TC4467/TC4468/TC4469

Logic-Input CMOS Quad Drivers

Features

- High Peak Output Current: 1.2 A
- Wide Operating Range:
  - 4.5 V to 18 V
- Symmetrical Rise/Fall Times: 25 nsec
- Short, Equal Delay Times: 75 nsec
- Latch-proof. Will Withstand 500 mA Inductive Kickback
- 3 Input Logic Choices:
  - AND / NAND / AND + Inv
- ESD Protection on All Pins: 2 kV

Applications

- General Purpose CMOS Logic Buffer
- Driving All Four MOSFETs in an H-Bridge
- Direct Small Motor Driver
- Relay or Peripheral Drivers
- CCD Driver
- Pin-Switching Network Driver

General Description

The TC4467/TC4468/TC4469 devices are a family of four-output CMOS buffers/MOSFET drivers with 1.2 A peak drive capability. Unlike other MOSFET drivers, these devices have two inputs for each output. The inputs are configured as logic gates: NAND (TC4467), AND (TC4468) and AND/INV (TC4469).
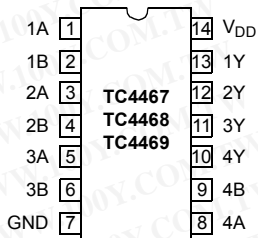
The TC4467/TC4468/TC4469 drivers can continuously source up to 250 mA into ground referenced loads. These devices are ideal for direct driving low current motors or driving MOSFETs in a H-bridge configuration for higher current motor drive (see Section 5.0 for details). Having the logic gates onboard the driver can help to reduce component count in many designs.

The TC4467/TC4468/TC4469 devices are very robust and highly latch-up resistant. They can tolerate up to 5 V of noise spiking on the ground line and can handle up to 0.5 A of reverse current on the driver outputs.
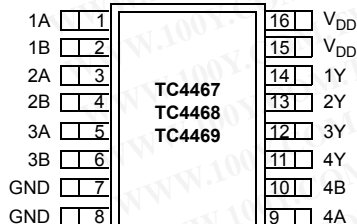
The TC4467/4468/4469 devices are available in commercial, industrial and military temperature ranges.
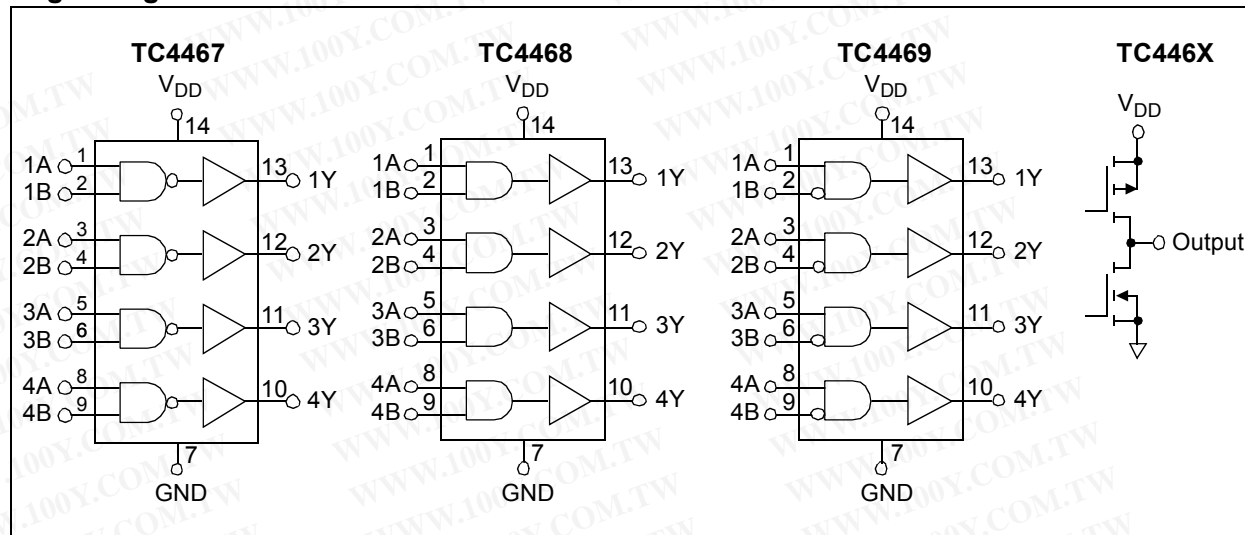
Package Types

14-Pin PDIP/CERDIP

	TC4467 / TC4468 / TC4469	
1A	1	14 V$_{DD}$
1B	2	13 1Y
2A	3	12 2Y
2B	4	11 3Y
3A	5	10 4Y
3B	6	9 4B
GND	7	8 4A

16-Pin SOIC (Wide)

	TC4467 / TC4468 / TC4469	
1A	1	16 V$_{DD}$
1B	2	15 V$_{DD}$
2A	3	14 1Y
2B	4	13 2Y
3A	5	12 3Y
3B	6	11 4Y
GND	7	10 4B
GND	8	9 4A

TC4467/TC4468/TC4469

Logic Diagrams

TC4467

V$_{DD}$
14

1A 1
1B 2 → 13 1Y

2A 3
2B 4 → 12 2Y

3A 5
3B 6 → 11 3Y

4A 8
4B 9 → 10 4Y

7
GND

TC4468

V$_{DD}$
14

1A 1
1B 2 → 13 1Y

2A 3
2B 4 → 12 2Y

3A 5
3B 6 → 11 3Y

4A 8
4B 9 → 10 4Y

7
GND

TC4469

V$_{DD}$
14

1A 1
1B 2 → 13 1Y

2A 3
2B 4 → 12 2Y

3A 5
3B 6 → 11 3Y

4A 8
4B 9 → 10 4Y

7
GND

TC446X

V$_{DD}$

Output

1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings†

Supply Voltage ....+20 V
Input Voltage .... (GND – 5 V) to (V_{DD} + 0.3 V)
Package Power Dissipation: ($T_A \leq 70°C$)
    PDIP...800 mW
    CERDIP ....840 mW
    SOIC ....760 mW
Package Thermal Resistance:
    CERDIP $R_{\theta J-A}$ ....100°C/W
    CERDIP $R_{\theta J-C}$ ....23°C/W
    PDIP $R_{\theta J-A}$ ....80°C/W
    PDIP $R_{\theta J-C}$ ....35°C/W
    SOIC $R_{\theta J-A}$ ....95°C/W
    SOIC $R_{\theta J-C}$ ....28°C/W
Operating Temperature Range:
    C Version ....0°C to +70°C
    E Version ....-40°C to +85°C
    M Version ....-55°C to +125°C
Maximum Chip Temperature......................................+150°C
Storage Temperature Range.........................-65°C to +150°C

†Notice: Stresses above those listed under "Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operation listings of this specification is not implied. Exposure to maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL SPECIFICATIONS

Electrical Characteristics: Unless otherwise noted, T_A = +25°C, with 4.5 V $\leq V_{DD} \leq$ 18 V.

