REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Add device type 02. Make corrections to paragragh 1.3 and table I. Add waveform distortion test to table I. The entire document has been through rewrite.	93-06-15	K. A. Cottongim
B	Add vendor CAGE number 57363. Add device types 03, 04, 05, and 06. Add case outlines M, N, T, and U.	93-10-08	K. A. Cottongim
C	Add case outlines 4 and 5.	95-01-13	K. A. Cottongim
D	Remove vendor CAGE 8K957. Add vendor CAGE 88379. Add device types 07, 08, 09, and 10. Update requirements to MIL-PRF-38534.	95-12-06	K. A. Cottongim

THE ORIGINAL FIRST PAGE OF THIS DRAWING HAS BEEN REPLACED.

REV																				
SHEET																				
REV	D	D	D	D	D	D	D	D	D	D	D	D	D							
SHEET	15	16	17	18	19	20	21	22	23	24	25	26	27							

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

PMIC N/A

STANDARD MICROCIRCUIT DRAWING

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

AMSC N/A

PREPARED BY
Gary Zahn

CHECKED BY
Michael C. Jones

APPROVED BY
Gregory A. Lude

DRAWING APPROVAL DATE
92-07-08

REVISION LEVEL
D

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUIT, HYBRID, DIGITAL, MULTICHIP, DUAL CHANNEL, DRIVER-RECEIVER

SIZE	CAGE CODE	
A	67268	**5962-92061**

SHEET 1 OF 27

DESC FORM 193
JUL 94

9004708 0019751 463

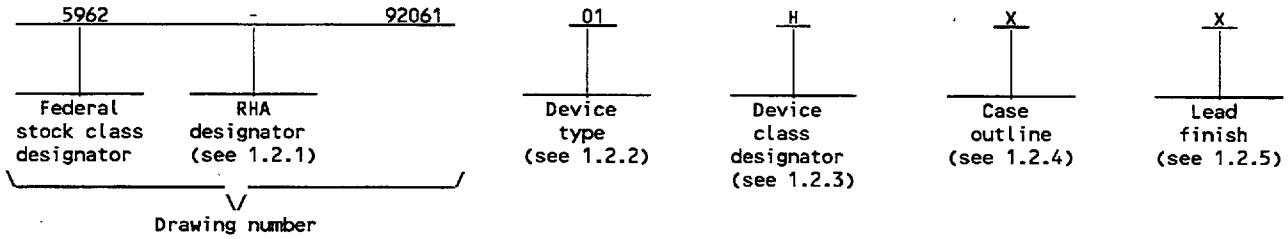
5962-E006-96

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

1. SCOPE

1.1 Scope. This drawing forms a part of a one part - one part number documentation system (see 6.6 herein). This drawing describes device requirements for hybrid microcircuits to be processed in accordance with MIL-PRF-38534. Two product assurance classes, military high reliability (device class H) and space application (device class K) and 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 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. Device classes H and K 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) shall identify the circuit function as follows:

Device type	Generic number	Circuit function
01	MR63147M	+5 V, dual channel, MIL-STD-1553 transceiver (Harris interface)
02	MR63147M-2	+5 V, dual channel, MIL-STD-1553 transceiver (Smith interface)
03	NHI-1559, NHI-1567, NHI-1573, NHI-1579	+5 V, dual channel, MIL-STD-1553 transceiver (standby low)
04	NHI-1560, NHI-1568, NHI-1574, NHI-1580	+5 V, dual channel, MIL-STD-1553 transceiver (standby high)
05	NHI-1563, NHI-1569, NHI-1578, NHI-1593	+5 V, dual channel, MacAir transceiver (standby low)
06	NHI-1570, NHI-1577, NHI-1581, NHI-1594	+5 V, dual channel, MacAir transceiver (standby high)
07	ACT4458-201-3	+5 V, dual channel, MIL-STD-1553 transceiver (standby low)
08	ACT4464-201-3	+5 V, dual channel, MIL-STD-1553 transceiver (standby high)
09	ACT4460-201-3	+5 V, dual channel, MacAir transceiver (standby low)
10	ACT4454-201-3	+5 V, dual channel, MacAir transceiver (standby high)

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 requirements documentation
H or K	Certification and qualification to MIL-PRF-38534

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

Outline letter	Descriptive designator	Terminals	Package style
M	See figure 1	20	Dual-in-line
N	See figure 1	20	Flat pack
T	See figure 1	36	Dual-in-line
U	See figure 1	36	Flat pack
X	See figure 1	36	Dual-in-line
Y	See figure 1	36	Flat pack
Z	See figure 1	24	Micro flat pack
4	See figure 1	36	Dual-in-line (ceramic)
5	See figure 1	36	Flat pack (ceramic)

1.2.5 Lead finish. The lead finish shall be as specified in MIL-PRF-38534 for classes H and K. Finish letter "X" shall not be marked on the microcircuit or its packaging. The "X" designation is for use in specifications when lead finishes A, B, and C are considered acceptable and interchangeable without preference.

1.3 Absolute maximum ratings. 1/

Supply voltage range (V_{CC})	-0.3 V dc to +7.0 V dc
Logic input voltage range	-0.3 V dc to +5.5 V dc
Receiver differential input voltage	10 Vp-p
Driver peak output current	+1.0 A
Power dissipation (P_D), device types 01 and 02:	
Hottest die (100% duty cycle)	2.2 W
Total hybrid (standby)	500 mW
Total hybrid (100% duty cycle)	2.46 W
Power dissipation (P_D), device types 03 through 06:	
Hottest die (100% duty cycle)	500 mW
Total hybrid (standby)	450 mW
Total hybrid (100% duty cycle)	950 mW
Power dissipation (P_D), device types 07 through 10:	
Total hybrid (standby)	100 mW
Total hybrid (100% duty cycle)	2 W
Storage temperature range	-65°C to +150°C
Lead temperature (soldering, 10 seconds)	+300°C
Junction temperature (T_J)	+135°C
Thermal resistance, junction-to-case (θ_{JC}):	
Device types 01 through 06	4°C/W (hottest die)
Device types 07 through 10	5°C/W
Thermal resistance, case-to-air (θ_{CA})	20°C/W (still air)

1.4 Recommended operating conditions.

Supply voltage range (V_{CC}):	
Device types 01, 02, 07, 08, 09, and 10	+4.75 V dc to +5.25 V dc
Supply voltage range (V_{CC}), device types 03 through 06	+4.5 V dc to +5.5 V dc
Logic input voltage range	0 V dc to +5.0 V dc
Receiver differential voltage	8.0 Vp-p
Driver peak output current	+700 mA
Maximum serial data rate	0 Hz to 1.0 MHz
Case operating temperature range (T_C)	-55°C to +125°C

2. APPLICABLE DOCUMENTS

2.1 Government specification, standards, and handbook. Unless otherwise specified, the following specification, standards, and handbook of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATION

MILITARY

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

STANDARDS

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.
MIL-STD-973 - Configuration Management.
MIL-STD-1835 - 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.

HANDBOOK

MILITARY

MIL-HDBK-780 - Standardized Military Drawings.

(Copies of the specification, standards, and handbook required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

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 shall take precedence.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with MIL-PRF-38534 and as specified herein.

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 on figure 1.

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

3.2.3 Timing waveform(s). The timing waveform(s) shall be as specified on figure 3.

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 described in table I.

3.5 Marking. Marking shall be in accordance with MIL-PRF-38534. The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked as listed in QML-38534.

3.6 Manufacturer eligibility. In addition to the general requirements of MIL-PRF-38534, the manufacturer of the part described herein shall maintain the electrical test data (variables format) from the initial quality conformance inspection group A lot sample, produced on the certified line, for each device type listed herein. The data should also 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 (DESC-EC) upon request.

3.7 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to supply to this drawing. The certificate of compliance submitted to DESC-EC shall affirm that the manufacturer's product meets the requirements of MIL-PRF-38534 and the requirements herein.

3.8 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.

