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MCE40 Series

XP Power

40W

AC-DC POWER SUPPLIES



The MCE40 series of PCB mount single output AC-DC medical power supplies delivers a power output of 40W and offers single output voltages ranging from 3.3V to 48VDC. The MCE40 series, which is available in open-frame and encapsulated mechanical formats, is specifically designed for medical applications with 2 x MOPP isolation and is approved for Class II applications.

With world-wide medical safety approvals, class B compliance for conducted and radiated emissions, high efficiency, high reliability, 4kVAC isolation, the MCE series benefits system designers with easy integration into a wide range of BF rated medical applications including imaging, patient treatment, surgical equipment and home healthcare applications.

Features

- Single outputs 3.3V to 48VDC
- Input range 80 to 264VAC
- Available in open frame and encapsulated formats
- High efficiency, up to 88%
- 4kVAC input to output isolation
- Class B conducted and radiated emissions
- IEC 60601-1 medical safety agency approvals, 2 x MOPP
- IEC class II insulation rating
- -25°C to +70°C operating temperature
- Overvoltage, overload and short circuit protection

Applications

Healthcare

Home Healthcare

Medical Diagnostic

Dimensions

MCE40:
3.46 x 1.50 x 1.12" (87.9 x 38.1 x 28.5mm)

MCE40-P:
3.35 x 1.38 x 1.09" (85.0 x 35.1 x 27.7mm)

Models & Ratings

Model Number[1]	Output Voltage	Output Current	Efficiency[2]	Output Power
MCE40US03	3.3VDC	9.10A	79%	30W
MCE40US05	5.0VDC	8.00A	84%	40W
MCE40US09	9.0VDC	4.44A	85%	40W
MCE40US12	12.0VDC	3.33A	86%	40W
MCE40US15	15.0VDC	2.66A	87%	40W
MCE40US24	24.0VDC	1.66A	88%	40W
MCE40US48	48.0VDC	0.82A	88%	40W

Notes:

1. For Open Frame version add suffix -P to model number, e.g. MCE40US12-P.
2. Typical efficiency at 230VAC and full load.

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Summary

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions	
Input Voltage Range	80		264	VAC	Derate from 100% at 90 VAC to 90% at 80VAC	
No Load Input Power			0.3	W		
Efficiency		86		%	Model dependent, see Models & Ratings	
Operating Temperature	-25		+70	°C	3V3 & 5V models	Derate output linearly from 100% at +45°C to 45% at +70°C
					Other models	Derate output linearly from 100% at 50°C to 50% at 70°C
EMC	EN55011 Level B Conducted & Radiated, EN61000-3-2, EN61000-3-3, EN60601-1-2					
Safety Approvals	IEC60601-1, EN60601-1, ES60601-1					

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage Range	80		264	VAC	Derate from 100% at 90VAC to 90% at 80VAC
Input Frequency	47		63	Hz	
Input Current - Full Load		0.7/0.4		A rms	At 115/230VAC
No Load Input Power			0.3	W	
Inrush Current			40	A	At 230VAC, cold start 25°C
Earth Leakage Current					Class II construction no earth
Input Protection	Internal T1.0 A/300 VAC fuse fitted in line and neutral				

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage	3.3		48	VDC	
Initial Set Accuracy			1.5/1.0	%	1.5% for 3V3 & 5V models, 1% for others at 50% load
Minimum Load	0			A	No minimum load required
Line Regulation			1	%	
Load Regulation			2		
Start Up Delay			2	s	
Start Up Rise Time			35	ms	
Hold Up Time	8	14		ms	At full load and 115VAC
Transient Response			4	%	Deviation, recovery within 1% in less than 500µs for a 25% load change
Ripple & Noise			100	mV pk-pk	3.3-5V models, 20MHz bandwidth
			1	% pk-pk	9V to 48V models, 20MHz bandwidth
Patient Leakage Current		65		µA	At 264VAC, 60Hz
Overvoltage Protection	115		145	% Vnom	220% typical for 3V3 model, auto recovery
Overload Protection	120		200	%	
Short Circuit Protection					Trip & Restart (hiccup mode)
Temperature Coefficient			0.05	%/°C	

