TC4626/TC4627

Power CMOS Drivers With Voltage Tripler

Features

- Power Driver With On Board Voltage Booster
- Low I_{DD} – <4mA
- Small Package – 8-Pin PDIP
- Under-Voltage Circuitry
- Fast Rise-Fall Time – <40nsec @1000pF
- Below-Rail Input Protection

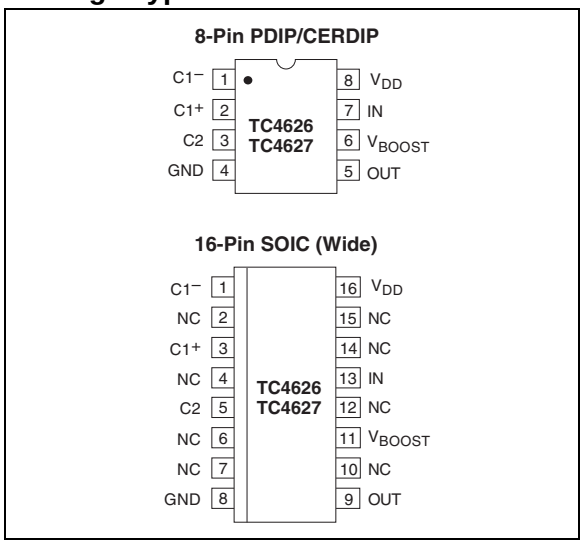
Applications

- Raises 5V to drive higher – Vgs (ON) MOSFETs
- Eliminates one system power supply

Device Selection Table

Part Number	Package	Temp. Range
TC4626COE	16-Pin SOIC (Wide)	-55°C to +125°C
TC4626CPA	8-Pin PDIP	-40°C to +85°C
TC4626EOE	16-Pin SOIC (Wide)	-40°C to +85°C
TC4626EPA	8-Pin PDIP	0°C to +70°C
TC4626MJA	8-Pin CERDIP	0°C to +70°C
TC4627COE	16-Pin SOIC (Wide)	-55°C to +125°C
TC4627CPA	8-Pin PDIP	-40°C to +85°C
TC4627EOE	16-Pin SOIC (Wide)	-40°C to +85°C
TC4627EPA	8-Pin PDIP	0°C to +70°C
TC4627MJA	8-Pin CERDIP	0°C to +70°C

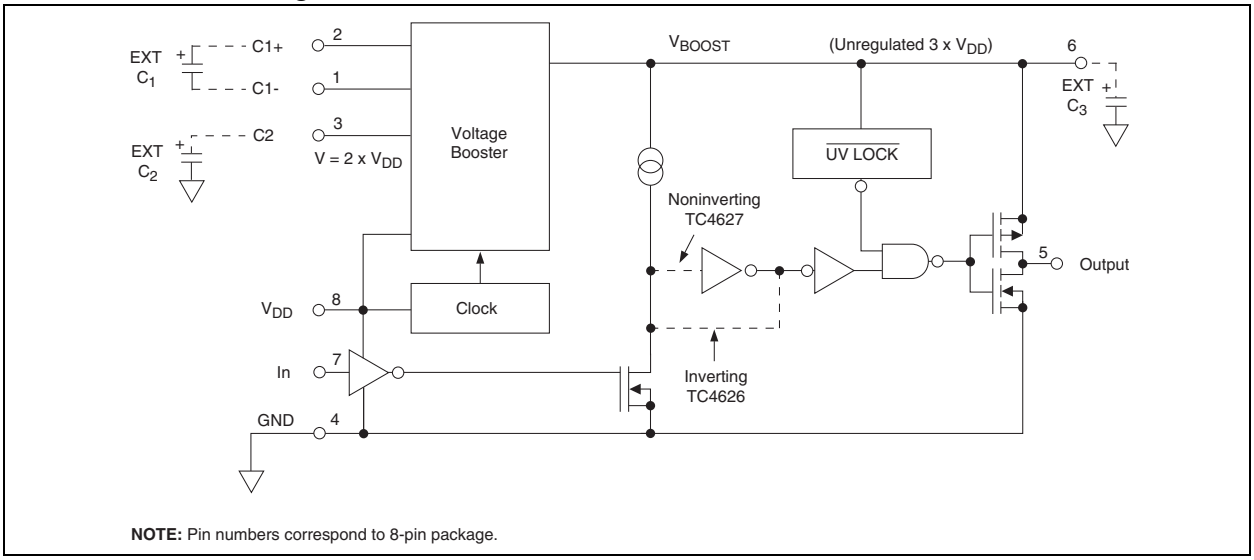
Package Type



General Description

The TC4626/TC4627 are single CMOS high speed drivers with an on-board voltage boost circuit. These parts work with an input supply voltage from 4 to 6 volts. The internal voltage booster will produce a V_{BOOST} potential up to 12 volts above V_{IN}. This V_{BOOST} is not regulated, so its voltage is dependent on the input V_{DD} voltage and output drive loading requirements. An internal undervoltage lockout circuit keeps the output in a low state when V_{BOOST} drops below 7.8 volts. Output is enabled when V_{BOOST} is above 11.3 volts.

