500mACurrent 35V Input Voltage LDO

CYP78MXX

General Description

CYP78MXX is three-terminal positive regulators. One of these regulators can deliver up to 500mA of output current. The internal limiting and thermal shut down features of the regulator make them essentially immune to overload. When used as a replacement for a zener diode-resist or Combination, an effective improvement in output impedance can be obtained, together with lower quiescent current.

Features

- Output Current of 500mA
- Max Input Voltage 35V
- Thermal Overload Protection
- Short Circuit Protection
- Output transistor safe area protection
- No external components
- Package：TO252
- Output voltage accuracy: tolerance ±5%

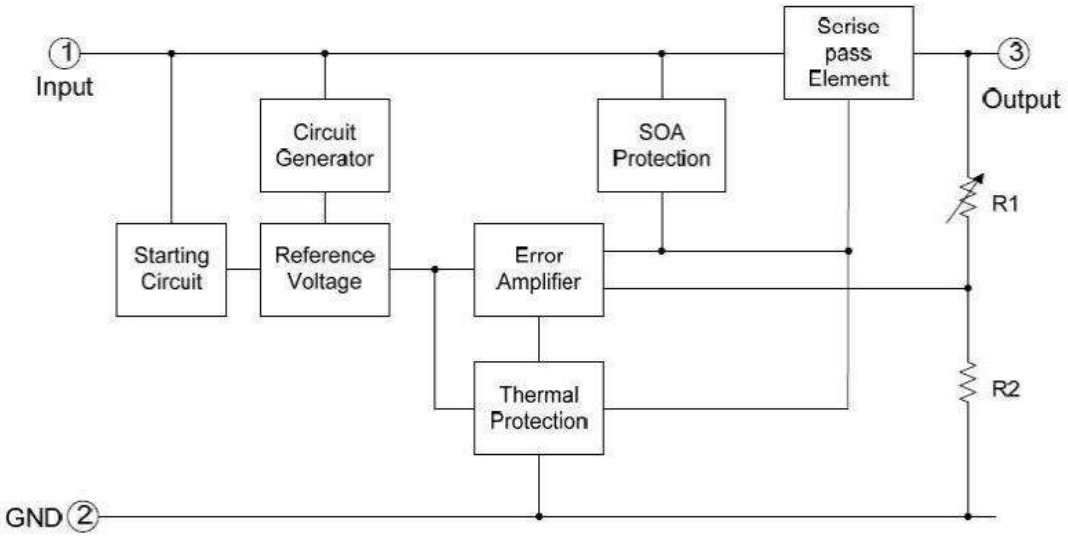
Order specification

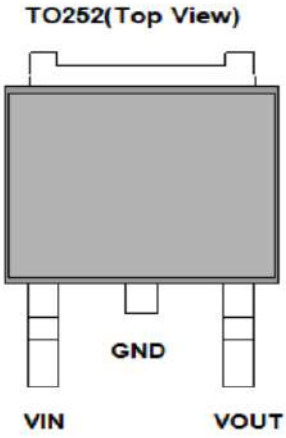
Device	Package	Manner of Packing	Devices per bag/reel
CYP78MXX	TO252	Reel	2500PCS/reel

Selection Table

Part No	Output Voltage	Package
CYP78M05	5.0V	TO252
CYP78M06	6.0V	
CYP78M08	8.0V	
CYP78M09	9.0V	
CYP78M12	12V	

Block Diagram and Pin Arrangement Diagram





Pin Assignment

Pin No.	Pin Name	Description
1	VIN	Supply Voltage Input.
2	GND	Ground connection.
3	VOUT	Output.

Functional Description

CYP78MXX is three-terminal positive regulators. One of these regulators can deliver up to 500mA of output current. The internal limiting and thermal-shutdown features of the regulator make them essentially immune to overload. The output voltage can be 5.0V, 6.0V, 8.0V, 9.0V or 12.0V.

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Supply Voltage Input	VIN	35	V
MAX. Output current	I_{OUT}	500	mA
MAX. Power	P_{MAX}	0.5	W
Maximum junction temperature	Tj	-25~125	℃
Storage Temperature	Tstr	-55~125	℃
Soldering temperature and time	Tst	+260(Recommended 10S)	℃

Note: The absolute maximum ratings are rated values exceeding which the product could suffer physical damage. These values must therefore not be exceeded under any conditions.

