



# ST1803DFX

## HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

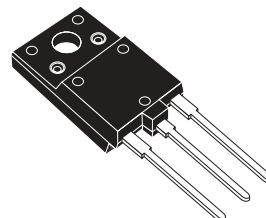
- NEW SERIES, ENHANCED PERFORMANCE
- FULLY INSULATED PACKAGE (U.L. COMPLIANT) FOR EASY MOUNTING
- INTEGRATED FREE WHEELING DIODE
- HIGH VOLTAGE CAPABILITY (> 1500 V)
- HIGH SWITCHING SPEED
- TIGHTER  $h_{fe}$  CONTROL
- IMPROVED RUGGEDNESS

### APPLICATIONS:

- HORIZONTAL DEFLECTION FOR COLOR TVS UP TO 29 INCHES

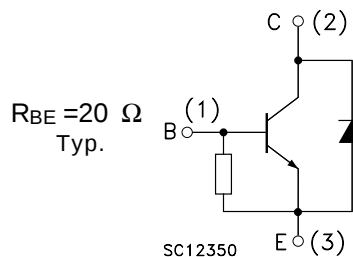
### DESCRIPTION

The ST1803DFX is manufactured using Diffused Collector technology for more stable operation Vs base drive circuit variations resulting in very low worst case dissipation.



ISOWATT218FX

### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

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

## THERMAL DATA

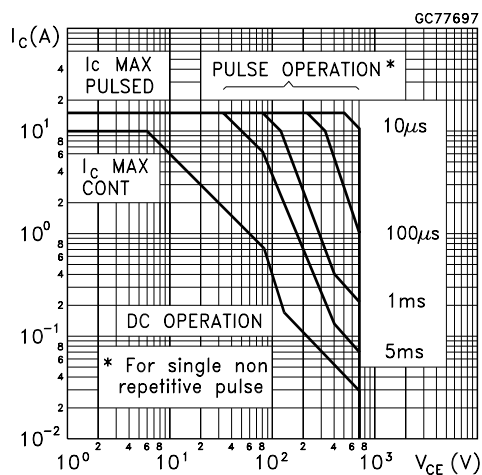
|                |                                  |     |     |               |
|----------------|----------------------------------|-----|-----|---------------|
| $R_{thj-case}$ | Thermal Resistance Junction-case | Max | 2.1 | $^{\circ}C/W$ |
|----------------|----------------------------------|-----|-----|---------------|

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

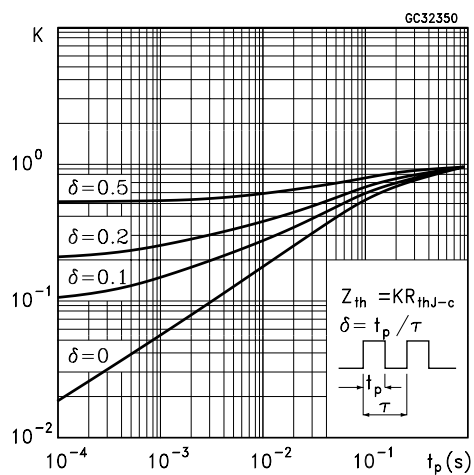
| Symbol         | Parameter                                    | Test Conditions                                                                                                | Min.    | Typ.       | Max.     | Unit               |
|----------------|----------------------------------------------|----------------------------------------------------------------------------------------------------------------|---------|------------|----------|--------------------|
| $I_{CES}$      | Collector Cut-off Current ( $V_{BE} = 0$ )   | $V_{CE} = 1500 V$<br>$V_{CE} = 1500 V \quad T_J = 125^{\circ}C$                                                |         |            | 1<br>2   | mA<br>mA           |
| $I_{EBO}$      | Emitter Cut-off Current ( $I_C = 0$ )        | $V_{EB} = 4 V$                                                                                                 | 130     |            | 400      | mA                 |
| $V_{(BR)EBO}$  | Emitter-Base Breakdown Voltage ( $I_C = 0$ ) | $I_E = 700 mA$                                                                                                 | 7       |            |          | V                  |
| $V_{CE(sat)*}$ | Collector-Emitter Saturation Voltage         | $I_C = 4 A \quad I_B = 0.8 A$<br>$I_C = 4 A \quad I_B = 1.2 A$                                                 |         | 3          | 5<br>1.5 | V<br>V             |
| $V_{BE(sat)*}$ | Base-Emitter Saturation Voltage              | $I_C = 4 A \quad I_B = 0.8 A$                                                                                  |         |            | 1.2      | V                  |
| $h_{FE*}$      | DC Current Gain                              | $I_C = 1 A \quad V_{CE} = 5 V$<br>$I_C = 4.5 A \quad V_{CE} = 1 V$<br>$I_C = 4.5 A \quad V_{CE} = 5 V$         | 10<br>5 | 15<br>5    | 20<br>9  |                    |
| $V_F$          | Diode Forward Voltage                        | $I_F = 5 A$                                                                                                    |         | 1.5        | 2        | V                  |
| $t_s$<br>$t_f$ | INDUCTIVE LOAD<br>Storage Time<br>Fall Time  | $I_C = 4 A \quad I_{Bon(END)} = 0.8 A$<br>$L_B = 5 \mu H \quad V_{BB} = -2.5 V$<br>$f = 16 KHz$ (see figure 1) |         | 2.7<br>0.3 | 4<br>0.6 | $\mu s$<br>$\mu s$ |

