

VM Series

25/30W 2:1 Regulated Single & Dual output

Features

- Wide 2:1 Input Range
- Full SMD Technology
- 1500 VDC Isolation
- Efficiency up to 91%
- -40 ~ 85°C Operation Temperature Range
- 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 VM series is a family of cost effective 25/30W single & dual output DC-DC converters. These converters combine nickel-coated copper package in a 2"x1.6" case with high performance features such as Active Clamp Technology, continuous short circuit protection with automatic restart and high line / load regulation. Devices are encapsulated using flame retardant resin. Input voltages of 12,24 and 48 with output voltage of 3.3 , 5, 12, 15, ± 12 , ± 15 Vdc. High performance features include high efficiency operation up to 91% and output voltage accuracy of $\pm 1\%$ maximum.

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

OUTPUT SPECIFICATIONS	
Output Voltage Accuracy	$\pm 1\%$
Output Voltage Adjustability(Trim)	$\pm 10\%$, max.
Maximum Output Current	See table
Line Regulation	$\pm 0.5\%$, max.
Load Regulation($I_o=10\%$ to 100%) (1)	$\pm 0.5\%$, max.
Cross Regulation (Dual Output) (2)	$\pm 5\%$
Ripple&Noise (3)	75mVpk-pk, max.
	3.3V output 3.9V
	5V output 6.2V
Over Voltage Protection	12V output 15V
(Zener diode clamp)	15V output 18V
	± 12 V output ± 15 V
	± 15 V output ± 18 V
Over Current Protection	120% of FL, typ.
Short Circuit Protection	Indefinite(hiccup) (Automatic Recovery)
Temperature Coefficient	$\pm 0.02\%/^{\circ}\text{C}$
Capacitive Load (4)	See table
Transient Recovery Time (5)	200 μs , typ.
Transient Response Deviation(5)	$\pm 3\%$, max.

INPUT SPECIFICATIONS	
Input Voltage Range	See table
Under Voltage Lockout	
12V Modes	Module ON / OFF 8.6Vdc / 7.9Vdc, typ.
24V Modes	Module ON / OFF 17.6Vdc / 16Vdc, typ.
48V Modes	Module ON / OFF 33.5Vdc / 30.5Vdc, typ.
Start up Time (Nominal V_{in} and constant resistive load)	20mS, typ.
Input Filter	Pi Type
Input Current(No-Load)	See table, typ.
Input Current(Full-Load)	See table, max.
Input Reflected Ripple Current(6)	20mApk-pk, typ.
Remote On/Off (CTRL)	
	ON: 2.5 ... 5.5Vdc or open circuit
	OFF: -0.7 ... 0.8Vdc or Short circuit pin2 and pin 3
	OFF idle current: 2.5 mA, typ

PHYSICAL SPECIFICATIONS	
Case Material	Nickel-coated Copper
Pin Material	$\Phi 1.0\text{mm}$ Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	48.0g
Dimensions	2.00"x1.60"x0.40"

GENERAL SPECIFICATIONS	
Efficiency	See table, typ.
I/O Isolation Voltage(60sec)	
Input/Output	1500Vdc
Case/Input & Output	1000Vdc
Isolation Resistance	1000 M Ω , min.
Isolation Capacitance	1200 pF, typ.
Switching frequency	270kHz, typ.
Humidity	95% rel H
Reliability Calculated MTBF(MIL-HDBK-217 F)	>1 Mhrs
Safety Standard	IEC/EN 60950-1
Safety Approvals	TUV,CB

