# MR1011S<sub>Series</sub> Direct CONVERTER DC/DC CONVERTER MODEL:MR10115.05RU wat 75.12RU

**Electrical Specifications** 

# **Ultra-Wide Input, 10W Compact, Railway DC/DC Converters**

# **Key Features:**

- 10W Output Power
- 40 160 VDC Input Range
- Meets EN 60950, EN 50155
- 1,500 VDC Isolation
- Efficiency to 86%
- Compact 1 x 2 Inch Case
- -40°C to +85°C Operation
- Industry Standard Pin-Out
- Chassis Mount Option
- DIN Rail Mount Option

	RoHS
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### **MicroPower Direct**

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Chassis Mount Adapter       See Mechanical Diagram (Page 4         DIN Rail Mount Adapter       See Mechanical Diagram (Page 4         Reliability Specifications       See Mechanical Diagram (Page 4	ParameterConditionsInput Voltage Range	40.0 (Pi) Filter Min. 1ax 0% e 1 e 1 e 1 110 s (Autorece	110.0 <b>Typ.</b> ±1.0 ±0.2 ±0.5 15 60 500 ±3.0 120 ±0.03	160.0 40.0 <b>Max.</b> ±2.0 ±0.5 ±1.0 30 100 1,000 ±5.0	VDC VDC <b>Units</b> % % % mV P - P mV P - P μS % %		
Input Voltage Range         40.0         110.0         160.0         VDC           Input Start Voltage         m         m         Mm         VDC         VDC           Input Filter         m         m         Typ.         Max.         Units           Output Voltage Accuracy         input Filter         Min.         Typ.         Max.         Units           Codupt Voltage Accuracy         input Filter         m         ±0.5         ±1.0         %           Line Regulation         Iour = 10% to 100%         ±0.5         ±1.0         %           Ripple (20 MHz)         See Note 1         50         11.0         %           Ripple (20 MHz)         See Note 1         60         100         mV P - P           Transient Recovery Time, See Note 2         25% Load Step Change         ±3.0         ±5.0         %           Transient Response Deviation         110         120         140         %         %         %           Coutput Short Circuit, See Note 3         Continuous (Autorecurstrustrustrustrustrustrustrustrustrust	Input Start Voltage Input Filter Output Parameter Conditions Dutput Voltage Accuracy Line Regulation Load Regulation VIN = Min to N Load Regulation Ripple (20 MHz) ViN = Min to 100 See Not Noise (20 MHz) See Note 2 Transient Recovery Time, See Note 2 Transient Response Deviation Dutput Power Protection Femperature Coefficient Output Short Circuit, See Note 3 Continuou	(Pi) Filter Min. Max D% e 1 e 1 e 1 e 1 e 1 s (Autoreco	110.0 <b>Typ.</b> ±1.0 ±0.2 ±0.5 15 60 500 ±3.0 120 ±0.03	40.0 <b>Max.</b> ±2.0 ±0.5 ±1.0 30 100 1,000 ±5.0	VDC <b>Units</b> % % mV P - P mV P - P μS % %		
Input Start Voltage         Input Start Voltage         VDC           Input Filter         π (P) Filter           Output         Typ.         Max.         Units           Parameter         Conditions         Min.         Typ.         Max.         Units           Output Voltage Accuracy         Imput Start Voltage         Imput Start Vo	Input Start Voltage Input Filter Output Parameter Conditions Dutput Voltage Accuracy Line Regulation Load Regulation VIN = Min to N Load Regulation Ripple (20 MHz) ViN = Min to 100 See Not Noise (20 MHz) See Note 2 Transient Recovery Time, See Note 2 Transient Response Deviation Dutput Power Protection Femperature Coefficient Output Short Circuit, See Note 3 Continuou	Min. Max D% e 1 e 1 nge 110 us (Autoreco	±1.0 ±0.2 ±0.5 15 60 500 ±3.0 120 ±0.03	Max. ±2.0 ±0.5 ±1.0 30 100 1,000 ±5.0	Units % % % mV P - P mV P - P μS %		
