March 1990
Edition 1.1

FUJITSU

PRODUCT PROFILE

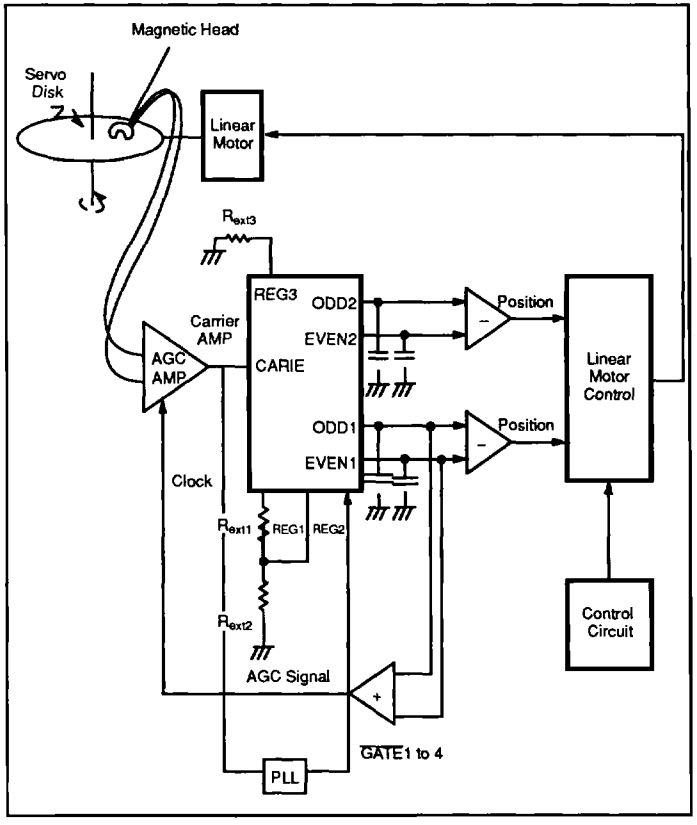
MB4319
Peakhold IC

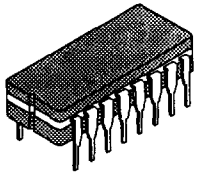
DESCRIPTION

The MB4319 is designed to generate the head position signal for head control in a magnetic disk unit similar to the one illustrated below. (See Figure 1.)

The MB4319 detects the peak of the servo signals that are read out from the servo disk via the carrier amplifier and makes the discharge continuously proportional to the head velocity. (See Figure 2.)

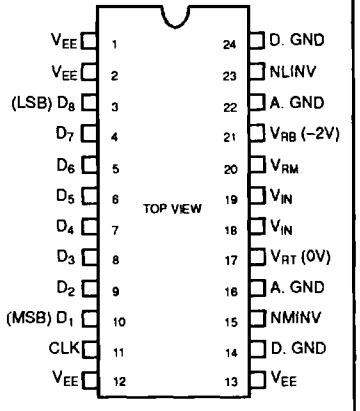
Figure 1. The MB4319 Disk Drive Application





Ceramic Package
DIP-16C-C05

Pin Assignment



This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields. However, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high impedance circuit.

