300mA、微功率、超低压差(VLDO)线性稳压器

UM175xx *SOT23-5*

描述

UM175xx 系列是专为低功耗便携式应用设计的 VLDO（极低压差）线性稳压器。在150mA负载电流下，最大压差电压仅为90mV。内部 P 沟道 MOSFET传输晶体管无需基极电流驱动，因此在最大负载电流为300mA时，该器件仅消耗 100μA电流。

其他特性还包括高输出电压精度、出色的瞬态响应、欠压锁定、使用低至1μF的超低ESR陶瓷电容器的稳定性、电池反接保护、短路和热过载保护以及输出电流限制。

UM175xx 系列采用扁平 SOT23-5 封装。

应用

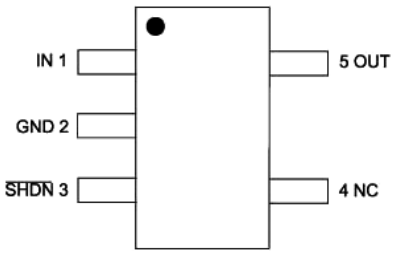
- 蓝牙/802.11 板卡
- PDA 和笔记本电脑
- 便携式仪器和电池供电系统
- 蜂窝电话

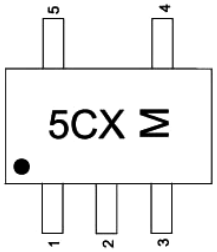
特性

- 超低压差：150mA 负载电流下压差最大90mV
- 最大输入电压：6.0 V
- 150mA 输出电流时具有±2%的电压精度
- 快速瞬态响应
- 欠压锁定
- 固定输出电压：3.3V/2.8V
- 输出电流限制
- 电池反接保护
- 无需保护二极管
- 使用 1μF 输出电容，具有良好的稳定性
- 短路和过温保护
- 采用扁平 SOT23-5 封装

引脚配置

顶部视图





M: Month Code
UM175xx
SOT23-5

Ordering Information

Part Number	Output Voltage	Packaging Type	Marking Code	Shipping Qty
UM17528	2.8V	SOT23-5	5CQ	3000pcs/7Inch Tape & Reel
UM17533	3.3V		5CU	

Pin Description

Pin Number	Symbol	Function
1	IN	Power Supply
2	GND	Ground
3	$\overline{SHDN}$	Shutdown Input, Active Low
4	NC	Not Connected
5	OUT	Voltage Regulated Output

Absolute Maximum Ratings (Note 1)

Symbol	Parameter	Value	Unit
V_{IN}	Supply Voltage on IN Pin	-7.5 to +7.5	V
$V_{\overline{SHDN}}$	Voltage on $\overline{SHDN}$ Pin	-0.3 to +7.5	V
V_{OUT}	Voltage on OUT Pin	-0.3 to +7.5	V
	Output Short-Circuit Duration	Indefinite	
T_J	Operating Junction Temperature (Note 2, 3)	-40 to +125	℃
T_{STG}	Storage Temperature Range	-65 to +150	℃
T_L	Lead Temperature for Soldering 10 Seconds	+300	℃

Note 1: Absolute Maximum Ratings are those values beyond which the life of a device may be impaired.

Note 2: The UM175xx is tested and specified under pulse load conditions such that $T_J \approx T_A$. The device is guaranteed to meet performance specifications from 0 ℃ to 70 ℃. Specifications over the –40 ℃ to 125 ℃ operating junction temperature range are assured by design, characterization and correlation with statistical process controls.

Note 3: This IC includes overtemperature protection that is intended to protect the device during momentary overload conditions. Junction temperature will exceed 125 ℃ when overtemperature protection is active. Continuous operation above the specified maximum operating junction temperature may impair device reliability.

