



# ST1802FX

## HIGH VOLTAGE FAST - SWITCHING NPN POWER TRANSISTOR

### Features

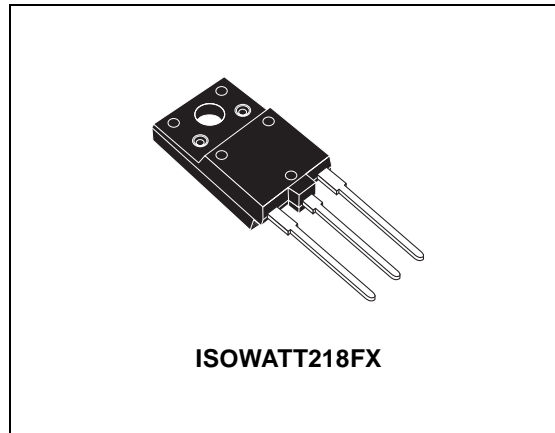
- NEW SERIES, ENHANCED PERFORMANCE
- FULLY INSULATED POWER PACKAGE (U.L. COMPLIANT) FOR EASY MOUNTING
- HIGH VOLTAGE CAPABILITY (>1500V)
- HIGH SWITCHING SPEED
- TIGHTER  $h_{FE}$  CONTROL
- IMPROVED RUGGEDNESS
- IN COMPLIANCE WITH THE 2002/93/EC EUROPEAN DIRECTIVE

### Applications

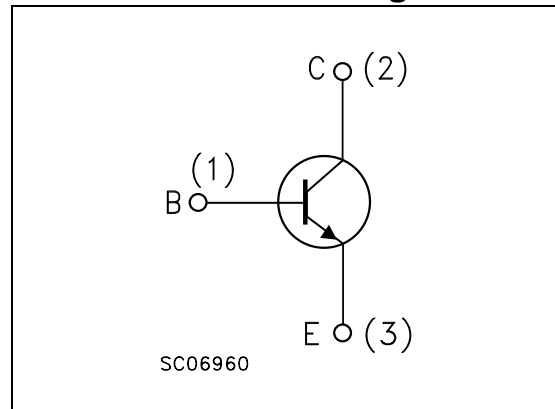
- HORIZONTAL DEFLECTION OUTPUT FOR COLOR TV UP TO 29-INCHES

### Description

The ST1802FX is manufactured using new Diffused Collector Technology for more stable operation Vs base drive circuit variations resulting in very low worst case dissipation.



### Internal Schematic Diagram



### Order codes

| Part Number | Marking | Package      | Packing |
|-------------|---------|--------------|---------|
| ST1802FX    | 1802FX  | ISOWATT218FX | TUBE    |

# 1 Electrical Ratings

**Table 1. Absolute Maximum Rating**

| Symbol     | Parameter  | Value      | Unit |
|------------|--|------------|------|
| $V_{CBO}$  | Collector-Base Voltage ( $I_E = 0$ )   | 1500       | V    |
| $V_{CEO}$  | Collector-Emitter Voltage ( $I_B = 0$ )                                      | 600        | V    |
| $V_{EBO}$  | Collector-Base Voltage ( $I_C = 0$ )   | 7          | V    |
| $I_C$      | Collector Current  | 10         | A    |
| $I_{CM}$   | Collector Peak Current ( $t_p < 5ms$ )                                       | 15         | A    |
| $I_B$      | Base Current   | 4          | A    |
| $P_{TOT}$  | Total dissipation at $T_C = 25^\circ C$                                      | 60         | 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  |            |      |

