400mA Low Dropout Voltage Regulators

The series of fixed-voltage monolithic micropower voltage regulators is designed for a wide range of applications. Thes device excellent choice fo use in battery-power application. Furthermore, the quiescent current increases on slightly at dropout, which prolongs battery life.

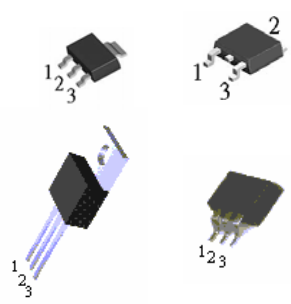
This series of fixed-voltage regulators features very low quiescent current (100mA Typ.) and very low drop output voltage (Typ. 60mV al light load and 600mV at 400mA). This includes a tight initial tolerance of 0.5% typ., extremely good load and line regulation of 0.05% typ., and very low output temperature coefficient.

This series is offered in 3-pin TO-263, TO-220, TO-252 & SOT-223 package, and in 5-pin TO-220 & TO-263 package with shutdown input.

FEATURES

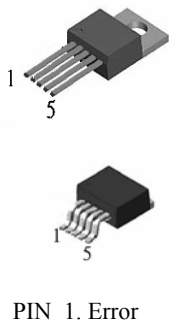
- Output accuracy within 2% at over timperature
- Very low quiescent current
- Low dropout voltage (400mV Typ)
- Extremely tight load and line regulation
- Very low temperature coefficient
- Unregulated DC input can withstand -20V reverse battery and +60V positive transients
- Avaiable Output Voltage 5V, 3.3V, 2.5V, 1.8V

SOT-223 / TO-252
TO-220 / TO-263



PIN 1. Input
2. Ground
3. Output

TO-220-5L
TO-263-5L



PIN 1. Error
2. Input
3. Ground
4. Output
5. Shutdown

APPLICATIONS

- High-efficiency linear regulator
- Battery powered systems
- Portable instrumentation
- Portable consumer equipment
- Portable / Palm top / Notebook computers
- Automotive electronics
- SMPS Post-Regulator

ORDERING INFORMATION

Device	Operating Temperature	Package
PJ48xxCZ-5L	-20℃ to +85℃	TO-220-5L
PJ48xxCM-5L		TO-263-5L
PJ48xxCZ		TO-220
PJ48xxCM		TO-263
PJ48xxCP		TO-252
PJ48xxCW		SOT-223

xx- output voltage

ABSOLUTE MAXIMUM RATINGS

Power Dissipation		Internally Limited
Lead Temperature (Soldering, 5 seconds)		260℃
Storage Temperature Range		.-65 to +150℃
Operating Junction Temperature Range		-55 to +150℃
Input Supply Voltage		-20 to +35V
Continuous total dissipation at 25℃ free-air temperature	TO-220/TO-263	2W
	TO-252	1W
	SOT-223	0.8W

ELECTRICAL CHARACTERISTICS at Vin = 14.4V, Ta = 25℃, I_L = 5mA, C_o = 100 μF, unless otherwise noted.

