MD2310FX

High voltage NPN power transistor for standard definition CRT display

Features

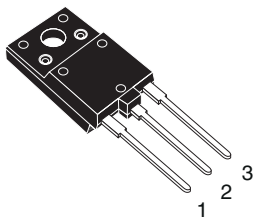
- State-of-the-art technology:
  - diffused collector “enhanced generation”
- Stable performance versus operating temperature variation
- Low base drive requirement
- Tight h_{FE} range at operating collector current
- Fully insulated power package U.L. compliant

Application

- Horizontal deflection output for monitor and real flat TV

Description

The MD2310FX is manufactured using planar technology with diffused collector adopting new and enhanced high voltage structure. The MD product series show improved silicon efficiency bringing updated performance to the horizontal deflection stage.



TO-3PF

Figure 1. Internal schematic diagram

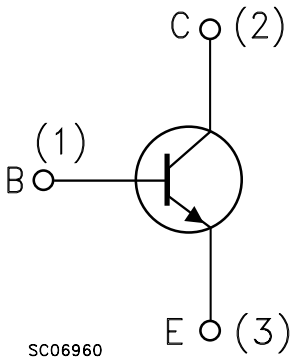


Table 1. Device summary

Order code	Marking	Package	Packing
MD2310FX	MD2310FX	TO-3PF	Tube

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter voltage (V_{BE} = 0)	1500	V
V_{CEO}	Collector-emitter voltage (I_B = 0)	700	V
V_{EBO}	Emitter-base voltage (I_C = 0)	9	V
I_C	Collector current	14	A
I_{CM}	Collector peak current (t_P < 5 ms)	21	A
I_B	Base current	7	A
P_{TOT}	Total dissipation at T_c = 25 °C	62	W
V_{INS}	Insulation withstand voltage (RMS) from all three leads to external heatsink	2500	V
T_{STG}	Storage temperature	-65 to 150	°C
T_J	Max. operating junction temperature	150	

Table 3. Thermal data

Symbol	Parameter		Value	Unit
R_{thJC}	Thermal resistance junction-case	Max	2	°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} = 1500 V V_{CE} = 1500 V T_c= 125 °C			0.2 2	mA mA
I_{EBO}	Emitter cut-off current (I_C = 0)	V_{EB} = 9 V			1	mA
$V_{CEO(sus)}$	Collector-emitter sustaining voltage (I_B = 0)	I_C = 100 mA	700			V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 7 A I_B = 1.75 A			2.5	V
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = 7 A I_B = 1.75 A			1.1	V
h_{FE} (1)	DC current gain	I_C = 1 A V_{CE} = 5 V I_C = 7 A V_{CE} = 1 V I_C = 7 A V_{CE} = 5 V	 6	28 5.5 	 8.5	
 t_s t_f	INDUCTIVE LOAD Storage time Fall time	I_C = 6 A f_h = 64 kHz $I_{B(on)}$ = 0.9 A $V_{BE(off)}$ = - 2.7 V $L_{BB(off)}$ = 1.6 µH		 2.3 0.12	 2.8 0.25	 µs µs

