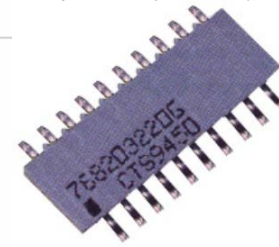




# 768 Series

## Surface Mount Resistor Network



### Features

- Surface Mount Gull Wing Package
- Solid Ceramic Construction
- Low Profile, Board to Network Clearance – 0.191mm ±0.064mm
- No Internal Dendrite Growth
- Meets EIA PDP 100 SOGN-0002 Outline
- Requires 30% Less Board Space Than Molded Products of the Same Power Rating
- Tape and Reel Packaging or Slide Pack

### RoHS Compliant in Accordance with EU Directive 2011/65/EU

- Lead-Free Termination Finish
- Exemption 7(c)-I, Electrical and electronic components containing lead [Pb] in glass

#### Part Weight:

- 14 Pin • 242.10mg
- 16 Pin • 276.70mg
- 20 Pin • 345.90mg

### Applications

- Telecom Infrastructure
- Optical Networking
- Wireless Networks
- Edge Routers
- Internet/Network Security
- Storage Area Networks
- Network Attached Storage
- Switches
- RAID Controllers

### Description

768 Series Resistor Networks are single packaged devices containing an array of homogeneous resistor elements. CTS network designs provide a smaller circuit footprint, excellent reliability, improved TCR tracking and resistor tolerance matching; while helping to save placement costs by reducing application component count.