Input Filter $\pi$ (Pi) FilterOutputParameterConditionsMin.Typ.Max.UnitsOutput Voltage AccuracyVIN = Min to Max $\pm 1.0$ $\pm 2.0$ %Line RegulationIour = 10% to 100% $\pm 0.5$ $\pm 1.0$ $\# 2.0$ Load RegulationIour = 10% to 100% $\pm 0.5$ $\pm 1.0$ $\# 2.0$ Ripple (20 MHz)See Note 11530mV P - PNoise (20 MHz)See Note 160100 $\# V P - P$ Transient Response Deviation25% Load Step Change $\pm 3.0$ $\pm 5.0$ $\# 0.7$ Output Power Protection110120140 $\# 0.7$ Transient Response Deviation110120140 $\# 0.7$ Output Short Circuit, See Note 3Continuous (Autorecovery) $\# 0.7$ $\# 0.7$ GeneralConditionsMin.Typ.Max.UnitsIsolation Voltage60 Seconds1,500VDCM $\Omega 0$ Isolation Capacitance500 VDC1,000 $\# 1.0$ $\# 2.4$ Switching Frequency350kHzEnvironmentalParameterConditionsMin.Typ.Max.UnitsSolation CapacitanceSol Whz/0.1V1,000 $\# 2.4$ $\# 3.0^{\circ} C^{\circ} C^{\circ}$	Input Filter π  Output  Parameter Conditions  Dutput Voltage Accuracy Line Regulation VIN = Min to M Load Regulation Ioυτ = 10% to 100 Ripple (20 MHz) See Note 100 Noise (20 MHz) See Note 2  Transient Recovery Time, See Note 2  Transient Response Deviation Dutput Power Protection  Femperature Coefficient Dutput Short Circuit, See Note 3  Continuou	Min. Max D% e 1 e 1 nge 110 us (Autoreco	±1.0 ±0.2 ±0.5 15 60 500 ±3.0 120 ±0.03	+2.0 ±0.5 ±1.0 30 100 1,000 ±5.0	% % mV P - P mV P - P μS %		
Output         Parameter         Conditions         Min.         Typ.         Max.         Units           Output Voltage Accuracy         ±1.0         ±2.0         %	Output         Parameter       Conditions         Dutput Voltage Accuracy       VIN = Min to M         Line Regulation       Iout = 10% to 100         Load Regulation       Iout = 10% to 100         Ripple (20 MHz)       See Not         Noise (20 MHz)       See Not         Transient Recovery Time, See Note 2       25% Load Step Char         Dutput Power Protection       Transient Response Deviation         Dutput Short Circuit, See Note 3       Continuou	Min. Max D% e 1 e 1 nge 110 us (Autoreco	±1.0 ±0.2 ±0.5 15 60 500 ±3.0 120 ±0.03	+2.0 ±0.5 ±1.0 30 100 1,000 ±5.0	% % mV P - P mV P - P μS %		
Parameter         Conditions         Min.         Typ.         Max.         Units           Output Voitage Accuracy         Vin = Min to Max         ±0.0         ±0.0         %           Line Regulation         Iour = 10% to 100%         ±0.5         ±1.0         %           Load Regulation         Iour = 10% to 100%         ±0.5         ±1.0         %           Ripple (20 MHz)         See Note 1         50         00         mV P - P           Noise (20 MHz)         See Note 1         60         100         mV P - P           Transient Recovery Time, See Note 2         25% Load Step Change         ±3.0         ±5.0         %           Output Power Protection         10         120         140         %           Temperature Coefficient         ±0.03         *         %/*         %/*           Output Short Circuit, See Note 3         Continuous (Autrecoutrec	Parameter       Conditions         Dutput Voltage Accuracy       VIN = Min to M         Line Regulation       Iout = 10% to 100         Load Regulation       Iout = 10% to 100         Ripple (20 MHz)       See Not         Noise (20 MHz)       See Not         Transient Recovery Time, See Note 2       25% Load Step Char         Dutput Power Protection       Transient Response Deviation         Dutput Short Circuit, See Note 3       Continuou	lax 0% e 1 e 1 inge 110 is (Autoreco	±1.0 ±0.2 ±0.5 15 60 500 ±3.0 120 ±0.03	+2.0 ±0.5 ±1.0 30 100 1,000 ±5.0	% % mV P - P mV P - P μS %		
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Noise (20 MHz)         See Note 1         60         100         mV P - P           Transient Recovery Time, See Note 2         25% Load Step Change         500         1,000         µS           Transient Response Deviation         110         120         140         %           Output Power Protection         110         120         140         %           Temperature Coefficient         ±0.03         %/°C         %/°C           Output Short Circuit, See Note 3         Continuous (Autorecourcy)         %/°C           General         Parameter         Conditions         Min.         Typ.         Max.         Units           Isolation Voltage         60 Seconds         1,500         VDC         MΩ2         MΩ2           Isolation Capacitance         100 kHz/0.1V         1,000         pF         Switching Frequency         kHz           Environmental         Parameter         Conditions         Min.         