FEW SERIES

20~30W WIDE INPUT RANGE

DANUBE

FEATURES

- 20~30W DIL PACKAGE
- INDUSTRY STANDARD PACKAGE
- 9-18V,18-36V,36-75V,9-36V,18-75V WIDE INPUT RANGE
- REGULATED OUTPUT
- INPUT UVLO & OVLO
- HIGH EFFICIENCY
- UL 94V-0 PACKAGE MATERIAL
- CUSTOM SOLUTIONS AVAILABLE
- 3 YEARS WARRANTY

OUTPUT SPECIFICATIONS

Voltage Set-point Accuracy		+/-2% max
Temperature Coefficient		+/-0.05%/°C
Ripple & Noise(20MHz BW)[1]		150mVp-p max
Line Regulation[2]		+/-0.3% max
Load Regulation[3]		+/-0.5% max
Minimum Load[4]		10% of Full Load
Short Circuit Protection		Continuous
Short Circuit Restart		Automatic
Over Load Protection		130%~180%
Transient Response[6]		500uS max
External Trim Adj. Range	Vout:5V	+/-10%
External Trim Adj. Range	Vout:12V,15V	-20%~+10%

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature (20W)	-40°C to +75°C
Operating Temperature (30W)	-40°C to +55°C
Case Temperature	+100°C max
Storage Temperature	-55°C to +125°C
Humidity	95% max
Cooling	Free-Air Convection

INPUT SPECIFICATIONS

Input Voltage Range	2:1 or 4:1 Input Range
Input Filter	Pi Network
Protection	Fuse Recommended
OVLO(Over Voltage Lockout)	See Page 6
UVLO(Under Voltage Lockout)	See Page 6
OVLO & UVLO Circuit Restart	Automatic

GENERAL SPECIFICATIONS

Efficiency	88% typ.
Isolation Voltage[5]	1500VDC min
Isolation Resistance	10^9 ohms min
Isolation Capacitance	3000pF max
Switching Frequency	300 KHz typ.
MTBF[7]	>300,000 Hours
Weight	31.2g typ.
Case Material	Six-Side Shielded Case
Case Size	50.8mm*25.4mm*11.2mm
Conducted Emissions	EN55022 Class A
Radiated Emissions	EN55022 Class A

ALL SPECIFICATIONS TYPICAL AT NOMINAL LINE, FULL LOAD, AND 25°C UNLESS OTHERWISE NOTED.

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[1] *Measured with 1uF ceramic capacitor connect to the output pins.*
[2] *High Line to Low Line.*
[3] *Load Regulation is for output load current change from 10% to 100%.*
[4] *FEWS-XXXXA20T Minimum load 20% of full load.*
[5] *For 10 seconds.*
[6] *25% Step Load Change.*
[7] *MIL-HDBK-217F @25°C, Ground Benign.*

● SELECTION GUIDE
2:1 20W OUTPUT

MODEL NUMBER	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	INPUT[8] CURRENT(mA)		EFF (%)[9]	CAPACITOR LOAD (Max)	PACKAGE
				FULL LOAD	NO LOAD			
FEWS-1203.3A20	9-18	3.3	5000	1617	65	85	1000uF	A
FEWS-1205A20	9-18	5	4000	1893	65	88	1000uF	
FEWS-1212A20	9-18	12	1666	1893	20	88	220uF	
FEWS-1215A20	9-18	15	1333	1872	20	89	100uF	
FEWD-1212A20	9-18	+/-12	+/-833	1893	20	88	220uF	
FEWD-1215A20	9-18	+/-15	+/-667	1872	20	89	100uF	
FEWS-2403.3A20	18-36	3.3	5000	809	45	85	1000uF	
FEWS-2405A20	18-36	5	4000	947	45	88	1000uF	
FEWS-2412A20	18-36	12	1666	936	20	89	220uF	
FEWS-2415A20	18-36	15	1333	926	20	90	100uF	
FEWD-2412A20	18-36	+/-12	+/-833	936	20	89	220uF	
FEWD-2415A20	18-36	+/-15	+/-667	926	20	89	100uF	
FEWS-4803.3A20	36-75	3.3	5000	404	40	85	1000uF	
FEWS-4805A20	36-75	5	4000	473	40	88	1000uF	
FEWS-4812A20	36-75	12	1666	473	10	88	220uF	
FEWS-4815A20	36-75	15	1333	468	10	89	100uF	
FEWD-4812A20	36-75	+/-12	+/-833	473	10	88	220uF	
FEWD-4815A20	36-75	+/-15	+/-667	473	10	88	100uF	

Note: Other input to output voltages may be available. Please contact factory.

