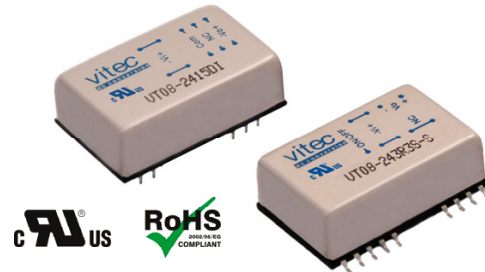


FEATURES AND APPLICATIONS

- 2:1 and 4:1 Input Range
- High Efficiency up to 88%
- SMD and DIL Package
- 110 Vdc Input (Railway Applications)
- UL60950-1 certified
- RoHS ✓



GENERAL DESCRIPTION

The VT08 and VTW08 series is a family of 8 Watt single and dual output DC-DC converters. These converters combine a five-side shielded nickel-coated copper package in a 1.25" x 0.8" x 0.4" compatible case (31.8 x 20.3 x 10.2 mm) 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 or 4:1 input bus voltage of 12, 24, 48 and 110 Vdc offering output voltage levels of 3.3, 5, 12, 15, ± 5 , ± 12 and ± 15 Vdc. Cooling is by free-air convection.

2:1 Input – Single and Dual Outputs							
Type Number	Input Voltage [Vdc]	Output Voltage [Vdc]	Output Current [mA]	Input Current no load [mA] 12/24/48	Output Ripple & Noise [mVpp]	Efficiency [%] 12/24/48	max. Cap. Load [μ F]
VT08-xx3R3S	12 24 48	3.3	2000	10/10/7	50	80/80/80	3300
VT08-xx05S		5.0	1500	15/30/8	50	83/83/83	1600
VT08-xx12S		12.0	666	13/13/10	50	88/86/86	350
VT08-xx15S		15.0	533	20/15/10	50	87/85/86	240
VT08-xx05D		± 5.0	± 800	15/15/8	50	83/82/85	± 1000
VT08-xx12D		± 12.0	± 333	20/15/8	50	87/86/87	± 160
VT08-xx15D		± 15.0	± 267	20/13/7	50	85/85/87	± 100

4:1 Input – Single and Dual Outputs							
Type Number	Input Voltage [Vdc]	Output Voltage [Vdc]	Output Current [mA]	Input Current no load [mA] 24/48/110	Output Ripple & Noise [mVpp] 24/48/110	Efficiency [%] 24/48/110	max. Cap. Load [μ F]
VTW08-xx3R3S	24 48 110	3.3	2400	40/20/8	50/50/75	85/85/84	1330
VTW08-xx05S		5.0	1600	40/20/8	50/50/75	87/87/85	1330
VTW08-xx12S		12.0	666	25/13/4	50/50/75	86/87/86	288
VTW08-xx15S		15.0	533	25/13/4	50/50/75	86/88/86	200
VTW08-xx05D		± 5.0	± 800	20/10/5	50/50/75	84/84/82	± 900
VTW08-xx12D		± 12.0	± 333	25/13/5	50/50/75	86/87/85	± 133
VTW08-xx15D		± 15.0	± 267	25/13/5	50/50/75	86/87/85	± 90

xx ... nominal Input voltage:

VT08-Series:
12 (9 – 18 Vdc)
24 (18 – 36 Vdc)
48 (36 – 75 Vdc)

VTW08-Series:
24 (9 – 36 Vdc)
48 (18 – 75 Vdc)
110 (43 – 160 Vdc)

Options: Suffix -S SMD Package

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ELECTRICAL SPECIFICATIONS

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

Input Specifications

Input Voltage Range	
2:1 input (VT08-Series)	4:1 input (VTW08-Series)
12V: 9 to 18 Vdc	24V: 9 to 36 Vdc
24V: 18 to 36 Vdc	48V: 18 to 75 Vdc
48V: 36 to 75 Vdc	110V: 43 to 160 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.
	110V: 170 Vdc, 100 mS, max.
Input reflected ripple current	20 mApp
Start Up time (nom. input, const. res. load)	700 mS, max. (VT-Series)
	450 mS, max. (VTW-Series)

