

REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Add device type 02. Add package Y. Add radiation features. Editorial changes throughout. - drw	01-06-29	Raymond Monnin
B	Add device type 03. - drw	01-08-29	Raymond Monnin
C	Add appendix A, die requirements. Editorial changes throughout. - drw	03-05-15	Raymond Monnin
D	Change to appendix A, figure A-1. - drw	03-06-05	Raymond Monnin
E	Add case outline X for vendor CAGE 27014. -rrp	03-06-10	Raymond Monnin
F	Add device types 04 and 05. Editorial changes throughout. - drw	04-08-25	Raymond Monnin
G	Sheet 6, table I, ICCZ test for device types 04 and 05, change from 2.7 mA max to 3.0 mA max. - drw	04-10-25	Raymond Monnin
H	Make clarifications to 1.5, 4.4.4.1, 4.4.4.2, and A.1.2. Add a footnote to 1.5. Add paragraph 3.1.1. - ro	09-05-05	Joseph D. Rodenbeck
J	Add device type 06. Add vendor CAGE F8859. Add paragraphs 2.2, 4.4.4.1.1, and Table IB and Table IIB. Under Table IIA device class V column; add subgroup1 to Interim electrical parameters, add subgroups 7, 8, 9, 10, 11 to Group C end point electrical parameters, and add subgroups 7, 9 to Group E end point electrical parameters. - ro	10-06-28	Charles F. Saffle
K	Add device type 07, case outline Z, figure A-2, and Neutron testing paragraph. Delete device class M references. - ro	14-06-18	Charles F. Saffle
L	Under paragraph 1.3, make change to the device type 07 Output voltage maximum limit. - ro	15-02-23	Charles F. Saffle
M	Add device type 08 and add delta burn-in parameters to Table IIB. Add note under figure A-1. - ro	15-10-22	Charles F. Saffle

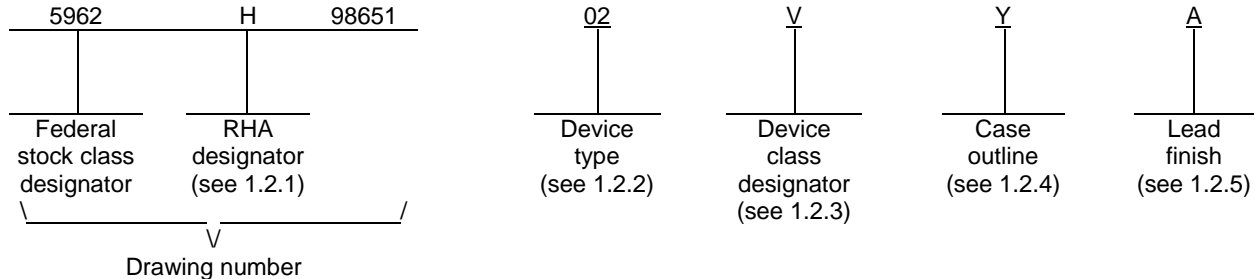


REV																				
SHEET																				
REV	M	M	M	M	M	M	M	M	M	M	M									
SHEET	15	16	17	18	19	20	21	22	23	24	25									
REV STATUS				REV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
OF SHEETS				SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	14	
PMIC N/A					PREPARED BY	DAN WONNELL				<p align="center"><b>DLA LAND AND MARITIME</b>  <b>COLUMBUS, OHIO 43218-3990</b>  <a href="http://www.landandmaritime.dla.mil">http://www.landandmaritime.dla.mil</a></p> <p><b>MICROCIRCUIT, LINEAR, CMOS, 3 VOLT LVDS</b>  <b>QUAD DIFFERENTIAL LINE DRIVER,</b>  <b>MONOLITHIC SILICON</b></p>										
<p align="center"><b>STANDARD</b>  <b>MICROCIRCUIT</b>  <b>DRAWING</b></p> <p>THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE</p>					CHECKED BY	RAYMOND MONNIN														
					APPROVED BY	RAYMOND MONNIN														
					DRAWING APPROVAL DATE	99-05-26														
AMSC N/A					REVISION LEVEL	M				SIZE	CAGE CODE	<b>5962-98651</b>								
					A	67268				SHEET 1 OF 25										

1. SCOPE

1.1 Scope. This drawing documents two product assurance class levels consisting of high reliability (device class Q) and space application (device class V). A choice of case outlines and lead finishes are available and are reflected in the Part or Identifying Number (PIN). When available, a choice of Radiation Hardness Assurance (RHA) levels is reflected in the PIN.

1.2 PIN. The PIN is as shown in the following example:



1.2.1 RHA designator. Device classes Q and V RHA marked devices meet the MIL-PRF-38535 specified RHA levels and are marked with the appropriate RHA designator. A dash (-) indicates a non-RHA device.

1.2.2 Device type(s). The device type(s) identify the circuit function as follows:

<u>Device type</u>	<u>Generic number</u>	<u>Circuit function</u>
01	DS90LV031A	3 V LVDS quad CMOS differential line driver
02	UT54LVDS031LV	Radiation hardened, 3 V LVDS quad CMOS differential line driver
03	UT54LVDS031LV	Radiation hardened, 3 V LVDS quad CMOS differential line driver
04	UT54LVDS031LVE	Radiation hardened, 3 V LVDS quad CMOS differential line driver, with enhanced AC parameters
05	UT54LVDS031LVE	Radiation hardened, 3 V LVDS quad CMOS differential line driver, with enhanced AC parameters
06	STLVDS31	Radiation hardened, 3 V LVDS quad CMOS differential line driver
07	RHFLVDS31	Radiation hardened, 3 V LVDS quad CMOS differential line driver, with enhanced AC parameters
08	RHFLVDS31	Radiation hardened, 3 V LVDS quad CMOS differential line driver

1.2.3 Device class designator. The device class designator is a single letter identifying the product assurance level as follows:

<u>Device class</u>	<u>Device requirements documentation</u>
Q or V	Certification and qualification to MIL-PRF-38535

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL M	SHEET 2

1.2.4 Case outline(s). The case outline(s) are as designated in MIL-STD-1835 and as follows:

<u>Outline letter</u>	<u>Descriptive designator</u>	<u>Terminals</u>	<u>Package style</u>
F	GDFP2-F16 or CDFP3-F16	16	Flat pack
X	GDFP1-G16	16	Flat pack with gullwing leads
Y	CDFP4-F16	16	Flat pack
Z	CDFP4-F16	16	Flat pack with grounded lid

1.2.5 Lead finish. The lead finish is as specified in MIL-PRF-38535 for device classes Q and V.

1.3 Absolute maximum ratings. 1/

Supply voltage ( $V_{CC}$ ):

Device types 01, 02, 03, 04, 05 .....	-0.3 V to +4 V
Device type 06 .....	-0.3 V to +4.5 V
Device types 07, 08 .....	-0.3 V to +4.8 V

Input voltage ( $D_{IN}$ ):

Device types 01, 02, 03, 04, 05, 06 .....	-0.3 V to ( $V_{CC} + 0.3$ V) <u>2/</u>
Device types 07, 08 .....	-0.3 V to +4.8 V

Enable input voltage ( $EN, \overline{EN}$ ):

Device types 01, 02, 03, 04, 05, 06 .....	-0.3 V to ( $V_{CC} + 0.3$ V)
Device type 07, 08 .....	-0.3 V to +4.8 V

Output voltage ( $D_{OUT+}, D_{OUT-}$ ):

Device types 01, 02, 03, 04, 05, 06 .....	-0.3 V to 3.9 V
Device types 07, 08 .....	-0.3 V to 4.8 V

Storage temperature range ..... -65°C to +150°C

Maximum power dissipation ( $P_D$ ):

Cases F and X .....	845 mW <u>3/</u>
Case Y .....	1250 mW
Case Z .....	1.04 W

Lead temperature (soldering, 4 seconds) ..... +260°C

Junction temperature ( $T_J$ ) ..... +150°C 4/

Thermal resistance, junction-to-case ( $\theta_{JC}$ ):

Cases F, X and Z .....	22°C/W
Case Y .....	20°C/W

Thermal resistance, junction-to-ambient ( $\theta_{JA}$ ):

Cases F and X .....	148°C/W
Cases Y and Z .....	120°C/W

1.4 Recommended operating conditions.

Supply voltage ( $V_{CC}$ ) ..... 3.0 V to 3.6 V

Ambient operating temperature range ( $T_A$ ) ..... -55°C to +125°C

1/ Stresses above the absolute maximum rating may cause permanent damage to the device. Extended operation at the maximum levels may degrade performance and affect reliability.

