

PHxxZG-xxxxE/Z/D2:1(H30)LF PHxxZG-xxxx E 4:1(H30)LF



PHR-SERIES

Rev.02-2009

- ✓ 33 - 75 Watt
- ✓ 2:1 /4:1 (Ultra) Wide Input
- ✓ Reg. Single, Dual, Triple Output
- ✓ 2.6" x 3" Case
- ✓ 1.5 up to 3 kV DC I/O Isolation
- ✓ Over Voltage / SC Protection
- ✓ Soft Start and Remote Ctrl.

The PHR series is a family of cost effective 33 - 60 W, single, dual and triple output DC/DC converters with a wide 2:1 or 4:1 input. These converters are encapsulated in nickel coated copper 2.6"x3" case with high performance technology like 1.5 up to 3 kV I/O isolation, high efficiency operation, remote on/off control, short circuit protection, thermal shutdown, UVLO/OVLO shutdown, soft start and output voltage accuracy of $\pm 2\%$ / $\pm 5\%$ typ.

All specifications typical at $T_a=25^\circ\text{C}$, nominal input voltage and full load unless otherwise specified

Input Specifications

Voltage Range	2:1 / 4:1 (Ultra) Wide Input (see table)
Input Filter	PI Type

Output Specifications

Voltage Accuracy	$\pm 2\%$ (Single/Dual/Trippl) $\pm 5\%$ (Auxiliary)
Short Circuit Protection	Continuous (Automatic Recovery)
Over Load Protection	$\geq 110\%$ of Full Load
Line Regulation	$\pm 1\%$
Load Regulation (25% - 100%)	$\pm 1\%$ (Single), $\pm 2\%$ (Dual / Trippl)
Ripple and Noise (20Mhz bandwidth)	≤ 80 mV pk-pk (3.3V, 5V); 1% of V_{out} (others)
Temperature Coefficient	$\pm 0.05\%$ / $^\circ\text{C}$
Transient Response Recovery Time	280us, max. (50% Load Step Change)

General Specifications

Efficiency	See Table
I/O Isolation Voltage (3 sec.)	1500 VDC (3000 VDC optional*)
I/O Isolation Resistance	1000 M Ohm
Switching Frequency	60 kHz, typ.
Humidity	95% rel H
Reliability Calculated MTBF (MIL-HDBK-217F)	> 0.3 Mhrs

Physical Specifications

Case Material	Nickel Coated Copper
Potting Material	Epoxy (UL94V-0 rated)
Weight	~ 212g, typ.

Environment Specifications

Operating Temperature	- 40 to +71 $^\circ\text{C}$ (ambient, max.)
Maximum Case Temperature	95 $^\circ\text{C}$
Thermal Shutdown	+105 to +115 $^\circ\text{C}$
Storage Temperature	- 55 to +115 $^\circ\text{C}$
Cooling	Free Air Convection
RoHS Conform	Soldering 260 $^\circ\text{C}$, max. (1.5mm from case 10s.)

Selection Guide

Single Output

Order #	Power (Watt)	Input Voltage (VDC)	Output Voltage I (VDC)	Output Voltage II (VDC)	Output Current I (mA)	Output Current II (mA)	Efficiency (%)
SINGLE OUTPUT 2:1							
PH33ZG-123R3E2:1LF	33	9 - 18	3.3	-	10000	-	78
PH40ZG-1205E2:1LF	40	9 - 18	5	-	8000	-	80
PH60ZG-1212E2:1LF	60	9 - 18	12	-	5000	-	83
PH75ZG-1212E2:1LF	75	9 - 18	12	-	6250	-	83
PH60ZG-1215E2:1LF	60	9 - 18	15	-	4000	-	84
PH75ZG-1215E2:1LF	75	9 - 18	15	-	5000	-	84
PH60ZG-1224E2:1LF	60	9 - 18	24	-	2500	-	86
PH75ZG-1224E2:1LF	75	9 - 18	24	-	3125	-	86
PH33ZG-243R3E2:1LF	33	18 - 36	3.3	-	10000	-	79
PH40ZG-2405E2:1LF	40	18 - 36	5	-	8000	-	81
PH60ZG-2412E2:1LF	60	18 - 36	12	-	5000	-	85
PH75ZG-2412E2:1LF	75	18 - 36	12	-	6250	-	85
PH60ZG-2415E2:1LF	60	18 - 36	15	-	4000	-	85
PH75ZG-2415E2:1LF	75	18 - 36	15	-	5000	-	85
PH60ZG-2424E2:1LF	60	18 - 36	24	-	2500	-	88
PH75ZG-2424E2:1LF	75	18 - 36	24	-	3125	-	88
PH33ZG-483R3E2:1LF	33	36 - 75	3.3	-	10000	-	79
PH40ZG-4805E2:1LF	40	36 - 75	5	-	8000	-	80
PH60ZG-4812E2:1LF	60	36 - 75	12	-	5000	-	83
PH75ZG-4812E2:1LF	75	36 - 75	12	-	6250	-	83
PH60ZG-4815E2:1LF	60	36 - 75	15	-	4000	-	84
PH75ZG-4815E2:1LF	75	36 - 75	15	-	5000	-	84
PH60ZG-4824E2:1LF	60	36 - 75	24	-	2500	-	84
PH75ZG-4824E2:1LF	75	36 - 75	24	-	3125	-	84

