

VT Series

30W 2:1 Regulated Single & Dual output

Features

- Ultra Wide 2:1 Input Range
- Full SMD Technology
- 1600 VDC Isolation
- Efficiency up to 92%
- Extended Operating Temperature Range -40 ~ 75°C max.
- Adjustable Output Voltage
- Remote On/Off Control (CTRL)
- Continuous Short Circuit Protection
- Over Current Protection
- Over Voltage Protection
- Over Temperature Protection
- Soft Start
- Optional Heat-sink

The VT series is a family of cost effective 30W single & dual & output DC-DC converters. These converters combine nickle-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 , 5.1, 12, 15, ±5, ±12, ±15Vdc . 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	
Output Voltage Accuracy	Single&Dual: ±1%
Output Voltage Adjustability (Single Output Only)	±10%, max.
Maximum Output Current	See table
Line Regulation	Single&Dual: ±0.5%, max.
Load Regulation	Single (0% to 100%): ±0.5%, max. Dual (0% to 100%): ±1%, max(balanced load)
Cross Regulation (1)	Dual: ±5%
Ripple&Noise (2)	Single&Dual : 100mVp-p,max.
Over Voltage Protection (Zener diode clamp)	3.3V output 3.9V 5V output 6.2V 5.1V output 6.2V 12V output 15V 15V output 18V ±5V output ±6.2V ±12V output ±15V ±15V output ±18V
Over Load Protection	150% of FL, typ.
Short Circuit Protection	Indefinite(hiccup) (Automatic Recovery)
Temperature Coefficient	±0.02%/°C
Capacitive Load (3)	See table
Transient Recovery Time (4)	250us, typ.
Transient Response Deviation (4)	±3%, max.

INPUT SPECIFICATIONS	
Input Voltage Range	See table
Under Voltage Lockout	
12V Models	Module ON / OFF 8.6Vdc / 7.9Vdc, typ.
24V Models	Module ON / OFF 17.8Vdc / 16Vdc, typ.
48V Models	Module ON / OFF 33.5Vdc / 30.5Vdc, typ.
Start up Time (Nominal Vin and constant resistive load)	30mS, typ.
Input Filter	Pi Type
Input Current (No-Load)	See table, max.
Input Current (Full-Load)	See table, typ.
Input Reflected Ripple Current (5)	20mA _{p-p} , typ.
Remote On/Off (CTRL) (6)	
ON:	3.0 ... 12Vdc or open circuit
OFF:	0 ... 1.2Vdc or Short circuit pin2 and pin 3
OFF idle current:	5 mA, typ.

GENERAL SPECIFICATIONS	
Efficiency	See table, typ.
I/O Isolation Voltage (60sec)	
Input/Output	1600Vdc
Case/Input & Output	1600Vdc
Isolation Resistance	1000 MΩ, min.
Isolation Capacitance	1000 pF, typ.
Switching frequency	330kHz, typ.
Humidity	95% rel H
Reliability Calculated MTBF (MIL-HDBK-217 F)	Single&Dual: >435 khrs
Safety Standard (designed to meet)	IEC/EN 60950-1

EMC CHARACTERISTICS		
Radiated Emissions	EN55032	CLASSA
Conducted Emissions(7)	EN55032	CLASSA
ESD	IEC 61000-4-2	Perf. Criteria A
RS	IEC 61000-4-3	Perf. Criteria A
EFT(8)	IEC 61000-4-4	Perf. Criteria A
Surge (8)	IEC 61000-4-5	Perf. Criteria A
CS	IEC 61000-4-6	Perf. Criteria A
PFMF	IEC 61000-4-8	Perf. Criteria A

PHYSICAL SPECIFICATIONS	
Case Material	Nickel-coated Copper
Base Material	Non-conductive Black Plastic(UL94V-0 rated)
Pin Material	Φ1.0mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	46.3g
Dimensions	2.00"x1.00"x0.40"