2/ For device types 02, 03, 04, 05, and 06, maximum voltage on any pin during cold spare ( $V_{DD} = V_{SS}$ ) -0.3 V to 4.3 V.

3/ At  $T_A > +25^\circ\text{C}$ , the derating factor for cases F and X is 6.8 mW/°C and case Z is 8.32 mW/°C.

4/ For device types 02, 03, 04, 05, and 06, the maximum junction temperature may be increased to +175°C during burn-in and life test.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL <b>M</b>	SHEET <b>3</b>

1.5 Radiation features.

Maximum total dose available:

Device types 02 and 04 (effective dose rate = 1 rad(Si)/s) .....	1 Mrads(Si) <u>5/</u>
Device types 03 and 05 (effective dose rate = 10 rad(Si)/s) .....	100 krads(Si) <u>5/</u>
Device type 06 (dose rate = 50 – 300 rads (Si)/s) .....	100 krads(Si) <u>6/</u>
Device types 07 and 08 (dose rate = 50 – 300 rads (Si)/s) .....	300 krads(Si) <u>6/</u>

Neutron irradiation :

Device types 02, 03, 04, and 05 only .....	1 X 10 <sup>13</sup> neutrons/cm <sup>2</sup> <u>7/</u>
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Single event effects (SEE):

Device types 02, 03, 04 and 05 only	
No SEL at effective LET (see 4.4.4.4) .....	≤ 100 MeV/mg/cm <sup>2</sup>
Device types 07 and 08 only	
No SEL at effective LET (see 4.4.4.4) .....	≤ 120 MeV/mg/cm <sup>2</sup>

2. APPLICABLE DOCUMENTS

2.1 Government specification, standards, and handbooks. The following specification, standards, and handbooks form a part of this drawing to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATION

MIL-PRF-38535 - Integrated Circuits, Manufacturing, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-883 - Test Method Standard Microcircuits.  
 MIL-STD-1835 - Interface Standard Electronic Component Case Outlines.

DEPARTMENT OF DEFENSE HANDBOOKS

MIL-HDBK-103 - List of Standard Microcircuit Drawings.  
 MIL-HDBK-780 - Standard Microcircuit Drawings.

(Copies of these documents are available online at <http://quicksearch.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

- 5/ Device types 02, 03, 04, 05 are irradiated at dose rate = 50 – 300 rads(Si)/s in accordance with MIL-STD-883, method 1019, condition A, and are guaranteed to the maximum total dose specified. The effective dose rate after extended room temperature anneal = 1 rad(Si)/s for device types 02 and 04 and 10 rads(Si)/s for device types 03 and 05 per MIL-STD-883, method 1019, condition A section 3.11.2. The total dose specification for these devices only applies to the specified effective dose rate, or lower, environment.
- 6/ The device types 06, 07 and 08 radiation end point limits for the noted parameters are guaranteed only for the conditions as specified in MIL-STD-883, method 1019, condition A.
- 7/ Guaranteed, but not tested.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL M	SHEET 4

2.2 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents are the issues of the documents cited in the solicitation or contract.

ASTM INTERNATIONAL (ASTM)

ASTM F1192 - Standard Guide for the Measurement of Single Event Phenomena (SEP) Induced by Heavy Ion Irradiation of Semiconductor Devices.

(Copies of these documents are available online at <http://www.astm.org> or from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA, 19428-2959).

2.3 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements for device classes Q and V shall be in accordance with MIL-PRF-38535 as specified herein, or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not affect the form, fit, or function as described herein.

3.1.1 Microcircuit die. For the requirements of microcircuit die, see appendix A to this document.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38535 and herein for device classes Q and V.

3.2.1 Case outlines. The case outlines shall be in accordance with 1.2.4 herein.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 1.

3.2.3 Radiation exposure circuit. The radiation exposure circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing and acquiring activity upon request.

3.3 Electrical performance characteristics and postirradiation parameter limits. Unless otherwise specified herein, the electrical performance characteristics and postirradiation parameter limits are as specified in table IA and shall apply over the full ambient operating temperature range.

3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table IIA. The electrical tests for each subgroup are defined in table IA.

3.5 Marking. The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked. For packages where marking of the entire SMD PIN number is not feasible due to space limitations, the manufacturer has the option of not marking the "5962-" on the device. For RHA product using this option, the RHA designator shall still be marked. Marking for device classes Q and V shall be in accordance with MIL-PRF-38535.

3.5.1 Certification/compliance mark. The certification mark for device classes Q and V shall be a "QML" or "Q" as required in MIL-PRF-38535.

3.6 Certificate of compliance. For device classes Q and V, a certificate of compliance shall be required from a QML-38535 listed manufacturer in order to supply to the requirements of this drawing (see 6.6.1 herein). The certificate of compliance submitted to DLA Land and Maritime-VA prior to listing as an approved source of supply for this drawing shall affirm that the manufacturer's product meets, for device classes Q and V, the requirements of MIL-PRF-38535 and herein.

3.7 Certificate of conformance. A certificate of conformance as required for device classes Q and V in MIL-PRF-38535 shall be provided with each lot of microcircuits delivered to this drawing.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL M	SHEET 5

TABLE IA. Electrical performance characteristics.

Test	Symbol	Conditions <u>1/ 2/</u> -55°C ≤ T <sub>A</sub> ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Output voltage high	V <sub>OH</sub>	R <sub>L</sub> = 100 Ω	1, 2, 3	01		1.85	V
				02, 03, 04, 05, 06, 07, 08		1.65	
Output voltage low	V <sub>OL</sub>	R <sub>L</sub> = 100 Ω	1, 2, 3	01	0.9		V
				02, 03, 04, 05, 06, 07, 08	0.925		
Input voltage high	V <sub>IH</sub>	<u>3/</u>	1, 2, 3	01, 02, 03, 04, 05, 06, 07, 08	2.0	V <sub>CC</sub>	V
Input voltage low	V <sub>IL</sub>	<u>3/</u>	1, 2, 3	01, 02, 03, 04, 05, 06, 07, 08	GND	0.8	V
Input current	I <sub>IN</sub>	V <sub>IN</sub> = V <sub>CC</sub> , GND, 2.5 V or 0.4 V, V <sub>CC</sub> = 3.6 V	1, 2, 3	01	-10	10	μA
		V <sub>IN</sub> = V <sub>CC</sub> or GND, V <sub>CC</sub> = 3.6 V		02, 03, 04, 05	-10	10	
Input current low	I <sub>IL</sub>	V <sub>IN</sub> = GND, V <sub>CC</sub> = 3.6 V	1,2,3	06, 07, 08	-10	10	μA
Input current high	I <sub>IH</sub>	V <sub>IN</sub> = V <sub>CC</sub> , V <sub>CC</sub> = 3.6 V	1,2,3	06, 07, 08	-10	10	μA
Differential output voltage	V <sub>OD1</sub>	R <sub>L</sub> = 100 Ω	1, 2, 3	01	250	450	mV
				02, 03, 04, 05, 06, 07, 08	250	400	
Offset voltage	V <sub>OS</sub>	R <sub>L</sub> = 100 Ω	1, 2, 3	01	1.125	1.625	V
				02, 03, 04, 05, 06, 07, 08	1.125	1.45	

See footnotes at end of table.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL M	SHEET 6

TABLE IA. Electrical performance characteristics – continued.

