

# Type 381LR 105 °C Highest Ripple, Snap-In Aluminum

## Ultra-High Ripple Capabilities



Compared to standard 105 °C snap-ins like the Type 381L/LX Type 381LR can handle an extra 25% ripple current or more. This remarkable capability stems from advances in electrolyte that give extremely low ESR values. In high ripple current applications like motor drives you can save by using fewer capacitors.

### Highlights

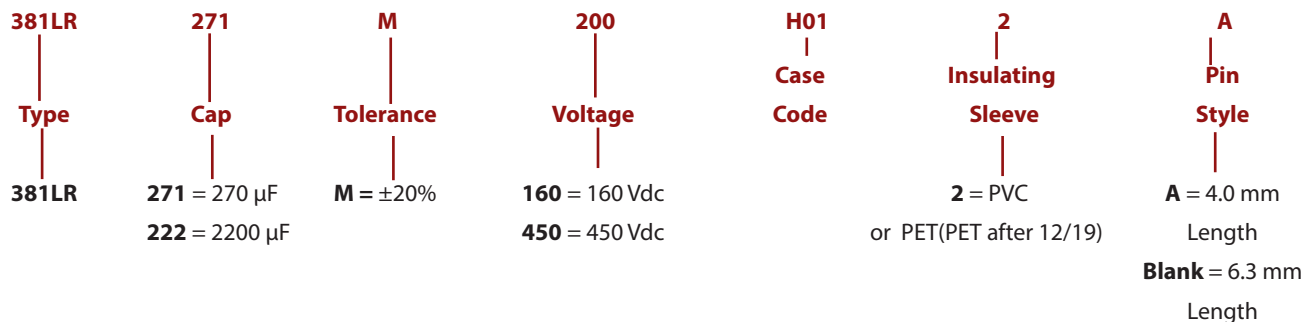
- The right choice for motor drive bus capacitors
- The right choice for UPS bus capacitors
- Compare to Type 381L
- Up to 2 times the ripple current

