

## Features

- 2:1 Input Range
- Operating Temperature Range: -40~85°C
- Approved to cURus, UKCA, CE, RoHS & REACH
- Safety Standards to IEC/UL/EN62368-1 & EC/EN/ANSI/AAMI ES 60601-1
- Efficiency up to 85%
- EMC Class A & B
- Single & Dual output 4.5~36V DC
- SCP & UVP



Ideal Power's 43MPL02-xyz 2W Isolated DC/DC Converter (DIP) Series are certified to cURus, UKCA, CE, CB, RoHS, REACH & EN 60601-1/ES 60601-1/IEC 62368-1/EN 62368-1/UL 62368-1 Standards and comply with Efficiency Regulations. These are primarily used in Medical, ITE, Audio & Video Industries and customised solutions are available upon request.

### Part Number Structure

**43MPL02 - 05 S 05**

Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)
	<b>05:</b> 4.5 ~ 13.2	<b>S:</b> Single	<b>3P3:</b> 3.3
	<b>12:</b> 9 ~ 18		<b>05:</b> 5
	<b>24:</b> 18 ~ 36		<b>12:</b> 12
			<b>15:</b> 15
		<b>D:</b> Dual	<b>05:</b> ±5
			<b>12:</b> ±12
			<b>15:</b> ±15

**Models**

Model Number	Input Range V DC	Output Voltage V DC	Output current @Full Load A	Input Current @ No Load A	Efficiency %	Maximum Capacitor Load μF
43MPL02-05S3P3	4.5 ~ 13.2	3.3	600	5	77	2000
43MPL02-05S05	4.5 ~ 13.2	5	400	5	82	820
43MPL02-05S12	4.5 ~ 13.2	12	167	12	83	470
43MPL02-05S15	4.5 ~ 13.2	15	134	20	84	470
43MPL02-05D05	4.5 ~ 13.2	±5	±200	5	82	±470
43MPL02-05D12	4.5 ~ 13.2	±12	±83	20	83	±220
43MPL02-05D15	4.5 ~ 13.2	±15	±67	25	81	±220
43MPL02-12S3P3	9 ~ 18	3.3	600	4	79	2000
43MPL02-12S05	9 ~ 18	5	400	4	81	820
43MPL02-12S12	9 ~ 18	12	167	6	85	470
43MPL02-12S15	9 ~ 18	15	134	10	83	470
43MPL02-12D05	9 ~ 18	±5	±200	4	81	±470
43MPL02-12D12	9 ~ 18	±12	±83	6	83	±220
43MPL02-12D15	9 ~ 18	±15	±67	10	81	±220
43MPL02-24S3P3	18 ~ 36	3.3	600	3	78	2000
43MPL02-24S05	18 ~ 36	5	400	3	80	820
43MPL02-24S12	18 ~ 36	12	167	6	82	470
43MPL02-24S15	18 ~ 36	15	134	6	82	470
43MPL02-24D05	18 ~ 36	±5	±200	3	80	±470
43MPL02-24D12	18 ~ 36	±12	±83	6	81	±220
43MPL02-24D15	18 ~ 36	±15	±67	6	80	±220

**Input Specifications**

Parameter	Conditions	Min	Typ	Max	Unit	
Operating input voltage range	2:1	5Vin(nom)	4.5	5	13.2	VDC
		12Vin(nom)	9	12	18	
		24Vin(nom)	18	24	36	
Startup voltage	2:1	5Vin(nom)	--	--	4.5	VDC
		12Vin(nom)	--	--	9	
		24Vin(nom)	--	--	18	
Shutdown voltage	2:1	5Vin(nom)	3	3.8	4.4	VDC
		12Vin(nom)	6.5	7.6	8.8	
		24Vin(nom)	15.2	16.4	17.6	
Startup time	Constant resistive load	Power up	--	10	20	ms
Input surge voltage	3 second, max.	5Vin(nom)	--	--	15	
		12Vin(nom)	--	--	25	
		24Vin(nom)	--	--	40	

