



## ST8812FX

High voltage fast-switching  
NPN Power transistor

### Features

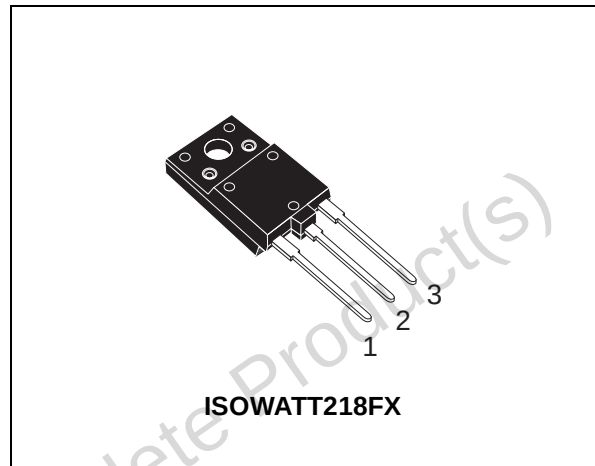
- High voltage capability
- Very high switching speed
- Tight hfe control
- Large R.B.S.O.A.
- Fully insulated Package U.L. compliant for easy mounting

### Applications

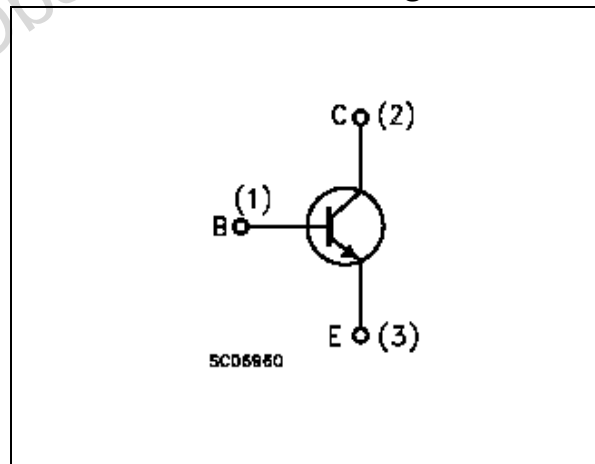
- Switch mode power supplies for crt TV

### Description

The ST8812FX is manufactured using latest Multi Epitaxial Planar technology with high voltage capability. It shows wide R.B.S.O.A. and high switching speed thanks to its Cellular Emitter structure with planar edge termination and deep base diffusion.



### Internal schematic diagram



### Order codes

| Part Number | Marking  | Package      | Packing |
|-------------|----------|--------------|---------|
| ST8812FX    | ST8812FX | ISOWATT218FX | TUBE    |

# 1 Electrical ratings

**Table 1. Absolute maximum rating**

| Symbol     | Parameter                                                                    | Value      | Unit       |
|------------|------------------------------------------------------------------------------|------------|------------|
| $V_{CBO}$  | Collector-Base Voltage ( $I_E = 0$ )                                         | 1150       | V          |
| $V_{CEO}$  | Collector-Emitter Voltage ( $I_B = 0$ )                                      | 600        | V          |
| $V_{EBO}$  | Emitter-Base Voltage ( $I_C = 0$ )                                           | 15         | V          |
| $I_C$      | Collector Current                                                            | 7          | A          |
| $I_{CM}$   | Collector Peak Current ( $t_P < 5ms$ )                                       | 12         | A          |
| $I_B$      | Base Current                                                                 | 4          | A          |
| $P_{TOT}$  | Total dissipation at $T_C = 25^\circ C$                                      | 50         | W          |
| $V_{isol}$ | Insulation Withstand Voltage (RMS) from All Three Leads to External Heatsink | 2500       | V          |
| $T_{STG}$  | Storage Temperature                                                          | -65 to 150 | $^\circ C$ |
| $T_J$      | Max. Operating Junction Temperature                                          | 150        | $^\circ C$ |

**Table 2. Thermal data**

| Symbol         | Parameter                            | Value | Unit         |
|----------------|--------------------------------------|-------|--------------|
| $R_{thJ-case}$ | Thermal Resistance Junction-Case Max | 2.5   | $^\circ C/W$ |

## 2 Electrical characteristics

( $T_{CASE} = 25^{\circ}C$ ; unless otherwise specified)

