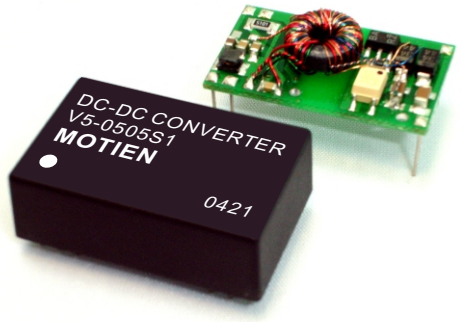
V5-1.5W Series

MOTIEN TECHNOLOGY

1.5W Regulated Single & Dual output

Features

- Regulated 24 Pin DIL Package
- Full SMD Technology
- 1000 VDC Isolation, Up to 6000 VDC(Metal Case Up To 3000Vdc)
- Continuous Short Circuit Protection
- Efficiency up to 78%
- -40 ~ 85°C Operation Temperature Range
- Plastic Case Standard, Optional Metal Case



The V5 series is a family of cost effective 1.5W single & dual output DC-DC converters. These converters combine miniature package in a 24-pin DIL compatible case with high performance features such as 1000 VDC~6000 VDC input/output isolation voltage, continuous short circuit protection with automatic restart and tight line / load regulation. Devices are encapsulated using flame retardant resin. Input voltages of 5, 12, 24 with output voltage of 3.3, 5, 9, 12, 15, 24, ±3.3, ±5, ±9, ±12, ±15 and ±24 Vdc. High performance features include high efficiency operation up to 78% and output voltage accuracy of ±2% maximum. Standard features include an input range of ±10% tolerance and low output noise and ripple.

All specifications typical at Ta=25°C, nominal input voltage and full load unless otherwise specified

OUTPUT SPECIFICATIONS

Voltage accuracy	±2%
Line regulation	Single & Dual : ±0.5%,max
Load regulation	Single (0% to 100%) : ±0.5%,max
	Dual (0% to 100%) : ±0.5%,max(balanced load)
	Single & Dual (Output 3.3V Model) : ±1.0%,max
Ripple & noise (20 MHz bandwidth)(1)	75mV pk-pk,max
Short Circuit Protection	Indefinite(Automatic Recovery)
Temperature coefficient	±0.02%/°C
Capacitor load(2)	See table

INPUT SPECIFICATIONS

Voltage Range	±10%
Max. Input Current	See table
No-Load Input Current	See table
Input Filter	PI type
Input Reflected Ripple Current(3)	35mA pk-pk

GENERAL SPECIFICATIONS

Efficiency	See table
I/O Isolation Voltage(3 sec)	
Input/Output	1000~6000Vdc
Metal Case/Input&Ouput	1000Vdc
I/O Isolation Capacitance	60 pF Typ.
I/O Isolation Resistance	1000M Ohm
Switching Frequency	Single 40kHz typ
	Dual 350kHz typ
Humidity	95% rel H
Reliability Calculated MTBF(MIL-HDBK-217 F)	>3.072Mhrs
Safety Standard : (designed to meet)	IEC 60950-1

PHYSICAL SPECIFICATIONS

Case Material	Non-conductive Black Plastic(UL94V-0 rated)
	Nickel-coated Copper
Base Material	Non-conductive Black Plastic(UL94V-0 rated)
Pin Material	0.5mm Alloy42 Solder-coated
	Ø0.5mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	12.5g(Plastic Case)/15.0g(Metal Case)
Dimensions	1.25"x0.8"x0.4"

ENVIRONMENT SPECIFICATIONS

Operating Temperature	-40°C~85°C(See Derating Curve)
Maximum Case Temperature	100°C
Storage Temperature	-40°C~125°C
Cooling	Nature Convection

ABSOLUTE MAXIMUM RATINGS(4)

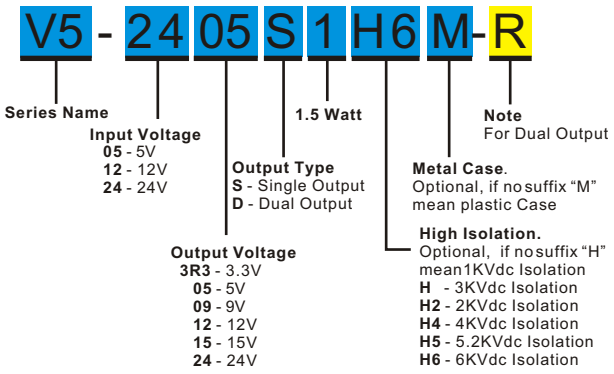
These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.