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Figure 2. TIMING DIAGRAM

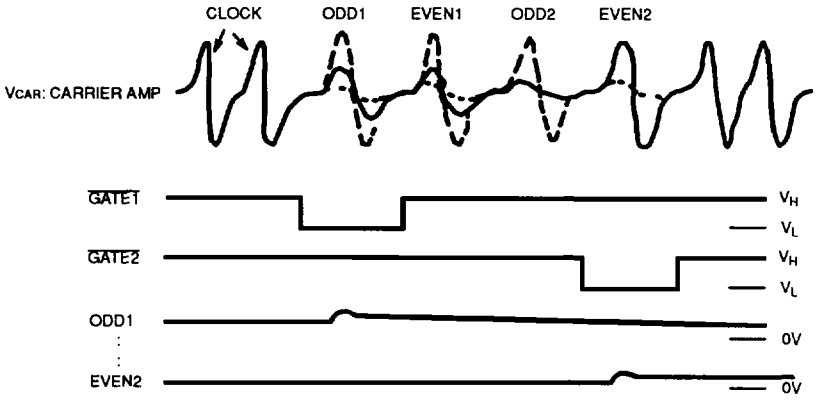
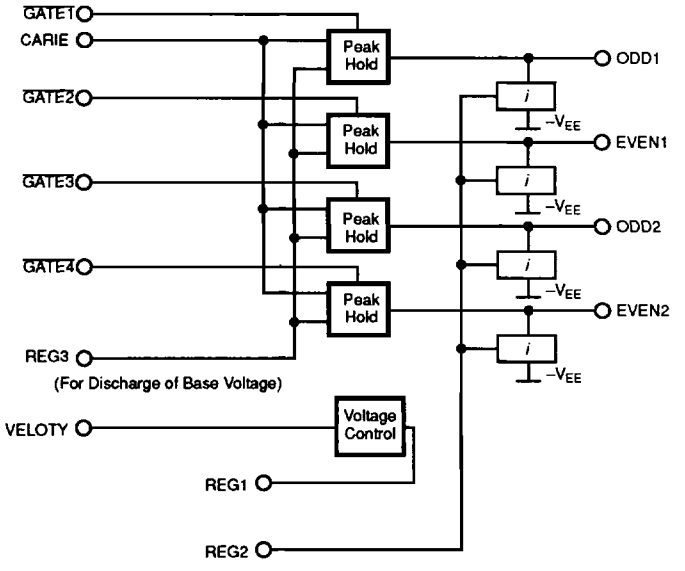


Figure 3. BLOCK DIAGRAM



Operation Details for the MB4319

The MB4319 detects each peak of the high frequency signal and selects the discharge constants externally. The MB4319 comprises four peak-hold circuits in order to control each discharge constant equally.

CARIE, the sampled signal illustrated in Figure 5, has a peak-to-peak value of 9 V Max. The gate signals are negative logic and have a 270 ns window for positive peak. When the gate is closed, the falling constant α is determined by the function of VELOTY, R R_{ext1}. and R_{ext2}. VELOTY is negative voltage that is proportional to the velocity of the head. VELOTY has a range of 0 V through –6.0 V.

Example: Charge rising constant : 10 V/µs
Discharge falling constant : –0.13V/µs at Vv = 0 V
: –0.5V/µs at Vv = –5.5 V
Condition : C_{ext} = 680 pF

As shown in Figure 1, the ODD and EVEN outputs should be buffered from the following stages by high impedance input amplifiers.

Figure 4. EQUIVALENT CIRCUIT

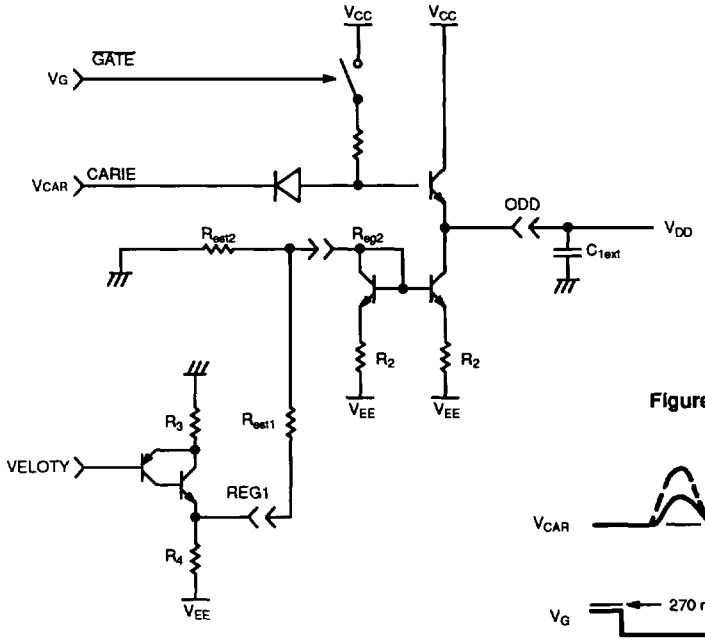
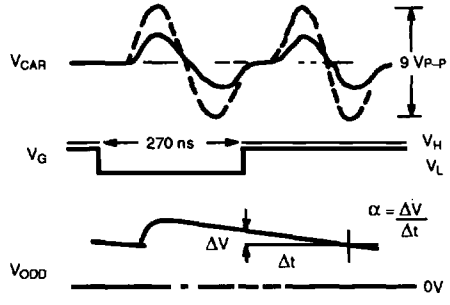