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General

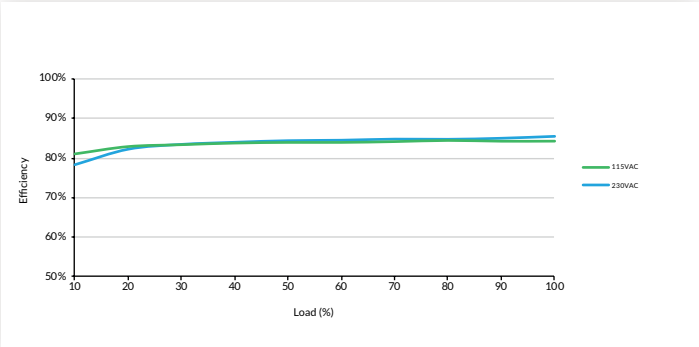
Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		86		%	Model dependent
Isolation: Input to Output	4000			VAC	2 x MOPP, suitable for BF applications
Switching Frequency	17		75	kHz	Varies with load
Power Density			7.7	W/in^3	For '-P' version
Mean Time Between Failure	550	600		khrs	MIL-HDBK-217F, +25°C GB
Weight		0.187 (85)		lb (g)	Open frame versions (-P)
		0.419 (190)			Encapsulated version

Environmental

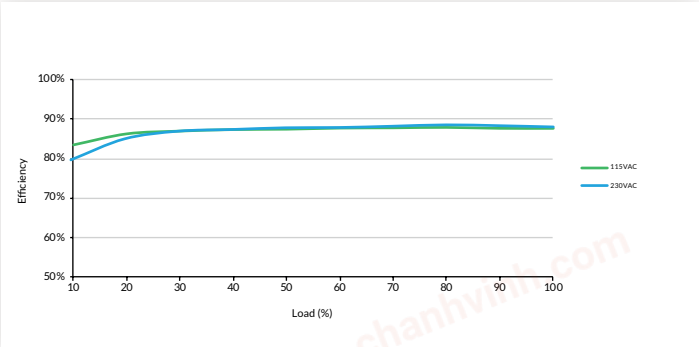
Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions	
Operating Temperature	-25		+70	°C	3V3 & 5V models	Derate output linearly from 100% at +45°C to 45% at +70°C
					Other models	Derate output linearly from 100% at 50°C to 50% at 70°C
Storage Temperature	-40		+85	°C		
Cooling	Convection-cooled					
Humidity			95	%RH	Non-condensing	
Operating Altitude			5000	m		
Shock	IEC68-2-27, 30g, 11ms half sine, 3 times in each of 6 axes					
Vibration	IEC68-2-6, 2g, 10Hz to 500kHz, 10 mins/cycle, 60 mins each cycle					

Efficiency Graphs

MCE40US12-P



MCE40US24-P



EMC: Emissions

Phenomenon	Standard	Test Level	Notes & Conditions
Conducted	EN55011	Class B	If output is connected to ground, additional external components will be required. See application notes
Radiated	EN55011	Class B	
Harmonic Current	EN61000-3-2	Class A	
Voltage Flicker	EN61000-3-3		

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EMC: Immunity

Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
Medical	EN60601-1-2	As below	As below	
ESD Immunity	EN61000-4-2	±8kV contact, ±15kV air discharge	A	
Radiated Immunity	EN61000-4-3	10 V/m	A	
EFT/Burst	EN61000-4-4	3	A	
Surge	EN61000-4-5	2	A	Line to line
Conducted	EN61000-4-6	10Vrms	A	
Magnetic Fields	EN61000-4-8	30A/m	A	
Dips and Interruptions	EN61000-4-11 (115VAC)	70% U_T (80.5VAC) for 100ms	A	
		40% U_T (46VAC) for 200ms	B	
		<5% U_T (0VAC) for 10ms	A	
		<5% U_T (0VAC) for 5000ms	B	
	EN61000-4-11 (230VAC)	70% U_T (161VAC) for 100 ms	A	
		40% U_T (92VAC) for 200ms	A	
		<5% U_T (0VAC) for 10ms	A	
		<5% U_T (0VAC) for 5000ms	B	

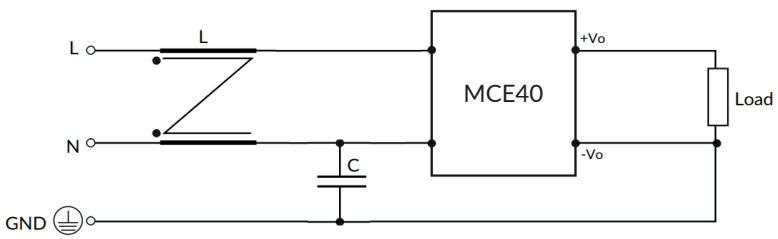
Safety Approvals

Certification	Standard	Notes & Conditions
CB	IEC60601-1	Medical, 2 x MOPP
UL	ES60601-1/CSA-C22.2 No.60601-1:14	Medical, 2 x MOPP
TUV	EN60601-1	Medical, 2 x MOPP
CE	Meets all applicable directives	
UKCA	Meets all applicable legislation	

Application Notes

EMC with output grounded

EMC with output grounded. This product is designed for class II operation, but if there is a requirement to connect the output to ground then additional components as shown below can be added to improve emissions.



