National Semiconductor

MILITARY DATA SHEET

MNDS96F172M-W REV 1B0

Original Creation Date: 06/19/95
Last Update Date: 10/21/96
Last Major Revision Date: 06/19/95

RS-485 COMPARABLE QUAD DIFFERENTIAL DRIVER

General Description

The DS96F172 is a high speed quad differential line driver designed to meet EIA Standards RS-485. It offers improved performance due to the use of new state-of-the-art L-FAST bipolar technology. The L-FAST technology allows for higher speeds and lower currents by utilizing extremely short gate delay times.

The DS96F172 has wide positive and negative common mode range for multipoint applications in noisy environments. Positive and negative current-limiting is provided to protect the driver from line fault conditions over +12V to -7V common mode range. The DS96F172 features an active high and active low Enable common to all four drivers.

Industry Part Number

DS96F172

NS Part Numbers

DS96F172MW-MIL

Prime Die

DS96M172

Controlling Document

5962-9076501

Processing

MIL-STD-883, Method 5004

Quality Conformance Inspection

MIL-STD-883, Method 5005

Subgrp	Description	Temp (^{O}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

(Absolute Maximum Ratings)

Supply Voltage	7.0V
Enable Input Voltage	5.5V
Maximum Power Dissipation at 25 deg c: (Note 1) W pkg	1000mW
Storage Temperature Range	-65 C to + 175 C
Lead Temperature Ceramic Dip (Soldering, 60 sec.)	300 C

Note 1: Derate W Pkg 7.1 mW/C above 25C.

Recommended Operating Conditions

Output Current Low (Iol)	60mA
Output Current High (Ioh)	-60mA
Supply Voltage (Vcc)	Min=4.50V, Typ=5.0V, Max=5.5V
Common Mode Output Voltage (Voc)	Min=-7.0V, Max=+12.0V
Operating Temperature (Ta)	Min=-55,Typ=+25,Max=+125c

Electrical Characteristics

DC PARAMETERS:

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: VCC = 5.5V

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
VIL	Logical 0 Input Voltage					0.8	V	1
						0.7	V	2, 3
VIH	Logical 1 Input Voltage				2		V	1, 2, 3
VIC	Input Clamp Voltage	I = -18mA			-1.5		V	1, 2, 3
VOD1	Differential Output Voltage	IO = 0mA				6	V	1, 2, 3
VOD2 (1)	Differential Output Voltage	VCC = 4.5V, RL = 54 ohms			1.5		V	1, 2
			1		1.2		V	3
VOD2 (2)	Differential Output Voltage	VCC = 4.5V, RL = 100 ohms			2.0		V	1, 2, 3
Delta VOD (1)	Change In Magnitude of (VOD2)	VCC = 4.5V, RL = 54 ohms			-200	200	mV	1, 2
			1		-400	400	mV	3
Delta VOD (2)	Change In Magnitude of (VOD2)	VCC = 4.5V, RL = 100 ohms			-200	200	mV	1, 2
			1		-400	400	mV	3
VOC (1)	Common Mode Output Voltage	RL = 54 ohms				3	V	1, 2, 3
VOC (2)	Common Mode Output Voltage	RL = 100 ohms				3	V	1, 2, 3
Delta VOC (1)	Change in Magnitude of VOC	VCC = 4.5V, RL = 54 ohms			-200	200	mV	1, 2, 3
Delta VOC (2)	Change in Magnitude of VOC	VCC = 4.5V, RL = 100 ohms			-200	200	mV	1, 2, 3
IO	Output Current With Power Off	VCC = 0V, VO = -7V to 12V			-50	50	uA	1, 2, 3
IOZ	High Impedance State Output Current	VO = -7V to 12V			-50	50	uA	1, 2, 3
IIH	Logical 1 Input Current	VI = 2.4V				20	uA	1, 2, 3
IIL	Logical 0 Input Current	VI = 0.4V			-50		uA	1, 2, 3
ICC	Supply Current	Outputs Enabled				50	mA	1, 2, 3
ICCX	Supply Current	Outputs Disabled				30	mA	1, 2, 3

Electrical Characteristics

DC PARAMETERS:(Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: VCC = 5.5V

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
IOS (1)	Short Circuit Output Current	VO = -7V	2		-250		mA	1, 2, 3
IOS (2)	Short Circuit Output Current	VO = 0V	2		-150		mA	1, 2, 3
IOS (3)	Short Circuit Output Current	VO = VCC	2			150	mA	1, 2, 3
IOS (4)	Short Circuit Output Current	VO = 12V	2			250	mA	1, 2, 3

AC PARAMETERS:

(The following conditions apply to all the following parameters, unless otherwise specified.)
AC: VCC = 5.0V

tPLH	Propagation Delay Lo to Hi Level	RL = 27 ohms, CL = 15pF				25	ns	10, 11
						16	ns	9
tPHL	Propagation Delay Hi to Lo Level	RL = 27 ohms, CL = 15pF				25	ns	10, 11
						16	ns	9
SKEW	Output to Output Delay Time	RL = 60 ohms				10	ns	10, 11
						4	ns	9
tLZ	Output Disable Time From Low Level	RL = 110 ohms, CL = 50pF				40	ns	10, 11
						25	ns	9
tZL	Output EnableTime to Low Level	RL = 110 ohms, CL = 50pF				100	ns	10, 11
						40	ns	9
tZH	Output EnableTime to High Level	RL = 110 ohms, CL = 50pF				40	ns	10, 11
						32	ns	9
tDD	Differential Output Delay Time	RL = 60 ohms, CL = 15pF				30	ns	10, 11
						22	ns	9
tTD	Differential Output Transition Time	RL = 60 ohms, CL = 15pF				40	ns	10, 11
						22	ns	9

