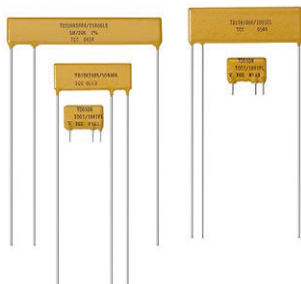


# Thick Film Planar Dividers, Through-Hole, High Voltage



## FEATURES

- 30 000 V capability
- Very low voltage coefficient to less than 1 ppm/V
- Outstanding stability under adverse conditions
- Stable cermet resistive elements bonded to a high-purity alumina substrate
- Tough epoxy-based coating and high voltage stability
- Custom designs built from customer supplied schematics available
- Custom dividers available with leadwire terminals or with leadless conductive pads
- Maximum resistance ratio of 1000:1 (for ratio's over 1000:1, contact factory)
- Minimum resistance ratio of 40:1
- TCR tracking to  $\pm 25$  ppm/ $^{\circ}\text{C}$
- Resistors available, see Vishay Techno's TR datasheet ([www.vishay.com/doc?68000](http://www.vishay.com/doc?68000))
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS\***  
Available

**HALOGEN**  
**FREE**

## APPLICATIONS

Applications include power supplies, transformers and any application requiring operation within an environment where high voltages are used.

