



EN: This Datasheet/Document is presented by the manufacturer.

Please visit our website for pricing and availability at www.hestore.hu.

LM79L05,LM79L05AC,LM79L12,LM79L12AC, LM79L15,LM79L15AC

LM79LXXAC Series 3-Terminal Negative Regulators



Literature Number: SNOSBR8J

LM79LXXAC Series

3-Terminal Negative Regulators

General Description

The LM79LXXAC series of 3-terminal negative voltage regulators features fixed output voltages of $-5V$, $-12V$, and $-15V$ with output current capabilities in excess of $100mA$. These devices were designed using the latest computer techniques for optimizing the packaged IC thermal/electrical performance. The LM79LXXAC series, when combined with a minimum output capacitor of $0.1\mu F$, exhibits an excellent transient response, a maximum line regulation of $0.07\% V_O/V$, and a maximum load regulation of $0.01\% V_O/mA$.

The LM79LXXAC series also includes, as self-protection circuitry: safe operating area circuitry for output transistor power dissipation limiting, a temperature independent short circuit current limit for peak output current limiting, and a thermal shutdown circuit to prevent excessive junction temperature. Although designed primarily as fixed voltage regulators, these devices may be combined with simple external circuitry for boosted and/or adjustable voltages and currents. The LM79LXXAC series is available in the 3-lead TO-92 package,

the 8-lead SOIC package, and the 6-Bump micro-SMD package.

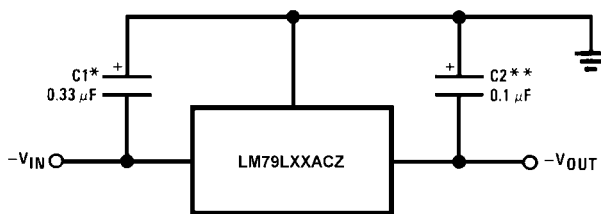
For output voltages other than the pre-set $-5V$, $-12V$ and $-15V$, the LM137L series provides an adjustable output voltage range from $-1.2V$ to $-47V$.

Features

- Preset output voltage error is less than $\pm 5\%$ overload, line and temperature
- Specified at an output current of $100mA$
- Easily compensated with a small $0.1\mu F$ output capacitor
- Internal short-circuit, thermal and safe operating area protection
- Easily adjustable to higher output voltages
- Maximum line regulation less than $0.07\% V_{OUT}/V$
- Maximum load regulation less than $0.01\% V_{OUT}/mA$
- See AN-1112 for micro-SMD considerations

Typical Applications

Fixed Output Regulator

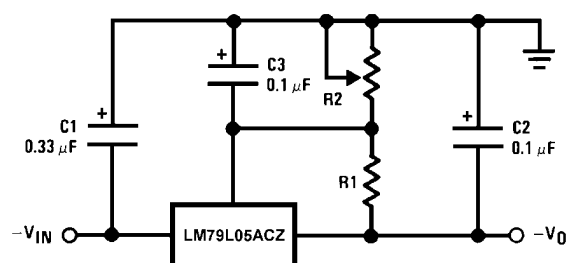


774801

*Required if the regulator is located far from the power supply filter. A $1\mu F$ aluminum electrolytic may be substituted.

**Required for stability. A $1\mu F$ aluminum electrolytic may be substituted.

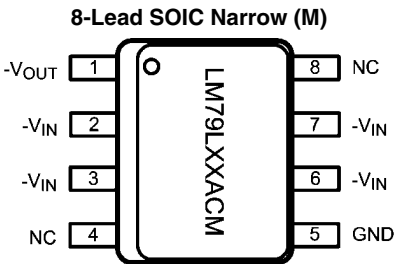
Adjustable Output Regulator



774803

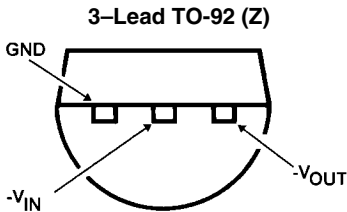
$$-V_O = -5V - (5V/R1 + I_O) \cdot R2, \\ 5V/R1 > 3 I_O$$

Connection Diagrams



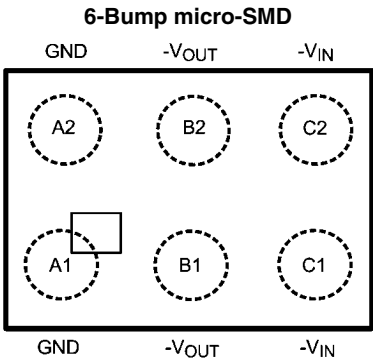
774804
Pins labeled 'NC' on LM79LXXACM 8-Lead SOIC (pin 4 and pin 8) are Open, no internal connection.

