REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
D	Corrected dimension D2 for case outlines U, X, and 4. Corrected dimensions D/E and D1/E1 for case outline Y. -sld	98-10-02	K.A. Cottongim
E	Added case outline 9. Added device type 05. Added vendor cage 0EU86 for device types 01 through 03 in the Standard Microcircuit Drawing Source Approval Bulletin. Figure 1; Made corrections to case outline M. Added thermal resistance ratings for all case outlines to paragraph 1.3 . –sld	00-05-11	Raymond Monnin

REV																				
SHEET																				
REV	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
SHEET	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34

REV STATUS	REV	E	E	E	E	E	E	E	E	E	E	E	E	E
OF SHEETS	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14

PMIC N/A

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DRAWING APPROVAL DATE
96-07-31

REVISION LEVEL
E

STANDARD MICROCIRCUIT DRAWING

THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE

AMSC N/A

DEFENSE SUPPLY CENTER COLUMBUS
COLUMBUS, OHIO 43216

MICROCIRCUIT, HYBRID, MEMORY, FLASH ERASABLE/PROGRAMMABLE READ ONLY MEMORY, 512K x 32-BIT

SIZE	CAGE CODE	
A	**67268**	**5962-94612**

SHEET 1 OF 34

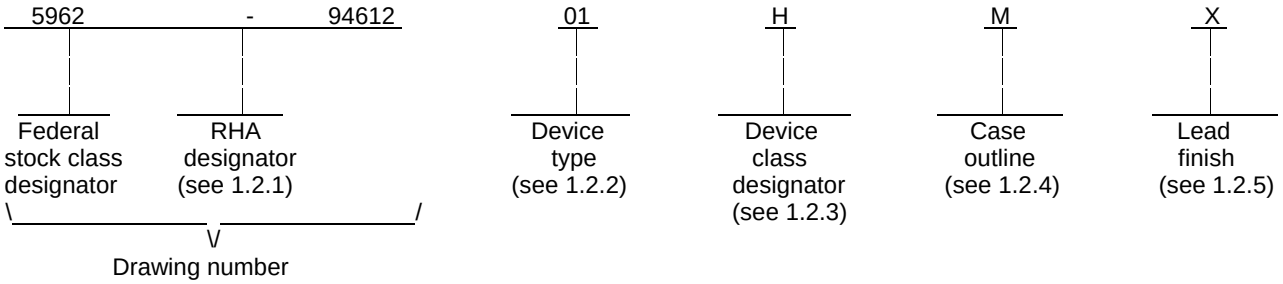
DSCC FORM 2233
APR 97

5962-E124-00

1. SCOPE

1.1 Scope. This drawing documents five product assurance classes, class D (lowest reliability), class E, (exceptions), class G (lowered high reliability), class H (high reliability), and class K, (highest reliability) and a choice of case outlines and lead finishes which are available and are reflected in the Part or Identifying Number (PIN). When available, a choice of radiation hardness assurance levels are reflected in the PIN.

1.2 PIN. The PIN shall be as shown in the following example:



1.2.1 Radiation hardness assurance (RHA) designator. RHA marked devices shall meet the MIL-PRF-38534 specified RHA levels and shall be 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:

Device type	Generic number	Circuit function	Access time
01	ACT-F512K32N-150,WF512K32-150, AS8F512K32Q-150/883C	EPROM FLASH, 512K x 32-bit	150 ns
02	WF512K32-120, ACT-F512K32N-120, AS8F512K32Q-120/883C	EPROM FLASH, 512K x 32-bit	120 ns
03	WF512K32-90, ACT-F512K32N-090, AS8F512K32Q-90/883C	EPROM FLASH, 512K x 32-bit	90 ns
04	WF512K32-70, ACT-F512K32N-070	EPROM FLASH, 512K x 32-bit	70 ns
05	ACT-F512K32N-060, WF512K32-60	EPROM FLASH, 512K x 32-bit	60 ns

1.2.3 Device class designator. This device class designator shall be a single letter identifying the product assurance level as follows:

Device class	Device performance documentation
D, E, G, H, or K	Certification and qualification to MIL-PRF-38534

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

Outline letter	Descriptive designator	Terminals	Package style
M	See figure 1	68	Co-fired ceramic, single/dual cavity, quad flatpack
N	See figure 1	68	Co-fired ceramic, single cavity, quad flatpack, low capacitance
T	See figure 1	68	Co-fired ceramic, single cavity, low profile,quad flatpack
U	See figure 1	66	Co-fired ceramic, hex-in-line, single cavity, with standoffs
X	See figure 1	66	Co-fired ceramic, hex-in-line, single cavity, without standoffs
Y	See figure 1	68	Co-fired ceramic, single cavity, quad flatpack, with tie bars
Z	See figure 1	68	Co-fired ceramic, single cavity, ultra low profile, quad flatpack
4	See figure 1	66	Co-fired ceramic, 1.075", hex-in-line, single cavity, with standoffs
9	See figure 1	68	Co-fired ceramic, single cavity, ultra low profile, quad flatpack

1.2.5 Lead finish. The lead finish shall be as specified in MIL-PRF-38534.

1.3 Absolute maximum ratings. 1/

Supply voltage range (V_{CC}) 2/	-2.0 V dc to +7.0 V dc
Signal voltage range (V_G)(any pin except A9) 2/	-2.0 V dc to +7.0 V dc
Power dissipation (P_D)	1.32 W Maximum at 5 MHz
Thermal resistance, junction-to-case (θ_{JC}):	
Case outlines M and Z	10.2°C/W
Case outlines U and 4	10.63°C/W
Case outlines X and Y	6.5°C/W
Case outline N	12.36°C/W
Case outline 9	4.57°C/W
Storage temperature range	-65°C to +150°C
Lead temperature (soldering, 10 seconds)	+300°C
Data retention	10 years minimum
Endurance (write/erase cycles)	10,000 cycles minimum
A9 voltage for sector protect (V_{ID}) 3/	-2.0 V dc to +14.0 V dc

1.4 Recommended operating conditions.

Supply voltage range (V_{CC})	+4.5 V dc to +5.5 V dc
Input low voltage range (V_{IL})	-0.5 V dc to +0.8 V dc
Input high voltage range (V_{IH})	+2.0 V dc to V_{CC} + 0.5 V dc
Case operating temperature range (T_C)	-55°C to +125°C
A9 voltage for sector protect	+11.5 V dc to +12.5 V dc

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 listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solitation.

SPECIFICATION

DEPARTMENT OF DEFENSE

MIL-PRF-38534 - Hybrid Microcircuits, General Specification for.

STANDARDS

DEPARTMENT OF DEFENSE

MIL-STD-883 - Test Method Standard Microcircuits.
MIL-STD-1835 - Interface Standard for Microcircuit Case Outlines.

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/ Minimum DC voltage on input or I/O pins is -0.5 V. During voltage transitions, input may overshoot V_{SS} to -2.0 V for periods of up to 20 ns. Maximum DC voltage on output and I/O pins is V_{CC} + 0.5 V. During voltage transitions, outputs may overshoot to V_{CC} + 2.0 V for periods of up to 20 ns.

3/ Minimum DC input voltage on A9 pin is -0.5 V. During voltage transitions, A9 may overshoot V_{SS} to -2.0 V for periods of up to 20 ns. Maximum DC input voltage on A9 is +13.5 V which may overshoot to +14.0 V for periods of up to 20 ns.

HANDBOOKS

DEPARTMENT OF DEFENSE

MIL-HDBK-103 - List of Standard Microcircuit Drawings (SMD's).
MIL-HDBK-780 - Standard Microcircuit Drawings.

(Unless otherwise indicated, copies of the specification, standards, and handbook are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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.

3. REQUIREMENTS

3.1 Item requirements. The individual item performance requirements for device classes D, E, G, H, and K shall be in accordance with MIL-PRF-38534. Compliance with MIL-PRF-38534 may include the performance of all tests herein or as designated in the device manufacturer's Quality Management (QM) plan or as designated for the applicable device class. Therefore, the tests and inspections herein may not be performed for the applicable device class (see MIL-PRF-38534). Furthermore, the manufacturer may take exceptions or use alternate methods to the tests and inspections herein and not perform them. However, the performance requirements as defined in MIL-PRF-38534 shall be met for the applicable device class.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38534 and herein.

3.2.1 Case outline(s). The case outline(s) shall be in accordance with 1.2.4 herein and figure 1.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 2.

3.2.3 Truth table(s). The truth table(s) shall be as specified on figure 3.

3.2.4 Timing diagram(s). The timing diagram(s) shall be as specified on figures 4, 5, and 6 .

3.2.5 Block diagram. The block diagram shall be as specified on figure 7.

3.2.6 Output load circuit. The output load circuit shall be as specified on figure 8.

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

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

3.5 Programming procedure. The programming procedure shall be as specified by the manufacturer and shall be available upon request.

3.6 Marking of Device(s). Marking of device(s) shall be in accordance with MIL-PRF-38534. The device shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's vendor similar PIN may also be marked.

