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STX1F10

High voltage fast-switching NPN power transistor

Features

- High voltage capability
- Low spread of dynamic parameters
- Minimum lot-to-lot spread for reliable operation
- Very high switching speed

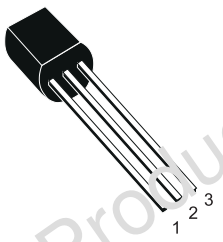
Application

- Battery charger

Description

The device is manufactured using high voltage multi-epitaxial planar technology for high switching speeds and high voltage capability.

Thanks to an increased intermediate layer, it has an intrinsic ruggedness which enables the transistor to withstand a high collector current level during breakdown condition, without using the transil protection usually necessary in typical converters for lamp ballast.



TO-92

Figure 1. Internal schematic diagram

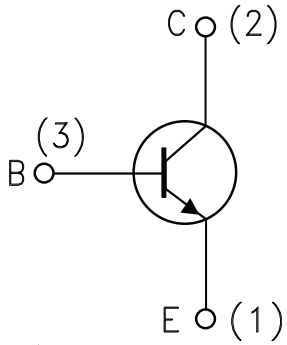


Table 1. Device summary

Order code	Marking	Package	Packaging
STX1F10	X1F10	TO-92	Box

1 Electrical ratings

Table 2. Absolute maximum rating

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter voltage (V_{BE} = 0)	980	V
V_{CEO}	Collector-emitter voltage (I_B = 0)	400	V
V_{EBO}	Emitter-base voltage (I_C = 0)	15	V
I_C	Collector current	1.5	A
I_{CM}	Collector peak current (t_P < 5 ms)	3	A
I_B	Base current	0.5	A
I_{BM}	Base peak current (t_P < 5 ms)	1	A
P_{tot}	Total dissipation at T_c = 25 °C	2.8	W
T_{stg}	Storage temperature	-65 to 150	°C
T_J	Max. operating junction temperature	150	°C

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal resistance junction-case max	44.6	°C/W

2 Electrical characteristics

(T_{case} = 25°C unless otherwise specified)

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector cut-off current (V_{BE} =0)	V_{CE} = 980 V V_{CE} = 980 V; T_C =125 °C			50 0.5	µA mA
I_{CEO}	Collector cut-off current (I_B =0)	V_{CE} = 400 V			250	µA
$V_{(BR)EBO}$	Emitter-base breakdown voltage (I_C = 0)	I_E = 1 mA	15			V
$V_{CEO(sus)}$ (1)	Collector-emitter sustaining voltage (I_B = 0)	I_C = 10 mA	400			V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 0.3 A I_B = 60 mA I_C = 1 A I_B = 0.2 A		0.15 0.3	0.5 1	V V
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = 1 A I_B = 0.2 A		1.1	1.5	V
h_{FE}	DC current gain	I_C = 500 µA V_{CE} = 2 V I_C = 0.45 A V_{CE} = 5 V I_C = 1 A V_{CE} = 5 V	15 30 14	 40 20	 61 28	
t_s t_f	Resistive load Storage time Fall time	V_{CC} = 125 V I_C = 1 A $I_{B(on)}$ = -$I_{B(off)}$ = 200 mA t_p = 300 µs $V_{BE(off)}$ = - 5 V		 2.5 350		 µs ns