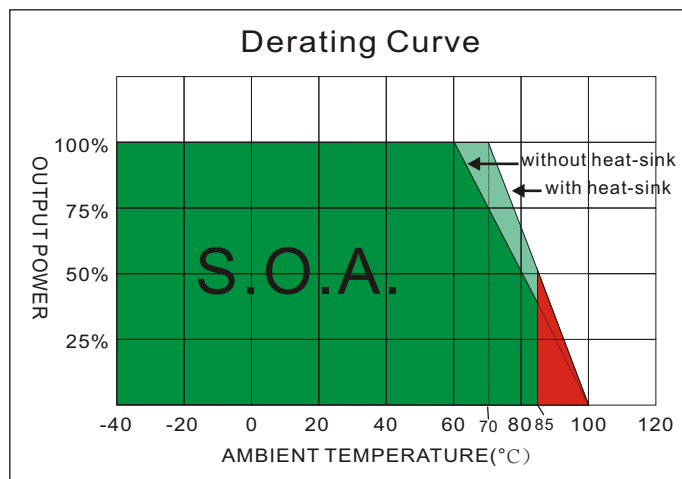
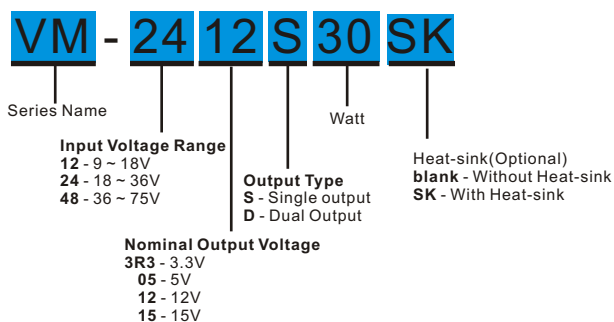
EMC CHARACTERISTICS		
Radiated Emissions	EN55032	CLASS A
Conducted Emissions(7)	EN55032	CLASS A
ESD	IEC61000-4-2	Perf. Criteria A
RS	IEC61000-4-3	Perf. Criteria A
EFT(8)	IEC61000-4-4	Perf. Criteria A
Surge (8)	IEC61000-4-5	Perf. Criteria A
CS	IEC61000-4-6	Perf. Criteria A
PFMF	IEC61000-4-8	Perf. Criteria A

ENVIRONMENTAL SPECIFICATIONS		
Operating Ambient Temperature	-40°C ~ +85°C(See Derating Curve)	
	-40°C ~ +60°C(For 100% load)	
Maximum Case Temperature	100°C	
Thermal Impedance (Nature Convection)	Without Heat-sink	10.2°C/W
	With Heat-sink	8.7°C/W
Storage Temperature	-55°C ~ +125°C	
Over Temperature Protection (Case)	110°C, typ.	
Cooling	Nature Convection	

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	260°C max.
(1.5mm from case 10sec Max.)	

