GJ2137

750mA CMOS Low Dropout Voltage Regulator

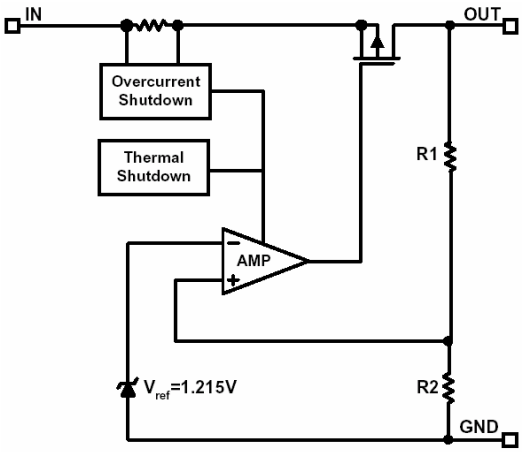
Description

The GJ2137 series of positive, linear regulators feature low quiescent current (30μA 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 GJ2137 is stable with an output capacitance of 2.2μF or greater.

Features

- Very Low Dropout Voltage
- Guaranteed 750mA output
- Over-Temperature Shutdown
- Current Limiting
- Short Circuit Current Fold-back
- Highly Accurate± 1.5%
- Low Temperature Coefficient

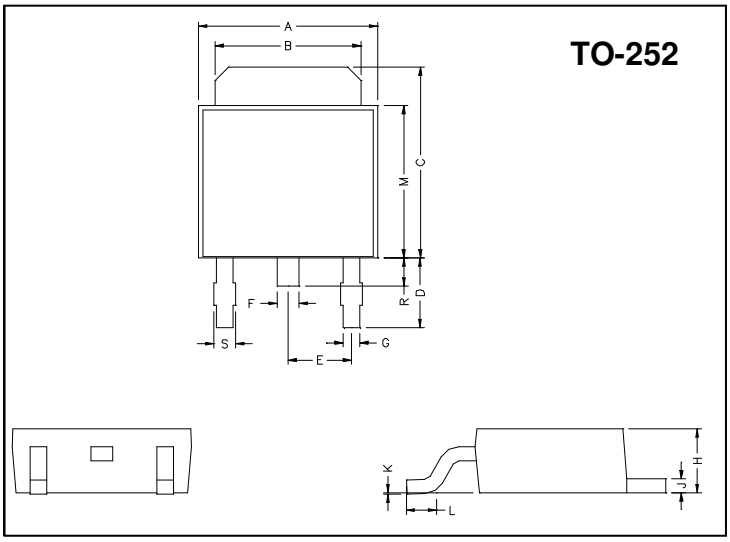
Functional Block Diagram

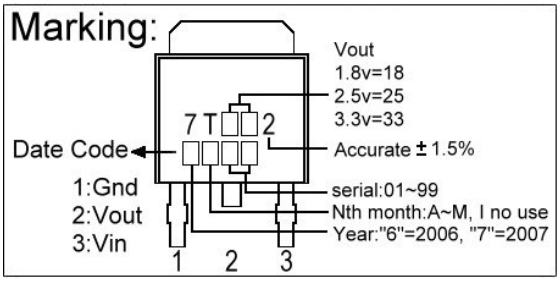


Applications

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

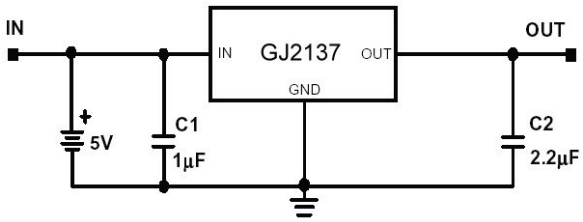
Package Dimensions





REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	6.40	6.80	G	0.50	0.70
B	5.20	5.50	H	2.20	2.40
C	6.80	7.20	J	0.45	0.55
D	2.40	3.00	K	0	0.15
E	2.30 REF.		L	0.90	1.50
F	0.70	0.90	M	5.40	5.80
S	0.60	0.90	R	0.80	1.20

Typical Application Circuit



Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Input Max Voltage	V_{IN}	8	V
Output Current	I_{OUT}	1	A
Output Voltage	V_{OUT}	1.5~3.8	V
Operating Ambient Temperature	Topr	-40 ~ +85	℃
Junction Temperature	Tj	-40 ~ +125	℃
Maximum Junction Temperature	$T_{j\,Max}$	150	℃
Thermal Resistance	θjc	60	℃/W
Internal Power Dissipation (ΔT=100℃)	PD	3	W
EDS Classification		B	

