

VT-40W Series

40W 2:1 Regulated Single & Dual output

Features

- Wide 2:1 Input Range
- 1600 VDC Isolation
- Efficiency up to 92%
- Extended Operating Temperature Range -40 ~ 71°C max.
- Adjustable Output Voltage
- Remote On/Off Control (CTRL)
- Continuous Short Circuit Protection
- Over Load Protection
- Over Voltage Protection
- Soft Start
- High Power Density: 40W in 2"x1"x0.4" package
- No Minimum Load Required



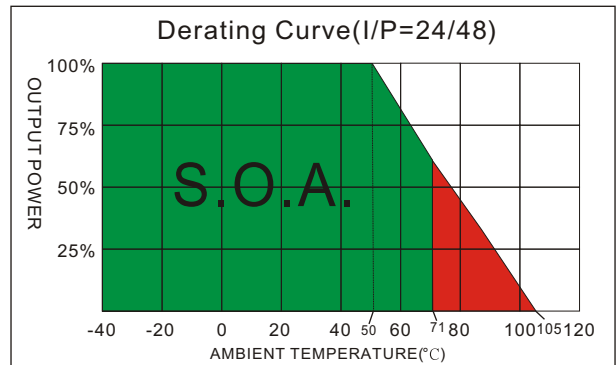
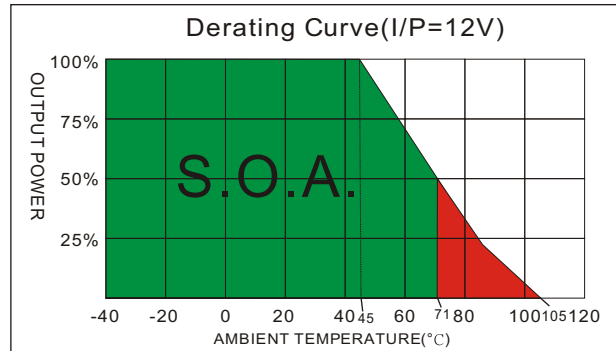
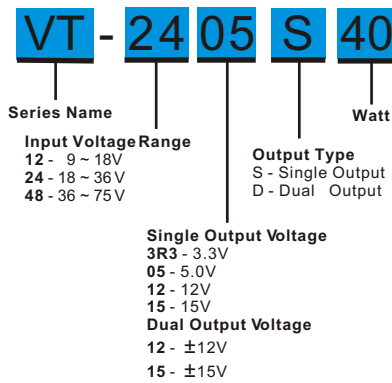
The VT-40W series is a family of cost effective 40W single & dual output DC-DC converters. These converters combine nickel-coated copper package in a 2"x1" case with high performance features such as Active Clamp Technology, continuous short circuit protection with automatic restart and tight line/ load regulation. Devices are encapsulated using flame retardant resin. Input voltages of 12 and 24 and 48 with output voltage of 3.3, 5, 12, 15, ± 12 , ± 15 Vdc. High performance features include high efficiency operation up to 92%.

ALL SPECIFICATIONS ARE TYPICAL AT 25°C, NOMINAL INPUT AND FULL LOAD UNLESS OTHERWISE NOTED.

