

## HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

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

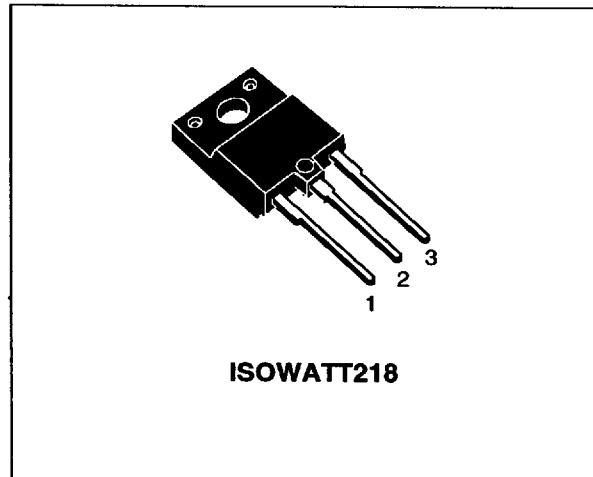
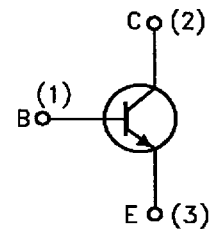
**APPLICATIONS:**

- HORIZONTAL DEFLECTION FOR MONITORS
- SWITCH MODE POWER SUPPLIES

**DESCRIPTION**

The BUH715 is manufactured using Multi-epitaxial Mesa technology for cost-effective high performance and uses a Hollow Emitter structure to enhance switching speeds.

The BUH series is designed for use in horizontal deflection circuits in televisions and monitors.


**INTERNAL SCHEMATIC DIAGRAM**

**ABSOLUTE MAXIMUM RATINGS**

| Symbol    | Parameter                               | Value      | Unit |
|-----------|---|------------|------|
| $V_{CB0}$ | Collector-Base Voltage ( $I_E = 0$ )    | 1500       | V    |
| $V_{CE0}$ | Collector-Emitter Voltage ( $I_B = 0$ ) | 700        | V    |
| $V_{EB0}$ | Emitter-Base Voltage ( $I_C = 0$ )      | 10         | V    |
| $I_C$     | Collector Current                       | 10         | A    |
| $I_{CM}$  | Collector Peak Current ( $t_p < 5$ ms)  | 20         | A    |
| $I_B$     | Base Current                            | 5          | A    |
| $I_{BM}$  | Base Peak Current ( $t_p < 5$ ms)       | 10         | A    |
| $P_{tot}$ | Total Dissipation at $T_c = 25$ °C      | 57         | W    |
| $T_{stg}$ | Storage Temperature                     | -65 to 150 | °C   |
| $T_j$     | Max. Operating Junction Temperature     | 150        | °C   |

**THERMAL DATA**

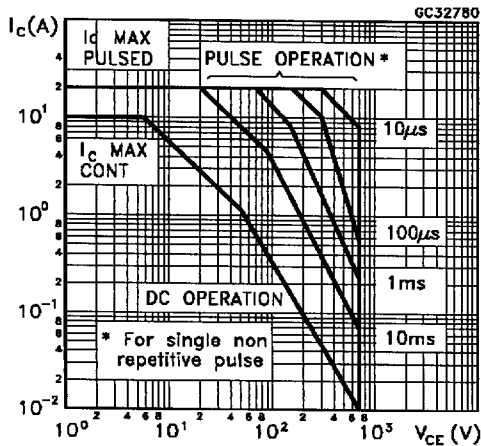
|                |                                  |     |     |               |
|----------------|----------------------------------|-----|-----|---------------|
| $R_{thj-case}$ | Thermal Resistance Junction-case | Max | 2.2 | $^{\circ}C/W$ |
|----------------|----------------------------------|-----|-----|---------------|

