Quad TRI-STATE® Line Driver

General Description

MC3487 is quad RS-422 driver features four independent drivers which comply with EIA Standards for the electrical characteristics of balanced voltage digital interface circuits. The outputs are TRI-STATE structures which are forced to a high impedance state when the appropriate output control pin reaches a logic zero condition. All input pins are PNP buffered to minimize input loading for either logic one or logic zero inputs.

DIP-16

SOP-16

TSSOP-16

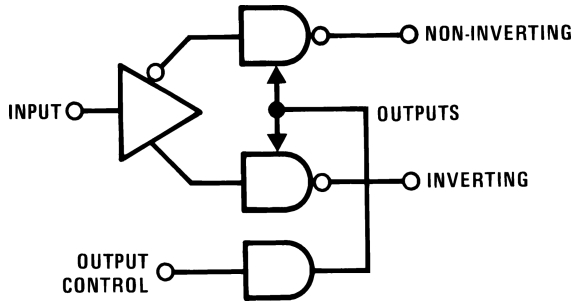
Features

- Four independent drivers
- TRI-STATE® outputs
- Fast propagation times (typ 10 ns)
- TTL compatible
- 5V supply
- Output rise and fall times less than 15 ns
- Pin compatible with DS8924 and DS3487

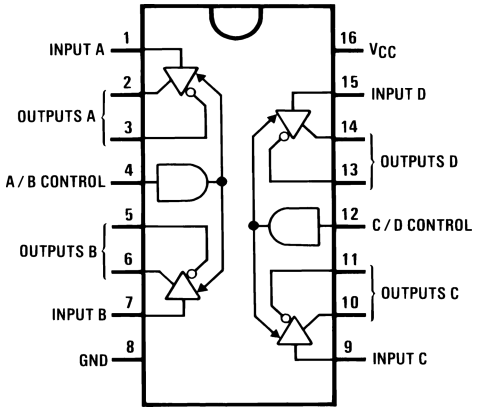
Ordering Information

DEVICE	Package Type	MARKING	Packing	Packing Qty
MC3487N	DIP-16	MC3487	TUBE	1000/box
MC3487M/TR	SOP-16	MC3487	REEL	2500/reel
MC3487MT/TR	TSSOP-16	MC3487	REEL	2500/reel

Block and Connection Diagrams



Dual-In-Line Package



Top View

(DIP-16/SOP-16/TSSOP-16)

Truth Table

Input	Control Input	Non-Inverting Output	Inverting Output
H	H	H	L
L	H	L	H
X	L	Z	Z

L = Low logic state

H = High logic state

X = Irrelevant

Z = TRI-STATE(high impedance)

Absolute Maximum Ratings (Note 2)

Condition	Min	Max
Supply Voltage	8V	
Input Voltage	5.5V	
Storage Temperature	−65˚C	+150˚C
Maximum Power Dissipation (Note 1) at 25˚C		
Molded DIP Package.	1476 mW	
SOP Package	1051 mW	
Lead Temperature (Soldering, 10 seconds)	260˚C	

Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is intended to be functional, but specific performance is not ensured.

Operating Conditions

	Min	Max	Units
Supply Votage,VCC	4.75	5.25	V
Temperature(TA)	-40	85	˚C

Electrical Characteristics (Notes 3, 4, 5, 6)

Symbol	Parameter	Conditions		Min	Typ	Max	Units
V_{IL}	Input Low Voltage					0.8	V
V_{IH}	Input High Voltage			2.0			V
I_{IL}	Input Low Current	V_{IL} = 0.5V				−200	μA
I_{IH}	Input High Current		V_{IH} = 2.7V			50	μA
			V_{IH} = 5.5V			100	μA
V_{CL}	Input Clamp Voltage	I_{CL} = −18 mA				−1.5	V
V_{OL}	Output Low Voltage	I_{OL} = 48 mA				0.5	V
V_{OH}	Output High Voltage	I_{OH} = −20 mA		2.5			V
I_{OS}	Output Short-Circuit Current			−40		−140	mA
I_{OZ}	Output Leakage Current (TRI-STATE)		V_O = 0.5V			−100	μA
			V_O = 5.5V			100	μA
I_{OFF}	Output Leakage Current Power OFF	V_{CC} = 0V	V_O = 6V			100	μA
			V_O = −0.25V			−100	μA
$\|V_{OS} - V_{OS}\|$	Difference in Output Offset Voltage					0.4	V
V_T	Differential Output Voltage			2.0			V
$\|V_T\| - V_T\|$	Difference in Differential Output Voltage					0.4	V
I_{CC}	Power Supply Current		Active		50	80	mA
			TRI-STATE®		35	60	mA

