## 100 & 200 Series

#### **Bulk Ceramic Axial Lead Resistors**

100 & 200 Series Axial Leaded Non-Inductive Bulk Ceramic Resistors provide excellent performance where high peak power or high-energy pulses must be handled in a small size. The advantage of the bulk construction is that it produces an inherently noninductive resistor; and it allows energy and power to be uniformly distributed through the entire ceramic resistor body — there is no film or wire to fail. We offer a full line of rugged, reliable ceramic resistors - including custom designs. Three distinctly different ceramic materials are available in each size to afford the designer with unique components to meet the most demanding requirements.

As alternatives to hard to find carbon composition resistors, composition resistors can be used as drop-in replacements for 1 and 2 watt sizes. Much larger sizes, up to 70 watts in a single component, are available for new or re-designs where an array of smaller resistors may have been previously required.



#### FEATURES

- · Non-inductive "bulk ceramic" resistor
- Uniform distribution of energy throughout resistor body
- Replacement of Carbon Composition Resistors
- Large peak energy in small size
- High power dissipation (Type SP)
- High voltage and energy absorption (Type AS)
- Through-hole or post mountable

#### MATERIAL TYPES

#### TYPE SP

Withstands high operating temperatures resulting in high power dissipation. Maximum continuous operating temperature is specified at 350°C. This type is suitable for use in oil without an oil-resistant coating.

#### TYPE AS

Best suited for high energy and voltage pulse applications. Maximum continuous operating temperature is specified at 230°C. The standard dielectric coating is recommended for use in air, and the oil-resistant coating is recommended

#### **Appplications**

- Soft Start/In-rush Limiters
- RC Snubber Circuits
- Spark-Gap Limiters
- Parasitic Suppression
- High Voltage Power Supplies

for use in oil.

- Pulse Waveform
- EMI/EFI Test Circuits
- RF Dummy Load Circuits
- Capacitor Dump Circuits

#### TYPE BA

Best suited for high energy and voltage pulse applications where the required resistance value is above the resistance values available in Type SP and Type AS resistors. Maximum continuous operating temperature is specified at 230°C. The standard dielectric coating is recommended for use in air, and the oil-resistant coating is recommended for use in oil.

#### **Appplications**

- DC Coupling and Filter Cap Discharge
- Voltage Balancing
- Pre-charge / Inrush Limit
- Voltage Divider
- Filter
- Snubber
- Crowbar
- Measuring
- EMI / EFI Test Circuits
- Test Loads

(continued)

