



# BUX48/48A BUV48A/V48AFI

## HIGH POWER NPN SILICON TRANSISTORS

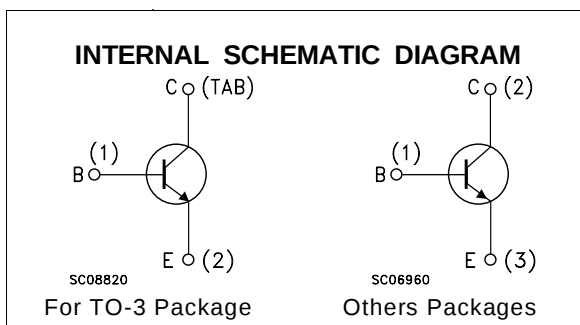
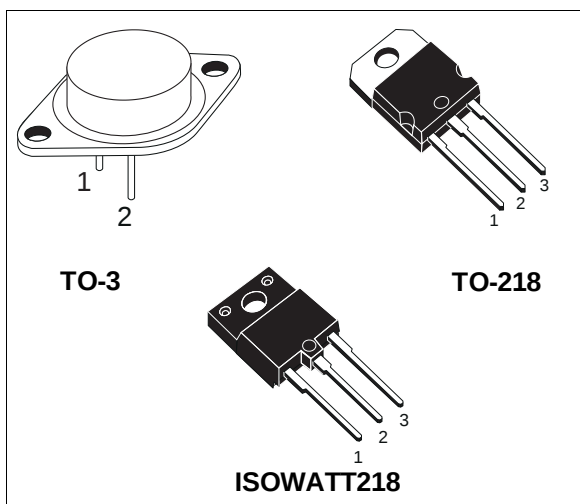
- STMicroelectronics PREFERRED SALESTYPES
- NPN TRANSISTOR
- HIGH VOLTAGE CAPABILITY
- HIGH CURRENT CAPABILITY
- FAST SWITCHING SPEED

### 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    |
|                  |                                                              | TO-3      | TO-218                       | ISOWATT218 |      |
| P <sub>tot</sub> | Total Dissipation at T <sub>c</sub> = 25 °C                  | 175       | 125                          | 55         | W    |
| T <sub>stg</sub> | Storage Temperature                                          | -65 to200 | -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 <sub>thj-case</sub> | Thermal Resistance Junction-case Max | 1    | 1      | 2.2        | °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<br>(V <sub>BE</sub> = 0)           | V <sub>CE</sub> = rated V <sub>CES</sub><br>V <sub>CE</sub> = rated V <sub>CES</sub> , T <sub>c</sub> = 125 °C                                                                                                                                                                             |            |      | 200<br>2                    | μA<br>mA              |
| I <sub>CER</sub>       | Collector Cut-off Current<br>(R <sub>BE</sub> = 10 Ω)        | V <sub>CE</sub> = rated V <sub>CER</sub><br>V <sub>CE</sub> = rated V <sub>CER</sub> , T <sub>c</sub> = 125 °C                                                                                                                                                                             |            |      | 500<br>4                    | μA<br>mA              |
| I <sub>EBO</sub>       | Emitter Cut-off Current<br>(I <sub>C</sub> = 0)              | V <sub>EB</sub> = 5 V                                                                                                                                                                                                                                                                      |            |      | 1                           | mA                    |
| V <sub>CEO(SUS)*</sub> | Collector-Emitter Sustaining<br>Voltage (I <sub>B</sub> = 0) | I <sub>C</sub> = 200 mA L = 25mH<br>for <b>BUX48</b><br>for <b>BUX48A/V48A/V48AFI</b>                                                                                                                                                                                                      | 400<br>450 |      |                             | V<br>V                |
| V <sub>EBO</sub>       | Emitter-Base Voltage<br>(I <sub>C</sub> = 0)                 | I <sub>E</sub> = 50 mA                                                                                                                                                                                                                                                                     | 7          |      | 30                          | V                     |
| V <sub>CE(sat)*</sub>  | Collector-Emitter Saturation<br>Voltage                      | for <b>BUX48</b><br>I <sub>C</sub> = 10 A I <sub>B</sub> = 2 A<br>I <sub>C</sub> = 15 A I <sub>B</sub> = 4 A<br>I <sub>C</sub> = 15 A I <sub>B</sub> = 3 A<br>for <b>BUX48A/V48A/V48AFI</b><br>I <sub>C</sub> = 8 A I <sub>B</sub> = 1.6 A<br>I <sub>C</sub> = 12 A I <sub>B</sub> = 2.4 A |            |      | 1.5<br>3.5<br>5<br>1.5<br>5 | V<br>V<br>V<br>V<br>V |
| V <sub>BE(sat)*</sub>  | Base-Emitter Saturation<br>Voltage                           | for <b>BUX48</b><br>I <sub>C</sub> = 10 A I <sub>B</sub> = 2 A<br>for <b>BUX48A/V48A/V48AFI</b><br>I <sub>C</sub> = 8 A I <sub>B</sub> = 1.6 A                                                                                                                                             |            |      | 1.6<br>1.6                  | V<br>V                |