Functional Block Diagram



NOTE: Pin numbers correspond to 8-pin package.

1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings*

Supply Voltage 6.2V
Input Voltage, Any Terminal
..... V_S + 0.3V to GND – 0.3V
Package Power Dissipation ($T_A \leq 70°C$)
PDIP 730mW
CERDIP 800mW
SOIC 760mW
Derating Factor PDIP ..... 5.6 mW/°C Above 36°C
CERDIP ..... 6.0mW/°C
Operating Temperature Range (Ambient)
C Version ..... 0°C to +70°C
E Version ..... -40°C to +85°C
M Version ..... -55°C to +125°C
Storage Temperature Range ..... -65°C to +150°C

*Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions above those indicated in the operation sections of the specifications is not implied. Exposure to Absolute Maximum Rating conditions for extended periods may affect device reliability.

TC4626/TC4627 ELECTRICAL SPECIFICATIONS

Electrical Characteristics: T_A = +25°C, V_{DD} = 5V, $C_1 = C_2 = C_3$ 10µF unless otherwise noted.

Symbol	Parameter	Min	Typ	Max	Units	Test Conditions
Input						
V_{IH}	Logic 1, High Input Voltage	2.4	—	—	V	
V_{IL}	Logic 0, Low Input Voltage	—	—	0.8	V	
I_{IN}	Input Current	-1	—	1	µA	$0V \leq V_{IN} \leq V_{DRIVE}$
Output						
V_{OH}	High Output Voltage	V_{BOOST} – 0.025	—	—	V	
V_{OL}	Low Output Voltage	—	—	0.025	V	
R_O	Output Resistance, High	—	10	15	Ω	I_{OUT} = 10mA, V_{DD} = 5V
R_O	Output Resistance, Low	—	8	10	Ω	I_{OUT} = 10mA, V_{DD} = 5V
I_{PK}	Peak Output Current	—	1.5	—	A	
Switching Time						
t_R	Rise Time	—	33	40	nsec	Figure 3-1, Figure 3-2
t_F	Fall Time	—	27	35	nsec	Figure 3-1, Figure 3-2
t_{D1}	Delay Time	—	35	45	nsec	Figure 3-1, Figure 3-2
t_{D2}	Delay Time	—	45	55	nsec	Figure 3-1, Figure 3-2
F_{MAX}	Maximum Switching Frequency	1.0	—	—	MHz	V_{DD} = 5V, V_{BOOST} > 8.5V, Figure 3-1
Voltage Booster						
R_3	Voltage Tripler Output Source Resistance	—	300	400	Ω	I_L = 10mA, V_{DD} = 5V
R_2	Voltage Doubler Output Source Resistance	—	120	200	Ω	
F_{OSC}	Oscillator Frequency	12	—	28	kHz	
V_{OSC}	Oscillator Amplitude Measured at C1-	4.5	—	10	V	R_{LOAD} = 10kΩ
UV @V_{BOOST}	Undervoltage Threshold	7.0	7.8	8.5	V	
V_{START} @V_{BOOST}	Start Up Voltage	10.5	11.3	12	V	
V_{BOOST}	@V_{DD} = 5V	14.6	—	—	V	No Load

TC4626/TC4627 ELECTRICAL SPECIFICATIONS (CONTINUED)