Parameters	Sym	Min	Typ	Max	Units	Conditions
Input						
Logic 1, High Input Voltage	V_{IH}	2.4	—	V_{DD}	V	**Note 3**
Logic 0, Low Input Voltage	V_{IL}	—	—	0.8	V	**Note 3**
Input Current	I_{IN}	-1.0	—	+1.0	µA	0 V $\leq V_{IN} \leq V_{DD}$
Output						
High Output Voltage	V_{OH}	$V_{DD} - 0.025$	—	—	V	I_{LOAD} = 100 µA **(Note 1)**
Low Output Voltage	V_{OL}	—	—	0.15	V	I_{LOAD} = 10 mA **(Note 1)**
Output Resistance	R_O	—	10	15	Ω	I_{OUT} = 10 mA, V_{DD} = 18 V
Peak Output Current	I_{PK}	—	1.2	—	A	
Continuous Output Current	I_{DC}	—	—	300	mA	Single Output
		—	—	500		Total Package
Latch-Up Protection Withstand Reverse Current	I	—	500	—	mA	4.5 V $\leq V_{DD} \leq$ 16 V
Switching Time (Note 1)						
Rise Time	t_R	—	15	25	nsec	Figure 4-1
Fall Time	t_F	—	15	25	nsec	Figure 4-1
Delay Time	t_{D1}	—	40	75	nsec	Figure 4-1
Delay Time	t_{D2}	—	40	75	nsec	Figure 4-1
Power Supply						
Power Supply Current	I_S	—	1.5	4	mA	
Power Supply Voltage	V_{DD}	4.5	—	18	V	**Note 2**

Note 1: Totem pole outputs should not be paralleled because the propagation delay differences from one to the other could cause one driver to drive high a few nanoseconds before another. The resulting current spike, although short, may decrease the life of the device. Switching times are ensured by design.

2: When driving all four outputs simultaneously in the same direction, V_{DD} will be limited to 16 V. This reduces the chance that internal dv/dt will cause high-power dissipation in the device.

3: The input threshold has approximately 50 mV of hysteresis centered at approximately 1.5 V. Input rise times should be kept below 5 µsec to avoid high internal peak currents during input transitions. Static input levels should also be maintained above the maximum, or below the minimum, input levels specified in the "Electrical Characteristics" to avoid increased power dissipation in the device.

TC4467/TC4468/TC4469

ELECTRICAL SPECIFICATIONS (OPERATING TEMPERATURES)

Electrical Characteristics: Unless otherwise noted, over operating temperature range with 4.5 V $\leq V_{DD} \leq$ 18 V.

Parameters	Sym	Min	Typ	Max	Units	Conditions
Input						
Logic 1, High Input Voltage	V_{IH}	2.4	—	—	V	**Note 3**
Logic 0, Low Input Voltage	V_{IL}	—	—	0.8	V	**Note 3**
Input Current	I_{IN}	-10	—	10	µA	$0\ V \leq V_{IN} \leq V_{DD}$
Output						
High Output Voltage	V_{OH}	$V_{DD} - 0.025$	—	—	V	I_{LOAD} = 100 µA **(Note 1)**
Low Output Voltage	V_{OL}	—	—	0.30	V	I_{LOAD} = 10 mA **(Note 1)**
Output Resistance	R_O	—	20	30	Ω	I_{OUT} = 10 mA, V_{DD} = 18 V
Peak Output Current	I_{PK}	—	1.2	—	A	
Continuous Output Current	I_{DC}	—	—	300	mA	Single Output
		—	—	500		Total Package
Latch-Up Protection Withstand Reverse Current	I	—	500	—	mA	$4.5\ V \leq V_{DD} \leq 16$ V
Switching Time (Note 1)						
Rise Time	t_R	—	15	50	nsec	Figure 4-1
Fall Time	t_F	—	15	50	nsec	Figure 4-1
Delay Time	t_{D1}	—	40	100	nsec	Figure 4-1
Delay Time	t_{D2}	—	40	100	nsec	Figure 4-1
Power Supply						
Power Supply Current	I_S	—	—	8	mA	
Power Supply Voltage	V_{DD}	4.5	—	18	V	**Note 2**

Note 1: Totem pole outputs should not be paralleled because the propagation delay differences from one to the other could cause one driver to drive high a few nanoseconds before another. The resulting current spike, although short, may decrease the life of the device. Switching times are ensured by design.

2: When driving all four outputs simultaneously in the same direction, V_{DD} will be limited to 16 V. This reduces the chance that internal dv/dt will cause high-power dissipation in the device.

3: The input threshold has approximately 50 mV of hysteresis centered at approximately 1.5 V. Input rise times should be kept below 5 µsec to avoid high internal peak currents during input transitions. Static input levels should also be maintained above the maximum, or below the minimum, input levels specified in the "Electrical Characteristics" to avoid increased power dissipation in the device.

TRUTH TABLE

Part No.	TC4467 NAND				TC4468 AND				TC4469 AND/INV			
Inputs A	H	H	L	L	H	H	L	L	H	H	L	L
Inputs B	H	L	H	L	H	L	H	L	H	L	H	L
Outputs TC446X	L	H	H	H	H	L	L	L	L	H	L	L

Legend: H = High L = Low

2.0 TYPICAL PERFORMANCE CURVES

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.

Note: T_A = +25°C, with 4.5 V $\leq V_{DD} \leq$ 18 V.
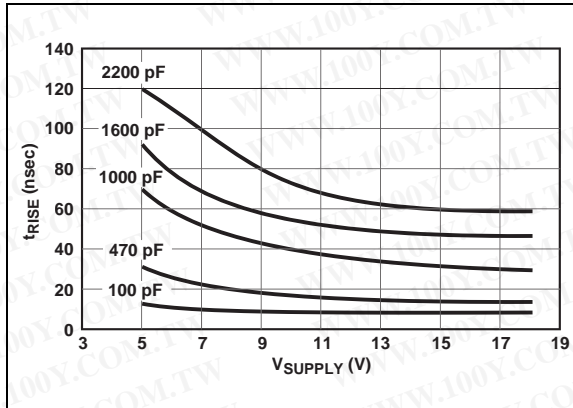
FIGURE 2-1: Rise Time vs. Supply Voltage.

FIGURE 2-2: Rise Time vs. Capacitive Load.

FIGURE 2-3: Rise/Fall Times vs. Temperature.

FIGURE 2-4: Fall Time vs. Supply Voltage.