### Ordering Information

| Model                                                                                                                                                               | Number of Pins          | Schematic                                                                                                                                                                                                                                       | Resistor Code | Resistor Tolerance            | RoHS Compliant | Packaging      |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------------------------|----------------|----------------|---------|------------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----------------------|----------------------------------------|------------------|------------------------------------------------------------------------------------------|------------------|------|------------|-----------|------|----------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------|-------|------------|-------|------------------|---|--------|---|-----|--|--|---|----------|---|-------|--|--|-------------------------------|--|---|------------------|--|--|--|--|
| 768                                                                                                                                                                 | 16                      | 3                                                                                                                                                                                                                                               | 103           | G                             | P              | TR13           |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| <table><tr><th>Code</th><th>Pin Count</th></tr><tr><td>14</td><td>14 Pins</td></tr><tr><td>16</td><td>16 Pins</td></tr><tr><td>20</td><td>20 Pins</td></tr></table> |                         | Code                                                                                                                                                                                                                                            | Pin Count     | 14                            | 14 Pins        | 16             | 16 Pins | 20               | 20 Pins | <table><tr><th>Code</th><th>Resistor Value *</th></tr><tr><td>103</td><td>10k ohm</td></tr><tr><td colspan="2">* See Addendum for Standard EIA Values</td></tr></table> |   | Code           | Resistor Value *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 103 | 10k ohm               | * See Addendum for Standard EIA Values |                  | <table><tr><th>Code</th><th>Compliance</th></tr><tr><td>P</td><td>RoHS</td></tr></table> |                  | Code | Compliance | P         | RoHS | <table><tr><th>Code</th><th>Packing</th></tr><tr><td>Blank</td><td>Slide Pack</td></tr><tr><td>TR13</td><td>Tape &amp; Reel, 13"</td></tr></table> | Code | Packing   | Blank | Slide Pack | TR13  | Tape & Reel, 13" |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| Code                                                                                                                                                                | Pin Count               |                                                                                                                                                                                                                                                 |               |                               |                |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| 14                                                                                                                                                                  | 14 Pins                 |                                                                                                                                                                                                                                                 |               |                               |                |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| 16                                                                                                                                                                  | 16 Pins                 |                                                                                                                                                                                                                                                 |               |                               |                |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| 20                                                                                                                                                                  | 20 Pins                 |                                                                                                                                                                                                                                                 |               |                               |                |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| Code                                                                                                                                                                | Resistor Value *        |                                                                                                                                                                                                                                                 |               |                               |                |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| 103                                                                                                                                                                 | 10k ohm                 |                                                                                                                                                                                                                                                 |               |                               |                |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| * See Addendum for Standard EIA Values                                                                                                                              |                         |                                                                                                                                                                                                                                                 |               |                               |                |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| Code                                                                                                                                                                | Compliance              |                                                                                                                                                                                                                                                 |               |                               |                |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| P                                                                                                                                                                   | RoHS                    |                                                                                                                                                                                                                                                 |               |                               |                |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| Code                                                                                                                                                                | Packing                 |                                                                                                                                                                                                                                                 |               |                               |                |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| Blank                                                                                                                                                               | Slide Pack              |                                                                                                                                                                                                                                                 |               |                               |                |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| TR13                                                                                                                                                                | Tape & Reel, 13"        |                                                                                                                                                                                                                                                 |               |                               |                |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
|                                                                                                                                                                     |                         | <table><tr><th>Code</th><th>Schematic Type</th></tr><tr><td>1</td><td>Bussed Circuit</td></tr><tr><td>3</td><td>Isolated Circuit</td></tr><tr><td>5</td><td>Dual Terminator Circuit</td></tr><tr><td>7</td><td>Ladder Circuit</td></tr></table> | Code          | Schematic Type                | 1              | Bussed Circuit | 3       | Isolated Circuit | 5       | Dual Terminator Circuit                                                                                                                                                 | 7 | Ladder Circuit | <table><tr><th colspan="2">Schematic Types 1 &amp; 3</th><th colspan="2">Schematic Type 5</th><th colspan="2">Schematic Type 7</th></tr><tr><th>Code</th><th>Tolerance</th><th>Code</th><th>Tolerance</th><th>Code</th><th>Tolerance</th></tr><tr><td>G</td><td>±2% [std]</td><td>Blank</td><td>±2%</td><td>F</td><td>±1 LSB</td></tr><tr><td>F</td><td>±1%</td><td></td><td></td><td>D</td><td>±0.5 LSB</td></tr><tr><td>D</td><td>±0.5%</td><td></td><td></td><td colspan="2">[LSB = Least Significant Bit]</td></tr><tr><td>J</td><td>±5%<sup>2</sup></td><td></td><td></td><td></td><td></td></tr></table> |     | Schematic Types 1 & 3 |                                        | Schematic Type 5 |                                                                                          | Schematic Type 7 |      | Code       | Tolerance | Code | Tolerance                                                                                                                                          | Code | Tolerance | G     | ±2% [std]  | Blank | ±2%              | F | ±1 LSB | F | ±1% |  |  | D | ±0.5 LSB | D | ±0.5% |  |  | [LSB = Least Significant Bit] |  | J | ±5% <sup>2</sup> |  |  |  |  |
| Code                                                                                                                                                                | Schematic Type          |                                                                                                                                                                                                                                                 |               |                               |                |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| 1                                                                                                                                                                   | Bussed Circuit          |                                                                                                                                                                                                                                                 |               |                               |                |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| 3                                                                                                                                                                   | Isolated Circuit        |                                                                                                                                                                                                                                                 |               |                               |                |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| 5                                                                                                                                                                   | Dual Terminator Circuit |                                                                                                                                                                                                                                                 |               |                               |                |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| 7                                                                                                                                                                   | Ladder Circuit          |                                                                                                                                                                                                                                                 |               |                               |                |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| Schematic Types 1 & 3                                                                                                                                               |                         | Schematic Type 5                                                                                                                                                                                                                                |               | Schematic Type 7              |                |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| Code                                                                                                                                                                | Tolerance               | Code                                                                                                                                                                                                                                            | Tolerance     | Code                          | Tolerance      |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| G                                                                                                                                                                   | ±2% [std]               | Blank                                                                                                                                                                                                                                           | ±2%           | F                             | ±1 LSB         |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| F                                                                                                                                                                   | ±1%                     |                                                                                                                                                                                                                                                 |               | D                             | ±0.5 LSB       |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| D                                                                                                                                                                   | ±0.5%                   |                                                                                                                                                                                                                                                 |               | [LSB = Least Significant Bit] |                |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |
| J                                                                                                                                                                   | ±5% <sup>2</sup>        |                                                                                                                                                                                                                                                 |               |                               |                |                |         |                  |         |                                                                                                                                                                         |   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |                       |                                        |                  |                                                                                          |                  |      |            |           |      |                                                                                                                                                    |      |           |       |            |       |                  |   |        |   |     |  |  |   |          |   |       |  |  |                               |  |   |                  |  |  |  |  |

#### Notes:

1. No dashes or spaces to appear in part number.
2. Not supported per PCN ECP-3200029. Use code "G" as standard platform tolerance.

