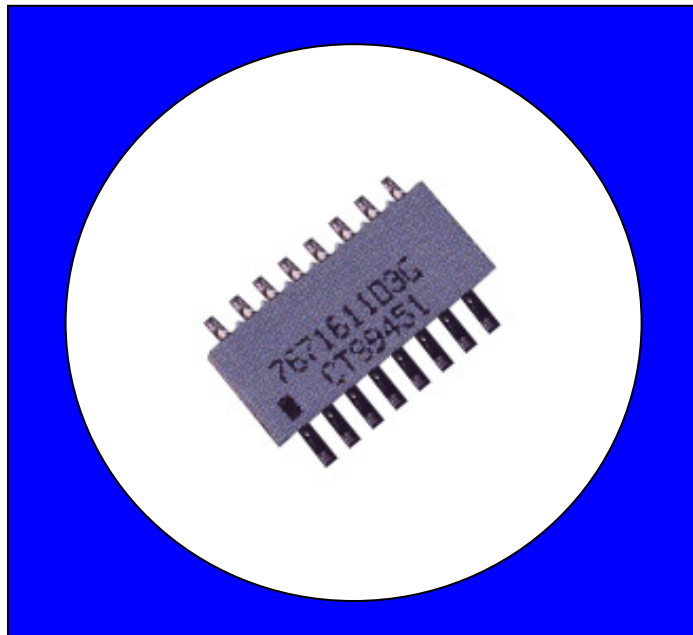


## Features

- Medium Body Design
- Solid Ceramic Construction
- No Internal Dendrite Growth
- Meets EIA PDP SOGN-0001 Outline
- Packaged in Tape & Reel or Slide Packs
- Application Specific Circuits Are Available
- Compatible With Reflow Solder Process
- RoHS Compliant



### Resistance Tolerance:

Standard:  $\pm 2\%$  or  $0.5\Omega$  (whichever is greater)  
 Special:  $\pm 0.25\%$  or  $0.3\Omega$  (whichever is greater)

### Operating Temperature Range:

$-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$

### Temperature Coefficient:

Standard:  $100\Omega$  to  $1\text{ Meg}\Omega$   
 $100\text{PPM}/^{\circ}\text{C}$  typical  
 $10\Omega$  to  $99\Omega$   
 $\pm 200\text{PPM}/^{\circ}\text{C}$  typical

### Resistance Range:

Standard:  $10\Omega$  to  $1\text{ Meg}\Omega$

### Dielectric Strength:

$100\text{ VAC}$

### Maximum Operating Voltage:

$50\text{V}$  not to exceed rated power

### Power Rating (Total Network Power):

|                        | 14 Pin | 16 Pin |
|------------------------|--------|--------|
| @ $25^{\circ}\text{C}$ | 2.0w   | 2.3w   |
| @ $70^{\circ}\text{C}$ | 1.3w   | 1.5w   |

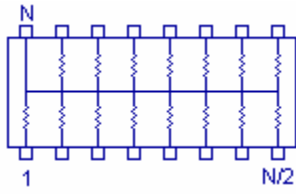
### Maximum Resistor Power:

(Not to Exceed Total Network Power)

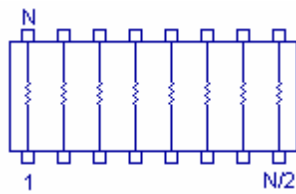
| Schematic              | 1     | 3     | 5     | 7     |
|------------------------|-------|-------|-------|-------|
| @ $25^{\circ}\text{C}$ | 0.15w | 0.30w | 0.15w | 0.15w |
| @ $70^{\circ}\text{C}$ | 0.10w | 0.20w | 0.10w | 0.10w |

## Types of Circuits

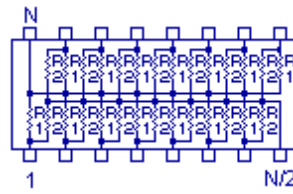
Bussed (Schematic 1)



