

PEAK

electronics

THE WORLD OF DC/DC-CONVERTERS



DC/DC-Converter
AC/DC-Converter

PRODUCT OVERVIEW

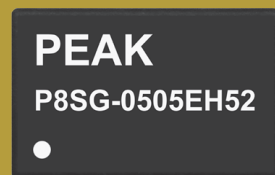
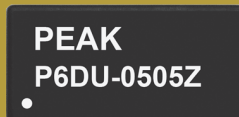
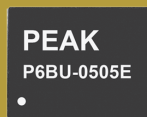
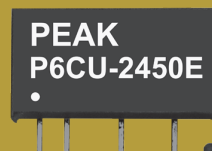
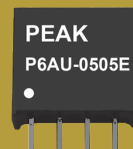
Switch-Regulator
LED - Driver

DIN RAIL
Power Supply Moduls

Custom Design

DEVELOPMENT PRODUCTION AND DISTRIBUTION OF DC/DC-CONVERTERS

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Switching Regulators

PSR Series

Wide Input, non Isolated & Regulated

Features

- ◆ Efficiency up to 96%
- ◆ Input: 4.5-32 V DC
- ◆ Output: (+, -) 3.3-15 V DC
- ◆ Temperature Range: -40°C to +85°
- ◆ No heat sink Required
- ◆ Short circuit protection, Thermal Shutdown
- ◆ Low Ripple and Noise
- ◆ SIP and SMD Package
- ◆ Industry Standard Pinout
- ◆ MTBF>2,000,000 hours



PSR SERIES PSR-78xxLF WIDE INPUT NON-ISOLATED REGULATED SINGLE OUTPUT SIP3

Wide Input Range
Efficiency up to 96%
Available Outputs:
+/- 3.3, 5, 6.5, 9, 12, 15 VDC
 Other specifications please enquire.

Electrical Specifications

(Typical at + 25° C, nominal input voltage, rated output current unless otherwise specified)

Output Specifications

Voltage accuracy (at 100% load)	+/- 2 %, typ. / +/- 3%, max.
Line voltage regulation (Vin=min. to max. at full load)	+/- 0,2%, typ. / +/- 0.4%, max.
Load voltage regulation (10% - 100%)	+/- 0.4%, typ. / 0.6%, max.
Ripple and noise (at 20 MHz BW)	20 mV p-p, typ. / 35 mV p-p, max.
Short circuit input power	0.5W, typ. / 1.8W, max.
Short circuit protection	Continuous, automatic recovery
Switching frequency	280KHz, min. / 330 KHz, typ. / 450 KHz, max.
Quiescent current	Positive Output: 5mA, typ / 8mA, max. Negative Output: 7mA, typ. / 13mA, max.
Thermal shutdown (Internal IC junction)	150 °C, typ.
Temperature coefficient (-40°C – +85°C ambient)	0.02% °C, max.
Capacitance load	1000uF, max.

Common Specifications

Operating temperature (ambient)	- 40° C to + 85° C / 100°C case max.
Storage temperature	- 55 °C to + 125 °C
Cooling	Free air convection
MTBF (MIL-HDBK-217F)	2000 KHrs, min.

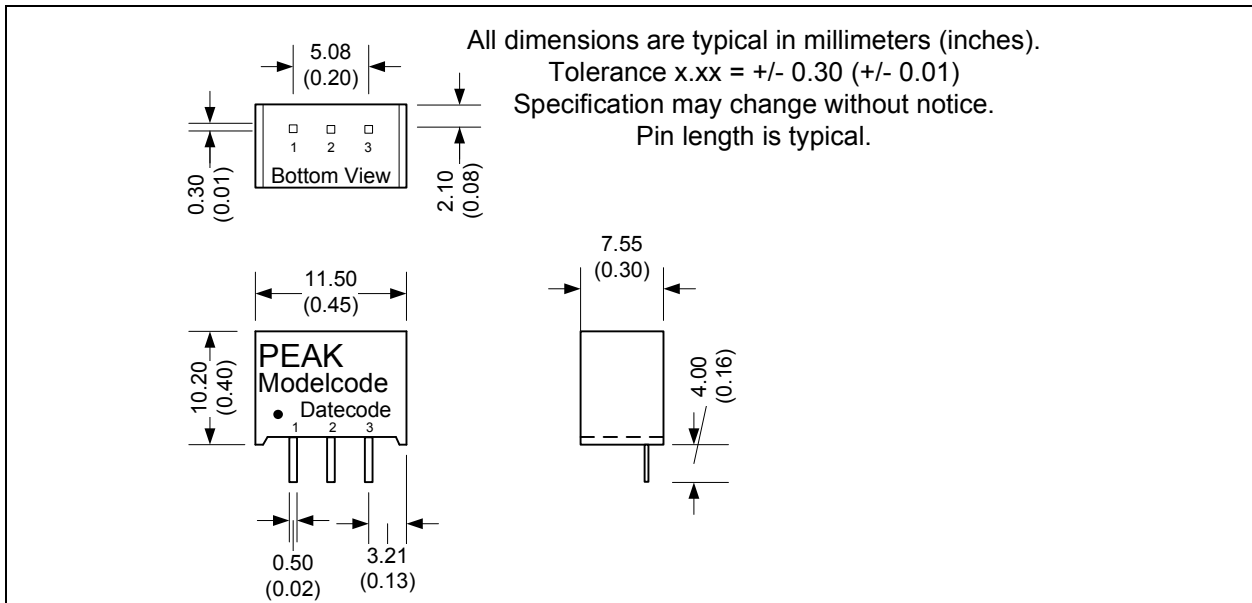
Physical Characteristics

Case material	Plastic (UL94-V0)
“RoHS compliant”	Soldering 260 °C / max. 10 sec.

