

FEATURES AND APPLICATIONS

- 4:1 Input Range
- High Efficiency up to 91%
- 2" x 1" Package
- Low Ripple & Noise
- UL60950-1 certified
- RoHS ✓



GENERAL DESCRIPTION

The VTW30C series is a family of 30 Watt single, dual and triple output DC-DC converters. These converters combine six side shielded nickel-coated copper package in a compatible case (2" x 1") 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. Cooling is by free-air convection. Models operate from a 4:1 input bus voltage of 24 and 48 Vdc offering output voltage levels of 1.5, 2.5, 3.3, 5, 5.1, 12, 15, ± 5 , ± 12 , ± 15 Vdc, 3.3 ± 12 Vdc, 3.3 ± 15 Vdc, 5 ± 12 Vdc and 5 ± 15 Vdc.

4:1 Input – Single, Dual and Triple Outputs

Type Number	Input Voltage [Vdc]	Output Voltage [Vdc]	Output Current [mA]		Input Current no load [mA] 24/48	Output Ripple & Noise [mVpp]	Efficiency [%] 24/48	max. Cap. Load [μ F]
			min. Load	max. Load				
VTW30C-xx1R5S	24 48	1.5	0	8500	70/30	100	80/80	20000
VTW30C-xx2R5S		2.5	0	8000	70/45	100	83/84	20000
VTW30C-xx3R3S		3.3	0	7500	70/45	100	86/86	20000
VTW30C-xx05S		5.0	0	6000	105/65	100	88/88	14400
VTW30C-xx5R1S		5.1	0	6000	105/65	100	88/88	14400
VTW30C-xx12S		12.0	0	2500	20/60	150	89/90	3000
VTW30C-xx15S		15.0	0	2000	30/50	150	89/91	2000
VTW30C-xx05D		± 5.0	0	± 3000	90/50	100	88/88	± 3000
VTW30C-xx12D		± 12.0	0	± 1250	25/15	150	87/88	± 2000
VTW30C-xx15D		± 15.0	0	± 1000	25/15	150	87/88	± 1300
VTW30C-xx3R312T		3.3 ± 12.0	500 ± 42	5000 ± 416	105/55	50/75	87/87	15000 ± 340
VTW30C-xx3R315T		3.3 ± 15.0	500 ± 33	5000 ± 333	105/55	50/75	87/87	15000 ± 220
VTW30C-xx0512T		5.0 ± 12.0	400 ± 42	4000 ± 416	105/55	50/75	88/88	8000 ± 340
VTW30C-xx0515T		5.0 ± 15.0	500 ± 33	4000 ± 333	105/55	50/75	88/88	8000 ± 220

xx ... nominal Input voltage:

VTW30C-Series: 24 (9 – 36 Vdc)
48 (18 – 75 Vdc)

Options:

Suffix N Remote ON/OFF Option, Negative Logic
Suffix -HS Heat Sink + Clamps
Suffix -HC Heat Sink only (no Clamps)

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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	24V: 9 to 36 Vdc 48V: 18 to 75 Vdc
Input Filter	Pi type
Input Surge Voltage	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)	30 mS
Start-up Voltage	24V: 9 Vdc, max. 48V: 18 Vdc, max.
Shutdown Voltage	24V: 9 Vdc 48V: 16 Vdc

Output Specifications

Output Power	30 Watts, max.
Output Voltage Accuracy	±1.0% (main) ±1.0% (auxiliary)
Output Voltage Trim	±10% (Single Output only) <small>The Output Voltage could be trimmed by using external Components (see Page 6)</small>
Min. Load for specified regulation	see table
Ripple and Noise (20 MHz BW)	see table
Line Voltage Regulation (LL to HL at full load)	±0.2% (single & dual types) ±1% (main, triple types) ±5% (auxiliary, triple types)
Load Voltage Regulation (No load to full load)	±0.5% (single types) ±1% (single types) ±1% (main, triple types) ±5% (auxiliary, triple types)
Cross Regulation (dual types)	±5% (Asym. load 25%/100% FL)
Temperature Coefficient	±0.02%/°C, max.
Over Load Protection	150% (of FL at nominal input)
Short Circuit Protection	Continuous (Hiccup)
Over Voltage Protection	1.5 Vout: 2.0 Vdc 2.5 Vout: 3.3 Vdc 3.3 Vout: 3.9 Vdc 5.0, 5.1 & ±5 Vout: 6.2 Vdc 12 & ±12 Vout: 15 Vdc 15 & ±15 Vout: 18 Vdc
Transient response recovery time	250 µsec (25% load step change)

