EMERAL TECH

70Vin 110Vout 2000 Watt

Technical Specification
EF70S110M18P

High Efficiency Military Converter

2000 Watts

Description

The EF70S110M18P Super brick DC/DC converters is a hgih density, high reliability DC/DC converter. The STF family of high efficiency DC/DC converters offer current levels that exceed all other same size military power converters on the market. They are targeted specifically at the aerospace, aerocraft portable weaponry industry and distributed power markets. With a wide input voltage range of 56-90 VDC and output 110 VDC. The model features input undervoltage lockout, output overvoltage protection, overtemperature protection, output overload protection and programmable current limiting, single bus current share and N+1 Redundancy. The fully enclosed, encapsulated construction with aluminum heat spreader design achieves efficient heat transfer with no hot spots. The use of patent-pending hybrid planar transformer technology and other patent-pending design concepts facilitate maximum power delivery with the highest efficiency of up to 97%. The converters combine creative design concepts with highly derated power devices to achieve very high reliability, high performance and low cost solution to systems designers requiring maximum power in small footprints.

Applications

- Aerospace, Aerocraft
- Complex power system
- Portable weaponry
- Distributed Power Architecture

Features

- Input: 70V, Output: 18.2A/110V, 2000W.
- Tight output regulation, typical ±0.5%
- No minimum load required
- Ripple & Noise (20Mhz BW) 200 mv (pk-pk) typical
- Input operating range 70V
- On/Off pin and remote sense
- Output adjustment +/-10% range
- Remote sense compensation
- Parallelable up to 10000 Watts
- N+1 Redandance
- 1500V, 10MΩ input-to-output isolation
- Output overcurrent and overvoltage protection
- Over Temperature protection
- Input Under voltage protection
- MTBF of 1,500,000 hours @ 50°C (Bellcore)

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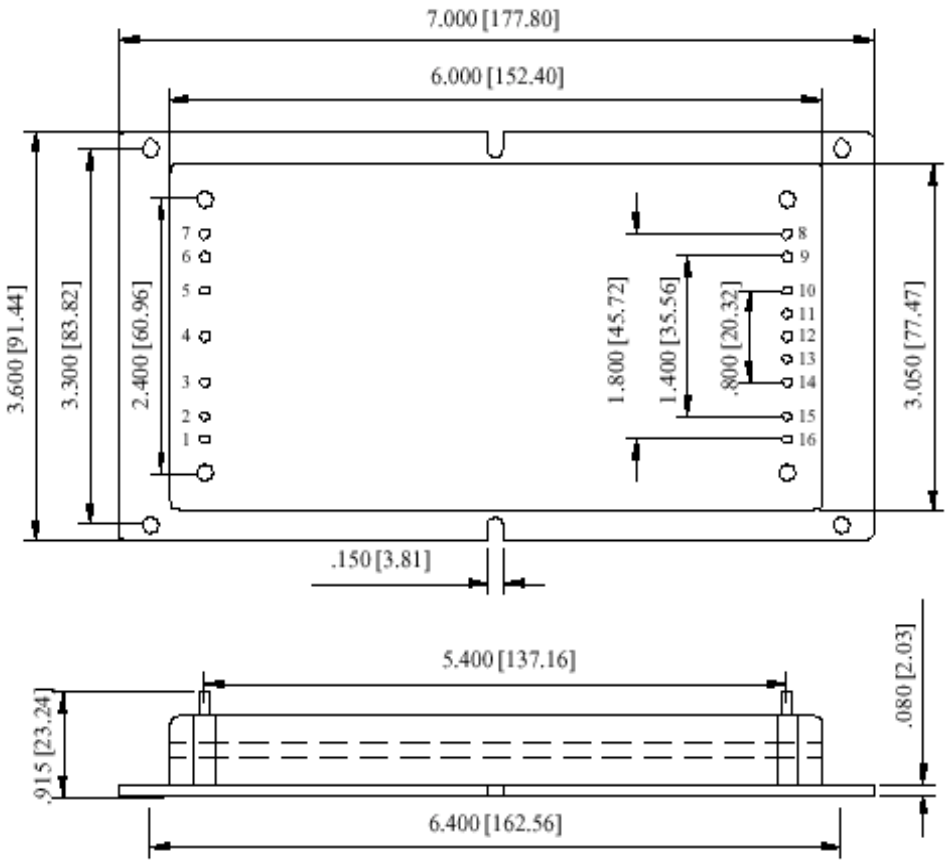
Part Number and Selection Information

Model / Part Number	Input			Output		Efficiency
	Voltage (Volts)	Current (A)		Voltage	Current	75% Load
	Nominal	No load	Full load	(Volts)	(Amps)	(%)
EF70S110M18P	70	0.2	23	110	18.2	97

Consult factory for other output voltage configurations

Outline Information and Pin-out

Pin Connection		Pin Size	
Pin #	Function	Inch	mm
1	Vin +	0.08"	2.03
2	Vin +	0.08"	2.03
3			
4	On/Off	0.08"	2.03
5			
6	Vin -	0.08"	2.03
7	Vin -	0.08"	2.03
8	Vo -	0.08"	2.03
9	Vo -	0.08"	2.03
10	S -	0.18"	2.03
11	LSHR	0.08"	2.03
12	TRIM	0.08"	2.03
13	ILIM	0.08"	2.03
14	S +	0.08"	2.03
15	Vo +	0.08"	2.03
16	Vo +	0.08"	2.03



Notes:

1). All dimensions are in inches [mm]
0.08" [2.032mm], 0.18" [4.572mm]

2). Pin material: Brass

3). Pin finish: Tin/Lead plated

4). Baseplate material: Aluminum.