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

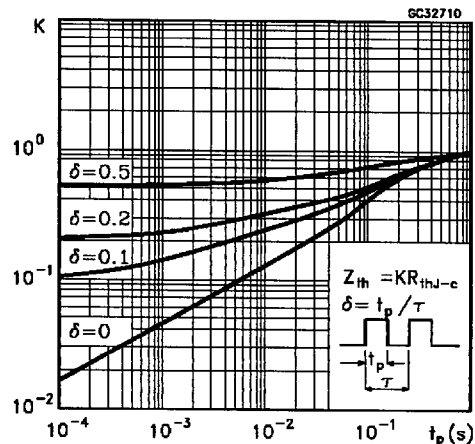
| Symbol         | Parameter                                   | Test Conditions  | Min.   | Typ.       | Max.       | Unit          |
|----------------|---|--|--------|------------|------------|---------------|
| $I_{CES}$      | Collector Cut-off Current ( $V_{BE} = 0$ )  | $V_{CE} = 1500 V$<br>$V_{CE} = 1500 V \quad T_j = 125^{\circ}C$  |        |            | 1<br>2     | mA<br>mA      |
| $I_{EBO}$      | Emitter Cut-off Current ( $I_C = 0$ )       | $V_{EB} = 5 V$   |        |            | 100        | $\mu A$       |
| $V_{CEO(sus)}$ | Collector-Emitter Sustaining Voltage        | $I_C = 100 mA$   | 700    |            |            | V             |
| $V_{EBO}$      | Emitter-Base Voltage ( $I_C = 0$ )          | $I_E = 10 mA$  | 10     |            |            | V             |
| $V_{CE(sat)*}$ | Collector-Emitter Saturation Voltage        | $I_C = 7 A \quad I_B = 1.5 A$  |        |            | 1.5        | V             |
| $V_{BE(sat)*}$ | Base-Emitter Saturation Voltage             | $I_C = 7 A \quad I_B = 1.5 A$  |        |            | 1.3        | V             |
| $h_{FE*}$      | DC Current Gain                             | $I_C = 7 A \quad V_{CE} = 5 V$<br>$I_C = 7 A \quad V_{CE} = 5 V \quad T_j = 100^{\circ}C$  | 8<br>5 |            | 16         |               |
| $t_s$<br>$t_f$ | RESISTIVE LOAD<br>Storage Time<br>Fall Time | $V_{CC} = 400 V \quad I_C = 7 A$<br>$I_{B1} = 1.5 A \quad I_{B2} = 3.5 A$  |        | 2.1<br>140 | 3.1<br>210 | $\mu s$<br>ns |
| $t_s$<br>$t_f$ | INDUCTIVE LOAD<br>Storage Time<br>Fall Time | $I_C = 7 A \quad f = 15625 Hz$<br>$I_{B1} = 1.5 A \quad I_{B2} = -3.5 A$<br>$V_{cefflyback} = 1050 \sin\left(\frac{\pi}{10} 10^6 t\right) V$ |        | 3.5<br>350 |            | $\mu s$<br>ns |
| $t_s$<br>$t_f$ | INDUCTIVE LOAD<br>Storage Time<br>Fall Time | $I_C = 7 A \quad f = 31250 Hz$<br>$I_{B1} = 1.5 A \quad I_{B2} = -3.5 A$<br>$V_{cefflyback} = 1200 \sin\left(\frac{\pi}{5} 10^6 t\right) V$  |        | 3.5<br>320 |            | $\mu s$<br>ns |

