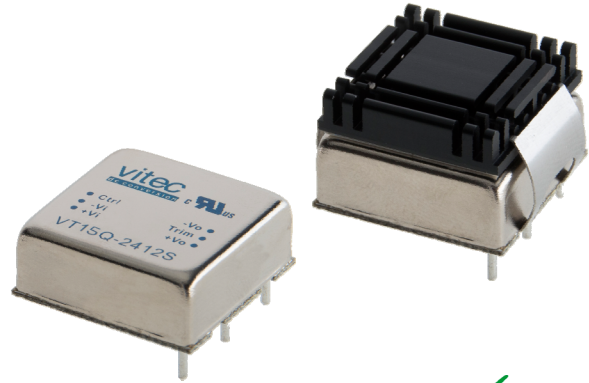


FEATURES AND APPLICATIONS

- 2:1 Input Range
- High Efficiency up to 89%
- 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 VT15Q series is a family of 15 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, ± 5 , ± 12 and ± 15 Vdc. Cooling is by free-air convection, 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 [μ F]
VT15Q-xx3R3S	12	3.3	4000	75	120/50/25	84/86/86	12000
VT15Q-xx05S		5.0	3000	75	90/65/35	88/88/88	6000
VT15Q-xx12S		12.0	1300	100	30/20/12	86/87/88	1000
VT15Q-xx15S	24	15.0	1000	100	30/20/12	88/88/88	660
VT15Q-xx05D	48	± 5.0	± 1500	100	30/15/12	85/85/85	± 3000
VT15Q-xx12D		± 12.0	± 625	100	30/15/15	87/88/89	± 520
VT15Q-xx15D		± 15.0	± 500	100	30/25/20	88/88/88	± 330

xx ... nominal Input voltage:

VT15Q-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

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: 36 Vdc, 100 ms, max. 24V: 50 Vdc, 100 ms, max. 48V: 100 Vdc, 100 ms, 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 / 14.5 / 30.5 Vdc

Output Specifications

Output Power	15 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 <small>Measured with a 1µF M/C X7R and a 10 µF T/C</small>
Line Voltage Regulation	±0.2% (single) ±0.5% (dual) <small>(LL to HL at Full Load)</small>
Load Voltage Regulation	±0.2% (single) ±1% (dual) <small>(LL to HL at Full Load)</small>
Cross Regulation	±5% (dual) <small>(Asymmetrical Load 25%/100% FL)</small>
Temperature Coefficient	±0.02%/°C, max.
Short Circuit Protection	Continuous (Hiccup)
Over Voltage Protection	3.3 Vout: 3.7 to 5.4 Vdc 5 Vout: 5.6 to 7.0 Vdc 12 Vout: 13.5 to 19.6 Vdc 15 Vout: 16.8 to 20.5Vdc <small>(Zener diode clamp)</small>
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
<small>The VT15Q meets EN55022 Class A and Class B without external components.</small>		
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)
<small>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</small>		
Conducted I.	EN61000-4-6	Perf. Criteria A (3 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	2.5 mA

General Specifications

Efficiency	see table
Switching Frequency	400 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	1000 pF, max.
Approvals	UL60950-1 certified (E352836) IEC/EN60950-1 (designed to meet)

Environmental Specification

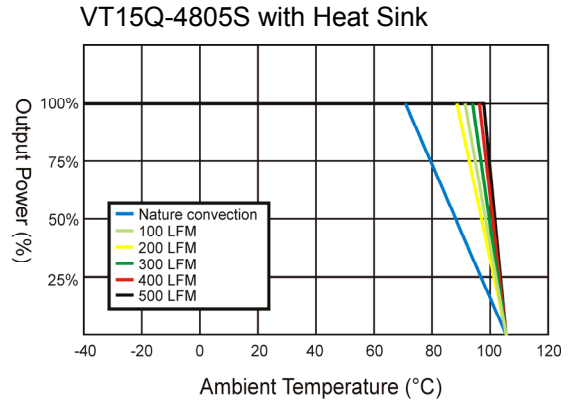
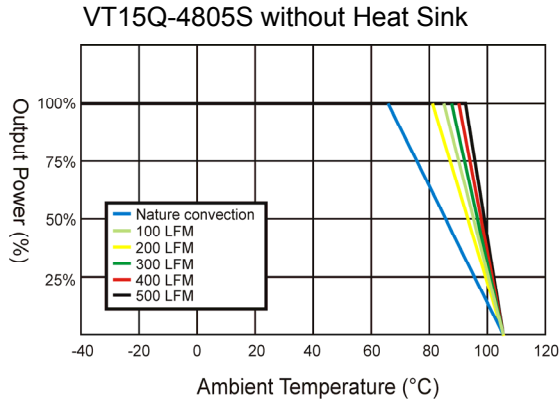
Operating Temperature	-40°C to +85°C (with derating) <small>(Heatsink available – see Page 4)</small>
Max. Case Temperature	+105°C
Storage Temperature	-55°C to +125°C
Cooling	Free-air Convection
Thermal Impedance	18.2°C/W Nature convection 15.8°C/W Heat sink (Nature conv.)
MTBF	MIL-HDBK-217F: 5.630 x 10 ⁵ Hrs (Notice2 @25°C, FL, Ground, Benign, controlled environment) Bellcore TR-NWT-000332: 1.330 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

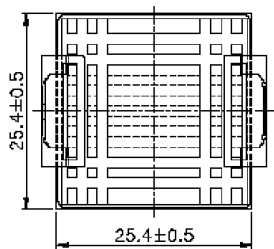
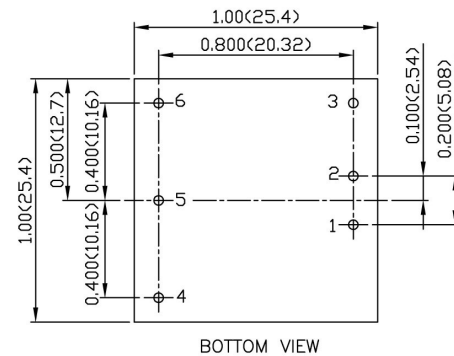
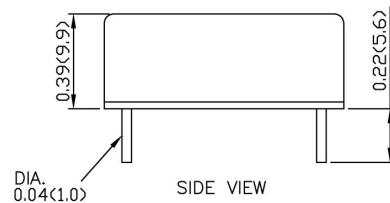
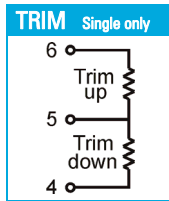
CAUTION: This power module is not internally fused. An input line fuse must always be used!

Derating

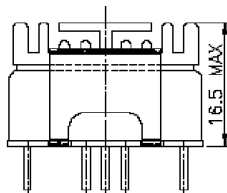
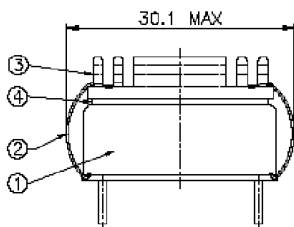


PIN Connections

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: VT15Q DC/DC converter
- 2: Clamps
- 3: Heat Sink
- 4: Thermal Pad



Heat Sink

To order VT15Q with Heat Sink add following Suffix to the Part Number:

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

Example: VT15Q-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.