

# UFEC40 SERIES

CHASSIS-MOUNT DC-DC CONVERTER



2:1 WIDE INPUT RANGE  
UP TO 40 Watts



## FEATURES

- 1600VDC INPUT TO OUTPUT ISOLATION
- APPLICATION OF CHASSIS-MOUNT DC/DC CONVERTERS
- SCREW TERMINALS FOR INPUT AND OUTPUT CONNECTIONS
- INTERNAL INPUT FUSE PROTECTION
- INTERNAL OUTPUT LED INDICATOR
- MEET EN55022 CLASS B
- SAFETY MEETS UL60950-1, EN60950-1, & IEC60950-1
- CE MARKED
- COMPLIANT TO RoHS II & REACH

## APPLICATIONS

- WIRELESS NETWORK
- TELECOM/DATACOM
- INDUSTRY CONTROL SYSTEM
- MEASUREMENT EQUIPMENT
- SEMICONDUCTOR EQUIPMENT

1600VDC ISOLATION	REMOTE CONTROL	UVP	OCP	SCP	OVP	FUSE INCLUDED	INRUSH LIMIT	REVERSE POLARITY PROTECTION
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## TECHNICAL SPECIFICATION

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

Model Number	Input Range	Output Voltage	Output Current @ Full Load		Input Current @ No Load	Efficiency	Maximum Capacitor Load (2)
	VDC	VDC	Min. Load (1) mA	Full Load mA	mA	%	µF
UFEC40-12S3P3	9.5 ~ 18	3.3	0	8000	177	85	21000
UFEC40-12S05	9.5 ~ 18	5	0	8000	230	85	13600
UFEC40-12S12	9.5 ~ 18	12	0	3333	260	85	2360
UFEC40-12S15	9.5 ~ 18	15	0	2666	318	86	1510
UFEC40-12S24	9.5 ~ 18	24	144	1800	40	84	600
UFEC40-12S28	9.5 ~ 18	28	122	1400	48	84	375
UFEC40-12D12	9.5 ~ 18	±12	±144	±1800	35	84	±1200
UFEC40-12D15	9.5 ~ 18	±15	±112	±1400	43	84	±750
UFEC40-12T3312	9.5 ~ 18	3.3 / ±12	600 / ±40	6000 / ±400	220	83	13000 / ±330
UFEC40-12T3315	9.5 ~ 18	3.3 / ±15	600 / ±30	6000 / ±300	235	83	13000 / ±110
UFEC40-12T0512	9.5 ~ 18	5 / ±12	600 / ±40	6000 / ±400	285	85	6800 / ±330
UFEC40-12T0515	9.5 ~ 18	5 / ±15	600 / ±30	6000 / ±300	285	85	6800 / ±110
UFEC40-24S3P3	18 ~ 36	3.3	0	8000	65	86	21000
UFEC40-24S05	18 ~ 36	5	0	8000	80	88	13600
UFEC40-24S12	18 ~ 36	12	0	3333	85	87	2360
UFEC40-24S15	18 ~ 36	15	0	2666	90	88	1510
UFEC40-24S24	18 ~ 36	24	144	1800	30	86	600
UFEC40-24S28	18 ~ 36	28	122	1400	30	86	375
UFEC40-24D12	18 ~ 36	±12	±144	±1800	25	86	±1200
UFEC40-24D15	18 ~ 36	±15	±112	±1400	25	86	±750
UFEC40-24T3312	18 ~ 36	3.3 / ±12	600 / ±40	6000 / ±400	65	84	13000 / ±330
UFEC40-24T3315	18 ~ 36	3.3 / ±15	600 / ±30	6000 / ±300	65	84	13000 / ±110
UFEC40-24T0512	18 ~ 36	5 / ±12	600 / ±40	6000 / ±400	65	86	6800 / ±330
UFEC40-24T0515	18 ~ 36	5 / ±15	600 / ±30	6000 / ±300	75	86	6800 / ±110
UFEC40-48S3P3	36 ~ 75	3.3	0	8000	40	87	21000
UFEC40-48S05	36 ~ 75	5	0	8000	42	89	13600
UFEC40-48S12	36 ~ 75	12	0	3333	52	88	2360
UFEC40-48S15	36 ~ 75	15	0	2666	55	88	1510
UFEC40-48S24	36 ~ 75	24	144	1800	21	86	600
UFEC40-48S28	36 ~ 75	28	122	1400	21	86	375
UFEC40-48D12	36 ~ 75	±12	±144	±1800	18	86	±1200
UFEC40-48D15	36 ~ 75	±15	±112	±1400	18	86	±750
UFEC40-48T3312	36 ~ 75	3.3 / ±12	600 / ±40	6000 / ±400	40	85	13000 / ±330
UFEC40-48T3315	36 ~ 75	3.3 / ±15	600 / ±30	6000 / ±300	40	85	13000 / ±110
UFEC40-48T0512	36 ~ 75	5 / ±12	600 / ±40	6000 / ±400	40	87	6800 / ±330
UFEC40-48T0515	36 ~ 75	5 / ±15	600 / ±30	6000 / ±300	45	87	6800 / ±110