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

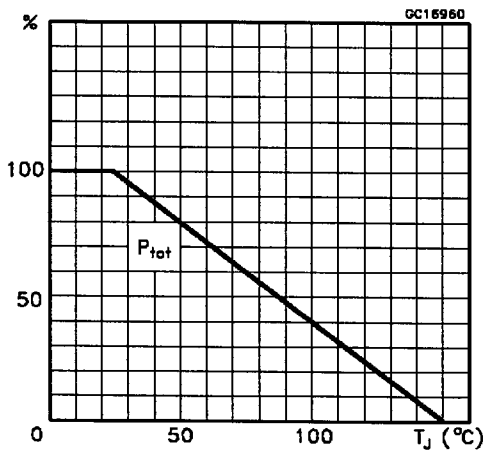
**Safe Operating Area**



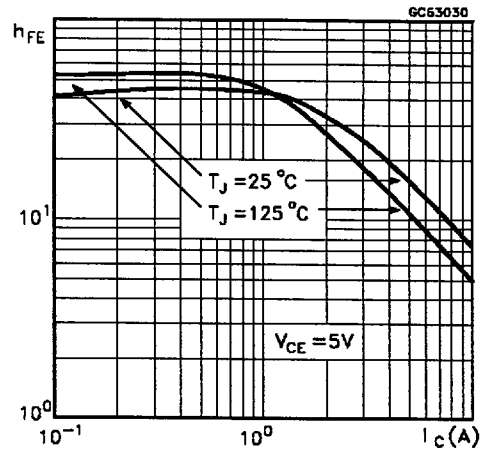
**Thermal Impedance**



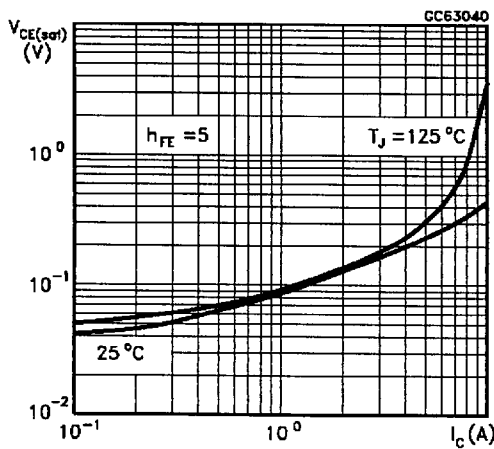
Derating Curve



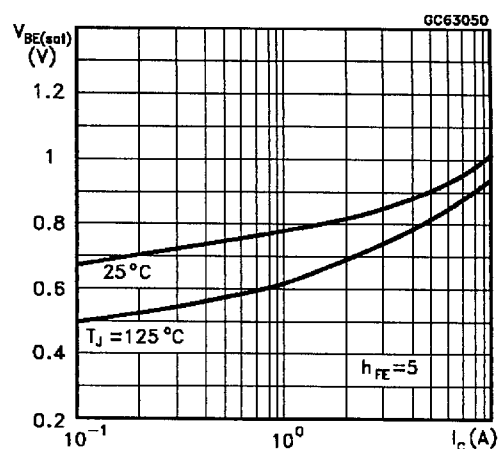
DC Current Gain



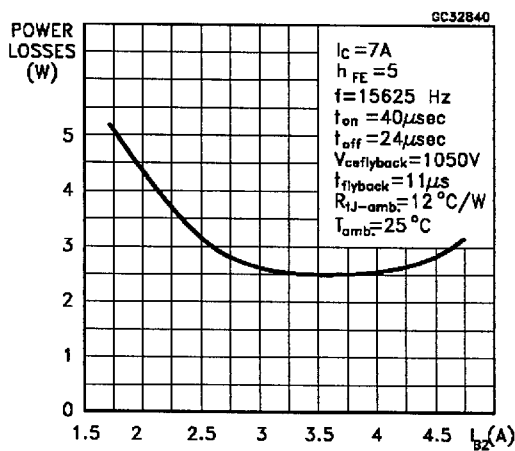
Collector Emitter Saturation Voltage



