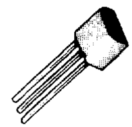
NPN Silicon Planar Medium Power Darlington Transistors

ZTX602
ZTX603



Plastic E-Line
(TO-92 Compatible)

FEATURES

- 1.5W power dissipation
- 1A continuous collector current
- 4A peak collector current
- Guaranteed h_{FE} specified up to 2A
- Fast switching

DESCRIPTION

The ZTX602 and ZTX603 are high performance medium power Darlington amplifier transistors encapsulated in the popular E-line (TO-92) plastic package.

The 1A performance permits use in a wide range of industrial consumer applications.

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 flat mounting.

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	ZTX602	ZTX603	Unit
Collector-base voltage	V_{CBO}	80	100	V
Collector-emitter voltage (note 1)	V_{CEO}	60	80	V
Emitter-base voltage	V_{EBO}	10		V
Peak pulse current (note 2)	I_{CM}	4		A
Continuous collector current	I_C	1		A
Practical power dissipation (note 3)	P_{totp}	1.5		W
Power dissipation at $T_{amb}=25°C$ (note 1) at $T_{case}=25°C$	P_{tot}	1 2.5		W W
Operating & storage temp. range (note 1)		−55 to +200		°C

Note 1: The maximum values of V_{CEO} and Power Dissipation are dependent on operating temperature. See Voltage Derating Graph for maximum power dissipation and operating temperature in a given application.

Note 2: Consult Safe Operating Area graph for conditions.

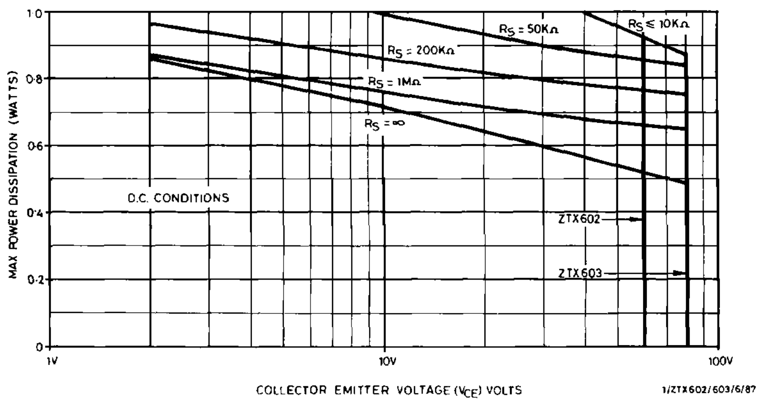
Note 3: The power which can be dissipated assuming device mounted in typical manner on P.C.B. with copper equal to 1sq.inch minimum.

ZTX602 ZTX603

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

Parameter	Symbol	ZTX602		ZTX603		Unit	Conditions
		Min.	Max.	Min.	Max.		
Collector-base breakdown voltage	$V_{(BR)CBO}$	80	–	100	–	V	$I_C = 100\mu A$
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	60	–	80	–	V	$I_C = 10mA$*
Emitter-base breakdown voltage	$V_{(BR)EBO}$	10	–	10	–	V	$I_E = 100\mu A$
Collector cut-off current	I_{CBO}	–	0.01	–	–	μA	$V_{CB} = 60V$
			10			μA	$V_{CB} = 60V$, $T_{amb} = 100°C$
		–	–	–	0.01	μA	$V_{CB} = 80V$
					10	μA	$V_{CB} = 80V$, $T_{amb} = 100°C$
Collector-emitter cut-off current	I_{CES}	–	10	–	– 10	μA μA	$V_{CES} = 60V$ $V_{CES} = 80V$
Emitter cut-off current	I_{EBO}	–	0.1	–	0.1	μA	$V_{EB} = 8V$
Collector-emitter saturation voltage	$V_{CE(sat)}$	– –	1.0 1.0	– –	1.0 1.0	V V	$I_C = 1A, I_B = 1mA$* $I_C = 0.4A$, $I_B = 0.4mA$*
Base-emitter saturation voltage	$V_{BE(sat)}$	–	1.8	–	1.8	V	$I_C = 1A$, $I_B = 1mA$*
Base-emitter turn-on voltage	$V_{BE(on)}$	–	1.7	–	1.7	V	$I_C = 1A$, $V_{CE} = 5V$*
Static forward current transfer ratio	h_{FE}	2000	–	2000	–		$I_C = 50mA$, $V_{CE} = 5V$
		5000	–	5000	–		$I_C = 500mA$, $V_{CE} = 5V$*
		2000	100,000	2000	100,000		$I_C = 1A$, $V_{CE} = 5V$*
		500	–	500	–		$I_C = 2A$, $V_{CE} = 5V$*
Transition frequency	f_T	150	–	150	–	MHz	$I_C = 100mA$, $V_{CE} = 10V$ $f = 20MHz$
Input capacitance	C_{ibo}	90 typ.				pF	$V_{EB} = 0.5V$, $f = 1MHz$
Output capacitance	C_{obo}	15 typ.				pF	$V_{CE} = 10V$, $f = 1MHz$
Switching times	t_{on} t_{off}	0.5 typ. 1.1 typ.				μs μs	$I_C = 0.5A$, $V_{CE} = 10V$ $I_{B1} = I_{B2} = 0.5mA$