Top View



774802

Bottom View



774820

Top View (Bump Side Down)

Ordering Information

Package	Part Number	Package Marking	Transport Media	NSC Drawing
8-Lead SOIC	LM79L05ACM	LM79L05ACM	Rail of 95	M08A
	LM79L05ACMX		Reel of 2500	
	LM79L12ACM	LM79L12ACM	Rail of 95	
	LM79L12ACMX		Reel of 2500	
	LM79L15ACM	LM79L15ACM	Rail of 95	
	LM79L15ACMX		Reel of 2500	
3-Pin TO-92	LM79L05ACZ	320L 79L05	Box of 1800	Z03A
	LM79L12ACZ	320L 79L12	Box of 1800	
	LM79L15ACZ	320L 79L15	Obsolete	
6-Bump micro-SMD	LM79L05ACTL	XVP	Reel of 250	TLA06AMA
	LM79L05ACTLX	IB	Reel of 3000	

Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Input Voltage

$$V_O = -5V, -12V, -15V$$

$$-35V$$

Internal Power Dissipation (Note 2)

Operating Temperature Range

Maximum Junction Temperature

Storage Temperature Range

Lead Temperature

(Soldering, 10 sec.)

Internally Limited

0°C to +70°C

+125°C

-55°C to +150°C

260°C

Electrical Characteristics (Note 3)
 $T_A = 0^\circ\text{C}$ to $+70^\circ\text{C}$ unless otherwise noted.

Output Voltage			-5V			-12V			-15V			Units
Input Voltage (unless otherwise noted)			-10V			-17V			-20V			
Symbol	Parameter	Conditions	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
V _O	Output Voltage	T _J = 25°C, I _O = 100mA	-5.2	-5	-4.8	-12.5	-12	-11.5	-15.6	-15	-14.4	V
		1mA ≤ I _O ≤ 100mA	-5.25		-4.75	-12.6		-11.4	-15.75		-14.25	
		V _{MIN} ≤ V _{IN} ≤ V _{MAX}	(-20 ≤ V _{IN} ≤ -7.5)			(-27 ≤ V _{IN} ≤ -14.8)			(-30 ≤ V _{IN} ≤ -18)			
		1mA ≤ I _O ≤ 40mA	-5.25		-4.75	-12.6		-11.4	-15.75		-14.25	
		V _{MIN} ≤ V _{IN} ≤ V _{MAX}	(-20 ≤ V _{IN} ≤ -7)			(-27 ≤ V _{IN} ≤ -14.5)			(-30 ≤ V _{IN} ≤ -17.5)			
ΔV _O	Line Regulation	T _J = 25°C, I _O = 100mA	60			45			45			mV
		V _{MIN} ≤ V _{IN} ≤ V _{MAX}	(-20 ≤ V _{IN} ≤ -7.3)			(-27 ≤ V _{IN} ≤ -14.6)			(-30 ≤ V _{IN} ≤ -17.7)			V
		T _J = 25°C, I _O = 40mA	60			45			45			mV
		V _{MIN} ≤ V _{IN} ≤ V _{MAX}	(-20 ≤ V _{IN} ≤ -7)			(-27 ≤ V _{IN} ≤ -14.5)			(-30 ≤ V _{IN} ≤ -17.5)			V
ΔV _O	Load Regulation	T _J = 25°C 1mA ≤ I _O ≤ 100mA	50			100			125			mV
ΔV _O	Long Term Stability	I _O = 100mA	20			48			60			mV/ khrs
I _Q	Quiescent Current	I _O = 100mA	2 6			2 6			2 6			mA
ΔI _Q	Quiescen Current Change	1mA ≤ I _O ≤ 100mA	0.3			0.3			0.3			mA
		1mA ≤ I _O ≤ 40mA	0.1			0.1			0.1			
		I _O = 100mA	0.25			0.25			0.25			mA
		V _{MIN} ≤ V _{IN} ≤ V _{MAX}	(-20 ≤ V _{IN} ≤ -7.5)			(-27 ≤ V _{IN} ≤ -14.8)			(-30 ≤ V _{IN} ≤ -18)			V
V _n	Output Noise Voltage	T _J = 25°C, I _O = 100mA f = 10Hz – 10kHz	40			96			120			μV
$\frac{\Delta V_{IN}}{\Delta V_O}$	Ripple Rejection	T _J = 25°C, I _O = 100mA f = 120Hz	50			52			50			dB
	Input Voltage Required to Maintain Line Regulation	T _J = 25°C, I _O = 100mA	-7.3			-14.6			-17.7			V
		I _O = 40mA	-7.0			-14.5			-17.5			V

