

S-29LXX0A Series

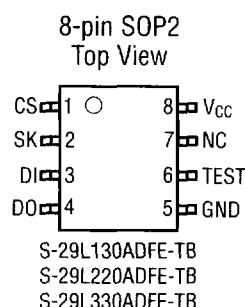
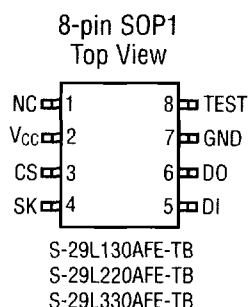
3-WIRE CMOS SERIAL E²PROM

The S-29LXX0A Series is low power 1K/2K/4K-bit E²PROM with a low operating voltage range. They are organized as 64-word x 16 bit, 128-word x 16-bit and 256-word x 16-bit, respectively. Each is capable of sequential read, at which time addresses are automatically incremented in 16-bit blocks. The instruction code is compatible with the NM93CSXX Series.

FEATURES

- Low power consumption
 - Standby: 0.8 μ A Max. ($V_{CC}=5.5V$)
 - Operating: 0.8 mA Max. ($V_{CC}=5.5V$)
 - 0.4 mA Max. ($V_{CC}=2.7V$)
- Low operating voltage range
 - Write: 1.8 to 5.5V
 - Read: 1.8 to 5.5V
- Sequential read capable
- Endurance: 10^5 cycles/word
- Data retention: 10 years
- S-29L130A: 1K bit NM93CS46 instruction code compatible
- S-29L220A: 2K bit NM93CS56 instruction code compatible
- S-29L330A: 4K bit NM93CS66 instruction code compatible

PIN ASSIGNMENT

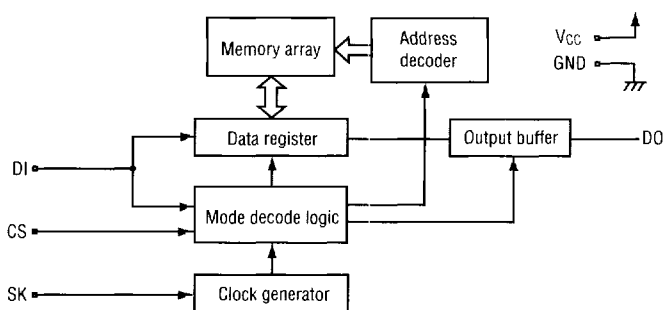


SSOP package is also available.
Contact Seiko Instruments, Inc.

PIN FUNCTIONS

Name	Pin Number SOP1	SOP2	Function
CS	3	1	Chip select input
SK	4	2	Serial clock input
DI	5	3	Serial data input
DO	6	4	Serial data output
GND	7	5	Ground
TEST	8	6	Test pin (normally kept open) (can be connected to GND or V _{CC})
NC	1	7	No Connection
V _{CC}	2	8	Power supply

BLOCK DIAGRAM



INSTRUCTION SET

Instruction	Start Bit	Op code	S-29L130A	Address S-29L220A	S-29L330A	Data
READ (Read data)	1	10	A ₅ to A ₀	XA ₆ to A ₀	A ₇ to A ₀	D ₁₅ to D ₀ Output*
WRITE (Write data)	1	01	A ₅ to A ₀	XA ₆ to A ₀	A ₇ to A ₀	D ₁₅ to D ₀ Input
ERASE (Erase data)	1	11	A ₅ to A ₀	XA ₆ to A ₀	A ₇ to A ₀	—
EWEN (Program enable)	1	00	11xxxx	11xxxxxx	11xxxxxx	—
EWDS (Program disable)	1	00	00xxxx	00xxxxxx	00xxxxxx	—

x: Doesn't matter.

*: Addresses are continuously incremented.