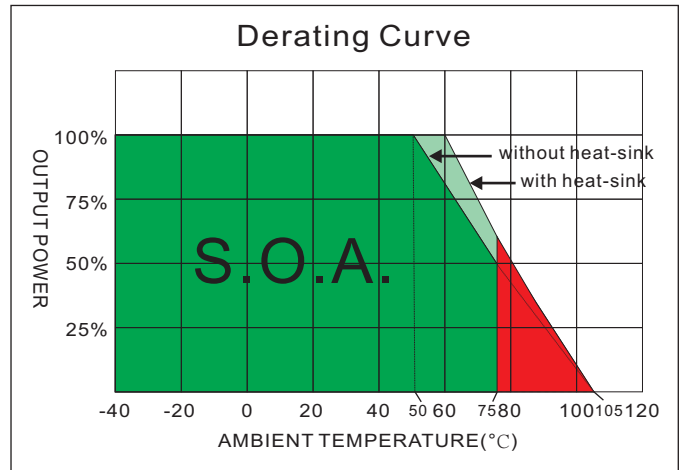
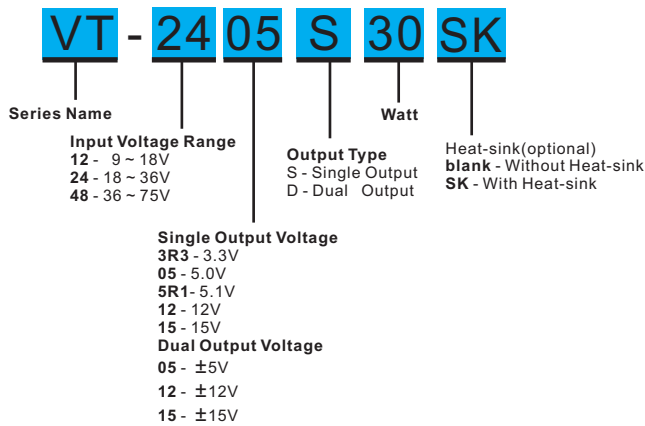
ABSOLUTE SPECIFICATIONS (9)	
These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.	
Input Surge Voltage (100mS)	
12 Models	25 Vdc, max.
24 Models	50 Vdc, max.
48 Models	100 Vdc, max.
Soldering Temperature (1.5mm from case 10sec max.)	260°C, max.

ENVIRONMENTAL SPECIFICATIONS	
Operating Ambient Temperature	-40°C ~ +75°C(See Derating Curve) -40°C ~ +50°C(For 100% load)
Maximum Case Temperature	105°C
Thermal Impedance (Nature Convection)	Without Heat-sink 12°C/W With Heat-sink 10°C/W
Storage Temperature	-55°C ~ +125°C
Over Temperature Protection (Case)	115°C, typ.
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 (% , typ.)	Capacitor Load @FL (µF , max.)
		No-Load (mA, max.)	Full Load (mA, typ.)		Min. load (mA)	Full load (mA)		
VT-123R3S30	9-18	80	2426	3.3	0	8000	89	20000
VT-1205S30	9-18	180	2874	5	0	6000	91	14000
VT-125R1S30	9-18	160	2874	5.1	0	6000	92	14000
VT-1212S30	9-18	30	2809	12	0	2500	91	2000
VT-1215S30	9-18	30	2809	15	0	2000	92	2000
VT-243R3S30	18-36	70	1185	3.3	0	8000	91	20000
VT-2405S30	18-36	100	1420	5	0	6000	92	14000
VT-245R1S30	18-36	100	1448	5.1	0	6000	92	14000
VT-2412S30	18-36	20	1436	12	0	2500	92	2000
VT-2415S30	18-36	40	1420	15	0	2000	92	2000
VT-483R3S30	36-75	50	593	3.3	0	8000	90	20000
VT-4805S30	36-75	70	702	5	0	6000	91	14000
VT-485R1S30	36-75	70	724	5.1	0	6000	91	14000
VT-4812S30	36-75	30	718	12	0	2500	91	2000
VT-4815S30	36-75	30	710	15	0	2000	91	2000
VT-1205D30	9-18	180	2874	±5	0	±3000	89	±3000
VT-1212D30	9-18	50	2874	±12	0	±1250	90	±1300
VT-1215D30	9-18	50	2874	±15	0	±1000	91	±1300
VT-2405D30	18-36	100	1437	±5	0	±3000	90	±3000
VT-2412D30	18-36	40	1453	±12	0	±1250	91	±1300
VT-2415D30	18-36	50	1437	±15	0	±1000	91	±1300
VT-4805D30	36-75	70	710	±5	0	±3000	90	±3000
VT-4812D30	36-75	50	718	±12	0	±1250	90	±1300
VT-4815D30	36-75	40	718	±15	0	±1000	90	±1300

