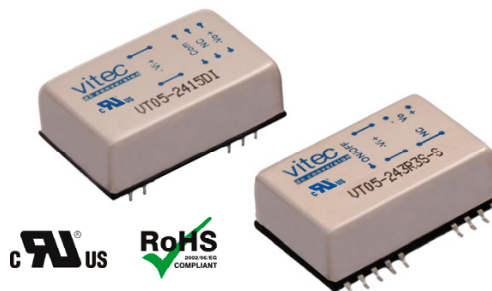


## FEATURES AND APPLICATIONS

- 2:1 and 4:1 Input Range
- High Efficiency up to 83%
- SMD and DIL Package
- Low Ripple & Noise
- UL60950-1 certified
- RoHS ✓



## GENERAL DESCRIPTION

The VT05 and VTW05 series is a family of 5 Watt single and dual output DC-DC converters. These converters combine five side shielded nickel-coated copper package for SMD or a 24-pin DIL 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 or a 4:1 input bus voltage of 12, 24 and 48 Vdc offering output voltage levels of 3.3, 5, 12, 15,  $\pm 5$ ,  $\pm 12$  and  $\pm 15$  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	Input Current full load [mA] 12/24/48	Output Ripple & Noise [mVpp]	Efficiency [%] 12/24/48	max. Cap. Load [ $\mu$ F]
VT05-xx3R3S	12 24 48	3.3	1000	10/10/10	382/194/98	50	76/75/74	2200
VT05-xx05S		5.0	1000	10/15/10	563/285/143	50	78/77/77	1000
VT05-xx12S		12.0	470	10/15/10	603/305/151	50	82/81/82	220
VT05-xx15S		15.0	400	10/15/10	649/325/162	50	81/81/81	150
VT05-xx05D		$\pm 5.0$	$\pm 500$	15/15/10	563/274/141	50	78/80/78	$\pm 680$
VT05-xx12D		$\pm 12.0$	$\pm 230$	20/20/5	597/288/147	50	81/84/82	$\pm 100$
VT05-xx15D		$\pm 15.0$	$\pm 190$	10/20/10	594/308/150	50	84/81/83	$\pm 68$

### 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	Input Current full load [mA] 24/48	Output Ripple & Noise [mVpp]	Efficiency [%] 24/48	max. Cap. Load [ $\mu$ F]
VTW05-xx3R3S	24 48	3.3	1000	5/5	191/100	50	76/73	2200
VTW05-xx05S		5.0	1000	10/10	278/138	50	79/79	1000
VTW05-xx12S		12.0	470	5/10	305/155	50	81/80	220
VTW05-xx15S		15.0	400	10/10	312/160	50	84/82	150
VTW05-xx05D		$\pm 5.0$	$\pm 500$	10/10	282/145	50	78/76	$\pm 680$
VTW05-xx12D		$\pm 12.0$	$\pm 230$	10/10	295/151	50	82/80	$\pm 100$
VTW05-xx15D		$\pm 15.0$	$\pm 190$	10/10	297/156	50	84/80	$\pm 68$

xx ... nominal Input voltage:

VT05-Series: 12 (9 – 18 Vdc)  
24 (18 – 36 Vdc)  
48 (36 – 75 Vdc)

VTW05-Series: 24 (9 – 36 Vdc)  
48 (18 – 75 Vdc)

Options: Suffix I Extended Temperature Range VT05-Series  
Suffix E Extended Temperature Range VTW05-Series  
Suffix -S SMD Package

**V i t e c POWER GmbH**

Hans Kudlich Gasse 12/3, A-2230 Gänserndorf, Austria, Tel.: +43/2282/3144, Fax.: +43/2282/60494, Email: [office@vitecpower.com](mailto:office@vitecpower.com)

[www.vitecpower.com](http://www.vitecpower.com)

## ELECTRICAL SPECIFICATIONS

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

### Input Specifications

Input Voltage Range	
2:1 input (VT05-Series)	4:1 input (VTW05-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	
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	20 mApp
Start Up time (nom. input, const. res. load)	450 mS, max.

