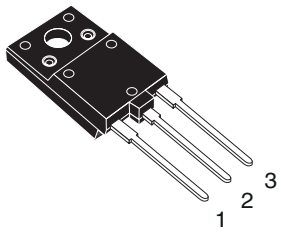
# MD1803DFX

## High voltage NPN Power transistor for standard definition CRT display

## 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

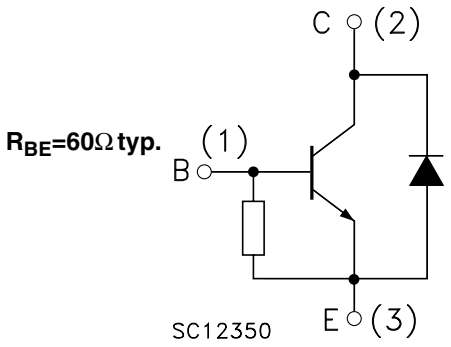



**ISOWATT218FX**

## Applications

- Horizontal deflection output for TV

## Internal schematic diagram




## Description

The MD1803DFX 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.

## Order codes

| Part number | Marking | Package | Packing |
|---|---|---|---|
| MD1803DFX | MD1803DFX | 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) | 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 | 57 | 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 2. Thermal data**

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $R_{thj\text{-}case}$ | Thermal resistance junction-case | Max | 2.2 | °C/W |



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# 2 Electrical characteristics

($T_{CASE}$ = 25°C; unless otherwise specified)

**Table 3. Electrical characteristics**

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_{CES}$ | Collector cut-off current ($V_{BE}$ = 0) | $V_{CE}$ = 1500V<br>$V_{CE}$ = 1500V $T_c$= 125°C | | | 0.2<br>2 | mA<br>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 |
| $V_{CE(sat)}$ *Note 1* | Collector-emitter saturation voltage | $I_C$ = 5 A $I_B$ = 1.25 A | | | 2 | V |
| $V_{BE(sat)}$ *Note 1* | Base-emitter saturation voltage | $I_C$ = 5 A $I_B$ = 1.25 A | | | 1.2 | V |
| $h_{FE}$ *Note 1* | DC current gain | $I_C$ = 1 A $V_{CE}$ = 5 V<br>$I_C$ = 5 A $V_{CE}$ = 1 V<br>$I_C$ = 5 A $V_{CE}$ = 5 V | <br><br>5.5 | 18<br>5<br> | <br><br>7.5 | |
| $V_f$ | Diode forward voltage | $I_F$= 5 A | | | 1.6 | V |
| <br>$t_s$<br>$t_f$ | Inductive load<br>Storage time<br>Fall time | $I_C$ = 4A $f_h$ = 16KHz<br>$I_{B(on)}$ = 0.6A $V_{BE(off)}$ = -2.7V<br>$L_{BB(off)}$ = 4.5µH | | <br>2.5<br>0.3 | <br>3<br>0.6 | <br>µs<br>µs |

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



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## 2.1 Electrical characteristics (curve)

