40V 250mA Ultralow-Quiescent-Current LDO

General Description

The GM7333 ultra-low quiescent current regulator features low dropout voltage and low current in the standby mode. With less than 1.5μA quiescent current at no load, the GM7333 is ideally suited for standby micro-control-unit systems, especially for always-on applications like E-meters, fire alarms, smoke detectors and other battery operated systems. The GM7333 retains all of the features that are common to low dropout regulators including a low dropout PMOS pass device, short circuit protection, and thermal shutdown.

The GM7333 has a 40-V maximum operating voltage limit, a -40°C to 125°C operating temperature range, and ±2% output voltage tolerance over the entire output current, input voltage, and temperature range. The GM7333 is available in a SOT893 through-hole and SOT235, surface mount packages.

Ordering Information

Part Number	Package	Ordering Number
GM7333	SOT893	GM7333
	SOT235	GM7333K

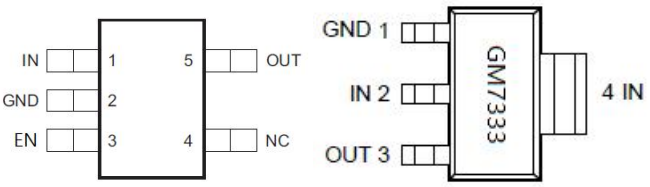
Features

- VIN Range up to 40V
- Output Voltage Tolerances of ±2% Over the Temperature Range
- Output Current of 250 mA
- Ultra Low Quiescent Current (IQ = 1.5 μA)
- Dropout Voltage Typically 1200 mV at IOUT = 250 mA
- Internal Thermal Overload Protection
- Internal Short-Circuit Current Limit
- Ceramic Capacitor Stable

Applications

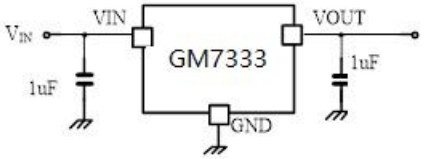
- E-meters, Water Meters and Gas Meters
- Fire Alarm, Smoke Detector
- Appliances and White Goods

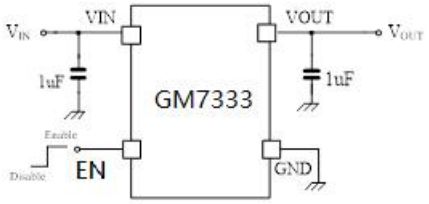
Pin Configuration



SOT235 SOT893

Typical Application Circuit

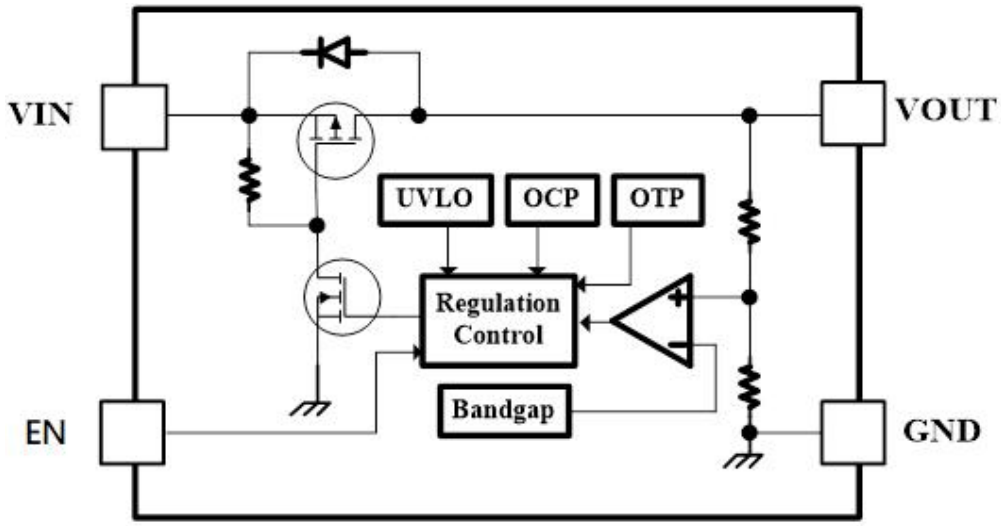




Pin Assignment

Pin Name	Pin No. SOT235	Pin No. SOT893	Pin Function
VOUT	5	3	Output Voltage Pin
GND	2	1	Ground
VIN	1	2,4	Input Voltage pin.
EN	3	--	Enable

