AMC DOC. #: AMC78L05_D (LF)
March 2004

ADD MICROTECH CORP.

AMC78L05

100mA / 3-TERMINAL 5V REGULATOR

DESCRIPTION

The AMC78L05 is a 3-terminal positive regulator with a fixed output voltage of 5V. Although it is designed as a fixed-voltage regulator, the output voltage can be increased by the use of a simple voltage divider. This regulator can provide local on card regulation, eliminating the distribution problems associated with single point regulation. In addition, it can be used with power-pass elements to make high-current voltage regulators with 100mA output current.

Protection features such as thermal shutdown and current limiting have been designed internally which will protect the device from damage in case of overload or overheating.

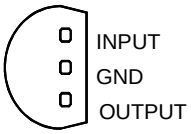
FEATURES

- ■ **±5% tolerance of output voltage**
- ■ **Wide input range**
- ■ **Output current ≥ 100mA**
- ■ **Internal thermal overload protection**
- ■ **No External Components**
- □ Short circuit protection
- □ Available in 3L plastic TO-92, surface mount SOT-89 and plastic 8 pin S.O.I.C.
- □ Identical pin assignment to earlier 78L05 series.

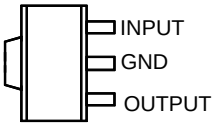
APPLICATIONS

- ■ Logic Systems
- ■ Computer Add-On Cards
- ■ Monitors
- ■ Power Suppliers

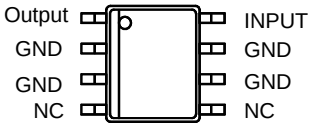
PACKAGE PIN OUT



3-Pin Plastic TO-92
(Top View)



3-Pin Plastic SOT-89
Surface Mount
(TOP View)



8-Pin S.O.I.C
Surface Mount
(Top View)

ORDER INFORMATION

T_A (°C)	LP	TO-92	DM	SO-8	PK	SOT-89
		3-pin		8-pin		3-pin
0 to 70	**AMC78L05LP(SnPb)**		**AMC78L05DM(SnPb)**		**AMC78L05PK(SnPb)**	
0 to 70	**AMC78L05LPF(Lead Free)**		**AMC78L05DMF(Lead Free)**		**AMC78L05PKF(Lead Free)**	

Note: 1. All surface-mount and TO-92 packages are available in Tape & Reel. Append the letter "T" to part number (i.e. AMC78L05LPT, AMC78L05DMT or AMC78L05PKT).
2. For TO-92 in Tape & Box (without reel), add suffix "TB" (i.e. AMC78L05LPTB)
3. The letter "F" is marked for Lead Free process .

ABSOLUTE MAXIMUM RATINGS (Note 1)	
Input Voltage	30V
Maximum junction operating temperature, T_J	150 ^{O}C
Storage temperature range	-65^{O}C to 150^{O}C
Lead temperature (soldiering, 10 seconds)	260 ^{O}C

Note 1: Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of the specified terminal.

POWER DISSIPATION TABLE

Package	θ_{JA} (^{O}C/W)	Derating factor (mW/^{O}C) $T_A \geq 25\,^{O}$C	$T_A \leq 25\,^{O}$C Power rating(mW)	T_A=70 ^{O}C Power rating(mW)	T_A= 85 ^{O}C Power rating (mW)
DM	165	6.06	757	485	394
DMF	165	6.06	757	485	394
LP	156	6.41	801	513	417
LPF	156	6.41	801	513	417
PK	71(note)	14.1	1763	1128	916
PKF	71(note)	14.1	1763	1128	916

Note : 1.For PK package, Thermal Resistance-Junction to Tab (θ_{JT}) = 35 ^{O}C/W. $T_J = T_{TAB} + (P_D \times \theta_{JT})$.
P_D: Power Dissipation.
2.θ_{JA}: Thermal Resistance-Junction to Ambient
Junction Temperature Calculation: $T_J = T_A + (P_D \times \theta_{JA})$.
The θ_{JA} numbers are guidelines for the thermal performance of the device/PC-board system.
All of the above assume no ambient airflow.

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Recommended Operating Conditions			Units
		Min.	Typ.	Max.	
Input Voltage	V_I	7		20	V
Output Current	I_{OUT}			100	mA
Operating Virtual Junction Temperature	T_J	0		125	^{O}C

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, these specifications in **bold type** apply over the operating temperature range of $0^{O}C \le T_J \le +150^{O}C$, VIN = 10V, I_{OUT} = 40mA,C_{IN} = 0.33μF, C_{OUT}= 0.1μF, and are for DC characteristics only. (Low duty cycle pulse testing techniques are used which maintains junction and case temperatures equal to the ambient temperature.)

