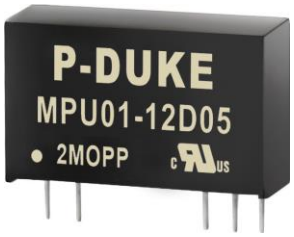
5 YEARS WARRANTY

RoHS COMPLIANT

REACH COMPLIANT



Medical
PV
Automation
Datacom
IPC
Industry
Measurement
Telecom
Automobile
Boat
Charger
Railway

2 x MOPP
LOW Leakage Current
5000 VAC Reinforced Insulation
Operating Altitude 5000 meter
HIGH Efficiency
SCP

PART NUMBER STRUCTURE

MPU01 - 05 S 05

Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)
	05: 4.5~5.5	**S:** Single	**3P3:** 3.3
	12: 9.6~14.4		**05:** 5
	15: 12.0~18.0		**12:** 12
	24: 19.2~28.8		**15:** 15
		D: Dual	**05:** ± 5
			12: ±12
			15: ±15

TECHNICAL SPECIFICATION All specifications are typical at nominal input, full load and 25℃ unless otherwise noted

Model Number	Input Range	Output Voltage	Output Current @Full Load	Input Current @ No Load	Efficiency	Maximum Capacitor Load
	VDC	VDC	mA	mA	%	μF
MPU01-05S3P3	4.5 ~ 5.5	3.3	303	30	80	2000
MPU01-05S05	4.5 ~ 5.5	5	200	30	82	820
MPU01-05S12	4.5 ~ 5.5	12	83	30	85	470
MPU01-05S15	4.5 ~ 5.5	15	67	30	84	470
MPU01-05D05	4.5 ~ 5.5	±5	±100	30	85	±470
MPU01-05D12	4.5 ~ 5.5	±12	±42	30	85	±220
MPU01-05D15	4.5 ~ 5.5	±15	±34	30	84	±220
MPU01-12S3P3	9.6 ~ 14.4	3.3	303	30	80	2000
MPU01-12S05	9.6 ~ 14.4	5	200	30	82	820
MPU01-12S12	9.6 ~ 14.4	12	83	30	84	470
MPU01-12S15	9.6 ~ 14.4	15	67	30	83	470
MPU01-12D05	9.6 ~ 14.4	±5	±100	30	82	±470
MPU01-12D12	9.6 ~ 14.4	±12	±42	30	83	±220
MPU01-12D15	9.6 ~ 14.4	±15	±34	30	83	±220
MPU01-15S3P3	12 ~ 18	3.3	303	15	79	2000
MPU01-15S05	12 ~ 18	5	200	15	83	820
MPU01-15S12	12 ~ 18	12	83	15	84	470
MPU01-15S15	12 ~ 18	15	67	15	84	470
MPU01-15D05	12 ~ 18	±5	±100	15	82	±470
MPU01-15D12	12 ~ 18	±12	±42	15	83	±220
MPU01-15D15	12 ~ 18	±15	±34	15	83	±220
MPU01-24S3P3	19.2 ~ 28.8	3.3	303	10	78	2000
MPU01-24S05	19.2 ~ 28.8	5	200	10	82	820
MPU01-24S12	19.2 ~ 28.8	12	83	10	83	470
MPU01-24S15	19.2 ~ 28.8	15	67	10	83	470
MPU01-24D05	19.2 ~ 28.8	±5	±100	10	80	±470
MPU01-24D12	19.2 ~ 28.8	±12	±42	10	81	±220
MPU01-24D15	19.2 ~ 28.8	±15	±34	10	81	±220

INPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating input voltage range		5Vin(nom)	4.5	5	5.5	VDC
		12Vin(nom)	9.6	12	14.4	
		15Vin(nom)	12	15	18	
		24Vin(nom)	19.2	24	28.8	
Input surge voltage	1 second, max.	5Vin(nom)			6	VDC
		12Vin(nom)			25	
		15Vin(nom)			25	
		24Vin(nom)			40	
	If the input will be switched electromechanically, the input should install an external capacitor to avoid voltage transient: 100μF/25V for 5Vin item 47μF/100V for other items					

OUTPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Voltage accuracy	Measured by nominal input & 60% FL Measured by nominal input & 90% FL	3.3Vout,5Vout,±5Vout Others	-3.5		+3.5	%
Line regulation	Measured by each 1% of Vin				0.2	%
Load regulation	10% Load to 100% Load	3.3Vout,5Vout,±5Vout Others			10 7	%
Minimum Load	Reference Characteristic Curve		0			%
Cross regulation	Asymmetrical load 25%/100% FL	Dual		±4		%
Ripple and noise	Measured by 20MHz bandwidth			75	100	mVp-p
Temperature coefficient			-0.03		+0.03	%/℃
Short circuit protection			Continuous, automatics recovery			

GENERAL SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation voltage	1 minute	Input to Output	5000			VAC
Isolation resistance	500VDC		10			GΩ
Isolation capacitance				15	20	pF
Leakage current	240VAC,60Hz				2	μA
Switching frequency			220		380	kHz
Clearance/Creepage			8.0			mm
Safety approvals	IEC/ 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						Silicone (UL94 V-0)
Weight						4.8g (0.17oz)
MTBF	MIL-HDBK-217F, Full load					1.936 x 10^7 hrs