Electrical Characteristics

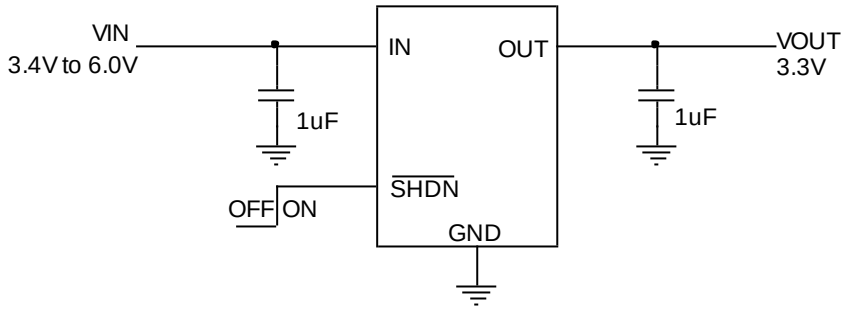
Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_{IN}	Input Voltage Range			V_{OUT}+ V_{DROP}		6.0	V
V_{UVLO1} (Note 1)	Input Under Voltage Lockout	V_{IN} Falling		2.0		2.6	V
V_{UVLO2} (Note 2)	Input Under Voltage Lockout	V_{IN} Falling		2.1		2.3	V
I_Q	Operating Quiescent Current	I_{OUT}=0mA			90		μA
		I_{OUT}=300mA			100		
$I_{\overline{SHDN}}$	Shutdown Leakage Current					1	μA
	ESD Rating	Human Body Mode		2			kV
I_{OUT}	Output Current			300			mA
	Output Voltage Accuracy	1mA≤I_{OUT}≤150mA, T_A=+25℃		-1		+1	%
		1mA≤I_{OUT}≤150mA, T_A=-40℃ to +85℃		-2		+2	
		1mA≤I_{OUT}≤300mA, T_A=-40℃ to +85℃		-2.5		+2.5	
ΔV_{DO}	Dropout Voltage	I_{OUT}=150mA				90	mV
I_{LIMT}	Output Current Limit	V_{IN}≥2.5V		450			mA
t	Startup Time Response	R_L=68Ω, C_{OUT}=1μF			20		μs
V_{IL}	$\overline{SHDN}$ Input Low Voltage					0.3×V_{IN}	V
V_{IH}	$\overline{SHDN}$ Input High Voltage			0.7×V_{IN}			V
	$\overline{SHDN}$ Input Current	$\overline{SHDN}$=V_{IN} or GND		-1	0.1	+1	μA
T_{SHDN}	Thermal-Shutdown Temperature				160		℃
ΔT_{SHDN}	Thermal-Shutdown Hysteresis				20		℃
	Line Regulation	V_{OUT}+1V≤V_{IN}≤V_{OUT}+2V I_{OUT}=10mA			0.09		%/V
	Load Regulation	V_{IN}=V_{OUT}+1V 1mA≤I_{OUT}≤150mA			0.2		%
PSRR	Power Supply Ripple Rejection	V_{IN}=V_{OUT}+1V I_{OUT}=100mA	f=100Hz		70		dB
			f=1kHz		65		
			f=10kHz		50		
			f=100kHz		40		

Note 1: V_{UVLO1} is measured for devices with V_{OUT}≥1.8V.
Note 2: V_{UVLO2} is measured for devices with V_{OUT}≤1.5V.
Note 3: ΔV_{DO} just define for device with V_{OUT}≥2.5V.

