Power Mate Technology, Inc

DU1P0 Series

Unregulated DC-DC Converter
1 Watts Output Power

3 YEARS WARRANTY

RoHS COMPLIANT

REACH COMPLIANT

Automation | Datacom | IPC

Industry | Measurement | Telecom

Automobile | Boat | Charger

Medical | PV | Railway

3000 VDC Reinforced Insulation

PART NUMBER STRUCTURE

DU1P0 -	05	S	05	N
Series Name	**Input Voltage (VDC)**	**Output Quantity**	**Output Voltage (VDC)**	**Isolation Options**
	05:4.5~5.5 **12:**10.8~13.2 **15:**13.5~16.5 **24:**21.6~26.4	**S:**Single	**05:**5 **12:**12 **15:**15	**_ :** Standard 1000VDC isolation **N:**3000VDC isolation
		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 VDC	Output Voltage VDC	Output Current @Min.Load mA	Output Current @FullLoad mA	Input Current @ No Load mA	Efficiency %	Maximum Capacitor Load µF
DU1P0-05S05	4.5 ~ 5.5	5	20	200	42	77	330
DU1P0-05S12	4.5 ~ 5.5	12	8.3	83	32	82	330
DU1P0-05S15	4.5 ~ 5.5	15	6.7	67	35	81	330
DU1P0-05D05	4.5 ~ 5.5	± 5	± 10	± 100	40	78	±150
DU1P0-05D12	4.5 ~ 5.5	± 12	± 4.2	± 42	35	82	±150
DU1P0-05D15	4.5 ~ 5.5	± 15	± 3.3	± 33	40	81	±150
DU1P0-12S05	10.8 ~ 13.2	5	20	200	17	77	330
DU1P0-12S12	10.8 ~ 13.2	12	8.3	83	17	82	330
DU1P0-12S15	10.8 ~ 13.2	15	6.7	67	18	79	330
DU1P0-12D05	10.8 ~ 13.2	± 5	± 10	± 100	18	77	±150
DU1P0-12D12	10.8 ~ 13.2	± 12	± 4.2	± 42	18	81	±150
DU1P0-12D15	10.8 ~ 13.2	± 15	± 3.3	± 33	18	82	±150
DU1P0-15S05	13.5 ~ 16.5	5	20	200	20	73	330
DU1P0-15S12	13.5 ~ 16.5	12	8.3	83	18	79	330
DU1P0-15S15	13.5 ~ 16.5	15	6.7	67	18	80	330
DU1P0-15D05	13.5 ~ 16.5	± 5	± 10	± 100	18	75	±150
DU1P0-15D12	13.5 ~ 16.5	± 12	± 4.2	± 42	16	80	±150
DU1P0-15D15	13.5 ~ 16.5	± 15	± 3.3	± 33	16	80	±150
DU1P0-24S05	21.6 ~ 26.4	5	20	200	12	72	330
DU1P0-24S12	21.6 ~ 26.4	12	8.3	83	12	78	330
DU1P0-24S15	21.6 ~ 26.4	15	6.7	67	10	78	330
DU1P0-24D05	21.6 ~ 26.4	± 5	± 10	± 100	12	75	±150
DU1P0-24D12	21.6 ~ 26.4	± 12	± 4.2	± 42	10	78	±150
DU1P0-24D15	21.6 ~ 26.4	± 15	± 3.3	± 33	10	79	±150

INPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating input voltage range		5Vin(nom)	4.5	5	5.5	VDC
		12Vin(nom)	10.8	12	13.2	
		15Vin(nom)	13.5	15	16.5	
		24Vin(nom)	21.6	24	26.4	
Input filter				C type		

OUTPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Voltage accuracy			-5.0		+5.0	%
Line regulation	Low Line to High Line at Full Load			1.3%,max / 1% of Vin		
Load regulation	20% to 100% Load	5Vout	-10		+10	%
		Others	-8		+8	
Ripple and noise	Measured by 20MHz bandwidth			100		mVp-p
Temperature coefficient			-0.1		+0.1	%/℃
Short circuit protection				1 Second, max.		

