# **Application Data for SCR and Snubbers Capacitors**

#### For use with capacitor series: A97F8600/ A97F8700

This Application Note is designed to allow users to select the correct capacitor for two common conditions encountered in power electronic circuits:

- (a) Sinusoidal waveform
- (b) Squarewave.

For applications that do not fit into either of these categories, please contact your GE sales representative for assistance.

To select the correct capacitor proceed as follows:

- 1. Determine the following:
  - (1) Microfarad value required
  - (2) Peak voltage
  - (3) RMS current
  - (4) Current pulsewidth
  - (5) Capacitor ambient temperature.
- 2. Select a capacitor with the correct capacitance and a peak voltage equal to or greater than the application voltage.
- 3. Apply the correction factors on the opposite page for Current Pulsewidth and Ambient Temperature to the 55 °C RMS Current Rating of the selected capacitor.

If the "corrected" RMS current value is equal to or greater than the RMS current of the application, the capacitor is suitable. **If not**, a capacitor with a higher current rating must be selected. This can be done by choosing a higher voltage capacitor. Note that the All-FilmA 97F8600 series has the highest current ratings.

# Note: In no case should the actual RMS current exceed the limit of the capacitor terminals .

Example No. 1	
Capacitance:	10 mF
Voltage:	200 Vac RMS 3 kHz
	Sinewave
Ambient Temperature:	65 °C

Peak Voltage RMS Current	= $200 \times \sqrt{2} = 283$ Volts = $2p \times 3000 \times 10 \times 10 - 6 \times 200$
	= 37.7 A
Current Pulsewidth	= 166 µs

The A97F8672 has a current rating of 136 A. Applying the correction factors for a 166 ms pulsewidth and a 65  $^\circ$ C ambient:

RMS current rating =  $136 \times 0.56 \times 0.75$ = 57.1 A

This capacitor is satisfactory. Note the terminal limit of 60 amps.

## Example No. 2

Capacitance: Voltage: Ambient T emperature:	5 μF 60 Vac RMS 16.6 kHz Sinewave 65°C
Peak Voltag RMS current	$= 60\sqrt{2} = 85 V$ = $20 \times 16,600 \times 5 \times 10^{-6} \times 60$ = $21.3 A$
Current Pulsewidth	= 3 0 µs

The A97F8671 is rated 86 amps which becomes 80.6A with the correction factors. This is more than adequate. Again, note the 60-A terminal limitation.

#### Example No. 3

Capacitar Voltage: Frequenc Rise Time Fall Time: Ambient T	nce: y: e: Fempera	ture:	20 µF 600 Vpeak unidirectional squarewave 200 Hz 60 µs 60 µs 65°C
Peak Volt	age	=	600 V
l peak =	CDV 0.64t	=	$\frac{20 \times 10^{-6} \times 600}{0.64 \times 60 \times 10} -6 = 313 \text{ A}$

 $I \text{ rms} = 313 \sqrt{60 \times 10^{-6} \times 200} = 32.4 \text{ A}$ 

Current Pulsewidth = 60 ms

The A97F8673 has a peak voltage rating of 600 V and a current rating of 235 A. The correction factor for 65°C is 0.75, and for a 60  $\mu$ s pulsewidth it is 0.90. Thus its current rating in this application is 235 x 0.80 x 0.90 = 158.6 A; adequate for the application. Again, note the 60A terminal limitation.

© 2000 GE Company



### **CORRECTION FACTOR FOR CURRENT PULSEWIDTH**









# **CORRECTION FACTOR FOR** AMBIENT TEMPERATURE

**RMS CURRENT** CORRECTION FACTOR

> © 2000 GE Company 12