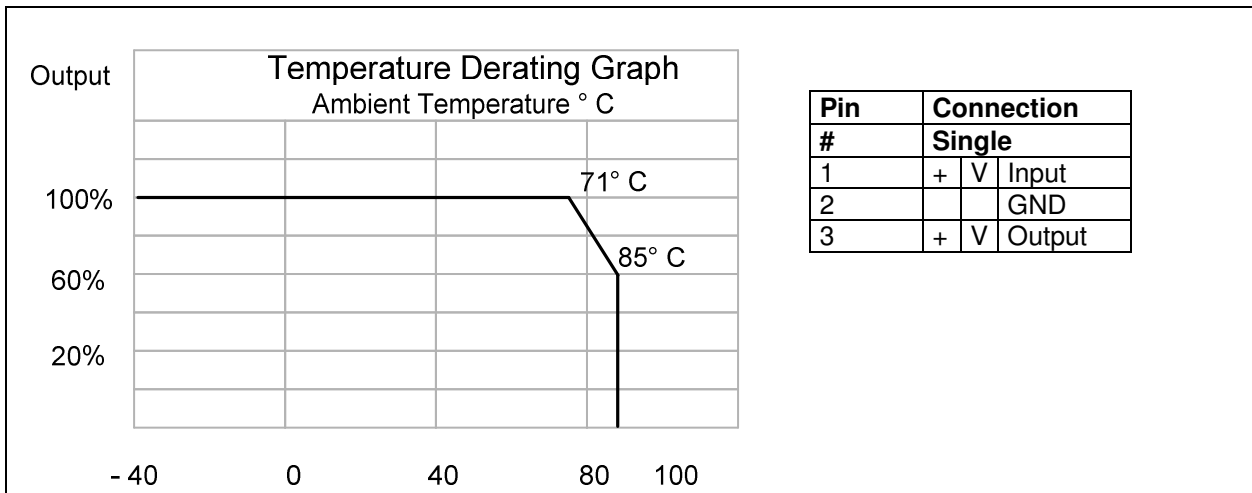
Examples for Partnumbers

PART NO.	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (max. mA)	EFFICIENCY	
				Min Vin (%)	Max Vin (%)
PSR-783R3LF	4.75-28	3.3	500	90	80
	4.75-25	-3.3	-400	73	78
PSR-7805LF	6.5-32	5.0	500	93	84
	6.0-27	-5.0	-400	78	83
PSR-786R5LF	8-32	6.5	500	94	87
	6.0-25	-6.5	-300	83	85
PSR-7809LF	11-32	9.0	500	95	91
	7.0-23	-9.0	-200	87	86
PSR-7812LF	15-32	12	500	95	92
	7.0-20	-12	-200	85	87
PSR-7815LF	18-32	15	500	96	93
	7.0-17	-15	-200	84	89

Dimensions

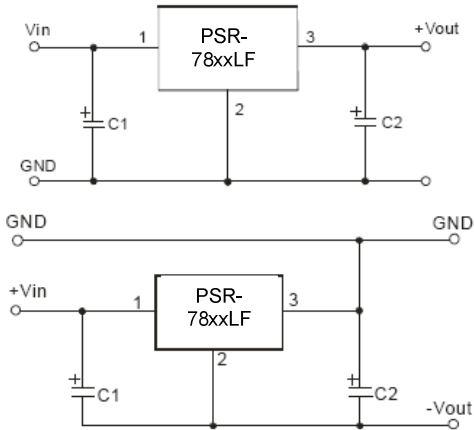


Derating Graph and Pinning

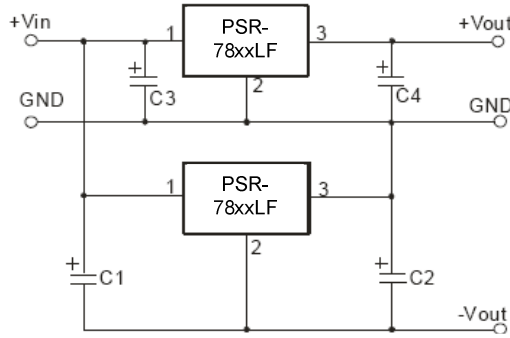


App Notes :

STANDARD APPLICATION CIRCUIT



APPLICATION EXAMPLE



- NOTE:
1. C1 and C2 are required and should be fitted close to the converter pins.
 2. See table for the capacitance of C1, C2, C3 and C4. Tantalum or low ESR electrolytic capacitors may also be used.
 3. No parallel connection or plug and play.