**Not all performance combinations and resistor values may be available.**  
**Contact your local CTS Representative or CTS Customer Service for availability.**

This product is specified for use only in standard commercial applications. Supplier disclaims all express and implied warranties and liability in connection with any use of this product in any non-commercial applications or in any application that may expose the product to conditions that are outside of the tolerances provided in its specification.



## Electrical & Environmental Specifications

### Operating Conditions

| Resistance Range [ohm] | Resistance Tolerance [%] <sup>1</sup>               | Operating Temperature Range | Temperature Coefficient                                                     | Dielectric Strength | Maximum Operating Voltage <sup>2</sup> |
|------------------------|-----------------------------------------------------|-----------------------------|-----------------------------------------------------------------------------|---------------------|----------------------------------------|
| 10 - 1M                | ±2% Std.<br>or<br>0.5 ohm<br>[whichever is greater] | -55°C to +125°C             | ±200ppm/°C<br>[10 ohms - 99 ohms]<br><br>±100ppm/°C<br>[100 ohms - 1M ohms] | 100V <sub>AC</sub>  | 50V                                    |

1. See Ordering Information for other options available.

2. Not to exceed rated power.

### Power Rating

| Temperature | 14 Pin | 16 Pin | 20 Pin |
|-------------|--------|--------|--------|
| @ +25°C     | 2.0W   | 2.3W   | 3.0    |
| @ +70°C     | 1.3W   | 1.5W   | 2.0    |

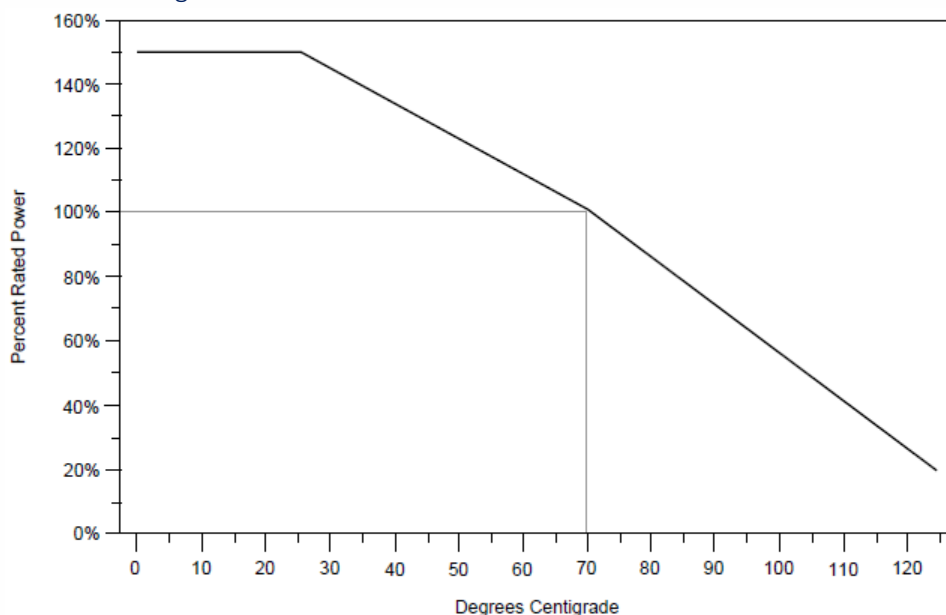
1. Total network power.

