VT20Q SERIES

20 Watt DC/DC Converter
Single and Dual Outputs
1500 Vdc Isolation

vitec dc conversion

FEATURES AND APPLICATIONS

- 2:1 Input Range
- High Efficiency up to 91%
- Six-Sided Continuous Shield
- 1 x 1 x 0.39 inches
- Over Voltage Protection
- Over Current Protection
- UL60950-1 certified
- Meet EN55022 without External Components
- RoHS ✓

GENERAL DESCRIPTION

The VT20Q series is a family of 20 Watt single and dual output DC-DC converters. These converters combine a six-side shielded nickel-coated copper package in a 1″ x 1″ x 0.4″ compatible case with high performance features such as 1500 Vdc input/output isolation voltage, continuous short circuit protection with automatic restart and tight line and load regulation.
Models operate from a 2:1 input bus voltage of 12, 24 and 48 Vdc offering output voltage levels of 3.3, 5, 12, 15, ±12 and ±15 Vdc. Cooling is by free-air convention, or optional by heat sink.

2:1 Input – single and dual Output

Model Number	Input Voltage [Vdc]	Output Voltage [Vdc]	Output Current Full Load [mA]	Output Ripple & Noise [mVpp]	Input Current no Load [mA] 12/24/48	Efficiency [%] 12/24/48	max. Cap. Load [µF]
VT20Q-xx3R3S	12 24 48	3.3	4500	75	10/6/4	87/87/87	7000
VT20Q -xx05S		5.0	4000	75	10/6/4	89/90/89	5000
VT20Q -xx12S		12.0	1670	100	10/6/4	89/90/90	850
VT20Q -xx15S		15.0	1330	100	10/6/4	89/91/90	700
VT20Q -xx12D		±12.0	±833	100	10/6/4	89/90/89	±500
VT20Q -xx15D		±15.0	±667	100	10/6/4	90/90/90	±350

xx … nominal Input voltage:

VT20Q-Series: **12 (9 – 18 Vdc)**
24 (18 – 36 Vdc)
48 (36 – 75 Vdc)

Options:

Suffix -HS **Heat Sink + Clamps**
Suffix -HC **Heat Sink only (no Clamps)**
Suffix P **Remote ON/OFF Positive Logic (Standard - Negative Logic)**
Suffix B **Without CTRL pin**
Suffix C **Negative logic remote ON/OFF without TRIM pin**
Suffix D **Without CTRL & TRIM pin**
Suffix E **Positive logic remote ON/OFF without TRIM pin**

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ELECTRICAL SPECIFICATIONS

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

Input Specifications

2:1 Input Voltage Range	12V:	9 to 18 Vdc
	24V:	18 to 36 Vdc
	48V:	36 to 75 Vdc
Input Filter		Pi Type
Input Surge Voltage	12V:	25 Vdc, 1 sec, max.
	24V:	50 Vdc, 1 sec, max.
	48V:	100 Vdc, 1 sec, max.
Input reflected ripple current		30 mApp
Start up time		30 mS, max.
Start up voltage	12V/24V/48V:	9 / 18 / 36 Vdc
Shutdown voltage	12V/24V/48V:	8 / 16 / 33 Vdc

Output Specifications

Output Power		20 Watts, max.
Output Voltage Accuracy		±1%
Min. Load for specified regulation		0 mA
External trim adjustment range		±10% (single output only)
Ripple and Noise (20 MHz BW)		see table
Measured with a 1µF M/C X7R and a 10 µF T/C		
Line Voltage Regulation		±0.2% (single)
(LL to HL at Full Load)		±0.5% (dual)
Load Voltage Regulation		±0.2% (single)
(LL to HL at Full Load)		±1% (dual)
Cross Regulation		±5% (dual)
(Asymmetrical Load 25%/100% FL)		
Temperature Coefficient		±0.02%/°C, max.
Short Circuit Protection		Continuous (Hiccup)
Over Voltage Protection	3.3 Vout:	3.7 to 5.4 Vdc
(Zener diode clamp)	5 Vout:	5.6 to 7.0 Vdc
	12 Vout:	13.5 to 19.6 Vdc
	15 Vout:	16.8 to 20.5Vdc
Over load protection (% to FL at nom. input)		150%, max
Transient response recovery time		250 µsec (25% load step change)

EMC Characteristics

EMI	EN55022	Class A, Class B

The VT20Q meets EN55022 Class A without external components and meet Class B with external components. Please contact Vitec for more information.

ESD	EN61000-4-2	Perf. Criteria A (Air ±8 kV; Contact ±6 kV)
Radiated Im.	EN61000-4-3	Perf. Criteria A (10 V/m)
F. Transients.	EN61000-4-4	Perf. Criteria A (±2 kV)
Surge	EN61000-4-5	Perf. Criteria A (±1 kV)

An external filter capacitor is required if the module has to meet EN61000-4-4 and EN61000-4-5. Recommended: 220 µF / 100 V, low ERS

Conducted I.	EN61000-4-6	Perf. Criteria A (10 Vrms)

Remote ON/OFF Control

Control Voltage referenced to negative (-) input		
Negative logic (Standard)	ON-Control:	0 - 1.2 V or short
	OFF-Control:	3 - 15 V or open
Positive logic (Option P)	ON-Control:	3 - 15 V or open
	OFF-Control:	0 - 1.2 V or short
Input current of remote control pin		-0.5 mA to 1.0 mA
Remote off state input current		2 mA