EXTERNAL CAPACITOR TABLE

Part Number	C1, C3 ceramic Capacitor	C2, C4 ceramic Capacitor
PSR-783R3LF	10uF/50V	22uF/6.3V
PSR-7805LF	10uF/50V	22uF/10V
PSR-786R5LF	10uF/50V	10uF/10V
PSR-7809LF	10uF/50V	10uF/16V
PSR-7812LF	10uF/50V	10uF/25V
PSR-7815LF	10uF/50V	10uF/25V

PSR SERIES PSR1-78xxLF

WIDE INPUT REGULATED SINGLE OUTPUT SIP3 – 1000mA

Wide Input Range
Efficiency up to 93%
Available Outputs:
3.3, 5, 6.5, 9, 12 VDC

Other specifications please enquire.

Electrical Specifications

(Typical at + 25° C, nominal input voltage, rated output current unless otherwise specified)

Output Specifications

Voltage accuracy (at 100% load)	+/- 2 %, typ. / +/- 3%, max.
Line voltage regulation (Vin=min. to max. at full load)	+/- 0,2%, typ. / +/- 0.4%, max.
Load voltage regulation (10% - 100%)	+/- 0.4%, typ. / 0.6%, max.
Ripple and noise (at 20 MHz BW)	20 mV p-p, typ. / 35 mV p-p, max.
Short circuit input power	0.5W, typ. / 1.2W, max.
Short circuit protection	Continuous, automatic recovery
Output current limit	2000mA, max.
Switching frequency	280KHz, min. / 330 KHz, typ. / 450 KHz, max.
Dynamic load stability 100% <-> 10% load	+/- 100mV
Quiescent current (Vin=min. to max. at 0% load)	5mA, typ. / 7mA, max.
Thermal shutdown (Internal IC junction)	150 °C, typ.
Temperature coefficient (-40°C – 85°C ambient)	0.02% °C, max.

Common Specifications

Operating temperature (ambient)	- 40° C to + 85° C / 100°C case max.
Storage temperature	- 55 °C to + 125 °C
Cooling	Free air convection
MTBF (MIL-HDBK-217F)	2000 KHrs, min.

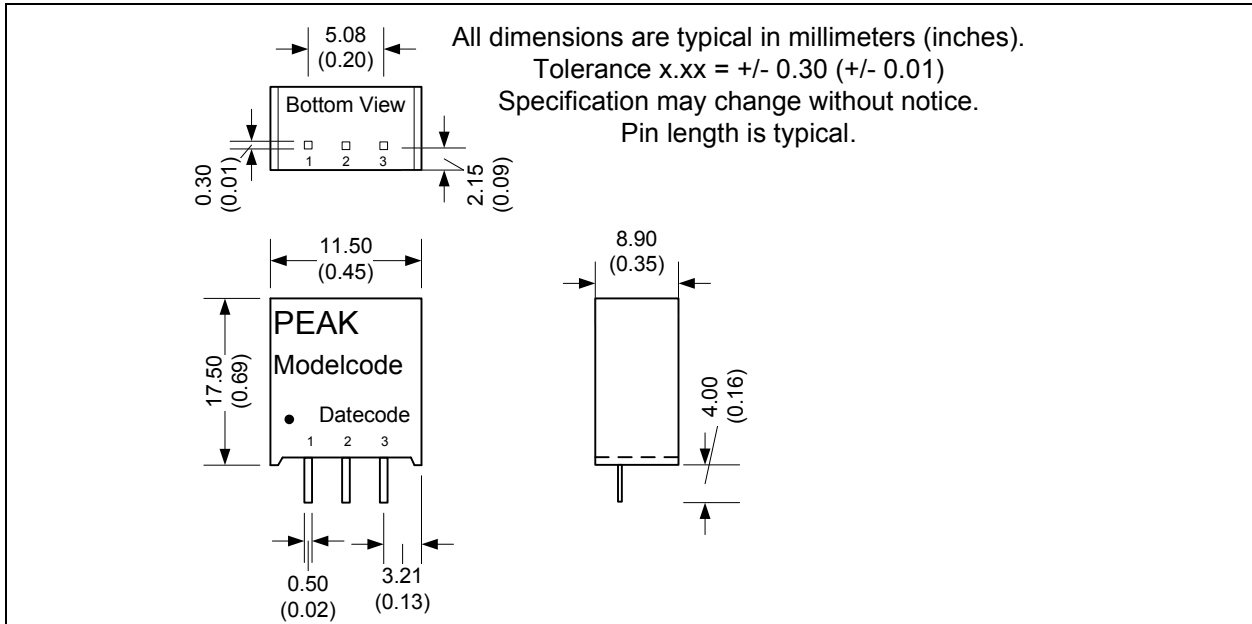
Physical Characteristics

Case material	Plastic (UL94-V0)
“RoHS compliant”	Soldering 260 °C / max. 10 sec.

