

EMI FILTERS

1 FEATURES

- Compliant to relevant electro-magnetic compatibility specifications
- 16 to 40V input voltage, 28V rated voltage
- Up to 7A output current
- Low output voltage drop, high efficiency
- Up to 40 dB attenuation at 500kHz

Table 1 Product Models

MODELS	
HMSF-600	HFE-CE03F
HFG-CE03	MSF-600(HFS-CE03)
HFD-CE03	HFA-CE03
HFD-CE03F	HFB-CE03F
HMD-CE03F	HFB-CE03F-A



Figure 1 Outline of EMI Filters

MODEL	SIZE	WEIGHT	MODEL	SIZE	WEIGHT
HMSF-600	29.9×29.9×10mm ³	65grams	HFE-CE03F	76.2×38.1×11.5mm ³	65grams
HFG-CE03	27.9×27.9×8.5mm ³	22grams	MSF-600 (HFS-CE03)	27.34×27.34×10.2mm ³	21grams
HFD-CE03	36.83×28.44×8.5mm ³	31grams	HFA-CE03	53.8×28.4×12.6mm ³	44grams
HFD-CE03F	50.8×28.44×8.8mm ³	34grams	HFB-CE03F	73.4×28.4×12.8mm ³	65grams
HMD-CE03F	68.58×34.18×12.8mm ³	41grams	HFB-CE03F-A	73.77×27.3×12.7mm ³	58grams

2 DESCRIPTION

The EMI filter modules are specifically designed to reduce the reflected input ripple current of high frequency DC/DC converters. They can minimize electromagnetic interference (EMI) for many models of DC/DC converters, ideal for use in aviation, aerospace and other high reliability applications.

The design and manufacturing process of these filter modules are in compliance with General Standards of Hybrid Integrated Circuits and detailed standards of manufacturing. The screening is in compliance with Relevant Test Methods and Procedures for Microelectronics.

3 ELECTRICAL PERFORMANCE

RECOMMENDED OPERATING CONDITIONS

- Input VDC: 16 to 40 V
- Case Temperature(Tc): -55℃ to +125℃

HMSF-600, HFG-CE03, HFD-CE03, HFD-CE03F

Table 2 Electrical Characteristics

(T_{CASE} = -55°C to +125°C, V_{in}=28V ± 0.5%, Unless Otherwise Specified)

MODELS		HMSF-600		HFG-CE03		HFD-CE03		HFD-CE03F		
Parameter	Conditions	Min	Max	Min	Max	Min	Max	Min	Max	
Input Voltage(V)	T _A =25°C	22	32	16	40	16	40	16	40	
Input Current(A)	T _A =25°C	—	0.6	—	1	—	1.5	—	2.5	
Output Current(A)	T _A =25°C	—	0.75	—	1	—	1.5	—	2.5	
Output Voltage Drop (V)	T _A =25°C, full load	—	2.8	—	0.5	—	0.8	—	0.5	
Power Dissipation(W)	T _A =25°C, full load	—	0.5	—	0.5	—	1.2	—	2	
Isolation (MΩ)	any pin to case at 500 VDC	100	—	100	—	100	—	100	—	
Insertion Loss(dB)	T _A = 25° C	10 to 100kHz	15	—	15	—	15	—	15	—
		100 to 500kHz	25	—	25	—	25	—	25	—
		500kHz to 1MHz	20	—	20	—	20	—	20	—
		1 to 10MHz	10	—	10	—	10	—	10	—

MSF-600(HFS-CE03), HFA-CE03m, HFB-CE03F, HFB-CE03F-A

Table 3 Electrical Characteristics

(T_{CASE} = -55°C to +105°C, V_{in}=28V ± 0.5%, Unless Otherwise Specified)

MODELS		MSF-600 (HFS-CE03)		HFA-CE03		HFB-CE03F		HFB-CE03F-A		
Parameter	Conditions	Min	Max	Min	Max	Min	Max	Min	Max	
Input Voltage(V)	T _A =25°C	16	40	16	36	16	36	22	32	
Input Current(A)	T _A =25°C	—	0.6	—	1.75	—	3.8	—	3.8	
Output Current(A)	T _A =25°C	—	—	—	1.75	—	3.8	—	3.8	
Output Voltage Drop (V)	T _A =25°C, full load	—	2.8	—	2.8	—	2	—	2	
Power Dissipation(W)	T _A =25°C, full load	—	—	—	4.9	—	7.6	—	7.6	
Isolation (MΩ)	any pin to case at 500 VDC	100	—	100	—	100	—	100	—	
Insertion Loss(dB)	T _A = 25° C	10 to 100kHz	15	—	15	—	15	—	15	—
		100 to 500kHz	25	—	25	—	25	—	25	—
		500kHz to 1MHz	20	—	20	—	20	—	20	—
		1 to 10MHz	10	—	10	—	10	—	10	—

