



## Standard Carbon Film Leaded Resistors



### FEATURES

- Securely bonded carbon film
- Good moisture resistance ( $\Delta R_{\max.} \leq \pm 1.5 \% R$ )
- Good long term stability ( $\Delta R_{\max.} \leq \pm 1.5 \% R$ , for 1000 h)
- Low noise (refer to graph)
- Suitable for general purpose commercial electronics and pulse load applications
- Lead (Pb)-free solder contacts
- Pure tin plating provides compatibility with lead (Pb)-free and lead containing soldering processes
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### STANDARD ELECTRICAL SPECIFICATIONS

| MODEL   | SIZE | POWER RATING<br>$P_{70}$<br>W | LIMITING<br>ELEMENT<br>VOLTAGE $U_{\max.}$<br>$V_{\equiv}$ | TOLERANCE<br>$\pm \%$ | RESISTANCE<br>RANGE<br>$\Omega$ | E-SERIES |
|---------|------|-------------------------------|------------------------------------------------------------|-----------------------|---------------------------------|----------|
| LCA0207 | 0207 | 0.35                          | 300                                                        | 2<br>5                | 1 to 1M<br>0.22 to 5.1M         | E24      |
| LCA0414 | 0414 | 0.6                           | 500                                                        | 2<br>5                | 1 to 1M<br>0.22 to 10M          | E24      |

#### Notes

- Coating: light blue
- Marking: color coded. Additional blue color marking after second band

### TECHNICAL SPECIFICATIONS

| PARAMETER                                            | UNIT               | LCA0207        | LCA0414    |
|------------------------------------------------------|--------------------|----------------|------------|
| Rated dissipation, $P_{70}$                          | W                  | 0.35           | 0.6        |
| Limiting element voltage, $U_{\max.}$ <sup>(1)</sup> | $V_{\equiv}$       | $\leq 300$     | $\leq 500$ |
| Limiting voltage, short-time                         | $V_{\equiv}$       | 500            | 1000       |
| Insulation voltage, $U_{\text{ins}}$ (1 min)         | V                  | $> 700$        | $> 700$    |
| Thermal resistance                                   | K/W                | $\leq 220$     | $\leq 140$ |
| Insulation resistance                                | $\Omega$           | $\geq 10^{11}$ |            |
| Category temperature range                           | $^{\circ}\text{C}$ | -55 to +155    |            |
| Failure rate                                         | $10^{-9}/\text{h}$ | $< 10$         |            |
| Weight                                               | g                  | 0.21           | 0.68       |

#### Note

<sup>(1)</sup> Rated voltage  $\sqrt{P \times R}$

# PART NUMBER AND PRODUCT DESCRIPTION

Part Number: LCA0207002401J2500

|                    |   |             |   |                            |   |                                                                                                                                                                                                                                                                                                      |   |   |   |                        |   |                                                           |   |                                 |   |   |   |
|--------------------|---|-------------|---|----------------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|------------------------|---|-----------------------------------------------------------|---|---------------------------------|---|---|---|
| L                  | C | A           | 0 | 2                          | 0 | 7                                                                                                                                                                                                                                                                                                    | 0 | 0 | 2 | 4                      | 0 | 1                                                         | J | 2                               | 5 | 0 | 0 |
| MODEL/SIZE         |   | VARIANT     |   | TCR                        |   | VALUE                                                                                                                                                                                                                                                                                                |   |   |   | TOLERANCE              |   | PACKAGING <sup>(1)</sup>                                  |   | SPECIAL                         |   |   |   |
| LCA0207<br>LCA0414 |   | 0 = neutral |   | 0 = neutral<br>See diagram |   | 3 digit value<br>1 digit multiplier<br>Multiplier<br>7 = *10 <sup>-3</sup><br>8 = *10 <sup>-2</sup><br>9 = *10 <sup>-1</sup><br>0 = *10 <sup>0</sup><br>1 = *10 <sup>1</sup><br>2 = *10 <sup>2</sup><br>3 = *10 <sup>3</sup><br>4 = *10 <sup>4</sup><br>5 = *10 <sup>5</sup><br>6 = *10 <sup>6</sup> |   |   |   | G = ± 2 %<br>J = ± 5 % |   | 25 = A5<br>22 = A2 (G53)<br>21 = A1<br>D5 = R5<br>D2 = R2 |   | Up to 2 digits<br>00 = standard |   |   |   |