### Output Specifications

Output Power	5 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	Single: ±0.5% (No load to full load) 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	200 µsec (25% load step change)

### General Specifications

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

### Environmental Specification

Operating Temperature	-25°C to +85°C with Derating
"I" Option (VT-Series):	-40°C to +85°C without Derating
"E" Option (VTW-Series):	-40°C to +85°C with Derating
Storage Temperature	-55°C to +105°C
Max. Case Temperature	+100°C (Standard Types) +105°C (I-Option Types)
Thermal Impedance	20°C/Watt (Natural Convection)
Cooling	Free-air Convection
MTBF	MIL-HDBK-217F: 1.631 x 10 <sup>6</sup> Hrs Notice2 @25°C, FL, Ground, Benign, controlled environment Bellcore TR-NWT-000332: 3.165 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

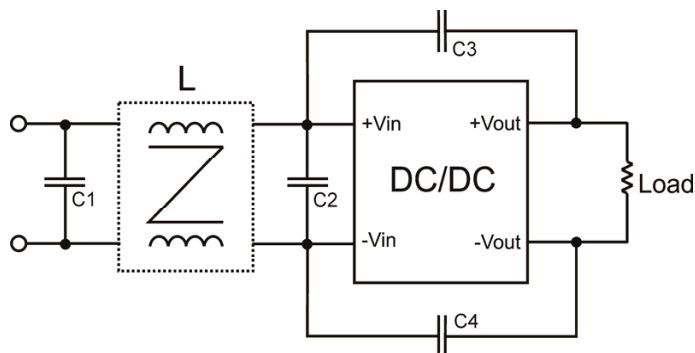
Dimensions	31.8 x 20.3 x 10.2 mm 1.25 x 0.80 x 0.40 inches
Case Material	Nickel-coated copper
Base Material	Non-conductive black plastic
Potting Material	Epoxy (UL94-V0)
Weight	DIL24: 16 g SMD24: 18 g

### EMC Characteristics

EMI	EN55022	Class A
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 B (±2 kV)
Surge	EN61000-4-5	Perf. Criteria B (±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, ERS 48 mΩ	
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!

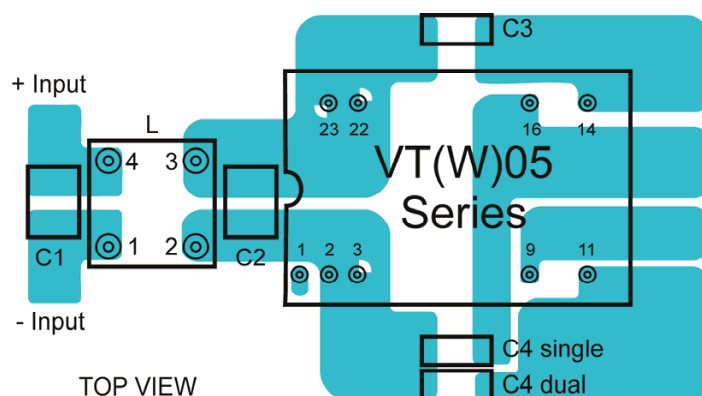
### Recommended Filter for EN55022 Class A or Class B Compliance



Recommended Components as follows:

