

R6-5W Series



5W 2:1 Regulated Single & Dual output

Features

- Wide 2:1 Input Range
- 1500 VDC Isolation, Up to 3500 VDC
- Continuous Short Circuit Protection
- Efficiency up to 84%
- Operation Temperature Range -40 ~ 98°C max.



PART NUMBER STRUCTURE

R6 - **24** **05** **S** **5** **H**
(1) (2) (3) (4) (5) (6)

(1) Series

(2) Input Voltage Range

12 - 9-18 V
24 - 18-36 V

(4) Output Type

S - Single Output
D - Dual Output

(5) Watt

(3) Output Voltage

05 - 5.0 V
09 - 9.0 V
12 - 12 V
15 - 15 V
24 - 24 V

(6) Isolation Voltage (Optional)

Blank - 1500 VDC
H - 3500 VDC

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

Model Number	Input Voltage Range (VDC)	Input Current		Output Voltage (VDC)	Output Current		Efficiency @FL (% , typ.)	Capacitive Load (μF, max.)
		No-Load (mA, max.)	Full Load (mA, typ.)		Min. load (mA)	Full load (mA)		
R6-1205S5	9-18	15	548	5	250	1000	76	2200
R6-1209S5	9-18	20	541	9	139	555	77	470
R6-1212S5	9-18	20	502	12	104	417	83	470
R6-1215S5	9-18	15	502	15	83	333	83	470
R6-1224S5	9-18	20	521	24	52	208	80	220
R6-1205D5	9-18	20	548	±5	±125	±500	76	±1000
R6-1209D5	9-18	25	534	±9	±70	±278	78	±220
R6-1212D5	9-18	20	534	±12	±52	±208	78	±220
R6-1215D5	9-18	25	521	±15	±42	±167	80	±220
R6-1224D5	9-18	20	521	±24	±26	±104	80	±100
R6-2405S5	18-36	8	267	5	250	1000	78	2200
R6-2409S5	18-36	10	257	9	139	555	81	470
R6-2412S5	18-36	8	254	12	104	417	82	470
R6-2415S5	18-36	10	248	15	83	333	84	470
R6-2424S5	18-36	15	248	24	52	208	84	220
R6-2405D5	18-36	15	274	±5	±125	±500	76	±1000
R6-2409D5	18-36	10	251	±9	±70	±278	83	±220
R6-2412D5	18-36	15	251	±12	±52	±208	83	±220
R6-2415D5	18-36	15	251	±15	±42	±167	83	±220
R6-2424D5	18-36	15	257	±24	±26	±104	81	±100

INPUT SPECIFICATIONS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	12V Input	9	12	18	VDC
	24V Input	18	24	36	
Input Filter	For Isolation Voltage 1500 VDC	LC Type			
	For Isolation Voltage 3500 VDC	Pi Type			
Input With External Capacitor	For Isolation Voltage 1500 VDC			10	μF
Input Reflected Ripple Current (1)			35		mApk-pk
Start up Time	Nominal Vin and constant resistive load		20		ms
Recommended input fuse (slow blow)	12V Input	1.0			A
	24V Input	0.5			
Note :					
1. Measured with a simulated source inductance of 12μH and a source capacitor Cin (47μF, ESR<1.0Ω at 100kHz).					

OUTPUT SPECIFICATIONS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		-1.0		+1.0	%
Line Regulation		-0.5		+0.5	%
Load Regulation	From 25% to 100% Load	-0.5		+0.5	%
Cross Regulation	Asymmetrical Load 25% / 100% for Dual Output	-5		+5	%
Ripple & Noise (1)	20MHz bandwidth			60	mVpk-pk
Short Circuit Protection		Continuous			
Temperature Coefficient		-0.02		+0.02	%/°C
Maximum Capacitive Load	Minimum Vin and constant resistive load	See Table			
Note :					
1. Typical value at nominal input voltage and full load.					

ABSOLUTE MAXIMUM RATINGS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (100 ms)	12V Input			24	VDC
	24V Input			40	
Soldering Temperature	1.5mm from case 10sec max.			260	$^{\circ}$ C
Note : These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.					

