



FM24C256 CHARACTERIZATION
Fairchild Semiconductor Salt Lake
3333 West 9000 South
West Jordan, UT 84088-8838
Fax: 1.801.562.7500

Qualification & Characterization

of the

FM24C256

Product:256 Kbit Serial EEPROM

Interface:.....IIC

Technology:CMOS

Process:FM35EE

Die Size:133.15 X 85.47 mils
3382 X 2171 microns

Passivation:Oxy-Nitride planarization

Packages:8 pin NDIP, SOIC, 14 pin TSSOP

Compiled by Sherry Valdez

March 28, 2000

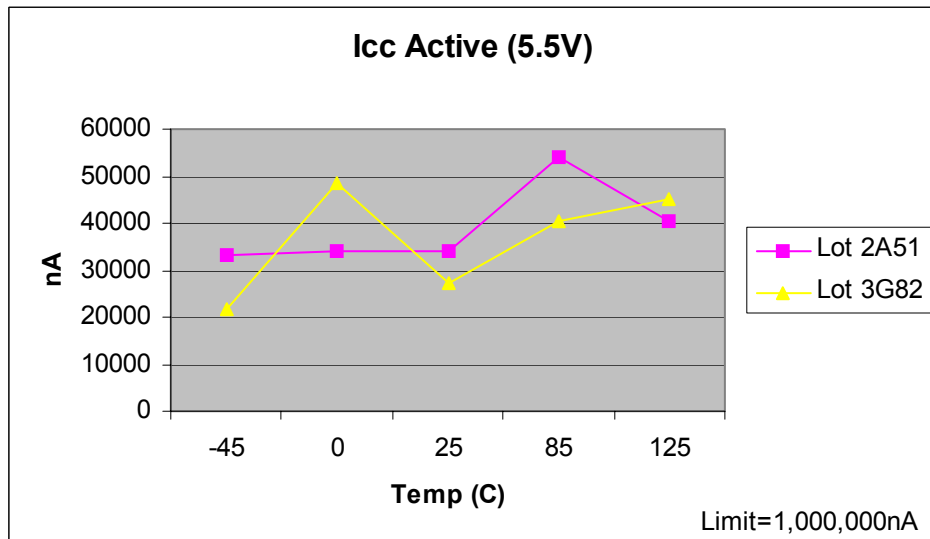
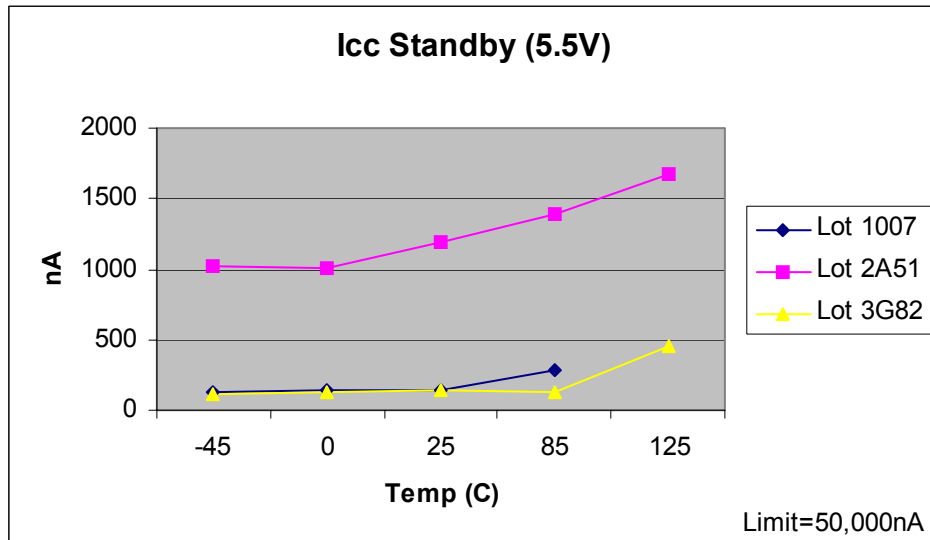
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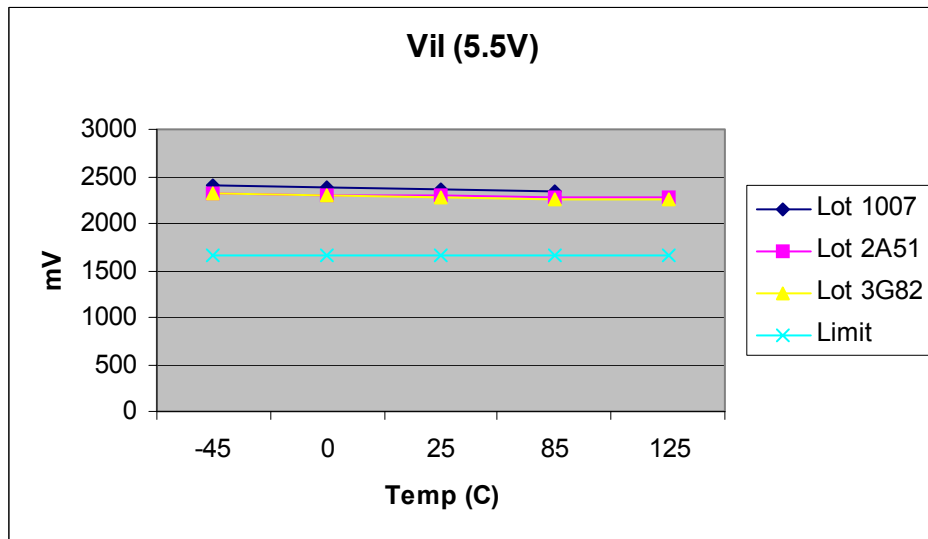
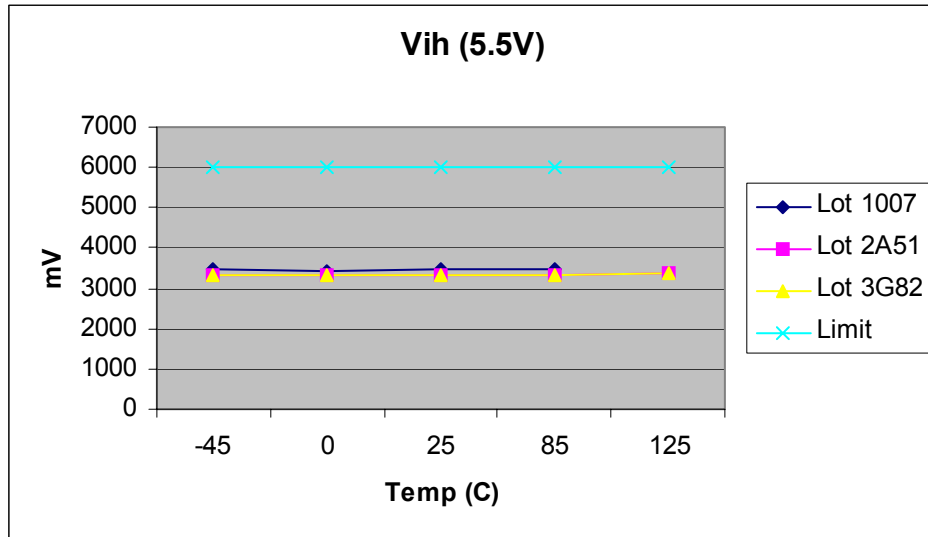
INTRODUCTION

This report is a summary of the qualification and characterization of the FM24C256 manufactured by Fairchild Semiconductor. This device offers the designer the ability to protect the entire memory array which then becomes ROM. Fairchild EEPROMs are designed and tested for applications requiring high endurance, high reliability, and low power consumption. The 24C series of EEPROMs conform to all specifications in the Extended IIC 2-wire protocol. The FM24C256 uses the UTEK 0.35 micron fabrication process. Qualification references and characterization data are included in this report.

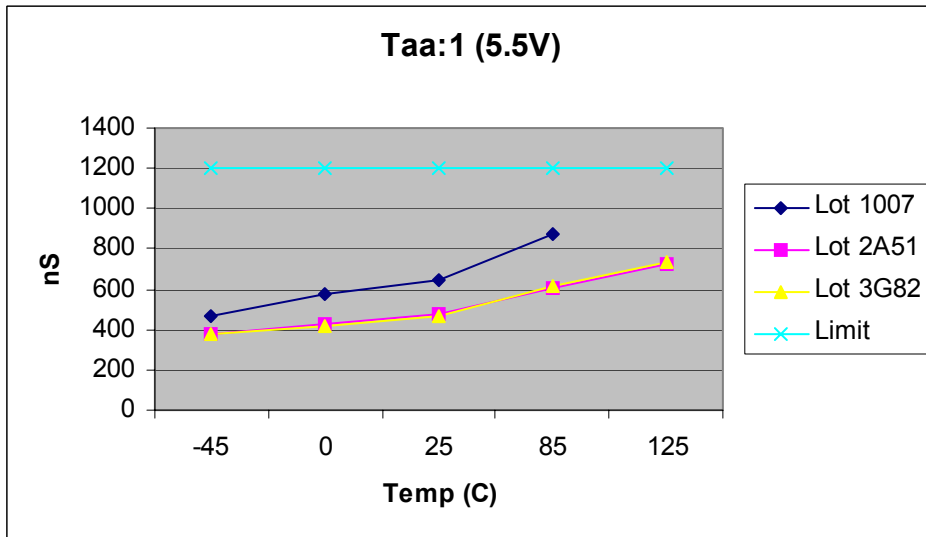
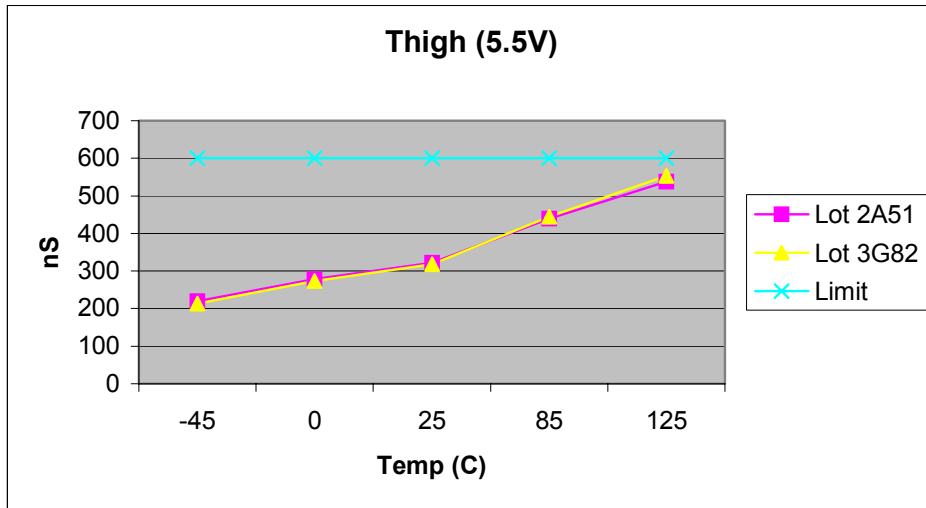
400KHZ TEMPERATURE CHARACTERISTICS 5.5V



