




- OFFER SINGLE, DUAL (TOTAL OUTPUT CURRENT 8A) AND TRIPLE OUTPUT
- 40 WATTS MAXIMUM OUTPUT POWER
- 2:1 WIDE INPUT VOLTAGE RANGE
- INTERNATIONAL SAFETY STANDARD APPROVAL
- SIX-SIDED CONTINUOUS SHIELD
- HIGH EFFICIENCY UP TO 90%
- STANDARD 2" x 2" x 0.4" PACKAGE
- FIXED SWITCHING FREQUENCY


**UL E193009**  
**TUV R50009835**  
**CB JPTUV-003843**  
**CE MARK**  
**Patent No.144566**

The FEC40 series offer 40 watts of output power from a 2 x 2 x 0.4 inch package. The FEC40 series with 2:1 wide input voltage of 18-36VDC and 36-75VDC and features 1600VDC of isolation, short-circuit and over-voltage protection, as well as six sided shielding. All models are particularly suited to telecommunications, industrial, mobile telecom and test equipment applications.

## TECHNICAL SPECIFICATION

All specifications are typical at nominal input, full load and 25°C otherwise noted

OUTPUT SPECIFICATIONS			
Output power			40 Watts max
Voltage accuracy FL and nominal Vin	Single / Dual		± 1%
	Triple Main		± 1%
	Auxiliary		± 3%
Voltage adjustability (Note 1)	Single output only		± 10%
Minimum load (Note 2)	Single and Dual		0%
	Triple		10% of FL
Line regulation LL to HL at Full Load	Single/Dual		± 0.5%
	Triple(main)		± 1%
	Triple(auxiliary)		± 5%
Load regulation 10% to 100% FL (Note 3)	Single		± 0.5%
	Dual		± 1%
	Triple Main		± 2%
	Auxiliary		± 5%
Load cross regulation (Note 4)	Single/Dual/Triple(main)		± 1%
	Triple(auxiliary)		± 5%
Ripple and noise (Note 5)	20MHz bandwidth (Measured with a 104pF/50V MLCC)		See table
Temperature coefficient			±0.02% / °C, max
Transient response recovery time	25% load step change		400uS
Over voltage protection Zener diode clamp	3.3V output		3.9V
	5V output		6.2V
	12V output		15V
	15V output		18V
Over load protection	% of FL at nominal input		150% max
Short circuit protection			Hiccup, automatic recovery
INPUT SPECIFICATIONS			
Input voltage range	24V nominal input		18 – 36VDC
	48V nominal input		36 – 75VDC
Under voltage lockout	24V input	DC-DC ON	17.8VDC
		DC-DC OFF	16VDC
	48V input	DC-DC ON	36VDC
		DC-DC OFF	34VDC
Input filter (Note 6)			L-C type
Input voltage variation dv/dt			5V/ms,max (Complies with ETS300 132 part 4.4)
Input surge voltage 100mS max	24V input		50VDC
	48V input		100VDC
Input reflected ripple (Note 7)	Nominal Vin and full load		40mA-p-p
Start up time	Nominal Vin and constant resistor load		25mS typ
Remote ON/OFF (Note 8)	DC-DC ON		Open or 3.5V < Vr < 12V
	DC-DC OFF		Short or 0V < Vr < 1.2V
Remote off input current	Nominal Vin		2.5mA