## 100 & 200 Series

### **Bulk Ceramic Axial Lead Resistors**

Series         Res. range (n)         Avg. power rating¹ (W)         Rated peak energy² (J)         Rated peak voltage²         Rated peak current³ (A)         Typ. body weight⁴ (g)           231 AS         25-6,350         1.5         75         1,500V         90         0.44           231 BA         6K-390K         1.2         35         1200V         350         0.44           233AS         6-1,800         2         170         1,100V         150         1.2           233BA         1.8K-150K         1.6         80         900V         90         1.2           233BA         1.8K-150K         1.6         80         900V         150         1.2           233BA         1.8K-150K         1.6         80         900V         150         1.9           234AS         12-5,000         3         275         2500V         150         1.9           234BA         4K-300K         2.4         140         2,000V         150         1.9           234BA         4K-300K         2.4         140         2,000V         190         1.9           250AS         4-1,200         2.5         260         1,500V         190         1.5           250AS <th></th> <th></th> <th colspan="4">SPECIFICATIONS</th>			SPECIFICATIONS				
231SP         1-1,000         2.5         15         375V         350         0.44           231BA         6K-390K         1.2         35         1200V         12           233AS         6-1,800         2         170         1,100V         150         1.2           233SP         1-120         7         20         375V         550         1.2           233BA         1.8K-150K         1.6         80         900V         150         1.9           234SA         12-5,000         3         275         2500V         150         1.9           234SA         1-330         10         30         500V         550         1.9           234BA         4K-300K         2.4         140         2,000V         190         1.9           250SP         1-150         8.5         20         375V         700         1.5           250SP         1-150         8.5         20         375V         700         1.5           251AS         8-2,300         3.5         400         2,500V         190         3.0           251BA         2K-190K         3         200         2,000V         150         3.8	Series	•					
231SP         1-1,000         2.5         15         375V         350         0.44           231BA         6K-390K         1.2         35         1200V         12           233AS         6-1,800         2         170         1,100V         150         1.2           233SP         1-120         7         20         375V         550         1.2           233BA         1.8K-150K         1.6         80         900V         150         1.9           234SA         12-5,000         3         275         2500V         150         1.9           234SA         1-330         10         30         500V         550         1.9           234BA         4K-300K         2.4         140         2,000V         190         1.9           250SP         1-150         8.5         20         375V         700         1.5           250SP         1-150         8.5         20         375V         700         1.5           251AS         8-2,300         3.5         400         2,500V         190         3.0           251BA         2K-190K         3         200         2,000V         150         3.8	231AS	25-6,350	1.5		1,500V	90	0.44
233AS         6-1,800         2         170         1,100V         150         1.2           233BP         1-120         7         20         375V         550         1.2           233BA         1.8K-150K         1.6         80         900V         150         1.2           234AS         12-5,000         3         275         2500V         150         1.9           234BA         4K-300K         2.4         140         2,000V         190         1.9           250AS         4-1,200         2.5         260         1,500V         190         1.9           250SA         4-1,200         2.5         260         1,500V         190         1.9           250SA         14-130K         2         130         1,200V         150         1.5           250BA         1K-130K         2         130         1,200V         190         3.0           251AS         8-2,300         3.5         400         2,500V         190         3.0           251SP         1-330         12         30         500V         700         2.4           251BA         2K-190K         3         200         2,000V         150	231SP		2.5	15	375V	350	0.44
233SP         1-120         7         20         375V         550         1.2           234AS         1.25,000         3         275         2500V         150         1.9           234SP         1-330         10         30         500V         550         1.9           234BA         4K-300K         2.4         140         2,000V         190         1.9           250AS         4-1,200         2.5         260         1,500V         190         1.9           250SP         1-150         8.5         20         375V         700         1.5           250BA         1K-130K         2         130         1,200V         190         3.0           251SP         1-330         12         30         500V         700         2.4           251SP         1-330         12         30         500V         700         2.4           251BA         2K-190K         3         200         2,000V         150         3.8           102BA         9K-700K         4         300         2,400V         150         3.8           102BA         9K-700K         4         300         2,400V         190         6.0	231BA	6K-390K	1.2	35	1200V		