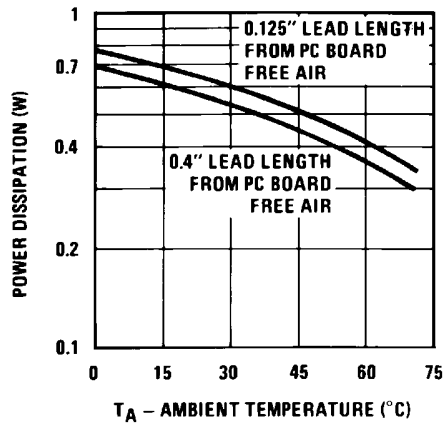
Note 1: Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is functional, but do not guarantee specific performance limits.

Note 2: Thermal resistance of TO-3 (Z) package is 60°C/W θ_{JC} , 232°C/W θ_{JA} at still air, and 88°C/W at 400 ft/min of air. The θ_{JA} of the LM78LXX in the 6-Bump micro-SMD package is 114°C/W when mounted on a 4-Layer JEDEC test board (JESD 51-7). The θ_{JA} of the LM78LXX in the SOIC-8 (M) package is 180°C/W in still air. The maximum junction temperature shall not exceed 125°C on electrical parameters.

Note 3: To ensure constant junction temperature, low duty cycle pulse testing is used.

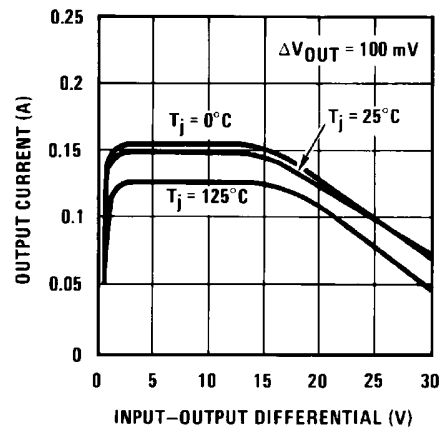
Typical Performance Characteristics

Maximum Average Power Dissipation (TO-92)