Test	Symbol	Conditions <u>1/ 2/</u> -55°C ≤ T <sub>A</sub> ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Change in magnitude of V <sub>OD1</sub> for complementary output states	DV <sub>OD1</sub>	R <sub>L</sub> = 100 Ω	1, 2, 3	01		50	mV
				02, 03, 04, 05, 06		35	
				07, 08		10	
Change in magnitude of V <sub>OS</sub> for complementary output states	DV <sub>OS</sub>	R <sub>L</sub> = 100 Ω	1, 2, 3	01		50	mV
				02, 03, 04, 05, 06		25	
				07, 08		15	
Input clamp voltage	V <sub>I</sub>	I <sub>IN</sub> = -8 mA, V <sub>CC</sub> = 3.0 V	1, 2, 3	01		-1.5	V
		I <sub>IN</sub> = +18 mA		02, 03, 04, 05, 06, 07, 08	-1.5		
Output short circuit current	I <sub>OS</sub>	ENABLED, D <sub>IN</sub> = V <sub>CC</sub> , D <sub>OUT+</sub> = 0 V or	1, 2, 3	01	-9.0		mA
		D <sub>IN</sub> = GND, D <sub>OUT-</sub> = 0 V		02, 03, 04, 05	-9.0		
		D <sub>OUT+</sub> = 0 V or D <sub>IN</sub> = GND, D <sub>OUT-</sub> = 0 V		06, 07, 08	-9.0		
Power-off leakage	I <sub>OFF</sub>	V <sub>OUT</sub> = 0 V or 3.6 V, V <sub>CC</sub> = 0 V or V <sub>CC</sub> = open	1, 2, 3	01	-20	20	μA
		V <sub>OUT</sub> = 0 V or 3.6 V		06	-20	20	
		V <sub>IN</sub> = 3.6 V, V <sub>CC</sub> = 0 V		02, 03, 04, 05, 06	-20	20	
				07, 08	-10	10	

See footnotes at end of table.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL M	SHEET 7

TABLE IA. Electrical performance characteristics – continued.

Test	Symbol	Conditions <u>1/2/</u> -55°C ≤ T <sub>A</sub> ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Output tri-state current	I <sub>O</sub>	EN = 0.8 V, $\overline{EN}$ = 2.0 V, V <sub>OUT</sub> = 0 V or V <sub>CC</sub> , V <sub>CC</sub> = 3.6 V	1, 2, 3	01	-10	10	μA
		EN = 0.0 V, $\overline{EN}$ = 3.6 V, V <sub>OUT</sub> = 0 V or V <sub>CC</sub> , V <sub>CC</sub> = 3.6 V		02, 03, 04, 05	-10	10	
Low impedance output current	I <sub>OZL</sub>	V <sub>OUT</sub> = 0 V, V <sub>CC</sub> = V <sub>CC</sub> , $\overline{EN}$ = 0.0 V, EN = 3.6 V	1,2,3	06, 07, 08	-10	10	μA
High impedance output current	I <sub>OZH</sub>	V <sub>OUT</sub> = 3.6 V, V <sub>CC</sub> = V <sub>CC</sub> , EN = 0.0 V, $\overline{EN}$ = 3.6 V	1,2,3	06, 07, 08	-10	10	μA
Drivers enabled supply current, no load	I <sub>CC</sub>	D <sub>IN</sub> = V <sub>CC</sub> or GND	1, 2, 3	01,06		18	mA
Drivers enabled supply current, loaded	I <sub>CCL</sub>	R <sub>L</sub> = 100 Ω all channels,  D <sub>IN</sub> = V <sub>CC</sub> or GND all inputs	1, 2, 3	01, 08		35	mA
				02, 03, 07		20	
				04, 05		18	
				06		25	
Drivers disabled supply current, loaded or no load	I <sub>CCZ</sub>	D <sub>IN</sub> = V <sub>CC</sub> or GND,  EN = GND, $\overline{EN}$ = V <sub>CC</sub>	1, 2, 3	01		12	mA
				02, 03, 06, 07, 08		4	
				04, 05		3.0	
Functional test	FT	See 4.4.1c	7, 8	All			

See footnotes at end of table.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL M	SHEET 8



TABLE IA. Electrical performance characteristics - continued.

Test	Symbol	Conditions <u>1/2/</u> -55°C ≤ T <sub>A</sub> ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Differential propagation delay, high to low	t <sub>PHLD</sub>	See figure 2	9, 10, 11	01, 08	0.3	3.5	ns
				02, 03, 06	0.3	3.0	
				04, 05	0.8	1.5	
				07	0.5	1.5	
Differential propagation delay, low to high	t <sub>PLHD</sub>	See figure 2	9, 10, 11	01, 08	0.3	3.5	ns
				02, 03, 06	0.3	3.0	
				04, 05	0.8	1.5	
				07	0.5	1.5	
Differential skew	t <sub>SKD</sub>		9, 10, 11	01		1.5	ns
				02, 03, 06		0.4	
				04, 05		0.31	
				07		0.3	
				08		0.6	
Channel to channel skew	t <sub>SK1</sub>	<u>4/</u>	9, 10, 11	01		1.75	ns
				02, 03, 06		0.5	
				04, 05, 07		0.28	
				08		0.6	
Chip to chip skew	t <sub>SK2</sub>	<u>5/</u>	9, 10, 11	01		3.2	ns
				02, 03, 06		2.7	
				04, 05, 07		0.7	
				08		3.0	

See footnotes at end of table.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL M	SHEET 9

TABLE IA. Electrical performance characteristics - continued.

Test	Symbol	Conditions <u>1/ 2/</u> -55°C ≤ T <sub>A</sub> ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Disable time high to Z	t <sub>PHZ</sub>		9, 10, 11	02, 03, 06		5.0	ns
				04, 05, 07		2.8	
				08		12	
Disable time low to Z	t <sub>PLZ</sub>		9, 10, 11	02, 03, 06		5.0	ns
				04, 05, 07		2.8	
				08		12	
Enable time Z to high	t <sub>PZH</sub>		9, 10, 11	02, 03		7.0	ns
				04, 05, 07		2.5	
				06		8.5	
				08		12	
Enable time Z to low	t <sub>PZL</sub>		9, 10, 11	02, 03		7.0	ns
				04, 05, 07		2.5	
				06		8.5	
				08		12	

1/ Device types 02 and 04 supplied to this drawing will meet all levels M, D, P, L, R, F, G, H of irradiation. However, device types 02 and 04 are only tested at the 'H' level. Device types 03, 05, and 06 supplied to this drawing will meet all levels M, D, P, L, R of irradiation. However, device types 03, 05, and 06 are only tested at the 'R' level. Device type 07 supplied to this drawing will meet all levels M, D, P, L, R, F of irradiation. However, device types 07 and 08 are only tested at the L, R, and F level. Pre and Post irradiation values are identical unless otherwise specified in Table IA. When performing post irradiation electrical measurements for any RHA level, T<sub>A</sub> = +25°C.

2/ Unless otherwise specified, Device type 01 DC parameters: V<sub>CC</sub> = 3.0 V and 3.6 V; AC parameters: V<sub>CC</sub> = 3.0 V, 3.3 V and 3.6 V, R<sub>L</sub> = 100Ω between outputs, C<sub>L</sub> = 20 pF each output to GND.  
Device types 02, 03, 04, 05, 06, 07, 08 DC parameters: V<sub>CC</sub> = 3.0 V and 3.6 V, R<sub>L</sub> = 100Ω between outputs, C<sub>L</sub> = 10 pF each output to GND.

3/ The V<sub>IH</sub> and V<sub>IL</sub> tests are not required and shall be applied as forcing functions for the V<sub>OL</sub> and V<sub>OH</sub> tests.

4/ Channel to channel skew is defined as the difference between the propagation delay of one channel and that of the others on the same chip with an event on the inputs.

5/ Chip to chip skew is defined as the difference between the minimum and maximum specified differential propagation delays.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL M	SHEET 10

TABLE IB. SEP test limits. 1/ 2/

Device types	SEP	Temperature (T <sub>C</sub> )	Bias V <sub>CC</sub> = 3.0 V for latch up (SEL) test no latch up effective linear energy transfer (LET)
02, 03, 04, 05	No SEL	+125°C	LET ≤ 100 MeV-cm <sup>2</sup> /mg
07, 08	No SEL	+125°C	LET ≤ 120 MeV-cm <sup>2</sup> /mg

1/ For SEP test conditions, see 4.4.4.3 herein.