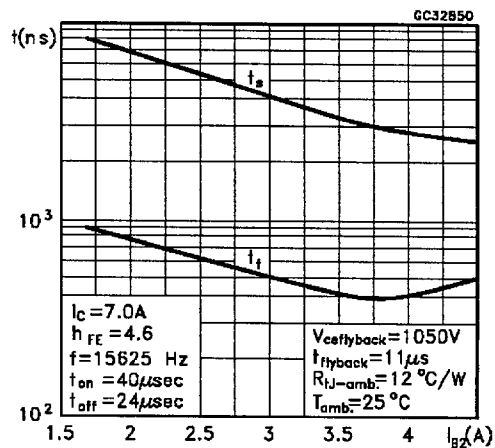
Base Emitter Saturation Voltage



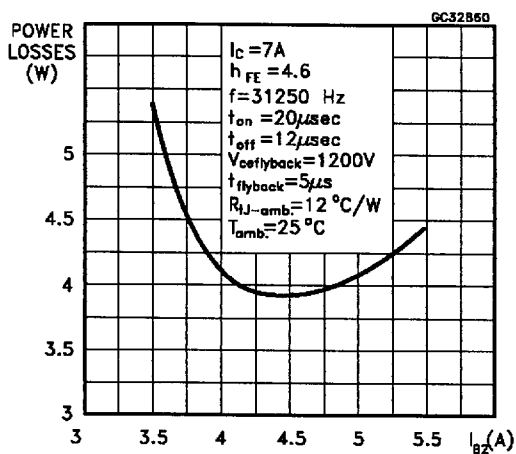
Power Losses at 16 KHz



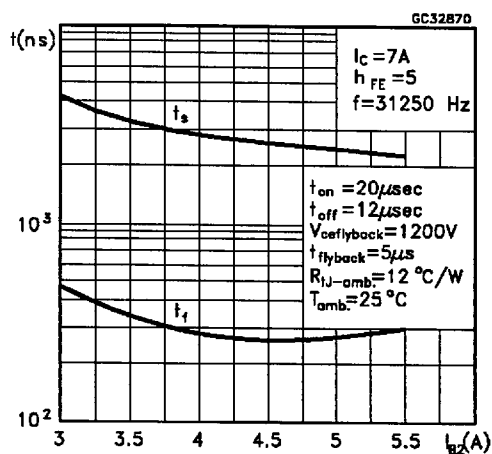
Switching Time Inductive Load at 16KHz (see figure 2)



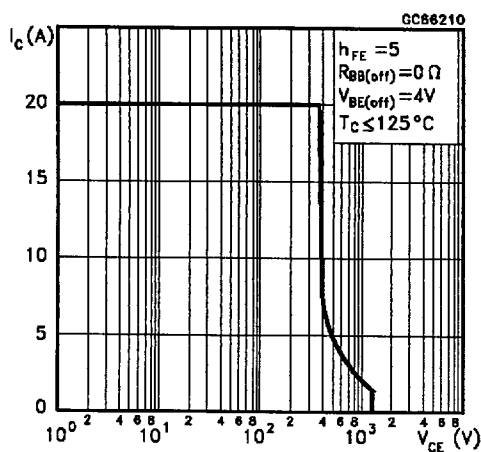
Power Losses at 32 KHz



Switching Time Inductive Load at 32 KHz  
(see figure 2)