Output Specifications

Output Power	8 Watts, max.
Output Voltage Accuracy	±1%
Min. Load for specified regulation	0%
Ripple and Noise (20 MHz BW)	see table
Line Voltage Regulation	±0.2% (LL to HL at full load)
Load Voltage Regulation	
	DIL Single: ±0.5% (No load to full load)
	SMD Single & Dual, DIL Dual: ±1% (No load to full load)
Cross Regulation (Dual)	±5% (Asym. load 25%/100% FL)
Temperature Coefficient	±0.02%/°C, max.
Over Load Protection	170% (of FL at nominal input)
Short Circuit Protection	Continuous (Hiccup)
Transient response recovery time	
	VT-Series: 200 µsec (25% load step change)
	VTW-Series: 250 µsec (25% load step change)

Remote ON/OFF Control

Control voltage referenced to negative (-) input	
ON-Control	3.5-12 V or open
OFF-Control	0-1.2 V or short
Input current of remote control pin	±0.5 mA, max.
Remote off input current	2.5 mA

Physical Characteristics

Dimensions	31.8 x 20.3 x 10.2 mm
	1.25 x 0.80 x 0.40 inches
Case Material	Nickel-coated copper
Base Material	Non-conductive black plastic
Potting Material	Epoxy (UL94-V0)
Weight	DIL24: 16 g
	SMD24: 18 g

General Specifications

Efficiency	see table
Switching Frequency	300 kHz, ±10%
Isolation Voltage	1500 Vdc, min. (1 minute)
Isolation Resistance	10 ⁹ Ohms, min.
Isolation Capacitance	
	VT-Series: 300 pF, max.
	VTW-Series: 1500 pF, max.
Approvals	UL60950-1 certified (E352836)
	IEC/EN60950-1 (designed to meet)
	EN50155 (designed to meet)

Environmental Specification

Operating Temperature	VT: -40 to +85°C, with derating
	VTW (5V, 12V, 15V, ±12V, ±15V):
	-40 to +105°C, derating above 78°C
	VTW (3.3V, ±5V):
	-40 to +105°C, derating above 70°C
Max. Case Temperature	VT: +100°C; VTW: +105°C
Storage Temperature	VT: -55°C to +105°C
	VTW: -55°C to +125°C

The VTW110 converter can meet the railway T2 and TX temperature requirements. T2: -40°C to +70°C as all models; TX: -40°C to +85°C as power derating to 55% output power.

Thermal Impedance	20°C/Watt (Natural Convection)
Cooling	Free-air Convection
MTBF	2:1 input / 4:1 input
	Bellcore TR-NWT-000332: 3.053 x 10 ⁶ Hrs / 2.350 x 10 ⁶ Hrs
	Case1, 50% Stress, 40°C
	MIL-HDBK-217F: 1.213 x 10 ⁶ Hrs / 1.078 x 10 ⁶ Hrs
	Notice2 @25°C, FL, Ground, Benign, contr. environment
Thermal Shock	MIL-STD-810F, EN61373 (VTW-Series)
Vibration	MIL-STD-810F, EN61373 (VTW-Series)
Relative Humidity	5% to 95% RH

EMC Characteristics

EMI	EN55022 (and EN55011 at 110Vin)	Class A
	With an external capacitor parallel to the input pins: see EMI Filter on Page 3	
ESD	EN61000-4-2	Perf. Criteria A (Air ±8 kV; Contact ±6 kV)
Radiated I.	EN61000-4-3	Perf. Criteria A (VT: 10 V/m; VTW: 20 V/m)
F. Transients.	EN61000-4-4	Perf. Criteria A (±2 kV)
	An external filter capacitor is required if the module has to meet EN61000-4-4.	
	Recommended: 220 µF/100 V, low ERS; 110Vin: 150 µF/200 V, low ERS	
Surge	EN61000-4-5	Perf. Criteria A (VT: ±1 kV; VTW: ±2 kV)
	An external filter capacitor is required if the module has to meet EN61000-4-5.	
	Recommended: 220 µF/100 V, low ERS; 110Vin: 150 µF/200 V, low ERS	
Conducted I.	EN61000-4-6	Perf. Criteria A (10 Vrms)

