R6-1.5W Series

MOTIEN TECHNOLOGY

1.5W 2:1 Regulated Single & Dual output

Features

- Wide 2:1 Input Range
- Full SMD Technology
- 1500 VDC Isolation, Up to 3500 VDC
- Continuous Short Circuit Protection
- Efficiency up to 78%
- -40 ~ 85°C Operating Temperature
- Plastic Case Standard, Optional Metal Case

CE

The R6 series is a family of cost effective 1.5W single & dual output DC-DC converters. These converters combine Plastic case in a 24-pin DIL package with high performance features such as 1500 VDC ~ 3500VDC 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 and 48 with output voltage of 5, 9, 12, 15, 24, ±5, ±9, ±12, ±15 and ±24 Vdc. High performance features include high efficiency operation up to 78% and output voltage accuracy of ±1% maximum.

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

OUTPUT SPECIFICATIONS

Voltage accuracy	±1%
Line regulation	±0.5%
Load regulation	±0.5%
Ripple & noise (20 MHz bandwidth)(1)	60mV pk-pk
Short circuit protection	Continuous
Temperature coefficient	±0.02%/°C
Capacitor load(2)	See table

INPUT SPECIFICATIONS

Voltage Range	See table
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, typ
I/O Isolation Voltage(3 sec)	
Input/Output	1500~3500Vdc
Metal Case/Input & Output	1000Vdc
I/O Isolation Capacitance	60 pF Typ.
I/O Isolation Resistance	1000M Ohm
Switching Frequency	100~400kHz
Humidity	95% rel H
Reliability Calculated MTBF(MIL-HDBK-217 F)	>2.199 Mhrs
Safety Standard : (desinged to meet)	IEC 60950-1

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

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	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"

ABSOLUTE MAXIMUM RATINGS(4)

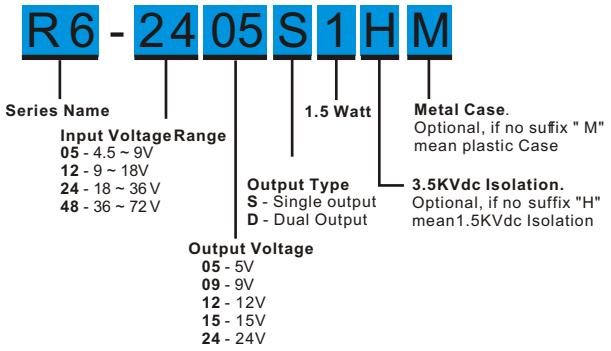
These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.

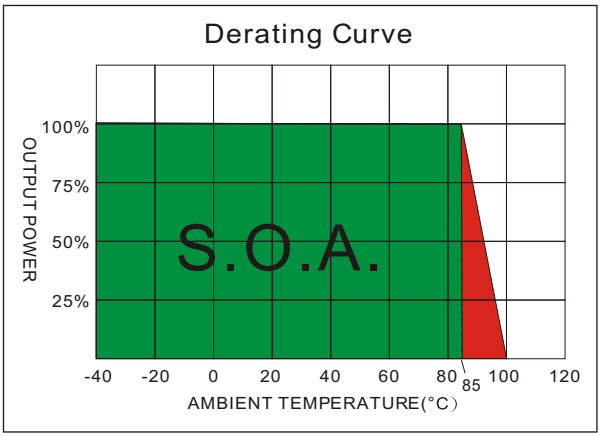
Input Voltage(100mS)	
5 Modes	-0.7~15 Vdc
12 Modes	-0.7~24 Vdc
24 Modes	-0.7~40 Vdc
48 Modes	-0.7~80 Vdc
Soldering Temperature (1.5mm from case 10sec.)	260°C