4. QUALITY ASSURANCE PROVISIONS

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

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 A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to either DESC-EC 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.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ 2/ 3/ $-55°C \le T_C \le +125°C$ unless otherwise specified	Group A subgroups	Device type	Limits Min	Limits Max	Unit
RECEIVER							
Output low voltage	V_{OL}	I_{OL} = 4.0 mA	1, 2, 3	01,02		0.65	V
				03,04, 05,06		0.4	
				07,08, 09,10		0.5	
Output high voltage	V_{OH}	I_{OH} = -0.4 mA	1, 2, 3	01,02, 07,08, 09,10	2.5		V
				03,04, 05,06	2.7		
Differential input level	V_I		4, 5, 6	All		8.0	V_{p-p}
Input common-mode voltage	V_{ICM}	4/	4, 5, 6	All	-5.0	+5.0	V-pk
Differential input resistance	R_{IN}	1 MHz sine wave 4/	4, 5, 6	01,02	2.0		kΩ
				03,04, 05,06	4.0		
				07,08, 09,10	20.0		
Input capacitance	C_{IN}	1 MHz sine wave 4/	4, 5, 6	All		10.0	pF
Threshold voltage	V_{TH}	1 MHz sine wave 5/	4, 5, 6	All	0.56	1.2	V
Receiver delay	t_{DR}	From input zero crossing to DATA or DATA see figure 3	9,10,11	01,02		600	ns
				03,04, 05,06		450	
				07,08, 09,10		500	
RECEIVER STROBE							
Input low voltage	V_{SIL}		1, 2, 3	All		0.7	V
Input high voltage	V_{SIH}		1, 2, 3	All	2.0		V

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ 2/ 3/ $-55°C \le T_C \le +125°C$ unless otherwise specified	Group A subgroups	Device type	Limits Min	Limits Max	Unit
RECEIVER STROBE - Continued.							
Input low current	I_{SIL}	V_{SIL} = 0.4 V	1, 2, 3	01,02	-1.1		mA
				03,04, 05,06, 07,08, 09,10	-0.4		
Input high current	I_{SIH}	V_{SIH} = 2.7 V	1, 2, 3	01,02, 07,08, 09,10		40.0	µA
				03,04, 05,06		20.0	
Strobe delay	t_{DS}	From strobe rising or falling edge to DATA or DATA see figure 3	9,10,11	01,02		200.0	ns
				03,04, 05,06		40.0	
				07,08, 09,10		100	
TRANSMITTER							
Input low voltage	V_{IL}		1, 2, 3	All		0.7	V
Input high voltage	V_{IH}		1, 2, 3	All	2.0		V
Input low current	I_{IL}	V_{IL} = 0.4 V	1, 2, 3	01,02	-1.1		mA
				03,04, 05,06, 07,08, 09,10	-0.4		
Input high current	I_{IH}	V_{IH} = 2.7 V	1, 2, 3	01,02, 07,08, 09,10		40.0	µA
				03,04, 05,06		20.0	

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ 2/ 3/ $-55°C \le T_C \le +125°C$ unless otherwise specified	Group A subgroups	Device type	Limits Min	Limits Max	Unit
TRANSMITTER - Continnued.							
Differential output voltage	V_O	35Ω load	4, 5, 6	01,02, 07,08, 09,10	6.0	9.0	V_{p-p}
				03,04, 05,06	7.0	9.0	
		140Ω load	4, 5, 6	01,02, 07,08, 09,10	24.0	36.0	V_{p-p}
				03,04, 05,06	28.0	36.0	
Differential output noise	V_{ON}	Inhibited 4/	4, 5, 6	All		10.0	mV_{p-p}
Differential output resistance	R_{OUT}	Transmitter off 4/	4, 5, 6	01,02, 03,04, 05,06	10.0		kΩ
		6/		07,08, 09,10	2.0		
Output impedence	R_{OUT}	When transmitting 4/	4, 5, 6	05,06		10.0	Ω
		7/		09,10		40.0	
Output capacitance	C_{OUT}	1 MHz sine wave 4/	4, 5, 6	01,02, 03,04, 05,06		15.0	pF
		7/		07,08, 09,10		15.0	

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ 2/ 3/ $-55°C \le T_C \le +125°C$ unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
TRANSMITTER - Continnued.							
Differential offset voltage	V_{OS}	35Ω load 8/	4, 5, 6	All	-90.0	+90.0	mV-pk
		140Ω load 8/			-360.0	+360.0	
Waveform distortion	Vwd	35Ω load 9/	4, 5, 6	01,02	-1.0	+1.0	Vpeak
		35Ω load 10/		03,04, 05,06, 07,08, 09,10	-0.1	+0.1	
Rise time	t_r	35Ω load, see figure 3	9,10,11	01,02, 03,04, 07,08	100.0	300.0	ns
Fall time	t_f	35Ω load, see figure 3	9,10,11	01,02, 03,04, 07,08	100.0	300.0	ns
Rise time	t_r	10% to 90%, see figure 3	9,10,11	05,06	220.0	300.0	ns
				09,10	200.0	300.0	
Fall time	t_f	10% to 90%, see figure 3	9,10,11	05,06	220.0	300.0	ns
				09,10	200.0	300.0	
Driver delay	t_{DT}	TX in to TX out see figure 3	9,10,11	01,02		450.0	ns
				03,04, 05,06, 07,08		150.0	
				09,10		400.0	

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ 2/ 3/ $-55°C \le T_C \le +125°C$ unless otherwise specified	Group A subgroups	Device type	Limits Min	Limits Max	Unit
TRANSMITTER - Continnued.							
Output harmonic content (Referenced to the average peak value at 1.0 MHz)		f = 1.5 MHz 3/	9,10,11	05,06, 09,10		-3	dB
		f = 2.5 MHz 3/				-13.5	
		f = 4.0 MHz 3/				-25.5	
TRANSMITTER INHIBIT							
Input low voltage	V_{IIL}		1, 2, 3	All		0.7	V
Input high voltage	V_{IIH}		1, 2, 3	All	2.0		V
Input low current	I_{IIL}	V_{IIL} = 0.4 V	1, 2, 3	01,02	-1.1		mA
				03,04, 05,06, 07,08, 09,10	-0.4		
Input high current	I_{IIH}	V_{IIH} = 2.7 V	1, 2, 3	01,02, 07,08, 09,10		40.0	µA
				03,04, 05,06		20.0	
Inhibit delay	t_{DI-H}	Inhibited output see figure 3	9,10,11	01,02, 07,08, 09,10		450.0	ns
				03,04, 05,06		150.0	
	t_{DI-L}	Active output see figure 3	9,10,11	01,02, 07,08		250.0	ns
				03,04, 05,06		150.0	
				09,10		450.0	

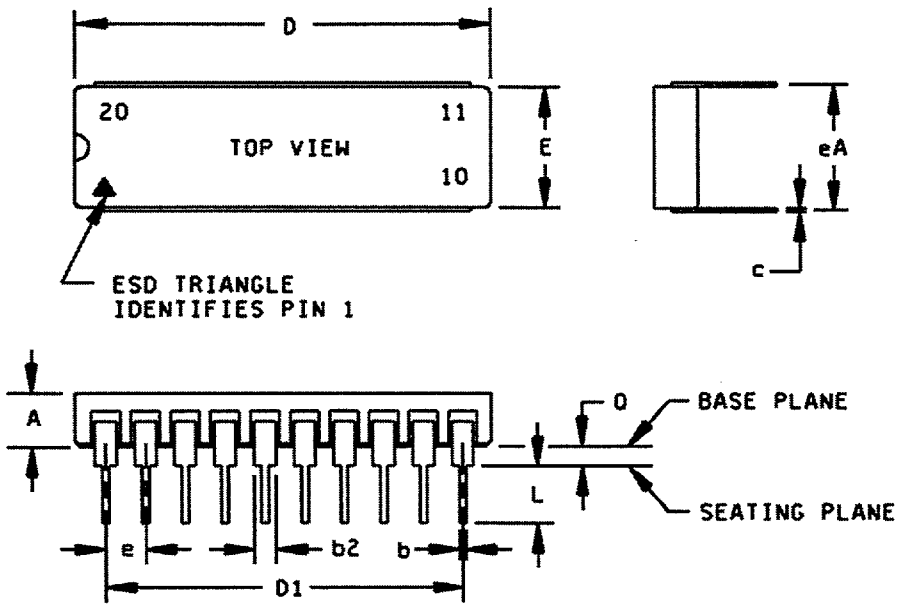
See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ 2/ 3/ $-55°C \le T_C \le +125°C$ unless otherwise specified	Group A subgroups	Device type	Limits Min	Limits Max	Unit
POWER SUPPLY							
Supply current	I_{CC1}	Standby, data applied, Inhibit high	1, 2, 3	01,02		55.0	mA
				03,04, 05,06		45.0	
				07,08, 09,10		30.0	
	I_{CC2}	25% duty cycle, 1 MHz See note 11.	4, 5, 6	01,02		300.0	mA
				03,04, 05,06 07,08, 09,10		195.0	
	I_{CC3}	50% duty cycle, 1 MHz See note 11.	4, 5, 6	01,02		500.0	mA
				03,04, 05,06		325.0	
				07,08, 09,10		345.0	
	I_{CC4}	100% duty cycle, 500 kHz See note 11.	4, 5, 6	01,02		800.0	mA
				03,04, 05,06		625.0	
				07,08, 09,10		650.0	
	I_{CC5}	80% duty cycle, 1 MHz	4, 5, 6	01,02		800.0	mA
				03,04, 05,06		600.0	

