

**FEATURES**

- ▶ DIP-24 Plastic Package
- ▶ Cost optimized Design
- ▶ Fully Regulated Outputs
- ▶ High Efficiency
- ▶ Operating Temperature up to +75°C at full Load
- ▶ Short Circuit Protection
- ▶ Pin compatible with S200R Series
- ▶ Input Filter meets EN 55022, class A and FCC, level A
- ▶ 3 Years Product Warranty


**PRODUCT OVERVIEW**

The MIAR03 series is a range of isolated 3W DC/DC converter modules featuring fully regulated output voltages and narrow input voltage ranges. Excellent efficiency allow an operating temperature range of -40°C to +85°C (with Derating). The product comes in a DIP-24 Plastic package with alternative pinout which makes these converters also a perfect replacement for the popular S200R series. These DC/DC converters offer a very economical solution for many cost critical applications.

**Model Selection Guide**

Model Number	Input Voltage (Range) VDC	Output Voltage VDC	Output Current mA	Input Current		Max. capacitive Load μF	Efficiency (typ.) @Max. Load %
				@Max. Load mA(typ.)	@No Load mA(typ.)		
MIAR03-05S05	5 ±10%	5	600	357	90	470	70
MIAR03-05S12		12	250	769		100	78
MIAR03-05S15		15	200	769		100	78
MIAR03-05D12		±12	±125	769		100#	78
MIAR03-05D15		±15	±100	769		100#	78
MIAR03-12S05	12 ±10%	5	600	338	45	470	74
MIAR03-12S12		12	250	316		100	79
MIAR03-12S15		15	200	316		100	79
MIAR03-12D12		±12	±125	316		100#	79
MIAR03-12D15		±15	±100	316		100#	79
MIAR03-24S05	24 ±10%	5	600	167	22	470	75
MIAR03-24S12		12	250	158		100	79
MIAR03-24S15		15	200	158		100	79
MIAR03-24D12		±12	±125	158		100#	79
MIAR03-24D15		±15	±100	156		100#	80

# For each output

**Input Specifications**

Parameter	Model	Min.	Typ.	Max.	Unit
Input Voltage Range	5V Input Models	4.5	5	5.5	VDC
	12V Input Models	10.8	12	13.2	
	24V Input Models	21.6	24	26.4	
Input Surge Voltage (1 sec. max.)	5V Input Models	-0.7	---	7.5	VDC
	12V Input Models	-0.7	---	15	
	24V Input Models	-0.7	---	30	
Short Circuit Input Power	All Models	---	---	2000	mW
Internal Power Dissipation		---	---	2500	mW
Conducted EMI		Compliance to EN 55022, class A and FCC part 15, class A			

**Output Specifications**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Output Voltage Setting Accuracy	At 50% Load and Nominal Vin	---	---	±4.0	%Vnom.
Output Voltage Balance	Dual Output, Balanced Loads	---	±1.0	±3.0	%
Line Regulation	Vin=Min. to Max.	---	±0.2	±0.5	%
Load Regulation	Io=10% to 100%	---	±0.2	±0.5	%
Min.Load	No minimum Load Requirement				
Ripple & Noise (20MHz)		---	30	60	mV <sub>P-P</sub>
Short Circuit Protection	Continuous				

**General Specifications**

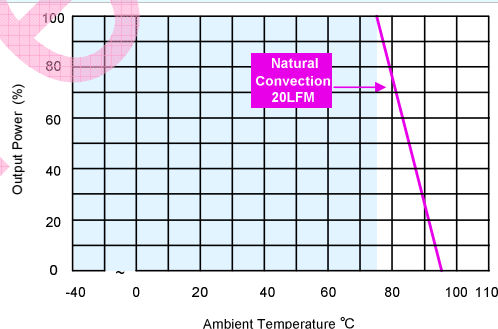
Parameter	Conditions	Min.	Typ.	Max.	Unit
I/O Isolation Voltage (rated)	60 Seconds	1500	---	---	VDC
I/O Isolation Resistance	500 VDC	1000	---	---	MΩ
I/O Isolation Capacitance	100KHz, 1V	---	300	---	pF
Switching Frequency		---	300	---	KHz
MTBF(calculated)	MIL-HDBK-217F@25°C, Ground Benign	700,000	---	---	Hours
Safety Approvals (pending)	UL/cUL 60950-1 recognition(GSA certificate), IEC/EN 60950-1(CB-scheme)				

**Input Fuse**

5V Input Models	12V Input Models	24V Input Models
1500mA Slow-Blow Type	700mA Slow-Blow Type	350mA Slow-Blow Type

**Environmental Specifications**

Parameter	Conditions	Min.	Max.	Unit
Operating Ambient Temperature Range (See Power Derating Curve)	Natural Convection	-40	+85	°C
Case Temperature		---	+95	°C
Storage Temperature Range		-50	+125	°C
Humidity (non condensing)		---	95	% rel. H
Cooling	Free-Air convection			
Lead Temperature (1.5mm from case for 10Sec.)		---	260	°C

