

# PES2-xxxxE/Z2:1LF



## PES2-SERIES

Rev.07-2009

- ✓ 2 Watt
- ✓ 2:1 Wide Input
- ✓ Regulated
- ✓ **Single and Dual Output**
- ✓ **SMD Case**
- ✓ **1.5 kV DC I/O Isolation**
- ✓ **Short Circuit Protection**

The PES2-Series are specially designed for applications with a wide input voltage range. Power supplies are isolated from the input power supply in a distributed power supply system on a circuit board. These products apply to:

- 1) Where the voltage of the input power supply is up to 2:1 range
- 2) Where isolation is necessary between input and output
- 3) Where the regulation of the output voltage and the output ripple noise are demanded.

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 Wide Input
Input Filter	Capacitors

### Output Specifications

Voltage Accuracy	$\pm 1\%$ , typ. (positive) $\pm 3\%$ , typ. (negative)
Short Circuit Protection	Continuous (automatic recovery)
Line Regulation	$\pm 0.5\%$ , max.
Load Regulation (10% - 100%)	$\pm 1\%$ , max. (unbalanced load for dual out: 5%)
Ripple and Noise (20Mhz bandwidth)	75 mV pk-pk, max.
Temperature Coefficient	$\pm 0.03\%$ / $^\circ\text{C}$

### General Specifications

Efficiency	See Table
I/O Isolation Voltage (3 sec.)	1500 VDC
I/O Isolation Resistance (Tested at 500 VDC)	1000 M Ohm
I/O Isolation Capacitance	85 pF, typ.
Switching Frequency	300 kHz, typ.
Humidity	95% rel H
Reliability Calculated MTBF (MIL-HDBK-217F)	> 1000 khrs

### Physical Specifications

Case Material	Epoxy Resin (UL94-V0 rated)
Weight	~ 5.2g, typ.

### Environment Specifications

Operating Temperature	-40 to +85 $^\circ\text{C}$ (ambient)
Storage Temperature	-55 to +125 $^\circ\text{C}$
Cooling	Free Air Convection (10mm distance required)
Soldering	Not usable for heat steam soldering
RoHS Conform	

# Selection Guide

## Single/Dual Output

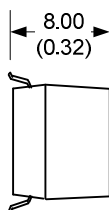
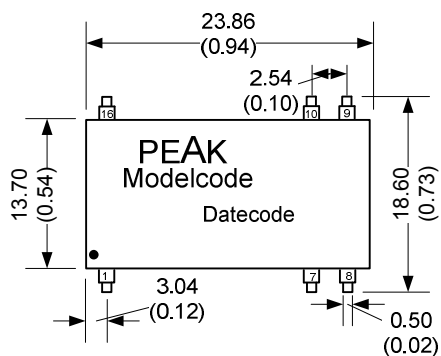
Order #	Input Voltage (VDC)	Output Voltage (VDC)	Output Current max. (mA)	Output Current min. (mA)	Efficiency (%)
<b>SINGLE OUTPUT</b>					
PES2-1203E2:1LF	9 - 18	3.3	500	50	70
PES2-1205E2:1LF	9 - 18	5	400	40	74
PES2-1209E2:1LF	9 - 18	9	222	22	76
PES2-1212E2:1LF	9 - 18	12	167	16	78
PES2-1215E2:1LF	9 - 18	15	133	13	79
PES2-2403E2:1LF	18 - 36	3.3	500	50	72
PES2-2405E2:1LF	18 - 36	5	400	40	76
PES2-2409E2:1LF	18 - 36	9	222	22	78
PES2-2412E2:1LF	18 - 36	12	167	16	80
PES2-2415E2:1LF	18 - 36	15	133	13	80

<b>DUAL OUTPUT</b>					
PES2-1205Z2:1LF	9 - 18	±5	±200	±20	74
PES2-1212Z2:1LF	9 - 18	±12	±83	±8	78
PES2-1215Z2:1LF	9 - 18	±15	±67	±7	80
PES2-2405Z2:1LF	18 - 36	±5	±200	±20	74
PES2-2412Z2:1LF	18 - 36	±12	±83	±8	78
PES2-2415Z2:1LF	18 - 36	±15	±67	±7	80

If you need other specifications, please enquire.

