



## S2000AFI

# HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

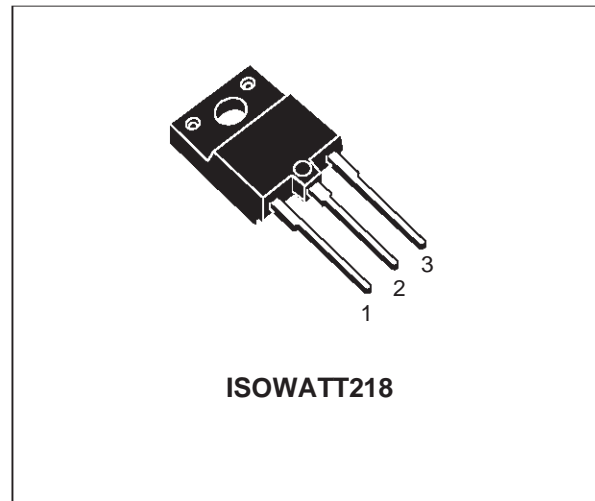
- STMicroelectronics PREFERRED SALESTYPE
- HIGH VOLTAGE CAPABILITY
- U.L. RECOGNISED ISOWATT218 PACKAGE (U.L. FILE # E81734 (N)).

### APPLICATIONS:

- HORIZONTAL DEFLECTION FOR COLOUR TV

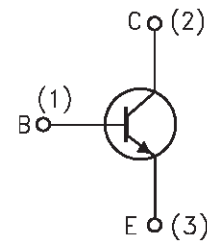
### DESCRIPTION

The S2000AFI is manufactured using Multi-epitaxial Mesa technology for cost-effective high performance and uses a Hollow Emitter structure to enhance switching speeds.



ISOWATT218

### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter                                  | Value      | Unit |
|-----------|--|------------|------|
| $V_{CES}$ | Collector-Emitter Voltage ( $V_{BE} = 0$ ) | 1500       | V    |
| $V_{CEO}$ | Collector-Emitter Voltage ( $I_B = 0$ )    | 700        | V    |
| $V_{EBO}$ | Emitter-Base Voltage ( $I_C = 0$ )         | 10         | V    |
| $I_C$     | Collector Current                          | 8          | A    |
| $I_{CM}$  | Collector Peak Current ( $t_p < 5$ ms)     | 15         | A    |
| $P_{tot}$ | Total Dissipation at $T_c = 25$ °C         | 50         | W    |
| $T_{stg}$ | Storage Temperature                        | -65 to 150 | °C   |
| $T_j$     | Max. Operating Junction Temperature        | 150        | °C   |

# S2000AFI

## THERMAL DATA

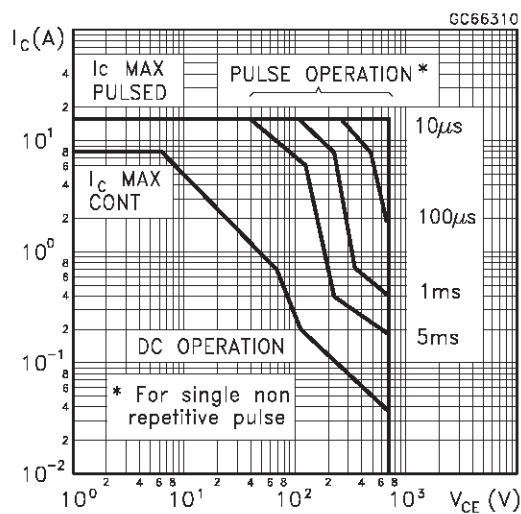
|                       |                                  |     |     |      |
|-----------------------|----------------------------------|-----|-----|------|
| R <sub>thj-case</sub> | Thermal Resistance Junction-case | Max | 2.5 | °C/W |
|-----------------------|----------------------------------|-----|-----|------|

## ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

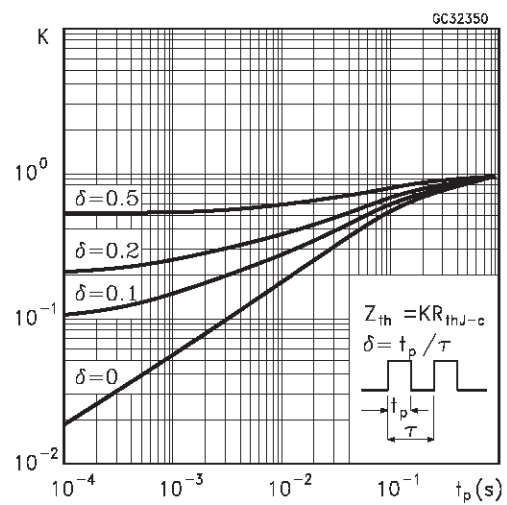
| Symbol                           | Parameter   | Test Conditions  | Min. | Typ.      | Max.   | Unit     |
|----------------------------------|---|--|------|-----------|--------|----------|
| I <sub>CES</sub>                 | Collector Cut-off Current (V <sub>BE</sub> = 0)           | V <sub>CE</sub> = 1500 V<br>V <sub>CE</sub> = 1500 V   |      |           | 1<br>2 | mA<br>mA |
| I <sub>EBO</sub>                 | Emitter Cut-off Current (I <sub>C</sub> = 0)              | V <sub>EB</sub> = 5 V  |      |           | 100    | μA       |
| V <sub>CEO(sus)*</sub>           | Collector-Emitter Sustaining Voltage (I <sub>B</sub> = 0) | I <sub>C</sub> = 100 mA  | 700  |           |        | V        |
| V <sub>EBO</sub>                 | Emitter Base Voltage (I <sub>C</sub> = 0)                 | I <sub>E</sub> = 10 mA   | 10   |           |        | V        |
| V <sub>CE(sat)*</sub>            | Collector-Emitter Saturation Voltage                      | I <sub>C</sub> = 4.5 A    I <sub>B</sub> = 2 A   |      |           | 1      | V        |
| V <sub>BE(sat)*</sub>            | Base-Emitter Saturation Voltage                           | I <sub>C</sub> = 4.5 A    I <sub>B</sub> = 2 A   |      |           | 1.3    | V        |
| t <sub>s</sub><br>t <sub>f</sub> | INDUCTIVE LOAD<br>Storage Time<br>Fall Time               | I <sub>C</sub> = 4.5 A    h <sub>FE</sub> = 2.5    V <sub>CC</sub> = 140 V<br>L <sub>C</sub> = 0.9 mH    L <sub>B</sub> = 3 μH |      | 7<br>0.55 |        | μs<br>μs |
| f <sub>T</sub>                   | Transition Frequency                                      | I <sub>C</sub> = 0.1 A    V <sub>CE</sub> = 5 V    f = 5 MHz   |      | 7         |        | MHz      |

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

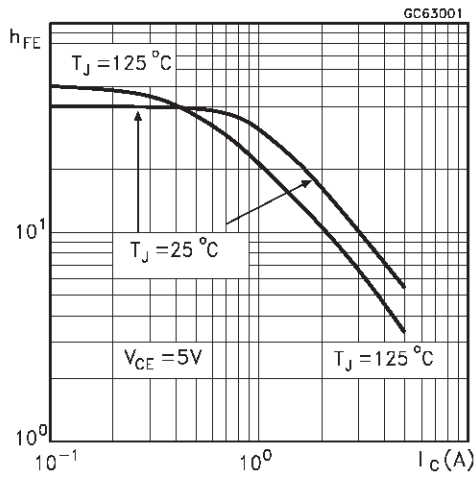
### Safe Operating Area.



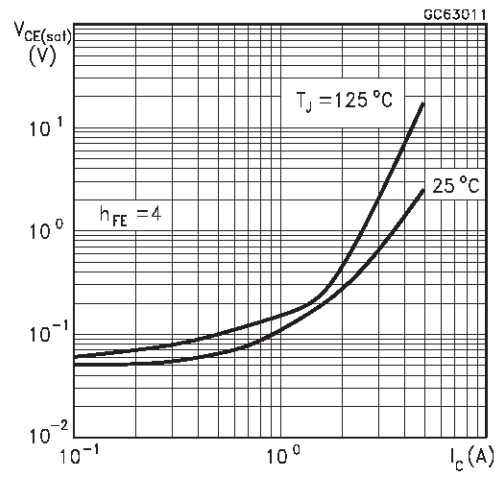
### Thermal Impedance



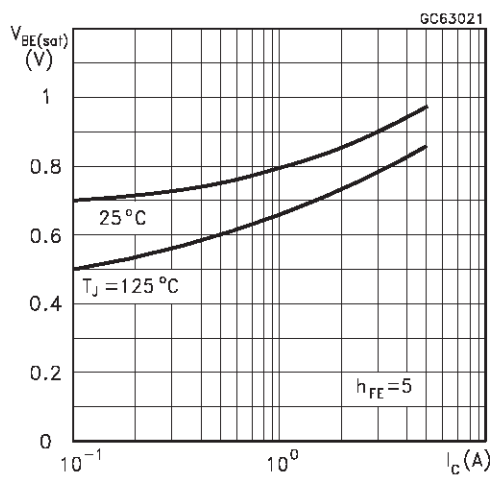
DC Current Gain



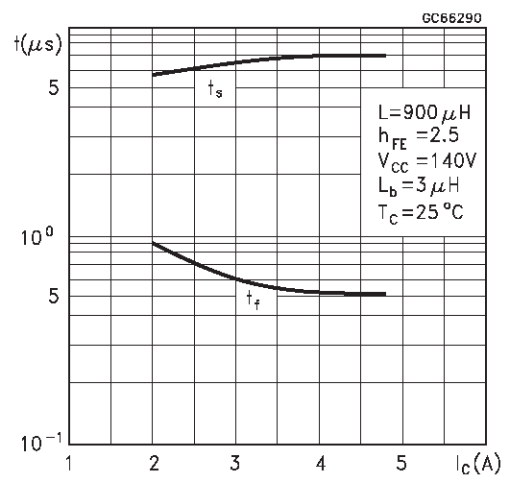
Collector Emitter Saturation Voltage



Base Emitter Saturation Voltage



Switching Time Inductive Load



Switching Time Inductive Load (see figure 1)