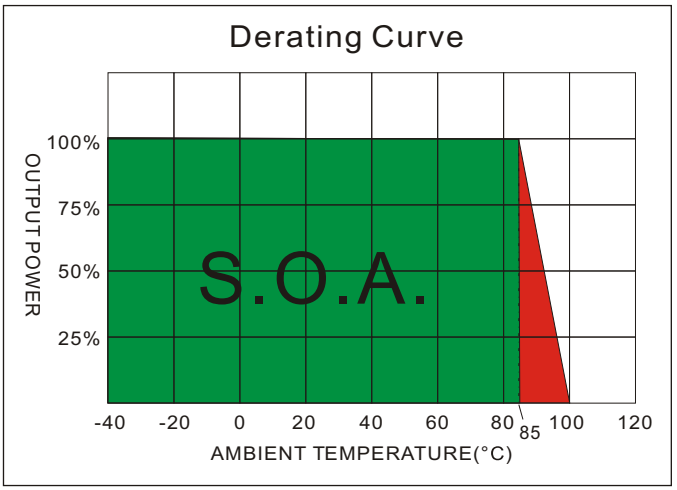
Input Voltage(100mS)	
5 Models	0~7 Vdc
12 Models	0~15 Vdc
24 Models	0~28 Vdc
Soldering Temperature (1.5mm from case 10sec.)	260°C max.

EMC SPECIFICATIONS

Radiated Emissions	EN55022	CLASS A
Conducted Emissions (6)	EN55022	CLASS A
ESD	IEC 61000-4-2	Perf. Criteria B
RS	IEC 61000-4-3	Perf. Criteria A
EFT (7)	IEC 61000-4-4	Perf. Criteria B
Surge (7)	IEC 61000-4-5	Perf. Criteria B
CS	IEC 61000-4-6	Perf. Criteria A
PFMF	IEC 61000-4-8	Perf. Criteria A

PART NUMBER STRUCTURE





MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current No-Load (mA)	INPUT Current Full Load (mA)	OUTPUT Voltage (Vdc)	OUTPUT Current Full load (mA)	EFFICIENCY @FL(%)	Capacitor Load(uF)
V5-053R3S1	5	50	517	3.3	400	51	220
V5-0505S1	5	50	454	5	300	66	220
V5-0509S1	5	50	468	9	167	64	220
V5-0512S1	5	50	441	12	125	68	220
V5-0515S1	5	50	441	15	100	68	220
V5-0524S1	5	50	461	24	62	65	220
V5-053R3D1-R	5	50	440	±3.3	±200	60	±1000
V5-0505D1-R	5	50	461	±5	±150	65	±1000
V5-0509D1-R	5	50	447	±9	±83	67	±470
V5-0512D1-R	5	50	428	±12	±63	70	±470
V5-0515D1-R	5	50	447	±15	±50	67	±470
V5-0524D1-R	5	50	454	±24	±31	66	±220
V5-123R3S1	12	40	203	3.3	400	54	220
V5-1205S1	12	40	189	5	300	66	220
V5-1209S1	12	40	186	9	167	67	220
V5-1212S1	12	40	178	12	125	70	220
V5-1215S1	12	40	195	15	100	64	220
V5-1224S1	12	40	201	24	62	62	220

Suffix "H" means 3KVdc isolation Suffix "H2" means 2KVdc isolation Suffix "H4" means 4KVdc isolation
Suffix "H5" means 5.2KVdc isolation Suffix "H6" means 6KVdc isolation
Suffix "M" means Metal Case Up To 3KVdc isolation

The models listed above is just for standard type. If you need the special specification product, please contact our service member by telephone presented in shortform cover or e-mail to : sales@motien.com.tw

