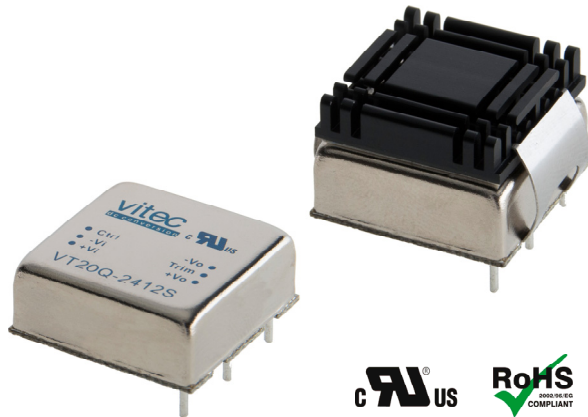


## FEATURES AND APPLICATIONS

- 4:1 Input Range
- High Efficiency up to 90%
- Six-Sided Continuous Shield
- 1 x 1 x 0.39 inches
- Over Voltage Protection
- Over Current Protection
- UL60950-1 certified
- RoHS ✓



## GENERAL DESCRIPTION

The VTW20Q 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 4:1 input bus voltage of 24 and 48 Vdc offering output voltage levels of 3.3, 5, 12, 15,  $\pm 12$  and  $\pm 15$  Vdc. Cooling is by free-air convection, or optional by heat sink.

### 4:1 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] 24/48	Efficiency [%] 24/48	max. Cap. Load [ $\mu$ F]
VTW20Q-xx3R3S	24 48	3.3	4500	75	6/4	88/87	7000
VTW20Q-xx05S		5.0	4000	75	6/4	89/89	5000
VTW20Q-xx12S		12.0	1670	100	6/4	89/89	850
VTW20Q-xx15S		15.0	1330	100	6/4	89/90	700
VTW20Q-xx12D		$\pm 12.0$	$\pm 833$	100	6/4	89/89	$\pm 500$
VTW20Q-xx15D		$\pm 15.0$	$\pm 667$	100	6/4	90/90	$\pm 350$

xx ... nominal Input voltage:

VTW20Q-Series: 24 (9 – 36 Vdc)  
48 (18 – 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

## ELECTRICAL SPECIFICATIONS

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

### Input Specifications

4:1 Input Voltage Range	24V: 9 to 36 Vdc 48V: 18 to 75 Vdc
Input Filter	Pi Type
Input Surge Voltage	24V: 50V dc, 1 sec, max. 48V: 100 Vdc, 1 sec, max.
Input reflected ripple current	30 mA <sub>pp</sub>
Start up time	30 mS, max.
Start up voltage	24V/48V: 9 / 18 Vdc
Shutdown voltage	24V/48V: 8 / 16 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 VTW20Q 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: 1500 Vdc, min. (1 minute)
Isolation Resistance	10 <sup>9</sup> Ohms, min.
Isolation capacitance	1500 pF, max.
Approvals	UL60950-1 certified (E352836) IEC/EN60950-1 (designed to meet)

### Environmental Specification

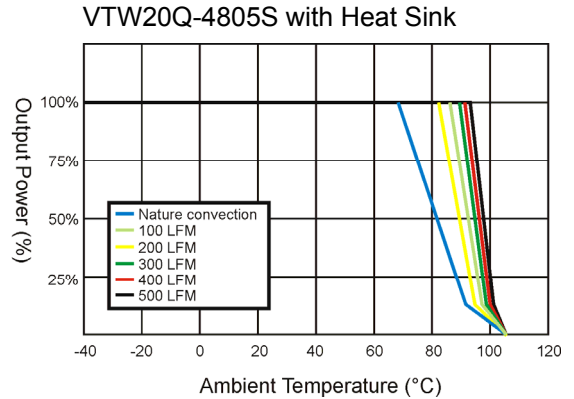
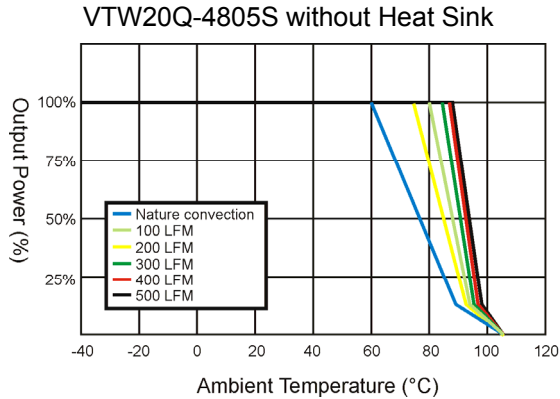
Operating Temperature	-40°C to +60°C (without derating) +60°C to +101°C (with derating) (Heatsink available – see Page 4)
Max. Case Temperature	+105°C
Storage Temperature	-55°C to +125°C
Cooling	Free-air Convection
Thermal Impedance	17.6°C/W Nature convection 14.8°C/W Heat sink (Nature conv.)
MTBF	MIL-HDBK-217F: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

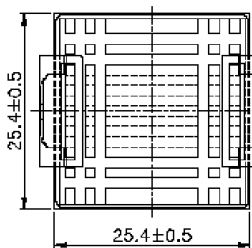
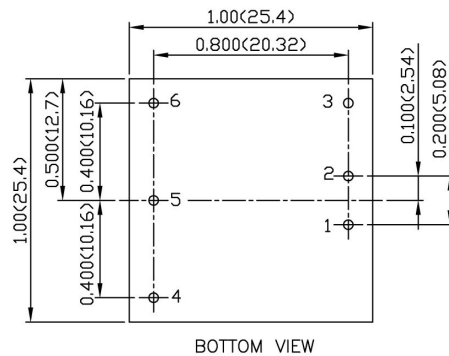
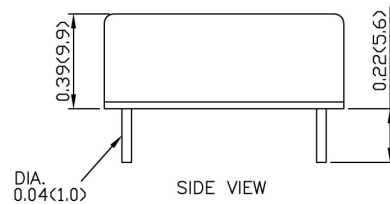
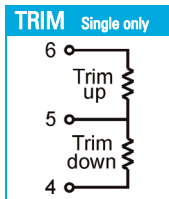
**CAUTION:** This power module is not internally fused. An input line fuse must always be used!

## Derating

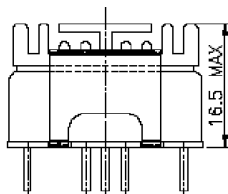
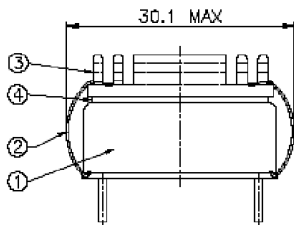


## PIN Connections

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



- 1: VTW20Q DC/DC converter
- 2: Clamps
- 3: Heat Sink
- 4: Thermal Pad



## Heat Sink

To order VTW20Q with Heat Sink add following Suffix to the Part Number:

- HS ... Heat Sink only
- HC ... Heat Sink + Clamps (Recommended)

Example: VTW20Q-4805S-HC

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.