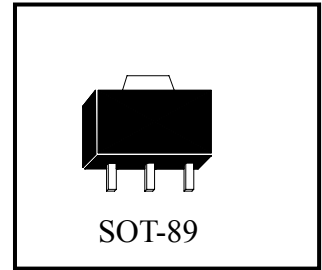


Low Current Positive Voltage Regulator

LM78L09M3



Description

The LM78L09M3 series of surface mount regulators are easy-to-use devices suitable for multitude of applications that require a regulated supply of up to 100mA. These regulators feature internal current limiting and thermal shutdown, making them remarkably rugged. No external components are required with the LM78L09M3 devices in many applications. These devices offer a substantial performance advantage over the traditional zener diode resistor combination, as output impedance and quiescent current are substantially reduced.

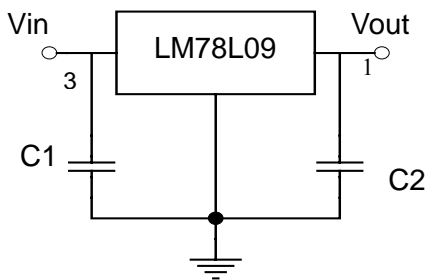
Features:

- Wide Range Of Available, Fixed Output Voltages
- Internal Short-Circuit Current Limiting
- Internal Thermal Overload Protection
- No External Components Required

Absolute Maximum Ratings (Ta=25°C)

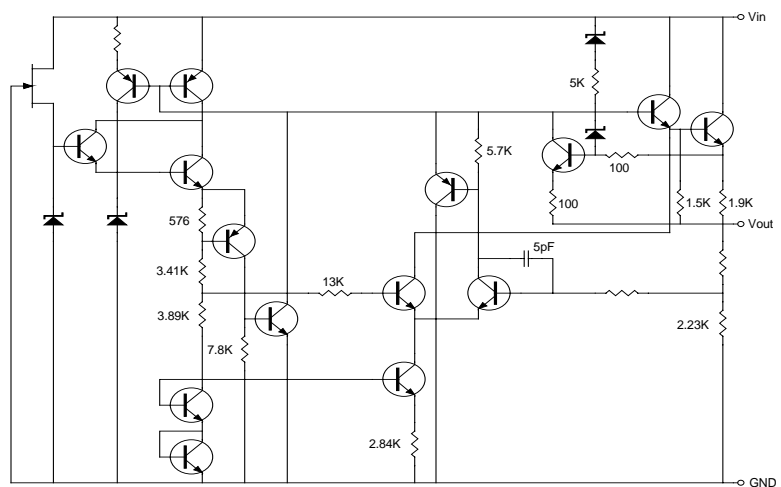
- Input Voltage 30 V
- Total Power Dissipation Internally limited
- Operating Temperature Range 0 °C to +125 °C
- Maximum Junction Temperature 125 °C
- Storage Temperature Range -55 °C to +150 °C
- Lead Temperature (Soldering 10S)..... 260 °C

Typical Application



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.
 Note : C1 and C2 are required if regulator is located far from power supply filter and load, or oscillation may induced on the loop.

Schematic Diagram



**Ordering Information**

Device	Rank	Output Voltage Tolerance
LM78L09M3	A	3%
LM78L09M3	B	5%

Electrical Characteristics

$V_{in}=15V$, $I_o=40mA$, $T_j=25^{\circ}C$ $C_{in}=0.33\mu F$, $C_{out}=0.1\mu F$ (unless otherwise noted)

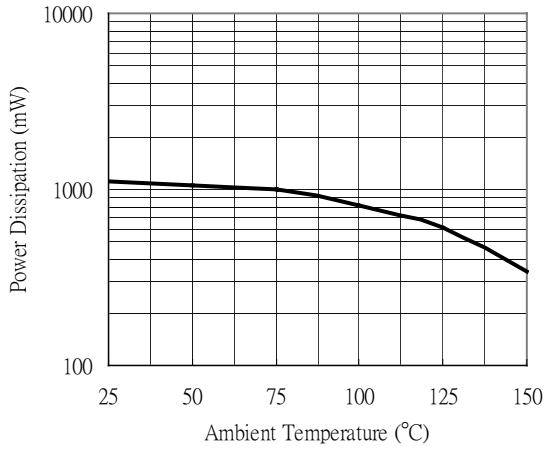
Symbol	Parameter	Conditions	LM78L09 A-rank			Units
			Min	Typ	Max	
Vo	Output Voltage	$T_j=25^{\circ}C$	8.73	9	9.27	V
		$11.5V \leq V_{in} \leq 24V$ $1mA \leq I_o \leq 40mA$	8.55	9	9.45	
		$1mA \leq I_o \leq 70mA$	8.55	9	9.45	
ΔV_o	Line Regulation	$11.5V \leq V_{in} \leq 24V$	-	-	200	mV
		$13V \leq V_{in} \leq 24V$	-	-	150	
ΔV_o	Load Regulation	$1mA \leq I_o \leq 100mA$	-	-	90	mV
		$1mA \leq I_o \leq 40mA$	-	-	45	
IQ	Quiescent Current	$T_a=25^{\circ}C$	-	-	5.5	mA
ΔIQ	Quiescent Current Change	$11.5V \leq V_{in} \leq 24V$	-	-	1.5	mA
		$1mA \leq I_o \leq 40mA$	-	-	0.1	
Vn	Output Noise Voltage	$T_a=25^{\circ}C$	-	70	-	μV
$\Delta V_{in} / \Delta V_{out}$	Ripple Rejection	$15V \leq V_{in} \leq 25V$, $f=120Hz$	38	44	-	dB
Ipk	Peak Output Current	$T_a=25^{\circ}C$	-	140	-	mA
VD	Dropout Voltage	$T_a=25^{\circ}C$	-	1.7	-	V