\* Pulsed: Pulse duration = 300  $\mu s$ , duty cycle 1.5 %

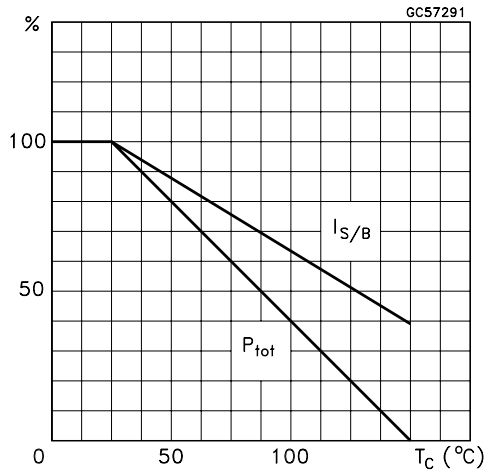
## Safe Operating Area



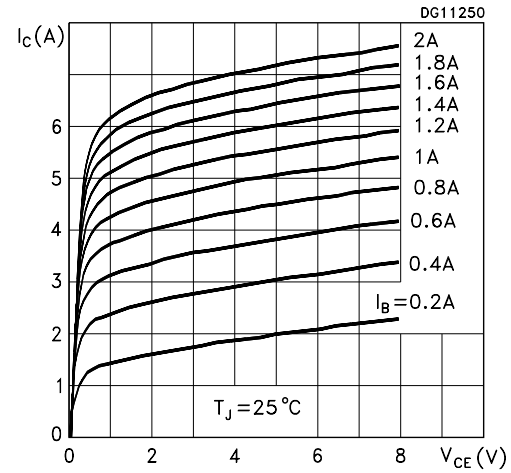
## Thermal Impedance



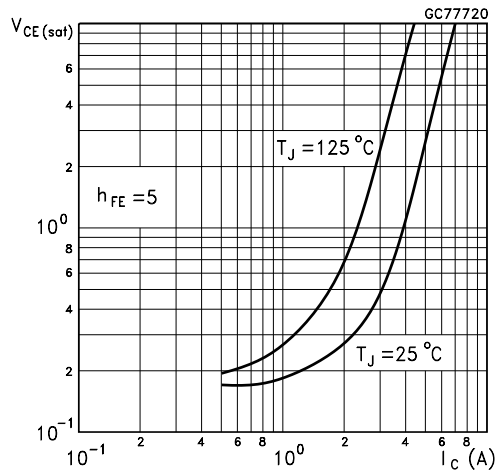
Derating Curve



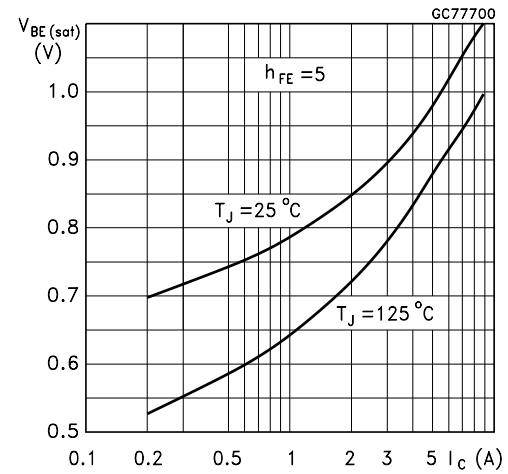
Output Characteristics



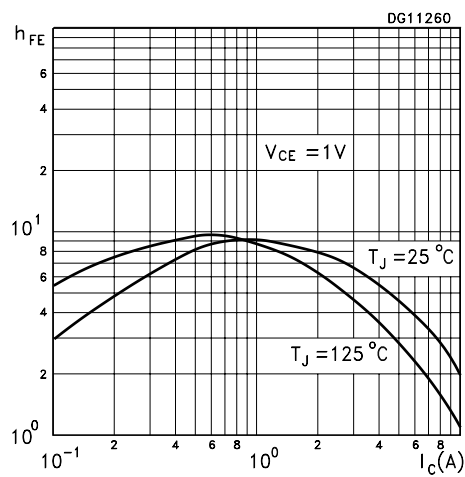