1. Pulsed duration = 300 µs, duty cycle ≤ 1.5%.

2.1 Typical characteristic

Figure 2. Safe operating area

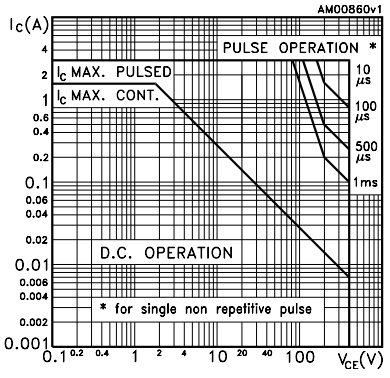


Figure 3. Derating curve

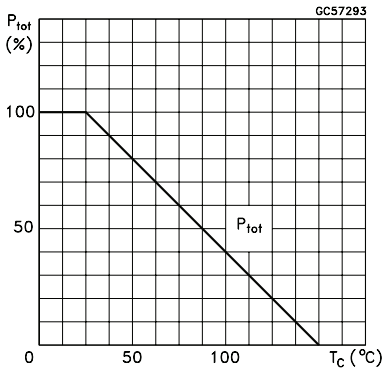


Figure 4. Output characteristics

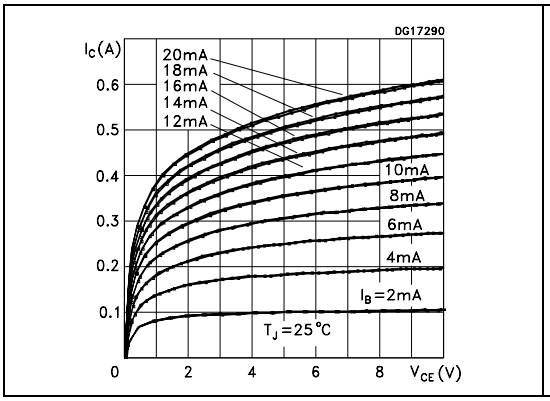


Figure 5. Reverse biased safe operating area

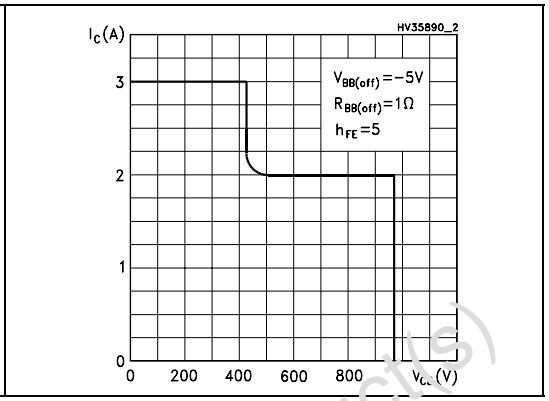


Figure 6. DC current gain (V_{CE} = 3 V)

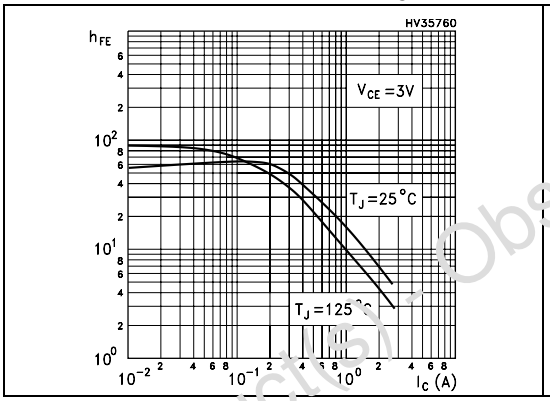


Figure 7. DC current gain (V_{CE} = 5 V)

