



# BU208A BU508A/BU508AFI

## HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTORS

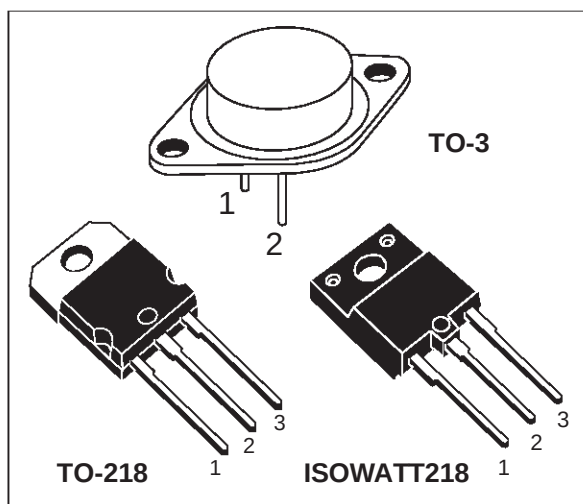
- STMicroelectronics PREFERRED SALESTYPES
- HIGH VOLTAGE CAPABILITY
- U.L. RECOGNISED ISOWATT218 PACKAGE (U.L. FILE # E81734 (N))
- JEDEC TO-3 METAL CASE.

### APPLICATIONS:

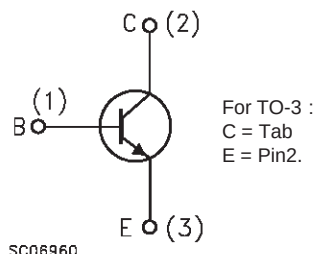
- HORIZONTAL DEFLECTION FOR COLOUR TV

### DESCRIPTION

The BU208A, BU508A and BU508AFI are manufactured using Multiepitaxial Mesa technology for cost-effective high performance and use a Hollow Emitter structure to enhance switching speeds.



### 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    |
|           |                                            | TO - 3     | TO - 218   | ISOWATT218 |      |
| $P_{tot}$ | Total Dissipation at $T_c = 25$ °C         | 150        | 125        | 50         | W    |
| $T_{stg}$ | Storage Temperature                        | -65 to 175 | -65 to 150 | -65 to 150 | °C   |
| $T_j$     | Max. Operating Junction Temperature        | 175        | 150        | 150        | °C   |

THERMAL DATA

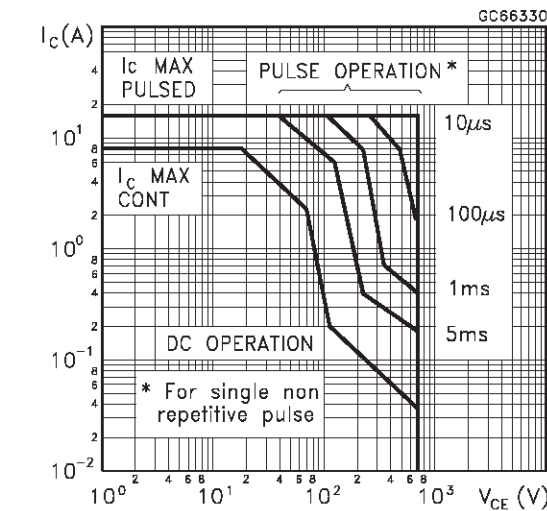
|                       |                                  |     | TO-3 | TO-218 | ISOWATT218 |      |
|-----------------------|----------------------------------|-----|------|--------|------------|------|
| R <sub>thj-case</sub> | Thermal Resistance Junction-case | Max | 1    | 1      | 2.5        | °C/W |

