# 5 kHz Low-Pass Filter




**EF114**

## Description

The EF114 Low-Pass Filter employs a 5th order elliptic filter design. The design reduces group delay variation while preserving a practical 5th order rejection skirt. The EF114 is notably designed to terminate into any modern voltage signal transfer system that has a high impedance input, including DAQ systems, laboratory test equipment, and oscilloscopes. This architecture provides the highest signal-to-noise ratio capabilities for $V_{transfer}$ systems.

## Specifications

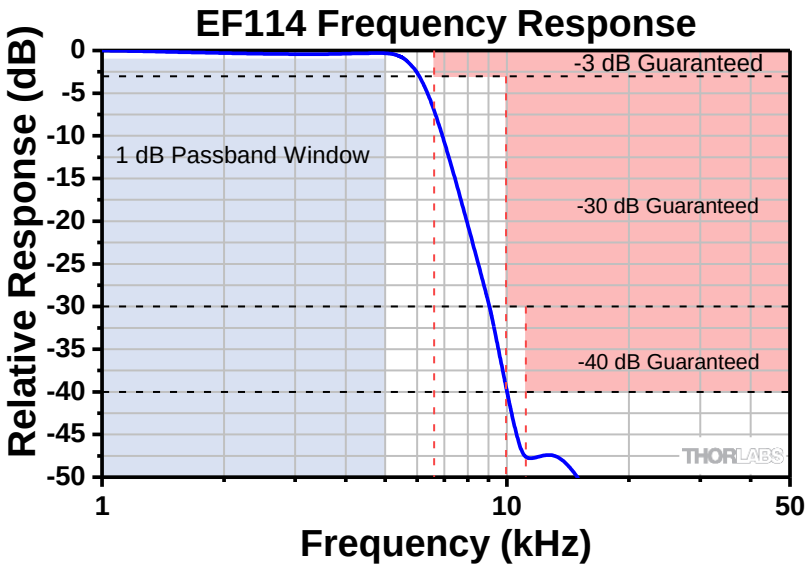
| EF114 | |
|---|---|
| | **Value[a]** |
| **Passband (1 dB Window)[b]** | 0 to 5 kHz |
| **3 dB Rejection** | >6.61 kHz |
| **30 dB Rejection** | >9.95 kHz |
| **40 dB Rejection** | >11.14 kHz |
| **Source Impedance (BNC Female)** | 50 Ω (Typical) |
| **Load Impedance[c] (BNC Female)** | ≥100 kΩ (Typical) |
| **Input Voltage** | ±10 V (Max) |
| **Storage Temperature** | -20 to +70 °C |

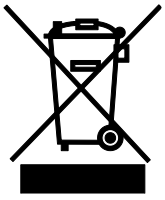
a. Values measured at 25 °C.
b. Performance measured to 500 MHz.
c. This filter can be operated with termination resistances below 1 kΩ, however, the passband will narrow at smaller termination resistances and the performance is not guaranteed.

