

DMA Series



- Open Frame Telecom DC-DC Converter
- -48 VDC Input
- ETSI Compliant
- NEBS Compliant
- 5 V Standby & 12 V Fan Outputs
- Remote On/Off & Power Good Signal
- AC Input Version Available (EMA212)

The DMA family complements the EMA212 series, offering a feature-rich power converter for DC-input applications. The EMA212 has been widely adopted in 1U networking systems, to include switching, routing, system monitoring, and video production racks. Designers will now have the ability to integrate a power solution, adopted for normal mains operation or -48V telecoms input requirements. The input to the DMA212 meets the stringent input regulations for connecting to telecoms networks as seen in ETS 300 132-2. Features include abnormal voltage operation, reverse polarity, transient protection, surge limiting EMC limits to ETSI and NEBS standards.

Models and Ratings

Max Output Power (10 CFM Air Flow)	Output Voltage V1	Output Current (10 CFM Airflow)	Fan Output V2	Standby Supply V3	Model Number
212 W	12.0 VDC	16.7 A	12.0 V/1.0 A	5.0 V/0.1 A	DMA21248S12

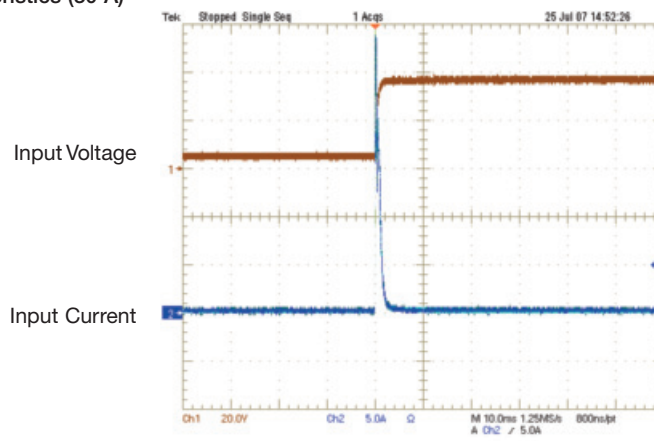
Input Characteristics

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage - Operating	36	48	75	VDC	Can be configured as -48 VDC. See Fig. 11
Input Current - Full Load		5	7	A	
Input Reverse Voltage Protection					Continuous protection with automatic recovery
Input Transient					ETSI EN300 132:2003 Compliant
Undervoltage Lockout Protection	32		35	VDC	
Inrush Current		30		A	48 VDC input ⁽¹⁾ . See Fig. 1
Input Protection		15		A	Fast acting fuse ⁽²⁾

Note: 1. ETSI EN 300 132:2003 Compliant

2. Fuse fitted in -ve input line. See Fig. 10 & 11.

Figure 1
Typical inrush current characteristics (30 A)