**Output Specifications**

Parameter	Conditions		Min	Typ	Max	Unit
Voltage accuracy			-2.5	--	+2.5	
Line regulation	Low Line to High Line at Full Load		-1.0	--	+1.0	
Load regulation	10% Load to 100% Load		-3.0	--	+3.0	%
Minimum Load	Reference Characteristic Curve		0	--	--	
Cross regulation	Asymmetrical load 25%/100% FL	Dual	--	+4	--	
Ripple and noise	Measured by 20MHz bandwidth	3.3Vout, 5Vout, +5Vout	--	100	--	mVp-p
		Others	--	125	--	
Temperature coefficient			-0.03	--	+0.03	%/°C
Transient response recovery time	25% load step change		--	300	--	µs
Short circuit protection	Continuous, automatic recovery					

**General Specifications**

Parameter	Conditions		Min	Typ	Max	Unit
Isolation voltage	1 minute	Input to Output	5000	--	--	V AC
Isolation resistance	500V DC		10	--	--	GΩ
Isolation capacitance			--	10	20	pF
Leakage current	240V AC, 60Hz		--	--	2	µA
Switching frequency			180	--	360	kHz
Clearance/Creepage			8.0	--	--	mm
Safety approvals	EC/ EN/ ANSI/AAMI ES 60601-1 IEC/ EN/ UL 62368-1					UL:E360199 UL:E193009 CB:UL(Demko)
Case material	Non-conductive black plastic					
Base material	None					
Potting material	Potting compound (UL94 V-0)					
Weight	5.1g (0.18oz)					
MTBF	MIL-HDBK-217F, Full Load					1.302 x 10 <sup>7</sup> hrs

**Environmental Specifications**

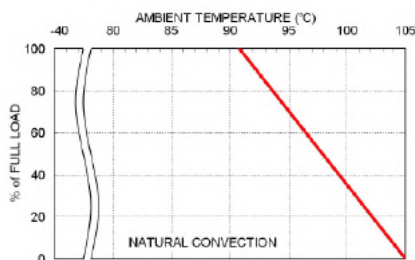
Parameter	Conditions		Min	Typ	Max	Unit
Operating ambient temperature	With derating		-40	--	+85	°C
Maximum case temperature			--	--	105	°C
Storage temperature range			-55	--	+125	°C
Operating altitude			--	--	5000	m
Thermal Shock	MIL-STD-810F					
Vibration	MIL-STD-810F					
Relative humidity	5% to 95% RH					

## EMC Specifications

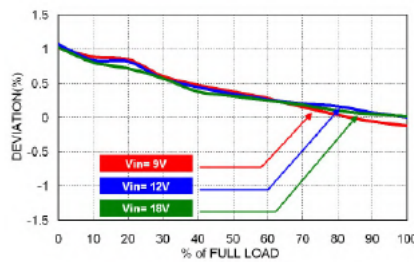
Parameter	Conditions		Level
EMI	EN55011, EN55032, EN60601-1-2 and FCC Part 18 / 15 With external components.		Class A, Class B
EMS	EN55024 and EN60601-1-2		Perf. Criteria A
SD	EN61000-4-2	Air $\pm 15$ kV and Contact $\pm 8$ kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	10 V/m	Perf. Criteria A
Fast transient	EN61000-4-4	$\pm 2$ kV External input filter circuit is required.	Perf. Criteria A
Surge	EN61000-4-5	$\pm 2$ kV External input filter circuit is required.	Perf. Criteria A
Conducted immunity	EN61000-4-6	10 Vr.m.s	Perf. Criteria A
Power frequency magnetic field	EN61000-4-8	100A/m continuous, 1000A/m 1 second	Perf. Criteria A

**CAUTION:** This power module is not internally fused. An input line fuse must always be used.

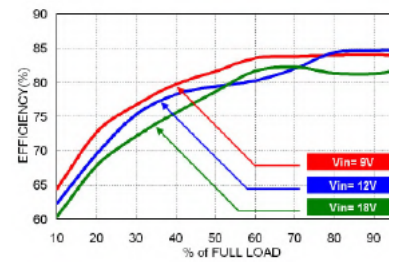
## Characteristic Curve



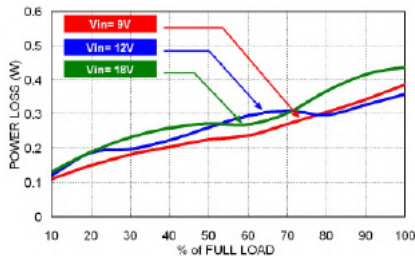
43MPL02-12S12 Derating Curve



43MPL02-12S12 Vout Deviation. vs. Output Load



43MPL02-12S12 Efficiency vs. Output Load



MPL02-12S12 Power Dissipation vs. Output Load

### Fuse Considerations

This power module is not internally fused. An input line fuse must always be used.

