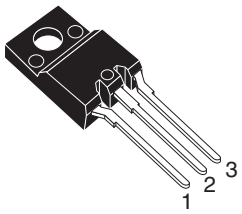
MD1803DFH

High voltage NPN Power transistor for standard definition CRT display

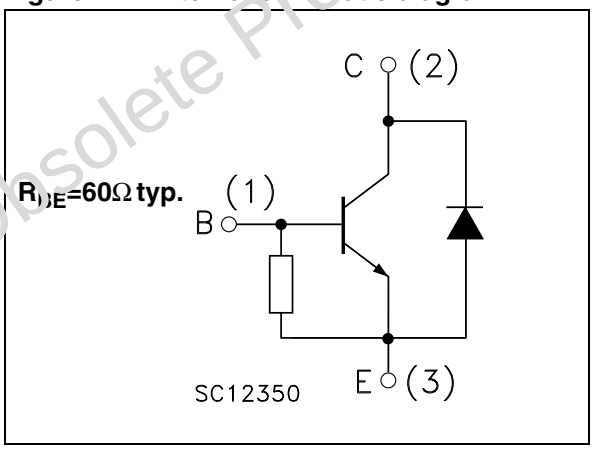
Features

- 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
- Integrated free wheeling diode



TO-220FH

Figure 1. Internal schematic diagram



Applications

- Horizontal deflection output for TV

Description

The MD1803DFH is manufactured using Diffused Collector in Planar Technology adopting new and enhanced high voltage structure. The new MD product series show improved silicon efficiency bringing updated performance to the Horizontal Deflection stage.

Table 1. Device summary

Order code	Marking	Package	Packing
MD1803DFH	MD1803DFH	TO-220FH	TUBE

Content

1 Electrical ratings

Table 2. Absolute maximum rating

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)	10	V
I_C	Collector current	10	A
I_{CM}	Collector peak current (t_P < 5ms)	15	A
I_B	Base current	5	A
P_{TOT}	Total dissipation at T_c = 25°C	40	W
V_{isol}	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
$R_{thj\text{-}case}$	Thermal resistance junction-case	Max	3.125	°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} = 1500V V_{CE} = 1500V T_c= 125°C			0.2 2	mA mA
I_{EBO}	Emitter cut-off current (I_C = 0)	V_{EB} = 5V	40		120	mA
$V_{(BR)EBO}$	Emitter-base breakdown voltage (I_C = 0)	I_E = 700 mA	10			V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 5 A I_B = 1.25 A			2	V
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = 5 A I_B = 1.25 A			1.2	V
h_{FE} (1)	DC current gain	I_C = 1 A V_{CE} = 5 V I_C = 5 A V_{CE} = 1 V I_C = 5 A V_{CE} = 5 V	 5.5	18 5 	 7.5	
V_f	Diode forward voltage	I_F= 5 A			1.6	V
t_s t_f	Inductive load Storage time Fall time	I_C = 4A f_h = 16KHz $I_{B(on)}$ = 0.6A $V_{BE(off)}$ = -2.7V $L_{BB(off)}$ = 4.5µH		 2.5 0.3	 3 0.6	 µs µs