Symbol	Parameter	Conditions	LM78L09 B-rank			Units
			Min	Typ	Max	
Vo	Output Voltage	$T_j=25^{\circ}C$	8.55	9	9.45	V
		$11.5V \leq V_{in} \leq 24V$ $1mA \leq I_o \leq 40mA$	8.55	9	9.45	
		$1mA \leq I_o \leq 70mA$	8.55	9	9.45	
ΔV_o	Line Regulation	$11.5V \leq V_{in} \leq 24V$	-	-	200	mV
		$13V \leq V_{in} \leq 24V$	-	-	150	
ΔV_o	Load Regulation	$1mA \leq I_o \leq 100mA$	-	-	90	mV
		$1mA \leq I_o \leq 40mA$	-	-	45	
IQ	Quiescent Current	$T_a=25^{\circ}C$	-	-	5.5	mA
ΔIQ	Quiescent Current Change	$11.5V \leq V_{in} \leq 24V$	-	-	1.5	mA
		$1mA \leq I_o \leq 40mA$	-	-	0.1	
Vn	Output Noise Voltage	$T_a=25^{\circ}C$	-	70	-	μV
$\Delta V_{in} / \Delta V_{out}$	Ripple Rejection	$15V \leq V_{in} \leq 25V$, $f=120Hz$	38	44	-	dB
Ipk	Peak Output Current	$T_a=25^{\circ}C$	-	140	-	mA
VD	Dropout Voltage	$T_a=25^{\circ}C$	-	1.7	-	V