1/ V_{CC} = +5.0 V dc ±0.1 V dc unless otherwise specified.
2/ All specifications and limits are for a single channel with no connections made to the other channel.
3/ Device types 03, 04, 05, 06, 07, 08, 09, and 10 are fully compliant to MIL-STD-1553 electrical specifications.
4/ Parameter shall be tested as part of device initial characterization and after design and process changes. Parameter shall be guaranteed to limits specified in table 1 for all lots not specifically tested.
5/ Threshold determined by first missing word of 33 word transmission to a 15530 CMOS Manchester encoder-decoder.
6/ When measured from 75 kHz to 1MHz at transformer secondary with transformer self impedence of 3 kohms minimum, power on/off.
7/ When measured from 75 kHz to 1MHz at transformer secondary.
8/ Offset is measured 2.5 µs after the mid-bit zero crossing of the last parity bit of a 660 µs transmission.
9/ This parameter exceeds the limits as indicated in MIL-STD-1553 for device types 01 and 02.
10/ The limits for device types 03, 04, 05, 06, 07, 08, 09, and 10 fully complies to MIL-STD-1553.
11/ For device types 07, 08, 09, and 10 the maximum supply currents with resolver to 2.12:1 transformer. Frequency equals 1 MHz.

Case outline M

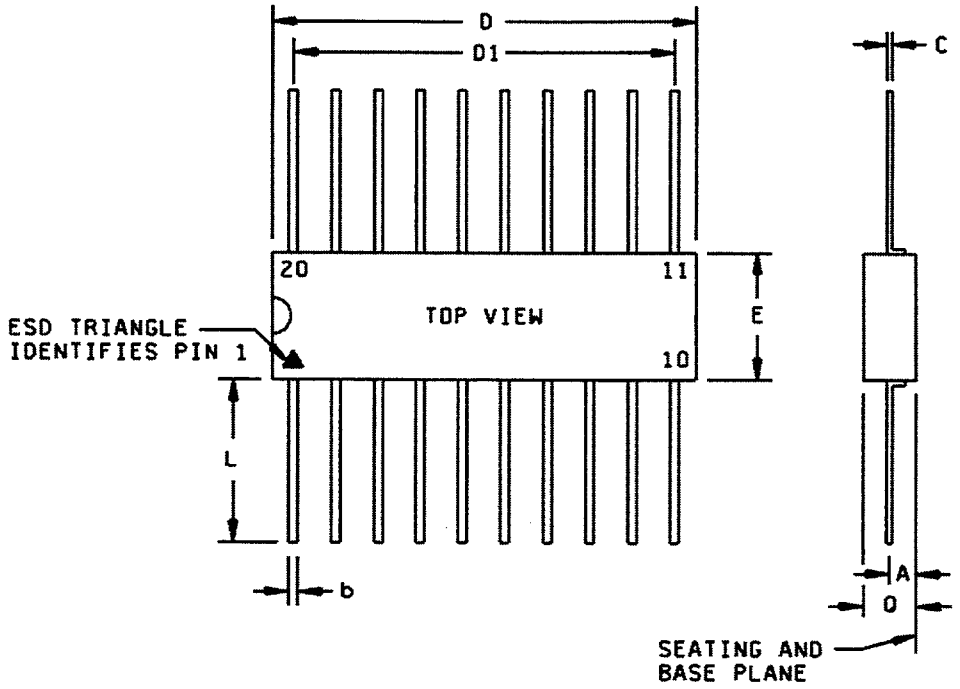


Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	2.49	3.10	0.098	0.122
b	0.41	0.51	0.016	0.020
b2	1.27 TYP		0.050 TYP	
c	0.20	0.30	0.008	0.012
D	25.15	25.65	0.990	1.010
D1	22.61	23.11	0.890	0.910
e	2.54 BSC		0.100 BSC	
E	7.29	7.70	0.287	0.303
eA	7.37	7.87	0.290	0.310
L	3.81		0.150	
Q	0.64	1.14	0.025	0.045

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.

Case outline N

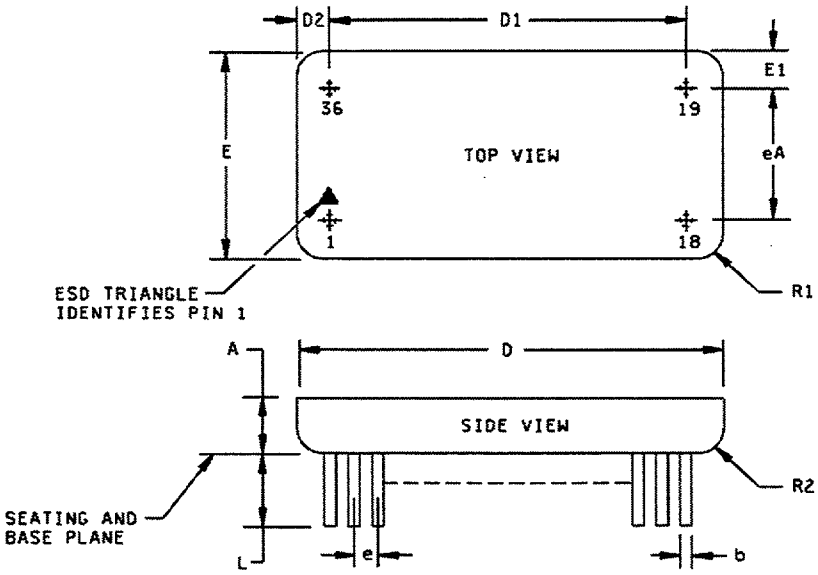


Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	1.27	1.78	0.050	0.070
b	0.41	0.51	0.016	0.020
c	0.20	0.30	0.008	0.012
D	25.15	25.65	0.990	1.010
D1	22.61	23.11	0.890	0.910
E	7.37	7.87	0.290	0.310
L	10.16		0.400	
Q	2.49	3.10	0.098	0.122

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

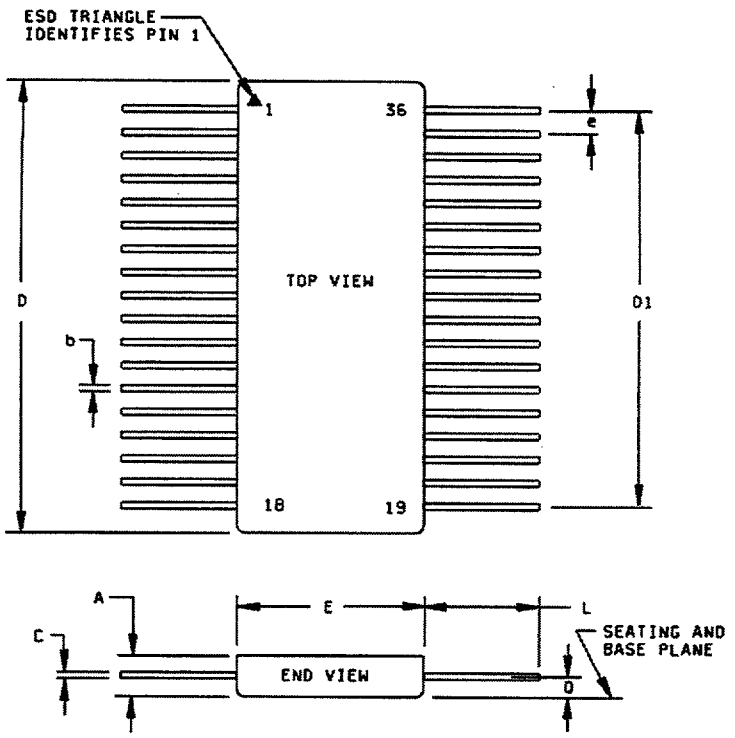


Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	4.45	4.95	0.175	0.195
b	0.41	0.51	0.016	0.020
D	48.01	48.51	1.890	1.910
D1	43.05	43.31	1.695	1.705
D2	2.29	2.79	0.090	0.110
E	19.56	20.07	0.770	0.790
E1	2.03	2.54	0.080	0.100
e	2.54 BSC		0.100 BSC	
eA	14.99	15.49	0.590	0.610
L	6.35		0.250	
R1	2.18 TYP		0.086 TYP	
R2	1.40 TYP		0.055 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 U



