IMA01 Series

DC-DC Converter

XP Power

1 Watt

- World Wide Medical Approvals
- Single and Dual Outputs
- SIP7 Package
- -40 °C to +75 °C Operation
- Full Load at 75 °C Ambient
- 4000 VAC Isolation, 1 x MOPP at 300 VAC
- 2 µA Patient Leakage Current
- MTBF 2.5 MHrs
- 3 Year Warranty



Dimensions:

IMA01:
0.77 x 0.36 x 0.44" (19.5 x 9.2 x 11.1 mm)

Models & Ratings

Input Voltage	Output Voltage	Output Current	Input current		Maximum capacitive load	Efficiency	Model Number
			No Load	Full Load			
4.5-5.5 V	3V3	300mA	50mA	285mA	1000uF	70%	IMA0105S3V3
	5V	200mA	50mA	260mA	470uF	77%	IMA0105S05
	9V	111mA	50mA	255mA	470uF	78%	IMA0105S09
	12V	83.3mA	50mA	250mA	220uF	80%	IMA0105S12
	15V	66.7mA	60mA	260mA	220uF	77%	IMA0105S15
	±3V3	±150mA	50mA	285mA	±470uF	70%	IMA0105D03
	±5V	±100mA	50mA	260mA	±220uF	77%	IMA0105D05
	±9V	±55.5mA	50mA	255mA	±220uF	78%	IMA0105D09
	±12V	±41.6mA	50mA	250mA	±100uF	80%	IMA0105D12
	±15V	±33.3mA	60mA	260mA	±100uF	77%	IMA0105D15
10.8-13.2 V	3V3	300mA	25mA	111mA	1000uF	75%	IMA0112S3V3
	5V	200mA	30mA	111mA	470uF	75%	IMA0112S05
	9V	111mA	30mA	110mA	470uF	76%	IMA0112S09
	12V	83.3mA	30mA	108mA	220uF	77%	IMA0112S12
	15V	66.7mA	30mA	111mA	220uF	75%	IMA0112S15
	±3V3	±150mA	25mA	111mA	±470uF	75%	IMA0112D03
	±5V	±100mA	30mA	111mA	±220uF	75%	IMA0112D05
	±9V	±55.5mA	30mA	110mA	±220uF	76%	IMA0112D09
	±12V	±41.6mA	30mA	108mA	±100uF	77%	IMA0112D12
	±15V	±33.3mA	30mA	111mA	±100uF	75%	IMA0112D15
13.5-16.5 V	3V3	300mA	15mA	91mA	1000uF	73%	IMA0115S3V3
	5V	200mA	25mA	93mA	470uF	72%	IMA0115S05
	9V	111mA	25mA	90mA	470uF	74%	IMA0115S09
	12V	83.3mA	25mA	88mA	220uF	76%	IMA0115S12
	15V	66.7mA	25mA	89mA	220uF	75%	IMA0115S15
	±3V3	±150mA	15mA	91mA	±470uF	73%	IMA0115D03
	±5V	±100mA	25mA	93mA	±220uF	72%	IMA0115D05
	±9V	±55.5mA	25mA	90mA	±220uF	74%	IMA0115D09
	±12V	±41.6mA	25mA	88mA	±100uF	76%	IMA0115D12
	±15V	±33.3mA	25mA	89mA	±100uF	75%	IMA0115D15
21.6-26.4 V	3V3	300mA	20mA	62mA	1000uF	68%	IMA0124S3V3
	5V	200mA	20mA	62mA	470uF	68%	IMA0124S05
	9V	111mA	20mA	58mA	470uF	72%	IMA0124S09
	12V	83.3mA	20mA	58mA	220uF	72%	IMA0124S12
	15V	66.7mA	20mA	58mA	220uF	72%	IMA0124S15
	±3V3	±150mA	20mA	62mA	±470uF	68%	IMA0124D03
	±5V	±100mA	20mA	62mA	±220uF	68%	IMA0124D05
	±9V	±55.5mA	20mA	58mA	±220uF	72%	IMA0124D09
	±12V	±41.6mA	20mA	58mA	±100uF	72%	IMA0124D12
	±15V	±33.3mA	20mA	58mA	±100uF	72%	IMA0124D15

Notes

Input currents measured at nominal input voltage.