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ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Power supply voltage	V _{CC}	-0.3 to +7.0	V
Input voltage	V _{IN}	-0.3 to V _{CC} +0.3	V
Output voltage	V _{OUT}	-0.3 to V _{CC}	V
Storage temperature under bias	T _{BIAS}	-50 to +95	°C
Storage temperature	T _{STG}	-65 to +150	°C

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Power supply voltage	V _{CC}	Read Operation	1.8	–	5.5	V
		Write Enable/Disable	1.8	–	5.5	V
High level input voltage	V _{IH}	Write Operation	0.8 x V _{CC}	–	V _{CC}	V
Low level input voltage	V _{IL}		0.0	–	0.2 x V _{CC}	V
Operating temperature	T _{OPR}		-40	–	+ 85	°C

DC ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	V _{CC} =4.5 to 5.5V			V _{CC} =2.7 to 4.5V			V _{CC} =1.8 to 2.7V			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Current consumption (READ)	I _{CC1}	DO unloaded	–	–	0.8	–	–	0.6	–	–	0.4	mA
Current consumption (PROGRAM)	I _{CC2}	DO unloaded	–	–	2.0	–	–	1.5	–	–	1.0	mA

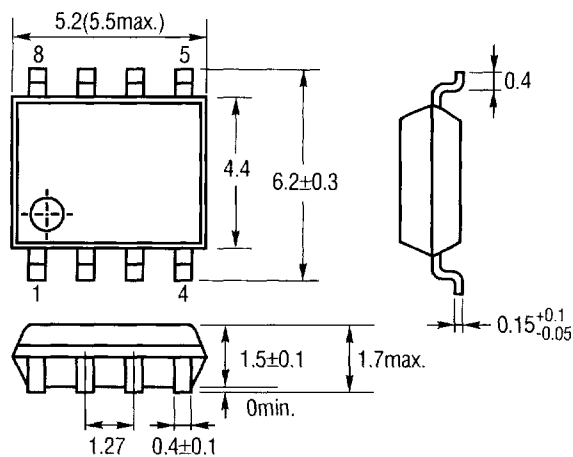
Parameter	Symbol	Conditions	V _{CC} =4.5 to 5.5V			V _{CC} =2.7 to 4.5V			V _{CC} =1.8 to 2.7V			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Standby current consumption	I _{SB}	CS=GND DO=Open Connected to V _{CC} or GND	–	–	0.8	–	–	0.6	–	–	0.4	μA
Input leakage current	I _{LI}	V _{IN} =GND to V _{CC}	–	0.1	1.0	–	0.1	1.0	–	0.1	1.0	μA
Output leakage current	I _{LO}	V _{OUT} =GND to V _{CC}	–	0.1	1.0	–	0.1	1.0	–	0.1	1.0	μA
Low level output voltage	V _{OL}	I _{OL} =2.1mA I _{OL} =100μA	–	–	0.45	–	–	0.1	–	–	0.1	V
			–	–	0.1	–	–	0.1	–	–	0.1	V
High level output voltage	V _{OH}	I _{OH} =-400 μA I _{OH} =-100 μA I _{OH} =-10 μA	2.4	–	–	–	–	–	–	–	–	V
			V _{CC} -0.7	–	–	V _{CC} -0.7	–	–	–	–	–	V
			V _{CC} -0.7	–	–	V _{CC} -0.7	–	–	V _{CC} -0.3	–	–	V
Write enable latch data hold voltage	V _{DH}	Only when write disable mode	1.5	–	–	1.5	–	–	1.5	–	–	V

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DIMENSIONS

8-pin SOP



Dimensions (Unit: mm)

ORDERING INFORMATION

Part #	Description	Order As
S-29L130ADFE-TB	1Kb (64 x 16) EEPROM, 3-wire, Low Power, Low Operating Voltage, SOP2	S-29L130ADFETB
S-29L130AFE-TB	1Kb (64 x 16) EEPROM, 3-wire, Low Power, Low Operating Voltage, SOP1	S-29L130AFETB
S-29L220ADFE-TB	2Kb (128 x 16) EEPROM, 3-wire, Low Power, Low Operating Voltage, SOP2	S-29L220ADFETB
S-29L220AFE-TB	2Kb (128 x 16) EEPROM, 3-wire, Low Power, Low Operating Voltage, SOP1	S-29L220AFETB
S-29L330ADFE-TB	4Kb (256 x 16) EEPROM, 3-wire, Low Power, Low Operating Voltage, SOP2	S-29L330ADFETB
S-29L330AFE-TB	4Kb (256 x 16) EEPROM, 3-wire, Low Power, Low Operating Voltage, SOP1	S-29L330AFETB