Symbol	Parameter	Min	Typ	Max	Units	Test Conditions
Power Supply						
I_{DD}	Power Supply Current	—	—	2.5	mA	V_{IN} = LOW or HIGH
V_{DD}	Supply Voltage	4.0	—	6.0	V	
Electrical Characteristics: Over operating temperature range, V_{DD} = 5V, $C_1 = C_2 = C_3$ 10µF unless otherwise noted.						
Symbol	**Parameter**	**Min**	**Typ**	**Max**	**Units**	**Test Conditions**
Input						
V_{IH}	Logic 1, High Input Voltage	2.4	—	—	V	
V_{IL}	Logic 0, Low Input Voltage	—	—	0.8	V	
I_{IN}	Input Current	-10	—	1	µA	$0V \le V_{IN} \le V_{BOOST}$
Output						
V_{OH}	High Output Voltage	V_{DRIVE} – 0.025	—	—	V	
V_{OL}	Low Output Voltage	—	—	0.025	V	
R_O	Output Resistance, High	—	 15 15	 20 25	Ω	I_{OUT} = 10mA, V_{DD} = 5V C & E Version (T_A = 70°C or 85°C) M Version (T_A = 125°C)
R_O	Output Resistance, Low	—	 10 10	 13 15	Ω	I_{OUT} = 10mA, V_{DD} = 5V C & E Version (T_A = 70°C or 85°C) M Version (T_A = 125°C)
I_{PK}	Peak Output Current	—	1.5	—	A	
Switching Time						
t_R	Rise Time	—	—	55	nsec	Figure 3-1, Figure 3-2
t_F	Fall Time	—	—	50	nsec	Figure 3-1, Figure 3-2
t_{D1}	Delay Time	—	—	60	nsec	Figure 3-1, Figure 3-2
t_{D2}	Delay Time	—	—	70	nsec	Figure 3-1, Figure 3-2
F_{MAX}	Maximum Switching Frequency	750	—	—	kHz	V_{DD} = 5V, V_{BOOST} > 8.5V, Figure 3-1
Voltage Booster						
R_3	Voltage Boost Output Source Resistance	—	400	500	Ω	I_L = 10mA, V_{DD} = 5V
R_2	Voltage Doubler Output Source Resistance	—	170	300	Ω	
F_{OSC}	Oscillator Frequency	5	—	50	kHz	
V_{OSC}	Oscillator Amplitude Measured at C1-	4.5	—	10	V	R_{LOAD} = 10kΩ
UV @V_{BOOST}	Undervoltage Threshold	7.0	7.8	8.5	V	
V_{START} @V_{BOOST}	Start Up Voltage	10.5	11.3	12	V	
V_{BOOST}	@V_{DD} = 5V	14.6	—	—	V	No Load
Power Supply						
I_{DD}	Power Supply Current	—	—	4	mA	V_{IN} = LOW or HIGH
V_{DD}	Supply Voltage	4.0	—	6.0	V	

2.0 PIN DESCRIPTIONS

The descriptions of the pins are listed in Table 2-1.

TABLE 2-1: PIN FUNCTION TABLE

Pin No. (8-Pin PDIP, CERDIP)	Symbol	Description
1	C1-	
2	C1+	
3	C2	
4	GND	Ground.
5	OUT	
6	V_{BOOST}	
7	IN	
8	V_{DD}	

Pin No. (16-Pin SOIC Wide)	Symbol	Description
1	C1-	
2	NC	No connect.
3	C1+	
4	NC	No connect.
5	C2	
6	NC	No connect.
7	NC	No connect.
8	GND	Ground.
9	OUT	
10	NC	No connect.
11	V_{BOOST}	
12	NC	No connect.
13	IN	
14	NC	No connect.
15	NC	No connect.
16	V_{DD}	

3.0 APPLICATIONS INFORMATION

FIGURE 3-1: INVERTING DRIVER SWITCHING TIME

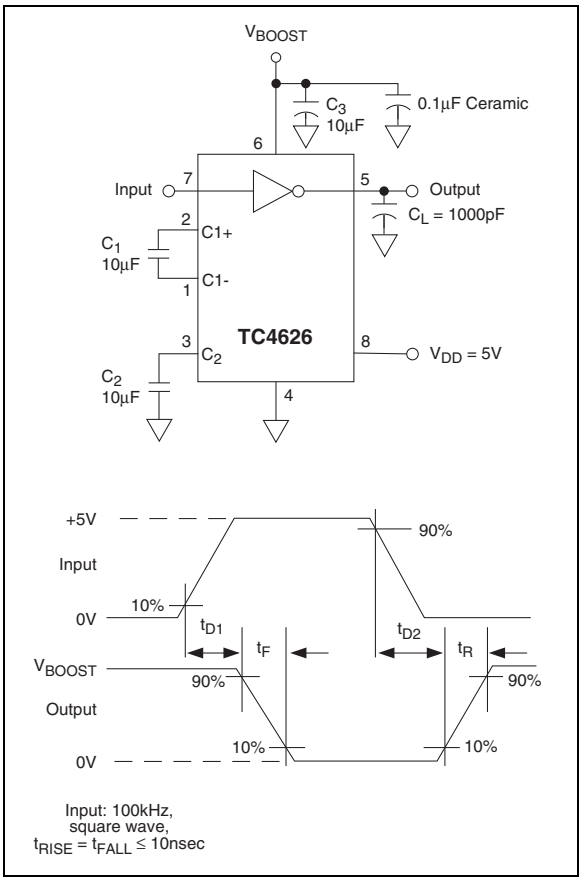
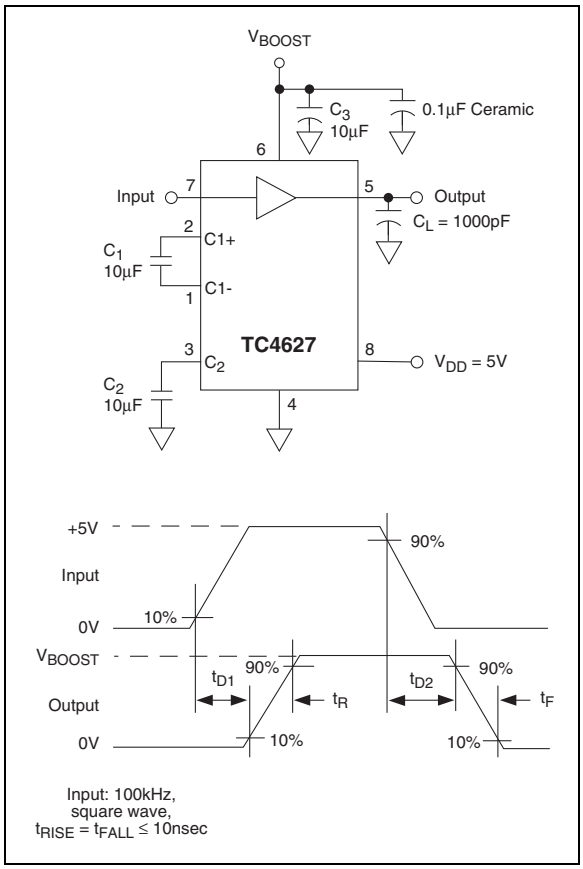