233BA         1.8K-150K         1.6         80         900V           234AS         12-5,000         3         275         2500V         150         1.9           234BP         1-330         10         30         500V         550         1.9           234BA         4K-300K         2.4         140         2,000V         190         1.9           250AS         4-1,200         2.5         260         1,500V         190         1.9           250SP         1-150         8.5         20         375V         700         1.5           250BA         1K-130K         2         130         1,200V         190         3.0           251AS         8-2,300         3.5         400         2,500V         190         3.0           251SP         1-330         12         30         500V         700         2.4           251BA         2K-190K         3         200         2,000V         150         3.8           102AS         30-9,000         5         600         3,000V         150         3.8           102SP         1-700         15         50         1,000V         50         3.8	233AS	6-1,800	2	170	1,100V	150	1.2
234AS         12-5,000         3         275         2500V         150         1.9           234SP         1-330         10         30         500V         550         1.9           234BA         4K-300K         2.4         140         2,000V         190         1.9           250AS         4-1,200         2.5         260         1,500V         190         1.9           250BA         1K-130K         2         130         1,200V         1.5         250BA         1K-130K         2         130         1,200V         1.5           251AS         8-2,300         3.5         400         2,500V         190         3.0           251SP         1-330         12         30         500V         700         2.4           251BA         2K-190K         3         200         2,000V         150         3.8           102AS         30-9,000         5         600         3,000V         150         3.8           102BA         9K-700K         4         300         2,400V         250         3.8           102BA         9K-700K         4         300         2,400V         4.8         252BA         5K-450K         5	233SP	1-120	7	20	375V	550	1.2
234SP         1-330         10         30         500V         550         1.9           234BA         4K-300K         2.4         140         2,000V         190         1.9           250AS         4-1,200         2.5         260         1,500V         190         1.9           250SP         1-150         8.5         20         375V         700         1.5           250BA         1K-130K         2         130         1,200V         190         3.0           251AS         8-2,300         3.5         400         2,500V         190         3.0           251SP         1-330         12         30         500V         700         2.4           251BA         2K-190K         3         200         2,000V         150         3.8           102AS         30-9,000         5         600         3,000V         150         3.8           102BA         9K-700K         4         300         2,400V         252         3.8           102SP         1-460         18         75         1,000V         700         4.8           252BA         5K-450K         5         450         2,400V         2. </td <td>233BA</td> <td>1.8K-150K</td> <td>1.6</td> <td>80</td> <td>900V</td> <td></td> <td></td>	233BA	1.8K-150K	1.6	80	900V		
234BA         4K-300K         2.4         140         2,000V           250AS         4-1,200         2.5         260         1,500V         190         1.9           250SP         1-150         8.5         20         375V         700         1.5           250BA         1K-130K         2         130         1,200V         190         3.0           251AS         8-2,300         3.5         400         2,500V         190         3.0           251BA         2K-190K         3         200         2,000V         190         3.0           251BA         2K-190K         3         200         2,000V         150         3.8           102AS         30-9,000         5         600         3,000V         150         3.8           102BA         9K-700K         4         300         2,400V         2.0         3.8           102BA         9K-700K         4         300         2,400V         2.0         3.8           102BA         9K-700K         4         300         2,400V         190         6.0           252BA         5K-450K         5         450         2,400V         150         7.6 <t< td=""><td>234AS</td><td>12-5,000</td><td>3</td><td>275</td><td>2500V</td><td>150</td><td>1.9</td></t<>	234AS	12-5,000	3	275	2500V	150	1.9
250AS         4-1,200         2.5         260         1,500V         190         1.9           250SP         1-150         8.5         20         375V         700         1.5           250BA         1K-130K         2         130         1,200V         190         3.0           251AS         8-2,300         3.5         400         2,500V         190         3.0           251BA         2K-190K         3         200         2,000V         190         3.0           251BA         2K-190K         3         200         2,000V         150         3.8           102BA         9,000         5         600         3,000V         150         3.8           102BA         9K-700K         4         300         2,400V         250         3.8           102BA         9K-700K         4         300         2,400V         190         6.0           252AS         20-5,800         6         900         3,000V         190         6.0           252BA         5K-450K         5         450         2,400V         150         7.6           104AS         55-18,000         9         1,200         9,000V         150<	234SP	1-330	10	30	500V	550	1.9
