

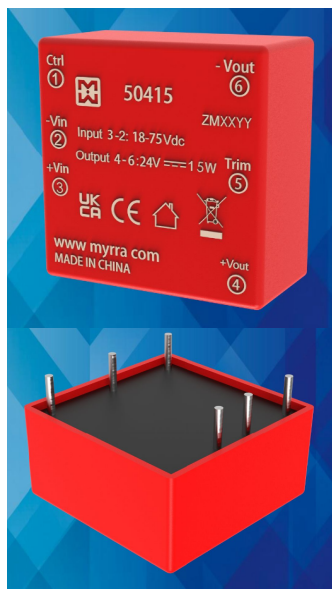
DC/DC CONVERTER - 15W ISOLATED

SINGLE OUTPUT



Power Supplies

5041x SERIES



MAIN FEATURES:

- 15W Small Compact Size - PCB Mount
- Output Range : 3.3VDC - 24VDC
- Operating Altitude Up To 5000m
- Low cost /High Reliability
- Remote ON/OFF control and Trimming Output.
- Better Energetic Efficiency and Low Standby Power Consumption <0.3W
- 1500Vdc I/O Isolation
- Operating Temperature range:-40°C to +85°C
- DIP 1" x 1" package with industry standard pinout
- Materials : Uses UL 94-V0 Plastic And Resin
- Safety:Meets All Requirements of IEC/EN62368-1,UL62368-1, CSA C22.2 No.62368-1-14,IEC60601-1, CE, UKCA,
- EMC : Conducted And Radiated Emissions Conform To EN55032 CLASS A/B, EN/IEC61000-3-2 CLASS A, EN61000-3-3,
- Immunity Conforms To EN61000-4-2, EN/IEC61000-4-3, EN61000-4-4, EN61000-4-5,EN61000-4-6,EN61000-4-8,EN610004-11



DATA SHEET

Part No	Power Rating Watts	Output Voltage (VDC)	Output Current (mA)	Input Current Typ.(Full load/No load) (mA)	Ambient Temp. (°C)	Efficiency Typical	Input Range
50410	10	3.3	3000	280/70	-40°C to +85°C	81%	Normal 48Vdc (18Vdc to 75Vdc)
50411	15	5.0	3000	380/80	-40°C to +85°C	85%	
50412	15	9.0	1670	380/30	-40°C to +85°C	89%	
50413	15	12	1250	380/25	-40°C to +85°C	89%	
50414	15	15	1000	380/25	-40°C to +85°C	88%	
50415	15	24	625	380/25	-40°C to +85°C	88%	

Note: Other output voltages are available upon request.

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Model: 15 Watt		Specifications
DC Input Characteristics	Input Voltage	Normal 48Vdc (18Vdc to 75Vdc)
	No Load Power	< 300mW
	Input Liter	Pi type
	Input U.V.P.	12Vdc min. / 15.5Vdc max.
	Protection	Fuse recommended: 1.5A delay time type
DC Output Characteristics	Rated Output Power	See table
	Output Voltage Accuracy	± 2%
	Output Voltage Line Regulation	± 0.5%
	Output Voltage Load Regulation	± 1%
	Switching Frequency	250KHz Typ.
	Ripple & Noise	50mVp-p typ. (100mVp-p max.), at nominal line (The measuring will be terminated with a 47uF AL E-Cap and a 0.1uF Ceramic-Cap. An oscilloscope set at 20MHz bandwidth)
	Rise time	70ms Max @18Vdc ~75Vdc input and DC output with full load.
	Overshoot	The output voltage shall not exceed +10% rated output voltage @ Power on and 18Vdc ~75Vdc input, and DC with full load.
	Hold up time	5mS Min@18Vdc ~75Vdc and DC output with full load.
	Turn on delay	2Smax @ 18Vdc ~75Vdc input and DC output with full load.
	Dynamic Response	The output voltage shall not exceed + 10% rated output voltage @ 10%-100 % Load change, 1A/μS, 1KHz 50% duty cycle
	Undershoot	The output voltage shall not exceed -10% rated output voltage @ Power off and 18Vdc ~75Vdc input and DC output with full load.

Please refer to MYRRA's website and catalogue for MYRRA SMPS application notes.