\* Pulsed: Pulse duration = 300 μs, duty cycle ≤ 2 %

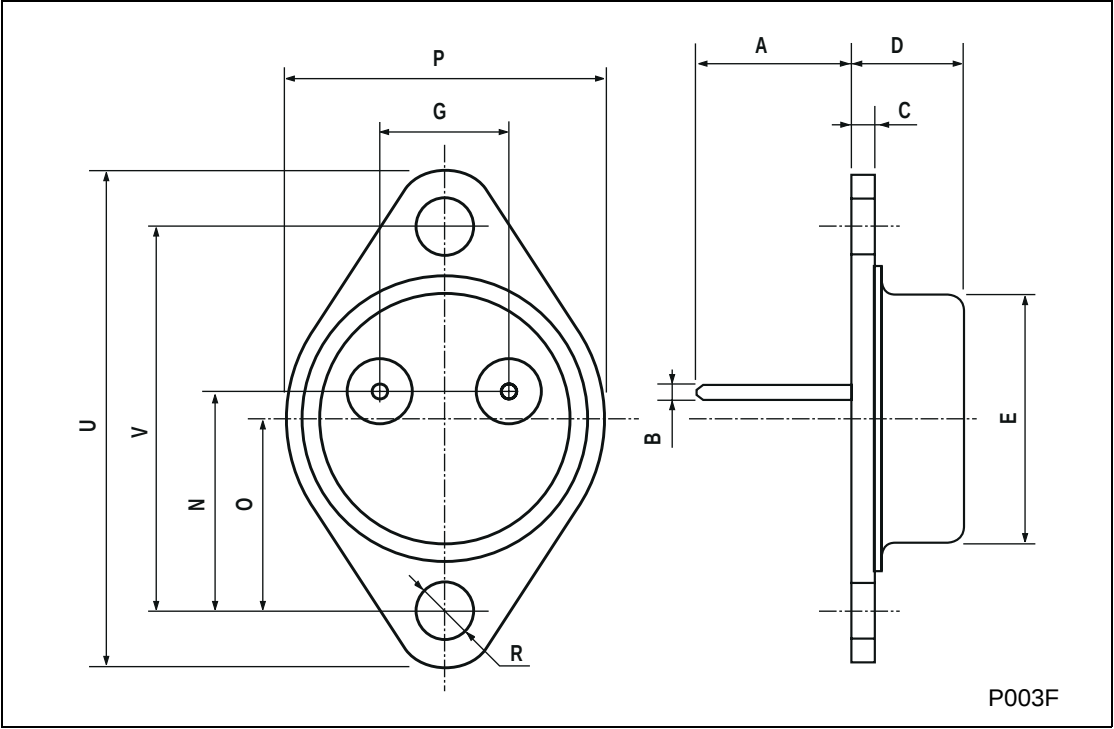
**RESISTIVE SWITCHING TIMES**

| Symbol          | Parameter    | Test Conditions                                                                                                                                                                                                                                | Min. | Typ. | Max.       | Unit     |
|-----------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------------|----------|
| t <sub>on</sub> | Turn-on Time | for <b>BUX48</b><br>V <sub>CC</sub> = 150 V I <sub>C</sub> = 10 A<br>I <sub>B1</sub> = 2 A<br>for <b>BUX48A/V48A/V48AFI</b><br>V <sub>CC</sub> = 150 V I <sub>C</sub> = 8 A<br>I <sub>B1</sub> = 1.6 A                                         |      |      | 1<br>1     | μs<br>μs |
| t <sub>s</sub>  | Storage Time | for <b>BUX48</b><br>V <sub>CC</sub> = 150 V I <sub>C</sub> = 10 A<br>I <sub>B1</sub> = - I <sub>B2</sub> = 2 A<br>for <b>BUX48A/V48A/V48AFI</b><br>V <sub>CC</sub> = 150 V I <sub>C</sub> = 8 A<br>I <sub>B1</sub> = - I <sub>B2</sub> = 1.6 A |      |      | 3<br>3     | μs<br>μs |
| t <sub>f</sub>  | Fall Time    | for <b>BUX48</b><br>V <sub>CC</sub> = 150 V I <sub>C</sub> = 10 A<br>I <sub>B1</sub> = - I <sub>B2</sub> = 2 A<br>for <b>BUX48A/V48A/V48AFI</b><br>V <sub>CC</sub> = 150 V I <sub>C</sub> = 8 A<br>I <sub>B1</sub> = - I <sub>B2</sub> = 1.6 A |      |      | 0.8<br>0.8 | μs<br>μs |

**INDUCTIVE SWITCHING TIMES**

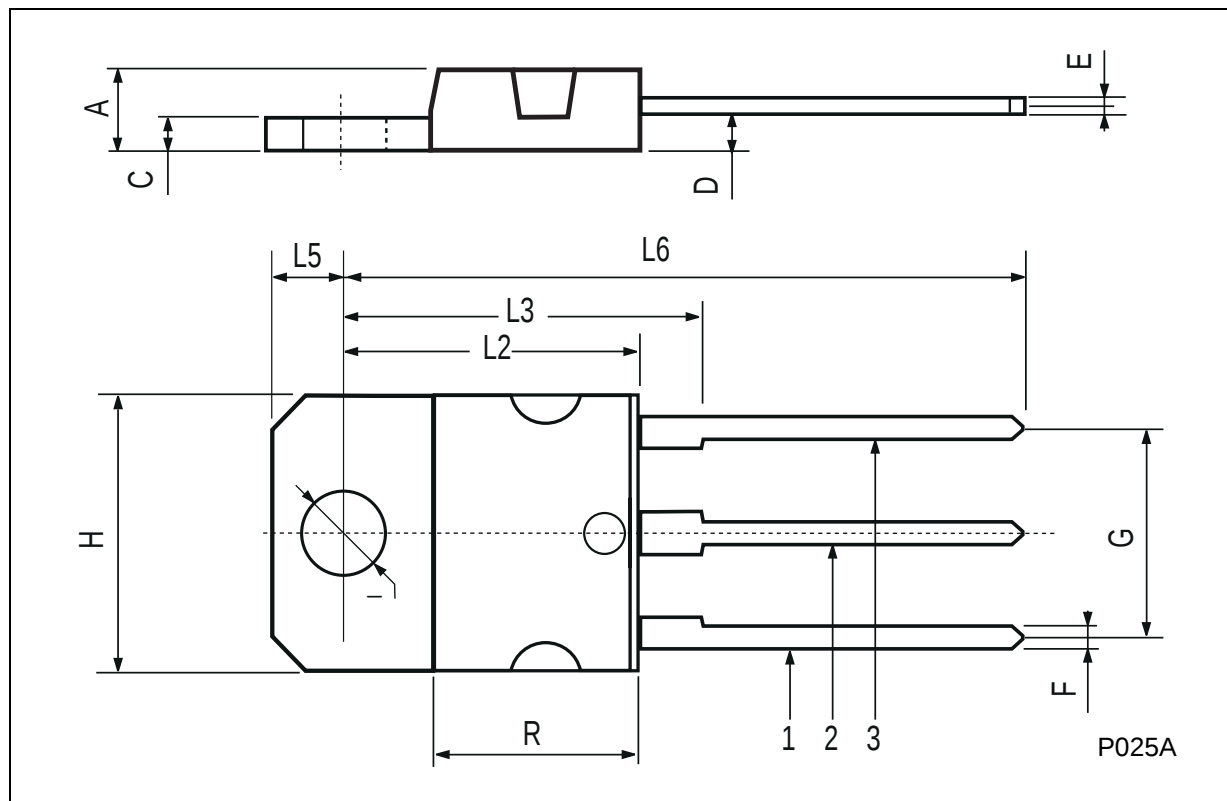