Parameter	Conditions	Min	Typ	Max	UNITS
Output Voltage	T_J=25℃ Full Operating Temperature	0.990|Vo| 0.980|Vo||	5.0 / 3.3 2.5 / 1.8	1.010|Vo| 1.020|Vo|	V
Output Voltage	1mA≤ I_L≤700mA, T_J≤ T_{JMAX}	0.975|Vo|		1.025|Vo|	V
Input Supply Voltage				26	V
Output VoltageTemperature Coefficient	(Note 1)		50	150	ppm/℃
Line Regulation (Note 2)	13V≤V_{in}≤26V (Note 3)		0.1	0.4	%
Load Regulation (Note 2)	1mA≤I_L≤700mA		0.1	0.3	%
Dropout Voltage (Note 4)	I_L=100mA I_L=400mA		200 400	300 600	mV mV
Ground Current (Note 5)	I_L=100 μA I_L=400mA		100 30	200 40	μA mA
Dropout Ground Current (Note 5)	V_{in}=Vout-0.5V, I_L=100 μA		200	300	μA
Current Limit	V_{out}=0		700	900	mA
Thermal Regulation (Note 6)			0.05	0.2	%W
Output Noise, 10Hz to 100KHz, I_L=400mA	C_L=2.2 μF C_L=3.3 μF C_L=33 μF		500 350 120		μVrms
Adjust Model					
Reference Voltage		1.21	1.235	1.26	V
Reference Voltage	Over Temperature (Note 7)	1.185		1.285	V
Feedback Pin Bias Current			20	40	nA
Reference Voltage Temperature Coefficient	(Note 1)		50		ppm/℃
Feedback Pin Bias Current Temperature Coefficient			0.1		nA/℃
Shutdown Input					
Input Logic Voltage	Low (Regulator ON) High (Regulator OFF)	 2	0.7		V
Shutdown Pin Input Current	Vs = 2.4V Vs = 26V		30 450	50 600	μA
Regulator Output Current in Shutdown	(Note 8)			200	μA

Note 1: Output or reference voltage temperature coefficients defined as the worst case voltage change divided by the tatal temperature range.
Note 2: Regulations is measured at constant junction temperature, using pulse testing with a low duty cycle. Changes in output voltage due to heating effects are covered under the specification for thermal regulation.
Note 3: Line regulation is tested at 125℃ for I_L = 5mA. For I_L = 100 μA and T_J = 125℃, line regulation is guaranteed by desigh to 0.2%. for 13V ≤ V_{in} ≤26V.
Note 4: Dropout voltage is defined as the input to output differential at which the output voltage drops2% below its nominal value measured at 1V differential.
Note 5: Ground pin current is the regulator quiescent current. The total current drawn from the source is the sum of the ground pin current and output load current.
Note 6: Thermal regulation is the change in output voltage at a time T after a change in power dissipation, excluding load or line regulation effects. Specifications are for a 200mA load pulse(3W pulse) for T = 10ms.
Note 7: Vref ≤ Vou t≤ (Vin-1V), 2.3V ≤ Vin ≤26V, 100 μA ≤ I_L ≤ 400mA, T_J ≤ T_{JMAX} .
Note 8: 2V ≤ Vshutdown, Vin ≤ 26V, Vout = 0V