SINGLE OUTPUT 4:1

PH40ZG-2405E4:1LF	40	9 - 36	5	-	8000	-	79
PH40ZG-2412E4:1LF	40	9 - 36	12	-	3300	-	84
PH40ZG-4805E4:1LF	40	18 - 72	5	-	8000	-	78
PH40ZG-4812E4:1LF	40	18 - 72	12	-	3300	-	85

If you need other specifications, please enquire.

*** For optional 3kV I/O Isolation, please add "H30" before "LF"**
For example: "PH40ZG-2412E4:1H30LF" for 3kV I/O Isolation

Selection Guide

Dual and Tripple Output

Order #	Power (Watt)	Input Voltage (VDC)	Output Voltage I (VDC)	Output Voltage II (VDC)	Output Current I (mA)	Output Current II (mA)	Efficiency (%)
DUAL OUTPUT 2:1							
PH40ZG-1205Z2:1LF	40	9 - 18	± 5	-	± 4000	-	79
PH60ZG-1212Z2:1LF	60	9 - 18	± 12	-	± 2500	-	83
PH75ZG-1212Z2:1LF	75	9 - 18	± 12	-	± 3125	-	83
PH60ZG-1215Z2:1LF	60	9 - 18	± 15	-	± 2000	-	84
PH75ZG-1215Z2:1LF	75	9 - 18	± 15	-	± 2500	-	84
PH40ZG-2405Z2:1LF	40	18 - 36	± 5	-	± 4000	-	79
PH60ZG-2412Z2:1LF	60	18 - 36	± 12	-	± 2500	-	84
PH75ZG-2412Z2:1LF	75	18 - 36	± 12	-	± 3125	-	84
PH60ZG-2415Z2:1LF	60	18 - 36	± 15	-	± 2000	-	84
PH75ZG-2415Z2:1LF	75	18 - 36	± 15	-	± 2500	-	84
PH40ZG-4805Z2:1LF	40	36 - 75	± 5	-	± 4000	-	79
PH60ZG-4812Z2:1LF	60	36 - 75	± 12	-	± 2500	-	83
PH75ZG-4812Z2:1LF	75	36 - 75	± 12	-	± 3125	-	83
PH60ZG-4815Z2:1LF	60	36 - 75	± 15	-	± 2000	-	86
PH75ZG-4815Z2:1LF	75	36 - 75	± 15	-	± 2500	-	86