| Symbol | Parameter    | Test Conditions                                                                                                                                                                                                                                                                                                                                                                                                                  | Min. | Typ.             | Max.           | Unit                                                                 |
|--------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|----------------|----------------------------------------------------------------------|
| $t_s$  | Storage Time | for <b>BUX48</b><br>$V_{CC} = 300\text{ V}$ $I_C = 10\text{ A}$<br>$L_B = 3\text{ }\mu\text{H}$<br>$V_{BE} = -5\text{ V}$ $I_{B1} = 2\text{ A}$<br>same conditions at $T_c = 125\text{ }^\circ\text{C}$<br>for <b>BUX48A/V48A/V48AFI</b><br>$V_{CC} = 300\text{ V}$ $I_C = 8\text{ A}$<br>$L_B = 3\text{ }\mu\text{H}$<br>$V_{BE} = -5\text{ V}$ $I_{B1} = 1.6\text{ A}$<br>same conditions at $T_c = 125\text{ }^\circ\text{C}$ |      | 2.7              | 5              | $\mu\text{s}$<br>$\mu\text{s}$                                       |
| $t_f$  | Fall Time    | for <b>BUX48</b><br>$V_{CC} = 300\text{ V}$ $I_C = 10\text{ A}$<br>$L_B = 3\text{ }\mu\text{H}$<br>$V_{BE} = -5\text{ V}$ $I_{B1} = 2\text{ A}$<br>same conditions at $T_c = 125\text{ }^\circ\text{C}$<br>for <b>BUX48A/V48A/V48AFI</b><br>$V_{CC} = 300\text{ V}$ $I_C = 8\text{ A}$<br>$L_B = 3\text{ }\mu\text{H}$<br>$V_{BE} = -5\text{ V}$ $I_{B1} = 1.6\text{ A}$<br>same conditions at $T_c = 125\text{ }^\circ\text{C}$ |      | 0.16<br><br>0.13 | 0.4<br><br>0.4 | $\mu\text{s}$<br>$\mu\text{s}$<br><br>$\mu\text{s}$<br>$\mu\text{s}$ |

