HELIOS
POWER SOLUTIONS

MCF-028015-001

EMI filter and transient protector

3 YEARS WARRANTY

RoHS COMPLIANT

REACH COMPLIANT

Railway | Defense | Industry

Automation | Datacom | Measurement

Telecom | Automobile | Boat

Charger | Medical | PV

NON -isolation | 4 : 1 Wide Input Range | MIL-STD 1275D Compliant | MIL-STD 461G | INRUSH CURRENT LIMIT | REVERSE POLARITY PROTECTION | REMOTE ON OFF | OCP | OTP | OVP | SCP | UVP

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

INPUT SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating input voltage range		9	28	36	VDC
Inrush current	With 1000μF connected to the output		5		A
Start up voltage				9	VDC
Remote ON/OFF	Referred to –Vin pin DC-DC ON DC-DC OFF		Open or Short or 0 ~ 1.2VDC 4 ~ 12VDC		
Transient voltage	1 second, max.			50	VDC
	50 ms, max.			100	VDC
Spikes	70μs , 15mJ	-250		250	VDC
Reverse polarity protection	Internal series MOSFET is held in an off state to avoid reverse current flow	-36		0	VDC

OUTPUT SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Output voltage			Vin-1	Vin	VDC
Clamping voltage	Input transient voltage mode		40		VDC
Efficiency			98		%
Output current				15	A
Output power range				250	W
Over load protection	Hiccup mode		35		A
Short circuit protection			Continuous, automatics recovery		

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GENERAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Standard meets	Compliance with standards voltage transient immunity			RIA12 Surge Susceptibility NF F 01-510 Surge Susceptibility MIL-STD-1275D Surge Susceptibility	
Isolation voltage	1 minute Input (Output) to Case	2250			VDC
Case material				Aluminum base-plate with plastic case	
Potting material				Silicone (UL94 V-0)	
Weight				64g (2.26oz)	
MTBF	MIL-HDBK-217F, Full load			6.095 x 10^5 hrs	

ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	With derating	-40		+105	℃
Maximum case temperature				105	℃
Over temperature protection			115		℃
Storage temperature range		-55		+125	℃
Thermal shock				MIL-STD-810F	
Vibration				MIL-STD-810F	
Relative humidity				5% to 95% RH	

EMC SPECIFICATIONS

Parameter	Conditions	Level
EMI	CE101-4 Curve #2 With external components CE102-1 Basic curve RE101-2 Navy RE102-3 Fixed Wing internal, ≥ 25 Meters Nose to Tail	MIL-STD-461G
EMS	CS101-1 Curve #2 With external components CS114-1 Curve #5 CS115-1 Basic waveform CS116-2 Imax.=10A	MIL-STD-461G

Note:

1. The MCF-028015-001 is a DC front-end module that provides EMI filtering and transient protection. The module enables designers using P-DUKE's 24V DC/DC converters to meet conducted emission and conducted susceptibility per MIL-STD-461G.

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

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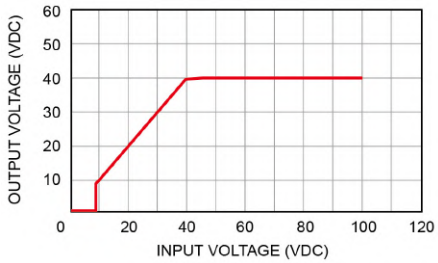
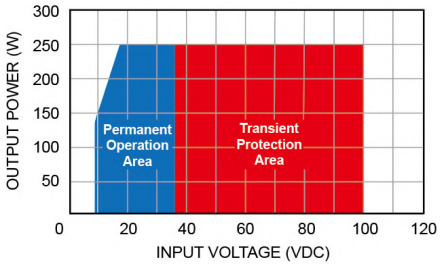
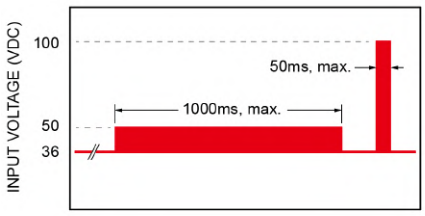
CHARACTERISTIC CURVE