OUTPUT SPECIFICATIONS			GENERAL SPECIFICATIONS		
Output Voltage Accuracy	Single&Dual: $\pm 1\%$		Efficiency	See table, typ.	
Output Voltage Adjustability (Single Output Only)	$\pm 10\%$, max.		I/O Isolation Voltage (3 sec)		
Maximum Output Current	See table		Input/Output	1600Vdc	
Line Regulation	Single&Dual: $\pm 0.5\%$, max.		Case/Input & Output	1600Vdc	
Load Regulation	Single (0% to 100%): $\pm 0.5\%$, max. Dual (0% to 100%): $\pm 1\%$, max(balanced load)		Isolation Resistance	1000 M Ω , min.	
Cross Regulation (1)	Dual: $\pm 5\%$		Isolation Capacitance	1000 pF, typ.	
Ripple&Noise (2)	3.3V&5.0V : 100mVpk-pk,max. other : 150mVpk-pk,max.		Switching frequency	270kHz, typ.	
Over Voltage Protection (Zener diode clamp)	3.3V output	3.9V	Humidity	95% rel H	
	5V output	6.2V	Reliability Calculated MTBF (MIL-HDBK-217 F)	Single&Dual: >328 khrs	
	12V output	15V	Safety Standard (designed to meet)	IEC/EN 60950-1	
	15V output	18V			
	± 12 V output	± 15 V			
Over Load Protection	115%~140% of lout max.		EMC CHARACTERISTICS		
Short Circuit Protection	Indefinite(hiccup) (Automatic Recovery)		Radiated Emissions(7)	EN55022	CLASS B
Temperature Coefficient	$\pm 0.02\%/^{\circ}\text{C}$		Conducted Emissions(7)	EN55022	CLASS B
Capacitive Load (3)	See table		ESD	IEC61000-4-2	Perf. Criteria A
Transient Recovery Time (4)	250us, typ.		RS	IEC61000-4-3	Perf. Criteria A
Transient Response Deviation (4)	$\pm 3\%$, max.		EFT(8)	IEC61000-4-4	Perf. Criteria A
INPUT SPECIFICATIONS			Surge (8)	IEC61000-4-5	Perf. Criteria A
Input Voltage Range	See table		CS	IEC61000-4-6	Perf. Criteria A
Under Voltage Lockout			PFMF	IEC61000-4-8	Perf. Criteria A
12V Models Module ON / OFF	8.6Vdc / 7.9Vdc, typ.		PHYSICAL SPECIFICATIONS		
24V Models Module ON / OFF	17.8Vdc / 16Vdc, typ.		Case Material	Nickel-coated Copper	
48V Models Module ON / OFF	33.5Vdc / 30.5Vdc, typ.		Base Material	Non-conductive Black Plastic(UL94V-0 rated)	
Start up Time	30mS, typ.		Pin Material	$\varnothing 1.0\text{mm}$ Brass Solder-coated	
(Nominal Vin and constant resistive load)			Potting Material	Epoxy (UL94V-0 rated)	
Input Filter	Pi Type		Weight	32.0g	
Input Current (No-Load)	See table, max.		Dimensions	2.00"x1.00"x0.40"	
Input Current (Full-Load)	See table, typ.		ABSOLUTE SPECIFICATIONS (9)		
Input Reflected Ripple Current (5)	20mA _{p-p} , typ.		These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.		
Remote On/Off (CTRL) (6)			Input Surge Voltage (100mS)		
ON: 3.0 ... 12Vdc or open circuit			12 Models	25 Vdc max.	
OFF: 0 ... 1.2Vdc or Short circuit pin2 and pin 3			24 Models	50 Vdc max.	
OFF idle current: 5 mA, typ			48 Models	100 Vdc max.	
			Soldering Temperature	260°C max, (1.5mm from case 10 sec. Max.)	
			ENVIRONMENTAL SPECIFICATIONS		
			Operating Ambient Temperature	-40°C ~ +71°C(See Derating Curve)	
			12 Models	-40°C ~ +45°C(For 100% load)	
			24 / 48 Models	-40°C ~ +50°C(For 100% load)	
			Maximum Case Temperature	105°C	
			Storage Temperature	-55°C ~ +125°C	
			Cooling(10)	Nature Convection	

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PART NUMBER STRUCTURE



MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current		EFFICIENCY @FL(%)	Capacitor Load(µF)
		No-Load (mA)	Full Load (mA)		Min-Lo ad (mA)	Full Load (mA)		
VT- 123R3S4 0	9-18	100	2444	3.3	0	8000	90	21800
VT-1205S4 0	9-18	160	3663	5	0	8000	91	13600
VT- 1212S4 0	9-18	40	3663	12	0	3333	91	2300
VT- 1215S4 0	9-18	50	3663	15	0	2666	91	1500
VT- 243R3S4 0	18-36	60	1208	3.3	0	8000	91	21800
VT- 2405S4 0	18-36	90	1811	5	0	8000	92	13600
VT- 2412S4 0	18-36	30	1831	12	0	3333	91	2300
VT- 2415S4 0	18-36	40	1811	15	0	2666	92	1500
VT- 483R3S4 0	36-75	40	604	3.3	0	8000	91	21800
VT- 4805S4 0	36-75	60	905	5	0	8000	92	13600
VT- 4812S4 0	36-75	20	915	12	0	3333	91	2300
VT- 4815S4 0	36-75	20	905	15	0	2666	92	1500
VT-1212D40	9-18	50	3663	±12	0	±1666	91	±1200
VT-1215D40	9-18	50	3623	±15	0	±1333	92	±750
VT-2412D40	18-36	50	1831	±12	0	±1666	91	±1200
VT-2415D40	18-36	40	1811	±15	0	±1333	92	±750
VT-4812D40	36-75	30	906	±12	0	±1666	92	±1200
VT-4815D40	36-75	40	906	±15	0	±1333	92	±750