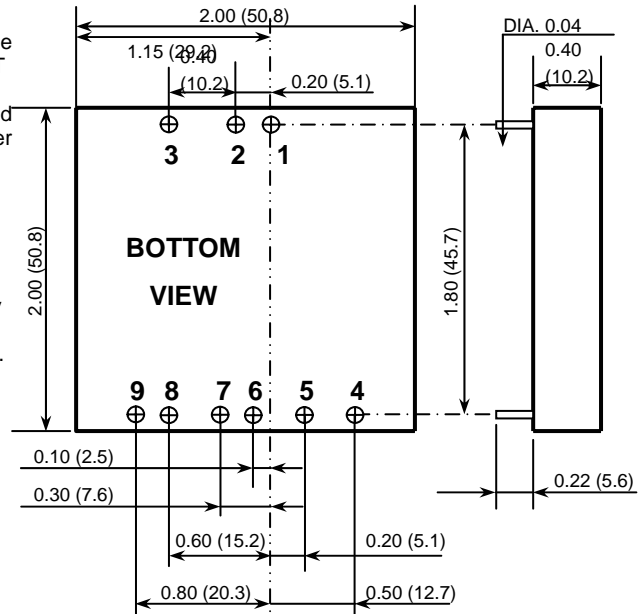
GENERAL SPECIFICATIONS		
Efficiency		See table
Isolation voltage		1600VDC, min
Isolation resistance		10 <sup>9</sup> ohms, min
Isolation capacitance		1000pF, max
Switching frequency (Note 9)		300KHz, typ
Approvals and standard		IEC60950, UL1950, EN60950
Case material		Nickel-coated copper
Base material		Non-conductive black FR4
Potting material		Epoxy (UL94-V0)
Dimensions		2.00 X 2.00 X 0.40 Inch (50.8 X 50.8 X 10.2 mm)
Weight		60g (2.11 oz)
MTBF (Note 10)		1.398 x 10 <sup>6</sup> hrs
ENVIRONMENTAL SPECIFICATIONS		
Operating temperature range		-40°C ~ +85°C (with derating)
Maximum case temperature		100°C
Storage temperature range		-55°C ~ +105°C
Over temperature protection		115°C, typ
Thermal impedance (Note 11)	Nature convection	9.2°C/Watt
	Heat-sink with 20LFM	8.5°C/Watt
	Heat-sink with 500LFM	2.8°C/Watt
Thermal shock		MIL-STD-810D
Vibration		10~55Hz, 2G, 30minutes along X,Y and Z
Relative humidity		5% to 95% RH
EMC CHARACTERISTICS		
Conducted emissions	EN55022	Level A
Radiated emissions	EN55022	Level A
ESD	EN61000-4-2	Perf. Criteria2
Radiated immunity	EN61000-4-3	Perf. Criteria2
Fast transient	EN61000-4-4	Perf. Criteria2
Surge	EN61000-4-5	Perf. Criteria2
Conducted immunity	EN61000-4-6	Perf. Criteria2



Model Number	Input Range	Output Voltage	Output Current	Output Ripple & Noise	Input Current <sup>(13)</sup>	Eff <sup>(14)</sup> (%)	Capacitor <sup>(15)</sup> Load max
FEC40-24S3P3	18 – 36 VDC	3.3 VDC	8000mA	50mVp-p	1325mA	87	21000uF
FEC40-24S05	18 – 36 VDC	5 VDC	8000mA	50mVp-p	1961mA	89	13600uF
FEC40-24S12	18 – 36 VDC	12 VDC	3333mA	75mVp-p	2048mA	88	2360uF
FEC40-24S15	18 – 36 VDC	15 VDC	2666mA	75mVp-p	1985mA	89	1510uF
FEC40-24D3305	18 – 36 VDC	3.3 / 5 VDC	4A / 4A (total 8A) <sup>(12)</sup>	100mVp-p	1729mA	84	11000 / 6800uF
FEC40-24T3312	18 – 36 VDC	3.3 / ±12 VDC	6000mA / ±400mA	50 / 75mVp-p	1512mA	85	13000 / ±330uF
FEC40-24T3315	18 – 36 VDC	3.3 / ±15 VDC	6000mA / ±300mA	50 / 75mVp-p	1481mA	85	13000 / ±110uF
FEC40-24T0512	18 – 36 VDC	5 / ±12 VDC	6000mA / ±400mA	50 / 75mVp-p	1989mA	87	6800 / ±330uF
FEC40-24T0515	18 – 36 VDC	5 / ±15 VDC	6000mA / ±300mA	50 / 75mVp-p	1958mA	87	6800 / ±110uF
FEC40-48S3P3	36 – 75 VDC	3.3 VDC	8000mA	50mVp-p	655mA	88	21000uF
FEC40-48S05	36 – 75 VDC	5 VDC	8000mA	50mVp-p	969mA	90	13600uF
FEC40-48S12	36 – 75 VDC	12 VDC	3333mA	75mVp-p	1000mA	89	2360uF
FEC40-48S15	36 – 75 VDC	15 VDC	2666mA	75mVp-p	992mA	89	1510uF
FEC40-48D3305	36 – 75 VDC	3.3 / 5 VDC	4A / 4A (total 8A) <sup>(12)</sup>	100mVp-p	854mA	85	11000 / 6800uF
FEC40-48T3312	36 – 75 VDC	3.3 / ±12 VDC	6000mA / ±400mA	50 / 75mVp-p	747mA	86	13000 / ±330uF
FEC40-48T3315	36 – 75 VDC	3.3 / ±15 VDC	6000mA / ±300mA	50 / 75mVp-p	732mA	86	13000 / ±110uF
FEC40-48T0512	36 – 75 VDC	5 / ±12 VDC	6000mA / ±400mA	50 / 75mVp-p	982mA	88	6800 / ±330uF
FEC40-48T0515	36 – 75 VDC	5 / ±15 VDC	6000mA / ±300mA	50 / 75mVp-p	967mA	88	6800 / ±110uF