Remote ON/OFF Control

Control Voltage referenced to negative (-) input	
Positive Logic (Standard):	ON-Control: 3.0 to 12 V or open OFF-Control: 0 to 1.2 V or short
Negative Logic (Suffix N):	ON-Control: 0 to 1.2 V or short OFF-Control: 3.0 to 12 V or open
Input current of remote control pin	-0.5 mA to +0.5 mA, max.
Remote off input current	3 mA

General Specifications

Efficiency	see table
Switching Frequency	430 kHz, ±10% (single & dual) 400 kHz, ±10% (triple)
Isolation Voltage	1500 Vdc, min. (1 minute)
Isolation Resistance	10 ⁹ Ohms, min.
Isolation Capacitance	1500 pF, max.
Approvals	UL60950-1 certified (E352836) IEC/EN60950-1 (designed to meet)

Environmental Specification

Operating Temperature	-40°C to +50°C without Derating +50°C to +85°C with Derating
Storage Temperature	-55°C to +125°C
Max. Case Temperature	+105°C
Over Temp. Protection	+115°C
Thermal Impedance	12°C/Watt (Natural Convection) 10°C/Watt (with Heat Sink)
Cooling	Free-air Convection single & dual / triple types
MTBF	MIL-HDBK-217F: 4.347 x 10 ⁵ Hrs / 3.904 x 10 ⁵ Hrs * Bellcore TR-NWT-000332: 3.163 x 10 ⁶ Hrs / 3.184 x 10 ⁵ Hrs ** <small>* Notice2 @25°C, FL, Ground, Benign, controlled environment ** Case1, 50% Stress, 40°C</small>
Thermal Shock	MIL-STD-810F
Vibration	MIL-STD-810F
Relative Humidity	5% to 95% RH

Physical Characteristics

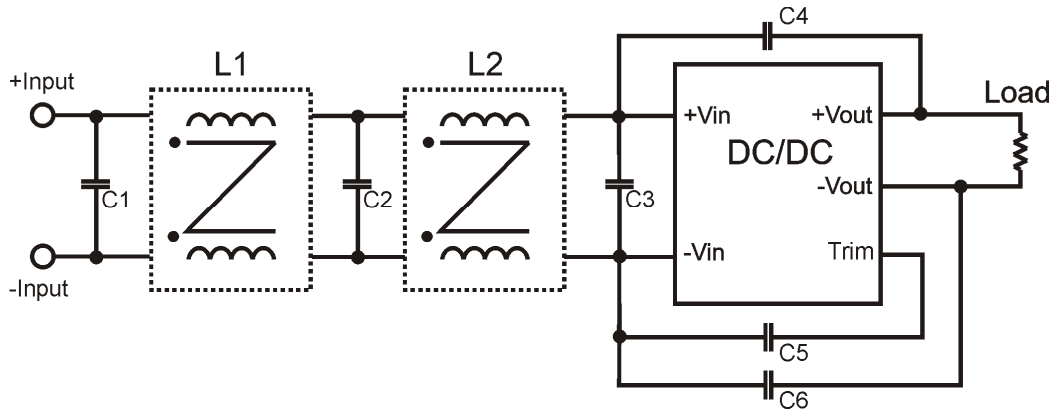
Dimensions	50.8 x 25.4 x 10.2 mm 2.00 x 1.00 x 0.40 inches
Case Material	Nickel-coated copper
Base Material	FR4 PCB
Potting Material	Epoxy (UL94-V0)
Weight	30.5 g

EMC Characteristics

EMI	EN55022	Class A or Class B <small>Standard module meets EN55022 Class A; Class B with external components; see next pages;</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: 12V & 24V Input: 330 µF/50 V, ERS 55 mΩ 48V Input: 220 µF/100 V, ERS 48 mΩ</small>
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!

