



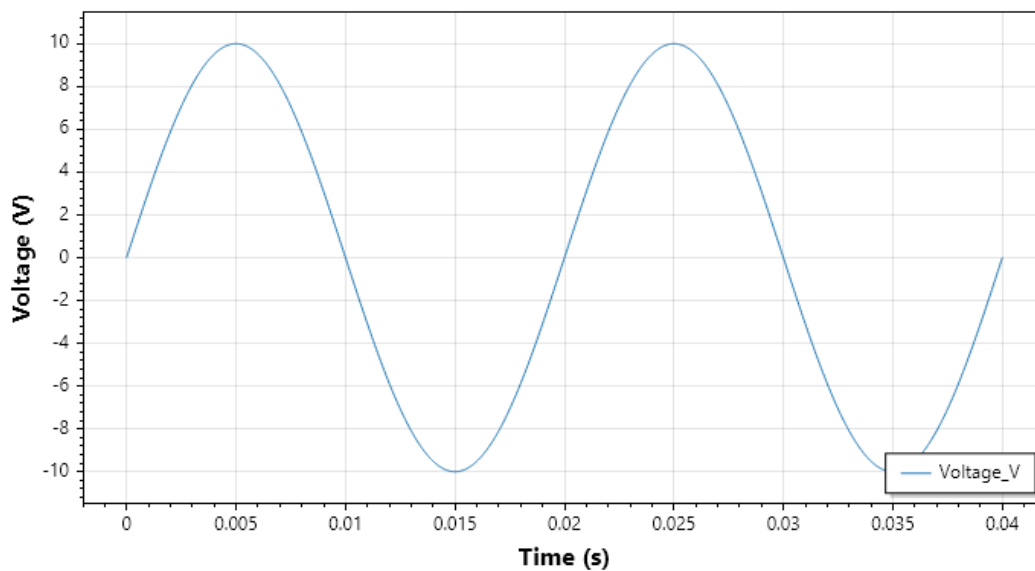
RC Low-Pass Filter Characterization

This report covers time-domain and frequency-domain characterization of a single-pole RC low-pass filter, buffered by an op-amp follower. Raw measurement data lives alongside this document as `.csv` files, plotted below directly - no separate spreadsheet needed.

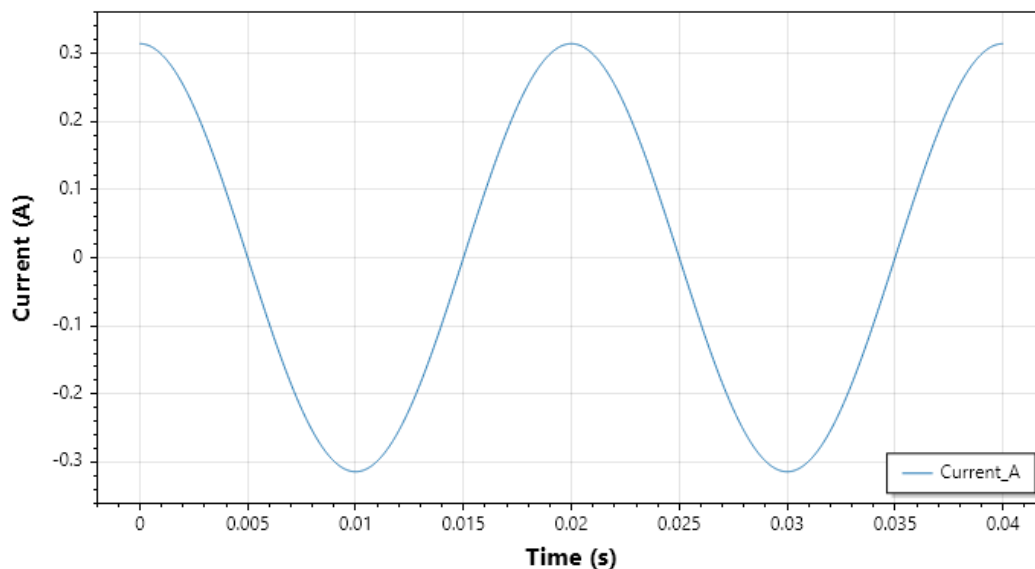
1. Time-Domain Response

The filter's step/sine response was captured across one full cycle of the input excitation, plotted separately below since voltage and current differ by an order of magnitude - the current's phase lead relative to the voltage is the expected capacitive behavior.

