

FPDK12SR8006PSS

5.6-14.0Vdc Input, 6A, 0.8-6.6Vdc Output

New Product Brief

The **DK** Series of non-isolated dc-dc converters provide high efficiency, cost effective, and complete Point-of-Load power solutions in very small and low profile SMD packages. Occupying a footprint of less than 2 cm² (0.3 in²), these are the converters of choice for a wide range of telecommunications, data communications, computing, industrial and consumer applications where board space, cost, height, efficiency, and reliable operation in elevated temperature environments are critical.

非絶縁型DC/DCコンバータの**DK**シリーズは、高効率、低価格、小型・低背のSMDパッケージで完全なPOL電源ソリューションを提供します。実装面積が2cm² (0.3 in²) 以下のこのコンバータは、基板スペース、費用、高さ、効率、及び高温環境での信頼性のある動作が重要な広範囲の電気通信、データ通信、コンピュータ、産業及びビジュアル向けのアプリケーションに最適です。

The **FPDK12SR8006PSS** converter of the **DK** Series operates from a 5.6Vdc to 14.0Vdc input, and delivers 6A of output current at a tightly regulated programmable output voltage of 0.8Vdc to 6.6Vdc. The thermal performance of the **FPDK12SR8006PSS** is best-in-class: Little derating is needed up to 85°C, under natural convection.

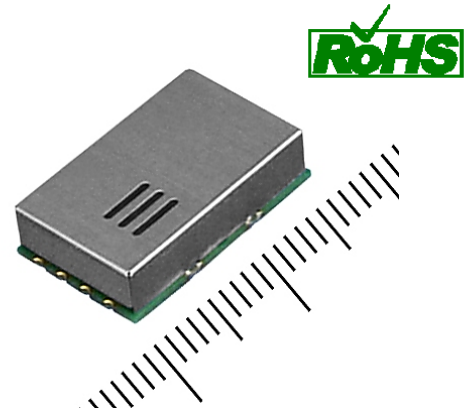
DKシリーズの**FPDK12SR8006PSS**は5.6V～14.0V入力で動作し、高い電圧精度でプログラム可能な出力電圧0.8V～6.6Vdcで、6Aの出力電流を供給します。**FPDK12SR8006PSS**の温度特性はクラス最高レベルです。自然対流条件で85°Cまでわずかなデレーティングしか必要としません。

The leading edge performance of the **DK** Series products, and their extremely high quality and reliability are achieved through advanced circuit and thermal design techniques and FDK's state of the art in-house manufacturing processes and systems.

DKシリーズ製品の最先端の特性と非常に高い品質及び信頼性は、高度な回路設計及び温度設計技術とFDKの最先端の自社製造プロセス及びシステムによりもたらされます。

Applications

- Telecommunications
 - Routers, Base Stations, Wirelessテレコムシステム (ルータ、基地局、無線)
- Data Communications
 - Internet Routers, Processorsデータ通信 (インターネットルータ、プロセッサ)
- Computing
 - Servers, Workstationsコンピュータ関係 (サーバー、ワークステーション)
- Industrial and Consumer
 - Navigation, POS systems, Office Equipment
 - Entertainment産業及びビジュアル向け
(ナビゲーション、ホスシステム、オフィス機器、エンターテインメント)

**FPDK12SR8006PSS**

Features

- RoHS compliant
RoHS準拠
- Delivers up to 6A (39.6W)
6A (39.6W)まで供給可能
- High efficiency, no heatsink required
高効率-放熱器が不要
- Small size and low profile: 0.657" x 0.402" x 0.173"
小型、低背 (16.7 x 10.2 x 4.4mm)
- Programmable output voltage via external resistor
外部接続の抵抗によりプログラム可能な出力電圧
- No minimum load required
最小負荷は不要
- Start up into pre-biased output
出力にプリバイアスがあっても起動可能
- Remote ON/OFF
リモートON/OFF機能
- Output voltage tracking function
出力電圧トラッキング機能
- Auto-reset output over-current protection
過電流保護機能: 自動復帰
- Auto-reset output over-temperature protection
内部過熱保護機能
- Power Good Signal
パワーグッド信号出力
- High reliability, MTBF = 1 Million Hours
高信頼性: MTBF = 1 Million Hours
- UL60950 recognition in U.S. & Canada, and CB Scheme certification per IEC/EN60950 (pending)
UL60950、CB Scheme (準拠)
- All materials meet UL94, V-0 flammability rating
全ての部品は UL94 V-0に適合

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New Product Brief

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Electrical Specifications 電氣的仕様

All specifications apply over specified input voltage, output load, and temperature range, unless otherwise noted.