### Specifications

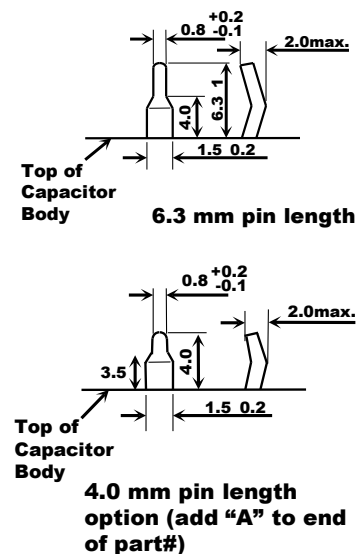
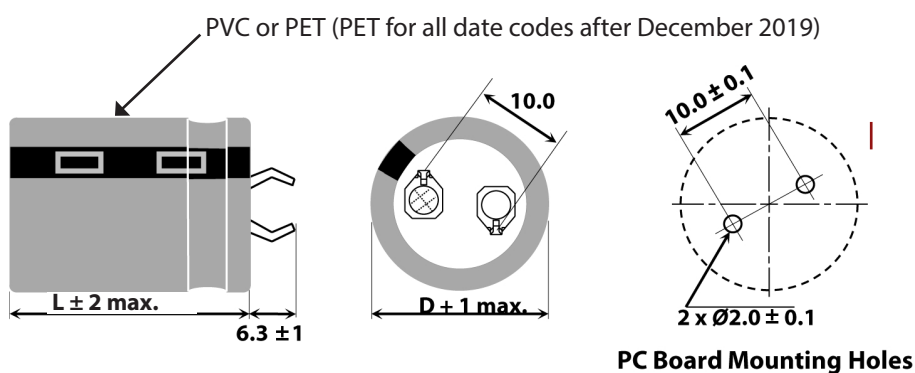
| Temperature Range               | -40 °C to + 105 °C ≤ 315 Vdc<br>-25 °C to + 105 °C ≥ 350 Vdc   |        |         |        |             |        |      |      |      |      |      |       |       |        |         |       |             |      |      |      |      |      |      |
|---------------------------------|--|--------|---------|--------|-------------|--------|------|------|------|------|------|-------|-------|--------|---------|-------|-------------|------|------|------|------|------|------|
| Rated Voltage Range             | 200 Vdc to 450 Vdc   |        |         |        |             |        |      |      |      |      |      |       |       |        |         |       |             |      |      |      |      |      |      |
| Capacitance Range               | 56 µF to 2,200 µF  |        |         |        |             |        |      |      |      |      |      |       |       |        |         |       |             |      |      |      |      |      |      |
| Capacitance Tolerance           | ± 20%  |        |         |        |             |        |      |      |      |      |      |       |       |        |         |       |             |      |      |      |      |      |      |
| Leakage Current                 | ≤ 3 $\sqrt{CV}$ µA, 4 mA max, 5 minutes  |        |         |        |             |        |      |      |      |      |      |       |       |        |         |       |             |      |      |      |      |      |      |
| Ripple Current Multipliers      | <p>Ambient Temperature</p> <table border="1"> <thead> <tr> <th>45 °C</th> <th>60 °C</th> <th>70 °C</th> <th>85 °C</th> <th>105 °C</th> </tr> </thead> <tbody> <tr> <td>2.35</td> <td>2.20</td> <td>2.00</td> <td>1.70</td> <td>1.00</td> </tr> </tbody> </table> <p>Frequency</p> <table border="1"> <thead> <tr> <th>50 Hz</th> <th>60 Hz</th> <th>120 Hz</th> <th>500 kHz</th> <th>1 kHz</th> <th>10 kHz &amp; Up</th> </tr> </thead> <tbody> <tr> <td>0.75</td> <td>0.80</td> <td>1.00</td> <td>1.20</td> <td>1.25</td> <td>1.40</td> </tr> </tbody> </table> | 45 °C  | 60 °C   | 70 °C  | 85 °C       | 105 °C | 2.35 | 2.20 | 2.00 | 1.70 | 1.00 | 50 Hz | 60 Hz | 120 Hz | 500 kHz | 1 kHz | 10 kHz & Up | 0.75 | 0.80 | 1.00 | 1.20 | 1.25 | 1.40 |