**PART NUMBER STRUCTURE**

<b>UFEC40</b> -	<b>48</b>	<b>S</b>	<b>05</b>	-	<b>EC</b>
Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)		Assembly Option
	12: 9.5~18 24: 18~36 48: 36~75	S: Single	3P3: 3.3 05: 5 12: 12 15: 15 24: 24 28: 28		□: None EC: Enclosed Mounting Type DR: Din Rail Mounting Type ED: Enclosed & Din Rail Mounting Type
		D: Dual	12: ±12 15: ±15		
		T: Triple	3312: 3.3 / ±12 3315: 3.3 / ±15 0512: 5 / ±12 0515: 5 / ±15		

**INPUT SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating input voltage range	12Vin(nom)	9.5	12	18	VDC
	24Vin(nom)	18	24	36	
	48Vin(nom)	36	48	75	
Input fuse (slow blow)	12Vin(nom)		8		A
	24Vin(nom)		8		
	48Vin(nom)		4		
In-rush current			15		A
Input reflected ripple current	Nominal input and Full load		15		mAp-p
Start up voltage	12Vin(nom)			9.5	VDC
	24Vin(nom)			18	
	48Vin(nom)			36	
Shutdown voltage	12Vin(nom)		8		VDC
	24Vin(nom)		16		
	48Vin(nom)		33		
Start up time	Constant resistive load	Power up	100		ms
		Remote ON/OFF	25		
Input surge voltage	100ms, max.	12Vin(nom)		36	VDC
		24Vin(nom)		50	
		48Vin(nom)		100	
Remote ON/OFF	Referred to -Vin pin	Positive logic DC-DC ON		Open or 3.5 ~ 12VDC	mA
		DC-DC OFF		Short or 0 ~ 1.2VDC	
		Input current of Ctrl pin	-0.5	0.5	
		Remote off input current	2.5		mA

**OUTPUT SPECIFICATIONS**

Parameter	Conditions		Min.	Typ.	Max.	Unit
Voltage accuracy	3.3Vout		-1.5		+1.5	%
	Single / Dual		-1.0		+1.0	
	Triple: 3.3Vout, 5Vout		-1.5		+1.5	
	Triple: 12Vout, 15Vout		-5.0		+5.0	
Line regulation	Low Line to High Line at Full Load					%
	Single / Dual		-0.5		+0.5	
	Triple: 3.3Vout, 5Vout		-1.0		+1.0	
Load regulation	Min. Load to Full Load					%
	3.3Vout		-1.5		+1.5	
	Single / Dual		-1.0		+1.0	
	Triple: Main output: (3.3Vout, 5Vout) 10% to 100% with 10% to 100% balanced on auxiliaries.		-2.0		+2.0	
	Triple: 3.3Vout, 5Vout		-5.0		+5.0	
Cross regulation	Dual: Asymmetrical load 25%/100% FL		-5.0		+5.0	%
	Triple: Main output:(3.3Vout, 5Vout) 100% load, auxiliary 100%, other auxiliary 25% to 100%		-2.5		+2.5	
	load or main output:(3.3Vout, 5Vout) 25%, auxiliary 25%, other auxiliary 25% to 100%.		-5.0		+5.0	
	Dual					
Voltage adjustability	Single output		-3		+17	%
	Others		-10		+10	
Ripple and noise	Measured by 20MHz bandwidth	Single / Triple: Main	3.3Vout, 5Vout	50		mVp-p
		Single / Triple: Auxiliary	12Vout, 15Vout	75		
		Single	24Vout, 28Vout	350		
		Dual	12Vout	120		
			15Vout	150		
Temperature coefficient			-0.02		+0.02	%/°C
Transient response recovery time	25% load step change			250		µs
Over voltage protection	Zener diode clamp		3.3Vout	3.9		VDC
			5Vout	6.2		
			12Vout	15		
			15Vout	18		
			24Vout	30		
			28Vout	36		
Output indicator			Green LED			
Over load protection	% of Iout rated		150			%
Short circuit protection			Continuous, automatic recovery			