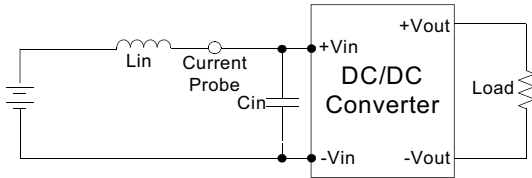
NOTE

- Dual: One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
- Measured with 20MHz bandwidth and 1.0uF ceramic capacitor.
- Tested by minimal Vin and constant resistive load.
- Tested by normal Vin and 25% load step change (75%-50%-25% of Io).
- Measured Input reflected ripple current with a simulated source inductance of 12uH.
- The remote on/off control pin is referenced to -Vin(pin2).
- The VT-40W series can meet EN55022 Class B With an external filter in parallel with the input pins .
- An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5.
The filter capacitor Motien suggest: Nippon chemi-con KY series, 220uF/100V.
- Exceeding the absolute ratings of the unit could cause damage.
It is not allowed for continuous operating.
- Nature Convection" is usually about 30-65 LFM but is not equal to still air (0 LFM).

TEST CONFIGURATIONS

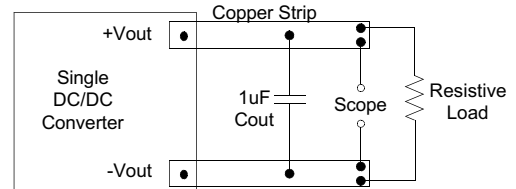
Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor L_{in} (4.7uH) and a source capacitor C_{in} (47uF, ESR<1.0Ω at 100KHz) at nominal input and full load.



Output Ripple & Noise Measurement Test

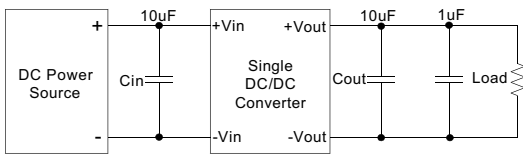
Use a capacitor C_{out} (1.0uF) measurement. The Scope measurement bandwidth is 0-20MHz.



DESIGN & FEATURE CONFIGURATIONS

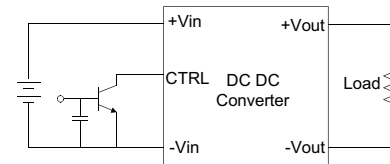
Output Ripple & Noise Reduction

To reduce ripple and noise, it is recommended to use a 1uF ceramic disk capacitor and a 10uF electrolytic



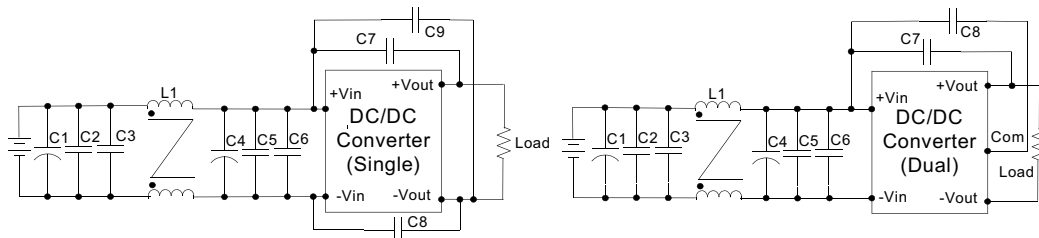
CTRL Module ON / OFF

Positive logic turns on the module during high logic and Off during low logic. Ctrl module on/off can be controlled by an external switch between the ctrl terminal and -Vin terminal. the switch can be an open collector or open drain for positive logic if the ctrl feature is not used, please leave the ctrl pin floating.



