9613

DUAL DIFFERENTIAL LINE RECEIVER

FAIRCHILD LINEAR INTEGRATED CIRCUIT

GENERAL DESCRIPTION — The 9613 is a Dual Differential Line Receiver designed to receive differential digital data from transmission lines and operate over the military and industrial temperature range using a single 5.0 V supply. It can receive ± 500 mV of differential data in the presence of high level (± 15 V) common mode voltag es and deliver undistrubed TTL logic to the output.

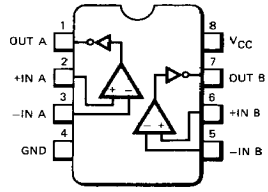
- **TTL COMPATIBLE OUTPUT**
- **HIGH COMMON MODE VOLTAGE RANGE**
- **SINGLE 5.0 V SUPPLY VOLTAGES**
- **MILITARY TEMPERATURE RANGE**

ABSOLUTE MAXIMUM RATINGS (above which the useful life may be impaired)

Supply Voltage (V_{CC} Potential to Ground)	−0.5 V to +7.0 V
Input Voltage Referred to Ground (Pins 2, 3, 5, 6)	±20 V
Differential Input Voltage (+ Input Referred to − Input)	±20 V
Internal Power Dissipation	
Molded DIP, Hermetic DIP (Note 1)	800 mW
Operating Temperature	
9613	−55°C to +125°C
9613C	0°C to +70°C
Storage Temperature	−65°C to +150°C
Pin Temperature	
9613 Hermetic DIP (Soldering, 60 s)	300°C
9613C Molded DIP (Soldering, 10 s)	260°C

NOTES:
1. Rating applies to ambient temperatures up to 30°C. Above 30°C ambient derate linearly at 5.4 mW/°C for Molded DIP and 6.7 mW/°C for Hermetic DIP.

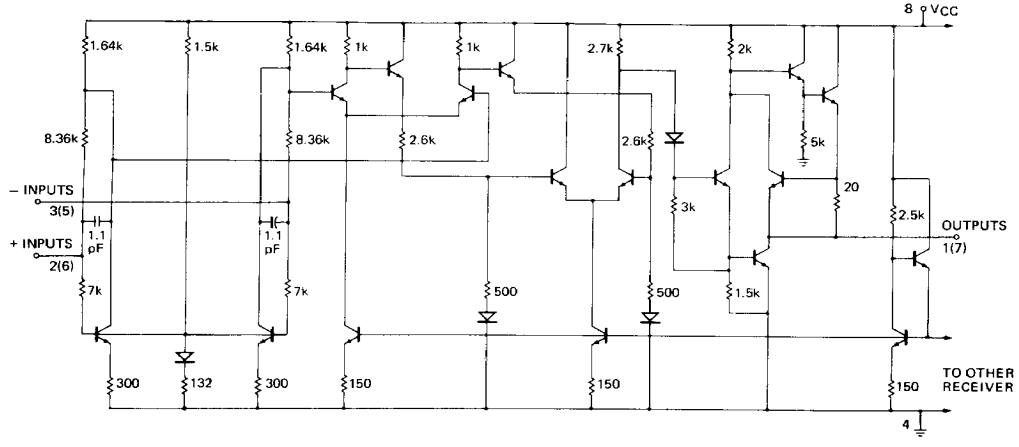
CONNECTION DIAGRAM
8-PIN DIP
(TOP VIEW)
PACKAGE OUTLINES 9T 6T
PACKAGE CODES T R



ORDER INFORMATION

TYPE	PART NO.
9613	**9613RM**
9613C	**9613RC**
9613C	**9613TC**

EQUIVALENT CIRCUIT (1/2 9613)



9613

ELECTRICAL CHARACTERISTICS: V_{CC} = 5.0 V ± 10%, −55°C ≤ T_A ≤ 125°C unless otherwise specified.

