VMR08

series

8 WATT DC/DC CONVERTER
Single & Double Output
Railway Input Range

vitec
dc conversion

FEATURES

- Ultra wide Input Range
- 3000 VDC Isolation
- Efficiency up to 89%
- Remote ON/OFF Control
- Over Voltage and Over Load Protection
- Continuous Short Circuit Protection
- Under Voltage lock-out circuit
- Extended Operating Temperature Range -40~98°C
- EN50155 approved for railway applications
- No minium Load required

CE RoHS COMPLIANT

GENERAL DESCRIPTION

The VMR08-Series is a family of 8 Watt single and dual output DC/DC converters designed for applications where isolated output is required from a distributed power system. Models operate from an ultra wide input bus voltage of 24 and 110 Vdc offering output voltage levels of 3.3, 5, 12, 15, ±5, ±12 and ±15 Vdc. Typical applications are in railway applications for on board power distribution.

PART NUMBER STRUCTUR

VMR08	-	24	05	S
Series Name		**Input Voltage (VDC)**	**Output Voltage (VDC)**	**Output Quantity**
		24: 13-70 **110:** 42-176	**3R3:** 3.3 **05:** 5 **12:** 12 **15:** 15 **05:** ±5 **12:** ±12 **15:** ±15	**S:** Single **D:** Dual

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SELECTION GUIDE

Model No.	nominal Input Voltage Range [Vdc]	nominal Output Voltage [Vdc]	Input Current		Output Current		Max. Capacitive Load [µF]	Efficiency typ. [%]
			No Load [mA] max.	Full Load [mA] typ.	Min. Load [mA] max.	Full Load [mA] typ.		
VMR08-243R3S	24 (13~70)	3.3	30	379	0	2400	1330	87
VMR08-2405S		5	20	375	0	1600	1330	89
VMR08-2412S		12	10	375	0	665	330	89
VMR08-2415S		15	10	375	0	535	220	89
VMR08-2405D		±5	10	392	0	±800	±900	85
VMR08-2412D		±12	10	375	0	±335	±220	89
VMR08-2415D		±15	10	379	0	±265	±100	88
VMR08-1103R3S	110 (42~176)	3.3	10	86	0	2400	1330	84
VMR08-11005S		5	10	86	0	1600	1330	86
VMR08-11012S		12	5	85	0	665	330	86
VMR08-11015S		15	5	85	0	535	220	86
VMR08-11005D		±5	10	89	0	±800	±900	82
VMR08-11012D		±12	5	86	0	±335	±220	85
VMR08-11015D		±15	5	86	0	±265	±100	86

INPUT SPECIFICATIONS

Item	Conditions		Min.	Typ.	Max.	Unit
Operating input voltage range	24 Vin (nom)		13	24	70	Vdc
	110 Vin (nom)		42	110	176	
Start up time	nominal Vin and constant resistive load		-	30	-	ms
Input Filter	-		Pi type			
Input Reflected Ripple Current	measured with a simulated source inductance of 12µH and a source capacitor Cin(33µF, ESR<1.0Ω at 100kHz)		-	20	-	mAp-p
Remote ON/OFF	Referred to -Vin pin (pin2, pin3)	DC-DC ON	Open or 3.0 ~ 12 Vdc			
		DC-DC OFF	Short (pin1 and pin2/3) or 0 ~ 1.2 Vdc			
		Remote off idle current	-	5	-	mA
Recommended input fuse (slow blow)	24 Vin module		1.0			A
	110 Vin module		0.4			

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OUTPUT SPECIFICATIONS

Item	Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	-		-1.0	-	+1.0	%
Line regulation	Low Line to high line @ full load		-0.5	-	+0.5	%
Load regulation	No load to full load	Single Output	-0.5	-	+0.5	%
		Double Output	-0.5	-	+0.5	%
Cross regulation	Asymmetrical Load 25% / 100% for Double Output		-5	-	+5	%
Ripple and noise (@ 20Hz bandwidth)	measured with a 1.0µF MLCC and 10µF electrolytic capacitor		-	-	75	mVp-p
Over Voltage Protection (zener diode clamp)	3.3V ouput		-	3.9	-	V
	5V output		-	6.2	-	
	12V output		-	15	-	
	15V output		-	18	-	
Short circuit protection	-		Indefinite hiccup (Automatic Recovery)			
Temperature coefficient	-		-0.02	-	+0.02	%/°C
Transient response recovery time	tested by nom. Vin and 25% load step change (75%-50%-25% of Io)	for all models	-	250	-	µs
Transient Response Deviation		3.3V Single Output	-5	-	+5	%
		Others	-3	-	+3	

ENVIRONMENTAL SPECIFICATIONS

Item	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature (see derating curve)	-	-40	-	+98	°C
Maximum case temperature	-	-	-	+105	°C
Storage temperature range	-	-55	-	+125	°C
Thermal impedance	-	25.81	-	-	°C/W
Cooling	„Natural convection“ is usually about 30-65 LFM, but is not equal to still air (0 LFM).	Natural convection			
Relative humidity	-	95% RH			
Thermal shock	-	EN60068			
Shock	-	EN61373			
Vibration	-	EN61373			