Pin Function

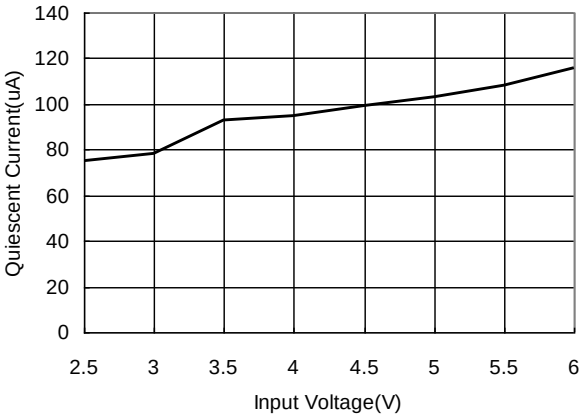
IN (Pin 1): Power for UM175xx and Load. Power is supplied to the devices through the IN pin. The IN pin should be locally bypassed to ground if the UM175xx series are more than a few inches away from another source of bulk capacitance. In general, the output impedance of a battery rises with frequency, so it is usually advisable to include an input bypass capacitor in battery-powered circuits. A capacitor in the range of 0.1μF to 1μF is usually sufficient. The UM175xx series are designed to withstand reverse voltages on the IN pin with respect to both ground and the output pin. In the case of a reversed input, which can happen if a battery is plugged in backwards, the UM175xx will act as if there is a large resistor in series with its input with only a small amount of current flow.
GND (Pin 2): Ground and Heat Sink. Solder to a ground plane or large pad to maximize heat dissipation.
$\overline{\text{SHDN}}$ (Pin 3): Shutdown, Active Low. This pin is used to put the UM175xx into shutdown. The $\overline{\text{SHDN}}$ pin cannot be left floating and must be tied to the input pin if not used.
NC (Pin 4): Not Connected.
OUT (Pin 5): Voltage Regulated Output. The OUT pin supplies power to the load. A minimum output capacitor of 1μF is required to ensure stability. Larger output capacitors may be required for applications with large transient loads to limit peak voltage transients. See the Applications Information section for more information on output capacitance.