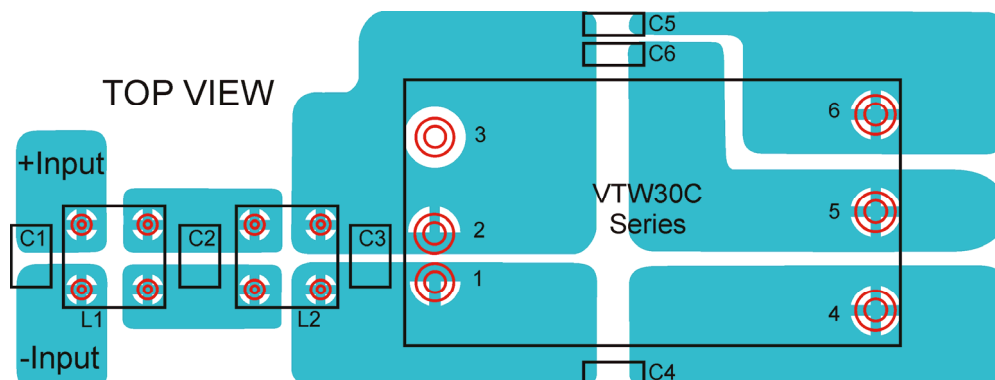
Recommended Filter for EN55022 Class B Compliance – Single Output



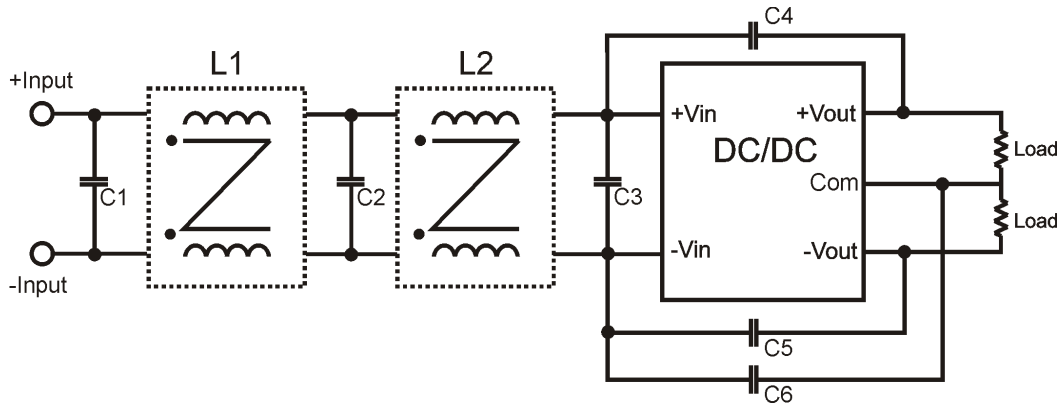
Recommended Components as follows:

		Class B Compliance			
		Component	Value	Voltage	Reference
VTW30C-24xxS	C1, C2, C3		4.7 μ F	50 V	1812 MLCC
	C4, C5, C6		1000 pF	2 kV	1808 MLCC
	L1		33.3 μ H	-	Common Choke, P/N: PMT-075
	L2		55.2 μ H	-	Common Choke, P/N: PMT-076
VTW30C-48xxS	C1, C2, C3		2.2 μ F	100 V	1812 MLCC
	C4, C5, C6		1000 pF	2 kV	1808 MLCC
	L1		33.3 μ H	-	Common Choke, P/N: PMT-075
	L2		55.2 μ H	-	Common Choke, P/N: PMT-076

Recommended EN55022 Class B Filter Circuit Layout:



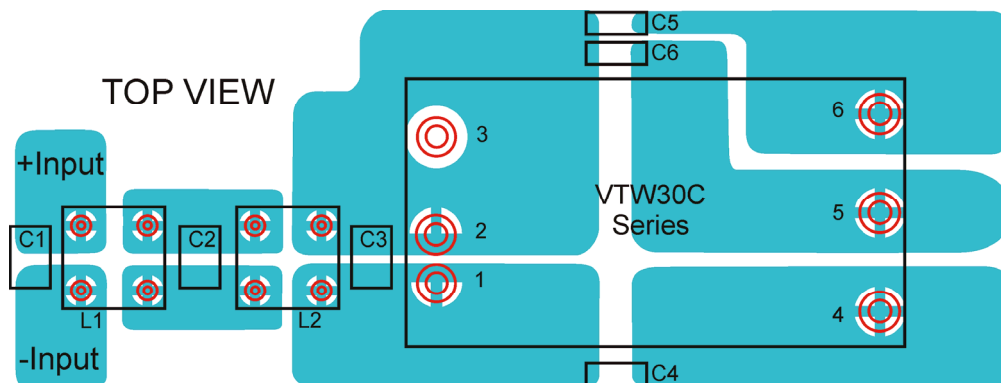
Recommended Filter for EN55022 Class B Compliance – Dual Output