**Table 2. Thermal Data**

| Symbol         | Parameter                               | Value | Unit |
|----------------|---|-------|------|
| $R_{thj-case}$ | Thermal Resistance Junction-Case<br>Max | 2.1   | °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>( $V_{BE} = 0$ )         | $V_{CE} = 1500V$                         |      |      | 1    | mA      |
|                                 |   | $V_{CE} = 1500V$ $T_C = 125^{\circ}C$    |      |      | 2    | mA      |
| $I_{EBO}$                       | Emitter Cut-off Current<br>( $I_C = 0$ )              | $V_{EB} = 7V$                            |      |      | 1    | mA      |
| $V_{CEO(sus)}$<br><i>Note 1</i> | Collector-Emitter Sustaining<br>Voltage ( $I_B = 0$ ) | $I_C = 700\text{ mA}$ $L = 25\text{ mH}$ | 600  |      |      | V       |
| $V_{CE(sat)}$<br><i>Note 1</i>  | Collector-Emitter Saturation<br>Voltage               | $I_C = 4\text{ A}$ $I_B = 0.8\text{ A}$  |      |      | 5    | V       |
|                                 |   | $I_C = 4\text{ A}$ $I_B = 1.2\text{ A}$  |      |      | 1.5  | V       |
| $V_{BE(sat)}$<br><i>Note 1</i>  | Base-Emitter Saturation Voltage                       | $I_C = 4.5\text{ A}$ $I_B = 1\text{ A}$  |      |      | 1.2  | V       |
| $h_{FE}$                        | DC Current Gain                                       | $I_C = 1\text{ A}$ $V_{CE} = 5\text{ V}$ |      | 25   |      |         |
|                                 |   | $I_C = 5\text{ A}$ $V_{CE} = 1\text{ V}$ |      | 4.5  |      |         |
|                                 |   | $I_C = 5\text{ A}$ $V_{CE} = 5\text{ V}$ | 4    |      | 9    |         |
| $t_s$<br>$t_f$                  | INDUCTIVE LOAD  | $I_C = 4A$ $f_h = 16KHz$                 |      |      |      |         |
|                                 | Storage Time  | $I_{B(on)(END)} = 850mA$                 |      | 2.6  | 4    | $\mu s$ |
|                                 | Fall Time   | $V_{BB(off)} = -2.5V$ $L_B = 4.5\mu H$   |      | 0.2  | 0.6  | $\mu s$ |

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

## 2.1 Electrical Characteristics (curves)

Figure 1. Safe Operating Area

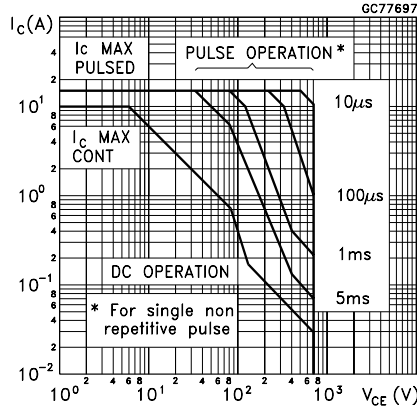


Figure 2. Thermal Impedance

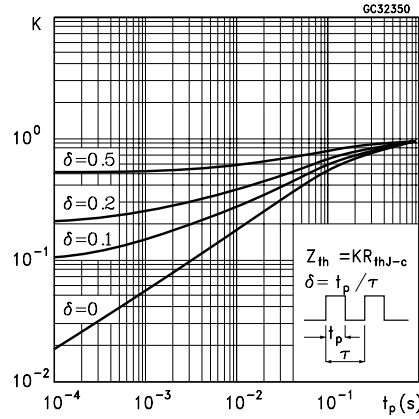


Figure 3. Collector-emitter saturation voltage Figure 4. Base-emitter saturation voltage

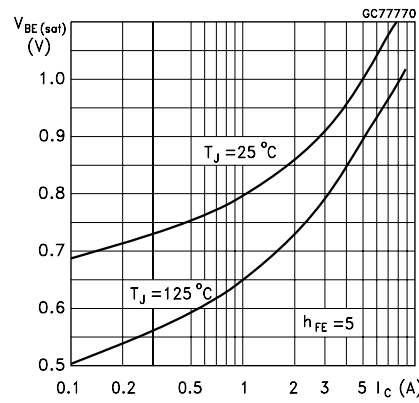
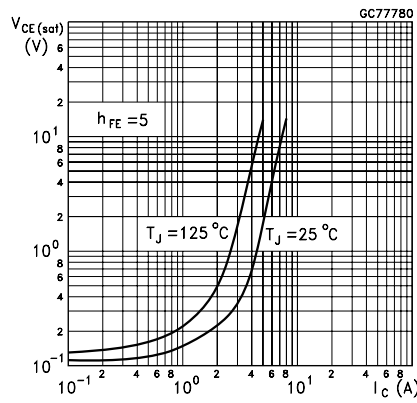