FIGURE 2-5: Fall Time vs. Capacitive Load.
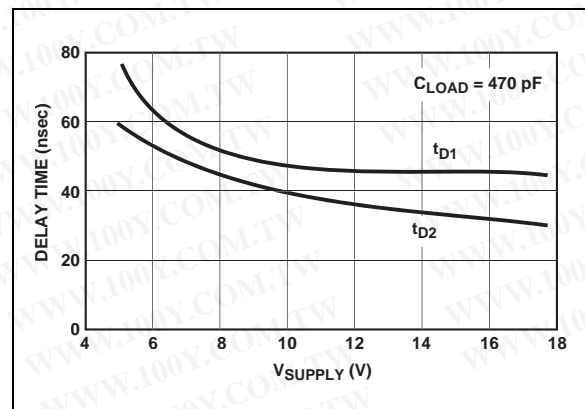
FIGURE 2-6: Propagation Delay Time vs. Supply Voltage.

TC4467/TC4468/TC4469

2.0   TYPICAL PERFORMANCE CURVES (CONTINUED)

Note: T_A = +25°C, with 4.5 V ≤ V_{DD} ≤ 18 V.
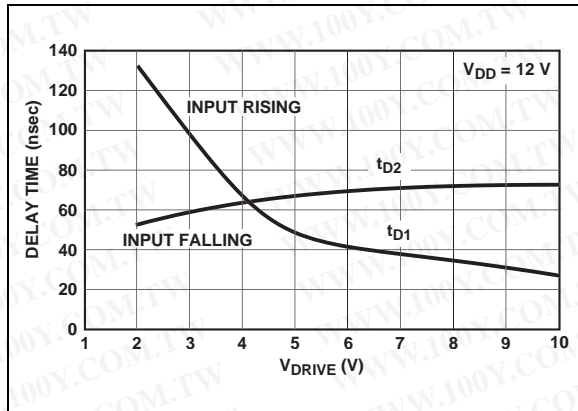
FIGURE 2-7:   Input Amplitude vs. Delay Times.
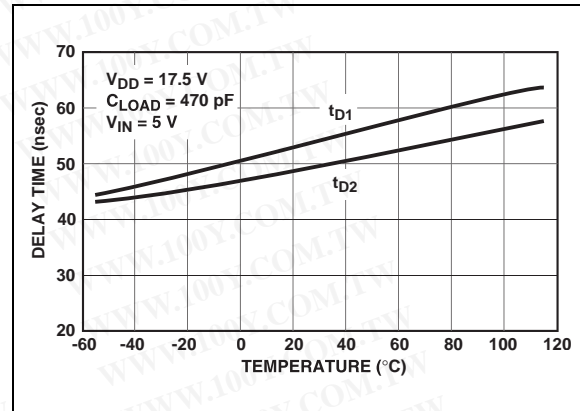
FIGURE 2-10:   Propagation Delay Times vs. Temperatures.
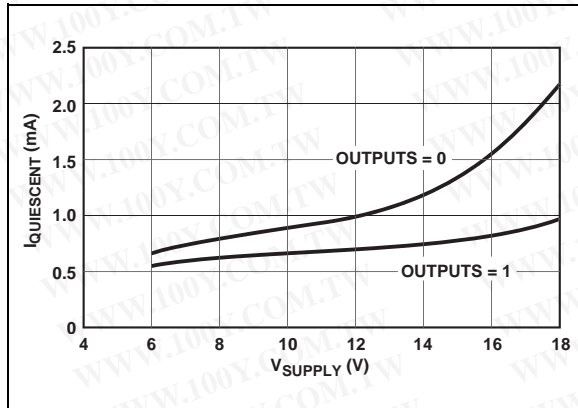

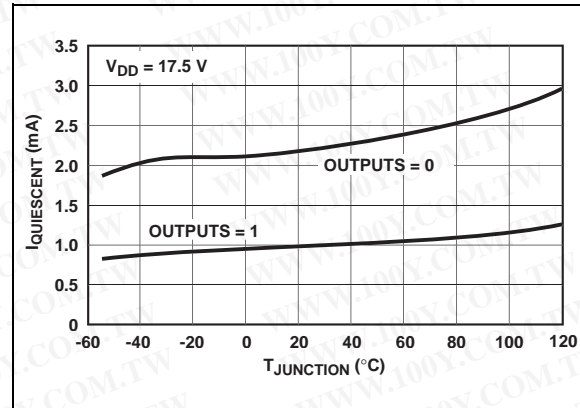**FIGURE 2-8:**   Quiescent Supply Current vs. Supply Voltage.

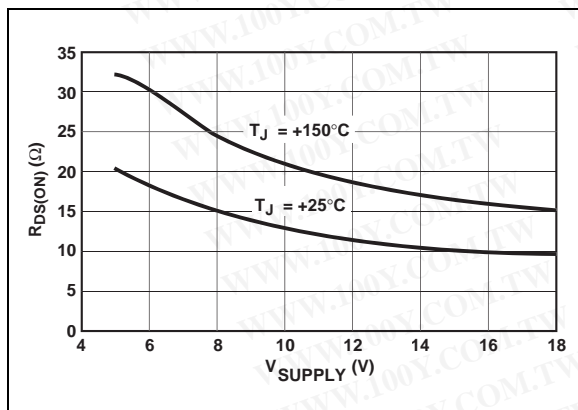**FIGURE 2-11:**   Quiescent Supply Current vs. Temperature.
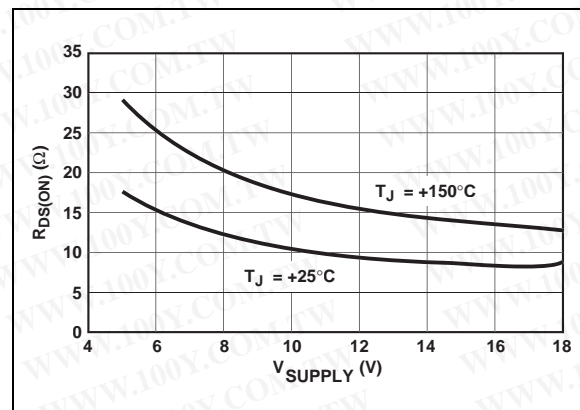

FIGURE 2-9:   High-State Output Resistance.

FIGURE 2-12:   Low-State Output Resistance.

2.0   TYPICAL PERFORMANCE CURVES (CONTINUED)
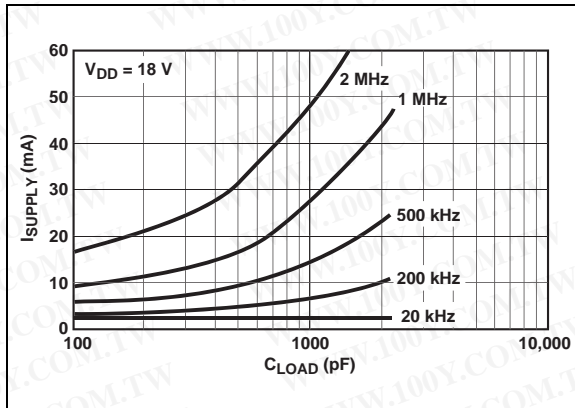
Note: (Load on single output only).

