

FEATURES AND APPLICATIONS

- Wide 2:1 Input range
- 1" x 1" Package
- Regulated Output Voltage
- High Efficiency up to 89%
- 1500 Vdc Isolation, 3500 Vdc on request
- RoHS ✓
- Mobile/Battery Driven Applications
- Distributed Power Networks
- Data Communications Equipments
- Telecommunication Instruments
- Process/Machine Control Equipments

GENERAL DESCRIPTION

The VM15Q series is a family of 15W single & dual output DC-DC converters with 1.5kVdc 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 2:1 Input voltage range providing stable output voltage.

Models operate from an input bus voltage of 12, 24 and 48Vdc offering output voltage levels of 3.3, 5, 12, 15, ±5, ±12 or ±15Vdc.

2:1 Input single and dual Output							
Model Number	Input Voltage Range [Vdc]	Output Voltage [Vdc]	Input Current		Full Load Output Current [mA]	max. Capacitor Load [µF]	Efficiency [%] 12/24/48
			No-Load [mA] 12/24/48	Full Load [mA] 12/24/48			
VM15Q-xx3R3S	9-18 18-36 36-75	3.3	20/15/10	1310/647/327	4000	1000	85/86/85
VM15Q-xx05S		5.0	20/15/10	1471/727/368	3000	1000	86/87/86
VM15Q-xx12S		12.0	20/15/10	1494/747/374	1300	330	88/88/88
VM15Q-xx15S		15.0	20/15/10	1420/710/359	1000	220	89/89/88
VM15Q-xx05D	9-18 18-36 36-75	± 5.0	20/15/10	1488/744/377	± 1500	± 470	85/85/84
VM15Q-xx12D		± 12.0	20/15/10	1420/718/363	± 625	± 220	89/88/87
VM15Q-xx15D		± 15.0	20/15/10	1437/710/359	± 500	± 100	89/89/88

* non standard output voltages on request

xx nominal input voltage:
 12 (9 – 18Vdc)
 24 (18 – 36Vdc)
 48 (36 – 75Vdc)
 Suffix H 3.5kVdc isolation, on request

ELECTRICAL SPECIFICATIONS

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

Input Specifications

Voltage Range	12Vdc, 9-18Vdc 24Vdc, 18-36Vdc 48Vdc, 36-72Vdc
Under Voltage Lockout (On/Off)	12Vdc: 8.5Vdc/7Vdc typ. 24Vdc: 17Vdc/15Vdc typ. 48Vdc: 35Vdc/34Vdc typ.
Filter	Pi-Network
Start up Time	20mSec, typ.
Input Reflected Ripple Currents	20mA pk-pk

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

Output Specifications

Voltage Accuracy	$\pm 1\%$, max.
Output Voltage Adjustability (Trim)	$\pm 10\%$, max. (Single Output only)
Ripple and Noise (20 MHz BW)	100 mVp-p, max.

(Measured with a 1.0 μ F ceramic capacitor and 10 μ F tantalum capacitor.)

Short Circuit Protection	Continuous
Short Circuit Restart	Automatic
Current Limiting	150% of max. Iout, typ.
Over Voltage Protection	Zener Diode Clamp
Line Voltage Regulation	$\pm 0.2\%$, max.
Load Voltage Regulation	$\pm 0.5\%$, max. (Single Models) $\pm 1.0\%$, max. (Dual Models)
Cross Regulation (Dual Output)	$\pm 5.0\%$, max.

(One load is 25% to 100%, the other load is 100% load)

Transient Recovery Time	250 μ s, typ.
Transient Response Deviation	$\pm 3.0\%$, max.

EMC Characteristics

EMI/RFI *	EN55022 Class A
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*with External Input Filter – see Filter Schematic below

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

**An external Capacitor is required; Suggestion Nippon chemi-con KY series, 220 μ F/100V

EN61000-4-6 (CS)	Perf. Criteria A
EN61000-4-8 (PFMF)	Perf. Criteria A

Remote ON/OFF Control

Control voltage referenced to negative (-) input (Pin 2)

ON-Control	3V-12V or open
OFF-Control	0V-1.2V or short Pin 2 and Pin 3

Off Idle Current: 5 mA typ.

