

**OBSOLETE PRODUCT**  
Contact factory for replacement model



# PWR40xxC

## SERIES DC/DC CONVERTER

POWER: 4 Watt  
LOW COST UNREGULATED  
SIZE: 1.125" X 1.125" X 0.40"



For full details go to  
[www.murata-ps.com/rohs](http://www.murata-ps.com/rohs)



## DESCRIPTION

The PWR40xxC Series offers a low-cost alternative for some of the most popular DC/DC converters industry wide. Each model has a high-isolation version and an outstanding demonstrated MTTF of 5,000,000 hours at 25°C. The superior reliability and low cost make it an excellent choice for industry standard usages.

The series includes thirteen standard models (other input and output voltages are available upon request), all set in a flexible encapsulation material which has excellent thermal dissipation and low mechanical stress on internal components. The use of surface-mount devices and manufacturing processes, combined with the encapsulation process, provides the user a product that is environmentally rugged.

The PWR40xxC has full isolation between input and output to give the designer maximum flexibility in grounding options and polarity configurations. The outputs are protected against momentary short circuits.

## FEATURES

- ROHS COMPLIANT
- LOW COST
- INDUSTRY-STANDARD PACKAGE
- SINGLE AND DUAL OUTPUTS
- INTERNAL INPUT AND OUTPUT FILTERING
- HIGH ISOLATION VOLTAGE OPTION AVAILABLE

## MECHANICAL

### Notes:

All dimensions are in inches (millimeters).  
GRID: 0.100 inches (2.54 millimeters)

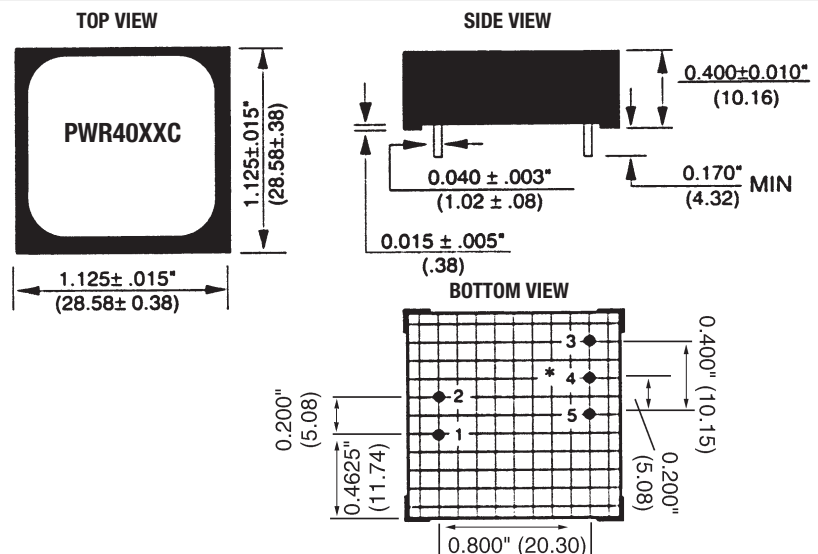
\*Common pins not present on single output models.

PIN PLACEMENT TOLERANCE:  $\pm 0.015"$

Marked with: specific model ordered, date code, job code.

**MATERIAL:** Units are encapsulated in a low thermal resistance molding compound which has excellent chemical resistance, wide operating temperature range, and good electrical properties under high humidity environments. The encapsulant and outer shell of the unit have UL94V-0 ratings. Lead base metal is phosphor bronze; lead finish is 100-300 micro-inches matte tin over 5-40 micro-inches of nickel.

PIN #	FUNCTION
1	+VIN
2	-VIN
3	+VOUT
4	* Common
5	-Vout



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# ELECTRICAL SPECIFICATIONS

Specifications typical at  $T_A = +25^{\circ}\text{C}$ , nominal input voltage and rated output current unless otherwise specified.

MODEL	MINIMUM INPUT VOLTAGE (Voc)	NOMINAL INPUT VOLTAGE (Voc)	MAXIMUM INPUT VOLTAGE (Voc)	RATED OUTPUT VOLTAGE (Voc)	RATED OUTPUT CURRENT (mA)	INPUT CURRENT		REFLECTED RIPPLE CURRENT (mAp-p)
						NO LOAD (mA)	RATED LOAD (mA)	
PWR4000C <sup>1</sup>	4.5	5	5.5	5	800	50	950	20
PWR4004C	4.5	5	5.5	$\pm 12$	$\pm 170$	50	950	20
PWR4005C <sup>2</sup>	4.5	5	5.5	$\pm 15$	$\pm 135$	50	950	20
PWR4006C	10.2	12	13.8	5	800	35	400	30
PWR4007C	10.2	12	13.8	12	340	35	400	30
PWR4010C	10.2	12	13.8	$\pm 12$	$\pm 170$	35	400	30
PWR4011C <sup>2</sup>	10.2	12	13.8	$\pm 15$	$\pm 135$	35	400	40
PWR4012C	12.75	15	17.25	5	800	30	300	40
PWR4016C	12.75	15	17.25	$\pm 12$	$\pm 170$	30	300	40
PWR4017C <sup>1</sup>	12.75	15	17.25	$\pm 15$	$\pm 135$	30	300	40
PWR4018C	20.40	24	27.6	5	800	30	180	40
PWR4022C	20.40	24	27.6	$\pm 12$	$\pm 170$	30	180	40
PWR4023C	20.40	24	27.6	$\pm 15$	$\pm 135$	30	180	40

NOTE: Models listed with strike-through text have been officially discontinued. These models can be built on a custom basis with sufficient quantity justification. In addition other input and output voltage options can be configured on a custom basis. Contact factory for details.

