

◆ DESCRIPTION

The MT78L05 is a three terminal positive regulator with a fixed output voltage of 5V. It employs internal current limiting and thermal shutdown, preventing the MT78L05 from overheating.

The MT78L05 offers an effective output impedance improvement of two orders of magnitude, and lower quiescent current. This regulator can provide local on card regulation, eliminating the distribution problems associated with single point regulation.

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

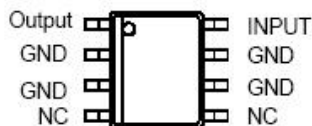
- $\pm 4\%$ tolerance of output voltage
- Output current of 100mA
- Internal thermal overload protection
- Thermal shutdown protection
- No External Components
- ESD rating is 2.7KV(Per MIL-STD-883D)
- SOP-8, SOT-89 and TO-92 packages available

◆ APPLICATIONS

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

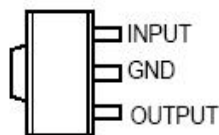
◆ PIN CONFIGURATIONS

SOP-8 (Top View)



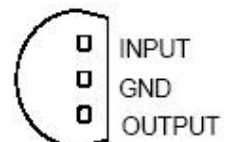
MT78L05M

SOT-89 (Top View)



MT78L05J

TO-92 (Top View)



MT78L05Z

◆ ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Maximum	Unit
Input supply voltage	V_{IN}	18	V
Thermal resistance junction to case SOP-8 SOT-89 TO-92	θ_{JC}	39 9 60	$^{\circ}C/W$
Operating junction temperature range	T_J	0 to 125	$^{\circ}C$
Storage temperature range	T_{STG}	-65 to 150	$^{\circ}C$
Lead temperature (soldering) 10sec	T_{LEAD}	260	$^{\circ}C$

Note:

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.

◆ ORDERING INFORMATION

Device	Package		T_J ($^{\circ}C$)	Note
MT78L05M	M	SOP-8	0~125	
MT78L05J	J	SOT-89	0~125	
MT78L05Z	Z	TO-92	0~125	

◆ POWER DISSIPATION TABLE

Package	θ_{JA} ($^{\circ}C/W$)	$T_A \leq 25^{\circ}C$ Power rating(mW)	$T_A = 70^{\circ}C$ Power rating(mW)	$T_A = 85^{\circ}C$ Power rating (mW)
M	165	757	485	394
J	71	1763	1128	916
Z	156	801	513	417

Note :

θ_{JA} : Thermal Resistance-Junction to Ambient, DF : Derating factor, Po: Power consumption.

Junction Temperature Calculation:

$$T_J = T_A + (P_D \times \theta_{JA}), P_o = D_F \times (T_J - T_A)$$

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	Operating Conditions			Unit
		Min.	Typ.	Max.	
Input Voltage	V_{IN}	7	-	16	V
Output Current (with adequate heat sinking)	I_O	-	-	100	mA
Junction temperature range	T_J	0 ~ 125			°C

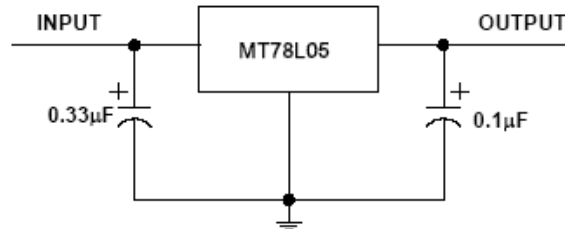
◆ ELECTRICAL CHARACTERISTICS

Operating Conditions: $V_{IN} = 10V$, $I_{OUT} = 10mA$; $C_{OUT} = 0.1\mu F$, $C_{IN} = 0.33\mu F$, $T_A = 25^\circ C$, unless otherwise specified.

