

# Type SCR Commutating Capacitors

## Type SCRN Film-Paper/Extended Foil Commutating Capacitors



Type SCRN capacitors are for SCR (silicon controlled rectifier) commutating applications that require high peak and rms current capability. These capacitors are ideal for other high frequency and pulsed applications. The SCRN is supplied in oval or rectangular metal cases with 1/4 x 20 threaded stud ceramic insulated terminals to withstand high current and high peak voltages.

### Highlights

- ◆ Conforms to EIA RS401 for power semiconductor applications
- ◆ Non ferrous covers available for high frequency applications
- ◆ 40,000 hours life at full rated voltage and temperature
- ◆ High voltage, high current and high frequency

### Specifications

|                               |                              |
|-------------------------------|------------------------------|
| <b>Capacitance Range:</b>     | 0.25 $\mu$ F to 50.0 $\mu$ F |
| <b>Voltage Range:</b>         | 200 Vpk to 2000 Vpk          |
| <b>Capacitance Tolerance:</b> | $\pm 10\%$                   |
| <b>Temperature Range:</b>     | -40 °C to 65 °C              |
| <b>Surface Temperature:</b>   | 80 °C                        |

### Ratings

| Cap<br>( $\mu$ F)                          | Catalog<br>Part Number | Case<br>Code | H<br>(Inches) | Max VA<br>(65 °C) | Max Amps<br>RMS |
|--------------------------------------------|------------------------|--------------|---------------|-------------------|-----------------|
| <b>200 Vpk (Paper dielectric)</b>          |                        |              |               |                   |                 |
| 3                                          | SCRN201R               | A            | 2.13          | 400               | 60              |
| 5                                          | SCRN202R               | A            | 2.63          | 465               | 60              |
| 10                                         | SCRN203R               | A            | 3.88          | 625               | 60              |
| 15                                         | SCRN205R               | A            | 4.75          | 765               | 60              |
| 20                                         | SCRN206R               | B            | 4.25          | 875               | 60              |
| 30                                         | SCRN208R               | C            | 5.25          | 1200              | 60              |
| 40                                         | SCRN209R               | C            | 6.75          | 1500              | 60              |
| 50                                         | SCRN210R               | D            | 5.75          | 1590              | 60              |
| <b>400 Vpk (Film and Paper dielectric)</b> |                        |              |               |                   |                 |
| 2                                          | SCRN211R               | A            | 2.63          | 790               | 60              |
| 3                                          | SCRN212R               | A            | 2.63          | 970               | 60              |
| 5                                          | SCRN213R               | A            | 3.88          | 1130              | 60              |
| 10                                         | SCRN214R               | B            | 4.75          | 1930              | 60              |
| 15                                         | SCRN215R               | C            | 4.75          | 2240              | 60              |
| 20                                         | SCRN216R               | C            | 6.25          | 2800              | 60              |
| 30                                         | SCRN217R               | D            | 6.75          | 3720              | 60              |
| 40                                         | SCRN218R               | D            | 8.00          | 4330              | 60              |
| 50                                         | SCRN219R               | E            | 6.25          | 6050              | 100             |
| <b>600 Vpk (Film and Paper dielectric)</b> |                        |              |               |                   |                 |
| 2                                          | SCRN220R               | A            | 2.63          | 815               | 60              |
| 3                                          | SCRN221R               | A            | 3.13          | 1200              | 60              |
| 5                                          | SCRN222R               | A            | 4.25          | 1420              | 60              |
| 10                                         | SCRN224R               | C            | 4.25          | 2040              | 60              |
| 15                                         | SCRN226R               | C            | 5.75          | 2800              | 60              |
| 20                                         | SCRN227R               | D            | 5.75          | 3260              | 60              |
| 25                                         | SCRN229R               | D            | 6.75          | 3720              | 60              |
| 30                                         | SCRN230R               | D            | 8.00          | 4330              | 60              |
| 40                                         | SCRN231R               | E            | 6.25          | 6060              | 100             |
| 50                                         | SCRN232R               | E            | 7.25          | 6850              | 100             |