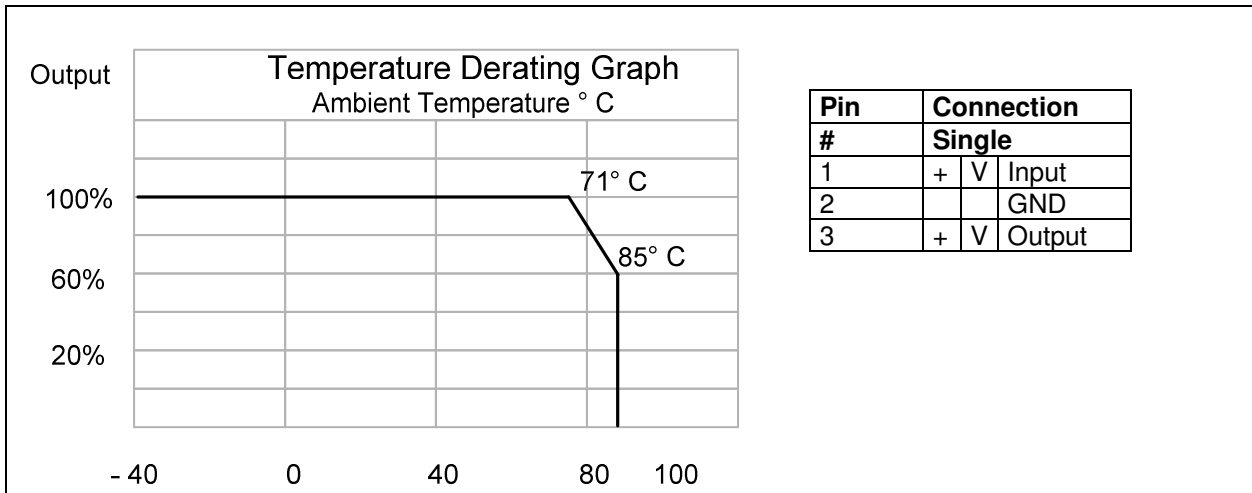
Examples for Partnumbers

PART NO.	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (max. mA)	EFFICIENCY	
				Min Vin (%)	Max Vin (%)
PSR1-783R3LF	4.75 – 28	3.3	1000	90	83
PSR1-7805LF	6.5 – 32	5	1000	93	88
PSR1-786R5LF	9.0 - 32	6.5	1000	94	90
PSR1-7809LF	12 - 32	9	1000	95	92
PSR1-7812LF	16 – 32	12	1000	96	94

Dimensions

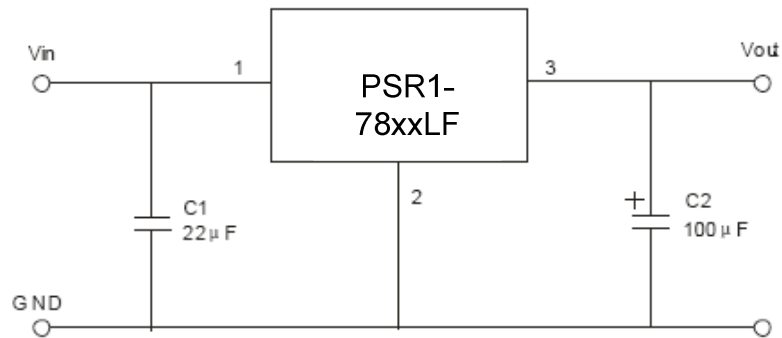


Derating Graph and Pinning



App Notes :

STANDARD APPLICATION CIRCUIT TOP VIEW



NOTE:

C1: a low ESR capacitor is required to keep the noise at the converter to a minimum. Ceramic capacitors are preferred, but tantalum or low ESR electrolytic capacitors may also be used. Use 22μF/50V ceramic capacitor.

C2: Optional use 100μF/25V electrolytic capacitor.

Note: No parallel connection or plug and play.

Specification can be changed without notice.

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REV: 10/08

PSR1-78xxS



PSR1-SERIES Rev.11-2010

- ✓ 1000mA **Switching Regulator**
- ✓ **Wide Input - Step down**
- ✓ **SIP3 Plastic Package**
- ✓ **Non-Isolated & Non-Regulated**
- ✓ **Short Circuit Protection**
- ✓ **High Efficiency**

The PSR1-S series is a family of cost effective 1.5~5W single output buck DC-DC converters. These converters are encapsulated in a non-conductive black plastic package 3-pin SIP case, continuous short circuit protection with automatic restart and good line / load regulation. Devices are filled up with flame retardant resin .Input voltages of 4.75~18, and 6.5~18 with output voltage of 1.5, 1.8, 2.5, 3.3, 5, Vdc. High performance features include high efficiency operation up to 94%. Standard features include an input range of 4.75~18Vdc tolerance and low output ripple and noise.