Typical Application Circuit

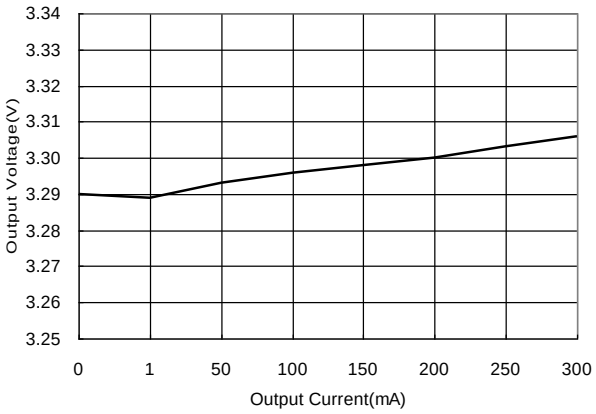


Typical Performance Characteristics

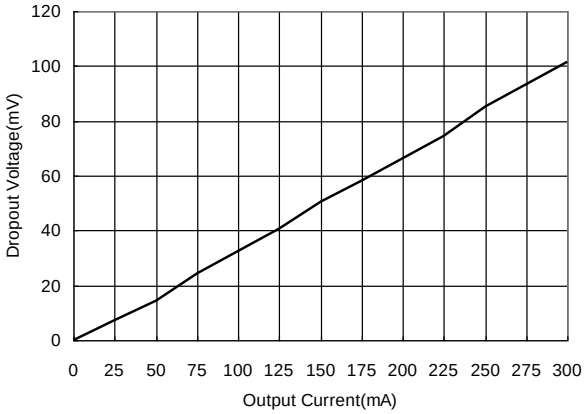
Quiescent Current vs. Input Voltage



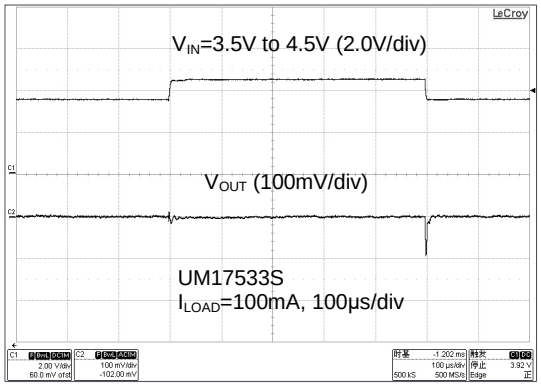
Output Voltage vs. Output Current



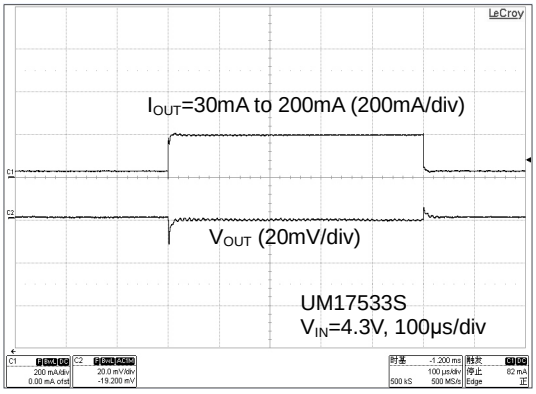
Dropout Voltage vs. Output Current



Line Transient Response



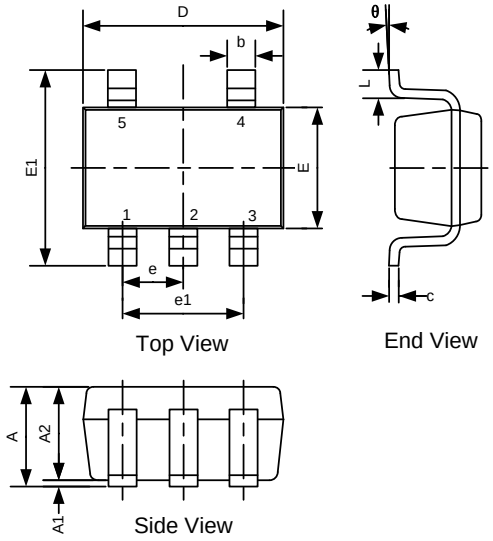
Load Transient Response



Package Information

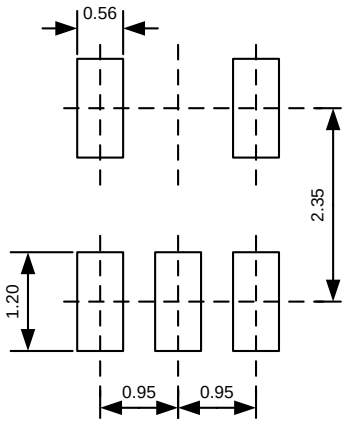
UM175xx: SOT23-5

Outline Drawing



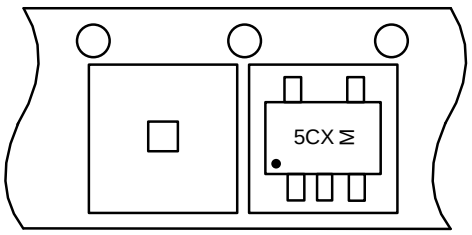
DIMENSIONS						
Symbol	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	1.013	1.15	1.40	0.040	0.045	0.055
A1	0.00	0.05	0.10	0.000	0.002	0.004
A2	1.00	1.10	1.30	0.039	0.043	0.051
b	0.30	-	0.50	0.012	-	0.020
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.82	-	3.10	0.111	-	0.122
E	1.50	1.60	1.70	0.059	0.063	0.067
E1	2.60	2.80	3.00	0.102	0.110	0.118
e	0.95REF			0.037REF		
e1	1.90REF			0.075REF		
L	0.30	-	0.60	0.012	-	0.024
θ	0 °	-	8 °	0 °	-	8 °

Land Pattern



NOTES:
1. Compound dimension: 2.92×1.60;
2. Unit: mm;
3. General tolerance ±0.05mm unless otherwise specified;
4. The layout is just for reference.

Tape and Reel Orientation



GREEN COMPLIANCE

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