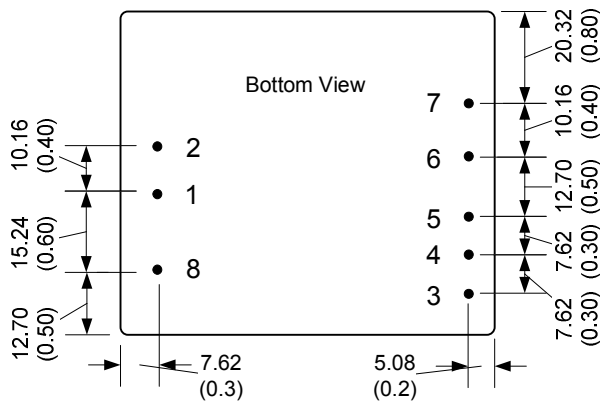
TRIPPLE OUTPUT 2:1

PH32ZG-123R312D2:1LF	32	9 - 18	3.3V	± 12V	6000	± 500	72
PH35ZG-123R315D2:1LF	35	9 - 18	3.3V	± 15V	6000	± 500	72
PH42ZG-120512D2:1LF	42	9 - 18	5V	± 12V	6000	± 500	75
PH45ZG-120515D2:1LF	45	9 - 18	5V	± 15V	6000	± 500	75
PH32ZG-243R312D2:1LF	32	18 - 36	3.3V	± 12V	6000	± 500	74
PH35ZG-243R315D2:1LF	35	18 - 36	3.3V	± 15V	6000	± 500	74
PH42ZG-240512D2:1LF	42	18 - 36	5V	± 12V	6000	± 500	76
PH45ZG-240515D2:1LF	45	18 - 36	5V	± 15V	6000	± 500	76
PH32ZG-483R312D2:1LF	32	36 - 75	3.3V	± 12V	6000	± 500	75
PH35ZG-483R315D2:1LF	35	36 - 75	3.3V	± 15V	6000	± 500	75
PH42ZG-480512D2:1LF	42	36 - 75	5V	± 12V	6000	± 500	77
PH45ZG-480515D2:1LF	45	36 - 75	5V	± 15V	6000	± 500	77

If you need other specifications, please enquire.

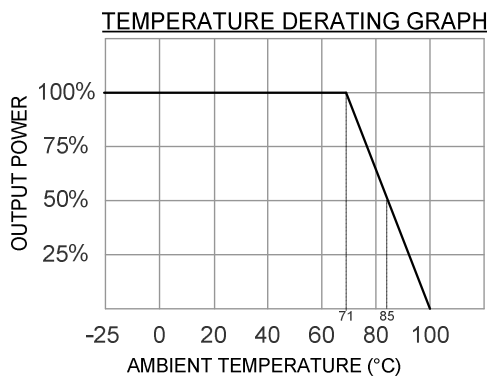
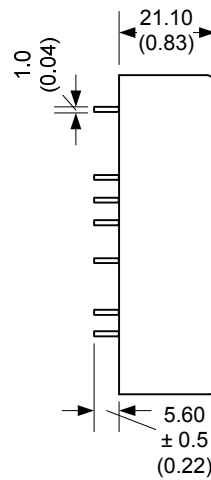
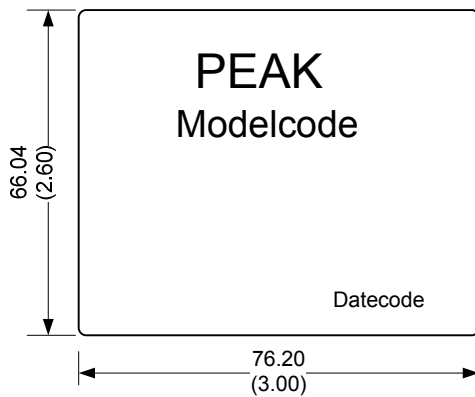
*** For optional 3kV I/O Isolation, please add "H30" before "LF"**
For example: "PH75ZG-4812Z2:1H30LF" for 3kV I/O Isolation

Package / Pinning / Derating



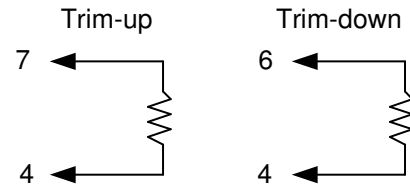
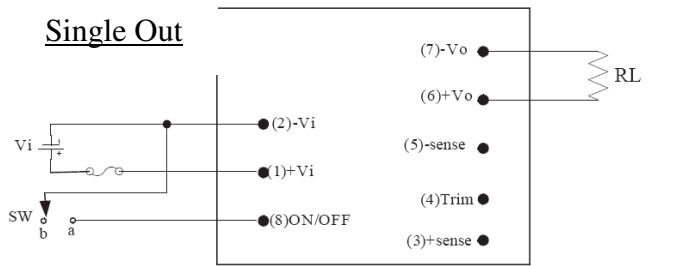
All dimensions are typical in millimeters (inches).
 - Pin diameter: 1.0 +/-0.05 (0.04 +/-0.002)
 - Pin pitch tolerance: +/-0.5 (+/-0.02)
 - Case tolerance +/-0.5 (+/-0.02)
 Specification may change without notice.