Typ.         Max.         Units           Operating Temperature Range         Conditions         Min.         Typ.         Max.         Units           Operating Temperature Range         Conditions         Min.         Typ.         Max.         Conditions           Operating Temperature Range         C	Noise (20 MHz)See NotIransient Recovery Time, See Note 2 Iransient Response Deviation25% Load Step CharOutput Power Protection25% Load Step CharImage: See Note See	e 1 nge 110 is (Autoreco	60 500 ±3.0 120 ±0.03	100 1,000 ±5.0	mV P - P μS %		
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Transient Response Deviation         ±3.0         ±5.0         %           Output Power Protection         110         120         140         %           Temperature Coefficient         ±0.03         ±0.03         %/°C           Output Short Circuit, See Note 3         Continuous (Autorecover)         ±0.03         %/°C           General         Parameter         Conditions         Min.         Typ.         Max.         Units           Isolation Voltage         60 Seconds         1,500         VDC         NΩ         MΩ           Isolation Resistance         500 VDC         1,000         PF         MΩ         MΩ           Isolation Capacitance         100 kHz/0.1V         1,000         PF         Switching Frequency         350         kHz           Environmental         -         4.00         +25         +85         °C            Operating Temperature Range         Conditions         Min.         Typ.         Max.         Units           Operating Temperature Range         Conditions         Min.         Typ.         Max.         Units           Operating Temperature Range         Conditions         Min.         Typ.         Max.         Units           Operating Temperature Ran	Transient Response Deviation Dutput Power Protection Temperature Coefficient Dutput Short Circuit, See Note 3 Continuou	110 is (Autoreco	120 ±0.03		%		
Temperature Coefficient         ••••••••••••••••••••••••••••••••••••	Temperature Coefficient           Output Short Circuit, See Note 3         Continuou	is (Autorece	±0.03	140			
Output Short Circuit, See Note 3         Continuous (Autorecover)           General           Parameter         Conditions         Min.         Typ.         Max.         Units           Isolation Voltage         60 Seconds         1,500           VDC           Isolation Resistance         500 VDC         1,000           MΩ           Isolation Capacitance         100 kHz/0.1V         1,000          kHz            Switching Frequency          350          kHz            Parameter         Conditions         Min.         Typ.         Max.         Units           Operating Temperature Range         Conditions         Min.         Typ.         Max.         Units           Operating Temperature Range         Conditions         Min.         Typ.         Max.         Units           Operating Temperature Range         Case         -40         +25         +85         °C           Cooling         Free Air Contexture         -55         I         +105         °C           Cooling         RH, Non-condensing         95         %         Physical           Case Size         See Mechanical Diazum (Page 2) </td <td>Output Short Circuit, See Note 3 Continuou</td> <td></td> <td></td> <td></td> <td>%/°C</td>	Output Short Circuit, See Note 3 Continuou				%/°C		
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ParameterConditionsMin.Typ.Max.UnitsIsolation Voltage60 Seconds1,500VDCVDCIsolation Resistance500 VDC1,000MΩIsolation Capacitance100 kHz/0.1V1,000pFSwitching Frequency350kHzEnvironmental-40+25+85°COperating Temperature RangeConditionsMin.Typ.Max.UnitsOperating Temperature RangeConditions-40+25+85°COperating Temperature RangeCase-55+125°CCoCoolingFree Air Convection95%%HumidityRH, Non-condensing95%%PhysicalSee Mechanical Diagram (Page 2)Case SizeSee Mechanical Diagram (Page 4)0.77 Oz (22g)Chassis Mount AdapterSee Mechanical Diagram (Page 4)See Mechanical Diagram (Page 4)IN Rail Mount AdapterSee Mechanical Diagram (Page 4)See Mechanical Diagram (Page 4)Reliability SpecificationsSee See Mechanical Diagram (Page 4)See Mechanical Diagram (Page 4)		Min.					