1. Pulse test: pulse duration ≤ 300 µs, duty cycle ≤ 2 %.

2.1 Typical characteristics

Figure 2. Safe operating area

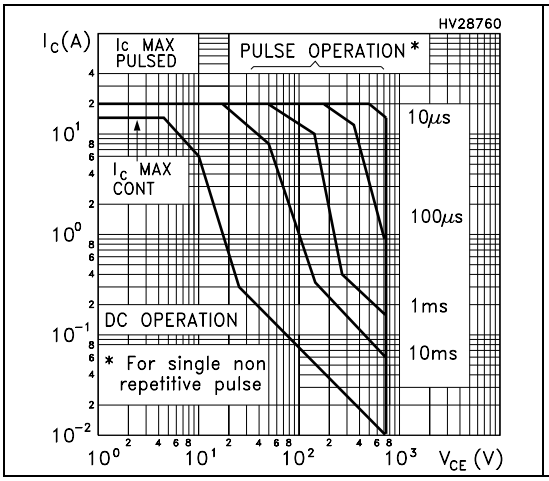


Figure 3. Derating curve

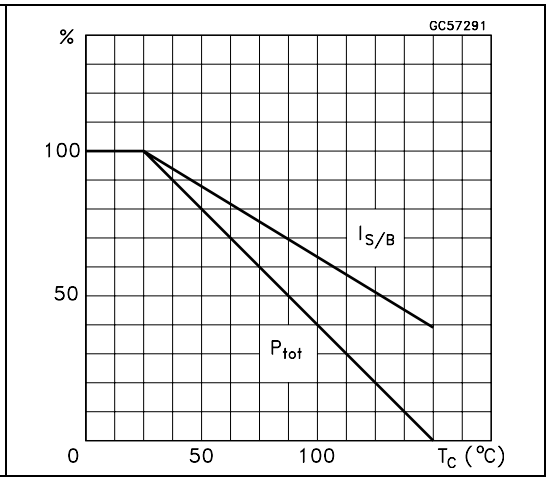


Figure 4. Output characteristics

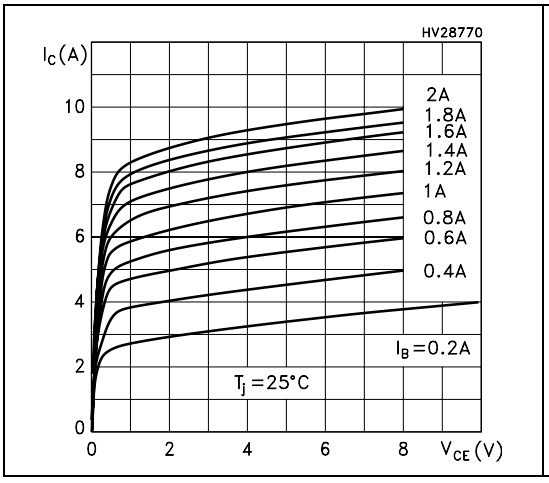


Figure 5. Reverse biased SOA

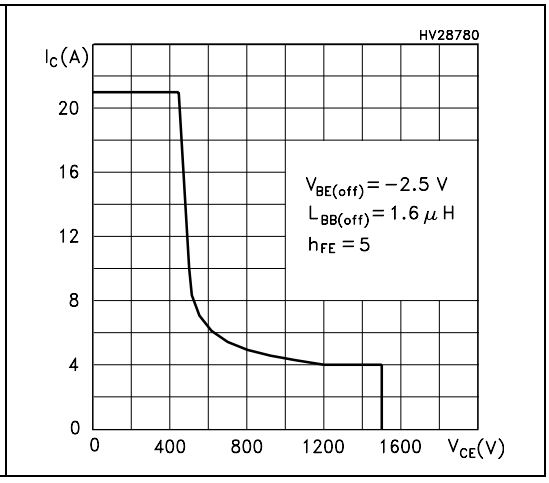


Figure 6. DC current gain (V_{CE} = 1 V)

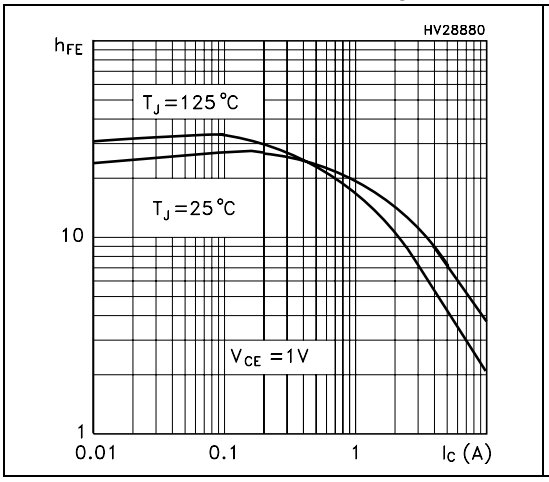


Figure 7. DC current gain (V_{CE} = 5 V)

