

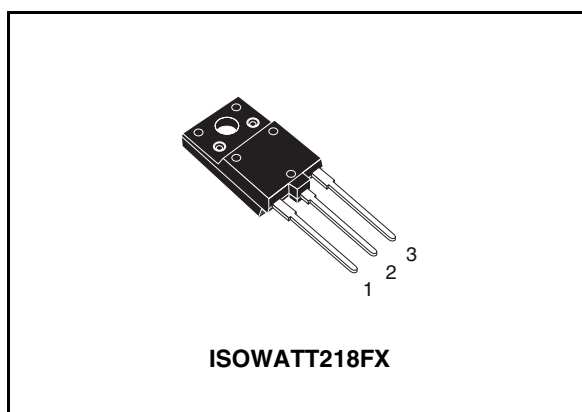


MD2103DFX

High voltage NPN power transistor for standard definition CRT display

General features

- State-of-the-art technology:
 - Diffused collector “enhanced generation”
- More stable performance versus operating temperature variation
- Low base drive requirement
- Tighter h_{FE} range at operating collector current
- Fully insulated power package U.L. compliant
- Integrated free wheeling diode
- In compliance with the 2002/93/EC European Directive



Description

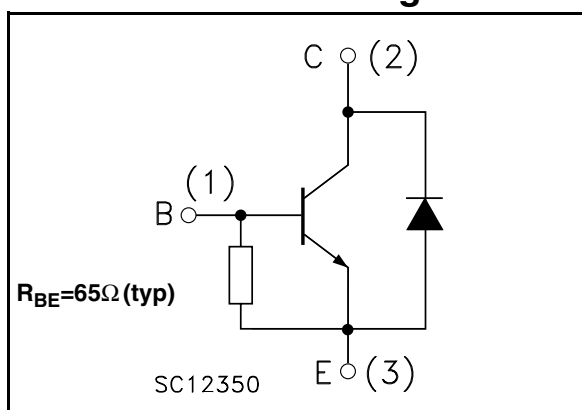
The MD2103DFX is manufactured using Diffused Collector in Planar technology adopting new and enhanced high voltage structure.

The new MD product series show improved silicon efficiency bringing updated performance to the horizontal deflection stage.

Applications

- Horizontal deflection output for TV

Internal schematic diagram



Order codes

Part number	Marking	Package	Packing
MD2103DFX	MD2103DFX	ISOWATT218FX	Tube

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1 Electrical ratings

Table 1. 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 ($I_C = 0$)	7	V
I_C	Collector current	6	A
I_{CM}	Collector peak current ($t_P < 5\text{ms}$)	9	A
I_B	Base current	3	A
P_{tot}	Total dissipation at $T_c \leq 25^\circ\text{C}$	52	W
V_{INS}	Insulation withstand voltage (RMS) from all three leads to external heatsink	2500	V
T_{stg}	Storage temperature	-65 to 150	$^\circ\text{C}$
T_J	Max. operating junction temperature	150	$^\circ\text{C}$

Table 2. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Thermal resistance junction-case max	2.4	$^\circ\text{C/W}$

2 Electrical characteristics

($T_{\text{case}} = 25^{\circ}\text{C}$ unless otherwise specified)

