300mA, Micropower, VLDO Linear Regulator

UM165xx *SOT23-3*

General Description

The UM165xx series are VLDO (very low dropout) linear regulators designed for low power portable applications. Maximum dropout is just 90mV at the load current of 150mA.The internal P-channel MOSFET pass transistor requires no base current, allowing the device to draw only 100μA during normal operation at the maximum load current of 300mA.
Other features include high output voltage accuracy, excellent transient response, under voltage lockout, stability with ultralow ESR ceramic capacitors as small as 1μF, reverse-battery protection, short-circuit and thermal overload protection and output current limiting.
The UM165xx series are available in a low profile SOT23-3 package.

Applications

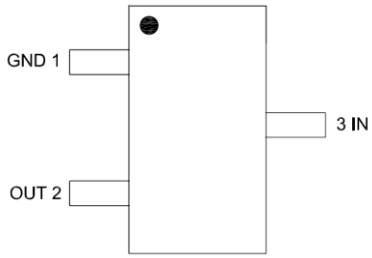
- Bluetooth/802.11 Cards
- PDAs and Notebook Computers
- Portable Instruments and Battery-Powered Systems
- Cellular Phones

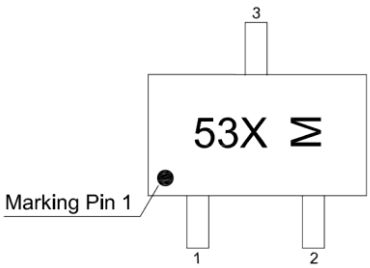
Features

- Very Low Dropout: 90mV (Max) at 150mA
- Maximum Input Voltage: 6.0V
- ±2%Voltage Accuracy at 150mA
- Fast Transient Response
- Under Voltage Lockout
- Fixed Output Voltage: 3.3V/2.8V
- Output Current Limit
- Reverse-Battery Protection
- No Protection Diodes Needed
- Stable with 1μF Output Capacitor
- Short-Circuit and Thermal Overload Protection
- Low Profile SOT23-3 Package

Pin Configurations

Top View





M: Month Code
UM165xx
SOT23-3

Ordering Information

Part Number	Output Voltage	Packaging Type	Marking Code	Shipping Qty
UM16528	2.8V	SOT23-3	53Q	3000pcs/7Inch Tape & Reel
UM16533	3.3V		53U	

Pin Description

Pin Number	Symbol	Function
1	GND	Ground
2	OUT	Voltage Regulated Output
3	IN	Power Supply

Absolute Maximum Ratings (Note 1)

Symbol	Parameter	Value	Unit
V_{IN}	Supply Voltage on IN Pin	-7.5 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 UM165xx 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

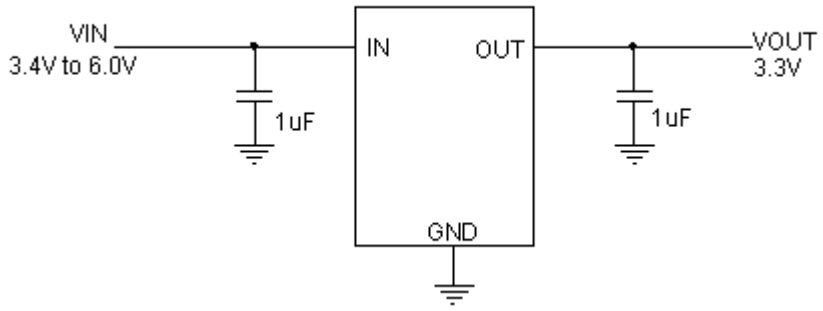
Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_{IN}	Input Voltage Range			V_{OUT}+ V_{DROP}		6.0	V
V_{UVLO1} (Note 1)	Input Under Voltage Lockout	V_{IN} Falling		2.0		2.6	V
V_{UVLO2} (Note 2)	Input Under Voltage Lockout	V_{IN} Falling		2.1		2.3	V
I_Q	Operating Quiescent Current	I_{OUT}=0mA			90		μA
		I_{OUT}=300mA			100		
	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
	Input Reverse Leakage Current (OUT to IN Leakage Current)	V_{IN}=4V, V_{OUT}=5.5V Chip Active			0.01	1.5	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