Function Block Diagram



Absolute Maximum Ratings (Note1)

- V_{IN} ---------- -0.3V to +45V
- Junction Temperature---------- 125°C
- Lead Temperature (Soldering, 10 sec.)---------- 300°C
- Storage Temperature ---------- –65°C to 150°C

Recommended Operating Conditions

- Input Voltage, V_{IN} ---------- +2.7V to +40V
- Junction Temperature ---------- -40°C to 125°C

Electrical Characteristics

V_{IN}=V_{OUT} + 1V, I_{OUT}=1mA, C_{IN}=C_{OUT}=2.2uF, T_J=25℃, unless otherwise specified

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Output Voltage	V_{OUT}		-2%	3.3	2%	V
Line Regulation	$\triangle V_{LINE}$	V_{IN}=V_{OUT} + 1V to 40V		2	12	mV
Load Regulation	$\triangle V_{LOAD}$	I_{OUT}= 1mA to 100mA		10	20	mV
		I_{OUT}= 1mA to 250mA		20	30	
Dropout Voltage	V_{DROP}	I_{OUT}=50mA		200		mV
		I_{OUT}=100mA		400		mV
		I_{OUT}=180mA		700		mV
		I_{OUT}=250mA		1200		mV
Quiescent Current	I_Q	TJ= 25℃		1.5	4.0	uA
Output Current	I_{OUT}		0		250	mA
Current Limit	I_{CL}		270	340		mA
Enable high level	V_{ENHI}		0.9			V
Enable low level	V_{ENLO}				0.4	V
Enable pin pull high current	I_{EN}			0.3		uA
Thermal Shutdown	T_{SD}			140		℃
Thermal Shutdown Hysteresis	T_{HY}			20		℃

Typical Characteristics

$V_{IN}=V_{OUT}$ + 1V, I_{OUT}=1mA, V_{OUT}=3.3V, $C_{IN}=C_{OUT}$=1uF, T_J=25℃, unless otherwise specified