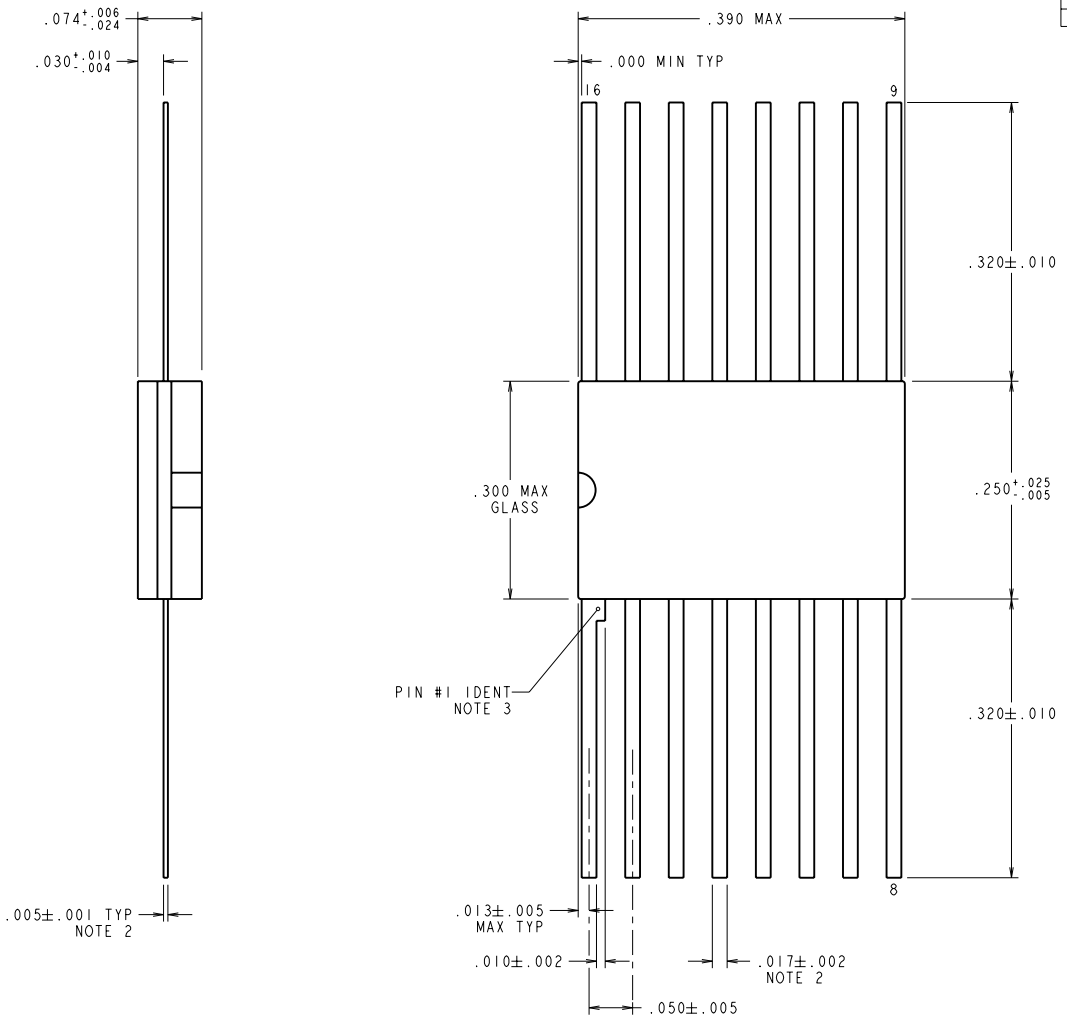
Note 1: -55C Limit exceeds EIA standard RS-485 Spec.
Note 2: .2uF cap is connected between the output and GND to reduce oscilation.

Graphics and Diagrams

GRAPHICS#	DESCRIPTION
W16ARL	CERPAC (W), 16 LEAD (P/P DWG)

See attached graphics following this page.

REVISIONS				
LTR	DESCRIPTION	E.C.N.	DATE	BY/APP'D
K	REVISE AND REDRAW PER NEW STANDARD.	10514	07/28/94	DEG/AEP
L	.017±.002 WAS .017±.020.	10656	10/21/94	DEG/



NOTES: UNLESS OTHERWISE SPECIFIED.

1. LEAD FINISH: SOLDER DIPPED WITH Sn60 OR Sn63 SOLDER CONFORMING TO MIL-M-38510 TO A MINIMUM THICKNESS OF 200 MICROINCHES. SOLDER MAY BE APPLIED OVER LEAD BASIS METAL OR Sn PLATE.
2. MAXIMUM LIMIT MAY BE INCREASED BY .003 INCHES AFTER LEAD FINISH APPLIED.
3. LEAD 1 IDENTIFICATION SHALL BE:
   a) A NOTCH OR OTHER MARK WITHIN THIS AREA
   b) A TAB ON LEAD 1, EITHER SIDE
4. REFERENCE JEDEC REGISTRATION MO-092, VARIATION AC, DATED 04/89.

MIL/AERO CONFIGURATION CONTROL

MIL-M-38510 CONFIGURATION CONTROL

APPROVALS	DATE
DRAWN D.E.Grady	07/28/94
DFTG. CHK.	
ENGR. CHK.	

National Semiconductor
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CERPACK, 16 LEAD

PROJECTION

INCH [MM]

SCALE	SIZE	DRAWING NUMBER	REV
N/A	C	MKT-W16A	L

DO NOT SCALE DRAWING | SHEET 1 of 1