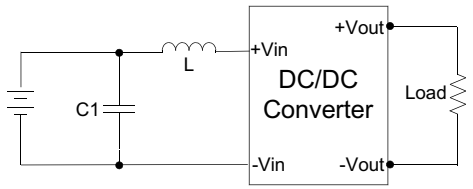
MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current No-Load (mA)	INPUT Current Full Load (mA)	OUTPUT Voltage (Vdc)	OUTPUT Current Full load (mA)	EFFICENCY @FL(%)	Capacitor Load(uF)
V5-123R3D1-R	12	35	171	±3.3	±200	64	±1000
V5-1205D1-R	12	35	183	±5	±150	68	±1000
V5-1209D1-R	12	35	178	±9	±83	70	±470
V5-1212D1-R	12	35	166	±12	±63	75	±470
V5-1215D1-R	12	35	173	±15	±50	72	±470
V5-1224D1-R	12	35	176	±24	±31	71	±220
V5-243R3S1	24	35	117	3.3	450	53	220
V5-2405S1	24	35	100	5	300	62	220
V5-2409S1	24	35	97	9	167	64	220
V5-2412S1	24	35	93	12	125	67	220
V5-2415S1	24	35	94	15	100	66	220
V5-2424S1	24	35	94	24	62	66	220
V5-243R3D1-R	24	15	83	±3.3	±200	66	±1000
V5-2405D1-R	24	15	89	±5	±150	70	±1000
V5-2409D1-R	24	15	85	±9	±83	73	±470
V5-2412D1-R	24	15	80	±12	±63	78	±470
V5-2415D1-R	24	15	83	±15	±50	75	±470
V5-2424D1-R	24	15	84	±24	±31	74	±220

Suffix "H" means 3KVdc isolation Suffix "H2" means 2KVdc isolation Suffix "H4" means 4KVdc isolation
Suffix "H5" means 5.2KVdc isolation Suffix "H6" means 6KVdc isolation
Suffix "M" means Metal Case Up To 3KVdc isolation

TEST CONFIGURATIONS

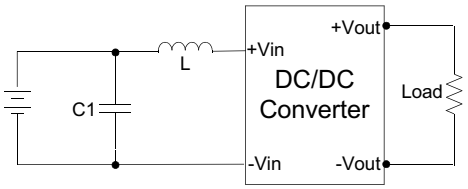
EMI Filter

Input filter components (C1, 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
V5-05XXXXX	220uF/100V	12uH
V5-12XXXXX	220uF/100V	12uH
V5-24XXXXX	220uF/100V	12uH

Single Output



	C1	L
V5-05XXXX-R	220uF/100V	22uH
V5-12XXXX-R	220uF/100V	22uH
V5-24XXXX-R	220uF/100V	22uH

Dual Output

NOTE

1. Ripple/Noise measured with 20MHz bandwidth.
2. Tested by minimal Vin and constant resistive load.
3. Measured Input reflected ripple current with a simulated source inductance of 12uH.
4. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.
5. Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.
6. Input filter components are be required to help meet conducted emission class A, which application refer to the EMI Filter of design & feature configuration.
7. An external filter capacitor is required if the module has to meet EN61000-4-4 and EN61000-4-5.
   The filter capacitor Motien suggest: Nippon - chemi - con KY series, 220uF/100V.

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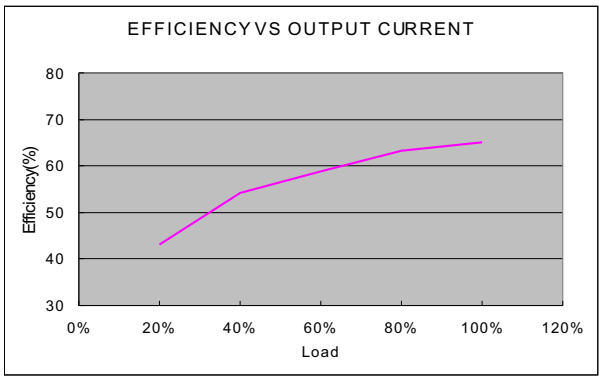
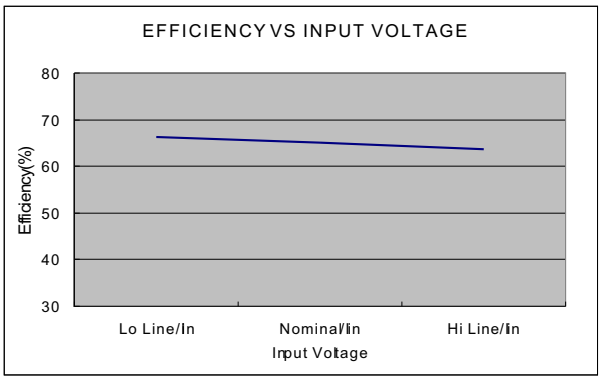
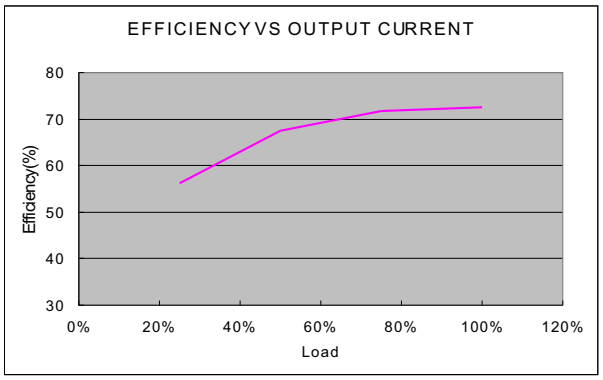
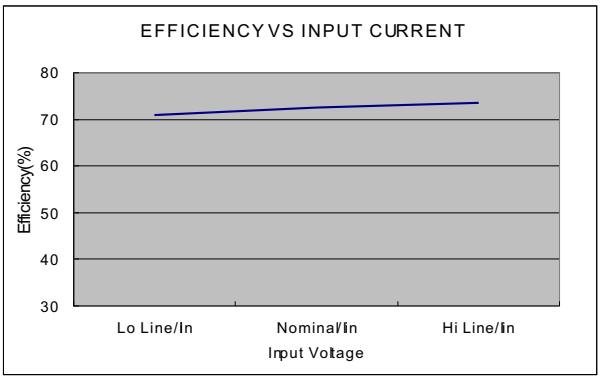