[8] *NOMINAL INPUT VOLTAGE.*
[9] *NOMINAL INPUT VOLTAGE, FULL LOAD.*

● SELECTION GUIDE
4:1 20W OUTPUT

MODEL NUMBER	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	INPUT[10] CURRENT(mA)		EFF (%)[11]	CAPACITOR LOAD (Max)	PACKAGE
				FULL LOAD	NO LOAD			
FEWS-1203.3A20T	9-36	3.3	5000	1617	80	85	1000uF	A
FEWS-1205A20T	9-36	5	4000	1915	80	87	1000uF	
FEWS-1212A20T	9-36	12	1666	1914	20	87	220uF	
FEWS-1215A20T	9-36	15	1333	1893	20	88	100uF	
FEWS-2405A20T	18-75	5	4000	957	60	87	1000uF	
FEWS-2412A20T	18-75	12	1666	946	20	88	220uF	
FEWS-2415A20T	18-75	15	1333	936	20	89	100uF	

Note: Other input to output voltages may be available. Please contact factory.

● SELECTION GUIDE
2:1 30W OUTPUT

MODEL NUMBER	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	INPUT[12] CURRENT(mA)		EFF (%)[13]	CAPACITOR LOAD (Max)	PACKAGE
				FULL LOAD	NO LOAD			
FEWS-1203.3B30	9-18	3.3	7000	2292	180	85	1000uF	B
FEWS-1205B30	9-18	5	6000	2841	165	88	1000uF	
FEWS-1212B30	9-18	12	2500	2793	140	89.5	220uF	
FEWS-1215B30	9-18	15	2000	2793	120	89.5	100uF	
FEWS-2403.3B30	18-36	3.3	7000	1119	120	86	1000uF	
FEWS-2405B30	18-36	5	6000	1412	95	88.5	1000uF	
FEWS-2412B30	18-36	12	2500	1404	40	89	220uF	
FEWS-2415B30	18-36	15	2000	1389	40	90	100uF	
FEWS-4803.3B30	36-75	3.3	7000	566	85	85	1000uF	
FEWS-4805B30	36-75	5	6000	710	60	88	1000uF	
FEWS-4812B30	36-75	12	2500	702	55	89	220uF	
FEWS-4815B30	36-75	15	2000	694	30	90	100uF	

Note: Other input to output voltages may be available. Please contact factory.

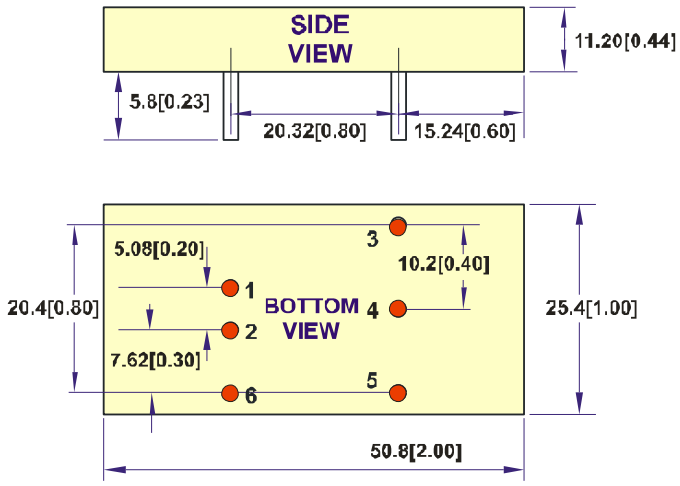
[10] *NOMINAL INPUT VOLTAGE.*
[11] *NOMINAL INPUT VOLTAGE, FULL LOAD.*
[12] *NOMINAL INPUT VOLTAGE.*
[13] *NOMINAL INPUT VOLTAGE, FULL LOAD.*

