



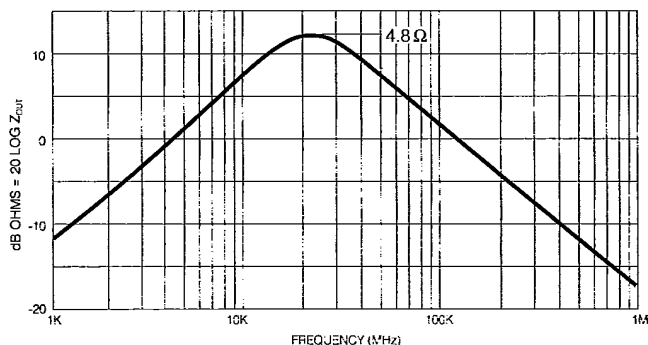
The FMC-461 EMI filter module has been specifically designed to reduce the input line reflected ripple current of Interpoint's MHF, MTR, MTO, MTW, MHE, and MLP series of dc-dc converters. It is intended for use in applications of high frequency switch-mode dc-dc converters which must meet MIL-STD-461B levels of conducted and radiated noise.

When used in conjunction with Interpoint converters, the FMC-461 reduces input ripple current by 40 dB within the frequency band of 200 kHz to 50 MHz. This gives the filter/converter combination a performance which exceeds the CEO3 test of MIL-STD-461B. Typical FMC-461 output impedance behavior and frequency response is shown in Figures 1 and 2. CEO3 performance of a typical converter with the FMC-461 attached is shown in Figure 3.

The FMC-461 also features a fast-reacting (1 pico second) transient suppressor which begins clamping the input voltage at approximately 47 Vdc, protecting the dc-dc converter from damage from induced line transients.

The filter is rated to operate with no degradation of performance over the temperature range of -55°C to $+125^{\circ}\text{C}$ (as measured at the baseplate). Above $+125^{\circ}\text{C}$, current must be derated as specified on the reverse. The maximum dc insertion loss for the FMC-461 (at a load of 22 watts) represents a power loss of less than 2% at typical input voltage.

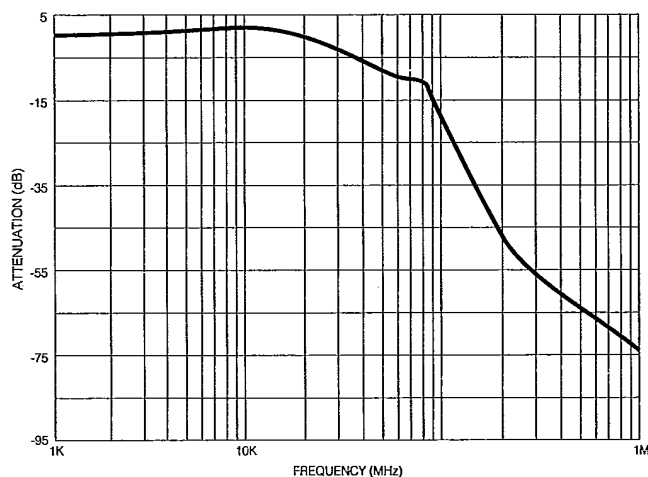
This unit is built using thick-film hybrid technology and is hermetically sealed in metal packages for military, aerospace, and other high-reliability applications. The filter uses only ceramic capacitors for reliable high temperature operation.



FMC-461 — MAGNITUDE OF TYPICAL OUTPUT Z WITH INPUT SHORTED

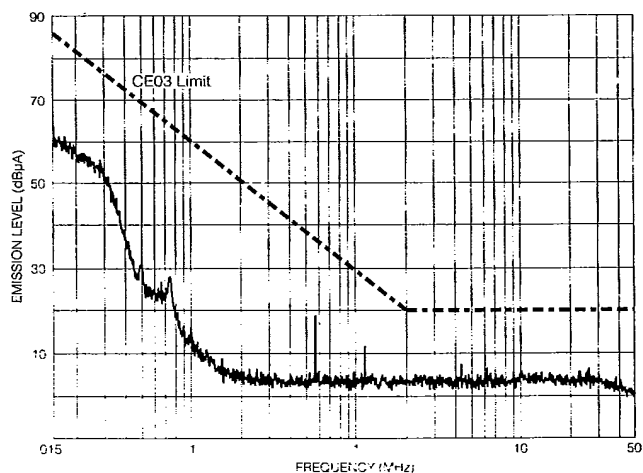
Figure 1

- Less than 2.4 sq. in. of board area
- -55°C to $+125^{\circ}\text{C}$ operation
- 40 dB min differential mode rejection at 200 kHz
- 50 dB min differential mode rejection from 400 kHz to 50 MHz
- Optional environmental screening
- Meets MIL-STD-461B CEO3 standards for MHF, MHE, MLP, MTO, MTR, and MTW dc-dc converters
- MIL-STD-704D DC power bus compatibility



