



# BUX48/48A BUV48A/V48AFI

## HIGH POWER NPN SILICON TRANSISTORS

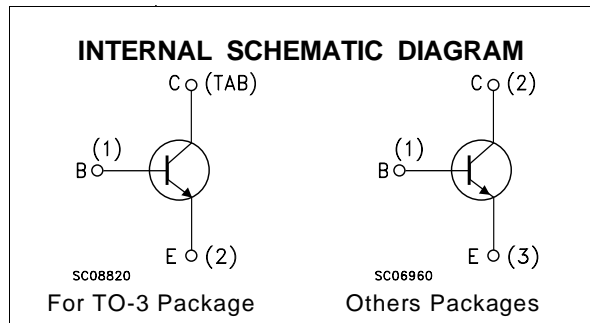
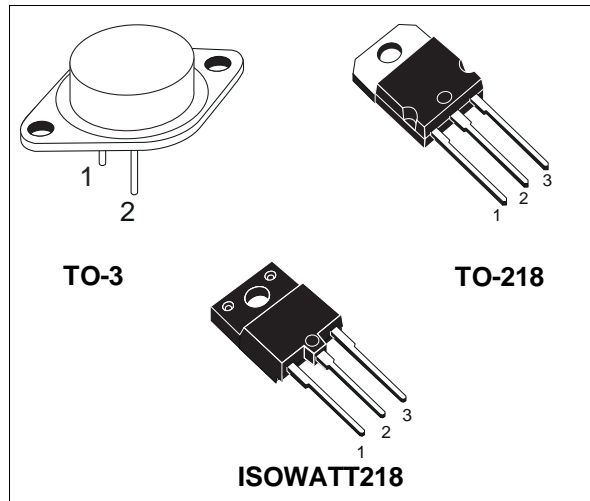
- STMicroelectronics PREFERRED SALESTYPES
- NPN TRANSISTOR
- HIGH VOLTAGE CAPABILITY
- HIGH CURRENT CAPABILITY
- FAST SWITCHING SPEED

### APPLICATIONS

- SWITCH MODE POWER SUPPLIES
- FLYBACK AND FORWARD SINGLE TRANSISTOR LOW POWER CONVERTERS

### DESCRIPTION

The BUX48/A, BUV48A and BUV48AFI are silicon Multiepitaxial Mesa NPN transistors mounted respectively in TO-3 metal case, TO-218 plastic package and ISOWATT218 fully isolated package. They are particularly intended for switching and industrial applications from single and three-phase mains.



### ABSOLUTE MAXIMUM RATINGS

| Symbol           | Parameter   | Value       |                              |                   | Unit |
|------------------|---|-------------|------------------------------|-------------------|------|
|                  |   | BUX48       | BUX48A<br>BUV48A<br>BUV48AFI |                   |      |
| V <sub>CER</sub> | Collector-Emitter Voltage (R <sub>BE</sub> = 10Ω)             | 850         | 1000                         |                   | V    |
| V <sub>CES</sub> | Collector-Emitter Voltage (V <sub>BE</sub> = 0)               | 850         | 1000                         |                   | V    |
| V <sub>CEO</sub> | Collector-Emitter Voltage (I <sub>B</sub> = 0)                | 400         | 450                          |                   | V    |
| V <sub>EBO</sub> | Emitter-Base Voltage (I <sub>C</sub> = 0)                     | 7           |                              |                   | V    |
| I <sub>C</sub>   | Collector Current   | 15          |                              |                   | A    |
| I <sub>CM</sub>  | Collector Peak Current  | 30          |                              |                   | A    |
| I <sub>CP</sub>  | Collector Peak Current non repetitive (t <sub>p</sub> < 20μs) | 55          |                              |                   | A    |
| I <sub>B</sub>   | Base Current  | 4           |                              |                   | A    |
| I <sub>BM</sub>  | Base Peak Current   | 20          |                              |                   | A    |
|                  |   | <b>TO-3</b> | <b>TO-218</b>                | <b>ISOWATT218</b> |      |
| P <sub>tot</sub> | Total Dissipation at T <sub>c</sub> = 25 °C                   | 175         | 125                          | 55                | W    |
| T <sub>stg</sub> | Storage Temperature   | -65 to 200  | -65 to 150                   | -65 to 150        | °C   |
| T <sub>j</sub>   | Max. Operating Junction Temperature                           | 200         | 150                          | 150               | °C   |