PART NUMBERS STRUCTURE

Model Name	Difference
FEWv-x1x2x3x4T-zzz	FE=Series Name W=Wide Input Range v=Type of output voltage (S=Single output；D=Dual output) x1=12V (9~18V；9~36V Input voltage) 24V (18~36V；18~75V Input voltage) 48V (36~75V Input voltage) x2=Output voltage(3.3V；5V；12V；15V) x3=Package(A；B) x4=Power(20W；30W) T= 4:1 Input voltage zzz= 0~9，A~Z or blank for market purpose.

MECHANICAL DIMENSIONS

PACKAGE "A"

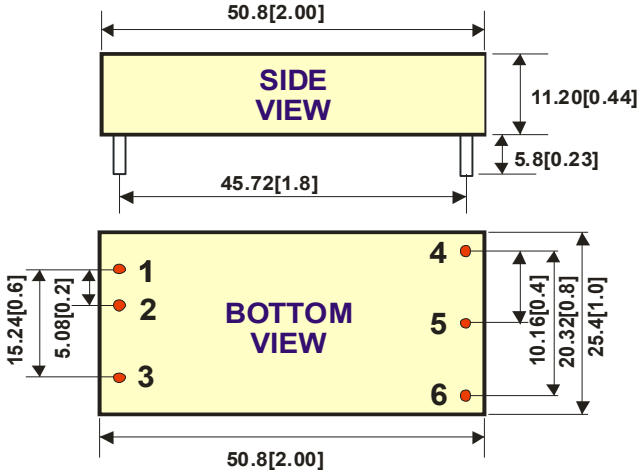


All dimensions are in millimeters[inches]

PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	Trim	Common
5	-Vout	-Vout
6	Remote On/Off	Remote On/Off

NOTE:
Pin Size is Tolerance 1.0Φ ±0.10mm
All Dimensions In mm(Inches)
Tolerance .X or .XX= ±0.80mm

PACKAGE "B"



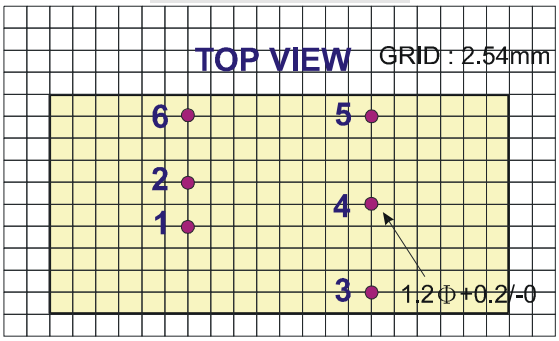
All dimensions are in millimeters [inches]

PIN	SINGLE
1	+Vin
2	-Vin
3	Remote On/Off
4	+Vout
5	-Vout
6	Trim

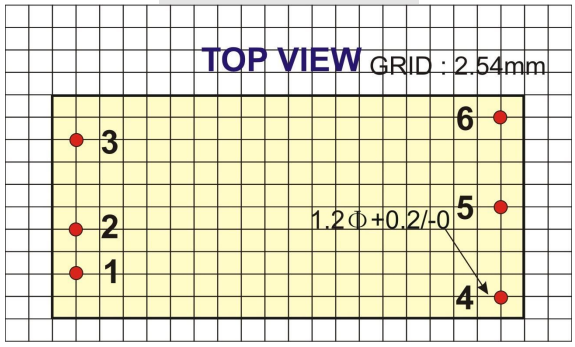
NOTE:
Pin Size is Tolerance 1.0Φ ±0.10mm
All Dimensions In mm(Inches)
Tolerance .X or .XX= ±0.80mm

RECOMMENDED FOOTPRINT DETAILS

PACKAGE "A"