2.6" x 3.0" – METAL CASE

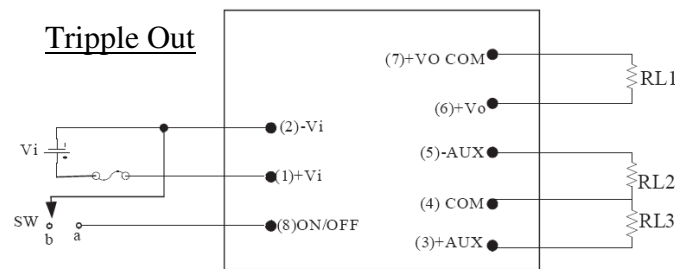
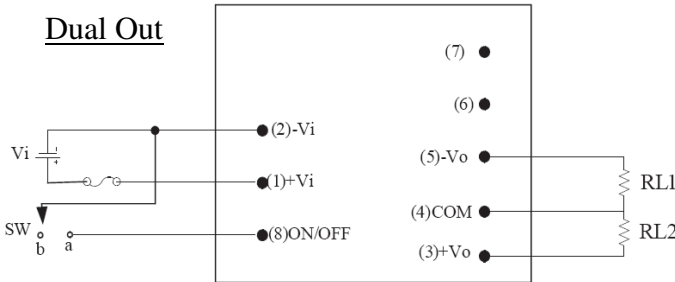


PIN CONNECTIONS			
#	SINGLE	DUAL	TRIPPLE
1	+Vin	+Vin	+Vin
2	- Vin	- Vin	- Vin
3	+Sense	+Vout	+Aux
4	Trim	Common	Common
5	- Sense	- Vout	- Aux
6	+Vout	Omitted	+Vout
7	- Vout	Omitted	+ Vout Com
8	Ctrl.	Ctrl.	Ctrl.

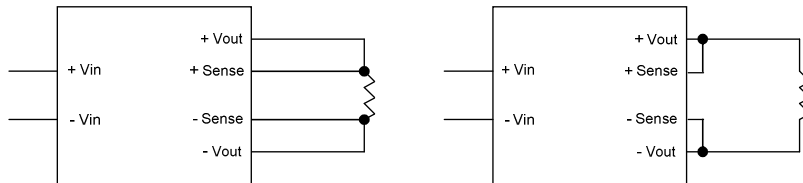
App Notes



External Output Trimming
Output can be externally trimmed.
(Single output models only!)



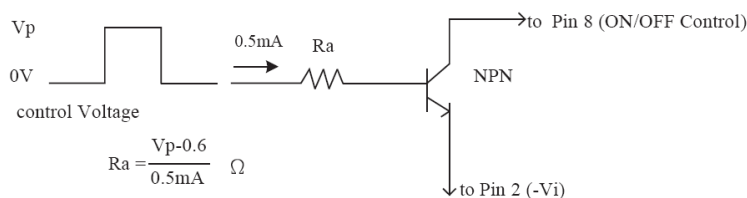
Sense Function:



The SENSE pin helps to precise the output voltage at remote terminal.
If sense is not in use, please shorten -Vout with - Sense and + Vout with + Sense

Remote Control (ON/OFF)

You can switch OFF the converter by connecting SW to position "a". The converter operates when SW is connected to position "b" The SW can be replaced by a NPN transistor:

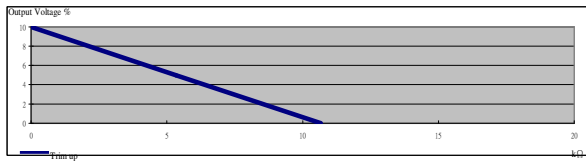


Note: The control voltage is referenced to negative input (-Vi)

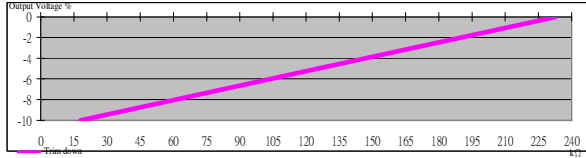
App Notes

Single 3.3Vout

Trim up

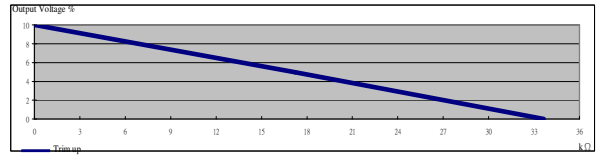


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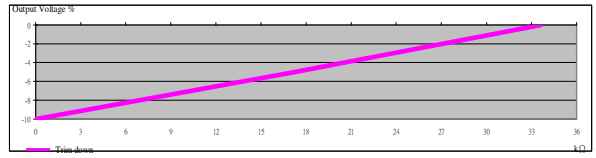