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	3.81	4.32	0.150	0.170
b	0.30	0.51	0.012	0.020
c	0.20	0.30	0.008	0.012
D	48.01	48.51	1.890	1.910
D1	48.05	43.31	1.695	1.705
e	2.54 BSC		0.100 BSC	
E	19.56	20.07	0.770	0.790
L	10.16		0.400	
Q	1.78	2.29	0.070	0.090

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 X

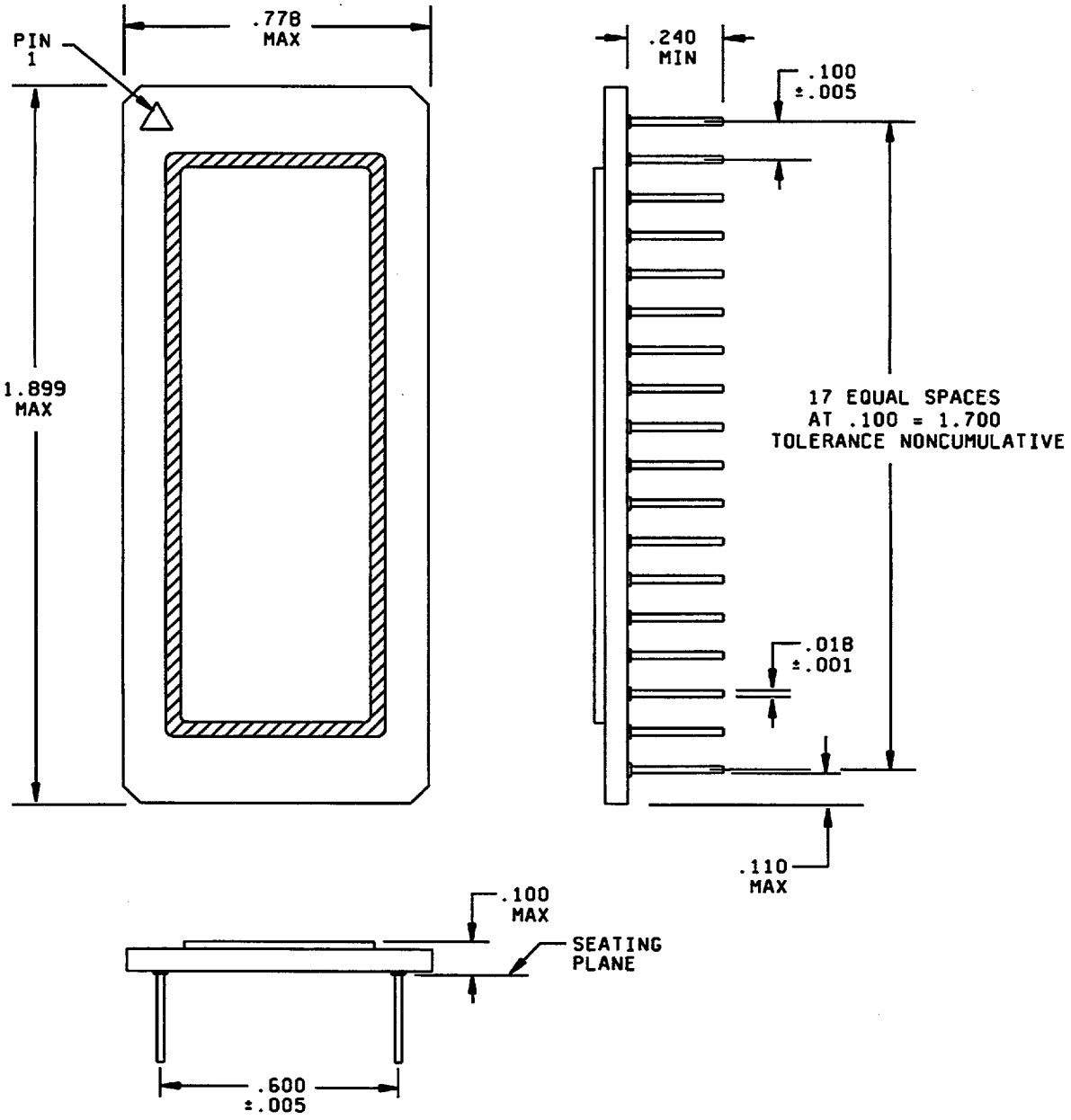


FIGURE 1. Case outlines - Continued.

STANDARD MICROCIRCUIT DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-92061
		REVISION LEVEL D	SHEET 15

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Case outline Y

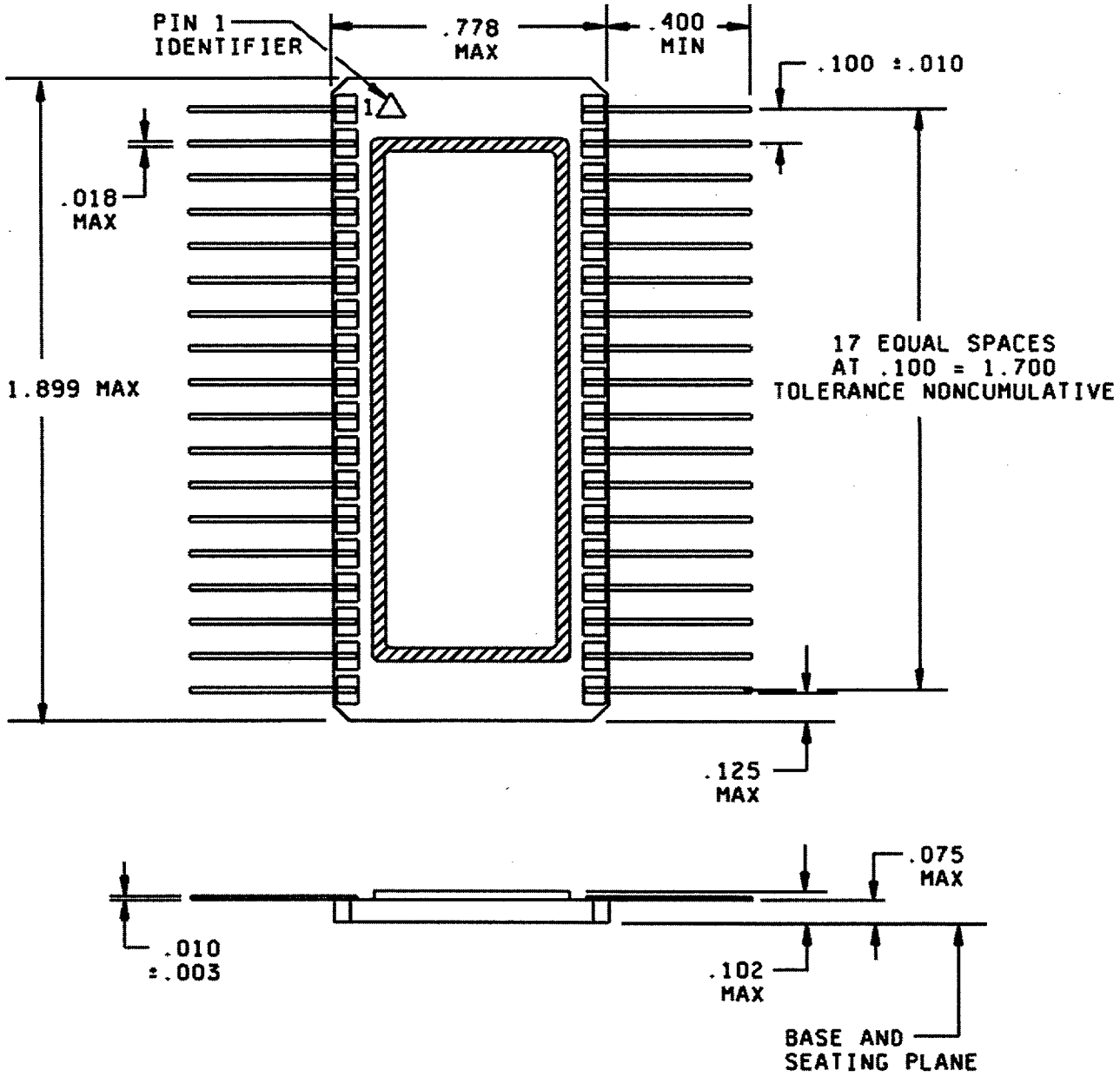
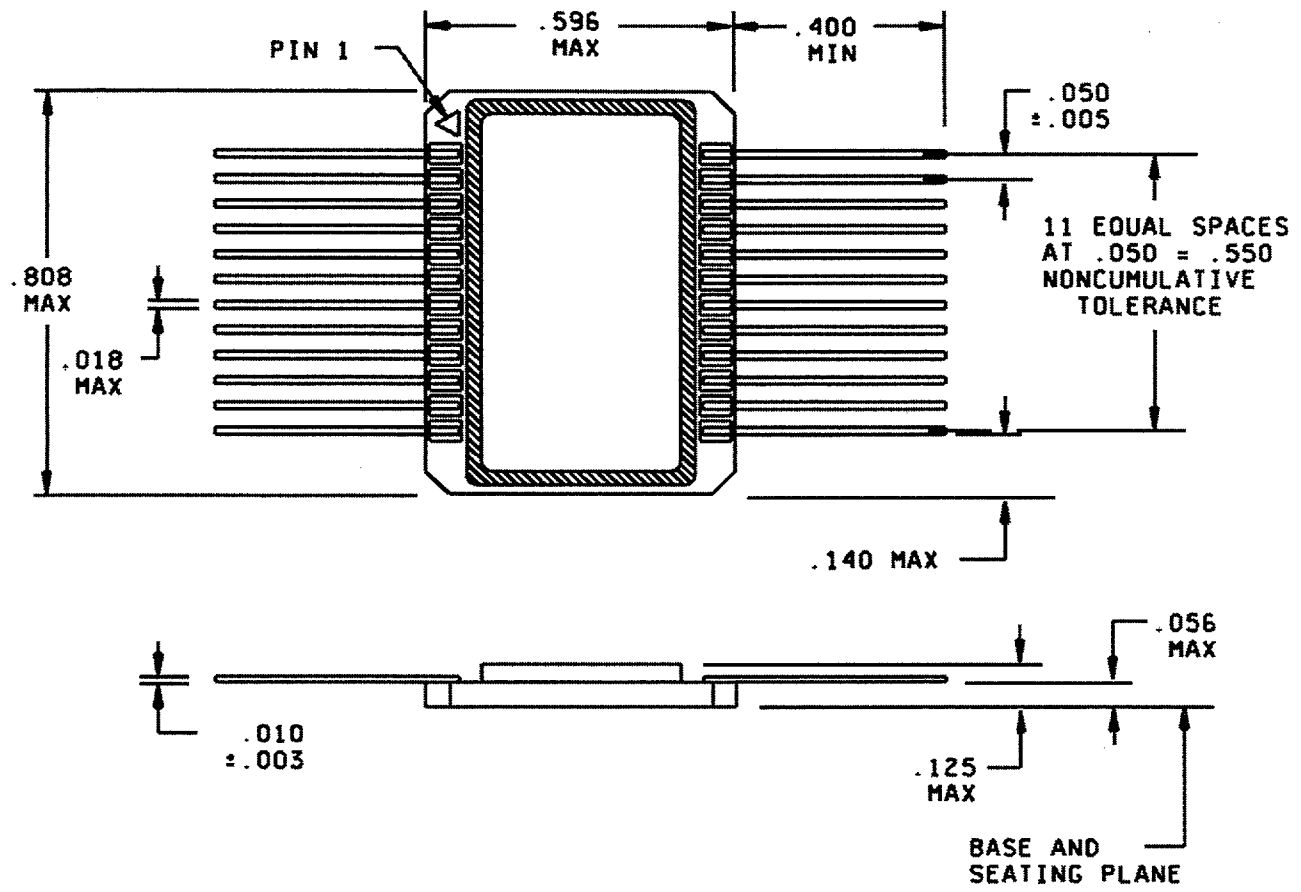


