

## FEATURES AND APPLICATIONS

- Ultra Wide 4:1 Input Range
- 1" x 1" Package
- Regulated Output Voltage
- High Efficiency up to 89%
- 1500 Vdc Isolation
- Adjustable Output Voltage
- Continuous Short Circuit Protection
- Over Current & Voltage Protection
- Soft Start
- RoHS ✓



## GENERAL DESCRIPTION

The VM20QW series is a family of 20 W single & dual output DC-DC converters with 1.5 kVdc isolation. These converters achieve miniature package in a 1" x 1" compatible case with high performance features and a short circuit protection with automatic restart and tight line/load regulation. Wide range devices operate over 4:1 Input voltage range providing stable output voltage. Models operate from an input bus voltage of 24 and 48 Vdc offering output voltage levels of 3.3, 5, 12, 15,  $\pm 12$  or  $\pm 15$  Vdc.

4:1 Input single and dual Output								
Model Number	Input Voltage Range [Vdc]	Output Voltage [Vdc]	Input Current		Full Load Output Current [mA]	Ripple & Noise max. [mV <sub>pk-pk</sub> ]	Capacitor Load max. [ $\mu$ F]	Efficiency [%] 24/48
			No-Load [mA] 24/48	Full Load [mA] 24/48				
VM20QW-xx3R3S	9-36 18-75	3.3	50/30	703/352	4500	75	10000	88/88
VM20QW-xx05S		5.0	50/30	936/468	4000	75	5000	89/89
VM20QW-xx12S		12.0	22/15	936/468	1670	100	850	89/89
VM20QW-xx15S		15.0	22/15	936/468	1330	100	700	89/89
VM20QW-xx12D	9-36	$\pm 12.0$	25/15	936/468	$\pm 833$	100	$\pm 470$	89/89
VM20QW-xx15D	18-75	$\pm 15.0$	25/15	936/468	$\pm 667$	100	$\pm 330$	89/89

\* non-standard output voltages on request

xx ... nominal input voltage:

24 (9 – 36 Vdc)  
48 (18 – 75 Vdc)

## ELECTRICAL SPECIFICATIONS

Specifications typical at +25°C, nominal Input voltage, rated output current unless otherwise specified.

### Input Specifications

Voltage Range	24 Vdc, 9-36 Vdc 48 Vdc, 18-75 Vdc
Under Voltage Lockout (On/Off)	24 Vdc: 8.6 Vdc / 7.9 Vdc typ. 48 Vdc: 17.8 Vdc / 15.5 Vdc typ.
Filter	Pi-Network
Start up Time	30 mSec, typ.
Input Voltage max. (100 ms)	24 Vin: -0.7 to 50 Vdc 48 Vin: -0.7 to 100 Vdc
Input Reflected Ripple Currents	30 mA pk-pk

(Measured with a simulated source inductance of 12  $\mu$ H and a source capacitor  $C_{in}$  = 47  $\mu$ F)

### Output Specifications

Voltage Accuracy	$\pm 1\%$ , max.
Output Voltage Adjustability (Trim)	$\pm 10\%$ , max. (Single Output only)
Ripple and Noise (20 MHz BW)	see Table
	<small>(Measured with a 1.0 <math>\mu</math>F ceramic capacitor and 10 <math>\mu</math>F tantalum capacitor.)</small>
Short Circuit Protection	Continuous (Hiccup)
Short Circuit Restart	Automatic
Over Current Protection	140% of max. Iout, typ.
Over Voltage Protection	3.3 Vout: 3.9 V
(Zener Diode Clamp)	5 Vout: 6.2 V
	12 Vout: 15 V
	15 Vout: 18 V
	$\pm 12$ Vout: $\pm 15$ V
	$\pm 15$ Vout: $\pm 18$ V
Line Voltage Regulation	$\pm 0.5\%$ , max.
Load Voltage Regulation	$\pm 0.5\%$ , max. (Single Models) $\pm 1.0\%$ , max. (Dual Models)
Cross Regulation (Dual Output)	$\pm 5.0\%$ , max.
	<small>(One load is 25% to 100%, the other load is 100% load)</small>
Transient Recovery Time	250 $\mu$ s, typ.
Temperature Coefficient	$\pm 0.02\%/^{\circ}\text{C}$

### Remote ON/OFF Control

Control voltage referenced to negative (-) input (Pin 2)	
ON-Control	3 V - 12 V or open
OFF-Control	0 V - 1.2 V or short Pin 2 and Pin 3
Off Idle Current:	5 mA typ.

