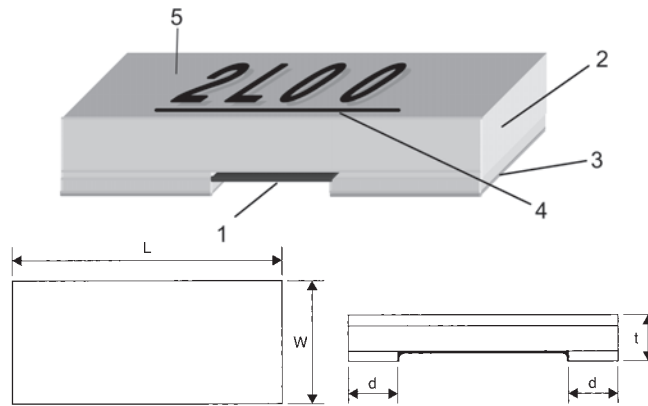


## METAL PLATE CURRENT SENSING MILLIOHM CHIP TLR



### STRUCTURE

- 1 Bottom protective coating
- 2 Resistive element: Metal alloy
- 3 Electrode
- 4 Marking (see "Identification")
- 5 Top protective coating (see "Identification")

### IDENTIFICATION

| PRODUCT CODE                       | COATING                      | MARKING   |
|------------------------------------|------------------------------|-----------|
| TLR2BD, TLR3AD, TLR3AW (1L00 only) | Black protective top coating | 4 digits* |
| All others                         | No protective top coating    |           |

\*TCR50 and TCR75 parts have underline marking

All these products have Pb-free terminations and meet EU-RoHS and China-RoHS requirements

### TYPE DESIGNATION (HOW TO ORDER)

| TLR                 | 3AW                                                    | D                              | TE                                                                                                            | 5L00                              | F                                | 75                                                             |
|---------------------|--------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------|----------------------------------------------------------------|
| PRODUCT CODE<br>TLR | POWER RATING<br>2B, 2BN: 0.5W<br>2H, 3A: 1W<br>3AW: 2W | TERMINAL MATERIAL<br>D: SnAgCu | TAPING*<br>TD: punch paper tape (only 2B)<br>TE: embossed plastic tape<br>BK: Bulk<br>*Please see "PACKAGING" | NOMINAL RESISTANCE<br>F: 4 digits | RESISTANCE TOLERANCE<br>F: (±1%) | T.C.R.<br>(ppm/K)<br>75: ±75<br>50: ±50<br>"Blank": ±150, ±200 |

Contact us when you have control request for environmental hazardous material other than the substance specified by EU-RoHS

### FEATURES

- Ultra low resistances (1 mΩ ~ )
- High reliability and performance with resistance tolerance ±1% and low T.C.R.
- Suitable for large current detecting
- Ultra low height with a thickness of 0.6 mm
- Suitable for use in small equipment
- Non-inductive type
- Excellent high frequency characteristics
- Filletless products (the soldering part of this product is only the bottom electrode).
- Automatic mounting machine is applicable
- Ideal for use in DC-DC converter, as current detection for CPU's, in motor control units and in inverter power supplies
- Meets or exceeds IEC 60115-1, JIS C 5201-1
- Suitable only for reflow soldering (no wave soldering)
- Rated ambient temperature: +70°C

### DIMENSIONS (mm)

| TYPE        | RESISTANCE (Ω)                                   | L           | W           | d                                                     | t                       |
|-------------|--------------------------------------------------|-------------|-------------|-------------------------------------------------------|-------------------------|
| TLR 2B, 2BN | 2 mΩ ... 20 mΩ<br>1 mΩ                           | 3.2 ± 0.2   | 1.6 ± 0.2   | 0.5 ± 0.2<br>1.8 ± 0.2                                | 0.6 ± 0.2<br>0.65 ± 0.2 |
| TLR 2H      | 2 mΩ ... 6 mΩ<br>7 mΩ ... 10 mΩ                  | 5.0 ± 0.2   | 2.5 ± 0.2   | 1.5 ± 0.2<br>0.5 ± 0.2                                | 0.6 ± 0.2               |
| TLR 3A      | 1 mΩ<br>2 mΩ<br>3 mΩ<br>4 mΩ                     | 6.35 ± 0.25 | 3.18 ± 0.25 | 2.2 ± 0.25<br>1.2 ± 0.25<br>1.85 ± 0.25<br>1.2 ± 0.25 | 0.62 ± 0.25             |
| TLR 3AW     | 1 mΩ ... 4 mΩ<br>5 mΩ ... 8 mΩ<br>9 mΩ ... 10 mΩ |             |             | 2.2 ± 0.25<br>1.2 ± 0.25<br>0.77 ± 0.25               | 0.6 ± 0.25              |