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

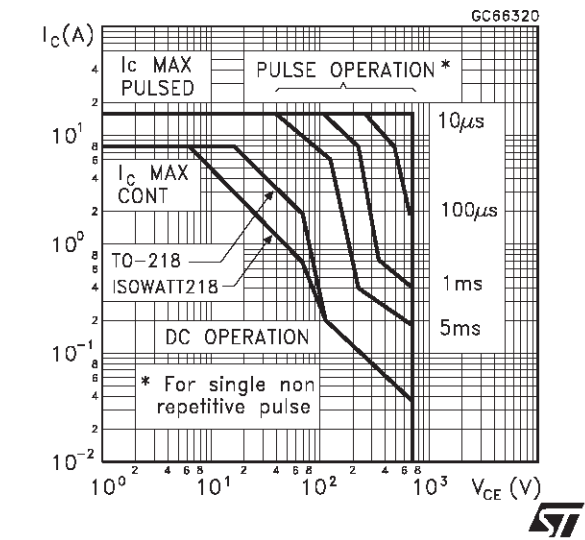
| Symbol                           | Parameter                                                 | Test Conditions                                                                                                                | Min. | Typ.      | Max.   | Unit     |
|----------------------------------|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------|-----------|--------|----------|
| I <sub>CES</sub>                 | Collector Cut-off Current (V <sub>BE</sub> = 0)           | V <sub>CE</sub> = 1500 V<br>T <sub>C</sub> = 125 °C                                                                            |      |           | 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<br>I <sub>B</sub> = 2 A                                                                                 |      |           | 1      | V        |
| V <sub>BE(sat)*</sub>            | Base-Emitter Saturation Voltage                           | I <sub>C</sub> = 4.5 A<br>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<br>L <sub>C</sub> = 0.9 mH<br>h <sub>FE</sub> = 2.5<br>L <sub>B</sub> = 3 μH<br>V <sub>CC</sub> = 140 V |      | 7<br>0.55 |        | μs<br>μs |
| f <sub>T</sub>                   | Transition Frequency                                      | I <sub>C</sub> = 0.1 A<br>V <sub>CE</sub> = 5 V<br>f = 5 MHz                                                                   |      | 7         |        | MHz      |

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

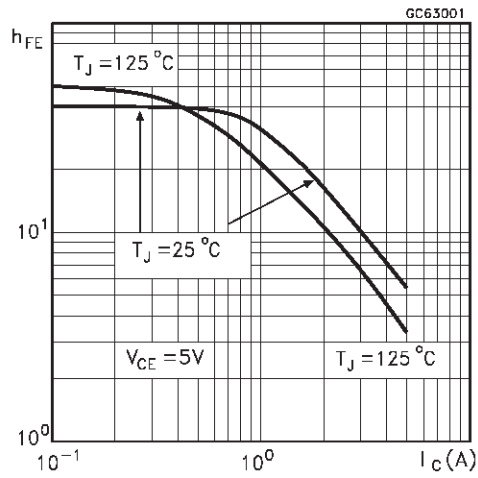
Safe Operating Area (TO-3)



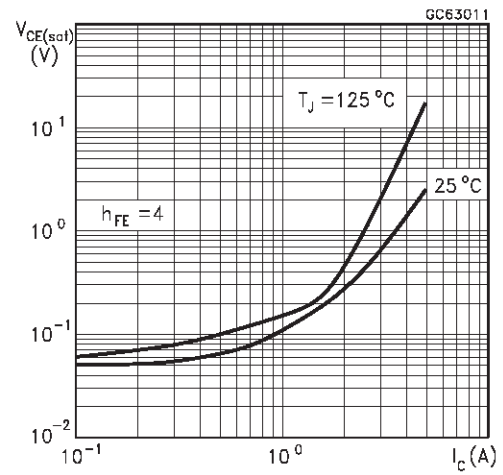
Safe Operating Areas (TO-218/ISOWATT218)