2/ Technology characterization and model verification supplemented by in-line data may be used in lieu of end of line testing. Test plan must be approved by the technical review board and qualifying activity.

#### 4. VERIFICATION

4.1 Sampling and inspection. For device classes Q and V, sampling and inspection procedures shall be in accordance with MIL-PRF-38535 or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not affect the form, fit, or function as described herein.

4.2 Screening. For device classes Q and V, screening shall be in accordance with MIL-PRF-38535, and shall be conducted on all devices prior to qualification and technology conformance inspection.

##### 4.2.1 Additional criteria for device classes Q and V.

- a. The burn-in test duration, test condition and test temperature, or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-PRF-38535. The burn-in test circuit shall be maintained under document revision level control of the device manufacturer's Technology Review Board (TRB) in accordance with MIL-PRF-38535 and shall be made available to the acquiring or preparing activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in method 1015 of MIL-STD-883.
- b. Interim and final electrical test parameters shall be as specified in table IIA herein.
- c. Additional screening for device class V beyond the requirements of device class Q shall be as specified in MIL-PRF-38535, appendix B.

4.3 Qualification inspection for device classes Q and V. Qualification inspection for device classes Q and V shall be in accordance with MIL-PRF-38535. Inspections to be performed shall be those specified in MIL-PRF-38535 and herein for groups A, B, C, D, and E inspections (see 4.4.1 through 4.4.4).

4.4 Conformance inspection. Technology conformance inspection for classes Q and V shall be in accordance with MIL-PRF-38535 including groups A, B, C, D, and E inspections, and as specified herein.

##### 4.4.1 Group A inspection.

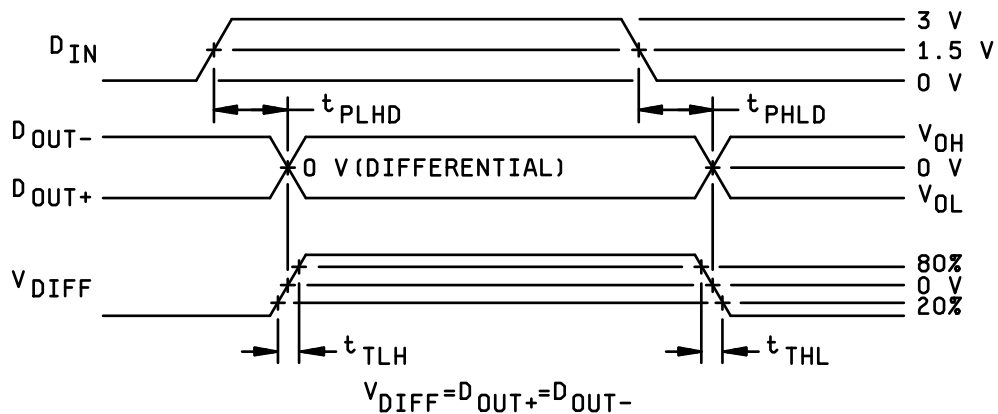
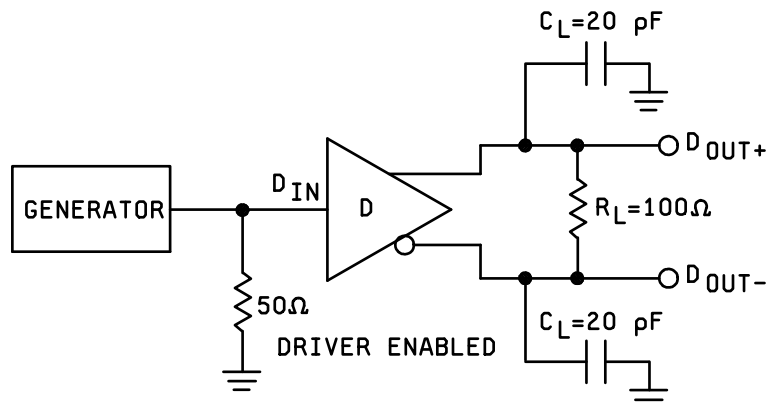
- a. Tests shall be as specified in table IIA herein.
- b. Subgroups 4, 5, and 6 in table I, method 5005 of MIL-STD-883 shall be omitted.
- c. For device classes Q and V, subgroups 7 and 8 shall include verifying the functionality of the device.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL <b>M</b>	SHEET <b>11</b>

Device types	01, 02, 03, 04, 05, 06, 07, 08
Case outlines	F, X, Y and Z
Terminal number	Terminal symbol
1	INPUT A
2	OUTPUT A+
3	OUTPUT A-
4	ENABLE
5	OUTPUT B-
6	OUTPUT B+
7	INPUT B
8	GND
9	INPUT C
10	OUTPUT C+
11	OUTPUT C-
12	$\overline{\text{ENABLE}}$
13	OUTPUT D-
14	OUTPUT D+
15	INPUT D
16	V <sub>CC</sub>

FIGURE 1. Terminal connections.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL M	SHEET 12



NOTE: Generator characteristics:  
 $f = 1 \text{ MHz}$   
 $Z_0 = 50 \Omega$   
 $t_r = 1 \text{ ns}$   
 $t_f = 1 \text{ ns}$

(Device type 01)

FIGURE 2. Propagation delay waveforms and test circuit.

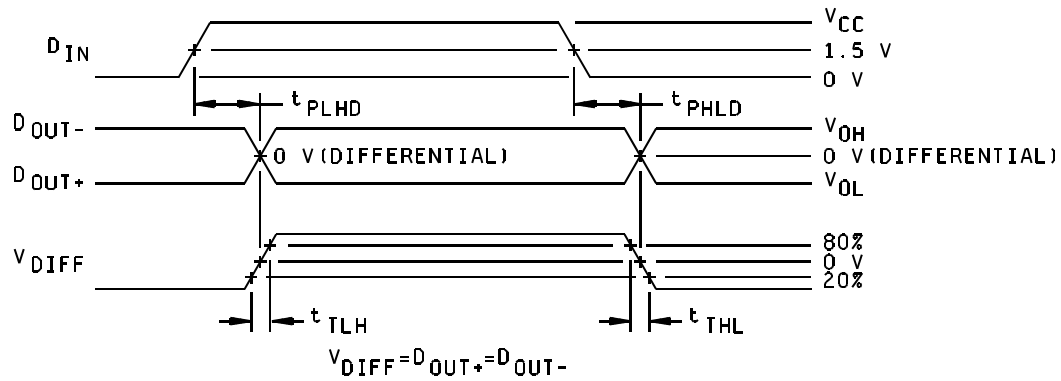
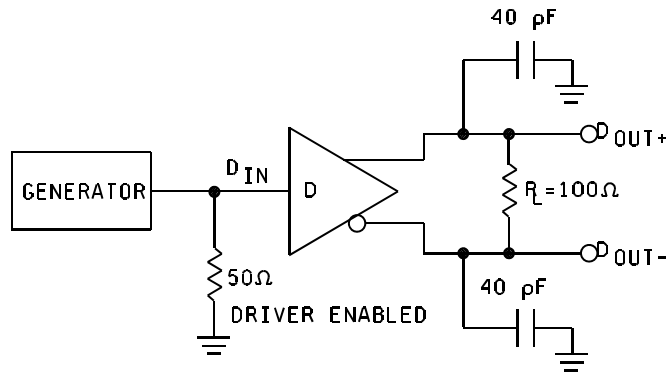
**STANDARD  
MICROCIRCUIT DRAWING**  
DLA LAND AND MARITIME  
COLUMBUS, OHIO 43218-3990

SIZE  
**A**

REVISION LEVEL  
**M**

**5962-98651**

SHEET  
**13**



(Device types 02, 03, 04, 05, 06 with  $C_L = 40$  pF. Device types 07 and 08 with  $C_L = 10$  pF).

FIGURE 2. Propagation delay waveforms and test circuit – continued.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL <b>M</b>	SHEET 14

TABLE IIA. Electrical test requirements.