注記が無い場合、全ての仕様は指定された入力電圧、負荷、温度範囲で適用されます。

Conditions: $T_a=25\text{degC}$, $\text{Airflow}=200\text{LFM}$ (1.0m/s), $V_{in}=12\text{Vdc}$, $V_{out}=0.8-6.6\text{Vdc}$, unless otherwise specified.

PARAMETER	NOTES	MIN	TYP	MAX	UNITS
ABSOLUTE MAXIMUM RATINGS¹					
Input Voltage	Continuous	-0.3		16	Vdc
Operating Temperature	Ambient temperature	-40		85	°C
Storage Temperature		-55		125	°C
Output Voltage		0.8		6.6	Vdc
FEATURE CHARACTERISTICS					
ON/OFF Control (Positive Logic)					
Module Off		-5		$V_{in}-2.7$	Vdc
Module On		$V_{in}-1.0$		V_{in}	Vdc
Power Good	Set point for power good output high		88		%Vout
Power Good Output Low	$I_{out} \leq 5\text{mA}$			0.5	V
Power Good Output High	Max current from power good pin. $V_{PGOOD}=5\text{V}$			10	uA
INPUT CHARACTERISTICS					
Operating Input Voltage Range (V_{in})	$V_{out} \leq 3.63\text{V}$	5.6	12	14	Vdc
	$3.63\text{V} < V_{out} \leq 5.5\text{V}$	8.0	12	14	Vdc
	$5.5\text{V} < V_{out}$	10	12	14	Vdc
Input Under Voltage Lockout					
Turn-on Threshold			4.5		Vdc
Turn-on Threshold			4.2		Vdc
OUTPUT CHARACTERISTICS					
Output Voltage Range (Over all operating input voltage, resistive load and temperature conditions until end of life)		-3.0		+3.0	%Vout
Output Ripple and Noise BW=20MHz					
Peak to Peak	$V_{out}=0.8\text{Vdc}$		TBD	TBD	mVp-p
Peak to Peak	$V_{out}=6.6\text{Vdc}$		TBD	TBD	mVp-p
External Load Capacitance				TBD	uF
Output Current		0		6	A
Output Current Limit Inception (I_{out})			160		%
EFFICIENCY					
Full load (6A)					
	$V_{out}=6.6\text{Vdc}$		94.0		%
	$V_{out}=6.0\text{Vdc}$		93.5		%
	$V_{out}=5.0\text{Vdc}$		92.5		%
	$V_{out}=3.3\text{Vdc}$		90.0		%
	$V_{out}=2.5\text{Vdc}$		88.0		%
	$V_{out}=1.8\text{Vdc}$		84.5		%
	$V_{out}=1.5\text{Vdc}$		82.5		%
	$V_{out}=1.2\text{Vdc}$		79.0		%
	$V_{out}=1.0\text{Vdc}$		76.5		%
	$V_{out}=0.8\text{Vdc}$		72.5		%

¹Absolute Maximum Ratings 絶対最大定格

Stresses in excess of the absolute maximum ratings and operation beyond the rated current as specified by the derating curves may lead to degradation in performance and reliability of the converter and may result in permanent damage.

絶対最大定格を超えたストレスとデレーティングカーブにより規定された定格電流を超えた動作は、性能の低下、長期信頼性の低下、及びモジュールの破損を引き起こすことがあります。

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New Product Brief

Output Voltage Tracking (Pin 4)

The **FPDK12SR8006PSS** converter incorporates an output voltage tracking function that enables 2 kinds of sequenced start-up and shut-down scenarios when using multiple converters:

- Sequential
- Simultaneous

These scenarios are enabled using the external circuitry shown in Fig.D and Fig.E. If voltage tracking is not needed, the TRACK pin (pin 4) should be connected to Vin, as shown in Fig.C.