250SP         1-150         8.5         20         375V         700         1.5           250BA         1K-130K         2         130         1,200V         3.0           251AS         8-2,300         3.5         400         2,500V         190         3.0           251SP         1-330         12         30         500V         700         2.4           251BA         2K-190K         3         200         2,000V         150         3.8           102AS         30-9,000         5         600         3,000V         150         3.8           102BA         9K-700K         4         300         2,400V         550         3.8           102BA         9K-700K         4         300         2,400V         190         6.0           252AS         20-5,800         6         900         3,000V         190         6.0           252BA         5K-450K         5         450         2,400V         150         7.6           104AS         55-18,000         9         1,200         9,000V         150         7.6           104AS         56-18,000         9         1,200         9,000V         150         7.6	234BA	4K-300K	2.4	140	2,000V		
250BA         1K-130K         2         130         1,200V           251AS         8-2,300         3.5         400         2,500V         190         3.0           251SP         1-330         12         30         500V         700         2.4           251BA         2K-190K         3         200         2,000V         150         3.8           102BS         30-9,000         5         600         3,000V         150         3.8           102BA         9K-700K         4         300         2,400V         250         3.8           102BA         9K-700K         4         300         2,400V         250         3.8           102BA         9K-700K         4         300         2,400V         250         3.8           102BA         9K-700K         4         300         2,400V         190         6.0           252BA         5K-450K         5         450         2,400V         1048         251,500         9         1,200         9,000V         150         7.6           104SP         2-1,500         25         95         3,600V         700         9.6           254AS         36-12,000	250AS	4-1,200	2.5	260	1,500V	190	1.9
251AS         8-2,300         3.5         400         2,500V         190         3.0           251SP         1-330         12         30         500V         700         2.4           251BA         2K-190K         3         200         2,000V         2.4           102AS         30-9,000         5         600         3,000V         150         3.8           102SP         1-700         15         50         1,000V         550         3.8           102BA         9K-700K         4         300         2,400V         2.000V         190         6.0           252BA         9K-700K         4         300         2,400V         700         4.8           252BA         5K-450K         5         450         2,400V         700         4.8           252BA         5K-450K         5         450         2,400V         104AS         55-18,000         9         1,200         9,000V         150         7.6           104SP         2-1,500         25         95         3,600V         550         7.6           104BA         18K-1M         7         600         7,000V         190         12.0           254S	250SP	1-150	8.5	20	375V	700	1.5
251SP         1-330         12         30         500V         700         2.4           251BA         2K-190K         3         200         2,000V         3.8           102AS         30-9,000         5         600         3,000V         150         3.8           102SP         1-700         15         50         1,000V         550         3.8           102BA         9K-700K         4         300         2,400V         252AS         20-5,800         6         900         3,000V         190         6.0           252SP         1-460         18         75         1,000V         700         4.8           252BA         5K-450K         5         450         2,400V         2.0           104AS         55-18,000         9         1,200         9,000V         150         7.6           104SP         2-1,500         25         95         3,600V         550         7.6           104BA         18K-1M         7         600         7,000V         190         12.0           254SP         2-1,000         31         150         3,600V         700         9.6           254BA         12K-970K         9<	250BA	1K-130K	2	130	1,200V		
251BA         2K-190K         3         200         2,000V           102AS         30-9,000         5         600         3,000V         150         3.8           102SP         1-700         15         50         1,000V         550         3.8           102BA         9K-700K         4         300         2,400V         190         6.0           252AS         20-5,800         6         900         3,000V         190         6.0           252SP         1-460         18         75         1,000V         700         4.8           252BA         5K-450K         5         450         2,400V         150         7.6           104AS         55-18,000         9         1,200         9,000V         150         7.6           104SP         2-1,500         25         95         3,600V         550         7.6           104BA         18K-1M         7         600         7,000V         190         12.0           254AS         36-12,000         11         1,800         9,000V         700         9.6           254BA         12K-970K         9         900         7,000V         150         11.4	251AS	8-2,300	3.5	400	2,500V	190	3.0