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



Voltage derating graph

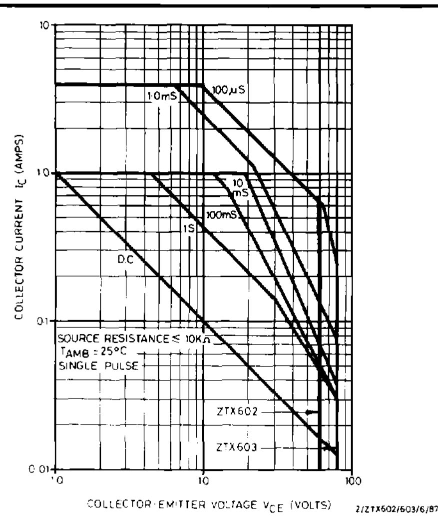
The maximum permissible operation temperature can be obtained from this graph using the equation

$$T_{amb(max)} = \frac{\text{Power (max)} - \text{Power (actual)}}{0.0057} + 25°C$$

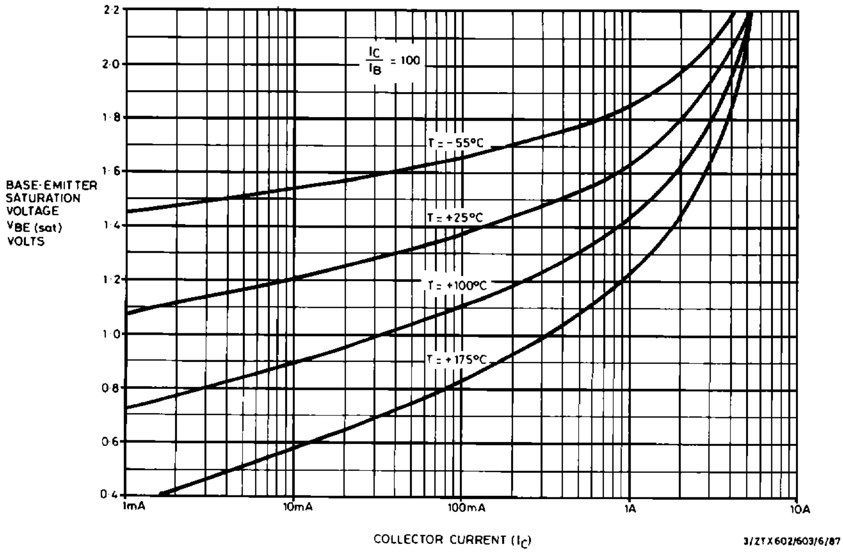
$T_{amb(max)}$ = Maximum operating ambient temperature.

Power (max) = Maximum power dissipation figure, obtained from the above graph for a given V_{CE} and source resistance (R_s).

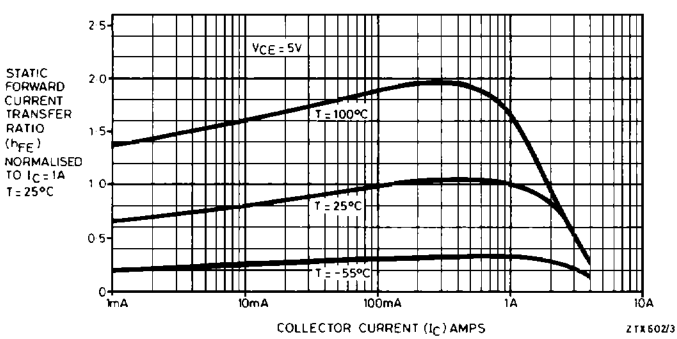
Power (actual) = Actual power dissipation in users circuit.