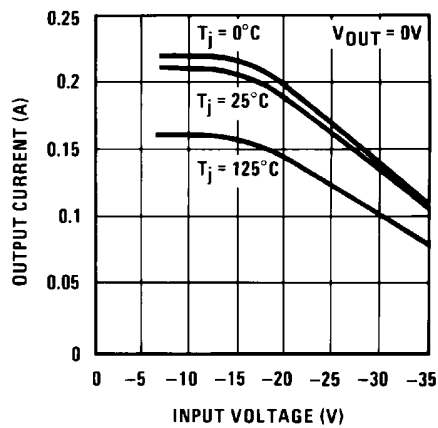
774811

Peak Output Current



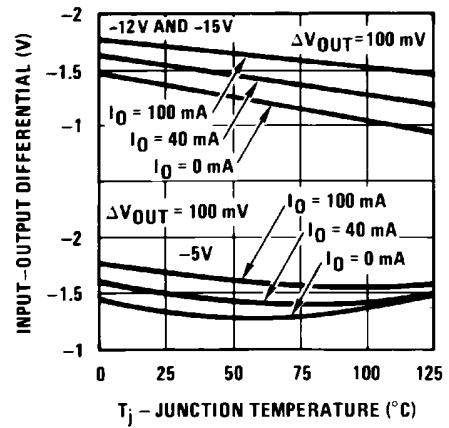
774812

Short Circuit Output Current



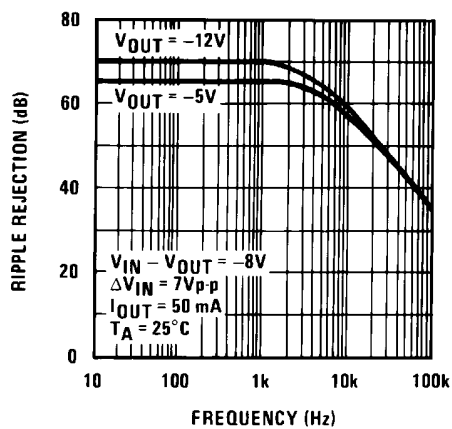
774813

Dropout Voltage



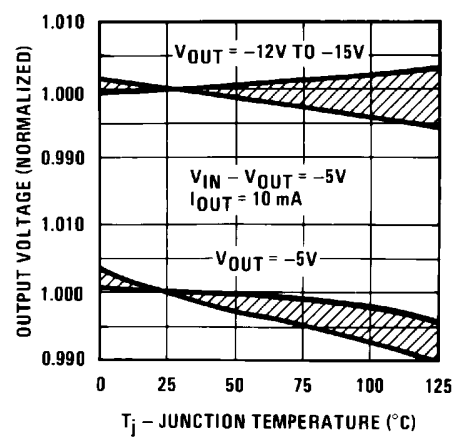
774814

Ripple Rejection

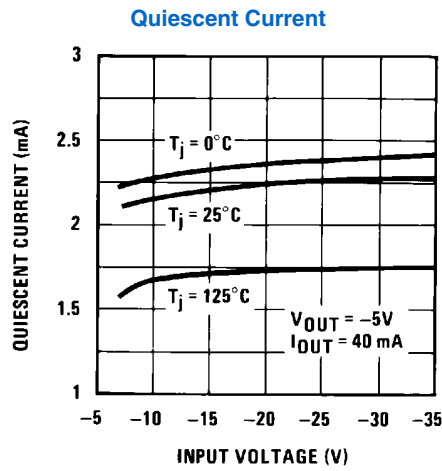


774815

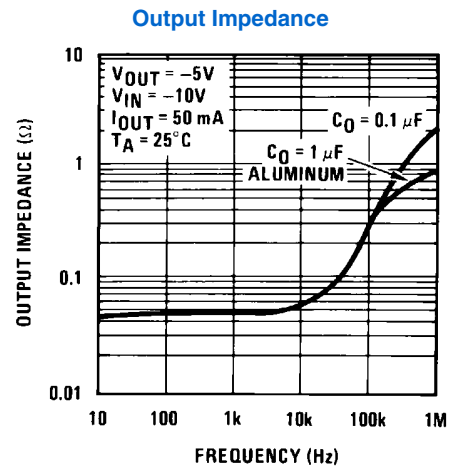
Output Voltage vs. Temperature
(Normalized to 1V @ 25°C)