| 45 °C                           | 60 °C  | 70 °C  | 85 °C   | 105 °C |             |        |      |      |      |      |      |       |       |        |         |       |             |      |      |      |      |      |      |
| 2.35                            | 2.20   | 2.00   | 1.70    | 1.00   |             |        |      |      |      |      |      |       |       |        |         |       |             |      |      |      |      |      |      |
| 50 Hz                           | 60 Hz  | 120 Hz | 500 kHz | 1 kHz  | 10 kHz & Up |        |      |      |      |      |      |       |       |        |         |       |             |      |      |      |      |      |      |
| 0.75                            | 0.80   | 1.00   | 1.20    | 1.25   | 1.40        |        |      |      |      |      |      |       |       |        |         |       |             |      |      |      |      |      |      |
| Low Temperature Characteristics | Impedance ratio: $Z_{-20^{\circ}\text{C}}/Z_{+25^{\circ}\text{C}}$<br>≤ 3 (200–450Vdc)   |        |         |        |             |        |      |      |      |      |      |       |       |        |         |       |             |      |      |      |      |      |      |
| Endurance Life Test             | 3000 h at full load at 105 °C<br>Δ Capacitance ±20%<br>ESR 200% of limit<br>DCL 100% of limit  |        |         |        |             |        |      |      |      |      |      |       |       |        |         |       |             |      |      |      |      |      |      |
| Shelf Life Test                 | 1000 h at 105 °C<br>Δ Capacitance ±20%<br>ESR 200% of limit<br>DCL 100% of limit   |        |         |        |             |        |      |      |      |      |      |       |       |        |         |       |             |      |      |      |      |      |      |
| Vibration                       | 10 to 55 Hz, 0.06" and 10 g max, 2 h each plane  |        |         |        |             |        |      |      |      |      |      |       |       |        |         |       |             |      |      |      |      |      |      |
| <b>RoHS Compliant</b>           |  |        |         |        |             |        |      |      |      |      |      |       |       |        |         |       |             |      |      |      |      |      |      |