Parameter	Symbol	Test Conditions	AMC78L05			Units
			Min.	Typ.	Max.	
Output Voltage	V_{OUT}	$T_J = 25^{O}C$	4.8	5.0	5.2	V
		$7V \le V_{IN} \le 20V$, $1mA \le I_{OUT} \le 40mA$	4.75		5.25	
		$1mA \le I_{OUT} \le 70mA$	4.75		5.25	
Line Regulation	$\triangle V_{OI}$	$7V \le V_{IN} \le 20V, T_J = 25^{O}C$		18	75	mV
		$8V \le V_{IN} \le 20V, T_J = 25^{O}C$		10	54	
Load Regulation	$\triangle V_{OL}$	$1mA \le I_{OUT} \le 100mA$, $T_J = 25^{O}C$		20	60	mV
		$1mA \le I_{OUT} \le 40mA$, $T_J = 25^{O}C$		5	30	
Peak Output Current	I_{PEAK}	$T_J = 25^{O}C$		140		mA
Dropout Voltage		$T_J = 25^{O}C$		1.7	2.0	V
Quiescent Current	I_Q			3	5	mA
Ripple Rejection (note 1)	R_R	f =120Hz, $8V \le V_{IN} \le 16V$, $T_J = 25^{O}C$	47	62		dB
Output Noise Voltage (note 1)	$V_{O\,RMS}$	$10Hz \le f \le 100KHz$, $T_J = 25^{O}C$		40		μV

Note 1: These parameters, although guaranteed, are not 100% tested in production prior to shipment.

Typical Applications

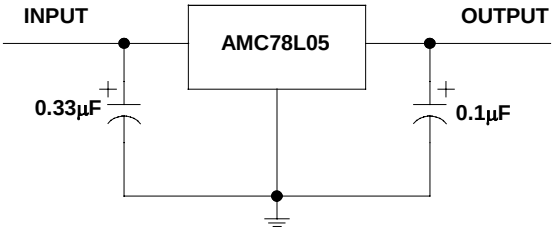


Fig. 1. Fixed Output Regulator – capacitors are required if the regulator is far away from the power supply filter.

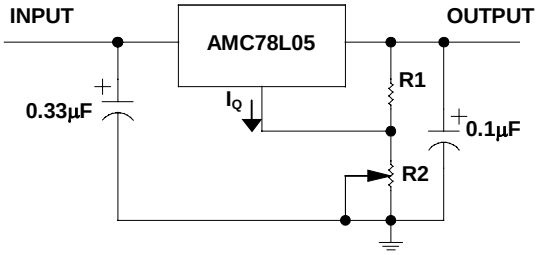


Fig. 2. Adjustable Output Regulator –

$V_{OUT} = 5V + (5V/R1 + I_Q)R2$

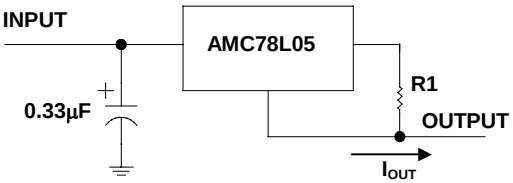
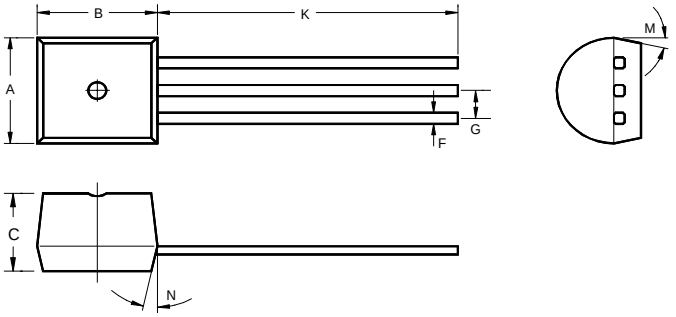


Fig. 3. Current Regulator:

$I_{OUT} = (V_{OUT}/R1) + I_Q$

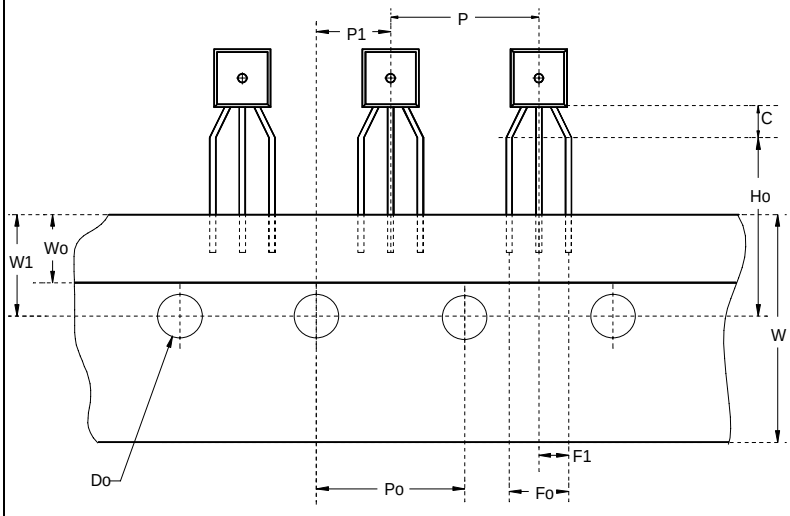
3-Pin Plastic TO-92



	INCHES			MILLIMETERS		
	MIN	TYP	MAX	MIN	TYP	MAX
A	0.175	0.180	0.205	4.45	4.57	5.21
B	0.170	0.180	0.210	4.32	4.57	5.33
C	0.125	0.142	0.165	3.18	3.62	4.19
F	-	0.015	-	-	0.38	-
G	-	0.050	-	-	1.27	-
J	-	0.150	-	-	3.81	-
K	0.500	0.580	-	12.70	14.73	-
M	-	5º	-	-	5º	-
N	-	5º	-	-	5º	-

Note: For TO-92 in tape and reel, refer to TO-92 package and carrier dimension data for lead dimensions.