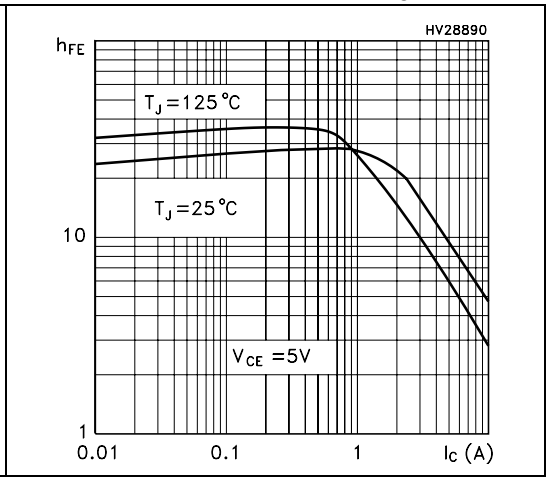


Figure 8. Collector-emitter saturation voltage

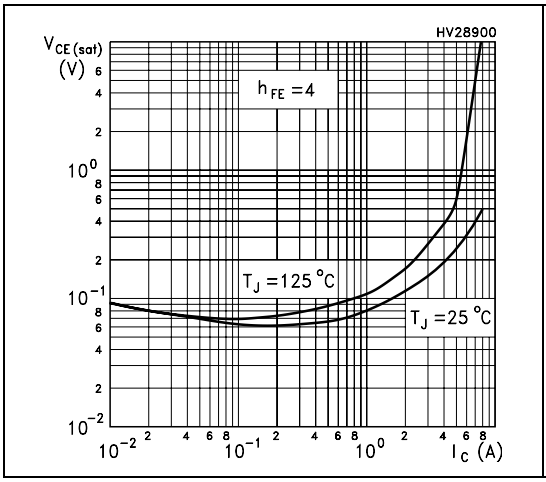


Figure 9. Base-emitter saturation voltage

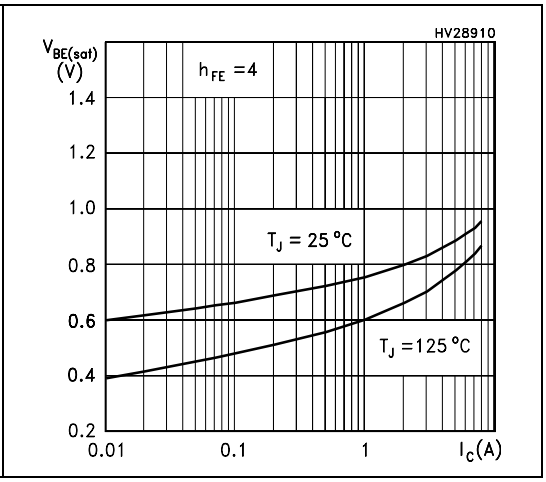


Figure 10. Power losses

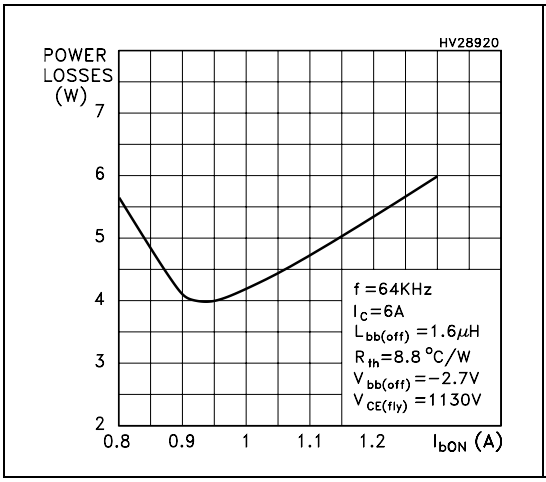
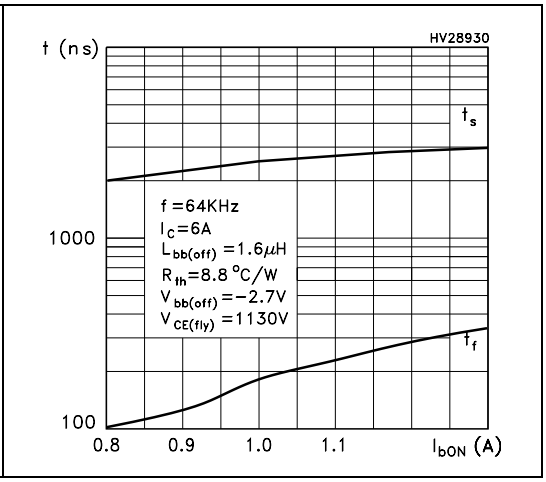


