# ST1803DHI

## HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

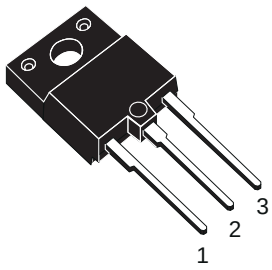
- NEW SERIES, ENHANCED PERFORMANCE
- FULLY INSULATED PACKAGE (U.L. COMPLIANT) FOR EASY MOUNTING
- INTEGRATED FREE WHEELING DIODE
- HIGH VOLTAGE CAPABILITY (> 1500 V)
- HIGH SWITCHING SPEED
- TIGTHER hfe CONTROL
- IMPROVED RUGGEDNESS

**APPLICATIONS:**

- HORIZONTAL DEFLECTION FOR COLOR TVS

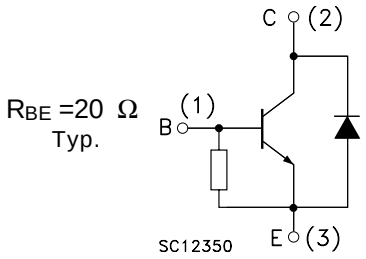
**DESCRIPTION**

The ST1803DHI is manufactured using Diffused Collector technology for more stable operation Vs base drive circuit variations resulting in very low worst case dissipation.




**ISOWATT218**

**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 | 50 | 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

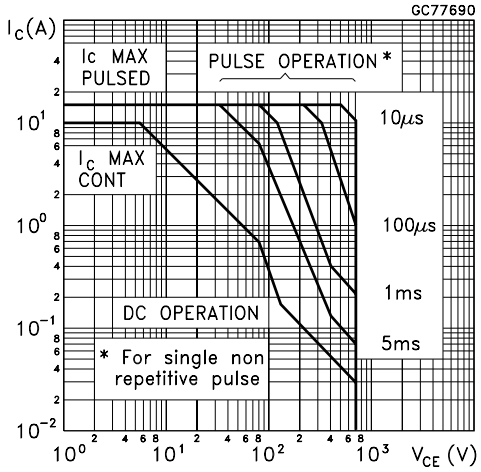
| | | | | |
|---|---|---|---|---|
| $R_{thj\text{-}case}$ | Thermal Resistance Junction-case | Max | 2.5 | $^oC/W$ |

## ELECTRICAL CHARACTERISTICS ($T_{case}$ = 25 $^oC$ unless otherwise specified)

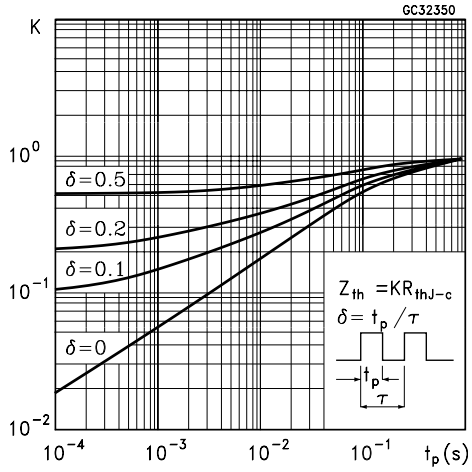
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_{CES}$ | Collector Cut-off Current ($V_{BE}$ = 0) | $V_{CE}$ = 1500 V<br>$V_{CE}$ = 1500 V $T_j$ = 125 $^oC$ | | | 1<br>2 | mA<br>mA |
| $I_{EBO}$ | Emitter Cut-off Current ($I_C$ = 0) | $V_{EB}$ = 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 $I_B$ = 0.8 A<br>$I_C$ = 4 A $I_B$ = 1.2 A | | 3 | 5<br>1.5 | V<br>V |
| $V_{BE(sat)}$* | Base-Emitter Saturation Voltage | $I_C$ = 4 A $I_B$ = 0.8 A | | | 1.2 | V |
| $h_{FE}$* | DC Current Gain | $I_C$ = 1 A $V_{CE}$ = 5 V<br>$I_C$ = 4.5 A $V_{CE}$ = 1 V<br>$I_C$ = 4.5 A $V_{CE}$ = 5 V | 10<br><br>5 | 15<br>5 | 20<br><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 $I_{Bon(END)}$ = 0.8 A<br>$L_B$ = 5 µH $V_{BB}$ = -2.5 V<br>f = 16 KHz (see figure 1) | | <br>2.7<br>0.3 | <br>4<br>0.6 | <br>µs<br>µs |

* Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %

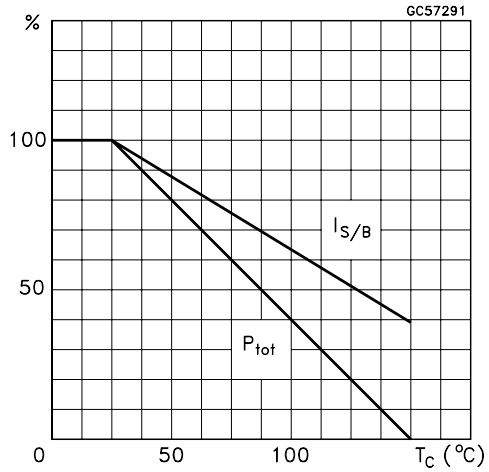
Safe Operating Area



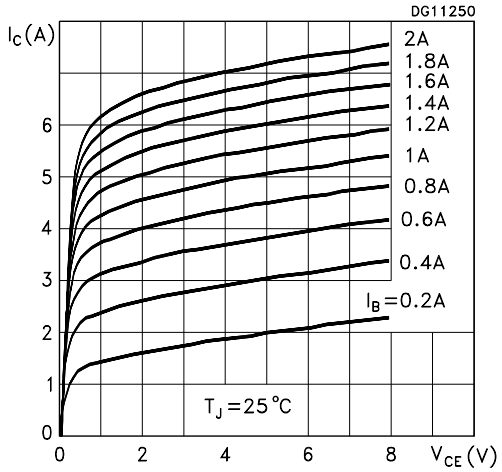

Thermal Impedance



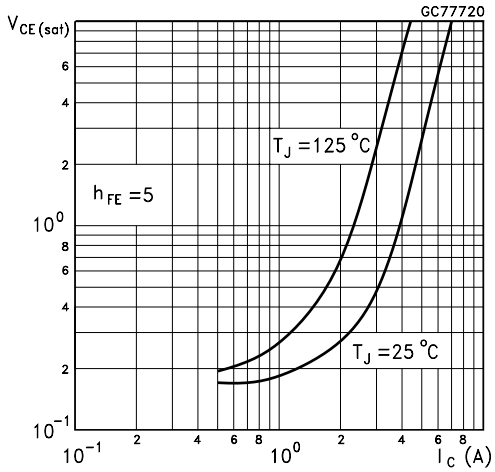
Derating Curve



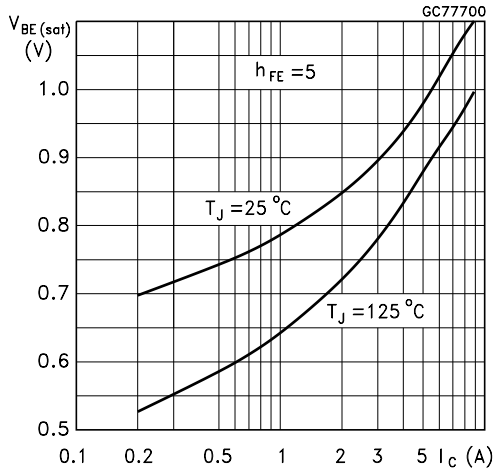

Output Characteristics



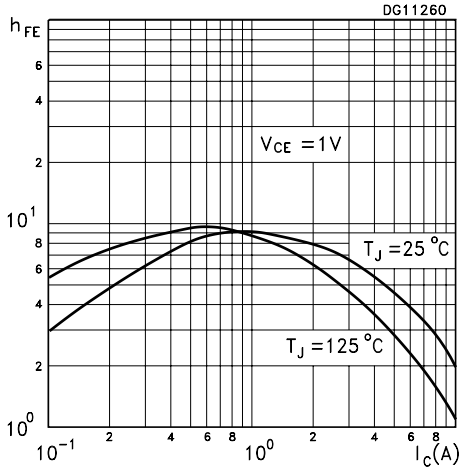

Collector Emitter Saturation Voltage



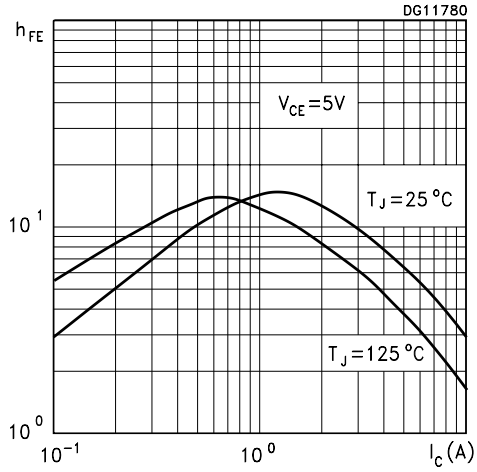

Base Emitter Saturation Voltage



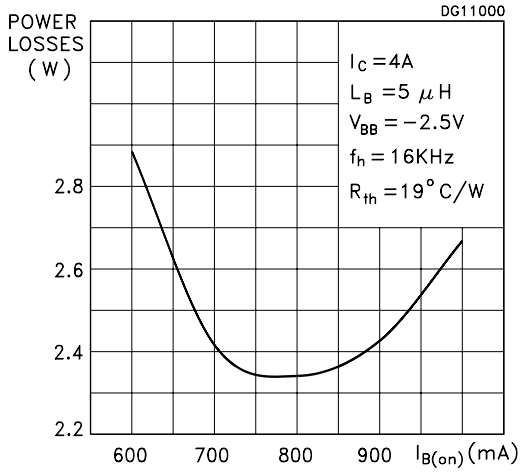

DC Current Gain



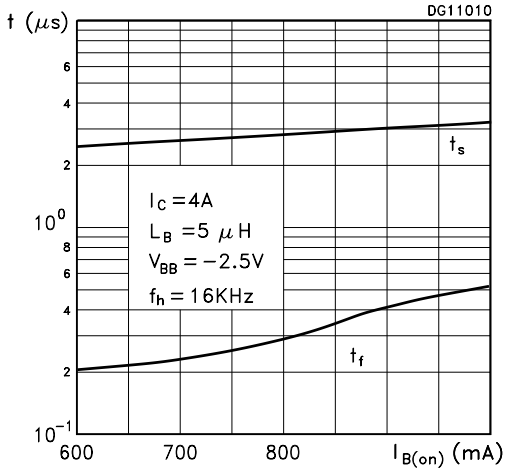

DC Current Gain



Power Losses




Switching Time Inductive Load




Reverse Biased SOA