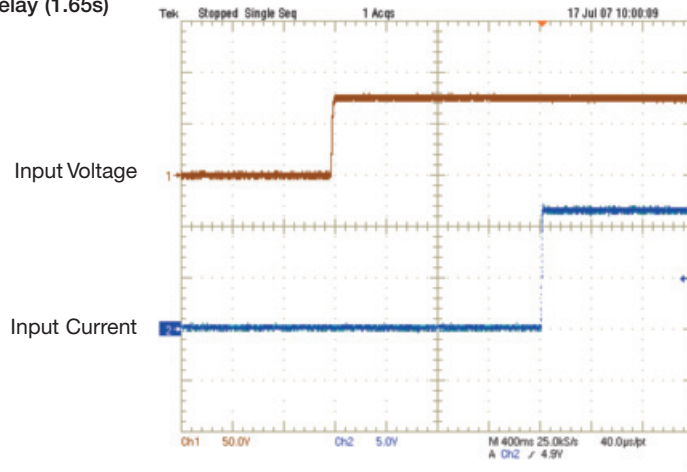


Output Characteristics

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage - V1	12		12	VDC	See Models and Ratings table
Initial Set Accuracy			V1:±1, V2:±5, V3:±3	%	48 VDC input at 50% load
Output Voltage Adjustment				%	Not fitted
Minimum Load	10			%	On V1 required to meet all specification parameters on V2 & V3.
Start Up Delay		2	3	s	See Fig. 2
Hold-Up Time		4		ms	
Drift			±0.2	%/°C	
Line Regulation			V1:±0.5, V2:±5, V3:±3	%	Of nominal with input variation 36-75 VDC
Load Regulation			V1:±1, V2:±5, V3:±3	%	10-100% load of nominal input
Transient Response - V1			4	%	Recovery within 1% in less than 500 µs for a 50-75-50% load step
Over/Undershoot - V1			1	%	
Ripple & Noise			1	% pk-pk	20 MHz bandwidth See Fig. 3
Overvoltage Protection	115		140	%	Vnom DC output 1 only, recycle input to reset
Overload Protection	110		125	% I nom	Output 1 only auto restart. See Fig. 4
Short Circuit Protection					Continuous, trip & restart (hiccup) characteristic
Temperature Coefficient			0.02	%/°C	After 20 mins warm up

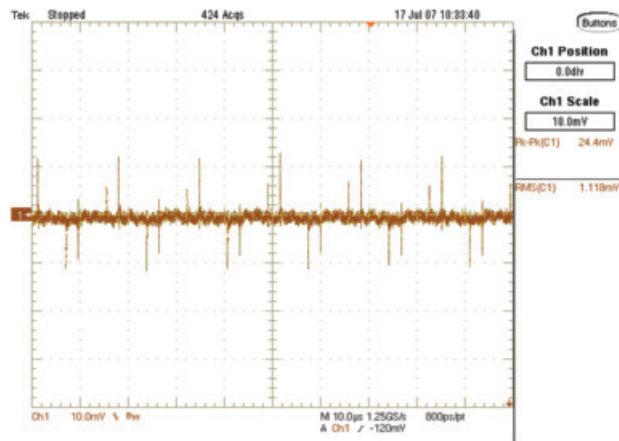
Start Up Delay From DC Turn On

Figure 2: Typical start up delay (1.65s)



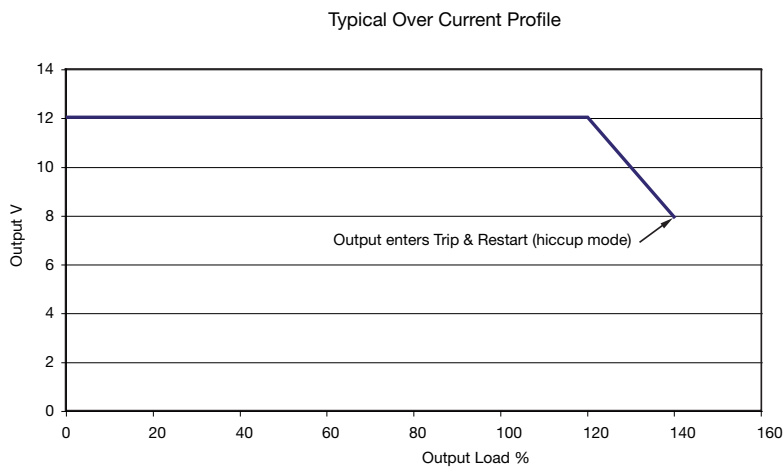
Ripple & Noise

Figure 3: Typical ripple & noise (24 mV)



Overcurrent Protection

Figure 4



General Specifications

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		88		%	See Fig. 5
Isolation: Input to Output Input to Ground Output to Ground	1500			VDC	Basic insulation
	1000			VDC	
	500			VDC	
Switching Frequency		60		kHz	
Power Density			11	W/in ³	
Mean Time Between Failure:		550		kHrs	See note 1
Weight		0.73 (330)		lb (g)	

Notes

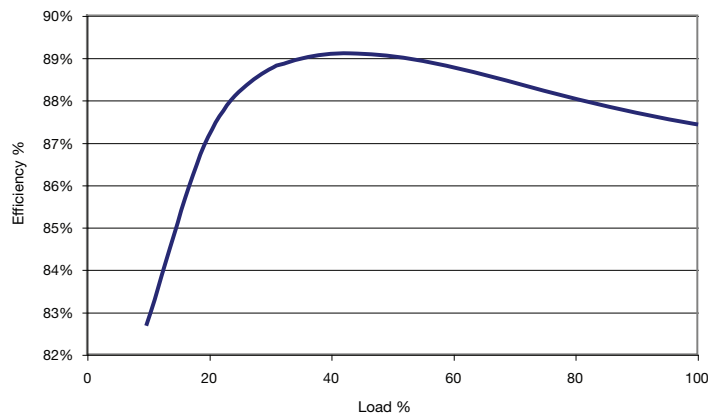
1. Compliant with MIL-HDBK-217F, Notice 2 +25 °C GB