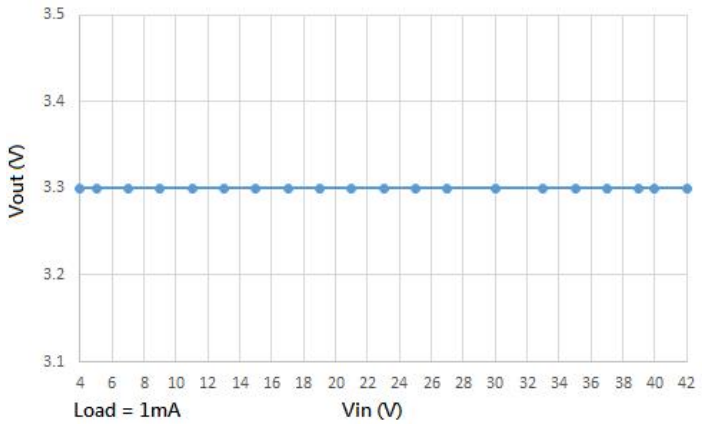


Fig 1 Vout vs Vin

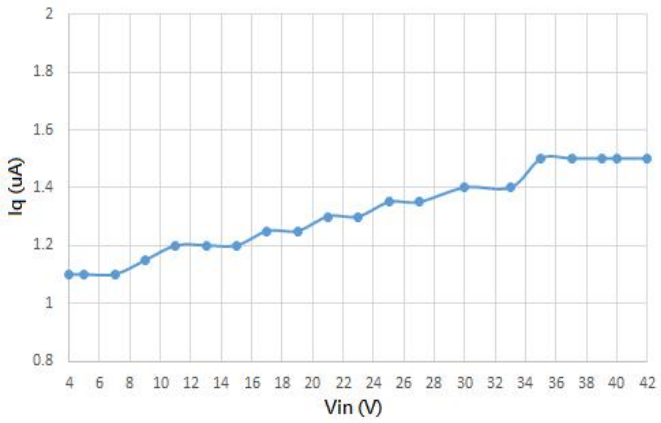


Fig 2 Iq vs Vin

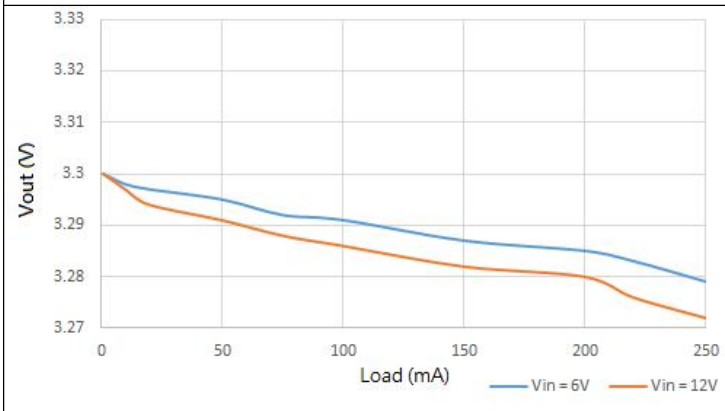


Fig 3 Vout vs Load

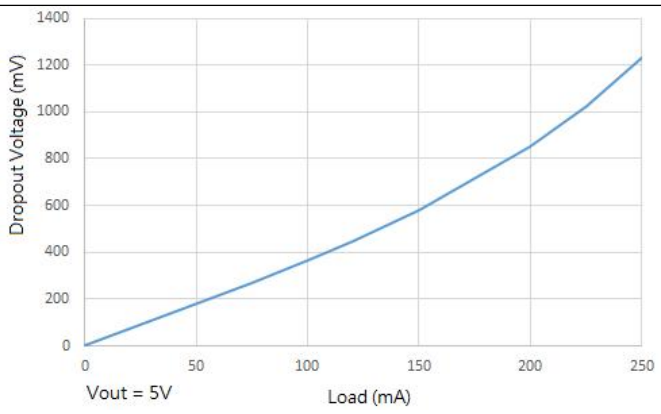


Fig 4 Dropout vs Load

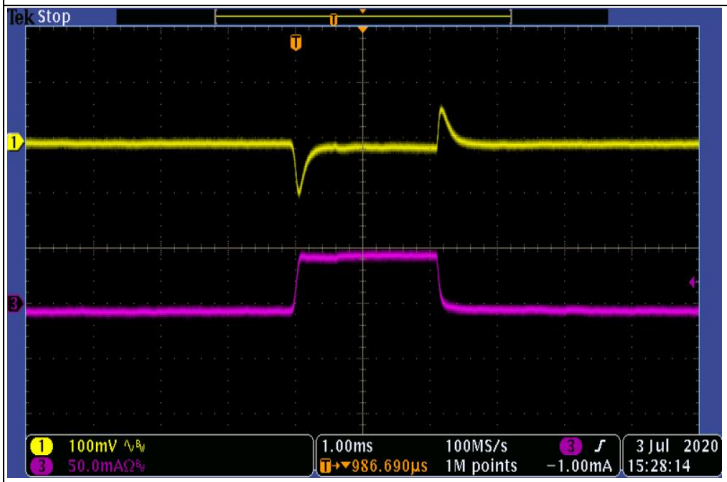


Fig 5 Vout Load Transient (0 to 50mA)