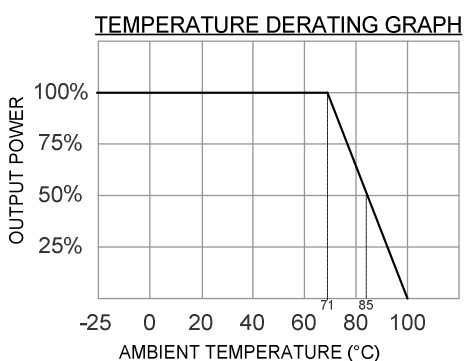
Notes:

# Package / Pinning / Derating



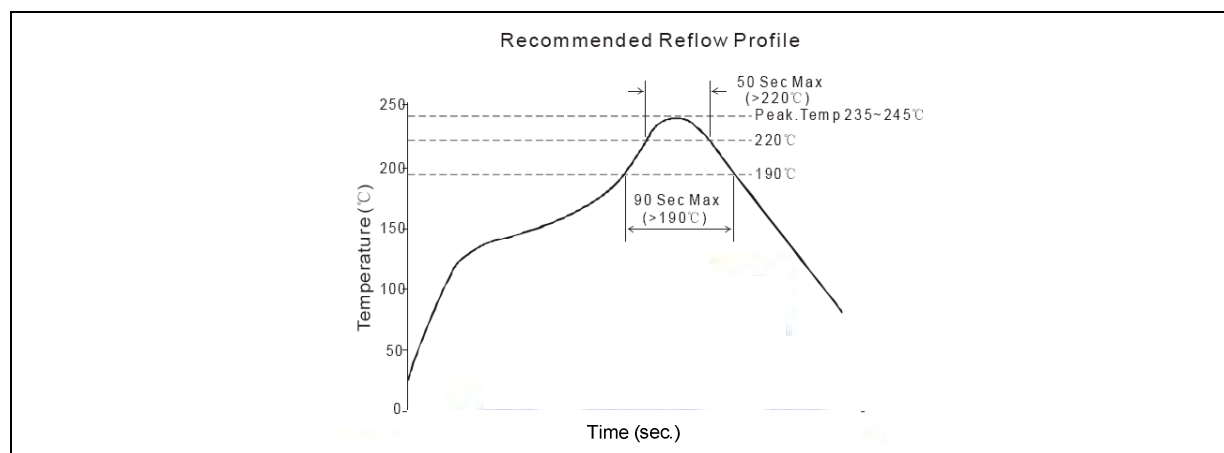
## PES2-Series

All dimensions are typical in millimeters (inches).  
 - Pin pitch tolerance: +/-0.35 (+/-0.014)  
 - Case tolerance +/-0.5 (+/-0.02)  
 Specification may change without notice.



PIN CONNECTIONS		
#	SINGLE	DUAL
1	- Vin	- Vin
7	N.C.	N.C.
8	N.C.	Common
9	+Vout	+Vout
10	- Vout	- Vout
16	+Vin	+Vin

## Reflow:



# App Notes

## Requirement On Output Load

In order to ensure the product operate efficiently and reliably, in addition to a max load (namely full load), a minimum load is specified for this kind of DC/DC converter. Make sure the specified range of input voltage is not exceeded, the minimum output load no less than 10% load. If the actual load is less than the specified minimum load, the output ripple may increase sharply while its efficiency and reliability will reduce greatly. If the actual output power is very small, please add an appropriate resistor as extra loading, or contact our company for other lower output power products.

## Recommended testing circuit

All the PES2-Series have been tested according to the following recommended testing circuit before leaving factory. This series should be tested under load. (See Figure)

If you want to further decrease the input/output ripple, you can increase capacitance properly or choose capacitors with low ESR. However, the capacitance of the output filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the greatest capacitance of its filter capacitor sees.

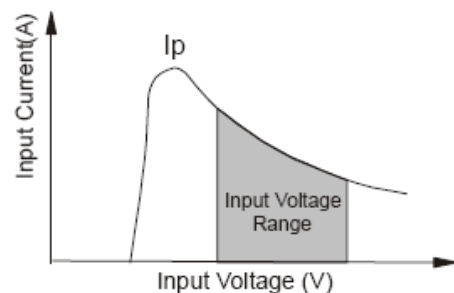
General: Cin: 12V            100μF  
                                   24V&48V 10μF~47μF  
 Cout: 10μF/100mA

EXTERNAL CAPACITOR TABLE			
Vin (VDC)	Cout (uF)	Dual Vout (VDC)	Cout (uF)
3.3	2200	± 5	680
5	1000	± 9	470
9	680	± 12	330
12	470	± 15	220
15	330	--	--

## Input Current

When it is used in unregulated power supply, be sure that the fluctuating range of the power supply and the rippled voltage do not exceed the module standard. Input current of power supply should afford the flash startup current of this kind of DC/DC module.

General:  $I_p \leq 1.4 * I_{in-max}$ :



## No parallel connection or plug and play.