Capacitor Voltage vs Time



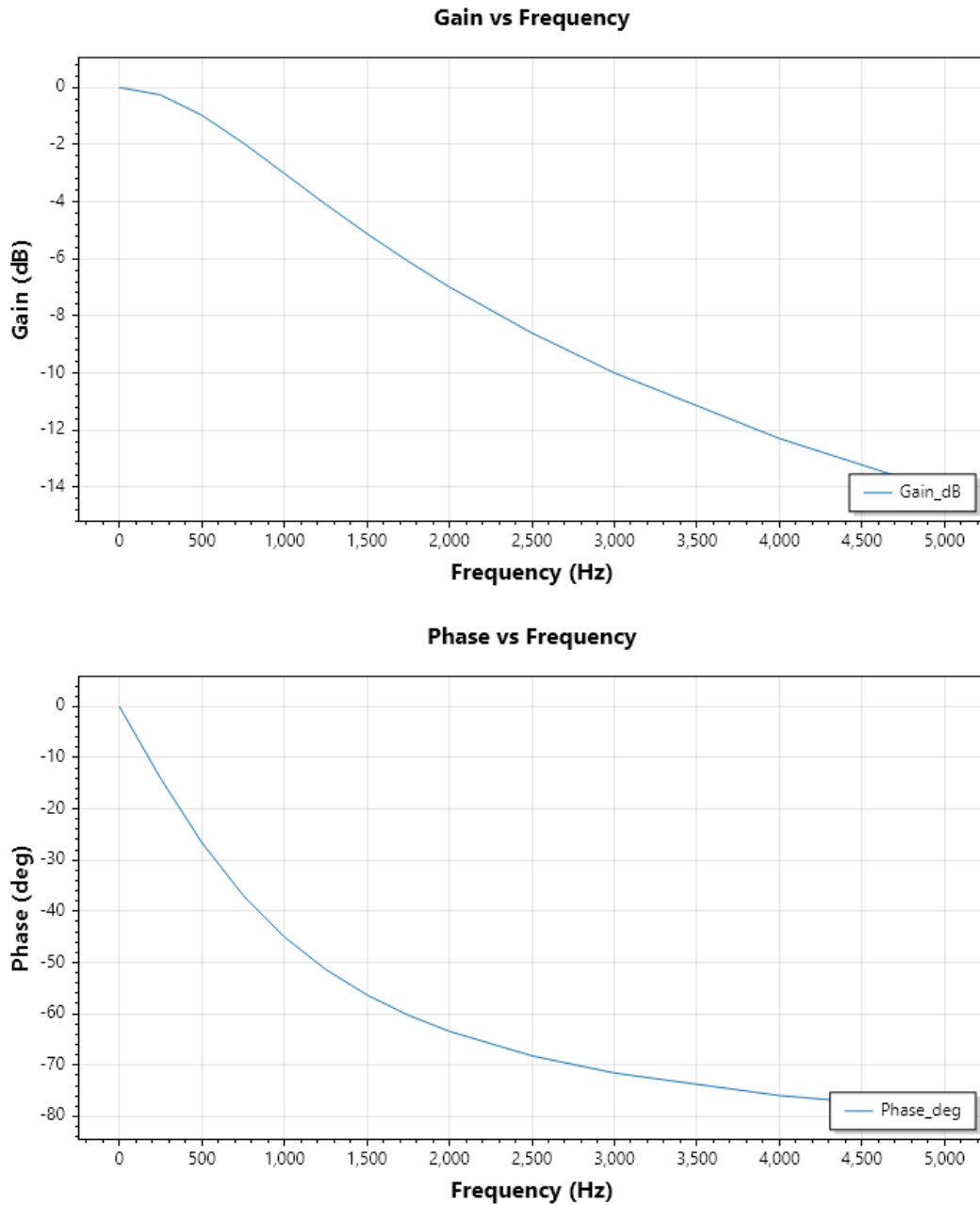
Capacitor Current vs Time





2. Frequency Response

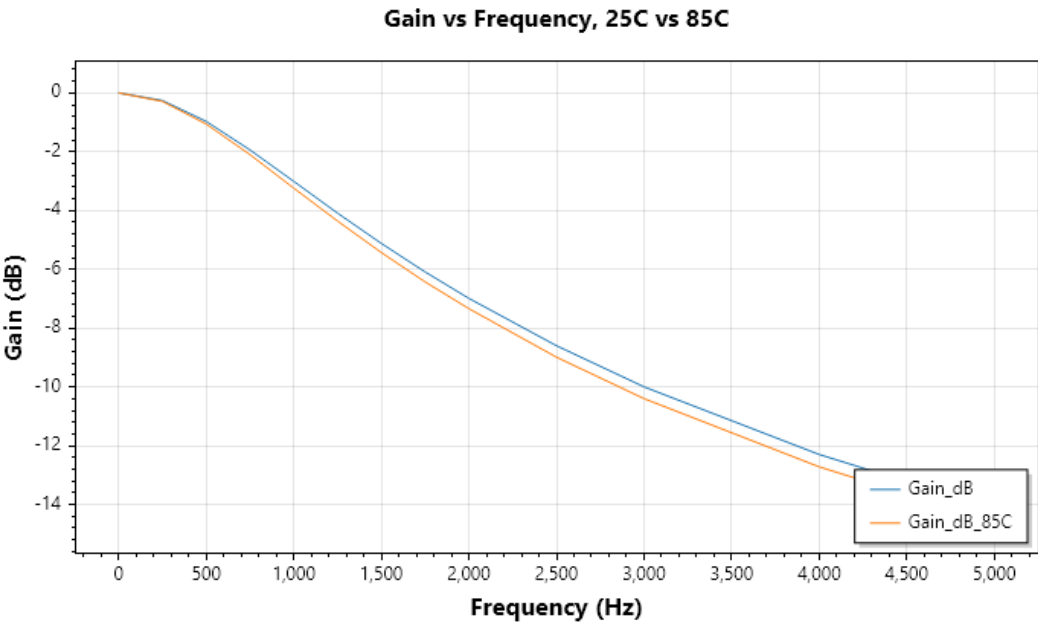
Gain and phase were measured by sweeping the input frequency and recording the output amplitude and phase shift relative to the input at each point.



The -3 dB point falls at approximately 1000 Hz, consistent with the R1/C1 values in the component table below:

$$f_c = \frac{1}{2\pi R_1 C_1}$$

