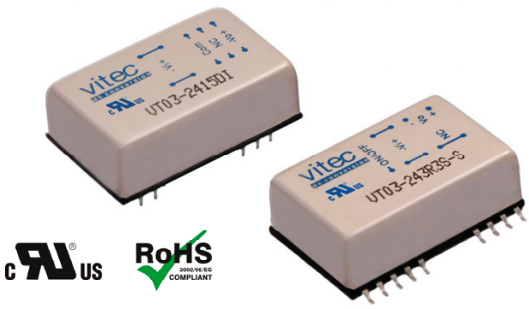
VT03 SERIES

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

vitec dc conversion

FEATURES AND APPLICATIONS

- 2:1 Input Range
- Efficiency up to 82%
- DIL24 or SMD24 Package
- Extended Temperature Range Option
- RoHS ✓
- UL60950-1 certified



GENERAL DESCRIPTION

The VT03 series is a family of 3 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 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 convention.

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 [µF]
VT03-xx3R3S	12 24 48	3.3	500	10/10/5	194/101/49	50	75/72/74	2200
VT03-xx05S		5.0	500	10/10/10	289/149/75	50	76/74/74	1000
VT03-xx12S		12.0	250	10/15/10	329/169/83	50	80/78/79	220
VT03-xx15S		15.0	200	15/15/10	325/169/84	50	81/78/78	150
VT03-xx05D		± 5.0	± 250	15/15/10	282/149/76	50	78/74/73	± 470
VT03-xx12D		± 12.0	± 125	15/20/10	329/171/83	50	80/77/79	± 100
VT03-xx15D		± 15.0	± 100	20/20/10	321/171/86	50	82/77/77	± 68

xx … nominal Input voltage:

VT03-Series: **12 (9 – 18 Vdc)**
24 (18 – 36 Vdc)
48 (36 – 75 Vdc)

Options : **Suffix I Extended Temperature Range**
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

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, 100mS, max.
	24V:	50 Vdc, 100mS, max.
	48V:	100 Vdc, 100mS, max.
Input reflected ripple current		20 mApp
Start Up time (nom. input a. const. res. load)		350 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:	±0.2% (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		180% (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	10^9 Ohms, min.
Isolation Capacitance	300 pF, max.
Approvals	UL60950-1certified (E352836)
	IEC/EN60950-1 (designed to meet)

Environmental Specification

Operating Temperature		-25°C to +85°C with Derating
	I-Option (Suffix I):	-40°C to +85°C without Derating
Max. Case Temperature		+100°C
Storage Temperature		-55°C to +105°C
Thermal Impedance		20°C/Watt (Natural convection)
Cooling		Free-air Convection
MTBF	Bellcore TR-NWT-000332:	3.155×10^6 Hrs (Case1, 50% Stress, 40°C)
	MIL-HDBK-217F:	2.597×10^6 Hrs (Notice2 @25°C, FL Ground, Benign, controlled environment)
Thermal Shock		MIL-STD-810F
Vibration		MIL-STD-810F
Relative Humidity		5% to 95% RH

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

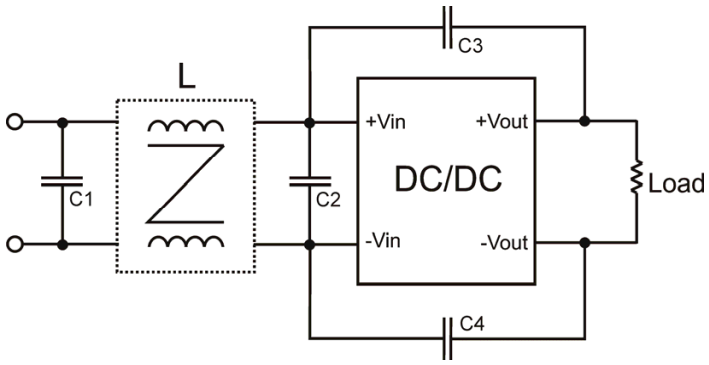
Conducted I.	EN61000-4-6	Perf. Criteria A (10 Vrms)