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	Efficiency	See table
Protection Characteristics	Over Current Protection	110% to 180% rated output power Protection type: Recovers automatically after fault condition is removed.
	Output Short Circuit Protection	The DC converter shall withstand a continuous output short without damage; The DC converter shall resume normal operation after the short is removed, no excessive heat, odour, or plastic deformation shall occur with no safety hazard
Remote Control	Ctrl Pin to -Vin Pin	DC/DC convertor ON: Ctrl Pin to -Vin Pin >5.5-75Vdc or open circuit DC/DC convertor OFF: Ctrl Pin to -Vin Pin <1.2Vdc or short
Environmental	Operation Temperature	-40°C ~+85°C (Refer to "DERATING GRAPH")
	Operation Humidity	10~ 90% RH(No Condensing) @ DC with full load
	Case Temperature	+110°C max.
	Storage Temperature	-10°C to +35°C
	Storage Humidity	< 75%RH
	Cooling Method	Ordinary or thermostat
Safety & EMC Requirement	Dielectric Strength	Input to Output: 1500Vdc 1mA, 3 secs.
	Radiation	Meets EN55032(CISPR32), (Class B with external components, refer to EMC typical recommended circuit).
	Conduction	Meets EN55032(CISPR32), (Class B with external components, refer to EMC typical recommended circuit).
	Harmonic Current Disturbance	Meets EN/IEC61000-3-2:2019, Class A
	Voltage Fluctuation And Flicker	Meets EN61000-3-3:2013
	Electrostatic Discharge	Meets EN61000-4-2:2009 Contact Discharge ±6KV,Air Discharge ±8KV
	RF Field Strength Susceptibility	Meets EN/IEC61000-4-3:2019
	Electrical Fast Transient	Meets EN61000-4-4:2012, ±1KV

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Safety & EMC Requirement	Lightning Surge	Meets EN61000-4-5:2014,+1KV (line to line)
	Conducted Susceptibility	MeetsEN61000-4-6:2014
	Power Frequency Magnetic Field Susceptibility Test	Meets EN61000-4-8:2010
	Voltage Dips And Interruptions	MeetsEN61000-4-11:2004
	Safety Standards	Meets all requirements of : UL62368-1,CSA C22.2 NO.62368-1-14, IEC/EC62368-1, IEC60601-1 CE,UKCA Mark
Reliability Requirement	MTBF	>200K Hours @ at 71deg.C; >900K Hours @ at 25deg.C <i>Calculated in accordance with MIL-HDBK-217-F2</i>
Net Weight	Approximately 20grams per product unit	
Physical size:	The units do not including PINs of input and output, and dimension is (L)25.5*(H) 25.5*(W) 12.5 ±0.5mm (see appearance drawing) .	
Guarantee	This product is in accordance with the European RoHS & REACH directives	

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EXTERNAL OUTPUT TRIMMING

In order to trim the voltage up or down one needs to connect the trim resistor either between the trim pin and -Vo for trim-up and between trim pin and +Vo for trim-down. This is shown in Figures 1 and 2:

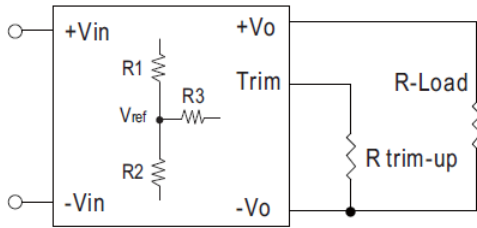


Figure 1. Trim-up Voltage Setup

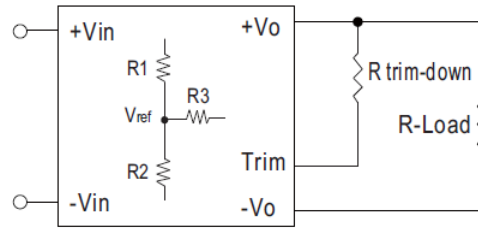


Figure 2. Trim-down Voltage Setup

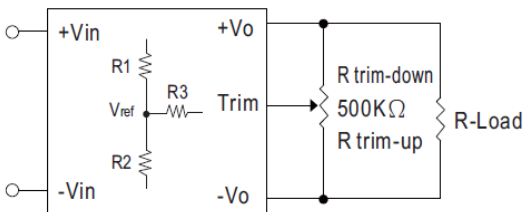


Figure 3. Trim-Connections

Table 1 – Trim up and Trim down Resistor Values

Vout	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref
3.3	1.69	1	5.6	1.25
5	1	1	3.6	2.5
12	3.83	1	7.5	2.5
15	7.5	1.5	11	2.5

1. The value of Rtrim-up defined as:

$$A = [V_{ref} / (V_o' - V_{ref})] * R_1$$

$$R_{trim-up} = [(A * R_2) / (R_2 - A)] - R_3$$

Where

Rtrim-up is the external resistor in Kohm.

Vo, nom is the nominal output voltage.

Vo' is the desired output voltage.

R1, R2, R3 and Vref are internal to the unit and defined in Table 1.