5).Outline dimension:
6"(152.4)x3"(76.2)x0.55"(14.0)

6). Max. Weight: 490g

Thermal Derating

Vin = 70V
Full load (18.2A) from –55 °C to 125 °C base plate temperature, Linearly derate to zero from 125 °C to 135 °C.

The information and specifications contained in this brief are believed to be accurate and reliable at the time of publication. Specifications are subject to change without notice. Refer to product specification sheet for performance characteristics and application guidelines.

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Electrical Specification

Typical operating condition at Ta=25°C, Vin=70V unless otherwise noted.

PARAMETER	NOTES	MIN	TYP	MAX	UNIT
Absolute maximum rating					
Input voltage				90	V
Output current				18.2	A
Operating case temperature		-55		125	°C
Storage temperature		-65		150	°C
Input characteristics					
Operating input voltage range		56		90	V
Turn on voltage threshold		54	55	56	V
Turn off voltage threshold		53	54	55	V
Transient withstanding	Transient duration: 100ms			100	V
Maximum input current	Maximum load, 50Vin		29	30	A
Off state input current			3	5	mA
Output characteristics					
Output voltage set point		108	110	112	V
Output current	Continuous	0		13.6	A
Output voltage line regulation	56-90V input		±1	±1.5	%
Output voltage load regulation	10%-100%Load		±1	±1.5	%
Output voltage trim range	Apply trim voltage 1–5V	105		115	V
Output voltage ripple and noise	20MHz bandwidth, 100% Load, 60Vin		400	600	mV(pk-pk)
Remote sense compensation	Compensate load line drop			5	V
Temperature coefficient				±0.05	%/°C
Capacitive Load		0		1,000	µF
Output dynamic characteristics					
Startup time	5% to 95% of the output voltage		250	500	ms
Start up overshoot	70V input, 50% load			5	V
Transient recovery time	30% load change (1.0A/us)		300	500	µs
Transient Peak	30% load change (1.0A/us)			5.5	V
Efficiency					
Full Load efficiency	70V input, 2000W output		96		%
Protection					
Output over current protection	Current limit , set by Ilim voltage 1-5V	16		20	A
Over voltage protection	Current limit , set by Ilim voltage 1-5V	130	135	140	V
Over temperature protection	Current limit fold back	110	115	120	°C
Parallel Operation					
Current share control voltage	Single share bus	0.5		2.5	V
Share accuracy	Typical at 50% load		5	6	%
Operation Environment					
Operating temperature		-55		125	C
Ambient air pressure		Vacuum		Normal	
Humidity				95%	
Mechanical shock & vibration	Per customer specification				
Miscellaneous					
Switching frequency		180	200	220	KHz

ON/OFF control (Positive logic) Converter On Converter Off	EF70S110M18P	 2.5 -1.0		 7 1.2	 V V
ON/OFF control (Negative logic) Converter On Converter Off	EF70S110M18N	 -1.0 2.5		 1.2 7	 V V
Calculated MTBF	Bellcore @ 50ºC		1,000,000		Hrs
Weight			490	500	gram

Basic operation and functions

Input Power (Pin 1&2, Pin 6&7)

Input power Vin(+) must be connected to Positive input voltage Pin1&2; Input power common Vin(-) must be connected to Negative input voltage Pin 6&7.

Output Power (Pin 8&9, Pin 15&16)

Output power Vout(+) must be connected to Positive output voltage Pin 8&9; Output power
Vout(-) must be connected to Negative output voltage Pin 15&16.

On/Off (Pin 4)

Control input pin to control on/off of the converter unit. Positive logic. On when voltage on this pin is greater than 2.5V and off when below 1.2V.

Current Share (Pin 11)

Single bus load share pin. When multiple units are connected in parallel to drive a common load, load current share can be achieved by connecting this pin of the all the units together. The voltage on this pin is proportional to the output current at 167mV/A.

Multiple EF converts can be used in parallel to drive a common load and allow N+1 redundancy architecture. In this mode of operation the load current can be shared by up to eightEF converters by just connecting the share but terminal (share) of the units together.

When paralleled, 95% of the total combined power ratings of the EF converters are available at the load. Overload and short circuit performance are not adversely affected during parallel operation.

Current Limit (Pin 13)

Current limit control input. A signal ranging from 1V to 5V DC adjusts the current limit setting from 9A to 15A. Internal current limit setting is 10A when this Pin 13 is open. Leave this pin open during initial testing.

Remote Sense (Pin 10, Pin 14)

Permits the user to maintain the accurate output voltage at the remote load terminals regardless of the line drop.
The Sense(-) (Pin 10) and Sense(+) (Pin 14) should be connected at the load or at the point where the regulation is needed.
The remote sense feature of the unit compensates for voltage drop occurring between the output pins of the unit and load. The Sense(-) (Pin 10) and Sense(+)(Pin 14) should be connected at the load or at the point where regulation is required.
If remote Sense is not required, the Sense(-) Pin must be connected to the Vout(-) Pin (Pin 9&10), and the Sense(+) Pin must be connected to the Vout(+) Pin (Pin 15&16) to ensure the unit will regulate at the specified output voltage. If these connections are not made, the unit's output voltage will be higher than the specified value.
The unit output over voltage protection senses the voltage across Vout(+) and Vout(-), and not across the sense lines, so the resistance between the output pins of the unit and the load should be minimized to prevent unwanted triggering of the OVP.
When using the remote sense feature, the output voltage at the unit can be increased by as much as 10% above the nominal rating, in order to maintain the required voltage across the load.
Therefore, the designer must consider this condition. Also when using the remote sense function, the output power must be taken care of, as not to exceed the maximum power capability of the unit.

Output Voltage Trim (Pin12)

Output voltage adjusting input. A signal ranging from 1V to 5V at this pin changes the output voltage approximately from 105V to 120V. Internal setting is 110V±3V when this pin is open.