3-Terminal 0.5A Positive Voltage Regulator ME78M05

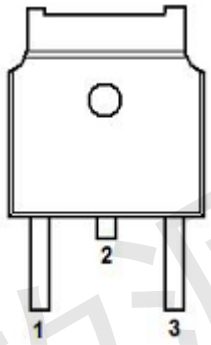
General Description

ME78M05 is a three-terminal positive regulator. Internal current limiting, thermal shutdown circuitry and safe-area compensation for the internal pass transistor combine to make these devices remarkably rugged under most operating conditions. Maximum output current, with adequate heat- sinking is 500 mA.

Features

- ●Output Current up to 0.5A
- ●Output Voltages of 5V
- ●Thermal Overload Protection
- ●Short Circuit Protection
- ●Package：TO252

Pin Configuration



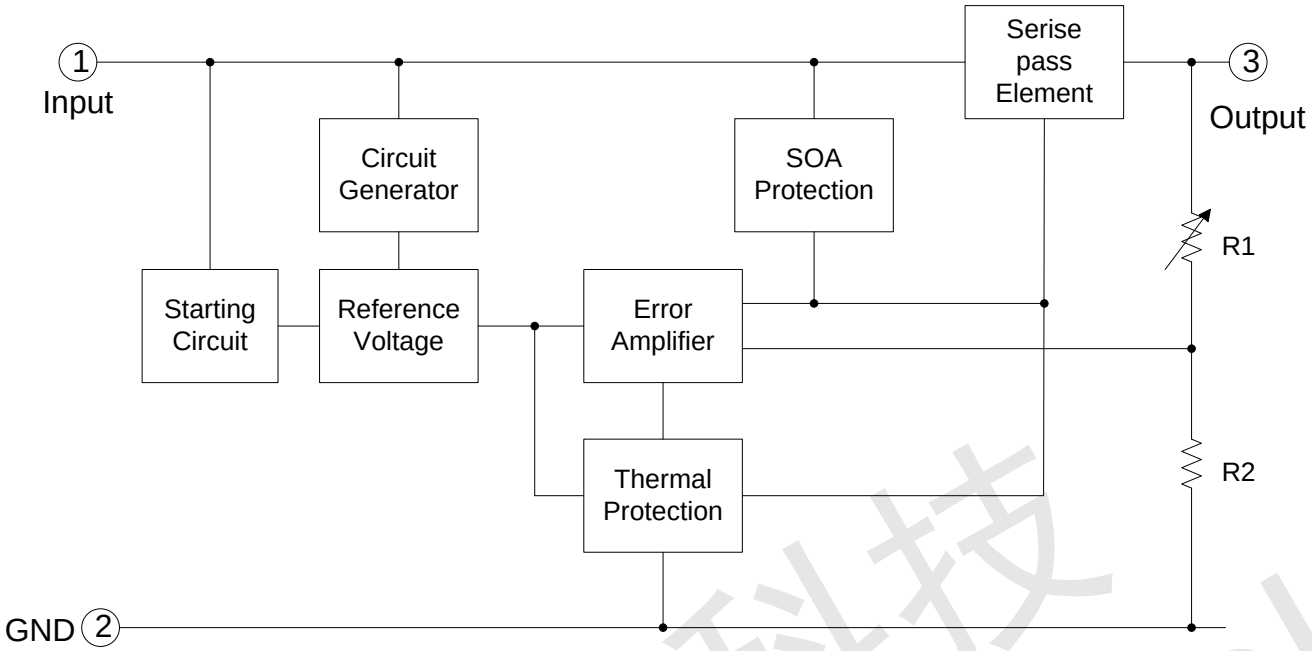
1. Input
2. GND
3. Output

Maximum Ratings(Ta=25℃)

Parameter	Rating	Unit
Input supply voltage : VIN	35	V
MAX. Output current:Iout	500	mA
Maximum junction temperature: T_j	-25～125	℃
Storage temperature :T_{str}	-55～150	℃
Soldering temperature and time	+260（Recommended 10S）	℃

Caution: 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.