FIGURE 3-2: NONINVERTING DRIVER SWITCHING TIME



3.1 BOOSTER FUNCTION

The voltage booster is an unregulated voltage tripler circuit. The tripler consists of three sets of internal switches and three external capacitors. S1a and S1b charge capacitor C1 to V_{DD} potential. S2a and S2b add C1 potential to V_{DD} input to charge C2 to 2 x V_{DD}. S3a and S3b add C1 potential to C2 to charge C3 to 3 x V_{DD}. The position of the switches is controlled by the internal 4 phase clock.

FIGURE 3-3: VOLTAGE BOOSTER

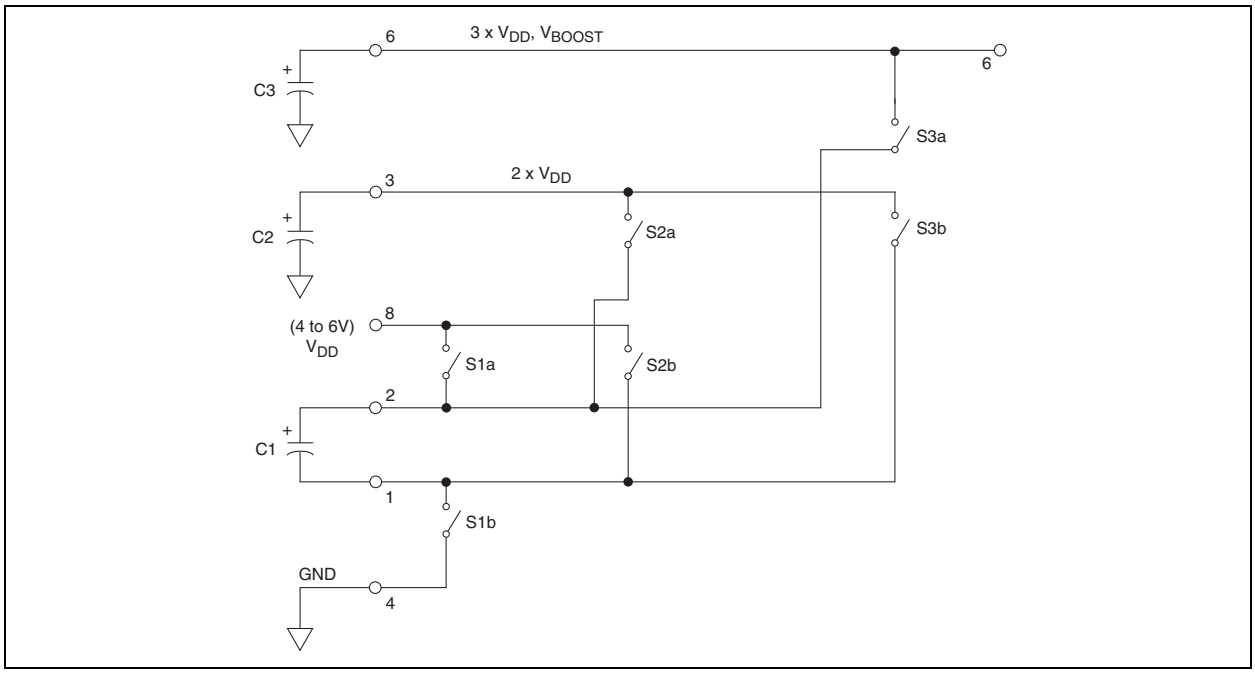
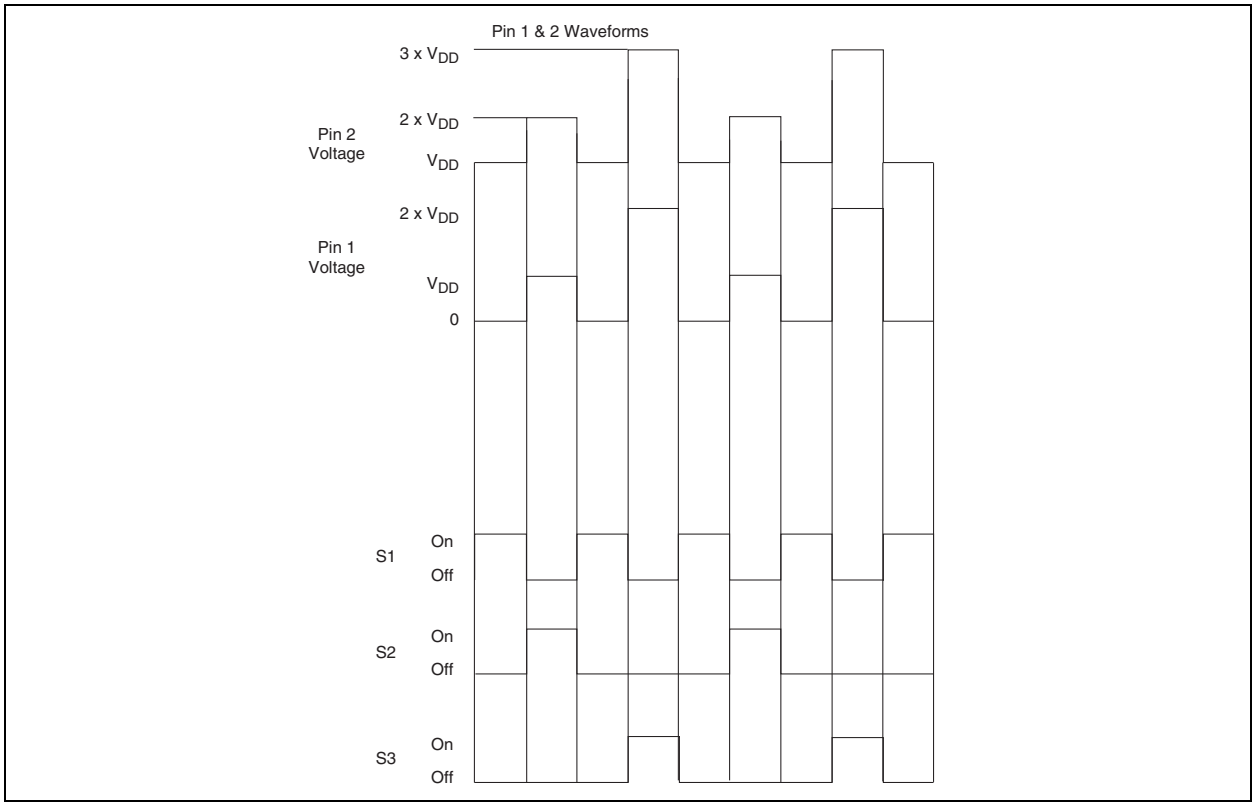
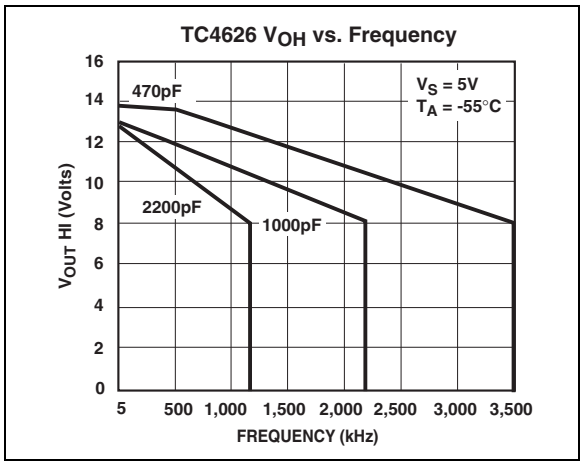