All specifications typical at Ta=25°C, nominal input voltage and full load unless otherwise specified

Input Specifications

Voltage Range	Wide Input (See Table)
Filter	Capacitors
Input Reflected Ripple Current	40mA pk-pk

Output Specifications

Voltage Accuracy	± 2%
Short Circuit Protection	Indefinite (Automatic Recovery)
Line Regulation	± 0.5%
Load Regulation (10% - 100% load)	± 0.6%
Ripple and Noise (20Mhz bandwidth)	60 mV pk-pk
Temperature Coefficient	± 0.02% / °C
Capacitor Load	220 uF

General Specifications

Efficiency	See Table
Switching Frequency	330 kHz, typ.
Humidity	95% rel H
Reliability Calculated MTBF (MIL-HDBK-217F)	> 4.3 Mhrs

Physical Specifications

Case Material	Non Conductive Black Plastic (UL94V-0 rated)
Potting Material	Epoxy (UL94V-0 rated)
Weight	~ 2.0 g, typ.

Environment Specifications

Operating Temperature	-40 to +60 °C (for 100%)
Maximum Case Temperature	100 °C
Cooling	Free Air Convection (10mm distance required)

EMC Characteristics

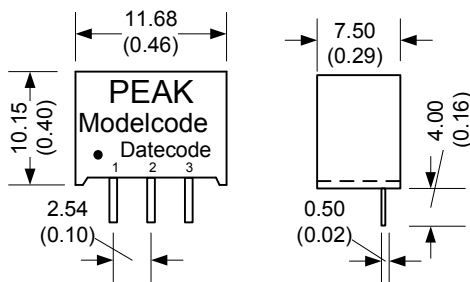
Radiated Emissions	EN55022 CLASS B
Conducted Emissions	EN55022 CLASS B
ESD	EN61000-4-2 Pref. Criteria B
RS	EN61000-4-3 Pref. Criteria A
EFT (An external filter capacitor is required if the module has to meet EN61000-4-4. (220uF/100V))	EN61000-4-4 Pref. Criteria B
CS	EN61000-4-6 Pref. Criteria A
PFMF	EN61000-4-8 Pref. Criteria A

Selection Guide

Order #	Input Voltage Range (VDC)	Input Current no Load (mA)	Input Current full Load (Vin min.)	Input Current full Load (Vin max.)	Output Voltage (V)	Output Current (mA)	Efficiency (Vin min.) (%)	Efficiency (Vin max.) (%)
PSR1-781R5S	4.75-18	10.0	416.00	119.00	1.5	1000	78	72
PSR1-781R8S	4.75-18	10.0	474.00	135.00	1.8	1000	82	76
PSR1-782R5S	4.75-18	10.0	619.00	176.00	2.5	1000	87	81
PSR1-783R3S	4.75-18	10.0	790.00	221.00	3.3	1000	90	85
PSR1-7805S	6.5-18	10.0	836.00	319.00	5.0	1000	94	89

If you need other specifications, please enquire.

Package / Pinning / Derating

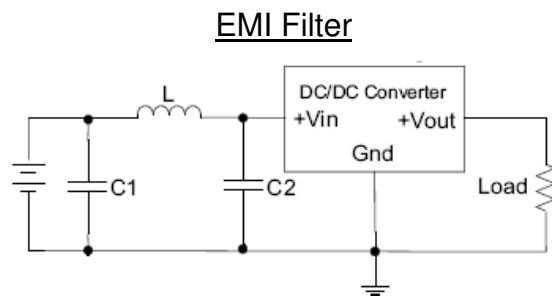
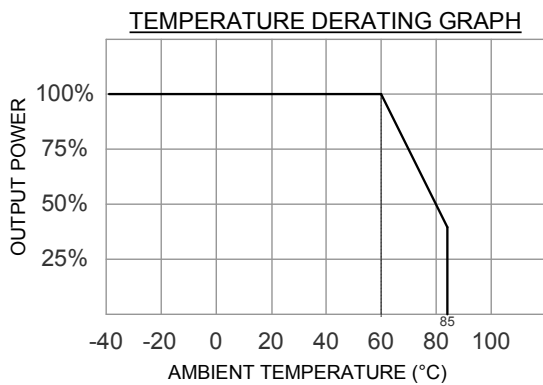


Notes : All dimensions are typical in millimeters (inches).

1. Pin diameter: 0.5 ± 0.05 (0.02 ± 0.002)
2. Pin pitch tolerance: ± 0.35 (± 0.014)
3. Case Tolerance: ± 0.5 (± 0.02)

Specification may change without notice. Pin length is typical.

PIN CONNECTIONS	
#	Switching Reg.
1	+ Vin
2	GND
3	+ Vout



C1 / C2 = 470uF, 35V
L = 6.4uH

PSRS-78xxLF



PME02-SERIES

Rev.09-2009

- ✓ 500 mA **Switching Regulator**
- ✓ **Wide** Input
- ✓ **SMD** Plastic Package
- ✓ Non-Isolated & Regulated
- ✓ **Adjustable** Output Voltage
- ✓ SC Prot. / Thermal Shutdown
- ✓ **Remote ON/OFF** Control

The PME02-500mA Series with high efficiency switching regulators are ideally supply for space constrained mobile applications. They are no need for any heat sinks, even if operate at +85°C. The additional features include remote ON/OFF control and adjustable output voltage. Super low ripple and noise of typically only 10mV and a shutdown input current of typically only 15uA.