# Type 381LR 105 °C Highest Ripple, Snap-In Aluminum

## Ultra-High Ripple Capabilities Part Numbering System



## Outline Drawing



Dimensions shown are in mm

## Insulated Case Dimensions

| Case Code | DIAMETER D |        | LENGTH L |        | Typical Weight (grams) | Case Code | DIAMETER D |        | LENGTH L |        | Typical Weight (grams) |
|-----------|------------|--------|----------|--------|------------------------|-----------|------------|--------|----------|--------|------------------------|
|           | mm         | inches | mm       | inches |                        |           | mm         | inches | mm       | inches |                        |
| H01       | 22         | 0.87   | 25       | 0.98   | 16                     | K01       | 30         | 1.18   | 25       | 0.98   | 30                     |
| H02       | 22         | 0.87   | 30       | 1.18   | 19                     | K02       | 30         | 1.18   | 30       | 1.18   | 35                     |
| H03       | 22         | 0.87   | 35       | 1.38   | 22                     | K03       | 30         | 1.18   | 35       | 1.38   | 40                     |
| H04       | 22         | 0.87   | 40       | 1.57   | 24                     | K04       | 30         | 1.18   | 40       | 1.57   | 44                     |
| H45       | 22         | 0.87   | 45       | 1.77   | 28                     | K45       | 30         | 1.18   | 45       | 1.77   | 49                     |
| H05       | 22         | 0.87   | 50       | 1.97   | 31                     | K05       | 30         | 1.18   | 50       | 1.97   | 53                     |
| J01       | 25         | 0.98   | 25       | 0.98   | 20                     | A01       | 35         | 1.38   | 25       | 0.98   | 42                     |
| J02       | 25         | 0.98   | 30       | 1.18   | 24                     | A02       | 35         | 1.38   | 30       | 1.18   | 48                     |
| J03       | 25         | 0.98   | 35       | 1.38   | 27                     | A03       | 35         | 1.38   | 35       | 1.38   | 54                     |
| J04       | 25         | 0.98   | 40       | 1.57   | 31                     | A04       | 35         | 1.38   | 40       | 1.57   | 60                     |
| J45       | 25         | 0.98   | 45       | 1.77   | 35                     | A45       | 35         | 1.38   | 45       | 1.77   | 67                     |
| J05       | 25         | 0.98   | 50       | 1.97   | 38                     | A05       | 35         | 1.38   | 50       | 1.97   | 74                     |
|           |            |        |          |        |                        | A55       | 35         | 1.38   | 55       | 2.17   | 80                     |

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## Ultra-High Ripple Capabilities