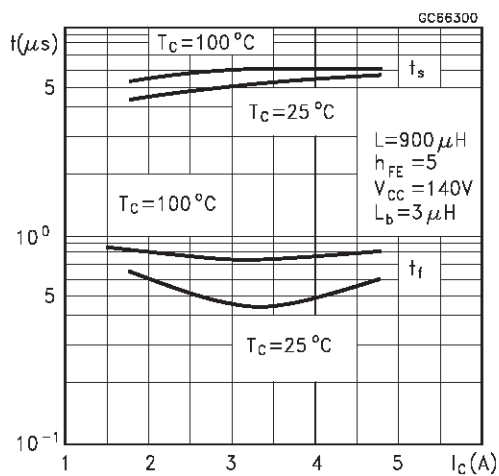
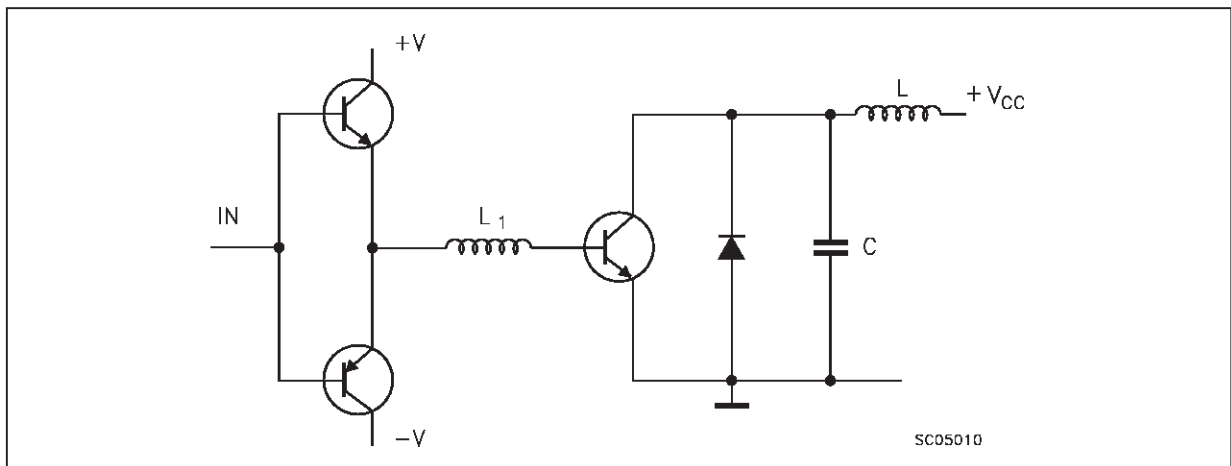
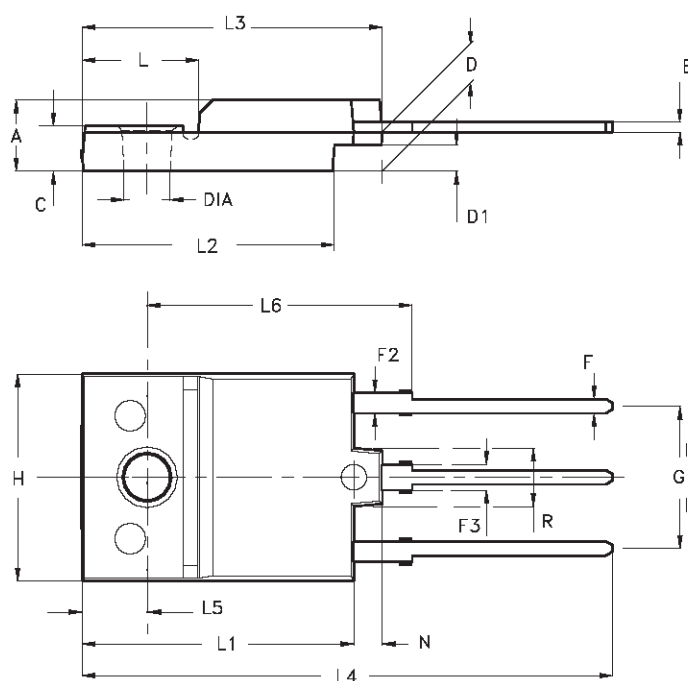


Figure 1: Inductive Load Switching Test Circuit.



## ISOWATT218 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    | 1.05  |      | 1.25  | 0.041 |       | 0.049 |
| F2   | 1.50  |      | 1.70  | 0.059 |       | 0.067 |
| F3   | 1.90  |      | 2.10  | 0.075 |       | 0.083 |
| 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  $\mu$ m

P025C/A

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