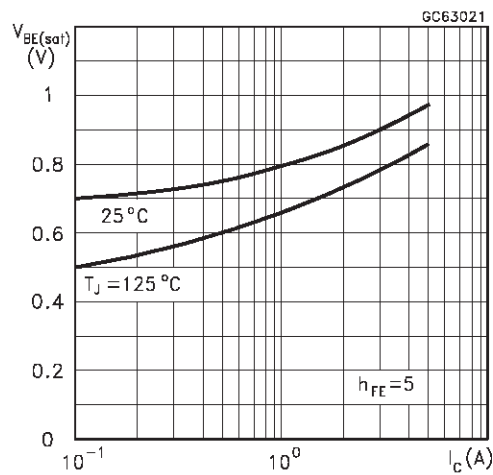
# DC Current Gain



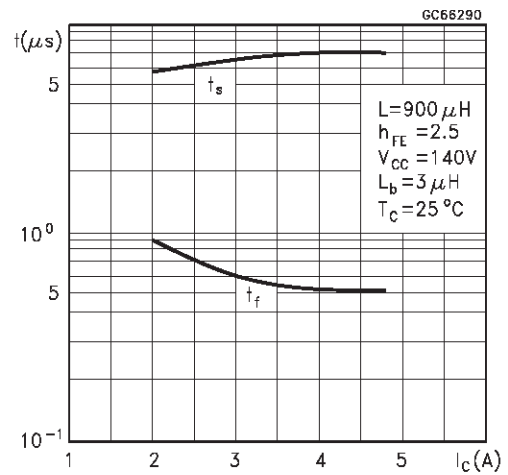
# Collector Emitter Saturation Voltage



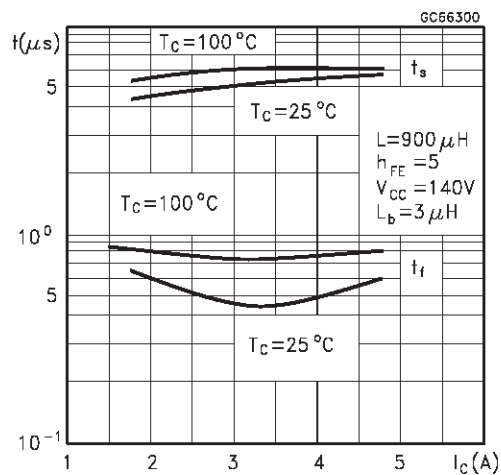
# Base Emitter Saturation Voltage



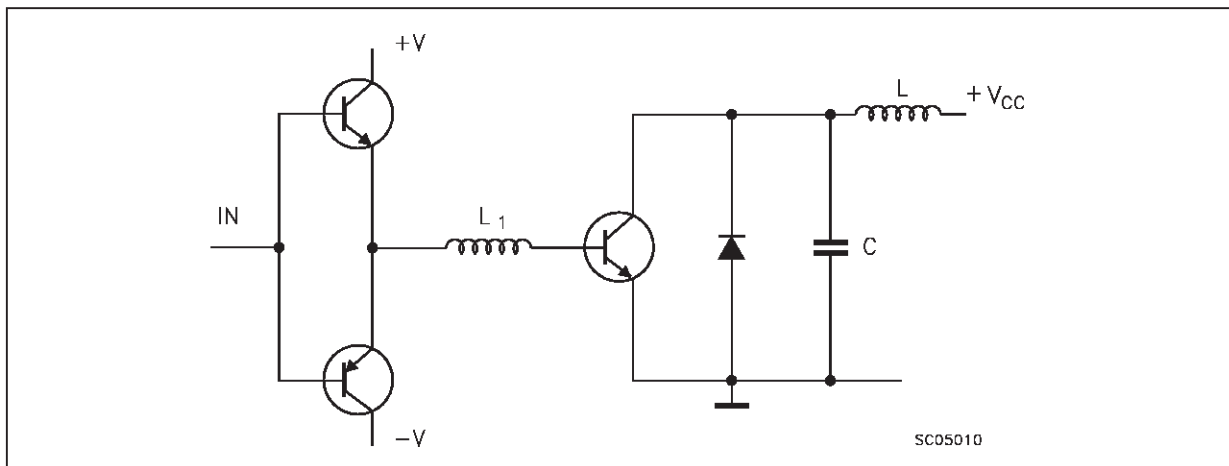
# Switching Time Inductive Load



# Switching Time Inductive Load (see figure 1)

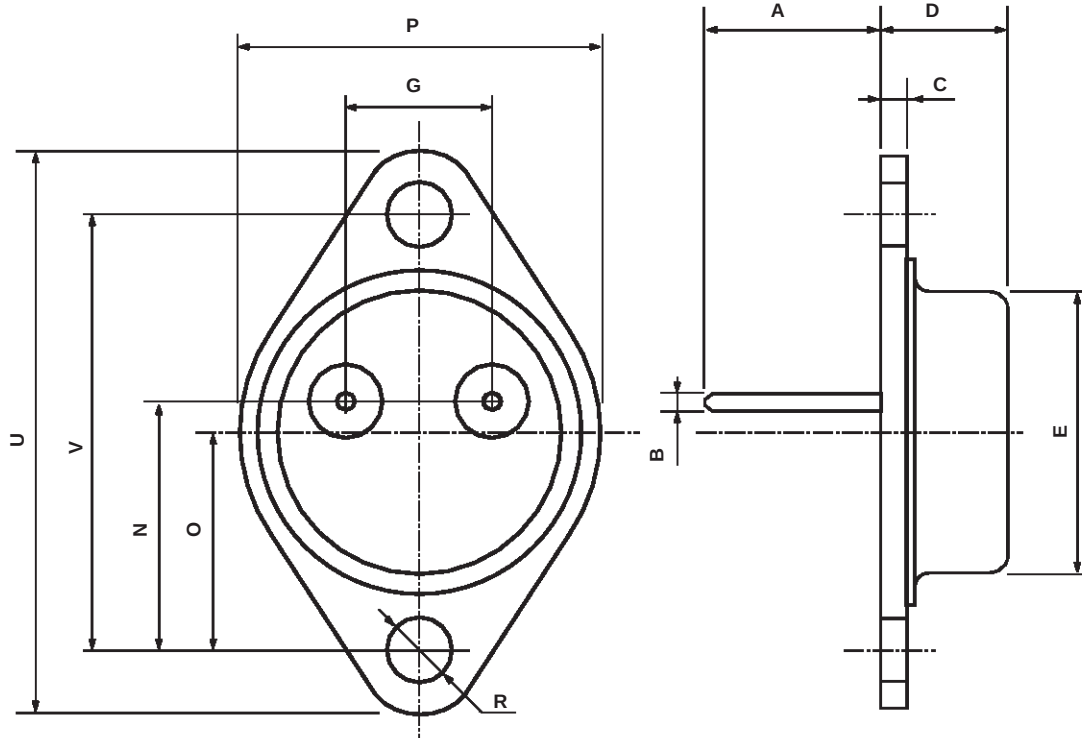


**Figure 1:** Inductive Load Switching Test Circuit.



## TO-3 MECHANICAL DATA

| DIM. | mm    |      |       | inch  |      |       |
|------|-------|------|-------|-------|------|-------|
|      | MIN.  | TYP. | MAX.  | MIN.  | TYP. | MAX.  |
| A    | 11.00 |      | 13.10 | 0.433 |      | 0.516 |
| B    | 0.97  |      | 1.15  | 0.038 |      | 0.045 |
| C    | 1.50  |      | 1.65  | 0.059 |      | 0.065 |
| D    | 8.32  |      | 8.92  | 0.327 |      | 0.351 |
| E    | 19.00 |      | 20.00 | 0.748 |      | 0.787 |
| G    | 10.70 |      | 11.10 | 0.421 |      | 0.437 |
| N    | 16.50 |      | 17.20 | 0.649 |      | 0.677 |
| P    | 25.00 |      | 26.00 | 0.984 |      | 1.023 |
| R    | 4.00  |      | 4.09  | 0.157 |      | 0.161 |
| U    | 38.50 |      | 39.30 | 1.515 |      | 1.547 |
| V    | 30.00 |      | 30.30 | 1.187 |      | 1.193 |



P003F



Technical drawing of a mechanical part, showing front and side views with dimensions.