Single 5V

Trim up

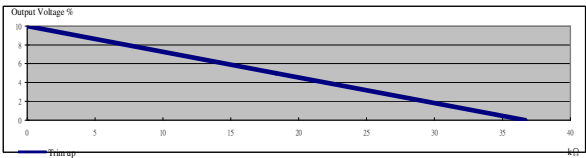


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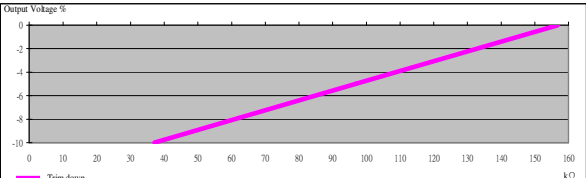


Single 12V

Trim up

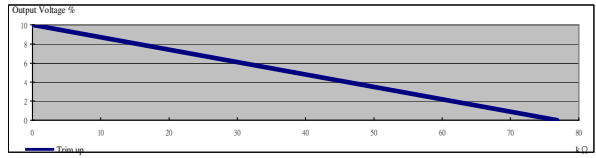


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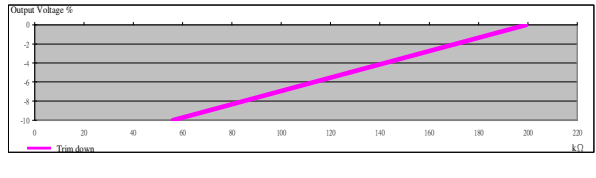


Single 15V

Trim up

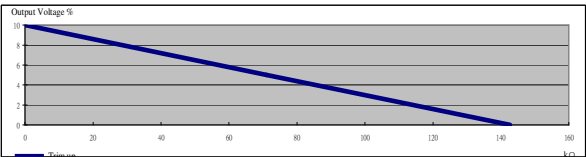


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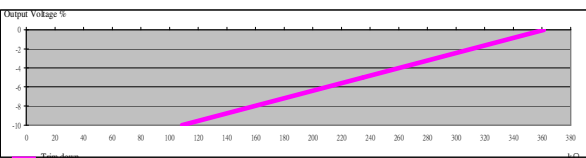


Single 24V

Trim up

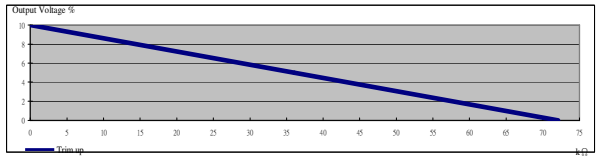


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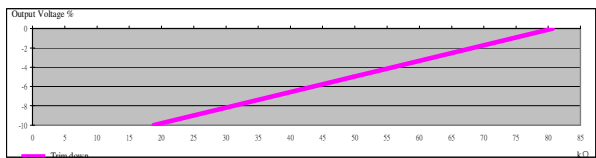


Dual 5Vout

Trim up

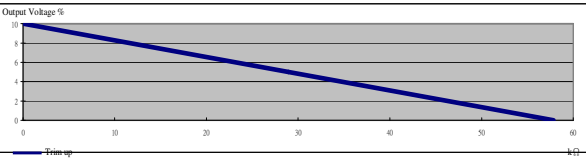


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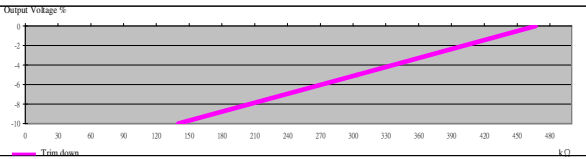


Dual 12Vout

Trim up

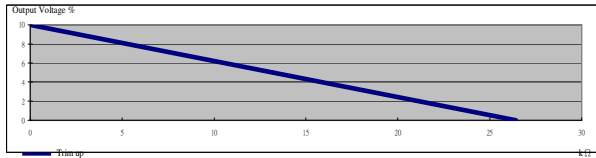


Trim down



Dual 15Vout

Trim up



Trim down