1. Pulsed duration = 300 ms, duty cycle £ 1.5%.

2.1 Electrical characteristics (curve)

Figure 2. Safe operating area

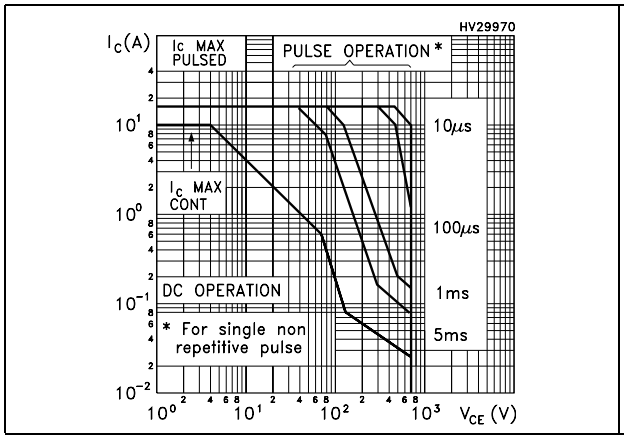


Figure 3. Derating curve

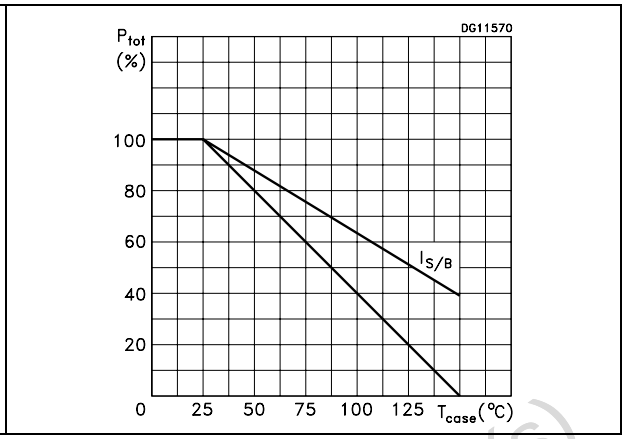


Figure 4. Output characteristics

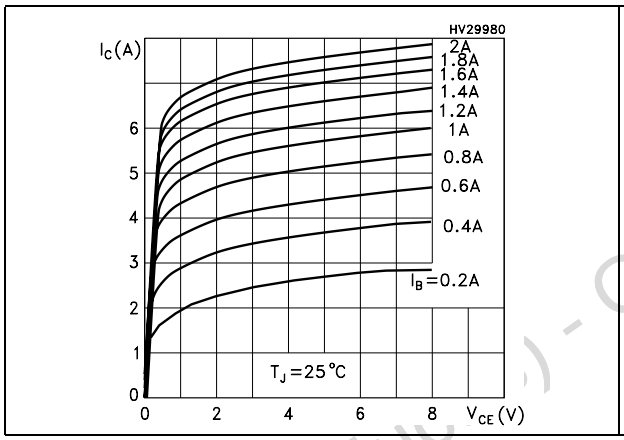


Figure 5. Reverse biased SOA

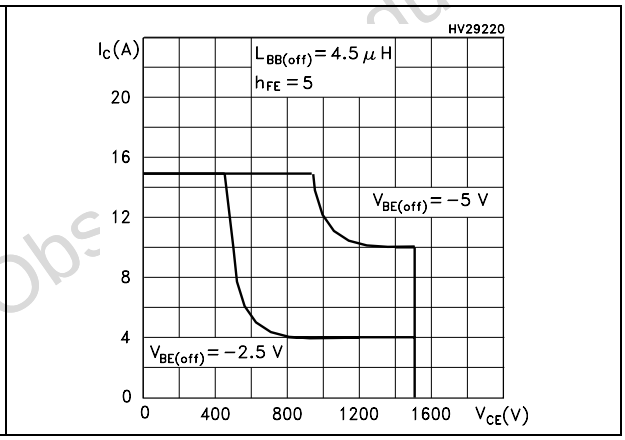


Figure 6. DC current gain