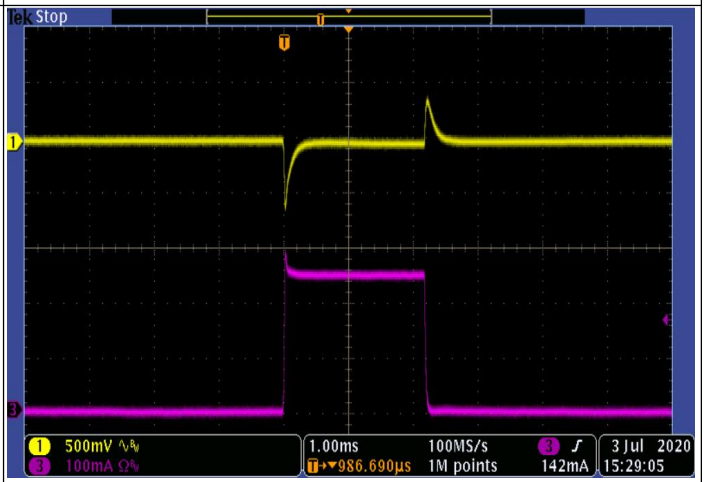


Fig 6 Vout Load Transient (1 to 250mA)

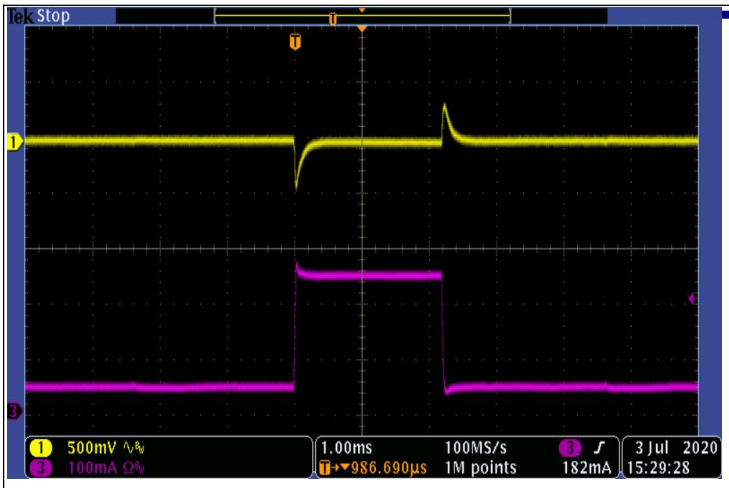


Fig 7 Vout Load Transient (50 to 250mA)