EMC SPECIFICATIONS

Radiated Emissions	EN55022	CLASS A
Conducted Emissions (7)	EN55022	CLASS A
ESD	IEC 61000-4-2	Perf. Criteria B
RS	IEC 61000-4-3	Perf. Criteria A
EFT (8)	IEC 61000-4-4	Perf. Criteria B
Surge (8)	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 Min. load (mA)	OUTPUT Current Full load (mA)	EFFICIENCY @FL(%)	Capacitor Load(uF)
R6-0505S1	4.5-9	40	461	5	75	300	65	2200
R6-0509S1	4.5-9	40	447	9	41.7	167	67	470
R6-0512S1	4.5-9	40	428	12	125	125	70	470
R6-0515S1	4.5-9	40	447	15	31	100	67	470
R6-0524S1	4.5-9	40	454	24	15.6	62.5	66	220
R6-0505D1	4.5-9	40	461	±5	±37.5	±150	65	±1000
R6-0509D1	4.5-9	40	447	±9	±20.8	±83.3	67	±220
R6-0512D1	4.5-9	40	428	±12	±15.6	±62.5	70	±220
R6-0515D1	4.5-9	40	447	±15	±12.5	±50	67	±220
R6-0524D1	4.5-9	40	454	±24	±7.7	±31	66	±100
R6-1205S1	9-18	20	169	5	75	300	74	2200
R6-1209S1	9-18	20	162	9	41.7	167	77	470
R6-1212S1	9-18	20	164	12	125	125	76	470
R6-1215S1	9-18	20	160	15	31	100	78	470
R6-1224S1	9-18	20	160	24	15.6	62.5	78	220
R6-1205D1	9-18	20	169	±5	±37.5	±150	74	±1000
R6-1209D1	9-18	20	164	±9	±20.8	±83.3	76	±220
R6-1212D1	9-18	20	166	±12	±15.6	±62.5	75	±220
R6-1215D1	9-18	20	160	±15	±12.5	±50	78	±220
R6-1224D1	9-18	20	160	±24	±7.7	±31	78	±100
R6-2405S1	18-36	12	84.5	5	75	300	74	2200
R6-2409S1	18-36	12	84.5	9	41.7	167	74	470
R6-2412S1	18-36	12	82	12	125	125	76	470
R6-2415S1	18-36	12	82	15	31	100	76	470
R6-2424S1	18-36	12	81	24	15.6	62.5	77	220
R6-2405D1	18-36	12	83	±5	±37.5	±150	75	±1000
R6-2409D1	18-36	12	82	±9	±20.8	±83.3	76	±220
R6-2412D1	18-36	12	81	±12	±15.6	±62.5	77	±220
R6-2415D1	18-36	12	80	±15	±12.5	±50	78	±220
R6-2424D1	18-36	12	80	±24	±7.7	±31	78	±100

Suffix "H" means 3.5KVdc isolation
Suffix "M" means Metal Case instead of standard Plastic case

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

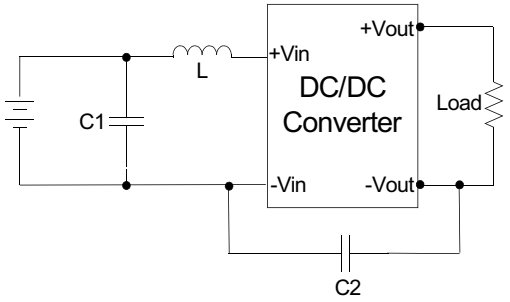
MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current No-Load (mA)	INPUT Current Full Load (mA)	OUTPUT Voltage (Vdc)	OUTPUT Current Min. load (mA)	OUTPUT Current Full load (mA)	EFFICIENCY @FL(%)	Capacitor Load(uF)
R6-4805S1	36-72	8	43	5	75	300	73	2200
R6-4809S1	36-72	8	42	9	41.7	167	75	470
R6-4812S1	36-72	8	40.5	12	125	125	77	470
R6-4815S1	36-72	8	40.5	15	31	100	77	470
R6-4824S1	36-72	8	40	24	15.6	62.5	78	220
R6-4805D1	36-72	8	42	±5	±37.5	±150	74	±1000
R6-4809D1	36-72	8	42	±9	±20.8	±83.3	75	±220
R6-4812D1	36-72	8	40.5	±12	±15.6	±62.5	77	±220
R6-4815D1	36-72	8	40	±15	±12.5	±50	78	±220
R6-4824D1	36-72	8	40	±24	±7.7	±31	78	±100

Suffix "H" means 3.5KVdc isolation
Suffix "M" means Metal Case instead of standard Plastic case

