

MC78M05/LM78M05

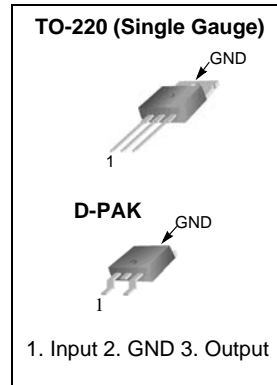
3-Terminal 0.5A Positive Voltage Regulator

Features

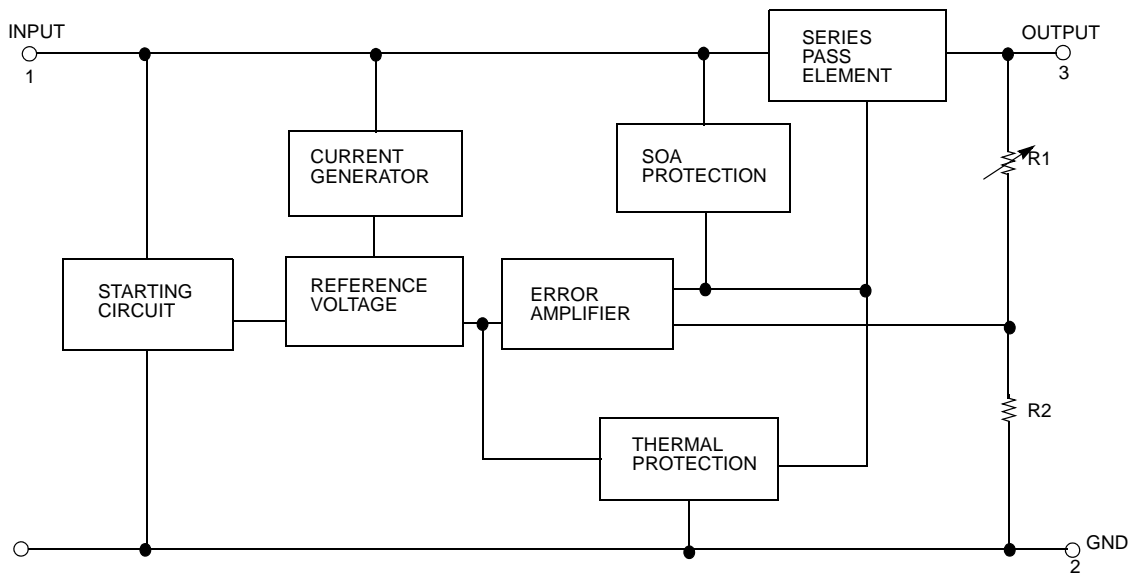
- Output Current up to 0.5A
- Output Voltages of 5V
- Thermal Overload Protection
- Short Circuit Protection
- Output Transistor Safe Operating Area (SOA) Protection

Description

The MC78M05/LM78M05 series of three-terminal positive regulators are available in the TO-220/D-PAK package with several fixed output voltages making it useful in a wide range of applications.



Internal Block Diagram



Rev. 1.0.8

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Input Voltage (for $V_O = 5V$)	V_I	35	V
Thermal Resistance Junction-Case (Note1) TO-220 ($T_c = +25^\circ\text{C}$)	$R_{\theta JC}$	2.5	$^\circ\text{C/W}$
Thermal Resistance Junction-Air (Note1, 2) TO-220 ($T_a = +25^\circ\text{C}$) D-PAK ($T_a = +25^\circ\text{C}$)	$R_{\theta JA}$	66 92	$^\circ\text{C/W}$
Operating Junction Temperature Range	TOPR	0 ~ +150	$^\circ\text{C}$
Storage Temperature Range	TSTG	-65 ~ +150	$^\circ\text{C}$

Note:

- Thermal resistance test board
Size: 76.2mm * 114.3mm * 1.6mm(1S0P)
JEDEC standard: JESD51-3, JESD51-7
- Assume no ambient airflow

Electrical Characteristics (MC78M05/LM78M05)