## BUX48 / BUX48A / BUV48A / BUV48AFI

### THERMAL DATA

|                |                                      | TO-3 | TO-218 | ISOWATT218 |      |
|----------------|--------------------------------------|------|--------|------------|------|
| $R_{thj-case}$ | Thermal Resistance Junction-case Max | 1    | 1      | 2.2        | °C/W |

### ELECTRICAL CHARACTERISTICS ( $T_{case} = 25\text{ °C}$ unless otherwise specified)

| Symbol          | Parameter   | Test Conditions  | Min.       | Typ. | Max.                        | Unit                  |
|-----------------|---|--|------------|------|-----------------------------|-----------------------|
| $I_{CES}$       | Collector Cut-off Current ( $V_{BE} = 0$ )          | $V_{CE} = \text{rated } V_{CES}$<br>$V_{CE} = \text{rated } V_{CES}, T_c = 125\text{ °C}$  |            |      | 200<br>2                    | $\mu\text{A}$<br>mA   |
| $I_{CER}$       | Collector Cut-off Current ( $R_{BE} = 10\ \Omega$ ) | $V_{CE} = \text{rated } V_{CER}$<br>$V_{CE} = \text{rated } V_{CER}, T_c = 125\text{ °C}$  |            |      | 500<br>4                    | $\mu\text{A}$<br>mA   |
| $I_{EBO}$       | Emitter Cut-off Current ( $I_C = 0$ )               | $V_{EB} = 5\text{ V}$  |            |      | 1                           | mA                    |
| $V_{CEO(SUS)*}$ | Collector-Emitter Sustaining Voltage ( $I_B = 0$ )  | $I_C = 200\text{ mA}$ $L = 25\text{mH}$<br>for <b>BUX48</b><br>for <b>BUX48A/V48A/V48AFI</b>   | 400<br>450 |      |                             | V<br>V                |
| $V_{EBO}$       | Emitter-Base Voltage ( $I_C = 0$ )                  | $I_E = 50\text{ mA}$   | 7          |      | 30                          | V                     |
| $V_{CE(sat)*}$  | Collector-Emitter Saturation Voltage                | for <b>BUX48</b><br>$I_C = 10\text{ A}$ $I_B = 2\text{ A}$<br>$I_C = 15\text{ A}$ $I_B = 4\text{ A}$<br>$I_C = 15\text{ A}$ $I_B = 3\text{ A}$<br>for <b>BUX48A/V48A/V48AFI</b><br>$I_C = 8\text{ A}$ $I_B = 1.6\text{ A}$<br>$I_C = 12\text{ A}$ $I_B = 2.4\text{ A}$ |            |      | 1.5<br>3.5<br>5<br>1.5<br>5 | V<br>V<br>V<br>V<br>V |
| $V_{BE(sat)*}$  | Base-Emitter Saturation Voltage                     | for <b>BUX48</b><br>$I_C = 10\text{ A}$ $I_B = 2\text{ A}$<br>for <b>BUX48A/V48A/V48AFI</b><br>$I_C = 8\text{ A}$ $I_B = 1.6\text{ A}$   |            |      | 1.6<br>1.6                  | V<br>V                |

\* Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle  $\leq 2\%$

### RESISTIVE SWITCHING TIMES

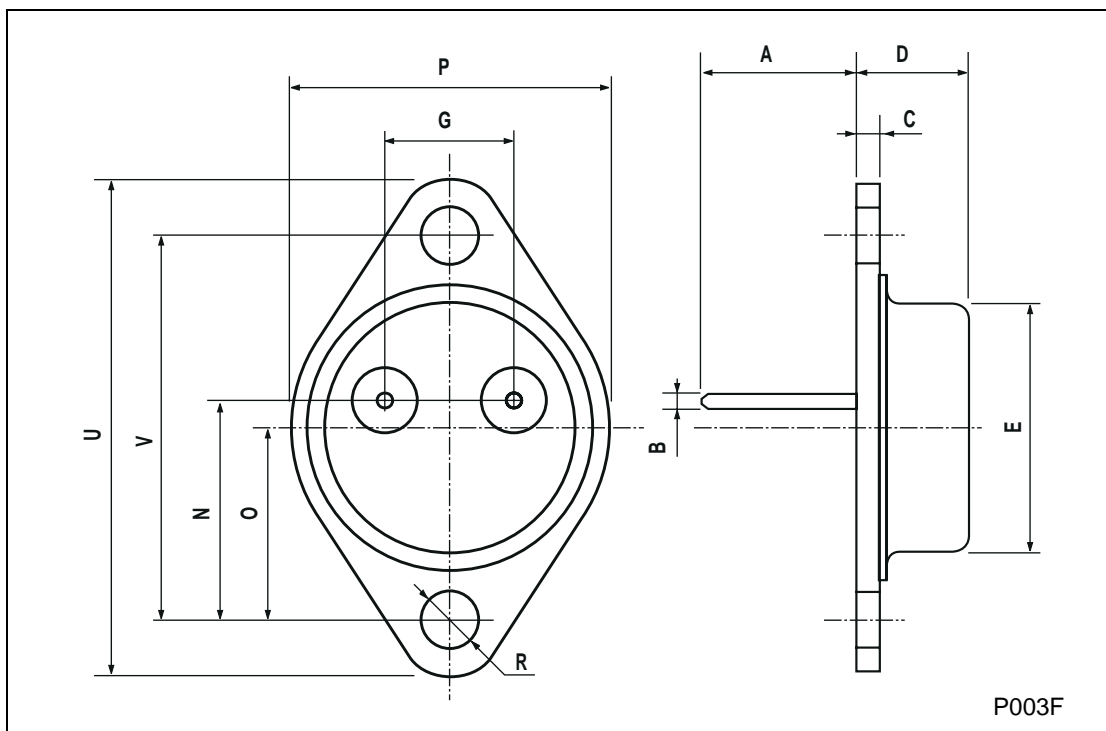
| Symbol   | Parameter    | Test Conditions  | Min. | Typ. | Max.       | Unit                           |
|----------|--------------|--|------|------|------------|--------------------------------|
| $t_{on}$ | Turn-on Time | for <b>BUX48</b><br>$V_{CC} = 150\text{ V}$ $I_C = 10\text{ A}$<br>$I_{B1} = 2\text{ A}$<br>for <b>BUX48A/V48A/V48AFI</b><br>$V_{CC} = 150\text{ V}$ $I_C = 8\text{ A}$<br>$I_{B1} = 1.6\text{ A}$                       |      |      | 1<br>1     | $\mu\text{s}$<br>$\mu\text{s}$ |
| $t_s$    | Storage Time | for <b>BUX48</b><br>$V_{CC} = 150\text{ V}$ $I_C = 10\text{ A}$<br>$I_{B1} = - I_{B2} = 2\text{ A}$<br>for <b>BUX48A/V48A/V48AFI</b><br>$V_{CC} = 150\text{ V}$ $I_C = 8\text{ A}$<br>$I_{B1} = - I_{B2} = 1.6\text{ A}$ |      |      | 3<br>3     | $\mu\text{s}$<br>$\mu\text{s}$ |
| $t_f$    | Fall Time    | for <b>BUX48</b><br>$V_{CC} = 150\text{ V}$ $I_C = 10\text{ A}$<br>$I_{B1} = - I_{B2} = 2\text{ A}$<br>for <b>BUX48A/V48A/V48AFI</b><br>$V_{CC} = 150\text{ V}$ $I_C = 8\text{ A}$<br>$I_{B1} = - I_{B2} = 1.6\text{ A}$ |      |      | 0.8<br>0.8 | $\mu\text{s}$<br>$\mu\text{s}$ |