Collector Emitter Saturation Voltage



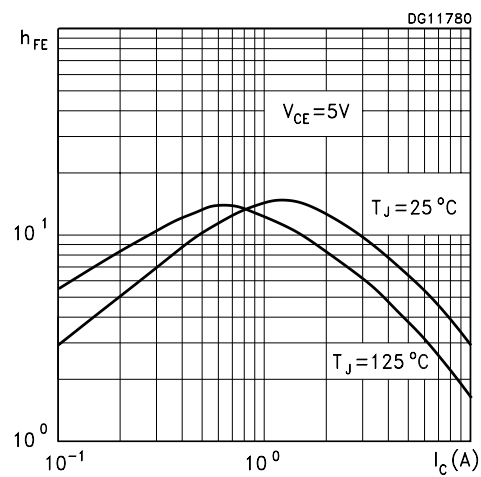
Base Emitter Saturation Voltage



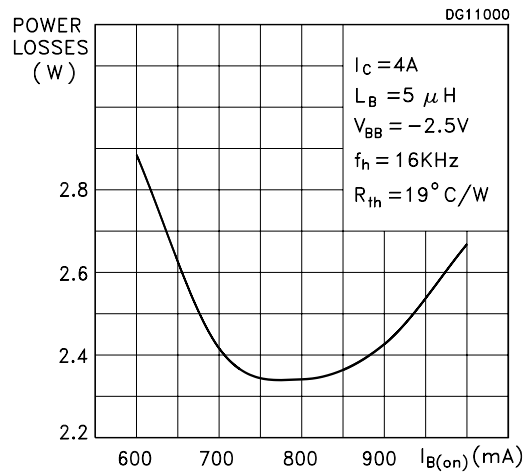
DC Current Gain



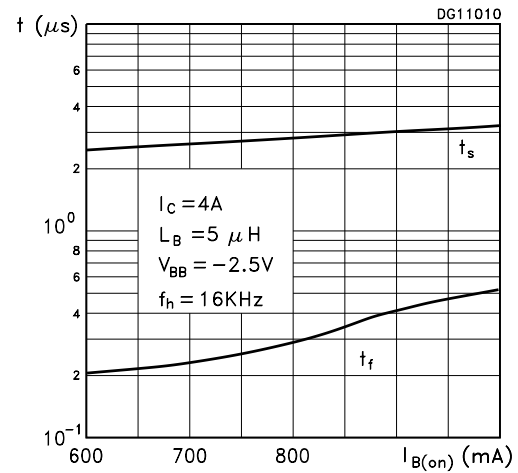
DC Current Gain



## Power Losses



## Switching Time Inductive Load



## Reverse Biased SOA

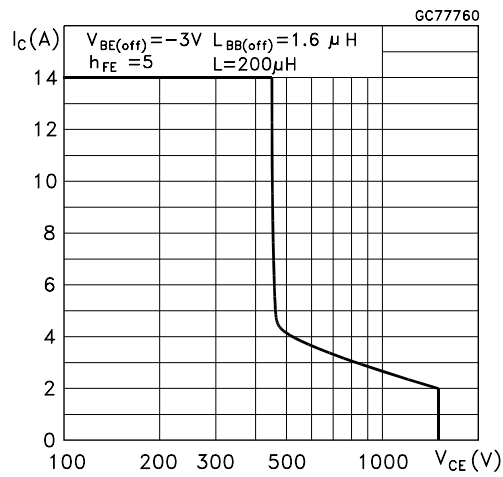