### Maximum Resistor Power

| Schematic | 1     | 3     | 5     | 7     |
|-----------|-------|-------|-------|-------|
| @ +25°C   | 0.15W | 0.30W | 0.15W | 0.15W |
| @ +70°C   | 0.10W | 0.20W | 0.10W | 0.10W |

1. Not to exceed total network power.

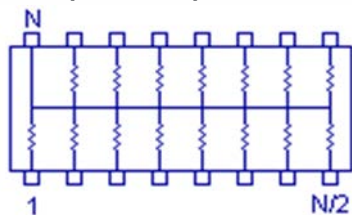
### Power Derating Curve



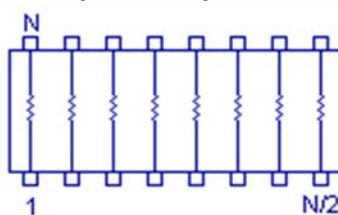
## Electrical & Environmental Specifications

### Circuit Types

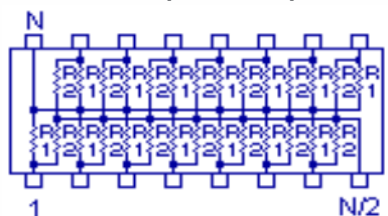
Bussed [Schematic 1]



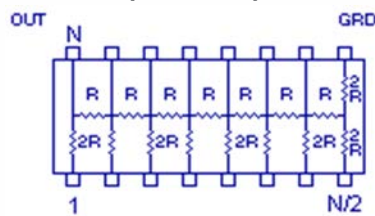
Isolated [Schematic 3]



Dual Terminator [Schematic 5]



R/2R Ladder [Schematic 7]



Note: Pin N is common to  $R_1$  and Pin N/2 common to  $R_2$ .