Block Diagram



Electrical Characteristics

(Io =350mA, VIN=10V,0≤Tj≤125^{O}C, unless otherwise noted)

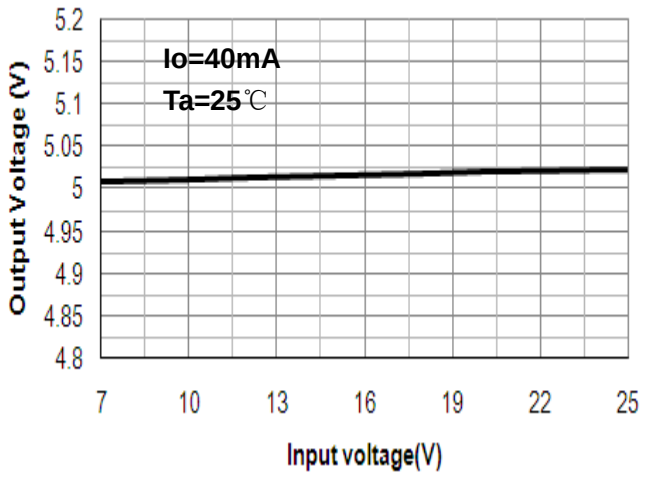
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_O	I_O=40mA, VIN=10V	4.8	5.0	5.2	V
		I_O=5mA～350mA VIN=7V～20V	4.75	5.0	5.25	
Line Regulations	LNR	VIN=7V～20V,I_O=40mA	-60	-	60	mV
Load Regulation	LDR	VIN=10V,I_O=5mA-500mA	-100	-	100	mV
Dropout Voltage	V_{DIF}	Tj=25^{O}C,Io=500mA	-	2	-	V
Output noise Voltage	V_N	f=10Hz to 100KHz	-	40	-	μV/Vo
Ripple Rejection	PSRR	Tj=25^{O}C,f=120Hz,Io=300mA VIN=8V～20V	-	80	-	dB
Peak Output Current	I_{pk}	Tj=25^{O}C	-	1000	-	mA
Quiescent Current	I_Q	Tj=25^{O}C	-	3.2	8	mA
Quiescent Current Change	ΔI_Q	I_O=5mA-350mA	-	-	0.5	mA
		I_O=200mA, VIN=8V～20V	-	-	0.8	

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.

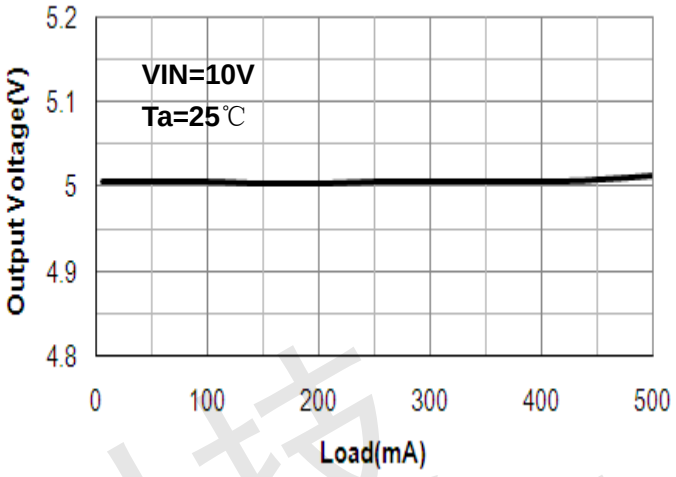
LDR: Load Regulation.The change in output voltage for a change in load current at constant chip temperature.

