



## Ultra Low Profile Power Resistors

### WDBR-UL Series

- Ultra low profile thick-film on steel
- Up to 7kW peak power
- Single fixing heatsink mountable
- Ideal for dynamic braking, inrush limit and snubber circuits
- Choice of flying lead or solder terminations
- Low inductance design
- High isolation, even after failsafe overload fusing
- RoHS compliant, non-flammable construction
- UL508 certified - UL file E238661



All Pb-free parts comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

## Electrical Data

|  |                | WDBR1UL                              | WDBR2UL | WDBR3UL | WDBR5UL | WDBR7UL |
|--|----------------|--------------------------------------|---------|---------|---------|---------|
| Resistance range <sup>5</sup>                    | ohms           | 12, 15, 20, 22, 25, 47, 50, 100, 150 |         |         |         |         |
| Resistance tolerance                             | %              | 10                                   |         |         |         |         |
| Pulse power rating <sup>1</sup>                  | kW             | 1.5                                  | 2.0     | 3.5     | 5.0     | 7.0     |
| Power rating on heatsink <sup>2</sup>            | W              | 170                                  | 190     | 240     | 250     | 260     |
| Power rating on fan-cooled heatsink <sup>3</sup> | W              | 660                                  | 740     | 850     | 950     | 1410    |
| TCR  | ppm/°C         | < +600                               |         |         |         |         |
| Maximum element temperature                      | °C             | 450                                  |         |         |         |         |
| Ambient temperature range (heatsink)             | °C             | -55 to +200                          |         |         |         |         |
| Dielectric withstand <sup>4</sup>                | V (dc/ac peak) | 2500                                 |         |         |         |         |
| Inductance (typical)                             | µH             | <3                                   | <4      | <5      | <5      | <6      |

### Notes:

1. For details of pulse condition see Fig. 1 in Performance Data.
2. Mounted on a 0.53°C/W heatsink with no forced air cooling, air temperature 25°C.
3. Mounted on a 0.53°C/W heatsink with 5m/s forced air cooling, air temperature 25°C.
4. Based on 100% production test, duration 2s minimum
5. Other ohmic values upon request

## Physical Data

| Dimensions in mm, weight without terminations in g |            |            |           |           |      |      |       |            |      |
|--|------------|------------|-----------|-----------|------|------|-------|------------|------|
|  | L<br>±0.25 | W<br>±0.25 | t<br>±0.1 | ΦD<br>nom | a ±1 | b ±1 | c ±1  | Wt.<br>nom |      |
| WDBR1UL  | 49.3       | 35.9       | 0.9       | 5.3       | 3.2  | 4.2  | 17.6  | 4.2        | 12.6 |
| WDBR2UL  | 61         | 40.6       |           |           | 5.5  | 19.7 | 5.5   | 17.1       |      |
| WDBR3UL  | 101.6      | 70         | 14.5      |           | 24.8 | 10.1 | 50.8  |            |      |
| WDBR5UL  | 122        | 70         | 15.3      |           | 27   | 8.6  | 101.2 |            |      |
| WDBR7UL  | 152.4      | 101.6      | 1.5       |           | 39.3 | 10.7 | 11.8  | 181.8      |      |



Fixing hole is located centrally.

In addition to the central fixing hole, WDBR7UL has two corner holes. These are present for manufacturing purposes only and should not be used as fixing holes.

Substrate thickness = t

### Construction

A high integrity dielectric layer is applied to a machined stainless steel substrate. Thick-film conductor and resistor patterns are printed and fired, then protected with a high temperature overglaze. The termination pads are tinned with solder and optional leads are soldered on.



### General Note

TT Electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

WDBR-UL Series

Terminations

The following termination options are available

| Option                                  | Code | Nominal Dimensions (mm) |  |       |   |              |       |   |       |                |     |     |     |               |   |     |     |
|---|------|-------------------------|--|-------|---|--------------|-------|---|-------|----------------|-----|-----|-----|---------------|---|-----|-----|
| Solder pad only <sup>1</sup>            | I    |                         | <table border="1"> <thead> <tr> <th>WDBR-UL Size</th> <th>1 &amp; 2</th> <th>3</th> <th>5 &amp; 7</th> </tr> </thead> <tbody> <tr> <td>Pad Length, PL</td> <td>8.8</td> <td>8.1</td> <td>9.1</td> </tr> <tr> <td>Pad Width, PW</td> <td>5</td> <td>8.1</td> <td>6.1</td> </tr> </tbody> </table> |       |   | WDBR-UL Size | 1 & 2 | 3 | 5 & 7 | Pad Length, PL | 8.8 | 8.1 | 9.1 | Pad Width, PW | 5 | 8.1 | 6.1 |
|   |      |                         | WDBR-UL Size   | 1 & 2 | 3 | 5 & 7        |       |   |       |                |     |     |     |               |   |     |     |
| Pad Length, PL                          | 8.8  | 8.1                     | 9.1  |       |   |              |       |   |       |                |     |     |     |               |   |     |     |
| Pad Width, PW                           | 5    | 8.1                     | 6.1  |       |   |              |       |   |       |                |     |     |     |               |   |     |     |
| Flying leads,<br>UL3134/5, 40A,<br>600V | L    |                         |  |       |   |              |       |   |       |                |     |     |     |               |   |     |     |

Notes:

1. Two options exist for solder type. The standard is SnAg (965C) which is Pb-free and the second (HT) is high temperature HMP alloy which is Pb-bearing. Both are RoHS compliant, but the second relies on the RoHS exemption for high temperature solders and is targeted at specialist high temperature applications.