**Figure 1. Safe operating area**

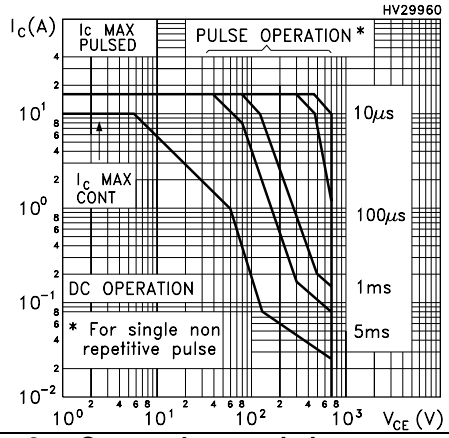


**Figure 2. Derating curve**

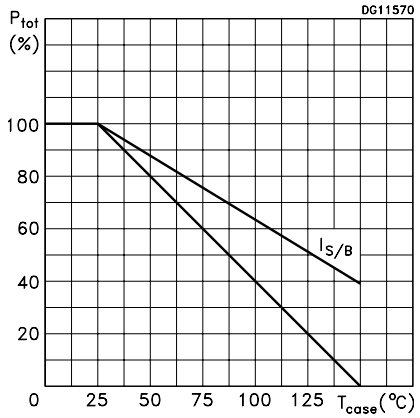


**Figure 3. Output characteristics**

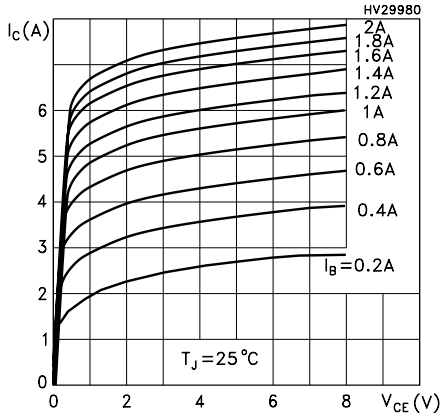


**Figure 4. Reverse biased SOA**

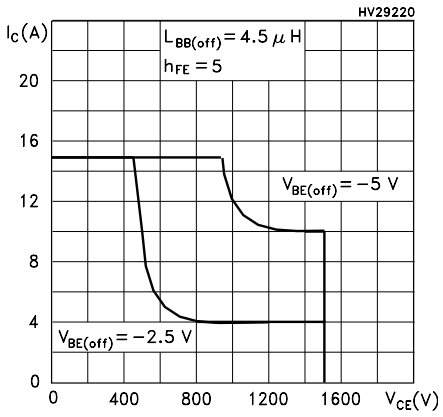


**Figure 5. DC current gain**

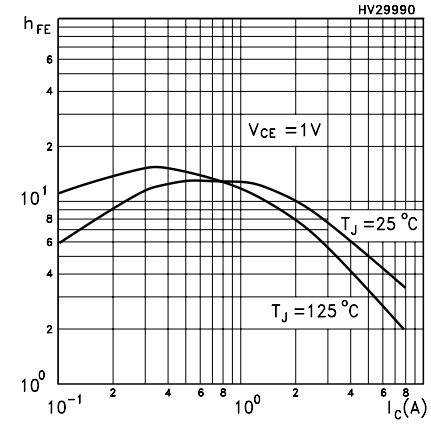


**Figure 6. DC current gain**

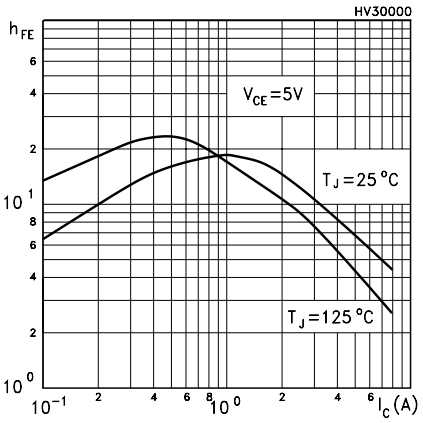




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**Figure 7. Collector-emitter saturation voltage**

