National Semiconductor

MILITARY DATA SHEET

MNDS9622-X REV 1A0

Original Creation Date: 01/25/96
Last Update Date: 04/26/96
Last Major Revision Date: 01/25/96

DUAL LINE RECEIVER

General Description

The DS9622 is a dual line receiver designed to discriminate a worst case logic swing of 2V from a ± 10V common mode noise signal or ground shift. A 1.5V threshold is built into the differential amplifier to offer a TTL compatible threshold voltage and maximum noise immunity. The offset is obtained by use of current sources and matched resistors.

The DS9622 allows the choice of output states with the input open, without affecting circuit performance by use of S3 input. A 130 ohms terminating resistor is provided at the input of each line receiver. An enable is also provided for each line receiver. The output level can be increased to 12V by tying it to a positive supply through a resistor. The output circuits allow wired-OR operation.

Industry Part Number

DS9622

NS Part Numbers

DS9622ME/883
DS9622MJ/883
DS9622MW/883

Prime Die

DS9622

Processing

MIL-STD-883, Method 5004

Quality Conformance Inspection

MIL-STD-883, Method 5005

Subgrp	Description	Temp (°C)
1	Static tests at	+25
2	Static tests at	+125
3	Static tests at	-55
4	Dynamic tests at	+25
5	Dynamic tests at	+125
6	Dynamic tests at	-55
7	Functional tests at	+25
8A	Functional tests at	+125
8B	Functional tests at	-55
9	Switching tests at	+25
10	Switching tests at	+125
11	Switching tests at	-55

Features

- TTL compatible threshold voltage
- Input terminating resistors
- Choice of output state with inputs open
- TTL compatible output
- High common mode
- Wired-OR capability
- Enable inputs
- Logic compatible supply voltages

(Absolute Maximum Ratings)
(Note 1)

Storage Temperaure Range	-65 C to +175 C
Operating Temperature Range	-55 C to +125 C
Lead Temperature (Soldering, 60 Sec.)	300 C
V+ to Gnd	-0.5V to +7.0V
Input Voltage	± 15V
Voltage Applied to Outputs for Output High State	-0.5V to +13.2V
V^{-} to Gnd	-0.5V to -12V
Enable to Gnd	-0.5V to +15V

Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. They are not meant to imply that the devices should be operated at these limits. The tables of "Electrical Characteristics" provide conditions for actual device operation.

Recommended Operating Conditions

Supply Voltage, Vcc	4.5V to 5.5V
Temperature, TA	-55 C to +125 C

Electrical Characteristics

DC PARAMETER

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
VOL	Logical "0" output Voltage	S3 = 4.5V, Vdiff=2.0V, En= OPEN						
		V+ =4.5V, V- = -11V, FIOL = 12.4mA, P4/P11 = -7.5V, P6/P9 = -5.5V				0.4	v	1, 2, 3
		V+ =4.5V, V- = -11V, FIOL = 12.4mA, P4/P11 = 4.5V, P6/P9 = 2.5V				0.4	V	1, 2, 3
		V+ =4.5V, V- = - 11V, FIOL = 12.4mA, P4/P11 = 2.0V, P6/P9 = 0.0V				0.4	V	1, 2, 3
		V+ =4.5V, V- = -11V, FIOL = 12.4mA, P4/P11 = 0.0V, P6/P9 = -2.0V				0.4	V	1, 2, 3
		V+ =4.5V, V- = -11V, FIOL = 12.4mA, P4/P11 = -2.5V, P6/P9 = -4.5V				0.4	v	1, 2, 3
		V+ =4.5V, V- = -11V, FIOL = 12.4mA, P4/P11 = -5.5V, P6/P9 = -7.5V				0.4	v	1, 2, 3
		V+ =4.5V, V- = - 9V, FIOL = 12.4mA, P4/P11 = 7.5V, P6/P9 = 5.5V				0.4	v	1, 2, 3
		V+ =4.5V, V- = - 9V, FIOL = 12.4mA, P4/P11 = 4.5V, P6/P9 = 2.5V				0.4	v	1, 2, 3
		V+ =4.5V, V- = - 9V, FIOL = 12.4mA, P4/P11 = 2.0V, P6/P9 = 0.0V				0.4	v	1, 2, 3
		V+ =4.5V, V- = - 9V, FIOL = 12.4mA, P4/P11 = 0.0V, P6/P9 = -2.0V				0.4	v	1, 2, 3
		V+ =4.5V, V- = - 9V, FIOL = 12.4mA, P4/P11 = -2.5V, P6/P9 = -4.5V				0.4	v	1, 2, 3
		V+ =4.5V, V- = - 9V, FIOL = 12.4mA, P4/P11 = -5.5V, P6/P9 = -7.5V				0.4	v	1, 2, 3
		V+ =5.5V, V- = -11V, FIOL = 12.4mA, P4/P11 = 7.5V, P6/P9 = 5.5V				0.4	v	1, 2, 3
		V+ =5.5V, V- = -11V, FIOL = 12.4mA, P4/P11 = 4.5V, P6/P9 = 2.5V				0.4	v	1, 2, 3
		V+ =5.5V, V- = -11V, FIOL = 12.4mA, P4/P11 = 2.0V, P6/P9 = 0.0V				0.4	v	1, 2, 3
		V+ =5.5V, V- = -11V, FIOL = 12.4mA, P4/P11 = 0.0V, P6/P9 = -2.0V				0.4	v	1, 2, 3
		V+ =5.5V, V- = -11V, FIOL = 12.4mA, P4/P11 = -2.5V, P6/P9 = -4.5V				0.4	v	1, 2, 3
		V+ =5.5V, V- = -11V, FIOL = 12.4mA, P4/P11 = -5.5V, P6/P9 = -7.5V				0.4	v	1, 2, 3
		V+ =5.5V, V- = - 9V, FIOL = 12.4mA, P4/P11 = 7.5V, P6/P9 = 5.5V				0.4	v	1, 2, 3
		V+ =5.5V, V- = - 9V, FIOL = 12.4mA, P4/P11 = 4.5V, P6/P9 = 2.5V				0.4	v	1, 2, 3