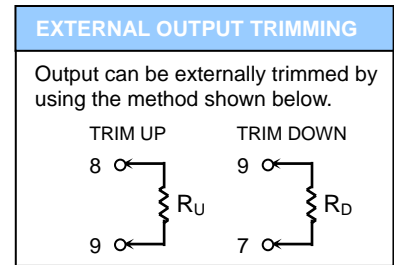
**Note**

- Maximum output deviation is 10% inclusive of remote sense and trim. If remote sense is not being used, the +Vsense should be connected to its corresponding +OUTPUT and likewise the sense should be connected to its corresponding -OUTPUT.
- The triple output required a minimum 10% loading on the output to maintain specified regulation. Operation under no-load condition will not damage these devices, however they may not meet all listed specification
- Load regulation for triple output:  
Main output(V1):10 to 100% with 10% to 100% balanced on auxiliaries.  
Auxiliary outputs(V2 and V3):10% to 100% balanced on all outputs.
- Cross regulation for triple output:  
Main output 100% load, auxiliary 100%, other auxiliary 25% to 100%.  
Auxiliary outputs(V2 and V3):main output 100% load, auxiliary 100%, other auxiliary 25% to 100% or main output 25%, auxiliary 25%, other auxiliary 25% to 100%.
- The models of FEC40-XXD3305 are specified with a 1uF ceramic output capacitors.
- An external filter capacitor is required for normal operation. The capacitor should be capable of handling 1A ripple current for 48V/24V models. Power mate suggest: Nippon chemi-con KMF series, 220uF/100V, ESR 90mΩ.
- Simulated source impedance of 12uH. 12uH inductor in series with +Vin.
- The ON/OFF control pin voltage is referenced to negative input.
- Switching frequency for dual output:  
master (5Vo) 300KHz slave (3.3Vo) 500KHz
- BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C. (Ground fixed and controlled environment).
- Heat sink is optional and P/N 7G-0026A.
- Any condition of dual output (3.3V/5V) rated lout current, not to exceed 8A of total output currents. The product safety approval pending..
- Maximum value at nominal input voltage and full load.
- Typical value at nominal input voltage and full load.
- Test by minimum Vin and constant resistor load

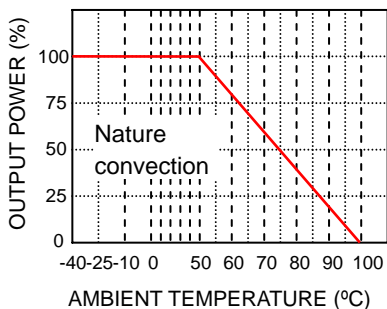


- All dimensions in Inches (mm)
- Pin pitch tolerance ±0.014(0.35)

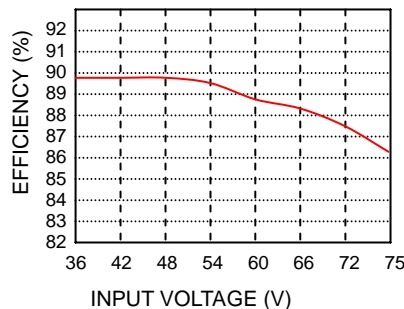
PIN CONNECTION			
PIN	SINGLE	DUAL	TRIPLE
1	+ INPUT	+ INPUT	+ INPUT
2	- INPUT	- INPUT	- INPUT
3	CTRL	CTRL	CTRL
4	NC	3.3V	+ AUX
5	- SENSE (Note1)	3.3V RTN (COM)	COMMON
6	+ SENSE (Note1)	NC	- AUX
7	+ OUTPUT	NC	+ OUTPUT
8	- OUTPUT	5V	- OUTPUT (COM)
9	TRIM	5V RTN (COM)	NC



FEC40-48S05  
Derating Curve



FEC40-48S05  
Efficiency VS Input voltage



FEC40-48S05  
Efficiency VS Output load