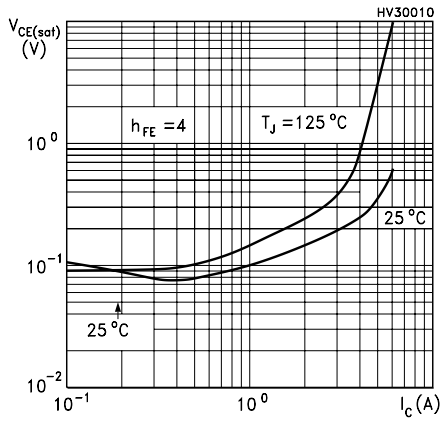



**Figure 8. Base-emitter saturation voltage**

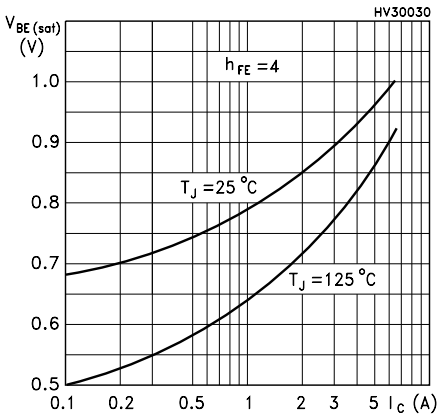



**Figure 9. Power losses**

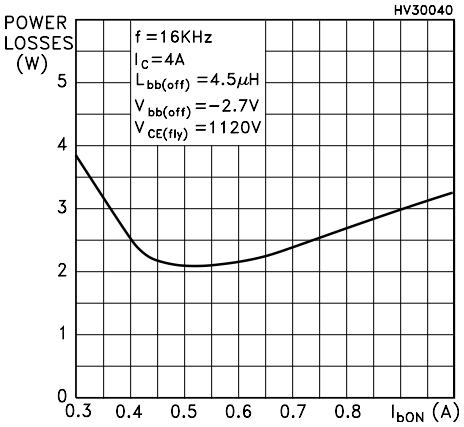
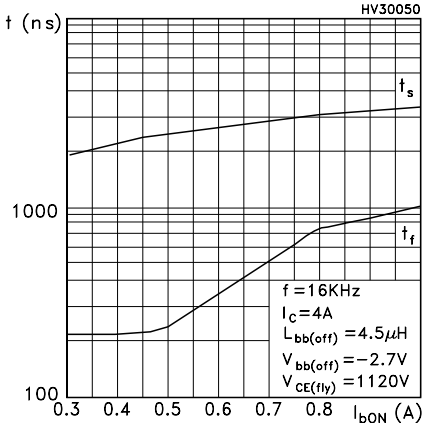



**Figure 10. Inductive load switching time**



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## 2.2 Test circuit

**Figure 11. Power losses and inductive load switching test circuit**

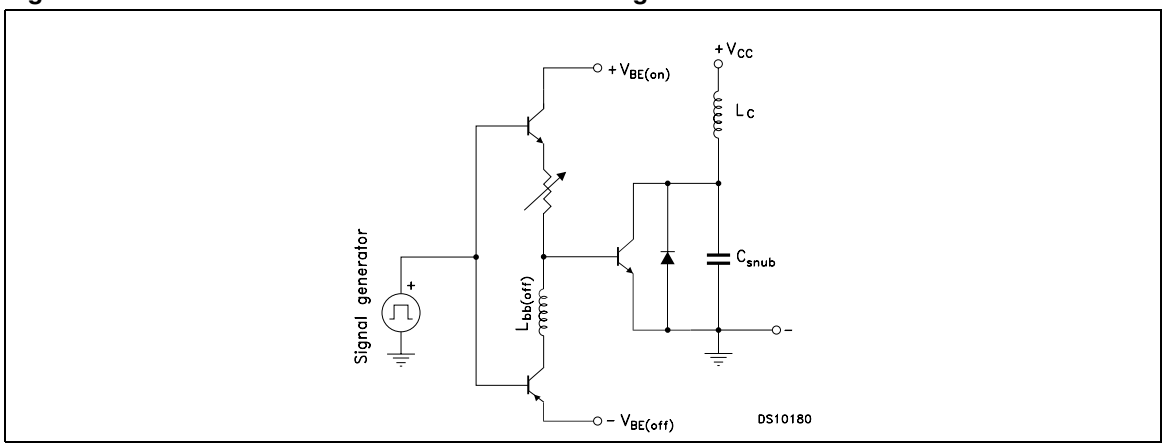
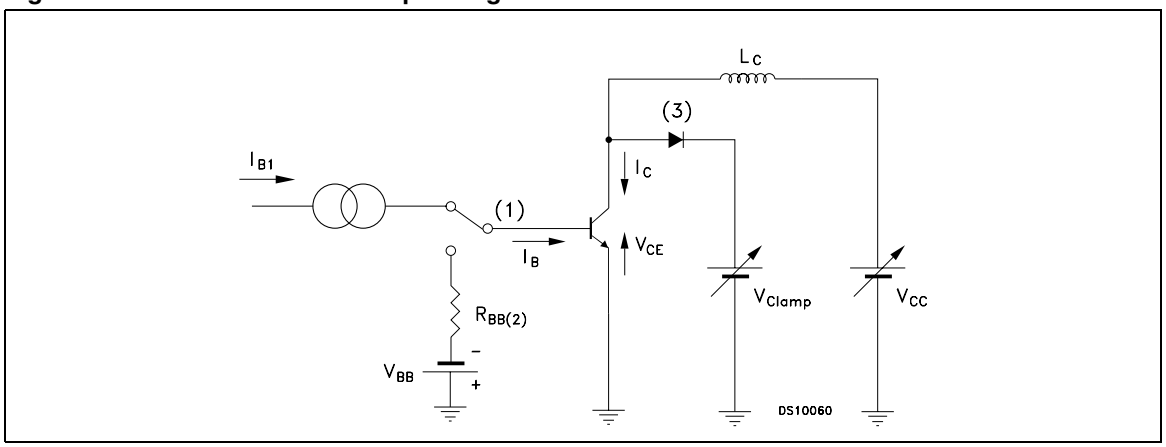