Figure 5. TIMING DIAGRAM



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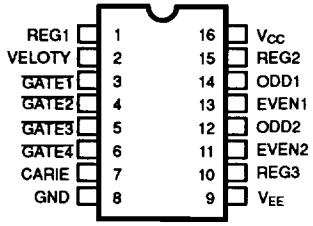
PIN ASSIGNMENT
(TOP VIEW)



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Absolute Maximum Ratings (TA = 25°C, unless otherwise noted.)

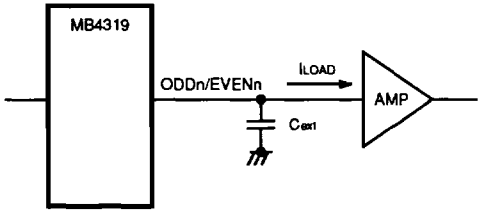
Parameter	Symbol	Rating	Unit
Supply Voltage	V_{CC}	+15	V
Supply Voltage	V_{EE}	–15	V
Power Dissipation	P_D	580	mW
Operating Temperature	T_{OP}	0 thru 70	°C
Storage Temperature	T_{STG}	–55 thru +150	°C
Input Voltage at CARIE	V_{CAR}	–5.5 thru +5.5	V
Input Voltage at $\overline{GATE_n}$	V_G	–0.5 thru +5.5	V
Input Voltage at VELOTY	V_V	V_{EE} thru +3.0	V
Input Current at REG2	I_{REG2}	1	mA
Input Current at REG3	I_{REG3}	5	mA
Output Load Current at ODD1/2 & EVEN1/2	I_{LOAD}	10	mA
Output Load Current at REG1	I_{REG1}	1	mA

Operating Conditions (T_A = 0°C thru +70°C, unless otherwise noted.)

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Supply Voltage	V_{CC}	11.4	12.0	12.6	V	
Supply Voltage	V_{EE}	−12.6	−12.0	−11.4	V	
Input Voltage at CARIE	V_{CAR}	−4.5	—	+4.5	V	
High-level Input Voltage at GATEn	V_{GH}	2.0	—	—	V	
Low-level Input Voltage at GATEn	V_{GL}	—	—	0.8	V	
Input Voltage at VELOTY	V_V	−5.5	—	+0.5	V	Rext1 = 22k Ω
Input Current at REG2	I_{REG2}	—	—	0.4	mA	
Input Current at REG3	I_{REG3}	—	—	2.5	mA	
Output Current at ODD1/2 & EVEN1/2	I_{LOAD}	—	—	1	mA	See Note
Output Current at REG1	I_{REG1}	—	—	0.3	mA	Vv = −5.5 V, Rext1 = 22k Ω

Note: I_{LOAD} is defined as illustrated below.

Figure 6. ILOAD



Electrical Characteristics

DC CHARACTERISTICS

(V_{CC} = +12 V, V_{EE} = −12 V, Tolerance: ±2%, unless otherwise noted.)

(V_{CC} = +12 V ±5%, V_{EE} = −12 V ±5% when T_A = 0°C thru 70°C as a condition.)