Test requirements	Subgroups (in accordance with MIL-PRF-38535, table III)	
	Device class Q	Device class V
Interim electrical parameters (see 4.2)	---	1
Final electrical parameters (see 4.2)	1, 2, 3, 7, <u>1/</u> 8, 9, 10, 11	1, 2, 3, <u>2/ 3/</u> 7, 8, 9, 10, 11
Group A test requirements (see 4.4)	1, 2, 3, 7, 8, 9, 10, 11	1, 2, 3, 7, 8, 9, 10, 11
Group C end-point electrical parameters (see 4.4)	1, 2, 3	1, 2, 3, 7, 8, <u>3/</u> 9, 10, 11
Group D end-point electrical parameters (see 4.4)	1, 2, 3	1, 2, 3
Group E end-point electrical parameters (see 4.4)	1	1, 7, 9

1/ PDA applies to subgroup 1.

2/ PDA applies to subgroups 1 and 7.

3/ Delta limits as specified in table IIB shall be required where specified, and the delta limits shall be computed with reference to the zero hour electrical parameters (see table IA).

TABLE IIB. Burn-in and operating life test delta parameters.  $T_A = +25^\circ\text{C}$ . 1/ 2/

Device type	Parameters	Symbol	Delta limits
02, 03, 04, 05	Drivers enabled supply current, loaded	I <sub>CCL</sub>	±1.8 mA
06	Input current low	I <sub>IL</sub>	±150 nA
	Input current high	I <sub>IH</sub>	±150 nA
	Low impedance output current	I <sub>OZL</sub>	±1 μA
	High impedance output current	I <sub>OZH</sub>	±1 μA
	Drivers enabled supply current, no loads	I <sub>CC</sub>	±1 mA
06, 07, 08	Drivers enabled supply current, loaded	I <sub>CCL</sub>	±1 mA
	Drivers disabled supply current, loaded or no load	I <sub>CCZ</sub>	±0.4 mA

1/ Deltas are performed at room temperature.

2/ These parameters shall be recorded before and after the required burn-in and life tests to determine delta limits.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL M	SHEET 15

4.4.2 Group C inspection. The group C inspection end-point electrical parameters shall be as specified in table IIA herein.

4.4.2.1 Additional criteria for device classes Q and V. The steady-state life test duration, test condition and test temperature, or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-PRF-38535. The test circuit shall be maintained under document revision level control by the device manufacturer's TRB in accordance with MIL-PRF-38535 and shall be made available to the acquiring or preparing activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in method 1005 of MIL-STD-883.

4.4.3 Group D inspection. The group D inspection end-point electrical parameters shall be as specified in table IIA herein.

4.4.4 Group E inspection. Group E inspection is required only for parts intended to be marked as radiation hardness assured (see 3.5 herein).

- a. End-point electrical parameters shall be as specified in table IIA herein.
- b. For device classes Q and V, the devices or test vehicle shall be subjected to radiation hardness assured tests as specified in MIL-PRF-38535 for the RHA level being tested. All device classes must meet the postirradiation end-point electrical parameter limits as defined in table IA at  $T_A = +25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ , after exposure, to the subgroups specified in table IIA herein.

4.4.4.1 Total dose irradiation testing. For device types 02, 03, 04, 05, 06, 07, and 08 only, total dose irradiation testing shall be performed in accordance with MIL-STD-883 method 1019 condition A and as specified herein (see 1.5).

4.4.4.1.1 Accelerated annealing test. Accelerated annealing testing shall be performed on all devices requiring a RHA level greater than 5 krad (Si). The post-anneal end-point electrical parameter limits shall be as specified in table IA herein and shall be the pre-irradiation end-point electrical parameter limits at  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ . Testing shall be performed at initial qualification and after any design or process changes which may affect the RHA response of the device.

4.4.4.2 Neutron testing. When required by the customer, neutron testing shall be performed in accordance with method 1017 of MIL-STD-883 and herein. All device classes must meet the post irradiation end-point electrical parameter limits as defined in table IA, for the subgroups specified in Table IIA herein at  $T_A = +25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  after an exposure of  $2 \times 10^{12}$  neutrons/cm<sup>2</sup> (minimum).

4.4.4.3 Dose rate induced latchup testing. When required by the customer, dose rate induced latchup testing shall be performed in accordance with test method 1020 of MIL-STD-883 and as specified herein (See 1.5). Tests shall be performed on devices, SEC, or approved test structures at technology qualification and after any design or process changes which may effect the RHA capability of the process.

4.4.4.4 Single event phenomena (SEP). When specified in the purchase order or contract, SEP testing shall be performed on class V devices. SEP testing shall be performed on the Standard Evaluation Circuit (SEC) or alternate SEP test vehicle as approved by the qualifying activity at initial qualification and after any design or process changes which may affect the upset or latchup characteristics. Test four devices with zero failures. ASTM F1192 may be used as a guideline when performing SEP testing. The recommended test conditions for SEP are as follows:

- a. The ion beam angle of incidence shall be between normal to the die surface and 60° to the normal, inclusive (i.e.  $0^{\circ} \leq \text{angle} \leq 60^{\circ}$ ). No shadowing of the ion beam due to fixturing or package related affects is allowed.
- b. The fluence shall be  $\geq 100$  errors or  $\geq 10^7$  ions/cm<sup>2</sup>.
- c. The flux shall be between  $10^2$  and  $10^5$  ions/cm<sup>2</sup>/s. The cross-section shall be verified to be flux independent by measuring the cross-section at two flux rates which differ by at least an order of magnitude.
- d. The particle range shall be  $\geq 20$  micron in silicon.
- e. The test temperature shall be 25°C for the latchup measurements.
- f. Bias conditions shall be defined by the manufacturer for the latchup measurements.
- g. For SEL test limits, see Table IB herein.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL <b>M</b>	SHEET <b>16</b>



5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-PRF-38535 for device classes Q and V.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use for Government microcircuit applications (original equipment), design applications, and logistics purposes.

6.1.1 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor prepared specification or drawing.

6.2 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished using DD Form 1692, Engineering Change Proposal.

6.3 Record of users. Military and industrial users should inform DLA Land and Maritime when a system application requires configuration control and which SMD's are applicable to that system. DLA Land and Maritime will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronic devices (FSC 5962) should contact DLA Land and Maritime-VA, telephone (614) 692-8108.

6.4 Comments. Comments on this drawing should be directed to DLA Land and Maritime-VA, Columbus, Ohio 43218-3990, or telephone (614) 692-0540.

6.5 Abbreviations, symbols, and definitions. The abbreviations, symbols, and definitions used herein are defined in MIL-PRF-38535 and MIL-HDBK-1331.

6.6 Sources of supply.

6.6.1 Sources of supply for device classes Q and V. Sources of supply for device classes Q and V are listed in MIL-HDBK-103 and QML-38535. The vendors listed in MIL-HDBK-103 and QML-38535 have submitted a certificate of compliance (see 3.6 herein) to DLA Land and Maritime-VA and have agreed to this drawing.

6.7 Additional information. When applicable, a copy of the following additional data shall be maintained and available from the device manufacturer:

- a. RHA test conditions (SEP).
- b. Occurrence of upsets (SEU).
- c. Occurrence of latchup (SEL).

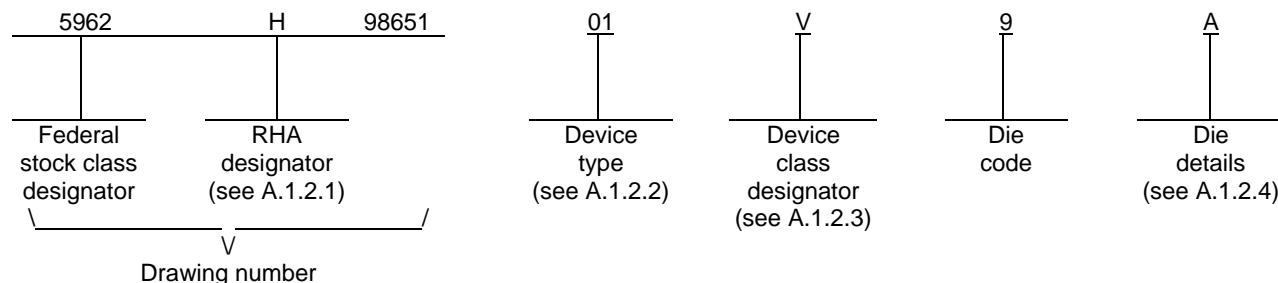
<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL M	SHEET 17

APPENDIX A  
APPENDIX A FORMS A PART OF SMD 5962-98651

A.1 SCOPE

A.1.1 Scope. This appendix establishes minimum requirements for microcircuit die to be supplied under the Qualified Manufacturers List (QML) Program. QML microcircuit die meeting the requirements of MIL-PRF-38535 and the manufacturers approved QM plan for use in monolithic microcircuits, multi-chip modules (MCMs), hybrids, electronic modules, or devices using chip and wire designs in accordance with MIL-PRF-38534 are specified herein. Two product assurance classes consisting of military high reliability (device class Q) and space application (device class V) are reflected in the Part or Identification Number (PIN). When available, a choice of Radiation Hardness Assurance (RHA) levels are reflected in the PIN.