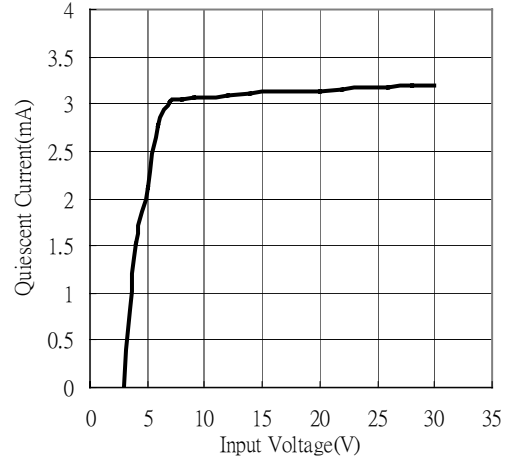


Characteristic Curves

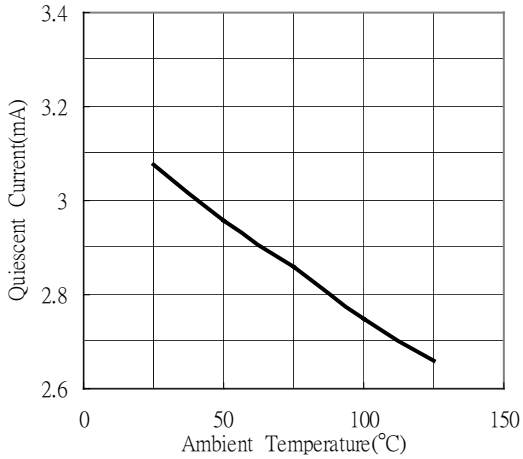
Maximum Average Power Dissipation



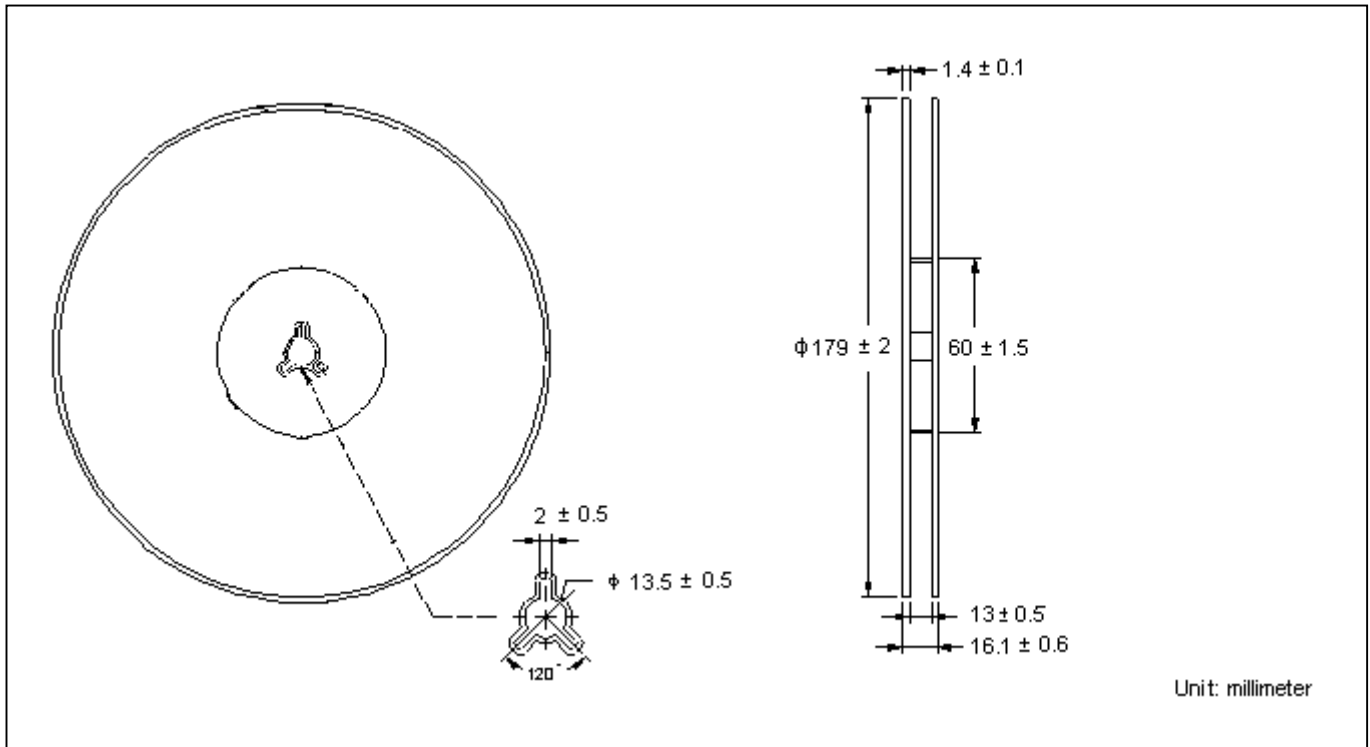
Quiescent Current



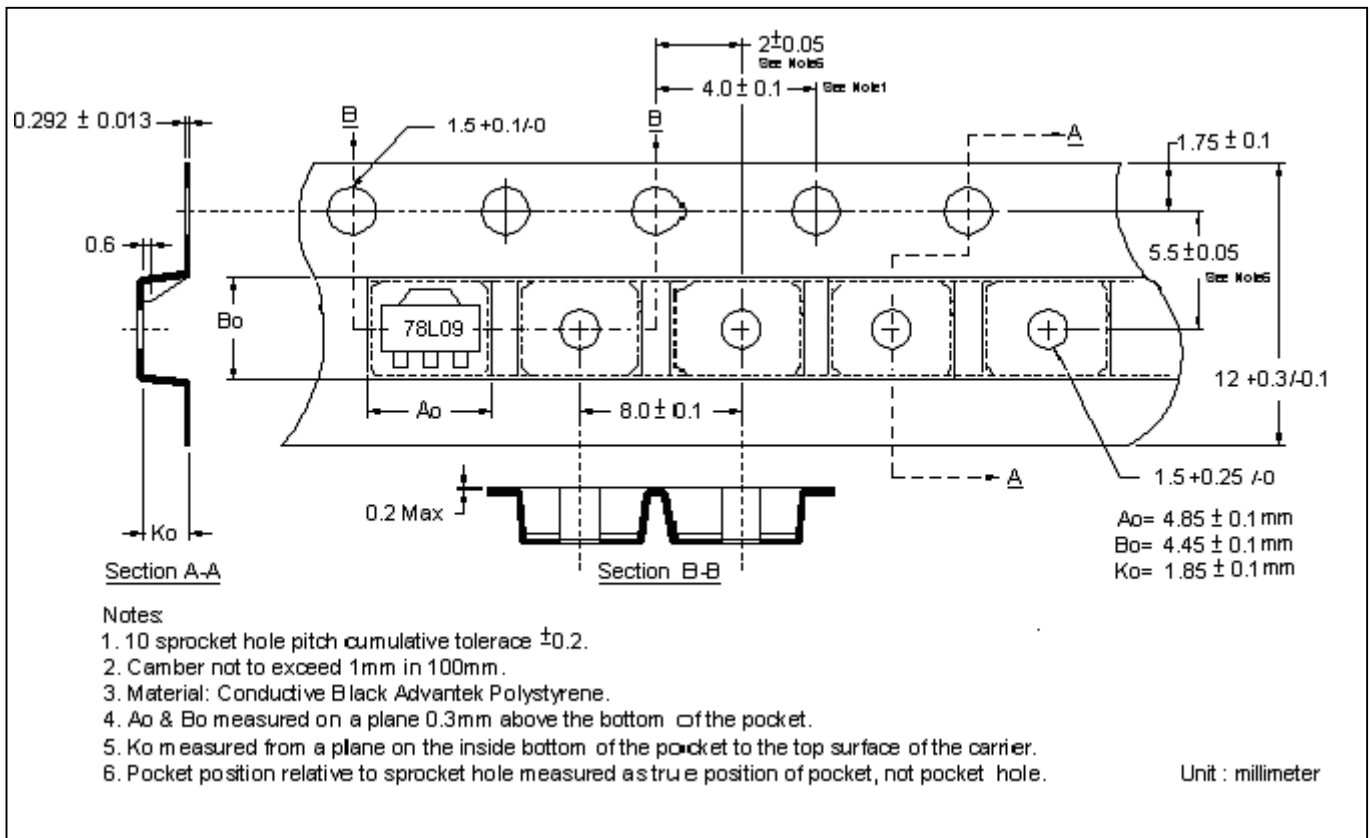
Quiescent Current



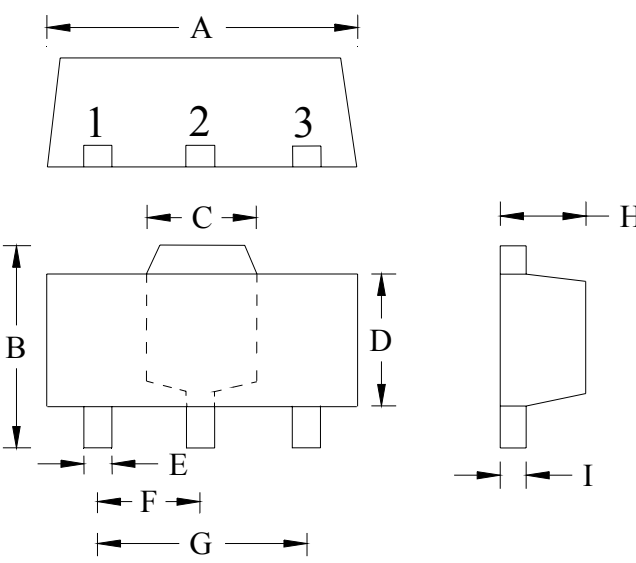
Reel Dimension



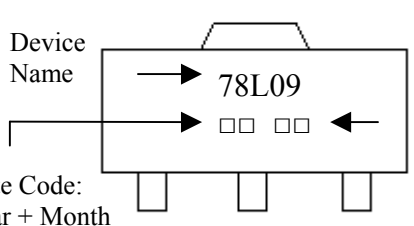
Carrier Tape Dimension



SOT-89 Dimension



Marking:



Device Name: 78L09
 Lot Code: 01~99

Date Code:
 Year + Month
 Year : 6→2006,
 7→2007, ...etc
 Month : 1→Jan,
 2→Feb,..., 9→
 Sep, A→Oct, B
 →Nov, C→Dec

Style: Pin 1. Vout 2. GND 3. Vin

3-Lead SOT-89 Plastic
 Surface Mounted Package
 CYStek Package Code: M3

*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1732	0.1811	4.40	4.60	F	0.0583	0.0598	1.48	1.527
B	0.1594	0.1673	4.05	4.25	G	0.1165	0.1197	2.96	3.04
C	0.0591	0.0663	1.50	1.70	H	0.0551	0.0630	1.40	1.60
D	0.0945	0.1024	2.40	2.60	I	0.0138	0.0161	0.35	0.41
E	0.01417	0.0201	0.36	0.51					

- Notes:**
1. Controlling dimension: millimeters.
 2. Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
 3. If there is any question with packing specification or packing method, please contact your local CYStek sales office.

Material:

- Lead: 42 Alloy ; solder plating
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

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