Parameter	Symbol	Condition	Value			Unit
			Min.	Typ.	Max.	
Gate High Input Current	I_{G1H}, I_{G2H}, I_{G3H}, I_{G4H}	$V_{G1} = V_{G2} = V_{G3} = V_{G4}$ = 2.0V, T_A = 0°C thru 70°C, see Figure 1.	—	—	100	µA
Gate Low Input Current	I_{G1L}, I_{G2L}, I_{G3L}, I_{G4L}	$V_{G1} = V_{G2} = V_{G3} = V_{G4}$ = 0.8 V, T_A = 25 ±2°C, see Figure 1.	−1.8	−1.2	−0.6	mA
CARIE Input Current	I_{CAR}	$V_{G1} = V_{G2} = V_{G3} = V_{G4}$ = 2.0 V, T_A = 0°C thru 70°C, V_{CAR} = +4.0 V, see Figure 1.	—	—	100	mA
CARIE Input Current	I_{CAR}	$V_{G1} = V_{G2} = V_{G3} = V_{G4}$ = 2.0 V, T_A = 25 ±2°C, V_{CAR} = −0.4 V, see Figure 1.	−2.4	−1.5	−1.0	mA
CARIE Input Current	I_{CAR}	$V_{G1} = V_{G2} = V_{G3} = V_{G4}$ = 0.8 V, T_A = 25 ±2°C, V_{CAR} = +4.0 V, see Figure 1.	−2.9	−2.0	−1.4	mA
CARIE Input Current	I_{CAR}	$V_{G1} = V_{G2} = V_{G3} = V_{G4}$ = 0.8 V, T_A = 25 ±2°C, V_{CAR} = −4.0 V, see Figure 1.	−7.1	−5.1	−3.9	mA
REG2 Input Voltage	ΔV_{REG2}	I_{REG2} = 45 µA, see Figure 2.	0.72	0.86	1.0	V
REG3 Input Voltage	ΔV_{REG3}	I_{REG3} = 1.0 mA, see Figure 2.	1.0	1.5	2.1	V
VELOTY Input Current	I_{VEL}	V_{VEL} = −4.0 V, see Figure 1.	—	0.5	13	µA
REG1 Output Voltage	V_{REG1}	V_{VEL} = 0 V, see Figure 1.	—	—	−11.4	V
REG1 Output Voltage	V_{REG1}	V_{VEL} = −4.0 V, see Figure 1.	−8.0	−6.8	−5.5	V

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Electrical Characteristics (Continued)