### Note

\* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

## STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL<br>MODEL /<br>SIZE | POWER<br>RATING<br>$P_{25^{\circ}\text{C}}$<br>W | MAXIMUM<br>WORKING<br>VOLTAGE <sup>(1)</sup><br>V | RESISTANCE<br>RANGE<br>$R_1$ <sup>(2)(3)</sup><br>$\Omega$ | ABSOLUTE<br>TOLERANCE<br>$\pm \%$ | ABSOLUTE<br>TEMPERATURE<br>COEFFICIENT<br>$\pm \text{ppm}/^{\circ}\text{C}$ | RATIO<br>TOLERANCE<br>$\pm \%$ | TCR<br>TRACKING <sup>(4)</sup><br>$\pm \text{ppm}/^{\circ}\text{C}$ | RATIO<br>MAX. <sup>(5)</sup> |
|---------------------------|--------------------------------------------------|---------------------------------------------------|------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------|------------------------------|
| TDA03                     | 0.25                                             | 0.8K                                              | 300 to 3M                                                  | 0.5, 1, 2, 5, 10, 20              | 100                                                                         | 0.5, 1, 2, 5                   | 25, 50, 100                                                         | 1000:1                       |
|                           |                                                  |                                                   | 3.01M to 25M                                               | 0.5, 1, 2, 5, 10, 20              | 200                                                                         | 0.5, 1, 2, 5                   | 25, 50, 100                                                         | 1000:1                       |
| TDX03                     |                                                  | 2.5K                                              | 25M to 250M                                                | 1, 2, 5, 10, 20                   | 200                                                                         | 1, 2, 5                        | 25, 50, 100                                                         | 1000:1                       |
|                           |                                                  |                                                   | 260M to 2G                                                 | 5, 10, 20                         | 200                                                                         | 1, 2, 5                        | 25, 50, 100                                                         | 1000:1                       |
|                           | 2.1G to 10G                                      |                                                   | 5, 10, 20                                                  | 500                               | 1, 2, 5                                                                     | 25, 50, 100                    | 1000:1                                                              |                              |
| TDA05                     | 0.5                                              | 4K                                                | 500 to 25M                                                 | 0.5, 1, 2, 5, 10, 20              | 100                                                                         | 0.5, 1, 2, 5                   | 25, 50, 100                                                         | 1000:1                       |
|                           |                                                  |                                                   | 25.1M to 200M                                              | 0.5, 1, 2, 5, 10, 20              | 200                                                                         | 0.5, 1, 2, 5                   | 25, 50, 100                                                         | 1000:1                       |
| TDX05                     |                                                  | 5K                                                | 30M to 1G                                                  | 1, 2, 5, 10, 20                   | 200                                                                         | 1, 2, 5                        | 25, 50, 100                                                         | 1000:1                       |
|                           |                                                  |                                                   | 1.1G to 20G                                                | 5, 10, 20                         | 200                                                                         | 1, 2, 5                        | 25, 50, 100                                                         | 1000:1                       |
|                           | 21G to 100G                                      |                                                   | 5, 10, 20                                                  | 500                               | 1, 2, 5                                                                     | 25, 50, 100                    | 1000:1                                                              |                              |
| TDA10                     | 1                                                | 6.5K                                              | 1K to 16M                                                  | 0.5, 1, 2, 5, 10, 20              | 100                                                                         | 0.5, 1, 2, 5                   | 25, 50, 100                                                         | 1000:1                       |
|                           |                                                  |                                                   | 16.1M to 120M                                              | 0.5, 1, 2, 5, 10, 20              | 200                                                                         | 0.5, 1, 2, 5                   | 25, 50, 100                                                         | 1000:1                       |
| TDX10                     |                                                  | 10K                                               | 20M to 1G                                                  | 1, 2, 5, 10, 20                   | 200                                                                         | 1, 2, 5                        | 25, 50, 100                                                         | 1000:1                       |
|                           |                                                  |                                                   | 1.1G to 15G                                                | 5, 10, 20                         | 200                                                                         | 1, 2, 5                        | 25, 50, 100                                                         | 1000:1                       |
|                           | 16G to 1T                                        |                                                   | 5, 10, 20                                                  | 500                               | 1, 2, 5                                                                     | 25, 50, 100                    | 1000:1                                                              |                              |
| TDA15                     | 1.5                                              | 12.5K                                             | 1.5K to 45M                                                | 0.5, 1, 2, 5, 10, 20              | 100                                                                         | 0.5, 1, 2, 5                   | 25, 50, 100                                                         | 1000:1                       |
|                           |                                                  |                                                   | 45.1M to 340M                                              | 0.5, 1, 2, 5, 10, 20              | 200                                                                         | 0.5, 1, 2, 5                   | 25, 50, 100                                                         | 1000:1                       |
| TDX15                     |                                                  | 15K                                               | 60M to 1G                                                  | 1, 2, 5, 10, 20                   | 200                                                                         | 1, 2, 5                        | 25, 50, 100                                                         | 1000:1                       |
|                           |                                                  |                                                   | 1.1G to 35G                                                | 5, 10, 20                         | 200                                                                         | 1, 2, 5                        | 25, 50, 100                                                         | 1000:1                       |
|                           | 36G to 1.5T                                      |                                                   | 5, 10, 20                                                  | 500                               | 1, 2, 5                                                                     | 25, 50, 100                    | 1000:1                                                              |                              |
| TDA20                     | 2                                                | 17.5K                                             | 2K to 64M                                                  | 0.5, 1, 2, 5, 10, 20              | 100                                                                         | 0.5, 1, 2, 5                   | 25, 50, 100                                                         | 1000:1                       |
|                           |                                                  |                                                   | 64.1M to 480M                                              | 0.5, 1, 2, 5, 10, 20              | 200                                                                         | 0.5, 1, 2, 5                   | 25, 50, 100                                                         | 1000:1                       |
| TDX20                     |                                                  | 20K                                               | 80M to 1G                                                  | 1, 2, 5, 10, 20                   | 200                                                                         | 1, 2, 5                        | 25, 50, 100                                                         | 1000:1                       |
|                           |                                                  |                                                   | 1.1G to 50G                                                | 5, 10, 20                         | 200                                                                         | 1, 2, 5                        | 25, 50, 100                                                         | 1000:1                       |
|                           | 51G to 2T                                        |                                                   | 5, 10, 20                                                  | 500                               | 1, 2, 5                                                                     | 25, 50, 100                    | 1000:1                                                              |                              |
| TDA30                     | 3                                                | 25K                                               | 3K to 82M                                                  | 0.5, 1, 2, 5, 10, 20              | 100                                                                         | 0.5, 1, 2, 5                   | 25, 50, 100                                                         | 1000:1                       |
|                           |                                                  |                                                   | 82.1M to 620M                                              | 0.5, 1, 2, 5, 10, 20              | 200                                                                         | 0.5, 1, 2, 5                   | 25, 50, 100                                                         | 1000:1                       |
| TDX30                     |                                                  | 30K                                               | 80M to 1G                                                  | 1, 2, 5, 10, 20                   | 200                                                                         | 1, 2, 5                        | 25, 50, 100                                                         | 1000:1                       |
|                           |                                                  |                                                   | 1.1G to 60G                                                | 5, 10, 20                         | 200                                                                         | 1, 2, 5                        | 25, 50, 100                                                         | 1000:1                       |
|                           |                                                  |                                                   | 61G to 3T                                                  | 5, 10, 20                         | 500                                                                         | 1, 2, 5                        | 25, 50, 100                                                         | 1000:1                       |