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	C2
R6-05XXXXX	220uF/100V	12uH	
R6-12XXXXX	220uF/100V	12uH	
R6-24XXXXX	220uF/100V	12uH	MLCC 471K
R6-48XXXXX	220uF/100V	12uH	MLCC 471K

NOTE

1. Typical value at nominal input voltage and full load.
2. Test by nominal input voltage and constant resistor 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. It's necessary to add minimum capacitor in output for some models, please check single model datasheet for detail value.
7. Input filter components are be required to help meet conducted emission class A, which application refer to the EMI Filter of design & feature configuration.
8. 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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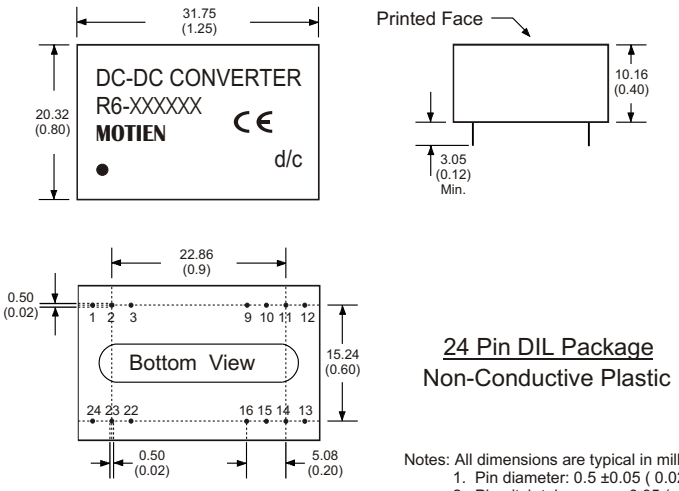
MECHANICAL SPECIFICATIONS FOR HIGH ISOLATION MODEL

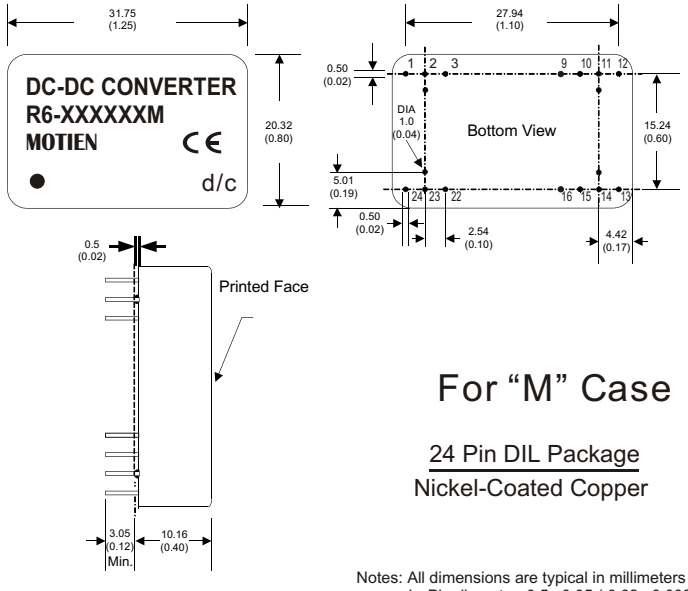


24 Pin DIL Package
Non-Conductive Plastic

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	N.P.	N.P.
2	N.C.	−V Output	-V Input	−V Input
3	N.C.	Common	-V Input	−V Input
9	N.P.	N.P.	N.P.	Common
10	−V Output	Common	N.P.	N.P.
11	+V Output	+V Output	N.C.	−V Output
12	−V Input	−V Input	N.P.	N.P.
13	−V Input	−V Input	N.P.	N.P.
14	+V Output	+V Output	+V Output	+V Output
15	−V Output	Common	N.P.	N.P.
16	N.P.	N.P.	−V Output	Common
22	N.C.	Common	+V Input	+V Input
23	N.C.	−V Output	+V Input	+V Input
24	+V Input	+V Input	N.P.	N.P.

MECHANICAL SPECIFICATIONS



For “M” Case

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)

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

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Last Update : Dec.08.2010