Table 3. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector cut-off current ($V_{\text{BE}} = 0$)	$V_{\text{CE}} = 1500\text{V}$ $V_{\text{CE}} = 1500\text{V}$ $T_{\text{C}} = 125^{\circ}\text{C}$			0.2 2	mA mA
I_{EBO}	Emitter cut-off current ($I_{\text{C}} = 0$)	$V_{\text{EB}} = 5\text{V}$	50		125	mA
$V_{(\text{BR})\text{EBO}}$	Emitter-base breakdown voltage ($I_{\text{C}} = 0$)	$I_{\text{E}} = 700\text{mA}$		11		V
$V_{\text{CE}(\text{sat})}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = 3\text{A}$ $I_{\text{B}} = 0.75\text{A}$			1.8	V
$V_{\text{BE}(\text{sat})}^{(1)}$	Base-emitter saturation voltage	$I_{\text{C}} = 3\text{A}$ $I_{\text{B}} = 0.75\text{A}$			1.5	V
$h_{\text{FE}}^{(1)}$	DC current gain	$I_{\text{C}} = 1\text{A}$ $V_{\text{CE}} = 5\text{V}$ $I_{\text{C}} = 3\text{A}$ $V_{\text{CE}} = 1\text{V}$ $I_{\text{C}} = 3\text{A}$ $V_{\text{CE}} = 5\text{V}$	6.5	17 6	9.5	
t_{s} t_{f}	Inductive load Storage time Fall time	$I_{\text{C}} = 3\text{A}$ $f_{\text{h}} = 16\text{kHz}$ $I_{\text{B}(\text{on})} = 0.5\text{A}$ $V_{\text{BE}(\text{off})} = -2.7\text{V}$ $L_{\text{BB}(\text{off})} = 6.3\mu\text{H}$ (see Figure 9)		3.8 0.25		μs μs
V_{F}	Diode forward voltage	$I_{\text{F}} = 3\text{A}$			2	V