Isolation Voltage         60 Seconds         1,500         VDC           Isolation Resistance         500 VDC         1,000         MΩ           Isolation Capacitance         100 kHz/0.1V         1,000         pF           Switching Frequency         350         kHz         kHz           Environmental         7up.         Max.         Units           Operating Temperature Range         Conditions         Min.         Typ.         Max.         Units           Operating Temperature Range         Conditions         4.40         +25         +85         °C           Operating Temperature Range         Conditions         4.40         +25         +85         °C           Operating Temperature Range         Conditions         4.40         +25         +85         °C           Operating Temperature Range         Case         -55         I         +105         °C           Cooling         Free Air Convection         -         95         %           Humidity         RH, Non-condensing         95         %           Physical         Case Size         See Mechanical Diagram (Page 2)         Case Material         Diagram (Page 4)           Gase Size         Aluminum Alloy With Non-Conductive Base (UL94-V0)	General	Min.					
Isolation Resistance         500 VDC         1,000         MΩ           Isolation Capacitance         100 kHz/0.1V         1,000         pF           Switching Frequency         350         kHz           Environmental         7yp.         Max.         Units           Parameter         Conditions         Min.         Typ.         Max.         Units           Operating Temperature Range         Ambient         -40         +25         +85         °C           Operating Temperature Range         Case         -         +105         °C           Storage Temperature Range         Case         -         +125         °C           Cooling         Free Air Convection         95         %           Humidity         RH, Non-condensing         95         %           Physical         Case Size         See Mechanical Diagram (Page 2)           Case Material         Aluminum Alloy With Non-Conductive Base (UL94-VO)         0.77 Oz (22g)           Chassis Mount Adapter         See Mechanical Diagram (Page 4)         DIN Rail Mount Adapter         See Mechanical Diagram (Page 4)           DIN Rail Mount Adapter         See Mechanical Diagram (Page 4)         See Mechanical Diagram (Page 4)         See Mechanical Diagram (Page 4)	Parameter Conditions		Тур.	Max.	Units		
Isolation Capacitance100 kHz/0.1V1,000pFSwitching FrequencyImage: State St	solation Voltage 60 Secon	ds 1,500			VDC		
Switching FrequencyImage: Second	solation Resistance 500 VI	DC 1,000			MΩ		
EnvironmentalParameterConditionsMin.Typ.Max.UnitsOperating Temperature RangeAmbient-40+25+85°COperating Temperature RangeCase-40+25+85°CStorage Temperature RangeCase-55+105°CCoolingFree Air Convection-55+125°CHumidityRH, Non-condensing95%PhysicalSee Mechanical Diagram (Page 2Case SizeSee Mechanical Diagram (Page 4Case MaterialAluminum Alloy With Non-Conductive Base (UL94-V0Weight0.77 Oz (22g)Chassis Mount AdapterSee Mechanical Diagram (Page 4DIN Rail Mount AdapterSee Mechanical Diagram (Page 4Reliability SpecificationsSee See See See See See See See See See	solation Capacitance 100 kHz/0.	1V	1,000		pF		
ParameterConditionsMin.Typ.Max.UnitsOperating Temperature RangeAmbient-40+25+85°COperating Temperature RangeCase-40+25+85°CStorage Temperature RangeCase-55+105°CCoolingFree Air Convection-55+125°CHumidityRH, Non-condensing95%PhysicalSee Mechanical Diagram (Page 2Case SizeSee Mechanical Diagram (Page 2Case MaterialAluminum Alloy With Non-Conductive Base (UL94-V0Weight0.77 Oz (22gChassis Mount AdapterSee Mechanical Diagram (Page 4DIN Rail Mount AdapterSee Mechanical Diagram (Page 4Reliability SpecificationsFinal Ambient of the set of	Switching Frequency		350		kHz		