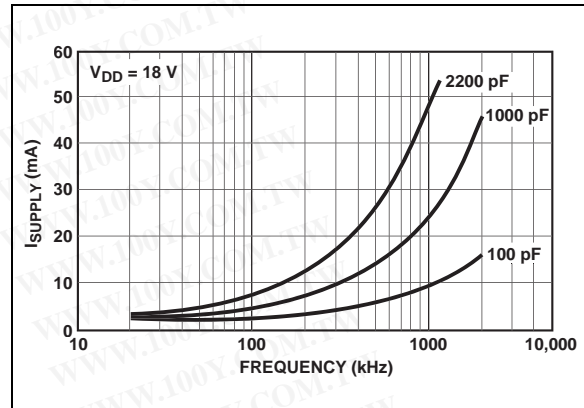**FIGURE 2-13:**   *Supply Current vs. Capacitive Load.*

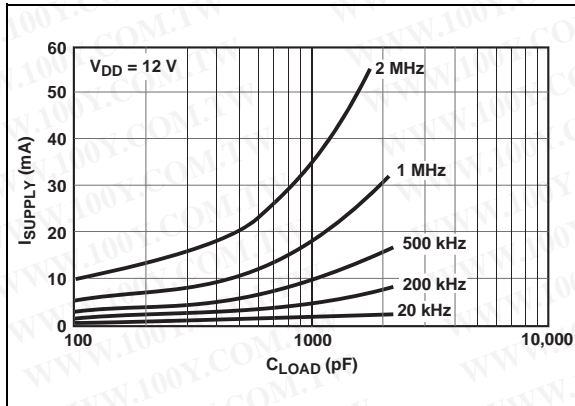**FIGURE 2-16:**   *Supply Current vs. Frequency.*

FIGURE 2-14:   *Supply Current vs. Capacitive Load.*
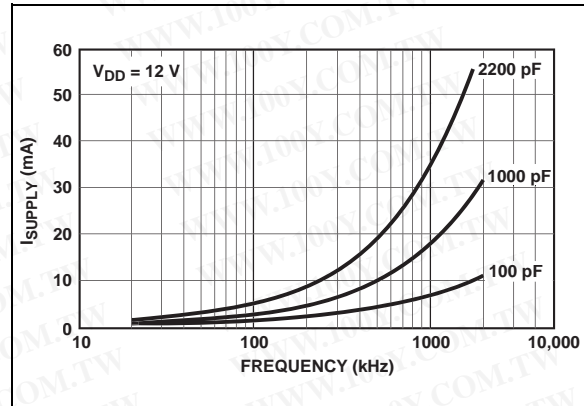
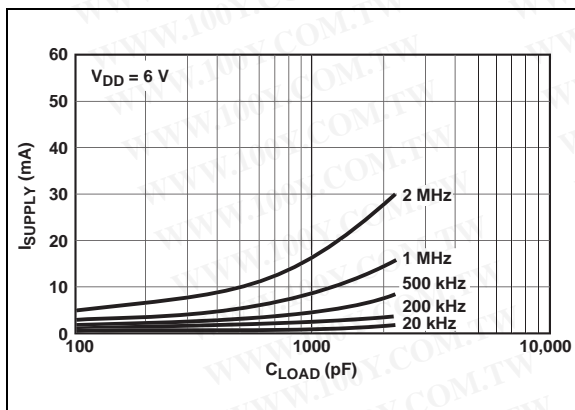**FIGURE 2-17:**   *Supply Current vs. Frequency.*

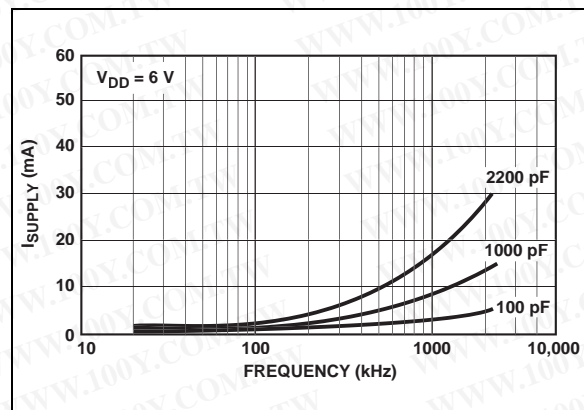**FIGURE 2-15:**   *Supply Current vs. Capacitive Load.*

FIGURE 2-18:   *Supply Current vs. Frequency.*

TC4467/TC4468/TC4469

3.0   PIN DESCRIPTIONS

The descriptions of the pins are listed in Table 3-1.

TABLE 3-1:   PIN FUNCTION TABLE

14-Pin PDIP, CERDIP	16-Pin SOIC (Wide)	Description
Symbol	Symbol	
1A	1A	Input A for Driver 1, TTL/CMOS Compatible Input
1B	1B	Input B for Driver 1, TTL/CMOS Compatible Input
2A	2A	Input A for Driver 2, TTL/CMOS Compatible Input
2B	2B	Input B for Driver 2, TTL/CMOS Compatible Input
3A	3A	Input A for Driver 3, TTL/CMOS Compatible Input
3B	3B	Input B for Driver 3, TTL/CMOS Compatible Input
GND	GND	Ground
—	GND	Ground
4A	4A	Input A for Driver 4, TTL/CMOS Compatible Input
4B	4B	Input B for Driver 4, TTL/CMOS Compatible Input
4Y	4Y	Output for Driver 4, CMOS Push-Pull Output
3Y	3Y	Output for Driver 3, CMOS Push-Pull Output
2Y	2Y	Output for Driver 2, CMOS Push-Pull Output
1Y	1Y	Output for Driver 1, CMOS Push-Pull Output
V_{DD}	V_{DD}	Supply Input, 4.5 V to 18 V
—	V_{DD}	Supply Input, 4.5 V to 18 V

4.0   DETAILED DESCRIPTION

4.1   Supply Bypassing

Large currents are required to charge and discharge large capacitive loads quickly. For example, charging a 1000 pF load to 18 V in 25 nsec requires 0.72 A from the device's power supply.

To ensure low supply impedance over a wide frequency range, a 1 µF film capacitor in parallel with one or two low-inductance, 0.1 µF ceramic disk capacitors with short lead lengths (<0.5 in.) normally provide adequate bypassing.

4.2   Grounding

The TC4467 and TC4469 contain inverting drivers. Potential drops developed in common ground impedances from input to output will appear as negative feedback and degrade switching speed characteristics. Instead, individual ground returns for input and output circuits, or a ground plane, should be used.