Electrical Characteristics

DC PARAMETER(Continued)

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
VOL	Logical "0" output Voltage	V+ =5.5V, V- = - 9V, FIOL = 12.4mA, P4/P11 = 2.0V, P6/P9 = 0.0V				0.4	v	1, 2, 3
		V+ =5.5V, V- = - 9V, FIOL = 12.4mA, P4/P11 = 0.0V, P6/P9 = -2.0V				0.4	v	1, 2, 3
		V+ =5.5V, V- = - 9V, FIOL = 12.4mA, P4/P11 = -2.5V, P6/P9 = -4.5V				0.4	v	1, 2, 3
		V+ =5.5V, V- = - 9V, FIOL = 12.4mA, P4/P11 = -5.5V, P6/P9 = -7.5V				0.4	v	1, 2, 3
VOLQ2	Logical "0" Output Voltage	S3=0V, Inputs = OPEN, En = OPEN						
		V+ = 4.5V, V- = -11V, FIOL = 12.4mA				0.4	V	1, 2, 3
VOH	Logical "1" Output Voltage	S3=0V, Vdiff= .7V, En = OPEN						
		V+ = 4.5V, V- = -9.0V, FIOH = -0.2mA			3.0		V	1
					2.9		V	2
					2.8		V	3
		V+ = 4.5V, V- = -11 V, FIOH = -0.2mA			3.0		V	1
					2.9		V	2
					2.8		V	3
		V+ = 5.5V, V- = -11 V, FIOH = -0.2mA			3.0		V	1
					2.9		V	2
					2.8		V	3
		V+ = 5.5V, V- = -9.0V, FIOH = -0.2mA			3.0		V	1
					2.9		V	2
					2.8		V	3

Electrical Characteristics

DC PARAMETER(Continued)

