



ZTX310 (BSV23)  
 ZTX311 (BSV24)  
 ZTX312 (BSV25)  
 ZTX313 (BSV26)  
 ZTX314 (BSV27)

## NPN Silicon Planar High Speed Switching Transistors

358-034

### DESCRIPTION

These are plastic encapsulated transistors specifically designed for high speed switching applications and are also useful where very short storage times and low capacitance are required.

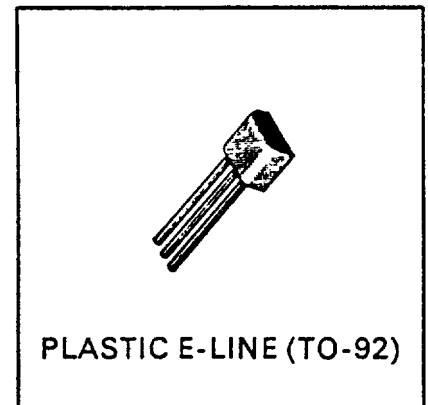
The E-line package is formed by injection moulding a SILICONE plastic specially selected to provide a rugged one-piece encapsulation resistant to severe environments and allow the high junction temperature operation normally associated with metal can devices.

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 flat mounting.

The ZTX310 series transistors have been approved for use in military equipment and are identified by the following numbers:

BS 9365 F040 to F044 – Category P.



### ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	ZTX310	ZTX311	ZTX312	ZTX313	ZTX314	Unit
Collector-Base Voltage	$V_{CBO}$	25	20	30	40	40	Volts
Collector-Emitter Voltage	$V_{CEO}$	12	15	12	15	15	Volts
Emitter-Base Voltage	$V_{EBO}$	3	5	5	5	5	Volts
Continuous Collector Current	$I_C$	500	500	500	500	500	mA
Base Current	$I_B$	100	100	100	100	100	mA
Power Dissipation (at $T_{amb} = 25^\circ C$ )	$P_{tot}$	300	300	300	300	300	mW
Operating and Storage Temp. Range		-55 to +175					$^\circ C$

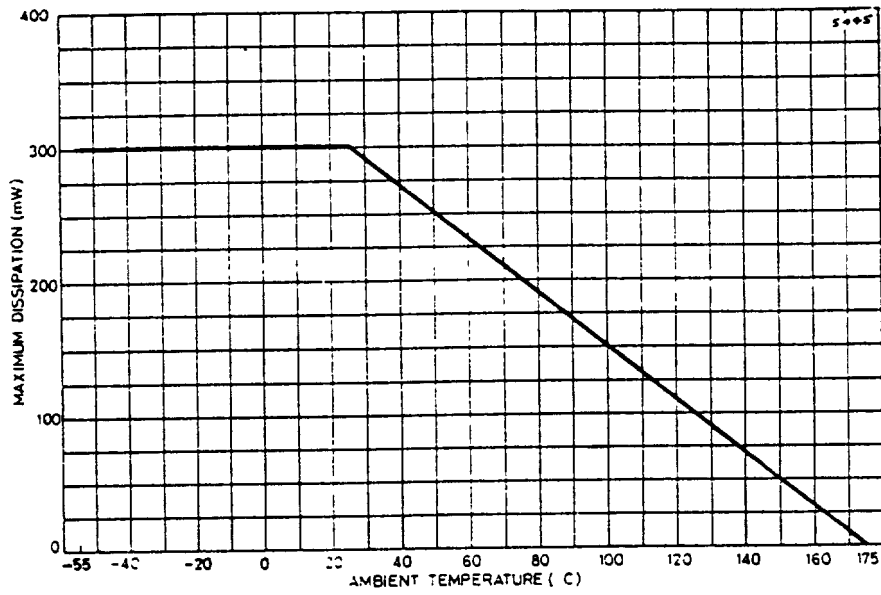
# ZTX310 Series

CHARACTERISTICS (at 25°C ambient temperature unless otherwise stated).