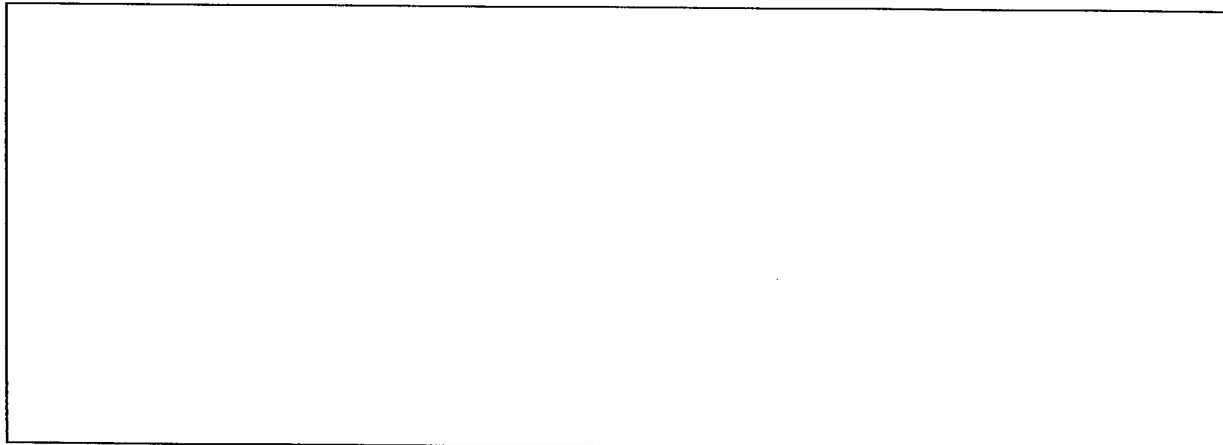


Reverse Biased SOA

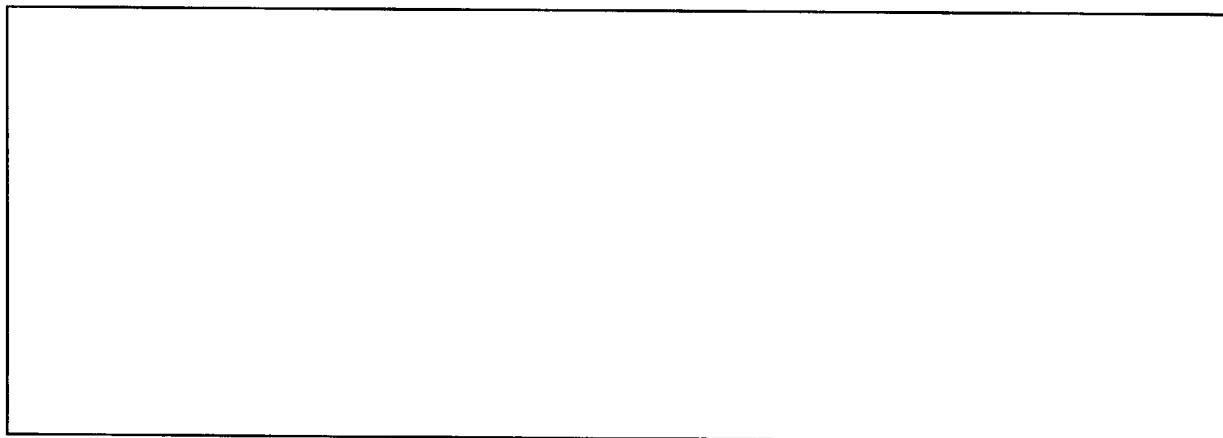


BASE DRIVE INFORMATION

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



**Figure 2:** Switching Waveforms in a Deflection Circuit



**ISOWATT218 MECHANICAL DATA**

| DIM. | mm    |      |       | inch  |       |       |
|------|-------|------|-------|-------|-------|-------|
|      | MIN.  | TYP. | MAX.  | MIN.  | TYP.  | MAX.  |
| A    | 5.35  |      | 5.65  | 0.210 |       | 0.222 |
| C    | 3.3   |      | 3.8   | 0.130 |       | 0.149 |
| D    | 2.9   |      | 3.1   | 0.114 |       | 0.122 |
| D1   | 1.88  |      | 2.08  | 0.074 |       | 0.081 |
| E    | 0.75  |      | 1     | 0.029 |       | 0.039 |
| F    | 1.05  |      | 1.25  | 0.041 |       | 0.049 |
| G    | 10.8  |      | 11.2  | 0.425 |       | 0.441 |
| H    | 15.8  |      | 16.2  | 0.622 |       | 0.637 |
| L1   | 20.8  |      | 21.2  | 0.818 |       | 0.834 |
| L2   | 19.1  |      | 19.9  | 0.752 |       | 0.783 |
| L3   | 22.8  |      | 23.6  | 0.897 |       | 0.929 |
| L4   | 40.5  |      | 42.5  | 1.594 |       | 1.673 |
| L5   | 4.85  |      | 5.25  | 0.190 |       | 0.206 |
| L6   | 20.25 |      | 20.75 | 0.797 |       | 0.817 |
| M    | 3.5   |      | 3.7   | 0.137 |       | 0.145 |
| N    | 2.1   |      | 2.3   | 0.082 |       | 0.090 |
| U    |       | 4.6  |       |       | 0.181 |       |

