

MIC4467/4468/4469

Quad 1.2A-Peak Low-Side MOSFET Driver

Bipolar/CMOS/DMOS

General Description

The MIC4467/8/9 family of 4-output CMOS buffer/drivers is an expansion from the earlier single- and dual-output drivers, to which they are functionally closely related. Because package pin count permitted it, each driver has been equipped with a 2-input logic gate for added flexibility. Placing four high-power drivers in a single package also improves system reliability and reduces total system cost. In some applications, one of these drivers can replace not only two packages of singleinput drivers, but some of the associated logic as well.

Although primarily intended for driving power MOSFETs, and similar highly capacitive loads, these drivers are equally well suited to driving any other load (capacitive, resistive, or inductive), which requires a high-efficiency, low-impedance driver capable of high peak currents, rail-to-rail voltage swings, and fast switching times. For example, heavily loaded clock lines, coaxial cables, and piezoelectric transducers can all be driven easily with MIC446X series drivers. The only limitation

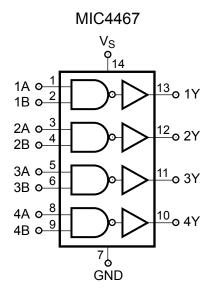
Features

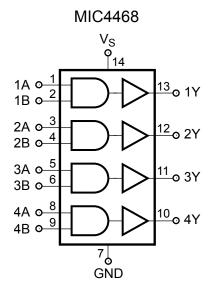
- Built using reliable, low power CMOS processes
- Latchproof. Withstands 500mA Inductive Kickback
- 3 Input Logic Choices
- Symmetrical Rise and Fall Times......25ns Short, Equal Delay Times75ns
- High Peak Output Current...... 1.2A
- Wide Operating Range4.5 to 18V Low Equivalent Input Capacitance (typ) 6pF
- Inputs = Logic 1 for Any Input From 2.4V to V_c
- **ESD Protected**

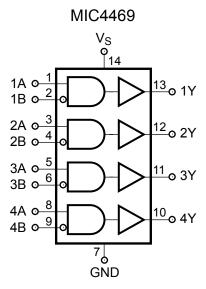
Applications

- General-Purpose CMOS Logic Buffer
- Driving All 4 MOSFETs in an H-Bridge
- Direct Small-Motor Driver
- Relay or Peripheral Drivers
- **Dual Differential Output Power Drivers**
- **CCD** Driver
- Pin-Switching Network Driver

Logic Diagrams







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on loading is that total power dissipation in the IC must be kept within the power dissipation limits of the package.

The MIC446X series drivers are built using a BCD process. They will not latch under any conditions within their power and voltage ratings. They are not subject to damage when up

to 5V of noise spiking (either polarity) occurs on the ground line. They can accept up to half an amp of inductive kickback current (either polarity) into their outputs without damage or logic upset.

Ordering Information

Part Number		Temperature		
Standard	Pb-Free	Range	Package	
MIC44xxCN*	MIC44xxZN*	0°C to +70°C	14-pin Plastic DIP	
MIC44xxCWM*	MIC44xxZWM*	0°C to +70°C	16-pin Wide SOIC	
MIC44xxBN*	MIC44xxYN*	–40°C to +85°C	14-pin Plastic DIP	
MIC44xxBWM*	MIC44xxYWM*	–40°C to +85°C	16-pin Wide SOIC	

^{*} xx identifies input logic:

67 — NAND

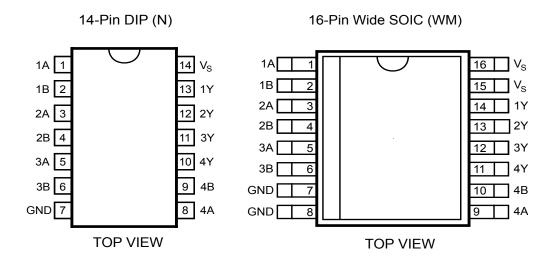
68 — AND

69 — AND with 1 inverting input

Truth Table

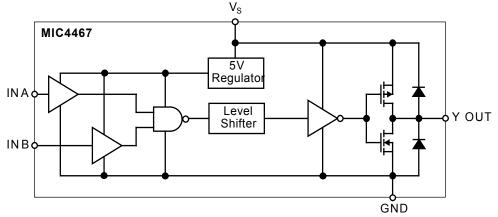
	Inpu	Output		
Part No.	Α	В	Υ	
MIC4467 (Each Driver)	L X H	X L H	H H L	
MIC4468 (Each Driver)	H L X	H X L	H L L	
MIC4469 (Each Driver)	L X H	X H L	L L H	

Pin Configurations

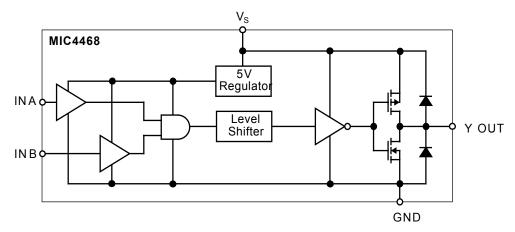


^{**}Pb-Free industrial grade PDIP available in MIC4468 & MIC4469 only.