| 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 |



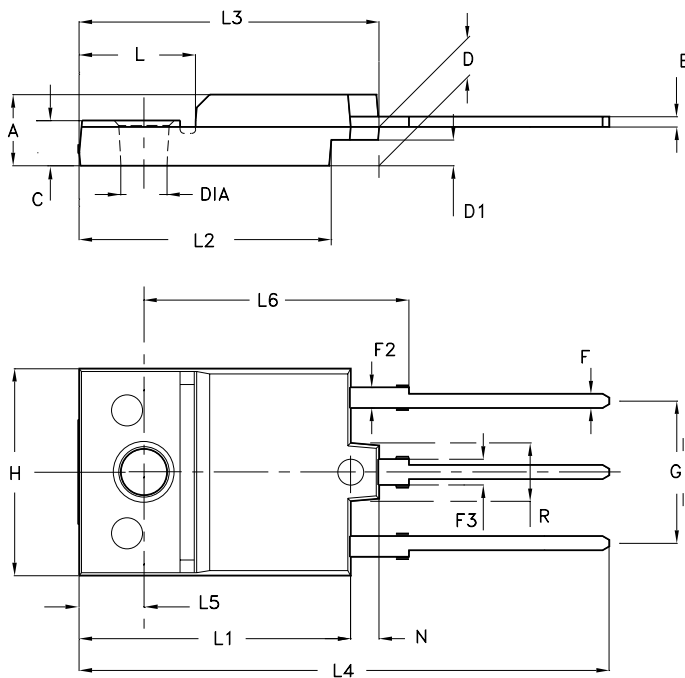
## TO-218 (SOT-93) MECHANICAL DATA

| 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 |



- 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/A

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