



ST1802FX

HIGH VOLTAGE FAST - SWITCHING NPN POWER TRANSISTOR

Features

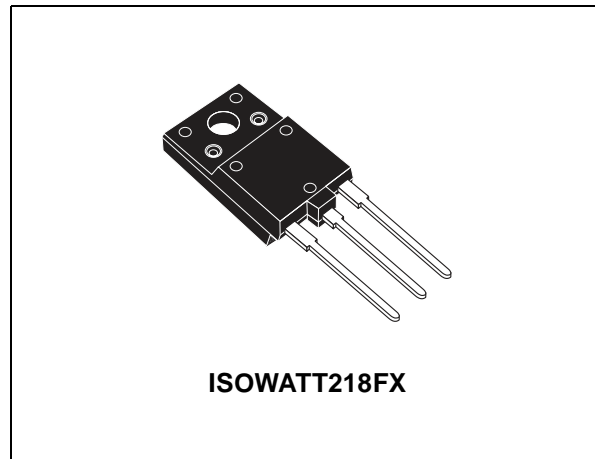
- NEW SERIES, ENHANCED PERFORMANCE
- FULLY INSULATED POWER PACKAGE (U.L. COMPLIANT) FOR EASY MOUNTING
- HIGH VOLTAGE CAPABILITY (>1500V)
- HIGH SWITCHING SPEED
- TIGHTER h_{FE} CONTROL
- IMPROVED RUGGEDNESS
- IN COMPLIANCE WITH THE 2002/93/EC EUROPEAN DIRECTIVE

Applications

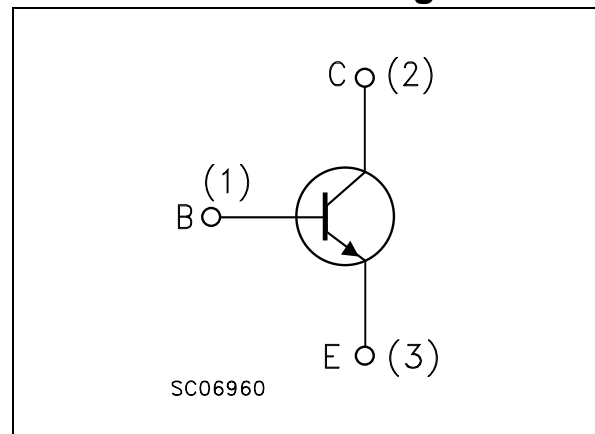
- HORIZONTAL DEFLECTION OUTPUT FOR COLOR TV UP TO 29-INCHES

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 ($t_P < 5\text{ms}$) | 15 | A |
| I_B | Base Current | 4 | A |
| P_{TOT} | Total dissipation at $T_C = 25^\circ\text{C}$ | 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 | 150 | |

Table 2. Thermal Data

| Symbol | Parameter | Value | Unit |
|----------------|---|-------|------|
| $R_{thj-case}$ | Thermal Resistance Junction-Case 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 ($V_{BE} = 0$) | $V_{CE} = 1500V$ | | | 1 | mA |
| | | $V_{CE} = 1500V$ $T_C = 125^{\circ}C$ | | | 2 | mA |
| I_{EBO} | Emitter Cut-off Current ($I_C = 0$) | $V_{EB} = 7V$ | | | 1 | mA |
| $V_{CEO(sus)}$ <i>Note 1</i> | Collector-Emitter Sustaining Voltage ($I_B = 0$) | $I_C = 700\text{ mA}$ $L = 25\text{ mH}$ | 600 | | | V |
| $V_{CE(sat)}$ <i>Note 1</i> | Collector-Emitter Saturation 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 |
| $V_{BE(sat)}$ <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 t_f | INDUCTIVE LOAD | $I_C = 4A$ $f_h = 16KHz$ | | | | |
| | Storage Time | $I_{Bon(ENd)} = 850mA$ | | 2.6 | 4 | μs |
| | Fall Time | $V_{BB(off)} = -2.5V$ $L_B = 4.5\mu H$ | | 0.2 | 0.6 | μs |