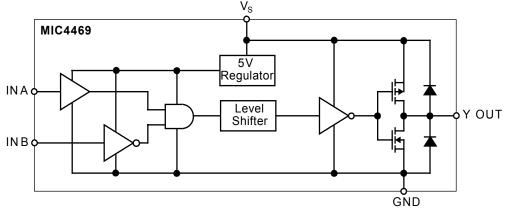
Block Diagrams



Functional Diagram for One Driver (Four Drivers per Package-Ground Unused Inputs)



Functional Diagram for One Driver (Four Drivers per Package-Ground Unused Inputs)



Functional Diagram for One Driver (Four Drivers per Package-Ground Unused Inputs)

Absolute Maximum Ratings (Notes 1 and 2)

Supply Voltage 22V **Power Dissipation**

(GND – 5V) to (V_s + 0.3V) Input Voltage N Package (14-Pin Plastic DIP) 1.5W 1W

Maximum Chip Temperature WM Package (16-Pin Wide SOIC)

Operating 150°C Storage -65° to +150°C Package Thermal Resistance Maximum Load Temperature 80°C/W

N Package (14-Pin Plastic DIP) θ_{JA} WM Package (16-Pin Wide SOIC) θ_{JA} (10 sec, for soldering) 300°C 120°C/W

Operating Ambient Temperature 0° to +70°C C Version

B Version -40° to +85°C

Electrical Characteristics: Measured at $T_A = 25^{\circ}\text{C}$ with $4.5\text{V} \le \text{V}_S \le 18\text{V}$ unless otherwise specified. (Note 3)

Symbol	Parameter	Conditions	Min	Тур	Max	Units
INPUT						
V _{IH}	Logic 1 Input Voltage		2.4	1.3		V
V _{IL}	Logic 0 Input Voltage			1.2	0.8	V
I _{IN}	Input Current	$0 \le V_{IN} \le V_{S}$	-1		1	μА
OUTPUT						
V _{OH}	High Output Voltage	I _{LOAD} = 10mA	V _s -0.15			V
V _{OL}	Low Output Voltage	I _{LOAD} = 10mA			0.15	V
R _o	Output Resistance	I _{OUT} = 10mA, V _S = 18V		5	15	Ω
I _{PK}	Peak Output Current			1.2		А
I	Latch-Up Protection Withstand Reverse Current		>500			mA
SWITCHIN	IG TIME		•			
t _R	Rise Time	Test Figure 1		14	25	ns
t _F	Fall Time	Test Figure 1		13	25	ns
t _{D1}	Delay Time	Test Figure 1		30	75	ns
t _{D2}	Delay Time	Test Figure 1		45	75	ns
POWER S	UPPLY	•				•
I _s	Power Supply Current Supply			0.2	4	mA
			•			

Note 3. Specification for packaged product only.

Electrical Characteristics:

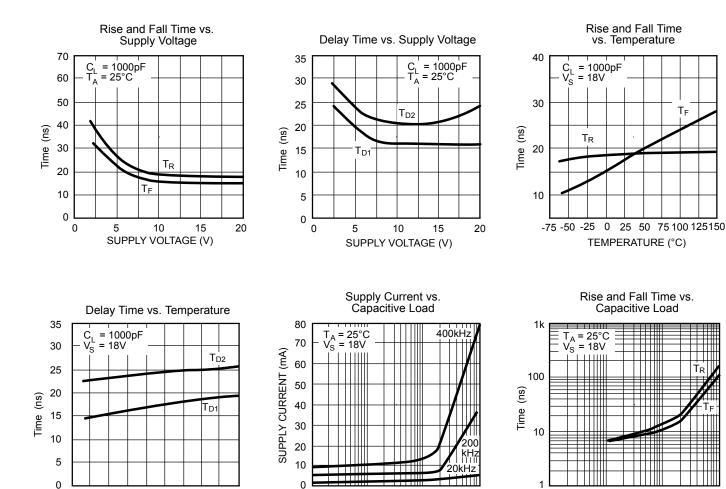
Measured over operating temperature range with 4.5V \leq V $_{\rm S}$ \leq 18V unless otherwise specified.

