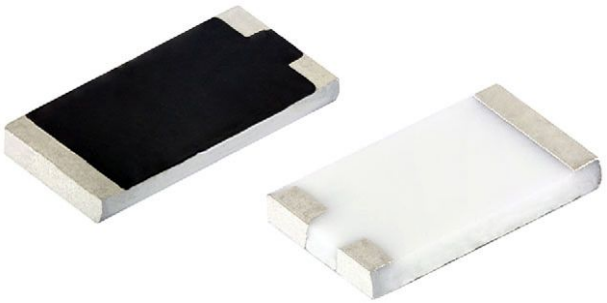
# Thick Film Chip Dividers, Medium Voltage



## FEATURES

- AEC-Q200 qualified
- Voltage up to 1415 V
- Precision to ± 0.5 % with low TCR tracking to 10 ppm/°C utilizing thick film technology
- Wide range of resistance value and ratios
- Termination style: 3-sided wraparound termination
- Termination material: solder-coated nickel barrier
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE

Pb-free

RoHS COMPLIANT

HALOGEN FREE

## LINKS TO ADDITIONAL RESOURCES

3D Models

Footprints

## APPLICATIONS

- Automotive:
  - EV charging for over voltage protection
  - Voltage dividers
  - On-board chargers
  - DC/DC converters
  - Battery management

## STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL | CASE SIZE | POWER RATING $P_{70\,°C}$ W | MAXIMUM WORKING VOLTAGE (1) V | RESISTANCE RANGE (2) Ω | TOLERANCE (3) ± % | RATIO RANGE $(R_1 + R_2)/R_2$ | TCR TRACKING (-55 °C to +155 °C) ± ppm/°C |
|---|---|---|---|---|---|---|---|
| CDMA | 2512 | 1 | 1415 | 500K to 50M | 0.5, 1, 2, 5, 10 | 100:1 to 600:1 | 10 to 50 |

**Notes**

(1) Continuous working voltage shall be $\sqrt{P \times R}$ or maximum working voltage, whichever is less

(2) Resistance values are calibrated at 100 $V_{DC}$. Calibration at other voltages available upon request

(3) Contact factory for tighter tolerances

## GLOBAL PART NUMBER INFORMATION

**New Global Part Numbering: CDMA20K0J1000GEB (preferred part number format)**

| C | D | M | A | 2 | 0 | K | 0 | J | 1 | 0 | 0 | 0 | G | E | B | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| GLOBAL MODEL | RESISTANCE VALUE ($R_1$) | TOLERANCE | RATIO $(R_1 + R_2) / R_2$ | RATIO TOLERANCE | SOLDER TERMINATION | PACKAGING | SPECIAL |
|---|---|---|---|---|---|---|---|
| **CDMA** = CDMA2512 | K = kΩ<br>M = MΩ<br>**20K0** = 20 kΩ<br>**800K** = 800 kΩ<br>**1M00** = 1 MΩ | **D** = ± 0.5 %<br>**F** = ± 1 %<br>**G** = ± 2 %<br>**J** = ± 5 %<br>**K** = ± 10 % | 3 digit significant figure, followed by a multiplier<br>**1000** = 100:1<br>**2000** = 200:1 | **D** = ± 0.5 %<br>**F** = ± 1 %<br>**G** = ± 2 %<br>**H** = ± 3 %<br>**J** = ± 5 % | **E** = Sn100 | **B** = bulk (250 pcs max.)<br>**F** = T / R (full reel)<br>**1** = T / R (1000 pcs)<br>**5** = T / R (500 pcs)<br>**T** = T / R (250 pcs min.) | |

**Note**

- For additional information on packaging, refer to the “Surface-Mount Resistor Packaging” document (www.vishay.com/doc?31543)



For technical questions, contact: te1resistors@vishay.com

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## VOLTAGE COEFFICIENTS AND RATIO TRACKING INFORMATION (Typical)

| RESISTANCE (Ω) | RATIO (MAXIMUM) | VCR (ppm/V) | RATIO TRACKING (ppm/°C) -55 °C to +155 °C |
|---|---|---|---|
| 500K | 100:1 | -10 | ± 20 |
| 15M | 250:1 | -10 | ± 10 |
| 50M | 600:1 | -10 | -50 to 0 |

**Note**
- Contact factory for other ratios

## MATERIAL SPECIFICATIONS

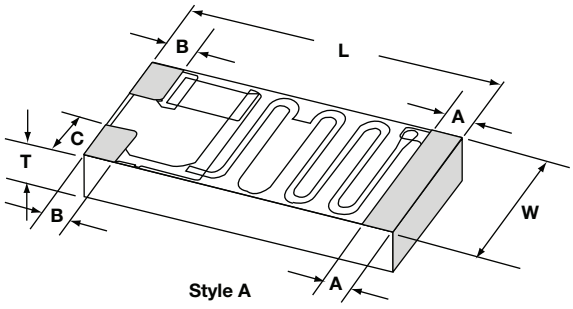
| | |
|---|---|
| Resistive element | Ruthenium oxide |
| Encapsulation | Epoxy |
| Substrate | 96 % alumina |
| Termination | Solder-coated nickel barrier terminations standard |
| Solder finish | Pure tin |