GENERAL SPECIFICATIONS

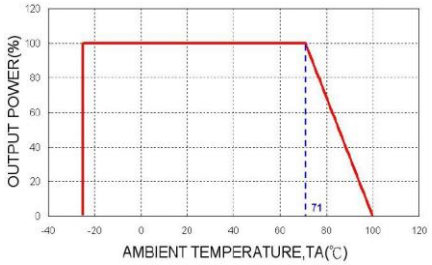
Parameter	Conditions			Min.	Typ.	Max.	Unit
Isolation voltage	1 minute	Input to Output	Standard type Suffix “N” (Reinforced insulation)	1000 3000			VDC
Isolation resistance	500VDC			1			GΩ
Isolation capacitance						30	pF
Switching frequency				60			kHz
Safety approvals	IEC/ EN/ UL62368-1					UL:E193009 CB:UL(Demko)	
Case material					Non-conductive black plastic		
Base material						None	
Potting material						Epoxy (UL94 V-0)	
Weight						2.0g (0.071oz)	
MTBF	MIL-HDBK-217F, Full load					2.019 x 10^{7} hrs	

ENVIRONMENTAL SPECIFICATIONS

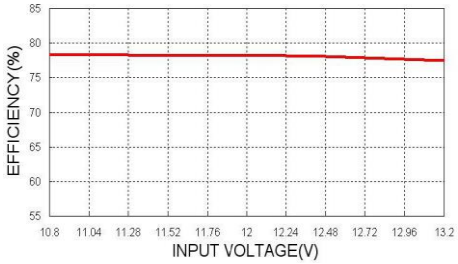
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	With derating	-25		+100	℃
Maximum case temperature				100	℃
Storage temperature range		-55		+125	℃
Thermal shock				MIL-STD-810F	
Vibration				MIL-STD-810F	
Relative humidity				5% to 95% RH	

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

CHARACTERISTIC CURVE



DU1P0-12S05 Derating Curve



DU1P0-12S05 Efficiency vs. Input Voltage

DU1P0-12S05 Efficiency vs. Output Load

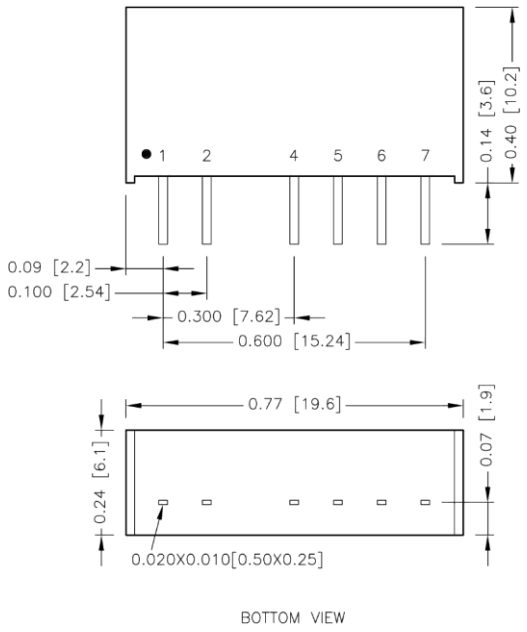
FUSE CONSIDERATION

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 :

Model	Fuse Rating (A)	Fuse Type
DU1P0-05S□□、DU1P0-05D□□	0.63	Slow-Blow
DU1P0-12S□□、DU1P0-12D□□	0.315	Slow-Blow
DU1P0-15S□□、DU1P0-15D□□	0.315	Slow-Blow
DU1P0-24S□□、DU1P0-24D□□	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



PIN CONNECTION
STANDARD

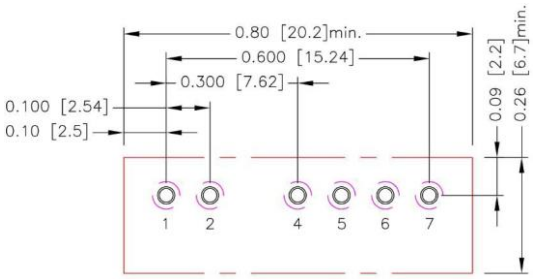
PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
4	-Vout	-Vout
5	NC	Common
6	+Vout	+Vout
7	No Pin	No Pin

SUFFIX "N"

PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
4	No Pin	No Pin
5	-Vout	-Vout
6	NC	Common
7	+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 pitch tolerance ±0.01 [0.25]
4. Pin dimension tolerance ±0.004[0.10]

RECOMMENDED PAD LAYOUT

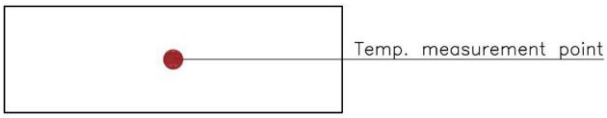


All dimensions in inch[mm]
Pad size(lead free recommended)
Through hole 1.2.4.5.6.7: Φ0.031[0.80]
Top view pad 1.2.4.5.6.7: Φ0.039[1.00]
Bottom view pad 1.2.4.5.6.7: Φ0.063[1.60]

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