4.3   Input Stage

The input voltage level changes the no-load or quiescent supply current. The N-channel MOSFET input stage transistor drives a 2.5 mA current source load. With logic "0" outputs, maximum quiescent supply current is 4 mA. Logic "1" output level signals reduce quiescent current to 1.4 mA, maximum. Unused driver inputs must be connected to V_{DD} or V_{SS}. Minimum power dissipation occurs for logic "1" outputs.

The drivers are designed with 50 mV of hysteresis, which provides clean transitions and minimizes output stage current spiking when changing states. Input voltage thresholds are approximately 1.5 V, making any voltage greater than 1.5 V, up to V_{DD}, a logic "1" input. Input current is less than 1 µA over this range.

4.4   Power Dissipation

The supply current versus frequency and supply current versus capacitive load characteristic curves will aid in determining power dissipation calculations. Microchip Technology's CMOS drivers have greatly reduced quiescent DC power consumption.

Input signal duty cycle, power supply voltage and load type influence package power dissipation. Given power dissipation and package thermal resistance, the maximum ambient operating temperature is easily calculated. The 14-pin plastic package junction-to-ambient thermal resistance is 83.3°C/W. At +70°C, the package is rated at 800 mW maximum dissipation. Maximum allowable chip temperature is +150°C.

Three components make up total package power dissipation:

1.   Load-caused dissipation (P_L).
2.   Quiescent power (P_Q).
3.   Transition power (P_T).

A capacitive-load-caused dissipation (driving MOSFET gates), is a direct function of frequency, capacitive load and supply voltage. The power dissipation is:

EQUATION

$$P_L = fCV_S^2$$

f = Switching Frequency
C = Capacitive Load
V_S = Supply Voltage

A resistive-load-caused dissipation for ground-referenced loads is a function of duty cycle, load current and load voltage. The power dissipation is:

EQUATION

$$P_L = D(V_S - V_L)I_L$$

D = Duty Cycle
V_S = Supply Voltage
V_L = Load Voltage
I_L = Load Current

TC4467/TC4468/TC4469

A resistive-load-caused dissipation for supply-referenced loads is a function of duty cycle, load current and output voltage. The power dissipation is

EQUATION

$$P_L = DV_OI_L$$

D = Duty Cycle
V_O = Device Output Voltage
I_L = Load Current

Quiescent power dissipation depends on input signal duty cycle. Logic HIGH outputs result in a lower power dissipation mode, with only 0.6 mA total current drain (all devices driven). Logic LOW outputs raise the current to 4 mA maximum. The quiescent power dissipation is:

EQUATION

$$P_Q = V_S(D(I_H) + (1 - D)I_L)$$

I_H = Quiescent Current with all outputs LOW
      (4 mA max.)
I_L = Quiescent Current with all outputs HIGH
      (0.6 mA max.)
D = Duty Cycle
V_S = Supply Voltage

Transition power dissipation arises in the complimentary configuration (TC446X) because the output stage N-channel and P-channel MOS transistors are ON simultaneously for a very short period when the output changes. The transition power dissipation is approximately:

EQUATION

$$P_T = fV_S(10 \times 10^{-9})$$

C = 1000 pF Capacitive Load
V_S = 15 V
D = 50%
f = 200 kHz

P_D = Package Power Dissipation
    = $P_L + P_Q + P_T$
    = $45mW + 35mW + 30mW$
    = $110mW$

Package power dissipation is the sum of load, quiescent and transition power dissipations. An example shows the relative magnitude for each term:

Maximum operating temperature is:

EQUATION

$$T_J - \theta_{JA}(P_D) = 141°C$$

T_J = Maximum allowable junction temperature
    (+150°C)
θ_{JA} = Junction-to-ambient thermal resistance
    (83.3°C/W) 14-pin plastic package

Note: Ambient operating temperature should not exceed +85°C for "EJD" device or +125°C for "MJD" device.
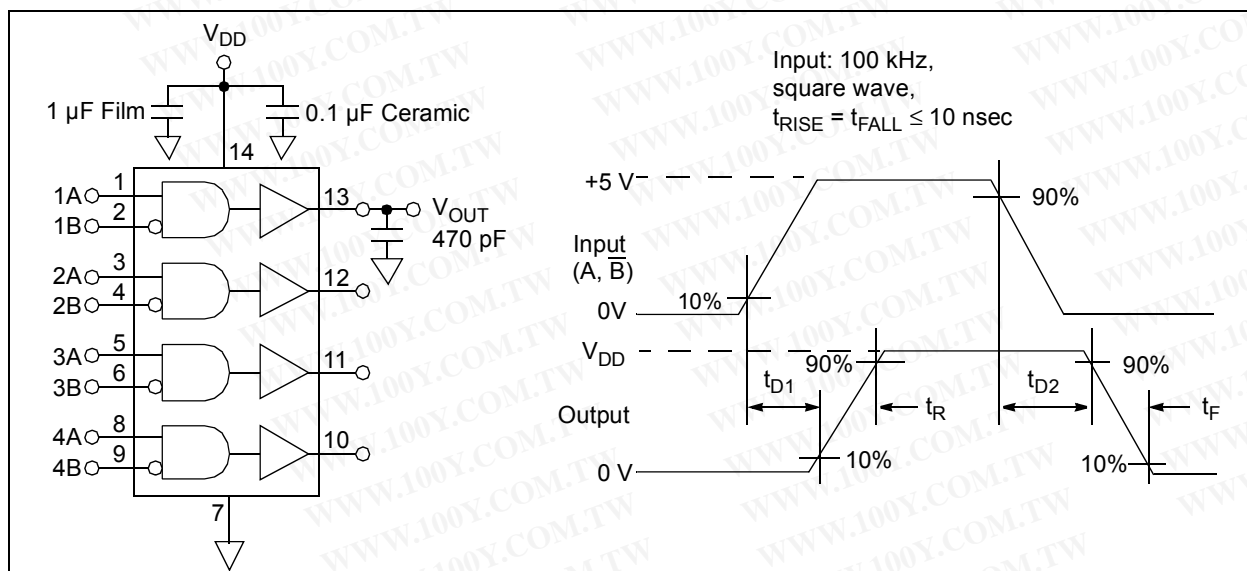