(1) -HV option model only.

(2) -HV option not available.

# COMMON SPECIFICATIONS

Specifications typical at  $T_A = +25^{\circ}\text{C}$ , nominal input voltage and rated output current unless otherwise specified.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
<b>ISOLATION (Standard)</b>					
Rated Voltage		500			Voc
Test Voltage	60Hz, 10 seconds	500			Vpk
Resistance			10		GΩ
Capacitance			50		pF
Leakage Current	$V_{ISO} = 240\text{VAC}$ , 60Hz		5		μArms
<b>ISOLATION (-HV Option)</b>					
Rated Voltage		1000			Voc
Test Voltage	60Hz, 60 seconds	3000			Vpk
Resistance			10		GΩ
Capacitance			50		pF
Leakage Current	$V_{ISO} = 240\text{VAc}$ , 60Hz		5	15	μArms
<b>OUTPUT</b>					
Rated Power			4.0		W
Voltage Setpoint Accuracy	Rated Load, Nominal $V_{IN}$		$\pm 3$	+7, -5	%
Temperature Coefficient			$\pm 0.02$		%/ $^{\circ}\text{C}$
Ripple & Noise	BW = DC to 10MHz BW = 10Hz to 20MHz		140 10		mV <sub>p-p</sub> mVrms
Voltage	No Load, $V_{OUT} = +5\text{V}$ No Load, $V_{OUT} = \pm 12\text{V}$ No Load, $V_{OUT} = \pm 15\text{V}$			7 $\pm 15$ $\pm 18$	Voc Voc Voc
Line Regulation			1.0		%/% $V_{IN}$
Load Regulation			See Curves		
<b>GENERAL</b>					
Switching Frequency			170		kHz
Package Weight			16		g
MTTF per MIL-HDBK-217 Rev. E	Circuit Stress Method		5,000,000		Hr
Efficiency			80		%
<b>TEMPERATURE</b>					
Specification		0	+25	+70	$^{\circ}\text{C}$
Operation		-25		+85	$^{\circ}\text{C}$
Storage		-40		+100	$^{\circ}\text{C}$

## ABSOLUTE MAXIMUM RATINGS

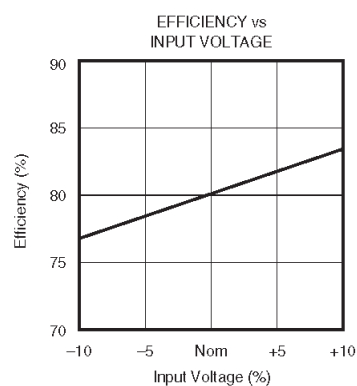
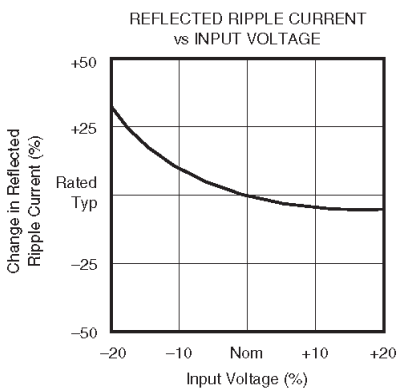
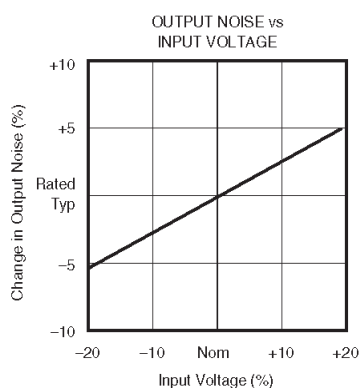
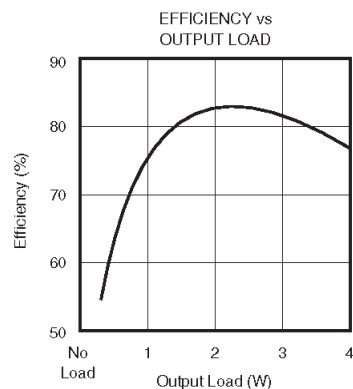
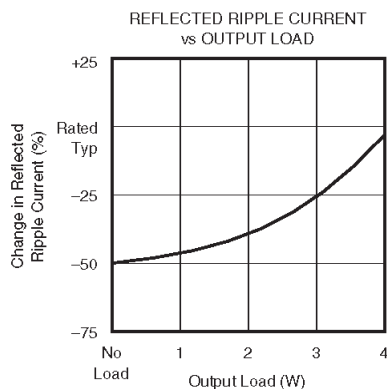
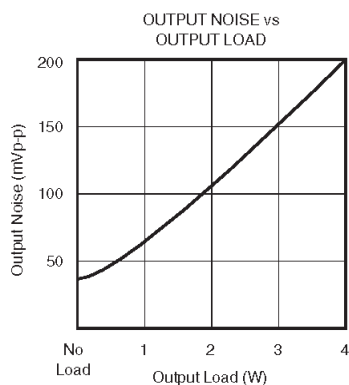
Output Short-Circuit Duration .....	1 second
Internal Power Dissipation .....	850mW
Lead Temperature (soldering, 10 seconds max) .....	+300°C