ENVIRONMENTAL SPECIFICATIONS

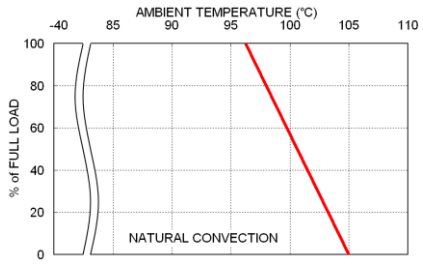
Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating ambient temperature		Without derating	-40		+95	℃
Maximum case temperature					105	℃
Storage temperature range			-55		+125	℃
Operating altitude					5000	m
Thermal shock						MIL-STD-810F
Shock						MIL-STD-810F
Vibration						MIL-STD-810F
Relative humidity						5% to 95% RH

EMC SPECIFICATIONS

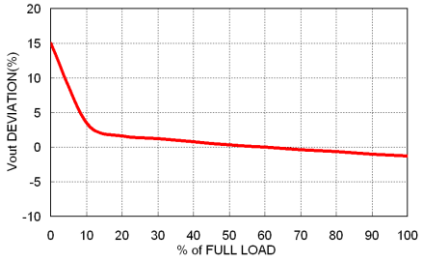
Parameter	Conditions	Level
EMI	EN55011, EN55032, EN60601-1-2 With external components	Class A, Class B
EMS	EN55035 and EN60601-1-2	Perf. Criteria A
ESD	EN61000-4-2 Air ± 15kV and Contact ± 8kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 10 V/m	Perf. Criteria A
Fast transient	EN61000-4-4 ± 2kV External input filter circuit is required, for further information, please contact P-DUKE.	Perf. Criteria A
Surge	EN61000-4-5 ± 2kV External input filter circuit is required, for further information, please contact P-DUKE.	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.

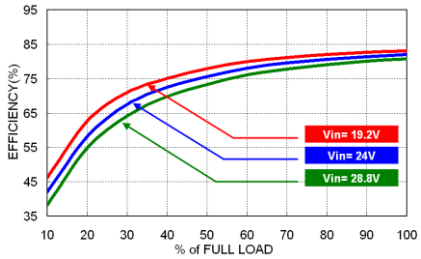
CHARACTERISTIC CURVE



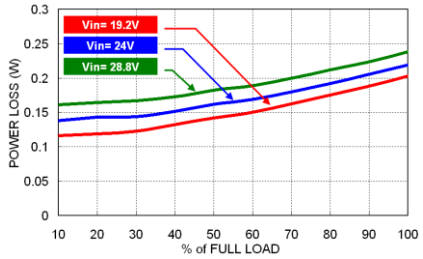
MPU01-24S05 Derating Curve



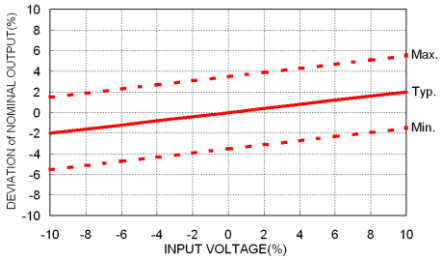
MPU01-24S05 Vout Deviation vs. Output Load



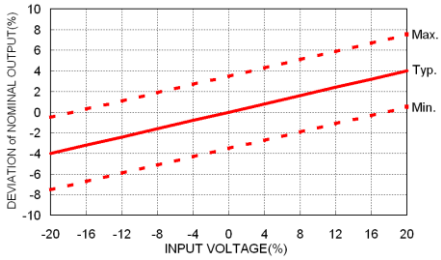
MPU01-24S05 Efficiency vs. Output Load



MPU01-24S05 Power Dissipation vs. Output Load



Vout Deviation vs. Input Voltage for 5Vin Models



Vout Deviation vs. Input Voltage for 12, 15, 24Vin Models

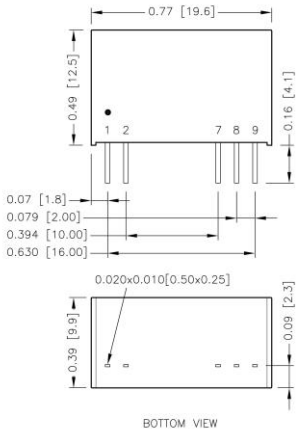
FUSE CONSIDERATION

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：

Modules	Fuse Rating (A)	Fuse Type
MPU01-05S□□、MPU01-05D□□	0.5	Slow-Blow
MPU01-12S□□、MPU01-12D□□	0.315	Slow-Blow
MPU01-15S□□、MPU01-15D□□	0.315	Slow-Blow
MPU01-24S□□、MPU01-24D□□	0.16	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

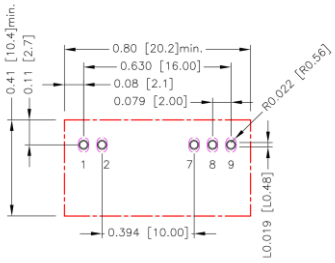


PIN CONNECTION

PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
7	-Vout	-Vout
8	No pin	Common
9	+Vout	+Vout

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. Pin dimension tolerance ±0.004[0.10]

RECOMMENDED PAD LAYOUT



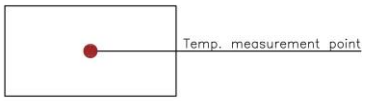
* There should be at least 8mm distance between primary and secondary circuit.
** For further information, please contact P-DUKE.

All dimensions in inch[mm]
Pad size(lead free recommended)
Through hole 1.2.7.8.9: ∅0.031[0.80]
Top view pad 1.2.7.8.9: ∅0.039[1.00]
Bottom view pad1.2.7.8.9:
Groove R0.022[0.56] L0.019[0.48]

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

P-DUKE Technology Co., Ltd.

Tel +886-4-2359-0668
Fax +886-4-2359-1337
Email sales@pduke.com
Web www.pduke.com
Add No. 36, 22nd Rd., Taichung Industrial Park, Taichung, Taiwan, R.O.C.