General Specifications

Efficiency	see table
Switching Frequency	3.3 & 5 Vout: 275 kHz ±10%
	others: 330 kHz ±10%
Isolation Voltage	Input to Output: 1500 Vdc, min. (1 minute)
	Input to Case: 1000 Vdc, min. (1 minute)
Isolation Resistance	10^9 Ohms, min.
Isolation capacitance	1500 pF, max.
Approvals	UL60950-1certified (E352836)
	IEC/EN60950-1 (designed to meet)

Environmental Specification

Operating Temperature		-40°C to +60°C (without derating)
		+60°C to +101°C (with derating)
		(Heatsink available – see Page 4)
Max. Case Temperature		+105°C
Storage Temperature		-55°C to +125°C
Cooling		Free-air Convection
Thermal Impedance		17.6°C/W Nature convection
		14.8°C/W Heat sink (Nature conv.)
MTBF	MIL-HDBK-217F:	5.530 x 10^5 Hrs (Notice2 @25°C, FL, Ground, Benign, controlled environment)
	Bellcore TR-NWT-000332:	1.766 x 10^6 Hrs (Case1, 50% Stress, 40°C)
Thermal Shock		MIL-STD-810F
Vibration		MIL-STD-810F
Relative Humidity		5% to 95% RH

Physical Characteristics

Dimensions	25.4 x 25.4 x 9.9 mm
	1.0 x 1.0 x 0.39 inches
Case Material	Nickel-Coated Copper
Base Material	FR4 PCB
Potting Material	Silicon (UL94-V0)
Weight	15 g

CAUTION: This power module is not internally fused. An input line fuse must always be used!

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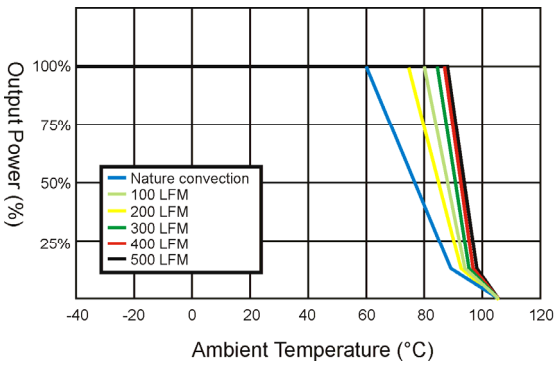
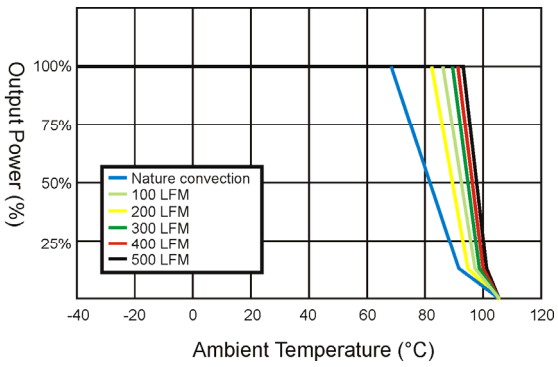
Derating

VT20Q-4805S without Heat Sink



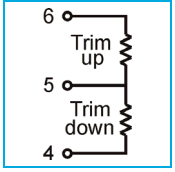
VT20Q-4805S with Heat Sink

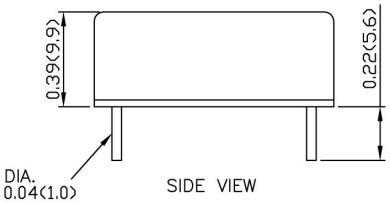


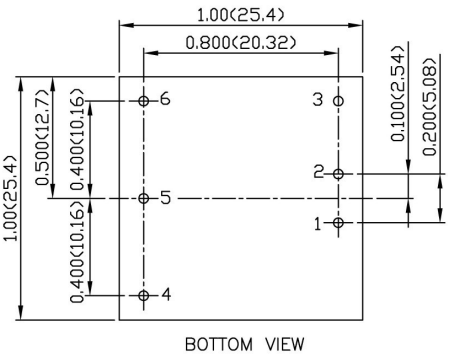
PIN Connections

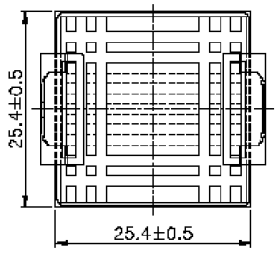
Standard PIN Connections		
Pin	Single Output	Dual Output
1	+V Input	+V Input
2	-V Input	-V Input
3	Ctrl	Ctrl
4	+V Output	+V Output
5	Trim	Common
6	-V Output	-V Output

TRIM Single only

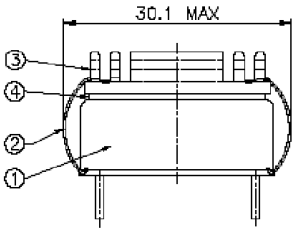


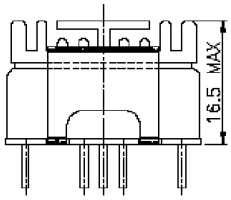






1: VT20Q DC/DC converter
2: Clamps
3: Heat Sink
4: Thermal Pad





Heat Sink

To order VT20Q with Heat Sink add following Suffix to the Part Number:

-HS … Heat Sink only
-HC … Seat Sink + Clamps (Recommended)

Example: VT20Q-4805S-HC

Notes: All dimensions in millimeters (inches). Tolerance ±0.25mm (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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