For example, to trim-up the output voltage of 12V model (50413) by 10% to 13.2V, Rtrim-up is calculated as follows:

$$V_o' - V_{o,nom} = 13.2V - 12V = 1.2V$$

$$R_1 = 3.83K\Omega, R_2 = 1K\Omega, R_3 = 7.5k\Omega, V_{ref} = 2.5V$$

$$A = [V_{ref} / (V_o' - V_{ref})] * R_1$$

$$= [2.5 / (13.2 - 2.5)] * 3.83$$

$$= 0.894$$

$$R_{trim-up} = [(A * R_2) / (R_2 - A)] - R_3$$

$$= [(0.894 * 1) / (1 - 0.894)] - 7.5$$

$$= (0.894 / 0.106) - 7.5$$

$$= 8.433 - 7.5$$

$$= 0.933K\Omega$$

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2. The value of Rtrim-down defined as:

$$A = [(V_o' - V_{ref}) / V_{ref}] * R_2$$

$$R_{trim-down} = [(A * R_1) / (R_1 - A)] - R_3$$

Where

Rtrim-down is the external resistor in Kohm.

Vo, nom is the nominal output voltage.

Vo' is the desired output voltage.

R1, R2, R3 and Vref are internal to the unit and defined in Table 1.

For example, to trim-down the output voltage of 12V model (50413) by 10% to 10.8V, Rtrim-down is calculated as follows:

$$V_{o,nom} - V_o' = 12V - 10.8V = 1.2V$$

$$R_1 = 3.83K\Omega$$

$$R_2 = 1K\Omega$$

$$R_3 = 7.5K\Omega$$

$$V_{ref} = 2.5V$$

$$A = [(V_o' - V_{ref}) / V_{ref}] * R_2$$

$$= [(10.8 - 2.5) / 2.5] * 1$$

$$= 3.32$$

$$R_{trim-down} = [(A * R_1) / (R_1 - A)] - R_3$$

$$= [(3.32 * 3.83) / (3.83 - 3.32)] - 7.5$$

$$= (12.715 / 0.51) - 7.5$$

$$= 24.931 - 7.5$$

$$= 17.431K\Omega$$

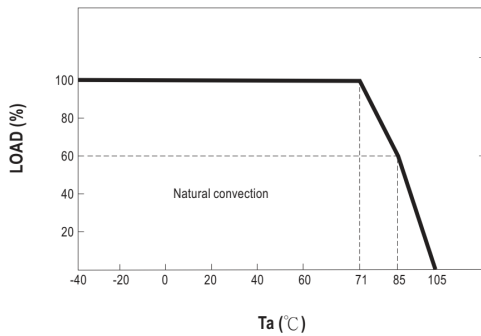
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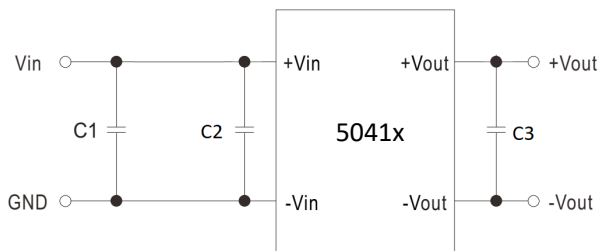


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DERATING GRAPH



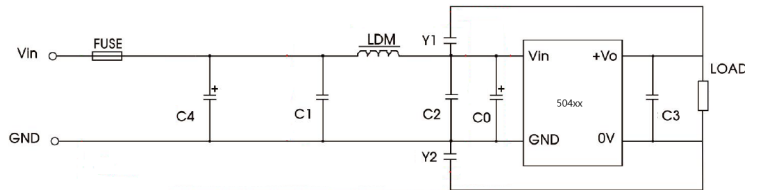
TYPICAL APPLICATION



- C1: 100uF/100V
- C2: No component
- C3:
 - 3.3Vdc, 5.0Vdc output types: 100uF/16V;
 - 9.0Vdc, 12Vdc output types: 100uF/25V;
 - 15Vdc, 24Vdc output types: 47uF/50V;

EMC SUGGESTION

Required external component to meet EN55032 radiated Class B emission as below:



- C4, C0: 330uF/100V
- C1, C2: 4.7uF/100V (MLCC)
- Y1, Y2: 100pF ~ 1nF/3kv (MLCC)
- LDM: 2.2 to 10uH
- C3:
 - 3.3Vdc, 5.0Vdc output types: 100uF/16V;
 - 9.0Vdc, 12Vdc output types: 100uF/25V;
 - 15Vdc, 24Vdc output types: 47uF/50V;

DIMENSIONS AND PINOUT 4 PINS

- Pin 1: Ctrl
- Pin 2: DC Input -Vin
- Pin 3: DC Input +Vin
- Pin 4: DC Output +Vout
- Pin 5: Trim
- Pin 6: DC Output -Vout

