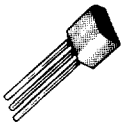
NPN Silicon Planar Medium Power High Voltage Transistors

ZTX656
ZTX657



Plastic E-Line
(TO-92 Compatible)

FEATURES

- 1W power dissipation at $T_{amb} = 25°C$
- Excellent gain characteristics at $I_C = 100mA$
- Voltages up to 300V
- Low saturation voltages
- Complementary types

DESCRIPTION

These plastic encapsulated, medium power transistors are designed for applications requiring high breakdown voltages and low saturation voltages.

The E-line package is formed by transfer moulding a silicone plastic specially selected to provide a rugged one-piece encapsulation resistant to severe environments and allow the high junction temperature operation normally associated with metal can devices.

E-line encapsulated devices are approved for use in military, industrial and professional equipments.

Alternative lead configurations are available as plug-in replacements of TO-5/39 and TO-18 metal can types, and for surface mounting. Also available on tape for automatic handling.

Complementary to ZTX756 and ZTX757.

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	ZTX656	ZTX657	Unit
Collector-base voltage	V_{CBO}	200	300	V
Collector-emitter voltage	V_{CEO}	200	300	V
Emitter-base voltage	V_{EBO}	5		V
Peak collector current (see note below)	I_{CM}	1		A
Continuous collector current	I_C	0.5		A
Practical power dissipation†	P_{totP}	1.5		W
Power dissipation : at $T_{amb} = 25°C$ derate above 25°C	P_{tot}	1 5.7		W mW/°C
Operating and storage temperature range	$t_j : t_{stg}$	−55 to +200		°C

Note: Consult Safe Operating Area graph for conditions.

† The power which can be dissipated assuming device mounted in typical manner on P.C.B. with copper equal to 1 sq.inch minimum.

ZTX656 ZTX657

CHARACTERISTICS (at $T_{amb} = 25°C$ unless otherwise stated).

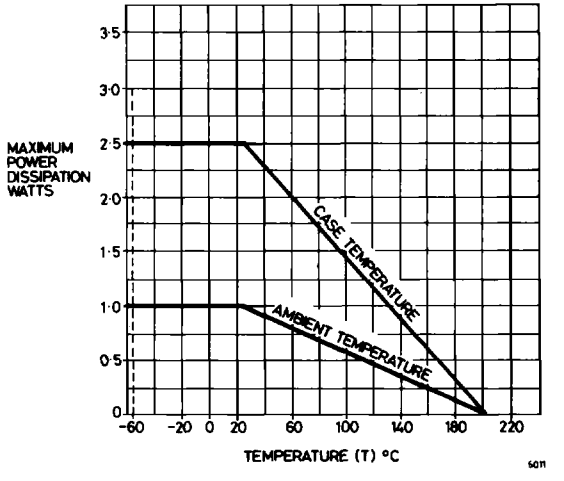
Parameter	Symbol	ZTX656		ZTX657		Unit	Conditions
		Min.	Max.	Min.	Max.		
Collector-base breakdown voltage	$V_{(BR)CBO}$	200	–	300	–	V	$I_C = 100\mu A$
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	200	–	300	–	V	$I_C = 10mA$
Emitter-base breakdown voltage	$V_{(BR)EBO}$	5	–	5	–	V	$I_E = 100\mu A$
Collector cut-off current	I_{CBO}	–	100	–	–	nA	$V_{CB} = 160V$
		–	–	–	100	nA	$V_{CB} = 200V$
Emitter cut-off current	I_{EBO}	–	100	–	100	nA	$V_{EB} = 3V$
Collector-emitter saturation voltage	$V_{CE(SAT)}$	–	0.5	–	0.5	V	$I_C = 100mA^*$, $I_B = 10mA$
Base-emitter saturation voltage	$V_{BE(SAT)}$	–	1	–	1	V	$I_C = 100mA^*$, $I_B = 10mA$
Static forward current transfer ratio	h_{FE}	50	–	50	–		$I_C = 100mA^*$, $V_{CE} = 5V$
		40	–	40	–		$I_C = 10mA$, $V_{CE} = 5V$
Base-emitter turn on voltage	$V_{BE(ON)}$	–	1	–	1	V	$I_C = 100mA^*$, $V_{CE} = 5V$
Transition frequency	f_T	30	–	30	–	MHz	$I_C = 10mA$, $V_{CE} = 20V$ $f = 20MHz$
Output capacitance	C_{obo}	–	20	–	20	pF	$V_{CB} = 20V$, $f = 1MHz$

*Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ⩽2%.