Thermal Performance

|  | ΔR% | Maximum    |
|--|-----|------------|
| Pulsed load at full pulse power rating 50,000 cycles (see Fig 1)<br>Mounted on a 0.53°C/W heatsink with 5m/s forced air cooling, air temperature 25°C. |     | 5          |
| Derating at heatsink temperatures >160°C   |     | See Fig. 2 |



General Note

TT Electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

## Application Notes

A heatsink with thermal resistance  $\leq 0.53^{\circ}\text{C}/\text{W}$  will enable the component to operate at its continuous power rating. Sufficient thermal grease (e.g. Dow Corning DC340) to give void-free coverage, or a 0.5mm thick compliant thermal pad (e.g. T Global TG-X) should be used and the heatsink should have a surface finish of  $<6.3\mu\text{m}$  with flatness of  $<0.05\text{mm}$ . The resistor should be mounted using an appropriate bolt as listed in the table below. This should be tightened so as to bring the whole area of the steel substrate into intimate contact with the heatsink. The unmounted part is slightly bowed so that the centre is above the edges. Inadequate tightening will leave the centre out of contact with the heatsink, whilst over tightening can cause the edges to rise. The tightening torque required will depend on the fixings and heatsink used, but typical figures are given for guidance. WDBR-UL resistors will fail safe (open circuit) under overload fault conditions and still maintain a 1kV dielectric withstand.

|         | Bolt Size | Typical Tightening Torque (Nm) |
|---------|-----------|--------------------------------|
| WDBR1UL | M3        | 2                              |
| WDBR2UL | M5        | 2.5                            |
| WDBR3UL | M5        | 2.5                            |
| WDBR5UL | M5        | 3.5                            |
| WDBR7UL | M5        | 4                              |

WDBR resistors may be customised in various ways including:

- Alternative shapes and dimensions up to 406mm x 406mm
- Integration of temperature measurement elements
- Alternative ohmic values, tolerance & TCR
- Increased dielectric withstand voltage
- Custom braking resistors with UL approval

For a full Applications Note for dynamic braking see <http://www.ttelectronics.com/themes/ttelectronics/datasheets/resistors/literature/WDBR.pdf>

## Overload Conditions



Mounted on a  $0.53^{\circ}\text{C}/\text{W}$  heatsink with 5m/s forced air cooling, air temperature  $25^{\circ}\text{C}$ .  $\Delta R \leq 5\%$ .

## Maximum peak current (A)

| Value   | 12R – 25R | 47R – 150R |
|---------|-----------|------------|
| WDBR1UL | 21.6      | 8.1        |
| WDBR2UL | 20.5      | 9.0        |
| WDBR3UL | 25.4      | 11.4       |
| WDBR5UL | 27.8      | 10.2       |
| WDBR7UL | 44.5      | 20.3       |

### General Note

TT Electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

## Ordering Procedure

**Example: WDBR2UL-100RKLW** (WDBR2UL, 100 ohms  $\pm 10\%$ , with flying leads, Pb-free)



| 1<br>Size | 2<br>Certification | 3<br>Solder Type                   | 4<br>Value     | 5<br>Tolerance | 6<br>Terminations | 7<br>Packing |              |         |
|-----------|--------------------|------------------------------------|----------------|----------------|-------------------|--------------|--------------|---------|
| WDBR1     | UL = UL508         | Omit for 96SC,<br>standard Pb-free | 3/4 characters | K = $\pm 10\%$ | I = solder pads   | W            | WDBR1UL....I | 100/box |
| WDBR2     |                    |                                    | R = ohms       |                | L = flying leads  |              | WDBR2UL....I |         |
| WDBR3     |                    | HT = HMP,<br>high temperature      |                |                |                   |              | WDBR1UL...L  | 40/box  |
| WDBR5     |                    |                                    |                |                |                   |              | WDBR2UL...L  |         |
| WDBR7     |                    |                                    |                |                |                   |              | WDBR3UL...I  |         |
|           |                    |                                    |                |                |                   | WDBR5UL....I |              |         |
|           |                    |                                    |                |                |                   | WDBR3UL....L | 20/box       |         |
|           |                    |                                    |                |                |                   | WDBR5UL....L |              |         |
|           |                    |                                    |                |                |                   | WDBR7UL....I |              |         |
|           |                    |                                    |                |                |                   | WDBR7UL....L |              |         |

**General Note**

TT Electronics reserves the right to make changes in product specification without notice or liability.  
All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкуренспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: [org@lifeelectronics.ru](mailto:org@lifeelectronics.ru)