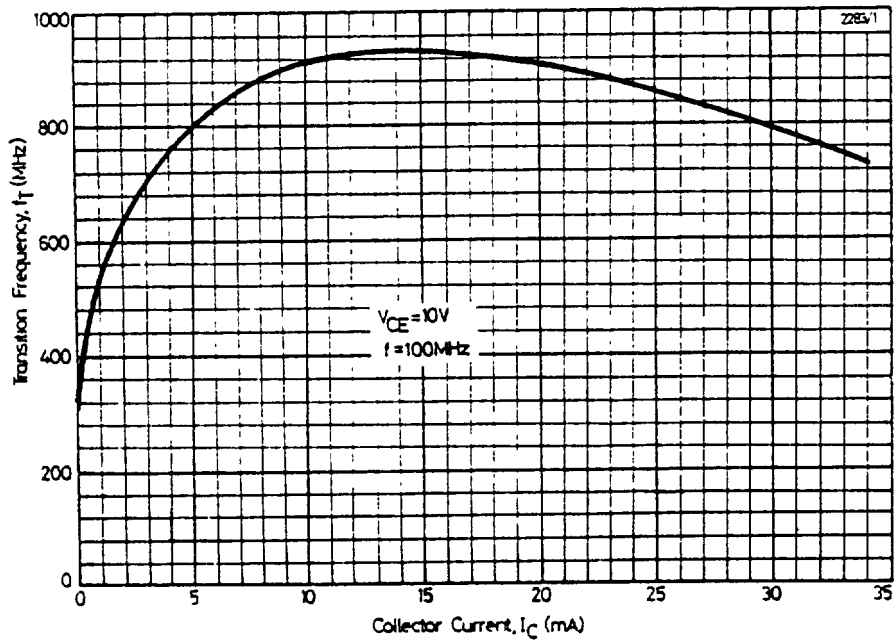
Parameter	Symbol	ZTX310 (BSV23)	ZTX311 (BSV24)	ZTX312 (BSV25)	ZTX313 (BSV26)	ZTX314 (BSV27)	Unit	Conditions
Max. Collector-base cut off current at $T_{amb} = 25^{\circ}\text{C}$	$I_{CBO}$	200	200	200	200	200	nA	$V_{CB} = 15\text{V}$ (ZTX310, 311) $V_{CB} = 20\text{V}$ (ZTX312, 313 and 314)
at $T_{amb} = 100^{\circ}\text{C}$		30	30	30	30	30	$\mu\text{A}$	
Min. Collector-base breakdown voltage	$V_{(BR)CBO}$	25	20	30	40	40	V	$I_C = 10\ \mu\text{A}$
Min. Collector-emitter sustaining voltage	$V_{CEO(sus)}$	12	15	12	15	15	V	$I_C = 10\ \text{mA}^*$
Max. Collector-emitter saturation voltage	$V_{CE(sat)}$	0.6	—	0.24	0.24	0.2	V	$I_C = 10\ \text{mA}$ $I_B = 1\ \text{mA}^*$ $I_C = 100\ \text{mA}$ $I_B = 10\ \text{mA}^*$
		—	—	—	—	0.5	V	
Base-emitter saturation voltage	$V_{BE(sat)}$	0.75	0.7	0.7	0.7	0.7	V	$I_C = 10\ \text{mA}$ $I_B = 1\ \text{mA}^*$ $I_C = 100\ \text{mA}$ $I_B = 10\ \text{mA}^*$
		0.9	0.9	0.85	0.85	0.85	V	
		—	—	—	—	1.6	V	
Static forward current transfer ratio :	$h_{FE}$	Min.	20	—	40	40	40	$I_C = 10\ \text{mA}$ $V_{CE} = 1\ \text{V}^*$ $I_C = 10\ \text{mA}$ $V_{CE} = 0.35\ \text{V}^*$ $I_C = 30\ \text{mA}$ $V_{CE} = 1\ \text{V}^*$ $I_C = 100\ \text{mA}$ $V_{CE} = 1\ \text{V}^*$ $I_C = 10\ \text{mA}$ $V_{CE} = 0.35\ \text{V}^*$
		Max.	—	—	—	120	120	
		Min.	—	50	—	—	40	
		Max.	—	200	—	—	120	
		Min.	—	—	35	—	30	
		Min.	—	—	—	15	20	
at $T_{amb} = -55^{\circ}\text{C}$	Min.	—	—	20	—	—		
Min. Transition frequency	$f_T$	200	200	400	500	500	MHz	$I_C = 10\ \text{mA}$ $V_{CE} = 10\ \text{V}$ $f = 100\ \text{MHz}$
Max. Output capacitance	$C_{obe}$	6	6	4	4	4	pF	$V_{CB} = 5\ \text{V}$ $f = 1\ \text{MHz}$
Max. Storage time	$t_{stc}$	60	25	13	13	13	ns	$I_C = I_{B1} = I_{B2}$ $= 10\ \text{mA}$
Max. Turn-on time	$t_{on}$	—	—	15	12	12	ns	$I_C = 10\ \text{mA}$ $I_{B1} = 3\ \text{mA}$
Max. Turn-off time	$t_{off}$	—	—	20	18	18	ns	$I_C = 10\ \text{mA}$ $I_{B1} = 3\ \text{mA}$ $I_{B2} = 1.5\ \text{mA}$