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage Range	4.5		5.5	VDC	5 V nominal
	10.8		13.2		12 V nominal
	13.5		16.5		15 V nominal
	21.6		26.4		24 V nominal
Input Reflected Ripple Current		20		mA pk-pk	Through 12 µH inductor and 47 µF capacitor
Input Surge			7	VDC for 100 ms	5 V models
			15		12 V models
			18		15 V nominal
			28		24 V nominal

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage	3.3		30	VDC	See Models and Ratings table
Initial Set Accuracy			±5	%	At full load
Minimum Load	10			%	Minimum load required to meet specified regulation
Line Regulation			±1.2	%/1%	Output changes by max of 1.2% for each 1% change in input voltage
Load Regulation		10		%	From 10% to full load, see application note
Cross Regulation		±4		%	On dual output models, when one output is at 25% load and other is varied from 10% load to full load
Ripple & Noise			150	mV pk-pk	20 MHz bandwidth. Measured using 10 µF electrolytic in parallel with 0.1 µF ceramic capacitor
Short Circuit Protection					Continuous
Maximum Capacitive Load					See Models and Ratings table
Temperature Coefficient			0.03	%/°C	

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		75		%	
Isolation: Input to Output	4000			VAC	1 x MOPP at 300 VAC working voltage, 2 x MOPP at 125 VAC working voltage
Patient Leakage Current			2	µA	
Isolation Resistance	10^9			Ω	
Isolation Capacitance		10	20	pF	
Switching Frequency	50		100	kHz	
Power Density			8.2	W/in^3	
Mean Time Between Failure	2.5			MHrs	MIL-HDBK-217F, +25 °C GB
Weight		0.008 (3.6)		lb (g)	

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-40		+75	°C	No derating
Storage Temperature	-40		+125	°C	
Case Temperature			+100	°C	
Humidity	2.5		95	%RH	Non-condensing
Cooling					Natural convection

EMC: Emissions

Phenomenon	Standard	Test Level	Notes & Conditions
Conducted	EN55011	Class B	See Application Note
Radiated	EN55011	Class B	

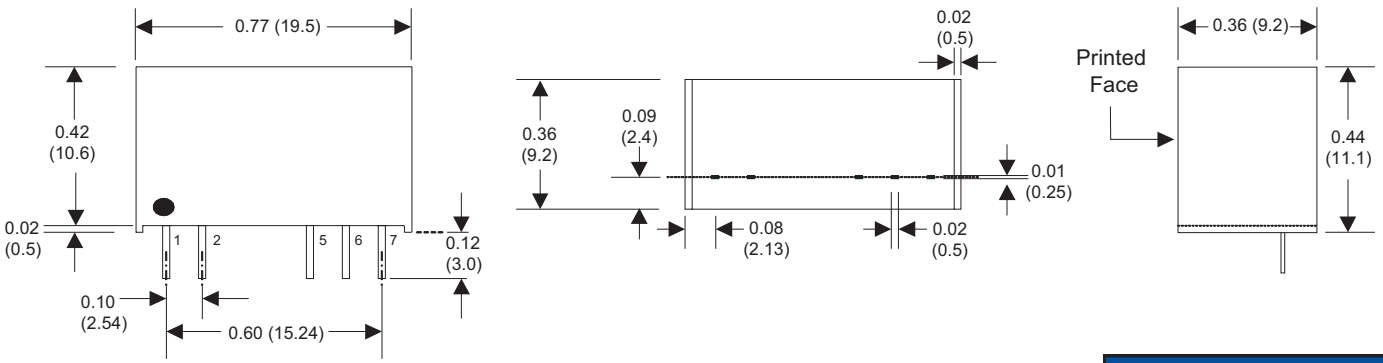
EMC: Immunity

Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
ESD Immunity	EN61000-4-2	±15 kV	A	Air Discharge
Radiated Immunity	EN61000-4-3	10 Vrms	A	
EFT/Burst	EN61000-4-4	2 kV	A	External components required, see applications note
Surge	EN61000-4-5	2 kV	A	External components required, see applications note
Conducted Immunity	EN61000-4-6	10 V rms	A	
Magnetic Fields	EN61000-4-8	30 A/m	A	