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GENERAL SPECIFICATIONS

Item	Conditions	Min.	Typ.	Max.	Unit
Isolation voltage	Input to Output, for 60 sec	3000	-	-	Vdc
	Input to case, for 60 sec	1000	-	-	
Isolation resistance	-	1	-	-	GΩ
Isolation capacitance	-	-	1000	-	pF
Switching frequency	24V models	-	330	-	kHz
	110 V models		220		
Safety standards	designed to meet	IEC / UL / EN62368-1			
Case material	-	Aluminum			
Base material	UL94V-0 rated	non-conductive black Plastic			
Pin material	-	Ø0,5mm Brass Solder-coated			
Potting material	UL94V-0 rated	Epoxy			
Weight	-	14.0g typ.			
MTBF	MIL-HDBK-217F, Full load	800 kHrs			
Dimensions	-	1.25" x 0.8" x 0.4"			
Soldering Temperature	1.5 mm from case, 10 sec max.	260°C			
Absolute Specifications Input Surge Voltage (100ms)	24V Models	-	-	100	Vdc
	110V Models	-	-	185	

EMC SPECIFICATIONS

Item	Conditions		Level
Radiated Emissions	EN50121-3-2	40dBuV from 30 ~ 230MHz; 47dBuV from 230 ~ 1000MHz	
Conducted Emissions	EN50121-3-2	99dBuV from 0.15 ~ 0.5MHz; 93dBuV from 0.5 ~ 30MHz	
ESD	EN61000-4-2	Air: 8kV / Contact: 6kV	Perf. Criteria A
Radiated Immunity	EN61000-4-3	10V/m	Perf. Criteria A
Fast transient	EN61000-4-4	2kV with external components	Perf. Criteria A
Surge	EN61000-4-5	2kV with external components	Perf. Criteria A
Conduced immunity	EN61000-4-6	10Vrms	Perf. Criteria A
Power frequency magnetic field	EN61000-4-8	10A/m	Perf. Criteria A

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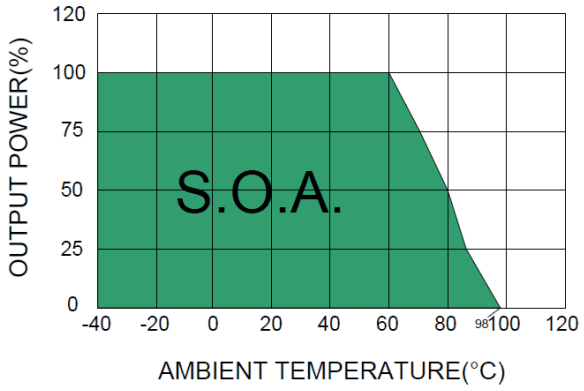
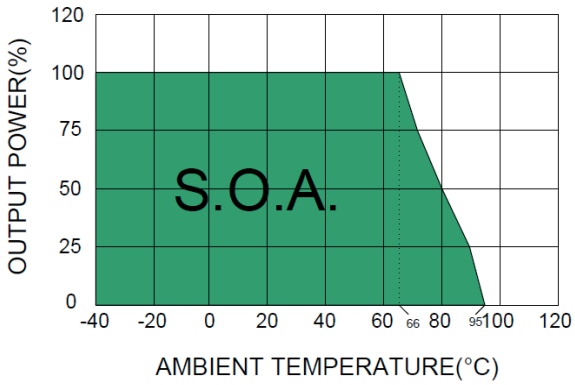
DERATING CURVES

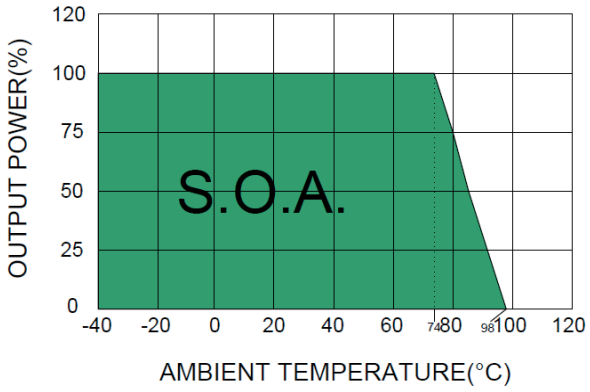
VMR08-11005D



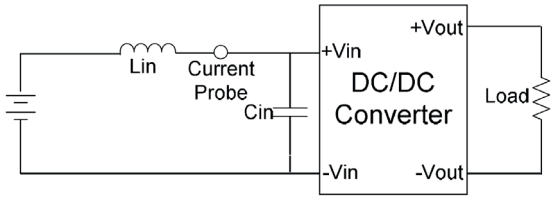
Efficiency 84%~86% Models



Efficiency 87%~89% Models



TEST CONFIGURATIONS



Input Reflected Ripple Current Test Step

Input reflected ripple current is measured with a source inductor Lin (12μH) and a source capacitor Cin (33μF, ESR<1.0Ω at 100kHz) at nominal input and full load

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DESIGN & FEATURE CONFIGURATIONS

Over Current Protection

The module includes an internal over current protection circuit, which will endure current limiting for an unlimited duration during output over load condition. If the output current exceeds the OCP set point, the module will shut down automatically (hiccup).The module will try to restart after shut down. If the over load condition still exists, the module will shut down again.