Parameter	Symbol	Condition	Value			Unit
			Min.	Typ.	Max.	
ODD1/2 EVEN1/2 Output Voltage	V_{ODD1} V_{ODD2} V_{EVEN1} V_{EVEN2}	$V_{G1} = V_{G2} = V_{G3} = V_{G4} = 2.0$ V, $T_A = 25 \pm 2°C$, see Figure 9. $V_{CAR} = +4.0$ V	−1.5	−1.2	−0.8	V
ODD1/2 EVEN1/2 Output Voltage	V_{ODD1} V_{ODD2} V_{EVEN1} V_{EVEN2}	$V_{G1} = V_{G2} = V_{G3} = V_{G4} = 2.0$ V, $T_A = 25 \pm 2°C$, see Figure 9. $V_{CAR} = +2.0$ V	−1.5	−1.2	−0.8	V
ODD1/2 EVEN1/2 Output Voltage	V_{ODD1} V_{ODD2} V_{EVEN1} V_{EVEN2}	$V_{G1} = V_{G2} = V_{G3} = V_{G4} = 2.0$ V, $T_A = 25 \pm 2°C$, see Figure 9. $V_{CAR} = 0$V	−1.5	−1.2	−0.8	V
ODD1/2 EVEN1/2 Output Voltage	V_{ODD1} V_{ODD2} V_{EVEN1} V_{EVEN2}	$V_{G1} = V_{G2} = V_{G3} = V_{G4} = 2.0$ V, $T_A = 25 \pm 2°C$, see Figure 9. $V_{CAR} = -4.0$ V	−1.5	−1.2	−0.8	V
ODD1/2 EVEN1/2 Output Voltage	V_{ODD1} V_{ODD2} V_{EVEN1} V_{EVEN2}	$V_{G1} = V_{G2} = V_{G3} = V_{G4} = 0.8$ V, $T_A = 25 \pm 2°C$, see Figure 9. $V_{CAR} = +4.0$ V	4.0	4.3	4.6	V
ODD1/2 EVEN1/2 Output Voltage	V_{ODD1} V_{ODD2} V_{EVEN1} V_{EVEN2}	$V_{G1} = V_{G2} = V_{G3} = V_{G4} = 0.8$ V, $T_A = 25 \pm 2°C$, see Figure 9. $V_{CAR} = +2.0$ V	2.0	2.3	2.6	V
ODD1/2 EVEN1/2 Output Voltage	V_{ODD1} V_{ODD2} V_{EVEN1} V_{EVEN2}	$V_{G1} = V_{G2} = V_{G3} = V_{G4} = 0.8$ V, $T_A = 25 \pm 2°C$, see Figure 9. $V_{CAR} = 0$V	0	0.3	0.6	V
ODD1/2 EVEN1/2 Output Voltage	V_{ODD1} V_{ODD2} V_{EVEN1} V_{EVEN2}	$V_{G1} = V_{G2} = V_{G3} = V_{G4} = 0.8$ V, $T_A = 25 \pm 2°C$, see Figure 9. $V_{CAR} = -4.0$ V	−1.5	−1.2	−0.8	V
ODD1/2 EVEN1/2 Output Difference Voltage	ΔV_{OUT}	$V_{G1} = V_{G2} = V_{G3} = V_{G4} = 0.8$ V, $V_{CAR} = 2.0$V, $T_A = 25 \pm 2°C$ The max difference voltage in the measurement of ODD1/2 & EVEN1/2 Output Voltage, see Figure 9.	—	—	0.1	V
ODD1/2 EVEN1/2	I_{OL1}	$V_{G1} = V_{G2} = V_{G3} = V_{G4} = 0.8$ V, $V_{ODD1} = V_{ODD2} = 2.0$ V, $V_{EVEN1} = V_{EVEN2} = 2.0$ V, $V_{CAR} = 0$V $R_{ext1} = R_{ext2}$: Open $T_A = 25 \pm 2°C$, see Figure 10.	−10	—	10	mA

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Electrical Characteristics

AC CHARACTERISTICS

(V_{CC} = +12 V, V_{EE} = −12 V, Tolerance: ±2%, unless otherwise noted.)

(V_{CC} = +12 V ±5%, V_{EE} = −12 V ±5% when T_A = 0°C thru 70°C)

Parameter	Symbol	Condition	Value			Unit
			Min	Typ	Max	
Rising Time of V_{ODDn}/ $EVEN_n$ when V_{Gn} is ON	t_{rO1}, t_{rO2}, t_{rE1}, t_{rE2}	V_{CAR} = 4 ±0.1 V, V_{VEL} = −4 ±0.1 V, T_A = 25 +2°C, see Figure 11.	—	350	500	ns
Rising Time of V_{ODDn}/ $EVEN_n$ when step input is input at V_{CAR}	t_{srO1}, t_{srO2}, t_{srE1}, t_{srE2}	V_{G1} = V_{G2} = V_{G3} = V_{G4} = 0.3V ±0.1 V, V_{VEL} = −4 ±0.1 V, T_A = 25 ±2°C see Figure 11.	—	190	300	ns
Falling Time of V_{ODDn}/ $EVEN_n$	t_{fO1}, t_{fO2}, t_{fE1}, t_{fE2}	V_{G1} = V_{G2} = V_{G3} = V_{G4} = 0.8 V, see Figure. 11, V_{VEL} = 0 V	50	90	180	µs
Falling Time of V_{ODDn}/ $EVEN_n$	t_{fO1}, t_{fO2}, t_{fE1}, t_{fE2}	V_{G1} = V_{G2} = V_{G3} = V_{G4} = 0.8 V, see Figure 11, V_{VEL} = −4 ±0.1 V	7	12.5	25	µs
Channel Separation	ΔV_{sp}	Change of VEVEN1 when V_{CAR} = +4.0 V, V_{G2} = 0.3 V, and V_{G1}, V_{G3}, and V_{G4} are changed from 2.0 V to 0.3 V at the same time. See Figure 11.	—	—	0.2	V