**Sample Response Data**

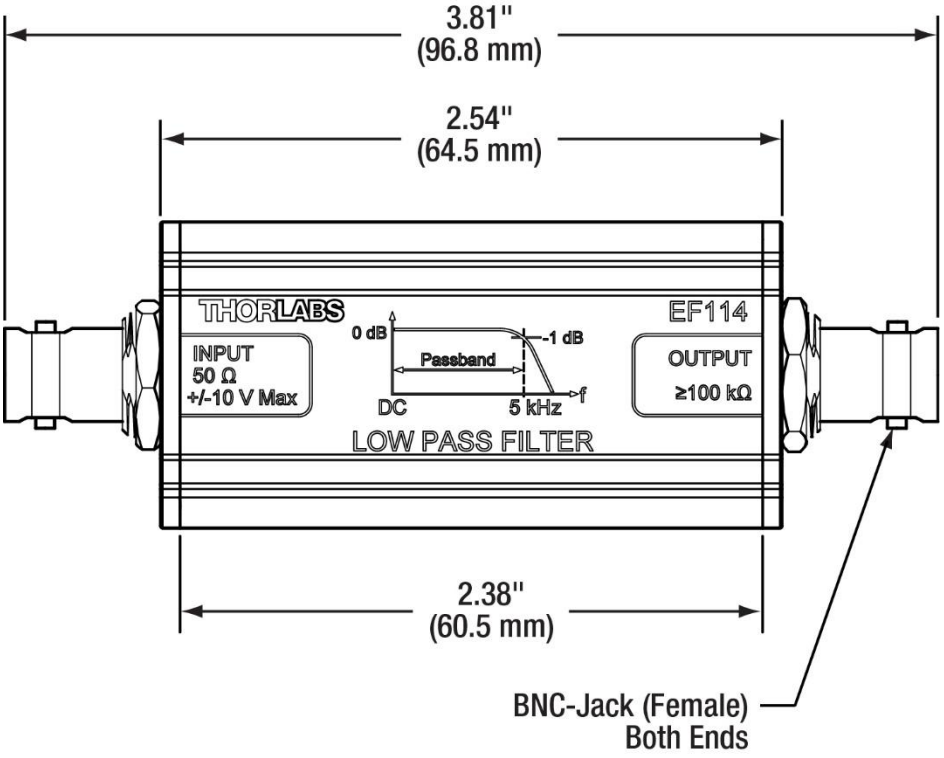
| Freq. (kHz) | Rel. Resp. (dB) | Group Delay Variation (µs) |
|---|---|---|
| 1.00 | 0.00 | 0.00 |
| 1.10 | -0.04 | -0.26 |
| 1.33 | -0.10 | -0.67 |
| 1.47 | -0.15 | -0.41 |
| 1.61 | -0.20 | -0.28 |
| 2.15 | -0.33 | 0.57 |
| 2.60 | -0.40 | 3.50 |
| 3.15 | -0.44 | 8.23 |
| 3.47 | -0.43 | 12.71 |
| 3.82 | -0.40 | 18.66 |
| 4.20 | -0.35 | 29.68 |
| 4.47 | -0.32 | 39.14 |
| 4.67 | -0.30 | 47.23 |
| 4.83 | -0.31 | 55.91 |
| 4.96 | -0.31 | 63.15 |
| 5.00 | -0.32 | 65.48 |
| 5.05 | -0.33 | 68.37 |
| 5.14 | -0.37 | 74.87 |
| 5.23 | -0.41 | 84.77 |
| 5.36 | -0.55 | 94.31 |
| 5.51 | -0.78 | 104.35 |
| 5.60 | -1.01 | 108.61 |
| 5.90 | -2.07 | 111.75 |
| 6.11 | -3.16 | 103.21 |
| 6.55 | -6.18 | 68.17 |
| 7.47 | -15.04 | -5.78 |

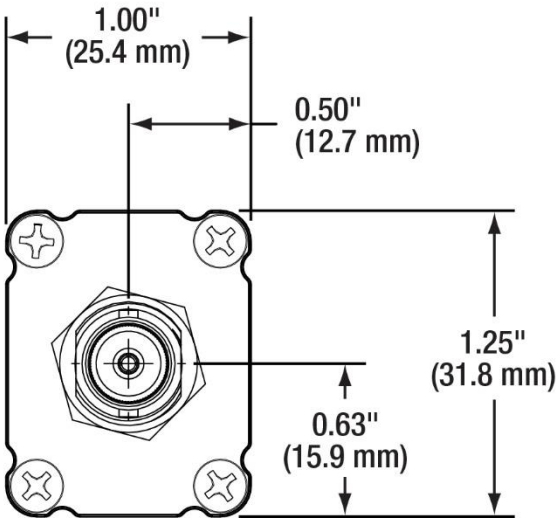
| Freq. (kHz) | Rel. Resp. (dB) |
|---|---|
| 9.04 | -29.86 |
| 9.12 | -30.68 |
| 9.20 | -31.51 |
| 9.95 | -39.46 |
| 10.04 | -40.35 |
| 10.13 | -41.28 |
| 10.76 | -46.83 |
| 11.24 | -48.22 |
| 12.70 | -47.01 |
| 14.09 | -48.14 |
| 16.20 | -52.43 |
| 18.62 | -59.20 |
| 21.22 | -69.53 |
| 24.39 | -61.97 |
| 28.28 | -58.11 |
| 32.22 | -56.78 |



## Drawings


3.81"
(96.8 mm)
2.54"
(64.5 mm)
THORLABS
EF114
INPUT
50 Ω
+/-10 V Max
0 dB
-1 dB
Passband
DC
5 kHz
f
OUTPUT
≥100 kΩ
LOW PASS FILTER
2.38"
(60.5 mm)
BNC-Jack (Female)
Both Ends


1.00"
(25.4 mm)
0.50"
(12.7 mm)
1.25"
(31.8 mm)
0.63"
(15.9 mm)