THERMAL CHARACTERISTICS

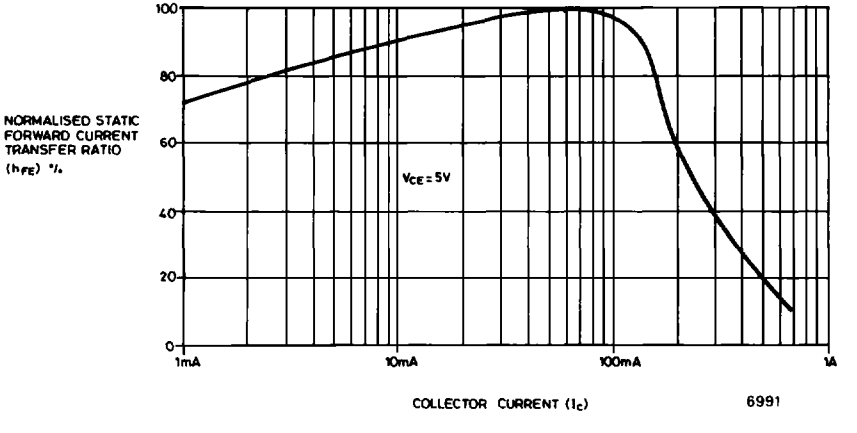
Parameter		Symbol	Maximum	Unit
Thermal resistance:	Junction to ambient$_1$	$R_{th(j\text{-}amb)1}$	175	°C/W
	Junction to ambient$_2$	$R_{th(j\text{-}amb)2}$†	116	°C/W
	Junction to case	$R_{th(j\text{-}case)}$	70	°C/W