FIGURE 4-1:   *Switching Time Test Circuit.*
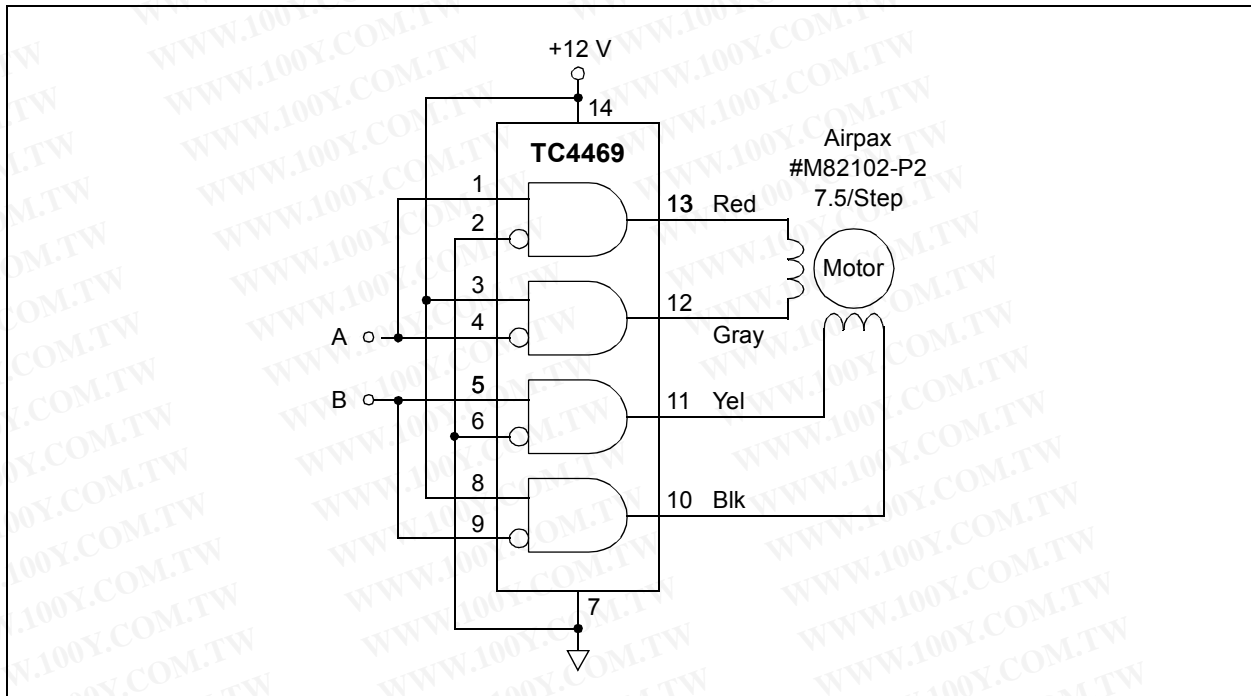
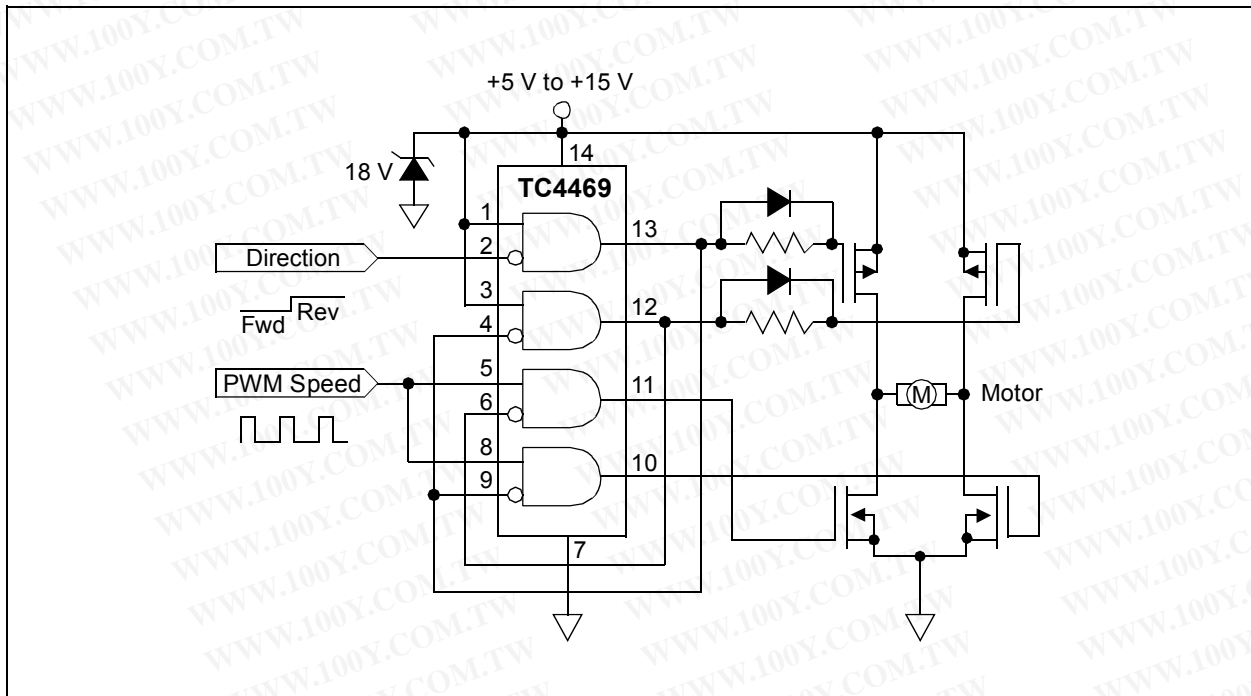## 5.0 APPLICATIONS INFORMATION

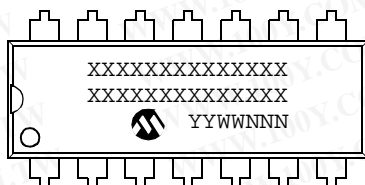**FIGURE 5-1:** Stepper Motor Drive.

FIGURE 5-2: Quad Driver For H-bridge Motor Control.
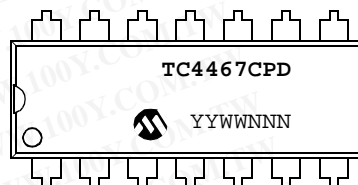
TC4467/TC4468/TC4469

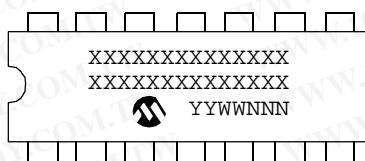## 6.0   PACKAGING INFORMATION

6.1   Package Marking Information

14-Lead PDIP (300 mil)

```
XXXXXXXXXXXXX
XXXXXXXXXXXXX
    Ⓜ YYWWNNN
```

Example:

```
    TC4467CPD
    Ⓜ YYWWNNN
```

14-Lead CERDIP (300 mil)

```
XXXXXXXXXXXXX
XXXXXXXXXXXXX
    Ⓜ YYWWNNN
```

Example:

```
    TC4468EJD
    Ⓜ YYWWNNN
```

16-Lead SOIC (300 mil)

```
XXXXXXXXXXX
XXXXXXXXXXX
XXXXXXXXXXX
    Ⓜ YYWWNNN
```

Example:

```
    TC4469COE
    YYWWNNN
    Ⓜ
```

Legend:	XX...X	Customer specific information*
	YY	Year code (last 2 digits of calendar year)
	WW	Week code (week of January 1 is week '01')
	NNN	Alphanumeric traceability code
Note:	In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line thus limiting the number of available characters for customer specific information.	