FIGURE 1. Case outlines - Continued.

Case outline Z

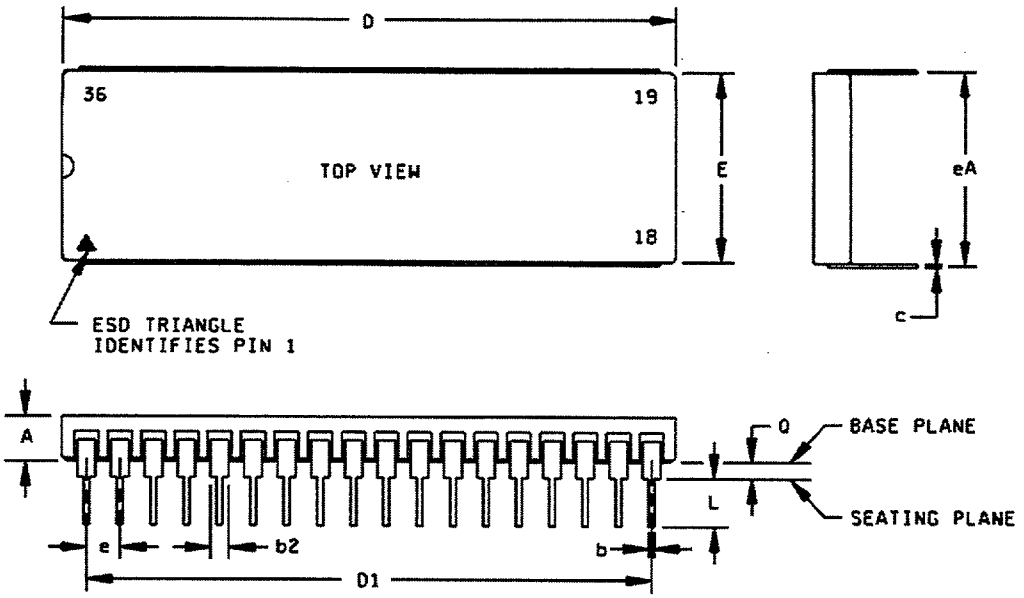


Inches	mm	Inches	mm	Inches	mm
.001	0.03	.075	1.91	.400	10.16
.003	0.08	.100	2.54	.550	13.97
.005	0.13	.102	2.59	.596	15.14
.010	0.25	.110	2.79	.600	15.24
.018	0.46	.125	3.18	.778	19.76
.050	1.27	.140	3.56	.808	20.53
.056	1.42	.240	6.10	1.700	43.18
				1.899	48.23

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are for general information only.
3. Unless otherwise specified, tolerance for three place decimals shall be ±.005 (.013 mm).
4. Case outline X, leads are bottom brazed to package.
5. Case outlines Y and Z may be supplied with a ceramic tiebar beyond the .400 lead dimension, to hold leads in place. Finished lead length visual acceptance criteria for solder dip apply to the leads up to .400 inch. The lead spacing measured shall be no less than .400 inch from edge of package.

FIGURE 1. Case outlines - Continued.

Case outline 4

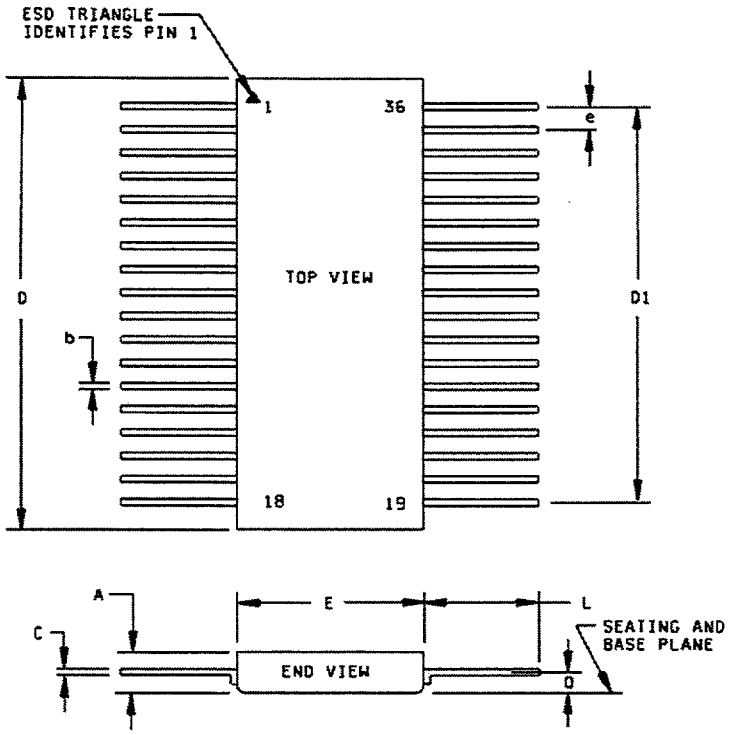


Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A		3.56		0.140
b	0.41	0.51	0.016	0.020
b2	1.23	1.32	0.048	0.052
c	0.20	0.30	0.008	0.012
D	46.61	47.37	1.835	1.865
D1		43.18		1.700
e	2.54 BSC		0.100 BSC	
E	14.78	15.19	0.582	0.598
eA	14.99	15.49	0.590	0.610
L	3.81		0.150	
Q	1.02	1.52	0.040	0.060