### RATING

| SIZE | TYPE    | T.C.R.<br>(ppm/K)* | POWER RATING** | RESISTANCE RANGE (Ω)                                                               | RESISTANCE TOLERANCE | OPERATING TEMP. RANGE |
|------|---------|--------------------|----------------|------------------------------------------------------------------------------------|----------------------|-----------------------|
| 1206 | TLR 2B  | ± 75               | 0.5 W          | 2m, 3m, 4m, 5m, 6m, 7m, 8m, 10m, 11m, 12m, 13m, 15m, 16m, 18m, 20m                 | F (±1%)              | -65°C... +155°C       |
|      | TLR 2BN | ± 150              |                | 2m, 3m, 4m, 5m, 6m, 7m, 8m, 10m, 11m, 12m, 13m, 15m, 16m, 18m, 20m                 |                      |                       |
| 2010 | TLR 2H  | ± 75<br>± 150      | 1.0 W          | 1m, 2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m<br>1m, 2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m |                      | -65°C... +170°C       |
|      | TLR 3A  | ± 150<br>± 200     |                | 1m, 2m<br>3m, 4m                                                                   |                      |                       |
| 2512 | TLR 3AW | ± 75<br>± 150      | 2.0 W          | 2m, 3m, 4m, 5m, 6m, 7m, 8m<br>1m, 2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m              |                      | -65°C... + 155°C***   |

\* T.C.R. + 50ppm/K is available on request for all sizes (please order detailed specification from KOA).

\*\* For resistors operated at an ambient temperature above +70°C, the power rating shall be derated in accordance with the shown "DERATING CURVE".

Rated voltage =  $\sqrt{\text{Power rating} \times \text{resistance value}}$  or max. working voltage, whichever is lower.

\*\*\* Ohmic values 4mΩ and higher allow the operating temperature range -65°C...+170°C.

### Precautions:

If these low ohm resistors are used as shunt resistors, please lay out a pattern considering the electromagnetic induction with surrounding inductors. Please note during design, that the voltage drop over these low ohm resistors is dependant on the PCB-layout, the shape and size of the pad pattern, the solder amount and the measuring points.

In case of using T.C.R. ±50 and ±150ppm/K parts, please consult KOA for the layout and the measuring points.

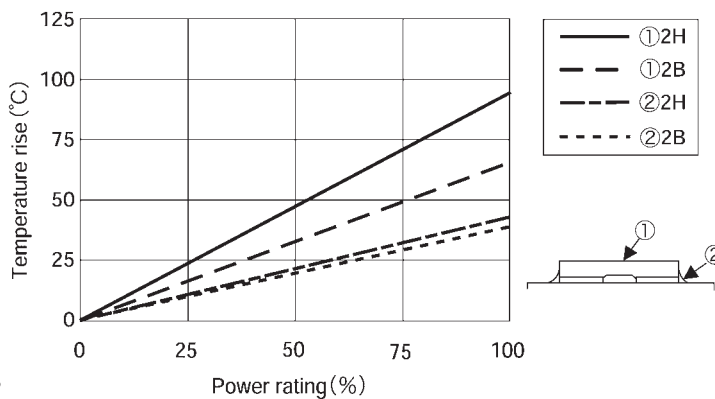
In any case, please order the detailed technical specification for the requested product before you order and use this series.

Contact our sales representatives before you use our products for applications including automobiles, medical equipment and aerospace equipment. Malfunction or failure of the products in such applications may cause loss of human life or serious damage.

