GM6253

300mA ULTRA LOW DROPOUT POSITIVE VOLTAGE REGULATOR

Description

GM6253 combines high accuracy with very low power consumption, and provides high output current even when the application requires extremely low input-output voltage dropout.

GM6253 includes a precision voltage reference, an error correction circuit, over-temperature protection, and a current limited output driver. Fast transient response to load variations provides excellent stability under dynamic loads.

GM6253 comes in SOT-223 package.

Features

- **Maximum output current up 300mA**
- **Output voltage from 1.5V to 5.0V in 0.1V increments**
- **Output voltage accuracy : ±2%**
- **CMOS low power consumption, typically 1.0μA at V_{OUT} = 5.0V**
- **Input stability: typically 0.2%/V**
- **Ultra low dropout voltage: 0.38V @ I_{OUT} = 200mV at V_{OUT} = 5.0V**

Application

Palmtops

Portable Cameras

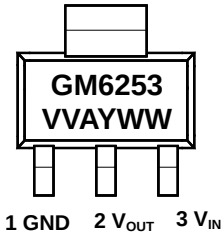
Video Recorders

Battery Powered Equipment

Reference Voltage Sources

Marking Information and Pin Configurations (Top View)

SOT223



VV: Voltage suffix (18 = 1.8V, 50 = 5.0V…)
A: Assembly / Test Site Code
Y: Year
WW: Week

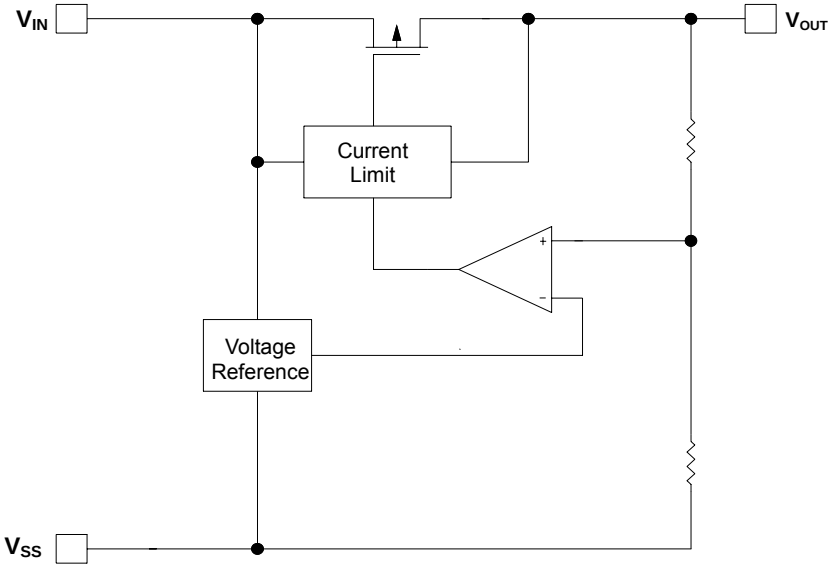
Ordering Information

Ordering Number	Output Voltage	Package	Shipping
GM6253-1.5ST3R	1.5V	SOT-223	2,500 Units/Tape and Reel
GM6253-1.8ST3R	1.8V	SOT-223	2,500 Units/Tape and Reel
GM6253-2.5ST3R	2.5V	SOT-223	2,500 Units/Tape and Reel
GM6253-3.3ST3R	3.3V	SOT-223	3,000 Units/Tape and Reel
GM6253-5.0ST3R	5.0V	SOT-223	3,000 Units/Tape and Reel

Absolute Maximum Ratings

PARAMETER		SYMBOL	RATINGS	UNITS
Input Voltage		V_{IN}	12	V
Output Current		I_{OUT}	500	mA
Output Voltage		V_{OUT}	VSS – 0.3 to VIN +0.3	V
Thermal Resistance, Junction to Case	SOT-223	θ_{JA}	15	℃/W
Operating Ambient Temperature		T_{opr}	- 30 to 80	℃
Storage Temperature		T_{stg}	- 40 to 125	℃

Block Diagram



Electrical Characteristics (T_A = 25°C, V_{IN} = V_{OUT} + 1V unless otherwise noted)

Parameter		Symbol	Condition	Min	Typ	Max	Unit
Output Voltage	GM6253-1.5	V_{OUT}	I_{OUT} = 40mA, V_{IN} = V_{OUT} + 1V	1.470	1.500	1.530	V
	GM6253-1.8			1.764	1.800	1.836	
	GM6253-2.5			2.450	2.500	2.550	
	GM6253-3.3			3.234	3.300	3.366	
	GM6253-5.0			4.900	5.000	5.100	
Line Regulation		ΔV_{OI}	I_{OUT} = 40mA, V_{OUT} + 1V < V_{IN} < 10V		0.2	0.3	%/V
Load Regulation		ΔV_{OL}	1mA < I_{OUT} < 80mA		0.02	0.03	%/mA
Dropout Voltage	V_{OUT} >2.5V	ΔV	I_{OUT} = 300mA		0.30	0.55	V
	2.0V < V_{OUT} < 2.5V				0.45	0.80	
	V_{OUT} < 2.0V				0.60	1.10	
Current Consumption		I_Q			1.0	2.9	μA
Output Current Limit		I_{CL}		500			mA