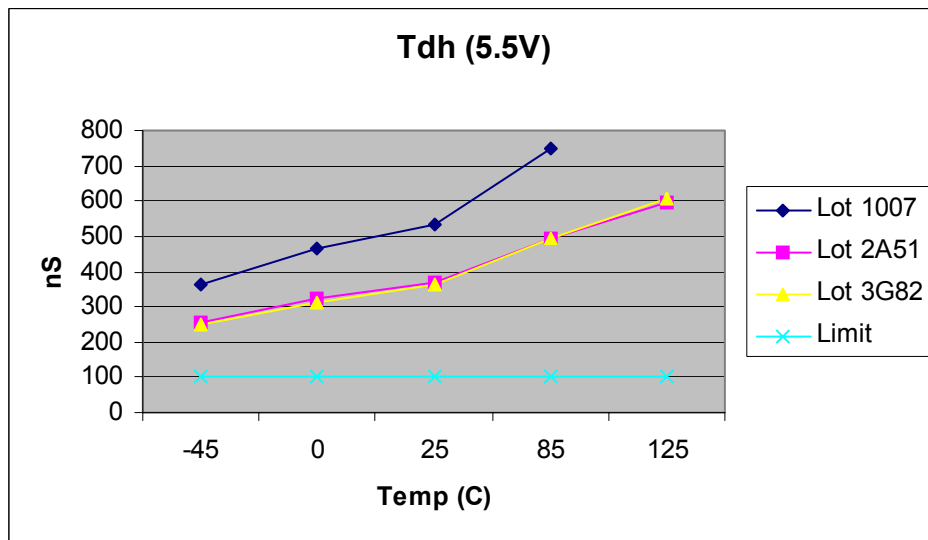
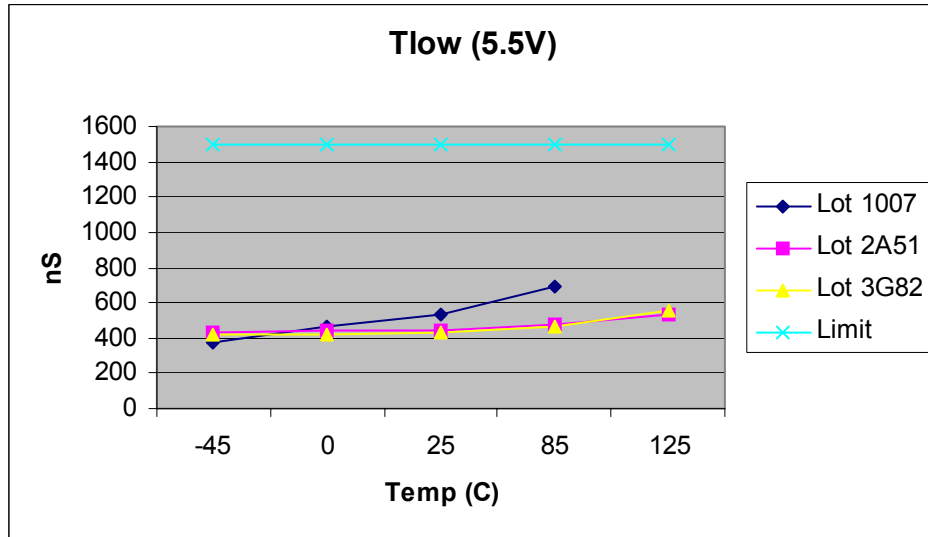
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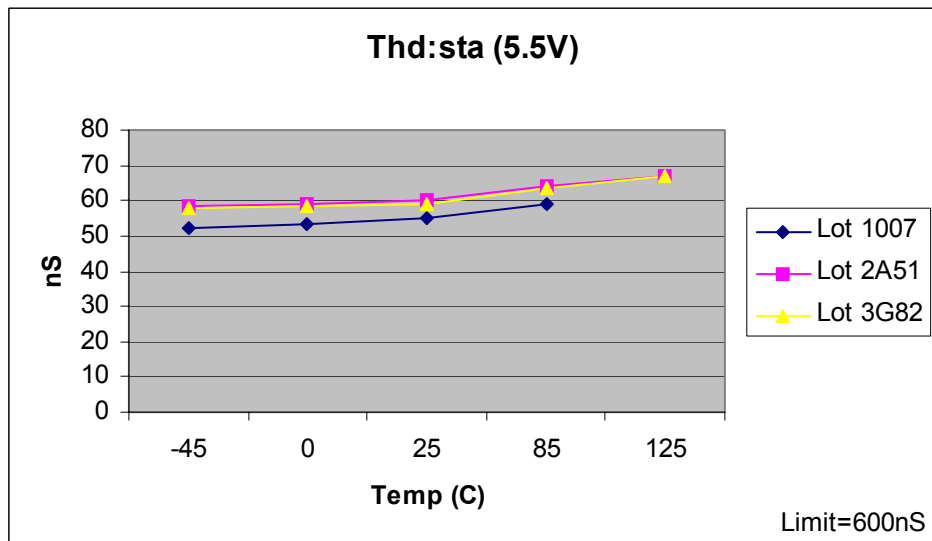
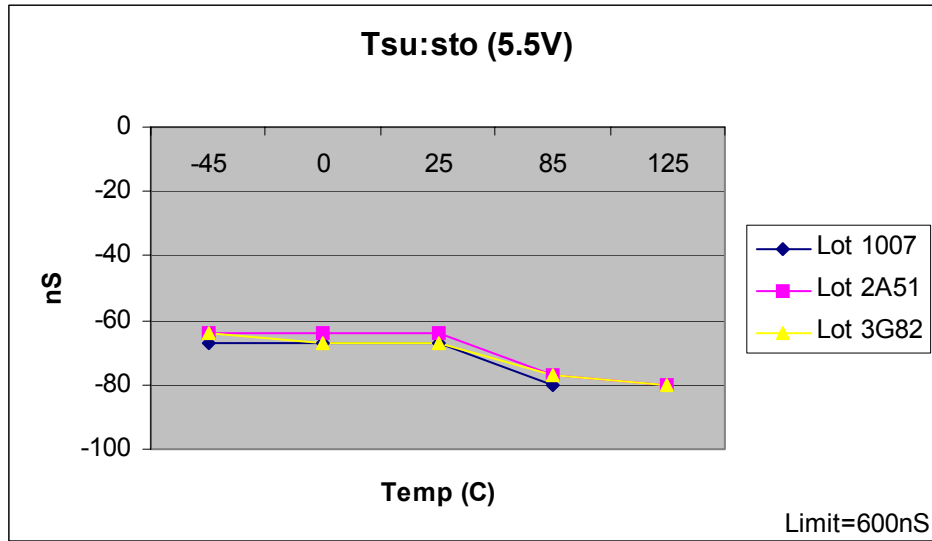
400KHZ TEMPERATURE CHARACTERISTICS 5.5V