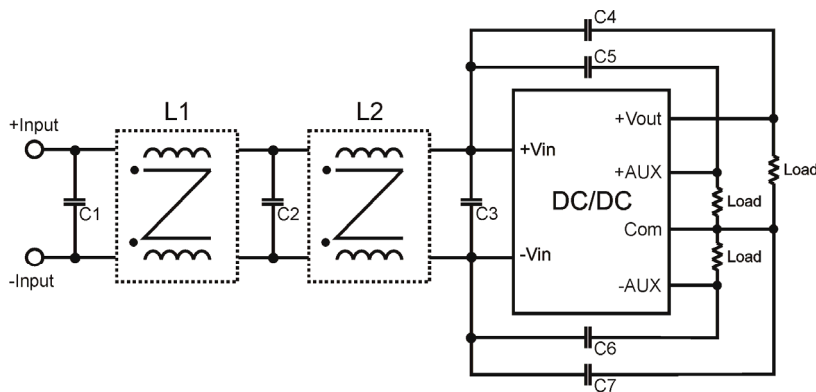
Recommended Components as follows:

		Class B Compliance			
		Component	Value	Voltage	Reference
VTW30C-24xxD	C1, C2, C3		4.7 μ F	50 V	1812 MLCC
	C4, C5, C6		1000 pF	2 kV	1808 MLCC
	L1		33.3 μ H	-	Common Choke, P/N: PMT-075
	L2		55.2 μ H	-	Common Choke, P/N: PMT-076
VTW30C-48xxD	C1, C2, C3		2.2 μ F	100 V	1812 MLCC
	C4, C5, C6		1000 pF	2 kV	1808 MLCC
	L1		33.3 μ H	-	Common Choke, P/N: PMT-075
	L2		55.2 μ H	-	Common Choke, P/N: PMT-076

Recommended EN55022 Class B Filter Circuit Layout:



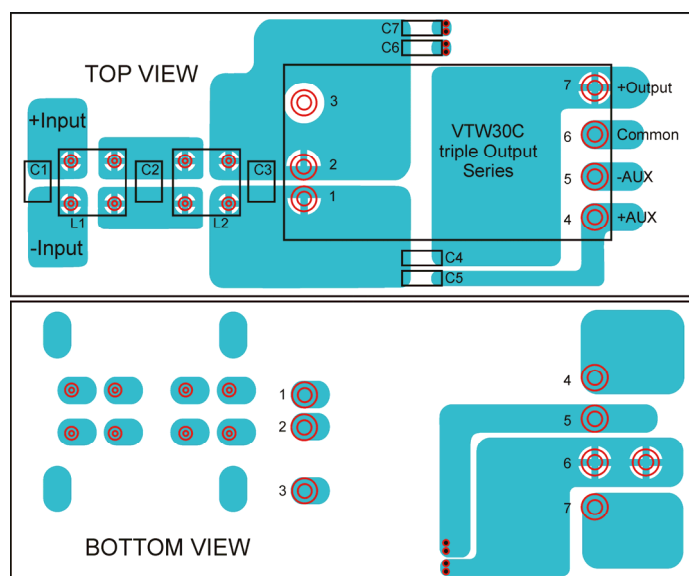
Recommended Filter for EN55022 Class B Compliance – Triple Output



Recommended Components as follows:

		Class B Compliance			
	Component	Value	Voltage	Reference	
VTW30C-24xxxxT	C1, C2, C3	4.7 μ F	50 V	1812 MLCC	
	C4, C5, C7	150 pF	2 kV	1206 MLCC	
	C6	1000 pF	3 kV	1808 MLCC	
	L1	450 μ H	-	Common Choke, P/N: PMT-048	
	L2	150 μ H	-	Common Choke, P/N: PMT-051	
VTW30C-48xxxxT	C1, C2, C3	2.2 μ F	100 V	1812 MLCC	
	C4, C5, C7	150 pF	2 kV	1206 MLCC	
	C6	1000 pF	3 kV	1808 MLCC	
	L1	450 μ H	-	Common Choke, P/N: PMT-048	
	L2	150 μ H	-	Common Choke, P/N: PMT-051	

Recommended EN55022 Class B Filter Circuit Layout:



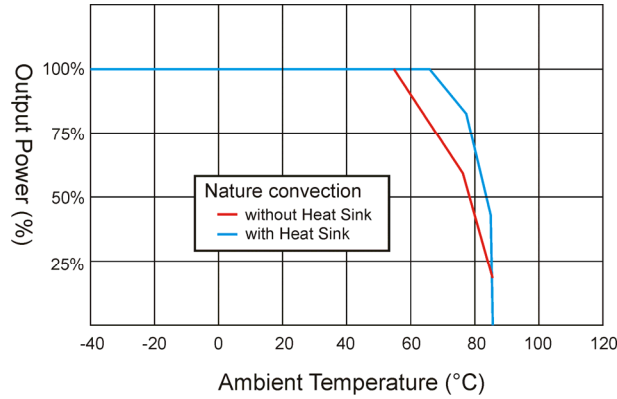
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Derating

VTW30C-4805S with and without Heat Sink

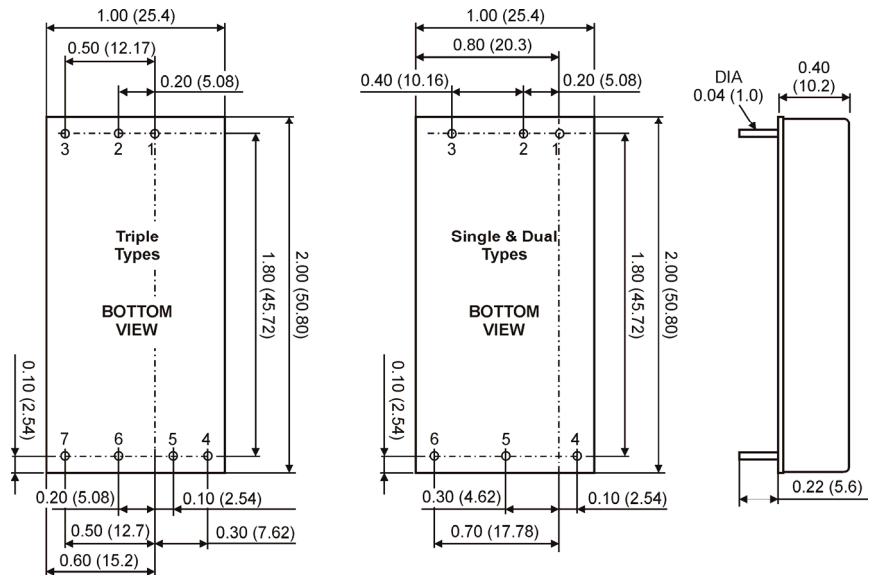
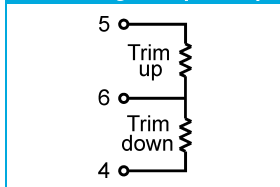


PIN Connections

Standard PIN Connections

Pin	Single	Dual	Triple
1	+V Input	+V Input	+V Input
2	-V Input	-V Input	-V Input
3	Ctrl	Ctrl	Ctrl
4	+V Output	+V Output	+V AUX
5	-V Output	Common	-V AUX
6	TRIM	-V Output	Common
7	-	-	+V Output

TRIM (single output only)

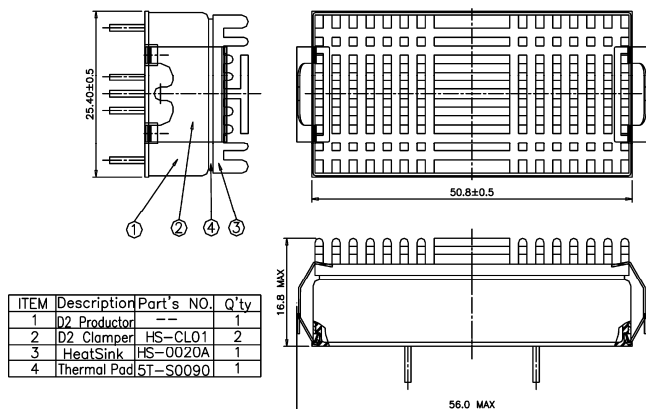


Heat Sink

To order the VTW30C-Series assembled with heat sink, add following suffix to the part number:

- HS ... for Heat Sink only
- HC ... for Heat Sink + Clamps (recommended)

e.g. VTW30C-2405S-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.