Electrical Characteristics $V_{IN}=V_{OUT}(T)+2V$, Ta=25℃ unless otherwise noted

Parameter	Symbol	Condition		Min	TYP	Max	Unit
Output Voltage	$V_{OUT}(E)$ (Note1)	I_O=1mA		-1.5%	$V_{OUT}(T)$ (Note2)	1.5%	V
Output Current	I_O	V_O>1.2V		750	-	-	mA
Current Limit	I_{LIM}	V_O>1.2V		750	850	-	mA
Load Regulation	REG_{LOAD}	$V_{IN}=V_{OUT}(T)+2V$, I_O=1mA to 750mA		-1	0.2	1	%
Dropout Voltage	$V_{DROPOUT}$	I_O=750mA $V_O=V_{OUT}(E)$-2%	1.4V<$V_{OUT}(T)$≤2.0V	-	-	1400	mV
			2.0V<$V_{OUT}(T)$≤2.8V	-	-	800	
			2.8V<$V_{OUT}(T)$	-	-	600	
Quiescent Current	I_Q	$V_{IN}=V_{OUT}(T)+2V$, I_O=0mA		-	30	50	μA
Ground Pin Current	I_{GND}	$V_{IN}=V_{OUT}(T)+2V$, I_O=1mA~750mA		-	35	-	μA
Line Regulation	REG_{LINE}	I_O=1mA $V_{IN}=V_{OUT}(T)+1$ to $V_{OUT}(T)+2$	1.4V<$V_{OUT}(T)$≤2.0V	-0.15	-	0.15	%
			2.0V<$V_{OUT}(T)$<4.0V	-0.1	0.02	0.1	
Input Voltage	V_{IN}			Note3	-	7	V
Over Temperature Shutdown	OTS			-	150	-	℃
Over Temperature Hysterisis	OTH			-	30	-	℃
Vo Temperature Coefficient	TC			-	30	-	ppm/℃
Short Circuit Current	I_{SC}	$V_{IN}=V_{OUT}(T)+1V$, V_{OUT}<0.8V		-	300	600	mA
Power Supply Rejection	PSRR	Io=100mA Co=2.2μF	f=1kHz	-	50	-	dB
			f=10kHz	-	20	-	
			f=100kHz	-	10	-	
Output Voltage Noise	eN	f=10Hz~100kHz, Io=10mA, Co=2.2μF		-	30	-	μVrms

Note 1: V_{OUT} (E) =Effective Output Voltage (i.e. the output voltage when "V_{OUT} (T) + 2.0V" is provided at the V_{IN} pin while maintaining a certain I_{OUT} value).

2: V_{OUT} (T) =Specified Output Voltage

3: $V_{IN\,(MIN)}=V_{OUT}+V_{DROPOUT}$

Ordering Information (contd.)

Part Number	Marking	Output Voltage	Part Number	Marking	Output Voltage
GJ2137-15	7T152 XXXX	1.5V	GJ2137-18	7T182 XXXX	1.8V
GJ2137-25	7T252 XXXX	2.5V	GJ2137-27	7T272 XXXX	2.7V
GJ2137-28	7T282 XXXX	2.8V	GJ2137-29	7T292 XXXX	2.9V
GJ2137-30	7T302 XXXX	3.0V	GJ2137-31	7T312 XXXX	3.1V
GJ2137-33	7T332 XXXX	3.3V	GJ2137-34	7T342 XXXX	3.4V
GJ2137-35	7T352 XXXX	3.5V	GJ2137-36	7T362 XXXX	3.6V
GJ2137-3.7	7T372 XXXX	3.7V	GJ2137-38	7T382 XXXX	3.8V
GJ2137-2H	7T2H2 XXXX	2.85V			

Detailed Description

The GJ2137 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℃, or the current exceeds 750mA. During thermal shutdown, the output voltage remains low. Normal operation is restored when the junction temperature drops below 120℃.

The GJ2137 switches from voltage mode to current mode when the load exceeds the rated output current. This prevents over-stress. The GJ2137 also incorporates current fold-back to reduce power dissipation when the output is short circuited. This feature becomes active when the output drops below 0.8V and reduces the current flow by 65%. Full current is restored when the voltage exceeds 0.8V.