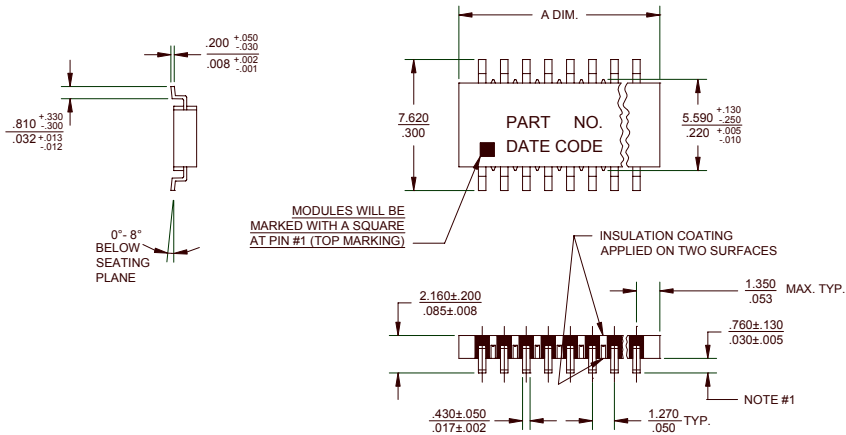
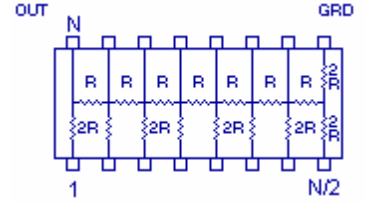
Isolated (Schematic 3)



Dual Terminator (Schematic 5)

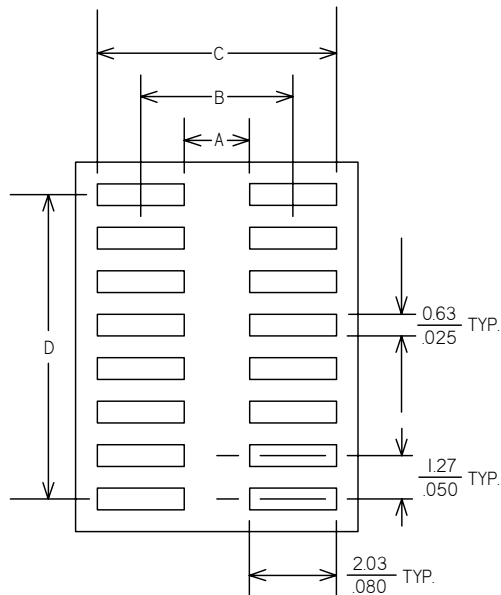


R/2R Ladder (Schematic 7)



| No. of Pins                            | "A" Dimension |              |
|----------------------------------------|---------------|--------------|
|                                        | mm            | in.          |
| 14                                     | 9.91 ±0.25    | 0.390 ±0.010 |
| 16                                     | 11.18 ±0.25   | 0.440 ±0.010 |
| Notes                                  |               |              |
| 1. Lead COPLANARITY                    |               | mm 0.10 MAX  |
|                                        |               | in. 0.004    |
| General Tolerances                     |               | mm ±0.25     |
|                                        |               | in. ±0.010   |
| mm & in. DIMENSIONS ARE NOT EQUIVALENT |               |              |

## Land Patterns



| LEAD COUNT |     | A    | B    | C    | D    |
|------------|-----|------|------|------|------|
| 14P        | mm  | 5.34 | 7.37 | 9.40 | 7.60 |
|            | in. | 0.21 | 0.29 | 0.37 | 0.30 |
| 16P        | mm  | 5.34 | 7.37 | 9.40 | 8.90 |
|            | in. | 0.21 | 0.29 | 0.37 | 0.35 |