Product Description: LCA0207 2K4 5 % A5

|                    |                             |                |                          |
|--------------------|-----------------------------|----------------|--------------------------|
| LCA0207            | 2K4                         | 5 %            | A5                       |
| MODEL              | RESISTANCE VALUE            | TOLERANCE      | PACKAGING <sup>(1)</sup> |
| LCA0207<br>LCA0414 | 220K = 220 kΩ<br>10R = 10 Ω | ± 2 %<br>± 5 % | A5, R5<br>A1, R2<br>A2   |

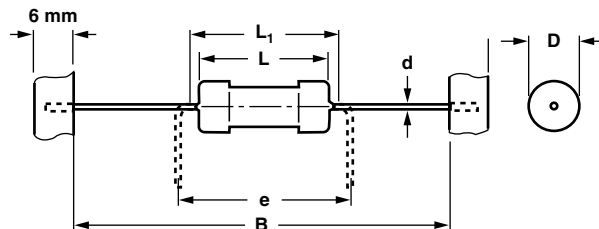
## Notes

- The PART NUMBER shown above is to facilitate the unified part numbering system for ordering products
- <sup>(1)</sup> Please refer to table PACKAGING

# PACKAGING

| MODEL   | REEL        |      |                                   | BOX          |          |                                   |
|---------|-------------|------|-----------------------------------|--------------|----------|-----------------------------------|
|         | PIECES/REEL | CODE | MIN. ORDER QTY<br>PACKAGING UNITS | PIECES/BOX   | CODE     | MIN. ORDER QTY<br>PACKAGING UNITS |
| LCA0207 | 5000        | R5   | 1                                 | 5000<br>2000 | A5<br>A2 | 1                                 |
| LCA0414 | 2000        | R2   | 1                                 | 1000         | A1       | 1                                 |

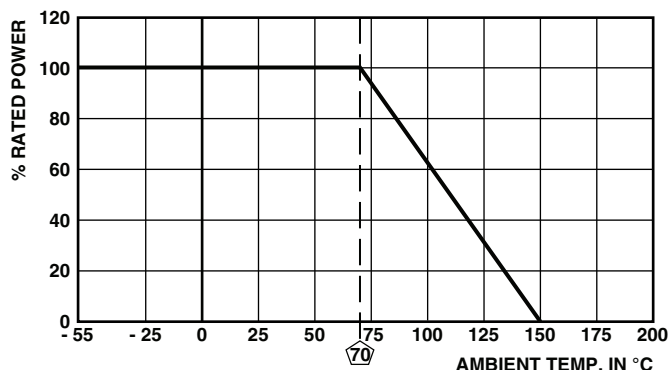
# DIMENSIONS in millimeters



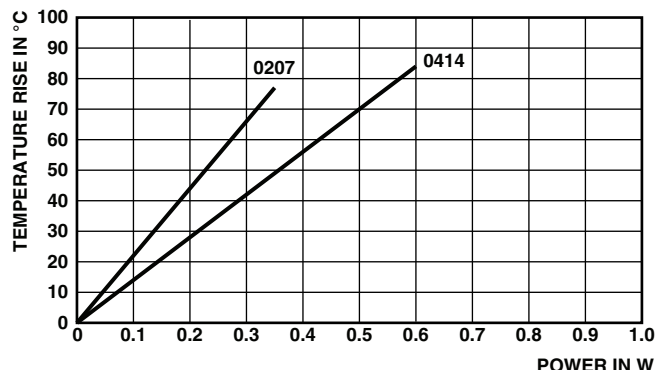
| MODEL   | D <sub>max.</sub> | L          | L <sub>1</sub> | B      | d   | e    |
|---------|-------------------|------------|----------------|--------|-----|------|
| LCA0207 | 2.4 - 0.3         | 6.1 - 0.5  | 8.1            | 53 ± 1 | 0.6 | 7.5  |
| LCA0414 | 4.2 - 0.5         | 12.2 - 0.7 | 14.2           | 63 ± 1 | 0.8 | 15.0 |