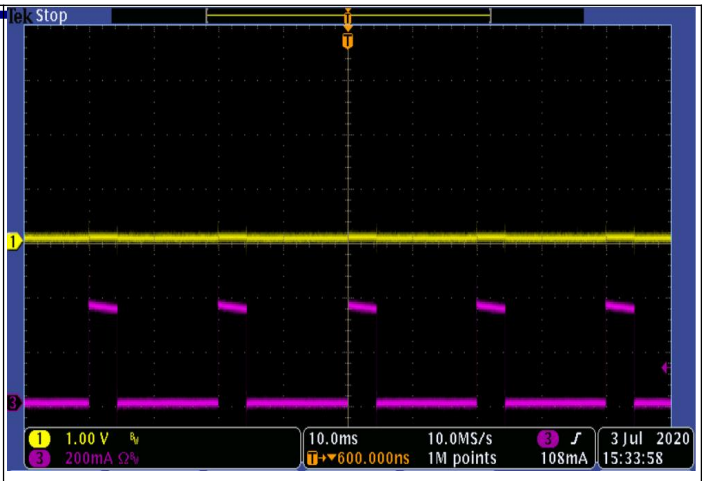


Fig 8 Vout Short to GND

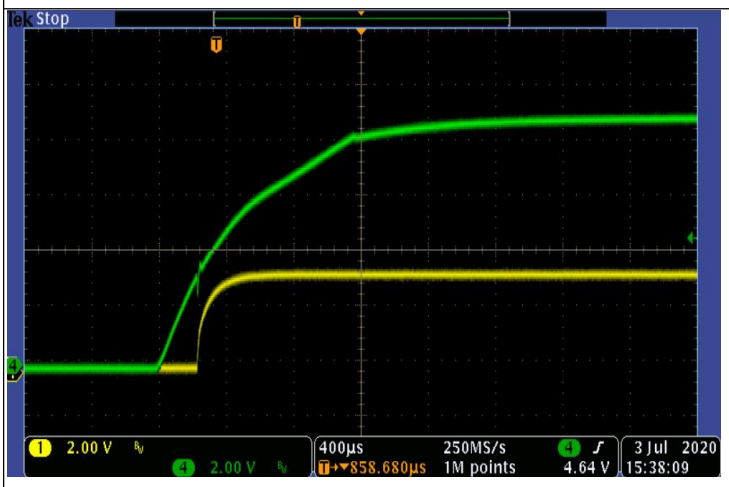
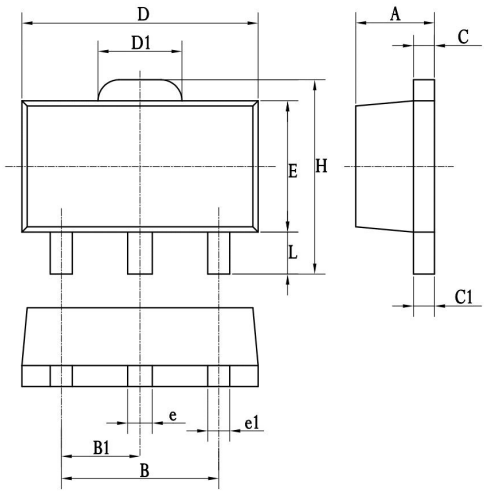


Fig 9 Vin Start up

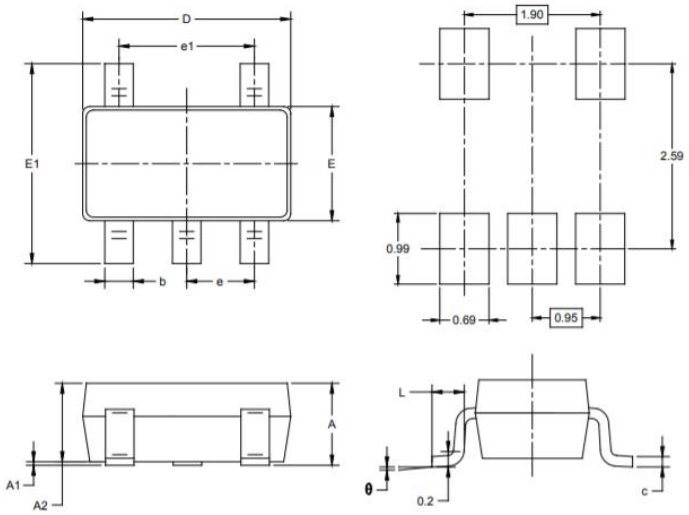
Package Information

SOT89-3



符号	毫米			英寸		
	最小值	典型值	最大值	最小值	典型值	最大值
A	1.4	1.5	1.6	-	-	-
B	2.8	3	3.2	-	-	-
B1	1.4	1.5	1.6	-	-	-
C	0.3	0.4	0.5	-	-	-
C1	0.3	0.4	0.5	-	-	-
D	4.4	4.5	4.6	-	-	-
D1	1.4	1.6	1.8	-	-	-
E	2.4	2.5	2.6	-	-	-
e	0.37	0.47	0.57	-	-	-
e1	0.22	0.42	0.62	-	-	-
H	-	-	4.25	-	-	-
L	0.8	-	-	-	-	-

SOT23-5



符号	毫米			英寸		
	最小值	典型值	最大值	最小值	典型值	最大值
A	1.05	1.15	1.25	-	-	-
A1	0.0	0.05	0.1	-	-	-
A2	1.05	1.1	1.15	-	-	-
b	0.3	0.4	0.5	-	-	-
c	0.1	0.15	0.2	-	-	-
D	2.82	2.92	3.02	-	-	-
E	1.5	1.6	1.7	-	-	-
E1	2.65	2.8	2.95	-	-	-
e		0.95		-	-	-
e1		1.9		-	-	-
L	0.3	-	0.6	-	-	-
θ	0°	-	8°	-	-	-