VT03B
VTW03B SERIES

3 Watt DC/DC Converter
Single and Dual Output
1500 and 3000 Vdc Isolation

vitec dc conversion

FEATURES AND APPLICATIONS

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

GENERAL DESCRIPTION

The VT03B and VTW03B series is a family of 3 Watt single and dual output DC-DC converters. These converters combine a DIL or a SMD package with high performance features such as 1500 Vdc or 3000 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 5, 12, 24 and 48 Vdc offering output voltage levels of 3.3, 5, 09, 12, 15, ±5, ±12 and ±15 Vdc. Cooling is by free-air convention.

2:1 Input – Single and Dual Outputs

Type Number	Input Voltage [Vdc]	Output Voltage [Vdc]	Output Current [mA]	Input Current no load [mA] 5/12/24/48	Input Current full load [mA] 5/12/24/48	Output Ripple & Noise [mVpp]	Efficiency [%] 5/12/24/48	Cap. Load [µF]
VT03B-xx3R3S	5 12 24 48	3.3	700	40/30/13/10	650/267/134/67	30	75/76/76/76	3300
VT03B-xx05S		5.0	600	40/30/13/10	800/324/162/81	30	79/81/81/81	1680
VT03B-xx09S		9.0	333	40/30/13/10	800/329/160/82	30	79/80/82/80	1000
VT03B-xx12S		12.0	250	40/30/13/10	790/320/160/80	30	80/82/82/82	820
VT03B-xx15S		15.0	200	50/30/13/10	780/320/158/80	30	81/82/83/82	680
VT03B-xx05D		± 5.0	± 300	50/30/13/10	790/329/164/81	30	80/80/80/81	± 1000
VT03B-xx12D		± 12.0	± 125	50/30/13/10	790/320/158/79	30	80/82/83/83	± 470
VT03B-xx15D		± 15.0	± 100	55/30/13/10	780/316/158/79	30	81/83/83/83	± 330

4:1 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	Cap. Load [µF]
VTW03B-xx3R3S	12 24 48	3.3	700	35/20/13	271/136/68	30	75/75/75	3300
VTW03B-xx05S		5.0	600	35/20/13	325/164/82	30	81/80/80	1680
VTW03B-xx09S		9.0	333	35/20/13	329/164/82	30	80/80/80	1000
VTW03B-xx12S		12.0	250	35/20/13	320/160/79	30	82/82/83	820
VTW03B-xx15S		15.0	200	35/20/13	320/160/80	30	82/82/82	680
VTW03B-xx05D		± 5.0	± 300	40/20/13	333/167/83	30	79/79/79	± 1000
VTW03B-xx12D		± 12.0	± 125	40/20/13	320/160/80	30	82/82/82	± 470
VTW03B-xx15D		± 15.0	± 100	45/20/13	325/162/81	30	81/81/81	± 330

xx … nominal Input voltage:

VT03B-Series:
05 (4.5 – 9 Vdc)
12 (9 – 18 Vdc)
24 (18 – 36 Vdc)
48 (36 – 75 Vdc)

VTW03B-Series:
12 (4.5 – 18 Vdc)
24 (9 – 36 Vdc)
48 (18 – 75 Vdc)

Options :
Suffix H 3 kVdc Isolation
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 (VT03B-Series)		4:1 input (VTW03B-Series)	
5V:	4.5 to 9 Vdc	12V:	4.5 to 18 Vdc
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: Capacitor type

Input Surge Voltage

5V:	15 Vdc, 1sec, max.	12V:	25 Vdc, 1sec, max.
24V:	50 Vdc, 1sec, max.	48V:	100 Vdc, 1sec, max.

Input reflected ripple current

2:1 input		4:1 input	
5V:	80 mApp	12V:	80 mApp
12V:	40 mApp	24V:	40 mApp
24V:	30 mApp	48V:	30 mApp
48V:	20 mApp		

Start Up time: 5 mS, max.

Output Specifications

Output Power		3 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:	±1% (No load to full load)
	Dual:	±1% (No load to full load)
	Single:	±0.5% (10% to 90% load)
	Dual:	±0.8% (10% to 90% load)
Cross Regulation (Dual) (Asymmetrical load 25%/100% FL)		±5%
Temperature Coefficient		±0.02%/°C, max.
Short Circuit Protection		Continuous (Hiccup)
Transient response recovery time		250 µsec (25% load step change)