Figure 11. Inductive load switching time



3 Test circuits

Figure 12. Power losses and inductive load switching test circuit

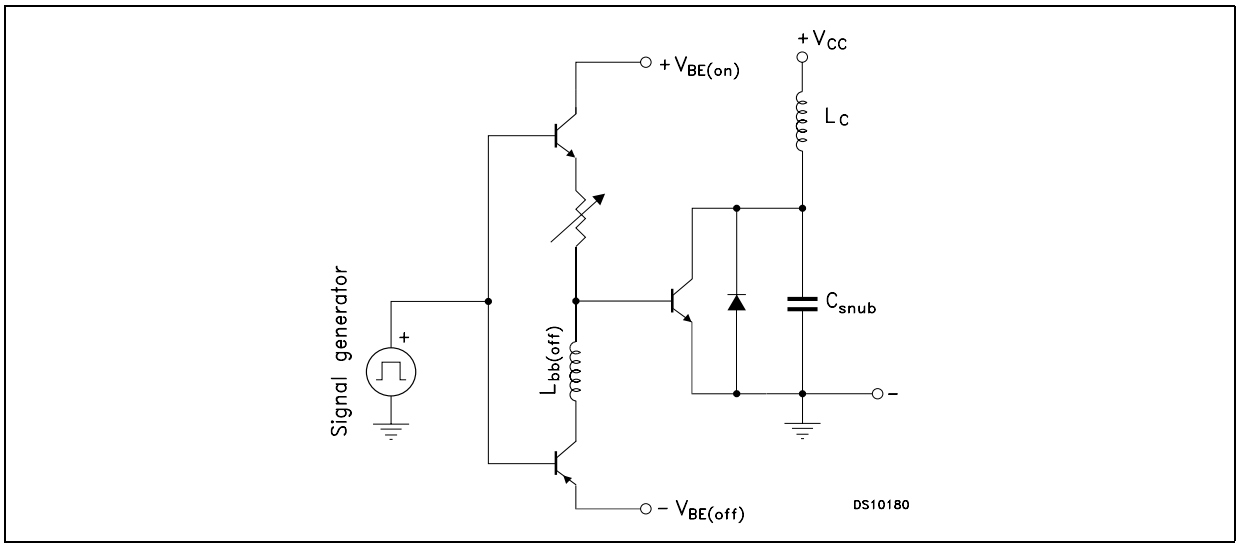
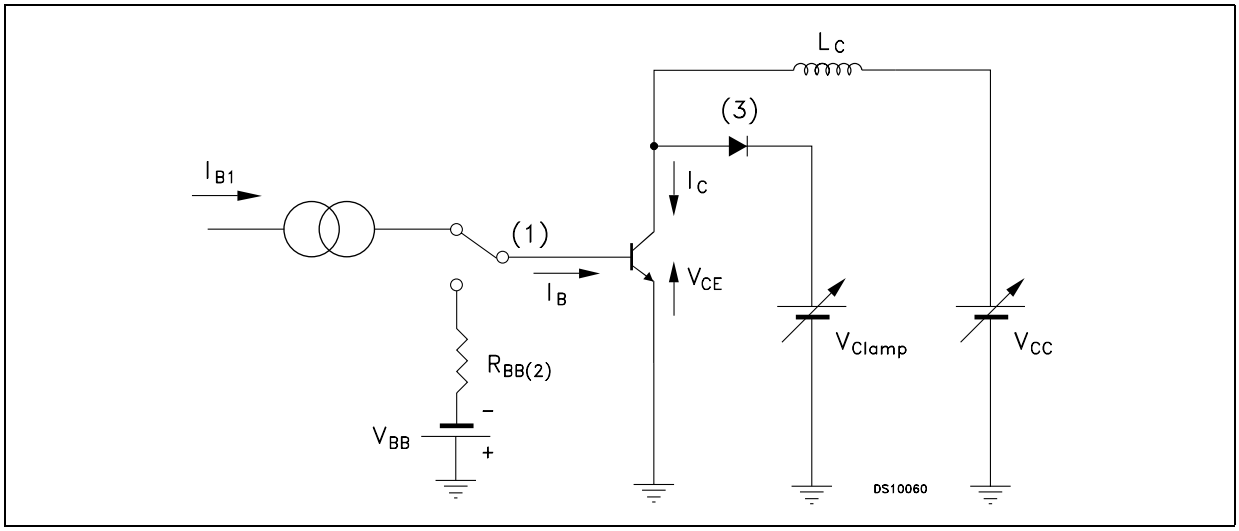