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Figure 7

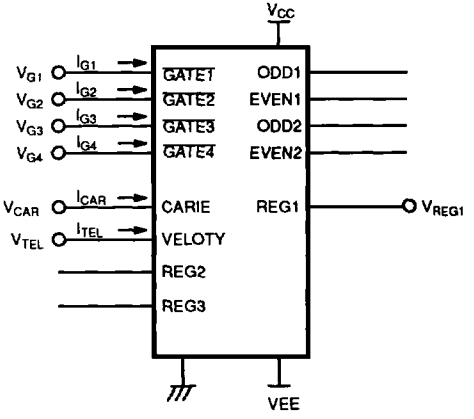

Figure 8

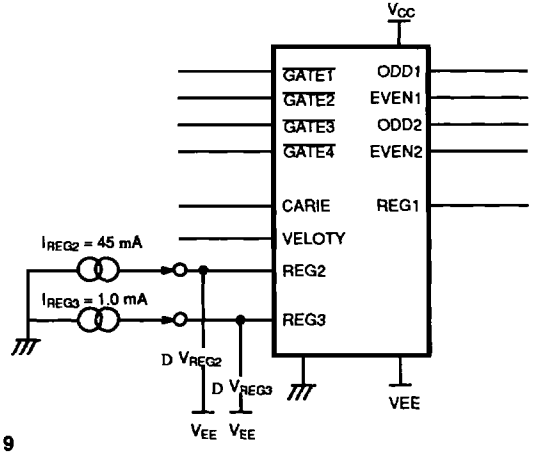

Figure 9

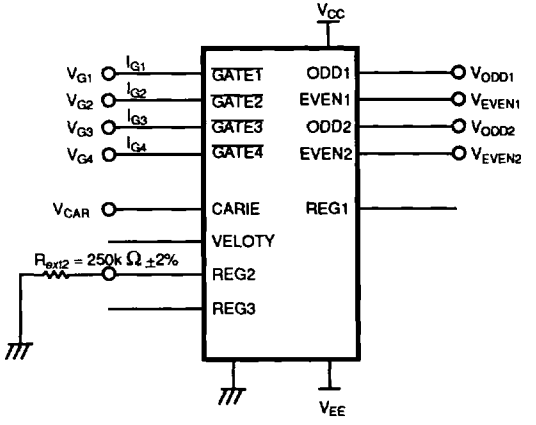

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Figure 10

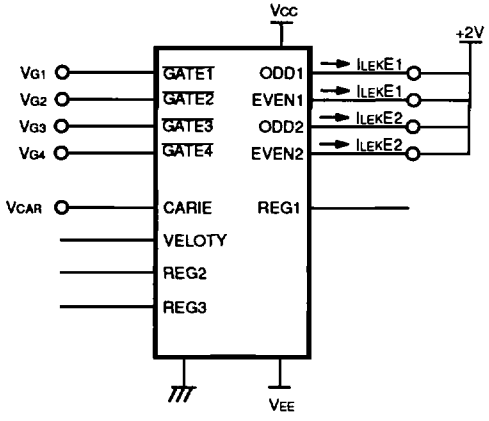