VM - 25/30W 2:1 Regulated Single & Dual output

PART NUMBER STRUCTURE

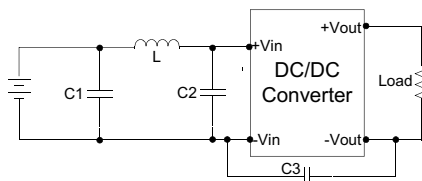


MODEL SELECTION GUIDE

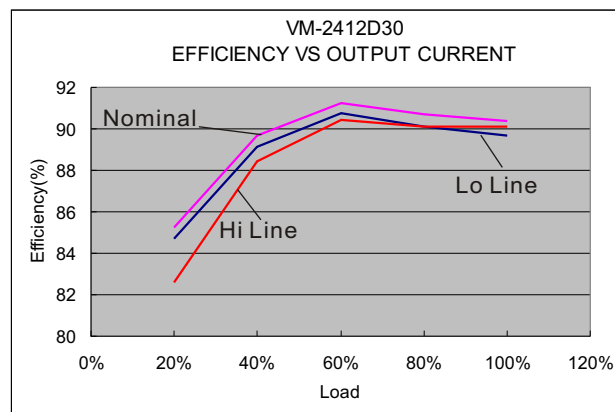
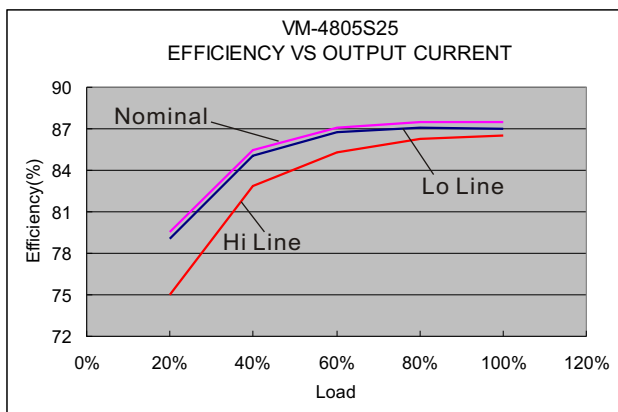
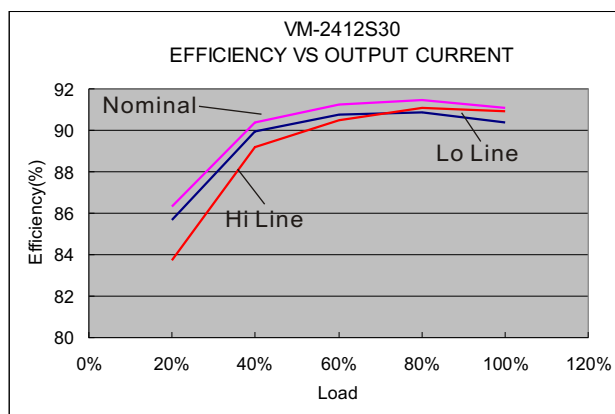
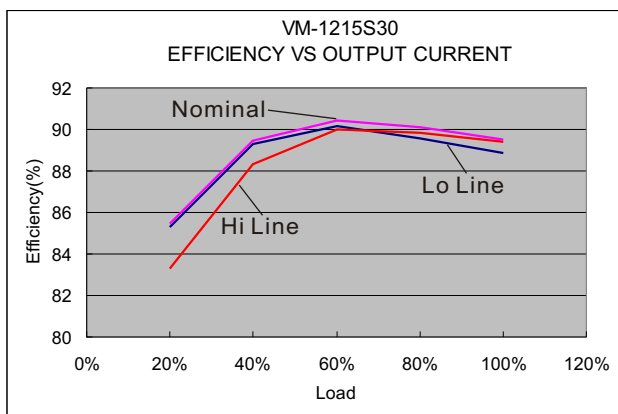
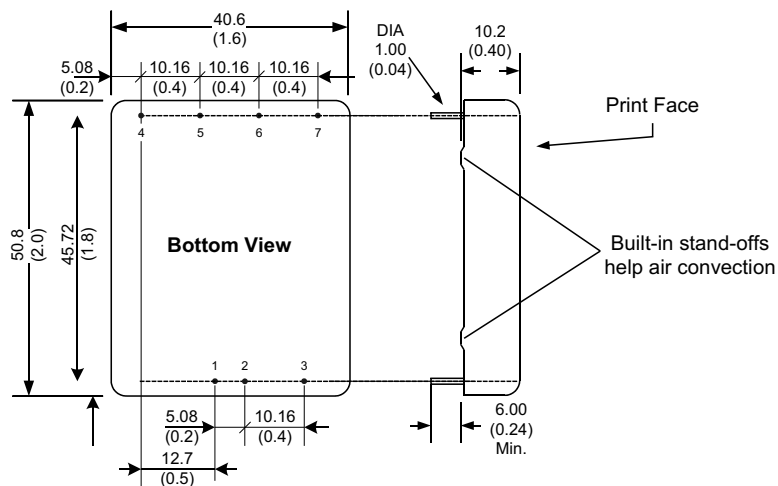
MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current		EFFICIENCY @FL (%. typ.)	Capacitor Load @FL (µF, max.)
		No-Load (mA, max.)	Full Load (mA, typ.)		Min. load (mA)	Full load (mA)		
VM-123R3S25	9-18	30	1867	3.3	0	5500	83	15000
VM-1205S25	9-18	30	2480	5	0	5000	86	10000
VM-1212S30	9-18	30	2841	12	0	2500	90	2200
VM-1215S30	9-18	30	2841	15	0	2000	90	1000
VM-243R3S25	18-36	25	922	3.3	0	5500	84	15000
VM-2405S25	18-36	25	1225	5	0	5000	87	10000
VM-2412S30	18-36	25	1404	12	0	2500	91	2200
VM-2415S30	18-36	25	1404	15	0	2000	91	1000
VM-483R3S25	36-75	20	461	3.3	0	5500	84	15000
VM-4805S25	36-75	20	613	5	0	5000	87	10000
VM-4812S30	36-75	20	702	12	0	2500	91	2200
VM-4815S30	36-75	20	702	15	0	2000	91	1000
VM-1212D30	9-18	30	2841	±12	0	±1250	90	±1000
VM-1215D30	9-18	30	2841	±15	0	±1000	90	±680
VM-2412D30	18-36	25	1404	±12	0	±1250	91	±1000
VM-2415D30	18-36	25	1404	±15	0	±1000	91	±680
VM-4812D30	36-75	20	710	±12	0	±1250	90	±1000
VM-4815D30	36-75	20	710	±15	0	±1000	90	±680

