

## Micrel MIC2826 四输出可编程电源管理方案

Micrel 公司的 MIC2826 是四输出可编程电源管理集成电路(PMIC),最适合用作移动应用处理器,协处理器,DSP,GPS 和媒体播放器芯片组的高效电源. MIC2826 集成了一个4MHz 500mA PWM/PFM 同步降压稳压器和三个 LDO 稳压器(每个输出 150mA)以及提供用于编程的 400kHz I2C 接口.本文介绍了 MIC2826 主要特性,方框图,以及在 GPS 子系统的应用电路, MIC2826 评估板电路图和材料清单(BOM).

The Micrel MIC2826 is a four output, programmable Power Management IC, optimized for high efficiency power support in Mobile Application Processors, Co-Processors, DSPs, GPS and Media Player chipsets. The device integrates a single 500mA PWM/PFM synchronous buck (step-down) regulator with three Low Dropout Regulators and a 400kHz I<sup>2</sup>C interface that provides programmable Dynamic Voltage Scaling (DVS), Power Sequencing, and individual output Enable/Disable controls allowing the user to optimally control all four outputs.

The 4MHz synchronous buck regulator features a patented HyperLight Load™ (HLL) architecture which minimizes switching losses and provides low quiescent current operation for high efficiency at light loads. Additional benefits of this proprietary architecture are low output ripple voltage and fast transient response throughout the entire load range with the use of small output capacitors, reducing the overall system size.

Three high performance LDOs are integrated into the MIC2826 to provide additional system voltages for I/O, memory and other analog functions. Each LDO is capable of sourcing 150mA output current with high PSRR and low output noise. A 2% output voltage accuracy, low dropout voltage (150mV @ 150mA), and low ground current of 116μA (all three LDOs operating) makes this device ideally suited for mobile applications.

The MIC2826 is available in a tiny 14-pin 2.5mm x 2.5mm Thin MLF® with a junction operating range from -40°C to +125°C.

MIC2826 主要特性:

- Fast-mode I2C control interface
- Tiny 14-pin 2.5mm x 2.5mm MLF® package
- Default start-up voltage states and sequencing
- Fault indication processor flag – IRQb

- -40°C to 125°C junction temperature range
- Thermal shutdown and current-limit protection
- Power On After Fault (POAF) function

#### DC-DC Synchronous Buck

- 2.7V to 5.5V input voltage range
- 500mA continuous output current
- HyperLight Load™ mode
  - 25µA quiescent current
- 90% peak efficiency; 85% at 1mA
- Ultra-fast transient response
- Dynamic Voltage Scaling (DVS) range: 0.8V to 1.8V
  - 0.8V to 1.2V in 25mV steps
  - 1.2V to 1.8V in 50mV steps
- ±2% initial accuracy
- Low output voltage ripple: 20mVpp in HyperLight

Load™ mode, 3mV in full PWM mode

#### LDOs

- 1.8V to V<sub>DVIN</sub> input voltage range
- 150mA output current (each LDO)
- Dynamic Voltage Scaling (each LDO)
  - DVS range: 0.8V to 3.3V in 50mV steps
- ±2% initial accuracy

- Low quiescent current – 50 $\mu$ A (each LDO)
- Low dropout voltage – 50mV @ 50mA
- Low output noise - 45 $\mu$ VRMS
- Stable with ceramic output capacitors
- 65dB PSRR at 1kHz

MIC2826 应用:

- Application processors
- GPS subsystems
- General purpose PMIC
- Mobile phones / PDAs
- Portable media players
- Mobile television receivers