All specifications typical at Ta=25°C, nominal input voltage and full load unless otherwise specified

Input Specifications

Voltage Range Wide Input (See Table)

Output Specifications

Voltage Accuracy (100% load)	± 2%, typ.
Short Circuit Protection	Continuous (Hiccup / Automatic Recovery)
Line Regulation	± 0.2%, typ.
Load Regulation (10% - 100% load)	± 0.3%, typ.
Ripple and Noise (20Mhz bandwidth)	25 mV pk-pk, max.
Output Current Limit	1.8 A
Temperature Coefficient	± 0.02% / °C

General Specifications

Dynamic Load Stability (100% <-> 10% load)	± 30 mV, typ.
Quiescent current (nom. Input, 3.3 and 5 Vout)	15 mA, typ
Thermal Shutdown	160°C
Capacitance Load	1000 uF, max.
ON/OFF control current ON: open or 1.5<Vc<6 OFF: GND or 0V<Vc<1V	2 uA, typ.
Shutdown Input Current	30 uA, max.
ON/OFF Shutdown Threshold Voltage	1.1 V, min / 1.25 V, typ. / 1.4 V, max.
Reliability Calculated MTBF (MIL-HDBK-217F)	≥ 2 Mhrs

Physical Specifications

Case Material	Non Conductive Black Plastic (UL94V-0 rated)
Weight	~ 2.3 g, typ.

Environment Specifications

Operating Temperature	-40 to +85 °C (ambient)
Maximum Case Temperature	100 °C
Storage Temperature	-55 to +125 °C
Cooling	Free Air Convection (10mm distance required)

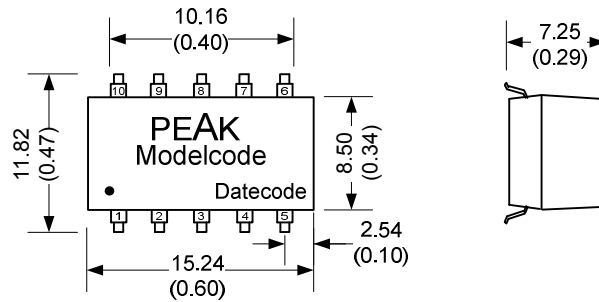
Selection Guide

Order #	Input Voltage nom. (VDC)	Input Voltage Range (VDC)	Output Normal (VDC)	Output Adjust Range (VDC)	Current max. (mA)	Efficiency max. (%)
PSRS-783R3LF	12	4.5 - 28	3.3	1.8 - 5.5	500	90
PSRS-7805LF	12	6.0 - 28	5	2.5 - 8.0	500	94
PSRS-7812LF	24	14 - 28	12	4.5 - 13.5	500	95
PSRS-7815LF	24	17 - 28	15	4.5 - 15.5	500	96

If you need other specifications, please enquire.

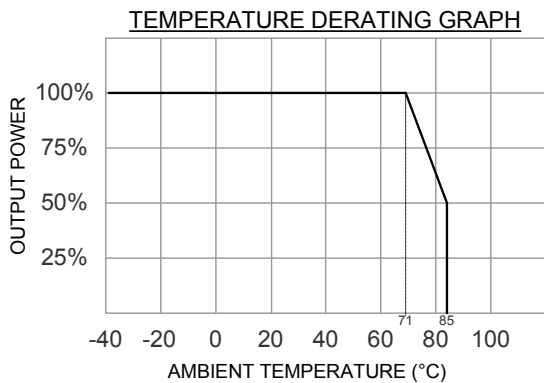
Notes:

Package / Pinning / Derating

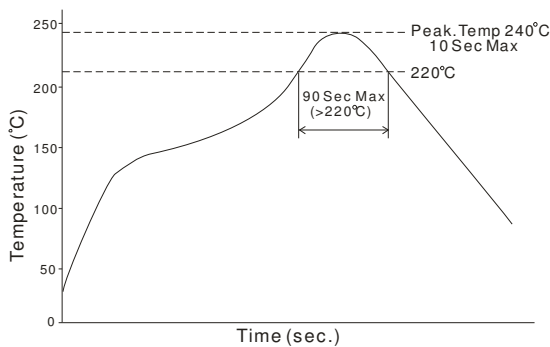


All dimensions are typical in millimeters (inches).
 - Pin pitch tolerance: ± 0.35 (± 0.014)
 - Case tolerance ± 0.5 (± 0.02)
 Specification may change without notice.

PME02-Series

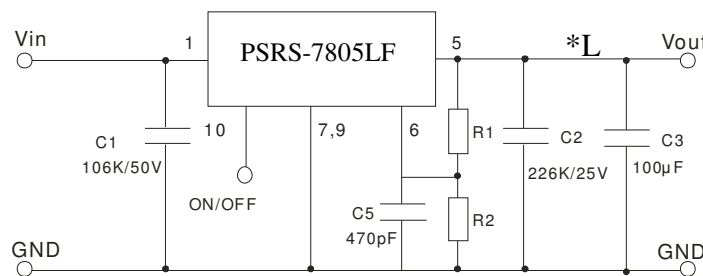


PIN CONNECTIONS	
#	Switching Reg.
1	+Vin
5	+Vout
6	Vadj
7	GND
9	GND
10	ON/OFF
others	Omitted



External Capacitor Table

Part Number	C1 (ceramic cap.)	C2 (ceramic cap.)
PSRS-783R3LF	10uF/50V	22uF/16V
PSRS-7805LF	10uF/50V	22uF/16V
PSRS-7812LF	10uF/50V	10uF/25V
PSRS-7815LF	10uF/50V	10uF/25V



1. C1,C2: Choose a ceramic type capacitors; C3 is require ,for best performance, use a 100µF or more capacitor please.
 2. C1,C2 are require and should be placed close to the pins of the converter, with shortest possible traces.
 3. No parallel connection or plug and play.
- *L: To reduce output ripple, it is recommended to add a LC filter to output port. Recommended parameter: 10µH ~ 47µH.

