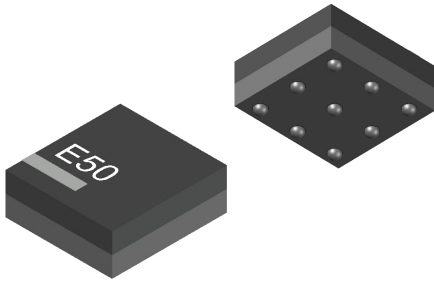# UDM81256

EPOCH
www.epoch-electronic.com

(2.5~5.5)V Input, 1A Output,DC-DC
Ceramic Substrate Boost Module，Fixed Output Voltage: 5V

E50

1 Features

- Ceramic power module, saves one inductor and one capacitor.
- 2.8mm×2.6mm×1.35mm/1.10mm
  9 pin LGA Package Dimensions
- Efficiency up to 95%
- Shielded structure, low EMI noise
- Input Voltage:(2.5~5.5)V
- Fixed Output Voltage: 5V
- Maximum Load Current:
  Iout ≥550mA(when Vin ≥2.5V)
  Iout ≥800mA(when Vin ≥3.3V)
  Iout ≥1000mA(when Vin ≥4.0V)
- Automatic PFM/PWM Mode Switching Function
- Uses low-ripple PFM mode under light load conditions
- Achieves ±1.5% voltage accuracy over the full load current range
- Internal soft start, overcurrent protection, and over temperature protection

2 Applications

- Medical Instruments, Mobile Phones, Portable Devices
- USB, USB-OTG, HDMI Applications
- Compact and Miniaturized Application Scenarios
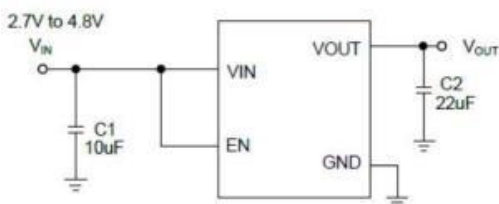
3 Description

The UDM81256 is a low-power boost DC-DC module suitable for space-constrained or noise-sensitive applications.

The device features an inductor-embedded ferrite substrate, which reduces both radiated EMI noise and conducted noise. It uses a plastic integrated package to enhance mounting reliability.

By adding input/output capacitors, the module is ready for use. It offers low noise, easy usage, and reliable performance. The device smoothly switches between PFM and PWM modes based on the load current. Under light load conditions, it automatically switches to PFM mode to ensure low power consumption. Under heavy load conditions, it automatically switches to PWM mode to ensure low ripple. The device maintains excellent output voltage accuracy even in PFM mode, keeping the output voltage accuracy within ±1.5% over the entire load current range.

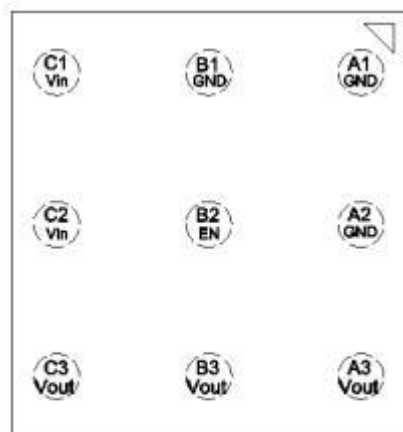When Vin > Vout, the switch duty cycle is 100%, and the device enters bypass mode.

Typical Application Circuit

Note: Recommended Cin (C1): 10μF/6.3V, Recommended Cout (C2): 22μF/6.3V; Add more capacitance can decrease the ripple.
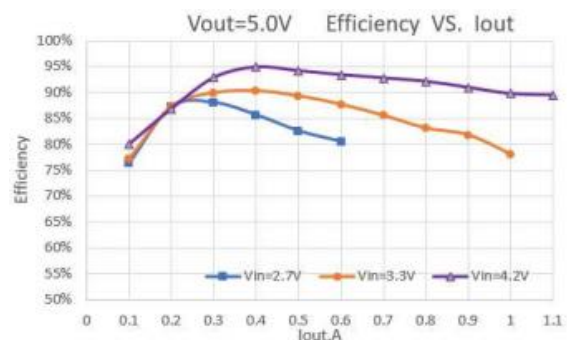
Pin Configuration