Environmental Specification

Operating Temperature	-40°C to +85°C derating above 66°C
Max. Case Temperature	+105°C
Storage Temperature	-40°C to +125°C
Cooling	Free-air convection

General Specification

Efficiency	see table
Switching Frequency	375 kHz, typ.
I/O Isolation Voltage	1500 Vdc (3 sec.)
Isolation Capacitance	1200 pF, max.
Resistance	10 ⁹ Ω , min.
Safety Standard	IEC/EN 60950-1 (designed to meet)
MTBF (MIL-HDBK-217 F)	> 560 khrs
Humidity	95% rel H

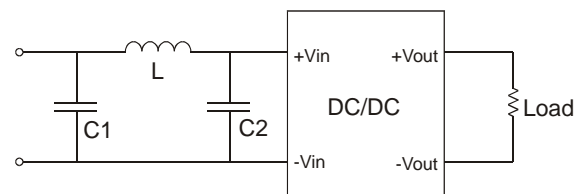
Physical Characteristics

Dimension	25.4 x 25.4 x 9.9 mm 1.0 x 1.0 x 0.39 inches
Weight	18.0 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.)

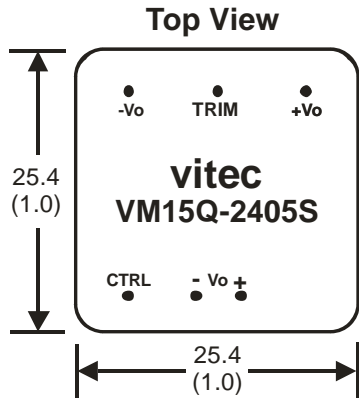
EMI/RFI-Filter

Suggest adding external input filter to meet emissions (EN55022 Class A)

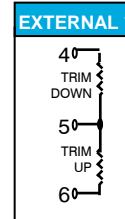
VM15Q-Series	L	C1, C2
12V-Input	12 μ H	2.2 μ F, 100V (1210)
24V-Input	12 μ H	2.2 μ F, 100V (1210)
48V-Input	12 μ H	2.2 μ F, 100V (1210)



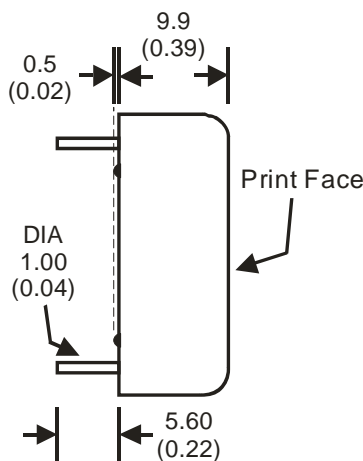
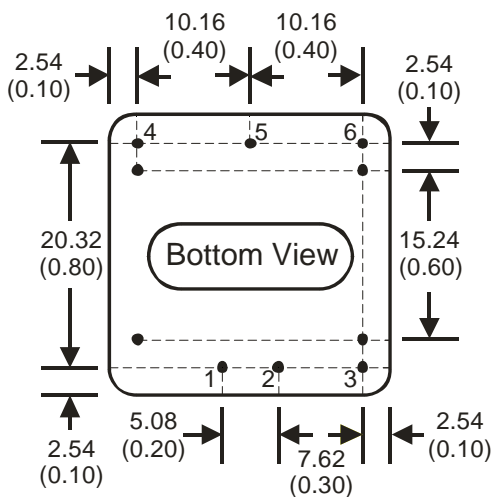
MECHANICAL SPECIFICATIONS



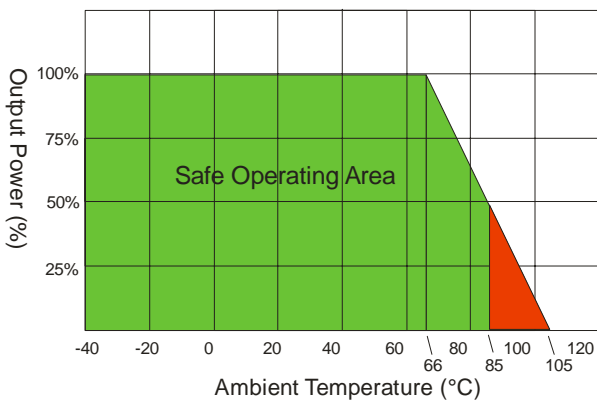
Standard Isolation		
Pin	Single Output	Dual Output
1	+ V Input	+ V Input
2	-V Input	-V Input
3	CTRL	CTRL
4	+ V Output	+ V Output
5	TRIM	Common
6	-V Output	-V Output



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



Derating VM15Q-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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