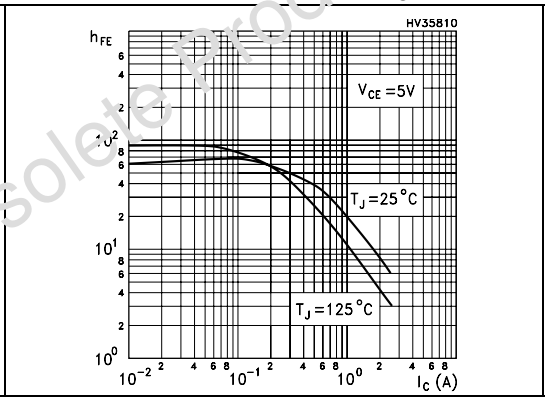


Figure 8. Base-emitter saturation voltage

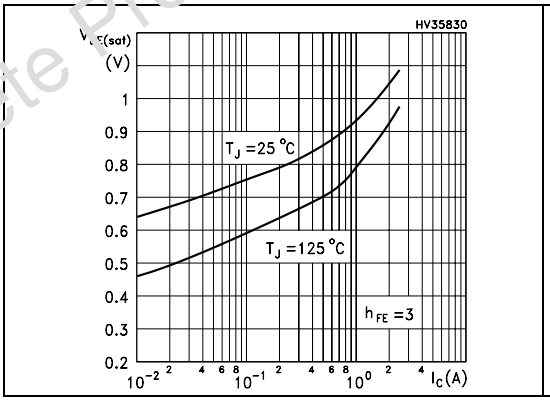


Figure 9. Collector-emitter saturation voltage

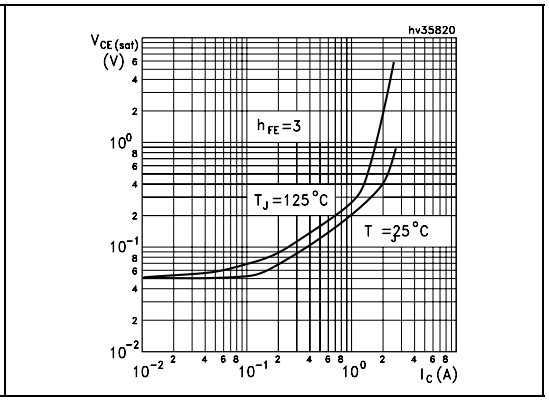


Figure 10. Resistive load switching time (turn-on, h_{FE} = 5)

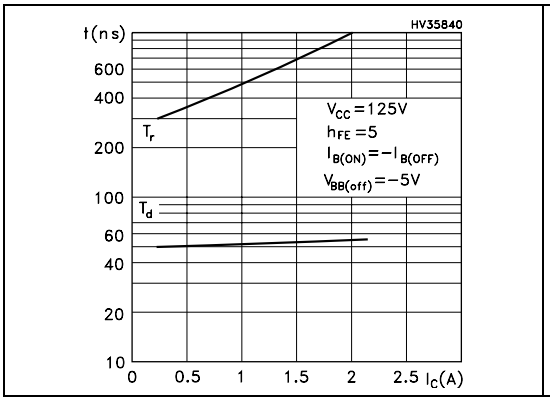


Figure 11. Resistive load switching time (turn-on, h_{FE} = 10)

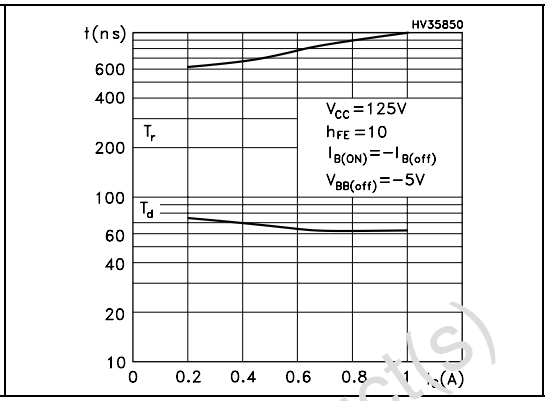


Figure 12. Resistive load switching time (turn-off, h_{FE} = 5)

