

# ALX Series

## Aluminum Nitride Thin Film Precision Chip



### FEATURES

- High thermal conductivity aluminum nitride substrate
- Power rating up to 6.0W
- Resistor tolerance to  $\pm 0.1\%$
- TCR to  $\pm 25\text{ppm}/^\circ\text{C}$

### APPLICATIONS

- Power Supplies
- Power Switching
- Braking System

### CHARACTERISTICS

| Series | Package size | Power Rating* | Max. Oper. Voltage | Max. Overload Voltage | Resistance Range             | Tolerance                                            | TCR                 |
|--------|--------------|---------------|--------------------|-----------------------|------------------------------|------------------------------------------------------|---------------------|
| ALX12  | 1206         | 2W            | 100V               | 200V                  | 50 $\Omega$ ~ 30.1K $\Omega$ | $\pm 0.1\%$ , $\pm 0.25\%$ , $\pm 0.5\%$ , $\pm 1\%$ | $\pm 25$ , $\pm 50$ |
| ALX25  | 2512         | 6W            |                    |                       |                              |                                                      |                     |

\* @70°C; dependant on component mounting by user

### CHARACTERISTICS

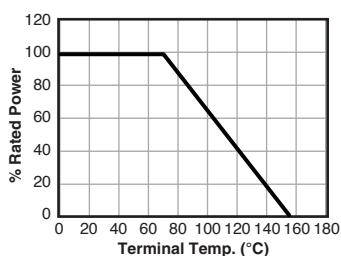
**Oper. Temp. Range** -55°C to +155°C

**Operating Voltage**  $\sqrt{(P \cdot R)}$  or Max. operating voltage listed above, whichever is lower

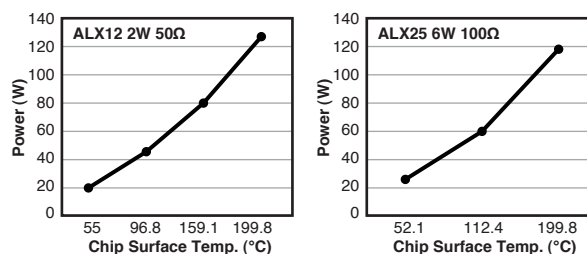
**Storage Temp.** 15~28°C; Humidity < 80%RH

**Reference Standards** MIL STD 202, JIS C 5201

### Derating



### Chip Temperature vs. Applied Power



Chip surface temperature measured using FLIR ETS-320 thermal imaging system with an approximate test card surface temperature

(continued)

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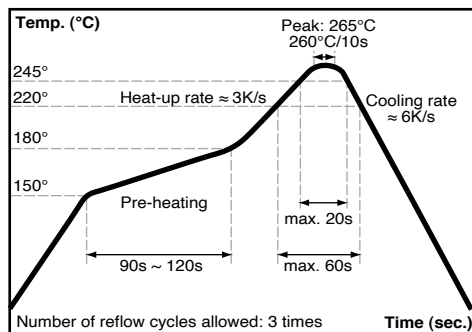
### PERFORMANCE