3.7 Data. In addition to the general performance requirements of MIL-PRF-38534, the manufacturer of the device described herein shall maintain the electrical test data (variables format) from the initial quality conformance inspection group A lot sample, for each device type listed herein. Also, the data should include a summary of all parameters manually tested, and for those which, if any, are guaranteed. This data shall be maintained under document revision level control by the manufacturer and be made available to the preparing activity (DSCC-VA) upon request.

3.8 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to supply to this drawing. The certificate of compliance (original copy) submitted to DSCC-VA shall affirm that the manufacturer's product meets the performance requirements of MIL-PRF-38534 and herein.

3.9 Certificate of conformance. A certificate of conformance as required in MIL-PRF-38534 shall be provided with each lot of microcircuits delivered to this drawing.

3.10 Endurance. A reprogrammability test shall be completed as part of the vendor's reliability monitors. This reprogrammability test shall be done for the initial characterization and after any design process changes which may affect the reprogrammability of the device. The methods and procedures may be vendor specific, but shall guarantee the number of program/erase cycles listed in section 1.3 herein over the full military temperature range. The vendor's procedure shall be kept under document control and shall be made available upon request of the acquiring or preparing activity.

3.11 Data retention. A data retention stress test shall be completed as part of the vendor's reliability monitors. This test shall be done for initial characterization and after any design process change which may affect data retention. The methods and procedures may be vendor specific, but shall guarantee the number of years listed in section 1.3 herein over the full military temperature range. The vendor's procedure shall be kept under document control and shall be made available upon request of the acquiring or preparing activity.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-PRF-38534 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.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ 2/ $-55°C \le T_C \le +125°C$ unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
DC parameters							
Input leakage current	I_{LI}	V_{CC} = 5.5 V dc, V_{IN} = GND or V_{CC}	1,2,3	All		10	µA
Output leakage current	I_{LO}	V_{CC} = 5.5 V dc, V_{IN} = GND or V_{CC}	1,2,3	All		10	µA
V_{CC} active current for Read	I_{CC1}	$\overline{CS}$ = V_{IL}, $\overline{OE}$ = V_{IH}, f = 5 MHz, V_{CC} = 5.5 V dc	1,2,3	All		190	mA
V_{CC} active current for program/erase	I_{CC2}	$\overline{CS}$ = V_{IL}, $\overline{OE}$ = V_{IH}, f = 5 MHz, V_{CC} = 5.5 V dc	1,2,3	All		240	mA
V_{CC} standby current	I_{SB}	$\overline{CS}$ = V_{IH}, f = 5 MHz, V_{CC} = 5.5 V dc	1,2,3	All		6.5	mA
Input low level	V_{IL}		1,2,3	All		0.8	V
Input high level	V_{IH}		1,2,3	All	2.0		V
Output low voltage	V_{OL}	V_{CC} = 4.5 V, I_{OL} = 8.0 mA	1,2,3	All		0.45	V
Output high voltage	V_{OH}	V_{CC} = 4.5 V, I_{OL} = -2.5 mA	1,2,3	All	0.85 x V_{CC}		V
Dynamic characteristics							
$\overline{OE}$ capacitance	C_{OE}	V_{IN} = 0 V, f = 1.0 MHz, T_A = +25° C	4	All		50	pF
		V_{IN} = 0 V, f = 1.0 MHz, T_A = +25° C, Case outline N only	4	All		32	pF

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ 2/ $-55°C \le T_C \le +125°C$ unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Dynamic characterisitics - Continued							
$\overline{WE}_{1-4}$ capacitance 3/	C_{WE}	V_{IN} = 0 V, f = 1.0 MHz, T_A = +25° C, Case outlines M, Z, U and 9	4	All		20	pF
		V_{IN} = 0 V, f = 1.0 MHz, T_A = +25° C, Case outline T	4	All		50	pF
		V_{IN} = 0 V, f = 1.0 MHz, T_A = +25° C, Case outline N	4	All		32	pF
$\overline{CS}_{1-4}$ capacitance 3/	C_{CS}	V_{IN} = 0 V, f = 1.0 MHz, T_A = +25° C	4	All		20	pF
		V_{IN} = 0 V, f = 1.0 MHz, T_A = +25° C, Case outline N only	4	All		15	pF
Data I/O capacitance 3/	$C_{I/O}$	V_{IN} = 0 V, f = 1.0 MHz, T_A = +25° C	4	All		20	pF
		V_{IN} = 0 V, f = 1.0 MHz, T_A = +25° C, Case outline N only	4	All		15	pF
Address input capacitance 3/	C_{AD}	V_{IN} = 0 V, f = 1.0 MHz, T_A = +25° C	4	All		50	pF
		V_{IN} = 0 V, f = 1.0 MHz, T_A = +25° C, Case outline N only	4	All		32	pF
Functional testing							
Functional tests		See 4.3.1c	7, 8A,8B	All			

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ 2/ $-55°C \le T_C \le +125°C$ unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Read cycle AC timing characteristics							
Read cycle time	t_{RC}	See figure 4	9,10,11	01 02 03 04 05	150 120 90 70 60		ns
Address access time	t_{ACC}	See figure 4	9,10,11	01 02 03 04 05		150 120 90 70 60	ns
Chip select access time	t_{CE}	See figure 4	9,10,11	01 02 03 04 05		150 120 90 70 60	ns
Output enable to output valid	t_{OE}	See figure 4	9,10,11	01 02 03,04 05		55 50 35 30	ns
Output hold from address, CS or OE change, whichever is first	t_{OH}	See figure 4	9,10,11	All	0		ns
Write/Erase/Program AC timing characteristics $\overline{WE}$ controlled							
Write cycle time	t_{WC}	See figure 5	9,10,11	01 02 03 04 05	150 120 90 70 60		ns
Chip select setup time	t_{CS}	See figure 5	9,10,11	All	0		ns
Write enable pulse width	t_{WP}	See figure 5	9,10,11	01,02 03,04 05	50 45 40		ns

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ 2/ $-55°C \le T_C \le +125°C$ unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Write/Erase/Program AC timing characteristics $\overline{WE}$ controlled - Continued.							
Address setup time	t_{AS}	See figure 5	9,10,11	All	0		ns
Data setup time	t_{DS}	See figure 5	9,10,11	01,02 03,04 05	50 45 40		ns
Data hold time	t_{DH}	See figure 5	9,10,11	All	0		ns
Address hold time	t_{AH}	See figure 5	9,10,11	01,02 03,04 05	50 45 45		ns
Write enable pulse high	t_{WPH}	See figure 5	9,10,11	All	20		ns
Chip erase time			9,10,11	All		120	s
Sector erase time			9,10,11	All		30	s
Programming time			9,10,11	All		50	s
Write/Erase/Program AC timing characteristics $\overline{CS}$ controlled.							
Write cycle time	t_{WC}	See figure 6	9,10,11	01 02 03 04 05	150 120 90 70 60		ns
Write enable setup time	t_{WS}	See figure 6	9,10,11	All	0		ns
Chip select pulse width	t_{CP}	See figure 6	9,10,11	01,02 03,04 05	50 45 40		ns

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ 2/ $-55°C \le T_C \le +125°C$ unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Write/Erase/Program AC characteristics $\overline{CS}$ controlled - Continued.							
Address setup time	t_{AS}	See figure 6	9,10,11	All	0		ns
Data hold time	t_{DH}	See figure 6	9,10,11	All	0		ns
Data setup time	t_{DS}	See figure 6	9,10,11	01,02 03,04 05	50 45 40		ns
Address hold time	t_{AH}	See figure 6	9,10,11	01,02 03,04 05	50 45 45		ns
Chip select pulse width high	t_{CPH}	See figure 6	9,10,11	All	20		ns
Chip erase time			9,10,11	All		120	s
Sector erase time			9,10,11	All		30	s
Programming time			9,10,11	All		50	s

1/ Unless otherwise specified, 4.5 V dc $\le V_{CC} \le$ 5.5 V dc and V_{SS} = 0 V.

2/ Unless otherwise specified, the DC test conditions are as follows:
Input pulse levels: $V_{IH} = V_{CC}$ - 0.3 V and V_{IL} = 0.3V.

Unless otherwise specified, the AC test conditions are as follows:
Input pulse levels: V_{IL} = 0 V and V_{IH} = 3.0 V.
Input rise and fall times: 5 nanoseconds.
Input and output timing reference levels: 1.5 V.
Output load circuit as specified in figure 7.

3/ Parameters shall be tested as part of design characterization and after any design or process changes which may affect these parameters. Parameters shall be guaranteed to the limits specified in table I for all lots not specifically tested.

Case outline M.