BLOCK DIAGRAM AND TYPICAL APPLICATIONS

Fixed Regulator for 3 Pin

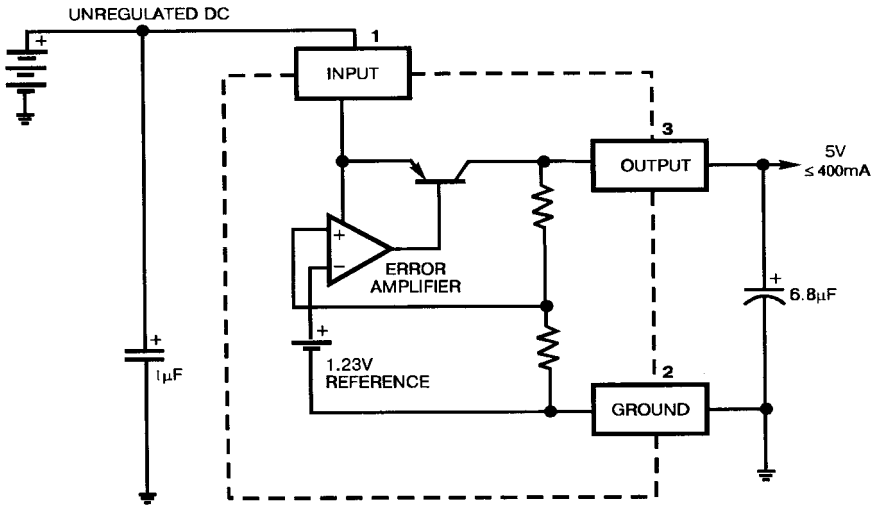
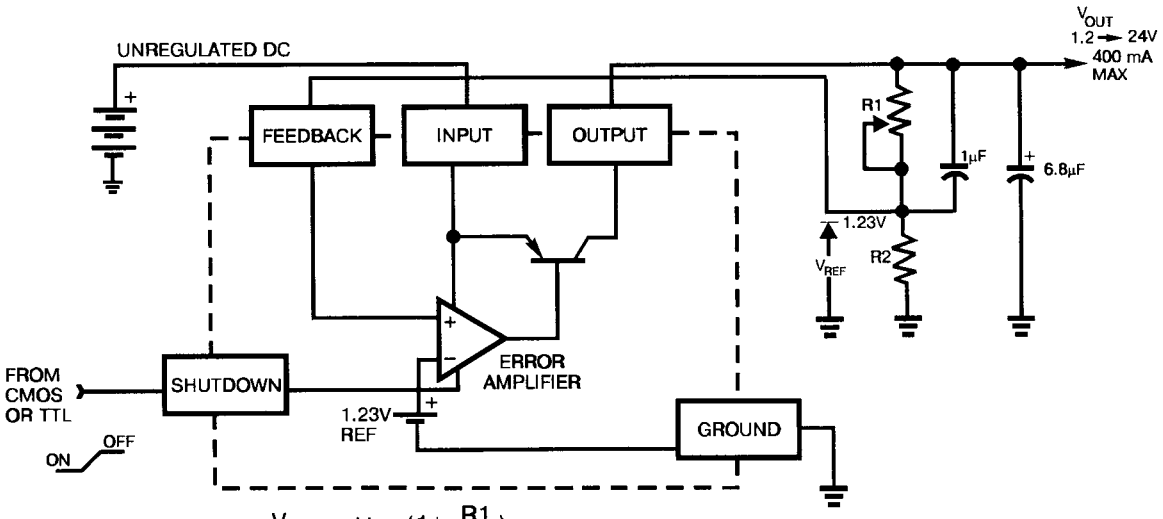