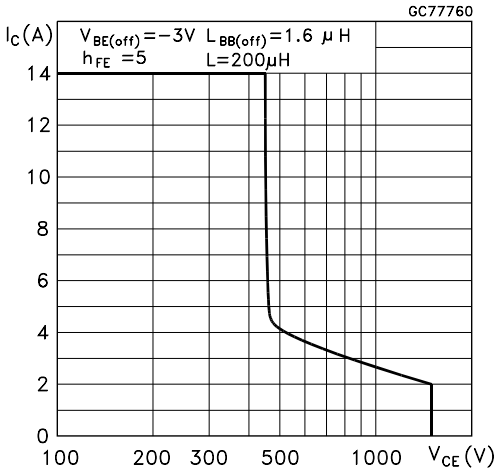
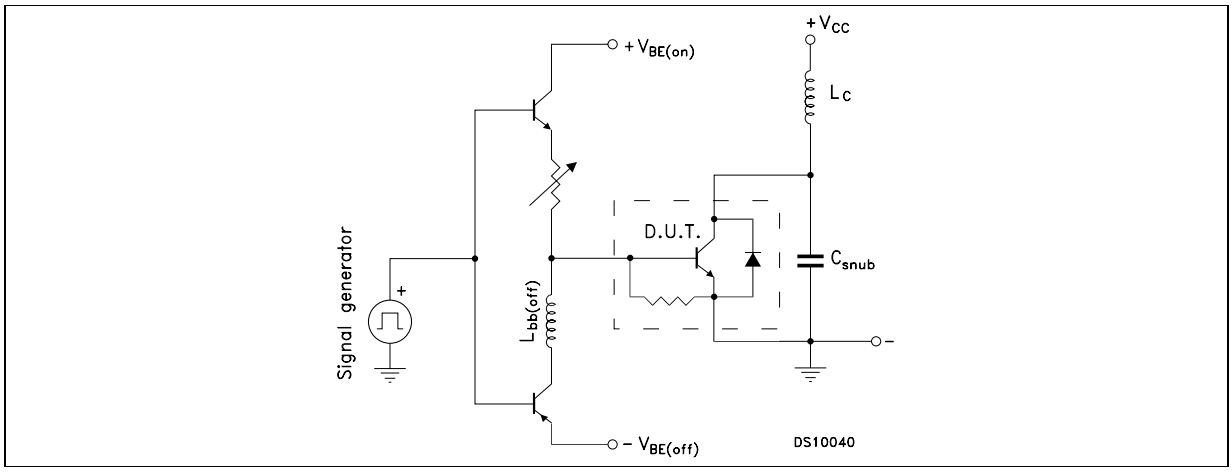
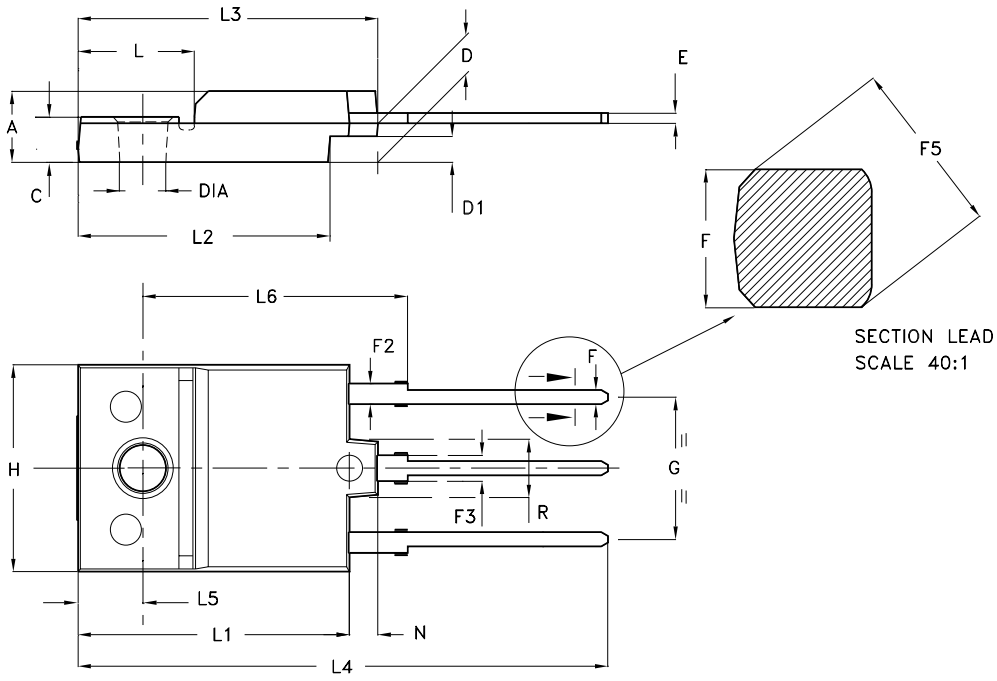



**Figure 1:** Inductive Load Switching Test Circuit.



## ISOWATT218 NARROW LEADS MECHANICAL DATA

| DIM. | mm | | | inch | | |
|---|---|---|---|---|---|---|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 5.35 | | 5.65 | 0.211 | | 0.222 |
| C | 3.30 | | 3.80 | 0.130 | | 0.150 |
| D | 2.90 | | 3.10 | 0.114 | | 0.122 |
| D1 | 1.88 | | 2.08 | 0.074 | | 0.082 |
| E | 0.75 | | 0.95 | 0.030 | | 0.037 |
| F | 0.75 | | 0.95 | 0.030 | | 0.037 |
| F2 | 1.50 | | 1.70 | 0.059 | | 0.067 |
| F3 | 1.90 | | 2.10 | 0.075 | | 0.083 |
| F5 | | | 1.10 | | | 0.043 |
| G | 10.80 | | 11.20 | 0.425 | | 0.441 |
| H | 15.80 | | 16.20 | 0.622 | | 0.638 |
| L | | 9 | | | 0.354 | |
| L1 | 20.80 | | 21.20 | 0.819 | | 0.835 |
| L2 | 19.10 | | 19.90 | 0.752 | | 0.783 |
| L3 | 22.80 | | 23.60 | 0.898 | | 0.929 |
| L4 | 40.50 | | 42.50 | 1.594 | | 1.673 |
| L5 | 4.85 | | 5.25 | 0.191 | | 0.207 |
| L6 | 20.25 | | 20.75 | 0.797 | | 0.817 |
| N | 2.1 | | 2.3 | 0.083 | | 0.091 |
| R | | 4.6 | | | 0.181 | |
| DIA | 3.5 | | 3.7 | 0.138 | | 0.146 |




- Weight : 4.9 g (typ.)
- Maximum Torque (applied to mounting flange) Recommended: 0.8 Nm; Maximum: 1 Nm
- The side of the dissipator must be flat within 80 μm

P025C/B