Note (1) Pulsed duration = 300 μs , duty cycle $\leq 5\%$

2.1 Electrical cMD2103DFX characteristics (curves)

Figure 1. Safe operating area

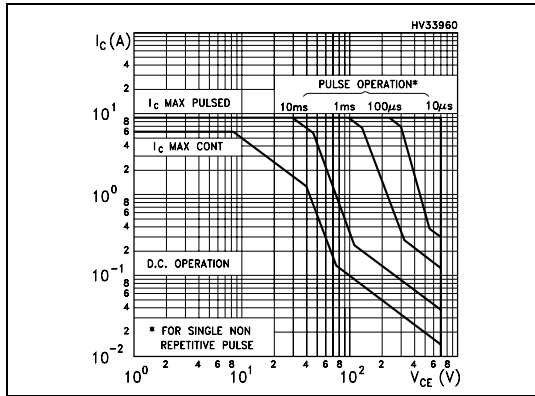


Figure 2. Derating curve

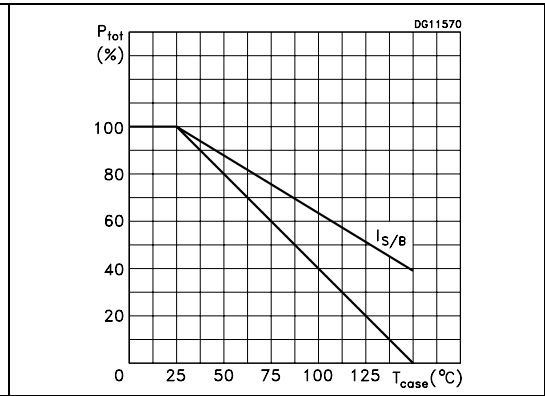


Figure 3. Output characteristics

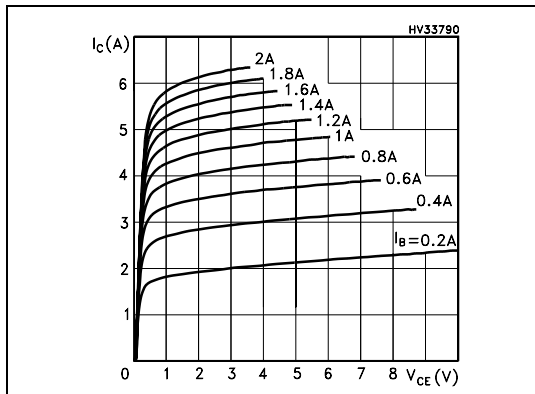


Figure 4. Reverse biased SOA

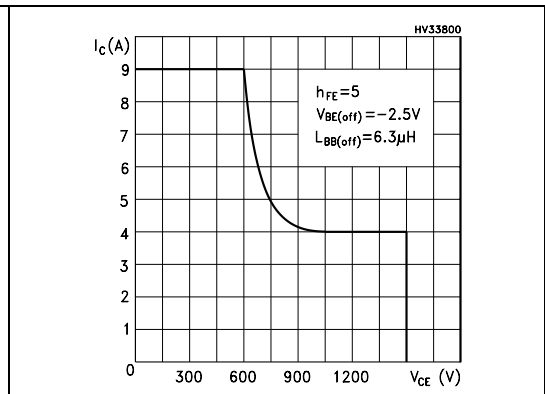


Figure 5. DC current gain

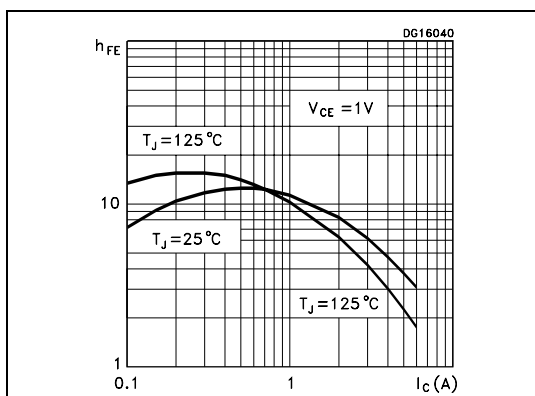


Figure 6. DC current gain

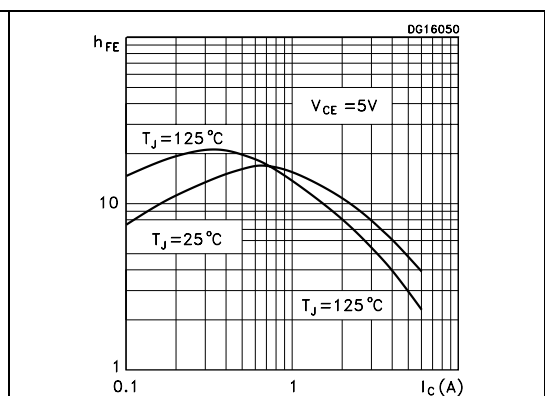


Figure 7. Collector-emitter saturation voltage

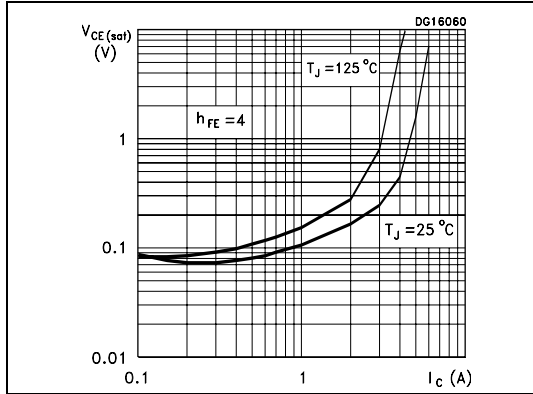
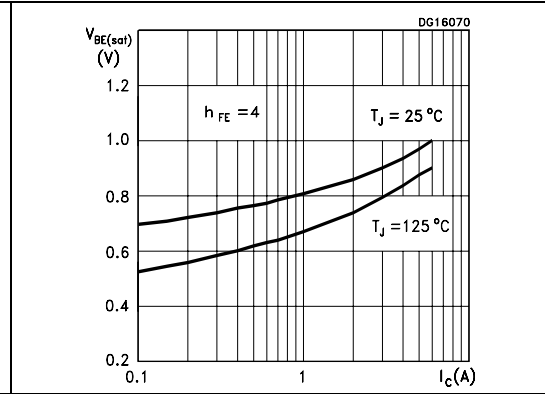
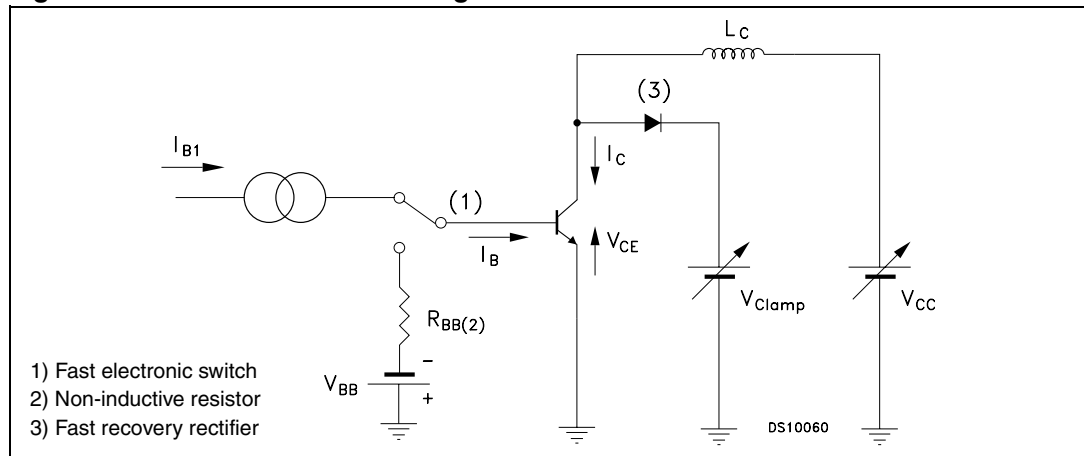