Figure 5. DC current gain

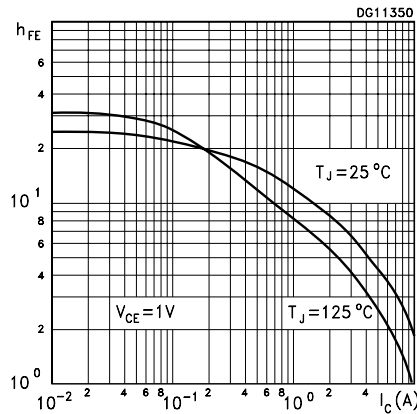


Figure 6. DC current gain

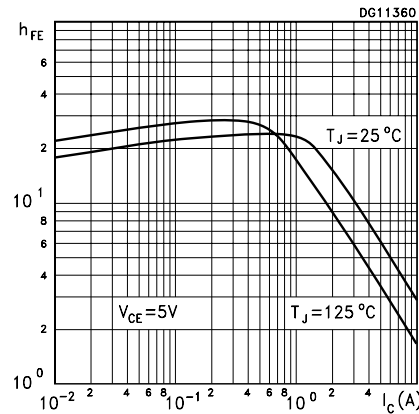


Figure 7. Power losses at 16KHz

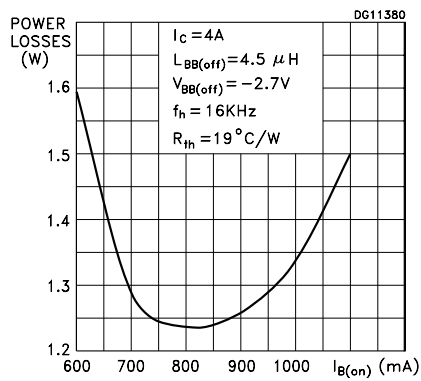


Figure 8. Switching time inductive load

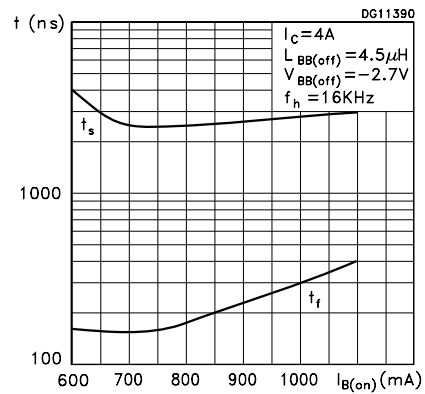
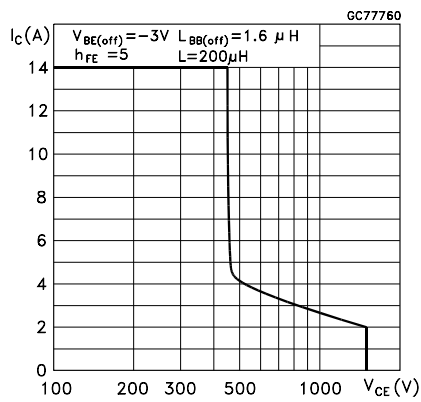
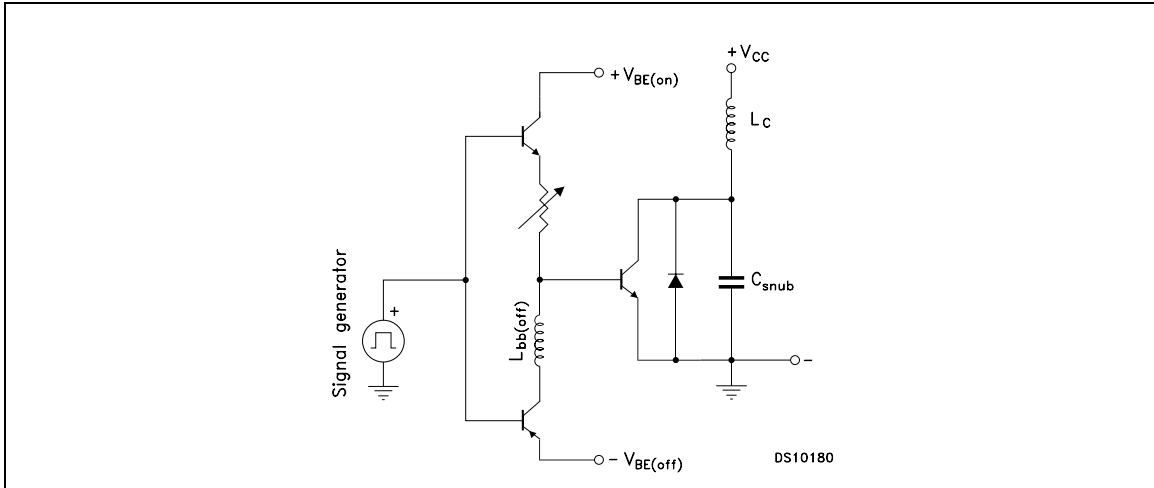