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 5



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	2.74	3.35	0.108	0.132
b	0.41	0.51	0.016	0.020
c	0.20	0.30	0.008	0.012
D	46.61	47.37	1.835	1.865
D1		43.18		1.700
e	2.54 BSC		0.100 BSC	
E	14.99	15.49	0.590	0.610
L	12.70		0.500	
Q	1.78	2.29	0.070	0.090

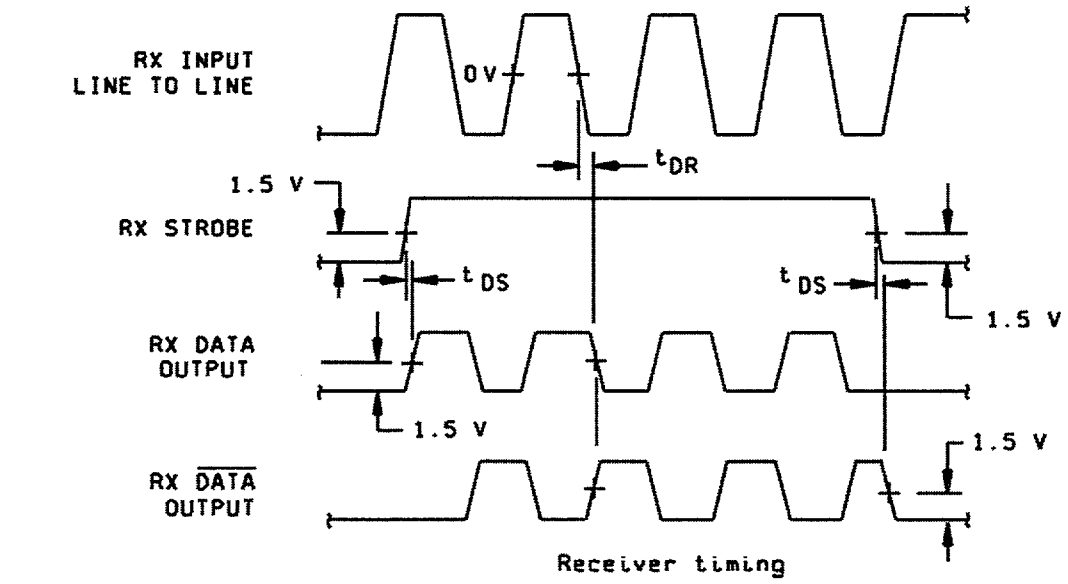
NOTES:
1. The U.S. preferred system of measurement is the metric SI. This item was designed using inch-pound units of measurement. In case of problems involving conflicts between the metric and inch-pound units, the inch-pound units shall rule.
2. Pin numbers are for reference only.

FIGURE 1. Case outlines - Continued.

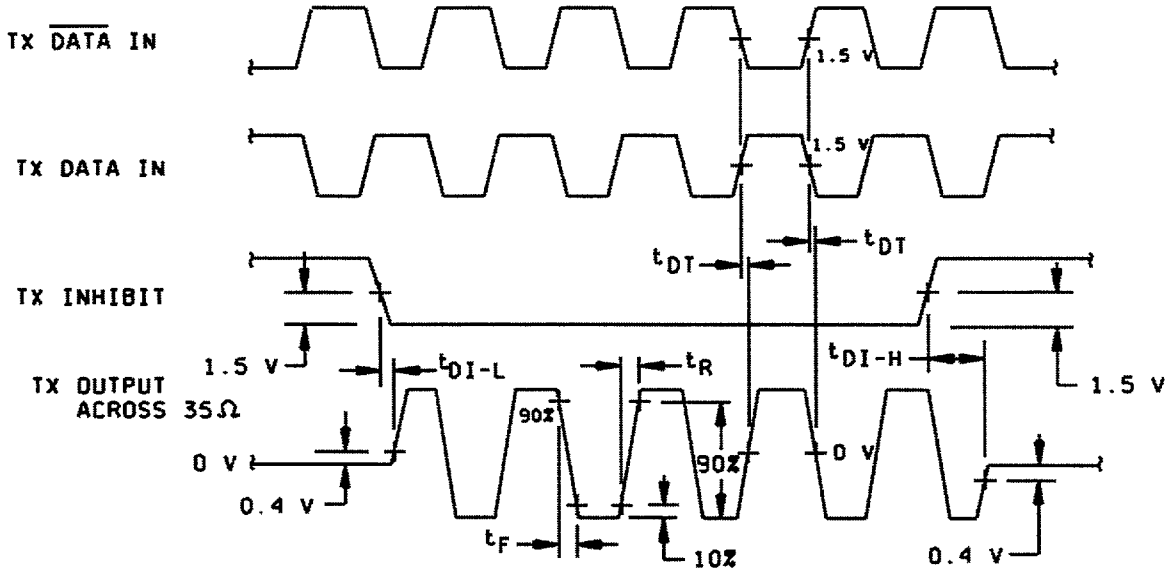
Device types	03, 04, 05, and 06		All		01, 02, 03, 04, 05, 06, 07, 08, 09, and 10	
Case outlines	M and N		X and Y (01 and 02) U, T, 4, and 5 (03, 04, 05, and 06)		Z	
Terminal number	Terminal symbol	Channel	Terminal symbol	Channel	Terminal symbol	Channel
1	+5 V dc (V_{CC})	A	TX DATA out	One	TX DATA out/RX DATA in	One
2	BUS_A	A	TX DATA out	One	TX DATA out/RX DATA in	One
3	BUS_A_L	A	GND	One	GND	One
4	RXENA_A	A	NC		RX DATA out	One
5	GND_A	A	RX DATA out	One	Strobe	One
6	+5 V dc (V_{CC})	B	Strobe	One	RX DATA out	One
7	BUS_B	B	GND	One	TX DATA out/RX DATA in	Two
8	BUS_B_L	B	RX DATA out	One	TX DATA out/RX DATA in	Two
9	RXENA_B	B	GND (case)	One	GND	Two
10	GND_B	B	TX DATA out	Two	RX DATA out	Two
11	RXB_L	B	TX DATA out	Two	Strobe	Two
12	RXB	B	GND	Two	RX DATA out	Two
13	TXINH_B	B	NC		GND	Two
14	TX_B	B	RX DATA out	Two	+5 V dc (V_{CC})	Two
15	TXB_L	B	Strobe	Two	GND	Two
16	RXA_L	A	GND	Two	Inhibit	Two
17	RXA	A	RX DATA out	Two	TX DATA in	Two
18	TXINH_A	A	NC		TX DATA in	Two
19	TXA	A	NC		GND	One
20	TXA_L	A	RX DATA in	Two	+5 V dc (V_{CC})	One
21	---	---	RX DATA in	Two	GND	One
22	---	---	GND	Two	Inhibit	One
23	---	---	NC		TX DATA in	One
24	---	---	+5 V dc (V_{CC})	Two	TX DATA in	One
25	---	---	Inhibit	Two	---	---
26	---	---	TX DATA in	Two	---	---
27	---	---	TX DATA in	Two	---	---
28	---	---	NC		---	---
29	---	---	RX DATA in	One	---	---
30	---	---	RX DATA in	One	---	---
31	---	---	GND	One	---	---
32	---	---	NC		---	---
33	---	---	+5 V dc (V_{CC})	One	---	---
34	---	---	Inhibit	One	---	---
35	---	---	TX DATA in	One	---	---
36	---	---	TX DATA in	One	---	---

FIGURE 2. Terminal connections.

Device types 01, 03, and 07.