### Notes

- Custom sizes available
- Voltage coefficient: typically less than 1 ppm/V (tested per MIL-STD-202)
- (1) Continuous working voltage shall be  $\sqrt{P \times R}$  or maximum working voltage, whichever is less
- (2) All resistance values are calibrated at 100 V<sub>DC</sub>. Calibration at other voltages available upon request
- (3) Minimum  $R_2$  value is 50  $\Omega$
- (4) TCR Tracking measured from 0 $^{\circ}\text{C}$  to +70 $^{\circ}\text{C}$
- (5) For ratios over 1000:1, contact factory

**GLOBAL PART NUMBER INFORMATION**

New Global Part Numbering: TDA20E100M3300FFEB

|                 |                                                    |                                  |                                                  |                                                                                                                                                                        |                                                                                                                              |                                                                    |   |                                                                                                        |   |                                  |   |           |   |   |   |   |   |
|-----------------|----------------------------------------------------|----------------------------------|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|---|--------------------------------------------------------------------------------------------------------|---|----------------------------------|---|-----------|---|---|---|---|---|
| T               | D                                                  | A                                | 2                                                | 0                                                                                                                                                                      | E                                                                                                                            | 1                                                                  | 0 | 0                                                                                                      | M | 3                                | 3 | 0         | 0 | F | F | E | B |
| GLOBAL<br>MODEL | VOLTAGE<br>RATING                                  | SIZE                             | TCR<br>TRACKING                                  | RESISTANCE<br>VALUE $R_1$                                                                                                                                              | RATIO<br>$R_1/R_2$                                                                                                           | RATIO<br>TOLERANCE                                                 |   | TOLERANCE                                                                                              |   | TERMINAL<br>FINISH               |   | PACKAGING |   |   |   |   |   |
| TD              | A =<br>medium<br>voltage<br>X =<br>high<br>voltage | 03<br>05<br>10<br>15<br>20<br>30 | E =<br>25 ppm<br>H =<br>50 ppm<br>K =<br>100 ppm | R = $\Omega$<br>K = k $\Omega$<br>M = M $\Omega$<br>G = G $\Omega$<br>T = T $\Omega$<br>400R =<br>400 $\Omega$<br>10M0 =<br>10 M $\Omega$<br>10G7 =<br>10.7 G $\Omega$ | 3 digit<br>significant<br>figure,<br>followed<br>by a<br>multiplier<br>0400 =<br>40:1<br>2210 =<br>221:1<br>1001 =<br>1000:1 | D = $\pm 0.5\%$<br>F = $\pm 1\%$<br>G = $\pm 2\%$<br>J = $\pm 5\%$ |   | D = $\pm 0.5\%$<br>F = $\pm 1\%$<br>G = $\pm 2\%$<br>J = $\pm 5\%$<br>K = $\pm 10\%$<br>M = $\pm 20\%$ |   | E =<br>Sn100<br>R =<br>Sn60/Pb40 |   | B = bag   |   |   |   |   |   |

**Notes**

- For additional information on packaging, refer to the Through Hole Resistor Packaging document ([www.vishay.com/doc?31544](http://www.vishay.com/doc?31544))
- The TCR listed in this datasheet is for resistance values up to 1 G $\Omega$ . For resistance values > 1 G $\Omega$ , please contact factory

**MECHANICAL SPECIFICATIONS**
**Resistive Element:** thick film

**Substrate:** 96 % pure alumina

**Encapsulation:** epoxy base, conformal coating

**Terminals:** solder plated copper leads

**Terminal Strength:** 4.5 pounds pull-test

**Power:** derated from ambient temperature +25  $^{\circ}\text{C}$ 
**ENVIRONMENTAL SPECIFICATIONS**
**Temperature Range:** -55  $^{\circ}\text{C}$  to +125  $^{\circ}\text{C}$ 

(for higher temperature range, consult factory)

**Load Life:** less than 0.15 %, 1000 h

**DIMENSIONS** in inches (millimeters)

Schematic

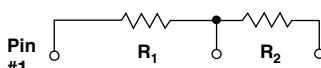


Figure 1

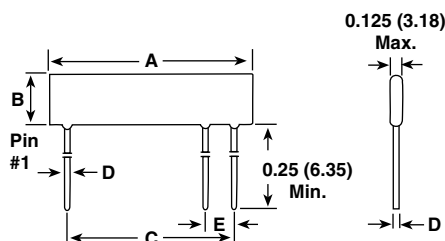
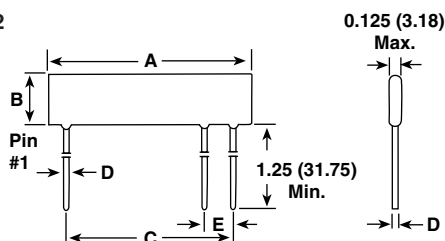