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}		4.8	5.0	5.2	V
Line Regulation	V_{SR}	$7V \leq V_{IN} \leq 18V$,	-	11	45	mV
Load Regulation	V_{LR}	$1mA \leq I_{OUT} \leq 100mA$	-	5	50	mV
Quiescent Current	I_Q	$T_A = 25^\circ C$	-	4.3	6.0	mA
Quiescent Current Change	ΔI_Q	$8V \leq V_{IN} \leq 18V$,	-	1.1	-	mA
		$1mA \leq I_{OUT} \leq 40mA$	-	0.13	-	
Peak Output Current	I_{PEAK}	$T_A = 25^\circ C$	-	100	-	mA
Dropout Voltage	V_D	$T_A = 25^\circ C$	-	1.7	2.0	V
Output Noise	V_N	$10Hz \leq f \leq 100KHz$	-	40	-	μV
Ripple Rejection	PSRR	$f=120Hz$, $8V \leq V_{IN} \leq 16V$	-	52	-	dB

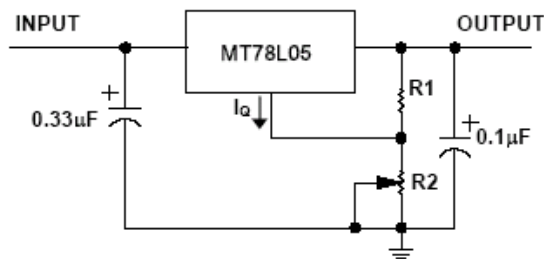
◆ TYPICAL APPLICATIONS

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



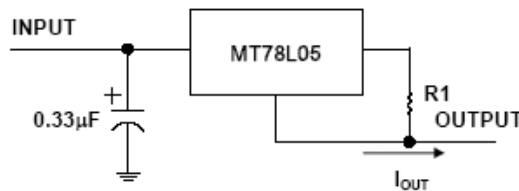
Adjustable Output Regulator –

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



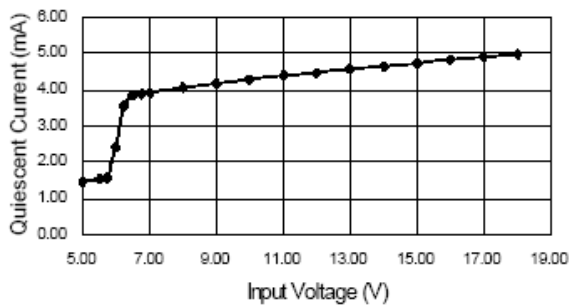
Current Regulator:

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

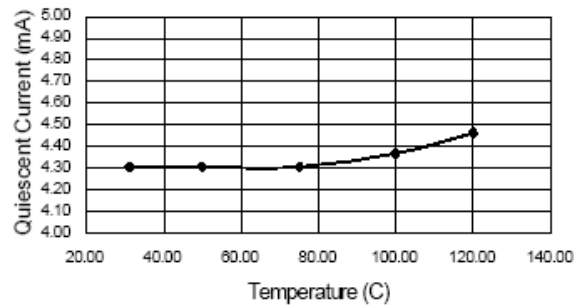


◆ TYPICAL PERFORMANCE CHARACTERISTICS
 $V_{IN} = 10V$, $I_{OUT} = 40mA$, $C_{IN} = 0.33\mu F$, $C_{OUT} = 0.1\mu F$, $T_A = 25^\circ C$, unless specified otherwise