## Standard Resistor Values & EIA Code

| Ohms | Code | Ohms | Code | Ohms | Code | Ohms | Code | Ohms | Code | Ohms | Code |
|------|------|------|------|------|------|------|------|------|------|------|------|
| 0    | 000X | 68   | 680  | 470  | 471  | 3.3K | 332  | 27K  | 273  | 220K | 224  |
| 10   | 100  | 75   | 750  | 510  | 511  | 3.9K | 392  | 33K  | 333  | 270K | 274  |
| 12   | 120  | 82   | 820  | 560  | 561  | 4.7K | 472  | 39K  | 393  | 330K | 334  |
| 15   | 150  | 100  | 101  | 680  | 681  | 5.1K | 512  | 47K  | 473  | 390K | 394  |
| 18   | 180  | 110  | 111  | 820  | 821  | 5.6K | 562  | 51K  | 513  | 470K | 474  |
| 22   | 220  | 120  | 121  | 1K   | 102  | 6.8K | 682  | 56K  | 563  | 510K | 514  |
| 27   | 270  | 150  | 151  | 1.2K | 122  | 8.2K | 822  | 68K  | 683  | 560K | 564  |
| 33   | 330  | 180  | 181  | 1.5K | 152  | 10K  | 103  | 82K  | 823  | 680K | 684  |
| 39   | 390  | 220  | 221  | 1.8K | 182  | 12K  | 123  | 100K | 104  | 820K | 824  |
| 47   | 470  | 270  | 271  | 2.0K | 202  | 15K  | 153  | 120K | 124  | 1M   | 105  |
| 51   | 510  | 330  | 331  | 2.2K | 222  | 18K  | 183  | 150K | 154  |      |      |
| 56   | 560  | 390  | 391  | 2.7K | 272  | 22K  | 223  | 180K | 184  |      |      |

### Dual Terminator Resistor Values

The Series 767 part number includes the EIA Code value of the Thevenin equivalent resistances of R1 and R2. The Thevenin equivalent resistance is calculated in the following way: The suffix letter relates only to the sequence of variations that equal the same equivalent resistance. Reference Thevenin Equivalent Resistance Chart

$$R_{eq} = R_1 R_2 / (R_1 + R_2)$$

| Example:   |             |             |              |
|------------|-------------|-------------|--------------|
| 767145191A | R1=330 Ohms | R2=470 Ohms | Req=194 Ohms |

Pin N/2 is common to R2 and Pin N is common to R1 on CTS Series 767.

### Thevenin Equivalent Resistance Chart

| R1   | R2   | Thevenin Equivalent | CTS Code | R1   | R2  | Thevenin Equivalent | CTS Code |
|------|------|---------------------|----------|------|-----|---------------------|----------|
| Ohms |      |                     |          | Ohms |     |                     |          |
| 25   | 50   | 17 ohm              | 150A     | 110  | 220 | 73 ohm              | 730A     |
| 30   | 50   | 19 ohm              | 190A     | 118  | 178 | 71 ohm              | 710A     |
| 30   | 620  | 29 ohm              | 290A     | 120  | 200 | 75 ohm              | 750B     |
| 33   | 4.7K | 33 ohm              | 330A     | 120  | 180 | 72 ohm              | 720A     |
| 36   | 620  | 34 ohm              | 340A     | 120  | 120 | 60 ohm              | 600B     |
| 43   | 620  | 40 ohm              | 400A     | 150  | 150 | 75 ohm              | 750A     |
| 68   | 189  | 50 ohm              | 500B     | 160  | 260 | 99 ohm              | 990A     |
| 75   | 620  | 67 ohm              | 670A     | 160  | 240 | 96 ohm              | 960A     |
| 80   | 220  | 59 ohm              | 590A     | 160  | 270 | 100 ohm             | 101D     |
| 81   | 130  | 50 ohm              | 500A     | 162  | 260 | 100 ohm             | 101B     |
| 81   | 2.2K | 78 ohm              | 780A     | 180  | 300 | 113 ohm             | 111B     |
| 100  | 200  | 67 ohm              | 670B     | 180  | 470 | 130 ohm             | 131C     |
| 100  | 430  | 81 ohm              | 810A     | 180  | 390 | 123 ohm             | 121A     |
| 100  | 150  | 60 ohm              | 600A     | 180  | 270 | 108 ohm             | 111A     |
| 106  | 169  | 65 ohm              | 650A     | 180  | 220 | 99 ohm              | 101A     |

