FIXED 2.5 AND 5 VOLT MINATURE VOLTAGE REGULATORS

ZMR250
ZMR500

ISSUE 2 - OCTOBER 1995

DEVICE DESCRIPTION

The ZMR250 and 500 three terminal fixed positive voltage regulators feature internal current limit and will shut down under thermal overload conditions making the devices almost impossible to destroy.

The circuit design offers an exceptionally small quiescent current, only 30µA for the 2.5 volt device, ideal for low power applications. The initial devices in the series regulate to 2.5 or 5 volts with a drive capability up to 50mA, however, the flexible design will allow other voltage selections to be made.

The device was designed with space saving in mind and so is available in the small outline SOT23 package. This tiny package is ideal for applications where space is restricted. The device is also available in the through hole TO92 package.

FEATURES

- Small outline SOT23 package
- TO92 package
- 2.5V and 5V
- Output current up to 50mA
- Very low Quiesent current (30µA)
- Unconditionally stable
- Other output voltages possible
- Internal short circuit current limit

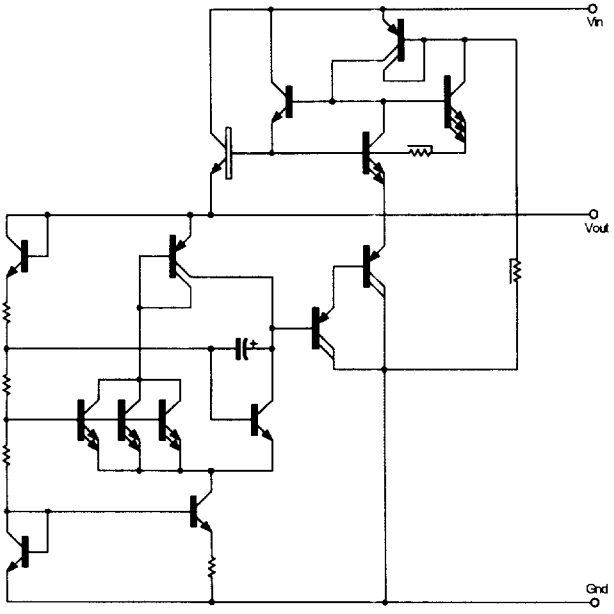
VOLTAGE RANGE

ZMR250 2.5V

ZMR500 5V

Contact Zetex Marketing for availability of other voltages

SCHEMATIC DIAGRAM



CONNECTION TABLE		
Pin	SOT223	TO92
1	G_{nd}	In
2	In	G_{nd}
3	Out	Out
Pack	F	C
see Diagrams Page 2 - 5		

ZMR250
ZMR500

ABSOLUTE MAXIMUM RATINGS

Input voltage	20V	
Package power dissipation	SOT23	500mW (Note 3)
(T_{amb}=25 °C)	TO92	600mW
Output current (I_O)		200mA
Operating temperature		-55 to 125°C
Storage temperature		-65 to 150°C

Note:

1. The maximum operating input voltage and output current of the device will be governed by the maximum power dissipation of the selected package. Maximum package power dissipation is specified at 25 °C and must be linearly derated to zero at T_{amb}=125°C.

2. The following data represents pulse test conditions with junction temperatures as indicated at the initiation of the test. Continuous operation of the devices with the stated conditions might exceed the power dissipation limits of the chosen package.

3. Maximum power dissipation, for the SOT23 package, is calculated assuming that the device is mounted on a ceramic substrate measuring 15 x 15 x 0.6mm.