**Figure 12. Reverse biased safe operating area test circuit**



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# 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



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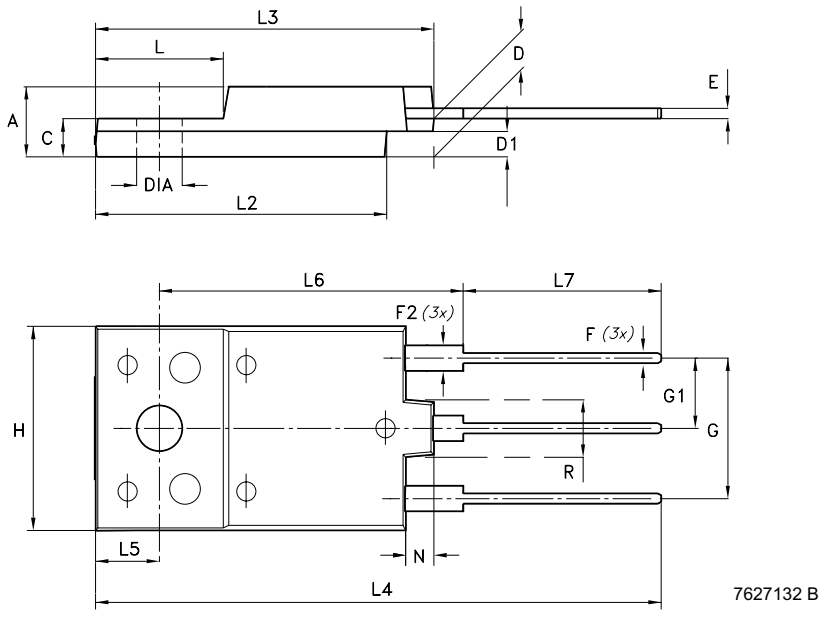
## ISOWATT218FX MECHANICAL DATA

| 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 |



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# 4 Revision history

**Table 4. Revision history**

| Date | Revision | Changes |
|---|---|---|
| 18-Oct-2005 | 1 | First release |
| 11-Nov-2005 | 2 | New Template, no content change |
| 15-Feb-2006 | 3 | Complete version with curves |
| 08-May-2006 | 4 | Typo mistake on table1 |
| 23-May-2006 | 5 | $V_{(BR)EBO}$ value has been changed |
| 22-Sep-2006 | 6 | New $h_{FE}$ limit |



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