INDUCTIVE SWITCHING TIMES

| Symbol         | Parameter    | Test Conditions  | Min. | Typ. | Max. | Unit     |
|----------------|--------------|--|------|------|------|----------|
| t <sub>s</sub> | Storage Time | for <b>BUX48</b><br>V <sub>CC</sub> = 300 V      I <sub>C</sub> = 10 A<br>L <sub>B</sub> = 3 μH<br>V <sub>BE</sub> = -5 V      I <sub>B1</sub> = 2 A<br>same conditions at T <sub>c</sub> = 125 °C               |      | 2.7  | 5    | μs<br>μs |
|                |              | for <b>BUX48A/V48A/V48AFI</b><br>V <sub>CC</sub> = 300 V      I <sub>C</sub> = 8 A<br>L <sub>B</sub> = 3 μH<br>V <sub>BE</sub> = -5 V      I <sub>B1</sub> = 1.6 A<br>same conditions at T <sub>c</sub> = 125 °C |      | 3    | 5    | μs<br>μs |
| t <sub>f</sub> | Fall Time    | for <b>BUX48</b><br>V <sub>CC</sub> = 300 V      I <sub>C</sub> = 10 A<br>L <sub>B</sub> = 3 μH<br>V <sub>BE</sub> = -5 V      I <sub>B1</sub> = 2 A<br>same conditions at T <sub>c</sub> = 125 °C               |      | 0.16 | 0.4  | μs<br>μs |
|                |              | for <b>BUX48A/V48A/V48AFI</b><br>V <sub>CC</sub> = 300 V      I <sub>C</sub> = 8 A<br>L <sub>B</sub> = 3 μH<br>V <sub>BE</sub> = -5 V      I <sub>B1</sub> = 1.6 A<br>same conditions at T <sub>c</sub> = 125 °C |      | 0.13 | 0.4  | μs<br>μs |