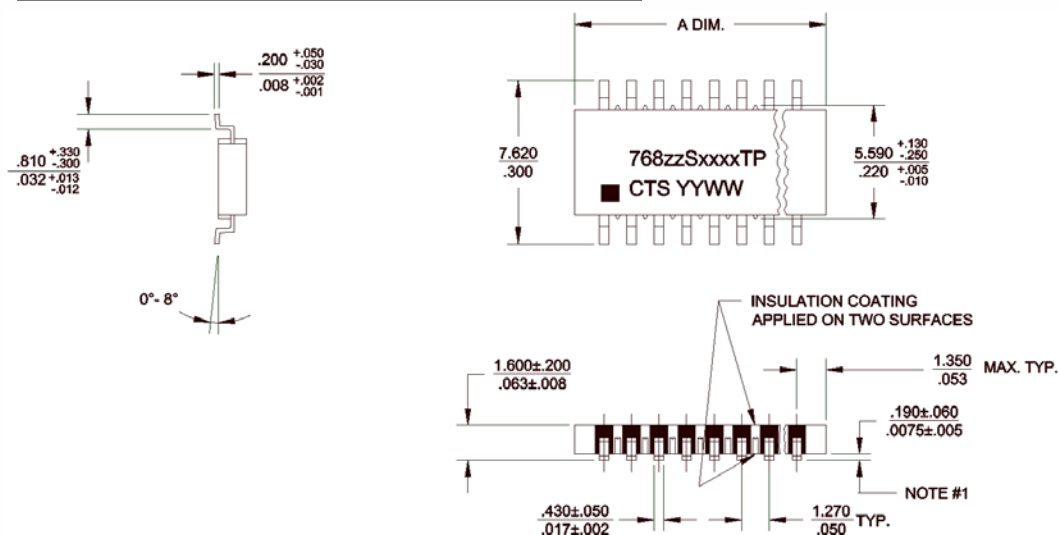
### Environmental Parameters

| Test                      | Maximum<br>Delta R [%] | MIL-STD-202<br>Method | Test Description                                            |
|---------------------------|------------------------|-----------------------|-------------------------------------------------------------|
| Thermal Cycle             | 0.25                   | 107 Condition B       | 5 cycles -65°C to +125°C                                    |
| Short Time Overload       | 0.25                   |                       | 2½ times rated working voltage for 5 seconds [100V maximum] |
| Moisture Resistance       | 0.50                   | 106                   | 240 hours, 0.1 rated load, -10°C to +65°C, 90% RH           |
| Load Humidity             | 1.00                   |                       | 1,000 hours, 0.1 rated load, +70°C, 85% - 92% RH            |
| High Temperture Exposure  | 1.00                   |                       | 240 hours @ +125°C, no load                                 |
| Load Life                 | 1.00                   | 108 Condition F       | 2,000 hours @ +70°C, rated load                             |
| Resistance to Solder Heat | 0.25                   |                       | 30 seconds @ +218°C, dwell                                  |
| Mechanical Shock          | 0.25                   | 213 Condition I       | 100g, 1m second, 3 shocks each plane                        |
| Vibration                 | 0.25                   | 204 Condition D       | 20g, 10Hz - 2,000Hz, 4 houes per plane                      |
| Terminal Strength         | 0.25                   |                       | 0.9kg pull, 30 seconds; two 45° bends                       |
| Low Temperature Storage   | 0.25                   |                       | 24 hours @ -65°C, no load                                   |
| Low Temperature Operation | 0.25                   |                       | 45 minutes @ -65°C, full load                               |
| Flammability              | N/A                    |                       | 94V-0                                                       |
| Non-Fungus                | Pass                   | ---                   | MIL-STD-810C                                                |
| Resistance to Solvents    | Pass                   |                       | Isopropyl alcohol, Freon TMC                                |
| Solderability             | Pass                   |                       | RMA Flux, +230°C, 5 seconds dip, 95% coverage               |

## Mechanical Specifications

### Package Drawing

| Package | "A" Dimension |              |
|---------|---------------|--------------|
|         | mm            | inch         |
| 14 Pin  | 9.91 ±0.25    | 0.390 ±0.010 |
| 16 Pin  | 11.18 ±0.25   | 0.440 ±0.010 |
| 20 Pin  | 13.70 ±0.25   | 0.540 ±0.010 |



### Marking Information

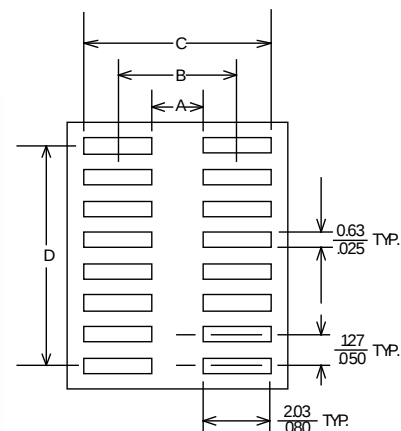
1. 768 – Product Series.
2. zz – Pin count, 14, 16 or 20.
3. S – Schematic type, 1, 3, 5 or 7.
4. xxxx – Resistance value code, 3 or 4 digits.
5. T – Resistor tolerance code; G, F or D. Leave blank for Schematic Code 5.
6. P – RoHS compliant.
7. ■ – Pin 1 identifier.
8. CTS – Manufacturer.
9. YYWW – Date Code: YY – year, WW – week.

### Notes

1. Lead Co-Planarity - 0.10mm maximum [0.004in.].
2. General Tolerances - ±0.25mm [±0.010in.].
3. Lead termination (e1). Barrier plating is nickel [Ni] with tin/silver/copper [Sn Ag Cu] finish.
4. Reflow conditions per JEDEC-J-STD-020; +260°C maximum, 30 seconds.

### Recommended Solder Pad Layout

| Package |      | Dimensions |      |      |       |
|---------|------|------------|------|------|-------|
|         |      | A          | B    | C    | D     |
| 14 Pin  | mm   | 5.34       | 7.37 | 9.40 | 7.60  |
|         | inch | 0.21       | 0.29 | 0.37 | 0.30  |
| 16 Pin  | mm   | 5.34       | 7.37 | 9.40 | 8.90  |
|         | inch | 0.21       | 0.29 | 0.37 | 0.35  |
| 20 Pin  | mm   | 5.34       | 7.37 | 9.40 | 11.40 |
|         | inch | 0.21       | 0.29 | 0.37 | 0.45  |



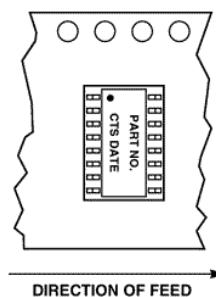


## Packaging

### Tape and Reel Information

| Reel Diameter<br>330mm [13"] | 14 Pin<br>Package | 16 Pin<br>Package | 20 Pin<br>Package |
|------------------------------|-------------------|-------------------|-------------------|
| Parts Per Reel               | 2,000             | 2,000             | 2,000             |
| Pitch                        | 12mm              | 12mm              | 12mm              |
| Carrier Width                | 24mm              | 24mm              | 24mm              |
| Material                     | Plastic           | Plastic           | Plastic           |

