National Semiconductor

DS9616H
Triple Line Driver

General Description

The DS9616H is a triple line driver which meets the electrical interface specifications of EIA RS-232-C and CCITT V.24 and/or MIL-STD-188C. Each driver converts TTL/DTL logic levels to EIA/CCIT and/or MIL-STD-188C logic levels for transmission between data terminal equipment and data communications equipment. The output slew rate is internally limited and can be lowered by an external capacitor; all output currents are short circuit limited. The outputs are protected against RS-232-C fault conditions. A logic HIGH on the inhibit terminal interrupts signal transfer and forces the output to a V_{OL} (EIA/CCITT MARK) state.

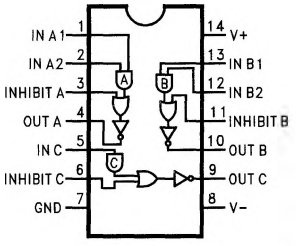
For the complementary function, see the DS9627MJ Dual EIA RS-232-C and MIL-STD-188C Line Receiver.

Features

- Internal slew rate limiting
- Meets EIA RS-232-C and CCITT V.24 and/or MIL-STD-188C
- Logic true inhibit function
- Output short circuit current-limiting
- Output voltage levels independent of supply voltages

Connection Diagrams

14-Lead DIP



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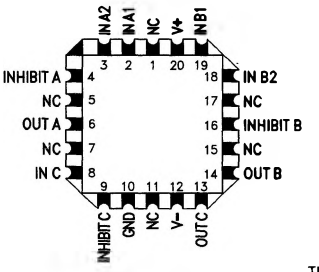
Top View

Order Number DS9616HMJ/883
See NS Package Number J14A

20-Terminal LCC



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Top View

Order Number DS9616HME/883
See NS Package Number E20A

For Complete Military 883 Specifications, see RETS Data Sheet.

Absolute Maximum Ratings

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Storage Temperature Range	−65°C to +175°C
Operating Temperature Range	−55°C to +125°C
Lead Temperature (Soldering, 60 seconds)	300°C
Internal Power Dissipation (Note 4)	
DIP and CCP	400 mW
Supply Voltage	±15V
Input or Inhibit Voltage	−1.5V to +6.0V
Output Signal Voltage	±15V

Note 1: V_{IH} and V_{IL} are guaranteed by the V_{OH} and V_{OL} tests.

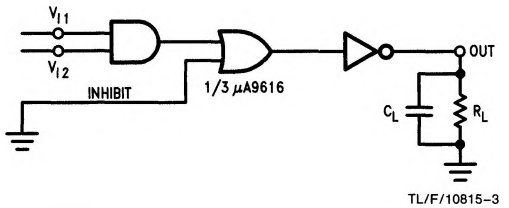
Note 2: All input and supply leads are grounded.

Note 3: An external capacitor may be needed to meet signal wave shaping requirements of MIL-STD-188C at the applicable modulation rate. No external capacitor is needed to meet RS-232-C.

Note 4: Rating applies to ambient temperatures up to 125°C. Above 125°C ambient, derate linearly at 120°C/W.

DS9616HM
Electrical Characteristics $\pm 10.8V \le V_{CC} \le \pm 13.2V$, $R_L = 3.0\ k\Omega$, unless otherwise specified

Symbol	Characteristic	Condition	Min	Max	Unit
V_{OH}	Output Voltage HIGH	V_{I1} and/or $V_{I2} = V_{INHIBIT} = 0.8V$	5.0	7.0	V
V_{OL}	Output Voltage LOW	$V_{I1} = V_{I2} = V_{INHIBIT} = 2.0V$	−7.0	−5.0	V
V_{OH} to V_{OL}	Output Voltage HIGH to Output Voltage LOW Magnitude Matching Error			±10	%
$I_{OS}+$	Positive Output Short Circuit Current	$R_L = 0\Omega$, V_{I1} and/or $V_{I2} = V_{INHIBIT} = 0.8V$	−45	−12	mA
$I_{OS}-$	Negative Output Short Circuit Current	$R_L = 0\Omega$, $V_{I1} = V_{I2} = V_{INHIBIT} = 2.0V$	12	60	mA
V_{IH}	Input Voltage HIGH (Note 1)		2.0		V
V_{IL}	Input Voltage LOW (Note 1)			0.8	V
I_{IH}	Input Current HIGH	$V_{I1} = V_{I2} = 2.4V$		40	μA
		$V_{I1} = V_{12} = 5.5V$		1.0	mA
I_{IL}	Input Current LOW	$V_{I1} = V_{12} = 0.4V$	−1.6		mA
I+	Positive Supply Current	$V_{I1} = V_{I2} = V_{INHIBIT} = 0.8V$		25	mA
		$V_{I1} = V_{I2} = V_{INHIBIT} = 2.0V$		15	mA
I−	Negative Supply Current	$V_{I1} = V_{I2} = V_{INHIBIT} = 0.8V$	−1.0		mA
		$V_{I1} = V_{I2} = V_{INHIBIT} = 2.0V$	−25		mA
R_O	Output Resistance, Power Off (Note 2)	$-2.0V \le V_O \le 0.5V$	300		Ω
SR+	Positive Slew Rate (Note 3)	$C_L = 2500\ pF$, $R_L = 3.0\ k\Omega$ (See *Figure 1*)	4.0	30	V/μs
			4.0	30	V/μs
SR−	Negative Slew Rate (Note 3)	$C_L = 2500\ pF$, $R_L = 3.0\ k\Omega$ (See *Figure 1*)	−30	−4.0	V/μs
			−30	−4.0	V/μs