Figure 9. Reverse biased area



### 3 Test Circuit

Figure 10. Inductive load switching test circuit

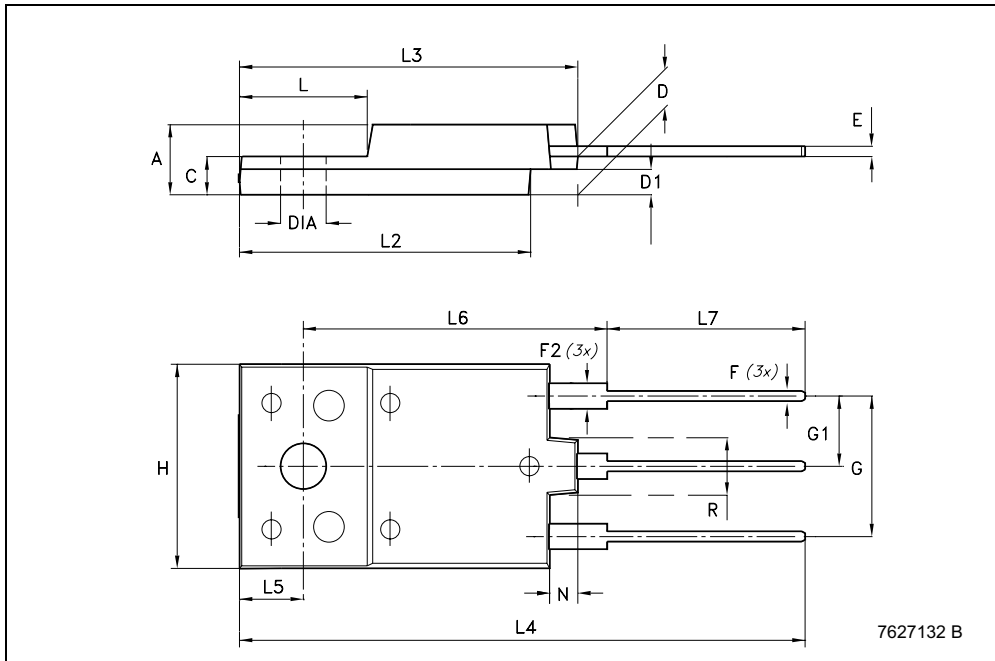


## 4 Package Mechanical Data

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](http://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  |





## 5 Revision History

| Date        | Revision | Changes       |
|-------------|----------|---------------|
| 18-Oct-2005 | 1        | First release |

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