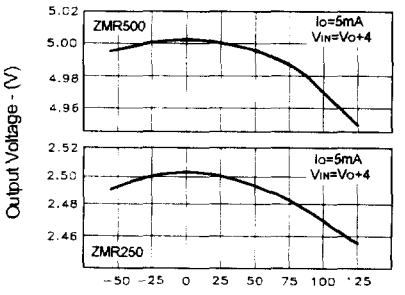
ZMR250
ELECTRICAL CHARACTERISTICS
TEST CONDITIONS (Unless otherwise stated): T_j=25°C, I_O=10mA, V_{in}=6.5V

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNITS
V_O	Output Voltage		2.438	2.5	2.563	V
		I_O=0 to 50mA T_j=-55 to 125°C	2.360		2.640	V
		V_{in}=4.5 to 20V I_O=0 to 50mA T_j=-55 to 125°C	2.360		2.640	V
ΔV_O	Line Regulation	Vin=4.5 to 20V		5	15	mV
ΔV_O	Load Regulation	I_O=0 to 50mA I_O=0 to 10mA		20 12	30	mV mV
I_q	Quiescent Current	T_j=-55 to 125°C		30	40	µA
ΔI_q	Quiescent Current Change	I_O=0 to 50mA V_{in}=4.5 to 20V		1 2	±10 10	µA µA
V_n	Output Noise Voltage	f=10Hz to 10KHz		65		µV rms
$\Delta V_{in}/\Delta V_O$	Ripple Rejection	V_{in}=6.3 to 18V f=120Hz	55	75		dB
V_{in}	Input Voltage Required To Maintain Regulation		4.2	3.9		V
$\Delta V_O/\Delta T$	Average Temperature Coefficient of V_O	I_O=5.0mA T_j=-55 to 125°C		0.275	0.700	mV/°C

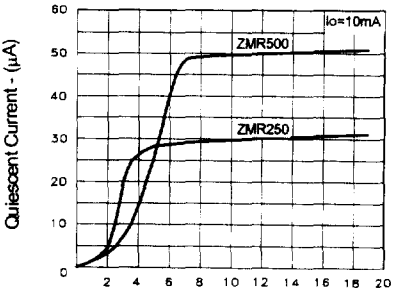
ZMR500
ELECTRICAL CHARACTERISTICS
TEST CONDITIONS (Unless otherwise stated): T_j=25°C, I_O=10mA, V_{in}=10V

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNITS
V_O	Output Voltage		4.875	5	5.125	V
		I_O=0 to 50mA T_j=-55 to 125°C	4.780		5.160	V
		V_{in}=7 to 20V I_O=0 to 50mA T_j=-55 to 125°C	4.780		5.175	V
ΔV_O	Line Regulation	V_{in}=7 to 20V		5	15	mV
ΔV_O	Load Regulation	I_O=0 to 50mA I_O=0 to 10mA		25 15	40	mV mV
I_q	Quiescent Current	T_j=-55 to 125°C		50	70	µA
ΔI_q	Quiescent Current Change	I_O=0 to 50mA V_{in}=7 to 20V		1 2	±10 10	µA µA
V_n	Output Noise Voltage	f=10Hz to 10KHz		90		µV rms
$\Delta V_{in}/\Delta V_O$	Ripple Rejection	V_{in}=8 to 18V f=120Hz	55	72		dB
V_{in}	Input Voltage Required To Maintain Regulation		7	6.7		V
$\Delta V_O/\Delta T$	Average Temperature Coefficient of V_O	I_O=5.0mA T_j=-55 to 125°C		0.275	0.700	mV/°C

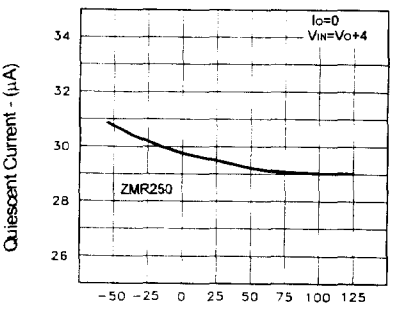
TYPICAL CHARACTERISTICS



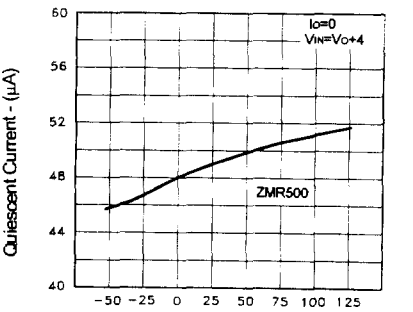
Output Voltage v Temperature Coefficient