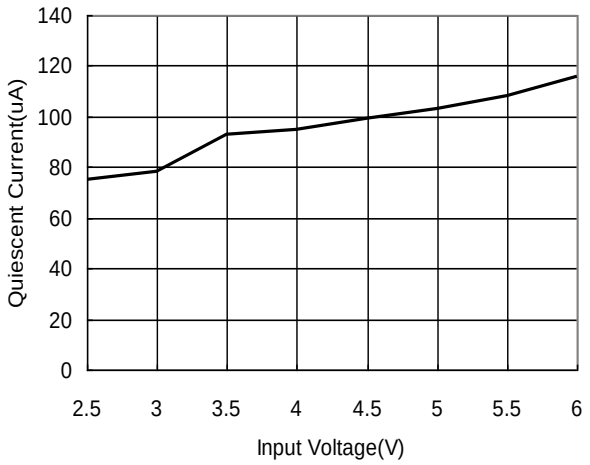
GND (Pin1): Ground and Heat Sink. Solder to a ground plane or large pad to maximize heat dissipation.
OUT (Pin 2): Voltage Regulated Output. The OUT pin supplies power to the load. A minimum output capacitor of 1μF is required to ensure stability. Larger output capacitors may be required for applications with large transient loads to limit peak voltage transients. See the Applications Information section for more information on output capacitance.
IN (Pin 3): Power for UM165xx and Load. Power is supplied to the devices through the IN pin. The IN pin should be locally bypassed to ground if the UM165xx 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 UM165xx 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 UM165xx will act as if there is a large resistor in series with its input with only a small amount of current flow.