*   Standard OTP marking consists of Microchip part number, year code, week code, facility code, mask rev#, and assembly code.

14-Lead Plastic Dual In-line (P) – 300 mil (PDIP)
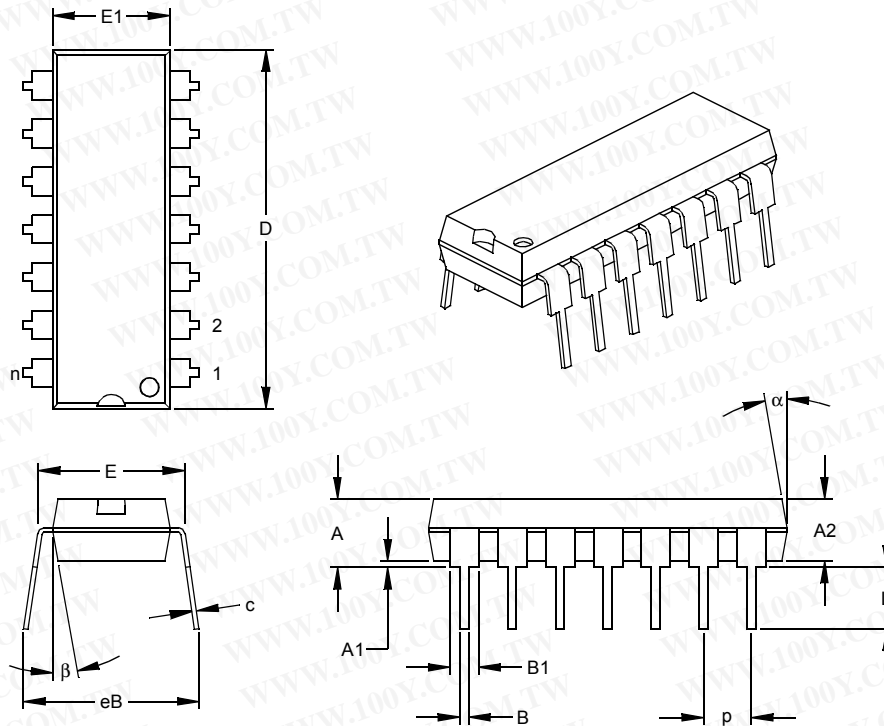
	Units	INCHES*			MILLIMETERS		
Dimension Limits		MIN	NOM	MAX	MIN	NOM	MAX
Number of Pins	n		14			14	
Pitch	p		.100			2.54	
Top to Seating Plane	A	.140	.155	.170	3.56	3.94	4.32
Molded Package Thickness	A2	.115	.130	.145	2.92	3.30	3.68
Base to Seating Plane	A1	.015			0.38		
Shoulder to Shoulder Width	E	.300	.313	.325	7.62	7.94	8.26
Molded Package Width	E1	.240	.250	.260	6.10	6.35	6.60
Overall Length	D	.740	.750	.760	18.80	19.05	19.30
Tip to Seating Plane	L	.125	.130	.135	3.18	3.30	3.43
Lead Thickness	c	.008	.012	.015	0.20	0.29	0.38
Upper Lead Width	B1	.045	.058	.070	1.14	1.46	1.78
Lower Lead Width	B	.014	.018	.022	0.36	0.46	0.56
Overall Row Spacing §	eB	.310	.370	.430	7.87	9.40	10.92
Mold Draft Angle Top	α	5	10	15	5	10	15
Mold Draft Angle Bottom	β	5	10	15	5	10	15

* Controlling Parameter
§ Significant Characteristic
Notes:
Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" (0.254mm) per side.
JEDEC Equivalent: MS-001
Drawing No. C04-005

TC4467/TC4468/TC4469

14-Lead Ceramic Dual In-line – 300 mil (CERDIP)

14-Pin CERDIP (Narrow)

PIN 1

.300 (7.62)
.230 (5.84)

.098 (2.49) MAX.

.030 (0.76) MIN.

.780 (19.81)
.740 (18.80)

.040 (1.02)
.020 (0.51)

.200 (5.08)
.160 (4.06)

.200 (5.08)
.125 (3.18)

.150 (3.81)
MIN.

.110 (2.79)
.090 (2.29)

.065 (1.65)
.045 (1.14)

.020 (0.51)
.016 (0.41)

.320 (8.13)
.290 (7.37)

.015 (0.38)
.008 (0.20)

3° MIN.

.400 (10.16)
.320 (8.13)

Dimensions: inches (mm)

16-Lead Plastic Small Outline (SO) – Wide, 300 mil (SOIC)

	Units	INCHES*			MILLIMETERS		
Dimension Limits		MIN	NOM	MAX	MIN	NOM	MAX
Number of Pins	n		16			16	
Pitch	p		.050			1.27	
Overall Height	A	.093	.099	.104	2.36	2.50	2.64
Molded Package Thickness	A2	.088	.091	.094	2.24	2.31	2.39
Standoff §	A1	.004	.008	.012	0.10	0.20	0.30
Overall Width	E	.394	.407	.420	10.01	10.34	10.67
Molded Package Width	E1	.291	.295	.299	7.39	7.49	7.59
Overall Length	D	.398	.406	.413	10.10	10.30	10.49
Chamfer Distance	h	.010	.020	.029	0.25	0.50	0.74
Foot Length	L	.016	.033	.050	0.41	0.84	1.27
Foot Angle	φ	0	4	8	0	4	8
Lead Thickness	c	.009	.011	.013	0.23	0.28	0.33
Lead Width	B	.014	.017	.020	0.36	0.42	0.51
Mold Draft Angle Top	α	0	12	15	0	12	15
Mold Draft Angle Bottom	β	0	12	15	0	12	15