### Ratings

| Cap.<br>(uF)                   | Catalog<br>Part Number | Max. ESR         |                  | Ripple Amps   |               | Nominal       |
|--------------------------------|------------------------|------------------|------------------|---------------|---------------|---------------|
|                                |                        | @ +25°C          |                  | @ +105°C      |               | Size          |
|                                |                        | 120 Hz<br>(ohms) | 20 kHz<br>(ohms) | 120 Hz<br>(A) | 20 kHz<br>(A) | D x L<br>(mm) |
| <b>200 Vdc (250 Vdc Surge)</b> |                        |                  |                  |               |               |               |
| 330                            | 381LR331M200H012       | 0.603            | 0.271            | 1.25          | 1.79          | 22 x 25       |
| 390                            | 381LR391M200H022       | 0.510            | 0.229            | 1.35          | 1.93          | 22 x 30       |
| 470                            | 381LR471M200H032       | 0.423            | 0.191            | 1.50          | 2.14          | 22 x 35       |
| 470                            | 381LR471M200J022       | 0.317            | 0.143            | 1.85          | 2.64          | 25 x 30       |
| 560                            | 381LR561M200H042       | 0.355            | 0.180            | 1.67          | 2.38          | 22 x 40       |
| 680                            | 381LR681M200J032       | 0.293            | 0.132            | 1.72          | 2.45          | 25 x 35       |
| 680                            | 381LR681M200K022       | 0.219            | 0.099            | 2.42          | 3.45          | 30 x 30       |
| 820                            | 381LR821M200J042       | 0.243            | 0.109            | 0.20          | 2.92          | 25 x 40       |
| 820                            | 381LR821M200K022       | 0.182            | 0.082            | 2.63          | 3.76          | 30 x 30       |
| 1000                           | 381LR102M200J452       | 0.149            | 0.067            | 2.84          | 4.06          | 25 x 45       |
| 1000                           | 381LR102M200J052       | 0.199            | 0.090            | 2.42          | 3.46          | 25 x 50       |
| 1000                           | 381LR102M200K032       | 0.149            | 0.067            | 2.84          | 4.06          | 30 x 35       |
| 1200                           | 381LR122M200J052       | 0.166            | 0.083            | 2.63          | 3.76          | 25 x 50       |
| 1200                           | 381LR122M200K042       | 0.124            | 0.062            | 3.13          | 4.47          | 30 x 40       |
| 1200                           | 381LR122M200A032       | 0.124            | 0.062            | 3.13          | 4.47          | 35 x 35       |
| 1500                           | 381LR152M200K052       | 0.099            | 0.050            | 3.56          | 5.06          | 30 x 50       |
| 1500                           | 381LR152M200A042       | 0.099            | 0.050            | 3.56          | 5.06          | 35 x 40       |
| 1800                           | 381LR182M200A452       | 0.083            | 0.041            | 3.84          | 5.48          | 35 x 45       |
| 2200                           | 381LR222M200A052       | 0.066            | 0.040            | 4.12          | 5.89          | 35 x 50       |
| <b>250 Vdc (300 Vdc Surge)</b> |                        |                  |                  |               |               |               |
| 220                            | 381LR221M250H012       | 0.905            | 0.407            | 1.00          | 1.43          | 22 x 25       |
| 270                            | 381LR271M250H022       | 0.737            | 0.332            | 1.18          | 1.69          | 22 x 30       |
| 330                            | 381LR331M250H022       | 0.603            | 0.271            | 1.30          | 1.65          | 22 x 30       |
| 390                            | 381LR391M250J032       | 0.510            | 0.229            | 1.49          | 2.12          | 25 x 35       |
| 470                            | 381LR471M250J032       | 0.423            | 0.191            | 1.65          | 2.35          | 25 x 35       |
| 470                            | 381LR471M250K022       | 0.317            | 0.143            | 1.85          | 2.64          | 30 x 30       |
| 560                            | 381LR561M250J032       | 0.355            | 0.160            | 1.80          | 2.57          | 25 x 35       |
| 560                            | 381LR561M250K022       | 0.266            | 0.120            | 2.14          | 3.05          | 30 x 30       |
| 680                            | 381LR681M250H052       | 0.219            | 0.099            | 2.42          | 3.45          | 22 x 50       |
| 680                            | 381LR681M250J452       | 0.293            | 0.132            | 2.00          | 2.85          | 25 x 45       |
| 680                            | 381LR681M250K032       | 0.219            | 0.099            | 2.42          | 3.45          | 30 x 35       |
| 820                            | 381LR821M250K042       | 0.182            | 0.082            | 2.63          | 3.76          | 30 x 40       |
| 820                            | 381LR821M250A032       | 0.182            | 0.082            | 2.63          | 3.76          | 35 x 35       |
| 1000                           | 381LR102M250K052       | 0.149            | 0.067            | 2.84          | 4.06          | 30 x 50       |
| 1000                           | 381LR102M250A042       | 0.149            | 0.067            | 2.84          | 4.06          | 35 x 40       |
| 1200                           | 381LR122M250A452       | 0.124            | 0.062            | 3.13          | 4.47          | 35 x 45       |
| 1500                           | 381LR152M250A052       | 0.099            | 0.050            | 3.56          | 5.06          | 35 x 50       |
| <b>400 Vdc (450 Vdc Surge)</b> |                        |                  |                  |               |               |               |
| 82                             | 381LR820M400H012       | 2.440            | 0.853            | 0.55          | 0.80          | 22 x 25       |
| 100                            | 381LR101M400H012       | 1.990            | 0.700            | 0.50          | 0.70          | 22 x 25       |
| 100                            | 381LR101M400H022       | 1.326            | 0.700            | 0.50          | 0.70          | 22 x 30       |
| 100                            | 381LR101M400J012       | 1.326            | 0.597            | 0.91          | 1.30          | 25 x 25       |