## Notes

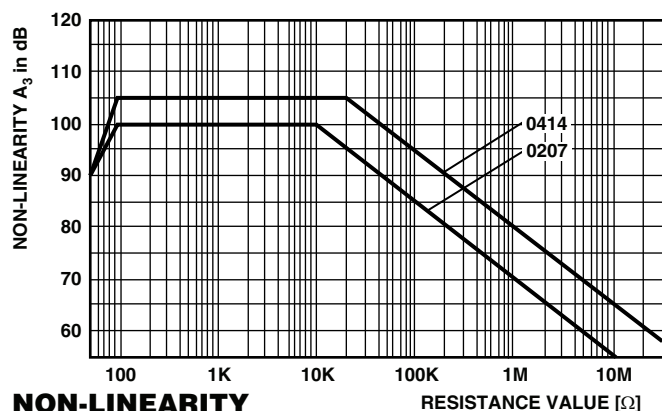
- Taping in according with IEC 60286-1
- D and L measured in according with IEC 60294
- d according to IEC 60301



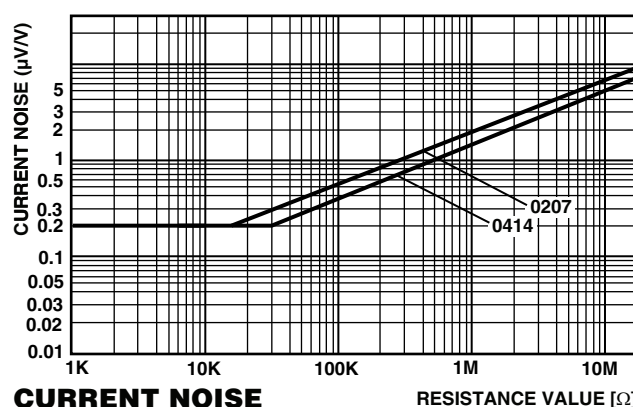
**DERATING**



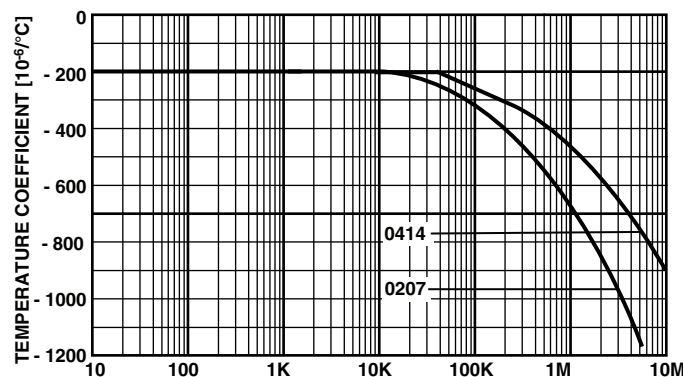
**TEMPERATURE RISE**



**NON-LINEARITY**

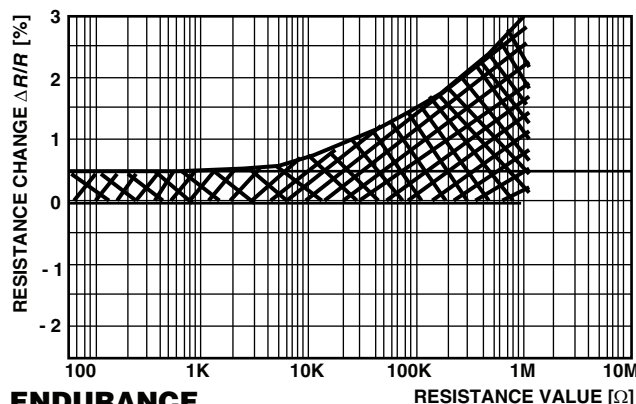