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Operating Temperature RangeCase+105°CStorage Temperature Range-55+125°CCoolingFree Air Convection*********************************	Parameter Conditions	Min.	Тур.	Max.	Units		
Storage Temperature Range       -55       +125       °C         Cooling       Free Air Convection         Humidity       RH, Non-condensing       95       %         Physical       Case Size       See Mechanical Diagram (Page 2)         Case Material       Aluminum Alloy With Non-Conductive Base (UL94-V0)         Weight       0.77 Oz (22g)         Chassis Mount Adapter       See Mechanical Diagram (Page 4)         DIN Rail Mount Adapter       See Mechanical Diagram (Page 4)         Reliability Specifications       Heither and the set of the se	Operating Temperature Range Ambie	ent -40	+25	+85	°C		
Cooling       Free Air Convection         Humidity       RH, Non-condensing       95       %         Physical       See Mechanical Diagram (Page 2       Case Size       Case Material       Diagram (Page 2         Case Material       Aluminum Alloy With Non-Conductive Base (UL94-V0       0.77 Oz (22g       0.77 Oz (22g         Chassis Mount Adapter       See Mechanical Diagram (Page 4       DIN Rail Mount Adapter       See Mechanical Diagram (Page 4         Reliability Specifications       Example 4       See Mechanical Diagram (Page 4       See Mechanical Diagram (Page 4	Operating Temperature Range Ca	ise		+105	°C		
Humidity     RH, Non-condensing     95     %       Physical     Physical     See Mechanical Diagram (Page 2)       Case Size     Case Material     Non-Conductive Base (UL94-V0)       Weight     0.77 Oz (22g)       Chassis Mount Adapter     See Mechanical Diagram (Page 4)       DIN Rail Mount Adapter     See Mechanical Diagram (Page 4)       Reliability Specifications     See Mechanical Diagram (Page 4)	Storage Temperature Range						
PhysicalCase SizeSee Mechanical Diagram (Page 2Case MaterialAluminum Alloy With Non-Conductive Base (UL94-V0Weight0.77 Oz (22gChassis Mount AdapterSee Mechanical Diagram (Page 4DIN Rail Mount AdapterSee Mechanical Diagram (Page 4Reliability Specifications	Cooling Free A						
Case SizeSee Mechanical Diagram (Page 2Case MaterialAluminum Alloy With Non-Conductive Base (UL94-V0Weight0.77 Oz (22gChassis Mount AdapterSee Mechanical Diagram (Page 4DIN Rail Mount AdapterSee Mechanical Diagram (Page 4Reliability Specifications	Humidity RH, Non-condensi	RH, Non-condensing 95 %					
Case MaterialAluminum Alloy With Non-Conductive Base (UL94-V0Weight0.77 Oz (22gChassis Mount AdapterSee Mechanical Diagram (Page 4DIN Rail Mount AdapterSee Mechanical Diagram (Page 4Reliability Specifications	Physical						
Weight0.77 Oz (22gChassis Mount AdapterSee Mechanical Diagram (Page 4DIN Rail Mount AdapterSee Mechanical Diagram (Page 4Reliability Specifications	Case Size						
Chassis Mount Adapter       See Mechanical Diagram (Page 4         DIN Rail Mount Adapter       See Mechanical Diagram (Page 4         Reliability Specifications       See Mechanical Diagram (Page 4	Case Material Aluminum All						
DIN Rail Mount Adapter See Mechanical Diagram (Page 4 Reliability Specifications	Weight	0.77 Oz (22g					
Reliability Specifications	Chassis Mount Adapter						
	DIN Rail Mount Adapter	See Mechanical Diagram (Page					
	Reliability Specifications						
Parameter Conditions Min. Typ. Max. Units	Parameter Conditions	Min.	Тур.	Max.	Units		
MTBF MIL HDBK 217F, 25°C, Gnd Benign 1.0 MHours	MTBF MIL HDBK 217F, 25°C, Gnd Ben	gn 1.0			MHours		
Vibration, 5 - 150 Hz Displacement Range 7.5 mm	Displacement Rar						
Acceleration 2G	Accelerat						
Absolute Maximum Ratings	Absolute Maximum Ratings						
Parameter Conditions Min. Typ. Max. Units	Parameter Conditions	Min.	Тур.	Max.	Units		
	nput Voltage Surge (1 Sec)	-0.7		200.0	VDC		
	Lead Temperature 1.5 mm From Case for 10 S	ec		300	°C		