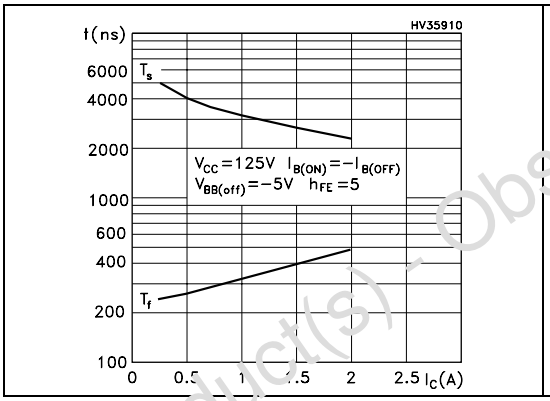
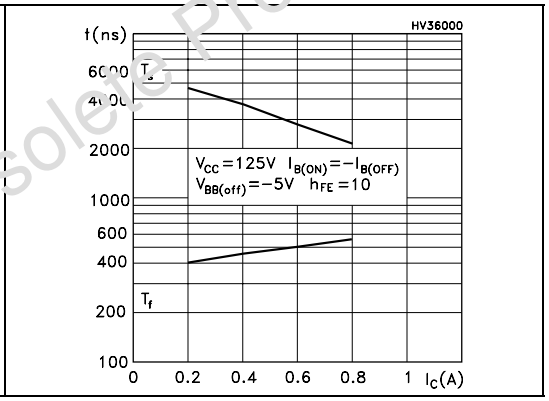
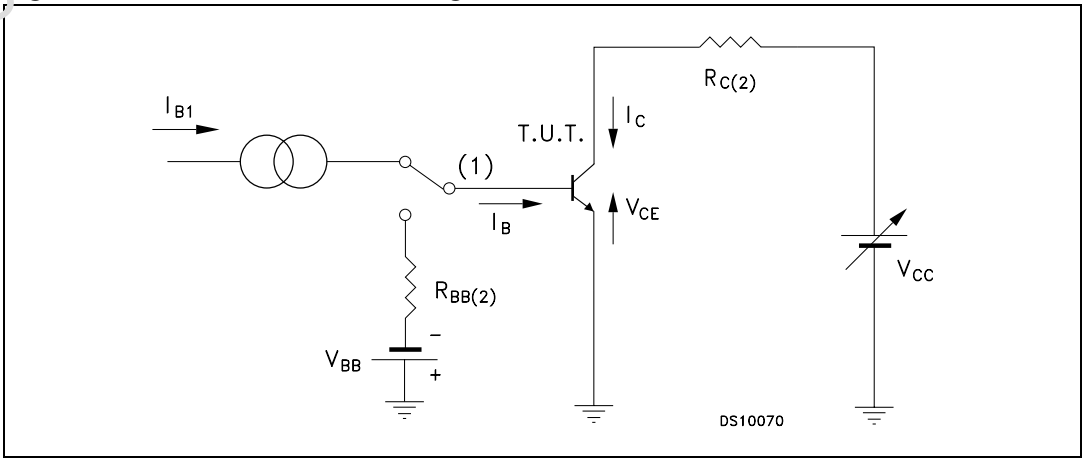


Figure 13. Resistive load switching time (turn-off, h_{FE} = 10)



2.2 Test circuits

Figure 14. Resistive load switching test circuit



1. Fast electronic switch
2. Non-inductive resistor

3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*.
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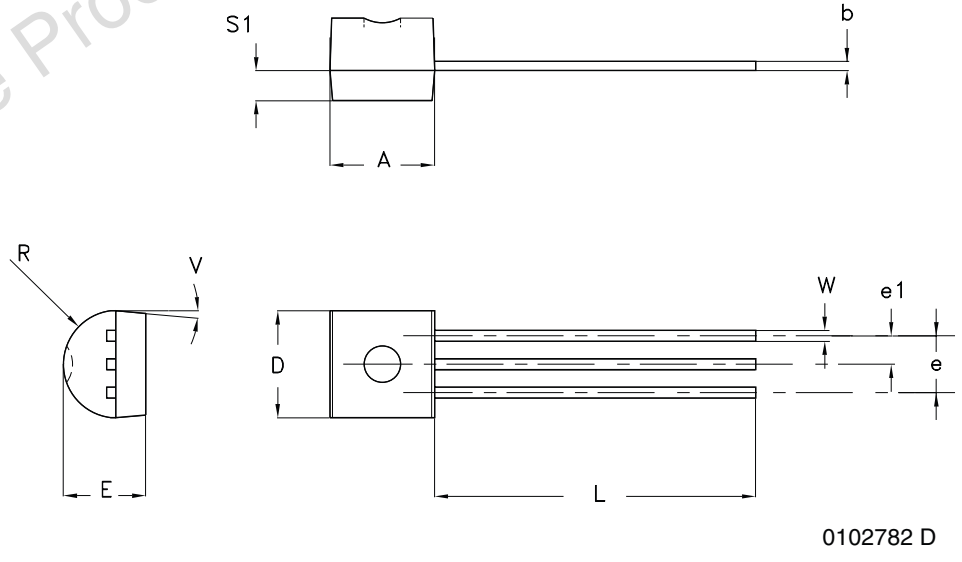
TO-92 bulk shipment mechanical data

DIM.	mm.		
	MIN.	TYP	MAX.
A	4.32		4.95
b	0.36		0.51
D	4.45		4.95
E	3.30		3.94
e	2.41		2.67
e1	1.14		1.40
L	12.70		15.49
R	2.16		2.41
S1	0.92		1.52
W	0.41		0.56
V		5°	



4 Revision history

Table 5. Document revision history

Date	Revision	Changes
18-Jun-2009	1	Initial release.

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