FMC-461 — TYPICAL AMPLITUDE RESPONSE VS. FREQUENCY

Figure 2



DC-DC CONVERTER TYPICAL WORST CASE EMI WITH FMC-461 FILTERING

Figure 3

CHARACTERISTICS

PARAMETER	CONDITION	MIN	TYP	MAX	UNITS	PARAMETER	CONDITION	MIN	TYP	MAX	UNITS
INPUT VOLTAGE	STEADY STATE	0	28	40	Vdc	POWER DISSIPATION	MAX. CURRENT	—	—	1.6	Watts
INPUT ¹ CURRENT	DC	—	—	2.70 ³	Amps	DIFFERENTIAL MODE REJECTION	200 kHz	40	—	—	dB
INPUT CLAMPING VOLTAGE	-55°C	40.8	45.1	49.4	Vdc	DIFFERENTIAL MODE REJECTION	400 kHz-50 MHz	50	—	—	dB
	+25°C	44.7	47.0	49.4			2 MHz-50 MHz	40	—	—	
	+125°C	44.7	49.5	54.2		COMMON MODE REJECTION	ANY PIN TO CASE	—	—	0.032	μF
OUTPUT ² VOLTAGE	STEADY STATE	$V_{OUT} = V_{IN} - I_{IN}(R_{dc})$			Vdc	CAPACITANCE	ANY PIN TO CASE, 500 Vdc	100	—	—	MΩ
OUTPUT ¹ CURRENT	RIPPLE	—	—	1.0	Amps RMS	OPERATING ¹ TEMP.	CASE BASEPLATE	-55	—	+125	°C
	STEADY STATE	—	—	2.70 ³	Amps	STORAGE TEMP.	CASE BASEPLATE	-65	—	+150	°C
DC RESISTANCE (R _{dc})	T = 25°C	—	—	0.20	Ohms	WEIGHT		—	46	48	Grams

¹ Above 125°C case temperature, derate current as follows:

- Output Ripple Current: Derate linearly to zero at +135°C case temp.
- DC Input & Output Current: Derate linearly to zero at +135°C case temp.

² Typical applications result in V_{OUT} within 2% of V_{IN} .

³ Parts manufactured after 8/1/91 have this increased current level.

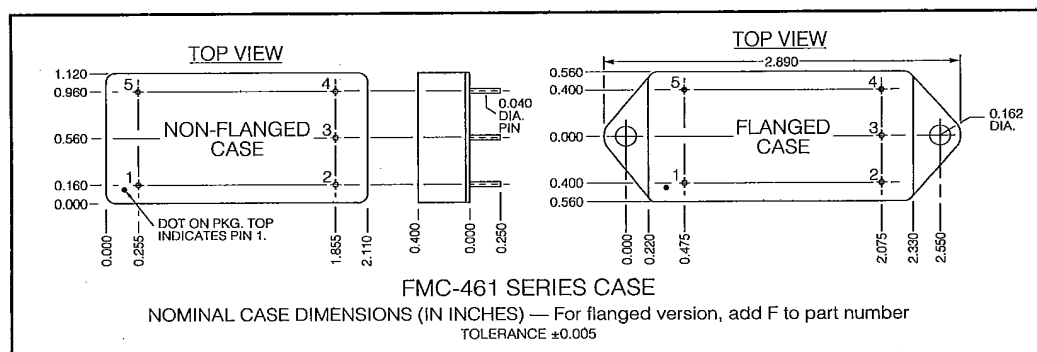
OPTIONAL ENVIRONMENTAL SCREENING

Environmental screening, referenced to MIL-STD-883, per Interpoint's in-house screening procedure, consists of the following:

- Pre-cap internal visual inspection: Per method 2017
- Stabilization bake: 24 hrs. at 125°C per method 1008 cond. B
- Temperature cycle: 10 times, -55°C to +125°C per method 1010
- Constant acceleration: 500 g per method 2001
- Fine leak: Per method 1014, cond. A
- Gross leak: Per method 1014, cond. C
- Burn-in: 96 hr. at 125°C case (typ.)
- Final electrical test (25°C)
- Final external visual inspection: Per method 2009

To order optional screening, add suffix -ES to model number. Example: FMC-461/ES. On unscreened parts, the screening code block is marked with "00" or "01." On screened parts, the block is marked "ES" or "02." Contact your Interpoint representative for information about additional Hi-Rel screening options.

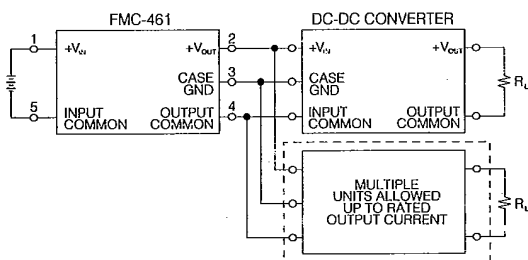
METAL HERMETIC PACKAGE:



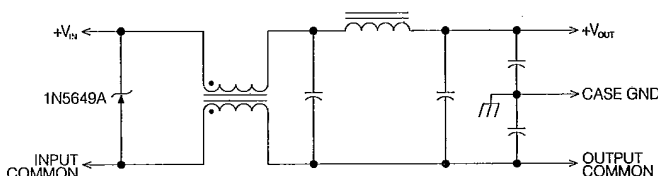
DESIGNATION	PIN
+ V_{IN}	1
+ V_{OUT}	2
Case Ground	3
Out Common	4
In Common	5

CAUTION: Heat from reflow or wave soldering may damage this part. Solder pins individually with heat application NOT exceeding 300°C for 10 seconds per pin.

FMC-461 CONNECTION DIAGRAM



FMC-461 SCHEMATIC (SIMPLIFIED)



99329 AUGUST 1991