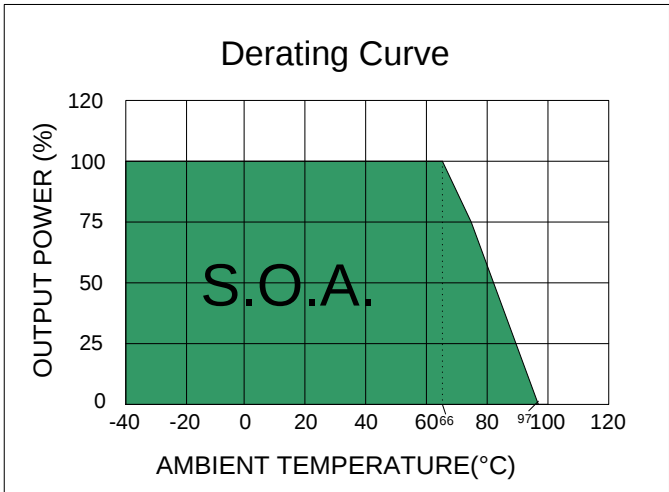
GENERAL SPECIFICATIONS						
Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, and rated for 60sec	Standard Type	1500			VDC
		Suffix “H”	3500			
Isolation Resistance	Input-output		1000			MΩ
Isolation Capacitance	Input-output			60		pF
Switching Frequency			100		400	kHz
MTBF	MIL-HDBK-217 F @ 25°C		1			M hours
Safety Approval	IEC / EN / UL 62368-1		Design to meet			
Environmental compliance			RoHS			

ENVIRONMENT SPECIFICATIONS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating Ambient Temperature	See the Derating Curve	-40		98	°C
Maximum Case Temperature				100	°C
Thermal Impedance		21.46			°C/W
Storage Humidity				95	% rel. H
Storage Temperature		-55		125	°C
Cooling	Natural Convection	30-65 LFM			

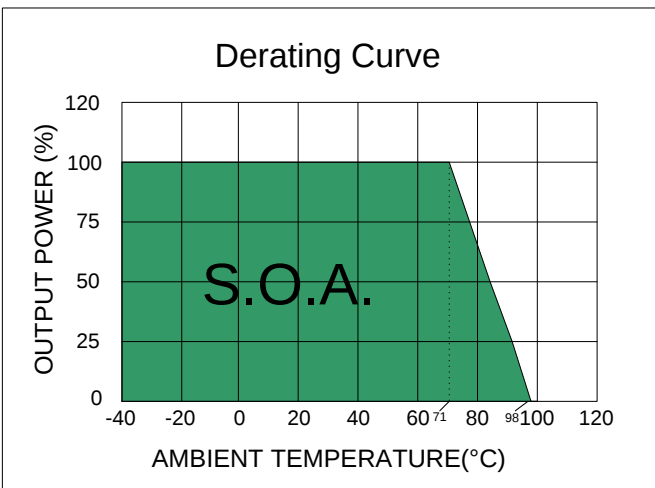
EMC SPECIFICATIONS			
Parameter	Standard	Condition	Criterion
Conducted Emissions	EN55032	with external components	A
Radiated Emissions	EN55032		A
ESD	IEC 61000-4-2	Air: ±8kV / Contact: ±6kV	A
RS	IEC 61000-4-3	10V/m	A
EFT	IEC 61000-4-4	±2kV with external components	A
Surge	IEC 61000-4-5	±1kV with external components	A
CS	IEC 61000-4-6	10Vrms	A
PFMF	IEC 61000-4-8	1A/m	A

PHYSICAL SPECIFICATIONS	
Parameter	Value
Case Material	Nonconductive Black Plastic (UL94V-0 rated)
Base Material	Nonconductive Black Plastic (UL94V-0 rated)
Pin Material	Ø0.5mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	Plastic Case : 12.5 g , typ.
Dimensions	1.25" x 0.8" x 0.4"

ELECTRICAL CHARACTERISTIC CURVES



Efficiency = 76% ~ 78%

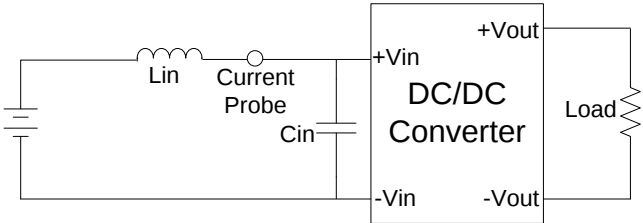


Efficiency = 79% ~ 84%

TEST CONFIGURATIONS

Input Reflected Ripple Current Test Step

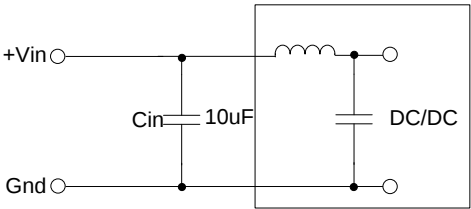
Input reflected ripple current is measured with a source inductor L_{in} ($12\mu H$) and a source capacitor C_{in} ($47\mu F$, $ESR < 1.0\Omega$ at $100kHz$) at nominal input and full load.