1. See Ordering Information for packaging code indicator.



### Plastic Tube

| Slide Pack     | 14 Pin<br>Package | 16 Pin<br>Package | 20 Pin<br>Package |
|----------------|-------------------|-------------------|-------------------|
| Tube Length    | 508mm             | 508mm             | 508mm             |
| Parts Per Tube | 48                | 43                | 35                |



## Addendum

### Standard EIA Codes and Resistor Values – E-24 [3-Digit Resistor Code for G, F & D Tolerances]

| CODE              | OHMS | CODE | OHMS | CODE | OHMS  | CODE | OHMS   | CODE | OHMS    | CODE | OHMS      |
|-------------------|------|------|------|------|-------|------|--------|------|---------|------|-----------|
| 000X <sup>1</sup> | 0    | 680  | 68   | 511  | 510   | 392  | 3,900  | 303  | 30,000  | 224  | 220,000   |
| 100               | 10   | 750  | 75   | 561  | 560   | 432  | 4,300  | 333  | 33,000  | 244  | 240,000   |
| 110               | 11   | 820  | 82   | 621  | 620   | 472  | 4,700  | 363  | 36,000  | 274  | 270,000   |
| 120               | 12   | 910  | 91   | 681  | 680   | 512  | 5,100  | 393  | 39,000  | 304  | 300,000   |
| 130               | 13   | 101  | 100  | 751  | 750   | 562  | 5,600  | 433  | 43,000  | 334  | 330,000   |
| 150               | 15   | 111  | 110  | 821  | 820   | 622  | 6,200  | 473  | 47,000  | 364  | 360,000   |
| 160               | 16   | 121  | 120  | 911  | 910   | 682  | 6,800  | 513  | 51,000  | 394  | 390,000   |
| 180               | 18   | 131  | 130  | 102  | 1,000 | 752  | 7,500  | 563  | 56,000  | 434  | 430,000   |
| 200               | 20   | 151  | 150  | 112  | 1,100 | 822  | 8,200  | 623  | 62,000  | 474  | 470,000   |
| 220               | 22   | 161  | 160  | 122  | 1,200 | 912  | 9,100  | 683  | 68,000  | 514  | 510,000   |
| 240               | 24   | 181  | 180  | 132  | 1,300 | 103  | 10,000 | 753  | 75,000  | 564  | 560,000   |
| 270               | 27   | 201  | 200  | 152  | 1,500 | 113  | 11,000 | 823  | 82,000  | 624  | 620,000   |
| 300               | 30   | 221  | 220  | 162  | 1,600 | 123  | 12,000 | 913  | 91,000  | 684  | 680,000   |
| 330               | 33   | 241  | 240  | 182  | 1,800 | 133  | 13,000 | 104  | 100,000 | 754  | 750,000   |
| 360               | 36   | 271  | 270  | 202  | 2,000 | 153  | 15,000 | 114  | 110,000 | 824  | 820,000   |
| 390               | 39   | 301  | 300  | 222  | 2,200 | 163  | 16,000 | 124  | 120,000 | 914  | 910,000   |
| 430               | 43   | 331  | 330  | 242  | 2,400 | 183  | 18,000 | 134  | 130,000 | 105  | 1,000,000 |
| 470               | 47   | 361  | 360  | 272  | 2,700 | 203  | 20,000 | 154  | 150,000 |      |           |
| 510               | 51   | 391  | 390  | 302  | 3,000 | 223  | 22,000 | 164  | 160,000 |      |           |
| 560               | 56   | 431  | 430  | 332  | 3,300 | 243  | 24,000 | 184  | 180,000 |      |           |
| 620               | 62   | 471  | 470  | 362  | 3,600 | 273  | 27,000 | 204  | 200,000 |      |           |

1. Include "X" in tolerance code.



## Addendum

### Dual Terminator Resistor Values [Schematic 5 - 4-Digit Resistor Code]

The 766 Series part number includes the EIA Code value of the Thevenin equivalent resistances of  $R_1$  and  $R_2$ .