**CURRENT NOISE**



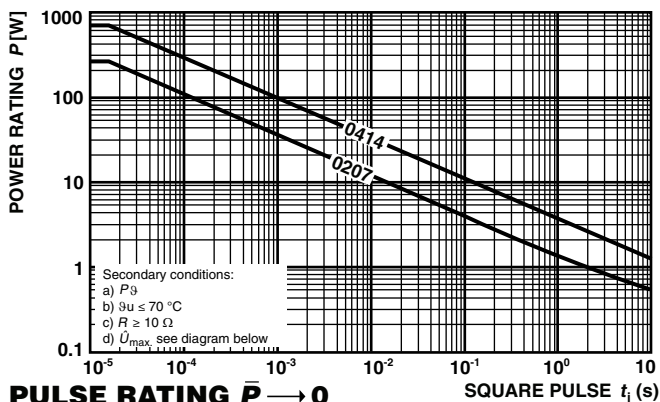
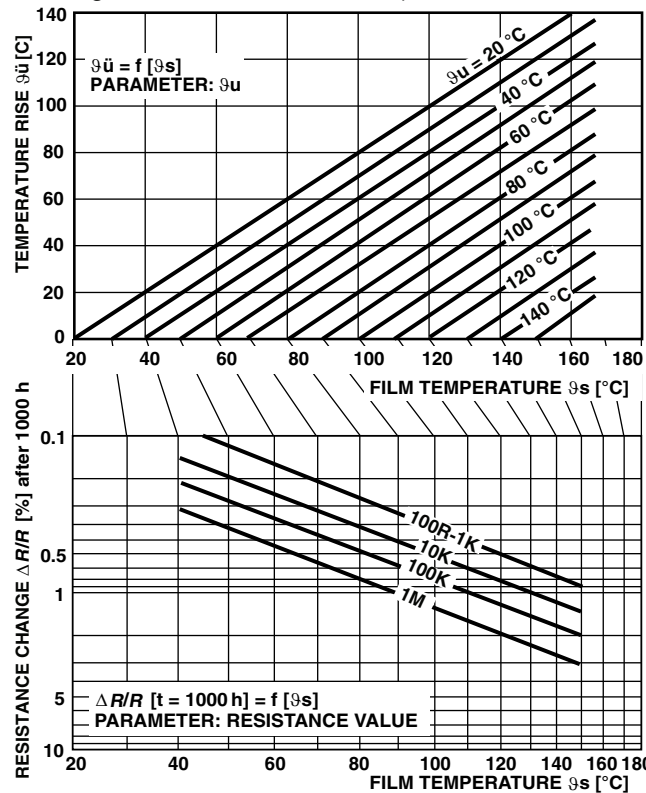
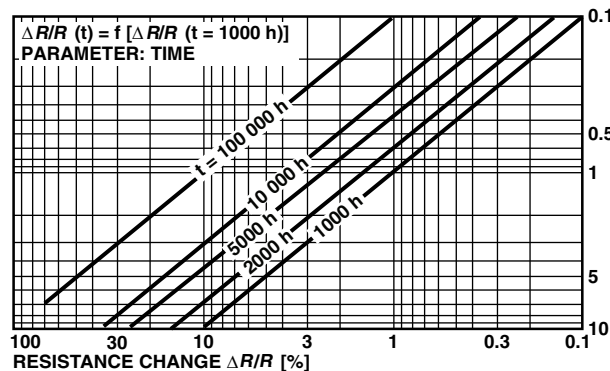
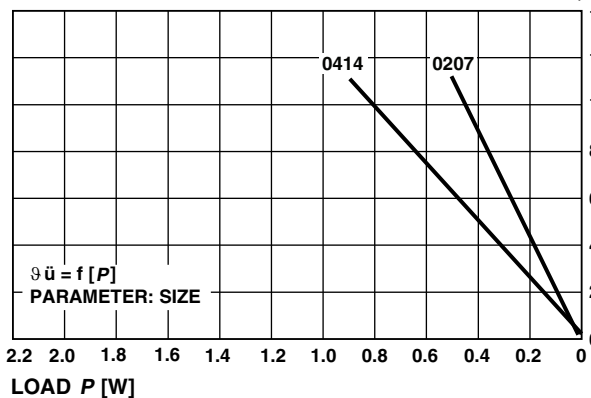
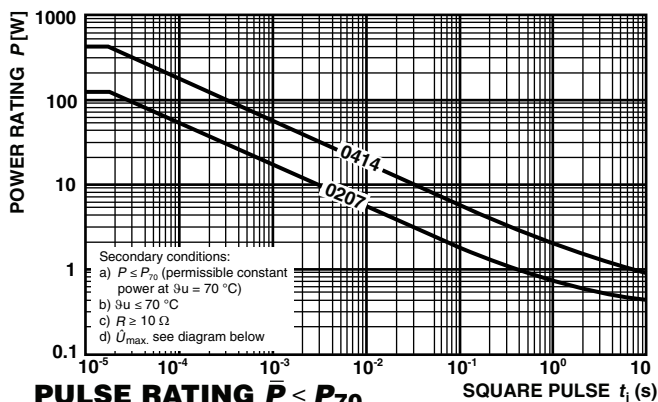
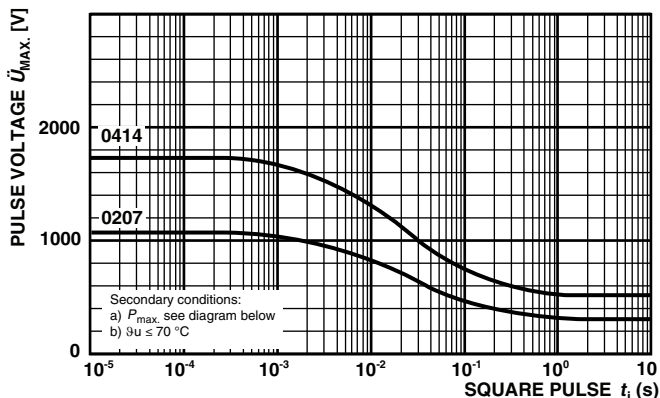
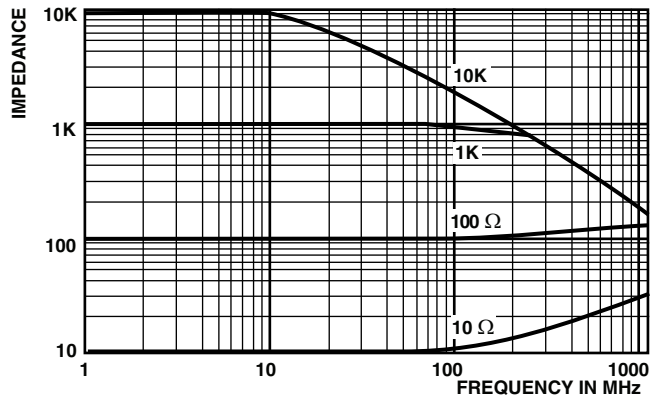
**TEMPERATURE COEFFICIENT**