102AS         30-9,000         5         600         3,000V         150         3.8           102SP         1-700         15         50         1,000V         550         3.8           102BA         9K-700K         4         300         2,400V         252AS         20-5,800         6         900         3,000V         190         6.0           252SP         1-460         18         75         1,000V         700         4.8           252BA         5K-450K         5         450         2,400V         2400V           104AS         55-18,000         9         1,200         9,000V         150         7.6           104SP         2-1,500         25         95         3,600V         550         7.6           104BA         18K-1M         7         600         7,000V         700         9.6           254AS         36-12,000         11         1,800         9,000V         190         12.0           254BA         12K-970K         9         900         7,000V         700         9.6           254BA         12K-970K         9         900         7,000V         150         11.4           106SP	251SP	1-330	12	30	500V	700	2.4
102SP         1-700         15         50         1,000V         550         3.8           102BA         9K-700K         4         300         2,400V         252AS         20-5,800         6         900         3,000V         190         6.0           252SP         1-460         18         75         1,000V         700         4.8           252BA         5K-450K         5         450         2,400V         2.0           104AS         55-18,000         9         1,200         9,000V         150         7.6           104SP         2-1,500         25         95         3,600V         550         7.6           104BA         18K-1M         7         600         7,000V         7.000V         190         12.0           254AS         36-12,000         11         1,800         9,000V         190         12.0           254SP         2-1,000         31         150         3,600V         700         9.6           254BA         12K-970K         9         900         7,000V         150         11.4           106SP         3-2,400         36         155         5,000V         550         11.4	251BA	2K-190K	3	200	2,000V		
102BA         9K-700K         4         300         2,400V           252AS         20-5,800         6         900         3,000V         190         6.0           252SP         1-460         18         75         1,000V         700         4.8           252BA         5K-450K         5         450         2,400V         104S         25-18,000         9         1,200         9,000V         150         7.6           104SP         2-1,500         25         95         3,600V         550         7.6           104BA         18K-1M         7         600         7,000V         7000V         12.0           254AS         36-12,000         11         1,800         9,000V         190         12.0           254SP         2-1,000         31         150         3,600V         700         9.6           254BA         12K-970K         9         900         7,000V         150         11.4           106SP         3-2,400         36         155         5,000V         550         11.4           106BA         30K-1M         10         1000         12,000V         190         18.0           256SP         2-1,600 </td <td>102AS</td> <td>30-9,000</td> <td>5</td> <td>600</td> <td>3,000V</td> <td>150</td> <td>3.8</td>	102AS	30-9,000	5	600	3,000V	150	3.8
252AS         20-5,800         6         900         3,000V         190         6.0           252SP         1-460         18         75         1,000V         700         4.8           252BA         5K-450K         5         450         2,400V           104AS         55-18,000         9         1,200         9,000V         150         7.6           104SP         2-1,500         25         95         3,600V         550         7.6           104BA         18K-1M         7         600         7,000V         7000V         12.0           254AS         36-12,000         11         1,800         9,000V         190         12.0           254SP         2-1,000         31         150         3,600V         700         9.6           254BA         12K-970K         9         900         7,000V         150         11.4           106AS         90-30,000         13         1,900         15,000V         150         11.4           106BA         30K-1M         10         1000         12,000V         190         18.0           256SP         2-1,600         45         240         5,000V         700         14.4	102SP	1-700	15	50	1,000V	550	3.8
252SP       1-460       18       75       1,000V       700       4.8         252BA       5K-450K       5       450       2,400V       1040V	102BA	9K-700K	4	300	2,400V		
252BA         5K-450K         5         450         2,400V           104AS         55-18,000         9         1,200         9,000V         150         7.6           104SP         2-1,500         25         95         3,600V         550         7.6           104BA         18K-1M         7         600         7,000V         700V         12.0           254AS         36-12,000         11         1,800         9,000V         190         12.0           254SP         2-1,000         31         150         3,600V         700         9.6           254BA         12K-970K         9         900         7,000V         150         11.4           106SP         3-2,400         36         155         5,000V         550         11.4           106BA         30K-1M         10         1000         12,000V         190         18.0           256AS         60-20,000         16         2,900         15,000V         700         14.4           256BA         20K-1M         13         1500         12,000V         100         14.4           256BA         20K-1M         13         1500         25,000V         150 <t< td=""><td>252AS</td><td>20-5,800</td><td>6</td><td>900</td><td>3,000V</td><td>190</td><td>6.0</td></t<>	252AS	20-5,800	6	900	3,000V	190	6.0