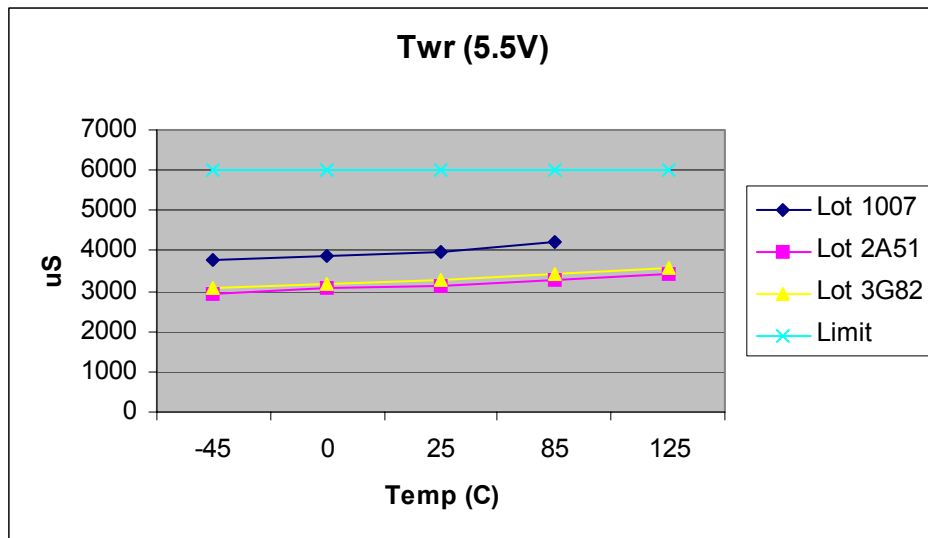
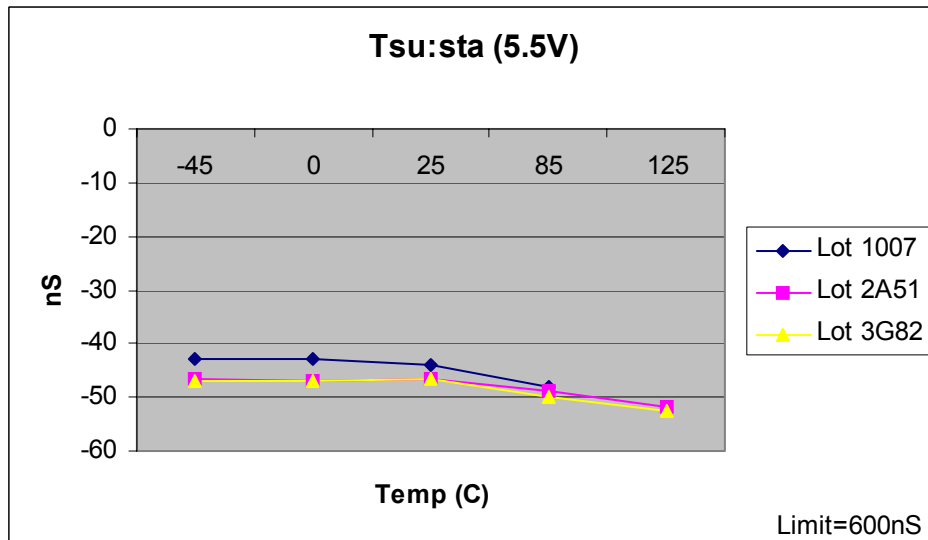
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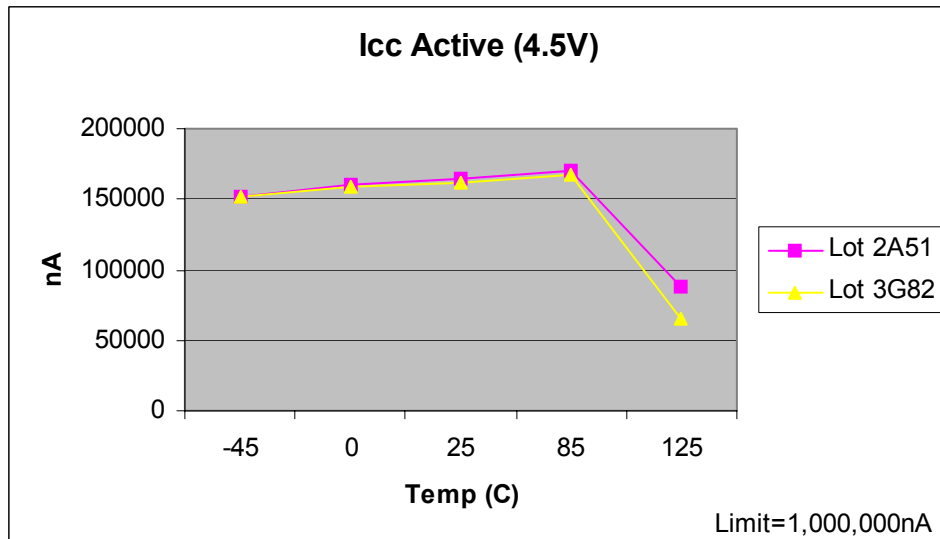
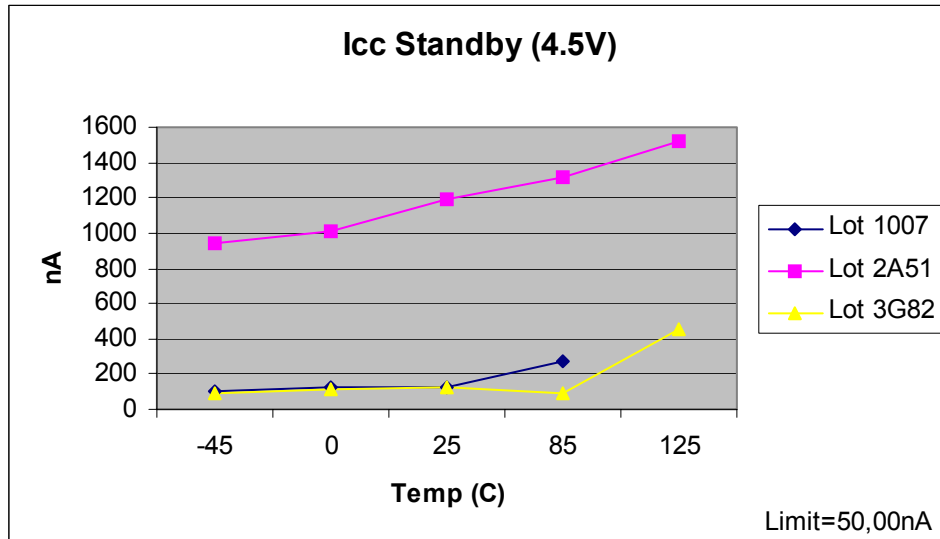
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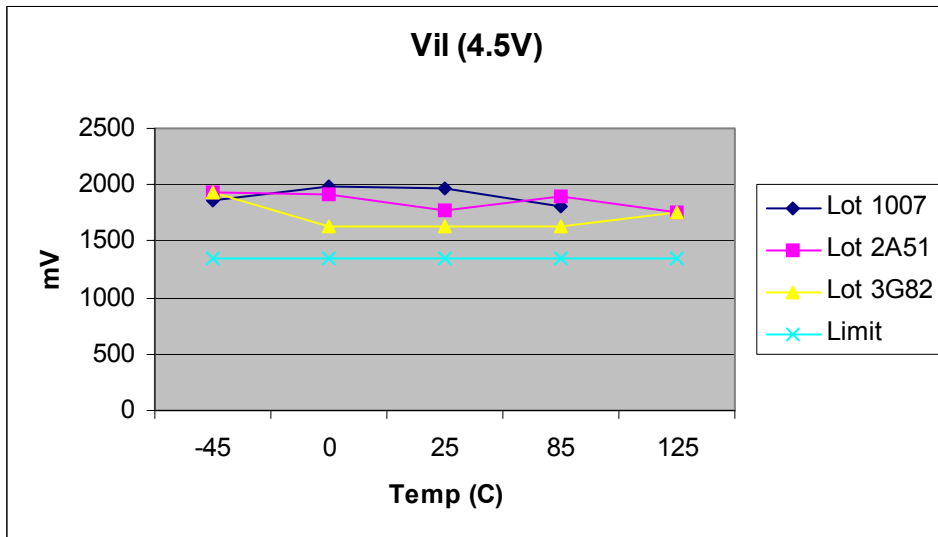
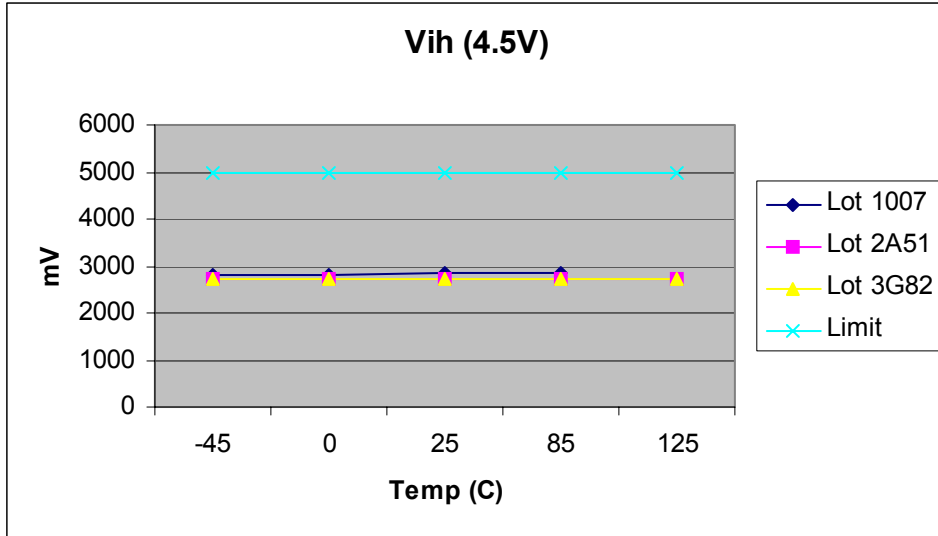
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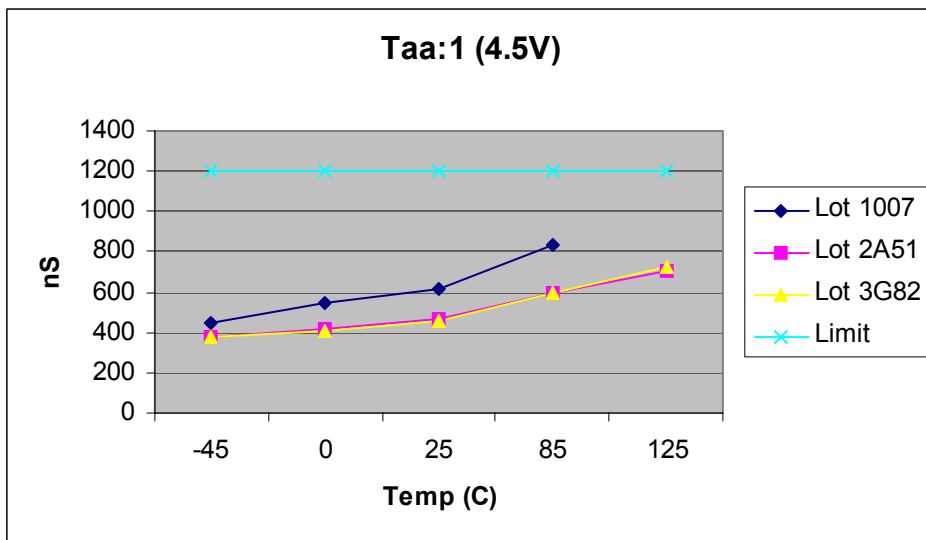