| Cap<br>( $\mu$ F)                             | Catalog<br>Part Number | Case<br>Code | H<br>(Inches) | Max VA<br>(65 °C) | Max Amps<br>RMS |
|-----------------------------------------------|------------------------|--------------|---------------|-------------------|-----------------|
| <b>600 Vpk (Film dielectric for low-loss)</b> |                        |              |               |                   |                 |
| 1                                             | SCRN262R               | A            | 2.38          | 2200              | 60              |
| 2                                             | SCRN263R               | A            | 2.38          | 2060              | 60              |
| 3                                             | SCRN264R               | A            | 3.88          | 3190              | 60              |
| 5                                             | SCRN265R               | A            | 4.25          | 4380              | 60              |
| 10                                            | SCRN266R               | C            | 4.25          | 6060              | 60              |
| <b>1000 Vpk (Film and Paper dielectric)</b>   |                        |              |               |                   |                 |
| 2                                             | SCRN234R               | A            | 3.13          | 1070              | 60              |
| 3                                             | SCRN235R               | A            | 3.88          | 1455              | 60              |
| 5                                             | SCRN236R               | B            | 4.25          | 1785              | 60              |
| 10                                            | SCRN237R               | C            | 5.75          | 2570              | 60              |
| 15                                            | SCRN238R               | D            | 5.75          | 3170              | 60              |
| 20                                            | SCRN239R               | E            | 5.13          | 5200              | 100             |
| <b>1500 Vpk (Film and Paper dielectric)</b>   |                        |              |               |                   |                 |
| 0.5                                           | SCRN240R               | A            | 2.13          | 990               | 60              |
| 1                                             | SCRN241R               | A            | 2.88          | 1240              | 60              |
| 2                                             | SCRN242R               | B            | 3.50          | 1890              | 60              |
| 3                                             | SCRN243R               | C            | 4.25          | 2550              | 60              |
| 5                                             | SCRN244R               | C            | 5.75          | 3250              | 60              |
| 10                                            | SCRN245R               | E            | 5.13          | 6500              | 100             |
| <b>2000 Vpk (Film and Paper dielectric)</b>   |                        |              |               |                   |                 |
| 0.25                                          | SCRN246R               | A            | 2.13          | 990               | 60              |
| 0.33                                          | SCRN257R               | A            | 2.13          | 1000              | 60              |
| 0.5                                           | SCRN247R               | A            | 2.63          | 1180              | 60              |
| 1                                             | SCRN248R               | A            | 3.13          | 1300              | 60              |
| 2                                             | SCRN249R               | B            | 4.25          | 2230              | 60              |
| 3                                             | SCRN251R               | C            | 4.75          | 2800              | 60              |
| 5                                             | SCRN253R               | D            | 5.75          | 4020              | 60              |
| 10                                            | SCRN256R               | F            | 5.75          | 7600              | 100             |