Signals

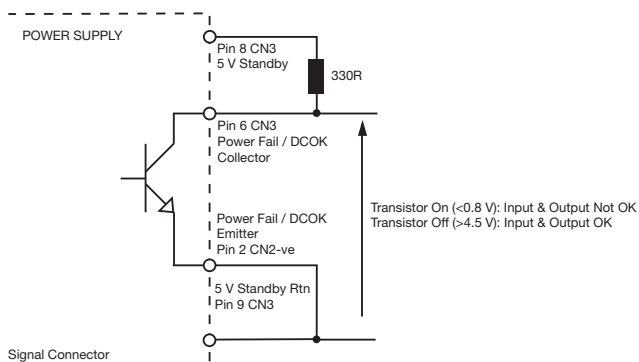
Characteristic	Notes & Conditions
Signals	
Combined Input Fail & DC OK	Open collector referenced to output 0V, transistor normally off when input & output good. Power Fail: Provides ≥ 5 ms warning of loss of output from input failure (see fig. 6). DC OK: Provides warning of DC output failure.
Remote On/Off	Uncommitted isolated opto-coupler diode - powered diode inhibits the supply (see fig. 6).
Current Share	For increased power, up to 3 supplies can be connected in parallel. Output current is shared within 10% at full load. Derate to 90%. The current share function is not designed to offer redundant operation.

Efficiency Vs Load Characteristics

Figure 5: Typical efficiency 48 V input



Combined Power Fail & DC OK Signal



Remote On/Off

Signal is an isolated control signal which can turn the PSU off by supplying 5 mA into the pin.

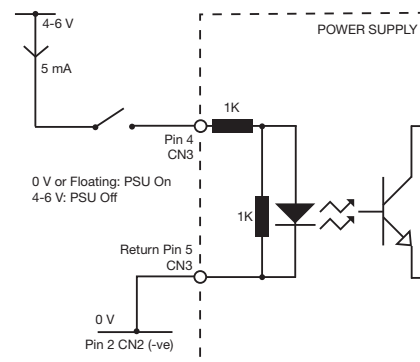


Figure 6.

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	0		+70	°C	Derate linearly at 2.5%/°C from +50 °C to +70 °C
Storage Temperature	-40		+80	°C	
Cooling - Force-air cooled	10			CFM	See Thermal Considerations
Operating Humidity	0		95	%RH	Non-condensing. See page 5. note 1 & 3
Storage Humidity	0		95	%RH	Non-condensing. See page 5. note 2 & 3
Operating Altitude			3000	m	See page 5. note 3
Shock	3 x 30 g/11 ms shocks in both +ve & -ve directions along the 3 orthogonal axis, total 18 shocks. See page 5. note 1 & 4				
Vibration	Single axis 10-500 Hz at 2 g x 10 sweeps. See page 5. note 1 & 5				

Safety Agency Approvals

Safety Agency	Safety Standard	Category
CB Report	NEMKO #UK 38710, IEC60950-1:2005	Information Technology
CSA	CSA Certificate #1964073 CSA22.2 No. 60950-1-03 / UL60950-1	Information Technology
TUV	TUV Certificate # B 07 11 45240 008 EN60950-1:2006	Information Technology
CE	LVD	

Electromagnetic Compatibility - Immunity

Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
EFT	EN61000-4-4	1	A	
Surges	EN61000-4-5	1	A	
Conducted	EN61000-4-6	2	A	
Narrow & Wide Band Noise	ETSI EN 300 132-2:2003			

Electromagnetic Compatibility - Emissions

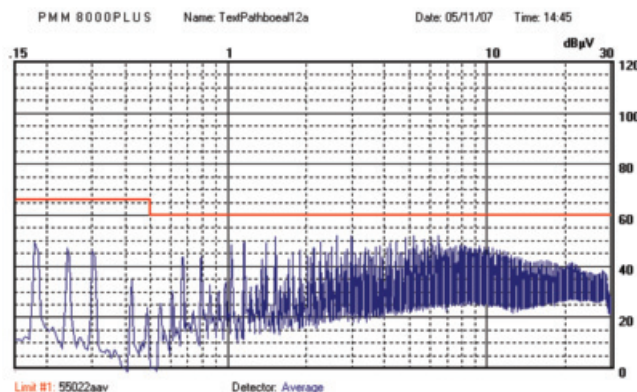
Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
Conducted	EN55022	Class A		⁽⁶⁾ See Fig. 7
Radiated	EN55022	Class A		⁽⁶⁾