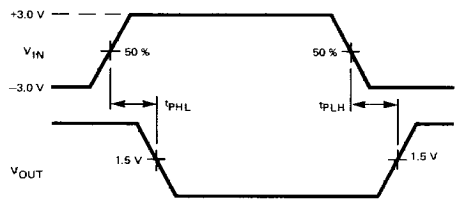
SYMBOL	CHARACTERISTICS	CONDITIONS	MIN	TYP	MAX	UNITS
V_{OL}	Output Low Voltage	I_{OL} = 16 mA		0.28	0.4	V
V_{OH}	Output High Voltage	I_{OH} = −5 mA	2.4	3.0		V
I_{SC}	Output Short-Circuit Current	V_{OUT} = 0 V	−60	−28	−12	mA
R_{IN}	Input Resistance		3.0	4.2		kΩ
V_{CM}	Operating Common Mode Voltage Range	−1.0 V ≤ V_{DIFF} ≤ +1.0 V	−15		+15	V
V_{TH}	Differential Input Threshold Voltage	−5.0 V ≤ V_{CM} ≤ +5.0 V	−0.5		+0.5	V
		−15 V ≤ V_{CM} ≤ +15 V	−1.0		+1.0	V
I_{CC}	Power Supply Current	V_{CC} = 5.25 V		29	50	mA
I_{MAX}	Maximum Supply Current	V_{CC} = 7.0 V		42	70	mA
t_{PLH}	Propagation Delay Time	T_A = 25°C; V_{CC} = 5.0 V; See AC Test Circuit and Waveforms		25	40	ns
t_{PHL}	Propagation Delay Time	T_A = 25°C; V_{CC} = 5.0 V; See AC Test Circuit and Waveforms		23	40	ns

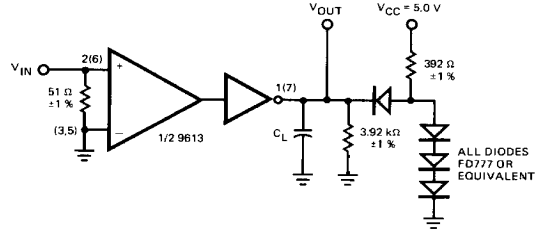
9613C

ELECTRICAL CHARACTERISTICS: V_{CC} = 5.0 V ± 5%, 0°C ≤ T_A ≤ 70°C unless otherwise specified.

SYMBOL	CHARACTERISTICS	CONDITIONS	MIN	TYP	MAX	UNITS
V_{OL}	Output Low Voltage	I_{OL} = 16 mA		0.28	0.4	V
V_{OH}	Output High Voltage	I_{OH} = −5 mA	2.4	3.0		V
I_{SC}	Output Short-Circuit Current	V_{OUT} = 0 V	−60	−28	−12	mA
R_{IN}	Input Resistance		3.0	4.2		kΩ
V_{CM}	Operating Common Mode Voltage Range	−1.0 V ≤ V_{DIFF} ≤ +1.0 V	−15		+15	V
V_{TH}	Differential Input Threshold Voltage	−5.0 V ≤ V_{CM} ≤ +5.0 V	−0.5		+0.5	V
		−15 V ≤ V_{CM} ≤ +15 V	−1.0		+1.0	V
I_{CC}	Power Supply Current	V_{CC} = 5.25 V		29	50	mA
I_{MAX}	Maximum Supply Current	V_{CC} = 7.0 V		42	70	mA
t_{PLH}	Propagation Delay Time	T_A = 25°C; V_{CC} = 5.0 V; See AC Test Circuit and Waveforms		25	40	ns
t_{PHL}	Propagation Delay Time	T_A = 25°C; V_{CC} = 5.0 V; See AC Test Circuit and Waveforms		23	40	ns

AC TEST CIRCUIT AND WAVEFORMS





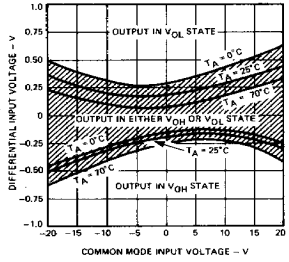
V_{IN}: (PULSE)
Amplitude: 6.0 V
Pulse Width: 100 ns
Duty Cycle: 50 %
$t_r = t_f \leq 5$ ns

C_L = 30 pF ±5 % Including jig capacitance.