Over Voltage Protection

The module includes an internal output over voltage protection circuit, which monitors the voltage on the output terminals. If this voltage exceeds the over voltage set point, the module will activate the control loop of internal circuit to clamp the output voltage.

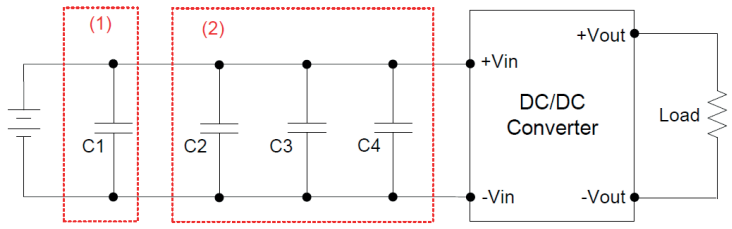
Remote Module ON / OFF

Positive logic turns on the module during high logic and off during low logic. Remote module ON/OFF can be controlled by an external switch between the CTRL terminal and -Vin terminal. For positive logic if the remote feature is not used, please leave the CTRL pin floating.

DESIGN & FEATURE CONFIGURATIONS

EMC Filter

The part (1) Circuit is used to meet Surge & EFT test, and the part (2) Circuit is used to meet EMI test.



Models	C1	C2, C3, C4
24 Vin	NIPPON Chemi-con KY Series 330 µF, 100V	-
110 Vin	RUBY-on BXF Series 100 µF, 250V	MLCC 1.0 µF, 250V

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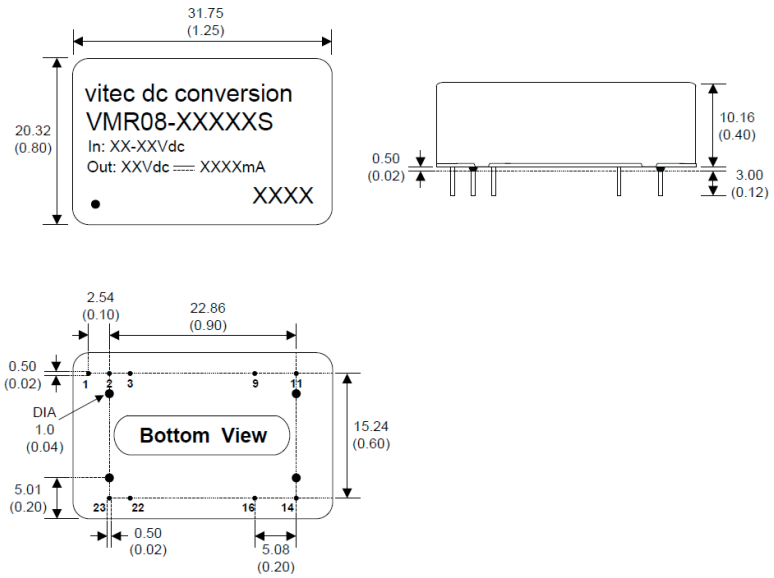
MECHANICAL DRAWING

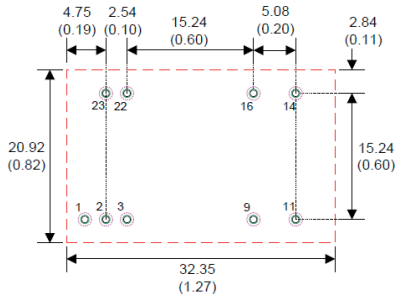


PIN CONNECTION

PIN	SINGLE	DUAL
1	CTRL	CTRL
2	-Vin	-Vin
3	-Vin	-Vin
9	no pin	COM
11	no conneted	-Vout
14	+Vout	+Vout
16	-Vout	COM
22	+Vin	+Vin
23	+Vin	+Vin

1. All dimensions in mm [inch]
2. Pin diameter: 0.5 ±0.05 [0.02 ±0.002]
3. Pin pitch and length tolerance: ±0.35 [±0.014]
4. Case Tolerance: ±0.5 [±0.02]
5. Stand-off Tolerance: ±0.1 [±0.004]

RECOMMENDED FOOTPRINT DETAILS



Notes: All dimensions in mm [inch]
Through hole (black) 2~23: Ø0.80 [0.031]
Top view pad (green) 2~23: Ø1.00 [0.039]
Through hole (pink) 2~23: Ø1.60 [0.063]

Specifications can be changed without prior notice. Products are not intended for and must not be used in life support systems, human implantation, nuclear facilities or systems or any other application where product failure or malfunction of the component could lead to loss of life or catastrophic property damage.

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