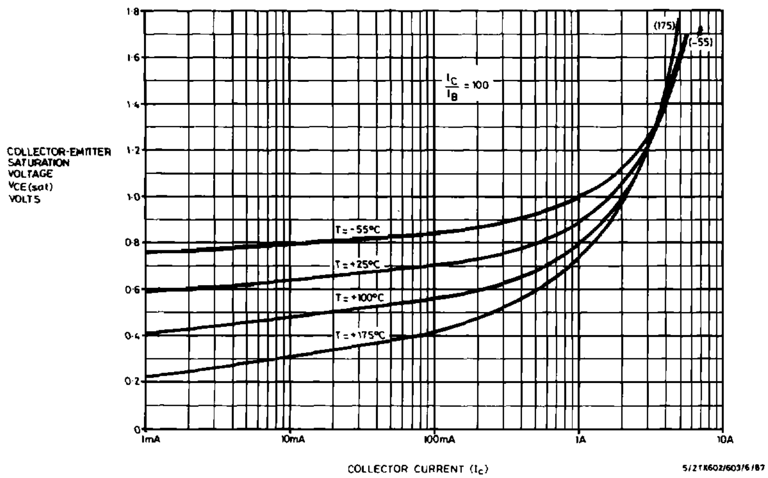
Safe operating area at T_{amb} = 25°C (Single pulse)



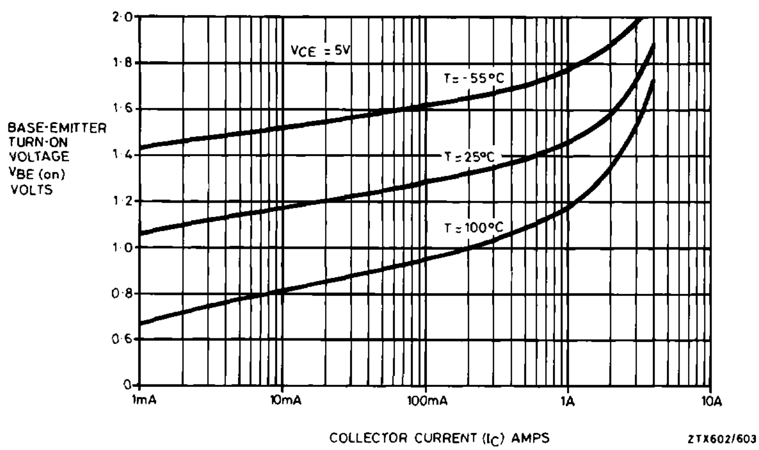
Typical base-emitter saturation voltages plotted against collector current



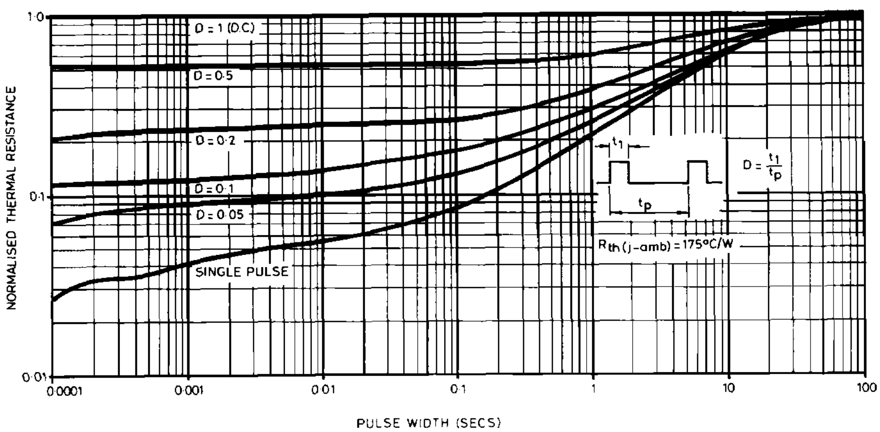
Typical static forward current transfer ratio plotted against collector current



Typical collector-emitter saturation voltages plotted against collector current



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



Maximum transient thermal impedance curves