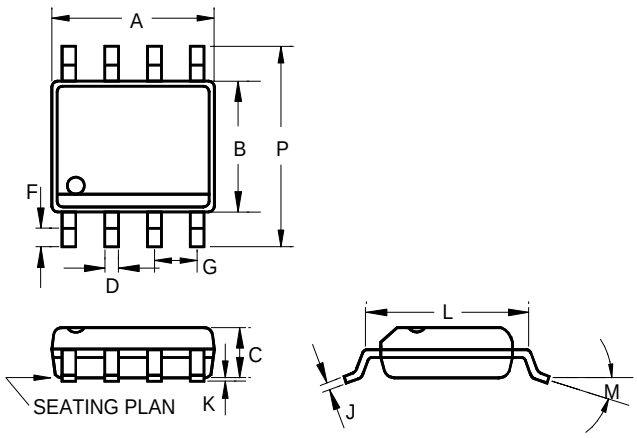
3-Pin Plastic TO-92 Package (Taped and Reeled) and Carrier Dimensions



	INCHES			MILLIMETERS		
	MIN	TYP	MAX	MIN	TYP	MAX
C	0.079	-	-	2.00	-	-
P	0.480	0.500	0.520	12.2	12.7	13.2
Po	0.488	0.500	0.512	12.4	12.7	13.0
Do	0.150	0.157	0.165	3.8	4.0	4.2
P1	0.230	0.250	0.256	5.85	6.35	6.85
Fo	0.165	0.197	0.220	4.2	5.0	5.6
W	0.669	0.709	0.748	17.0	18.0	19.0
Ho	0.610	0.630	0.649	15.5	16.0	16.5
Wo	0.224	0.236	0.248	5.7	6.0	6.3
W1	0.335	0.354	0.374	8.5	9.0	9.5

Note: For 3L TO92, 2,000 units per Reel

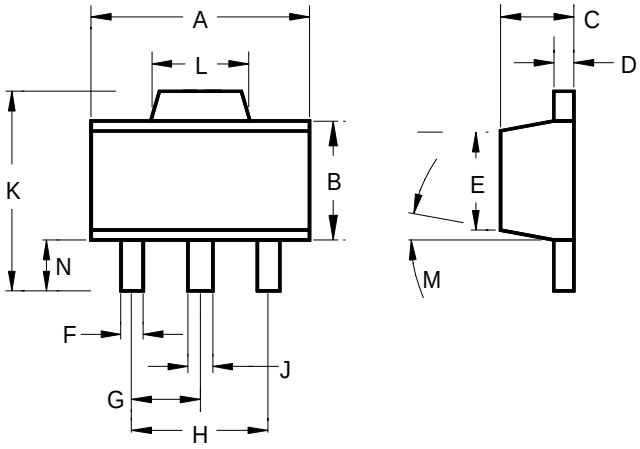
8-Pin Plastic S.O.I.C.



	INCHES			MILLIMETERS		
	MIN	TYP	MAX	MIN	TYP	MAX
A	0.183	-	0.202	4.65	-	5.13
B	0.144	-	0.163	3.66	-	4.14
C	0.068	-	0.074	1.73	-	1.88
D	0.010	-	0.020	0.25	-	0.51
F	0.015	-	0.035	0.38	-	0.89
G	0.050 BSC			1.27 BSC		
J	0.007	-	0.010	0.19	-	0.25
K	0.005	-	0.010	0.13	-	0.25
L	0.189	-	0.205	4.80	-	5.21
M	-	-	8º	-	-	8º
P	0.228	-	0.244	5.79	-	6.20

Note: for 8 pin S.O.I.C., 100 units per tube

3-Pin Surface Mount SOT-89



	INCHES			MILLIMETERS		
	MIN	TYP	MAX	MIN	TYP	MAX
A	0.173	-	0.181	4.39	-	4.59
B	0.090	-	0.102	2.28	-	2.59
C	0.055	-	0.063	1.39	-	1.60
D	0.015	-	0.017	0.38	-	0.43
E	0.084	-	0.090	2.13	-	2.28
F	0.016	-	0.019	0.33	-	0.48
G	0.059 BSC			1.49 BSC		
H	0.118 BSC			2.99 BSC		
J	0.018	-	0.022	0.45	-	0.55
K	0.155	-	0.167	3.94	-	4.24
L	0.067	-	0.072	1.70	-	1.82
M	0°	-	8°	0°	-	8°
N	0.035	-	0.047	0.89	-	1.19

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