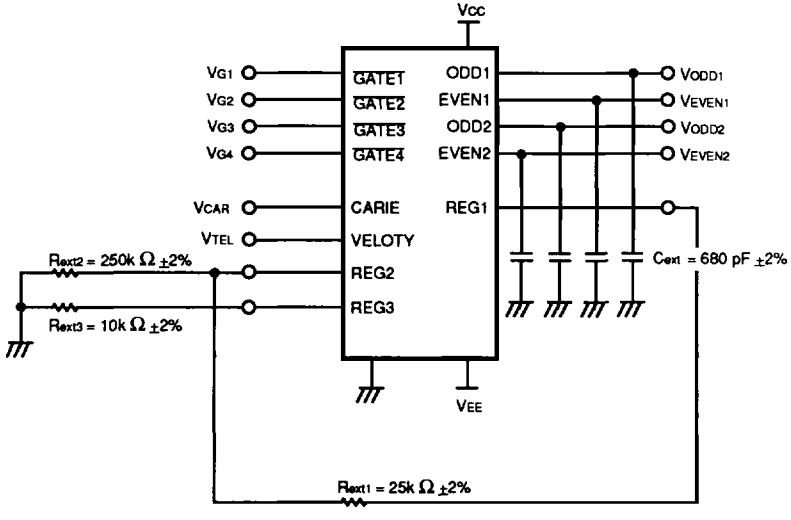


Figure 11



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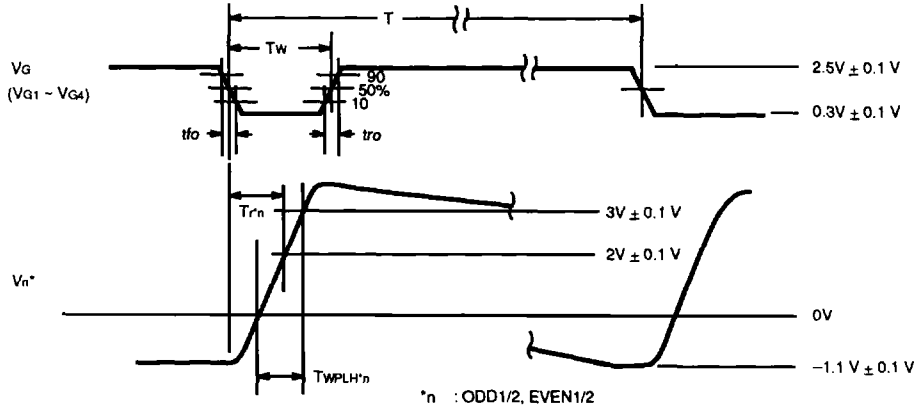
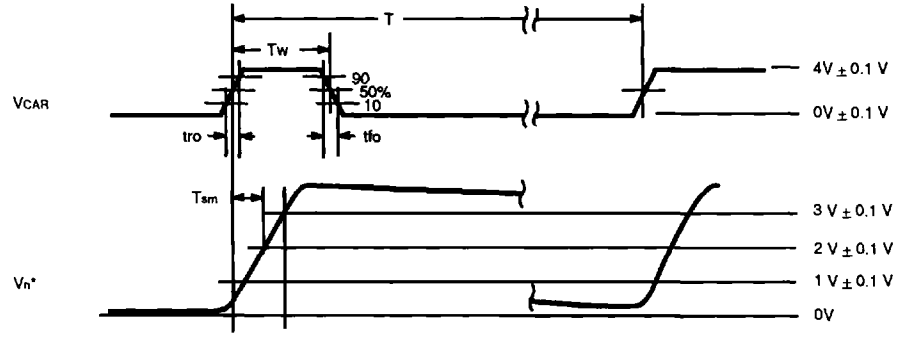
TIME CHART 1.



*n : ODD1/2, EVEN1/2
Tw = 500 ns ± 10 ns
tfo = tro ≤ 10 ns
T ≥ 220 µs

TIME CHART 2.