Notes

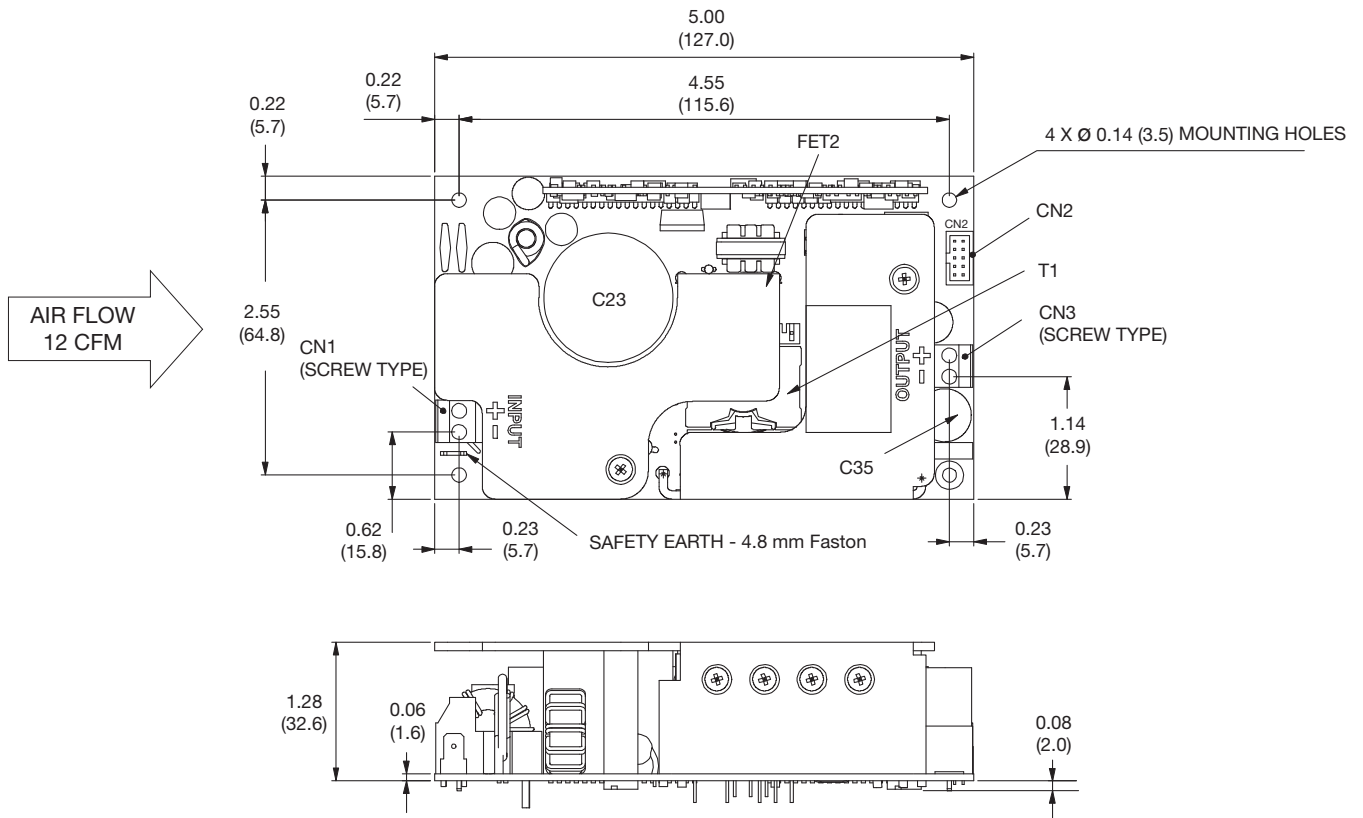
1. Compliant with ETS 300 019-1-3 May 1992 + ammendment 1 June 1997 class 3.1.
2. Compliant with ETS 300 019-1-1 Feb 1992 class 1.1, ETS 300 019-1-2 Feb 1992 class 2.2.
3. Compliant with NEBS GR-63-Core issue 3.
4. Compliant with EN60068-2-27.
5. Compliant with EN60068-2-6.
6. Compliant with EN61204-3, ETSI EN 300 132-2 2003, ETSI 300 386-1 1994, NEBS GR-1089-CORE issue 4

