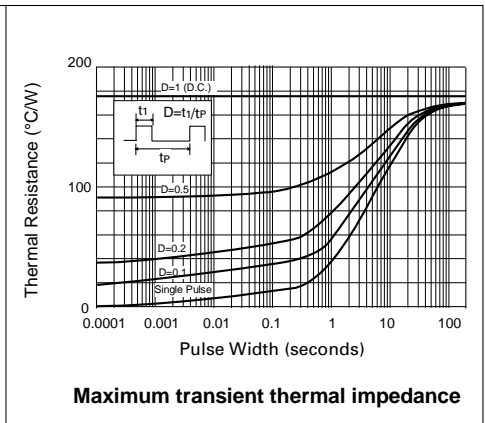
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Transition Frequency	f_T	50			MHz	$I_C=20\text{mA}$, $V_{CE}=20\text{V}$ $f=20\text{MHz}$
Collector-Base Breakdown Voltage	C_{obo}			10	pF	$V_{CB}=20\text{V}$, $f=1\text{MHz}$
Switching times	t_{on}		130		ns	$I_C=100\text{mA}$, $V_C=100\text{V}$ $I_{B1}=10\text{mA}$, $I_{B2}=-20\text{mA}$
	t_{off}		3300		ns	

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

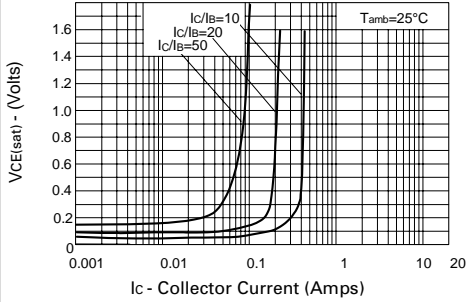
THERMAL CHARACTERISTICS

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

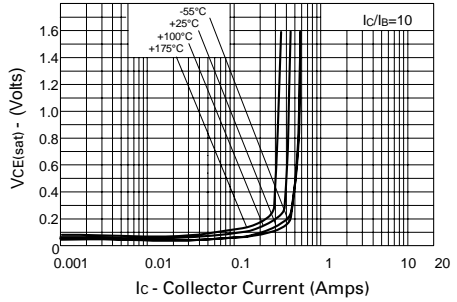
† Device mounted on P.C.B. with copper equal to 1 sq. Inch minimum.



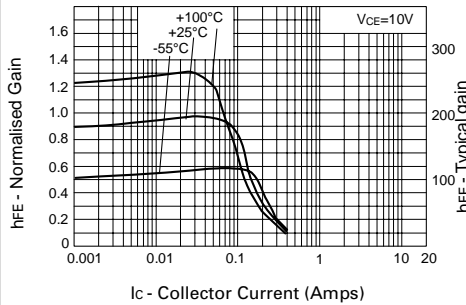
TYPICAL CHARACTERISTICS



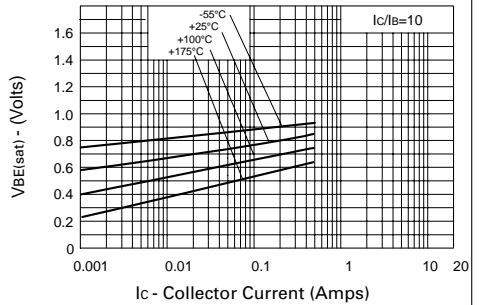
$V_{CE(sat)}$ v I_C



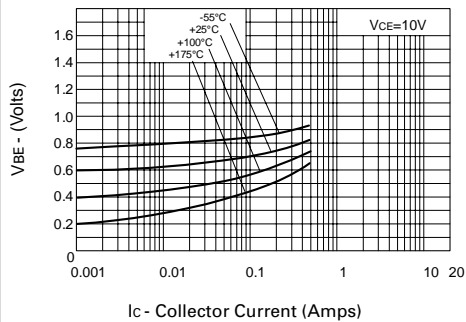
$V_{CE(sat)}$ v I_C



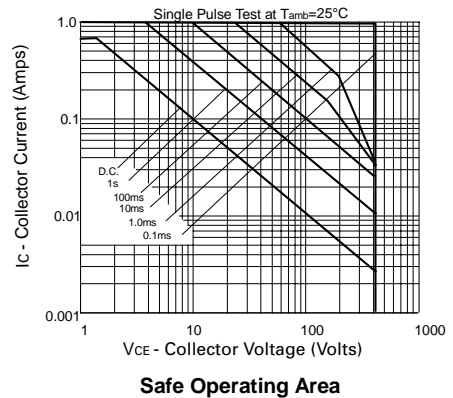
h_{FE} v I_C



$V_{BE(sat)}$ v I_C



$V_{BE(on)}$ v I_C



Safe Operating Area