This encapsulated power module can be used in a wide variety of applications, ranging from simple stand-alone operation to an integrated part of sophisticated power architecture.

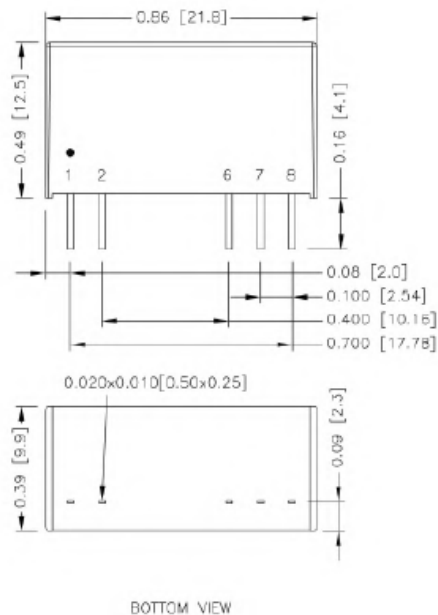
To maximum flexibility, internal fusing is not included; however, to achieve maximum safety and system protection, always use an input line fuse.

The input line fuse suggest as below :

Model	Fuse Rating (A)	Fuse Type
43MPL02-05S□□, 43MPL02-05D□□	1.00	Slow-Blow
43MPL02-12S□□, 43MPL02-12D□□	0.50	Slow-Blow
43MPL02-24S□□, 43MPL02-24D□□	0.315	Slow-Blow

The table based on the information provided in this data sheet on inrush energy and maximum DC input current at low Vin.

### Mechanical Drawing

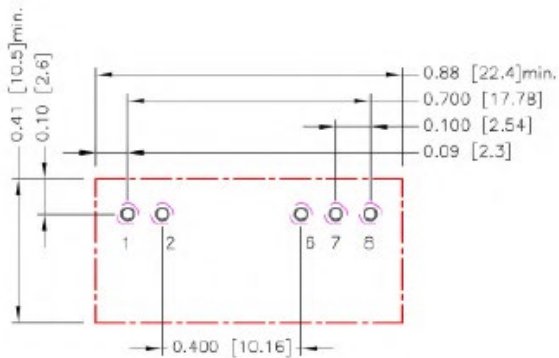


- 1 All dimensions in inch [mm]
- 2 Tolerance :x.xx±0.02 [x.x±0.5]  
x.xxx±0.010 [x.xx±0.25]
- 3 Pin dimension tolerance ±0.004[0.10]

### Pin Connection

Pin	Single	Dual
1	-Vin	-Vin
2	+Vin	+Vin
6	+Vout	+Vout
7	-Vout	Common
8	NC	-Vout

### Recommended Pad Layout



All dimensions in inch[mm]

Pad size(lead free recommended)

Through hole 1.2.6.7.8:  $\varnothing 0.031[0.80]$

Top view pad 1.2.6.7.8:  $\varnothing 0.039[1.00]$

Bottom view pad 1.2.6.7.8:  $\varnothing 0.063[1.60]$

- There should be at least 8mm distance between primary and secondary circuit.

### Thermal Considerations

The power module operates in a variety of thermal environments.

However, sufficient cooling should be provided to help ensure reliable operation of the unit.

Heat is removed by conduction, convection, and radiation to the surrounding Environment.

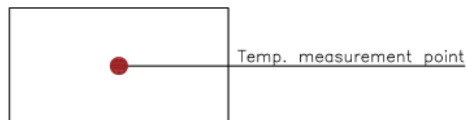
Proper cooling can be verified by measuring the point as the figure below.

The temperature at this location should not exceed "Maximum case temperature".

When operating, adequate cooling must be provided to maintain the test point temperature at or below "Maximum case temperature".

You can limit this Temperature to a lower value for extremely high reliability.

- Thermal test condition with vertical direction by natural convection (20LFM).



TOP VIEW