The Thevenin equivalent resistance is calculated using the following formula;  $R_{EQ} = R_1 * R_2 / (R_1 + R_2)$ .

| R1<br>[ohms] | R2<br>[ohms] | Thevenin<br>Equivalent<br>[ohms] | CTS<br>Resistor<br>Code | R1<br>[ohms] | R2<br>[ohms] | Thevenin<br>Equivalent<br>[ohms] | CTS<br>Resistor<br>Code | R1<br>[ohms] | R2<br>[ohms] | Thevenin<br>Equivalent<br>[ohms] | CTS<br>Resistor<br>Code | R1<br>[ohms] | R2<br>[ohms] | Thevenin<br>Equivalent<br>[ohms] | CTS<br>Resistor<br>Code |
|--------------|--------------|----------------------------------|-------------------------|--------------|--------------|----------------------------------|-------------------------|--------------|--------------|----------------------------------|-------------------------|--------------|--------------|----------------------------------|-------------------------|
| 22           | 50           | 15                               | 150A                    | 118          | 178          | 71                               | 710A                    | 240          | 620          | 173                              | 171C                    | 680          | 1,500        | 468                              | 471A                    |
| 25           | 50           | 17                               | 170A                    | 120          | 120          | 60                               | 600B                    | 250          | 250          | 125                              | 131B                    | 715          | 240          | 180                              | 181B                    |
| 30           | 50           | 19                               | 190A                    | 120          | 150          | 67                               | 670C                    | 260          | 162          | 100                              | 101G                    | 750          | 750          | 375                              | 381A                    |
| 30           | 620          | 29                               | 290A                    | 120          | 180          | 72                               | 720A                    | 270          | 130          | 88                               | 880B                    | 750          | 2,300        | 566                              | 571A                    |
| 33           | 680          | 31                               | 310A                    | 120          | 200          | 75                               | 750B                    | 270          | 180          | 108                              | 111C                    | 780          | 390          | 260                              | 261A                    |
| 33           | 4,700        | 33                               | 330A                    | 120          | 220          | 78                               | 780B                    | 270          | 270          | 135                              | 141A                    | 820          | 560          | 333                              | 331B                    |
| 36           | 620          | 34                               | 340A                    | 121          | 195          | 75                               | 750C                    | 270          | 470          | 171                              | 171A                    | 1,000        | 1,000        | 500                              | 501A                    |
| 38           | 125          | 29                               | 290B                    | 122          | 253          | 82                               | 820A                    | 271          | 131          | 88                               | 880A                    | 1,000        | 1,500        | 600                              | 601B                    |
| 43           | 620          | 40                               | 400A                    | 130          | 210          | 80                               | 800A                    | 330          | 220          | 132                              | 131D                    | 1,000        | 2,000        | 667                              | 671A                    |
| 47           | 68           | 28                               | 280A                    | 133          | 154          | 71                               | 710B                    | 330          | 330          | 165                              | 171B                    | 1,000        | 2,200        | 688                              | 691A                    |
| 47           | 270          | 40                               | 400B                    | 150          | 150          | 75                               | 750A                    | 330          | 390          | 179                              | 181A                    | 1,000        | 3,300        | 767                              | 771A                    |
| 65           | 90           | 38                               | 380A                    | 150          | 180          | 82                               | 820B                    | 330          | 470          | 194                              | 191A                    | 1,100        | 820          | 470                              | 471B                    |
| 68           | 189          | 50                               | 500B                    | 150          | 1,000        | 130                              | 131E                    | 330          | 680          | 222                              | 221A                    | 1,100        | 2,200        | 733                              | 731A                    |
| 75           | 620          | 67                               | 670A                    | 160          | 240          | 96                               | 960A                    | 330          | 3,900        | 304                              | 301A                    | 1,200        | 1,200        | 600                              | 601A                    |
| 80           | 220          | 59                               | 590A                    | 160          | 260          | 99                               | 990A                    | 360          | 390          | 187                              | 191B                    | 1,500        | 1,500        | 750                              | 751A                    |
| 81           | 130          | 50                               | 500A                    | 160          | 270          | 100                              | 101D                    | 360          | 600          | 225                              | 231A                    | 1,500        | 3,300        | 1,031                            | 102A                    |