HFE-CE03F, HMD-CE03F

Table 4 Electrical Characteristics

($T_{CASE} = -55^{\circ}C$ to $+105^{\circ}C$, $V_{in}=28V \pm 0.5\%$, Unless Otherwise Specified)

MODELS		HFE-CE03F		HMD-CE03F		
Parameter	Conditions	Min	Max	Min	Max	
Input Voltage(V)	$T_A=25^{\circ}C$	16	40	16	36	
Input Current(A)	$T_A=25^{\circ}C$	—	6	—	7	
Output Current(A)	$T_A=25^{\circ}C$	—	6	—	7	
Output Voltage Drop (V)	$T_A=25^{\circ}C$,full load	—	2	—	1	
Power Dissipation(W)	$T_A=25^{\circ}C$,full load	—	14	—	7	
Isolation ($M\Omega$)	any pin to case at 500 VDC	100	—	100	—	
Insertion Loss(dB)	$T_A = 25^{\circ}C$	10 to 100kHz	15	—	15	—
		100 to 500kHz	25	—	25	—
		500kHz to 1MHz	20	—	20	—
		1 to 10MHz	10	—	10	—

4 TYPICAL MTBF CURVES

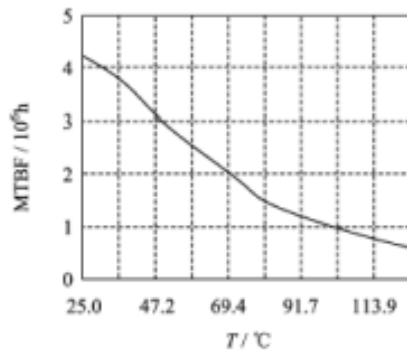


Figure 2 HFE—CE03F

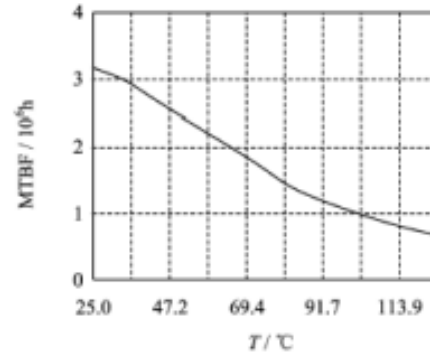


Figure 3 HMD—CE03F

5 TYPICAL CONNECTION DIAGRAM

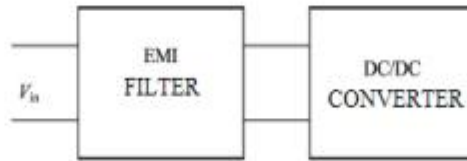
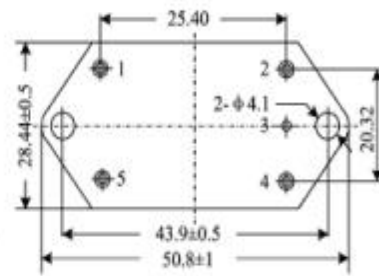
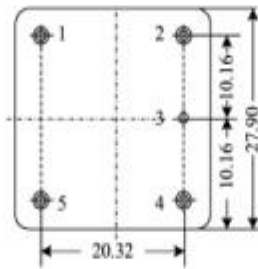
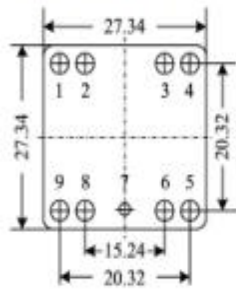


Figure 12 CONNECTION DIAGRAM WITH DC/DC CONVERTER

6 PACKAGE SPECIFICATIONS

BOTTOM VIEW



SIDE VIEW

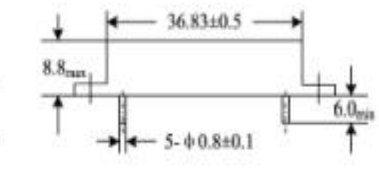
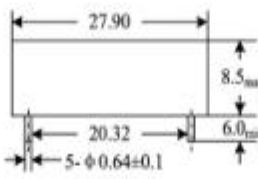
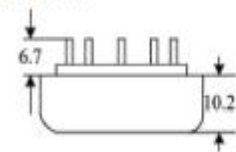
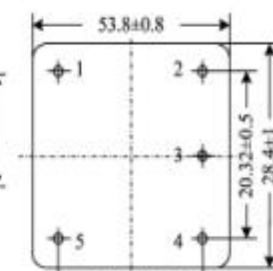
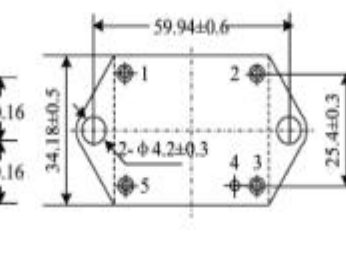
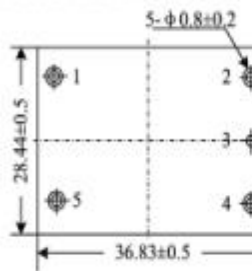