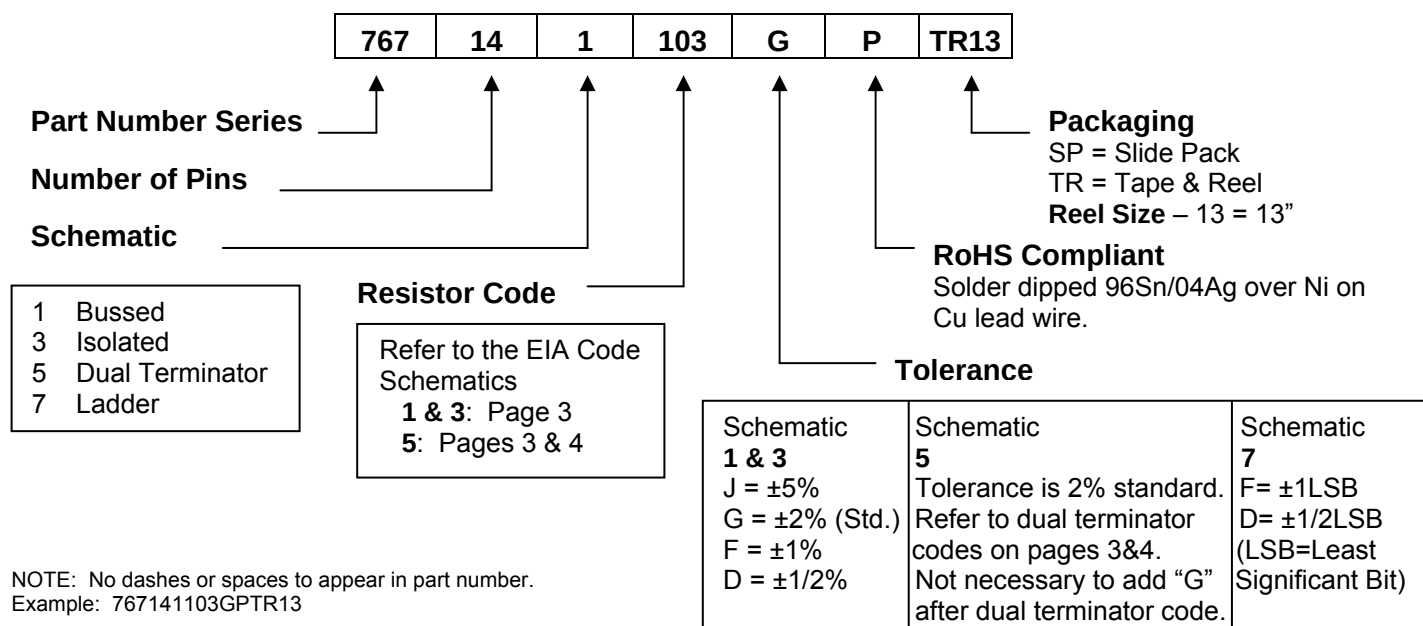
(Cont.)

## (Cont.) Thevenin Equivalent Resistance Chart

| R1   | R2   | Thevenin Equivalent | CTS Code | R1   | R2   | Thevenin Equivalent | CTS Code |
|------|------|---------------------|----------|------|------|---------------------|----------|
| Ohms |      |                     |          | Ohms |      |                     |          |
| 200  | 1.5K | 176 ohm             | 171D     | 560  | 1K   | 359 ohm             | 361A     |
| 220  | 330  | 132 ohm             | 131A     | 680  | 1K   | 405 ohm             | 401A     |
| 220  | 270  | 121 ohm             | 121B     | 750  | 750  | 375 ohm             | 381A     |
| 220  | 220  | 110 ohm             | 111D     | 750  | 2.3K | 566 ohm             | 571A     |
| 240  | 170  | 100 ohm             | 101C     | 1K   | 3.3K | 767 ohm             | 771A     |
| 240  | 620  | 173 ohm             | 171C     | 1K   | 2K   | 667 ohm             | 671A     |
| 250  | 250  | 125 ohm             | 131B     | 1.1K | 2.2K | 733 ohm             | 731A     |
| 270  | 470  | 171 ohm             | 171A     | 1.2K | 1.2K | 600 ohm             | 601A     |
| 270  | 180  | 108 ohm             | 111C     | 1.5K | 1.5K | 750 ohm             | 751A     |
| 271  | 131  | 88 ohm              | 880A     | 1.5K | 3.3K | 1031 ohm            | 102A     |
| 330  | 470  | 194 ohm             | 191A     | 2K   | 2K   | 1000 ohm            | 102B     |
| 330  | 680  | 222 ohm             | 221A     | 2.2K | 5.6K | 1579 ohm            | 162A     |
| 330  | 390  | 179 ohm             | 181A     | 2.2K | 4.4K | 1467 ohm            | 152A     |
| 330  | 220  | 132 ohm             | 131D     | 2.2K | 3.3K | 1320 ohm            | 132A     |
| 330  | 330  | 165 ohm             | 171B     | 3K   | 6.2K | 2022 ohm            | 202A     |
| 360  | 720  | 240 ohm             | 241B     | 3K   | 2K   | 1200 ohm            | 122A     |
| 360  | 600  | 225 ohm             | 231A     | 3.3K | 4.7K | 1939 ohm            | 192A     |
| 390  | 620  | 239 ohm             | 241A     | 3.9K | 3.3K | 1788 ohm            | 182A     |
| 470  | 1K   | 320 ohm             | 321A     | 4.7K | 22K  | 3873 ohm            | 392A     |
| 470  | 680  | 278 ohm             | 281A     | 5K   | 5K   | 2500 ohm            | 252A     |
| 470  | 940  | 313 ohm             | 311A     | 6.8K | 22K  | 5194 ohm            | 522A     |
| 500  | 500  | 250 ohm             | 251A     | 10K  | 51K  | 8361 ohm            | 842A     |
| 560  | 910  | 347 ohm             | 351A     | 50K  | 100K | 33,333 ohm          | 333A     |