Top View
（Scenograph）

Pin	Symbol	description
C1、C2	V_{in}	The V_{in} pin provides current to the internal regulator of the module.
B2	EN	This is the on/off control pin of the device. Connecting this pin to GND keeps the device in the off mode. Pulling this pin to Vin enables the device with a soft start function. This pin must not be left floating. EN = H: Device On, EN = L: Device Off.
A3、B3、C3	V_{out}	Regulated output pin. Connect the output load between this pin and GND.
A1、A2、B1	GND	Ground Pin

Ordering Information

Product Model	Input		Output	Packaging	note
	Input Range	Nominal Input			
UDM81256	2.5V~5.5V	--	5.0V	3000pcs/roll	

DC DC POWER MODULES

Electrical Characteristics

Absolute Maximum Ratings	Conditions	Minimum Value	Nominal Value	Maximum Value	Units
Input Voltage V_{IN}, EN		-0.3		6	V
V_{SW}		-0.3		V_{IN}+0.3	V
Output Voltage V_{OUT}	**Factory set, fixed output voltage**			6	V
Storage Temperature		-55		+150	℃
Electrical characteristics	**Conditions**	**Minimum Value**	**Nominal Value**	**Maximum Value**	**Units**
Input Voltage Range			5.0		V
Input Undervoltage Lockout Threshold			2.1	2.3	V
Input Undervoltage Lockout Hysteresis			150		mV
Minimum Start-Up Voltage		2.3			V
Quiescent current	**EN = Vin，Vin=3.6V, No Load**		75	125	µA
Shutdown current	**EN = GND，Vin=3.6V**			5	µA
Switching Frequency		2	2.5	3	MHz
Efficiency	V_{IN} =3.3V，V_{OUT} =5.0V，I_{OUT}=0.40A		91		%
EN Threshold (On)		1.05			V
EN Threshold (Off)				0.4	mV
Maximum Duty Cycle				100	%
Soft-Start Time			600		µs
Line regulation	**Iout=0.6A，2.5V < VIN< 5.5V**			±1.5	%
Load regulation	V_{IN}=3.3V，V_{OUT}=5.0V,0A < I_{OUT} ≤ 1A			±1.5	%
Ripple and noise	V_{IN} =3.3V，V_{OUT} =5.0V，I_{OUT}=0.50A, C_{out}=22uF, Bandwidth:20MHz		25		mV
Dynamic load response	V_{IN} =3.3V, V_{OUT} =5.0V，Iout=0.5A~1A, C_{out}=22uF, di/dt=2A/µs		268		mV

Electrical Characteristics(continued)

Structural Characteristics	Conditions	Minimum Value	Nominal Value	Maximum Value	Units
Dimensions	2.8mm×2.6mm×1.35mmMax 2.8mm×2.6mm×1.10mmMax				mm
Weight			0.042		g
Environmental Adaptability	**Conditions**	**Minimum Value**	**Nominal Value**	**Maximum Value**	**Units**
Operating Temperature (Case Temperature)		**-40**		**125**	℃
High-Temperature Storage (Ambient Temperature)	**+125℃，48h**				
High-Temperature Operation (Ambient Temperature)	**+85℃，24h；** **Low Input Voltage, Nominal Input Voltage, High Input Voltage, 8 hours；** **V_{IN} =60V，V_{OUT} =12V，I_{OUT}=2.4A**				
Low-Temperature Storage (Ambient Temperature)	**-55℃，24h**				
Low-Temperature Operation (Ambient Temperature)	**-40℃，24h；** Low Input Voltage, Nominal Input Voltage, High Input Voltage, 8 hours				
Humid Heat	**High-Temperature and High-Humidity Stage: 60℃ ，95%；** **Low-Temperature and High-Humidity Stage: 30℃ ，95%；** **10 cycles of 24h each**				
Temperature Shock	**High Temperature: 125℃,** **Low Temperature: -55℃,** **High and low temperatures of one hour each for a cycle, a total of 32 cycles of testing**				