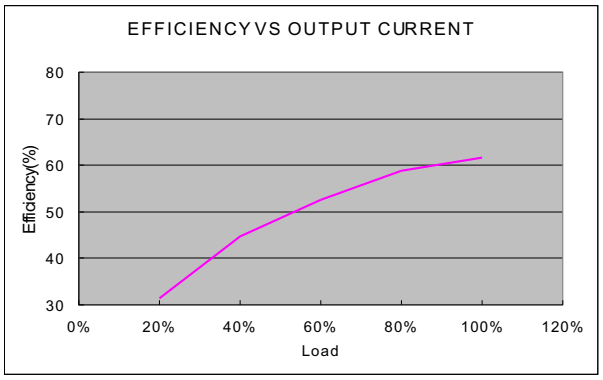


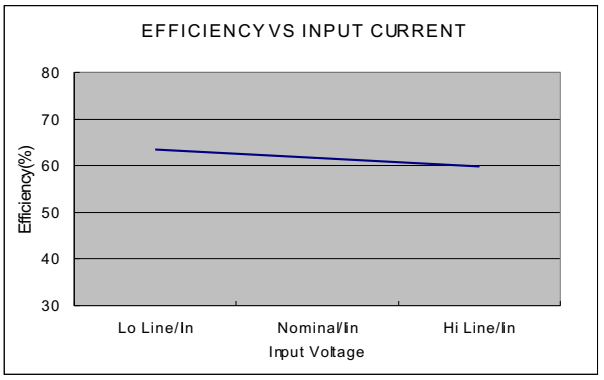
05 Single Output Models



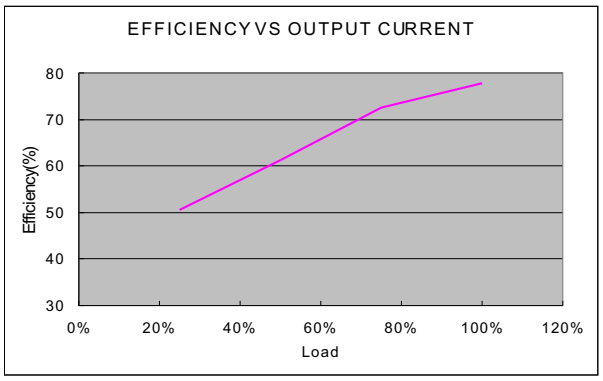


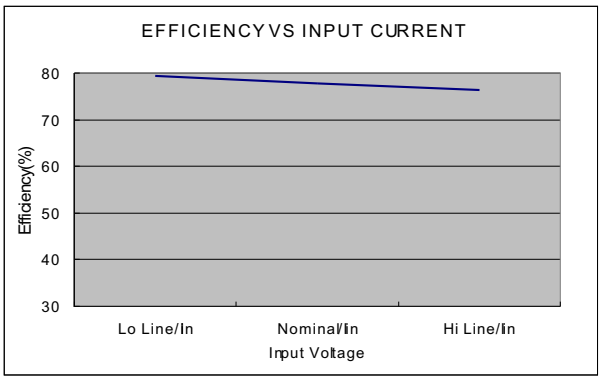
05 Dual Output Models





24 Single Output Models





24 Dual Output Models

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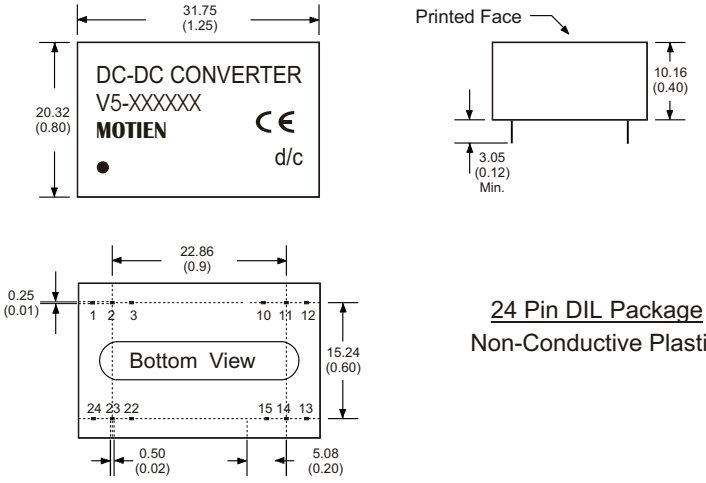
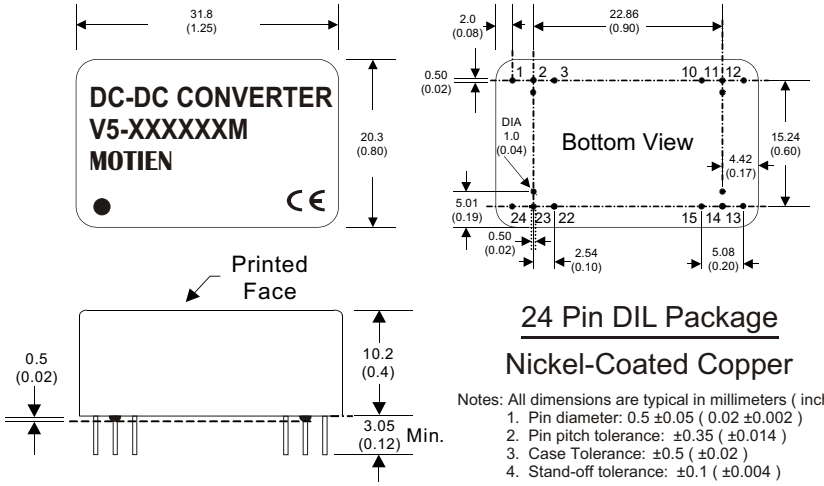
MECHANICAL SPECIFICATIONS



24 Pin DIL Package
Non-Conductive Plastic

Notes : All dimensions are typical in millimeters (inches).
1. Pin diameter: 0.5±0.05 (0.02±0.002)
2. Pin pitch tolerance: ±0.35 (±0.014)
3. Case Tolerance: ±0.5 (±0.02)

PIN CONNECTIONS				
PIN NUMBER	SINGLE	DUAL	SINGLE-H	DUAL-H
1	+V Input	+V Input	+V Input	+V Input
2	N.C.	−V Output	+V Input	+V Input
3	N.C.	Common	N.P.	N.P.
10	−V Output	Common	N.P.	Common
11	+V Output	+V Output	N.P.	Common
12	−V Input	−V Input	−V Output	N.P.