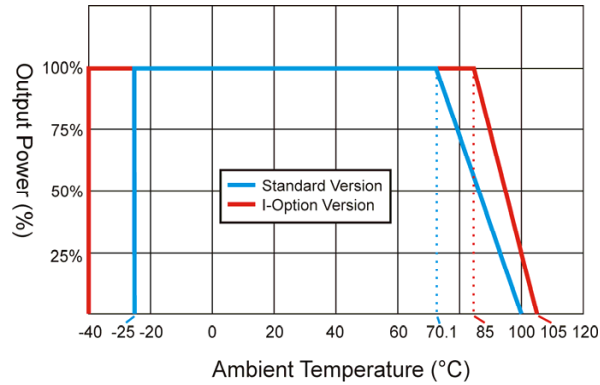
	Class A Compliance				Class B Compliance			
	C1	C2	C3, C4	L	C1	C2	C3, C4	L
VT05-12xxx	-	4.7 $\mu$ F / 25V 1210 MLCC	1000 pF / 2kV 1206 MLCC	-	4.7 $\mu$ F / 50V 1812 MLCC	-	1000 pF / 2kV 1206 MLCC	325 $\mu$ H Common Choke, PMT-050
VT05-24xxx	-	-	1000 pF / 2kV 1206 MLCC	-	6.8 $\mu$ F / 50V 1812 MLCC	-	1000 pF / 2kV 1206 MLCC	325 $\mu$ H Common Choke, PMT-050
VT05-48xxx	-	-	1000 pF / 2kV 1206 MLCC	-	2.2 $\mu$ F / 100V 1812 MLCC	2.2 $\mu$ F / 100V 1812 MLCC	1000 pF / 2kV 1206 MLCC	325 $\mu$ H Common Choke, PMT-050
VTW05-24xxx	-	1.0 $\mu$ F / 50V 1210 MLCC	1000 pF / 2kV 1206 MLCC	-	6.8 $\mu$ F / 50V 1812 MLCC	-	1000 pF / 2kV 1206 MLCC	325 $\mu$ H Common Choke, PMT-050
VTW05-48xxx	-	0.47 $\mu$ F / 100V 1812 MLCC	1000 pF / 2kV 1206 MLCC	-	2.2 $\mu$ F / 100V 1812 MLCC	2.2 $\mu$ F / 100V 1812 MLCC	1000 pF / 2kV 1206 MLCC	325 $\mu$ H Common Choke, PMT-050

Recommended EN55022 Class A or Class B Filter Circuit Layout:



## Derating

VT05-4805S Derating Curve



## PIN Connections DIL24 Package

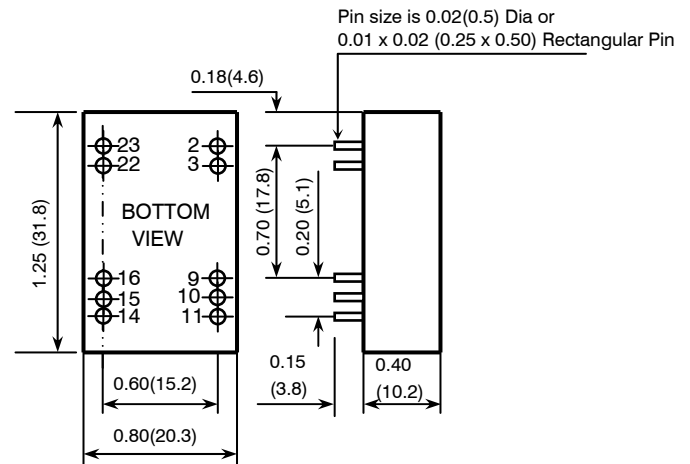
PIN Connections DIL 24 Types

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

NC ... No Connection

NP ... No Pin

\* There is no pin at Pin10 & Pin15 for VTW05-Series

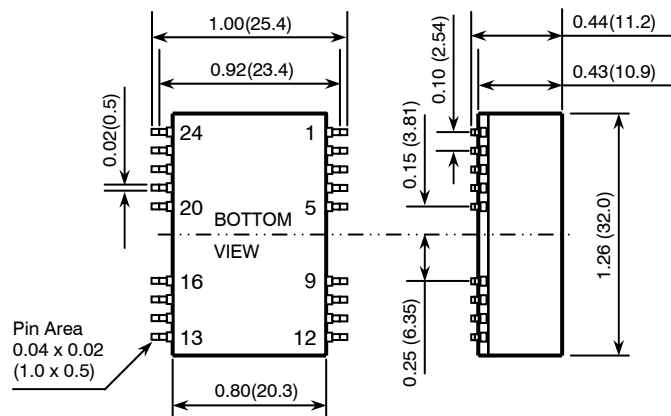


## PIN Connections SMD (Suffix -S)

PIN Connections SMD Types

Pin	Single Output	Dual Output
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.