Switching Characteristics

VCC = 5V, TA = 25˚C

Symbol	Parameter	Conditions	Min	Typ	Max	Units
t_{PHL}	Input to Output			10	15	ns
t_{PLH}	Input to Output			10	15	ns
t_{THL}	Differential Fall Time			10	15	ns
t_{TLH}	Differential Rise Time			10	15	ns
t_{PHZ}	Enable to Output	R_L = 200Ω, C_L = 50 pF		17	25	ns
t_{PLZ}	Enable to Output	R_L = 200Ω, C_L = 50 pF		15	25	ns
t_{PZH}	Enable to Output	R_L = ∞, C_L = 50 pF, S1 Open		11	25	ns
t_{PZL}	Enable to Output	R_L = 200Ω, C_L = 50 pF, S2 Open		15	25	ns

Note 1: Derate DIP molded package 11.9mW/˚C above 25˚C.Derate SOP package 8.41mW/˚C above 25˚C

Note 2: “Absolute Maximum Ratings” are those values beyond which the safety of the device cannot be guaranteed. They are not meant to imply that the devicesshould be operated at these limits. The table of “Electrical Characteristics” provides conditions for actual device operation.

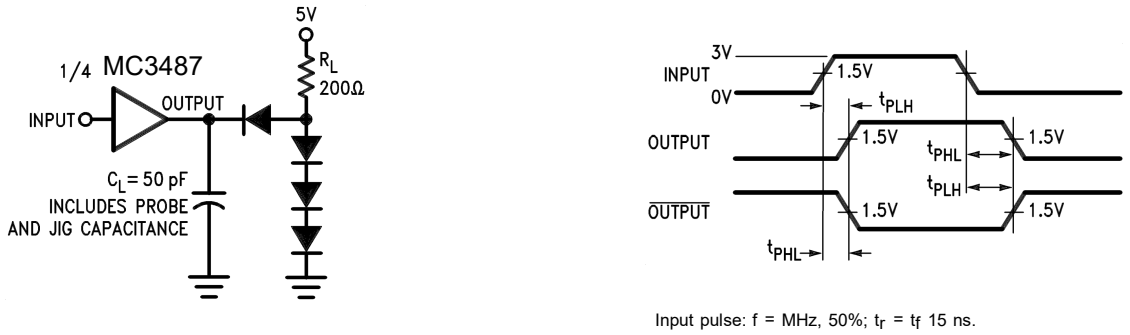
Note 3: Unless otherwise specified min/max limits apply across the 0˚C to +70˚C range for the MC3487. All typicals are given for V_{CC} = 5V and T_A = 25˚C.

Note 4: All currents into device pins are positive, all currents out of device pins as negative. All voltages are referenced to ground unless otherwise specified.

Note 5: Only one output at a time should be shorted.