Figure 2



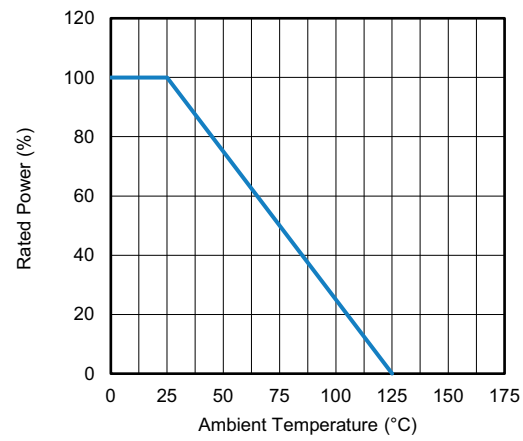
| MODEL                       | A<br>(LENGTH)                           | B<br>(HEIGHT)                           | C<br>(OVERALL<br>LEAD SPACING)          | D<br>(LEAD DIA.)                       | E<br>( $R_2$ LEAD SPACING)             |
|-----------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|----------------------------------------|----------------------------------------|
| TDA03, TDX03 <sup>(1)</sup> | 0.300 $\pm$ 0.030<br>(7.62 $\pm$ 0.76)  | 0.210 $\pm$ 0.021<br>(5.33 $\pm$ 0.53)  | 0.200 $\pm$ 0.020<br>(5.08 $\pm$ 0.51)  | 0.025 $\pm$ 0.002<br>(0.64 $\pm$ 0.05) | 0.100 $\pm$ 0.010<br>(2.54 $\pm$ 0.25) |
| TDA05, TDX05 <sup>(1)</sup> | 0.500 $\pm$ 0.050<br>(12.70 $\pm$ 1.27) | 0.300 $\pm$ 0.030<br>(7.62 $\pm$ 0.76)  | 0.400 $\pm$ 0.040<br>(10.16 $\pm$ 1.02) | 0.025 $\pm$ 0.002<br>(0.64 $\pm$ 0.05) | 0.100 $\pm$ 0.010<br>(2.54 $\pm$ 0.25) |
| TDA10, TDX10                | 1.00 $\pm$ 0.100<br>(25.40 $\pm$ 2.54)  | 0.350 $\pm$ 0.035<br>(8.89 $\pm$ 0.89)  | 0.900 $\pm$ 0.090<br>(22.86 $\pm$ 2.29) | 0.032 $\pm$ 0.002<br>(0.81 $\pm$ 0.05) | 0.200 $\pm$ 0.020<br>(5.08 $\pm$ 0.51) |
| TDA15, TDX15                | 1.50 $\pm$ 0.150<br>(38.10 $\pm$ 3.81)  | 0.350 $\pm$ 0.035<br>(8.89 $\pm$ 0.89)  | 1.40 $\pm$ 0.140<br>(35.56 $\pm$ 3.56)  | 0.032 $\pm$ 0.002<br>(0.81 $\pm$ 0.05) | 0.200 $\pm$ 0.020<br>(5.08 $\pm$ 0.51) |
| TDA20, TDX20                | 2.00 $\pm$ 0.200<br>(50.80 $\pm$ 5.08)  | 0.350 $\pm$ 0.035<br>(8.89 $\pm$ 0.89)  | 1.90 $\pm$ 0.190<br>(48.26 $\pm$ 4.83)  | 0.032 $\pm$ 0.002<br>(0.81 $\pm$ 0.05) | 0.200 $\pm$ 0.020<br>(5.08 $\pm$ 0.51) |
| TDA30, TDX30                | 3.00 $\pm$ 0.300<br>(76.20 $\pm$ 7.62)  | 0.400 $\pm$ 0.040<br>(10.16 $\pm$ 1.02) | 2.90 $\pm$ 0.290<br>(73.66 $\pm$ 7.37)  | 0.032 $\pm$ 0.002<br>(0.81 $\pm$ 0.05) | 0.200 $\pm$ 0.020<br>(5.08 $\pm$ 0.51) |

**Note**

- <sup>(1)</sup> Refer to Fig. 1 for TDA03, TDX03, TDA05 and TDX05 lead lengths



## DERATING





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