

CHF Range of Power RF Terminations

The wireless telecom, broadcast and radar industries rely on high power transmission of radio waves to reach subscribers or measure the environment. This application note provides some background on the function of the 50-ohm load in such equipment.

Basic Functionality

RF engineers use 50-ohm loads to terminate unused ports on devices or open strip lines in microwave circuits.

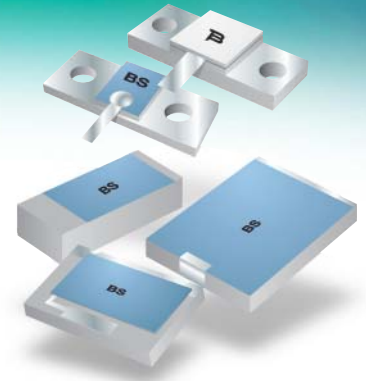
Key Applications

Drop-In Isolators

One of the key building blocks of an amplifier is a ferrite-based device called a “drop-in isolator”. An isolator provides isolation or protection of an amplifier’s input and output. An isolator will contain one 50-ohm load, which shunts energy to ground during an unexpected surge or reflection of energy. (See Figure 1 for the overall appearance of an isolator). There are different types of isolators on the market with different power ratings. Bourns has been qualified with its 20 W load (CHF1206CNT500L) and 150 W load (CHF3523CNT500L) on two different drop-in isolator designs. In addition, Bourns can customize a 50-ohm load to most requirements, with no NRE for engineering expenses in creating a design and/or manufacturing engineering samples. Manufacturers of “drop-in isolators” are key targets for the CHF family. The format of such loads consists of an input terminal soldered to an external lead and a ground plane, which is soldered to the metallic surface of the isolator.

Amplifier Boards

Power amplifier printed circuit boards for base stations or television transmitters will also require 50-ohm loads to terminate unused ports. The 10 W (CHF2010CNP500L) and 40 W versions (CHF3725CNP500L) have both been qualified on amplifier boards for cellular base station applications. These are parts with traditional surface mount terminals. In some cases, the customer will use a flanged load. A flanged load connects to the circuit board via a silver lead. It is also connected to a heat sink to safely dissipate the heat via its flange. These parts are quite common in broadcast applications. Bourns 150 W (CHF8838CNF500L) and 250 W (CHF9838CBF500L) models are qualified for broadcast applications. Bourns can customize a 50-ohm load to most requirements, with no NRE for engineering expenses in creating a design and/or manufacturing engineering samples. Manufacturers of amplifier modules for the telecom and broadcast markets as well as manufacturers of cellular phone base stations are the main target customers for these products.



Substrate Materials

All parts use thermally conductive ceramics such as Aluminium Nitride or Beryllium Oxide as substrate materials. The high power rating of these parts necessitates the use of such materials to limit temperature rise of the part during use.

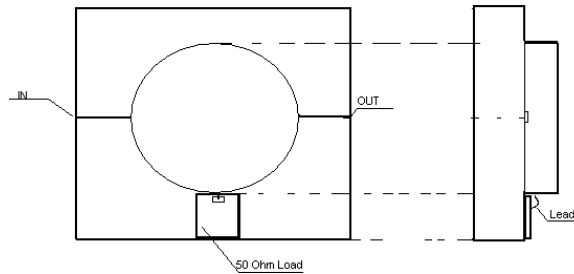


Figure 1 - Typical Appearance of a Drop-In Isolator with 50-ohm Load

Test

RF Engineers require that the VSWR (Voltage Standing Wave Ratio) be as close to unity as possible. The VSWR is an indicator of how well the parts absorb energy and not reflect it in the opposite direction. The standard test attaches the part to a fixture and measures the S parameters on a network analyzer. Figure 2 shows a typical fixture. The power is tested by running the part at full DC power for 1000 hours on an appropriate heat sink.

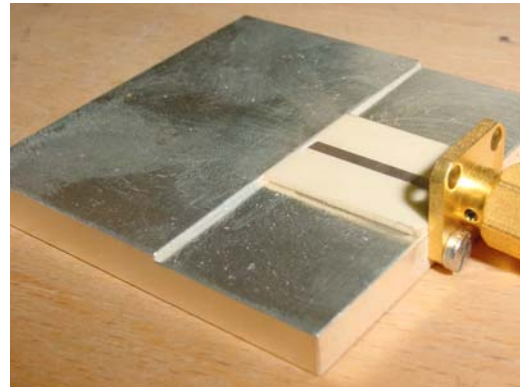


Figure 2 - Photograph of a Test Fixture for S Parameters

Conclusion

Bourns now supplies a wide range of RF Power Terminations for applications in telecom, broadcast and radar. The CHF family is supplied in either surface mount or flanged varieties and cover powers ranging from 10 W to 250 W and frequency ranges from DC to 4.0 GHz.

Please contact your local Bourns Sales Representative for more information.

Asia-Pacific: Tel +886-2 256 241 17
Fax +886-2 256 241 16

Europe: Tel +41-(0)41 768 55 55
Fax +41-(0)41 768 55 10

Americas: Tel +1-951-781-5500
Fax +1-951-781-5700