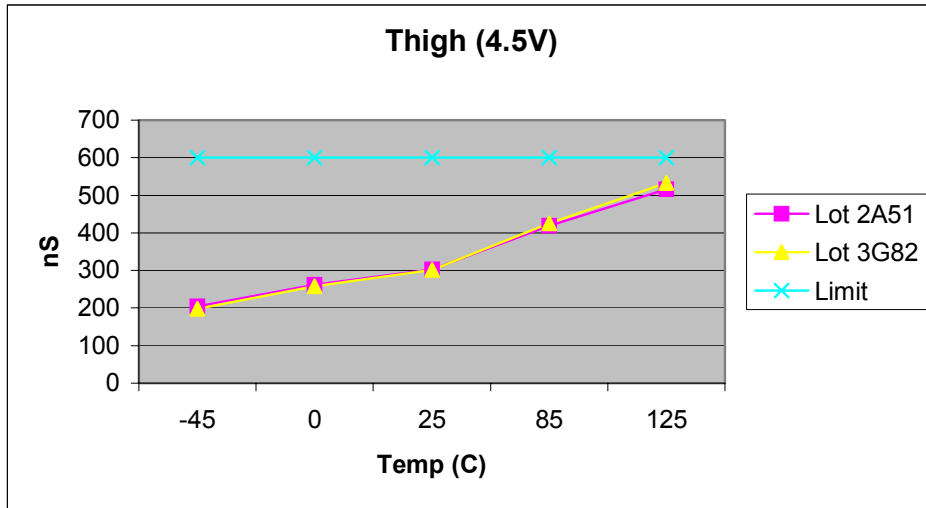
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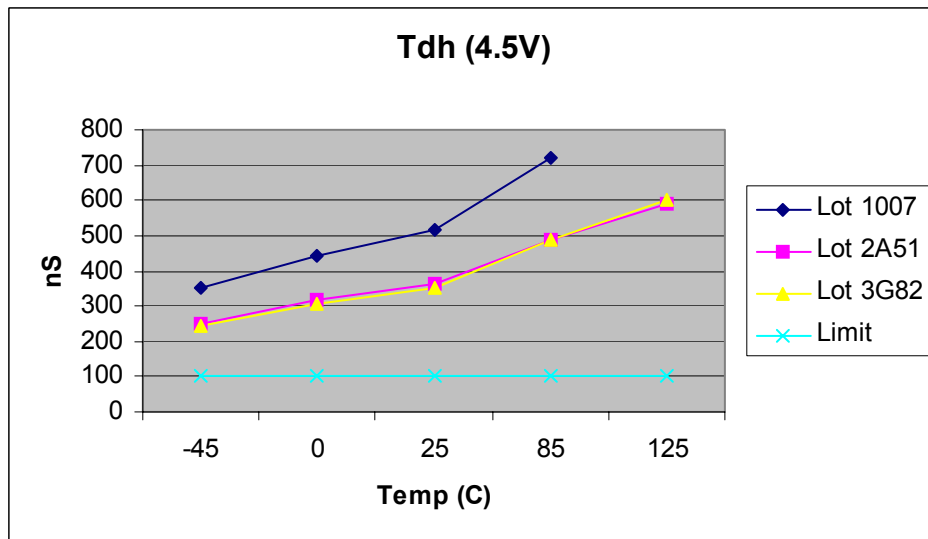
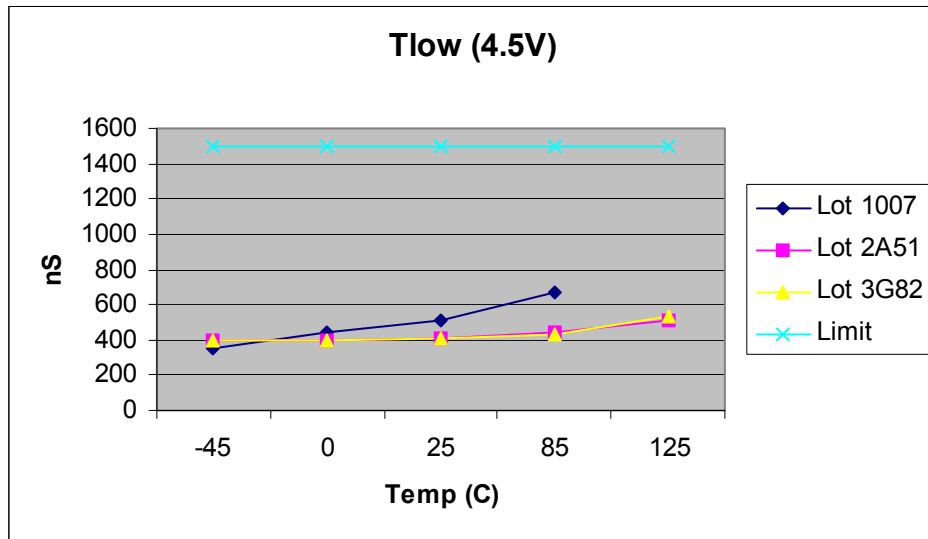
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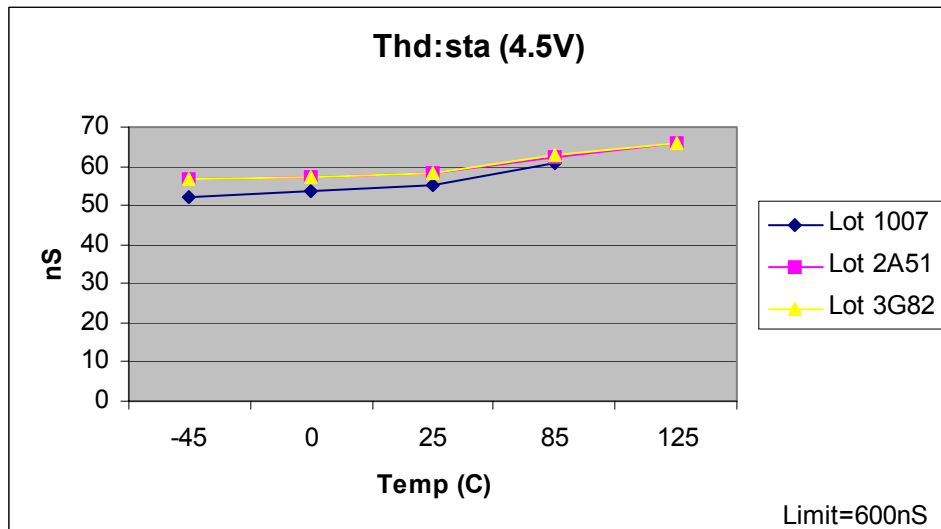
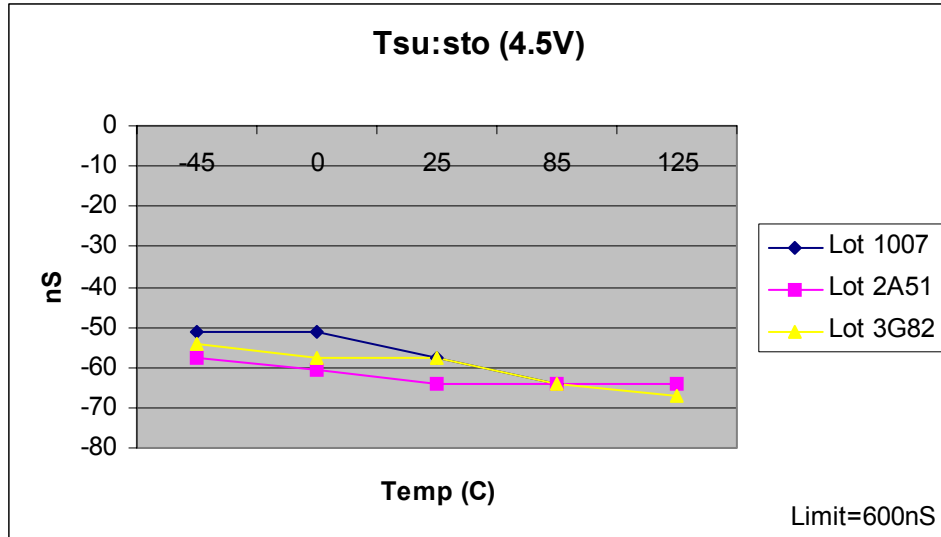
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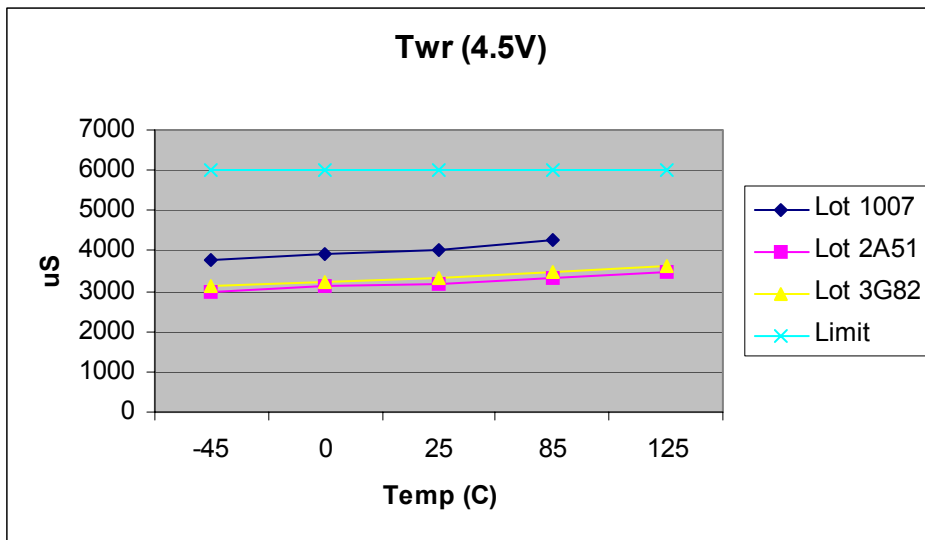
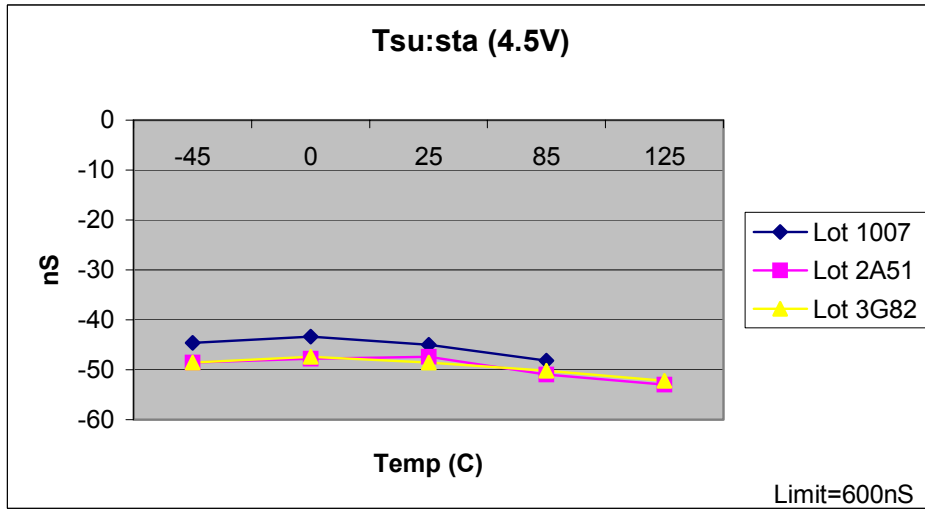