FIGURE 13 MSF-600 (HFS-CE03)

FIGURE 14 HFG-CE03

FIGURE 15 HFD-CE03F

BOTTOM VIEW



SIDE VIEW

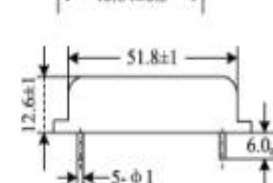
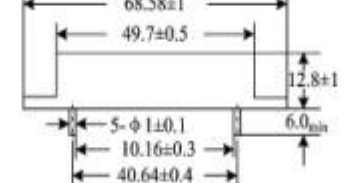


Figure 16 HFD-CE03

Figure 17 HMD-CE03F

Figure 18 HFA-CE03

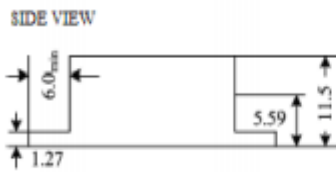
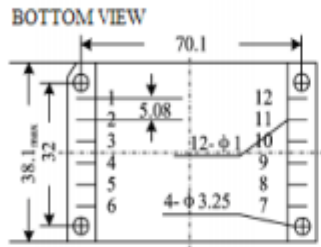


Figure 19 HFE-CE03F

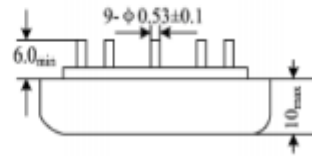
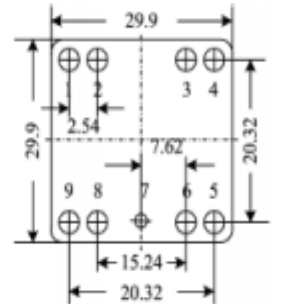


Figure 20 HMSF-600

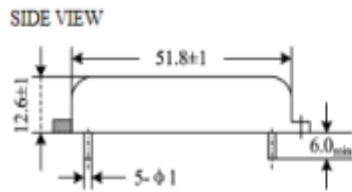
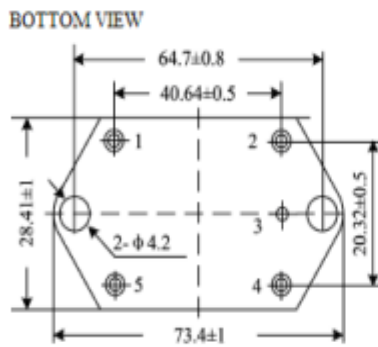


Figure 21 HFB-CE03F

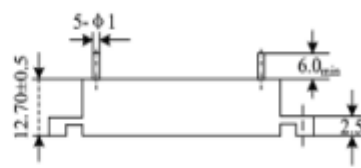
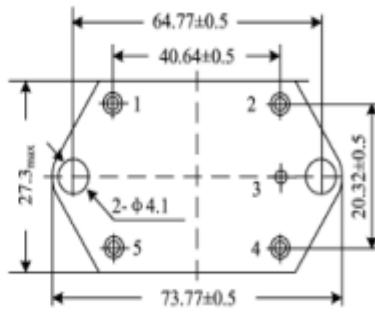