A.1.2 PIN. The PIN is as shown in the following example:



A.1.2.1 RHA designator. Device classes Q and V RHA identified die meet the MIL-PRF-38535 specified RHA levels. A dash (-) indicates a non-RHA die.

<u>Device type</u>	<u>Generic number</u>	<u>Circuit function</u>
02	UT54LVDS031LV	Radiation hardened (dose rate $\leq 1$ rad(Si)/s), 3 V LVDS quad CMOS differential line driver
03	UT54LVDS031LV	Radiation hardened (dose rate $\leq 10$ rad(Si)/s), 3 V LVDS quad CMOS differential line driver
04	UT54LVDS031LVE	Radiation hardened (dose rate $\leq 1$ rad(Si)/s), 3 V LVDS quad CMOS differential line driver, with enhanced AC parameters
05	UT54LVDS031LVE	Radiation hardened (dose rate $\leq 10$ rad(Si)/s), 3 V LVDS quad CMOS differential line driver, with enhanced AC parameters
07	RHFLVDS31	Radiation hardened 3 V LVDS quad CMOS differential line driver, with enhanced AC parameters
08	RHFLVDS31	Radiation hardened 3 V LVDS quad CMOS differential line driver

A.1.2.3 Device class designator.

<u>Device class</u>	<u>Device requirements documentation</u>
Q or V	Certification and qualification to the die requirements of MIL-PRF-38535

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>	REVISION LEVEL M	<b>5962-98651</b> SHEET 18
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APPENDIX A  
APPENDIX A FORMS A PART OF SMD 5962-98651

A.1.2.4 Die details. The die details designation is a unique letter which designates the die's physical dimensions, bonding pad location(s) and related electrical function(s), interface materials, and other assembly related information, for each product and variant supplied to this appendix.

A.1.2.4.1 Die physical dimensions.

<u>Die type</u>	<u>Figure number</u>
02, 03, 04, 05	A-1
07, 08	A-2

A.1.2.4.2 Die bonding pad locations and electrical functions.

<u>Die type</u>	<u>Figure number</u>
02, 03, 04, 05	A-1
07, 08	A-2

A.1.2.4.3 Interface materials.

<u>Die type</u>	<u>Figure number</u>
02, 03, 04, 05	A-1
07, 08	A-2

A.1.2.4.4 Assembly related information.

<u>Die type</u>	<u>Figure number</u>
02, 03, 04, 05	A-1
07, 08	A-2

A.1.3 Absolute maximum ratings. See paragraph 1.3 herein for details.

A.1.4 Recommended operating conditions. See paragraph 1.4 herein for details.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL M	SHEET 19

APPENDIX A  
APPENDIX A FORMS A PART OF SMD 5962-98651

A.2 APPLICABLE DOCUMENTS.

A.2.1 Government specification, standards, and handbooks. The following specification, standards, and handbooks form a part of this drawing to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATION

MIL-PRF-38535 - Integrated Circuits, Manufacturing, General Specification for.

DEPARTMENT OF DEFENSE STANDARD

MIL-STD-883 - Test Method Standard Microcircuits.

DEPARTMENT OF DEFENSE HANDBOOKS

MIL-HDBK-103 - List of Standard Microcircuit Drawings.

MIL-HDBK-780 - Standard Microcircuit Drawings.

(Copies of these documents are available online at <http://quicksearch.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

A.2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

A.3 REQUIREMENTS

A.3.1 Item requirements. The individual item requirements for device classes Q and V shall be in accordance with MIL-PRF-38535 and as specified herein or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not affect the form, fit, or function as described herein.

A.3.2 Design, construction and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38535 and herein and the manufacturer's QM plan for device classes Q and V.

A.3.2.1 Die physical dimensions. The die physical dimensions shall be as specified in A.1.2.4.1 and on figure A-1.

A.3.2.2 Die bonding pad locations and electrical functions. The die bonding pad locations and electrical functions shall be as specified in A.1.2.4.2 and on figure A-1.

A.3.2.3 Interface materials. The interface materials for the die shall be as specified in A.1.2.4.3 and on figure A-1.

A.3.2.4 Assembly related information. The assembly related information shall be as specified in A.1.2.4.4 and on figure A-1.

A.3.2.5 Radiation exposure circuit. The radiation exposure circuit shall be as defined in paragraph 3.2.3 herein.

A.3.3 Electrical performance characteristics and post-irradiation parameter limits. Unless otherwise specified herein, the electrical performance characteristics and post-irradiation parameter limits are as specified in table IA of the body of this document.

A.3.4 Electrical test requirements. The wafer probe test requirements shall include functional and parametric testing sufficient to make the packaged die capable of meeting the electrical performance requirements in table IA.

A.3.5 Marking. As a minimum, each unique lot of die, loaded in single or multiple stack of carriers, for shipment to a customer, shall be identified with the wafer lot number, the certification mark, the manufacturer's identification and the PIN listed in A.1.2 herein. The certification mark shall be a "QML" or "Q" as required by MIL-PRF-38535.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL <b>M</b>	SHEET <b>20</b>

APPENDIX A  
APPENDIX A FORMS A PART OF SMD 5962-98651

A.3.6 Certification of compliance. For device classes Q and V, a certificate of compliance shall be required from a QML-38535 listed manufacturer in order to supply to the requirements of this drawing (see A.6.4 herein). The certificate of compliance submitted to DLA Land and Maritime -VA prior to listing as an approved source of supply for this appendix shall affirm that the manufacturer's product meets, for device classes Q and V, the requirements of MIL-PRF-38535 and the requirements herein.

A.3.7 Certificate of conformance. A certificate of conformance as required for device classes Q and V in MIL-PRF-38535 shall be provided with each lot of microcircuit die delivered to this drawing.

A.4 VERIFICATION

A.4.1 Sampling and inspection. For device classes Q and V, die sampling and inspection procedures shall be in accordance with MIL-PRF-38535 or as modified in the device manufacturer's Quality Management (QM) plan. The modifications in the QM plan shall not affect the form, fit, or function as described herein.

A.4.2 Screening. For device classes Q and V, screening shall be in accordance with MIL-PRF-38535, and as defined in the manufacturer's QM plan. As a minimum, it shall consist of:

- a. Wafer lot acceptance for class V product using the criteria defined in MIL-STD-883, method 5007.
- b. 100% wafer probe (see paragraph A.3.4 herein).
- c. 100% internal visual inspection to the applicable class Q or V criteria defined in MIL-STD-883, method 2010 or the alternate procedures allowed in MIL-STD-883, method 5004.

A.4.3 Conformance inspection.

A.4.3.1 Group E inspection. Group E inspection is required only for parts intended to be identified as radiation assured (see A.3.5 herein). RHA levels for device classes Q and V shall be as specified in MIL-PRF-38535. End point electrical testing of packaged die shall be as specified in table IIA herein. Group E tests and conditions are as specified in paragraphs 4.4.4, 4.4.4.1, 4.4.4.1.1, 4.4.4.2, 4.4.4.3, and 4.4.4.4 herein.

A.5 DIE CARRIER

A.5.1 Die carrier requirements. The requirements for the die carrier shall be accordance with the manufacturer's QM plan or as specified in the purchase order by the acquiring activity. The die carrier shall provide adequate physical, mechanical and electrostatic protection.