Note: Stress above the values listed in the "Absolute Maximum Ratings" section may cause permanent damage to the device. Exposure to any absolute maximum rating condition for extended periods may affect the reliability and lifespan of the device.
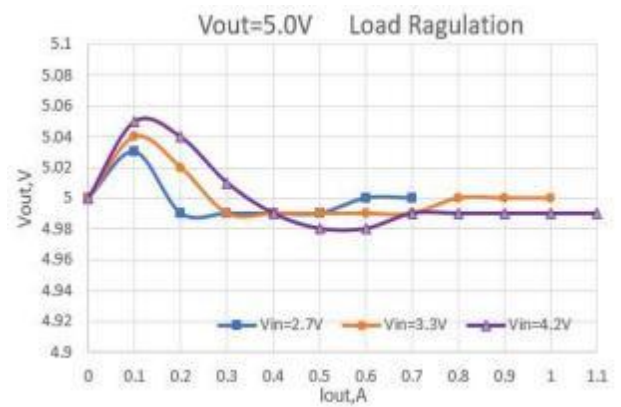
Typical characteristics

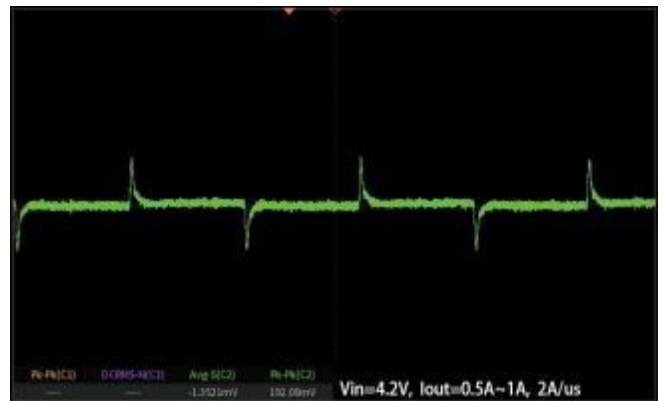**Unless otherwise noted, test conditions are T_ambient= 25℃**

Efficiency
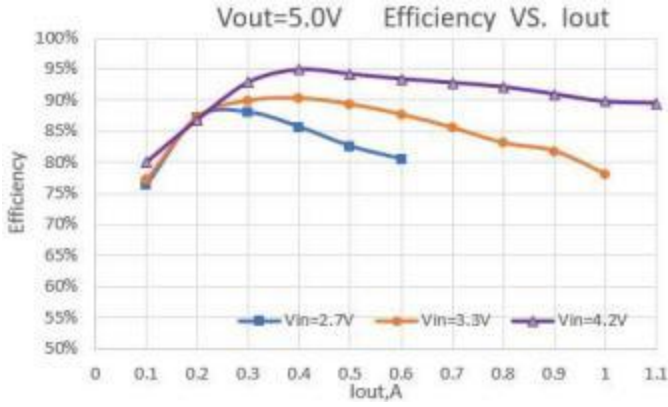
Load regulation

Vin=3.3V Dynamic Response

Vin=3.3V , Iout=0.5A~1A, 2A/us

Vin=4.2V Dynamic Response

Vin=4.2V, Iout=0.5A~1A, 2A/us

UDM81256

Operation

Summary

The UDM81256 is a DC-DC boost power module with synchronous rectification control, featuring an embedded inductor on a magnetic ceramic substrate. It integrates a control IC, power MOSFETs, and filtering capacitors. The module requires only input and output capacitors for operation. It has a small footprint and high power density, making it particularly suitable for applications with limited board space.

It uses a ceramic substrate with a shielded structure, providing excellent EMI resistance. It combines high reliability, good thermal conductivity, and low temperature rise.