(Refer to the test circuits, $0 \leq T_J \leq +125^\circ\text{C}$, $I_O = 350\text{mA}$, $V_I = 10\text{V}$, unless otherwise specified, $C_I = 0.33\mu\text{F}$, $C_O = 0.1\mu\text{F}$)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_O	$T_J = +25^\circ\text{C}$	4.8	5	5.2	V
		$I_O = 5\text{mA to } 350\text{mA}$ $V_I = 7\text{V to } 20\text{V}$	4.75	5	5.25	
Line Regulation (Note3)	ΔV_O	$I_O = 200\text{mA}$ $T_J = +25^\circ\text{C}$	-	-	100	mV
		$V_I = 7\text{V to } 25\text{V}$ $V_I = 8\text{V to } 25\text{V}$	-	-	50	
Load Regulation (Note3)	ΔV_O	$I_O = 5\text{mA to } 0.5\text{A}$, $T_J = +25^\circ\text{C}$	-	-	100	mV
		$I_O = 5\text{mA to } 200\text{mA}$, $T_J = +25^\circ\text{C}$	-	-	50	
Quiescent Current	I_Q	$T_J = +25^\circ\text{C}$	-	4.0	6.0	mA
Quiescent Current Change	ΔI_Q	$I_O = 5\text{mA to } 350\text{mA}$	-	-	0.5	mA
		$I_O = 200\text{mA}$ $V_I = 8\text{V to } 25\text{V}$	-	-	0.8	
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5\text{mA}$ $T_J = 0 \text{ to } +125^\circ\text{C}$	-	-0.5	-	mV/ $^\circ\text{C}$
Output Noise Voltage	V_N	$f = 10\text{Hz to } 100\text{kHz}$	-	40	-	$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$, $I_O = 300\text{mA}$ $V_I = 8\text{V to } 18\text{V}$, $T_J = +25^\circ\text{C}$	-	80	-	dB
Dropout Voltage	V_D	$T_J = +25^\circ\text{C}$, $I_O = 500\text{mA}$	-	2	-	V
Short Circuit Current	ISC	$T_J = +25^\circ\text{C}$, $V_I = 35\text{V}$	-	300	-	mA
Peak Current	IPK	$T_J = +25^\circ\text{C}$	-	700	-	mA

Note:

- Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

Typical Applications

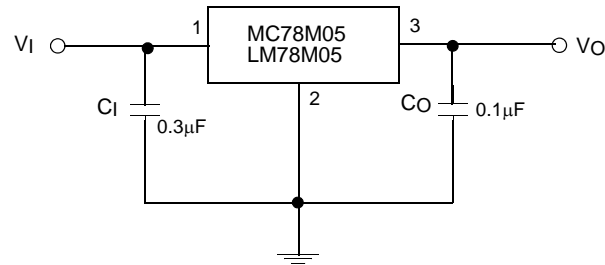


Figure 1. Fixed Output Regulator

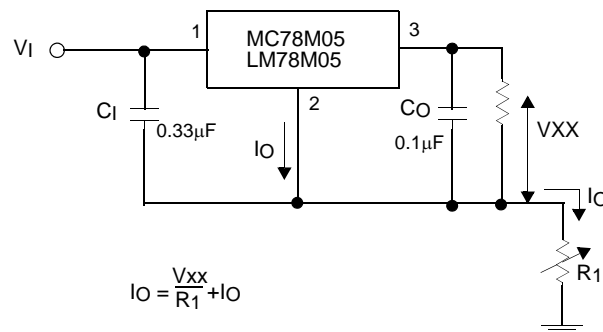


Figure 2. Constant Current Regulator

Notes:

1. To specify an output voltage, substitute voltage value for "XX"
2. Although no output capacitor is needed for stability, it does improve transient response.
3. Ci is required if regulator is located an appreciable distance from power Supply filter

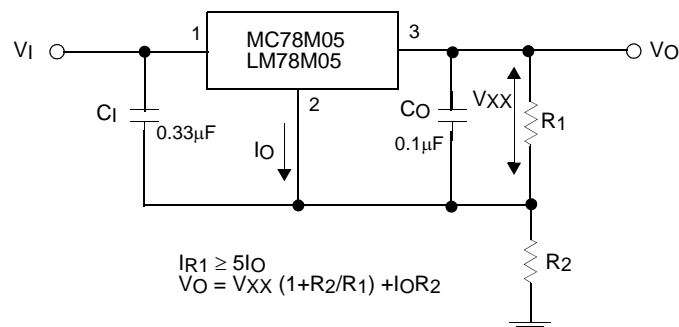


Figure 3. Circuit for Increasing Output Voltage

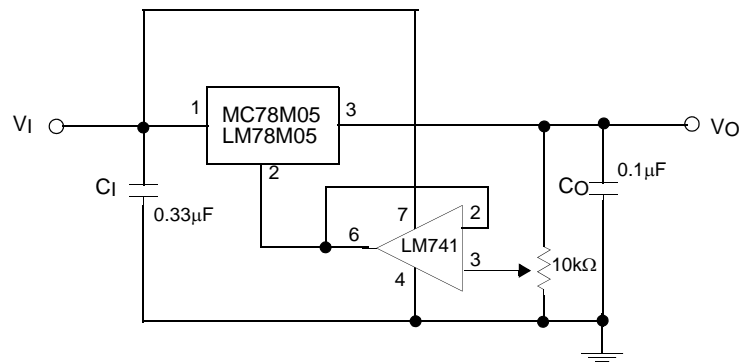


Figure 4. Adjustable Output Regulator (7 to 30V)