774816



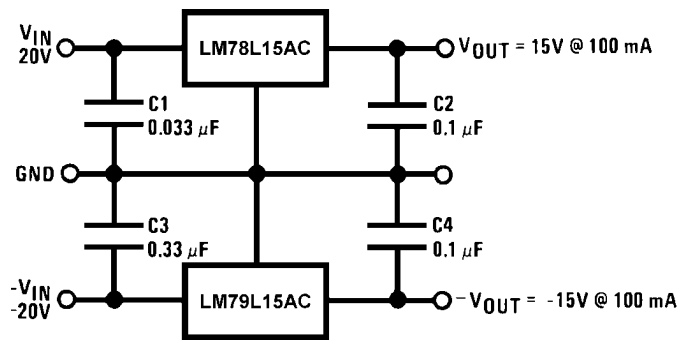
774817



774818

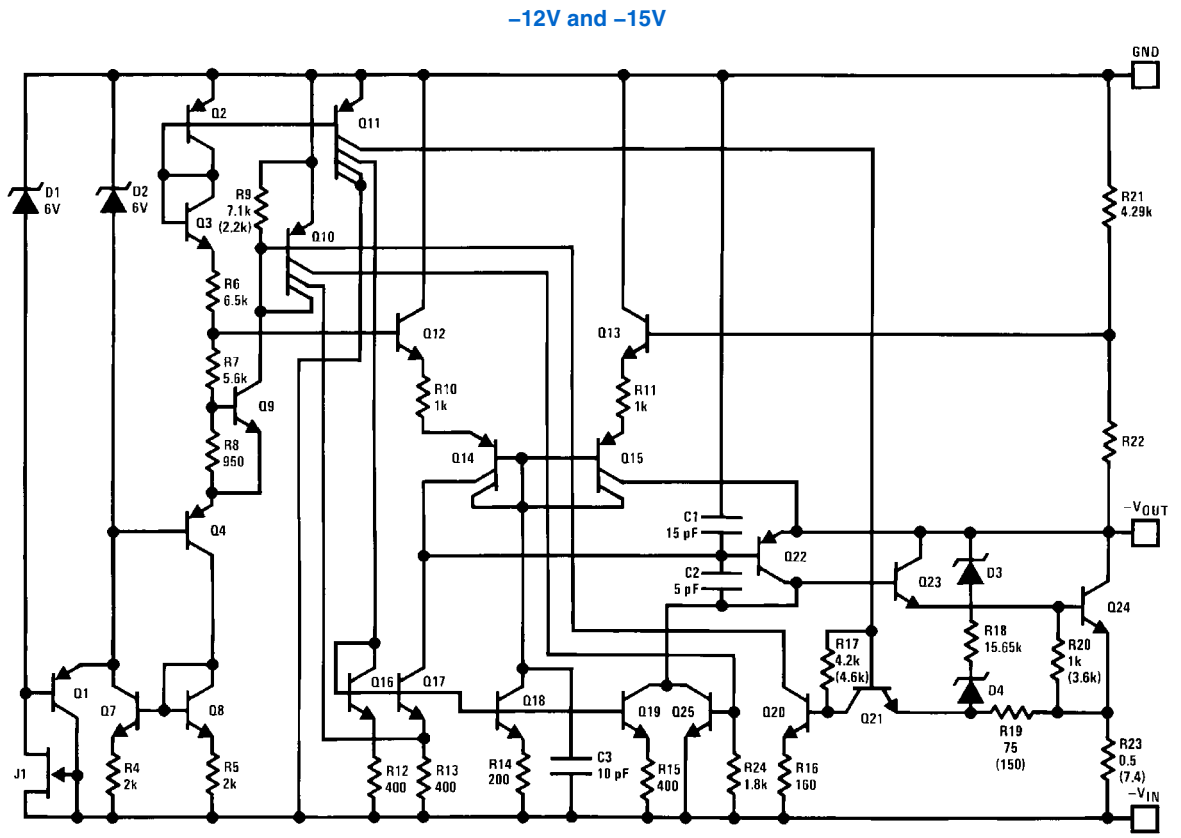
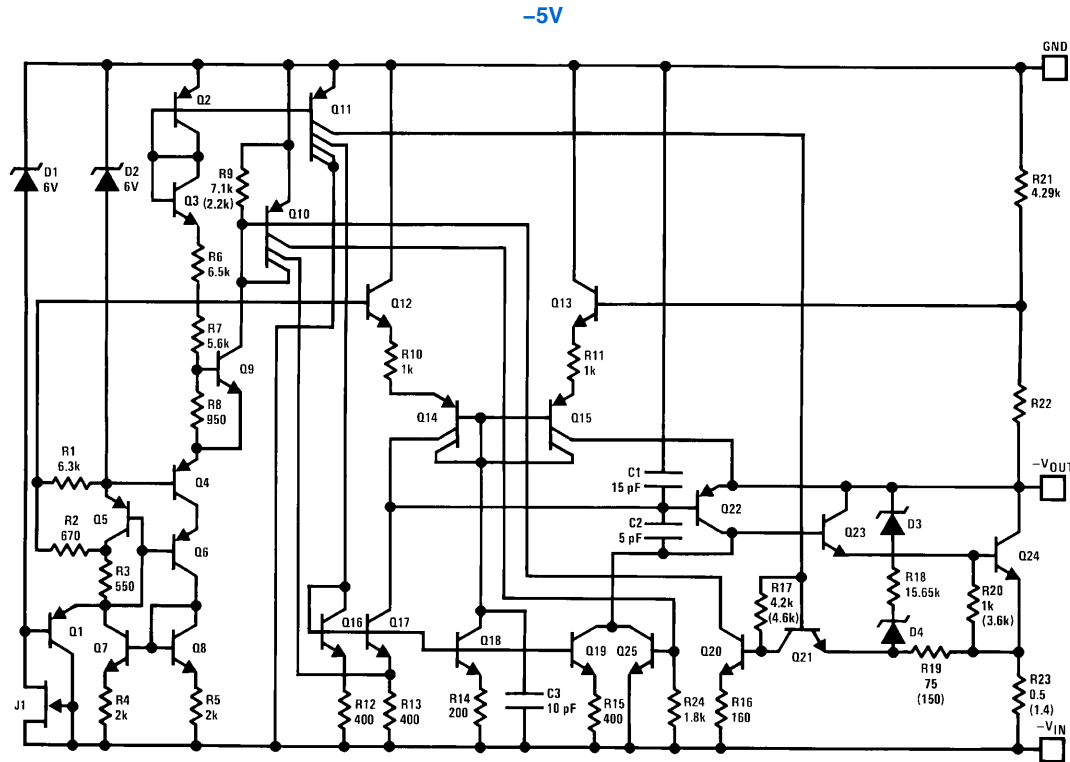
Typical Applications