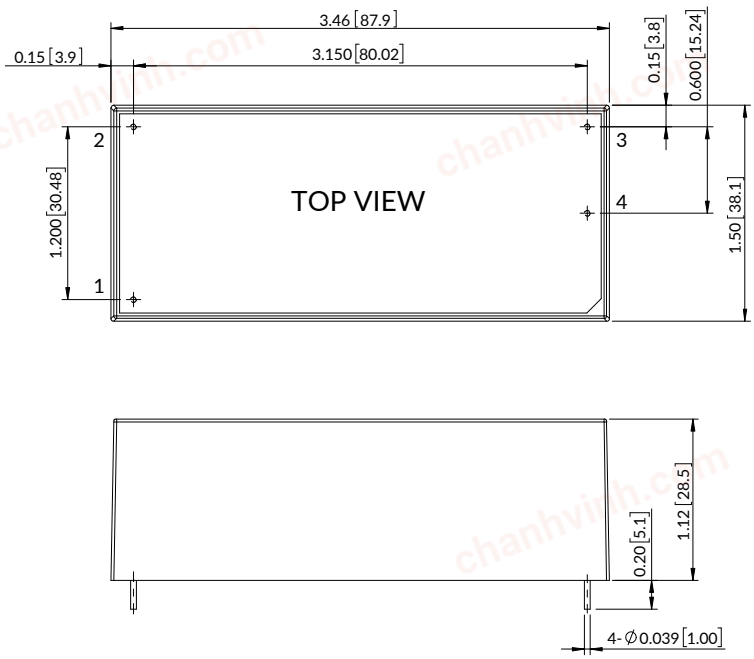
Suggested value - C: Y1 cap, 10mm. 1000pF/400VAC, 20% CD TDK.
- L: CMCK DIP UU-9.8 Φ0.35*60T 10mH (min)

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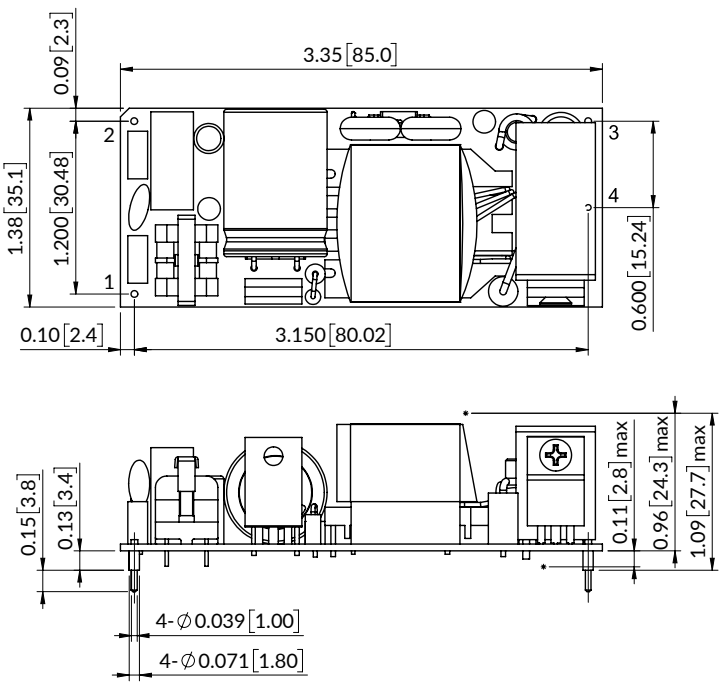
Mechanical Details

Encapsulated



Pin Connections	
Pin	Single
1	ACL
2	ACN
3	+Vout
4	-Vout

Open Frame (-P)



Notes:

1. Dimensions in inches (mm).
2. Weight: Open frame versions (-P): 0.187lbs (85g) Encapsulated: 0.419lbs (190g)
3. Tolerances: x.xx = ± 0.02 (x.x = ± 0.5) x.xxx = ± 0.01 (x.xx = ± 0.25)