Symbol	Parameter	Conditions	Min	Тур	Max	Units
INPUT			 		<u> </u>	
V _{IH}	Logic 1 Input Voltage		2.4	1.4		V
V _{IL}	Logic 0 Input Voltage			1.0	0.8	V
I _{IN}	Input Current	$0 \le V_{IN} \le V_{S}$	-1		1	μA
OUTPUT			'			•
V _{OH}	High Output Voltage	I _{LOAD} = 10 mA	V _s -0.3			V
V _{OL}	Low Output Voltage	I _{LOAD} = 10 mA			0.3	V
R _o	Output Resistance	I _{OUT} = 10 mA, V _S = 18V		7	30	Ω
I _{PK}	Peak Output Current			1.2		Α
I	Latch-Up Protection Withstand Reverse Current		500			mA
SWITCHI	NG TIME	•	 			•
t _R	Rise Time	Test Figure 1		17	50	ns
t _F	Fall Time	Test Figure 1		16	50	ns
t _{D1}	Delay Time	Test Figure 1		35	100	ns
t _{D2}	Delay Time	Test Figure 1		55	100	ns
POWER	SUPPLY	1	I	ļ.	ı	!
I _s	Power Supply Current Supply			0.4	8	mA

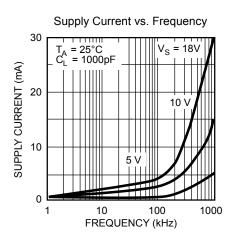
NOTE 1: Functional operation above the absolute maximum stress ratings is not implied.

NOTE 2: Static sensitive device. Store only in conductive containers. Handling personnel and equipment should be grounded to prevent static damage.

Typical Characteristics

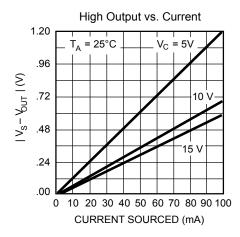


10



-75 -50 -25 0 25 50 75 100 125 150

TEMPERATURE (°C)



100

1000

CAPACITIVE LOAD (pF)

10000

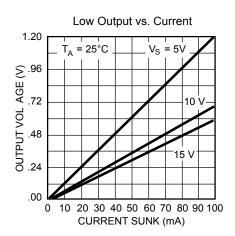
10

100

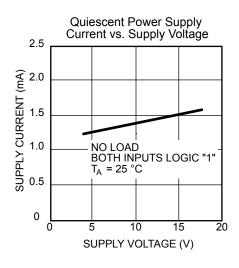
1000

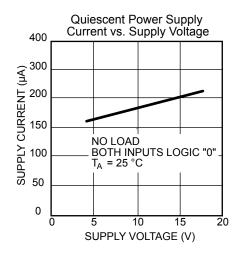
CAPACITIVE LOAD (pF)

10000

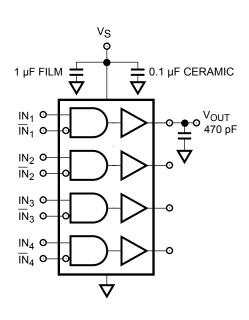


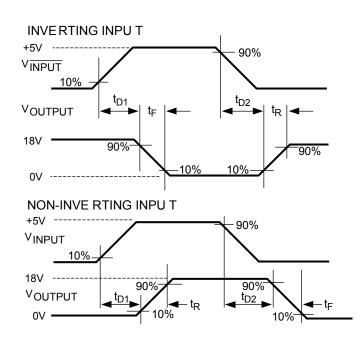
 T_F



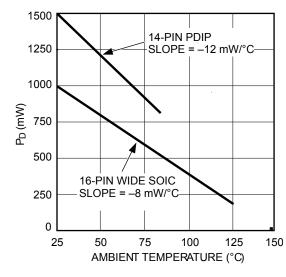


Test Figure 1

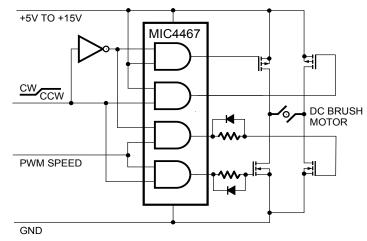




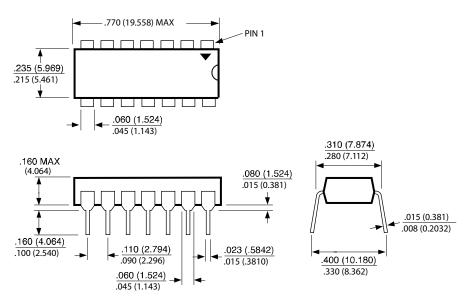
Package Power Dissipation



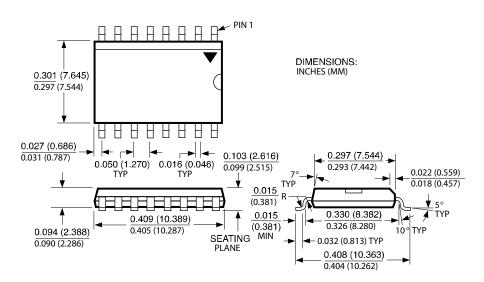
Quad Driver Drives H Bridge to Control Motor Speed and Direction



Package Information



14-Pin Plastic DIP (N)



16-Pin Wide SOP (WM)

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