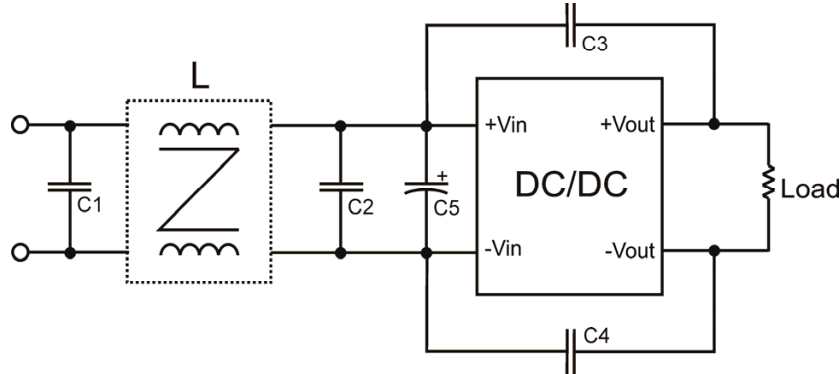
CAUTION: This power module is not internally fused. An input line fuse must always be used!

V i t e c P O W E R G m B H

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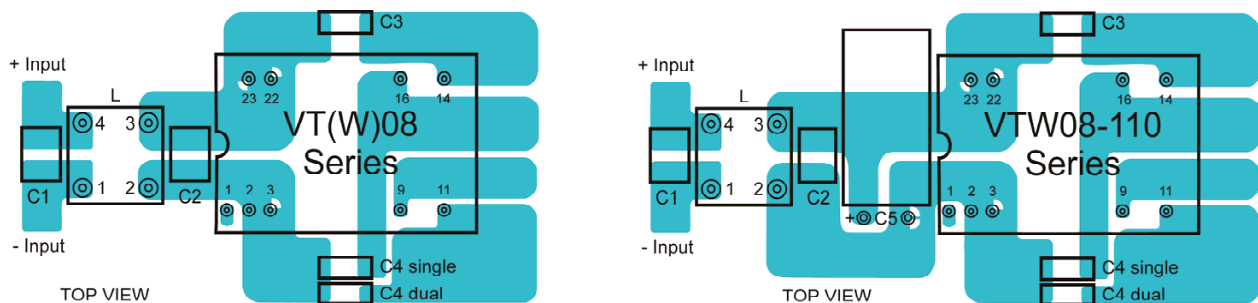
Recommended Filter for EN55022 and EN55011 Class A and Class B Compliance



Recommended Components as follows:

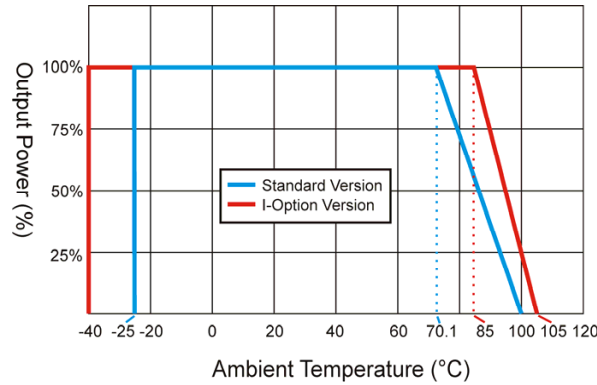
	Class A Compliance			Class B Compliance			
	C2	C1, C3, C4, C5, L	C1	C2	C3, C4	C5	L1
VT08-12xxx	4.7 μ F / 25V 1210 MLCC	-	4.7 μ F / 50V 1812 MLCC	-	1000 pF / 2kV MLCC	-	325 μ H Common Choke PMT-050
VT08-24xxx	-	-	6.8 μ F / 50V 1812 MLCC	-	1000 pF / 2kV MLCC	-	325 μ H Common Choke PMT-050
VT08-48xxx	-	-	2.2 μ F / 100V 1812 MLCC	2.2 μ F / 100V 1812 MLCC	1000 pF / 2kV MLCC	-	325 μ H Common Choke PMT-050
VTW08-24xxx	1 μ F / 50V 1210 MLCC	-	4.7 μ F / 50V 1812 MLCC	-	1000 pF / 2kV MLCC	-	325 μ H Common Choke PMT-050
VTW08-48xxx	0.47 μ F / 100V 1812 MLCC	-	1.5 μ F / 100V 1812 MLCC	1.5 μ F / 100V 1812 MLCC	1000 pF / 2kV MLCC	-	325 μ H Common Choke PMT-050
VTW08-110xxx	1 μ F / 250V * 2pcs 1812 MLCC	-	1 μ F / 100V 1812 MLCC	-	1000 pF / 2kV MLCC	22 μ F / 200V	497 μ H Common Choke PMT-017

Recommended EN55022 Class B Filter Circuit Layout:



Derating

VT05-4805S Derating Curve



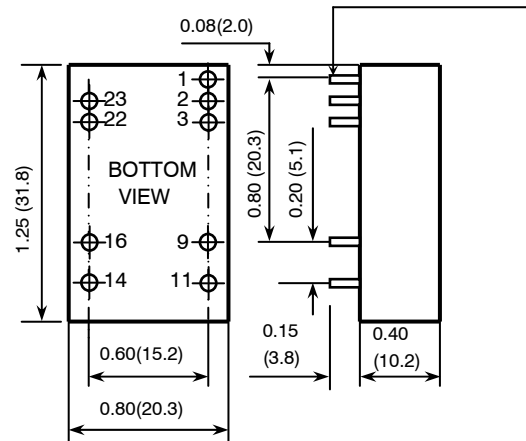
PIN Connections

PIN Connections DIL 24 Types

Pin	Single	Dual
1	ON/OFF	ON/OFF
2	-V Input	-V Input
3	-V Input	-V Input
9	NC	Common
11	NC	-V Output
14	+V Output	+V Output
16	-V Output	Common
22	+V Input	+V Input
23	+V Input	+V Input

NC...not connected

Pin size is 0.02(0.5) Dia or
0.01 x 0.02 (0.25 x 0.50) Rectangular Pin

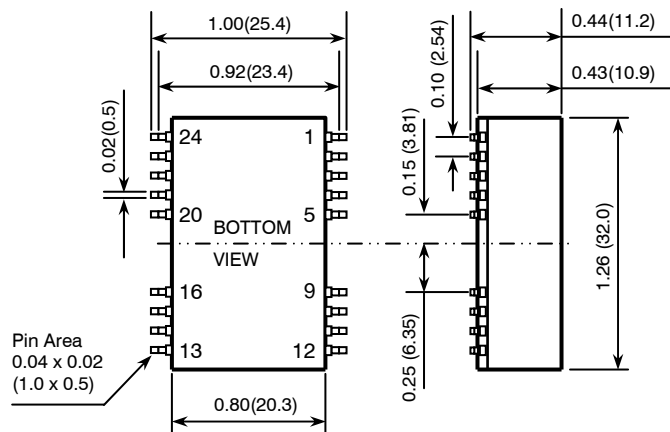


PIN Connections SMD (Suffix -S)

PIN Connections SMD Types

Pin	Single Output	Dual Output
1	ON/OFF	ON/OFF
2	-V Input	-V Input
3	-V Input	-V Input
9	NC	Common
10	NC	NC
11	NC	-V Output
14	+V Output	+V Output
15	NC	NC
16	-V Output	Common
22	+V Input	+V Input
23	+V Input	+V Input

NC ... No Connection



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.