* Controlling Parameter
§ Significant Characteristic

Notes:
Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" (0.254mm) per side.
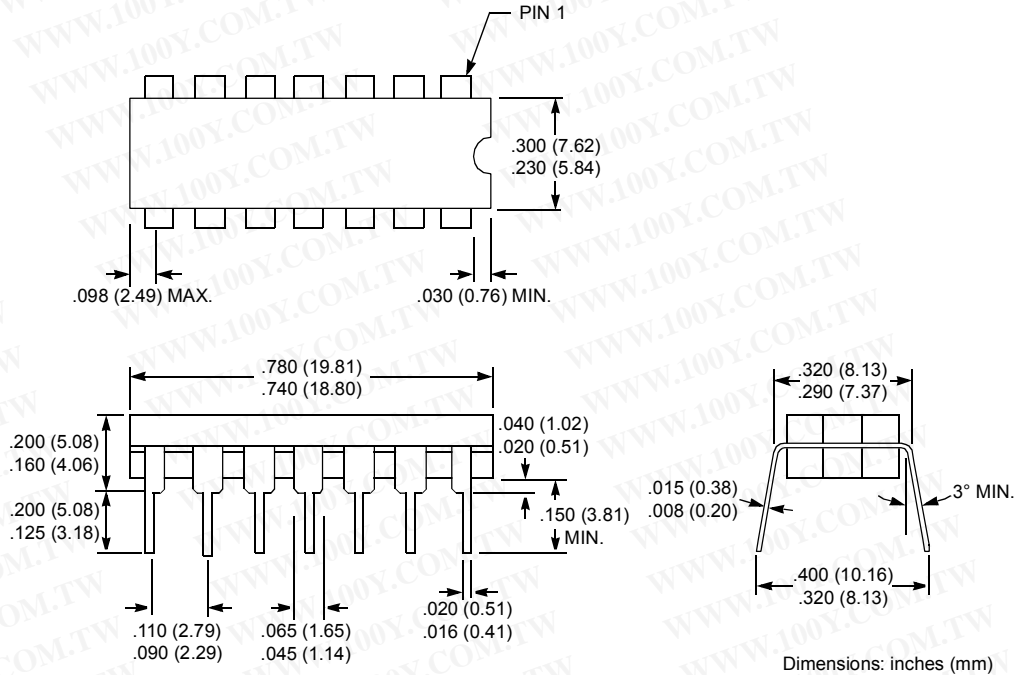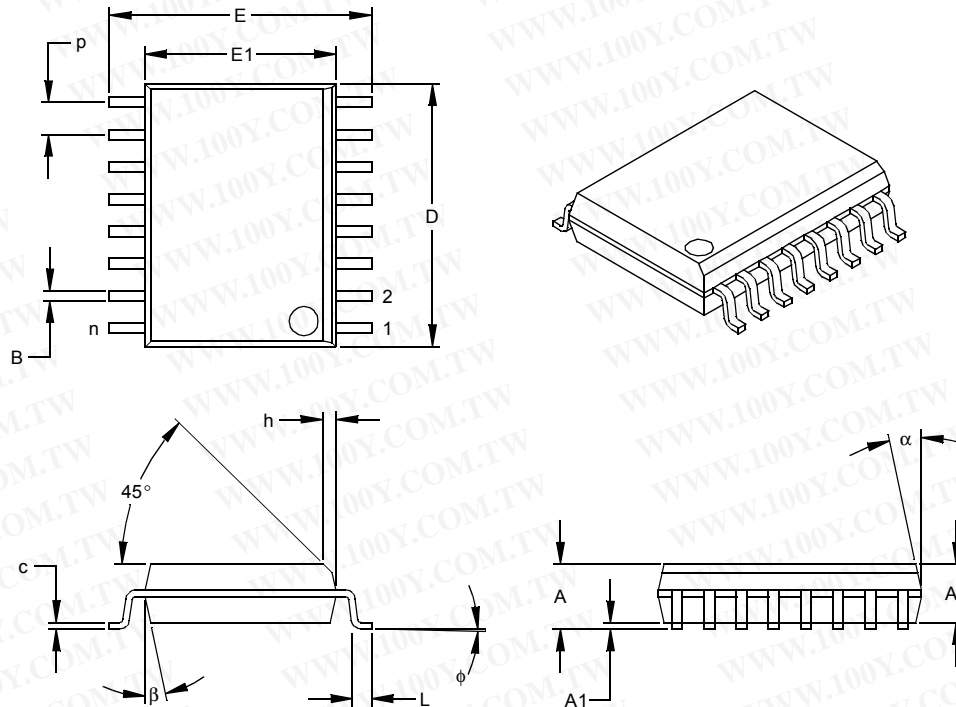JEDEC Equivalent: MS-013
Drawing No. C04-102

NOTES:

ON-LINE SUPPORT

Microchip provides on-line support on the Microchip World Wide Web (WWW) site.

The web site is used by Microchip as a means to make files and information easily available to customers. To view the site, the user must have access to the Internet and a web browser, such as Netscape or Microsoft Explorer. Files are also available for FTP download from our FTP site.

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The Microchip web site is available by using your favorite Internet browser to attach to:

www.microchip.com

The file transfer site is available by using an FTP service to connect to:

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The web site and file transfer site provide a variety of services. Users may download files for the latest Development Tools, Data Sheets, Application Notes, User's Guides, Articles and Sample Programs. A variety of Microchip specific business information is also available, including listings of Microchip sales offices, distributors and factory representatives. Other data available for consideration is:

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Systems Information and Upgrade Hot Line

The Systems Information and Upgrade Line provides system users a listing of the latest versions of all of Microchip's development systems software products. Plus, this line provides information on how customers can receive any currently available upgrade kits. The Hot Line Numbers are:

1-800-755-2345 for U.S. and most of Canada, and

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013001

TC4467/TC4468/TC4469

READER RESPONSE

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Device: **TC4467/TC4468/TC4469**   Literature Number: **DS21425B**

Questions:

1. What are the best features of this document?

     _____

     _____

2. How does this document meet your hardware and software development needs?

     _____

     _____

3. Do you find the organization of this data sheet easy to follow? If not, why?

     _____

     _____

4. What additions to the data sheet do you think would enhance the structure and subject?

     _____

     _____

5. What deletions from the data sheet could be made without affecting the overall usefulness?

     _____

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6. Is there any incorrect or misleading information (what and where)?

     _____

     _____

7. How would you improve this document?

     _____

     _____

8. How would you improve our software, systems, and silicon products?

     _____

     _____

PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, refer to the factory or the listed sales office.

PART NO.   X   XX

Device   Temperature Range   Package

Device:
- TC4467: 1.2A Quad MOSFET Driver, NAND
- TC4468: 1.2A Quad MOSFET Driver, AND
- TC4469: 1.2A Quad MOSFET Driver, AND/INV

Temperature Range:
- C = 0°C to +70°C
- E = -40°C to +85°C (CERDIP only)
- M = -55°C to +125°C (CERDIP only)

Package:
- PD = Plastic DIP, (300 mil body), 14-lead
- JD = Ceramic DIP, (300 mil body), 14-lead
- OE = SOIC (Wide), 16-lead
- OE713 = SOIC (Wide), 16-lead (Tape and Reel)

Examples:

a) TC4467COE: Commerical Temperature, SOIC package.
b) TC4467CPD: Commercial Temperature, PDIP package.
c) TC4467MJD: Military Temperature, Ceramic DIP package.

a) TC4468COE713: Tape and Reel, Commerical Temp., SOIC package.
b) TC4468CPD: Commercial Temperature, PDIP package.

a) TC4469COE: Commercial Temperature, SOIC package.
b) TC4469CPD: Commercial Temperature, PDIP package.

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:

1. Your local Microchip sales office
2. The Microchip Corporate Literature Center U.S. FAX: (480) 792-7277
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