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Caution: Exceeding Absolute Maximum Ratings may damage the module. These are not continuous operating ratings.

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# **Model Selection Guide**

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Madal		Inp	out		Output			Efficience.	Over	Capacitive	Fuse
Model Number	Voltag	je (VDC)	Curren	ıt (mA)	Voltage	Current	Current	Efficiency (%, Typ)	Voltage Protection	Load	Rating Slow-Blow
	Nominal	Range	Full-Load	No-Load	(VDC)	(mA, Max)	(mA, Min)	(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	(VDC Typ)	(µF, Max)	(mA)
MR1011S-05RU	110	40 - 160	112	15	5.0	2,000	100	81	6.2	2,200	250
MR1011S-12RU	110	40 - 160	107	8	12.0	833	42	85	15.0	220	250
MB1011S-15RU	110	40 - 160	107	8	15.0	667	33	85	18.0	100	250
MB1011S-24RU	110	40 - 160	106	8	24.0	416	21	86	28.8	47	250

Notes:

1. When measuring output ripple, it is recommended that an external ceramic capacitor (approx 10 μF) be placed from the +Vour to the -Vour pins.

2. Transient recovery is measured to within a 1% error band for a load step change of 25%.

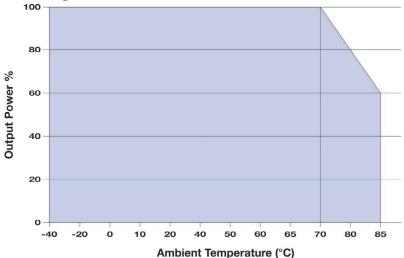
3. Short circuit protection is provided by a "hiccup mode" circuit.

4. These units should not be operated with a load under 5% of full load. Operation at no-load will not damage the unit, but they may not meet all specifications.

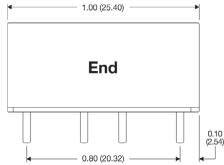
5. These units should not be operated over +85°C. Exceeding +85°C may damage the unit.

 It is recommended that a fuse be used on the input of a power supply for protection. See the Model Selection table above for the correct rating.

# **Derating Curve**

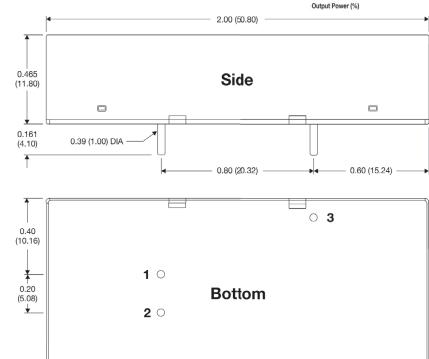


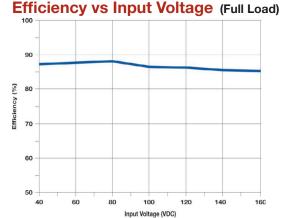
# **Mechanical Dimensions**



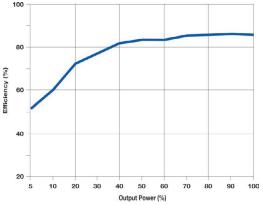
# **Pin Connections**

Pin	Function
1	-VIN
2	+VIN
3	+Vout
4	-Vout





### Efficiency vs Output Power (VIN= 110 VDC)



04

# **EMC** Specifications

# www.micropowerdirect.com

Contact the factory for more information.