FPDK12SR8006PSSコンバータは複数のコンバータを使用する際に、想定する2種類のシーケンス起動及び停止を可能にする出力電圧トラッキング機能を持っています。

- シーケンス
- 同時

想定されるこれらのシーケンス起動及び停止は、図D-図Eに示される外付け回路を使用することで可能となります。トラッキング機能を使用されない場合、下図のようにTRACK端子(4番ピン)をVinに接続して下さい(図C)。

A recommended value for R1=13kΩ / R2=4.7kΩ.

各抵抗の推奨値はR1=13kΩ / R2=4.7kΩ

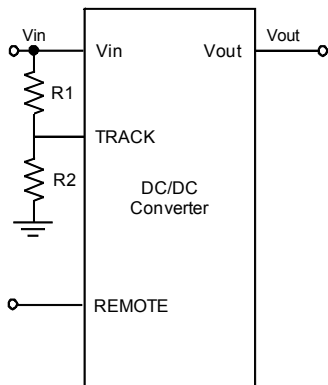


Fig. C: TRACK pin connection to Vin

Sequential

Sequential start-up and shut-down of converters PS1 and PS2 (Fig.D) is enabled by placing an On/Off circuit between the Vout of PS1 and the REMOTE pin (pin 3) of PS2.

コンバータPS1とPS2のシーケンス起動及び停止(図D)はオン/オフ制御回路をPS1のVoutとPS2のリモート端子(3番ピン)の間に配置することで実行されます。

A recommended value for R1=13kΩ / R2=4.7kΩ.

各抵抗の推奨値はR1=13kΩ / R2=4.7kΩ

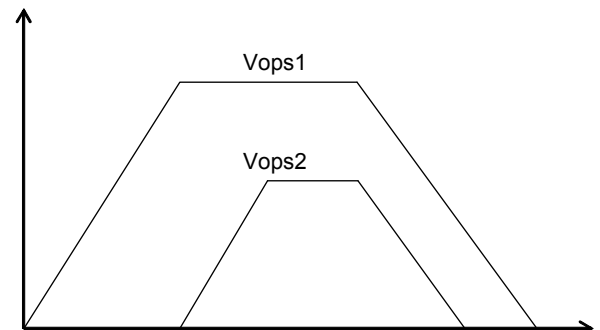
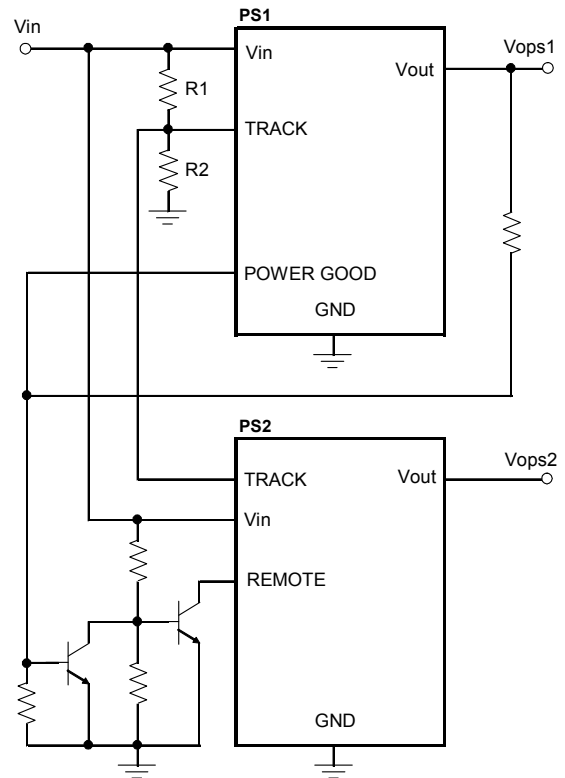


Fig. D: Sequential

For sequential start-up and shut-down, The PSV Type converters of the FPDK12S Series can be used for both PS1 and PS2, In that case, R1 and R2 are not necessary.