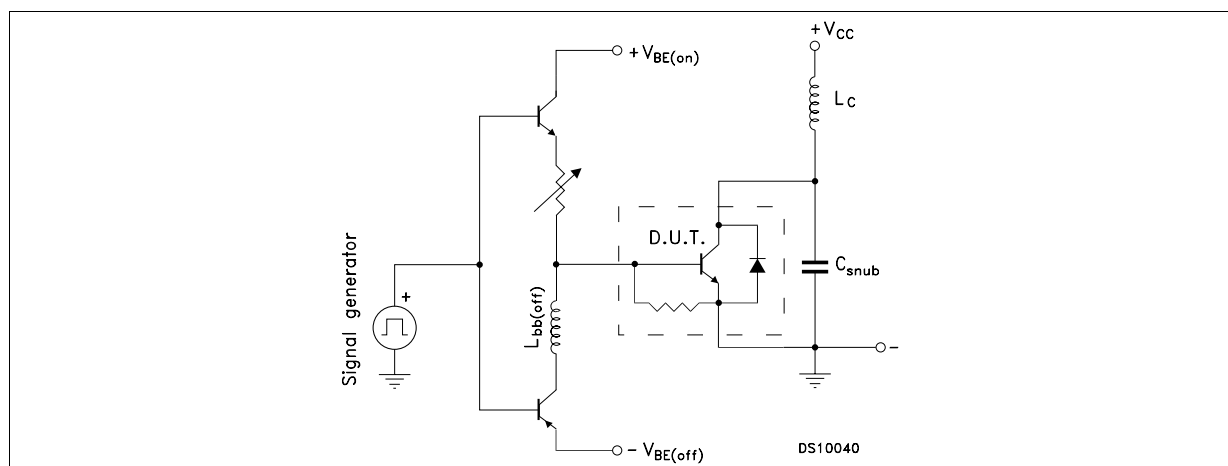
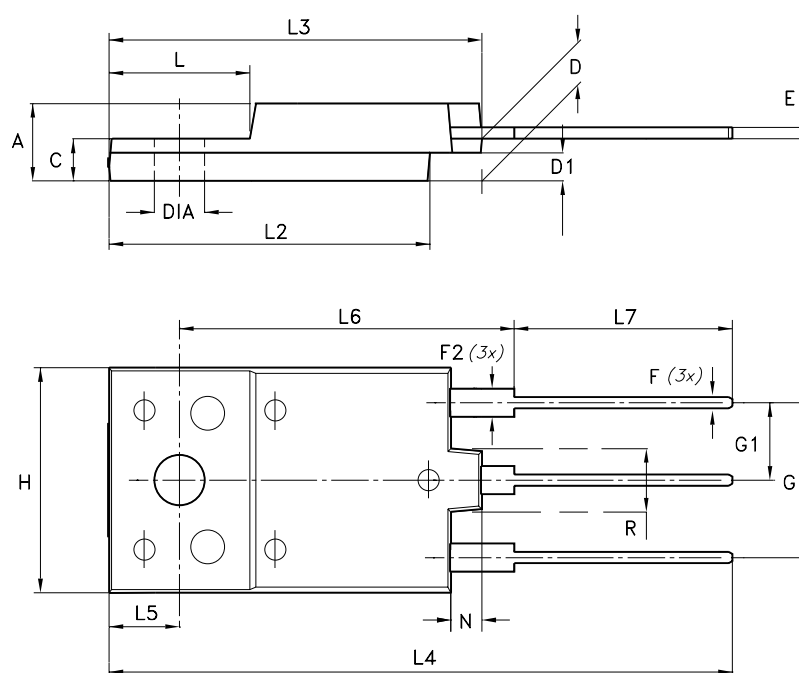


Figure 1: Inductive Load Switching Test Circuit.



## 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    | 9.80  |      | 10.20 | 0.386 |       | 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

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