**GENERAL SPECIFICATIONS**

Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation voltage	1 minute	Input to Output	1600			VDC
		Input (Output) to Chassis	1600			
Isolation resistance	500VDC		1			GΩ
Isolation capacitance					4000	pF
Switching frequency			270	300	330	kHz
Safety meets						UL60950-1 EN60950-1 IEC60950-1
Chassis material						Aluminum
Weight						122g (4.29oz)
MTBF	MIL-HDBK-217F, Full load					6.565 x 10 <sup>5</sup> hrs

**ENVIRONMENTAL SPECIFICATIONS**

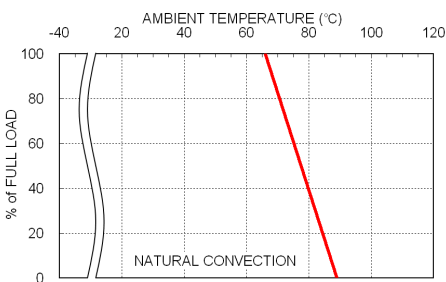
Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating ambient temperature	Without derating		-40		+55	°C
	With derating		+55		+85	
Over temperature protection	DC/DC Converter Case			115		°C
Storage temperature range			-40		+105	°C
Thermal shock						MIL-STD-810F
Vibration						MIL-STD-810F
Relative humidity						5% to 95% RH

**EMC SPECIFICATIONS**

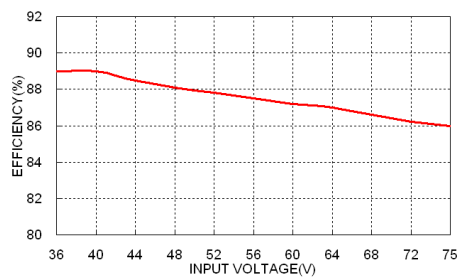
Parameter	Conditions		Level
EMI	EN55022		Class B
ESD	EN61000-4-2	Air $\pm 8kV$ and Contact $\pm 6kV$	Perf. Criteria A
Radiated immunity	EN61000-4-3	10V/m	Perf. Criteria A
Fast transient	EN61000-4-4	$\pm 2kV$	Perf. Criteria A
Surge	EN61000-4-5	$\pm 1kV$	Perf. Criteria A
Conducted immunity	EN61000-4-6	10Vr.m.s	Perf. Criteria A
Power frequency magnetic field	EN61000-4-8	100A/m continuous; 1000A/m 1 second	Perf. Criteria A

**Note:**

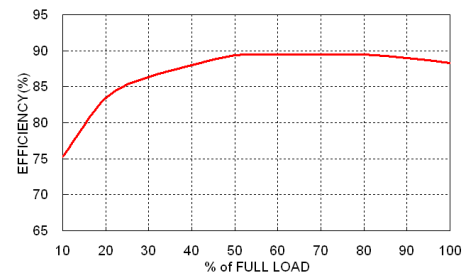
- The output requires a minimum loading on the output to maintain specified regulation. Operation under no-load condition will not damage these devices, however they may not meet all listed specification.
- Test by minimum input and constant resistive load.