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

2.1 Electrical Characteristics (curves)

Figure 1. Safe Operating Area

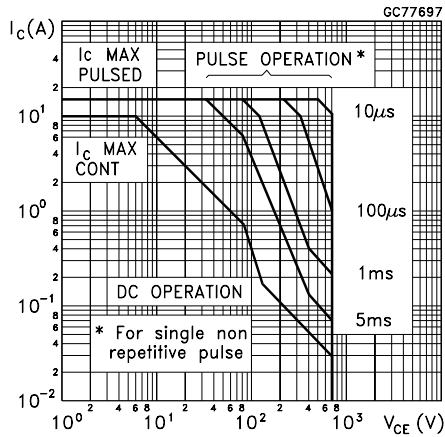


Figure 2. Thermal Impedance

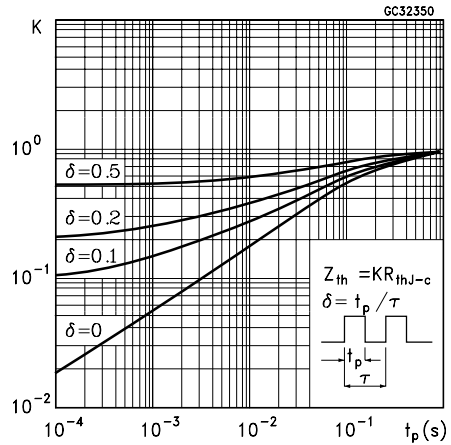


Figure 3. Collector-emitter saturation voltage

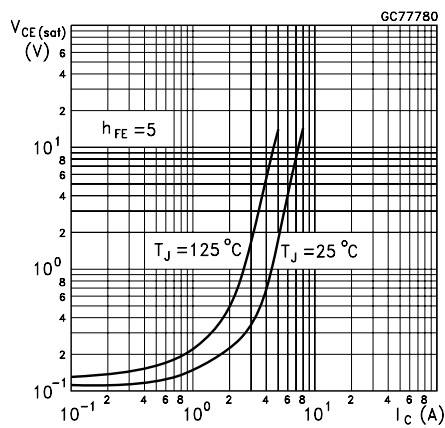


Figure 4. Base-emitter saturation voltage

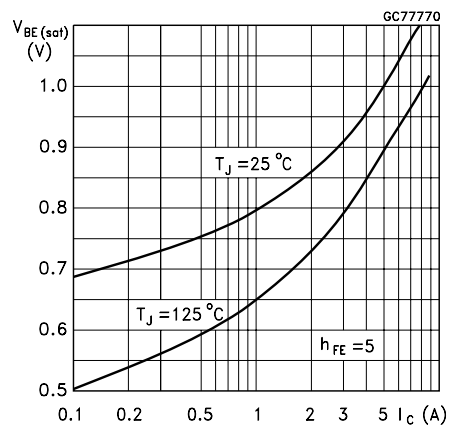


Figure 5. DC current gain

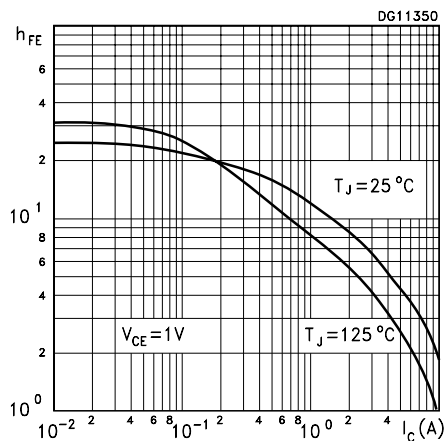


Figure 6. DC current gain

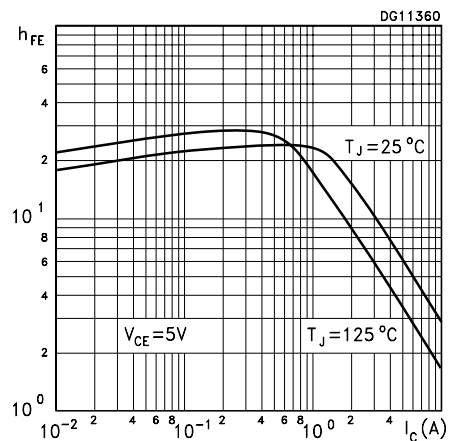


Figure 7. Power losses at 16KHz

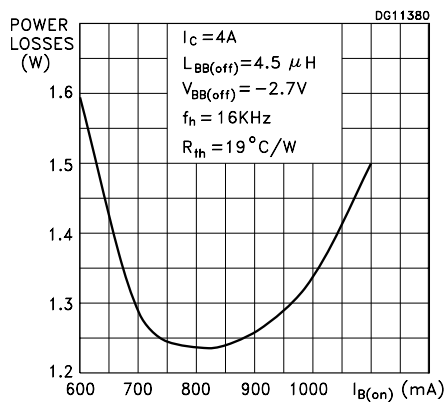


Figure 8. Switching time inductive load