Type Characteristics

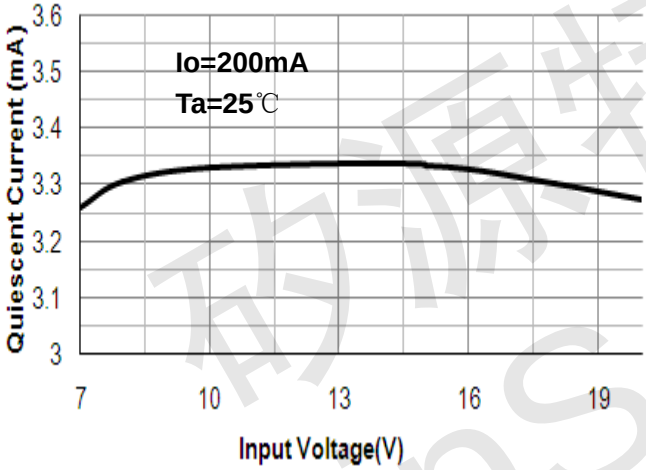
Output Voltage vs. Input voltage



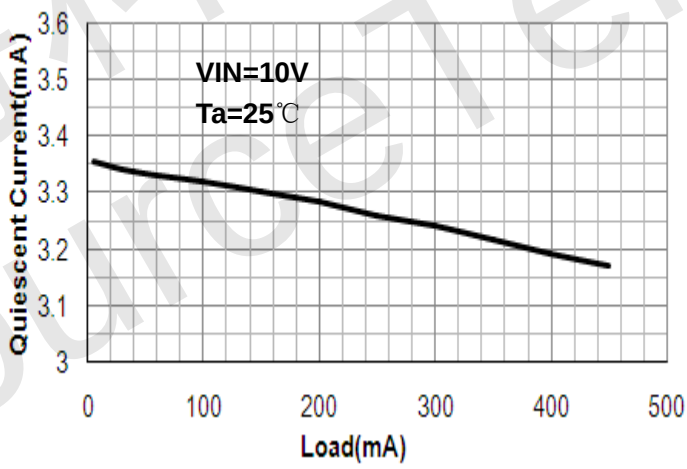
Output Voltage vs. Load



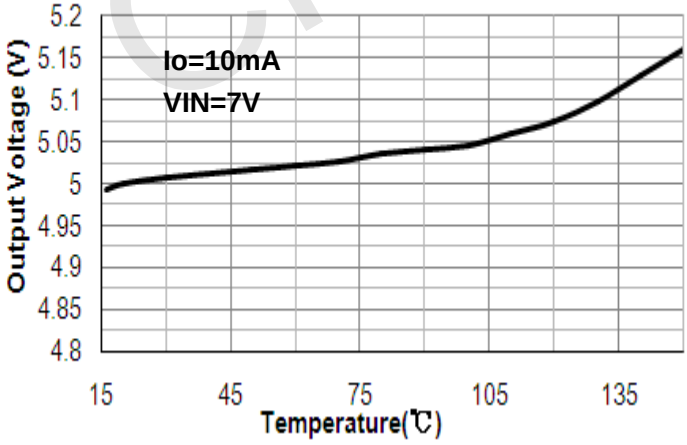
Quiescent Current vs. Input Voltage



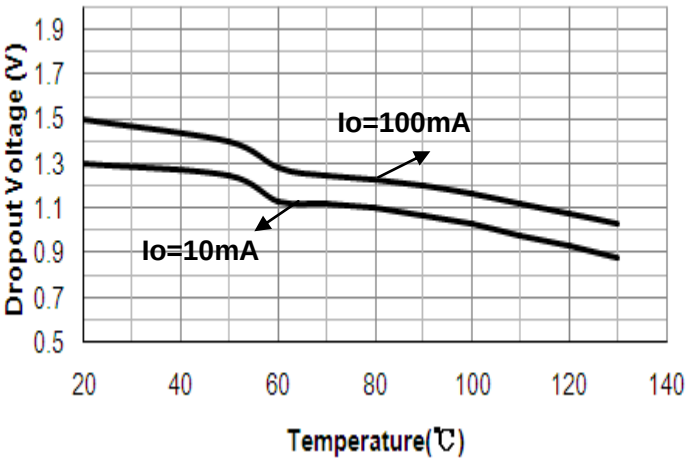
Quiescent Current vs. Load



Output Voltage vs. Temperature



Dropout Voltage vs. Temperature



Operation Description

ME78M05 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.