Application Note

Notes on Usage

1. It is recommended to operate the GM6253 series within the stipulated absolute maximum ratings as the IC is liable to malfunction it is operated outside the ratings.
2. There is a possibility of heat or oscillation as a result of the impedance present between the power supply and the IC's input. Where impedance is greater 10Ω, it is recommend to use a capacitor (C_{IN}) of at least 1μF at the input terminal.
3. With a large output current, operations can be stabilized by increasing capacitor size (C_{IN}). If C_{IN} is too small and capacitance of (C_L) is increased, there is a possibility of oscillation due to input impedance. In such case, operation can be stabilized by either increasing the size of C_{IN} or decreasing the size of C_L.
4. Please ensure the output current (I_{OUT}) is less than Pd ÷ (V_{IN} - V_{OUT}) and does not exceed the stipulated continuous for total power dissipation value (Pd) for the package.

CALCULATING POWER DISSIPATION

The GM6253 series precision linear regulators include thermal shutdown and current limit circuitry to protect the devices. However, high power regulators normally operate at high junction temperatures so it is important to calculate the power dissipation and junction temperatures accurately to be sure that you use and adequate heat sink.

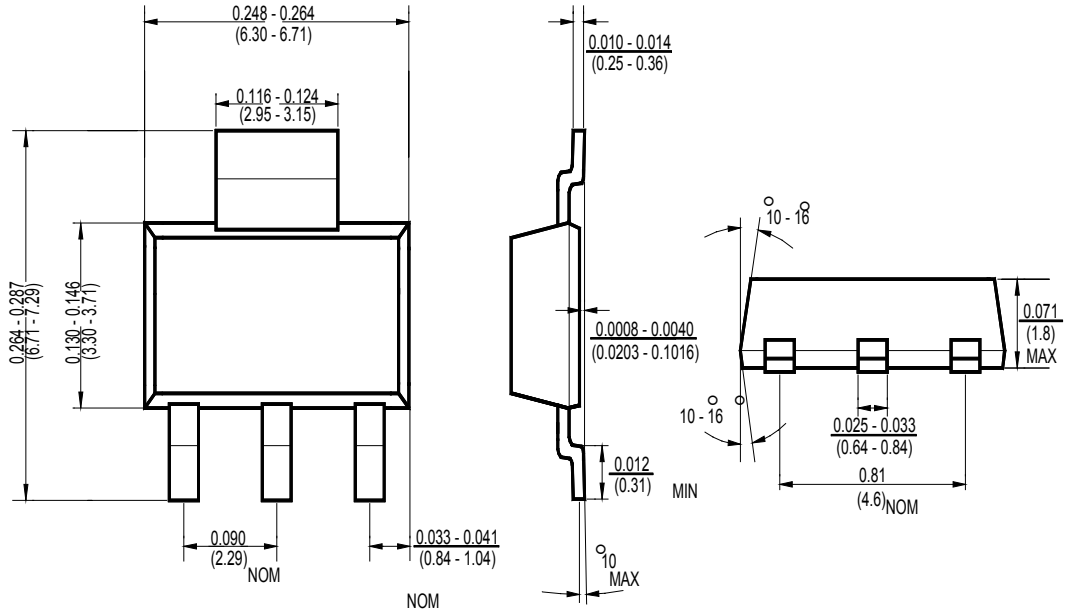
The thermal characteristics of an IC depend four factors:

1. Maximum Ambient Temperature T_A (℃)
2. Power Dissipation P_D (Watts)
3. Maximum Junction Temperature T_J (℃)
4. Thermal Resistance Junction to ambient R_{JA} (oClW)

These relationship of these four factors is expressed by equation : $\mathbf{T_J = T_A + P_D \ X \ R_{JA}}$

Maximum ambient temperature and power dissipation are determined by the design while the maximum junction temperature and thermal resistance depend on the manufacturer and the package type.

Package Outline Dimensions – SOT 223



Ordering Number

GM	6253	1.8	ST3	R
APM Gamma Micro	Circuit Type	Output Voltage 1.8 = 1.8V 2.5 = 2.5V 3.3 = 3.3V 5.0 = 5.0V	Package Type ST3: TO 223	Shipping Type T: Tube R: Tape & Reel