

MNDS96F174M-X REV 1A0

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RS-485 COMPARABLE QUAD DIFFERENTIAL DRIVER

General Description

The DS96F174 is a high speed quad differential line driver designed to meet EIA Standard RS-485. The DS96F174 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. Thus, the DS96F174 features lower power, extended temperature range, improved RS-485 specifications.

The DS96F174 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 a + 12V to -7v common mode range. The DS96F174 features separate active high Enables for each driver pair.

Industry Part Number

DS96F174

NS Part Numbers

 DS96F174ME/883
 DS96F174MJ/883
 DS96F174MW/883

Prime Die

DS96M174

Controlling Document

5962-9076502

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

(Absolute Maximum Ratings)

Supply Voltage	7.0V
Enable Input Voltage	5.5V
Maximum Power Dissipation at 25 C (Note 1, 2, 3)	
E pkg	2000mW
J pkg	1800mW
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.

Note 2: Derate E Pkg 13.3 mW/C above 25C.

Note 3: Derate J Pkg 12.5 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

(Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)

DC: VCC = 5.5V

AC: VCC = 5.0V

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
VIL	Logical 0 Input Voltage					.8	V	1
						.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

(Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)

DC: VCC = 5.5V

AC: VCC = 5.0V

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
IOS (1)	Short Circuit Output Current	V0 = -7V	2		-250		mA	1, 2, 3
IOS (2)	Short Circuit Output Current	V0 = 0V	2		-150		mA	1, 2, 3
IOS (3)	Short Circuit Output Current	V0 = VCC	2			150	mA	1, 2, 3
IOS (4)	Short Circuit Output Current	V0 = 12V	2			250	mA	1, 2, 3
tPLH	Propagation Delay Lo to Hi level	RL = 27 ohms, CL = 15pF				25	ns	10, 11
						16	ns	9
tPHL	Propagation Delay Hi to Low 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
tHZ	Output Disable Time From High Level	RL = 110 ohms, CL = 50pF				80	ns	10, 11
						30	ns	9
tZL	Output Enable Time to Low Level	RL = 110 ohms, CL = 50pF				100	ns	10, 11
						40	ns	9
tZH	Output Enable Time 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: -55 C limit exceeds EIA standard RS-485 specification.

Note 2: .2uF cap is connected between the output and GND to reduce oscillation.