$\pm 15\text{V}$, 100mA Dual Power Supply

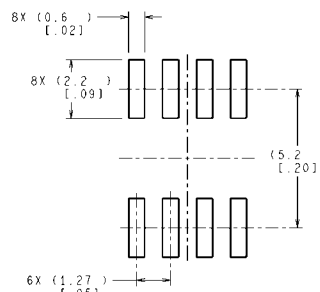
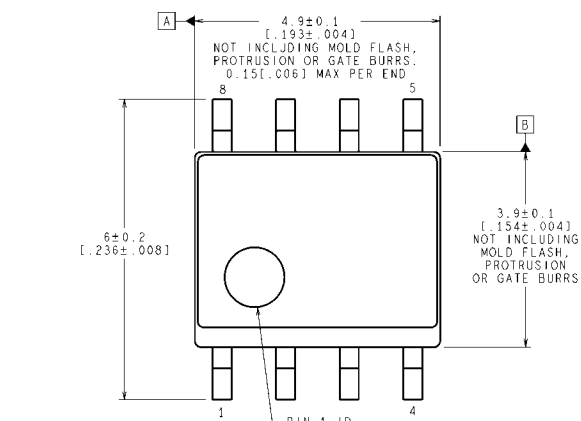


774806

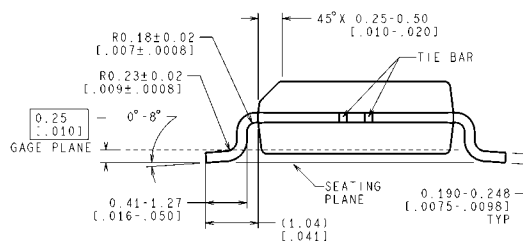
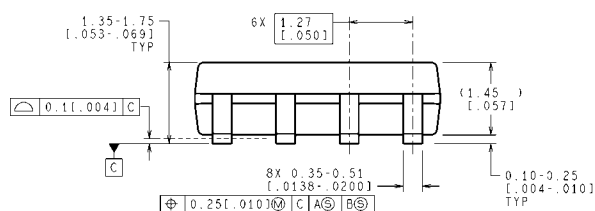
Schematic Diagrams



Physical Dimensions inches (millimeters) unless otherwise noted



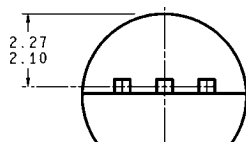
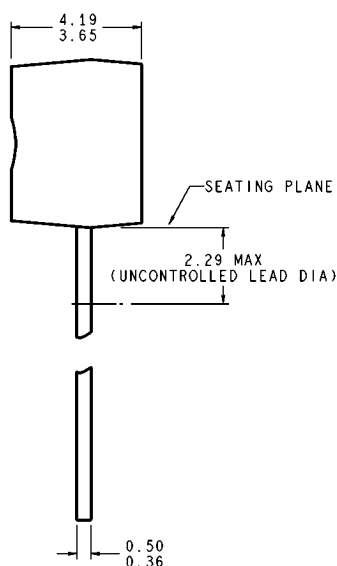
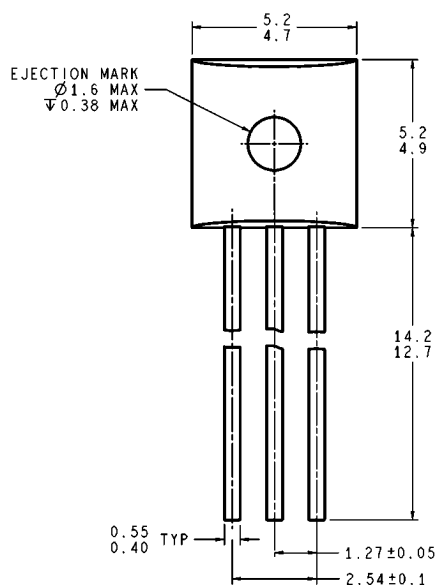
RECOMMENDED LAND PATTERN