Electrical Characteristics

CIN=0.33uF,CO=0.1uF,0≤Tj≤125℃， unless otherwise noted.

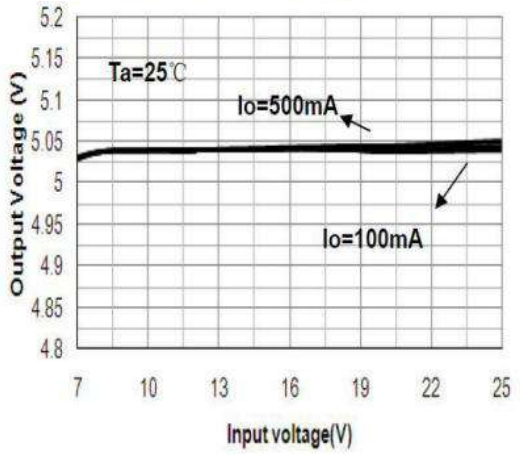
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	Io=40mA, V_{IN}=10V	0.964× V_{OUT}	V_{OUT}	1.036× V_{OUT}	V
		Io=1mA~40mA V_{IN}=7V~18V	0.96×V_{OUT}	V_{OUT}	1.04×V_{OUT}	V
		Io=1mA~10mA V_{IN}=10V	0.95×V_{OUT}	V_{OUT}	1.05×V_{OUT}	V
Line Regulation	LNR	V_{IN}=7V~18V, Io=40mA	-150	-	150	mV
		V_{IN}=8V~18V, Io=40mA	-100	-	100	mV
Load Regulation	LDR	V_{IN}=10V, Io=1mA~100mA	-60	-	60	mV
		V_{IN}=10V, Io=1mA~40mA	-30	-	30	mV
Dropout Voltage	VDIF	Tj=25℃, Io=100mA	-	2	-	V
Output noise Voltage	V_N	F=10Hz to 100KHz	-	40	-	uV/ Vo
Ripple Rejection	PSRR	Tj=25℃, f=120Hz, Io=40mA, V_{IN}=8V~20V	-	80	-	dB
Quiescent Current	I_Q	V_{IN}=10V, I_{OUT}=40mA	-	-	5.5	mA
Quiescent Current Change	$\triangle I_Q$	V_{IN}=8V~18V, I_O=40mA	-1.5	-	1.5	mA
		V_{IN}=10V, I_{OUT}=1mA~40mA,	-0.1	-	0.1	mA

LNR: Line Regulation. The change in output voltage for a change in the input voltage. The measurement is made under conditions of low dissipation or by using pulse techniques such that the average chip temperature is not significantly affected.

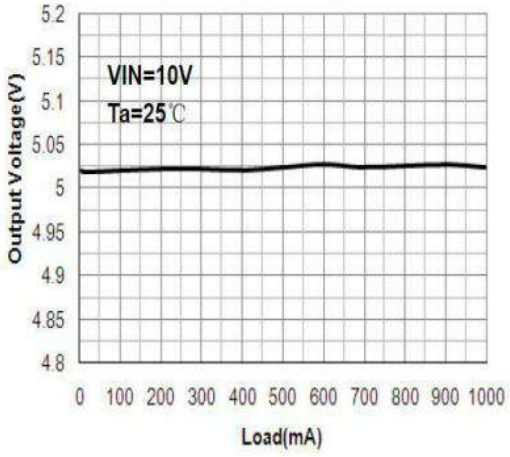
LDR: Load Regulation.The change in output voltage for a change in load current at constant chip temperature.