Application Note (For Isolation Voltage 1500 VDC)

All the series have been tested according to the following recommended testing circuit before leaving factory.

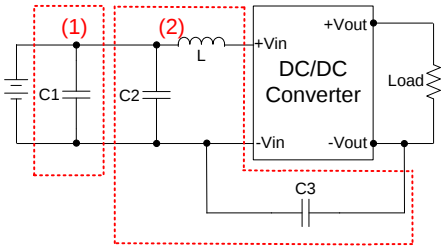
Input With External Capacitor



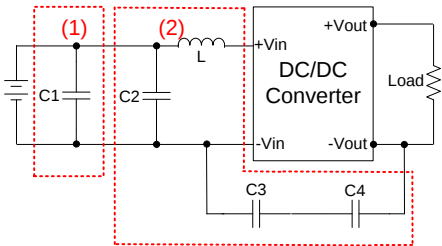
DESIGN & FEATURE CONFIGURATIONS

EMC Filter

The part (1) Circuit is used to meet Surge & EFT test, and the part (2) Circuit is used to meet EMI test.



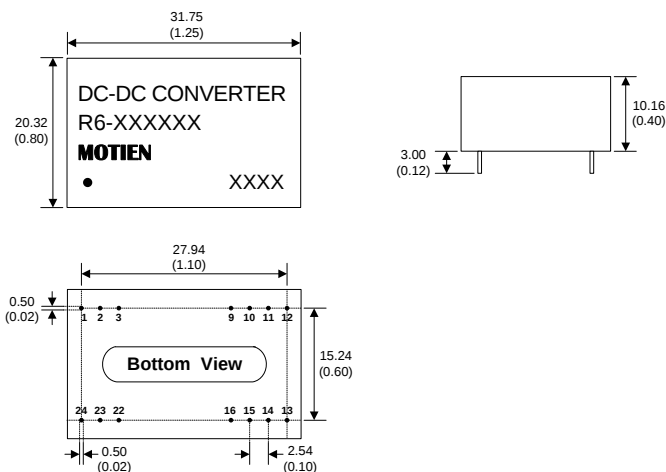
	C1, C2	C3	L
R6-12XXX5	NIPPON Chemi-con KY Series 220μF, 100V		12μH
R6-24XXX5		MLCC 470pF,2KV	



	C1, C2	C3	C4	L
R6-12XXX5H	NIPPON Chemi-con KY Series 220μF, 100V			12μH
R6-24XXX5H		MLCC 1000pF,2KV	MLCC 1000pF,2KV	

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MECHANICAL SPECIFICATIONS



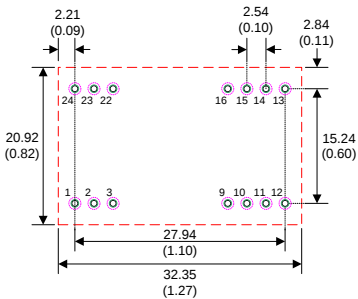
DIP24 Package
Non-Conductive Plastic

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

PIN CONNECTIONS				
PIN NUMBER	SINGLE	DUAL	SINGLE-H	DUAL-H
1	+Vin	+Vin	N.P.	N.P.
2	N.C.	-Vout	-Vin	-Vin
3	N.C.	COM	-Vin	-Vin
9	N.P.	N.P.	N.P.	COM
10	-Vout	COM	N.P.	N.P.
11	+Vout	+Vout	N.C.	-Vout
12	-Vin	-Vin	N.P.	N.P.
13	-Vin	-Vin	N.P.	N.P.
14	+Vout	+Vout	+Vout	+Vout
15	-Vout	COM	N.P.	N.P.
16	N.P.	N.P.	-Vout	COM
22	N.C.	COM	+Vin	+Vin
23	N.C.	-Vout	+Vin	+Vin
24	+Vin	+Vin	N.P.	N.P.

*N.P. : No PIN
*N.C. : No Connection

RECOMMENDED FOOTPRINT DETAILS



- Notes : 1. All dimensions are typical in millimeters (inches).
- Through hole (black) 1 ~ 24: Ø0.80 (0.031)
- Top view pad (green) 1 ~ 24: Ø1.00 (0.039)
- Bottom view pad (pink) 1 ~ 24: Ø1.60 (0.063)