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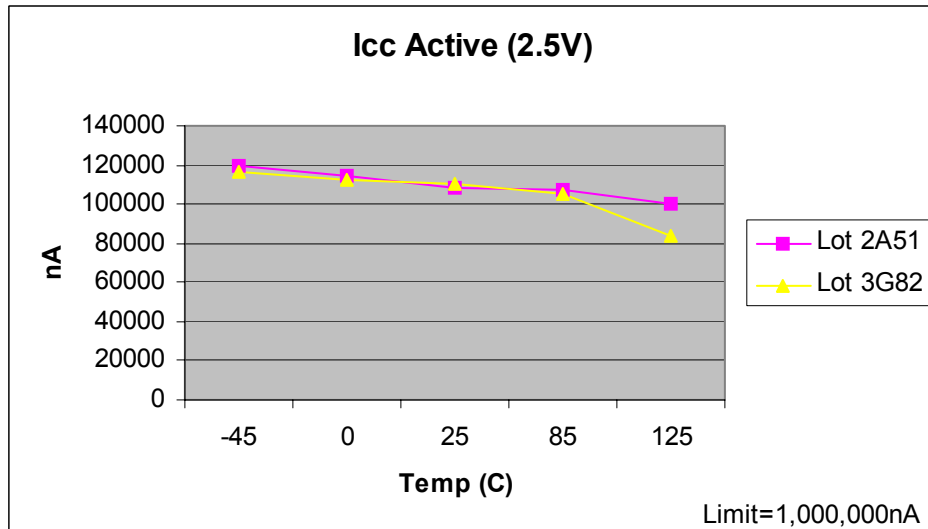
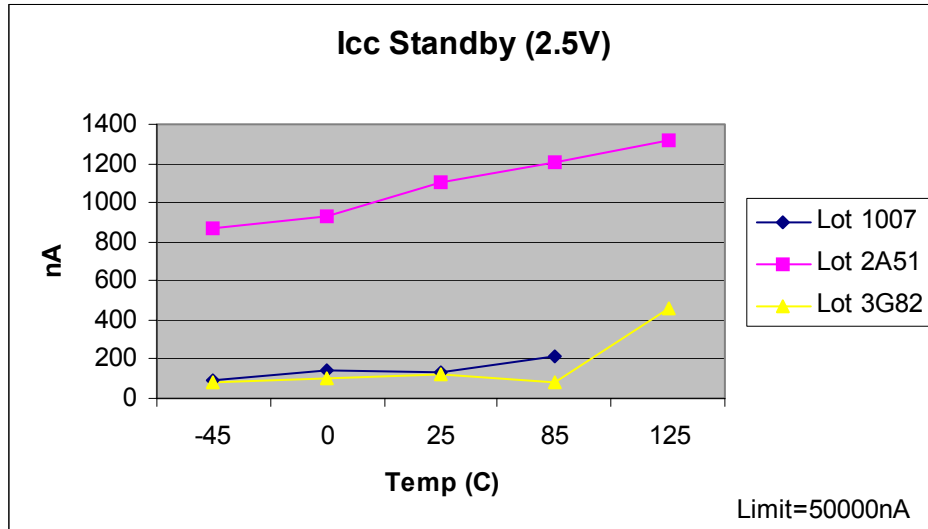
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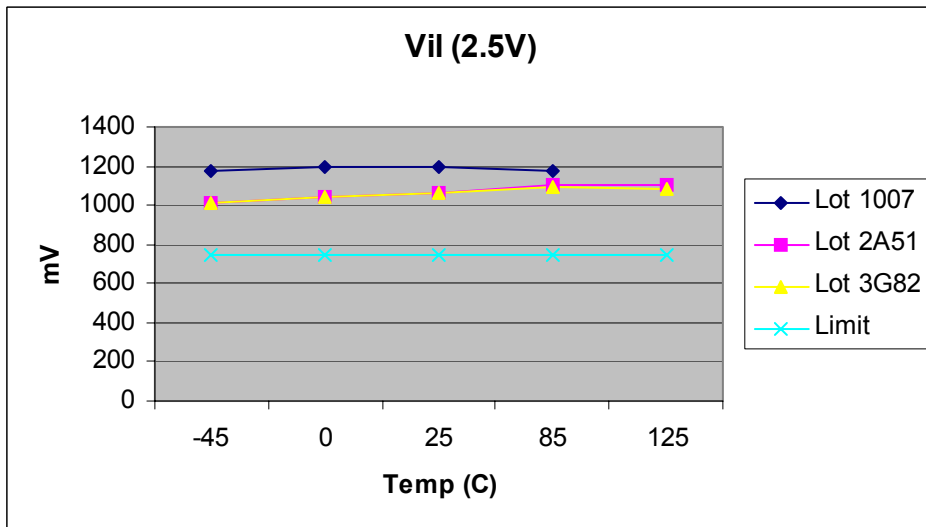
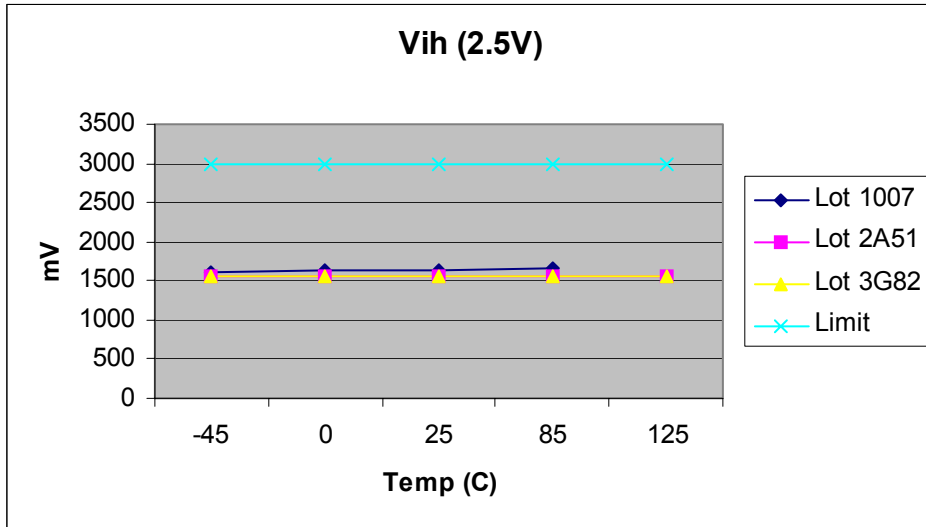
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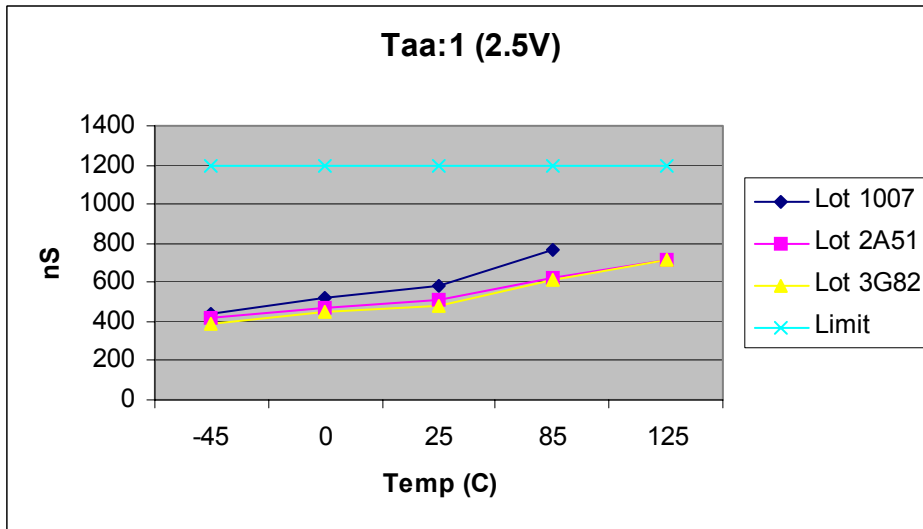
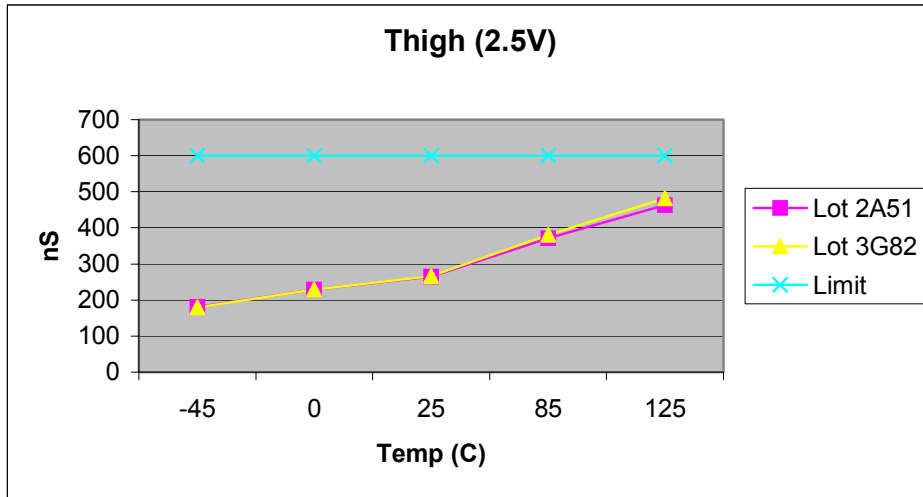