**CHARACTERISTIC CURVE**


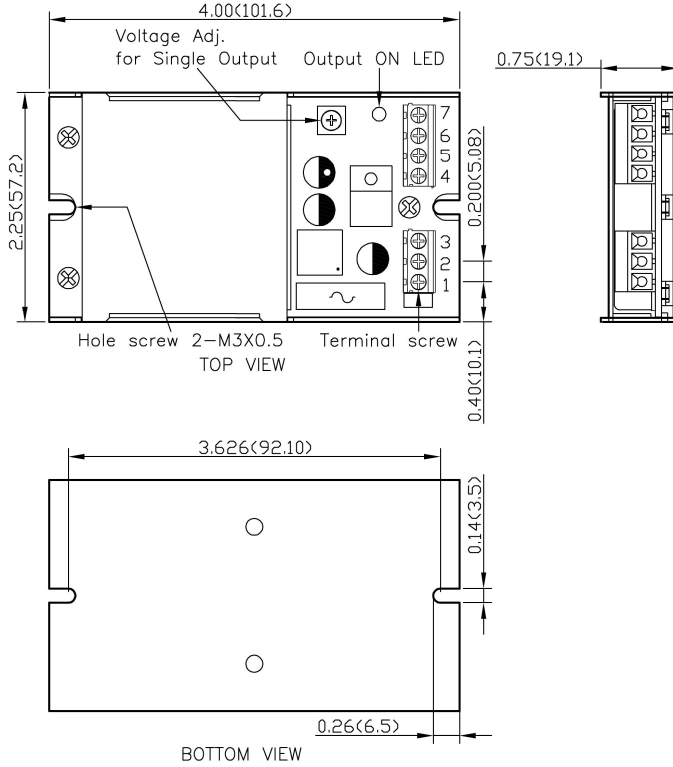
UFEC40-48S05 Derating Curve



UFEC40-48S05 Efficiency vs. Input Voltage



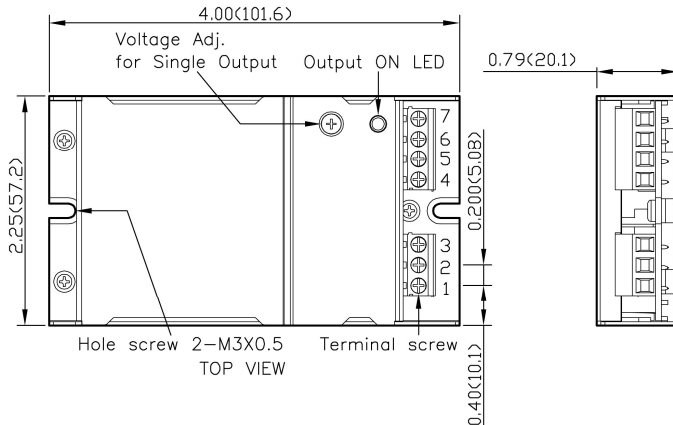
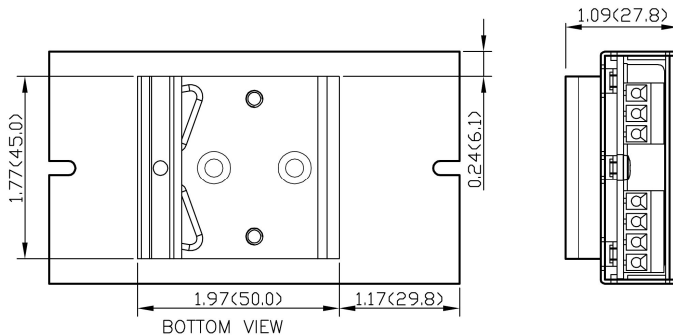
UFEC40-48S05 Efficiency vs. Output Load

**MECHANICAL DRAWING**
**CHASSIS MOUNTING TYPE**

**PIN CONNECTION**

PIN	SINGLE	DUAL	TRIPLE
1	+Vin	+Vin	+Vin
2	-Vin	-Vin	-Vin
3	Ctrl	Ctrl	Ctrl
4	NC	NC	+Aux
5	-Vout	-Vout	Common
6	+Vout	Common	-Aux
7	NC	+Vout	+Vout

\* NC : No Connection

\* Screw terminals – wire range from 14 to 18 AWG

**ENCLOSED MOUNTING TYPE**

**DIN RAIL MOUNTING TYPE**


1. All dimensions in Inch (mm)
2. Tolerance : X.XX±0.02 (X.X±0.5)  
X.XXX±0.01 (X.XX±0.25)
3. Hole screw locked torque :  
MAX 5.0kgf-cm (0.49N-m)
4. Terminal screw locked torque :  
MAX 2.5kgf-cm (0.25N-m)