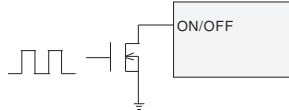
PME02-Series – PSRS-78xxLF – Switching Regulator – SMD – Plastic Case

Specification can change without a notice – We accept no liability for any inaccuracy or printing errors.

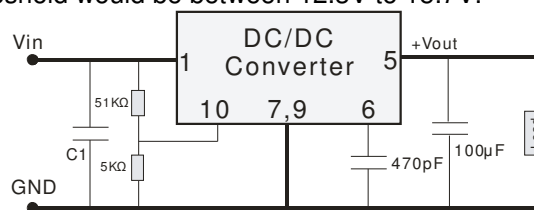
App Notes

The ON/OFF pin provides several features for adjusting and sequencing the power supply, a user has the flexibility of using the ON/OFF pin as:

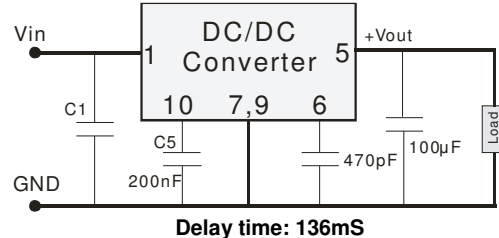
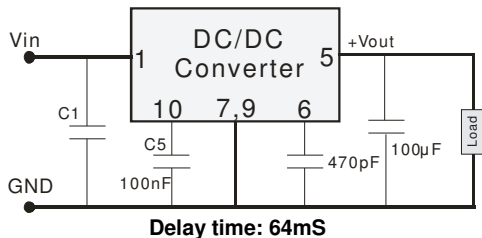
- 1) A digital on/off control by pulling down the ON/OFF pin with an open-drain transistor.



- 2) Line UVLO. If desired to achieve a UVLO voltage, an resistor divider from Vin to ON/OFF to GND can be used to disable the converter until a higher input voltage is achieved. For example, it is not useful for a converter with 12V output to start up with a 12V input voltage, as the output cannot reach regulation. To enable the converter when the input voltage reaches 14V, a 51kΩ/5kΩ resistor divider from Vin to GND can be connected to the ON/OFF pin. Both the precision 1.25V threshold and 150mV hysteresis are multiplied by the resistor ratio, providing a proportional 12% hysteresis for any startup threshold. So, the turn off threshold would be between 12.3V to 15.7V.



- 2) Power supply sequencing. By connecting a small capacitor from ON/OFF to GND, the 2µA current source and 1.25V threshold can provide a stable and predictable delay between start-up of multiple power supplies. For example, a start-up delay of roughly 64mS is provided using 100nF, and roughly 136mS by using 200nF.



Part #	Vout (nominal)	Vout adjust up R2 (kOhm)	Vout adjust down R1 (kOhm)
PSRS-783R3LF	3.3	$= \frac{75.10 - 10 * Vout}{Vout - 3.3}$	$= \frac{61 * Vout - 75.10}{3.3 - Vout}$
PSRS-7805LF	5	$= \frac{91.52 - 10 * Vout}{Vout - 5}$	$= \frac{61 * Vout - 91.52}{5 - Vout}$
PSRS-7812LF	12	$= \frac{287.02 - 20 * Vout}{Vout - 12}$	$= \frac{71 * Vout - 287.02}{12 - Vout}$
PSRS-7815LF	15	$= \frac{269.37 - 15 * Vout}{Vout - 15}$	$= \frac{66 * Vout - 269.37}{15 - Vout}$

The R1, R2 which choose from the table 1 equation are used to set the output voltage. Select the R1 or R2 resistor to provide the desired regulation voltage. R1 is used to set the output voltage to lower, R2 is used to set the output voltage to higher. If no need to adjust the output voltage, please connect a ceramic capacitor to GND with 470pF typical value. Insure the output voltage is in the adjust range.

PSRW-78xxLF



PSRW-SERIES Rev.11-2010

- ✓ 500 mA **Switching Regulator**
- ✓ **Wide** Input
- ✓ **SIP3** Plastic Package
- ✓ Non-Isolated & Non-Regulated
- ✓ **Low quiescence** out current
- ✓ Short Circuit Protection
- ✓ Low Ripple and Noise

The PSRW series is a family of cost effective 1.65~7.5W single output buck DC-DC converters. These converters are encapsulated in a non conductive black plastic 3-pin SIP case, continuous short circuit protection with automatic restart, good line / load regulation and ultra low quiescence current. Devices are filled up with flame retardant resin. Input voltages of 9~72, 14~72, 17~72, 20~72, and 36~72 with output voltage of 3.3, 5, 6.5, 7.2, 9, 12 and 15Vdc. High performance features include high efficiency operation up to 95%.