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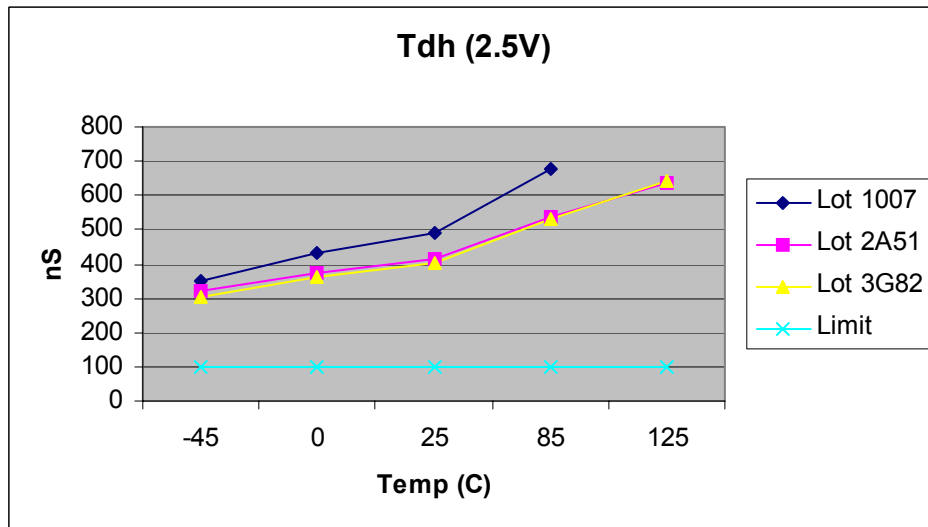
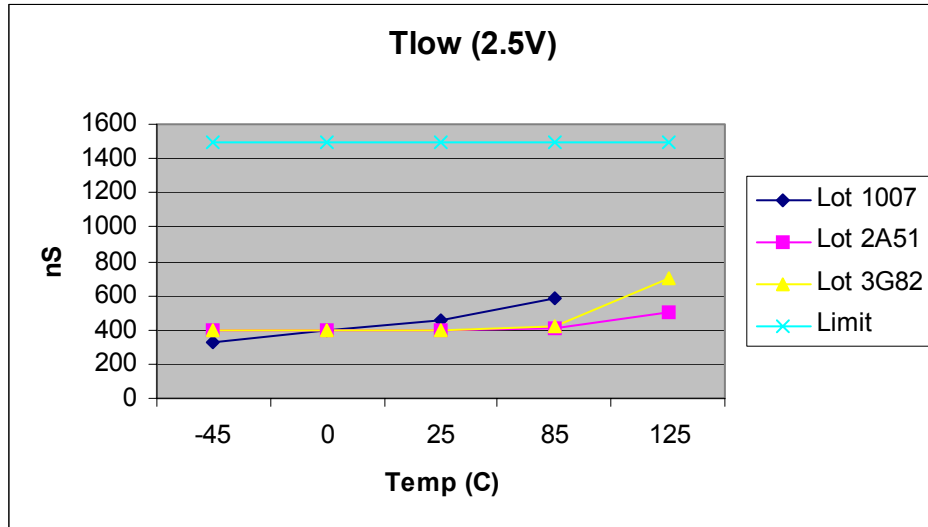
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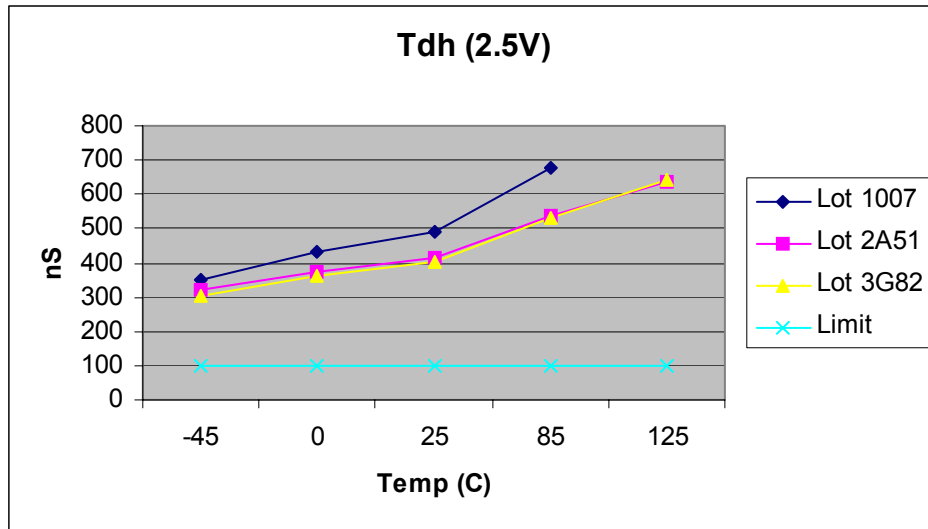
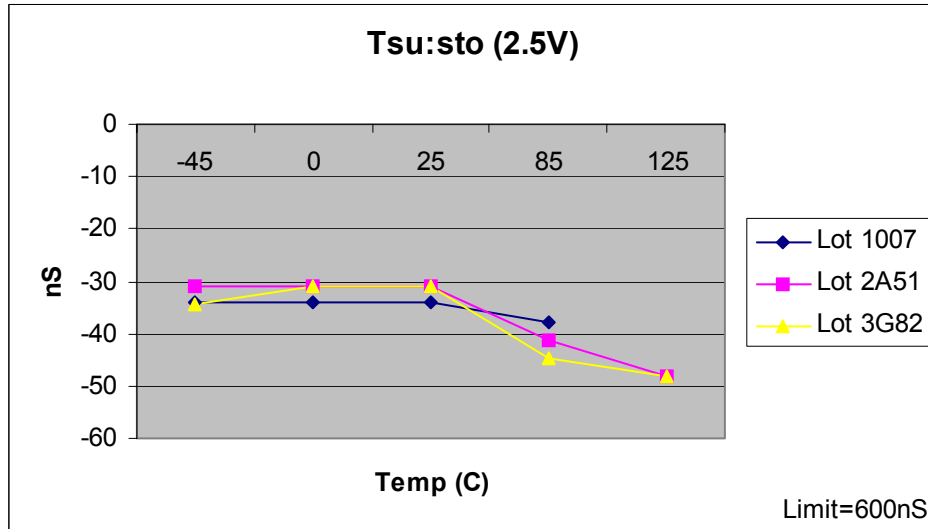
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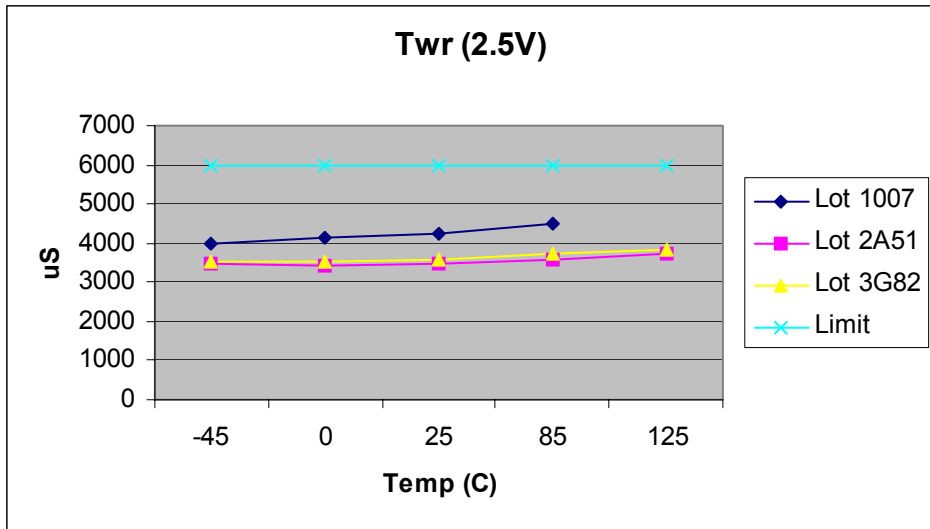
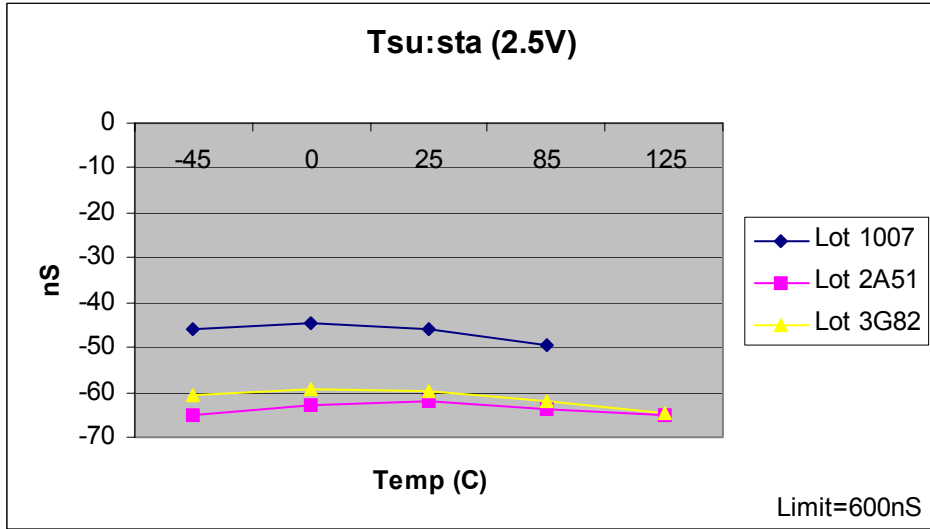
400KHZ TEMPERATURE CHARACTERISTICS 2.5V