Safety Approvals

Safety Agency	Safety Standard	Notes & Conditions
UL	ANSI/AMMI ES60601-1	1 x MOPP at 230 VAC
CSA	CSA C22.2 No. 60601-1	
TUV	EN60601-1	
CB	IEC60601-1	
CE	Meets all applicable directives	
UKCA	Meets all applicable legislation	

Mechanical Details



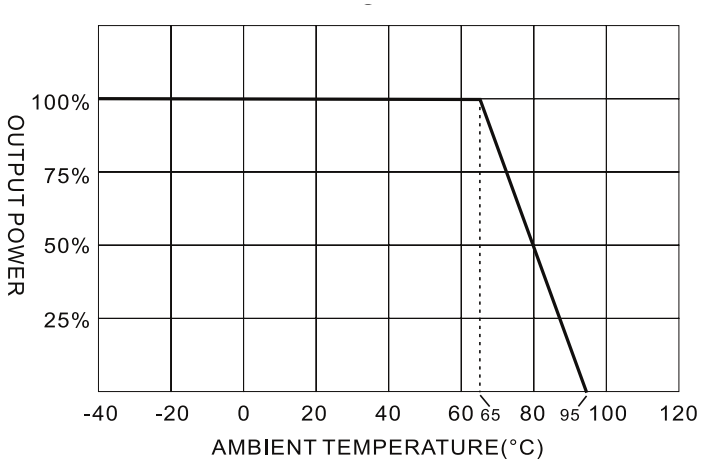
Pin Connections		
Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
5	-Vout	-Vout
6	No Pin	Common
7	+Vout	+Vout

Notes

1. All dimensions are in inches (mm)
2. Weight: 0.008 lbs (3.6 g) approx.
3. Pin diameter: 0.02±0.002 (0.5±0.05)
4. Pin pitch tolerance: ±0.014 (±0.35)
5. Case tolerance: ±0.02 (±0.5)

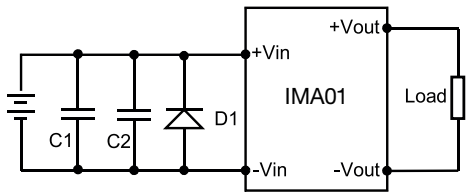
Application Note

Regulation



EFT and Surge Filter

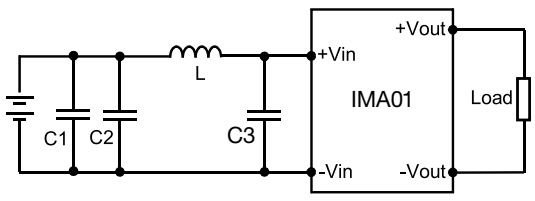
Input components (C1, C2, D1) are used to help meet surge test requirement for the module.



	C1	C2	D1
IMA0105XXXX	1000 µF/35 V	330 µF/50 V	SMDJ9.0A
IMA0112XXXX	1000 µF/35 V	330 µF/50 V	SMDJ13A
IMA0115XXXX	1000 µF/35 V	330 µF/50 V	SMDJ18A
IMA0124XXXX	1000 µF/35 V	330 µF/50 V	SMDJ28A

EMI Filter

Input filter components (C1,C2, C3 and L) are used to help meet conducted emissions requirements for the module. These components should be mounted as close as possible to the module, and all leads should be minimised to decrease radiated noise.



	C1	C2	C3	L
IMA0105XXXX	1206, 4.7 µF/ 50 V			6.8 µH
IMA0112XXXX	1206, 4.7 µF/ 50 V	1206, 4.7 µF/ 50 V		6.8 µH
IMA0115XXXX	1206, 4.7 µF/ 50 V	1206, 4.7 µF/ 50 V		6.8 µH
IMA0124XXXX	1206, 4.7 µF/ 50 V	1206, 4.7 µF/ 50 V	1206, 4.7 µF/50 V	6.8 µH