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## Ultra-High Ripple Capabilities

| Cap.<br>(uF)                   | Catalog<br>Part Number | Max. ESR<br>@ +25°C |        | Ripple Amps<br>@ +105°C |        | Nominal<br>Size<br>D x L<br>(mm) |
|--------------------------------|------------------------|---------------------|--------|-------------------------|--------|----------------------------------|
|                                |                        | 120 Hz              | 20 kHz | 120 Hz                  | 20 kHz |                                  |
|                                |                        | (ohms)              | (ohms) | (A)                     | (A)    |                                  |
| <b>400 Vdc (450 Vdc Surge)</b> |                        |                     |        |                         |        |                                  |
| 120                            | 381LR121M400H022       | 1.659               | 0.746  | 0.70                    | 0.98   | 22 x 30                          |
| 150                            | 381LR151M400H032       | 1.327               | 0.464  | 0.80                    | 1.10   | 22 x 35                          |
| 180                            | 381LR181M400J032       | 1.106               | 0.500  | 0.95                    | 1.33   | 25 x 35                          |
| 180                            | 381LR181M400K022       | 0.737               | 0.322  | 1.12                    | 1.60   | 30 x 30                          |
| 220                            | 381LR221M400H452       | 0.905               | 0.407  | 1.00                    | 1.40   | 22 x 45                          |
| 220                            | 381LR221M400J042       | 0.603               | 0.271  | 1.42                    | 2.03   | 25 x 40                          |
| 220                            | 381LR221M400K022       | 0.603               | 0.271  | 1.42                    | 2.03   | 30 x 30                          |
| 220                            | 381LR221M400A012       | 0.603               | 0.271  | 1.42                    | 2.03   | 35 x 25                          |
| 270                            | 381LR271M400H452       | 0.603               | 0.271  | 1.42                    | 2.03   | 22 x 45                          |
| 270                            | 381LR271M400K022       | 0.737               | 0.332  | 1.22                    | 1.71   | 30 x 30                          |
| 270                            | 381LR271M400K032       | 0.491               | 0.221  | 1.56                    | 2.23   | 30 x 35                          |
| 330                            | 381LR331M400K032       | 0.603               | 0.272  | 1.39                    | 1.95   | 30 x 35                          |
| 330                            | 381LR331M400K042       | 0.402               | 0.181  | 1.71                    | 2.44   | 30 x 40                          |
| 330                            | 381LR331M400A022       | 0.402               | 0.181  | 1.71                    | 2.44   | 35 x 30                          |
| 390                            | 381LR391M400J452       | 0.340               | 0.153  | 1.85                    | 2.64   | 25 x 45                          |
| 390                            | 381LR391M400K452       | 0.340               | 0.153  | 1.85                    | 2.64   | 30 x 45                          |
| 390                            | 381LR391M400A032       | 0.340               | 0.153  | 1.85                    | 2.64   | 35 x 35                          |
| 470                            | 381LR471M400A042       | 0.282               | 0.127  | 2.01                    | 2.87   | 35 x 40                          |
| 560                            | 381LR561M400A452       | 0.237               | 0.107  | 2.35                    | 3.36   | 35 x 45                          |
| <b>420 Vdc (470 Vdc Surge)</b> |                        |                     |        |                         |        |                                  |
| 68                             | 381LR680M420H012       | 2.930               | 1.320  | 0.56                    | 0.80   | 22 x 25                          |
| 82                             | 381LR820M420H012       | 2.430               | 1.090  | 0.64                    | 0.91   | 22 x 25                          |
| 100                            | 381LR101M420H012       | 1.990               | 0.900  | 0.70                    | 1.00   | 22 x 25                          |
| 120                            | 381LR121M420H022       | 1.660               | 0.750  | 0.70                    | 1.00   | 22 x 30                          |
| 180                            | 381LR181M420K022       | 0.737               | 0.332  | 1.12                    | 1.60   | 30 x 30                          |
| 220                            | 381LR221M420H452       | 0.900               | 0.410  | 1.05                    | 1.51   | 22 x 45                          |
| 220                            | 381LR221M420K032       | 0.603               | 0.271  | 1.42                    | 2.03   | 30 x 35                          |
| 270                            | 381LR271M420J452       | 0.740               | 0.330  | 1.20                    | 1.71   | 25 x 45                          |
| 270                            | 381LR271M420K042       | 0.491               | 0.221  | 1.68                    | 2.40   | 30 x 40                          |
| 330                            | 381LR331M420A032       | 0.402               | 0.181  | 1.78                    | 2.54   | 35 x 35                          |
| 330                            | 381LR331M420K452       | 0.402               | 0.181  | 1.78                    | 2.54   | 30 x 45                          |
| 390                            | 381LR391M420K052       | 0.340               | 0.153  | 1.91                    | 2.73   | 30 x 50                          |
| 390                            | 381LR391M420A042       | 0.340               | 0.153  | 1.91                    | 2.73   | 35 x 40                          |
| 470                            | 381LR471M420A452       | 0.282               | 0.127  | 2.23                    | 3.18   | 35 x 45                          |
| <b>450 Vdc (500 Vdc Surge)</b> |                        |                     |        |                         |        |                                  |
| 56                             | 381LR560M450H012       | 3.550               | 1.600  | 0.50                    | 0.71   | 22 x 25                          |
| 68                             | 381LR680M450H012       | 2.930               | 1.320  | 0.53                    | 0.75   | 22 x 25                          |
| 82                             | 381LR820M450H012       | 1.617               | 0.728  | 0.80                    | 1.01   | 22 x 25                          |
| 82                             | 381LR820M450H022       | 2.430               | 1.090  | 0.64                    | 0.91   | 22 x 30                          |
| 100                            | 381LR101M450H022       | 1.990               | 0.900  | 0.70                    | 1.00   | 22 x 30                          |
| 100                            | 381LR101M450J022       | 1.326               | 0.597  | 0.91                    | 1.30   | 25 x 30                          |
| 120                            | 381LR121M450H032       | 1.660               | 0.750  | 0.80                    | 1.15   | 22 x 35                          |