Gain was also measured at 85°C to check thermal drift - both traces on one chart make the shift easy to compare directly:

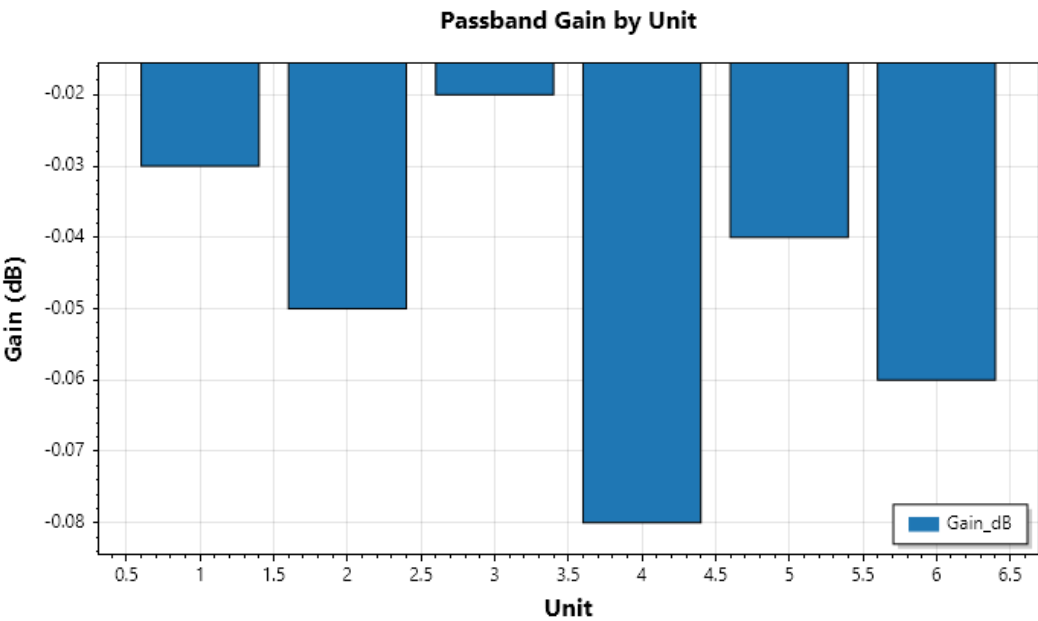


3. Component Specifications

Component	Value	Tolerance	Package
R1	10 kΩ	±1%	0603
C1	15.9 nF	±5%	0805
R2	4.7 kΩ	±1%	0603
U1	OPA2137	-	SOIC-8

4. Unit-to-Unit Consistency

Passband gain (measured at 100 Hz) across six production units from the same reel:





5. Test Summary

Test	Result	Status
DC offset	< 5 mV	PASS
Cutoff frequency (f_c)	1001 Hz	PASS
Passband ripple	< 0.1 dB	PASS