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
VHB	Logical "1" Output Voltage	S3 = 0V, VIN (EN) 1.0 @ 25c, 0.7 @ 125c, 1.3 @ -55C						
		V+ = 5V, V- = -10V, FIOHB = -0.2mA			3.0		V	1
					2.9		V	2
					2.8		V	3
		V+ =4.5V, V- = -9.0V, FIOHB = -0.2mA			3.0		V	1
					2.9		V	2
					2.8		V	3
		V+ =5.5V, V- = -9.0V, FIOHB = -0.2mA			3.0		V	1
					2.9		V	2
					2.8		V	3
		V+ =4.5V, V- = -11V, FIOHB = -0.2mA			3.0		V	1
					2.9		V	2
					2.8		V	3
		V+ =5.5V, V- = -11V, FIOHB = -0.2mA			3.0		V	1
					2.9		V	2
					2.8		V	3
VOH3	Logical "1" Output Voltage	V+ = 5V, V- = -10V, FIOH3 = -0.2mA, S3 = 5V, Inputs = EN = Open			3.0		V	1
					2.9		V	2
					2.8		V	3
VOHQCMP	Common Mode Voltage	V+=5.0V, V-=-10.0V, FIOH=-0.2mA, S3=0V, Vin+=11V, Vin=10V, En=OPEN			3.0		V	1
					2.9		V	2
					2.8		V	3
VOHQCMN	Common Mode Voltage	V+=5.0V, V-=-10.0V, FIOH=-0.2mA, S3=0V, Vin+=-10V, Vin=-11V,En=OPEN			3.0		V	1
					2.9		V	2
					2.8		V	3
VOLQCMP	Common Mode Voltage	V+=5.0V, V-=-10.0V, FIOL=12.4mA, S3=5V, Vin+=12V, Vin=+10V, En=OPEN				0.4	V	1, 2, 3
VOLQCMN	Common Mode Voltage	V+=5.0V, V-= -10V, FIOL=12.4mA, S3=5V, Vin+=-10V, Vin=-12V, En=OPEN				0.4	V	1, 2, 3
ICEX	Output Leakage Current	V+=4.5V, V-= -11V, FVCEX=12.0V, S3=0V, VDIFF=1.0V, En=OPEN				100	uA	1
						200	uA	2
						50	uA	3

Electrical Characteristics

DC PARAMETER(Continued)

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
IIH	Enable Input Leakage Current	V+=4.5V, V-= -11V, FVIIH= 4.0V, S3=4.5V, Inputs OPEN				2.0	uA	1
						5.0	uA	2
IBVIQR	Input Resistor 130 Ohm Nominal	V+=5.5V, V-= -11V, FVRES= 1.0V			11.0	5.4	mA	1
					91	185	Ohms	1
IIL1	+Input Forward Current	V+ = 5.0V, V- = -10V, Vin+ = Vin- =0, S3=OPEN, En=OPEN			-2.1		mA	1
					-2.0		mA	2
					-2.3		mA	3
IIL2	-Input Forward Current	V+ = 5.0V, V- = -10V, Vin+ = Vin- =0, S3= 5.0V, En=OPEN			-2.4		mA	1
					-2.3		mA	2
					-2.6		mA	3
IIL	Enable Input Forward Current	V+ = 5.5V, V- = -9 V, Inputs OPEN, S3=0V, EN=0V			-1.5		mA	1, 2, 3
IOS	Output Shorted Current	V+ = 5.0V, V- = -10V, FVIOS=0V, S3=0V, VDIFF=1.0V, EN=OPEN			-3.1	-1.4	mA	1
					-3.1	-1.3	mA	2, 3
ICCN	Supply Current	V+ = 5.5V, V- = -11V, Vin+=5.5V, Vin-=0, S3=5.5V, EN=OPEN				22.9	mA	1
ICCP	Supply Current	V+ = 5.5V, V- = -11V, Vin+=5.5V, Vin-=0, S3=5.5V, EN=OPEN			-11.1		mA	1
Vt	Differential Input Threshold Voltage	V+ = 5.0V $\pm$ 10%, V-=-10V $\pm$ 10%	1		.7	2	V	1, 2, 3
VCM	Common Voltage VCM	V+ = 5.0V, V-= -10V, VDIM=1.0 or 2.0V	2		-10	+10	V	1, 2, 3
Vil	Logical "0" Input Voltage (Enable)	V+= 5.0V $\pm$ 10%, V- = -10V $\pm$ 10%	3			1.0	V	1
		V+= 5.0V $\pm$ 10%, V- = -10V $\pm$ 10%	3			0.7	V	2
		V+= 5.0V $\pm$ 10%, V- = -10V $\pm$ 10%	3			1.3	V	3

AC PARAMETER

tPLH	Propagation Delay to High Level	V+= 5.0V, V-= -10V, RL=3.9K Ohms, Voff=0.0V, CL=30pF, Vamp=3.0V				50	nS	9
tPHL	Propagation Delay to Low Level	V+= 5.0V, V-= -10V, RL=390 Ohms, Voff=0.0V, CL=30pF, Vamp=3.0V				50	nS	9