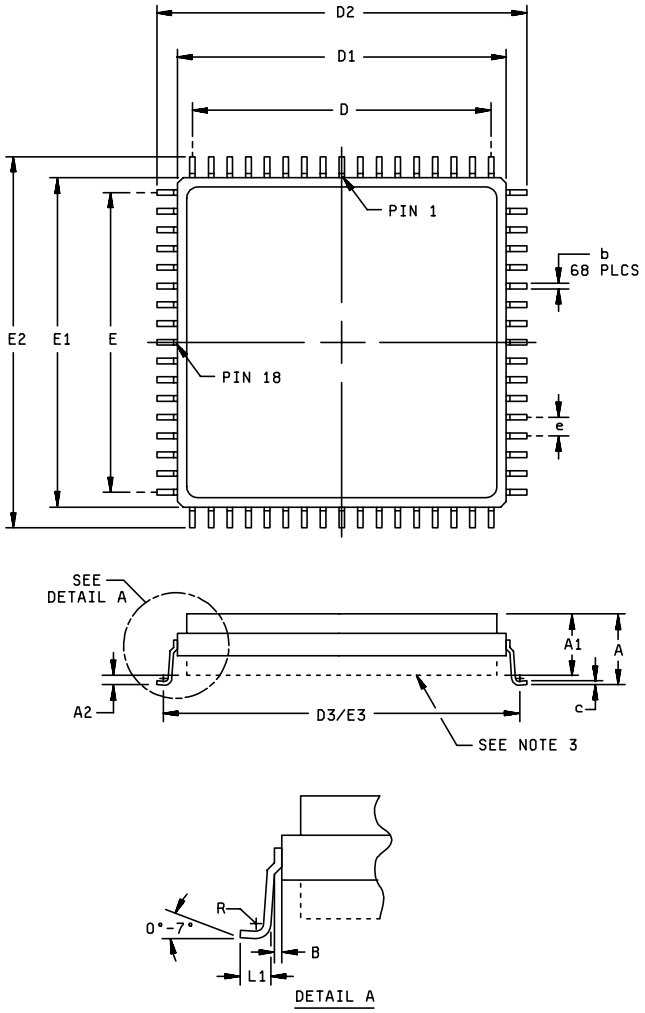


FIGURE 1. Case outlines.

Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	3.12	5.10	.123	.200
A1	2.30	4.72	.118	.186
A2	0.24	0.64	.005	.025
b	0.33	0.43	.013	.017
B	0.25 REF		.010 REF	
c	0.23	0.30	.009	.012
D/E	20.3 BSC		.800 BSC	
D1/E1	22.10	22.65	.870	.890
D2/E2	24.89	25.35	.980	1.000
D3/E3	23.75	24.28	.936	.956
e	1.27 BSC		.050 BSC	
R	0.25 BSC		.010 BSC	
L1	0.89	1.14	.035	.045

NOTES:
1. The U.S. preferred system of measurement is the metric SI. This item was designed using inch-pound units of measurement. In case of problems involving conflicts between the metric and inch-pound units, the inch-pound units shall rule.
2. Pin numbers are for reference only.
3. Case outline M may be either a single or dual cavity package. Dimension A2 is measured between the lowest horizontal plane of the package and the seating plane of the lead(s).

FIGURE 1. Case outlines - Continued.

Case outline N.

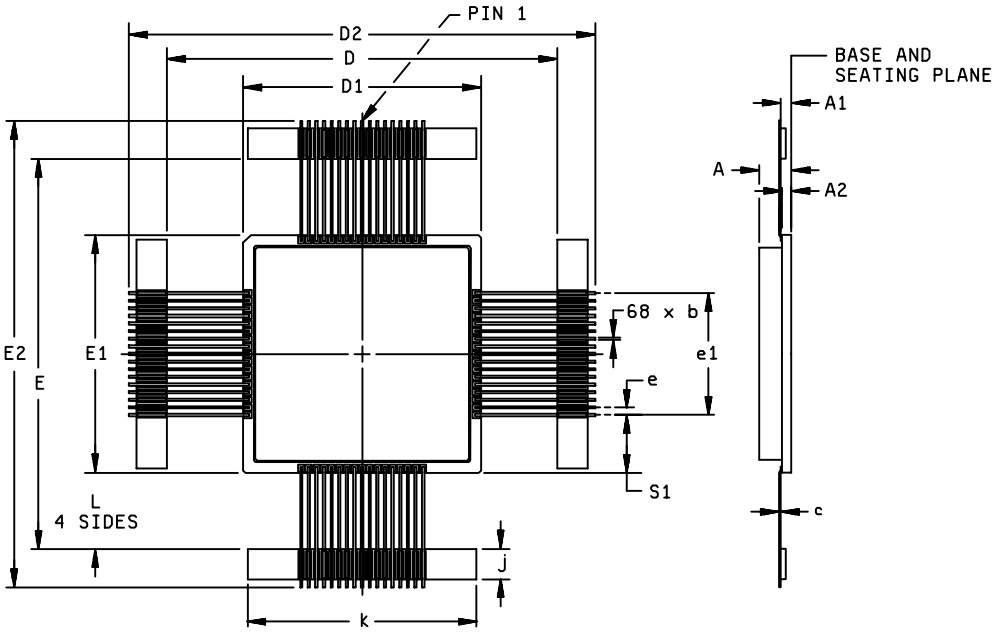


FIGURE 1. Case outlines - Continued.

Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	2.92	5.10	.115	.200
A1	1.40	1.65	.055	.065
A2	1.14	1.40	.045	.055
b	0.30	0.46	.012	.018
c	0.23	0.31	.009	.012
D/E	63.63	66.42	2.505	2.615
D1/E1	39.24	40.01	1.545	1.575
D2/E2	73.28	84.20	2.885	3.315
e	1.14	1.40	.045	.055
e1	19.10	21.16	.750	.850
j	4.83	5.33	.190	.210
k	37.72	38.48	1.485	1.515
L	12.19	13.21	.480	.520
S1	9.45	9.86	.372	.388

NOTES:
1. The U.S. preferred system of measurement is the metric SI. This item was designed using inch-pound units of measurement. In case of problems involving conflicts between the metric and inch-pound units, the inch-pound units shall rule.
2. Pin numbers are for reference only.

FIGURE 1. Case outlines - Continued.

Case outline T.

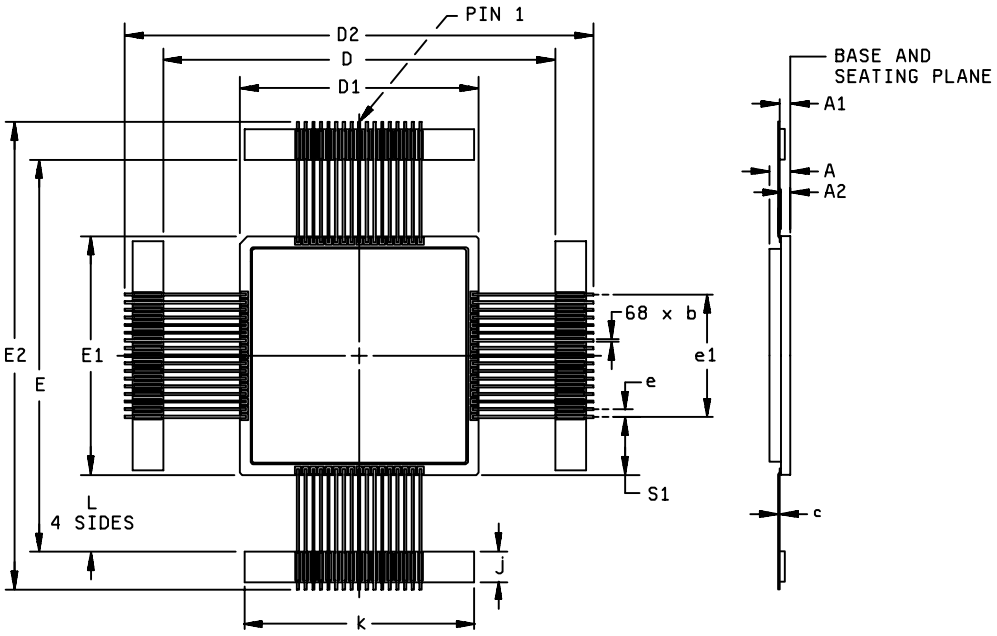


FIGURE 1. Case outlines- Continued.

STANDARD MICROCIRCUIT DRAWING	SIZE A		5962-94612
DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000		REVISION LEVEL E	SHEET 15

Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	2.92	3.56	.115	.140
A1	1.40	1.65	.055	.065
A2	1.14	1.40	.045	.055
b	0.30	0.46	.012	.018
c	0.23	0.31	.009	.012
D/E	63.63	66.42	2.505	2.615
D1/E1	39.24	40.01	1.545	1.575
D2/E2	73.28	84.20	2.885	3.315
e	1.14	1.40	.045	.055
e1	19.10	21.16	.750	.850
j	4.83	5.33	.190	.210
k	37.72	38.48	1.485	1.515
L	12.19	13.21	.480	.520
S1	9.45	9.86	.372	.388

NOTES:
1. The U.S. preferred system of measurement is the metric SI. This item was designed using inch-pound units of measurement. In case of problems involving conflicts between the metric and inch-pound units, the inch-pound units shall rule.
2. Pin numbers are for reference only.

FIGURE 1. Case outlines - Continued.

Case outlines U, X, and 4.