400KHZ TEMPERATURE CHARACTERISTICS 2.5V



400KHZ TEMPERATURE CHARACTERISTICS 2.5V



RELIABILITY TEST RESULT

FLOW	RESULT		
	Lot 1	Lot 2	Lot 3
Precondition			
➤ Temperature cycle (-65C/+150C) 5 cycles			
➤ Bake (125C) 24hrs			
➤ Moisture Soak 168hrs (85C/85%RH)			
➤ Infrared Reflow (220C) 3X			
➤ Flux immersion 10sec			
➤ Visual Inspection 40X			
➤ Test	0/204	1/204	0/204
Note: FA results show this failure to be an endurance failure.			
Autoclave with Precondition			
➤ Temperature 121C			
➤ Pressure 15Psig			
➤ Humidity 100%RH			
• 168hrs	0/77	0/77	0/77
Temperature Humidity Bias Test with Precondition			
➤ Temperature 85C			
➤ Relative Humidity 85%			
• 168hrs	0/77	1/77	0/77
• 500hrs	0/77	0/77	0/77
• 1000hrs	0/77	0/77	0/77
Note: FA shows the failure at 168 hours to be oxide related.			
Temperature Cycle with Precondition			
➤ Cold temperature -65C			
➤ Hot temperature +150C			
➤ Dwell time 10min			
• 500cyc	0/77	1/77	0/77
• 1000cyc	0/77	0/76	0/77
Note: FA shows the failure at 500 hours to be oxide related.			
Dynamic Operating Life without Precondition			
➤ Temperature 150C			
• 168hrs	0/77	0/77	0/77
• 500hrs	0/77	0/77	0/77
• 1000hrs	0/77	0/77	0/77
High Temperature Data Retention without Precondition (Bake)			
➤ Temperature 150C			
• 168hrs	0/77	0/77	0/77
• 500hrs	0/77	0/77	0/77
• 1000hrs	0/77	0/77	0/77
Endurance			
➤ 100K Cycles			
	0/77	0/77	0/77

Electro Static Discharge (ESD) Tests & Latch-up

Method	Voltage/Current	Rejects
ESD - Human Body Model	+/- 4000V	0/5
Latch-up	+/- 300mA	0/5

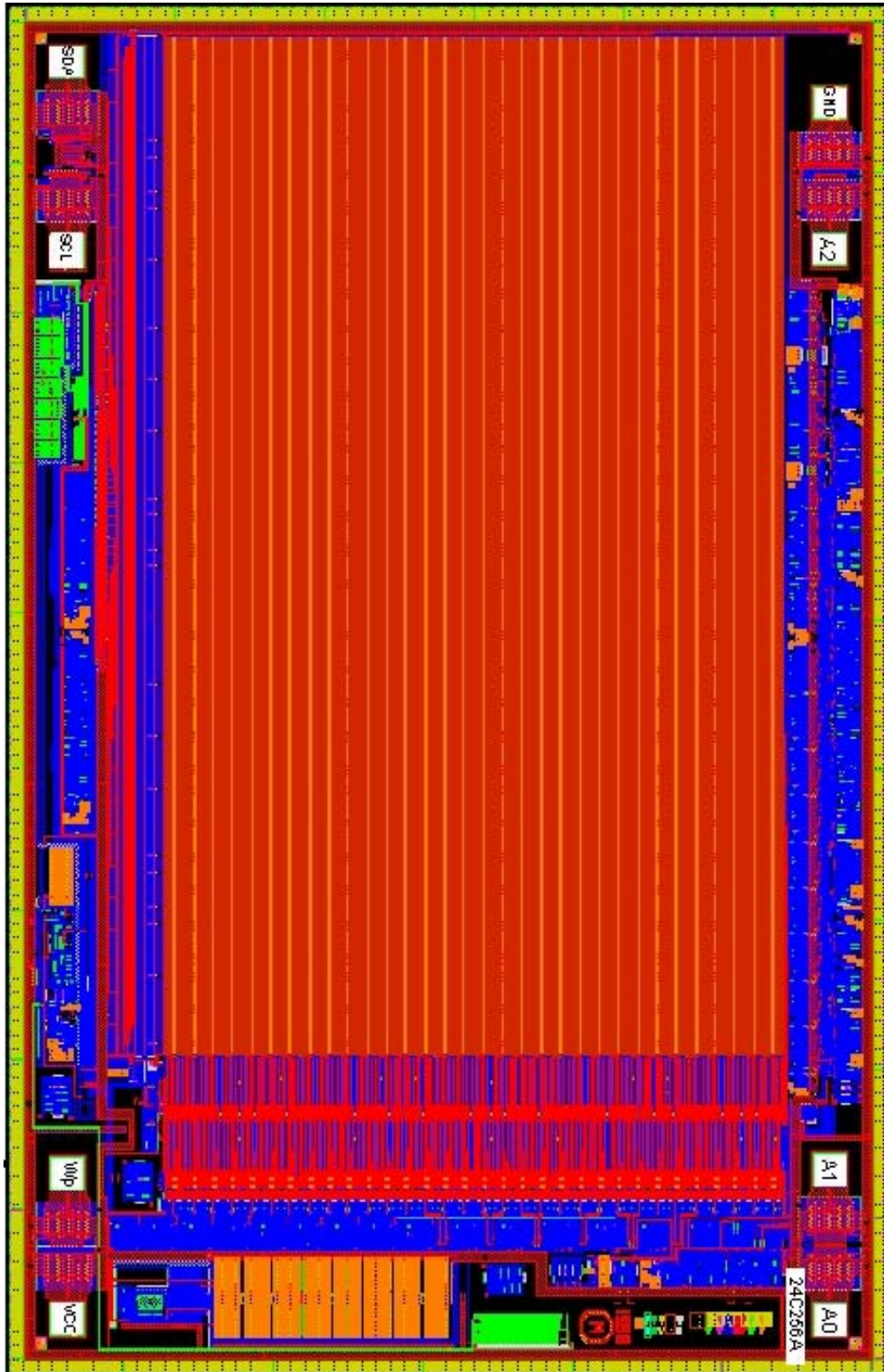
THERMAL IMPEDANCE (THETA J-A)

		θ J-A(C ⁰ /watt)	θ J-A(C ⁰ /watt)
Die Size (mils)	Die Area (mils)	N8	M8
133.15 x 85.47	11380	108*	172*

*These values are typical of EEPROM devices of similar die size for the same package.