| Item                                        | Requirement        | Test Method                                                                                                                                                                                            |
|---------------------------------------------|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature Coefficient of Resistance (TCR) | As Spec.           | MIL-STD-202 Method 304; +25/-55/+25/+125/+25°C                                                                                                                                                         |
| Short Time Overload                         | $\Delta R \pm 0.5$ | Actual power handling capability is limited by the end user mounting process. As with any high power chip resistor the ability to remove the heat is critical to the overall performance of the device |
| Insulation Resistance                       | >9999M $\Omega$    | MIL-STD-202 Method 302; Apply 100VDC for 1 minute                                                                                                                                                      |
| Endurance                                   | $\Delta R \pm 1$   | MIL-STD-202 Method 108A; 70 $\pm 2^\circ\text{C}$ , RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"                                                                                              |
| Damp Heat with Load                         | $\Delta R \pm 0.4$ | MIL-STD-202 Method 103B; 40 $\pm 2^\circ\text{C}$ , 90~95% R.H. RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"                                                                                  |
| Solderability                               | 95% min. coverage  | MIL-STD-202 Method 208H; 245 $\pm 5^\circ\text{C}$ for 3 seconds                                                                                                                                       |
| Resistance to Soldering Heat                | $\Delta R \pm 0.2$ | MIL-STD-202 Method 210E; 260 $\pm 5^\circ\text{C}$ for 10 seconds                                                                                                                                      |
| Low Temperature Operation                   | $\Delta R \pm 0.2$ | JIS-C-5201 1 4.36; 1 hour, -65°C, followed by 45 minutes of RCWV                                                                                                                                       |
| High Temperature Exposure                   | $\Delta R \pm 0.2$ | MIL-STD-202 Method 108; At +155°C for 1000hrs                                                                                                                                                          |
| Thermal Shock                               | $\Delta R \pm 0.2$ | MIL-STD-202F Method 107G; -55°C ~ 155°C, 100 cycles                                                                                                                                                    |

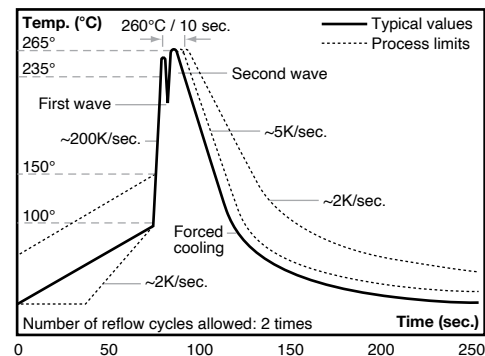
### SOLDERING

- (1) Time of IR reflow soldering at maximum temperature point 260°C: 10s
- (2) Time of wave soldering at maximum temperature point 260°C: 10s
- (3) Time of soldering iron at maximum temperature point 410°C: 5s

#### IR Reflow Soldering

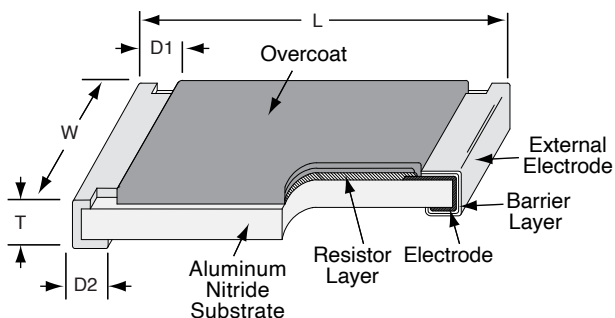


#### Wave Soldering (Flow Soldering)

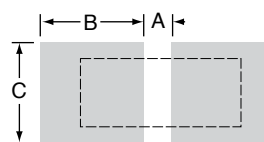


### DIMENSIONS

(mm)



#### Land pattern



| Series | A    | B    | C              |
|--------|------|------|----------------|
| ALX12  | 0.60 | 1.90 | 1.80 $\pm 0.1$ |
| ALX25  | 2.77 | 2.31 | 3.20 $\pm 0.2$ |

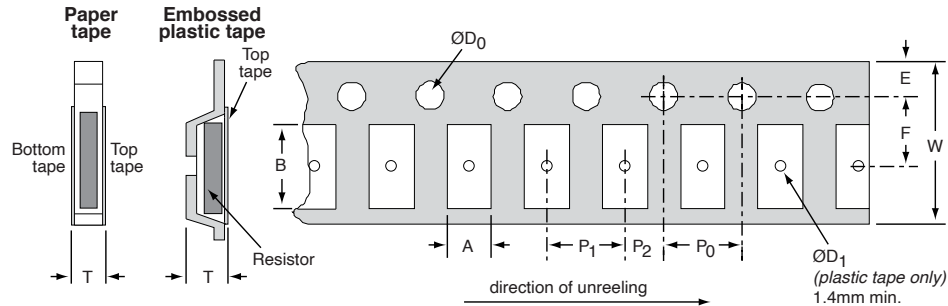
| Series | L               | W               | T               | D1              | D2              | Weight per 1000 |
|--------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| ALX12  | 3.05 $\pm 0.20$ | 1.55 $\pm 0.20$ | 0.43 $\pm 0.15$ | 0.50 $\pm 0.15$ | 1.20 $\pm 0.20$ | 10.98g          |
| ALX25  | 6.30 $\pm 0.20$ | 3.10 $\pm 0.20$ | 0.43 $\pm 0.15$ | 0.70 $\pm 0.25$ | 1.60 $\pm 0.25$ | 42.32g          |