(mean value) between - 25 °C to + 125 °C deviation ± 25 %



**ENDURANCE**

at upper category temperature, 155 °C 1000 h


**STABILITY NOMOGRAM, TYPICAL VALUES** (For handling see General Information)

**PULSE RATING  $P \rightarrow 0$** 

**PULSE RATING  $P \leq P_{70}$** 

**MAXIMUM PULSE VOLTAGE**

**HF CHARACTERISTICS LCA0207**

**PERFORMANCE CHARACTERISTICS**

| TEST                                              | CONDITIONS OF TEST                                                                                                              | REQUIREMENTS ( $\Delta R/R$ ) <sup>(1)</sup> |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| Endurance test at 70 °C<br>IEC 60115-1, 4.25.1    | 1000 h at 70 °C, 1.5 h ON, 0.5 h OFF<br>8000 h at 70 °C, 1.5 h ON, 0.5 h OFF                                                    | $\leq \pm 1.5 \%$<br>$\leq \pm 4.0 \%$       |
| Endurance at UCT<br>IEC 60115-1, 4.25.3           | 1000 h at 155 °C without load<br>8000 h at 155 °C without load                                                                  | $\leq \pm 3.0 \%$<br>$\leq \pm 8.0 \%$       |
| Overload test<br>IEC 60115-1, 4.13                | Room temperature; $P = 6.25 \times P_n$ ;<br>voltage not more than 2x limiting voltage;<br>2 s for size 0207; 5 s for size 0414 | $\leq \pm 0.5 \%$                            |
| Thermal shock<br>IEC 60115-1, 4.19                | Rapid change between upper and lower category temperature                                                                       | $\leq \pm 0.25 \%$                           |
| Climatic sequence<br>IEC 60115-1, 4.23            | Dry heat, damp heat cyclic, cold, low air pressure                                                                              | $\leq \pm 1.5 \%$                            |
| Damp heat steady state<br>IEC 60115, 4.24         | 56 days; 40 °C; 90 % to 95 % RH;<br>loaded with 0.01 $P_{70}$                                                                   | $\leq \pm 1.5 \%$                            |
| Resistance to soldering heat<br>IEC 60115-1, 4.18 | 10 s at 260 °C solder bath temperature                                                                                          | $\leq \pm 0.25 \%$                           |
| Robustness of terminations<br>IEC 60115-1, 4.16   | Tensile, bending and torsion                                                                                                    | $\leq \pm 0.25 \%$                           |
| Vibration<br>IEC 60115-1, 4.22                    | Frequency 10 Hz to 500 Hz; displacement 1.5 mm or<br>acceleration 10 g; three directions; 6 h                                   | $\leq \pm 0.25 \%$                           |

**Note**

<sup>(1)</sup> For ohmic values between 10  $\Omega$  and 1 M $\Omega$

**APPLICABLE SPECIFICATIONS**

- CECC 40101-806
- EN 140100; EN 60115-1



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