NOTE

- Operation between no-load and 10% load conditions will not damage the module, but it may not meet all specifications listed.
- 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 1.0µF 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 12µH.
- Input filter components (C1, C2, 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.
- An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5.
 The filter capacitor Motien suggest: Nichicon FW series, 1000µF/100V.
- Exceeding the absolute ratings of the unit could cause damage.
 It is not allowed for continuous operating.



	C1	L	C2	C3
VM-12XXXXX	330µF, 100V	12µH	100µF, 100V	N/A
VM-24XXXXX	330µF, 100V	12µH	100µF, 100V	N/A
VM-48XXXXX	330µF, 100V	12µH	100µF, 100V	1000pF/2KV

ELECTRICAL CHARACTERISTIC CURVES

MECHANICAL SPECIFICATIONS


All dimensions are typical in millimeters (inches).

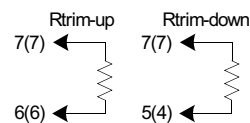
1. Pin diameter: 1.0 ± 0.05 (0.04 ± 0.002)
2. Pin pitch and length tolerance: ± 0.35 (± 0.014)
3. Case Tolerance: ± 0.5 (± 0.02)

PIN CONNECTIONS

PIN NUMBER	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	CTRL	CTRL
4	No pin	+Vout
5	+Vout	Com
6	-Vout	-Vout
7	Trim	Trim

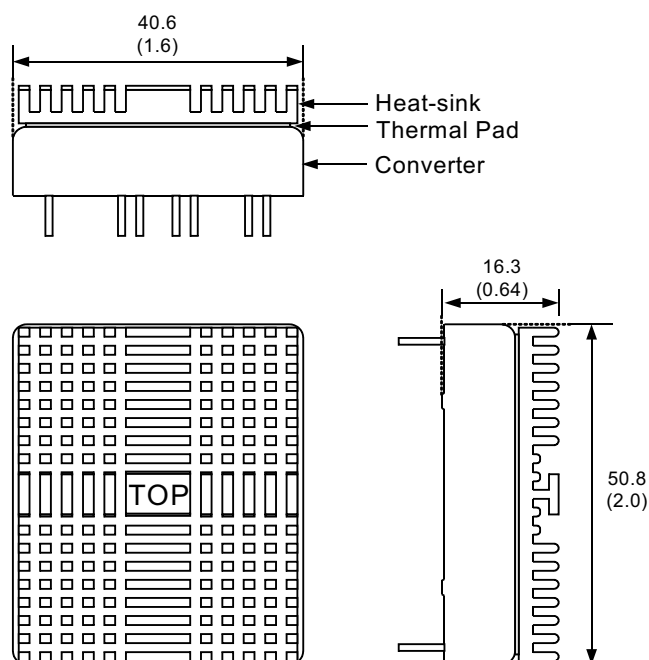
EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by using the method as below. () for dual output trim.



MECHANICAL SPECIFICATIONS

With Heat-sink



Order code: VM-XXXXS25SK(contain: heat-sink, thermal pad)
 Material: Aluminum
 Finish: Anodic treatment (black)
 Weight: 17 g (0.6oz) (without converter)

Note:

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