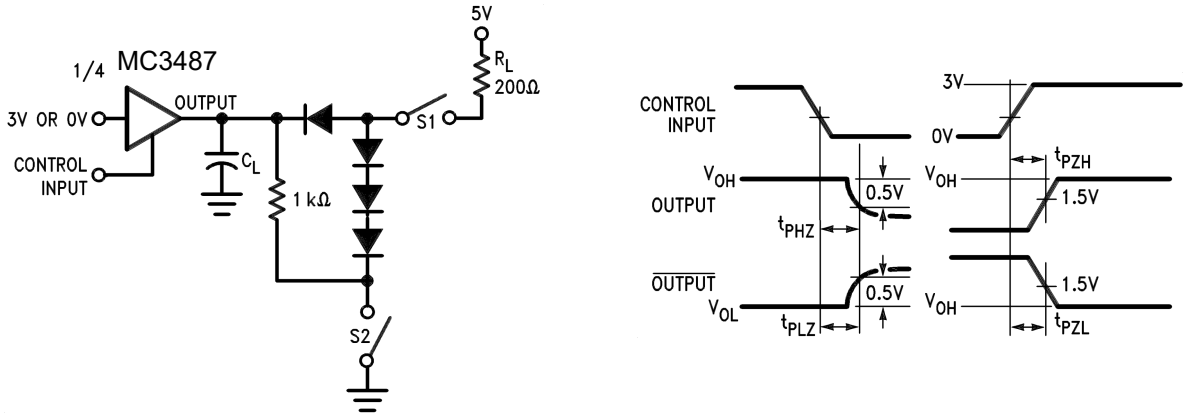
Note 6: Symbols and definitions correspond to EIA RS-422, where applicable.

AC Test Circuits and Switching Time Waveforms



Input pulse: f = MHz, 50%; t_r = t_f 15 ns.

FIGURE 1. Propagation Delays



Input pulse: f = MHz, 50%; tr = tf ＜15 ns.

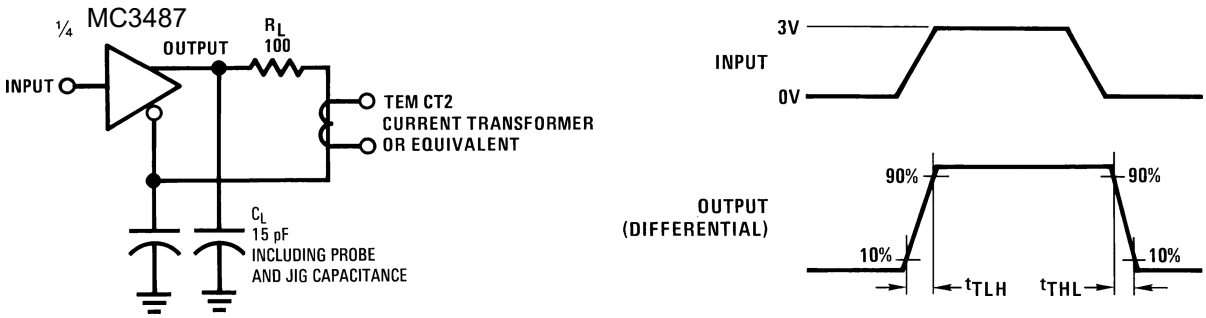
S1 and S2 closed except as noted.

CL includes probe and jig capacitance.

S1 = open for tPZH

S2 = open for tPZL

FIGURE 2. TRI-STATE Enable and Disable Delays

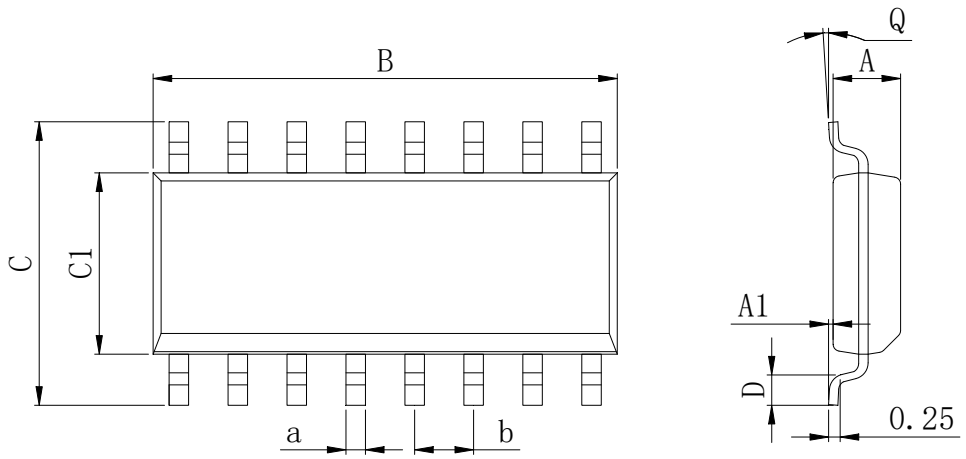


Input pulse: f = MHz, 50%; tr = tf ＜15 ns.