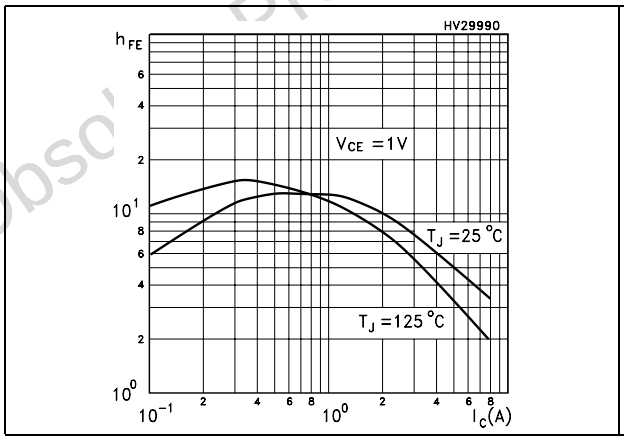


Figure 7. DC current gain

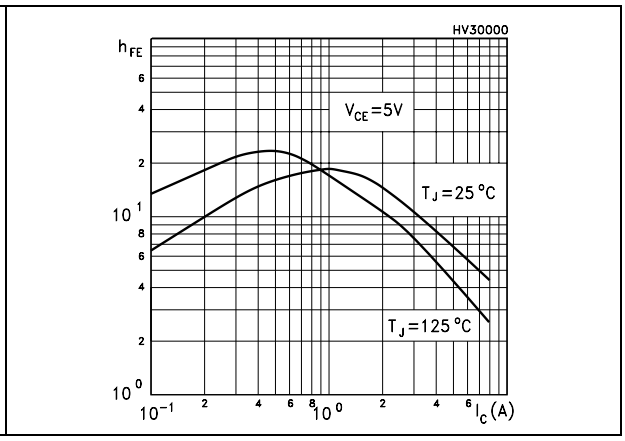


Figure 8. Collector-emitter saturation voltage

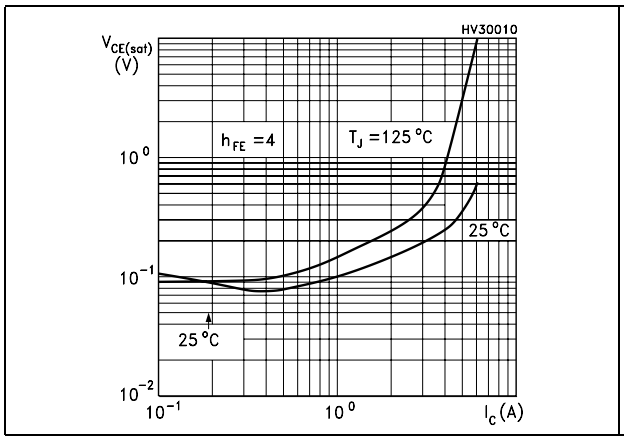


Figure 9. Base-emitter saturation voltage

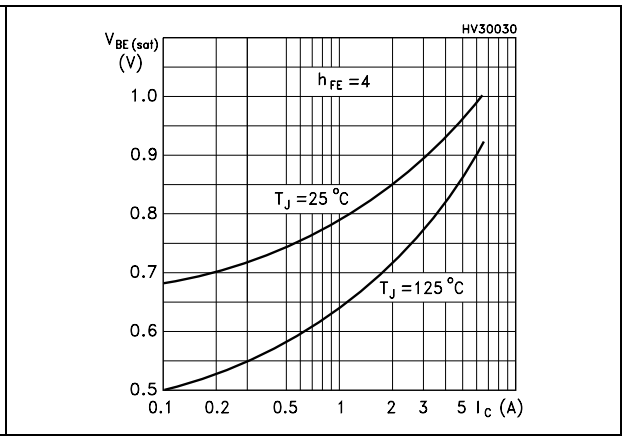


Figure 10. Power losses

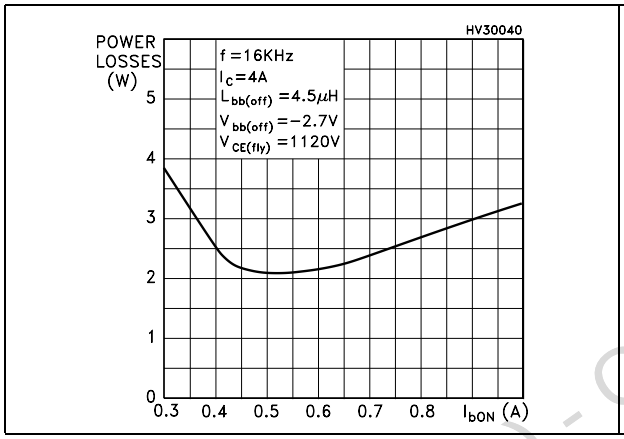
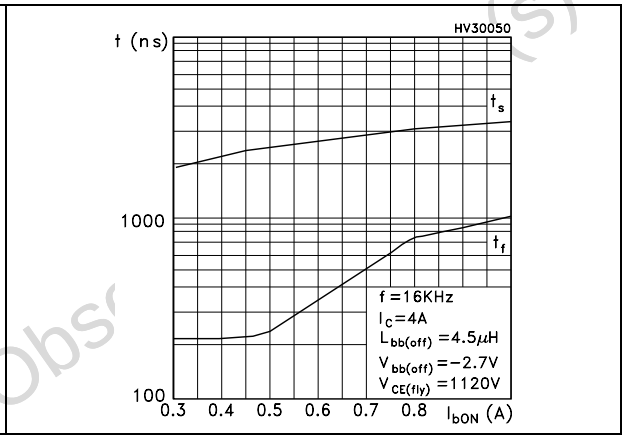