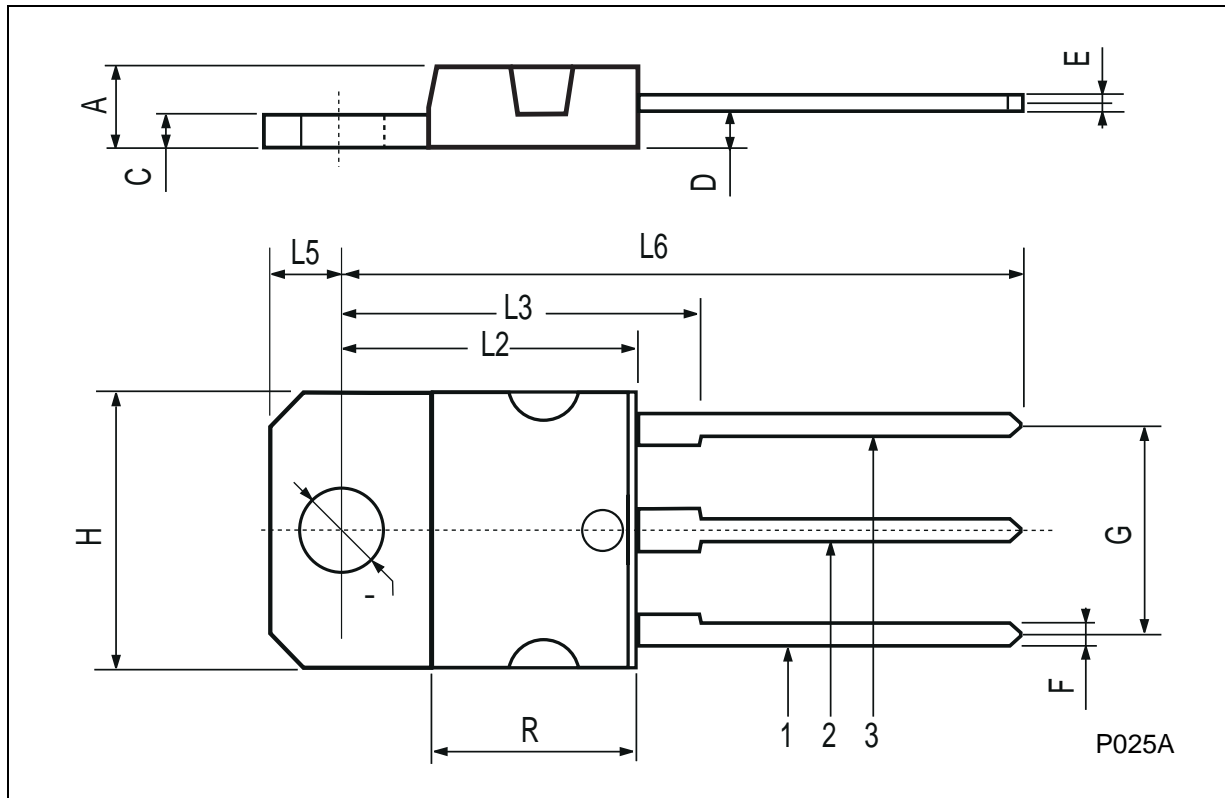
**TO-3 MECHANICAL DATA**

| 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 |



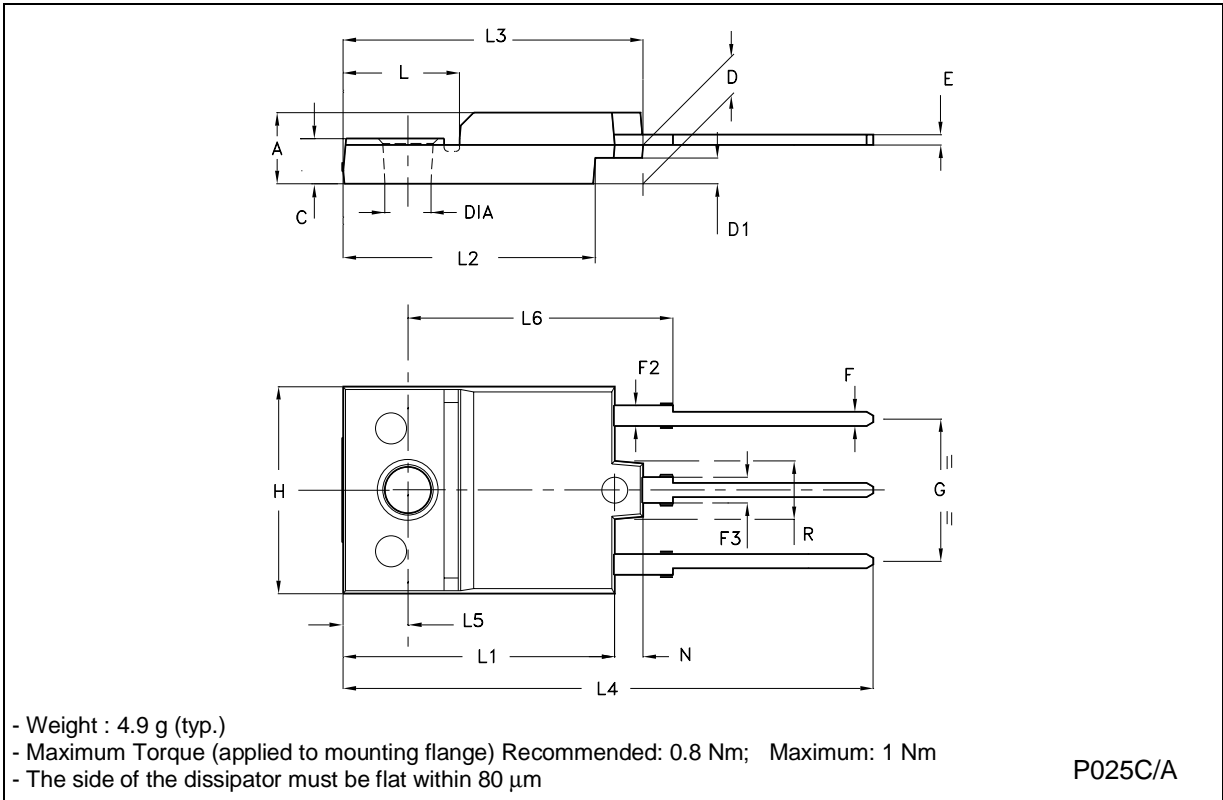
**TO-218 (SOT-93) MECHANICAL DATA**

| DIM. | mm   |      |      | inch  |       |       |
|------|------|------|------|-------|-------|-------|
|      | MIN. | TYP. | MAX. | MIN.  | TYP.  | MAX.  |
| A    | 4.7  |      | 4.9  | 0.185 |       | 0.193 |
| C    | 1.17 |      | 1.37 | 0.046 |       | 0.054 |
| D    |      | 2.5  |      |       | 0.098 |       |
| E    | 0.5  |      | 0.78 | 0.019 |       | 0.030 |
| F    | 1.1  |      | 1.3  | 0.043 |       | 0.051 |
| G    | 10.8 |      | 11.1 | 0.425 |       | 0.437 |
| H    | 14.7 |      | 15.2 | 0.578 |       | 0.598 |
| L2   | -    |      | 16.2 | -     |       | 0.637 |
| L3   |      | 18   |      |       | 0.708 |       |
| L5   | 3.95 |      | 4.15 | 0.155 |       | 0.163 |
| L6   |      | 31   |      |       | 1.220 |       |
| R    | -    |      | 12.2 | -     |       | 0.480 |
| Ø    | 4    |      | 4.1  | 0.157 |       | 0.161 |



**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 |



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