The device adjusts its operating frequency based on the load current. Under light load conditions, it automatically reduces the frequency to minimize module power consumption. Under heavy load conditions, it automatically switches to the normal frequency to ensure low ripple and high efficiency.

The device maintains ±1.5% output voltage accuracy over the entire load current range.

Internal Soft-Start (SS)

The soft start function is designed to prevent inrush current during module startup. The UDM81256 has an integrated soft start feature: when the module is enabled, the typical soft start time is 600µs.

Overcurrent Protection and Short Circuit (OCP)

The UDM81256 features cycle-by-cycle current limit protection. When the inductor current peak exceeds the internal peak current limit threshold, the upper transistor is turned off and a counter begins. After about ten consecutive occurrences, the device will enter the EN off state. Approximately 20ms later, the power module automatically performs a soft start.

Overtemperature Shutdown Protection (OTP)

To prevent damage from overheating, the UDM81256 stops switching when the internal chip temperature exceeds 150°C. Once the temperature falls below the threshold (typically 120°C), the module resumes operation.
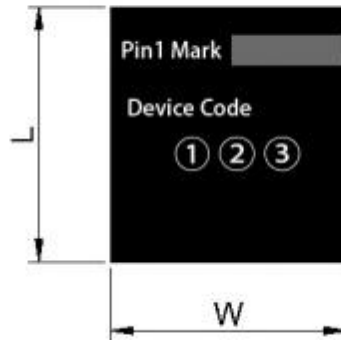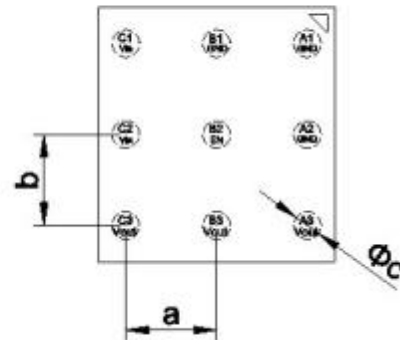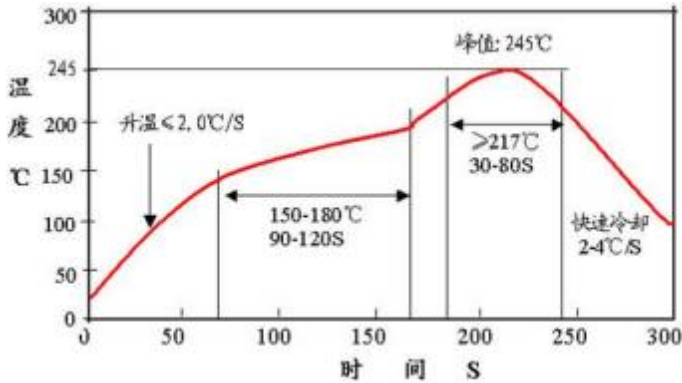
PACKAGE DESCRIPTION

Side View

Top View

Top View (Scenograph)

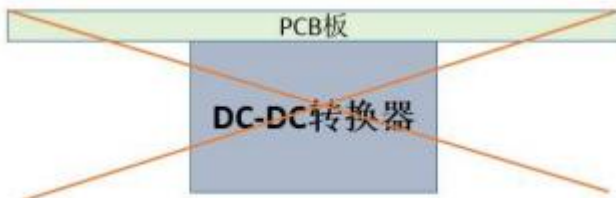| Symbol	Dimension (mm)
L	2.8±0.2
W	2.6±0.2
T	1.35Max or1.1Max
a	1.0
b	1.0
c	0.3

DC DC POWER MODULES

Soldering and Storage Precautions
Recommended Reflow Soldering Profile

Note:

    1.Due to the larger size of the module, do not place the module on the bottom side of the board during reflow soldering to avoid module drop.

    2.   For bulk and unpackaged products, store them in a dry box (relative humidity should be kept below 10%). For products that are still in their original packaging, store them in a dry box whenever possible.

    3.Before mounting, moisture-sensitive products must be baked according to strict baking conditions: bake for more than 48 hours at 125°C.