### Environmental Specification

Operating Temperature	-40°C to +75°C derating above +55°C
Max. Case Temperature	+105°C
Storage Temperature	-40°C to +125°C
Cooling	Free-air convection

### General Specification

Efficiency	see table
Switching Frequency	330 kHz, typ.
I/O Isolation Voltage	1500 Vdc (3 sec.)
Isolation Capacitance	1500 pF, max.
Resistance	$10^9 \Omega$ , min.
Safety Standard	IEC/EN 60950-1 (designed to meet)
MTBF (MIL-HDBK-217 F)	> 560 khrs
Humidity	95% rel H

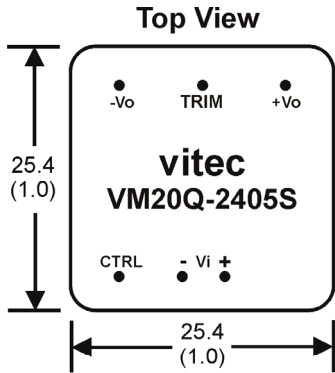
### EMC Characteristics

EMI/RFI	EN55022 Class A
EN61000-4-2 (ESD)	Perf. Criteria A
EN61000-4-3 (RS)	Perf. Criteria A
EN61000-4-4 (EFT)*	Perf. Criteria A
EN61000-4-5 (Surge) *	Perf. Criteria A
	<small>*An external Capacitor is required; Suggestion Nippon chemi-con KY series, 220<math>\mu</math>F/100V.</small>
EN61000-4-6 (CS)	Perf. Criteria A
EN61000-4-8 (PFMF)	Perf. Criteria A

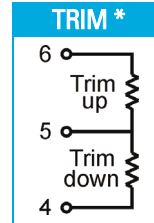
### Physical Characteristics

Dimension	25.4 x 25.4 x 9.9mm 1.0 x 1.0 x 0.4 inches
Weight	19.0 g
Case Material	Nickel-Coated Copper Metal
Base Material (UL94V-0 rated)	Non-conductive Black Plastic
Pin Material	Dia 1.0 mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Soldering Temperature	260°C max. (1.5mm from case 10 sec. max.)

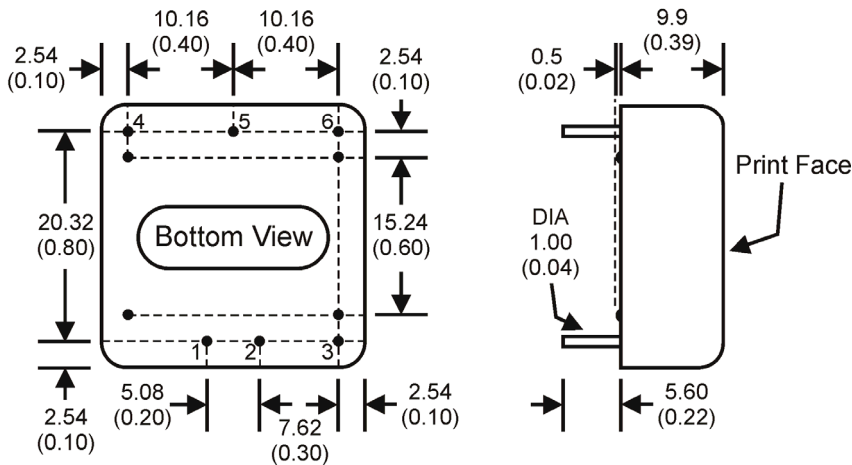
## MECHANICAL SPECIFICATIONS



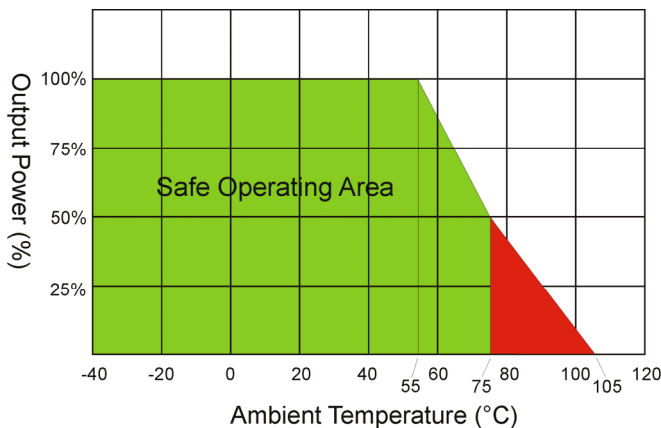
Standard Isolation		
Pin	Single Output	Dual Output
1	+ V Input	+ V Input
2	-V Input	-V Input
3	CTRL	CTRL
4	+ V Output	+ V Output
5	TRIM	Common
6	-V Output	-V Output



\* Output can be externally trimmed  
(Single output models only)



## Derating VM20QW-Series



**Notes:**

All dimensions in millimeters (inches).

Tolerance  $\pm 0.25\text{mm}$  (0.01).

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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