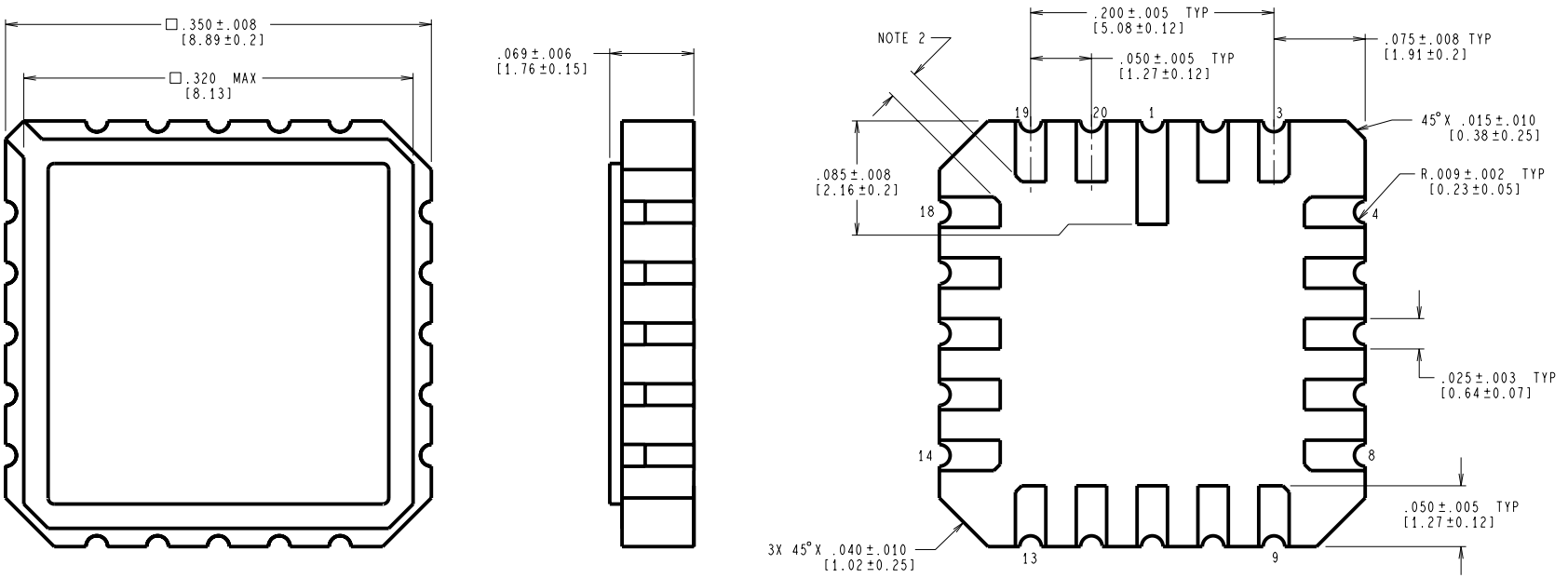
Note 1: Guaranteed by testing VOL & VOH.
Note 2: Guaranteed by testing VOHQCMP,VOHQCMN, VOLQCMP and VOLQCMN.
Note 3: Guaranteed by testing VHB.

Graphics and Diagrams

GRAPHICS#	DESCRIPTION
E20ARE	LDLESS CHIP CARRIER, TYPE C 20 TERMINAL(P/P DWG)
J14ARH	CERDIP (J), 14 LEAD (P/P DWG)
W14BRM	(blank)

See attached graphics following this page.

REVISIONS				
LTR	DESCRIPTION	E.C.N.	DATE	BY/APP'D
E	REVISE AND REDRAW.	10005	02/10/94	DEG/



NOTES: UNLESS OTHERWISE SPECIFIED.

1. LEAD FINISH TO BE ONE OF THE FOLLOWING:

   a. 50 MICROINCHES/12.7 MICROMETERS MINIMUM GOLD PLATING OVER 50-350 MICROINCHES/1.27-8.89 MICROMETERS NICKEL.

   b. SOLDER DIP.
   SOLDER THICKNESS PER LATEST REVISION OF MIL-STD-1835.

2. CORNER PADS MAY HAVE A 45°X.020IN/0.51mm MAXIMUM CHAMFER TO ACCOMPLISH THE .015IN/0.38mm DIMENSION.

4. REFERENCE JEDEC REGISTRATION MS-004, VARIATION CB, DATED 7/90.

CONTROLLING DIMENSION IS INCH
VALUES IN [ ] ARE MILLIMETERS

MIL/AERO
CONFIGURATION CONTROL

APPROVALS	DATE
DRAWN: Dwayne Grady	02/10/94
DFTG. CHK.	
ENGR. CHK.	
APPROVAL	

PROJECTION
INCH
[MM]