104AS       55-18,000       9       1,200       9,000V       150       7.6         104SP       2-1,500       25       95       3,600V       550       7.6         104BA       18K-1M       7       600       7,000V       7000V       7.6         254AS       36-12,000       11       1,800       9,000V       190       12.0         254SP       2-1,000       31       150       3,600V       700       9.6         254BA       12K-970K       9       900       7,000V       700       9.6         254BA       12K-970K       9       900       7,000V       150       11.4         106SP       3-2,400       36       155       5,000V       550       11.4         106BA       30K-1M       10       1000       12,000V       190       18.0         256AS       60-20,000       16       2,900       15,000V       190       18.0         256SP       2-1,600       45       240       5,000V       700       14.4         256BA       20K-1M       13       1500       12,000V         109AS       150-48,000       20       3,000       25,000V       150 </td <td>252SP</td> <td>1-460</td> <td>18</td> <td>75</td> <td>1,000V</td> <td>700</td> <td>4.8</td>	252SP	1-460	18	75	1,000V	700	4.8
104SP       2-1,500       25       95       3,600V       550       7.6         104BA       18K-1M       7       600       7,000V       190       12.0         254AS       36-12,000       11       1,800       9,000V       190       12.0         254SP       2-1,000       31       150       3,600V       700       9.6         254BA       12K-970K       9       900       7,000V       150       11.4         106AS       90-30,000       13       1,900       15,000V       150       11.4         106SP       3-2,400       36       155       5,000V       550       11.4         106BA       30K-1M       10       1000       12,000V         256AS       60-20,000       16       2,900       15,000V       190       18.0         256SP       2-1,600       45       240       5,000V       700       14.4         256BA       20K-1M       13       1500       12,000V         109AS       150-48,000       20       3,000       25,000V       150       17.1         109BA       48K-1M       16       1500       20,000V       190       27.0	252BA	5K-450K	5	450	2,400V		
104BA       18K-1M       7       600       7,000V         254AS       36-12,000       11       1,800       9,000V       190       12.0         254SP       2-1,000       31       150       3,600V       700       9.6         254BA       12K-970K       9       900       7,000V       7000V         106AS       90-30,000       13       1,900       15,000V       150       11.4         106SP       3-2,400       36       155       5,000V       550       11.4         106BA       30K-1M       10       1000       12,000V       190       18.0         256AS       60-20,000       16       2,900       15,000V       190       18.0         256SP       2-1,600       45       240       5,000V       700       14.4         256BA       20K-1M       13       1500       12,000V       150       17.1         109AS       150-48,000       20       3,000       25,000V       150       17.1         109BA       48K-1M       16       1500       20,000V       190       27.0         259AS       100-32,000       25       4,600       25,000V       190	104AS	55-18,000	9	1,200	9,000V	150	7.6
254AS       36-12,000       11       1,800       9,000V       190       12.0         254SP       2-1,000       31       150       3,600V       700       9.6         254BA       12K-970K       9       900       7,000V       150       11.4         106AS       90-30,000       13       1,900       15,000V       150       11.4         106SP       3-2,400       36       155       5,000V       550       11.4         106BA       30K-1M       10       1000       12,000V       190       18.0         256AS       60-20,000       16       2,900       15,000V       190       18.0         256SP       2-1,600       45       240       5,000V       700       14.4         256BA       20K-1M       13       1500       12,000V         109AS       150-48,000       20       3,000       25,000V       150       17.1         109SP       4-3,800       55       250       8,800V       550       17.1         109BA       48K-1M       16       1500       20,000V       190       27.0         259SP       3-2,500       70       380       8,800V       <	104SP	2-1,500	25	95	3,600V	550	7.6
254SP       2-1,000       31       150       3,600V       700       9.6         254BA       12K-970K       9       900       7,000V       150       11.4         106AS       90-30,000       13       1,900       15,000V       150       11.4         106SP       3-2,400       36       155       5,000V       550       11.4         106BA       30K-1M       10       1000       12,000V       190       18.0         256AS       60-20,000       16       2,900       15,000V       700       14.4         256BA       20K-1M       13       1500       12,000V       10       14.4         256BA       20K-1M       13       1500       12,000V       150       17.1         109AS       150-48,000       20       3,000       25,000V       150       17.1         109SP       4-3,800       55       250       8,800V       550       17.1         109BA       48K-1M       16       1500       20,000V       190       27.0         259SP       3-2,500       70       380       8,800V       700       21.6	104BA	18K-1M	7	600	7,000V		