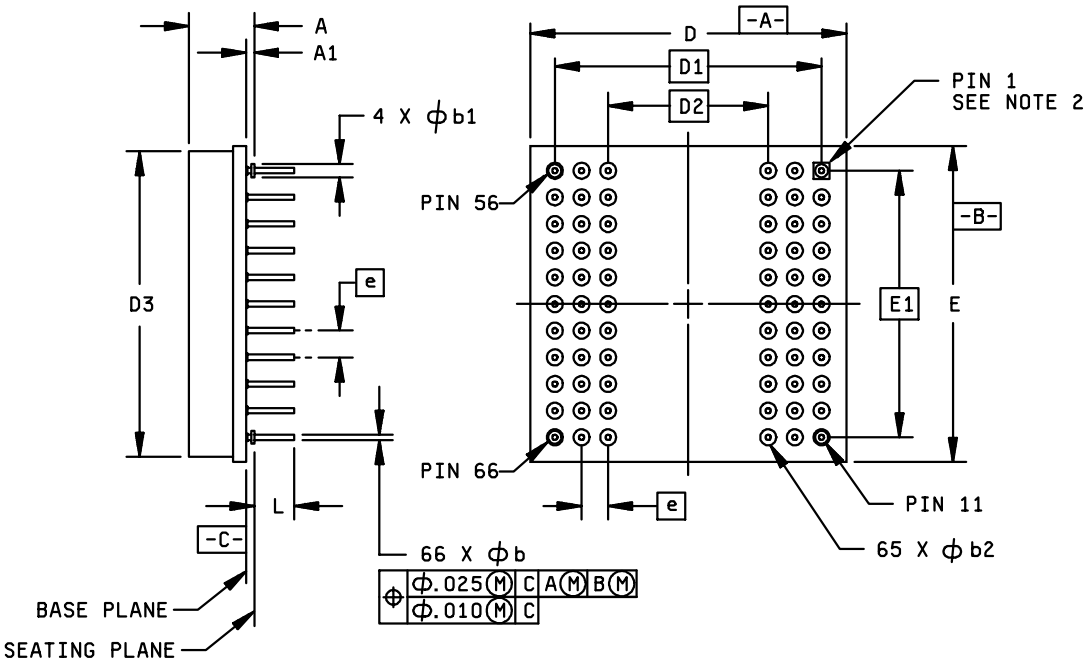


FIGURE 1. Case outlines - Continued.

Symbol	Millimeters		Inches		
	Min	Max	Min	Max	
A	3.30	6.22	.130	.245	
A1	0.13	0.89	.005	.035	
θb	0.41	0.51	.016	.020	
θb1	1.14	1.40	.045	.055	
θb2	1.65	1.91	.065	.075	
D/E	26.92	30.48	1.060	1.200	
D1/E1	25.40 BSC		1.000 BSC		
D2	15.24 BSC		.600 BSC		
D3	26.16	34.29	1.030	1.350	
e	2.54 BSC		.100 BSC		
L	3.68	3.94	.145	.155	(case U)
L	4.19	4.70	.165	.185	(case X)

NOTES:
1. The U.S. preferred system of measurement is the metric SI. This item was designed using inch-pound units of measurement. In case of problems involving conflicts between the metric and inch-pound units, the inch-pound units shall rule.
2. Pin 1 is identified by a .070 square pad.
3. Pin numbers are for reference only.
4. Case outline U has standoffs and case outline X does not have standoffs.
5. For case outline U, dimension A is measured from the top of the package to the bottom of the standoff. For case outline X, dimension A is measured from the top of the package to the bottom of the seating plane.
6. For case ouline U, dimension L is measured from the bottom of the standoff to the end of the lead. For case outline X, dimension L is measured from the bottom of the seating plane to the end of the lead.

FIGURE 1. Case outlines - Continued.

Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	3.43	4.60	.135	.181
A1	0.64	0.89	.025	.035
θb	0.41	0.51	.016	.020
θb1	1.14	1.40	.045	.055
θb2	1.65	1.91	.065	.075
D/E	27.05	27.56	1.065	1.085
D1/E1	25.40 BSC		1.000 BSC	
D2	15.24 BSC		.600 BSC	
D3	25.90	26.92	1.020	1.060
e	2.54 BSC		.100 BSC	
L	3.35	3.94	.132	.155

NOTES:
1. The U.S. preferred system of measurement is the metric SI. This item was designed using inch-pound units of measurement. In case of problems involving conflicts between the metric and inch-pound units, the inch-pound units shall rule.
2. Pin 1 is identified by a .070 square pad.
3. Pin numbers are for reference only.

FIGURE 1. Case outlines - Continued.

Case outline Y.

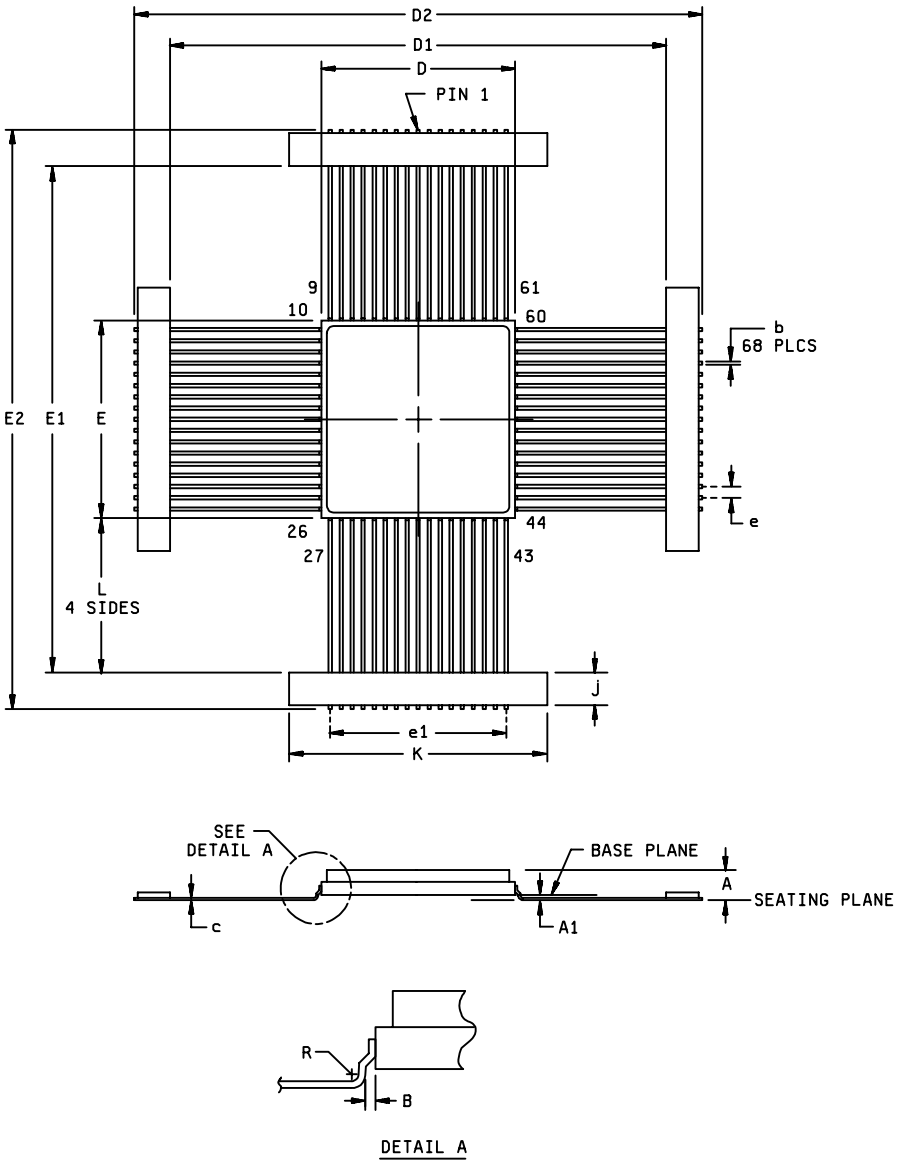


FIGURE 1. Case outlines - Continued.

Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	3.12	4.06	.123	.160
A1	0.13	0.64	.005	.025
B	0.25 REF		.010 REF	
b	0.33	0.43	.013	.017
c	0.23	0.31	.009	.012
D/E	22.10	22.65	.870	.890
D1/E1	64.52	65.53	2.540	2.580
D2/E2	74.78	77.72	2.940	3.060
e	1.27 BSC		.050 BSC	
e1	20.12	20.52	.792	.808
j	4.83	5.33	.190	.210
k	37.72	38.48	1.485	1.515
L	21.34 REF		.840 REF	
R	0.25 TYP		.010 TYP	

NOTES:
1. The U.S. preferred system of measurement is the metric SI. This item was designed using inch-pound units of measurement. In case of problems involving conflicts between the metric and inch-pound units, the inch-pound units shall rule.
2. Pin numbers are for reference only.

FIGURE 1. Case outlines - Continued.

Case outline Z.