Figure 8. Base-emitter saturation voltage



2.2 Test circuits

Figure 9. Inductive load switching test circuit

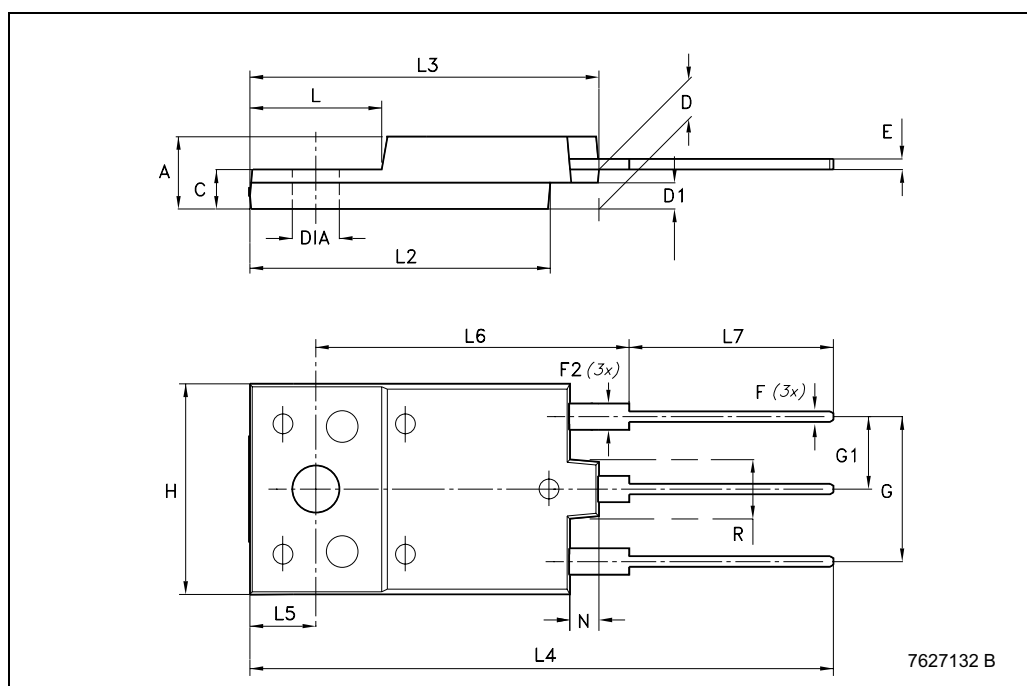


3 Package mechanical data

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

ISOWATT218FX 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		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



4 Revision history

Table 4. Revision history

Date	Revision	Changes
16-Oct-2006	1	First release

MD2103DFX

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