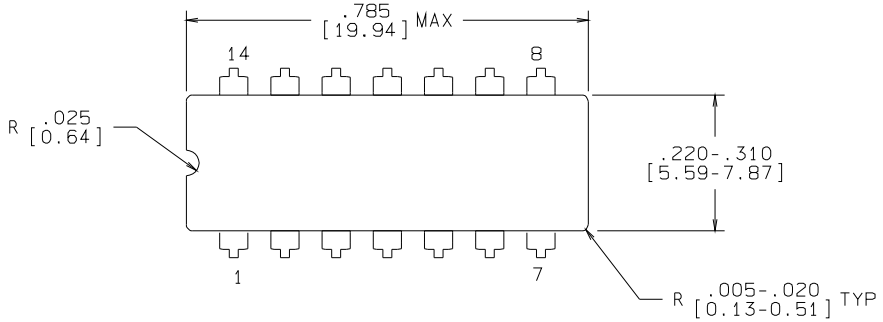
NATIONAL SEMICONDUCTOR CORPORATION
2900 Semiconductor Drive, Santa Clara, CA 95052-8090

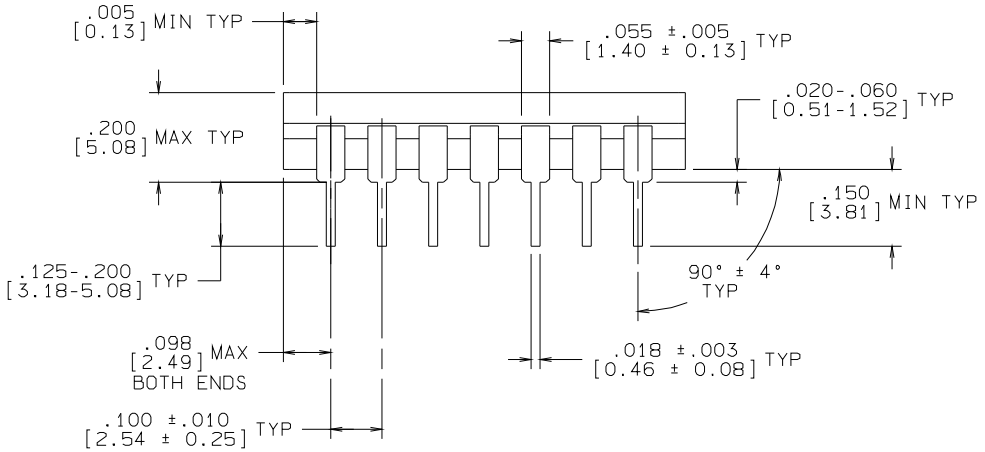
LEADLESS CHIP CARRIER, TYPE C, 20 TERMINAL

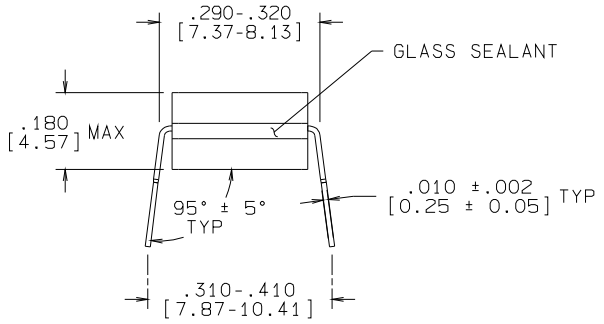
SCALE	SIZE	DRAWING NUMBER	REV
N/A	C	MKT-E20A	E

DO NOT SCALE DRAWING | SHEET 1 of 1

REVISIONS				
LTR	DESCRIPTION	E.C.N.	DATE	BY/APP'D
H	REVISE PER CURRENT STD; REDRAW	10001	09/15/93	TL/







CONTROLLING DIMENSION: INCH

MIL/AERO CONFIGURATION CONTROL

MIL-M-38510 CONFIGURATION CONTROL

NOTES: UNLESS OTHERWISE SPECIFIED

1. LEAD FINISH TO BE 200 MICROINCHES / 5.08 MICROMETERS MINIMUM SOLDER MEASURED AT THE CREST OF THE MAJOR FLATS.
2. JEDEC REGISTRATION MO-036, VARIATION AB, DATED 04/1981.

APPROVALS	DATE
DRAWN T. LEQUANG	09/15/93
DFTG. CHK.	
ENGR. CHK.	
APPROVAL	

PROJECTION

INCH
[MM]

NATIONAL SEMICONDUCTOR CORPORATION
2900 Semiconductor Drive, Santa Clara, CA 95052-8090

CERDIP (J), 14 LEAD,

SCALE	SIZE	DRAWING NUMBER	REV
N/A	B	MKT-J14A	H

DO NOT SCALE DRAWING | SHEET 1 OF 1