Figure 1. Fixed Regulator

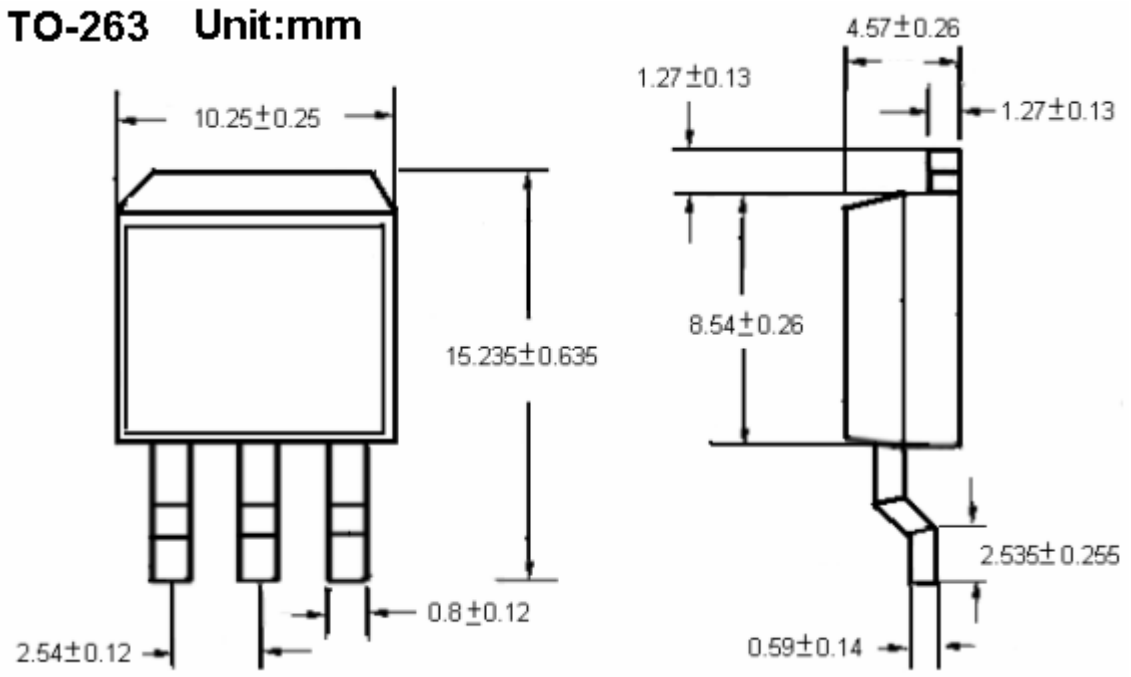
Adj / Fixed Regulator for 5 Pin



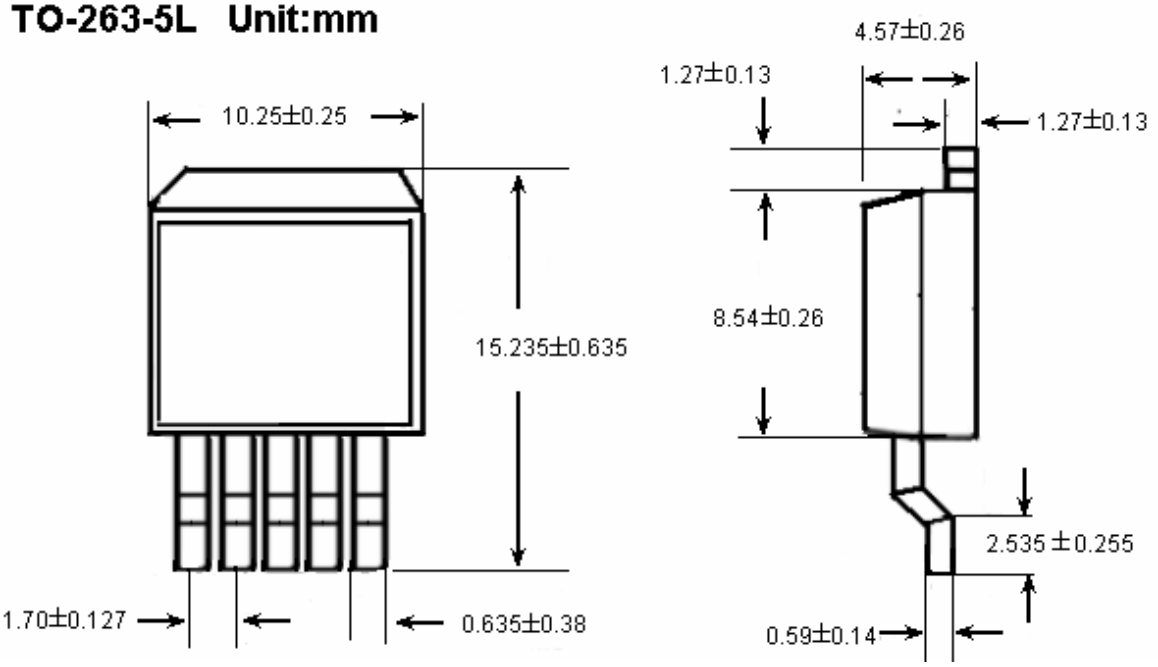
$$V_{out} = V_{REF}\left(1+\frac{R1}{R2}\right)$$