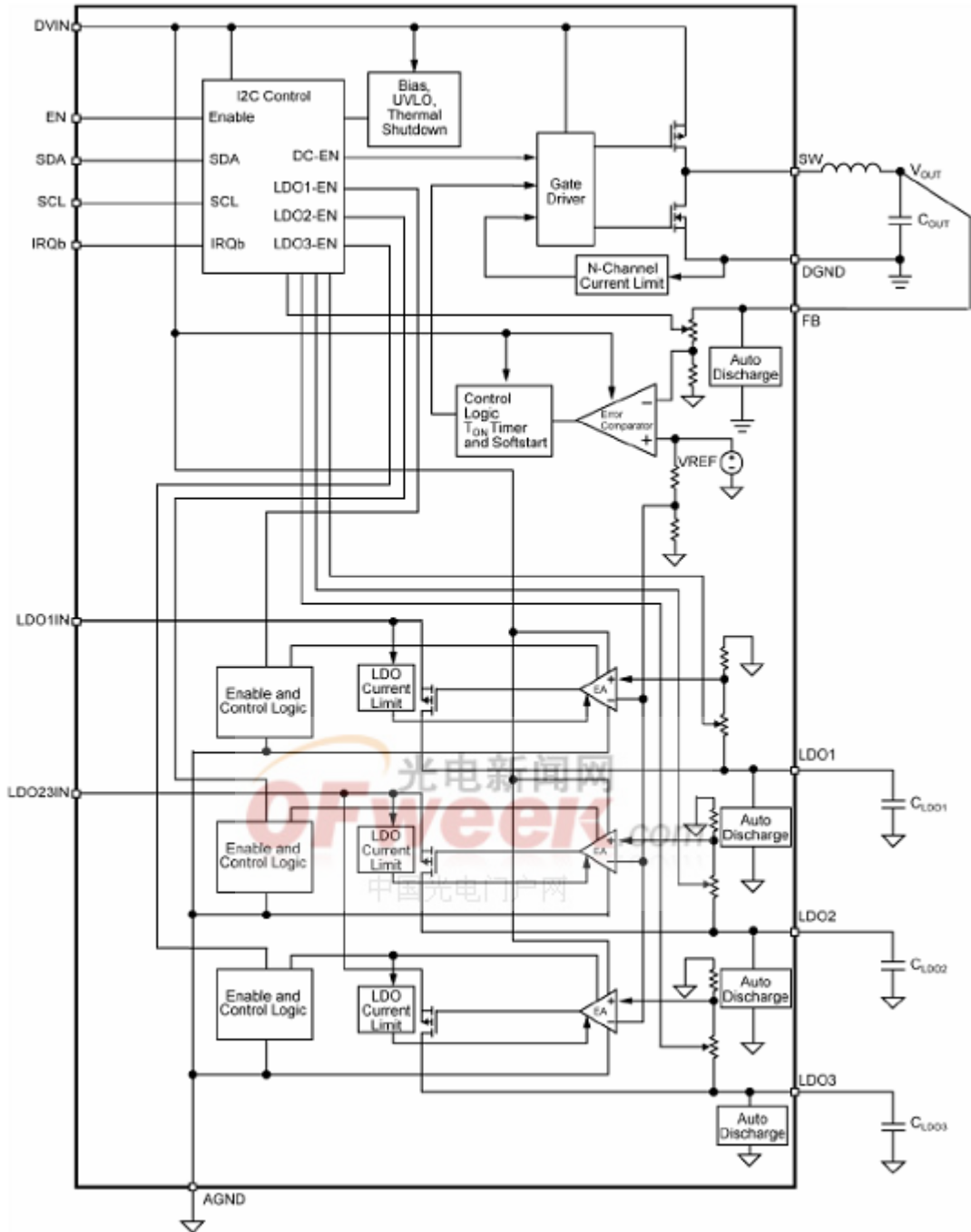


图 1.MIC2826 功能方框图

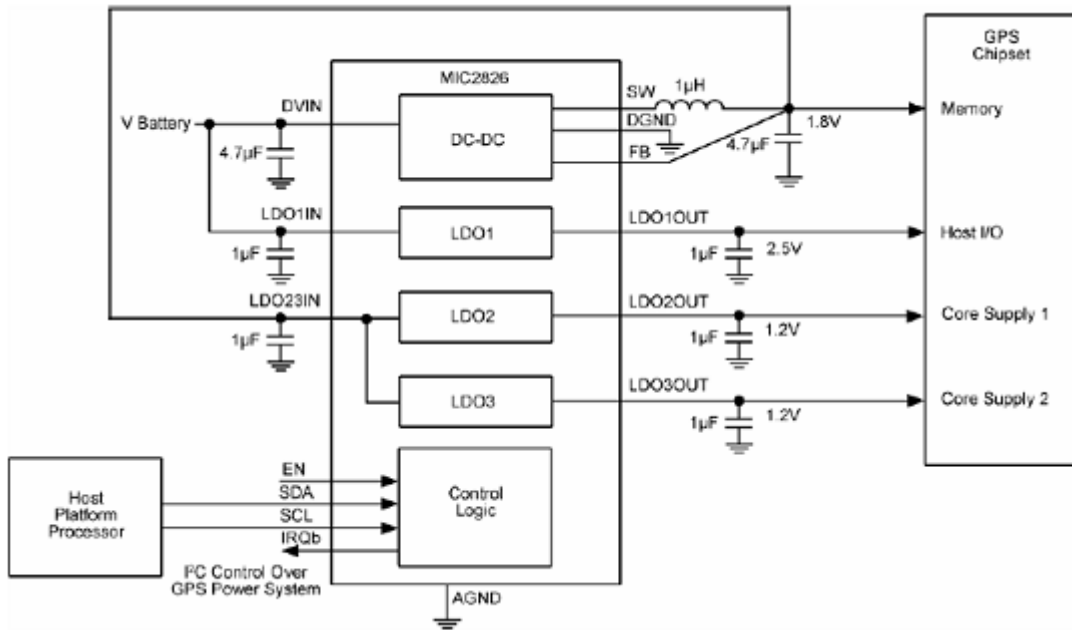


图 2.MIC2826 在 GPS 子系统的应用电路

### MIC2826 评估板

The MIC2826 evaluation kit includes:

- MIC2826 Evaluation Board
- CD-ROM including:
  - MIC2826/7 Evaluation Software
  - Evaluation User Guide

Third party hardware required:

- USB-to-I2C Interface Board (dongle)
- USB Peripheral Cable

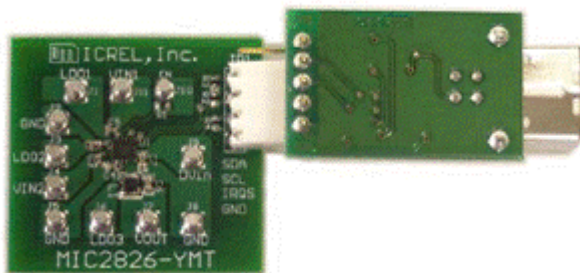


图 3.MIC2826 评估板外形图

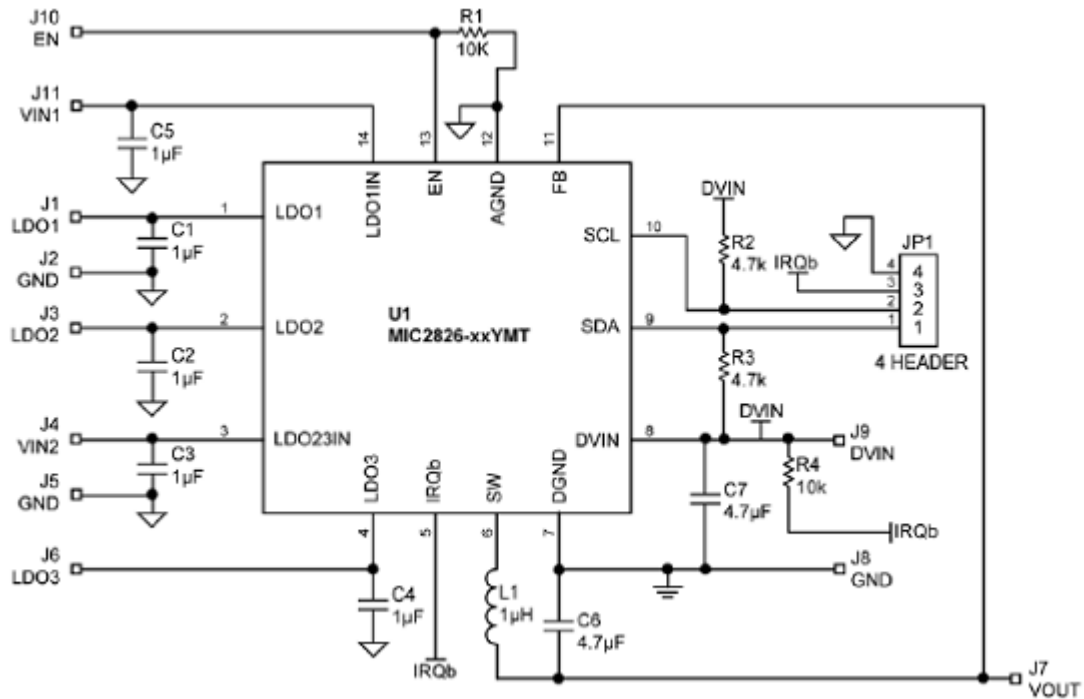


图 4.MIC2826 评估板电路图

MIC2826 评估板材料清单(BOM):

Item	Part Number	Manufacturer	Description	Qty.
C1, C2, C3, C4, C5	GRM155R61A105KE15D	Murata <sup>(1)</sup>	Capacitor, 1µF, 10V, X5R, 0402 size	5
	C1005X5R0J105KT	TDK <sup>(2)</sup>	Capacitor, 1µF, 10V, X5R, 0402 size	
	CL05A225KP5NSNC	Samsung <sup>(6)</sup>	Capacitor, 2.2µF, 10V, X5R, 0402 size	
C6, C7	GRM188R60J475K	Murata <sup>(1)</sup>	Capacitor, 4.7µF, 6.3V, X5R, 0603 size	2
	C1608X5R0J475M	TDK <sup>(2)</sup>	Capacitor, 4.7µF, 6.3V, X5R, 0603 size	
	CL05A475KP5NRNC	Samsung <sup>(6)</sup>	Capacitor, 4.7µF, 6.3V, X5R, 0402 size	
R1, R4	CRCW040210K0FKEA	Vishay <sup>(3)</sup>	Resistor, 10kΩ, 1%, 1/16W, 0402 size	2
R2, R3	CRCW04024K70FKEA	Vishay <sup>(3)</sup>	Resistor, 4.7kΩ, 1%, 1/16W, 0402 size	2
JP1	0022152046	Molex <sup>(4)</sup>	Connector, 2.54mm (0.1") Pitch PCB Connector, 4 pins	1
L1	LQM21PN1R0MC0	Murata <sup>(1)</sup>	Inductor, 1.0µH, 0.8A, 2.0 x 1.25 x 0.5mm	1
	MLP2520S1R0L	TDK <sup>(2)</sup>	Inductor, 1.0µH, 1.5A, 2.5 x 2.0 x 1.0mm	
	XPL2010-102ML	Coilcraft <sup>(5)</sup>	Inductor, 1.0µH, 1.1A, 2.0 x 1.9 x 1.0mm	
	CIG21W1R0MNE	Samsung <sup>(6)</sup>	Inductor, 1.0µH, 1.05A, 2.0 x 1.25 x 1.0mm	
U1	MIC2826-xxYMT	Micrel, Inc. <sup>(7)</sup>	Quad Output PMIC with HyperLight Load™ DC-DC, Three LDOs, and I <sup>2</sup> C Control	1