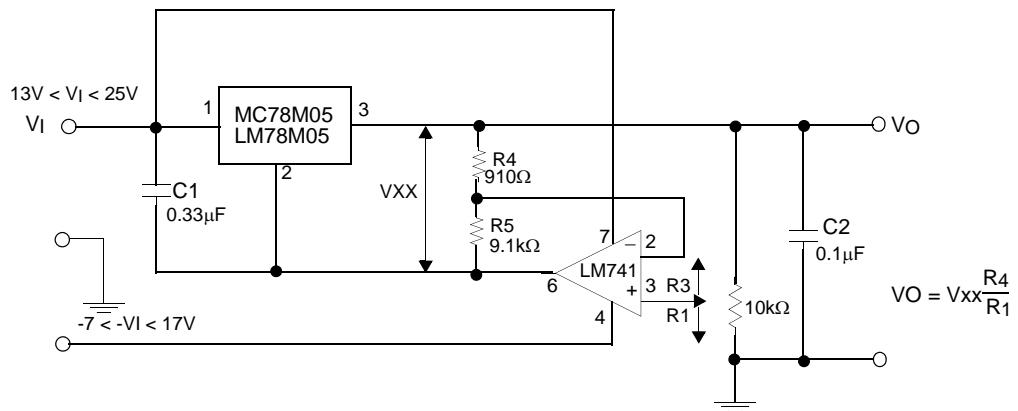


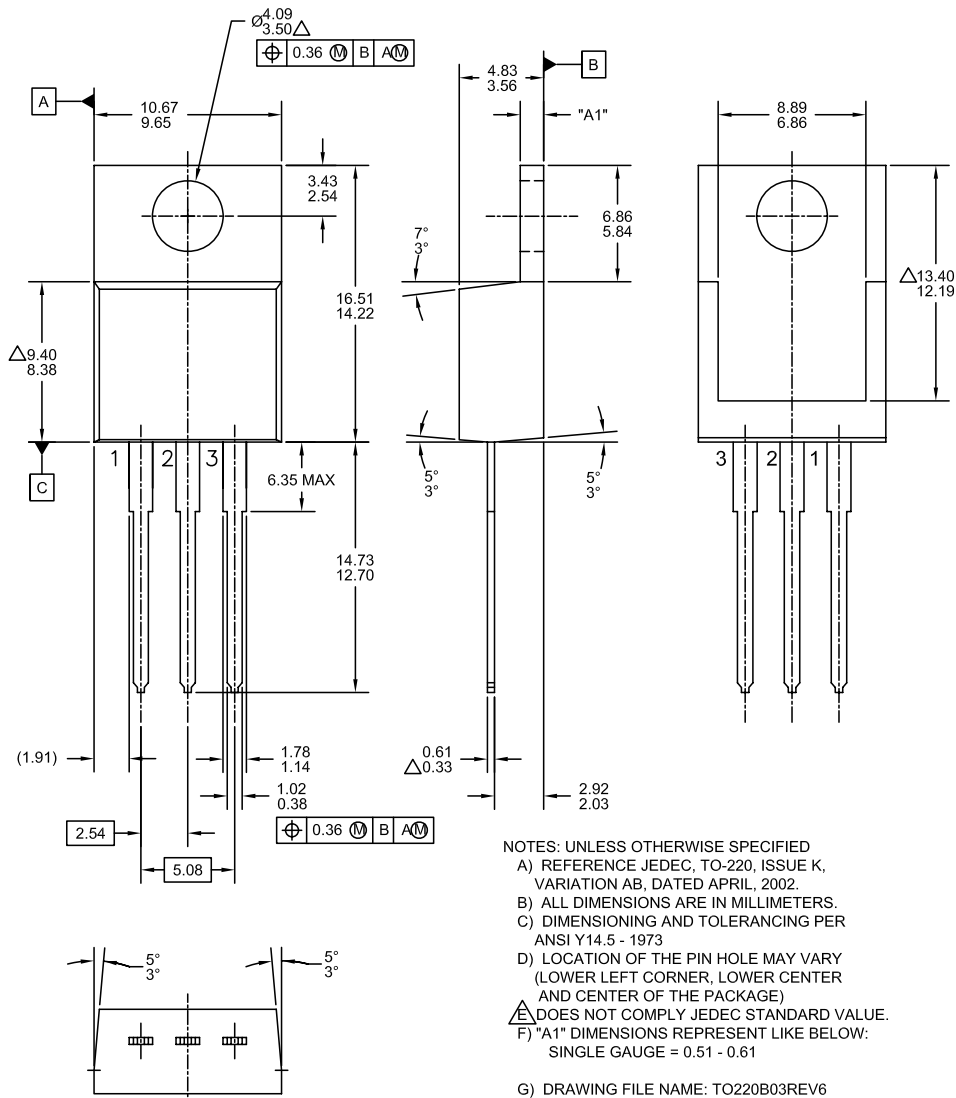
Figure 5. 0.5 to 10V Regulator

Mechanical Dimensions

Package

Dimensions in millimeters

TO-220 [SINGLE GAUGE]