Figure 11. Inductive load switching time



3 Test circuit

Figure 12. Power losses and inductive load switching test circuit

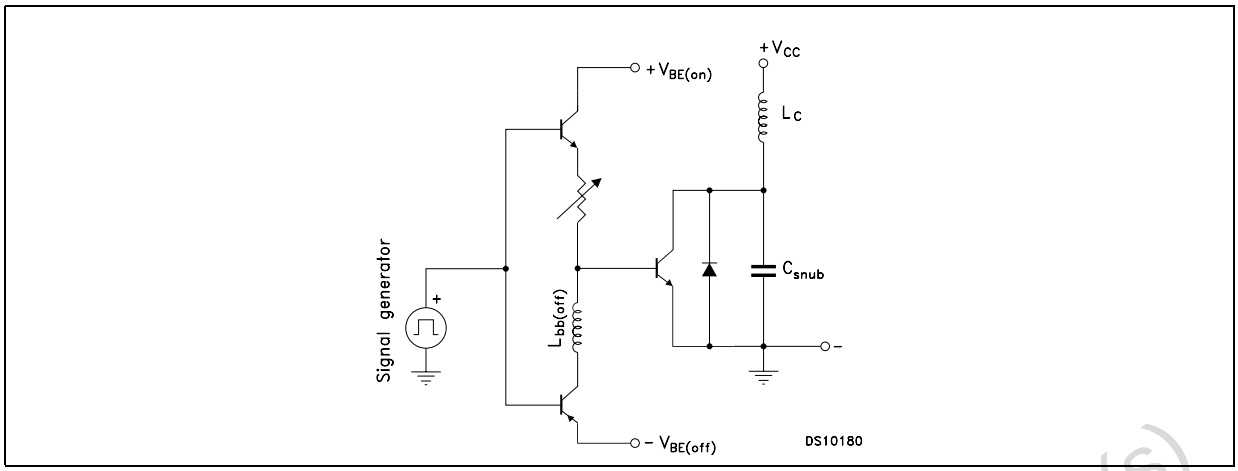
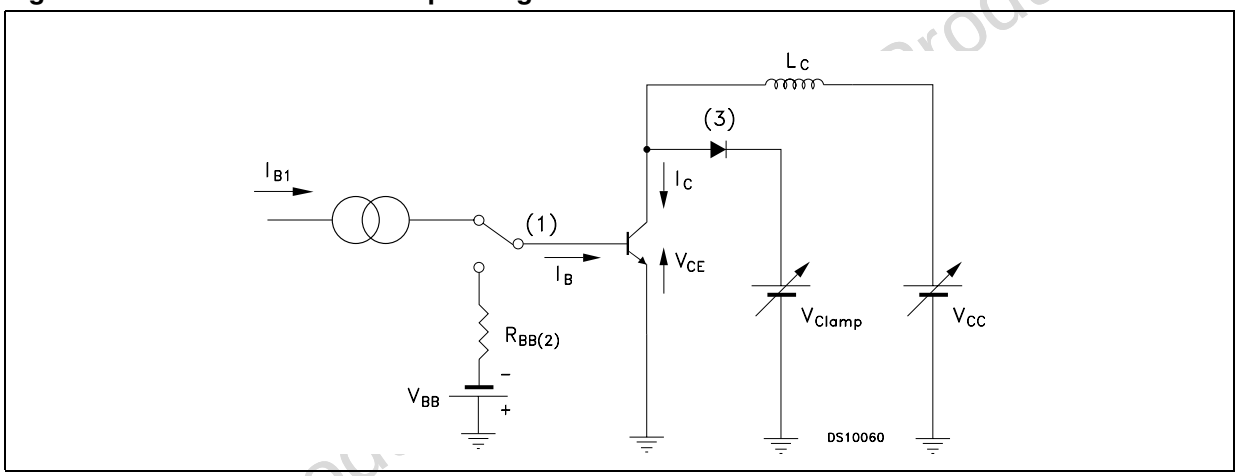