13	−V Input	−V Input	+V Output	−V Output
14	+V Output	+V Output	N.P.	N.P.
15	−V Output	Common	N.P.	+V Output
22	N.C.	Common	N.P.	N.P.
23	N.C.	−V Output	−V Input	−V Input
24	+V Input	+V Input	−V Input	−V Input



24 Pin DIL Package
Nickel-Coated Copper

Notes: All dimensions are typical in millimeters (inches).
1. Pin diameter: 0.5 ±0.05 (0.02 ±0.002)
2. Pin pitch tolerance: ±0.35 (±0.014)
3. Case Tolerance: ±0.5 (±0.02)
4. Stand-off tolerance: ±0.1 (±0.004)

For “M” Case

PIN CONNECTIONS				
PIN NUMBER	SINGLE	DUAL	SINGLE-H	DUAL-H
1	+V Input	+V Input	+V Input	+V Input
2	N.C.	−V Output	+V Input	+V Input
3	N.C.	Common	N.P.	N.P.
10	−V Output	Common	N.P.	Common
11	+V Output	+V Output	N.P.	Common
12	−V Input	−V Input	−V Output	N.P.
13	−V Input	−V Input	+V Output	−V Output
14	+V Output	+V Output	N.P.	N.P.
15	−V Output	Common	N.P.	+V Output
22	N.C.	Common	N.P.	N.P.
23	N.C.	−V Output	−V Input	−V Input
24	+V Input	+V Input	−V Input	−V Input