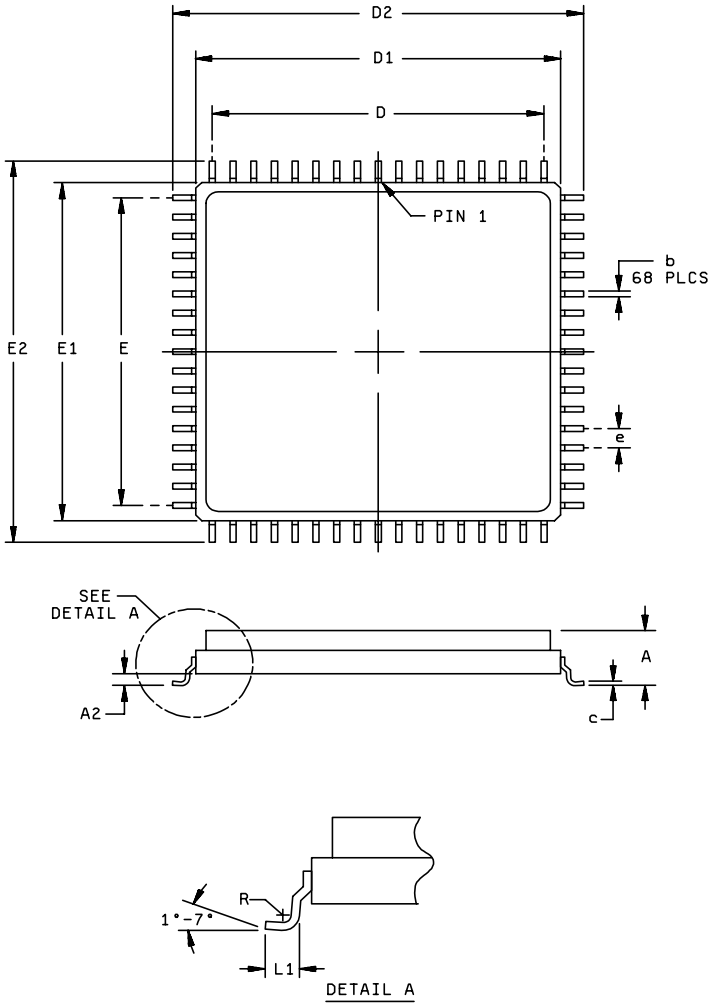


FIGURE 1. Case outlines - Continued.

Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	---	3.56	---	.140
A2	0.36	0.71	.014	.028
b	0.33	0.43	.013	.017
c	0.23	0.30	.009	.012
D/E	20.32 BSC		.800 BSC	
D1/E1	22.10	22.61	.870	.890
D2/E2	24.89	25.35	.980	1.000
e	1.27 TYP		.050 TYP	
R	0.13 MIN		.005 MIN	
L1	0.89	1.14	.035	.045

NOTES:
1. The U.S. preferred system of measurement is the metric SI. This item was designed using inch-pound units of measurement. In case of problems involving conflicts between the metric and inch-pound units, the inch-pound units shall rule.
2. Pin numbers are for reference only.

FIGURE 1. Case outlines - Continued.

Case outline 9.

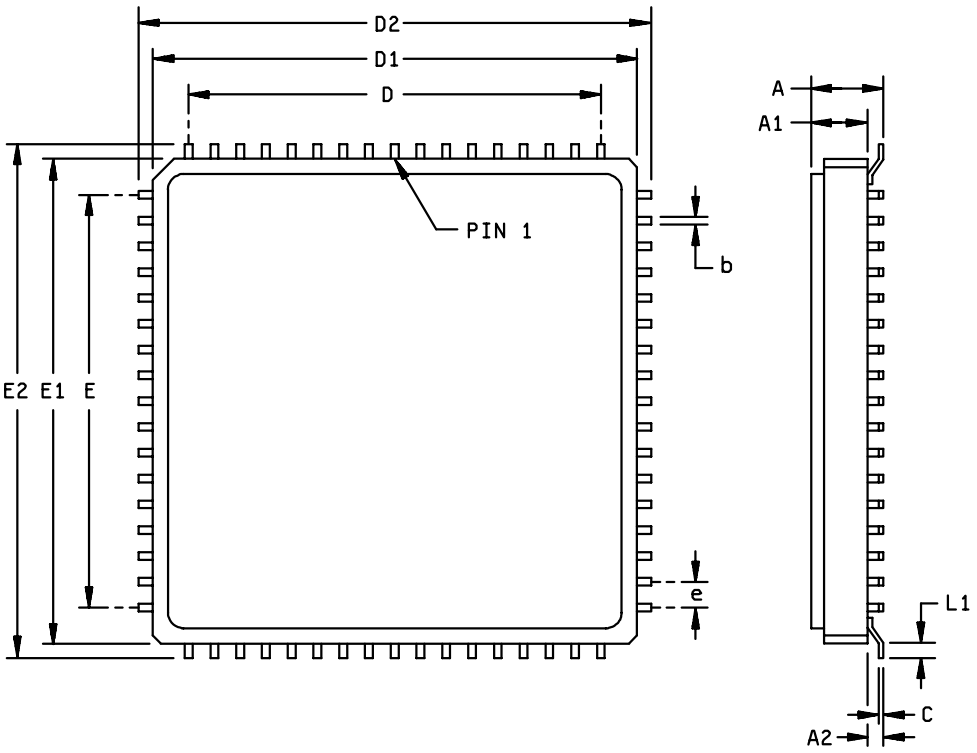


FIGURE 1. Case outlines - Continued.

Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	---	3.56	---	.140
A1	---	2.79	---	.110
A2	0.46	0.76	.018	.030
b	0.33	0.43	.013	.017
C	0.15	0.25	.006	.010
D/E	20.32 TYP		.800 TYP	
D1/E1	23.65	24.10	.931	.949
D2/E2	25.15	25.40	.990	1.000
e	1.27 TYP		.050 TYP	
L1	0.51	1.14	.020	.045

NOTES:
1. The U.S. preferred system of measurement is the metric SI. This item was designed using inch-pound units of measurement. In case of problems involving conflicts between the metric and inch-pound units, the inch-pound units shall rule.
2. Pin numbers are for reference only.

FIGURE 1. Case outlines - Continued.

Device types	All	Device types	All	Device types	All	Device types	All
Case outline	M, Y, Z, 9	Case outline	M, Y, Z, 9	Case outline	M, Y, Z, 9	Case outline	M, Y, Z, 9
Terminal number	Terminal symbol	Terminal number	Terminal symbol	Terminal number	Terminal symbol	Terminal number	Terminal symbol
1	GND	18	GND	35	$\overline{OE}$	52	GND
2	$\overline{CS3}$	19	I/O8	36	$\overline{CS2}$	53	I/O23
3	A5	20	I/O9	37	A17	54	I/O22
4	A4	21	I/O10	38	$\overline{WE2}$	55	I/O21
5	A3	22	I/O11	39	$\overline{WE3}$	56	I/O20
6	A2	23	I/O12	40	$\overline{WE4}$	57	I/O19
7	A1	24	I/O13	41	A18	58	I/O18
8	A0	25	I/O14	42	NC	59	I/O17
9	NC	26	I/O15	43	NC	60	I/O16
10	I/O0	27	V_{CC}	44	I/O31	61	V_{CC}
11	I/O1	28	A11	45	I/O30	62	A10
12	I/O2	29	A12	46	I/O29	63	A9
13	I/O3	30	A13	47	I/O28	64	A8
14	I/O4	31	A14	48	I/O27	65	A7
15	I/O5	32	A15	49	I/O26	66	A6
16	I/O6	33	A16	50	I/O25	67	$\overline{WE1}$
17	I/O7	34	$\overline{CS1}$	51	I/O24	68	$\overline{CS4}$

FIGURE 2. Terminal connections.

Device types	All	Device types	All	Device types	All	Device types	All
Case outlines	N,T	Case outlines	N,T	Case outlines	N,T	Case outlines	N,T
Terminal number	Terminal symbol	Terminal number	Terminal symbol	Terminal number	Terminal symbol	Terminal number	Terminal symbol
1	GND	18	GND	35	$\overline{OE}$	52	GND
2	$\overline{CS1}$	19	I/O8	36	$\overline{CS4}$	53	I/O23
3	A5	20	I/O9	37	A17	54	I/O22
4	A4	21	I/O10	38	A18	55	I/O21
5	A3	22	I/O11	39	NC	56	I/O20
6	A2	23	I/O12	40	NC	57	I/O19
7	A1	24	I/O13	41	NC	58	I/O18
8	A0	25	I/O14	42	NC	59	I/O17
9	NC	26	I/O15	43	NC	60	I/O16
10	I/O0	27	V_{CC}	44	I/O31	61	V_{CC}
11	I/O1	28	A11	45	I/O30	62	A10
12	I/O2	29	A12	46	I/O29	63	A9
13	I/O3	30	A13	47	I/O28	64	A8
14	I/O4	31	A14	48	I/O27	65	A7
15	I/O5	32	A15	49	I/O26	66	A6
16	I/O6	33	A16	50	I/O25	67	$\overline{WE}$
17	I/O7	34	$\overline{CS2}$	51	I/O24	68	$\overline{CS3}$

FIGURE 2. Terminal connections - Continued.