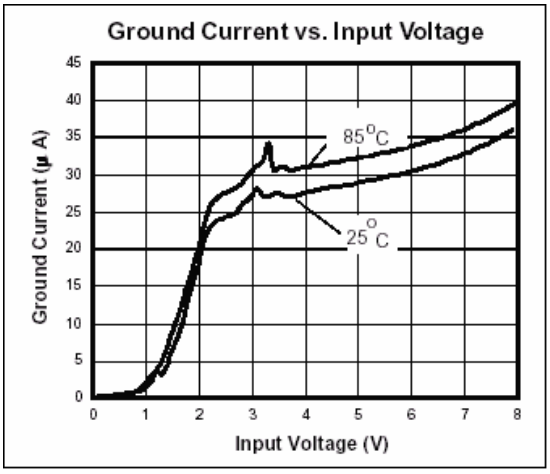
External Capacitors

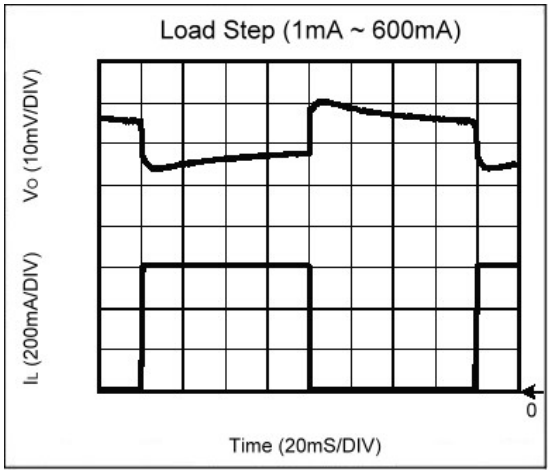
The GJ2137 is stable with an output capacitance to ground of 2.2μF or greater. Ceramic capacitors have the lowest ESR, and will offer the best AC performance. Conversely, Aluminum Electrolytic capacitors exhibit the highest ESR, resulting in the poorest AC response. Unfortunately, large value ceramic capacitors are comparatively expensive. One option is to parallel a 0.1μF ceramic capacitor with a 10μF Aluminum Electrolytic. The benefit is low ESR, high capacitance, and low overall cost.

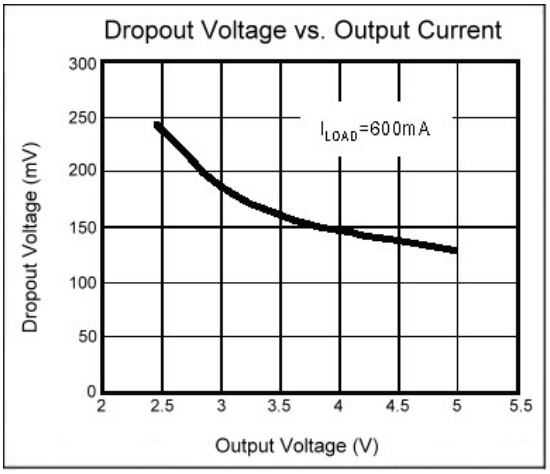
A second capacitor is recommended between the input and ground to stabilize Vin. The input capacitor should be at least 0.1μF to have a beneficial effect.

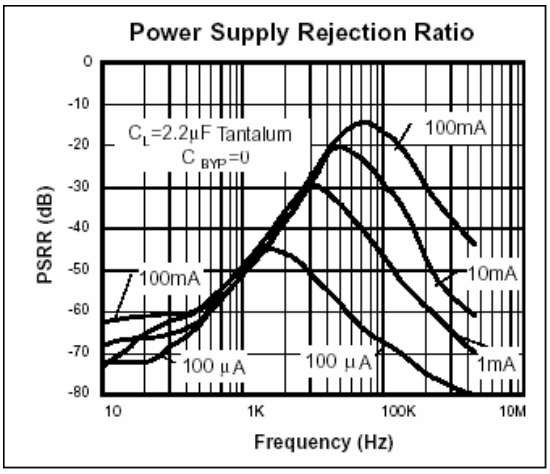
All capacitors should be placed in close proximity to the pins. A “Quiet” ground termination is desirable. This can be achieved with a “Star” connection.