A.6 NOTES

A.6.1 Intended use. Microcircuit die conforming to this drawing are intended for use in microcircuits built in accordance with MIL-PRF-38535 or MIL-PRF-38534 for government microcircuit applications (original equipment), design applications, and logistics purposes.

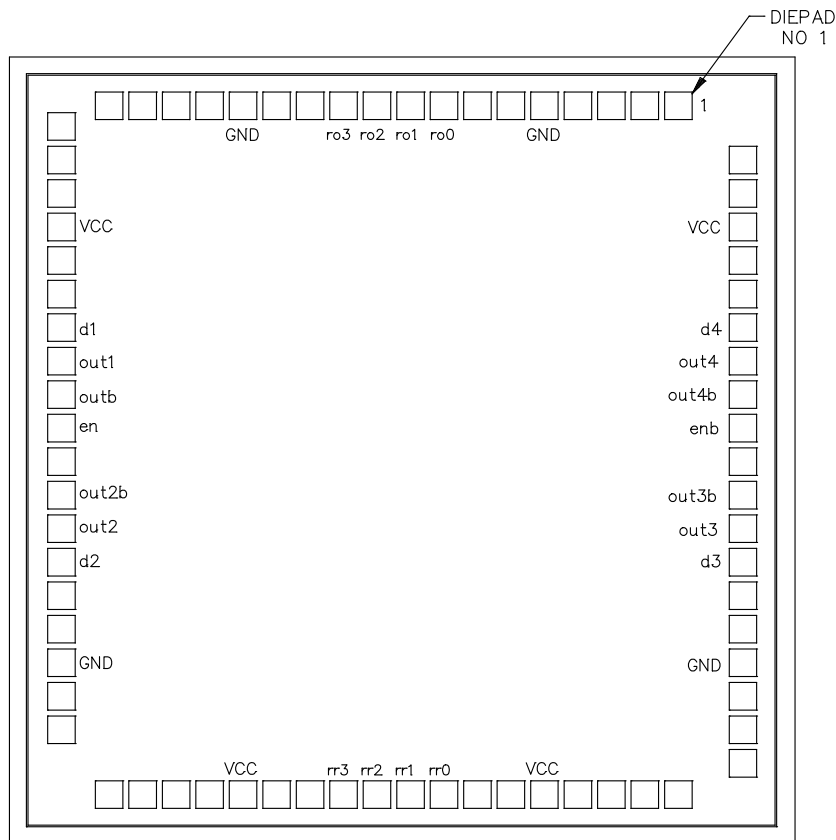
A.6.2 Comments. Comments on this appendix should be directed to DLA Land and Maritime -VA, Columbus, Ohio, 43218-3990 or telephone (614)-692-0540.

A.6.3 Abbreviations, symbols, and definitions. The abbreviations, symbols, and definitions used herein are defined in MIL-PRF-38535 and MIL-HDBK-1331.

A.6.4 Sources of supply for device classes Q and V. Sources of supply for device classes Q and V are listed in QML-38535. The vendors listed within QML-38535 have submitted a certificate of compliance (see A.3.6 herein) to DLA Land and Maritime -VA and have agreed to this drawing.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL <b>M</b>	SHEET <b>21</b>

APPENDIX A  
APPENDIX A FORMS A PART OF SMD 5962-98651



**NOTE:** On a wafer lot basis, the die manufacturer will determine the bonding for die pads ro3, ro2, ro1, ro0, rr3, rr2, rr1, rr0. These pads must be bonded to VCC or GND per the die manufacturer provided bonding instructions. Die pad one located counter clockwise next to fiducial "1" die marking. Die pads count counter clockwise with every fifth die pad fiducially marked.

**Die bonding pad locations and electrical functions**

**Die physical dimensions.**

Die size: 0.085 inch x 0.085 inch  
Die thickness: 17.5 +/-0.5 mils

**Interface materials.**

Top metallization: Al 99.5%, Cu 0.5% + barrier + W plugs  
Backside metallization: None

**Glassivation.**

Type: SiO<sub>2</sub>/Si<sub>3</sub>N<sub>4</sub>  
Thickness: 2600 Å < Thickness < 10,000 Å

Substrate: Single crystal silicon

**Assembly related information.**

Substrate potential: V<sub>SS</sub>/Ground  
Special assembly instructions: None

FIGURE A-1. Die bonding pad locations and electrical functions.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL <b>M</b>	SHEET <b>22</b>

APPENDIX A  
APPENDIX A FORMS A PART OF SMD 5962-98651

Units: Mills

Origin (0,0) = die Center

Die Pad	X center	Y center	Signal Name
1	29.3	35.9	N/C
2	25.7	35.9	N/C
3	22.2	35.9	N/C
4	18.6	35.9	N/C
5	15.1	35.9	GND
6	11.5	35.9	N/C
7	8.0	35.9	N/C
8	4.5	35.9	Note 1
9	0.9	35.9	Note 1
10	-2.6	35.9	Note 1
11	-6.2	35.9	Note 1
12	-9.7	35.9	N/C
13	-13.3	35.9	N/C
14	-16.8	35.9	GND
15	-20.4	35.9	N/C
16	-23.9	35.9	N/C
17	-27.4	35.9	N/C
18	-31.0	35.9	N/C
19	-35.9	34.2	N/C
20	-35.9	30.7	N/C
21	-35.9	27.1	N/C
22	-35.9	23.6	VDD
23	-35.9	20.0	N/C
24	-35.9	16.5	N/C
25	-35.9	12.9	DIN1
26	-35.9	9.4	DOUT1+
27	-35.9	5.9	DOUT1-
28	-35.9	2.3	EN
29	-35.9	-1.2	N/C
30	-35.9	-4.8	DOUT2-
31	-35.9	-8.3	DOUT2+
32	-35.9	-11.9	DIN2
33	-35.9	-15.4	N/C
34	-35.9	-19.0	N/C
35	-35.9	-22.5	VSS
36	-35.9	-26.0	N/C
37	-35.9	-29.6	N/C

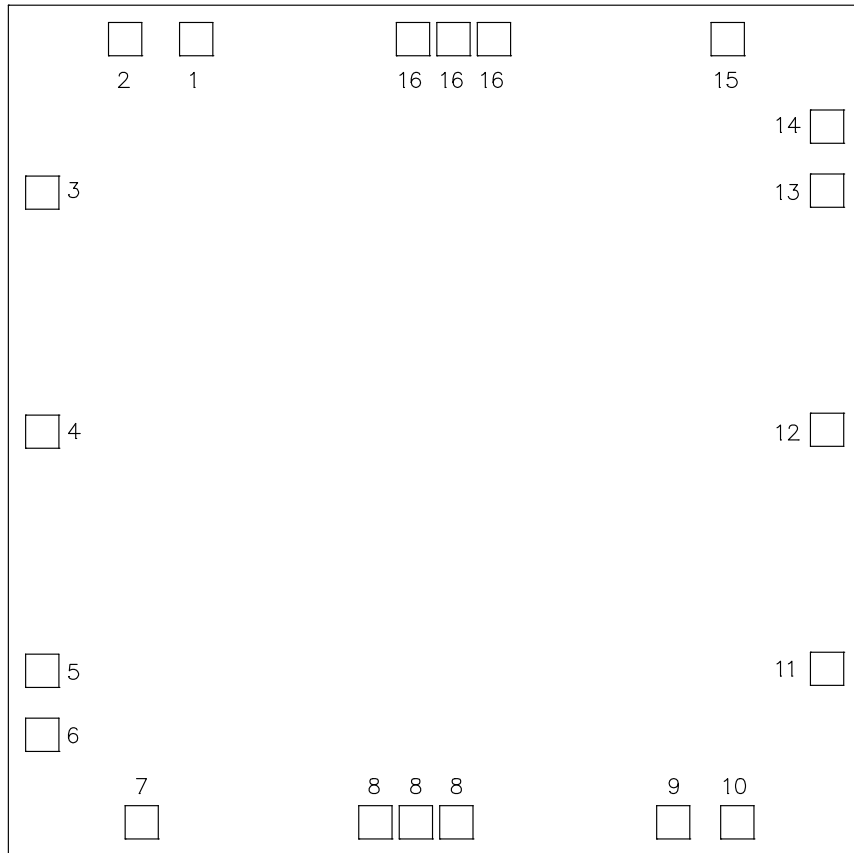
Die Pad	X center	Y center	Signal Name
38	-31.0	-35.9	N/C
39	-27.4	-35.9	N/C
40	-23.9	-35.9	N/C
41	-20.4	-35.9	N/C
42	-16.8	-35.9	VDD
43	-13.3	-35.9	N/C
44	-9.7	-35.9	N/C
45	-6.2	-35.9	Note 1
46	-2.6	-35.9	Note 1
47	0.9	-35.9	Note 1
48	4.5	-35.9	Note 1
49	8.0	-35.9	N/C
50	11.5	-35.9	N/C
51	15.1	-35.9	VDD
52	18.6	-35.9	N/C
53	22.2	-35.9	N/C
54	25.7	-35.9	N/C
55	29.3	-35.9	N/C
56	35.9	-33.1	N/C
57	35.9	-29.6	N/C
58	35.9	-26.0	N/C
59	35.9	-22.5	VSS
60	35.9	-19.0	N/C
61	35.9	-15.4	N/C
62	35.9	-11.9	DIN3
63	35.9	-8.3	DOUT3+
64	35.9	-4.8	DOUT3-
65	35.9	-1.2	N/C
66	35.9	2.3	EN/
67	35.9	5.9	DOUT4-
68	35.9	9.4	DOUT4+
69	35.9	12.9	DIN4
70	35.9	16.5	N/C
71	35.9	20.0	N/C
72	35.9	23.6	VDD
73	35.9	27.1	N/C
74	35.9	30.7	N/C