## ORDERING INFORMATION

	<b>PWR</b>	<b>40XX</b>	<b>-HV</b>	<b>C</b>
Device Family	PWR indicates DC/DC converter			
Model Number	Selected from Table of Electrical Characteristics			
High Voltage Option	No Designator Indicates Standard Model			
RoHS Compliant				

## TYPICAL PERFORMANCE CURVES

T<sub>A</sub> = +25°C, Rated Input Voltage, rated Output Current unless otherwise noted.



## THROUGH-HOLE SOLDERING INFORMATION

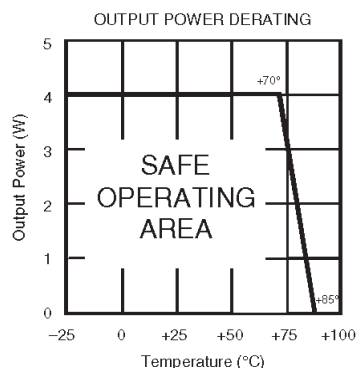
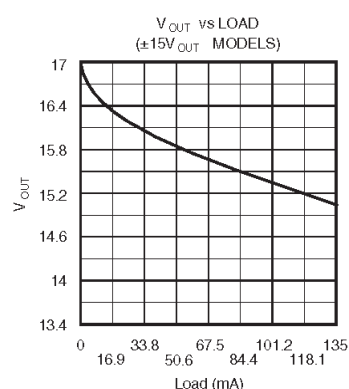
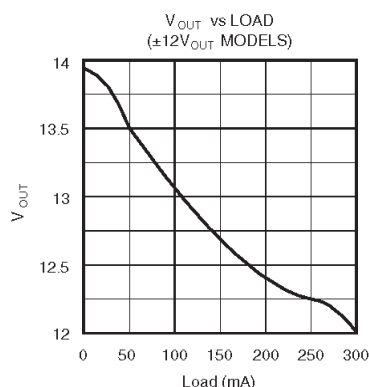
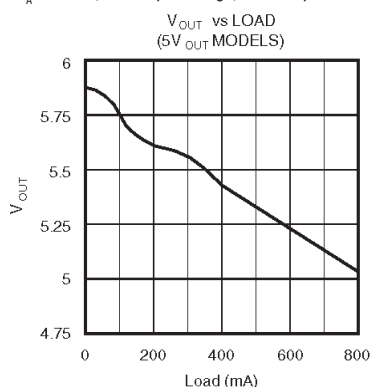
These devices are intended for wave soldering or manual soldering.

**They are not intended to be subject to surface mount processes under any circumstances.**

The normal wave soldering process can be used with these devices where the device is subjected to a maximum wave temperature of 260°C for a period of no more than 10 seconds. Within this time and temperature range, the integrity of the device's plastic body will not be compromised and internal temperatures within the converter will not exceed 175°C. Care should be taken to control manual soldering limits identical to that of wave soldering.

## TYPICAL PERFORMANCE CURVES

$T_A = +25^\circ\text{C}$ , rated input voltage, rated output current unless otherwise noted.



## APPLICATION NOTES

### SHORT CIRCUIT PROTECTION

To maintain low cost, the PWR40xxC Series provides limited short-circuit protection. To protect against continuous short circuits, a fuse is required. It is recommended that the fuse be placed in series with the input of the converter. The required  $I^2t$  will vary with input voltage.

Input Voltage	Littlefuse® Part Number
5V	229.015
12V	229.500
15V	229.375
24V	229.250

TABLE I. Recommended Fuses (or Equivalent)

### OUTPUT POWER

The PWR40xxC series was designed to meet power requirements up to 4W. Due to the nature of unregulated power supplies, a higher-than-rated output voltage will result when less-than-rated power is used (see Typical Performance Curves). This series has been designed to run from no load to 4W without derating up to  $+70^\circ\text{C}$ .

### UNBALANCED LOADS

Unbalanced loads may be used on dual output models with each side sourcing up to 200mA as long as the total power out is not more than 4W. With an unbalanced load, the output voltages will track within 5% of each other.

### OUTPUT NOISE

The output noise can be reduced to less than 50mVp-p by adding a low ESR 10 $\mu\text{f}$  tantalum capacitor across each output.



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