**Table 3. Electrical characteristics**

| Symbol                           | Parameter                                             | Test Conditions                                                                                                                          | Min. | Typ.    | Max.       | Unit          |
|----------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|------|---------|------------|---------------|
| $I_{CES}$                        | Collector Cut-off Current<br>( $V_{BE} = 0$ )         | $V_{CE} = 1150V$                                                                                                                         |      |         | 1          | mA            |
|                                  |                                                       | $V_{CE} = 1150V$ $T_C = 125^{\circ}C$                                                                                                    |      |         | 2          | mA            |
| $I_{EBO}$                        | Emitter Cut-off Current<br>( $I_C = 0$ )              | $V_{EB} = 14V$                                                                                                                           |      |         | 1          | mA            |
| $V_{CEO(sus)}$<br><i>Note: 1</i> | Collector-Emitter<br>Sustaining Voltage ( $I_B = 0$ ) | $I_C = 100mA$                                                                                                                            | 600  |         |            | V             |
| $V_{CE(sat)}$<br><i>Note: 1</i>  | Collector-Emitter Saturation Voltage                  | $I_C = 4A$ $I_B = 0.8A$                                                                                                                  |      |         | 3          | V             |
|                                  |                                                       | $I_C = 4A$ $I_B = 1.2A$                                                                                                                  |      |         | 1.5        | V             |
| $V_{BE(sat)}$<br><i>Note: 1</i>  | Base-Emitter Saturation Voltage                       | $I_C = 4A$ $I_B = 0.8A$                                                                                                                  |      |         | 1.3        | V             |
| $h_{FE}$                         | DC Current Gain                                       | $I_C = 1A$ $V_{CE} = 5V$                                                                                                                 |      | 25      |            |               |
|                                  |                                                       | $I_C = 5A$ $V_{CE} = 1V$                                                                                                                 |      | 5       |            |               |
|                                  |                                                       | $I_C = 5A$ $V_{CE} = 5V$                                                                                                                 | 4.5  |         | 9          |               |
| $t_s$<br>$t_f$                   | INDUCTIVE LOAD<br>Storage Time<br>Fall Time           | $I_C = 4A$ $R_{BB} = 0$<br>$V_{Clamp} = 480V$ $V_{BE(off)} = -5V$<br>$I_{B1} = 0.8A$ $L_C = 220\mu H$<br>(See <a href="#">Figure 8</a> ) |      | 1<br>60 | 1.6<br>120 | $\mu s$<br>ns |