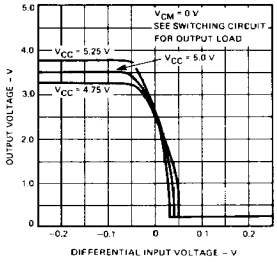
TYPICAL ELECTRICAL CHARACTERISTICS CURVES

9613

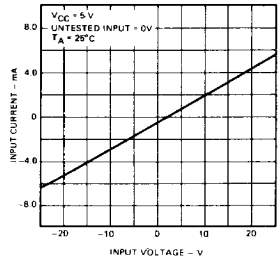
INPUT DIFFERENTIAL THRESHOLD AMBIGUITY AS A FUNCTION OF COMMON MODE INPUT VOLTAGE



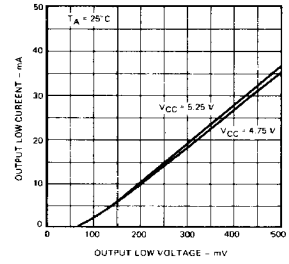
INPUT/OUTPUT TRANSFER CHARACTERISTIC AS A FUNCTION OF POWER SUPPLY VOLTAGE



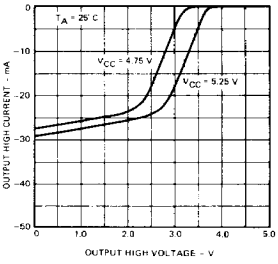
INPUT CURRENT AS A FUNCTION OF INPUT VOLTAGE



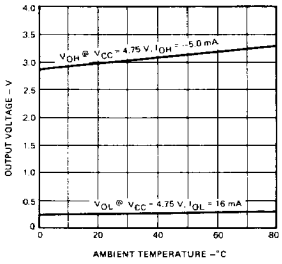
OUTPUT LOW CURRENT AS A FUNCTION OF OUTPUT LOW VOLTAGE



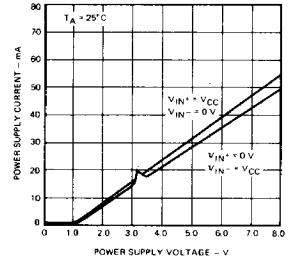
OUTPUT HIGH CURRENT AS A FUNCTION OF OUTPUT HIGH VOLTAGE



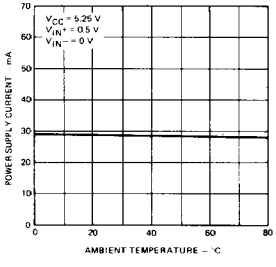
OUTPUT VOLTAGE AS A FUNCTION OF AMBIENT TEMPERATURE



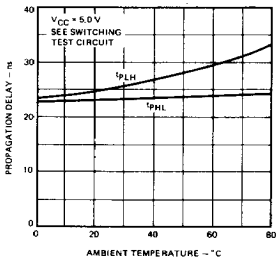
POWER SUPPLY CURRENT AS A FUNCTION OF POWER SUPPLY VOLTAGE



POWER SUPPLY CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE



PROPAGATION DELAY AS A FUNCTION OF AMBIENT TEMPERATURE



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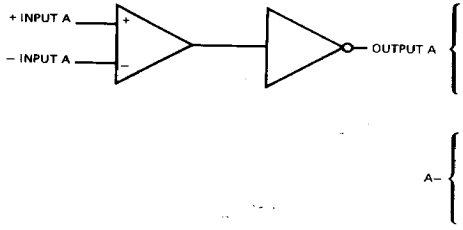
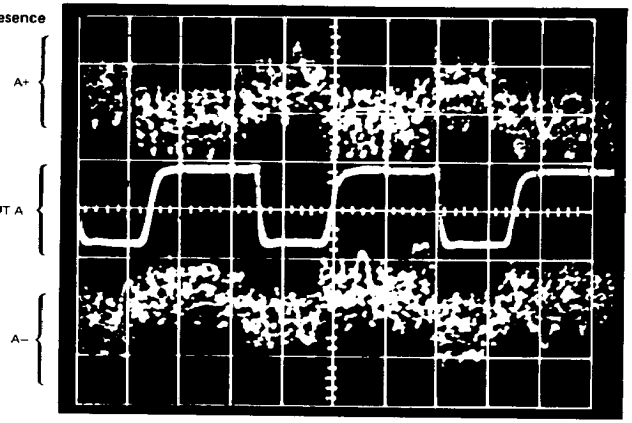
Photograph of a 9613 switching differential data in the presence of high common mode noise.

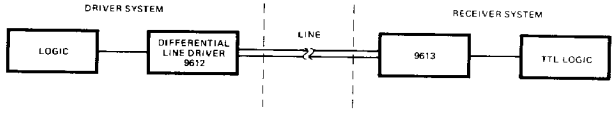




VERTICAL = 2.0 V DIV. HORIZONTAL = 50 ns/DIV.

Fig. 1

STANDARD USAGE



For example of operation see 9612 data sheet application section.

Fig. 2