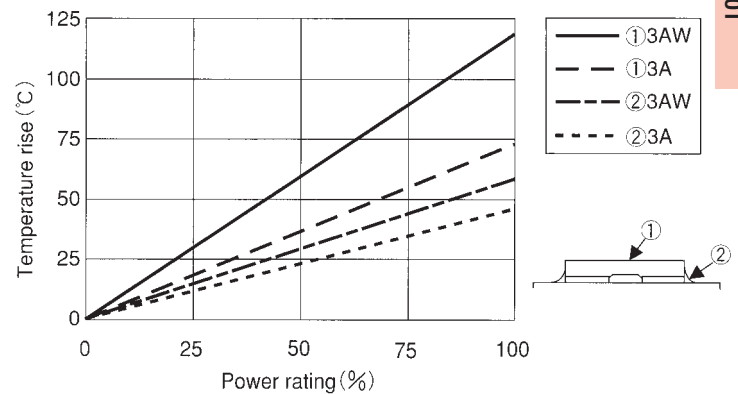
## METAL PLATE CURRENT SENSING MILLIOHM CHIP TLR

### TEMPERATURE RISE

#### TLR2B/2BN/2H 8mΩ

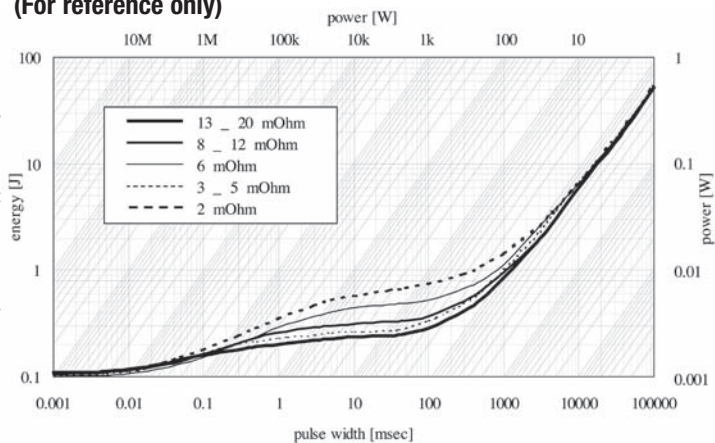


#### TLR3A/3AW 4mΩ

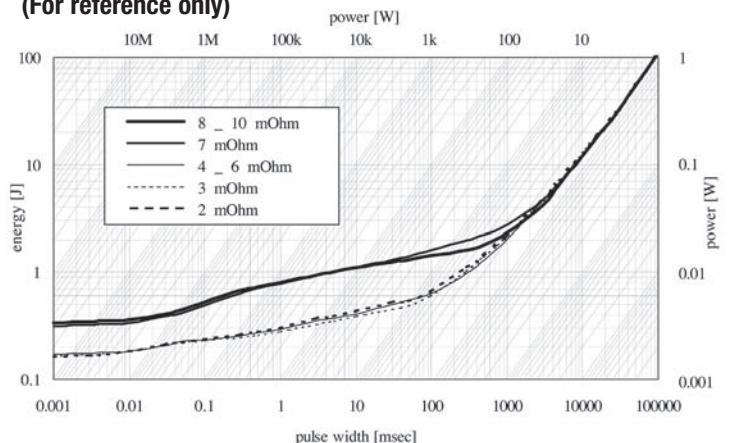


Regarding the temperature rise, the value of the temperature varies per conditions and board for use since the temperature is measured under our measuring conditions.

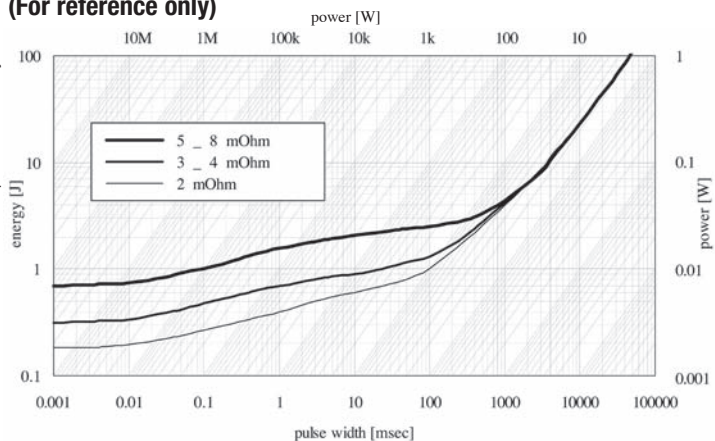
#### ONE PULSE LIMIT TLR2B 75ppm (For reference only)



#### ONE PULSE LIMIT TLR2H 75ppm (For reference only)



#### ONE PULSE LIMIT TLR3AW 75ppm (For reference only)



#### DERATING CURVE

