GL2138

1.5A CMOS Low Dropout Voltage Regulator

Overcurren

Shutdown

Description

The GL2138 series of positive, linear regulators feature low quiescent current (45µA typ.) with low dropout voltage, making them ideal for battery applications.

These rugged devices have both Thermal Shutdown, and Current Fold-back to prevent device failure under the "Worst" of operating conditions.

The GL2138 is stable with an output capacitance of 4.7µF or greater.

Features

- Very Low Dropout Voltage
- Guaranteed 1.5A output
- Over-Temperature Shutdown
- Current Limiting
- Short Circuit Current Fold-back
- Highly Accurate± 1.5%
- Low Temperature Coefficient

Applications

- Battery Powered Widgets
- Instrumentation
- Wireless Devices
- PC Peripherals
- Portable Electronics

Package Dimensions



Typical Application Circuit





AM

Thermal

Shutdown

OUT

R1

R2

GND

Functional Block Diagram

Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Input Max Voltage	VIN	8	V
Output Current	Ιουτ	Pd/(VIN- VO)	A
Output Voltage	Vout	1.5~5.0	V
Operating Ambient Temperature	Topr	-40 ~ +85	°C
Junction Temperature	Tj	-40 ~ +125	°C
Maximum Junction Temperature	Tj Max	150	°C
Thormal Bosistanco	θjc (Non-Conductive Epoxy)*	31	°C/W
Thermal nesistance	θја	135	°C/W
Internal Power Dissipation	PD	800	mW
EDS Classification		В	

*Measure 0jc on backside center of tab.

Electrical Characteristics VIN=VOUT(T)+2V, Ta=25°C unless otherwise noted

Parameter	Symbol	Condition		Min	TYP	Max	Unit
Output Voltage	Vout(E) (Note1)	Io=1mA		-1.5%	Vout(T) (Note2)	1.5%	V
Output Current	Io	Vo>1.2V		1.5	-	-	А
Current Limit	ILIM	Vo>1.2V		1.5	2.0	-	А
Load Regulation	REGLOAD	VIN=VOUT(T)+2V, IO=1mA to 1.5A		-1	0.2	1	%
Dropout Voltage	Vdropout	Io=1.5A Vo=Vout(E)-2%	1.4V <vouт(t)≤2.0v< td=""><td>-</td><td>-</td><td>1300</td><td rowspan="3">mV</td></vouт(t)≤2.0v<>	-	-	1300	mV
			2.0V <vout(t)≤2.8v< td=""><td>-</td><td>-</td><td>800</td></vout(t)≤2.8v<>	-	-	800	
			2.8V <vout(t)< td=""><td>-</td><td>-</td><td>600</td></vout(t)<>	-	-	600	
Quiescent Current	Iq	VIN= VOUT(T)+2V, IO=0mA		-	45	70	μA
Ground Pin Current	Ignd	VIN= VOUT(T)+2V, IO=1mA~1.5A		-	45	-	μA
Line Regulation	REGLINE	Io=1mA VIN=Vout(T)+1 to Vout(T)+2	Vout(T)<2.0V	-0.15	-	0.15	%
			2.0V≤Vout(T)<4.0V	-0.1	0.02	0.1	
			4.0V≤Vou⊤(T)	-0.4	-	0.4	
Input Voltage	Vin			Note3	-	7	V
Over Temperature Shutdown	OTS			-	150	-	°C
Over Temperature Hysterisis	OTH			-	30	-	°C
Output Voltage Temperature Coefficient	тс			-	30	-	ppm/°C
Short Circuit Current	Isc	VIN=VOUT(T)+1V, VOUT<0.4V		-	750	-	mA
Power Supply Rejection	PSRR	Io=100mA Co=4.7μF	f=100Hz	-	70	-	dB
			f=1kHz	-	50	-	
			f=10kHz	-	20	-	
Output Voltage Noise	eN	f=10Hz~100kHz, Io=10mA, Co=4.7µF		-	30	-	μVrms

Note 1: VOUT (E) = Effective Output Voltage (i.e. the output voltage when "VOUT (T) + 2.0V" is provided at the VIN pin while maintaining a certain IOUT value).

2: VOUT (T) =Specified Output Voltage

3: VIN (MIN) = VOUT+VDROPOUT

Ordering Information (contd.)

Part Number	Marking	Output Voltage	Part Number	Marking	Output Voltage
GL2138-15	8T152 XXXX	1.5V	GL2138-18	8T182 xxxx	1.8V
GL2138-19	8T192 XXXX	1.9V	GL2138-25	8T252 XXXX	2.5V
GL2138-33	8T332 xxxx	3.3V	GL2138-47	8T472 XXXX	4.75V
GL2138-50	8T502 XXXX	5.0V			

Detailed Description

The GL2138 series of COMS regulators contain a PMOS pass transistor, voltage reference, error amplifier, over-current protection, and thermal shutdown.

The P-channel pass transistor receives data from the error amplifier, over-current shutdown, and thermal protection circuits. During normal operation, the error amplifier compares the output voltage to a precision reference. Over-current and Thermal shutdown circuits become active when the junction temperature exceeds 150° C, or the current exceeds 2.2A. During thermal shutdown, the output voltage remains low. Normal operation is restored when the junction temperature drops below 120° C.

The GL2138 behaves like a current source when the load reaches 2.2A. However, if the load impedance drops below 0.3Ω , the current drops back to 600mA to prevent excessive power dissipation. Normal operation is restored when the load resistance exceeds 0.75Ω .

External Capacitors

The GL2138 is stable with an output capacitance to ground of 4.7μ F or greater. Ceramic capacitors have the lowest ESR, and will offer the best AC performance. Conversely, Aluminum Electrolytic capacitors exhibit the highest ESR, resulting in the poorest AC response. Unfortunately, large value ceramic capacitors are comparatively expensive. One option is to parallel a 0.1μ F ceramic capacitor with a 10μ F Aluminum Electrolytic. The benefit is low ESR, high capacitance, and low overall cost.

A second capacitor is recommended between the input and ground to stabilize Vin. The input capacitor should be at least 0.1µF to have a beneficial effect.

All capacitors should be placed in close proximity to the pins. A "Quiet" ground termination is desirable. This can be achieved with a "Star" connection.

Characteristics Curve







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