**Front View (Top):**

- Overall height:  $A$
- Overall width:  $B$
- Distance from left edge to center of hole:  $C$
- Distance from center of hole to right edge:  $D$
- Distance from right edge to end of part:  $E$

**Side View (Bottom):**

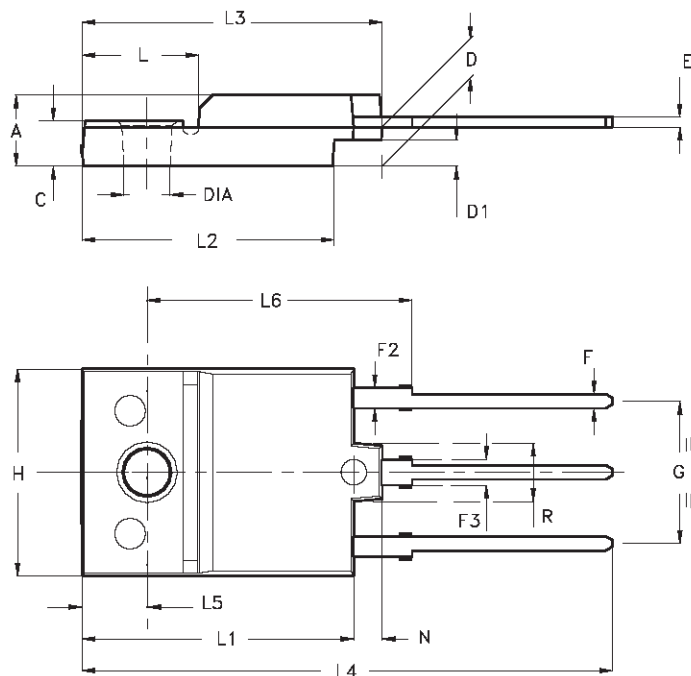
- Overall height:  $H$
- Overall width:  $G$
- Distance from left edge to center of hole:  $L1$
- Distance from center of hole to right edge:  $L2$
- Distance from center of hole to end of part:  $L3$
- Distance from right edge to end of part:  $L4$
- Distance from left edge to end of part:  $L5$
- Distance from center of hole to end of part:  $L6$
- Radius of hole:  $R$
- Distance from right edge to end of part:  $F$

**Labels:**

- 1, 2, 3: Labels for the three holes in the side view.
- P025A: Part number.

## 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

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. Specification 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 trademark of STMicroelectronics

© 1999 STMicroelectronics – Printed in Italy – All Rights Reserved

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - China - Finland - France - Germany - Hong Kong - India - Italy - Japan - Malaysia - Malta - Morocco -  
Singapore - Spain - Sweden - Switzerland - United Kingdom - U.S.A.

<http://www.st.com>