Contact the factory for more information.

1. With a pulse interval that is >60S. Requires the addition of the filter module MDCFM-40U (or a similar discrete filter circuit) as shown in the circuit/ board layout diagrams below. Contact the factory for more information. 2. With a pulse interval that is >60S. Requires the addition of the filter module MDCFM-40U (or a similar discrete filter circuit) as shown in the circuit/ board layout diagrams below. Contact the factory for more information. 3. All units will meet class B with the addition of the MDCFM-40U (or a similar discrete filter circuit) as shown in the circuit/board layout diagrams below.

4. To meet the requirements of EN 61000-4-4 (±2 kV), external components are needed. This can be done discretely, or with the addition of the MDCFM-40U.

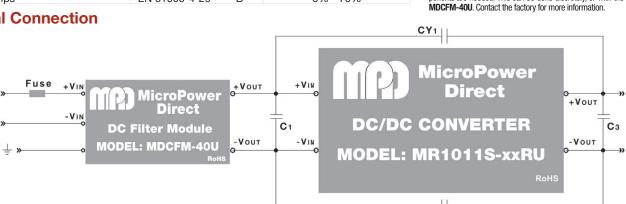
5. To meet the requirements of EN 61000-4-5 (±2 kV/±4 kV), external components are needed. This can be done discretely, or with the addition of the

Notes:

CY<sub>2</sub>

Parameter	Standard	Criteria	
Transient Input Voltage, See Note 1	RIA 12	А	385V/20mS Criteria A
Maximum Input Valtaga, Saa Nata 2	EN 50155	В	1,800V (5/50 $\mu$ S, 50 OR 100 $\Omega$
Maximum Input Voltage, See Note 2	EN 30133	В	8,400V (0.05/0.1 μS, 100Ω
Radiated Emissions, See Note 3	EN 55022		Class B
Conducted Emissions, See Note 3	EN 55022		Class B
ESD	EN 61000-4-2	В	±6 kV Contact
RS	EN 61000-4-3	А	10V/m
EFT, See Note 4	EN 61000-4-4	В	±2 kV
Surge, See Note 5	EN 61000-4-5	В	±2 kV/ ±4 kV
CS	EN 61000-4-6	А	3 Vrms
Voltage Dips	EN 61000-4-29	В	0% - 70%

# **Typical Connection**



The diagram above illustrates a typical connection of the MR1011S series The 5. Suggested component values are: MDCFM-40U filter module is used to make the circuit compliant with input surge and EMC standards EN 55022, EN61000 and EN 50155. This can also be accomplished by using external filter components as shown in the board layout drawing below. Some notes on these components are:

- 1. It is recommended that an external fuse be used. The recommended fuse is shown in the model chart on page 2.
- 2. An external MOV is recommended on the input to protect the unit in the event of a surge. A recommended value is given in the table at right.
- 3. An external TVS is recommended on the input to protect the unit in the event of a voltage spike. A recommended value is given in the table at right.
- 4. The output filtering capacitor (C3) is a high frequency, low resistance electrolytic capacitor. Care must be taken in choosing this capacitor not to exceed the capacitive load specification for the unit. Voltage derating of capacitors should be 80% or above.