CONTROLLING DIMENSION IS MILLIMETER
VALUES IN [] ARE INCHES
DIMENSIONS IN () FOR REFERENCE ONLY

**8-Lead, SOIC NARROW
NS Package Number M08A**

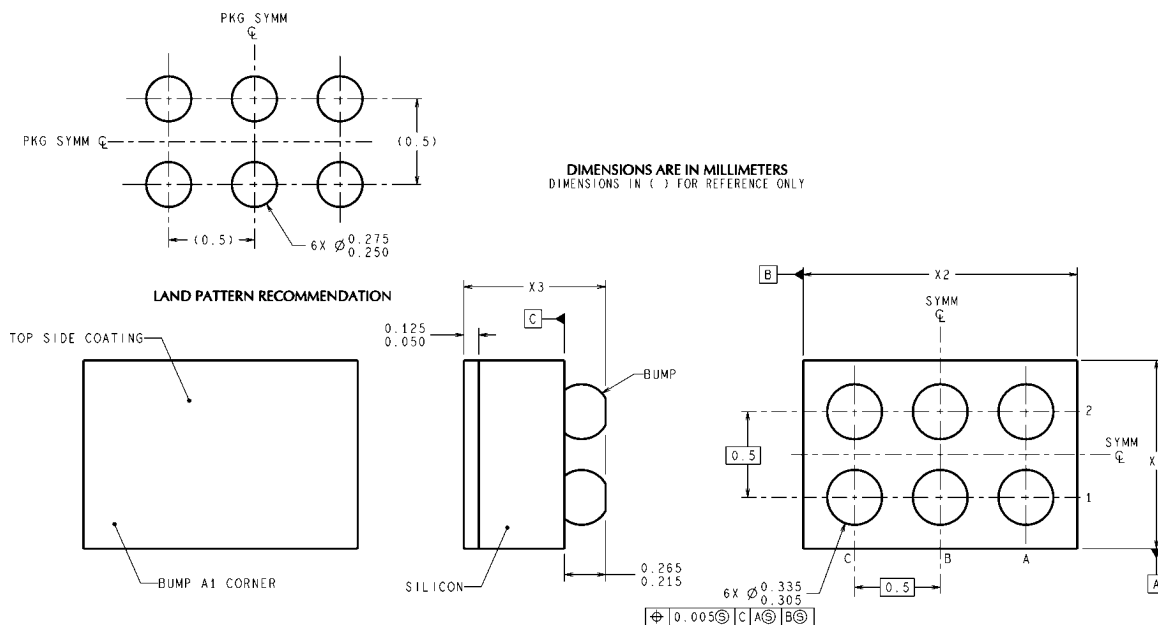
M08A (Rev M)



DIMENSIONS ARE IN MILLIMETERS

**TO-92, Molded, 3-Lead
NS Package Number Z03A**

Z03A (Rev G)



TLA06XXX (Rev C)

NOTES: UNLESS OTHERWISE SPECIFIED

1. EPOXY COATING.
2. 63Sn/67Pb EUTECTIC BUMP.
3. RECOMMEND NON-SOLDER MASK DEFINED LANDING PAD.
4. PIN A1 ESTABLISHED BY LOWER LEFT CORNER WITH RESPECT TO TEXT ORIENTATION.
5. XXX IN DRAWING NUMBER REPRESENTS PACKAGE SIZE VARIATION WHERE X1 IS PACKAGE WIDTH, X2 IS PACKAGE LENGTH AND X3 IS PACKAGE HEIGHT.
6. REFERENCE JEDEC REGISTRATION MO-211, VARIATION BC.

6-Bump micro SMD
NS Package Number TLA06AMA
X₁ = 1006μm X₂ = 1793μm X₃ = 600μm

Notes

Notes

For more National Semiconductor product information and proven design tools, visit the following Web sites at:
www.national.com

Products		Design Support	
Amplifiers	www.national.com/amplifiers	WEBENCH® Tools	www.national.com/webench
Audio	www.national.com/audio	App Notes	www.national.com/appnotes
Clock and Timing	www.national.com/timing	Reference Designs	www.national.com/refdesigns
Data Converters	www.national.com/adc	Samples	www.national.com/samples
Interface	www.national.com/interface	Eval Boards	www.national.com/evalboards
LVDS	www.national.com/lvds	Packaging	www.national.com/packaging
Power Management	www.national.com/power	Green Compliance	www.national.com/quality/green
Switching Regulators	www.national.com/switchers	Distributors	www.national.com/contacts
LDOs	www.national.com/ldo	Quality and Reliability	www.national.com/quality
LED Lighting	www.national.com/led	Feedback/Support	www.national.com/feedback
Voltage References	www.national.com/vref	Design Made Easy	www.national.com/easy
PowerWise® Solutions	www.national.com/powerwise	Applications & Markets	www.national.com/solutions
Serial Digital Interface (SDI)	www.national.com/sdi	Mil/Aero	www.national.com/milaero
Temperature Sensors	www.national.com/tempsensors	SolarMagic™	www.national.com/solarmagic
PLL/VCO	www.national.com/wireless	PowerWise® Design University	www.national.com/training