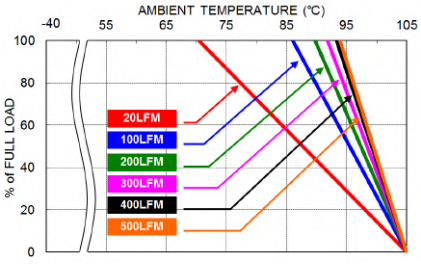
Transfer Function



Pout vs. Input Voltage



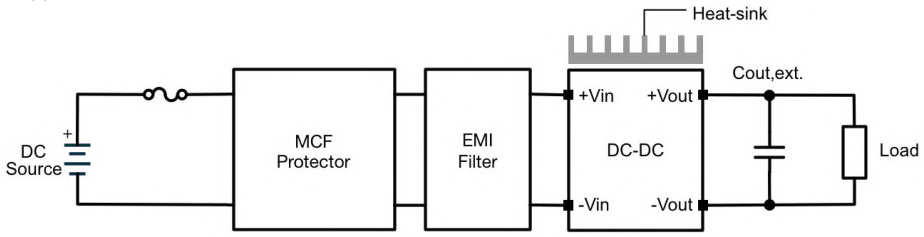
Transient Limitation



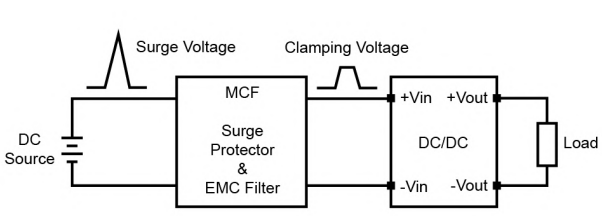
Derating Curve

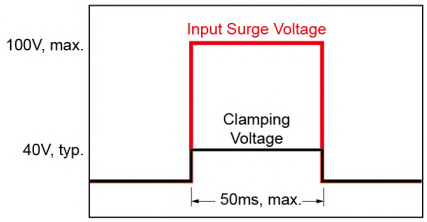
TYPICAL APPLICATION

1. The schematic for typical application is shown as below.



2. Surge protector clamps over-voltage to a safe value in order to protect the power module from damaging. According to MIL-STD-1275D, the module should keep working during input surge occurs.





3. This surge protector can be used for 28V battery system of MIL-STD-1275D application. Input range of DC/DC converters also has to meet 24V system input range.

Standard	Un (VDC)	Permanent Operating Input Range (VDC)	Brownout	Transient	Spike
MIL-STD-1275D	28	23 – 33	n/a	40V / 500ms 100V / 50ms	±250V / 70μs
EN 50155	24	16.6 – 30	14.4V / 100ms	33.6V / 1000ms	n/a
RIA12	24	16.6 – 30	14.4V / 100ms	36V / 1000ms 84V / 20ms	n/a
NF F 01-510	24	18 – 34	12V / 100ms	40V / 100ms	n/a

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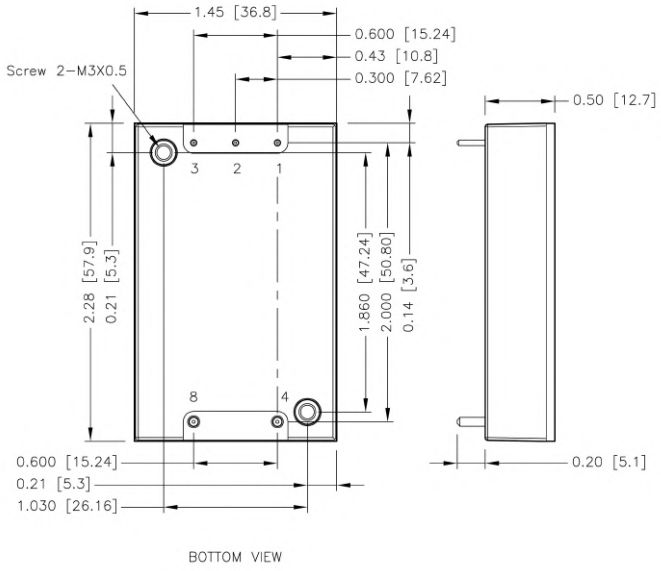
MECHANICAL DRAWING

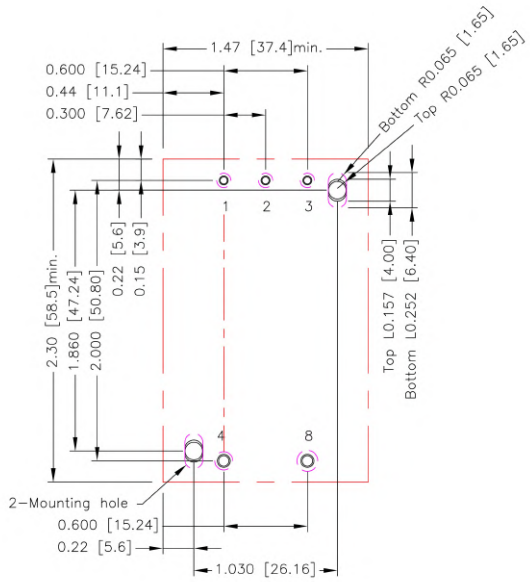


PIN CONNECTION

PIN	DEFINE	DIAMETER
1	- Vin	0.04 Inch
2	Ctrl	0.04 Inch
3	+ Vin	0.04 Inch
4	- Vout	0.06 Inch
8	+ Vout	0.06 Inch

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]
4. The screw locked torque:MAX 3.5kgf-cm [0.34N-m]

RECOMMENDED PAD LAYOUT

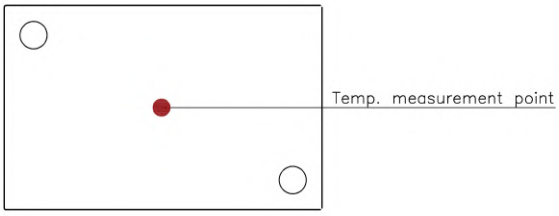


All dimensions in inch[mm]
Pad size(lead free recommended)
Through hole 1.2.3: ∅0.051[1.30]
Through hole 4.8: ∅0.075[1.90]
Through hole of mounting: ∅0.126[3.20]
Top view pad 1.2.3: ∅0.064[1.63]
Top view pad 4.8: ∅0.094[2.38]
Top view pad of mounting:Groove R0.065[1.65]L0.157[4.00]
Bottom view pad 1.2.3: ∅0.102[2.60]
Bottom view pad 8: ∅0.150[3.80]
Bottom view pad 4: ∅0.130[3.30]
Bottom view pad of mounting:Groove R0.065[1.65]L0.252[6.40]

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).



BASE PLATE