シーケンス起動及び停止については、PS1及びPS2ともにFPDK12シリーズのPSVタイプも使用可能です。その際は、R1及びR2は不要です。

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New Product Brief

Simultaneous

Simultaneous start-up and shut-down of converters PS1 and PS2 (Fig.E), whereby the difference in output voltage between the converters during turn-on and turn-off is minimized, is enabled by connecting the Vout of PS1 to the TRACK pin (pin 4) of PS2.

Note the output voltage setting of PS1 should always be higher than the output voltage setting of PS2.

電源オン及びオフ時のPS1とPS2間の出力電圧の差異を最小化する、これら2つのコンバータの同時起動及び停止は、図Eに示される様に、PS1のVoutをPS2のTRACK端子(4番ピン)に接続することで可能となります。

PS1の設定電圧は常にPS2の設定電圧より高い必要があることに注意してください。

A recommended value for R1=13kΩ/ R2=4.7kΩ/ R3=10kΩ.

各抵抗の推奨値はR1=13kΩ / R2=4.7kΩ / R3=10kΩです。

The values of R4 can be determined from:

R4の値は次の方程式から求められます。

$$R4 = \frac{70 \times (1 + R_{trimps2})}{71 + R_{trimps2}} \text{ [k}\Omega\text{]}$$

However, a recommended value of R4 is 70kΩ for Vo=0.8V of PS2.

但し、PS2がVo=0.8Vの場合は、R4の値は70kΩを推奨します。

The PSV Type of the FPDK12 series can be used for PS1. In that case, R1 and R2 are unnecessary.

PS1にはFPDK12シリーズのPSVタイプも使用可能です。その際は、R1及びR2は不要です。

Notes :

- (a) For simultaneous start-up and shut-down, the REMOTE pin (pin 3) of PS2 should be in the ON state before applying input voltage to PS1 and PS2. (The REMOTE pin of PS2 should be tied to Vin or left open.)

同時起動及び停止の場合、PS1とPS2に入力電圧を印加する前にPS2のリモート端子(3番ピン)はON状態にして下さい。(リモート端子をVinに接続、または未接続。)

- (b) For proper voltage tracking, the TRACK pin (pin 4) voltage should stay at 0V for 10ms or more after the input voltage reaches Vin-MIN. This time period allows for the initialization of soft-start.

適切な電圧トラッキングにおいては、TRACK端子(4番ピン)の電位は入力電圧がVin-MINに達してから10ms以上の間、0Vのままの状態を保持しておく必要があります。この時間は、ソフトスタートの初期化のためです。

- (c) Please do not impress the voltage to TRACK pin (4 pin) with the input voltage not impressed.

入力電圧を印加していない状態で、TRACK端子(4番ピン)に電圧を印加しないでください。

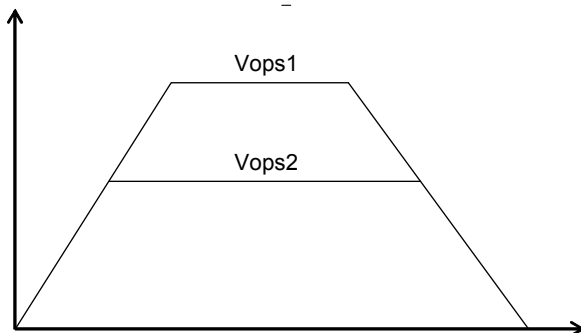
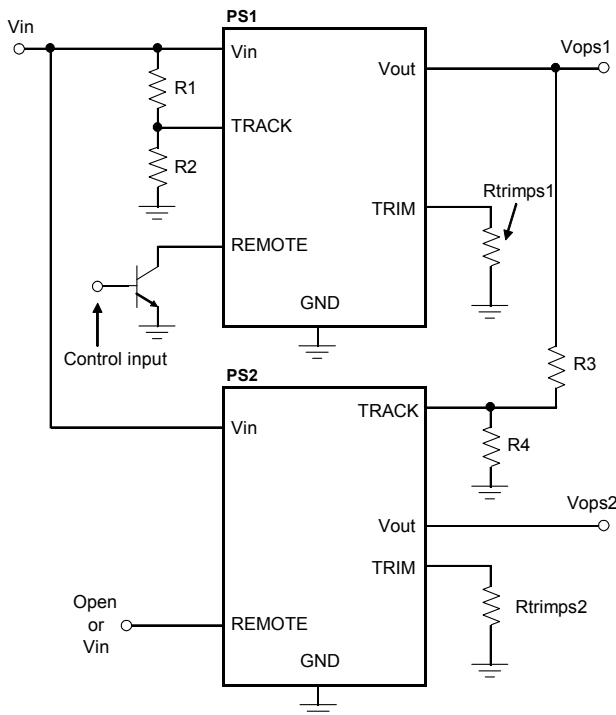