Figure 2. Adjustable Regulator

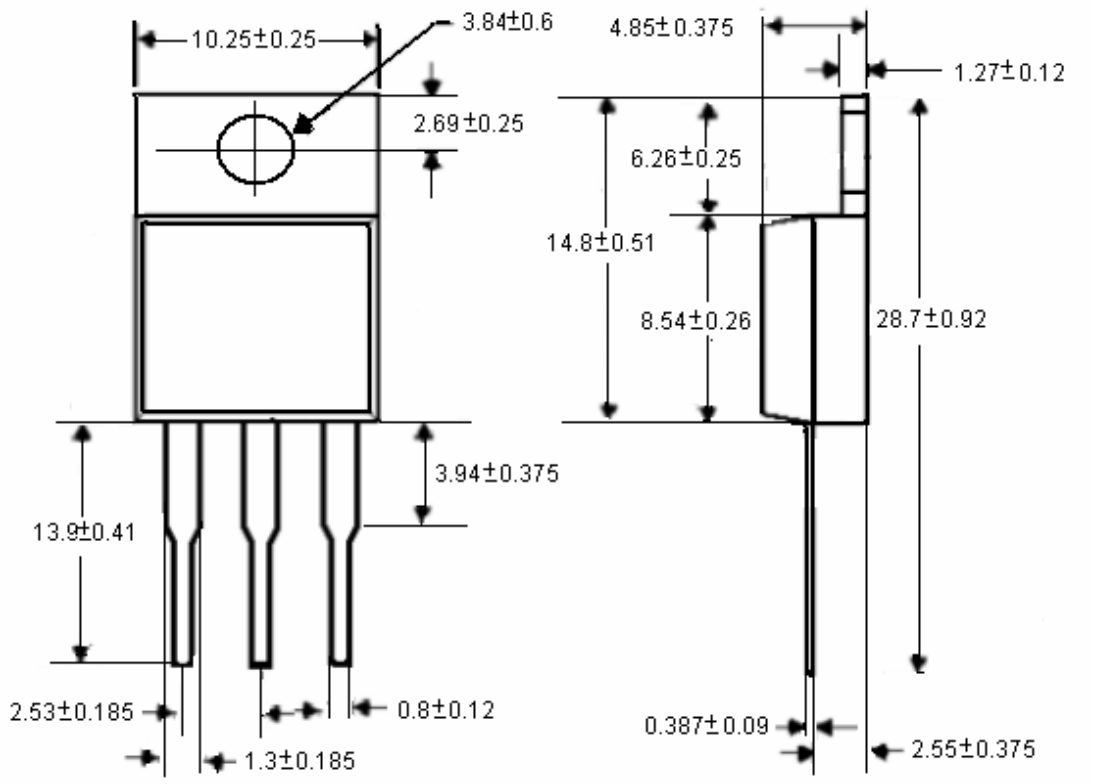
TO-263 Unit:mm



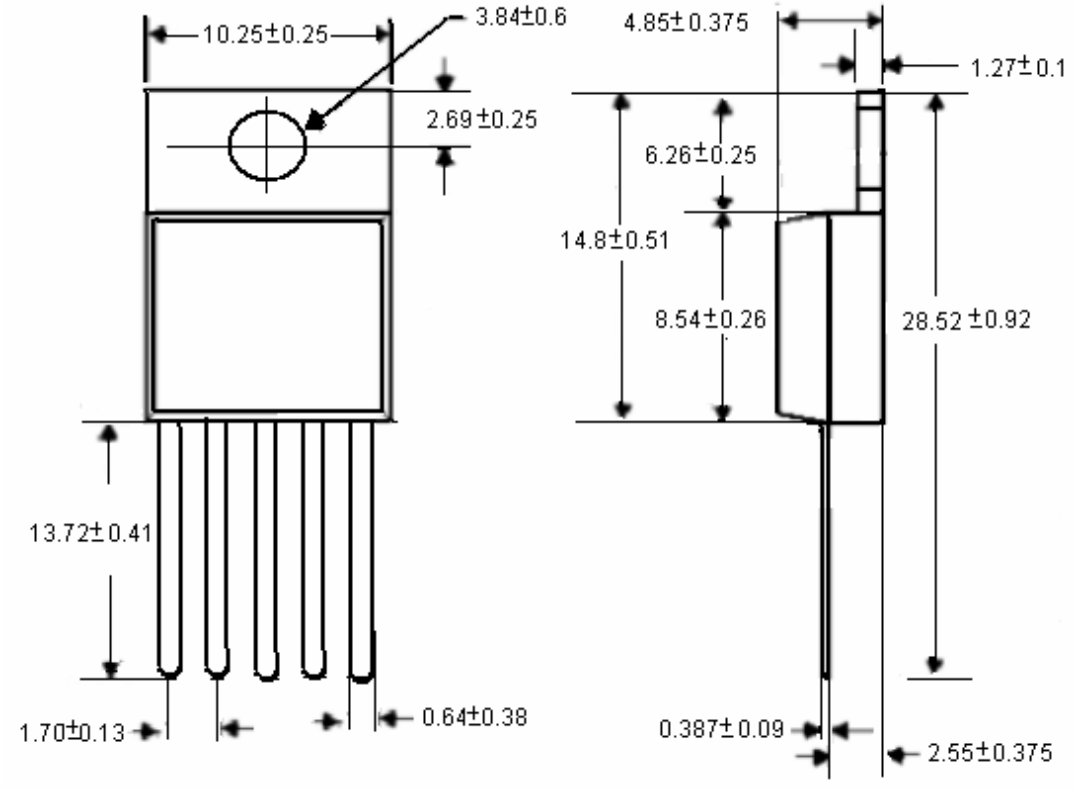