Typical EMC Plot

Figure 7: DMA212 at full load with 48 VDC input



Mechanical Details



PIN CONNECTIONS - CN1	
1	-Vin
2	+Vin
0.25" Faston	
	Earth

PIN CONNECTIONS - CN2	
1	+V2
2	V2 Return
3	V2 Return
4	ROF
5	ROF Return
6	Input Fail/DC OK
7	Current Share
8	+V3
9	-V3
10	+V2

PIN CONNECTIONS - CN3	
1	+V1
2	V1 Return

Mating Connectors:
 CN2: Molex housing 51110-1050 and crimp 50394-8100.

Notes

1. All dimensions in inches (mm). Tolerance .xx = ±0.02 (0.50); .xxx = ±0.01 (0.25)
2. Units supplied with screw terminal (CN2) as standard. For faston type, add suffix '-F' to the part number.
3. All 4 mounting positions should be connected to safety earth.
4. The air flow needs to be directed through the power supply within the end application.

Thermal Considerations

In order to ensure correct and reliable operation of the PSU in the most adverse conditions permitted in the end-use equipment, the temperature of the components listed in the table below must not be exceeded. See drawing on page 6 for component locations. Temperature should be monitored using K type thermocouples placed on the hottest part of the component (out of any direct air flow).

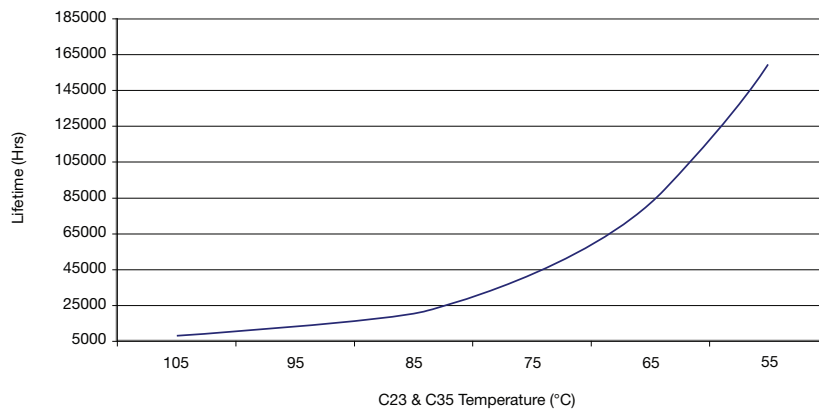
Temperature Measurements (Ambient $\leq 50\text{ }^{\circ}\text{C}$)	
Component	Max Temperature $^{\circ}\text{C}$
T1	130 $\text{ }^{\circ}\text{C}$
FET2	110 $\text{ }^{\circ}\text{C}$
C35	100 $\text{ }^{\circ}\text{C}$
C23	100 $\text{ }^{\circ}\text{C}$

Service Life

The estimated service life of the DMA is determined by the cooling arrangements and load conditions experienced in the end application. Due to the uncertain nature of the end application this estimated service life is based on the actual measured temperature of two key capacitors within the product when installed in the end application. The highest of the two component temperatures should be used.

The graph below expresses the estimated lifetime for a given component temperature and assumes continuous operation at this temperature.

Estimated Service Life vs Component Temperature



Input Configuration

The DMA input is floating and can be configured for use with either +48 VDC or -48VDC for telecom applications

Figure 8: +48 VDC Configuration

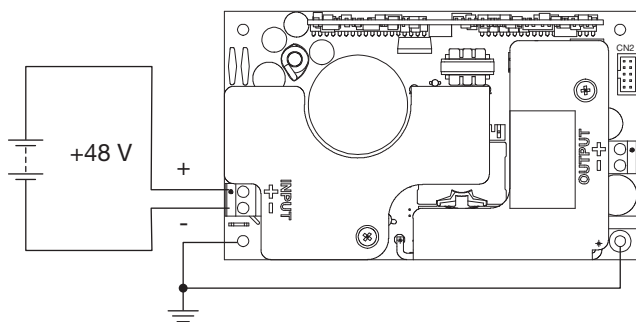


Figure 9: -48 VDC Configuration