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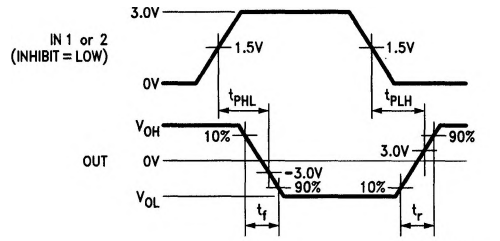

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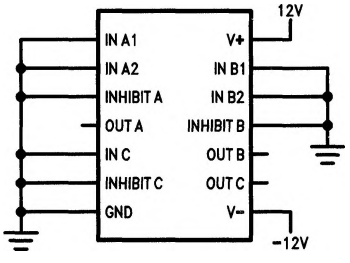
Omit V_{I2} for channel "C".
Input: FR = 50 kHz
Pulse Width = 10 μs
$t_r = t_f = 10 \pm 5.0$ ns

FIGURE 1. Switching Time Test Circuit and Waveforms

Primary Burn-In Circuit



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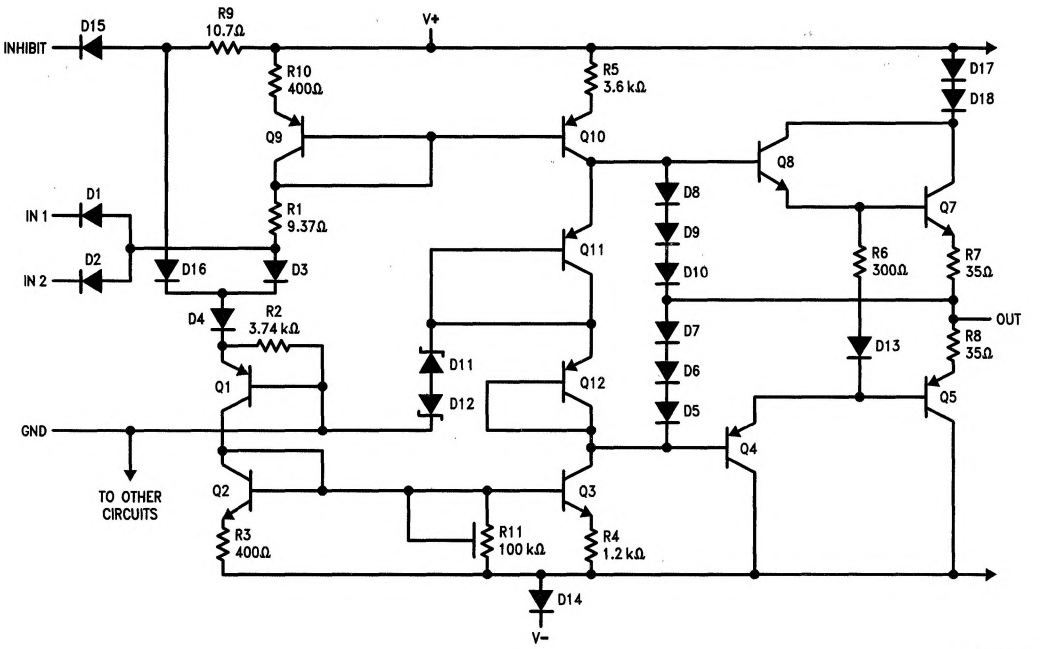
Equivalent Circuit (⅓ of circuit)



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