Die Size in Microns is 3382 X 2171

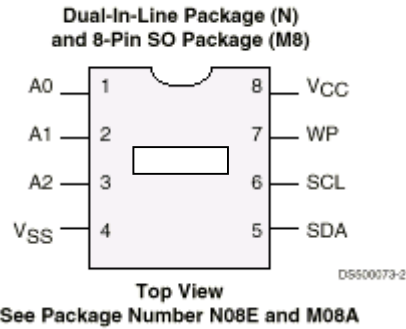
FM24C256 DIE LAYOUT



PACKAGES & PINOUTS

The packages used for the FM24C256 have been extensively used for the previous revision of this product. All packages have been previously tested and qualified for

Connection Diagram

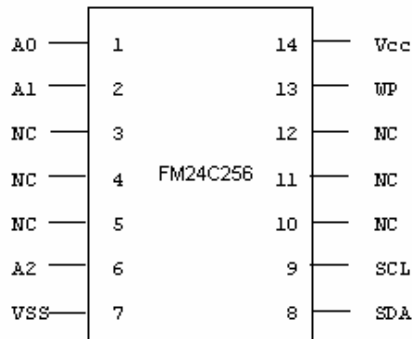


Pin Names

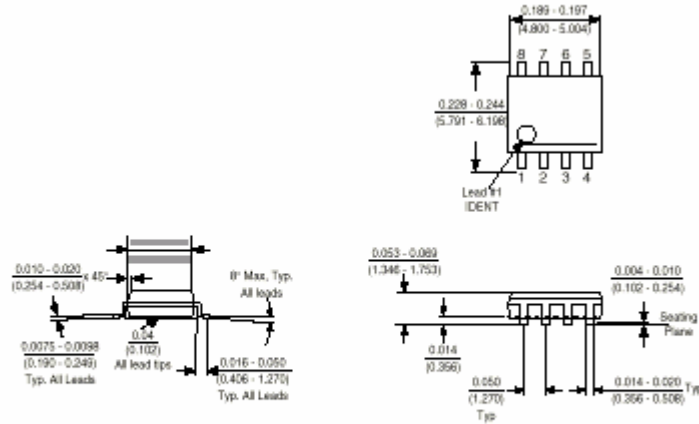
A0, A1, A2	Device Address Input
V _{SS}	Ground
SDA	Data I/O
SCL	Clock Input
WP	Write Protect
V _{CC}	Power Supply

this part. Package dimensions, specifications and pin outs are shown on the following pages.

Connection Diagram TSOP Package (T)

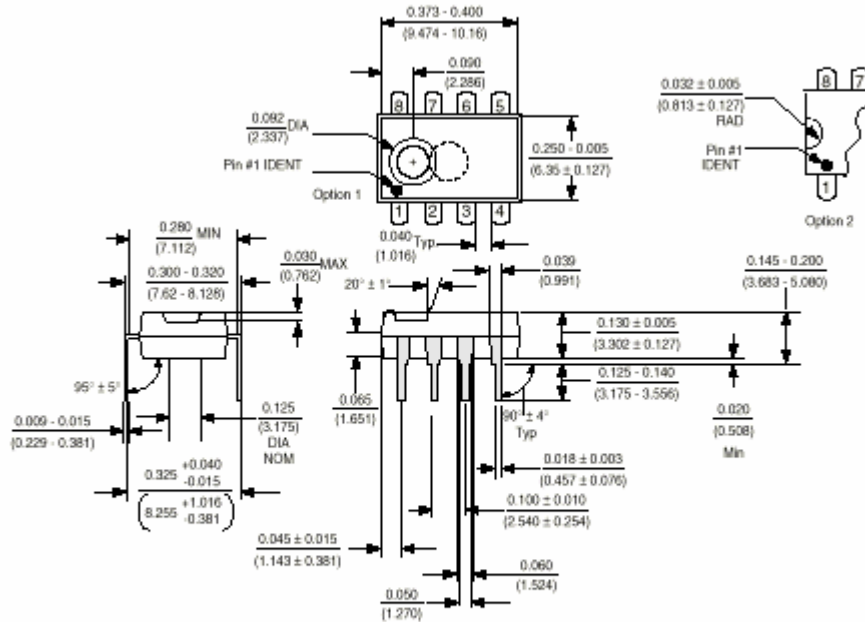


Physical Dimensions inches (millimeters) unless otherwise noted



Molded Small Out-Line Package (M8)
 Order Number FM24C256xxxM8 or FM24C256xxxEM8
 Package Number M08A

Physical Dimensions inches (millimeters) unless otherwise noted



Molded Dual-In-Line Package (N)
 Order Number FM24C256xxxN or FM24C256xxxEN
 Package Number N08E

Appendix I

Audit Test Conditions

The parameters for the Audit tests performed for the Ultralite process are listed below.

TEST	CONDITIONS
Operating Life (OPL) Duration = 1000 hrs.	T= 150°C; Bias = 6.0 volts
Temperature Cycle (TMCL) Duration = 1000 cycles	T= -65°C to +150°C
Autoclave (ACLV) Duration: 168 hrs.	T= 121°C R.H.= 100% 15 psig
Temperature Humidity Bias (THB or 85/85)	T= 85°C R.H.= 85% Duration: 1000 hrs. Bias = 6/0 volts

Appendix II

Compatible Programmers Guide

The following pages contain a list of programmer manufacturers that produce device programmers for the FM24C256. They use the Fairchild programming algorithm, which ensures high programmability ratio and excellent data retention. Contact a specific manufacturer to find the best programmer for your application. Also see our web page at www.fairchildsemi.com for the latest updates.

Advantest Corporation

Shinjuku-NS Bldg.,2-4-1,Nishi-Shinjuku,
Shinjuku-ku, Tokyo 163-0880
Phone +81-3-3342-7500
ate@advantest.co.jp
info@advantest.co.jp
<http://207.240.44.26/index-e.html>

Advin Systems Inc.

1050-L East Duane Avenue
Sunnyvale, CA 94086 USA
Phone: (408) 243-7000
Fax: (408) 736-2503
Sales@advin.com
<http://www.advin.com/>

American Reliance (AMREL)

11801 Goldring Road Arcadia CA 91006
Phone (626) 303-6688
Amrel@amrel.com
<http://www.amrel.com>

Advantech

Fl.7, No.98, Ming-Chuan Road,
Shing-Tien City, Taipei, Taiwan, R.O.C.
Telephone: 886-2-2218-4567
Fax: 886-2-2218-2435
Information: citron_chang@acl.advantech.com.tw
Sales: citron_chang@acl.advantech.com.tw

BP Microsystems

Tel: (713) 688-2675 or (800) 225-2102
Fax: (713) 688-0920
web@bpmicro.com
<http://www.bpmicro.com/index.html>

Data IO

Phone: 800-332-8246
Fax: 425-869-7423
telsales@data-io.com
<http://www.data-io.com/>

Dataman Programmers, Inc.

215 East Michigan Avenue
Orange City, FL 32763 USA
Tel: (904) 774-7785
Fax: (904) 774-7796
sales@dataman.com
<http://www.dataman.com/>

Elan Digital Systems Ltd.

Elan House, Little Park Farm Road,
Segensworth West, Fareham,
Hampshire, PO15 5SJ. UK
Tel: +44 (0)1489 579 799
Fax: +44 (0)1489 577 516
support@elan-digital-systems.co.uk
<http://www.elan-digital-systems.co.uk/>

GTEK, Inc.

PO Box 2310 Bay
St. Louis, MS 39521-2310
Phone: 1-800-282-GTEK
%20spot@gtek.com
<http://www.gtek.com/>

Hi-Lo Ssystems Research Co.

4F. NO. 2, SEC. 5, MING SHEN E. RD.
TAIPEI, TAIWAN
TEL:886-2-27640215.
FAX:886-2-27566403, 27601559
Sales@hilosystems.com.tw
<http://www.hilosystems.com.tw/>

ICE Technology Ltd.

Unit 4, Penistone Court
Sheffield Road
Penistone, Sheffield
S YORKS, S36 6HP UK
Tel: +44(0) 1226 767404
Fax: +44(0) 1226 370434
Sales@icetech.com
<http://www.icetech.com/>

International Microsystems Inc.

521 Valley Way
Milpitas, CA 95035
Tel: 408-942-1001
Fax: 408-942-1051
<http://www.imtest.com/>

Logical Devices

1221 South Clarkson
Denver Colorado 80210 USA.
Tel: 303 722 6868
Fax: 303 733 6868
logdev@logicaldevices.com
<http://www.logicaldevices.com/>

M2L Electronics

3526 Jasmine #4
Los Angeles, CA 90034
Phone: (310) 837-7818
Fax/BBS: (310) 841-6050
sales@m2l.com
<http://www.m2l.com/>

Needham's Electronics

4630 Beloit Drive, Suite #20
Sacramento, CA 95838
Phone: (916) 924-8037
Fax: (916) 924-8065
<http://www.needhams.com/home.htm>

Systems General

Tel:1-408-2636667
Fax:1-408-2629220
Sales@sg.com.tw
<http://www.sg.com.tw/>

Xeltek

3563 Ryder Street
Santa Clara, CA 95051-0707,
Phone:408-5241929
Fax:408-2457084
info@xeltek.com
<http://www.xeltek.com>