| 81           | 220          | 59                               | 600C                    | 160          | 440          | 117                              | 121D                    | 360          | 720          | 240                              | 241B                    | 2,000        | 1,000        | 667                              | 671B                    |
| 81           | 330          | 65                               | 650B                    | 162          | 260          | 100                              | 101B                    | 390          | 620          | 239                              | 241A                    | 2,000        | 2,000        | 1,000                            | 102B                    |
| 81           | 2,200        | 78                               | 780A                    | 180          | 220          | 99                               | 101A                    | 400          | 200          | 133                              | 131F                    | 2,200        | 3,300        | 1,320                            | 132A                    |
| 82           | 120          | 49                               | 490A                    | 180          | 240          | 103                              | 101F                    | 400          | 600          | 240                              | 241C                    | 2,200        | 4,400        | 1,467                            | 152A                    |
| 82           | 130          | 50                               | 500D                    | 180          | 270          | 108                              | 111A                    | 470          | 330          | 194                              | 191C                    | 2,200        | 5,600        | 1,579                            | 162A                    |
| 83           | 128          | 50                               | 500C                    | 180          | 300          | 113                              | 111B                    | 470          | 680          | 278                              | 281C                    | 3,000        | 2,000        | 1,200                            | 122A                    |
| 95           | 156          | 59                               | 590B                    | 180          | 390          | 123                              | 121A                    | 470          | 940          | 313                              | 311A                    | 3,000        | 6,200        | 2,022                            | 202A                    |
| 100          | 75           | 43                               | 430A                    | 180          | 470          | 130                              | 131C                    | 470          | 1,000        | 320                              | 321A                    | 3,300        | 4,700        | 1,939                            | 192A                    |
| 100          | 82           | 45                               | 450A                    | 182          | 245          | 104                              | 101E                    | 500          | 500          | 250                              | 251A                    | 3,900        | 3,300        | 1,788                            | 182A                    |
| 100          | 100          | 50                               | 500E                    | 200          | 100          | 67                               | 670D                    | 510          | 760          | 305                              | 311B                    | 4,400        | 2,200        | 1,467                            | 152B                    |
| 100          | 150          | 60                               | 600A                    | 200          | 270          | 115                              | 121C                    | 560          | 390          | 230                              | 231B                    | 4,700        | 4,700        | 2,350                            | 242A                    |
| 100          | 175          | 64                               | 640A                    | 200          | 1,500        | 176                              | 171D                    | 560          | 820          | 333                              | 331A                    | 4,700        | 22,000       | 3,873                            | 392A                    |
| 100          | 200          | 67                               | 670B                    | 220          | 220          | 110                              | 111D                    | 560          | 910          | 347                              | 351A                    | 5,000        | 5,000        | 2,500                            | 252A                    |
| 100          | 220          | 69                               | 690A                    | 220          | 270          | 121                              | 121B                    | 560          | 1,000        | 359                              | 361A                    | 6,800        | 22,000       | 5,194                            | 522A                    |
| 100          | 430          | 81                               | 810A                    | 220          | 330          | 132                              | 131A                    | 620          | 820          | 353                              | 351B                    | 10,000       | 20,000       | 6,667                            | 672A                    |
| 106          | 169          | 65                               | 650A                    | 220          | 470          | 150                              | 151A                    | 620          | 910          | 369                              | 371A                    | 10,000       | 51,000       | 8,361                            | 842A                    |
| 110          | 91           | 50                               | 500F                    | 220          | 1,800        | 196                              | 201A                    | 660          | 990          | 396                              | 401B                    | 50,000       | 100,000      | 33,333                           | 333A                    |
| 110          | 220          | 73                               | 730A                    | 240          | 170          | 100                              | 101C                    | 680          | 1,000        | 405                              | 401A                    | 360,000      | 390,000      | 187,200                          | 194A                    |

1. Resistor tolerances are  $\pm 2\%$ .

2. Suffix letter in CTS Code has no significance, assigned in sequential order.

# Mouser Electronics

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