Typical Application Circuit

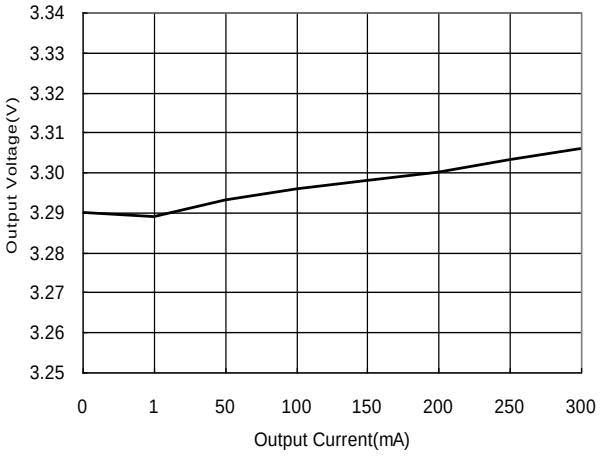


Typical Performance Characteristics

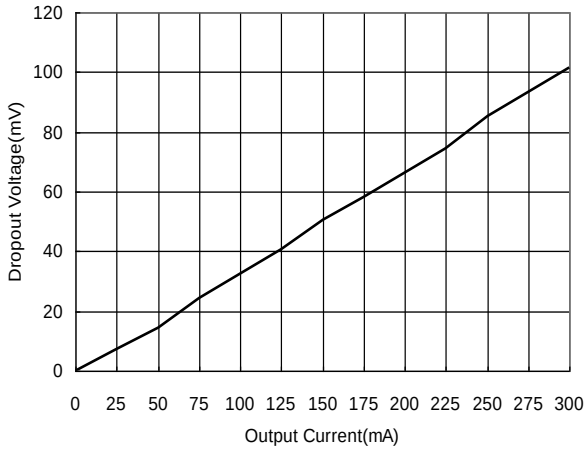
Quiescent Current vs. Input Voltage



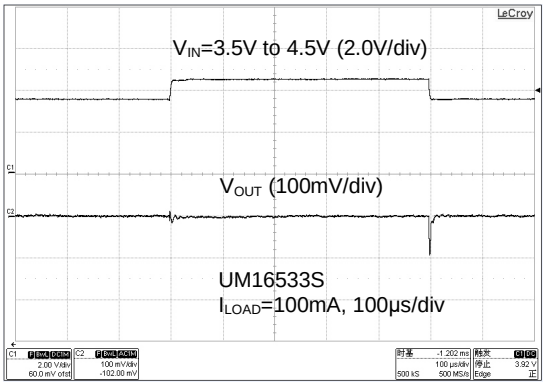
Output Voltage vs. Output Current



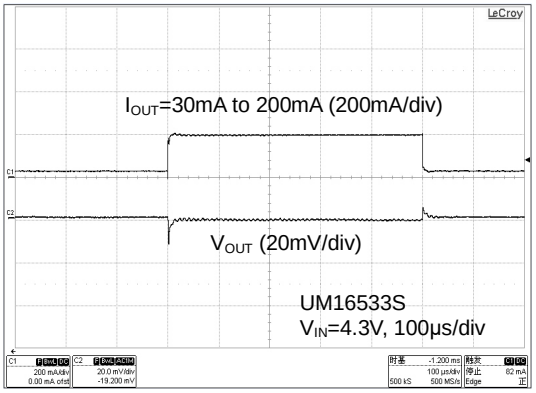
Dropout Voltage vs. Output Current



Line Transient Response



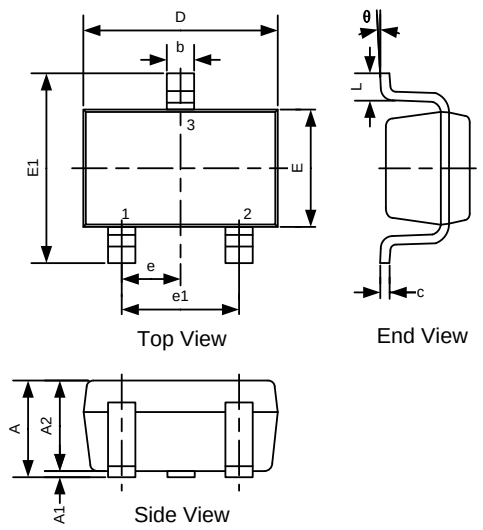
Load Transient Response



Package Information

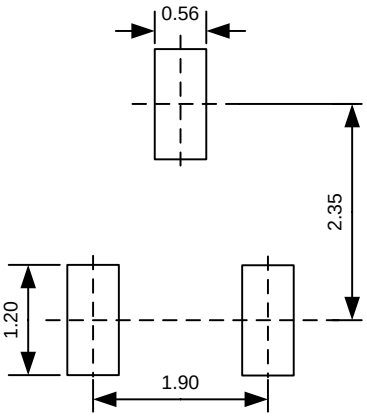
UM165xx: SOT23-3

Outline Drawing



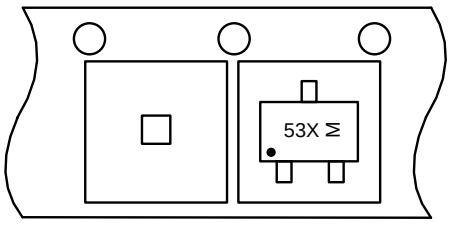
DIMENSIONS						
Symbol	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	1.013	1.15	1.40	0.040	0.045	0.055
A1	0.00	0.05	0.10	0.000	0.002	0.004
A2	1.00	1.10	1.30	0.039	0.043	0.051
b	0.30	-	0.50	0.012	-	0.020
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.82	-	3.10	0.111	-	0.122
E	1.50	1.60	1.70	0.059	0.063	0.067
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

Union Semiconductor is committed to environmental excellence in all aspects of its operations including meeting or exceeding regulatory requirements with respect to the use of hazardous substances. Numerous successful programs have been implemented to reduce the use of hazardous substances and/or emissions.
All Union components are compliant with the RoHS directive, which helps to support customers in their compliance with environmental directives. For more green compliance information, please visit:
http://www.union-ic.com/index.aspx?cat_code=RoHSDeclaration

IMPORTANT NOTICE

The information in this document has been carefully reviewed and is believed to be accurate. Nonetheless, this document is subject to change without notice. Union assumes no responsibility for any inaccuracies that may be contained in this document, and makes no commitment to update or to keep current the contained information, or to notify a person or organization of any update. Union reserves the right to make changes, at any time, in order to improve reliability, function or design and to attempt to supply the best product possible.