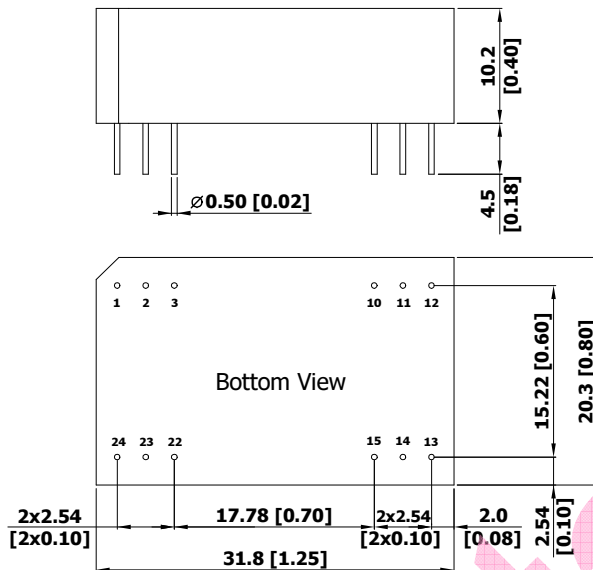
**Power Derating Curve**


**Notes**

- 1 Specifications typical at Ta=+25°C, resistive load, nominal input voltage and rated output current unless otherwise noted.
- 2 Ripple & Noise measurement bandwidth is 0-20MHz.
- 3 All DC/DC converters should be externally fused at the front end for protection.
- 4 Other input and output voltage may be available, please contact factory.
- 5 That "natural convection" is about 20LFM but is not equal to still air (0 LFM).
- 6 Specifications are subject to change without notice.

**Package Specifications**

## Mechanical Dimensions



## Pin Connections

Pin	Single Output	Dual Output
1	+Vin	+Vin
2	NC	-Vout
3	NC	Common
10	-Vout	Common
11	+Vout	+Vout
12	-Vin	-Vin
13	-Vin	-Vin
14	+Vout	+Vout
15	-Vout	Common
22	NC	Common
23	NC	-Vout
24	+Vin	+Vin

NC: No Connection

- ▶ All dimensions in mm (inches)
- ▶ Tolerance: X.X±0.5 (X.XX±0.02)  
X.XX±0.25 (X.XXX±0.01)
- ▶ Pin diameter  $\varnothing 0.5 \pm 0.05$  (0.02±0.002)

**Physical Characteristics**

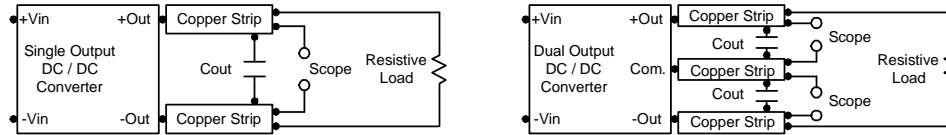
Case Size	: 31.8x20.3x10.2 mm (1.25x0.80x0.40 inches)
Case Material	: Non-Conductive Black Plastic (flammability to UL 94V-0 rated)
Pin Material	: Copper-Clad Steel Wire
Weight	: 12.4g

### Test Setup

#### Peak-to-Peak Output Noise Measurement Test

Use a  $C_{out}$  0.33 $\mu$ F ceramic capacitor.

Scope measurement should be made by using a BNC socket, measurement bandwidth is 0-20 MHz. Position the load between 50 mm and 75 mm from the DC/DC Converter.



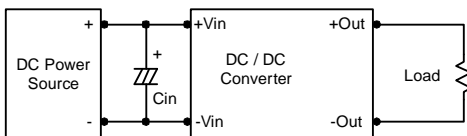
### Technical Notes

#### Maximum Capacitive Load

The MIAR03 series has limitation of maximum connected capacitance at the output. The power module may be operated in current limiting mode during start-up, affecting the ramp-up and the startup time. The maximum capacitance can be found in the data sheet.

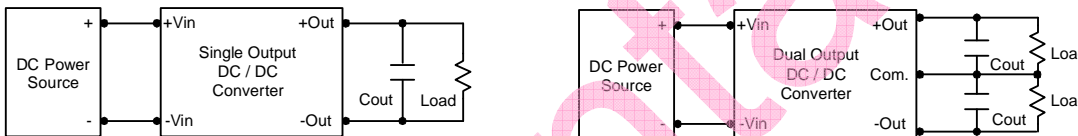
#### Input Source Impedance

The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the power module. In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup. Capacitor mounted close to the power module helps ensure stability of the unit, it is recommended to use a good quality low Equivalent Series Resistance (ESR < 1.0 $\Omega$  at 100 KHz) capacitor of a 4.7 $\mu$ F for the 5V input devices and a 2.2 $\mu$ F for the 12V and 24V devices.



#### Output Ripple Reduction

A good quality low ESR capacitor placed as close as practicable across the load will give the best ripple and noise performance. To reduce output ripple, it is recommended to use 1.5 $\mu$ F capacitors at the output.



#### Thermal Considerations

Many conditions affect the thermal performance of the power module, such as orientation, airflow over the module and board spacing. To avoid exceeding the maximum temperature rating of the components inside the power module, the case temperature must be kept below 95°C. The derating curves are determined from measurements obtained in a test setup.