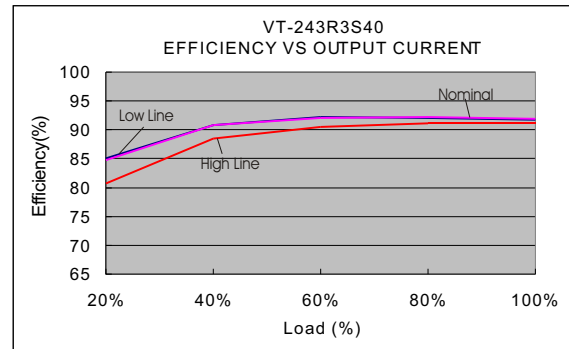
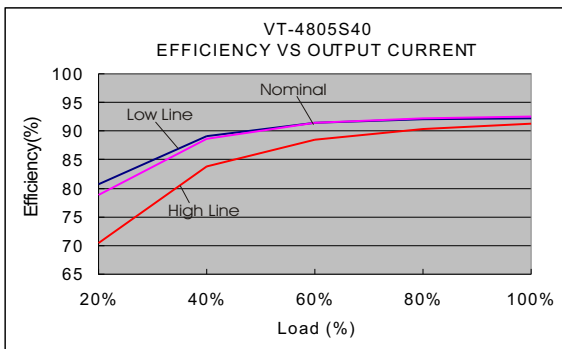
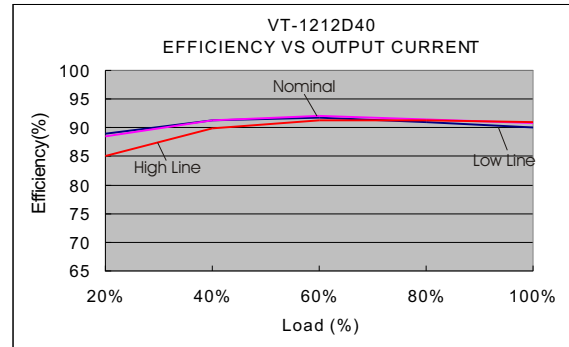
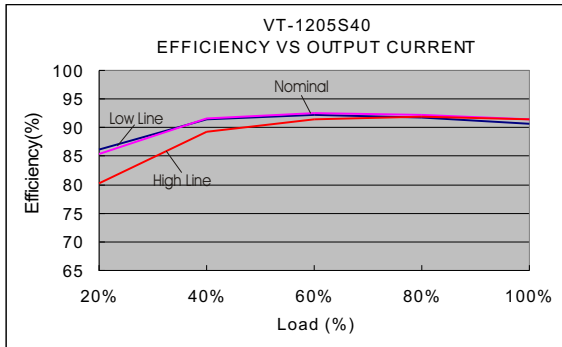
EMI Filter

Input filter components are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.

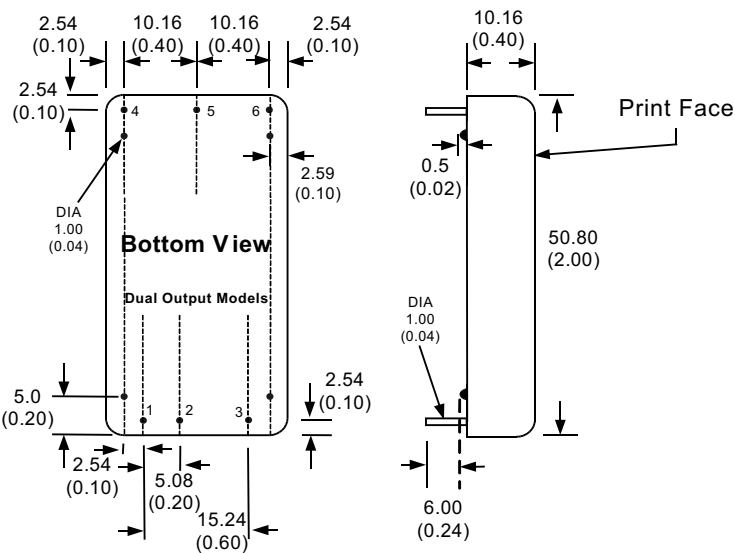


	C1	L1	C2/C3/C5/C6	C4	C7	C8	C9
Single							
VT-12XXXSXX	220uF, 100V	Common Choke 68uH	1812,6.8uF, 50V	330uF, 100V			1206,1000PF, 2KV
VT-24XXXSXX	220uF, 100V	Common Choke 68uH	1812,4.7uF, 50V	220uF, 100V	1206,1000PF, 2KV	1206,1000PF, 2KV	
VT-48XXXSXX	220uF, 100V	Common Choke 68uH	1812,1.5uF, 100V	220uF, 100V	1206,1000PF, 2KV	1206,1000PF, 2KV	
Dual							
VT-12XXXDXX	220uF, 100V	Common Choke 68uH	1812,6.8uF, 50V	330uF, 100V	1206,1000PF, 2KV	1206,1000PF, 2KV	
VT-24XXXDXX	220uF, 100V	Common Choke 68uH	1812,4.7uF, 50V	220uF, 100V	1206,1000PF, 2KV	1206,1000PF, 2KV	
VT-48XXXDXX	220uF, 100V	Common Choke 68uH	1812,1.5uF, 100V	220uF, 100V	1206,1000PF, 2KV	1206,1000PF, 2KV	

ELECTRICAL CHARACTERISTIC CURVES



MECHANICAL SPECIFICATIONS



PIN CONNECTIONS		
PIN NUMBER	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	CTRL	CTRL
4	+Vout	+Vout
5	-Vout	Com
6	Trim	-Vout

EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by using the method as below. (single output models only)

Rtrim-up

Rtrim-down

All dimensions are typical in millimeters (inches).

1. Pin diameter: 1.0 ±0.05 (0.04 ±0.002)
2. Pin pitch and length tolerance: ±0.35 (±0.014)
3. Case Tolerance: ±0.5 (±0.02)
4. Stand-off Tolerance: ±0.1 (±0.004)