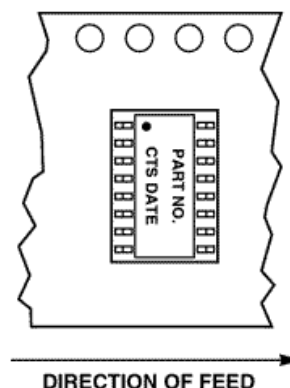
1. All tolerances +/-2%. 2. Other values available on request. 3. Suffix letter has no significance - assigned in sequential order.

### How to Order



## Packaging

| Tape & Reel      | 14P   | 16P   |
|------------------|-------|-------|
| Tape width       | 24mm  | 24mm  |
| Tape pitch       | 12mm  | 12mm  |
| Reel diameter    | 13"   | 13"   |
| #parts/reel      | 2,000 | 2,000 |
| Slide Packs      |       |       |
| Tube length      | 20"   | 20"   |
| #parts/slide pac | 48    | 43    |



## Environmental Performance Specifications

| Test                      | Max. % Delta R | Mil. Std. 202 Method | Test Cond. | Test Description                                  |
|---------------------------|----------------|----------------------|------------|---------------------------------------------------|
| Thermal Cycling           | 0.25%          | 107                  | B          | 5 cycles, -65°C to +125°C                         |
| Short Time Overload       | 0.25%          |                      |            | 2 1/2 x rated voltage, 5 sec (100V Max.)          |
| Moisture Resistance       | 0.5%           | 106                  |            | 240 hours, 0.1 rated load, -10°C to +65°C, 90% RH |
| Load Humidity             | 1.0%           |                      |            | 1000 hours, 0.1 rated load, 70°C, 85-92% RH       |
| High Temp Exposure        | 1.0%           |                      |            | 240 hours, no load, @ 125°C                       |
| Load Life                 | 1.0%           | 108                  | F          | 2000 hours @ 70°C rated load                      |
| Resistance to Solder Heat | 0.25%          |                      |            | 30 seconds @ 218°C, dwell                         |
| Mechanical Shock          | 0.25%          | 213                  | I          | 100g, 1 msec., 3 shocks each plane                |
| Vibration                 | 0.25%          | 204                  | D          | 20g, 10-2000Hz, 4 hours/plane                     |
| Terminal Strength         | 0.25%          |                      |            | 0.9 Kg. Pull, 30 sec., two 45° bends              |
| Low Temp Storage          | 0.25%          |                      |            | 24 hours @ -65°C, no load                         |
| Low Temp Operation        | 0.25%          |                      |            | 45 min @ -65°C, full load                         |
| Flammability              | N/A            |                      |            | 94V-0                                             |
| Non-Fungus                | Pass           |                      |            | per MIL-STD 810C                                  |
| Resistance to Solvents    | Pass           |                      |            | Isopropyl alcohol                                 |
| Solderability             | Pass           |                      |            | RMA Flux, 230°C, 5 seconds dip, 95% coverage      |