254BA       12K-970K       9       900       7,000V         106AS       90-30,000       13       1,900       15,000V       150       11.4         106SP       3-2,400       36       155       5,000V       550       11.4         106BA       30K-1M       10       1000       12,000V       1000       12,000V         256AS       60-20,000       16       2,900       15,000V       190       18.0         256SP       2-1,600       45       240       5,000V       700       14.4         256BA       20K-1M       13       1500       12,000V         109AS       150-48,000       20       3,000       25,000V       150       17.1         109SP       4-3,800       55       250       8,800V       550       17.1         109BA       48K-1M       16       1500       20,000V         259AS       100-32,000       25       4,600       25,000V       190       27.0         259SP       3-2,500       70       380       8,800V       700       21.6	254AS	36-12,000	11	1,800	9,000V	190	12.0
106AS       90-30,000       13       1,900       15,000V       150       11.4         106SP       3-2,400       36       155       5,000V       550       11.4         106BA       30K-1M       10       1000       12,000V         256AS       60-20,000       16       2,900       15,000V       190       18.0         256SP       2-1,600       45       240       5,000V       700       14.4         256BA       20K-1M       13       1500       12,000V         109AS       150-48,000       20       3,000       25,000V       150       17.1         109SP       4-3,800       55       250       8,800V       550       17.1         109BA       48K-1M       16       1500       20,000V         259AS       100-32,000       25       4,600       25,000V       190       27.0         259SP       3-2,500       70       380       8,800V       700       21.6	254SP	2-1,000	31	150	3,600V	700	9.6
106SP       3-2,400       36       155       5,000V       550       11.4         106BA       30K-1M       10       1000       12,000V       1000       12,000V       1000       12,000V       1000	254BA	12K-970K	9	900	7,000V		
106BA     30K-1M     10     1000     12,000V       256AS     60-20,000     16     2,900     15,000V     190     18.0       256SP     2-1,600     45     240     5,000V     700     14.4       256BA     20K-1M     13     1500     12,000V       109AS     150-48,000     20     3,000     25,000V     150     17.1       109SP     4-3,800     55     250     8,800V     550     17.1       109BA     48K-1M     16     1500     20,000V       259AS     100-32,000     25     4,600     25,000V     190     27.0       259SP     3-2,500     70     380     8,800V     700     21.6	106AS	90-30,000	13	1,900	15,000V	150	11.4
256AS       60-20,000       16       2,900       15,000V       190       18.0         256SP       2-1,600       45       240       5,000V       700       14.4         256BA       20K-1M       13       1500       12,000V         109AS       150-48,000       20       3,000       25,000V       150       17.1         109SP       4-3,800       55       250       8,800V       550       17.1         109BA       48K-1M       16       1500       20,000V         259AS       100-32,000       25       4,600       25,000V       190       27.0         259SP       3-2,500       70       380       8,800V       700       21.6	106SP	3-2,400	36	155	5,000V	550	11.4
256SP       2-1,600       45       240       5,000V       700       14.4         256BA       20K-1M       13       1500       12,000V         109AS       150-48,000       20       3,000       25,000V       150       17.1         109SP       4-3,800       55       250       8,800V       550       17.1         109BA       48K-1M       16       1500       20,000V         259AS       100-32,000       25       4,600       25,000V       190       27.0         259SP       3-2,500       70       380       8,800V       700       21.6	106BA	30K-1M	10	1000	12,000V		
256BA       20K-1M       13       1500       12,000V         109AS       150-48,000       20       3,000       25,000V       150       17.1         109SP       4-3,800       55       250       8,800V       550       17.1         109BA       48K-1M       16       1500       20,000V         259AS       100-32,000       25       4,600       25,000V       190       27.0         259SP       3-2,500       70       380       8,800V       700       21.6	256AS	60-20,000	16	2,900	15,000V	190	18.0
109AS     150-48,000     20     3,000     25,000V     150     17.1       109SP     4-3,800     55     250     8,800V     550     17.1       109BA     48K-1M     16     1500     20,000V       259AS     100-32,000     25     4,600     25,000V     190     27.0       259SP     3-2,500     70     380     8,800V     700     21.6	256SP	2-1,600	45	240	5,000V	700	14.4
109SP     4-3,800     55     250     8,800V     550     17.1       109BA     48K-1M     16     1500     20,000V       259AS     100-32,000     25     4,600     25,000V     190     27.0       259SP     3-2,500     70     380     8,800V     700     21.6	256BA	20K-1M	13	1500	12,000V		
109BA     48K-1M     16     1500     20,000V       259AS     100-32,000     25     4,600     25,000V     190     27.0       259SP     3-2,500     70     380     8,800V     700     21.6	109AS	150-48,000	20	3,000	25,000V	150	17.1
259AS 100-32,000 25 4,600 25,000V 190 27.0 259SP 3-2,500 70 380 8,800V 700 21.6	109SP	4-3,800	55	250	8,800V	550	17.1
259SP 3-2,500 70 380 8,800V 700 21.6	109BA	48K-1M	16	1500	20,000V		
259SP 3-2,500 70 380 8,800V 700 21.6	259AS	100-32,000	25	4,600	25,000V	190	27.0
	259SP	3-2,500			8,800V	700	21.6
	259BA	30K-1M	20	2300	20,000V		