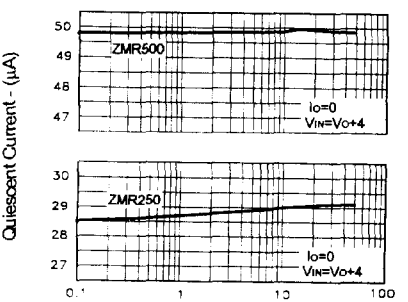
Quiescent Current v Input Voltage



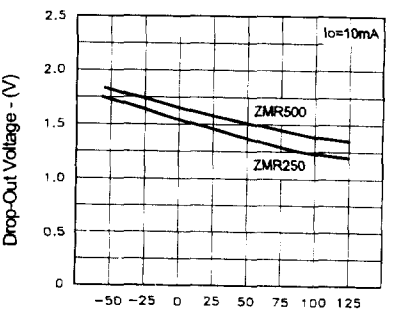
Quiescent Current v Temperature



Quiescent Current v Temperature

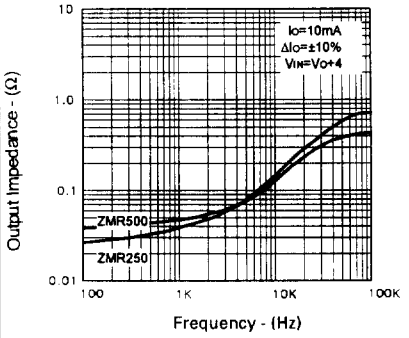


Quiescent Current v Output Current

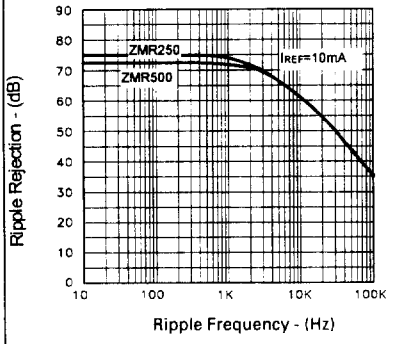


Drop-Out Voltage v Temperature

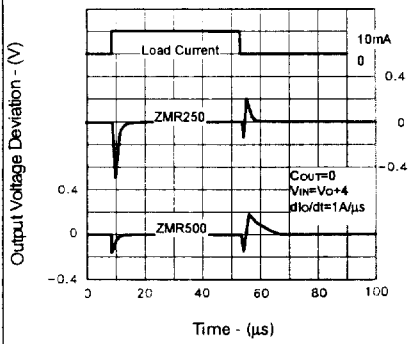
TYPICAL CHARACTERISTICS



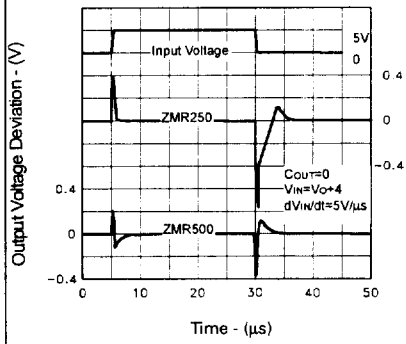
Output Impedance v Frequency



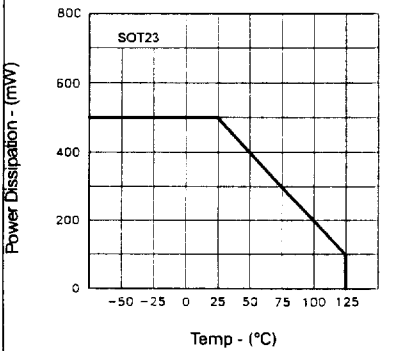
Ripple Rejection v Ripple Frequency



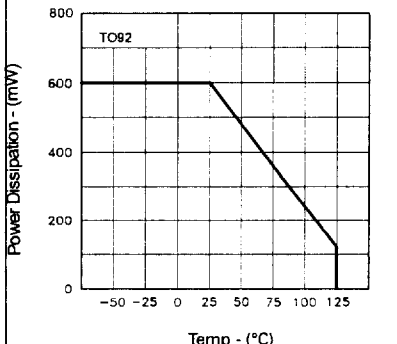
Load Transient Response



Line Transient Response



Power Derating



Power Derating