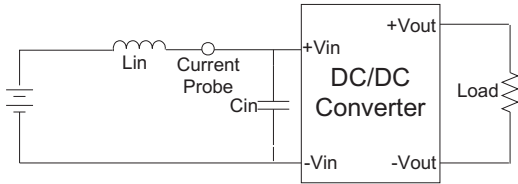
NOTE

- 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 4.7uH.
- The remote on/off control pin is referenced to -Vin(pin2).
- The VT series can meet EN55032 Class A 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

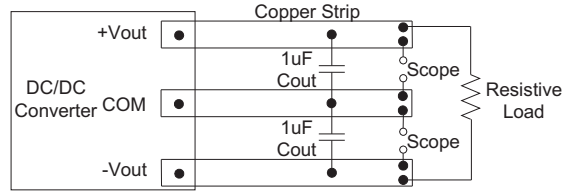
Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor L_{in} (4.7uH) and a source capacitor C_{in} (33uF, ESR<1.0Ω at 100KHz) at nominal input and full load.



Output Ripple & Noise Measurement Test

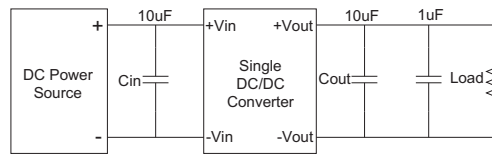
Use a capacitor C_{out} (1.0uF) measurement. The Scope measurement bandwidth is 0-20MHz.



DESIGN & FEATURE CONFIGURATIONS

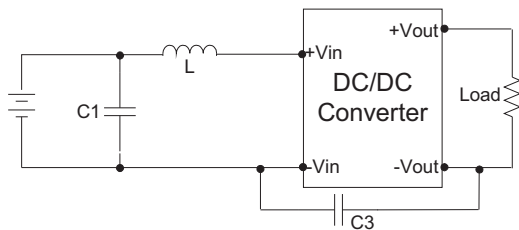
Output Ripple & Noise Reduction

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



EMI Filter

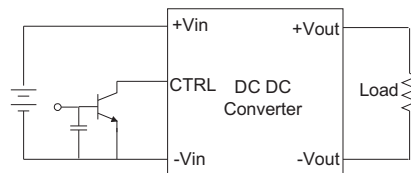
Input filter components (C_1, C_3, L) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



	C1	L	C3
VT-12XXXXXXXXXX	100uF, 100V	12uH	1206,470PF, 2KV
VT-24XXXXXXXXXX	100uF, 100V	12uH	1206,470PF, 2KV
VT-48XXXXXXXXXX	100uF, 100V	12uH	1206,470PF, 2KV

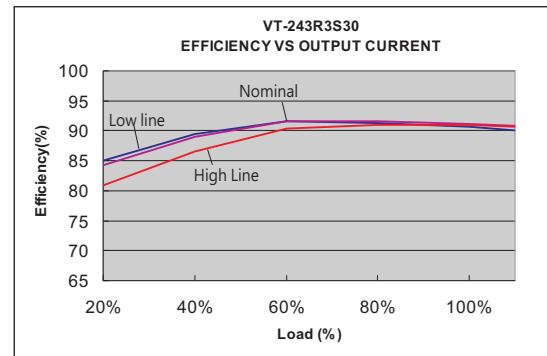
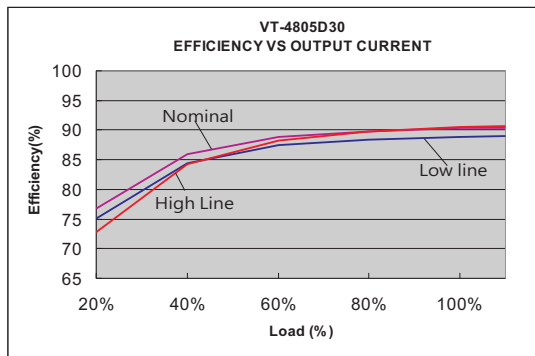
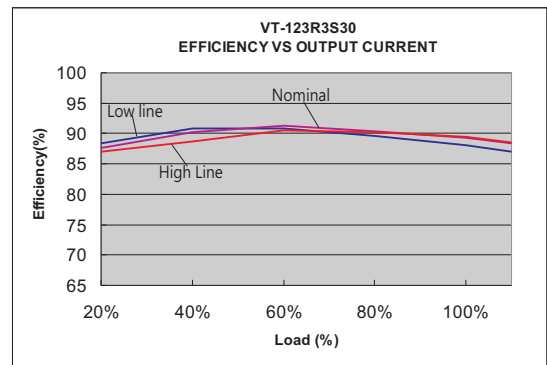
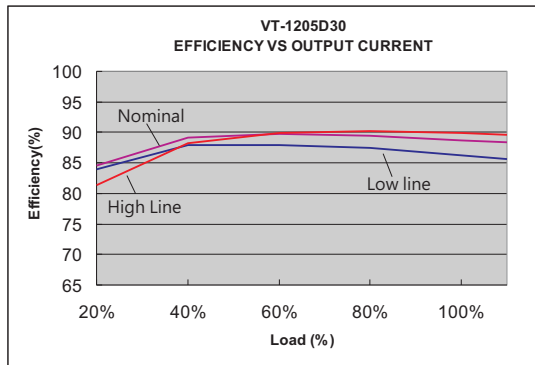
CTRL Module ON / OFF