*Note: 1 Pulsed duration = 300  $\mu s$ , duty cycle  $\leq 1.5\%$ .*

2.1 Typical characteristics test circuit

Figure 1. DC current gain

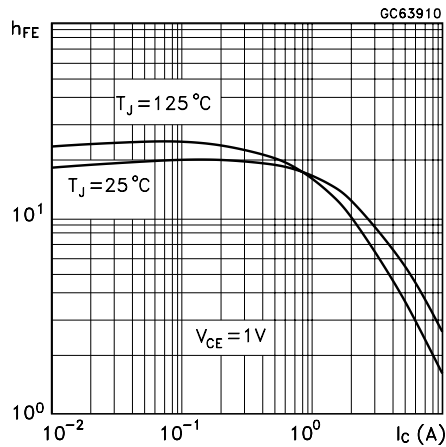


Figure 2. DC current gain

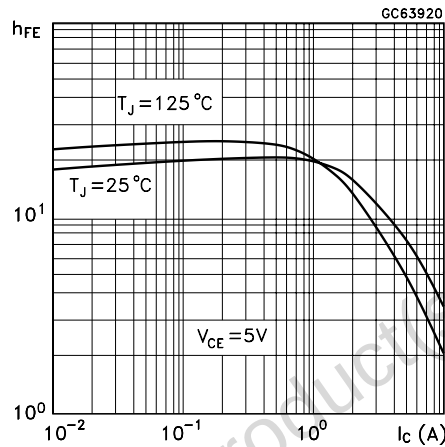


Figure 3. Collector emitter saturation voltage

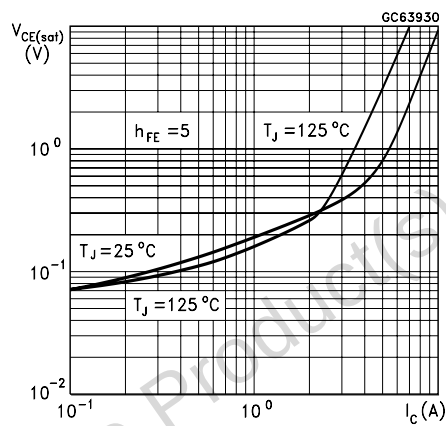


Figure 4. Base emitter saturation voltage

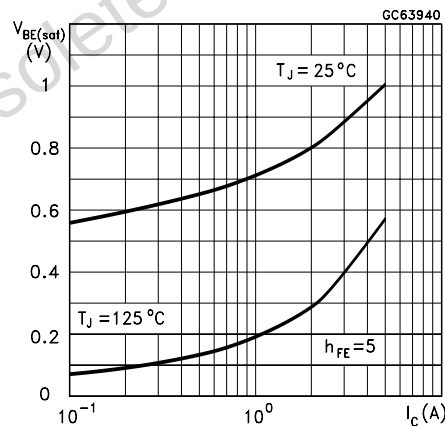


Figure 5. Inductive load storage time

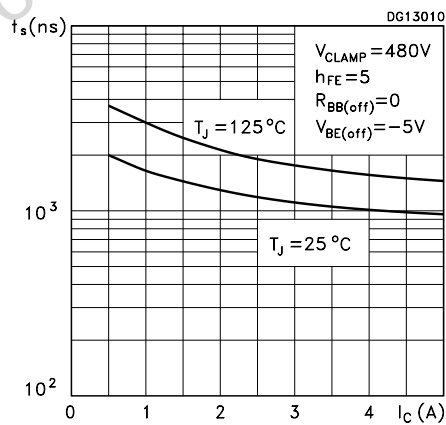


Figure 6. Inductive load fall time

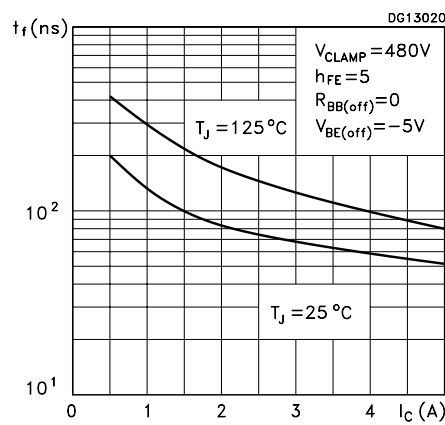
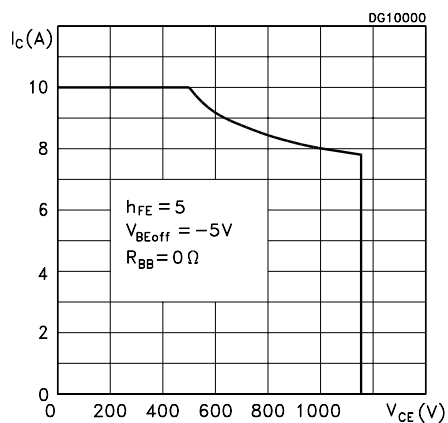
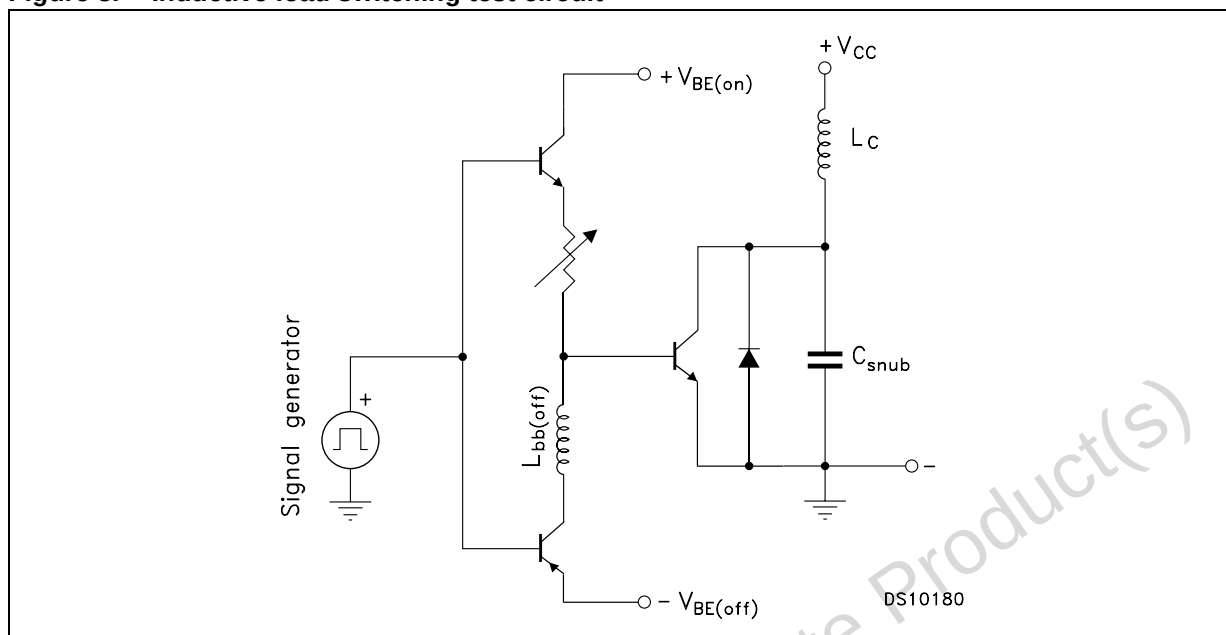