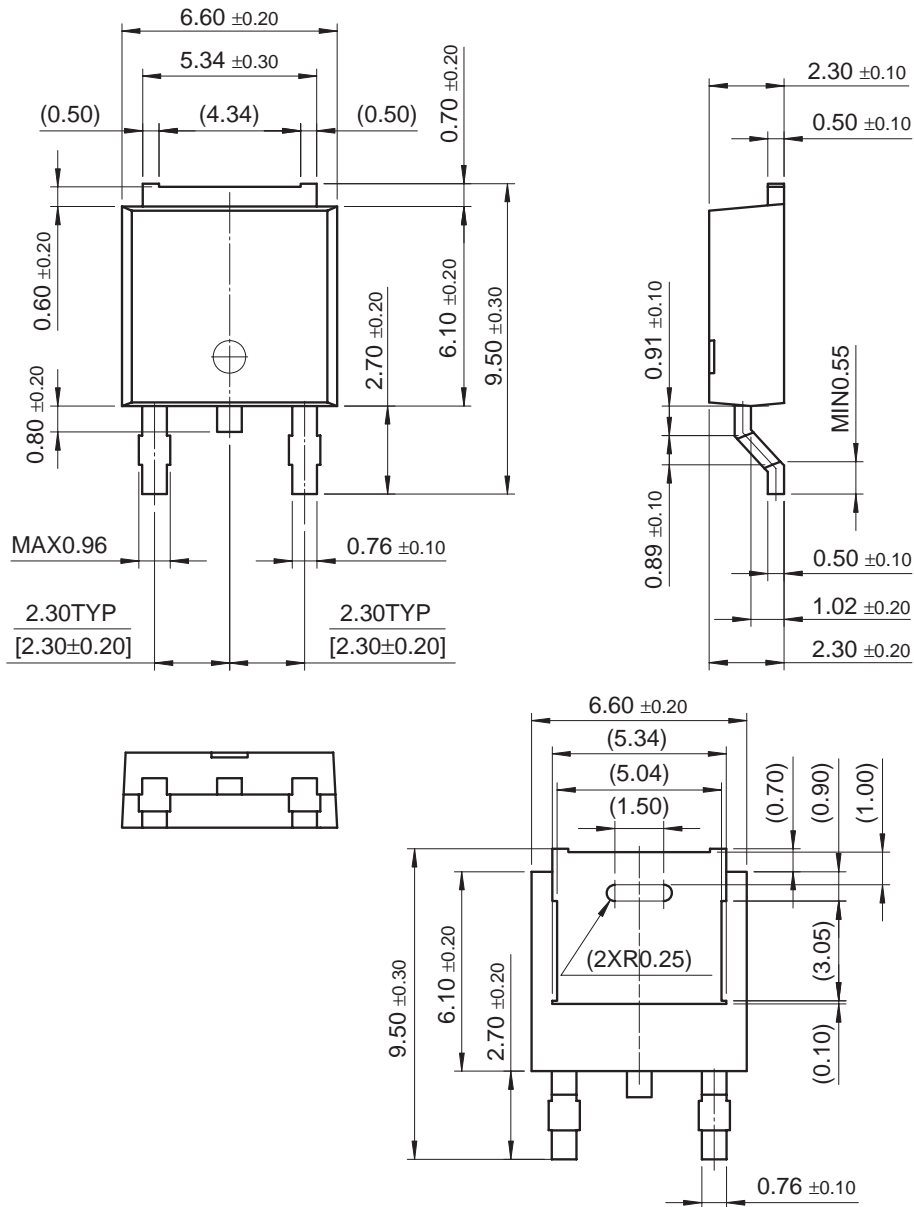


Mechanical Dimensions (Continued)

Package

Dimensions in millimeters

D-PAK



Ordering Information

Product Number	Package	Operating Temperature
LM78M05CT	TO-220 (Single Gauge)	0 ~ +125°C
Product Number	Package	Operating Temperature
MC78M05CDT	D-PAK	0 ~ +125°C

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