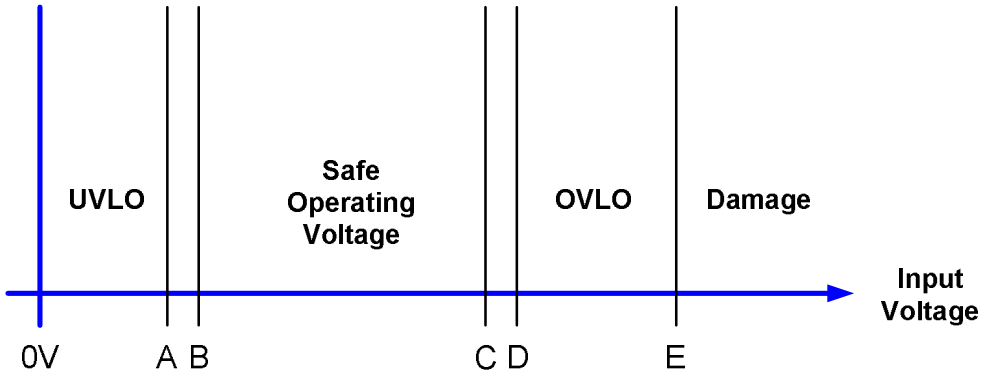


PACKAGE "B"



Remote On/Off Control			
Control Input	Package A : PIN6 Package B : PIN3	Control Common	PIN2
Control Voltage		Converter Shutdown Idle Current	10mA
ON	>+2.5VDC or Open Circuit	Logic Compatibility	CMOS or Open Collector TTL
OFF	<+0.8VDC or Jumper to PIN2		

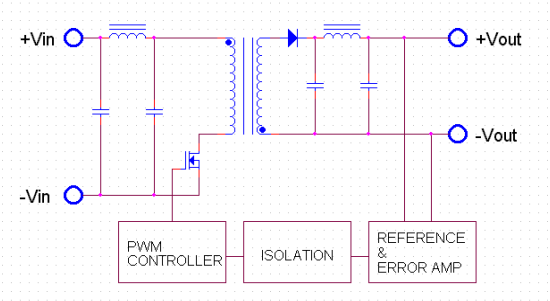
INPUT OPERATING VOLTAGE



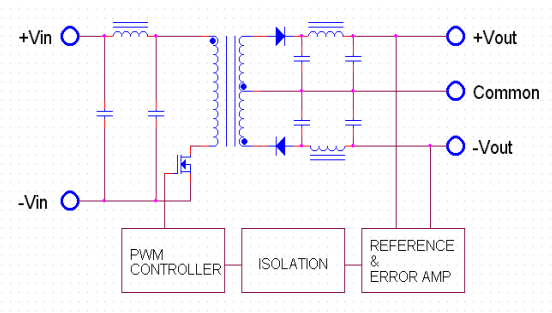
	A	B	C	D	E
FEW*-12*****	8V typ.	9V	18V	20V typ.	25V
FEWS-12*****T	8V typ.	9V	36V	40V typ.	50V
FEW*-24*****	16V typ.	18V	36V	40V typ.	50V
FEWS-24*****T	16V typ.	18V	75V	80V typ.	100V
FEW*-48*****	32V typ.	36V	75V	80V typ.	100V