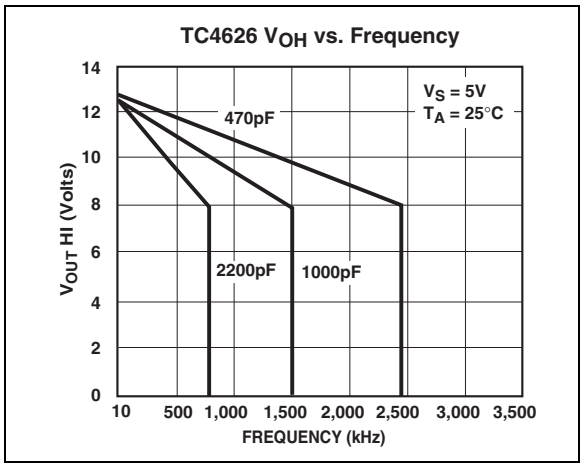
FIGURE 3-4: POSITION OF SWITCHES

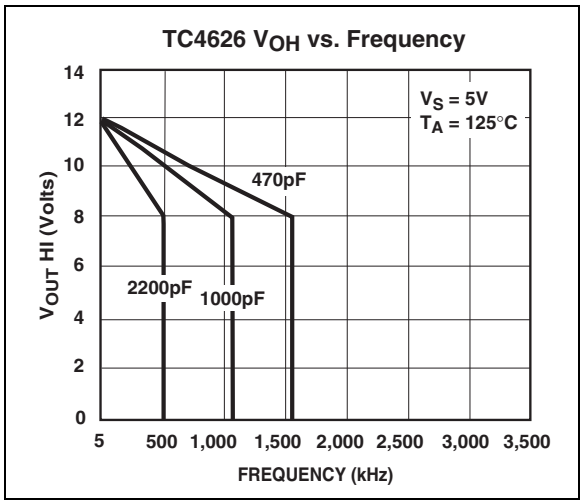


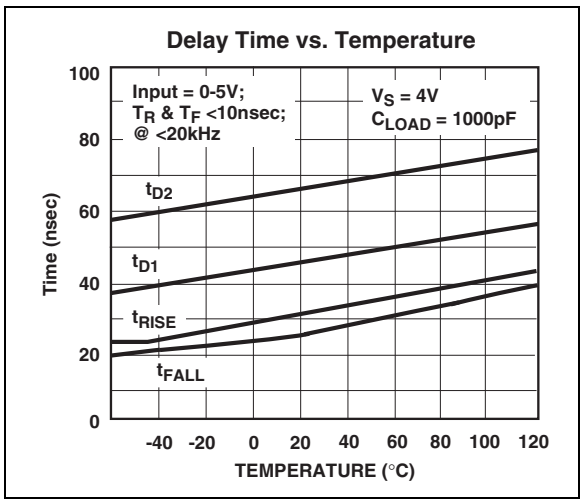
4.0 TYPICAL CHARACTERISTICS

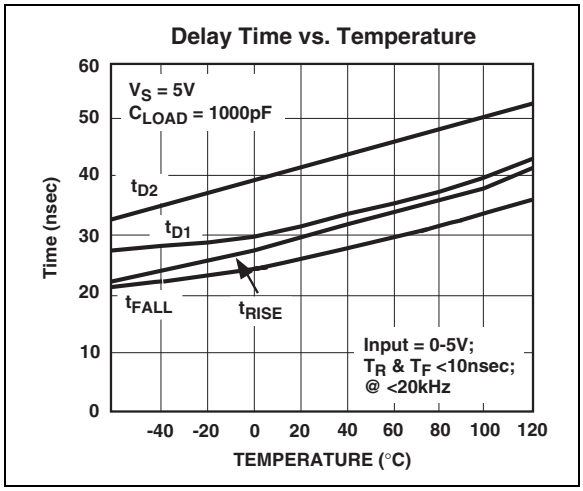
Note: The graphs and tables provided following this note are a statistical summary based on a limited number of samples and are provided for informational purposes only. The performance characteristics listed herein are not tested or guaranteed. In some graphs or tables, the data presented may be outside the specified operating range (e.g., outside specified power supply range) and therefore outside the warranted range.