All specifications typical at Ta=25°C, nominal input voltage and full load unless otherwise specified

Input Specifications

Voltage Range	Wide Input (See Table)
Filter	Capacitors
Input Reflected Ripple Current	35mA pk-pk

Output Specifications

Voltage Accuracy	± 3%
Short Circuit Protection	Indefinite (Automatic Recovery)
Line Regulation	± 1%
Load Regulation (10% - 100% load)	± 0.6%
Ripple and Noise (20Mhz bandwidth)	75 mV pk-pk
Temperature Coefficient	± 0.02% / °C
Capacitor Load	100 uF

General Specifications

Efficiency	See Table
Switching Frequency	120 - 800 kHz
Humidity	95% rel H
Reliability Calculated MTBF (MIL-HDBK-217F)	> 4.5 Mhrs

Physical Specifications

Case Material	Non Conductive Black Plastic (UL94V-0 rated)
Potting Material	Silicon (UL94V-0 rated)
Weight	~ 1.8 g, typ.

Environment Specifications

Operating Temperature	-40 to +60 °C (for 100%)
Maximum Case Temperature	105 °C
Storage Temperature	-40 to +125 °C
Cooling	Free Air Convection (10mm distance required)

EMC Characteristics

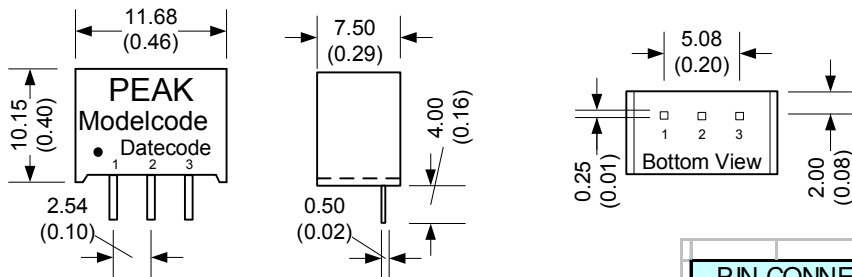
Radiated Emissions	EN55022 CLASS B
Conducted Emissions	EN55022 CLASS B
ESD	EN61000-4-2 Pref. Criteria A

Selection Guide

Order #	Input Voltage Range (VDC)	Input Current no Load (mA)	Input Current full Load (Vin min.)	Input Current full Load (Vin max.)	Output Voltage (V)	Output Current (mA)	Efficiency (Vin min.) (%)	Efficiency (Vin max.) (%)
PSRW-783R3LF	9-72	3.0	230	32	3.3	500	82	75
PSRW-7805LF	9-72	3.0	327	45	5.0	500	87	80
PSRW-786R5LF	9-72	3.0	406	56	6.5	500	91	83
PSRW-787R2LF	14-72	3.0	289	61	7.2	500	91	84
PSRW-7809LF	14-72	3.0	358	76	9.0	500	92	86
PSRW-7812LF	17-72	3.0	384	97	12	500	94	89
PSRW-7815LF	20-72	3.0	404	119	15	500	95	91

If you need other specifications, please enquire.

Package / Pinning / Derating

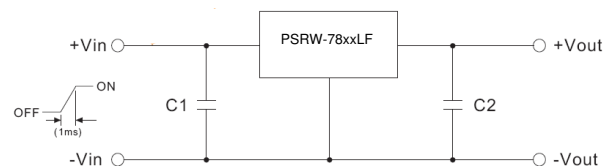
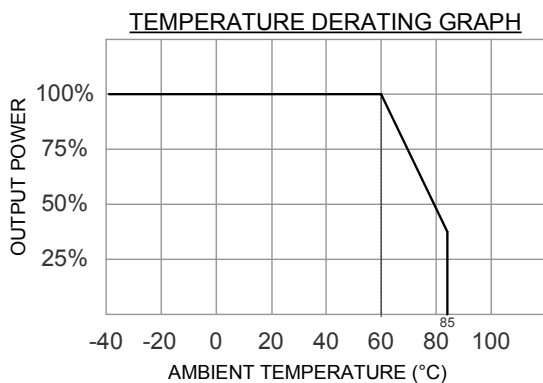


Notes : All dimensions are typical in millimeters (inches).

1. Pin diameter: 0.5 ± 0.05 (0.02 ± 0.002)
2. Pin pitch tolerance: ± 0.35 (± 0.014)
3. Case Tolerance: ± 0.5 (± 0.02)

Specification may change without notice. Pin length is typical.

PIN CONNECTIONS	
#	Switching Reg.
1	+ Vin
2	GND
3	+ Vout



1. If $V_{in} > 50V$, in order to protect the converter during power-up, an external capacitor $C1 = 3.3\mu F / 100V$ is required.

2. $C2 = 100\mu F$ (Optional)