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

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

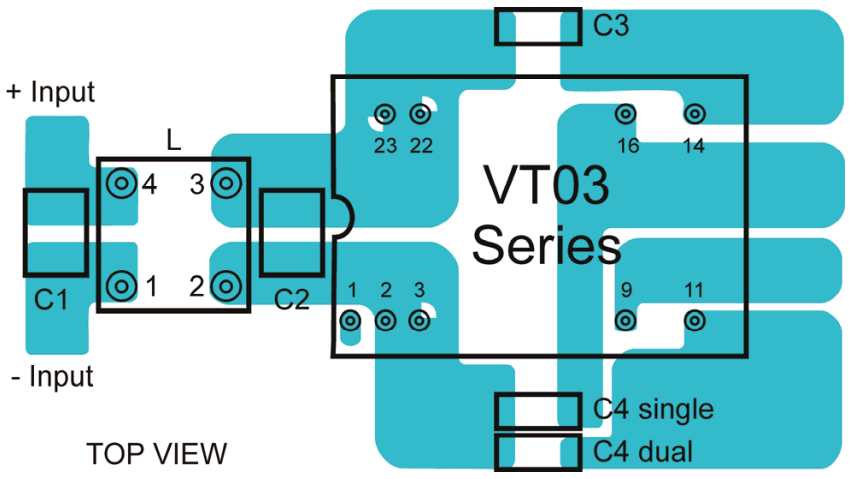
Recommended Filter for EN55022 Class A or Class B Compliance



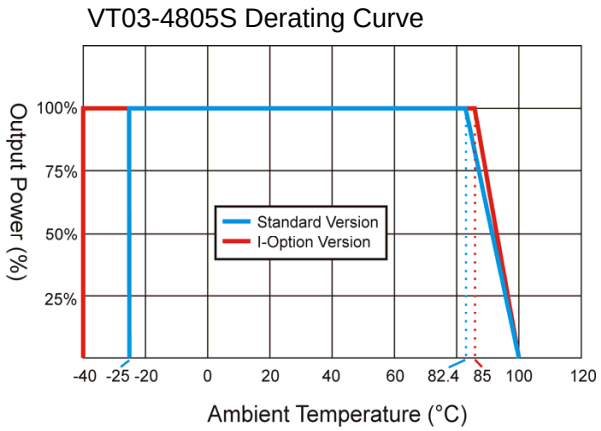
Recommended Components as follows:

	Class A Compliance				Class B Compliance			
	C1	C2	C3, C4	L	C1	C2	C3, C4	L
VT03-12xxx	-	4.7 µF / 25V 1210 MLCC	1000 pF / 2kV 1206 MLCC	-	4.7 µF / 50V 1812 MLCC	-	1000 pF / 2kV 1206 MLCC	325µH Common Choke, PMT-050
VT03-24xxx	-	-	1000 pF / 2kV 1206 MLCC	-	6.8 µF / 50V 1812 MLCC	-	1000 pF / 2kV 1206 MLCC	325µH Common Choke, PMT-050
VT03-48xxx	-	-	1000 pF / 2kV 1206 MLCC	-	2.2 µF / 100V 1812 MLCC	2.2 µF / 100V 1812 MLCC	1000 pF / 2kV 1206 MLCC	325µH Common Choke, PMT-050

Recommended EN55022 Class A or Class B Filter Circuit Layout:



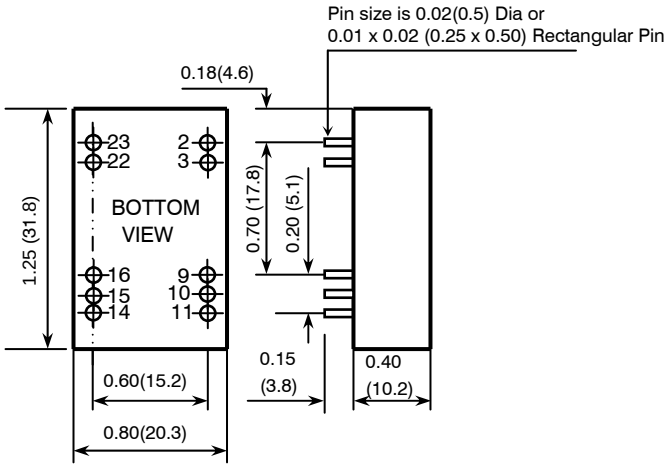
Derating



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	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

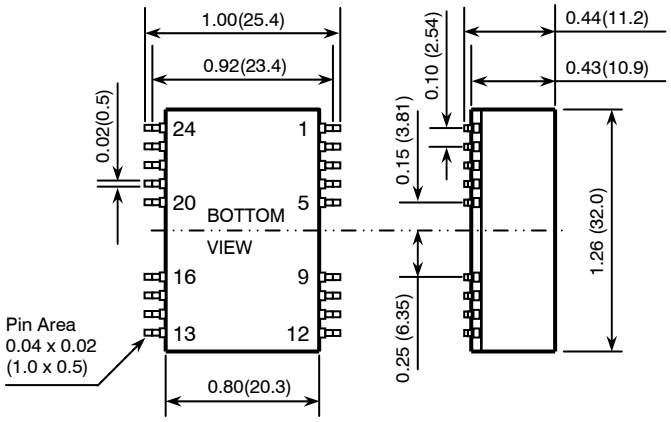
NC … No Connection



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 ±0.25mm (0.01).

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