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.

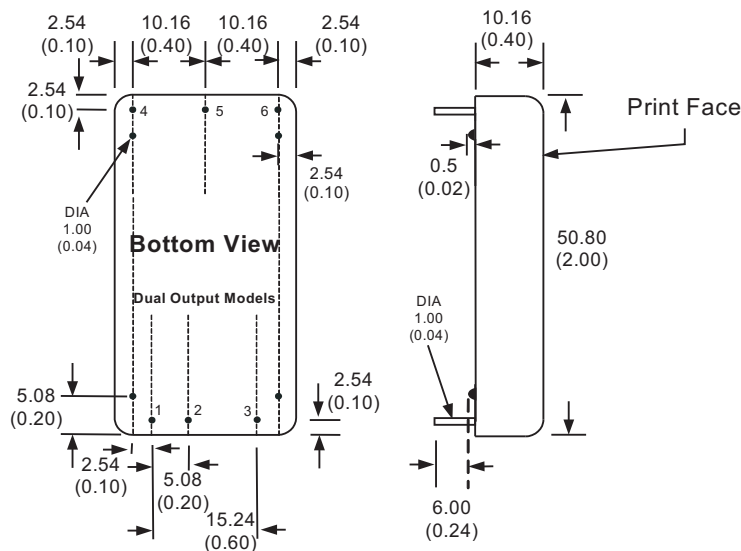


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ELECTRICAL CHARACTERISTIC CURVES



MECHANICAL SPECIFICATIONS

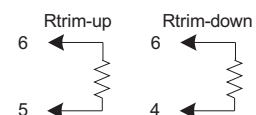


PIN CONNECTIONS

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

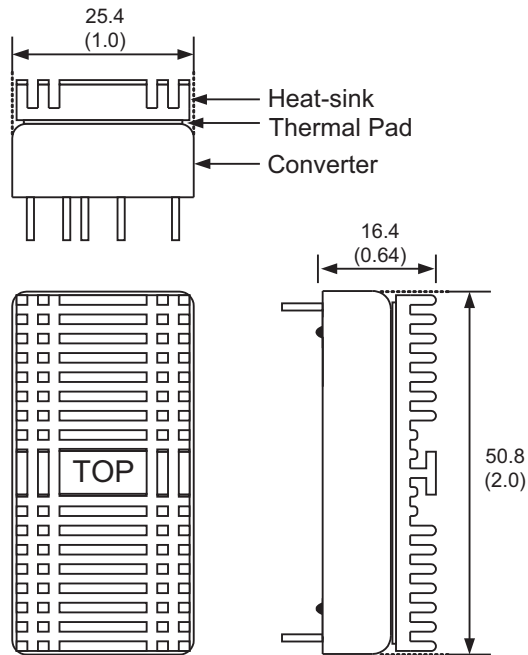
Output can be externally trimmed by using the method as below. (single output models only)



- 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)

MECHANICAL SPECIFICATIONS

With Heat-sink



Order code: VT-XXXXS30SK(contain: heat-sink, thermal pad)
 Material: Aluminum
 Finish: Anodic treatment (black)
 Weight: 11.2 g (0.39oz) (without converter)

Note:

1. Converters will be supplied with heat-sinks already mounted.
 Please contact factory for quotation.