*n : ODD1/2, EVEN1/2
Tw = 500 ns ± 10 ns
tfo = tro ≤ 10 ns
T ≥ 220 µs

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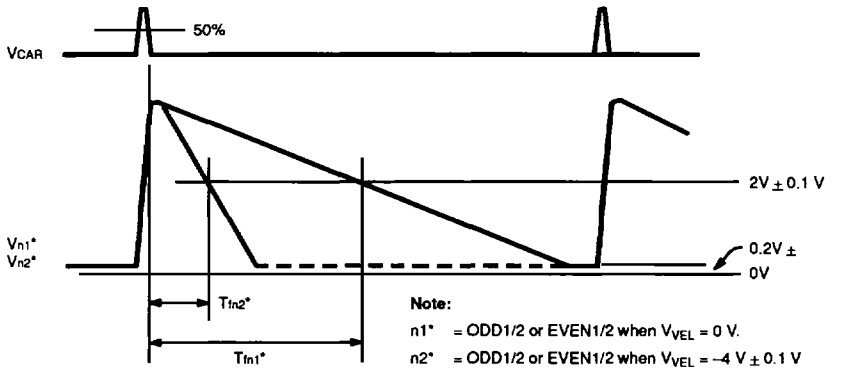
TIME CHART 3.



Note:

n1* = ODD1/2 or EVEN1/2 when V_{VEL} = 0 V.

n2* = ODD1/2 or EVEN1/2 when V_{VEL} = −4 V ± 0.1 V

V_{CAR} : As same as Time Chart 2.

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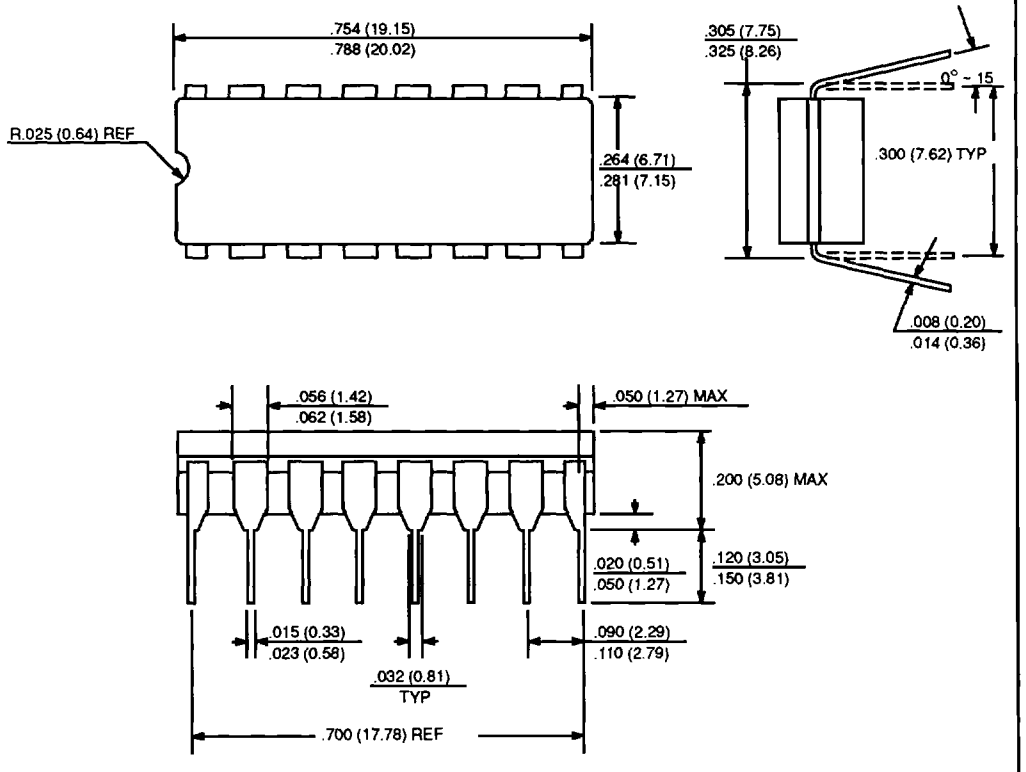
DIP-16C-C05



Dimensions in inches
and (millimeters)

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