Figure 7. Reverse biased S.O.A.



**Figure 8. Inductive load switching test circuit**

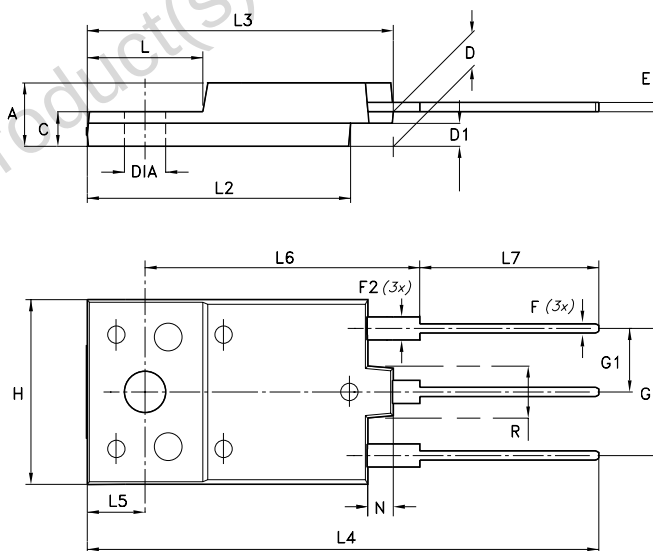
### 3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK<sup>®</sup> 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](http://www.st.com).

Obsolete Product(s) - Obsolete Product(s)

## ISOWATT218FX MECHANICAL DATA

| DIM. | mm    |      |       | inch  |       |       |
|------|-------|------|-------|-------|-------|-------|
|      | MIN.  | TYP. | MAX.  | MIN.  | TYP.  | MAX.  |
| A    | 5.30  |      | 5.70  | 0.209 |       | 0.224 |
| C    | 2.80  |      | 3.20  | 0.110 |       | 0.126 |
| D    | 3.10  |      | 3.50  | 0.122 |       | 0.138 |
| D1   | 1.80  |      | 2.20  | 0.071 |       | 0.087 |
| E    | 0.80  |      | 1.10  | 0.031 |       | 0.043 |
| F    | 0.65  |      | 0.95  | 0.026 |       | 0.037 |
| F2   | 1.80  |      | 2.20  | 0.071 |       | 0.087 |
| G    | 10.30 |      | 11.50 | 0.406 |       | 0.453 |
| G1   |       | 5.45 |       |       | 0.215 |       |
| H    | 15.30 |      | 15.70 | 0.602 |       | 0.618 |
| L    | 9.0   |      | 10.20 | 0.354 |       | 0.402 |
| L2   | 22.80 |      | 23.20 | 0.898 |       | 0.913 |
| L3   | 26.30 |      | 26.70 | 1.035 |       | 1.051 |
| L4   | 43.20 |      | 44.40 | 1.701 |       | 1.748 |
| L5   | 4.30  |      | 4.70  | 0.169 |       | 0.185 |
| L6   | 24.30 |      | 24.70 | 0.957 |       | 0.972 |
| L7   | 14.60 |      | 15.00 | 0.575 |       | 0.591 |
| N    | 1.80  |      | 2.20  | 0.071 |       | 0.087 |
| R    | 3.80  |      | 4.20  | 0.150 |       | 0.165 |
| DIA  | 3.40  |      | 3.80  | 0.134 |       | 0.150 |



- Weight : 5.6 g (typ.)
- Maximum Torque (applied to mounting flange) Recommended: 0.55 Nm; Maximum: 1 Nm
- The side of the dissipator must be flat within 80  $\mu$ m



## 4 Revision History

Table 4. Revision history

| Date        | Revision | Changes          |
|-------------|----------|------------------|
| 23-Feb-2006 | 1        | Initial release. |

Obsolete Product(s) - Obsolete Product(s)

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