Figure 22 HFB-CE03F-A

Table 5 Case Materials

Case Model	Header	Header Plating	Cover	Cover Plating	Pin	Pin Plating	Sealing Style	Notes
UPP2727-5 (HFG-CE03)	Cold Rolled Steel(10#)	Au	Iron/Nickel Alloy(4J42)	Ni	Copper Compound	Au	Compression Seal	
UPP3728-5 (HFD-CE03)	Cold Rolled Steel(10#)	Au	Iron/Nickel Alloy(4J42)	Ni	Copper Compound	Au	Compression Seal	
UPP3728-5a (HFD-CE03F)	Cold Rolled Steel(10#)	Au	Iron/Nickel Alloy(4J42)	Ni	Copper Compound	Au	Compression Seal	
UPP5034-05c (HFD-CE03F)	Cold Rolled Steel(10#)	Au	Iron/Nickel Alloy(4J42)	Ni	Copper Compound	Au	Compression Seal	
FPP6438-12a (HFE-CE03)	Cold Rolled Steel(10#)	Au	Iron/Nickel Alloy(4J42)	Ni	Copper Compound	Au	Compression Seal	
PP5227-5 (HFA-CE03/HF B-CE03F)	Cold Rolled Steel(08AL)	Au	Cold Rolled Steel (SPCC-SD)	Sn	Iron/Nickel Alloy(4J50)	Au	Compression Seal	
UPP5327-5 (HFB-CE03F-A)	Cold Rolled Steel(10#)	Au	Iron/Nickel Alloy(4J42)	Ni	Copper Compound	Au	Compression Seal	Nickel plating is for ground pin.
PP2727-09(MS F-600/HFS-CE 03)(HMSF-600)	Cold Rolled Steel(08AL)	Au	Cold Rolled Steel (SPCC-SD)	Sn	Iron/Nickel Alloy(4J50)	Au	Compression Seal	

Notes:

Solder pins individually with heat application not exceeding 300° C for 10 seconds per pin.

7 PIN DESIGNATION

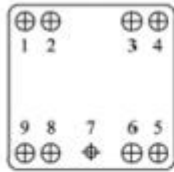


Figure 23 MSF-600(HPS-CE03)

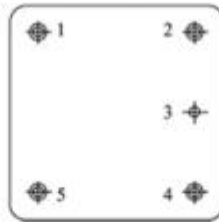


Figure 24 HFG-CE03



Figure 25 HFD-CE03



Figure 26 HFD-CE03F

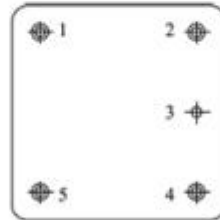


Figure 27 HFA-CE03

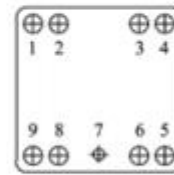


Figure 28 HMSF-600



Figure 29 HMD-CE03F



Figure 30 HFE-CE03F

Table 6 Pin designation

Pin Designation	Pin No.				
	HMSF-600	HFG-CE03	HFD-CE03	HFD-CE03F	HMD-CE03F
Positive Input	3,4	1	1	1	1
Input Common	1,2	5	5	5	5
Positive Output	5,6	2	2	2	2
Output Common	8,9	4	4	4	3
Case Ground	7	3	3	3	4

Table 7 Pin designation

Pin Designation	Pin No.				
	HFE-CE03F	MSF-600 (HPS-CE03)	HFA-CE03	HFB-CE03F	HFB-CE03F-A
Positive Input	1,2,3	3,4	1	1	1
Input Common	4,5,6	1,2	5	5	5
Positive Output	10,11,12	5,6	2	2	2
Output Common	7,8,9	8,9	4	4	4
Case Ground	-	7	3	3	3

8 ORDERING INFORMATION

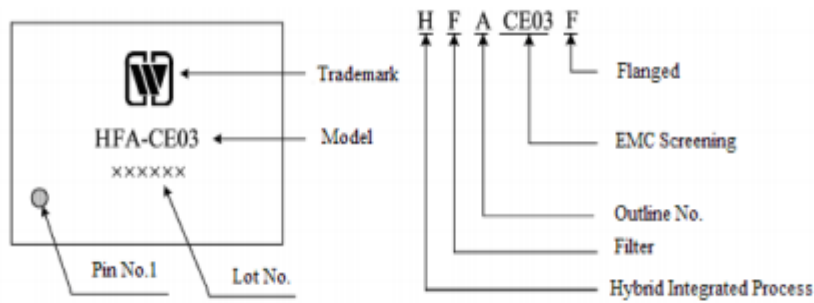


Figure31 Part Numbering Key

Application Notes:

- The correct power supply is to be ensured that may not cause permanent damage to the device.
- When the electrical performance is tested, the testing position should be pin of the device.
- When the device is mounted, the bottom of the device should be closely attached to the circuit board. So as to avoid the damage of the pins, the shockproof should be increased when it is required
- The pin should not be bending to avoid the glass insulator breaking and case leakage.
- When the case temperature is at 105℃, it is suggested that thickness of the thermal sinking plate(copper material) is 5mm, the dimension is greater than 120mm×100mm.
- When the case temperature is at 125℃, it is suggested that thickness of the thermal sinking plate is 5mm, the dimension is greater than 120mm×80mm.

To request a quotation or place orders ,please contact our sales representative or the ECRIM Sales Department at:

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