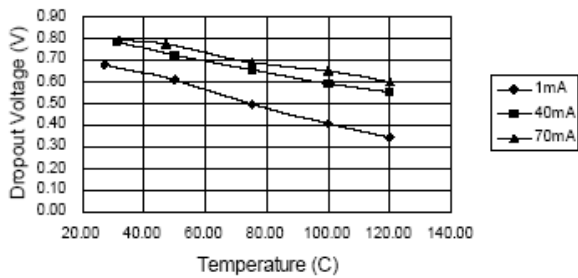
Quiescent Current vs Input Voltage



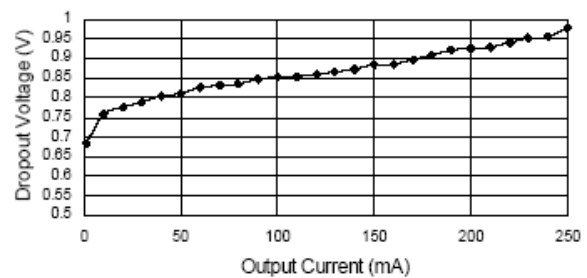
Quiescent Current vs Temperature



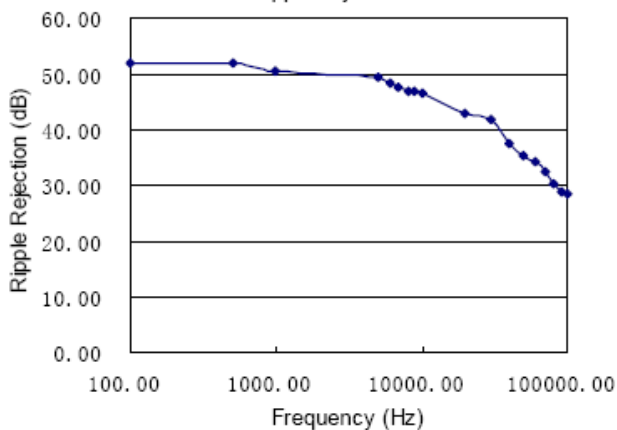
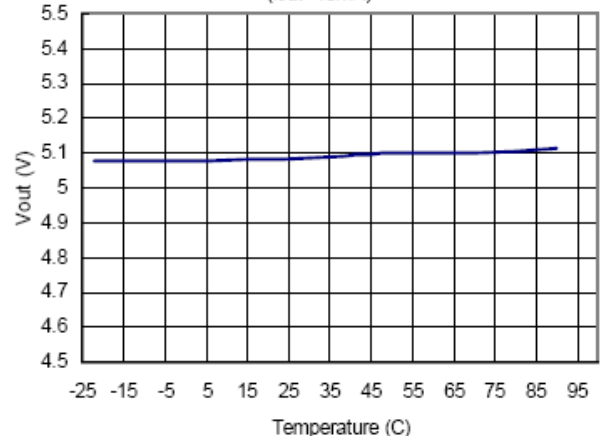
Dropout Voltage vs Temperature