Juggesteu	component	values	a.c.
mnonont		Voluo	

Component	Value
MOV	S14K130
L1	56 <i>µ</i> H
TVS	SMCJ170A
C1	100 µF/200V
Сз	1.0 μF/50V
L2	4.7 μH
Cy1, Cy2	1,000 pF/2 kV

Input noise and surge suppression modules are available 6 for a number of MPD DC/DC power supplies. For use with

# the MRxx11S product series, the MDCFM-40U DC filter modules are

recommended. For pricing or full technical information, please contact the factory.	Vin (VDC)	Input Capacitor	Vout (VDC)	Output Capacito
In many applications simply			5	470 μF
adding input/output capaci-	110	100.5	12	220 µF

100 µF

15

24

t

tor

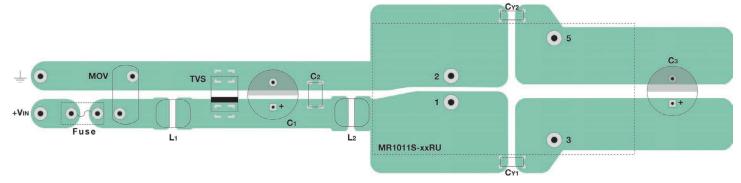
220 JF

100 µF

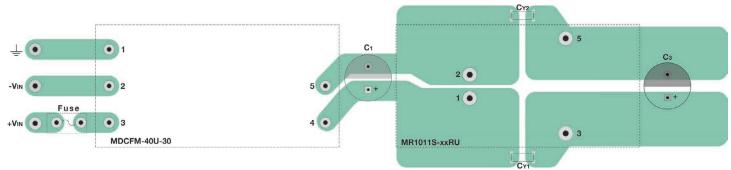
7. In many applications simply	
adding input/output capaci-	
tors will enhance the input	110
surge protection and reduce	
output ripple sufficiently. In	
this case the canacitors C+ and	1 Co wo

ors C1 and C3 would be connected as shown without the other filter components. Recommended capacitor values are given in the table above ...

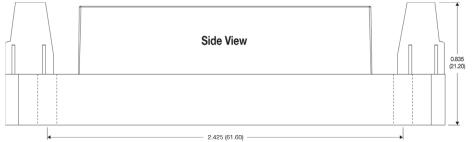
# Typical Board Layout: With External Filter/Surge Components

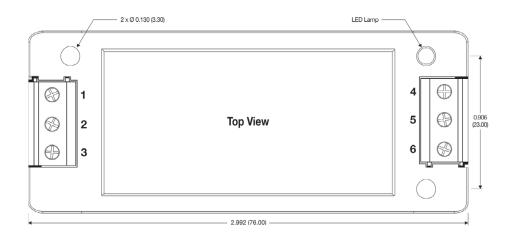


# Typical Board Layout: With External Filter Module

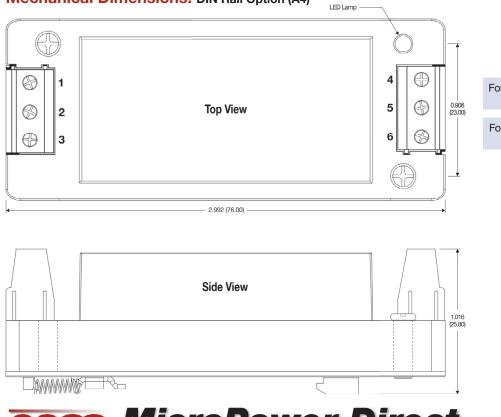


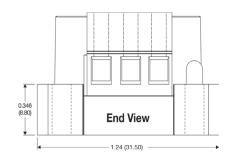
# Mechanical Dimensions: Chassis Mount Option (A2)





# Mechanical Dimensions: DIN Rail Option (A4)





# **Adapter Plate**



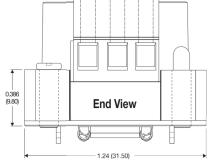
All models of the MR1011S-xxRU series are available mounted on an adapter plate similar to the one pictured above. The adapter plate makes it easier to mount the unit to a chassis or to a standard DIN rail. Please contact the factory for more information.

# **Pin Connections**

Pin	Function
1	No Connection
2	-Vin
3	+VIN
4	-Vout
5	No Connection
6	+Vout

For the chassis mount option, add suffix "A2" to the model number (i.e. MR1011S-05RU-A2)

For the DIN rail mount option, add suffix "A4" to the model number (i.e. MR1011S-24RU-A4)



Notes: • All dimensions are typical in inches (mm) • Tolerance  $x.xx = \pm 0.02 \ (\pm 0.50)$ 

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