THE CONTENTS OF THIS DOCUMENT ARE PROVIDED IN CONNECTION WITH NATIONAL SEMICONDUCTOR CORPORATION ("NATIONAL") PRODUCTS. NATIONAL MAKES NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE ACCURACY OR COMPLETENESS OF THE CONTENTS OF THIS PUBLICATION AND RESERVES THE RIGHT TO MAKE CHANGES TO SPECIFICATIONS AND PRODUCT DESCRIPTIONS AT ANY TIME WITHOUT NOTICE. NO LICENSE, WHETHER EXPRESS, IMPLIED, ARISING BY ESTOPPEL OR OTHERWISE, TO ANY INTELLECTUAL PROPERTY RIGHTS IS GRANTED BY THIS DOCUMENT.

TESTING AND OTHER QUALITY CONTROLS ARE USED TO THE EXTENT NATIONAL DEEMS NECESSARY TO SUPPORT NATIONAL'S PRODUCT WARRANTY. EXCEPT WHERE MANDATED BY GOVERNMENT REQUIREMENTS, TESTING OF ALL PARAMETERS OF EACH PRODUCT IS NOT NECESSARILY PERFORMED. NATIONAL ASSUMES NO LIABILITY FOR APPLICATIONS ASSISTANCE OR BUYER PRODUCT DESIGN. BUYERS ARE RESPONSIBLE FOR THEIR PRODUCTS AND APPLICATIONS USING NATIONAL COMPONENTS. PRIOR TO USING OR DISTRIBUTING ANY PRODUCTS THAT INCLUDE NATIONAL COMPONENTS, BUYERS SHOULD PROVIDE ADEQUATE DESIGN, TESTING AND OPERATING SAFEGUARDS.

EXCEPT AS PROVIDED IN NATIONAL'S TERMS AND CONDITIONS OF SALE FOR SUCH PRODUCTS, NATIONAL ASSUMES NO LIABILITY WHATSOEVER, AND NATIONAL DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY RELATING TO THE SALE AND/OR USE OF NATIONAL PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

LIFE SUPPORT POLICY

NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS PRIOR WRITTEN APPROVAL OF THE CHIEF EXECUTIVE OFFICER AND GENERAL COUNSEL OF NATIONAL SEMICONDUCTOR CORPORATION. As used herein:

Life support devices or systems are devices which (a) are intended for surgical implant into the body, or (b) support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in a significant injury to the user. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system or to affect its safety or effectiveness.

National Semiconductor and the National Semiconductor logo are registered trademarks of National Semiconductor Corporation. All other brand or product names may be trademarks or registered trademarks of their respective holders.

Copyright© 2011 National Semiconductor Corporation

For the most current product information visit us at www.national.com



**National Semiconductor
Americas Technical
Support Center**
Email: support@nsc.com
Tel: 1-800-272-9959

**National Semiconductor Europe
Technical Support Center**
Email: europe.support@nsc.com

**National Semiconductor Asia
Pacific Technical Support Center**
Email: ap.support@nsc.com

**National Semiconductor Japan
Technical Support Center**
Email: jpn.feedback@nsc.com

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products

Audio	www.ti.com/audio
Amplifiers	amplifier.ti.com
Data Converters	dataconverter.ti.com
DLP® Products	www.dlp.com
DSP	dsp.ti.com
Clocks and Timers	www.ti.com/clocks
Interface	interface.ti.com
Logic	logic.ti.com
Power Mgmt	power.ti.com
Microcontrollers	microcontroller.ti.com
RFID	www.ti-rfid.com
OMAP Mobile Processors	www.ti.com/omap
Wireless Connectivity	www.ti.com/wirelessconnectivity

Applications

Communications and Telecom	www.ti.com/communications
Computers and Peripherals	www.ti.com/computers
Consumer Electronics	www.ti.com/consumer-apps
Energy and Lighting	www.ti.com/energy
Industrial	www.ti.com/industrial
Medical	www.ti.com/medical
Security	www.ti.com/security
Space, Avionics and Defense	www.ti.com/space-avionics-defense
Transportation and Automotive	www.ti.com/automotive
Video and Imaging	www.ti.com/video

TI E2E Community Home Page

e2e.ti.com

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2011, Texas Instruments Incorporated