Typical Performance Characteristics

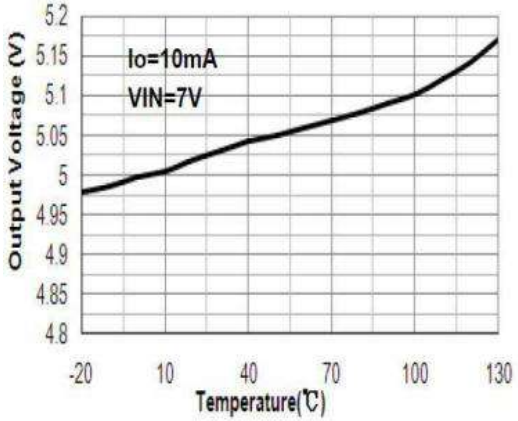
Output Voltage vs. Input voltage



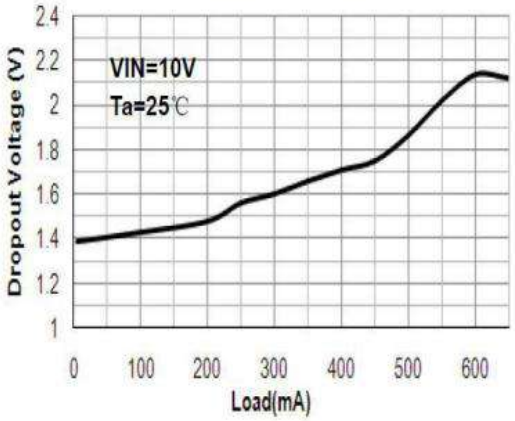
Output Voltage vs. Load



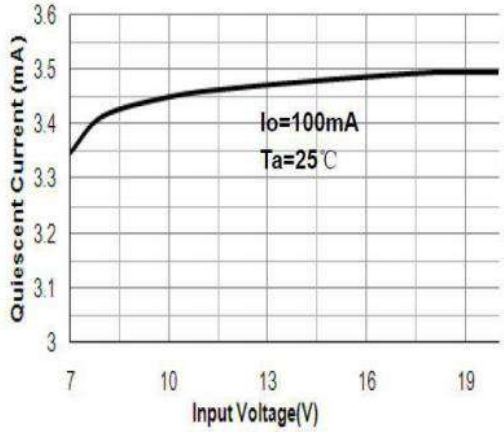
Output Voltage vs. Temperature



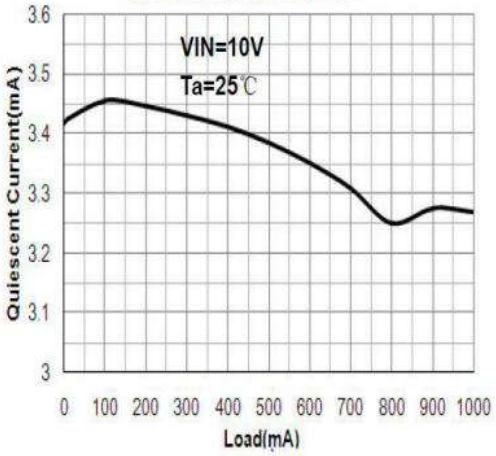
Dropout Voltage vs. Load



Quiescent Current vs. Input Voltage



Quiescent Current vs. Load



Application Circuits

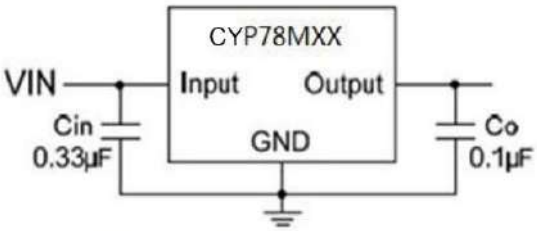


Fig.1 Fixed Output Regulator

A common ground is required between the input and the output voltages. The input voltage must remain typically 2.0V above the output voltage even during the low point on the input ripple voltage.

- Cin is required if regulator is located an appreciable distance from power supply filter.
- Co is not needed for stability; however, it does improve transient response.

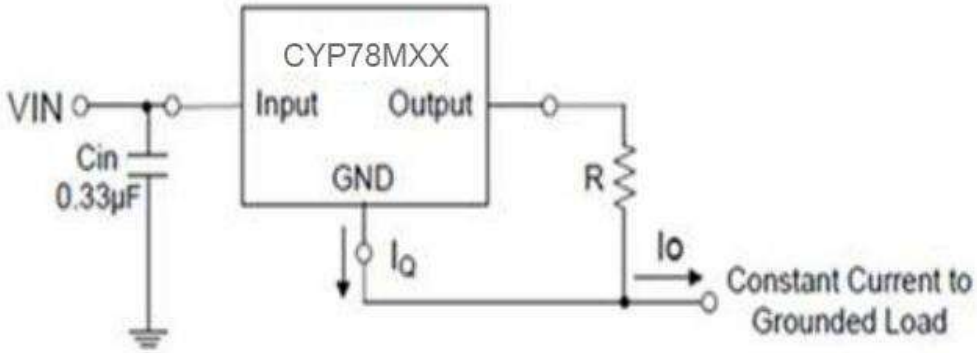


Fig.2 Constant Current Regulator

The CYP78MXX regulator can also be used as a current source when connected as Fig.2. In order to minimize dissipation the 78LXX is chosen in this application.
Resistor R determines the current as follows:

$$I_O = \frac{5V}{R} + I_Q$$

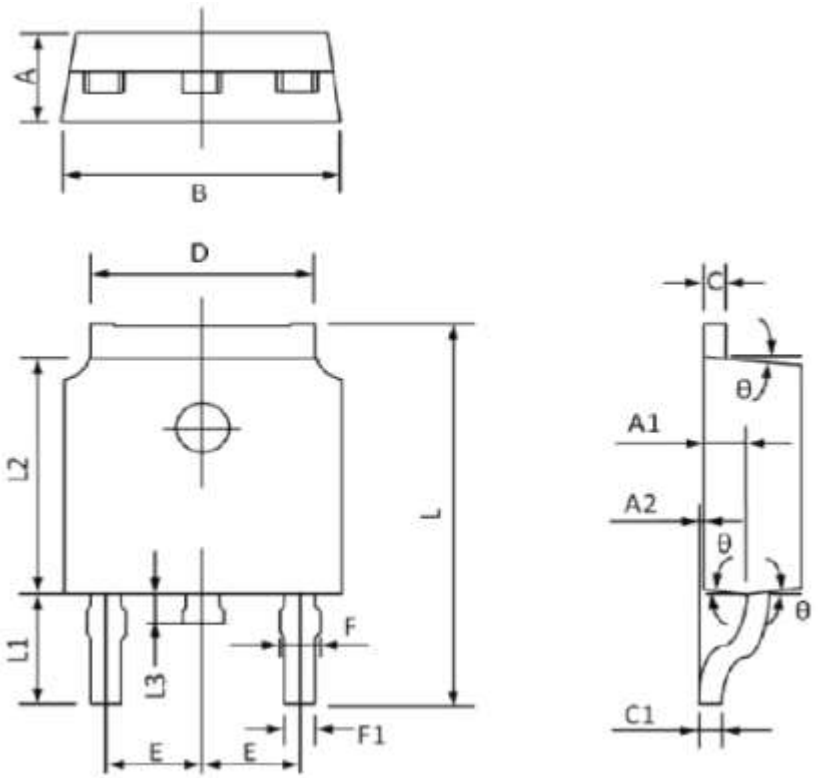
Operation Description

CYP78MXX is designed with Thermal Overload Protection that shuts down the circuit when subjected to an excessive power overload condition, Internal Short Circuit Protection that limits the maximum current the circuit will pass, and Output Transistor Safe-Area Compensation that reduces the output short circuit current as the voltage across the pass transistor is increased.

In many low current applications, compensation capacitors are not required.

However, it is recommended that the regulator input be bypassed with a capacitor if the regulator is connected to the power supply filter with long wire lengths, or if the output load capacitance is large. An input bypass capacitor should be selected to provide good high frequency characteristics to insure stable operation under all load conditions. A 0.33μFor larger tantalum, mylar, or other capacitor having low internal impedance at high frequencies should be chosen. The bypass capacitor should be mounted with the shortest possible leads directly across the regulator's input terminals. Normally good construction techniques should be used to minimize ground loops and lead resistance drops since the regulator has no external sense lead.

Package Information（TO252）



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.20	2.40	0.087	0.094
A1	0.91	1.11	0.036	0.044
A2	0.00	0.15	0.000	0.006
B	6.50	6.70	0.256	0.264
C	0.46	0.580	0.018	0.230
C1	0.46	0.580	0.018	0.230
D	5.10	5.46	0.201	0.215
E	2.186	2.386	0.086	0.094
F	0.74	0.94	0.029	0.037
F1	0.660	0.860	0.026	0.034
L	9.80	10.40	0.386	0.409
L1	2.9REF		0.114REF	
L2	6.00	6.20	0.236	0.244
L3	0.60	1.00	0.024	0.039
θ	3°	9°	3°	9°