# Type SCR Commutating Capacitors

## Outline Drawing

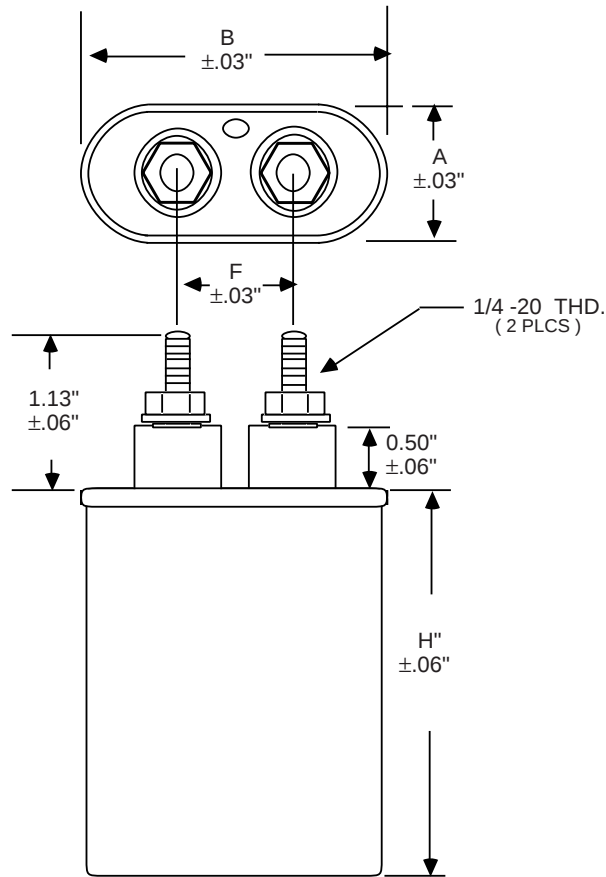


Figure 1

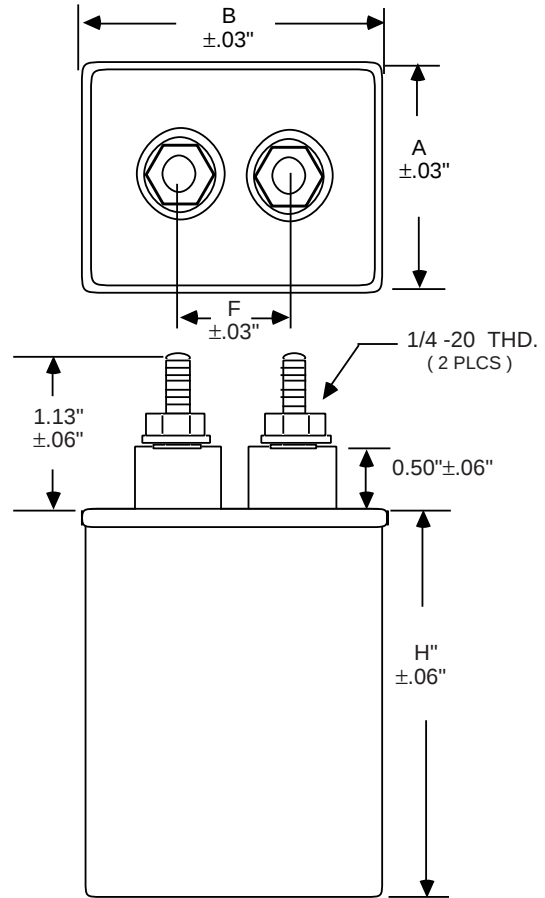


Figure 2

## Mounting Hardware

| Case Code | Dimensions Inches |      |      |           | Figure |
|-----------|-------------------|------|------|-----------|--------|
|           | A                 | B    | F    | H         |        |
| A         | 1.31              | 2.16 | 0.81 | see table | Fig. 1 |
| B         | 1.56              | 2.69 | 1.25 | see table | Fig. 1 |
| C         | 1.91              | 2.91 | 1.38 | see table | Fig. 1 |
| D         | 1.97              | 3.66 | 1.38 | see table | Fig. 1 |
| E         | 2.84              | 4.56 | 2.00 | see table | Fig. 2 |
| F         | 3.75              | 4.56 | 2.00 | see table | Fig. 2 |

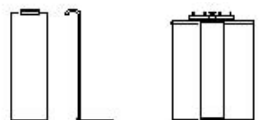
| Case Code | Wrap Bracket |
|-----------|--------------|
| A         | 30393-5      |
| B         | 30393-3      |
| C         | 30393-9      |
| D         | 30393-10     |
| E         | —            |
| F         | —            |

| Case Code | Universal Bracket |
|-----------|-------------------|
| A         | 32107-1           |
| B         | —                 |
| C         | 32107-2           |
| D         | 32107-3           |
| E         | —                 |
| F         | —                 |

End Mount Footed  
Bracket (2 required)  
#30434

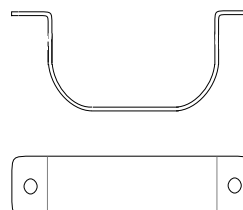


Side Mount Footed  
Bracket (2 required)  
#31762

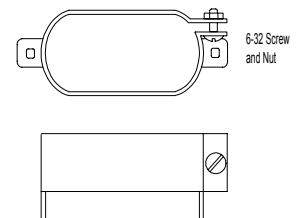


| H (Inches) | End Mount | Side Mount |
|------------|-----------|------------|
| 2.13       | 30434-33  | 31762-45   |
| 2.38       | 30434-37  | 31762-46   |
| 2.63       | 30434-41  | 31762-47   |
| 2.88       | 30434-45  | 31762-48   |
| 3.13       | 30434-49  | 31762-49   |
| 3.50       | 30434-55  | 31762-50   |
| 3.75       | 30434-59  | 31762-83   |
| 3.88       | 30434-61  | 31762-51   |
| 4.25       | 30434-67  | 31762-52   |
| 4.75       | 30434-75  | 31762-54   |
| 5.13       | 30434-81  | 31762-132  |
| 5.25       | 30434-83  | 31762-55   |
| 5.75       | 30434-91  | 31762-56   |
| 6.25       | 30434-99  | 31762-59   |
| 6.75       | 30434-107 | 31762-60   |
| 7.25       | 30434-115 | 31762-62   |
| 8.00       | 30434-127 | 31762-63   |
| 9.00       | 30434-143 | 31762-78   |

Wrap  
Around  
Bracket  
30393



Universal  
Mounting  
Bracket  
32107



## How to Choose a Commutating Capacitor

1. From circuit analysis or measurement, determine application values for these six parameters:

Nominal capacitance in  $\mu\text{F}$   
 Current pulse width in  $\mu\text{s}$   
 Current pulse period in  $\mu\text{s}$   
 Maximum peak voltage  
 Continuous AC voltage in  $V_{\text{rms}}$   
 Maximum volt-amps

2. Choose a capacitor from the ratings table of the desired nominal capacitance with a peak voltage rating no less than your maximum peak voltage.