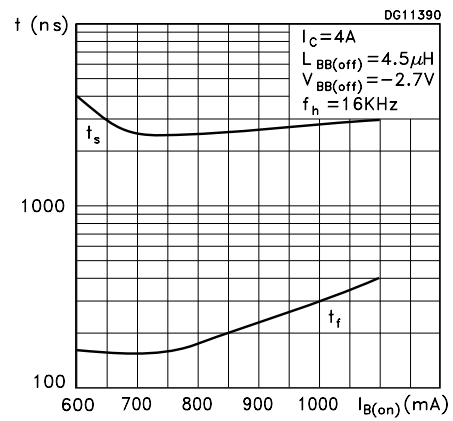
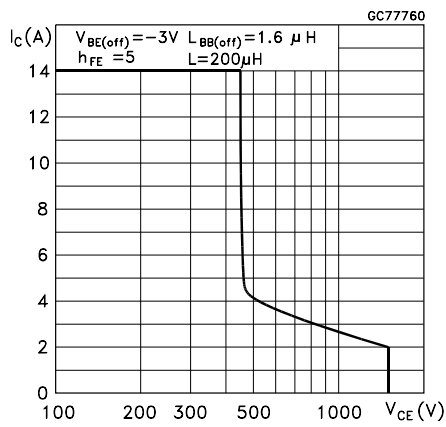
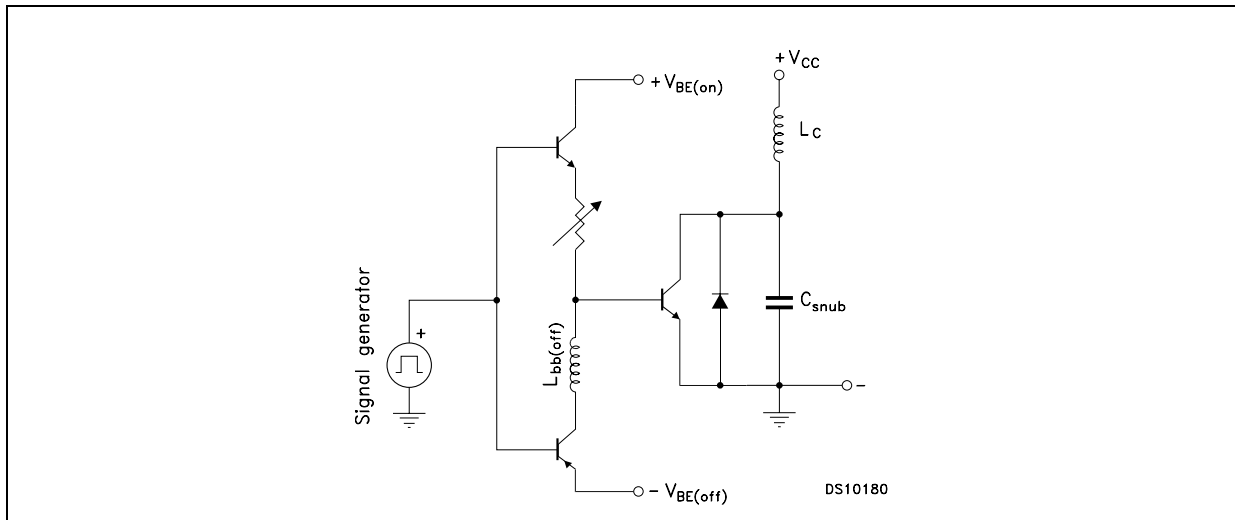


Figure 9. Reverse biased area



3 Test Circuit

Figure 10. Inductive load switching test circuit

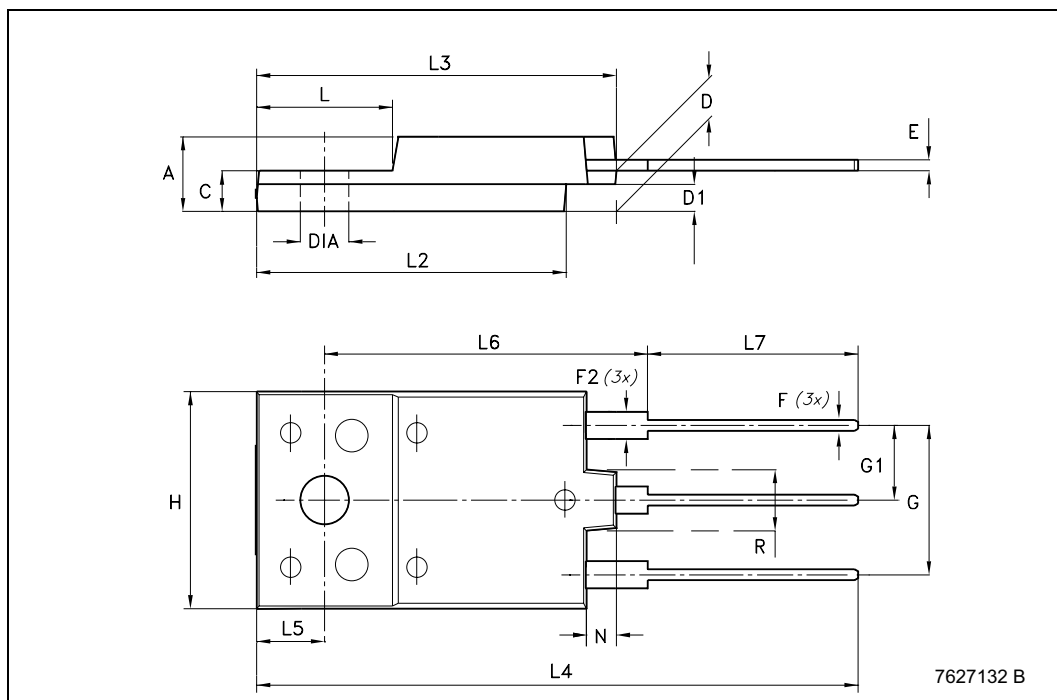


4 Package Mechanical Data

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

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 |

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics.
All other names are the property of their respective owners

© 2005 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan -
Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com