Receiver timing

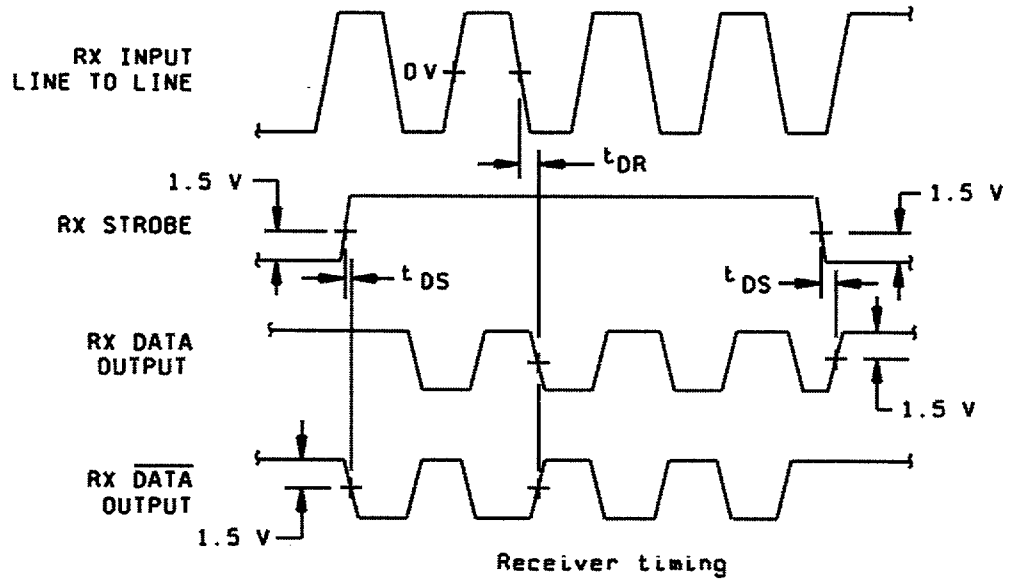


Transmitter timing

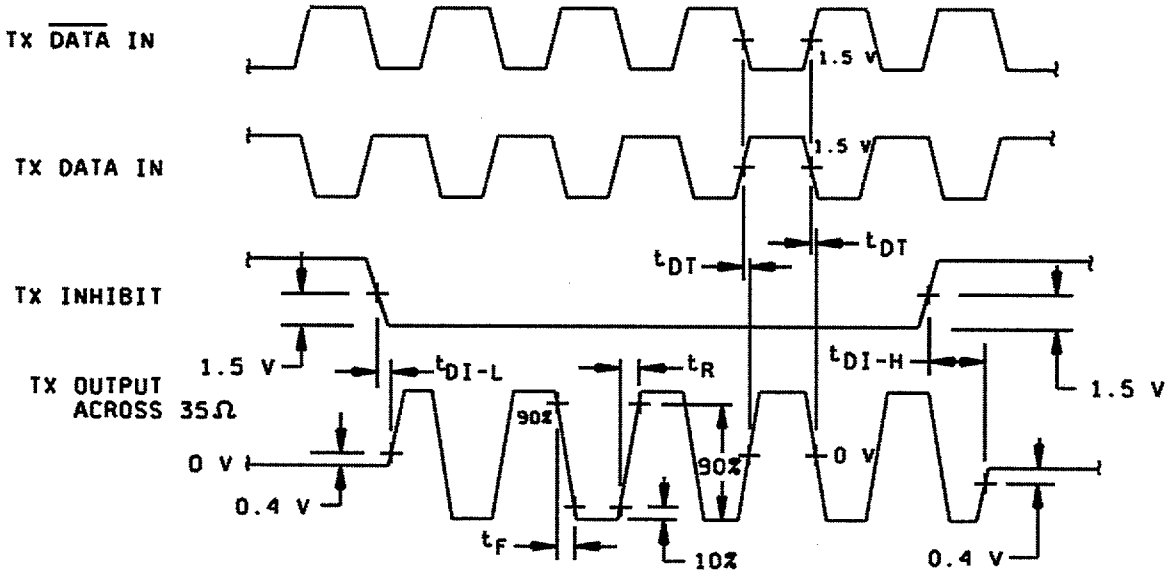
NOTE: Both inputs "TX $\overline{\text{DATA}}$ IN" and "TX DATA IN" must be in the same logic states during off times.

FIGURE 3. Timing waveforms.

Device types 02, 04, and 08.



Receiver timing

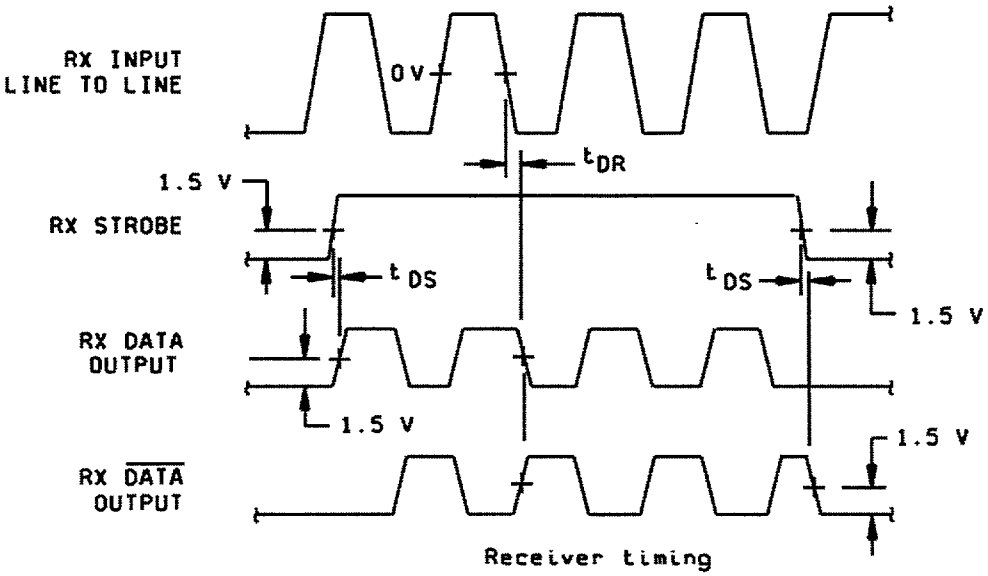


Transmitter timing

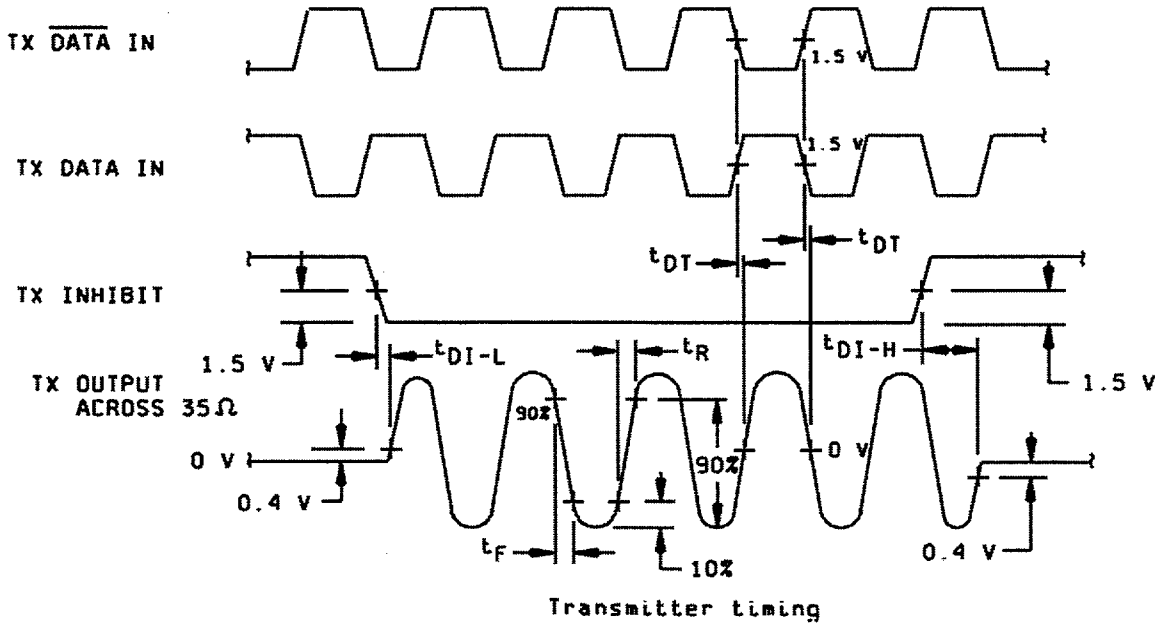
NOTE: Both inputs "TX $\overline{\text{DATA}}$ IN" and "TX DATA IN" must be in the same logic states during off times.

FIGURE 3. Timing waveforms - Continued.

Device types 05 and 09.