Typical Application Circuit

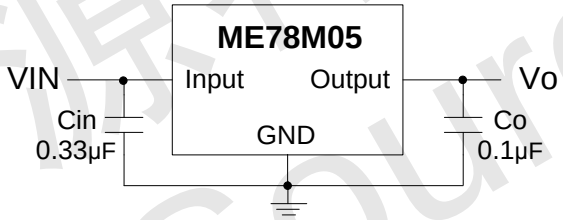


Fig.1 Fixed Output Regulator

Note:a.Cin is required if the regulator is located an appreciable distance from the power supply filter.

b.Although no output capacitor is needed for stability, it does improve transient response.

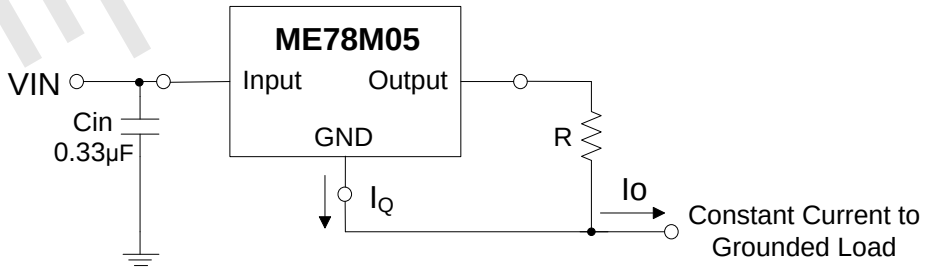
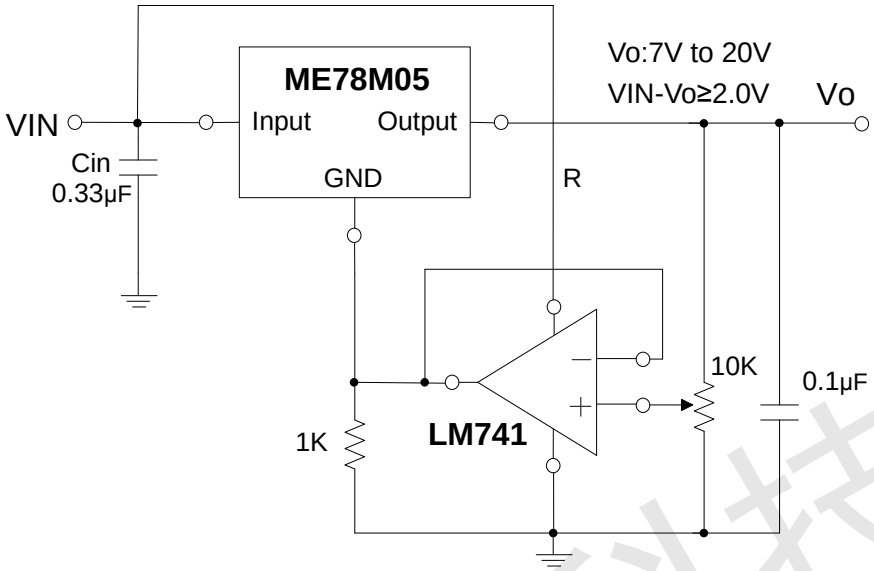


Fig.2 Constant Current Regulator

The ME78M05 regulatorcan also be used as a current source when connected as Fig.2. In order to minimize dissipation the ME78M05 is chosen in this application. Resistor R determines the current as follows:

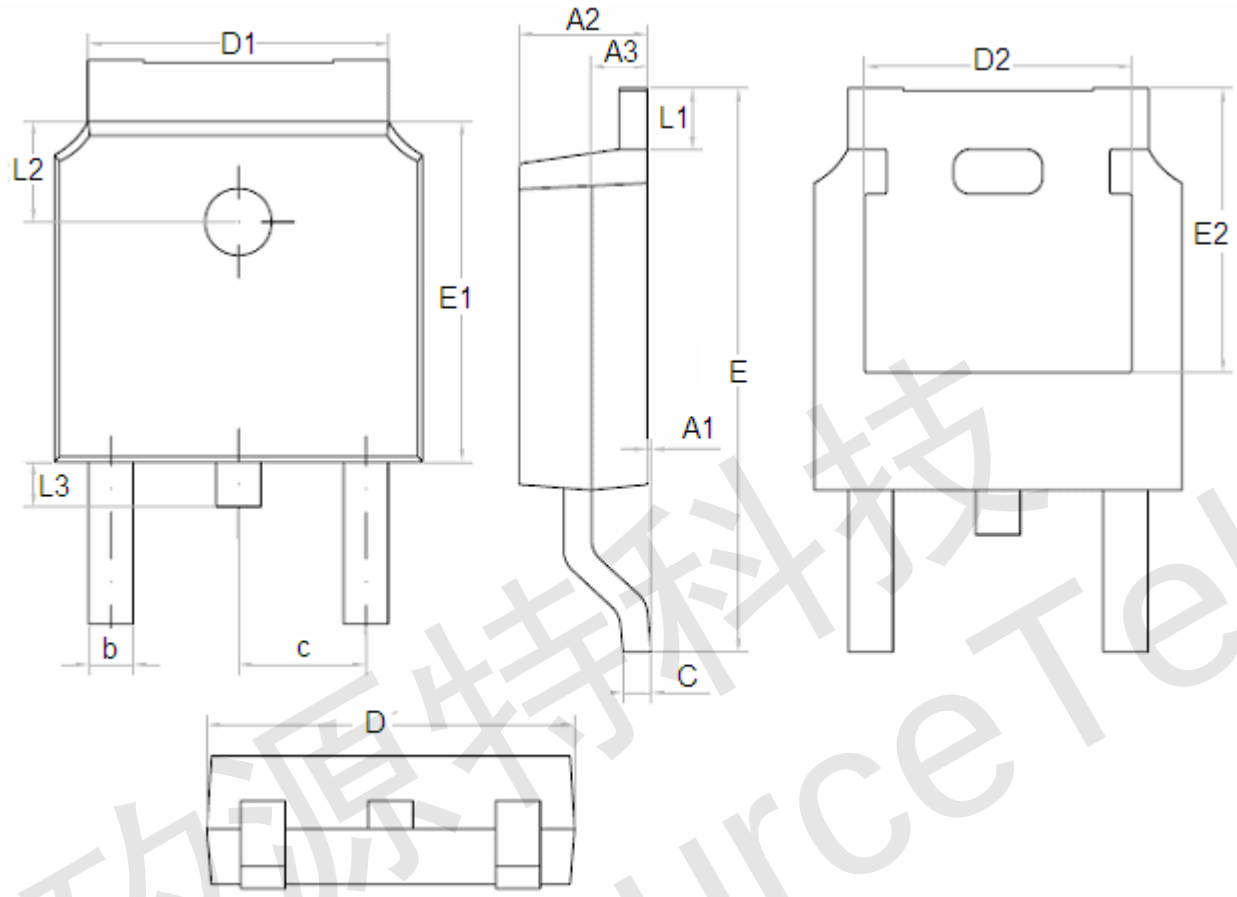
$$I_O = \frac{5V}{R} + I_Q$$



The addition of an operational amplifier allows adjustment to higher or intermediate values while retaining regulation characteristics. The minimum voltage obtainable with this arrangement is 2.0 V greater than the regulator voltage.

Package Information

Package Type:TO-252



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A1	0	0.1	0	0.004
A2	2.20	2.40	0.0866	0.0945
A3	0.90	1.10	0.0354	0.0433
b	0.75	0.85	0.0295	0.0335
c	2.20	2.40	0.0866	0.0945
C	0.50	0.60	0.0197	0.0236
D	6.50	6.70	0.2559	0.2638
D1	5.30	5.50	0.2087	0.2165
D2	4.70	4.90	0.1850	0.1929
E	9.90	10.30	0.3898	0.4055
E1	6.00	6.20	0.2362	0.2441
E2	5.20	5.40	0.2047	0.2126
L1	0.90	1.25	0.0354	0.0492
L2	1.70	1.90	0.0669	0.0748
L3	0.60	1.00	0.0236	0.0394

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