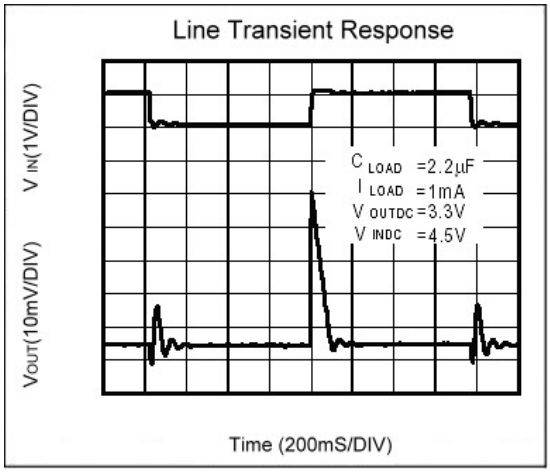
Characteristics Curve

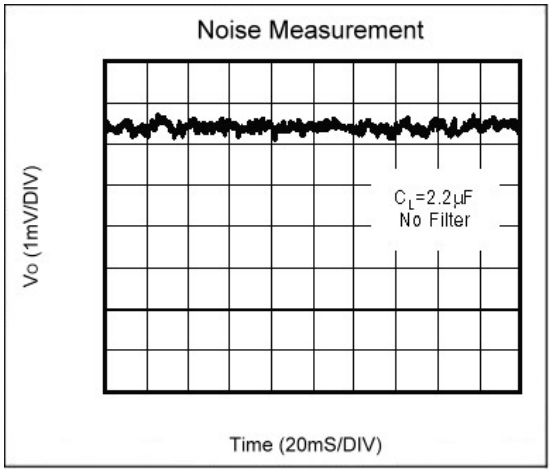


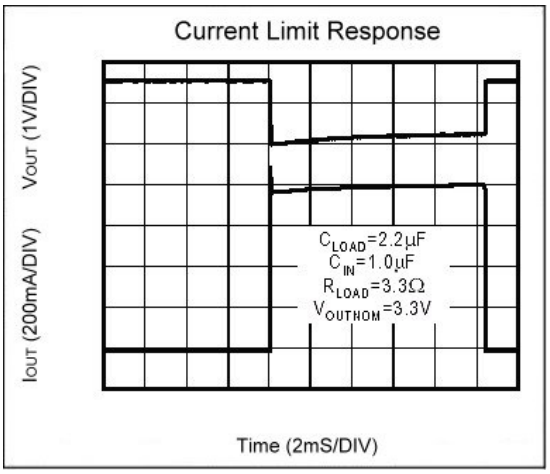


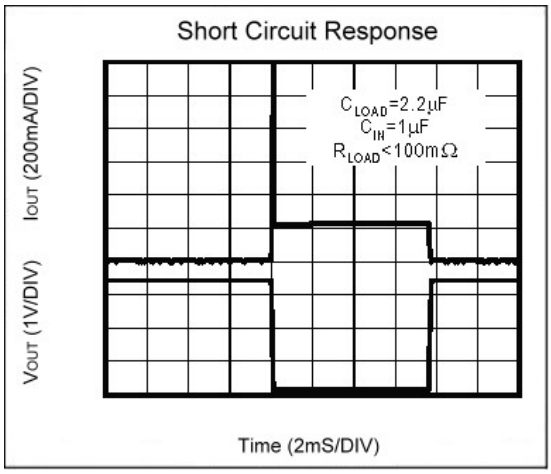


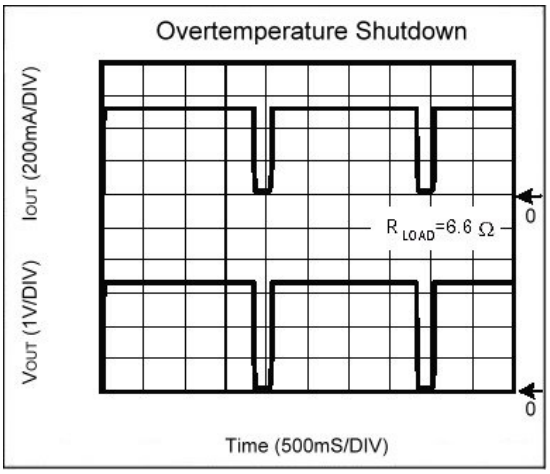


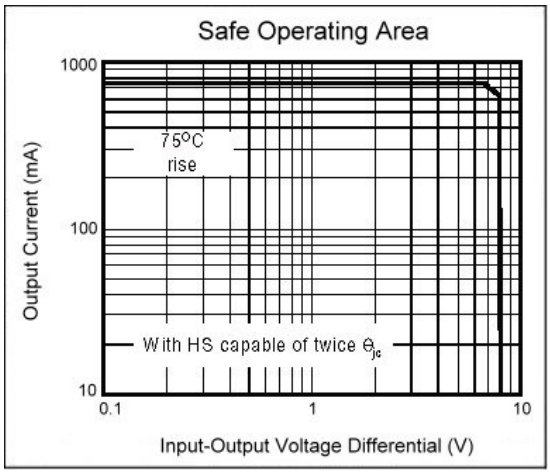












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