Figure 13. Reverse biased safe operating area test circuit

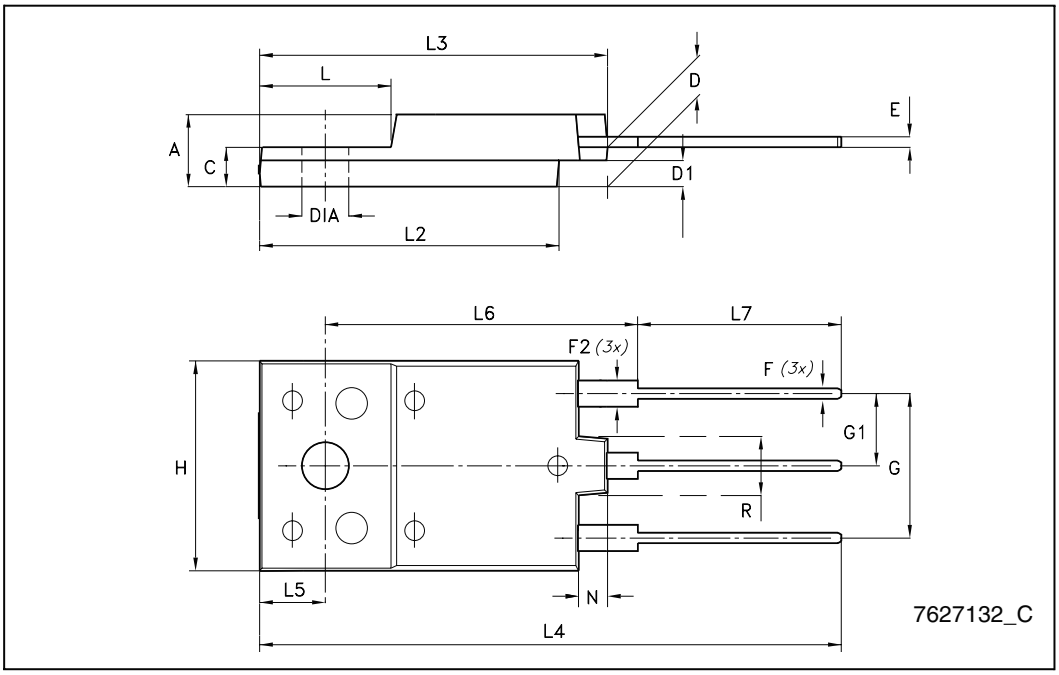


4 Package mechanical data

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*. ECOPACK® is an ST trademark.

TO-3PF mechanical data

DIM.	mm.		
	min.	typ	max.
A	5.30		5.70
C	2.80		3.20
D	3.10		3.50
D1	1.80		2.20
E	0.80		1.10
F	0.65		0.95
F2	1.80		2.20
G	10.30		11.50
G1		5.45	
H	15.30		15.70
L	9.80	10	10.20
L2	22.80		23.20
L3	26.30		26.70
L4	43.20		44.40
L5	4.30		4.70
L6	24.30		24.70
L7	14.60		15
N	1.80		2.20
R	3.80		4.20
Dia	3.40		3.80



5 Revision history

Table 5. Document revision history

Date	Revision	Changes
18-Oct-2005	1	First release
25-Nov-2005	2	Complete datasheet
15-Dec-2005	3	Legal page inserted
29-Sep-2006	4	New h_{FE} limit
27-Oct-2009	5	Updated TO-3PF package mechanical data

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