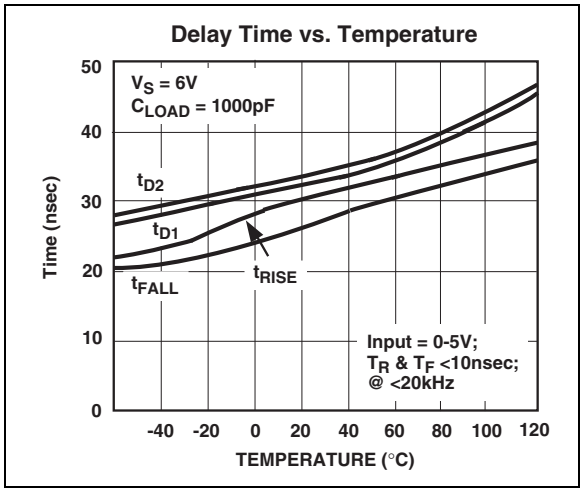




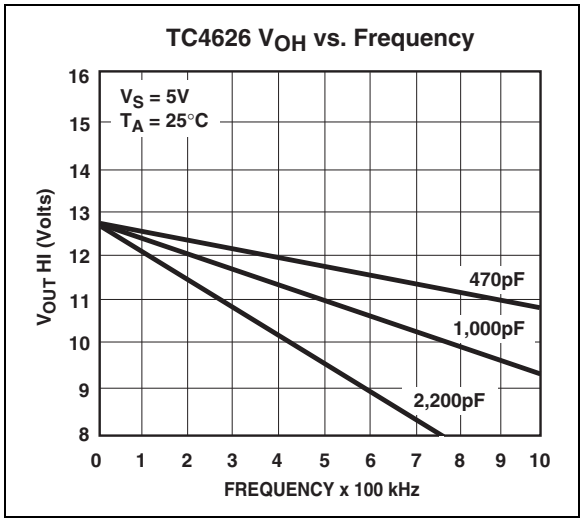


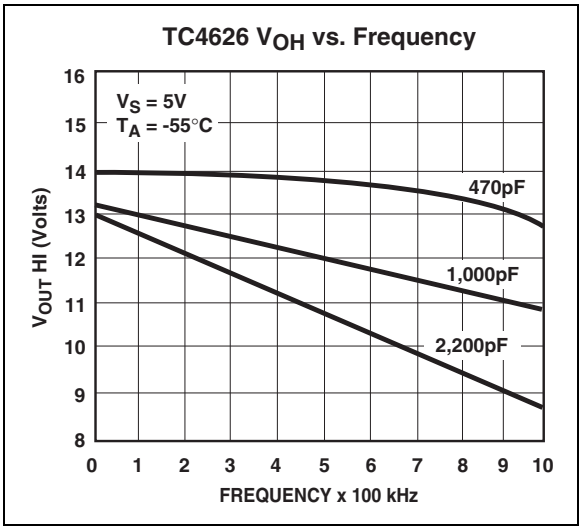


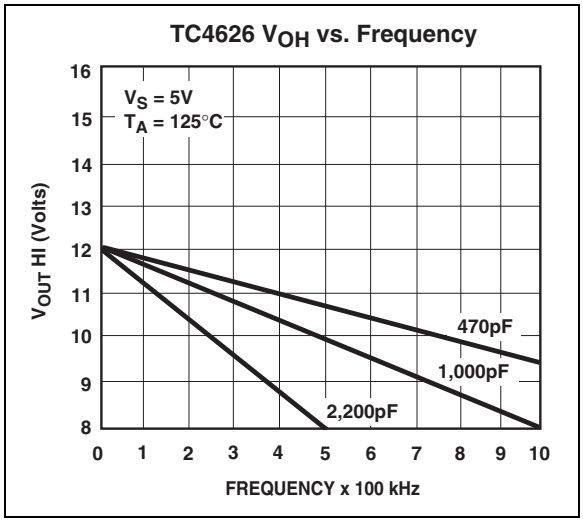




TYPICAL CHARACTERISTICS (CONTINUED)







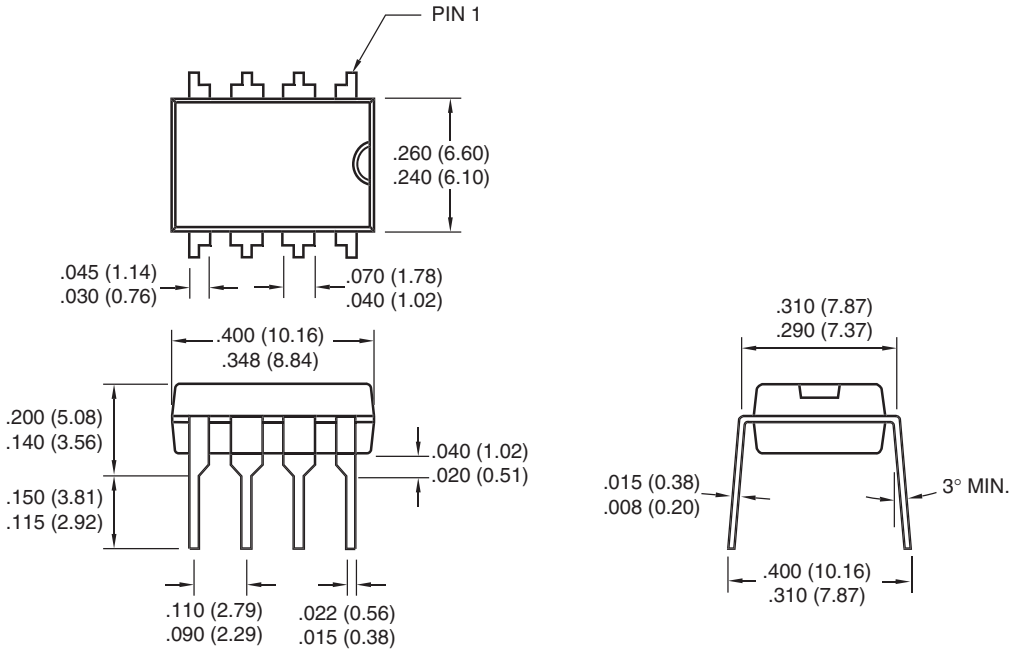
5.0 PACKAGING INFORMATION

Package marking data not available at this time.