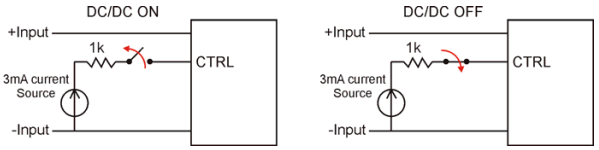
General Specifications

Efficiency		see table
Switching Frequency		100 kHz, min.
Isolation Voltage	Standard:	1500 Vdc, min. (1 minute)
	H-Option:	3000 Vdc, min. (1 minute)
Isolation Resistance		10^9 Ohms, min.
Isolation Capacitance		50 pF, max.
Approvals		UL60950-1certified (E352836)
		IEC/EN60950-1 (designed to meet)

Remote ON/OFF Control

Control Voltage referenced to negative (-) input

DC/DC ON	Open or high impedance
DC/DC OFF	Control pin applied current 2~4 mA max. (via 1 kΩ)
Remote off input current	2.5 mA



Environmental Specification

Operating Temperature	-40°C to +71°C without Derating +71°C to +85°C with Derating
Storage Temperature	-55°C to +125°C
Cooling	Free-air Convection
MTBF	2:1 input / 4:1 input
Bellcore TR-NWT-000332:	4.386x 10^6 Hrs / 3.963 x 10^6 Hrs Case1, 50% Stress, 40°C
MIL-HDBK-217F:	2.401 x 10^6 Hrs / 1.707 x 10^6 Hrs Notice2 @25°C, FL, Ground, Benign, controlled environment
Thermal Shock	MIL-STD-810F
Vibration	MIL-STD-810F
Relative Humidity	5% to 90% RH
Lead-free reflow solder process:	IPC J-STD-020D
Moisture sensitivity level (MSL):	IPC J-STD-033B (Level 2a)

Physical Characteristics

Dimensions	18.9 x 12.8 x 8.4 mm 0.74 x 0.50 x 0.33 inches
Package Materials	UL94-V0
Weight	4.5 g

EMC Characteristics

EMI	EN55022	Class A with an External Filter – see Recommended EMI Filter
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)

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

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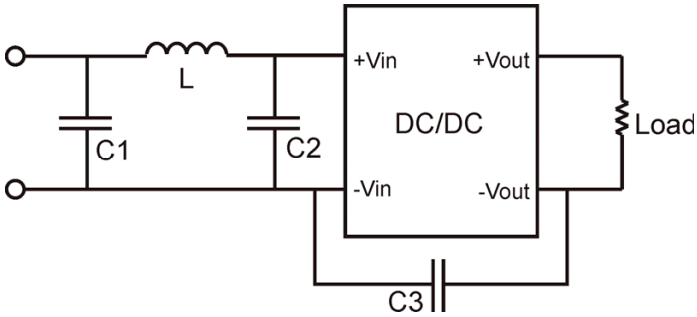
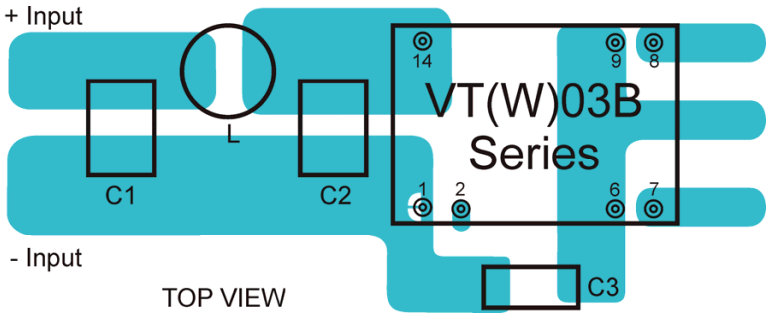
Recommended Filter for EN55022 Class A or Class B Compliance



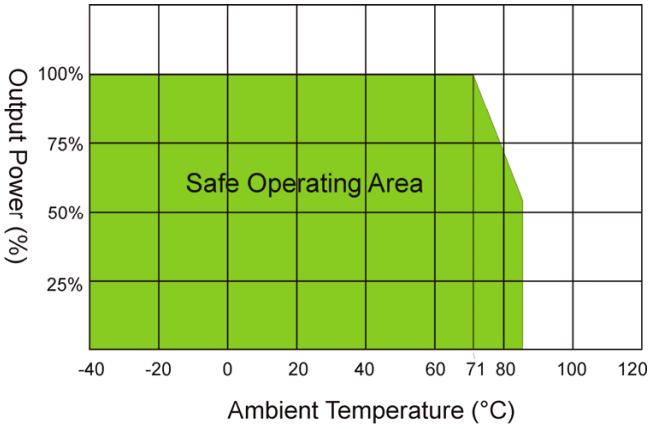
Recommended Components as follows:

	Class A Compliance				Class B Compliance			
	C1	C2	C3	L	C1	C2	C3	L
VT03B-05xxx	10 µF / 25V 1812 MLCC	-	220 pF / 3kV 1808 MLCC	3.3 µH 0504 SMD Inductor PMT-044	10 µF / 25V 1812 MLCC	10 µF / 25V 1812 MLCC	220 pF / 3kV 1808 MLCC	3.3 µH 0504 SMD Inductor PMT-044
VT03B-12xxx	4.7 µF / 50V 1812 MLCC	-	220 pF / 3kV 1808 MLCC	12 µH 0504 SMD Inductor PMT-062	4.7 µF / 25V 1812 MLCC	4.7 µF / 25V 1812 MLCC	220 pF / 3kV 1808 MLCC	12 µH 0504 SMD Inductor PMT-062
VT03B-24xxx	4.7 µF / 100V 1812 MLCC	-	330 pF / 3kV 1808 MLCC	18 µH 0504 SMD Inductor PMT-046	4.7 µF / 50V 1812 MLCC	4.7 µF / 50V 1812 MLCC	330 pF / 3kV 1808 MLCC	18 µH 0504 SMD Inductor PMT-046
VT03B-48xxx	4.7 µF / 100V 1812 MLCC	-	220 pF / 3kV 1808 MLCC	18 µH 0504 SMD Inductor PMT-046	4.7 µF / 100V 1812 MLCC	4.7 µF / 100V 1812 MLCC	220 pF / 3kV 1808 MLCC	18 µH 0504 SMD Inductor PMT-046
VTW03B-12xxx	4.7 µF / 25V 1812 MLCC	-	220 pF / 3kV 1808 MLCC	10 µH 0504 SMD Inductor PMT-047	6.8 µF / 50V 1812 MLCC	6.8 µF / 50V 1812 MLCC	220 pF / 3kV 1808 MLCC	10 µH 0504 SMD Inductor PMT-047
VTW03B-24xxx	4.7 µF / 50V 1812 MLCC	-	220 pF / 3kV 1808 MLCC	12 µH 0504 SMD Inductor PMT-062	4.7 µF / 50V 1812 MLCC	4.7 µF / 50V 1812 MLCC	220 pF / 3kV 1808 MLCC	12 µH 0504 SMD Inductor PMT-062
VTW03B-48xxx	4.7 µF / 100V 1812 MLCC	-	220 pF / 3kV 1808 MLCC	10 µH 0504 SMD Inductor PMT-047	4.7 µF / 100V 1812 MLCC	4.7 µF / 100V 1812 MLCC	220 pF / 3kV 1808 MLCC	18 µH 0504 SMD Inductor PMT-046

Recommended EN55022 Class A or Class B Filter Circuit Layout:



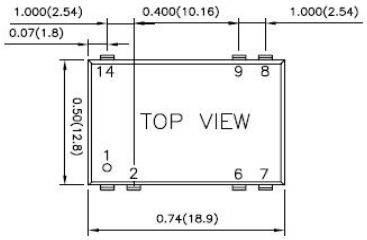
Derating

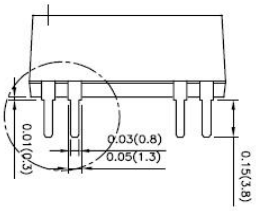


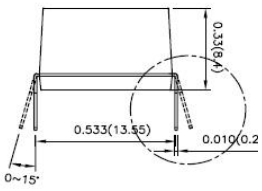
PIN Connections DIL and SMD Types

DIL and SMD Types		
Pin	**Single Output**	**Dual Output**
1	-V Input	-V Input
2	Ctrl	Ctrl
6	N.C.	Common
7	N.C.	-V Output
8	+V Output	+V Output
9	-V Output	Common
14	+V Input	+V Input

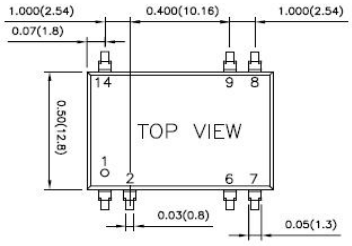
DIL Type (Standard Type)

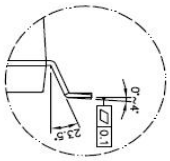


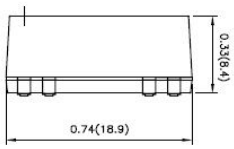


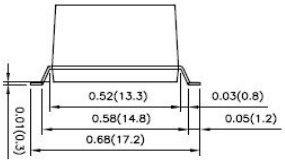


SMD Type (Suffix –S)









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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