3. Check that your application's rms current is no more than the capacitor's Max. Amps RMS. You can calculate the

current from your  $V_{\text{rms}}$  using the equations in the following section.

4. Check that your application's volt-amperes is not more than the capacitor's VA capability. The VA capability is the max VA rating times the Volt-Ampere multiplier from Figure 2 (Current Pulse Width) and that times the Volt-Ampere Multiplier from Figure 3 (Ambient Temperature). See the following section for more on using voltampere multipliers

If you need a greater VA capability, repeat these steps for a higher peak voltage capacitor or consider connecting units in parallel to divide the VA required. For up to peak voltage of 600 V, you may also consider polypropylene film dielectric units, Catalog Numbers SCRN262R through SCRN266R, with higher VA capability

## Using Volt-Ampere Ratings

The capacitors maximum VA rating is the maximum product of the sinewave voltage and current that may be applied at 65 °C without overheating the capacitor and reducing its expected life. For other temperatures and pulsed current, use the multipliers of Figures 2 and 3 to derate the Max VA rating.

The Max Amps RMS rating is set by the capability of the capacitor terminals. Exceeding this limit can damage the terminals and cause capacitor failure.

Calculate the capacitor's actual VA load as the product of the rms voltage across the capacitor and the rms current through the capacitor. To calculate rms current for an applied sine wave or squarewave voltage, use these equations.

For a sinewave voltage the current is:

$$I_{\text{rms}} = 2\pi f C V_{\text{rms}} \times 10^{-6}$$

and for a squarewave the current is:

$$I_{\text{rms}} = C \cdot V / 0.64(tT)^{0.5} = I_{\text{peak}}(t/T)^{0.5}$$

where (f) is repetition frequency in Hz, C is nominal capacitance in  $\mu\text{F}$ ,  $\Delta V$  the peak-to-peak squarewave amplitude in volts, (t) is the pulse width in  $\mu\text{s}$  and T is the pulse period in  $\mu\text{s}$ .

The peak current for the square wave voltage is:

$$I_{\text{peak}} = C \cdot V / 0.64t$$

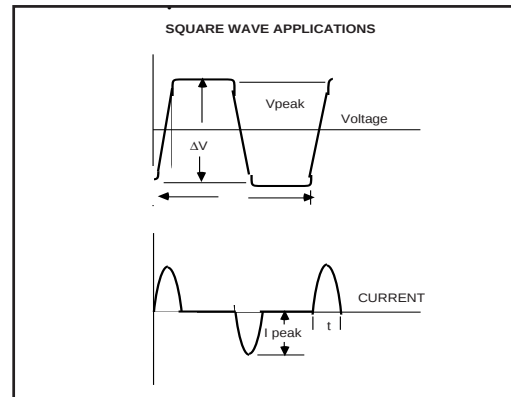


Figure 1

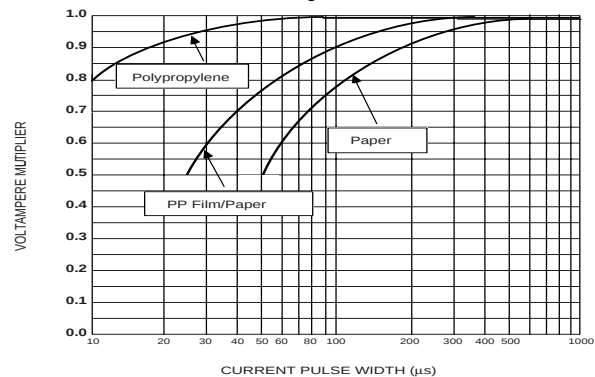


Figure 2

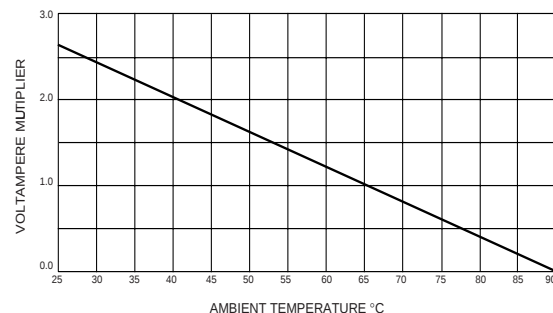


Figure 3