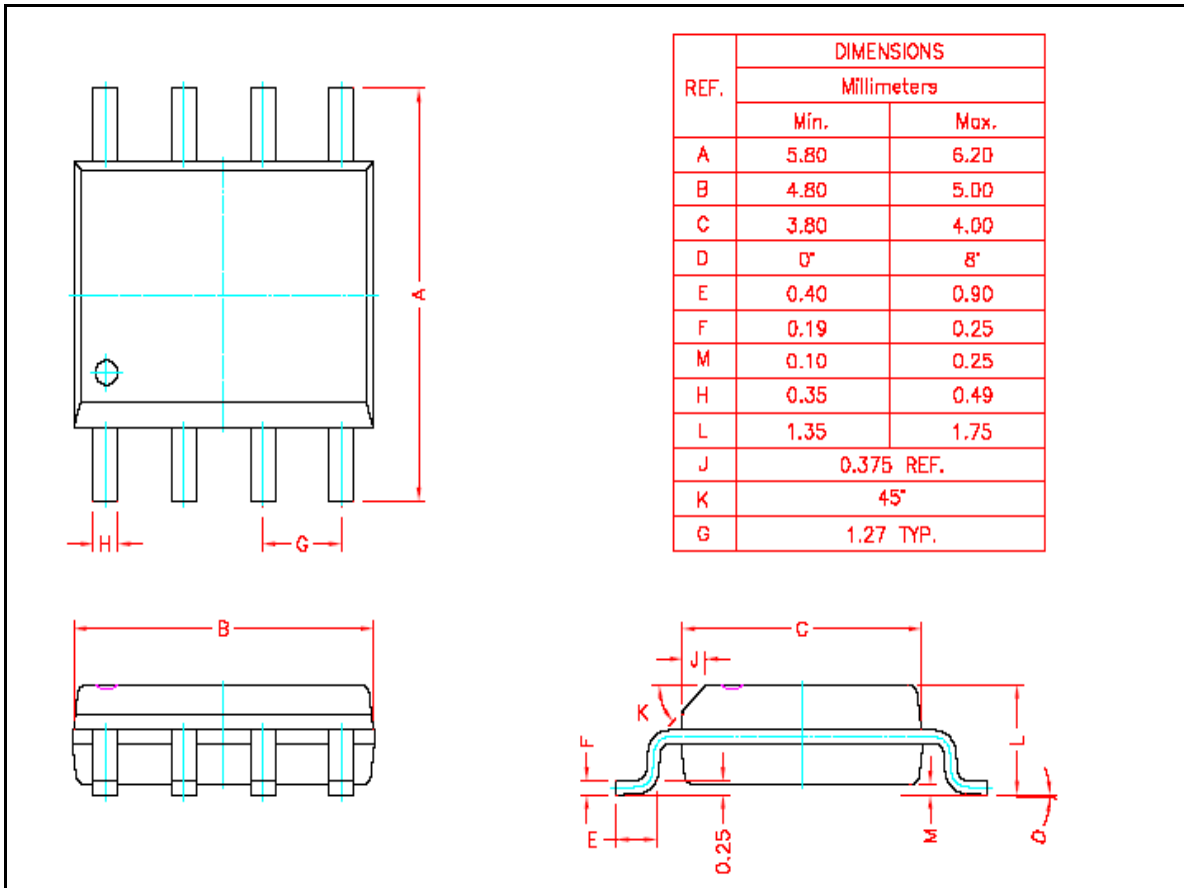


Dropout Voltage vs Output Current

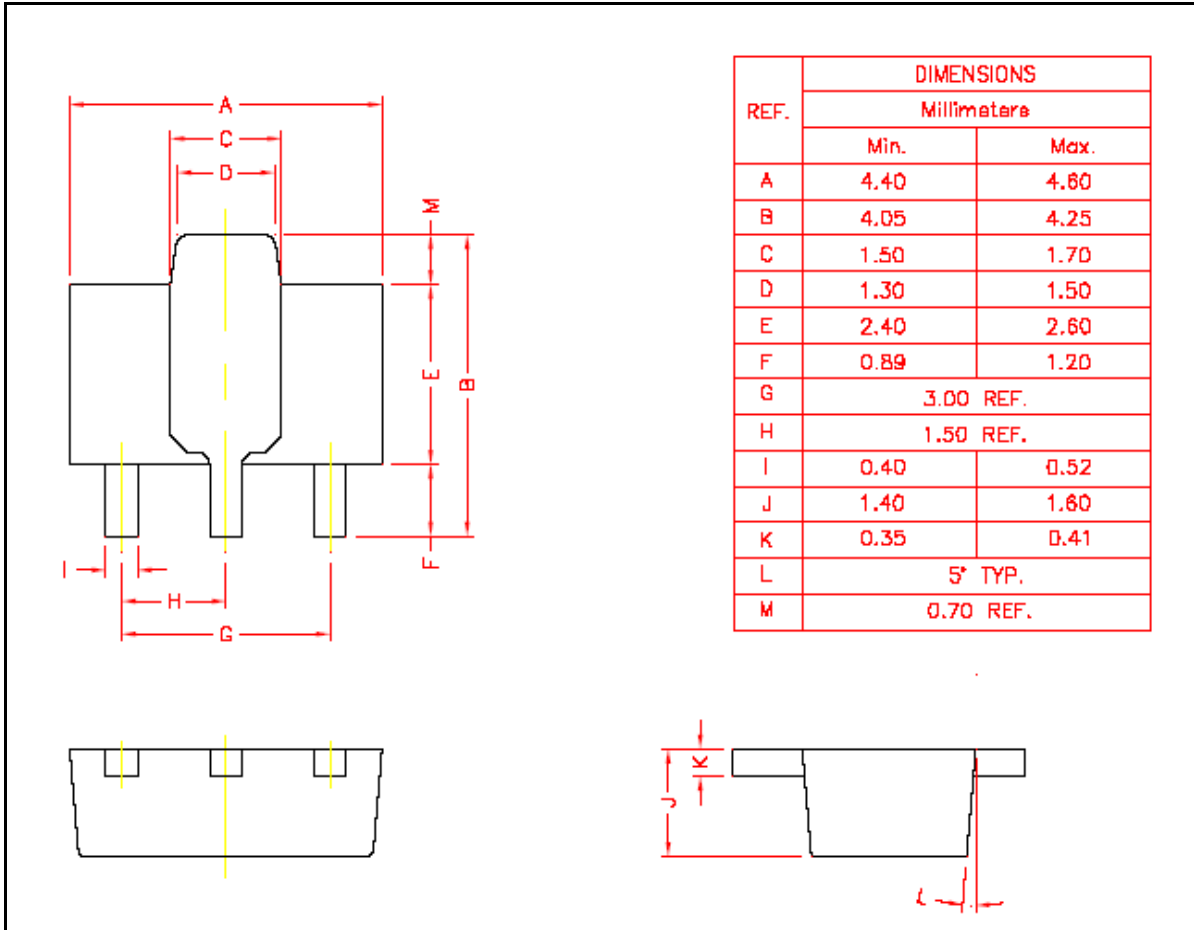


Ripple Rejection

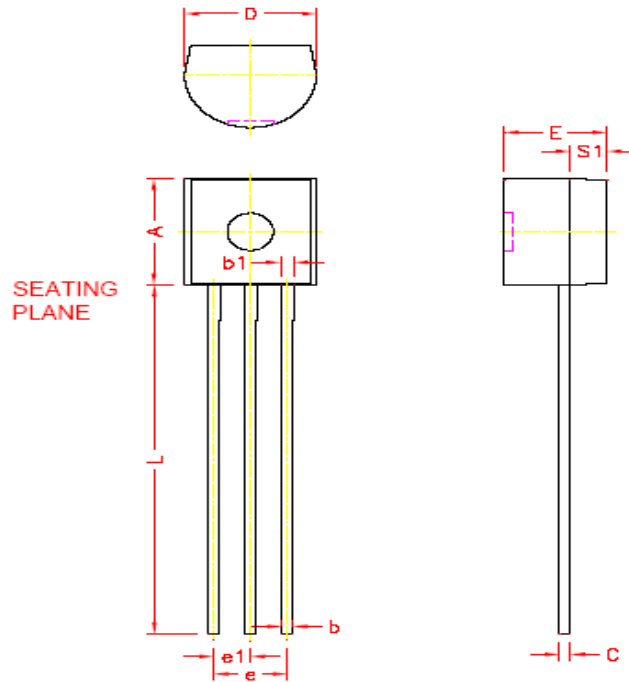

 Vout vs. Temperature
(Iout=10mA)


◆ PHYSICAL DIMENSIONS
8-Pin Plastic S.O.I.C. (M)


◆ **PHYSICAL DIMENSIONS**
3-Pin surface Mount SOT-89(J)



◆ **PHYSICAL DIMENSIONS:**
3-Pin Plastic TO-92(Z)



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	4.45	4.70	D	4.44	4.7
S1	1.02	—	E	3.30	3.81
b	0.36	0.51	L	12.70	—
b1	0.36	0.76	e1	1.15	1.39
C	0.36	0.51	e	2.42	2.66