- 1. @ 40°C Ambient. Derate linearly to 0 Watts at 230°C for Type AS and BA. Derate linearly to 0 Watts at 350 °C for Type SP.
- 2. Allowable peak energy/voltage will depend on the resistance value and pulse width. Energy ratings are based on pulse <10 milliseconds. Type SP rating can be substantially greater for longer pulses. Consult factory.
- 3. Peak Current Ratings presume energy approaching rated peak energy values. Allowable current can be higher for lower energy values. Consult factory.
- 4. Excludes caps/leads and coating.



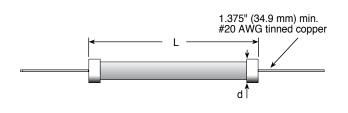
## 100 & 200 Series

### **Bulk Ceramic Axial Lead Resistors**

CHARACTERISTICS					
Characteristic	Test	Type SP	Type AS		
Operating Temp.		-55°C to +350°C*	-55°C to +230°C		
Resistance Temp. Coefficient		+0.2 to -0.08 %/°C	+0.0 to -0.08 %/°C		
Voltage Coefficient	Max. % per kilovolt per inch active length	-1.0%	-1.0%	Derating	
	Max. % change after 10 cycles of 1000% rated power 5 sec. On, 90 sec. Off	±5%	±2%	100 80 40°	
Load Life	Max. % change after 1,000 hours at rated power	±5%	±5%	od 60 SP SP	
Thermal Shock	Max. % change after 10 cycles -55°C to +125°C	±3%	±3%	8º 20 AS & BA 230° 350°	
Moisture Resistance	Max. % change when tested per MIL-STD-202, Method 103	±5%	±5%	0 100 200 300 400 Ambient Temperature (°C)	
Density		2.2-2.4 gm/cc	2.2-2.6 gm/cc		
Specific Heat		0.24-0.26 cal/gm -°C	0.23-0.25 cal/gm -°C		
Thermal Conductivity		0.14-0.16 cal/(cm-°C-sec)	0.003-0.006 cal/(cm-	·C-sec)	

<sup>\*</sup>When required, Type SP material can withstand short periods of use at red-heat conditions, i.e. up to 550°C to 600°C

#### DIMENSIONS



Size	Diam. d max. in. (mm)	Length L max. in. (mm)
231	0.2 (5.1)	0.75 (19.1)
233	0.31 (7.9)	0.75 (19.1)
234	0.31 (7.9)	1.125 (28.6)
250	0.44 (11.1)	0.75 (19.1)
251	0.44 (11.1)	1.125 (28.6)
102	0.31 (7.9)	2.125 (54.0)
252	0.44 (11.1)	2.125 (54.0)
104	0.31 (7.9)	4.125 (104.8)
254	0.44 (11.1)	4.125 (104.8)
106	0.31 (7.9)	6.125 (155.6)
256	0.44 (11.1)	6.125 (155.6)
109	0.31 (7.9)	9.125 (231.8)
259	0.44 (11.1)	9.125 (231.8)

#### **ORDERING INFORMATION**

# $\begin{array}{c} \textbf{102AS} \ \textbf{101} \ \textbf{KD} \\ \textbf{Construction} \\ \textbf{Type} \\ & \text{For} \ge 10\Omega : \text{First 2 digits} \\ \textbf{J} = \pm 5\% \\ \text{are significant, third is} \\ \textbf{K} = \pm 10\% \\ \text{number of zeros to} \\ \text{follow, e.g. } 101 = 100\Omega \\ \textbf{For} < 10\Omega : \text{R replaces} \\ \text{decimal point, e.g. } 7\text{R5} \\ = 7.5\Omega \\ \end{array}$

Туре	Coating/Terminal option
SP	No Suffix = Standard Includes aluminum metalization under caps/leads.
AS, BA	D = Standard; includes dielectric coating and aluminum metalization under caps/leads.  DS = Dielectric coating and silver metalization under caps/leads.  O = Oil resistant coating and silver metalization under caps/leads  M = Ceramic based coating and aluminum metalization under caps/leads

Packaging: Bulk in poly bags is standard. Tape & reel is also available.