● SIMPLIFIED SCHEMATIC

SINGLE OUTPUT



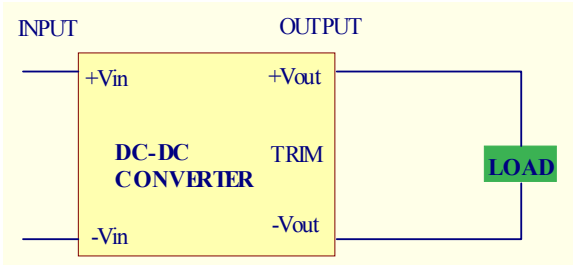
DUAL OUTPUT



● TYPICAL APPLICATIONS

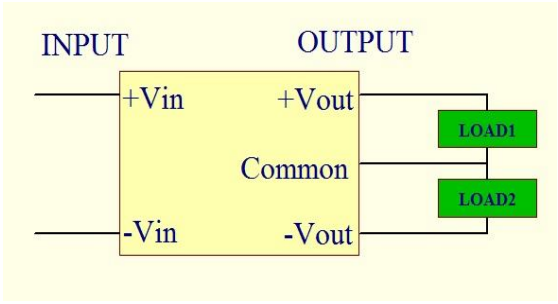
SINGLE OUTPUT

FIXED VOLTAGE OUTPUT

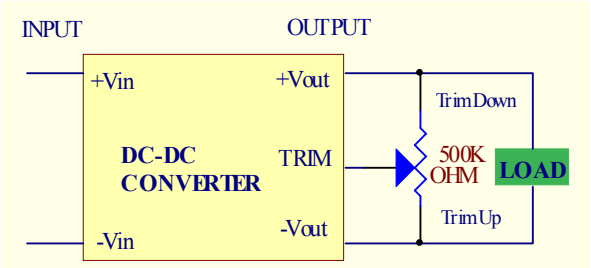


DUAL OUTPUT

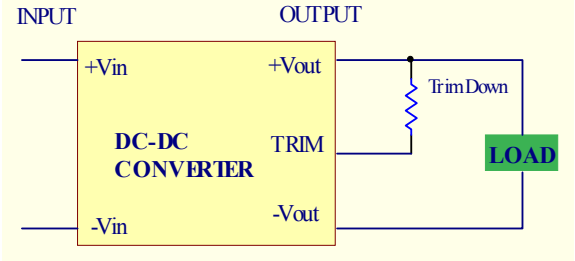
FIXED VOLTAGE OUTPUT



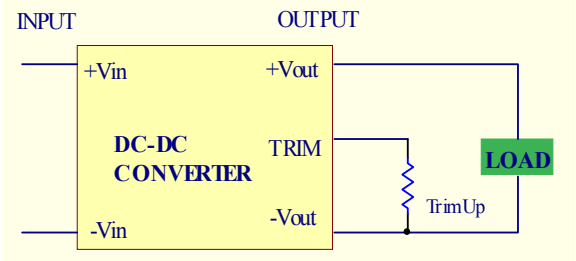
TRIM CONNECTIONS USING A TRIMPOT



FIXED-VALUE TRIM DOWN RESISTOR



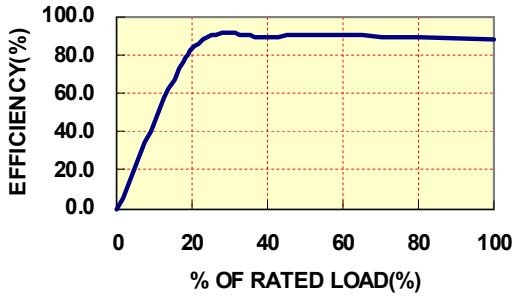
FIXED-VALUE TRIM UP RESISTOR



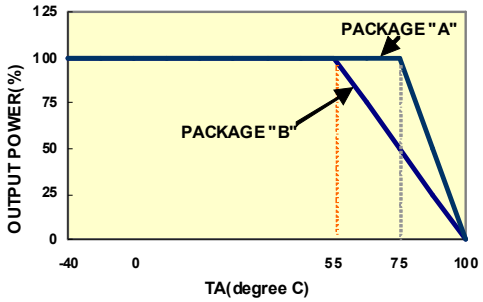
● TYPICAL PERFORMANCE CURVES

Specifications typical at Ta=25 °C, nominal input voltage, rated output current unless otherwise specified.