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

# ZTX310 Series



DERATING CURVE

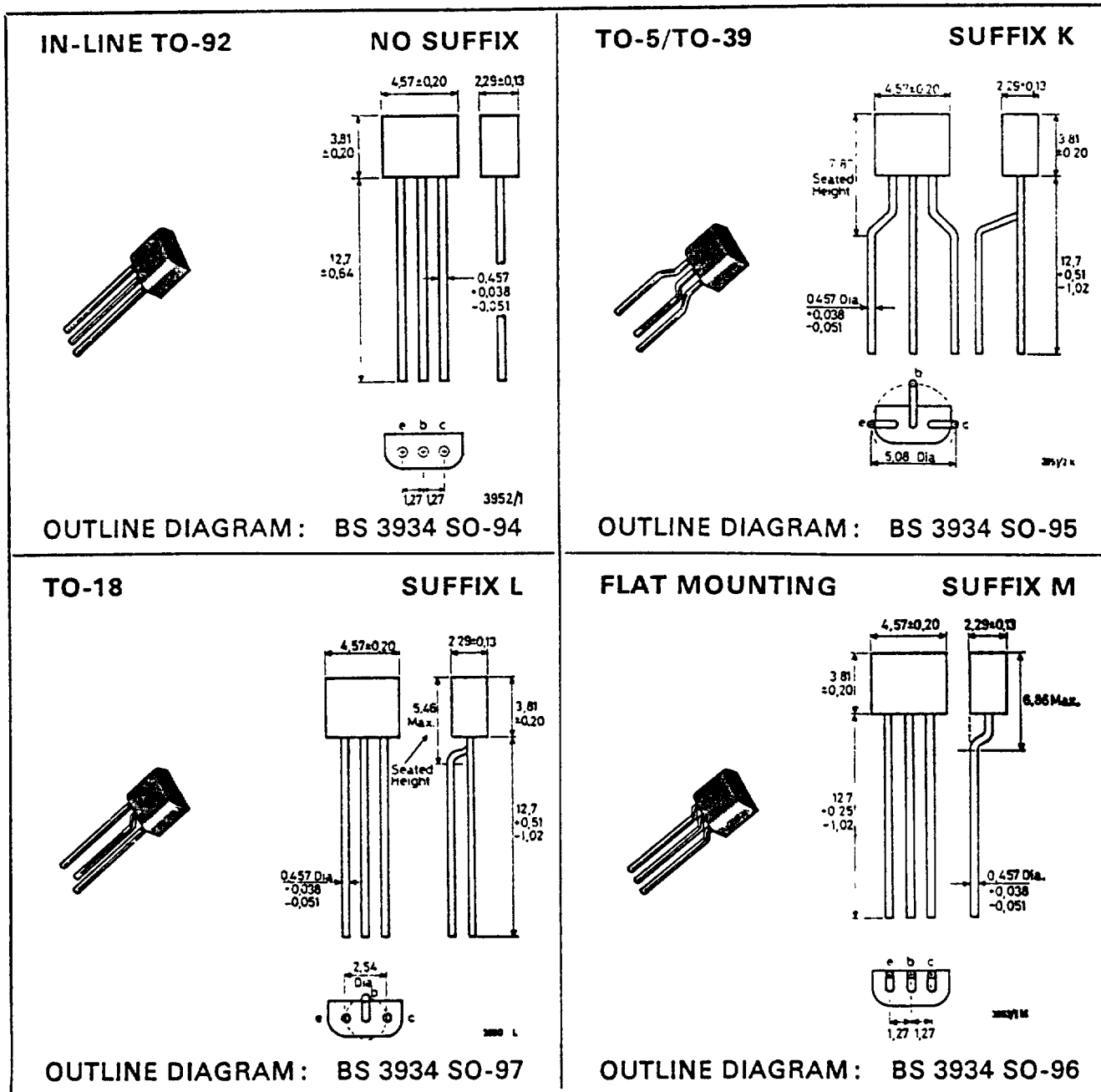


$I_C/f_T$  (ZTX312)

# ZTX310 Series

## LEAD CONFIGURATIONS

Devices can be ordered with the following lead configurations by adding the indicated suffix to the part number.



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