Device type	All	Device type	All	Device type	All	Device type	All
Case outlines	U, X, 4	Case outlines	U, X, 4	Case outlines	U, X, 4	Case outlines	U, X, 4
Terminal number	Terminal symbol	Terminal number	Terminal symbol	Terminal number	Terminal symbol	Terminal number	Terminal symbol
1	I/O8	18	A15	35	I/O25	52	$\overline{WE3}$
2	I/O9	19	V_{CC}	36	I/O26	53	$\overline{CS3}$
3	I/O10	20	$\overline{CS1}$	37	A7	54	GND
4	A14	21	NC	38	A12	55	I/O19
5	A16	22	I/03	39	NC	56	I/O31
6	A11	23	I/015	40	A13	57	I/O30
7	A0	24	I/O14	41	A8	58	I/O29
8	A18	25	I/O13	42	I/O16	59	I/O28
9	I/O0	26	I/O12	43	I/O17	60	A1
10	I/O1	27	$\overline{OE}$	44	I/O18	61	A2
11	I/O2	28	A17	45	V_{CC}	62	A3
12	$\overline{WE2}$	29	$\overline{WE1}$	46	$\overline{CS4}$	63	I/O23
13	$\overline{CS2}$	30	I/O7	47	$\overline{WE4}$	64	I/O22
14	GND	31	I/O6	48	I/O27	65	I/O21
15	I/O11	32	I/O5	49	A4	66	I/O20
16	A10	33	I/O4	50	A5		
17	A9	34	I/O24	51	A6		

FIGURE 2. Terminal connections - Continued.

$\overline{CS}$	$\overline{OE}$	$\overline{WE}$	I/O	MODE
V_{IL}	V_{IL}	V_{IH}	D_{OUT}	Read
V_{IH}	X	X	High Z	Standby
V_{IL}	V_{IH}	V_{IH}	High Z	Output disable
V_{IL}	V_{IH}	V_{IL}	D_{IN}	Write

NOTES:

1. V_{IH} = High Logic Level
2. V_{IL} = Low Logic Level
3. X = Do not care (either high or low)
4. High Z = High Impedance State

FIGURE 3. Truth table.

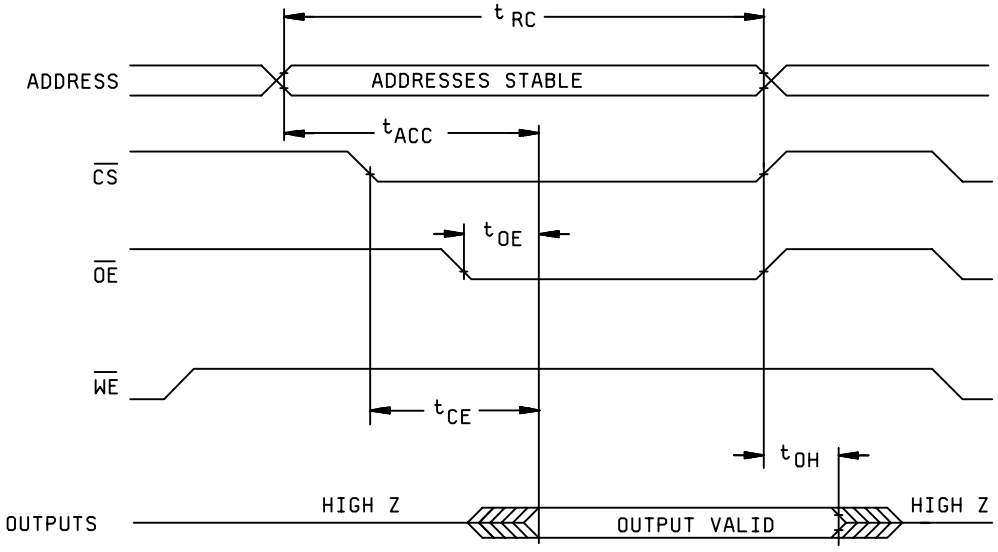


FIGURE 4. Read cycle timing diagram.

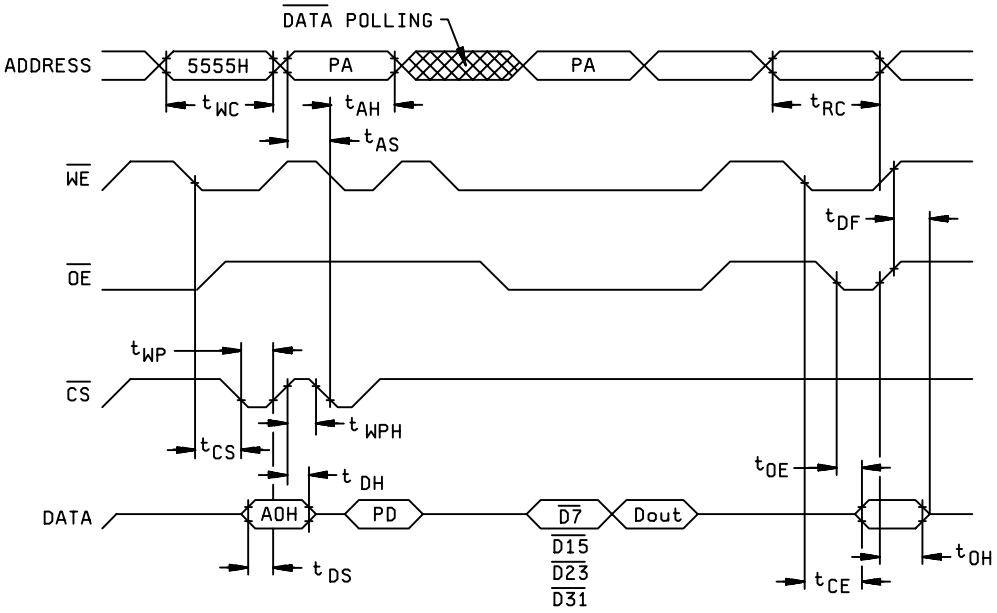


FIGURE 5. Write/Erase/Program operations, $\overline{WE}$ controlled.

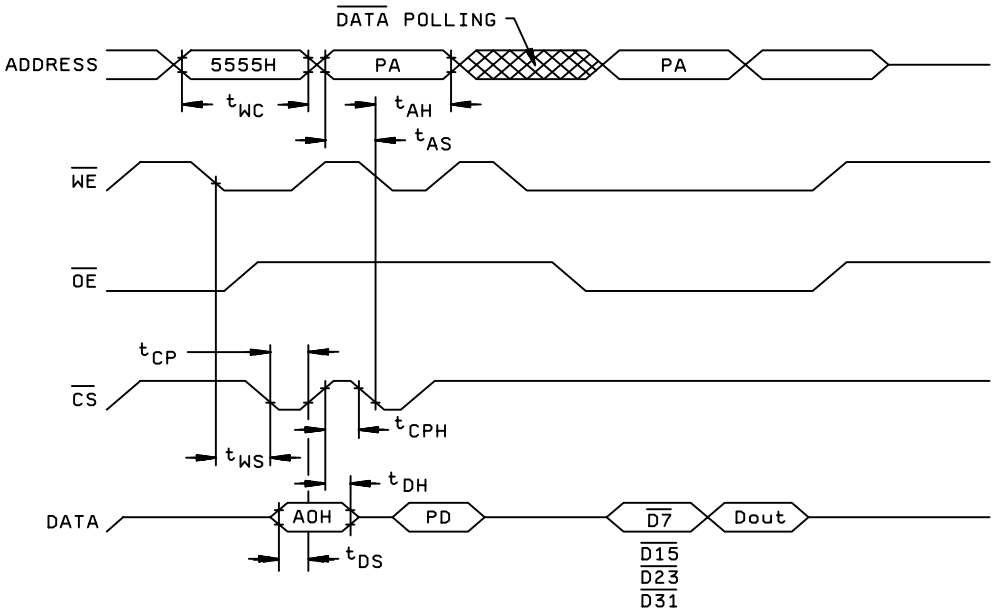


FIGURE 6. Write/Erase/Program operations, $\overline{CS}$ controlled.