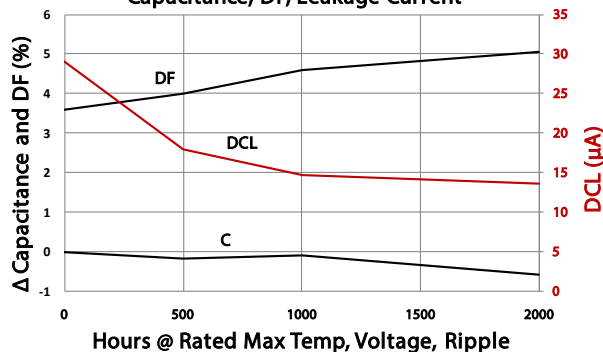
# Type 381LR 105 °C Highest Ripple, Snap-In Aluminum

## Ultra-High Ripple Capabilities

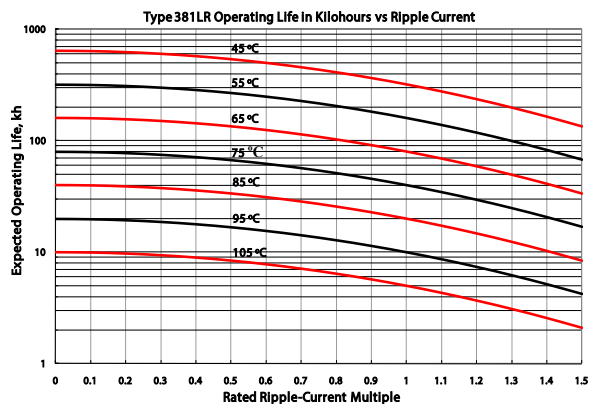
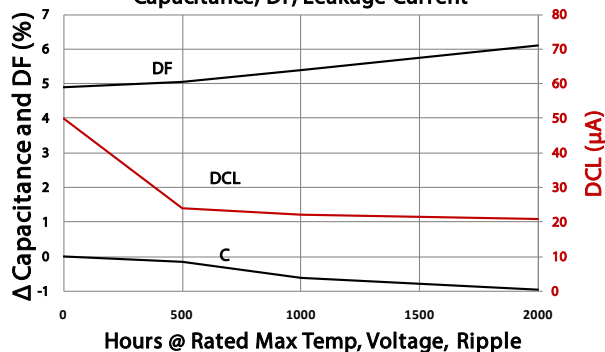
| Cap.<br>(uF)                   | Catalog<br>Part Number | Max. ESR<br>@ +25°C |        | Ripple Amps<br>@ +105°C |        | Nominal<br>Size<br>D x L<br>(mm) |
|--------------------------------|------------------------|---------------------|--------|-------------------------|--------|----------------------------------|
|                                |                        | 120 Hz              | 20 kHz | 120 Hz                  | 20 kHz |                                  |
|                                |                        | (ohms)              | (ohms) | (A)                     | (A)    |                                  |
| <b>450 Vdc (500 Vdc Surge)</b> |                        |                     |        |                         |        |                                  |
| 150                            | 381LR151M450H032       | 1.327               | 0.594  | 0.88                    | 1.26   | 22 x 35                          |
| 150                            | 381LR151M450J022       | 1.330               | 0.464  | 0.830                   | 1.04   | 25 x 30                          |
| 150                            | 381LR151M450J042       | 0.884               | 0.396  | 1.07                    | 1.53   | 25 x 40                          |
| 150                            | 381LR151M450K022       | 0.884               | 0.396  | 1.07                    | 1.53   | 30 x 30                          |
| 180                            | 381LR181M450H042       | 1.110               | 0.500  | 1.00                    | 1.43   | 22 x 40                          |
| 180                            | 381LR181M450K022       | 0.737               | 0.332  | 1.12                    | 1.60   | 30 x 30                          |
| 220                            | 381LR221M450J042       | 0.603               | 0.271  | 1.42                    | 2.03   | 25 x 40                          |
| 220                            | 381LR221M450K032       | 0.603               | 0.271  | 1.42                    | 2.03   | 30 x 35                          |
| 220                            | 381LR221M450A022       | 0.603               | 0.271  | 1.42                    | 2.03   | 35 x 30                          |
| 270                            | 381LR271M450K042       | 0.491               | 0.221  | 1.72                    | 2.45   | 30 x 40                          |
| 270                            | 381LR271M450A032       | 0.491               | 0.221  | 1.72                    | 2.45   | 35 x 35                          |
| 330                            | 381LR331M450K052       | 0.402               | 0.181  | 1.85                    | 2.64   | 30 x 50                          |
| 330                            | 381LR331M450A042       | 0.402               | 0.181  | 1.85                    | 2.64   | 35 x 40                          |
| 390                            | 381LR391M450A042       | 0.340               | 0.153  | 1.97                    | 2.82   | 35 x 40                          |
| 470                            | 381LR471M450A052       | 0.282               | 0.127  | 2.47                    | 3.53   | 35 x 50                          |

## Typical Performance Curves

Life Test 105 °C, Full Load, 220 µF, 400 Vdc  
Capacitance, DF, Leakage Current



Life Test 105 °C, Full Load, 330 µF, 400 Vdc  
Capacitance, DF, Leakage Current



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