OUTPUT LOAD VS EFFICIENCY



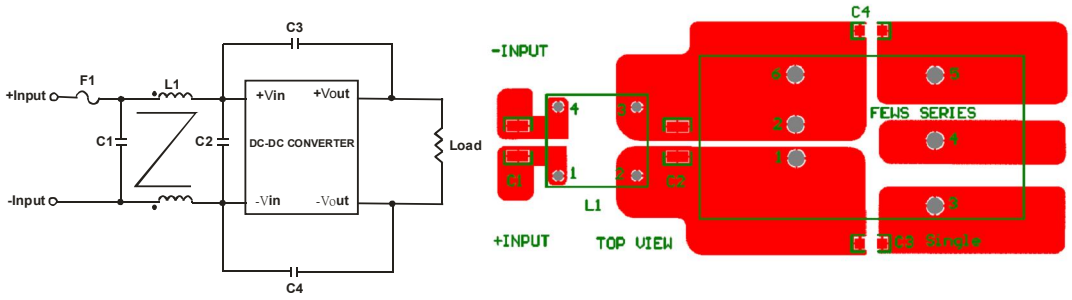
TEMPERATURE DERATING



● RECOMMENDED FILTER FOR EN55022 CLASS B

The components used in the above figure, together with the manufacturer's part numbers for these components, are as follows:

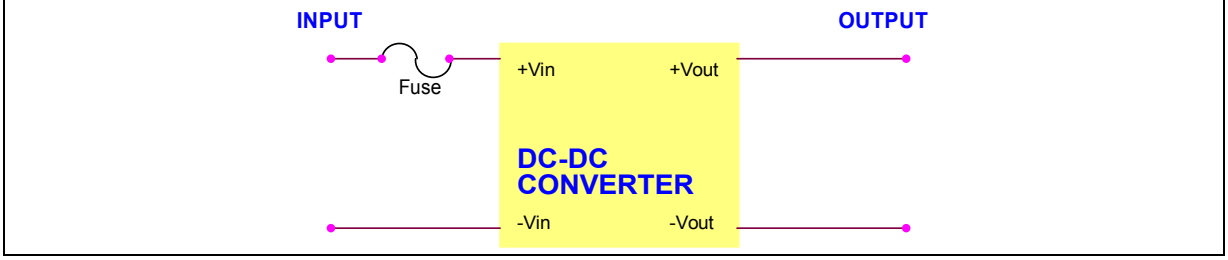
	C1	C2	C3	C4	L1
FEW*-12***	3.3uF/50V 1812 MLCC	3.3uF/50V 1812 MLCC	1000pF/2KV MLCC	1000pF/2KV MLCC	325uH Common Choke
FEW*-24***	3.3uF/50V 1812 MLCC	N/A	1000pF/2KV MLCC	1000pF/2KV MLCC	325uH Common Choke
FEW*-48***	1.5uF/100V 1812 MLCC	1.5uF/100V 1812 MLCC	1000pF/2KV MLCC	1000pF/2KV MLCC	325uH Common Choke



RECOMMENDED EN55022 CLASS B FILTER CIRCUIT LAYOUT

● INPUT FUSE SELECTION GUIDE

9-18V INPUT VOLTAGE(VDC)	18-36V INPUT VOLTAGE(VDC)	36-75V INPUT VOLTAGE(VDC)
5000mA Slow-Blow Type	3000mA Slow-Blow Type	1500mA Slow-Blow Type



Note: Certain applications may require the installation of external fuse in front of the input.

FEW SERIES APPLICATION NOTES:

EXTERNAL CAPACITANCE REQUIREMENTS:

No external capacitance is required for operation of the FEW series.

External output capacitance is not required for operation; however it is recommended that 10uF tantalum and 0.1uF ceramic capacitance be selected for reduced system noise.

We Can Offer EMC-Filter According To EN55011/22 Class B.

Negative Outputs:

A negative output voltage may be obtained by connecting the +OUT to circuit ground and connecting –OUT as the negative output.

Remote ON/OFF:

The remote ON/OFF pin may be left floating if this function is not use. It is recommended to drive this pin with an open collector arrangement or a relay contact. When the ON/OFF pin is pulled low with respect to the –VIN, the converter is placed in a low power drain state.

Output TRIM:

The TRIM pin may be used to adjust the output +10% ~ -20% from the nominal setting .this function allows adjustment for voltage drops in the system wiring. If the TRIM function is not required the pin may be left floating.

FOR MORE INFORMATION CALL:

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