5.1 Package Dimensions

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

8-Pin Plastic DIP

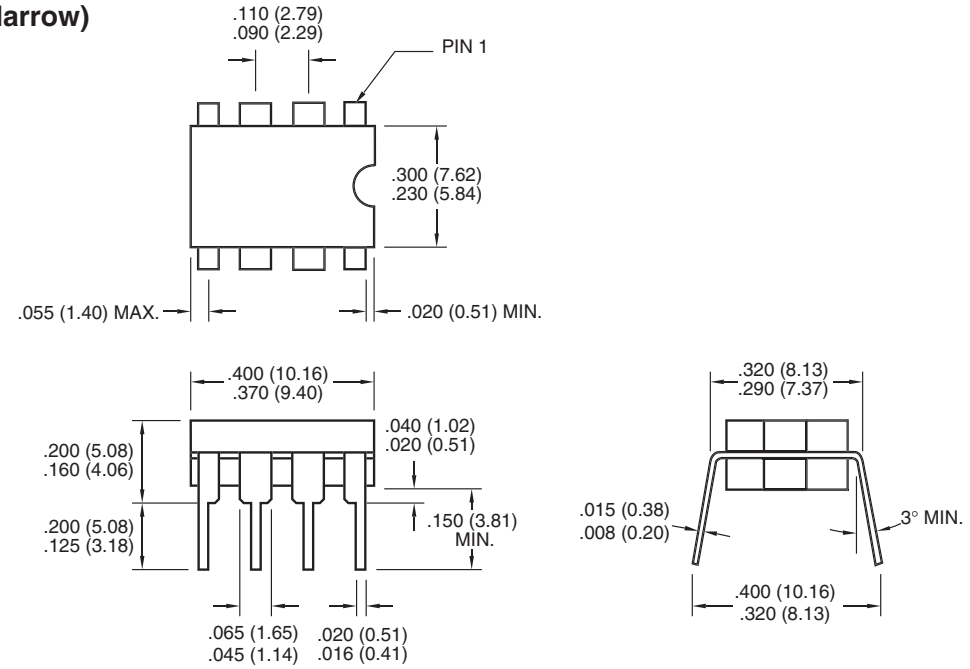


Dimensions: inches (mm)

Package Dimensions (Continued)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

8-Pin CDIP (Narrow)

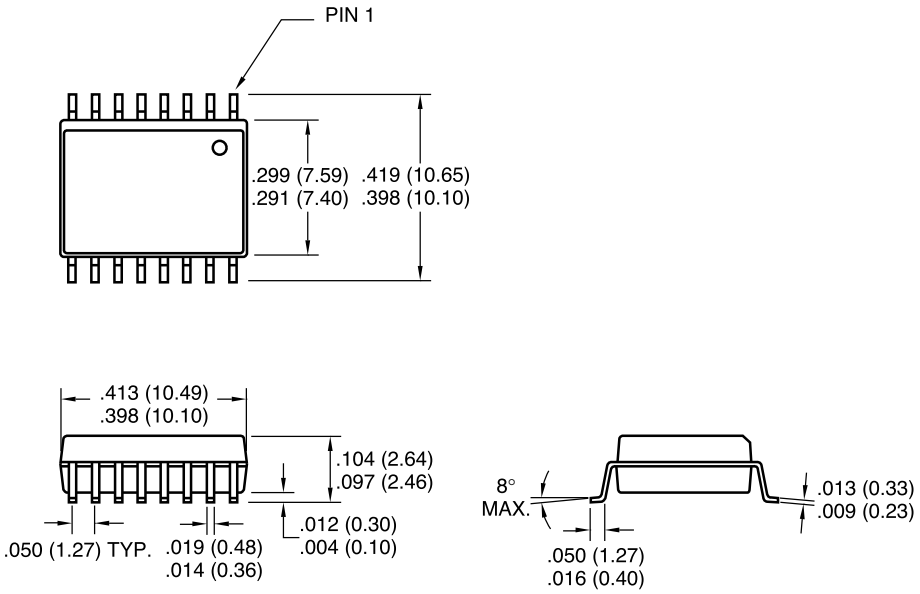


Dimensions: inches (mm)

Package Dimensions (Continued)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

16-Pin SOIC (Wide)



Dimensions: inches (mm)

6.0 REVISION HISTORY

Revision C (December 2012)

Added a note to each package outline drawing.

Sales and Support

Data Sheets
Products supported by a preliminary Data Sheet may have an errata sheet describing minor operational differences and recommended workarounds. To determine if an errata sheet exists for a particular device, please contact one of the following:

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- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «**JONHON**», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «**FORSTAR**».

AVIC JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).

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