TO-263-5L Unit:mm



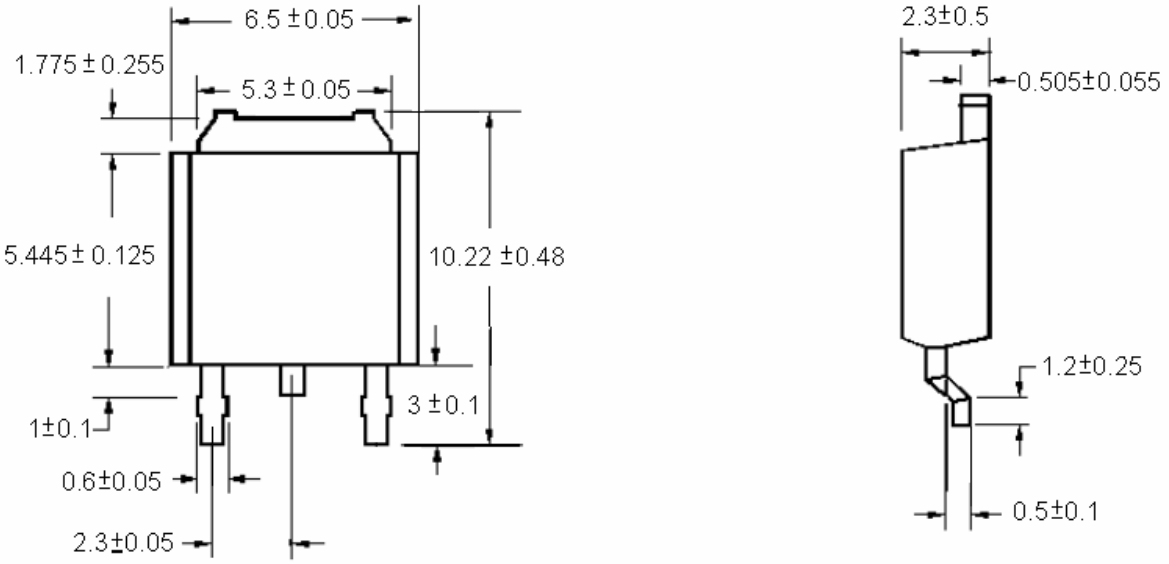
TO-220 Unit:mm



TO-220-5L Unit:mm



TO-252 Unit:mm



SOT-223 Unit:mm