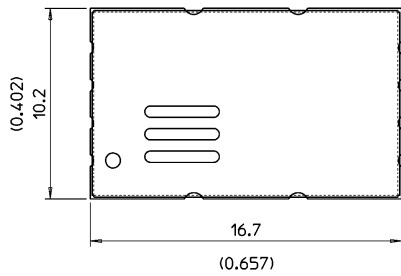
Fig. E: Simultaneous

FPDK12SR8006PSS

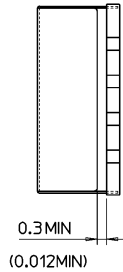
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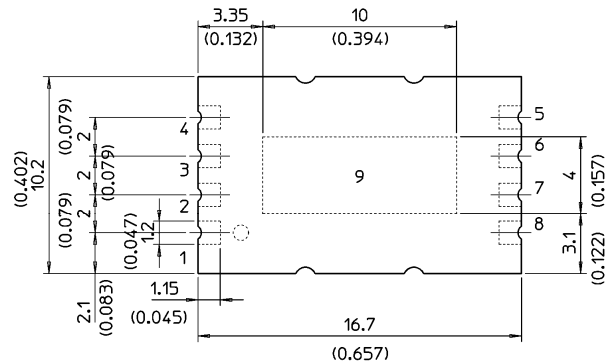
Mechanical Drawing



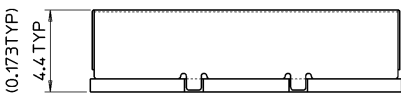
TOP VIEW OF BOARD



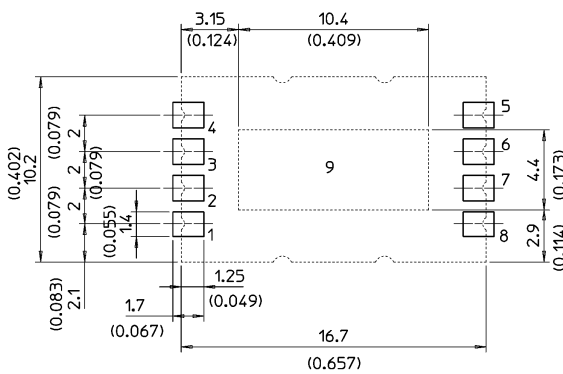
SIDE VIEW OF BOARD



TOP VIEW OF BOARD



SIDE VIEW OF BOARD



RECOMMENDED PAD LAYOUT

Notes

- All dimensions are in millimeters (inches)
- Unless otherwise specified, tolerances are +/- 0.25mm
- Connector Finish: Gold over Nickel
- Converter Weight: 0.046oz (1.3g)
- The only PCB traces under the converter should be the recommended pads, and GND traces.

Terminal Connections			
Pin#	Function	Pin#	Function
1	Vin	6	POWER GOOD
2	GND	7	GND
3	REMOTE	8	Vout
4	TRACK	9	GND (Thermal Pad)
5	TRIM		

DK Series Part Numbering Scheme

Product Series	Sub Series	Nominal Input Voltage	Mounting Scheme	Output Voltage	Rated Current	ON/OFF Logic	Option1	Option2
FP	DK	12	S	R80	06	P	S	S
Series Name		Typ=12V	Surface Mount	0.8V (Programmable: See page 6)	6A	Positive	Standard	Tracking

Notes

NUCLEAR AND MEDICAL APPLICATIONS: FDK Corporation products are not authorized for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems without the written consent of FDK Corporation.

CLEANSING : Cleansing of this converter is not recommended. When cleansing, determine a cleansing condition on your own responsibility after confirming there is no impact on the characteristics/performance of the converter.

SPECIFICATION CHANGES AND REVISIONS: Specifications are version-controlled, but are subject to change without notice.