## ENVIRONMENTAL SPECIFICATIONS

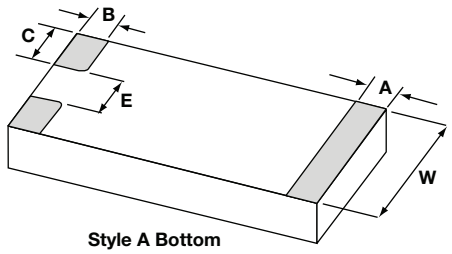
| | |
|---|---|
| Operating temperature | -55 °C to +155 °C |
| Life | Less than 0.5 % change when tested at full rated power |

**Note**
- Reference only: not for all values specified. Consult factory for your size and value

## DIMENSIONS in inches (millimeters)



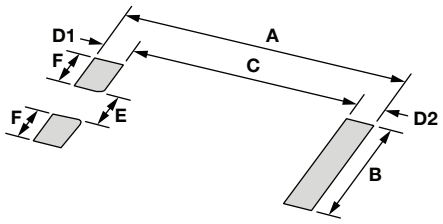

Style A




Style A Bottom
(3-sided wraparound)

| TERMINATION | LENGTH (L) ± 0.006 (0.152) | WIDTH (W) ± 0.006 (0.152) | THICKNESS (T) ± 0.005 (0.127) | A ± 0.005 | B ± 0.005 | C ± 0.005 | E ± 0.010 |
|---|---|---|---|---|---|---|---|
| Style A (3-sided wraparound) | 0.250 | 0.126 | 0.025 | 0.025 | 0.025 | 0.040 | 0.046 |

## RECOMMENDED SOLDER PAD LAYOUT



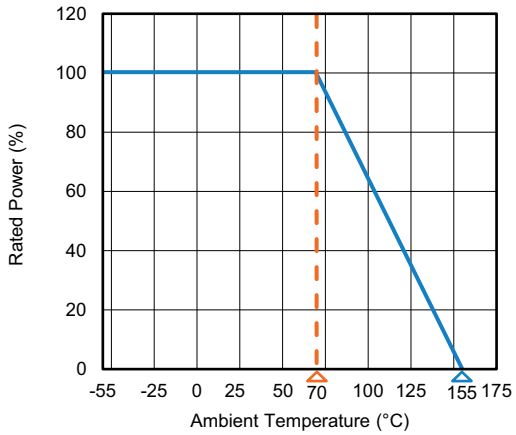

| MODEL | DIMENSIONS in inches (millimeters) | | | | | | |
|---|---|---|---|---|---|---|---|
| | A | B | C | D1 | D2 | E | F |
| CDMA2512 | 0.275 (6.99) | 0.126 (3.20) | 0.190 (4.83) | 0.050 (1.27) | 0.035 (0.89) | 0.040 (1.02) | 0.046 (1.17) |



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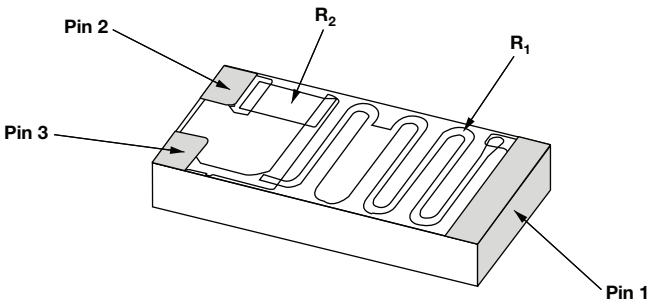
## DERATING CURVE

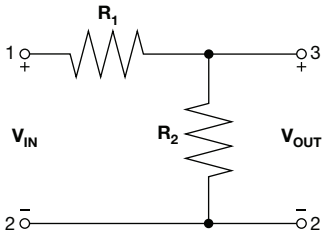



**Note**

- Reference only: not for all values specified. Consult factory for your specific value

## SCHEMATIC




## PERFORMANCE

| TEST | CONDITIONS OF TEST | TEST LIMITS |
|---|---|---|
| High temperature exposure (storage) | MIL-STD-202, method 108, 2000 h at T = 155 °C at 0 % power | ± 1.0 % |
| Thermal shock | JESD22 method JA-104, 2000 cycles (-55 °C to +150 °C), dwell time = 15 min, maximum transfer time = 20 s air to air | ± 1.0 % |
| Moisture resistance | MIL-STD-202, method 106 | ± 1.0 % |
| Biased humidity | MIL-STD, method 103, 2000 h 85 °C / 85 % RH<br>Note: specified conditions: 10 % of rated voltage | ± 2.0 % |
| Operational life | MIL-STD-202, method 108, 2000 h, $T_a$ = 125 °C at rated power | ± 1.0 % |
| Resistance to solvents | MIL-STD-202, method 215 | No damage to parts |
| Mechanical shock | MIL-STD-202, method 213, figure 1, SMD, condition C | ± 0.5 % |
| Vibration | MIL-STD-202, method 204, 5 *g*'s for 20 minutes.<br>12 cycles each of 3 orientations | ± 0.5 % |
| Resistance to solder heat | MIL-STD-202, method 210, condition J | ± 1.0 % |
| Solderability | J-STD-002, method B1, 4 h at 155 °C dry heat, solder at 245 °C, magnification 50 x | > 95 % coverage |
| Flammability | UL 94 | V-0 |
| Board flex | AEC-Q200-005 2 mm min. | ± 1.0 % |
| Terminal strength (SMD) | AEC-Q200-006 force of 1.8 kg for 60 s | ± 1.0 % |



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