NOTE 1: Contact factory for bonding information on these pads.

FIGURE A-1. Die bonding pad locations and electrical functions – continued.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL <b>M</b>	SHEET <b>23</b>

APPENDIX A  
APPENDIX A FORMS A PART OF SMD 5962-98651



Die bonding pad locations and electrical functions

Die physical dimensions.

Die size: 0.0826 inch x 0.0826 inch

Die thickness: 280  $\mu\text{m}$   $\pm$  25  $\mu\text{m}$

Interface materials.

Top metallization: Al 99.5%, Cu 0.5%

Backside metallization: None

Glassivation.

Type: Phosphorous Silicon Glass (PSG) 5000 Å, Nitride (SiN) 6000 Å

Substrate: Silicon

Assembly related information.

Substrate potential:  $V_{SS}$ /Ground

Special assembly instructions: None

FIGURE A-2. Die bonding pad locations and electrical functions.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL M	SHEET 24



APPENDIX A  
APPENDIX A FORMS A PART OF SMD 5962-98651

Die pad	Signal name	Pad placements		Pad dimensions	
		X =	Y =	X =	Y =
1	A1	-577.46	980.0	80.0	80.0
2	Y1	-737.5	980.0	80.0	80.0
3	Z1	-908.0	595.88	80.0	80.0
4	G	-980.0	0.23	80.0	80.0
5	Z2	-980.0	-595.44	80.0	80.0
6	Y2	-980.0	-745.88	80.0	80.0
7	A2	-737.5	-980.0	80.0	80.0
8	AGND	-153.45	-980.0	80.0	80.0
8	AGND	-53.45	-980.0	80.0	80.0
8	AGND	46.55	-980.0	80.0	80.0
9	A3	577.46	-980.0	80.0	80.0
10	Y3	737.5	-980.0	80.0	80.0
11	Z3	980.0	-595.44	80.0	80.0
12	Gb	980.0	-95.15	80.0	80.0
13	Z4	980.0	595.88	80.0	80.0
14	Y4	980.0	745.88	80.0	80.0
15	A4	737.5	980.0	80.0	80.0
16	VCCA	160.95	980.0	80.0	80.0
16	VCCA	60.95	980.0	80.0	80.0
16	VCCA	-39.05	980.0	80.0	80.0

NOTES:

1. All dimensions are in microns.
2. Pad placement values correspond to each pad center coordinates.
3. Pad placement origin is the center of the die.

FIGURE A-2. Die bonding pad locations and electrical functions – continued.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-98651</b>
		REVISION LEVEL M	SHEET 25

## STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 15-10-22

Approved sources of supply for SMD 5962-98651 are listed below for immediate acquisition information only and shall be added to MIL-HDBK-103 and QML-38535 during the next revision. MIL-HDBK-103 and QML-38535 will be revised to include the addition or deletion of sources. The vendors listed below have agreed to this drawing and a certificate of compliance has been submitted to and accepted by DLA Land and Maritime-VA. This information bulletin is superseded by the next dated revision of MIL-HDBK-103 and QML-38535. DLA Land and Maritime maintains an online database of all current sources of supply at <http://www.landandmaritime.dla.mil/Programs/Smcr/>.

Standard microcircuit drawing PIN <u>1</u> /	Vendor CAGE number	Vendor similar PIN <u>2</u> /
5962-9865101QFA	27014	DS90LV031AW-QML
5962-9865101QXA	<u>3</u> /	DS90LV031AWGQML
5962H9865102Q9A	65342	UT54LVDS031LV_QDIE
5962H9865102QYA	65342	UT54LVDS031LVUCA
5962H9865102QYC	65342	UT54LVDS031LVUCC
5962H9865102V9A	65342	UT54LVDS031LV_VDIE
5962H9865102VYA	65342	UT54LVDS031LVUCA
5962H9865102VYC	65342	UT54LVDS031LVUCC
5962R9865103Q9A	65342	UT54LVDS031LV_QDIE
5962R9865103QYA	65342	UT54LVDS031LVUCA
5962R9865103QYC	65342	UT54LVDS031LVUCC
5962R9865103V9A	65342	UT54LVDS031LV_VDIE
5962R9865103VYA	65342	UT54LVDS031LVUCA
5962R9865103VYC	65342	UT54LVDS031LVUCC
5962H9865104Q9A	65342	UT54LVDS031LVE_QDIE
5962H9865104QYA	65342	UT54LVDS031LVEUCA
5962H9865104QYC	65342	UT54LVDS031LVEUCC
5962H9865104V9A	65342	UT54LVDS031LVE_VDIE
5962H9865104VYA	65342	UT54LVDS031LVEUCA
5962H9865104VYC	65342	UT54LVDS031LVEUCC
5962R9865105Q9A	65342	UT54LVDS031LVE_QDIE
5962R9865105QYA	65342	UT54LVDS031LVEUCA
5962R9865105QYC	65342	UT54LVDS031LVEUCC
5962R9865105V9A	65342	UT54LVDS031LVE_VDIE
5962R9865105VYA	65342	UT54LVDS031LVEUCA
5962R9865105VYC	65342	UT54LVDS031LVEUCC

STANDARD MICROCIRCUIT DRAWING BULLETIN – continued.

DATE: 15-10-22

Standard microcircuit drawing PIN <u>1/</u>	Vendor CAGE number	Vendor similar PIN <u>2/</u>
5962R9865106VYC	F8859	RH-LVDS31K
5962F9865107VZC	F8859	RHFLVDS31AK01V
5962F9865107VZA	F8859	RHFLVDS31AK02V
5962F9865107V9A	F8859	RHFLVDS31AD2V
5962F9865108VZC	F8859	RHFLVDS315K01V
5962F9865108VZA	F8859	RHFLVDS315K02V
5962F9865108V9A	F8859	RHFLVDS315D2V

- 1/ The lead finish shown for each PIN representing a hermetic package is the most readily available from the manufacturer listed for that part. If the desired lead finish is not listed contact the vendor to determine its availability.
- 2/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.
- 3/ Not available from an approved source of supply.

Vendor CAGE  
number

Vendor name  
and address

27014

National Semiconductor  
2900 Semiconductor Dr  
PO Box 58090  
Santa Clara, CA 95052-8090

65342

Aeroflex Colorado Springs, Inc.  
4350 Centennial Blvd.  
Colorado Springs, CO 80907-3486

F8859

ST Microelectronics  
3 rue de Suisse  
CS 60816  
35208 RENNES cedex2-FRANCE

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