FIGURE 3. Differential Rise and Fall Times

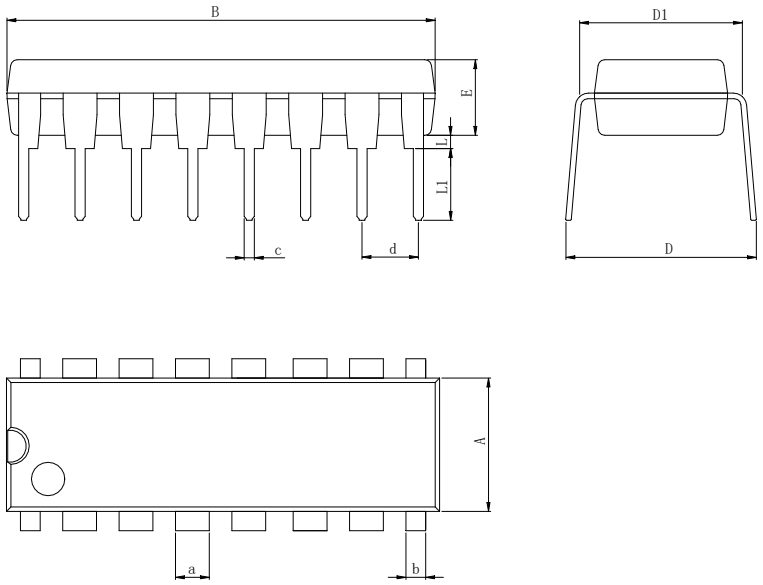
Physical Dimensions

SOP-16



Dimensions In Millimeters(SOP-16)									
Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	1.35	0.05	9.80	5.80	3.80	0.40	0°	0.35	1.27 BSC
Max:	1.55	0.20	10.0	6.20	4.00	0.80	8°	0.45	

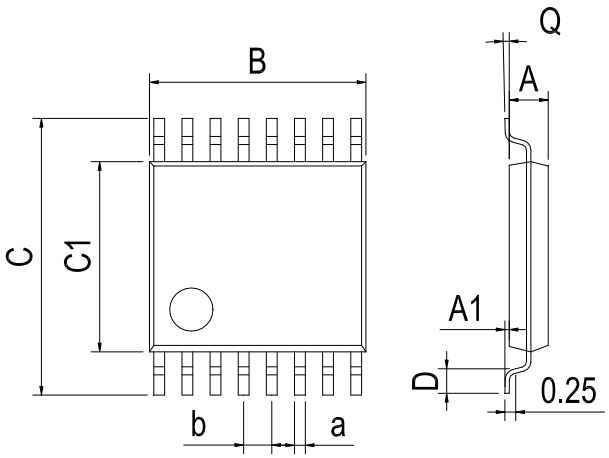
DIP-16



Dimensions In Millimeters(DIP-16)											
Symbol:	A	B	D	D1	E	L	L1	a	b	c	d
Min:	6.10	18.94	8.10	7.42	3.10	0.50	3.00	1.50	0.85	0.40	2.54 BSC
Max:	6.68	19.56	10.9	7.82	3.55	0.70	3.60	1.55	0.90	0.50	

Physical Dimensions

TSSOP-16



Dimensions In Millimeters(TSSOP-16)									
Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	0.85	0.05	4.90	6.20	4.30	0.40	0°	0.20	0.65 BSC
Max:	0.95	0.20	5.10	6.60	4.50	0.80	8°	0.25	

Revision History

REVISION NUMBER	DATE	REVISION	PAGE
V1.0	2016-3	New	1-9
V1.1	2019-9	Modify the package dimension diagram TSSOP-16、Update encapsulation type、Updated DIP-16 dimension	1、6、7
V1.2	2020-7	Add annotation for Maximum Ratings.	3
V1.3	2024-11	Update Lead Temperature	3

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