Figure 13. Reverse biased safe operating area test circuit

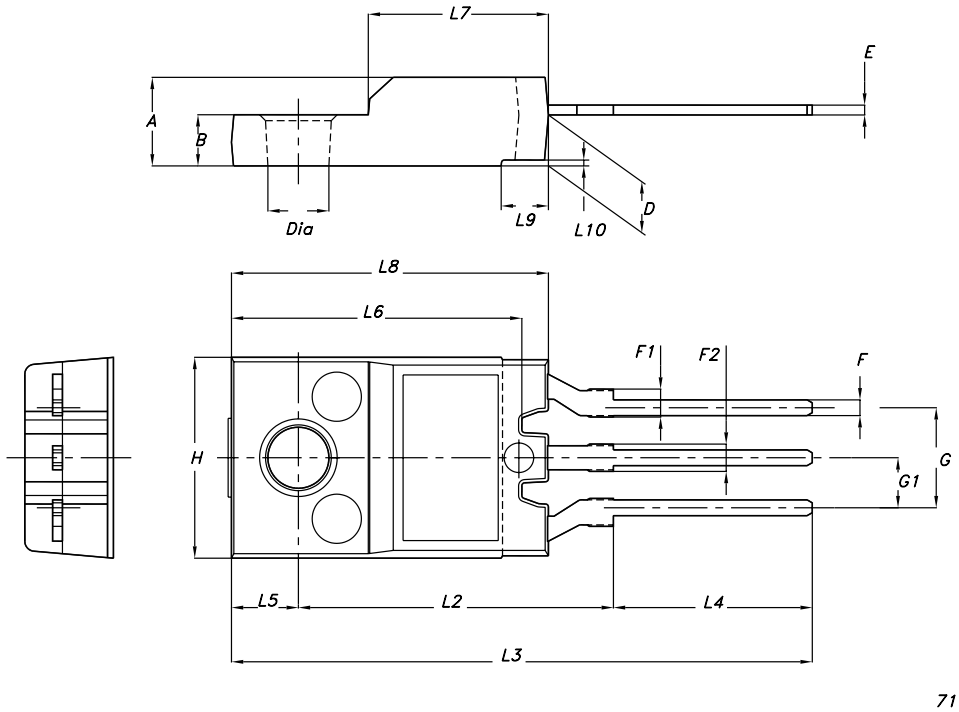


4 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com

TO-220FH (fully plastic high voltage) mechanical data

Dim	mm		
	Min	Typ	Max
A	4.4		4.6
B	2.5		2.7
D	2.5		2.75
E	0.45		0.7
F	0.75		1
F1	1.3		1.8
F2	1.3		1.8
G	4.95		5.2
G1	2.4		2.7
H	10		10.4
L2		16	
L3	28.6		30.6
L4	9.8		10.6
L5		3.4	
L6	15.9		16.4
L7	9		9.3
L8	14.5		15
L9		2.4	
L10		0.3	
Dia	3		3.2



5 Revision history

Table 5. Revision history

Date	Revision	Changes
18-Oct-2005	1	First release
15-Feb-2006	2	New template, complete version with curves
08-May-2006	3	Typo mistake on table1
22-May-2006	4	$V_{(BR)EBO}$ value has been changed
22-Sep-2006	5	New h_{FE} limit
11-Jul-2007	6	Updated mechanical data

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