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



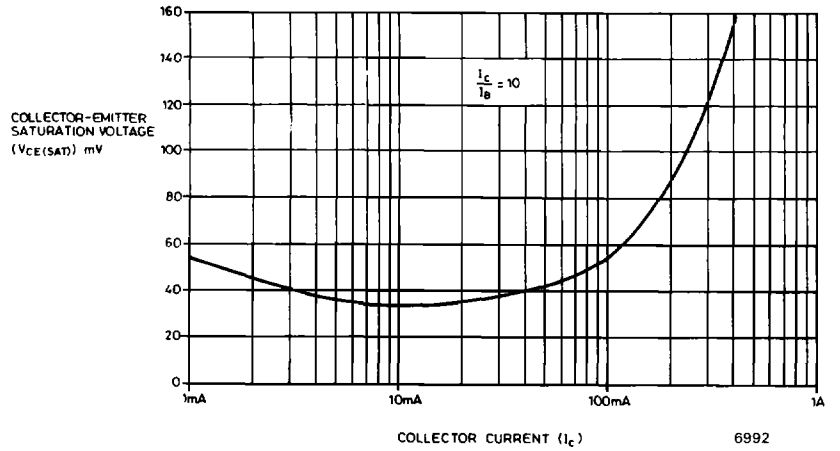
Dissipation derating curve

Typical characteristics

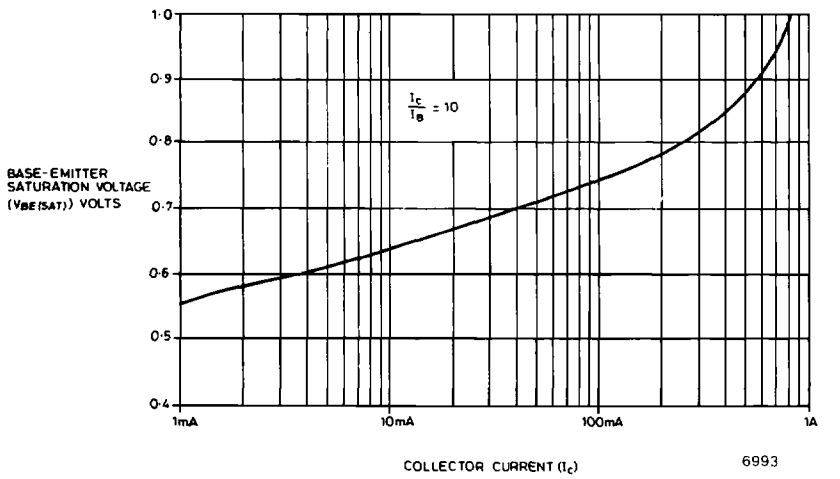


Typical static forward current transfer ratio plotted against collector current

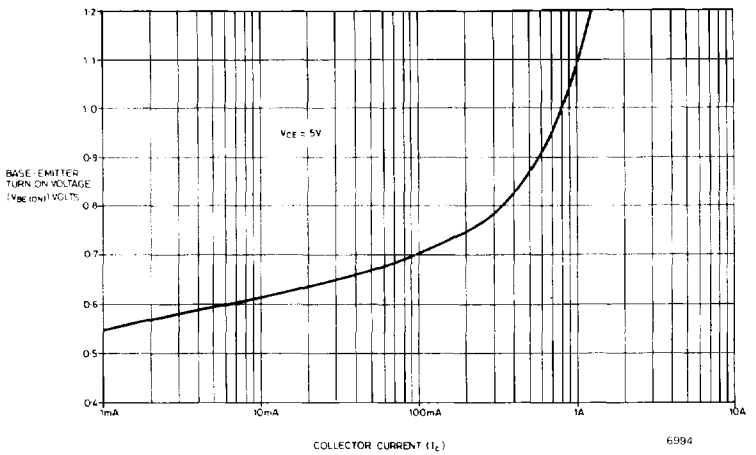
Typical characteristics



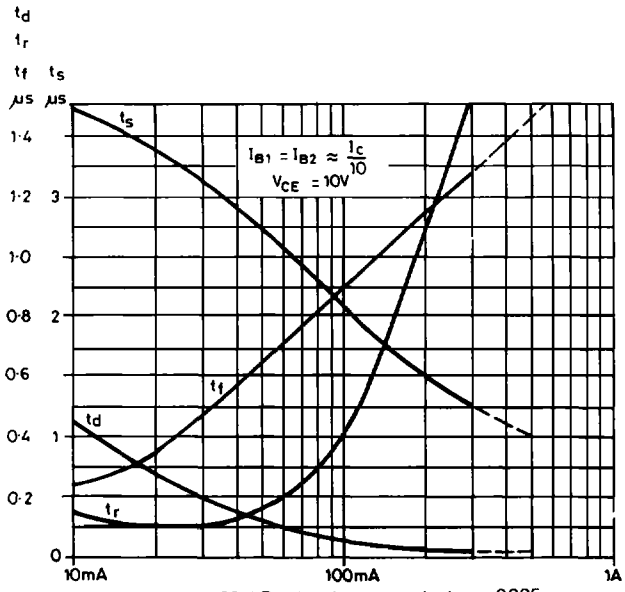
Typical collector-emitter saturation voltages plotted against collector current



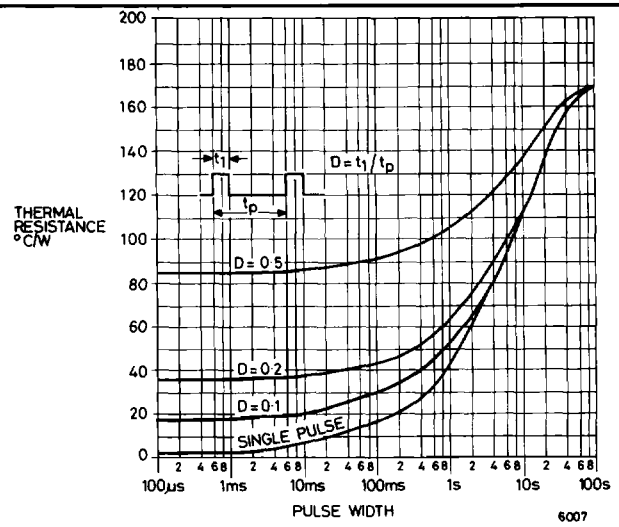
Typical base-emitter saturation voltages plotted against collector current



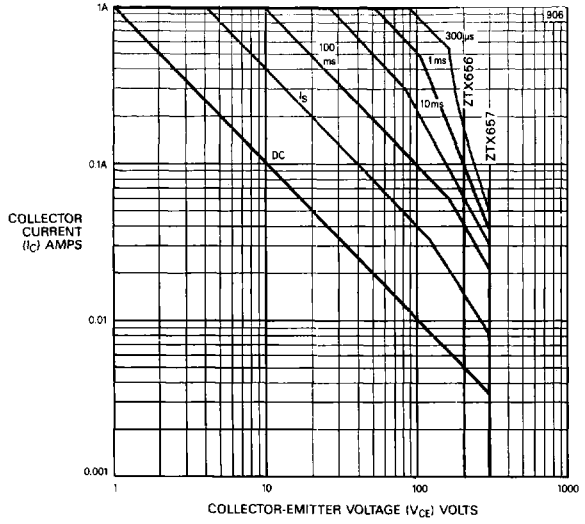
Typical base-emitter turn-on voltages plotted against collector current



Typical switching speeds



Maximum transient thermal impedance curves



Safe operating area at $T_{amb} = 25°C$ (single pulse)