Receiver timing

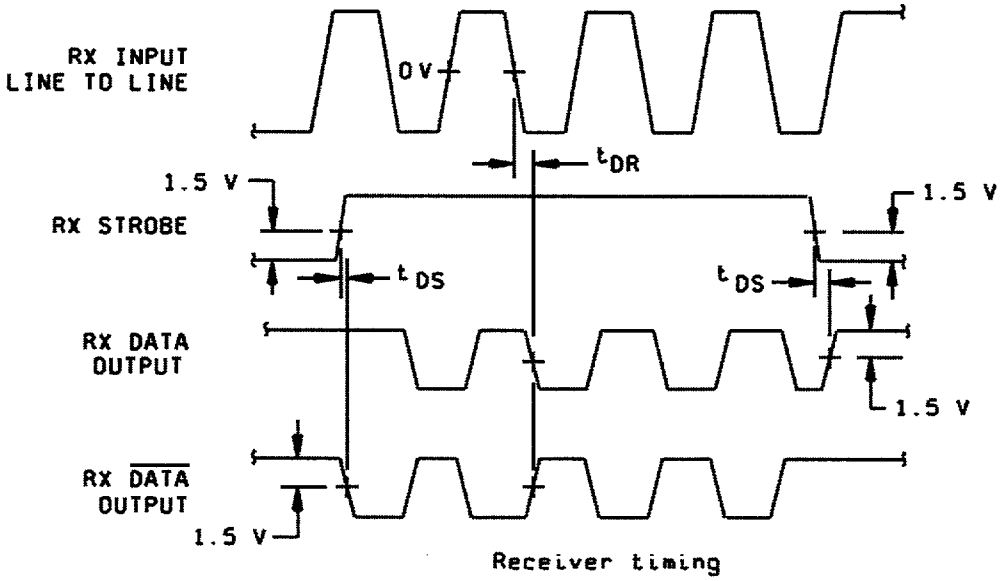


Transmitter timing

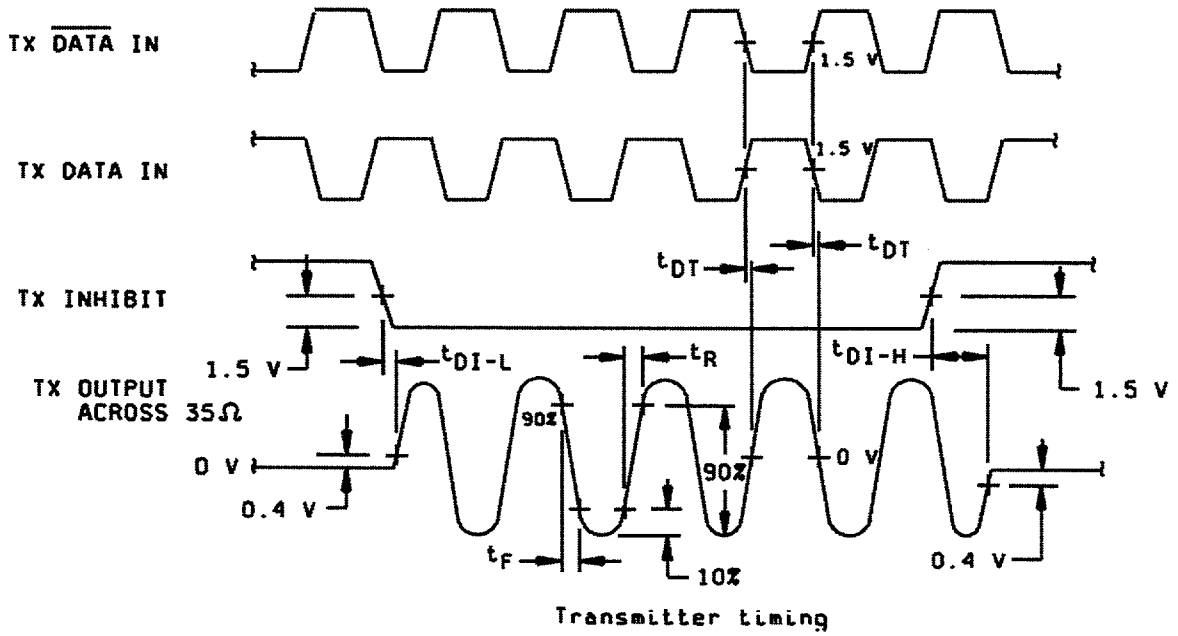
NOTE: Both inputs "TX $\overline{\text{DATA}}$ IN" and "TX DATA IN" must be in the same logic states during off times.

FIGURE 3. Timing waveforms - Continued.

Device types 06 and 10.



Receiver timing



Transmitter timing

NOTE: Both inputs "TX $\overline{\text{DATA}}$ IN" and "TX DATA IN" must be in the same logic states during off times.

FIGURE 3. Timing waveforms - Continued.

TABLE II. Electrical test requirements.

MIL-PRF-38534 test requirements	Subgroups (in accordance with MIL-PRF-38534, group A test table)
Interim electrical parameters	3,6,11
Final electrical test parameters	1*,2,3,4,5,6,9,10,11
Group A test requirements	1,2,3,4,5,6,9,10,11
Group C end-point electrical parameters	1,2,3
MIL-STD-883, group E end-point electrical parameters for RHA devices	Subgroups ** (in accordance with method 5005, group A test table)

* PDA applies to subgroup 1.
** When applicable to this standardized military drawing, the subgroups shall be defined.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with MIL-PRF-38534 and as specified herein.

4.3.1 Group A inspection. 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 7 and 8 shall be omitted.

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

4.3.3 Group C inspection. 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 A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to either DESC-EC 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. Group D inspection shall be in accordance with MIL-PRF-38534.

4.3.5 Group E inspection. Group E inspection is required only for parts intended to be marked as radiation hardness assured (see 3.5 herein). RHA levels for device classes H and K shall be M, D, R, and H. RHA quality conformance inspection sample tests shall be performed at the RHA level specified in the acquisition document.

a. RHA tests for device classes H and K for levels M, D, R, and H shall be performed through each level to determine at what levels the devices meet the RHA requirements. These RHA tests shall be performed for initial qualification and after design or process changes which may affect the RHA performance of the device.

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

c. Prior to total dose irradiation, each selected sample shall be assembled in its qualified package. It shall pass the specified group A electrical parameters in table I for subgroups specified in table II herein.

d. For device classes H and K, the devices shall be subjected to radiation hardness assured tests as specified in MIL-PRF-38534 for RHA level being tested, and meet the postirradiation end-point electrical parameter limits as defined in table I at T_A = +25°C ±5 percent, after exposure.

e. Prior to and during total dose irradiation testing, the devices shall be biased to establish a worst case condition as specified in the radiation exposure circuit.

f. For device classes H and K, subgroups 1 and 2 in table V, method 5005 of MIL-STD-883 shall be tested as appropriate for device construction.

g. When specified in the purchase order or contract, a copy of the RHA delta limits shall be supplied.

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 with the users of record for the individual documents. This coordination will be accomplished in accordance with MIL-STD-973 using DD Form 1692, Engineering Change Proposal.

6.4 Record of users. Military and industrial users shall inform Defense Electronics Supply Center when a system application requires configuration control and the applicable SMD. DESC 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 DESC-EC, telephone (513) 296-6047.

6.5 Comments. Comments on this drawing should be directed to DESC-EC, Dayton, Ohio 45444, or telephone (513) 296-5373.

6.6 One part - one part number system. The one part - one part number system described below has been developed to allow for transitions between identical generic devices covered by the three major microcircuit requirements documents (MIL-PRF-38534, MIL-PRF-38535, and 1.2.1 of MIL-STD-883) without the necessity for the generation of unique PIN's. The three military requirements documents represent different class levels, and previously when a device manufacturer upgraded military product from one class level to another, the benefits of the upgraded product were unavailable to the Original Equipment Manufacturer (OEM), that was contractually locked into the original unique PIN. By establishing a one part number system covering all three documents, the OEM can acquire to the highest class level available for a given generic device to meet system needs without modifying the original contract parts selection criteria.

Military documentation format	Example PIN under new system	Manufacturing source listing	Document listing
New MIL-PRF-38534 Standard Microcircuit Drawings	5962-XXXXXZZ(H or K)YY	QML-38534	MIL-BUL-103
New MIL-PRF-38535 Standard Microcircuit Drawings	5962-XXXXXZZ(Q or V)YY	QML-38535	MIL-BUL-103
New 1.2.1 of MIL-STD-883 Standard Microcircuit Drawings	5962-XXXXXZZ(M)YY	MIL-BUL-103	MIL-BUL-103

6.7 Sources of supply for device classes H and K. Sources of supply for device classes H and K are listed in QML-38534. The vendors listed in QML-38534 have submitted a certificate of compliance (see 3.7 herein) to DESC-EC and have agreed to this drawing.