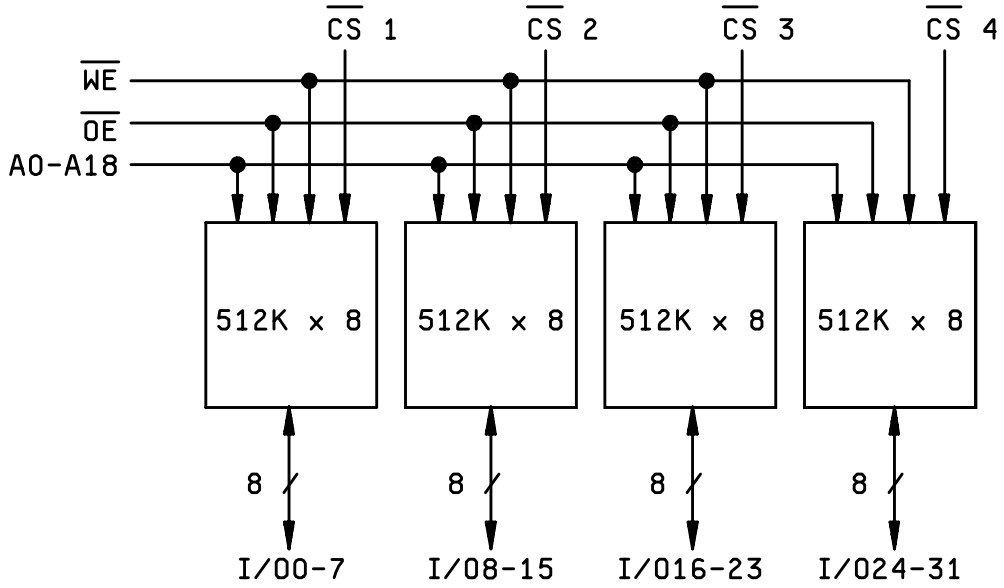


FIGURE 7. Block diagram, case outlines N and T.

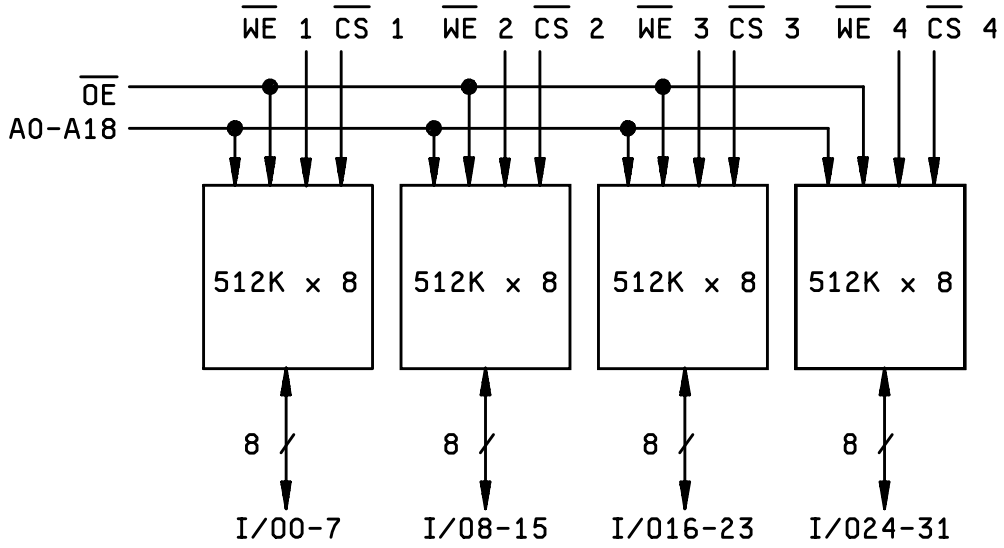
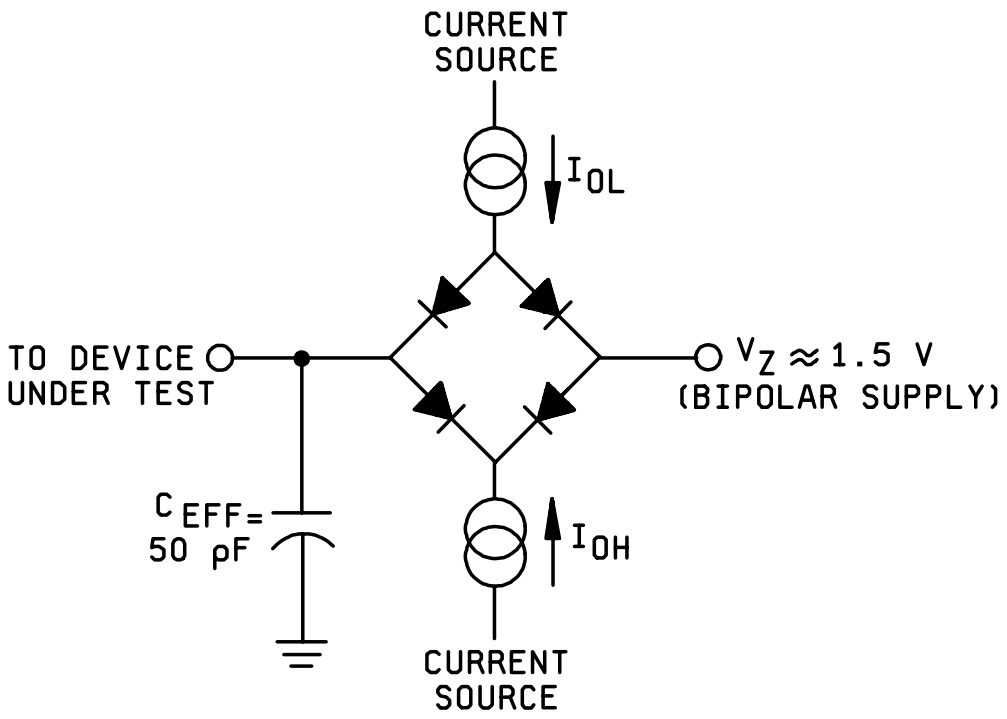


FIGURE 7. Block diagram, case outlines M, U, X, Y, Z, 4, and 9.



Parameter	Typ.	Unit
Input pulse level	0 - 3.0	V
Input rise and fall	5	ns
Input and output reference level	1.5	V
Output load capacitance	50	pF

NOTES:
1. V_Z is programmable from +2 V to +7 V.
2. I_{OL} and I_{OH} are programmable from 0 to 16 mA.
3. Tester impedance is Z_0 = 75 ohms.
4. V_Z is typically the midpoint of V_{OL} and V_{OH}.
5. I_{OL} and I_{OH} are adjusted to simulate a typical resistive load circuit.
6. ATE tester includes jig capacitance.

FIGURE 8. Output load circuit.

TABLE II. Electrical test requirements.

MIL-PRF-38534 test requirements	Subgroups (in accordance with MIL-PRF-38534, group A test table)
Interim electrical parameters	1,4,7,9
Final electrical parameters	1,2,3,4,7,8A,8B,9,10,11
Group A test requirements	1*,2,3,4,7,8A,8B,9,10,11
Group C end-point electrical parameters	1,2,3,4,7,8A,8B,9,10,11
End-point electrical parameters for Radiation Hardness Assurance (RHA) devices	Not applicable

* PDA applies to subgroup 1.

4.2 Screening. Screening shall be in accordance with MIL-PRF-38534. The following additional criteria shall apply:

a. Burn-in test, method 1015 of MIL-STD-883.

(1) Test condition B. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to either DSCC-VA or the acquiring activity upon request. Also, the test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1015 of MIL-STD-883.

(2) T_A as specified in accordance with table I of method 1015 of MIL-STD-883.

b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

4.3 Conformance and periodic inspections. Conformance inspection (CI) and periodic inspection (PI) shall be in accordance with MIL-PRF-38534 and as specified herein.

4.3.1 Group A inspection (CI). Group A inspection shall be in accordance with MIL-PRF-38534 and as follows:

a. Tests shall be as specified in table II herein.

b. Subgroups 5 and 6 shall be omitted.

c. Subgroups 7 and 8 shall include verification of the truth table on figure 3.

4.3.2 Group B inspection (PI). Group B inspection shall be in accordance with MIL-PRF-38534.

4.3.3 Group C inspection (PI). Group C inspection shall be in accordance with MIL-PRF-38534 and as follows:

a. End-point electrical parameters shall be as specified in table II herein.

b. Steady-state life test, method 1005 of MIL-STD-883.

(1) Test condition B. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to either DSCC-VA or the acquiring activity upon request. Also, the test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1005 of MIL-STD-883.

(2) T_A as specified in accordance with table I of method 1005 of MIL-STD-883.

(3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

4.3.4 Group D inspection (PI). Group D inspection shall be in accordance with MIL-PRF-38534.

4.3.5 Radiation Hardness Assurance (RHA) inspection. RHA inspection is not currently applicable to this drawing.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-PRF-38534.

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.

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

6.3 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated as specified in MIL-PRF-38534.

6.4 Record of users. Military and industrial users shall inform Defense Supply Center Columbus when a system application requires configuration control and the applicable SMD. DSCC 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 DSCC-VA, telephone (614) 692-0544.

6.5 Comments. Comments on this drawing should be directed to DSCC-VA, Columbus, Ohio 43216-5000, or telephone (614) 692-0512.

6.6 Sources of supply. Sources of supply are listed in MIL-HDBK-103 and QML-38534. The vendors listed in MIL-HDBK-103 and QML-38534 have submitted a certificate of comp0liance (see 3.7 herein) to DSCC-VA and have agreed to this drawing.

STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 00-05-11

Approved sources of supply for SMD 5962-94612 are listed below for immediate acquisition information only and shall be added to MIL-HDBK-103 and QML-38534 during the next revisions. MIL-HDBK-103 and QML-38534 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 DSCC-VA. This bulletin is superseded by the next dated revisions of MIL-HDBK-103 and QML-38534.

Standard microcircuit drawing PIN 1/	Vendor CAGE number	Vendor similar PIN 2/
5962-9461201HMA	0EU86	AS8F512K32Q-150/883C
5962-9461201HMA	54230	WF512K32-150G2Q5
5962-9461201HMA	88379	ACT-F512K32N-150F5Q
5962-9461201HMC	0EU86	AS8F512K32Q-150/883C
5962-9461201HMC	54230	WF512K32-150G2Q5
5962-9461201HMC	88379	ACT-F512K32N-150F5Q
5962-9461201HNC	54230	WF512K32F-150G4Q5
5962-9461201HTC	54230	WF512K32-150G4TQ5
5962-9461201HUA	54230	WF512K32N-150HQ5
5962-9461201HUA	88379	ACT-F512K32N-150P7Q
5962-9461201HUC	54230	WF512K32N-150HQ5
5962-9461201HUC	88379	ACT-F512K32N-150P7Q
5962-9461201HXA	88379	ACT-F512K32N-150P3Q
5962-9461201HXC	88379	ACT-F512K32N-150P3Q
5962-9461201HYC	88379	ACT-F512K32N-150F5UQ
5962-9461201HZA	54230	WF512K32-150G2UQ5
5962-9461201HZC	54230	WF512K32-150G2UQ5
5962-9461201H4A	0EU86	ASF512K32P-150/883C
5962-9461201H4A	54230	WF512K32N-150H1Q5
5962-9461201H4A	88379	ACT-F512K32A-150P7Q
5962-9461201H4C	0EU86	AS8F512K32P-150/883C
5962-9461201H4C	54230	WF512K32N-150H1Q5
5962-9461201H4C	88379	ACT-F512K32A-150P7Q
5962-9461201H9A	54230	WF512K32-150G1UQ5
5962-9461201H9C	54230	WF512K32-150G1UQ5
5962-9461202HMA	0EU86	ASF512K32Q-120/883C
5962-9461202HMA	54230	WF512K32-120G2Q5
5962-9461202HMA	88379	ACT-F512K32N-120F5Q
5962-9461202HMC	0EU86	ASF512K32Q-120/883C
5962-9461202HMC	54230	WF512K32-120G2Q5
5962-9461202HMC	88379	ACT-F512K32N-120F5Q
5962-9461202HNC	54230	WF512K32F-120G4Q5
5962-9461202HTC	54230	WF512K32-120G4TQ5
5962-9461202HUA	54230	WF512K32N-120HQ5
5962-9461202HUA	88379	ACT-F512K32N-120P7Q
5962-9461202HUC	54230	WF512K32N-120HQ5
5962-9461202HUC	88379	ACT-F512K32N-120P7Q
5962-9461202HXA	88379	ACT-F512K32N-120P3Q
5962-9461202HXC	88379	ACT-F512K32N-120P3Q
5962-9461202HYC	88379	ACT-F512K32N-120F5UQ
5962-9461202HZA	54230	WF512K32-120G2UQ5
5962-9461202HZC	54230	WF512K32-120G2UQ5
5962-9461202H4A	0EU86	ASF512K32P-120/883C
5962-9461202H4A	54230	WF512K32N-120H1Q5
5962-9461202H4A	88379	ACT-F512K32A-120P7Q
5962-9461202H4C	0EU86	ASF512K32P-120/883C
5962-9461202H4C	54230	WF512K32N-120H1Q5
5962-9461202H4C	88379	ACT-F512K32A-120P7Q
5962-9461202H9A	54230	WF512K32-120G1UQ5
5962-9461202H9C	54230	WF512K32-120G1UQ5

Standard microcircuit drawing PIN 1/	Vendor CAGE number	Vendor similar PIN 2/
5962-9461203HMA	0EU86	AS8F512K32Q-90/883C
5962-9461203HMA	54230	WF512K32-90G2Q5
5962-9461203HMA	88379	ACT-F512K32N-090F5Q
5962-9461203HMC	0EU86	AS8F512K32Q-90/883C
5962-9461203HMC	54230	WF512K32-90G2Q5
5962-9461203HMC	88379	ACT-F512K32N-090F5Q
5962-9461203HNC	54230	WF512K32F-90G4Q5
5962-9461203HTC	54230	WF512K32-90G4TQ5
5962-9461203HUA	54230	WF512K32N-90HQ5
5962-9461203HUA	88379	ACT-F512K32N-090P7Q
5962-9461203HUC	54230	WF512K32N-90HQ5
5962-9461203HUC	88379	ACT-F512K32N-090P7Q
5962-9461203HXA	88379	ACT-F512K32N-090P3Q
5962-9461203HXC	88379	ACT-F512K32N-090P3Q
5962-9461203HYC	88379	ACT-F512K32N-090F5UQ
5962-9461203HZA	54230	WF512K32-90G2UQ5
5962-9461203HZC	54230	WF512K32-90G2UQ5
5962-9461203H4A	0EU86	AS8F512K32P-90/883C
5962-9461203H4A	54230	WF512K32N-90H1Q5
5962-9461203H4A	88379	ACT-F512K32A-090P7Q
5962-9461203H4C	0EU86	AS8F512K32P-90/883C
5962-9461203H4C	54230	WF512K32N-90H1Q5
5962-9461203H4C	88379	ACT-F512K32A-090P7Q
5962-9461203H9A	54230	WF512K32-90G1UQ5
5962-9461203H9C	54230	WF512K32-90G1UQ5
5962-9461204HMA	54230	WF512K32-70G2Q5
5962-9461204HMA	88379	ACT-F512K32N-070F5Q
5962-9461204HMC	54230	WF512K32-70G2Q5
5962-9461204HMC	88379	ACT-F512K32N-070F5Q
5962-9461204HNC	54230	WF512K32F-70G4Q5
5962-9461204HTC	54230	WF512K32-70G4TQ5
5962-9461204HUA	54230	WF512K32N-70HQ5
5962-9461204HUA	88379	ACT-F512K32N-070P7Q
5962-9461204HUC	54230	WF512K32N-70HQ5
5962-9461204HUC	88379	ACT-F512K32N-070P7Q
5962-9461204HXA	88379	ACT-F512K32N-070P3Q
5962-9461204HXC	88379	ACT-F512K32N-070P3Q
5962-9461204HYC	88379	ACT-F512K32N-070F5UQ
5962-9461204HZA	54230	WF512K32-70G2UQ5
5962-9461204HZC	54230	WF512K32-70G2UQ5
5962-9461204H4A	54230	WF512K32N-70H1Q5
5962-9461204H4A	88379	ACT-F512K32A-070P7Q
5962-9461204H4C	54230	WF512K32N-70H1Q5
5962-9461204H4C	88379	ACT-F512K32A-070P7Q
5962-9461204H9A	54230	WF512K32-70G1UQ5
5962-9461204H9C	54230	WF512K32-70G1UQ5

Standard microcircuit drawing PIN 1/	Vendor CAGE number	Vendor similar PIN 2/
5962-9461205HMA	54230	WF512K32-60G2Q5
5962-9461205HMA	88379	ACT-F512K32N-060F5Q
5962-9461205HMC	54230	WF512K32-60G2Q5
5962-9461205HMC	88379	ACT-F512K32N-060F5Q
5962-9461205HNC	54230	WF512K32F-60G4Q5
5962-9461205HTC	54230	WF512K32-60G4TQ5
5962-9461205HUA	54230	WF512K32N-60HQ5
5962-9461205HUA	88379	ACT-F512K32N-060P7Q
5962-9461205HUC	54230	WF512K32N-60HQ5
5962-9461205HUC	88379	ACT-F512K32N-060P7Q
5962-9461205HXA	88379	ACT-F512K32N-060P3Q
5962-9461205HXC	88379	ACT-F512K32N-060P3Q
5962-9461205HYC	88379	ACT-F512K32N-060F5UQ
5962-9461205HZA	54230	WF512K32-60G2UQ5
5962-9461205HZC	54230	WF512K32-60G2UQ5
5962-9461205H4A	54230	WF512K32N-60H1Q5
5962-9461205H4A	88379	ACT-F512K32A-060P7Q
5962-9461205H4C	54230	WF512K32N-H1Q5
5962-9461205H4C	88379	ACT-F512K32A-060P7Q
5962-9461205H9A	54230	WF512K32-60G1UQ5
5962-9461205H9C	54230	WF512K32-60G1UQ5

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 for 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.

Vendor CAGE number	Vendor name and address
0EU86	Austin Seminconductor Incorporated 8701 Cross Park Drive Austin, TX 78754-4566
54230	White Electronic Designs Corporation 3601 East University Drive Phoenix, AZ 85034-7217
88379	Aeroflex Circuit Technology 35 South Service Road Plainview NY, 11803-4193