# ALX Series

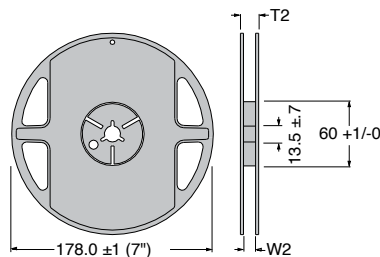
## Aluminum Nitride Thin Film Precision Chip

### TAPE AND REEL

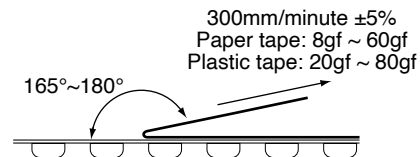
(mm)



| Series | Packaging        | A          | B          | W          | E          | F         | P0         | P1         | P2         | D0         | T          |
|--------|------------------|------------|------------|------------|------------|-----------|------------|------------|------------|------------|------------|
| ALX12  | Paper tape       | 2.00 ±0.05 | 3.55 ±0.05 | 8.00 ±0.10 | 1.75 ±0.05 | 3.5 ±0.05 | 4.00 ±0.10 | 4.00 ±0.10 | 2.00 ±0.05 | 1.55 ±0.05 | 0.75 ±0.05 |
| ALX25  | Embossed plastic | 3.40 ±0.10 | 6.65 ±0.10 | 12.0 ±0.10 | 1.75 ±0.10 | 5.5 ±0.05 | 4.00 ±0.10 | 4.00 ±0.10 | 2.00 ±0.05 | 1.50 ±0.10 | 1.00 ±0.20 |



| Series | W2        | T2        | Qty./reel |
|--------|-----------|-----------|-----------|
| ALX12  | 9.5 ±1.0  | 11.5 ±1.0 | 5000      |
| ALX25  | 13.5 ±1.0 | 15.5 ±1.0 | 4000      |



### ORDERING INFORMATION

| ALX12W75R0BET |           |           |              |           |             |
|---------------|-----------|-----------|--------------|-----------|-------------|
| ALX series    | Size      | TCR       | Resistance   | Tolerance | Tape & Reel |
|               | 12 = 1206 | W = 25ppm | 10R2 = 10.2Ω | B = 0.1%  |             |
|               | 25 = 2512 | V = 50ppm | 1K00 = 1KΩ   |           |             |
|               |           |           | 10K0 = 10KΩ  |           |             |

RoHS Compliant

#### Standard Values

|               |               |
|---------------|---------------|
| ALX12W49R9BET | ALX25W49R9BET |
| ALX12W75R0BET | ALX25W75R0BET |
| ALX12W100RBET | ALX25W100RBET |
| ALX12W150RBET | ALX25W150RBET |
| ALX12W175RBET |               |
| ALX12W1K00BET | ALX25W1K00BET |
| ALX12W4K99BET | ALX25W4K99BET |
| ALX12W10K0BET | ALX25W10K0BET |

#### Marking Example

|            |      |       |      |        |
|------------|------|-------|------|--------|
| Resistance | 500Ω | 2.2KΩ | 10KΩ | 12.5KΩ |
| Marking    | 5000 | 2201  | 1002 | 1252   |