

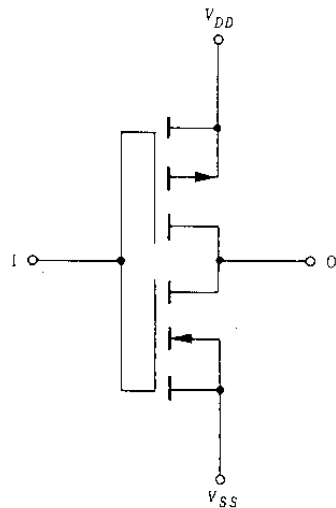
HD14069UB

Hex Inverter

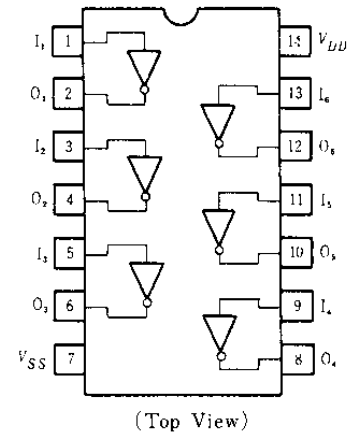
FEATURES

- Quiescent Current = 0.5nA typ/pkg @5V
- Noise Immunity = 45% of V_{DD} typ
- Capable of Driving One Low-power Schottky TTL Load Over the Rated Temperature Range
- Pin-for Pin Replacements for CD4069B and MC14069B Series

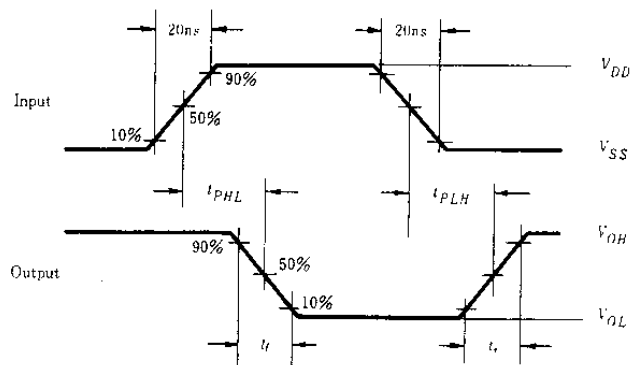
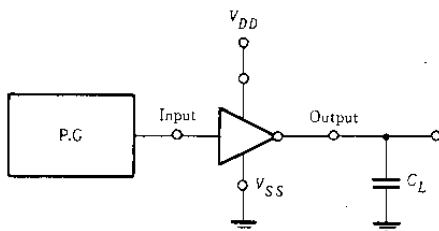
CIRCUIT SCHEMATIC (1/6)



PIN ARRANGEMENT



SWITCHING TIME TEST CIRCUIT



ELECTRICAL CHARACTERISTICS

| Characteristic | Symbol | V _{DD} (V) | Test Conditions | -40°C | | 25°C | | | 85°C | | Unit |
|-----------------------|------------------------|---------------------|---|-------|------|-------|---------|------|-------|------|------|
| | | | | min | max | min | typ | max | min | max | |
| Output Voltage | V _{OL} | 5.0 | V _{in} = V _{DD} | - | 0.05 | - | 0 | 0.05 | - | 0.05 | V |
| | | 10 | | - | 0.05 | - | 0 | 0.05 | - | 0.05 | |
| | | 15 | | - | 0.05 | - | 0 | 0.05 | - | 0.05 | |
| | V _{OH} | 5.0 | V _{in} = 0 | 4.95 | - | 4.95 | 5.0 | - | 4.95 | - | V |
| | | 10 | | 9.95 | - | 9.95 | 10 | - | 9.95 | - | |
| | | 15 | | 14.95 | - | 14.95 | 15 | - | 14.95 | - | |
| Input Voltage | V _{IL} | 5.0 | V _{out} = 4.5V | - | 1.0 | - | 2.25 | 1.0 | - | 1.0 | V |
| | | 10 | V _{out} = 9.0V | - | 2.0 | - | 4.50 | 2.0 | - | 2.0 | |
| | | 15 | V _{out} = 13.5V | - | 2.5 | - | 6.75 | 2.5 | - | 2.5 | |
| | V _{IH} | 5.0 | V _{out} = 0.5V | 4.0 | - | 4.0 | 2.75 | - | 4.0 | - | V |
| | | 10 | V _{out} = 1.0V | 8.0 | - | 8.0 | 5.50 | - | 8.0 | - | |
| | | 15 | V _{out} = 1.5V | 12.5 | - | 12.5 | 8.25 | - | 12.5 | - | |
| Output Drive Current | I _{OH} | 5.0 | V _{OH} = 2.5V | -2.5 | - | -2.1 | -4.2 | - | -1.7 | - | mA |
| | | 5.0 | V _{OH} = 4.6V | -0.52 | - | -0.44 | -0.88 | - | -0.36 | - | |
| | | 10 | V _{OH} = 9.5V | -1.3 | - | -1.1 | -2.25 | - | -0.9 | - | |
| | I _{OL} | 15 | V _{OH} = 13.5V | -3.6 | - | -3.0 | -8.8 | - | -2.4 | - | mA |
| | | 5.0 | V _{OL} = 0.4V | 0.52 | - | 0.44 | 0.88 | - | 0.36 | - | |
| | | 10 | V _{OL} = 0.5V | 1.3 | - | 1.1 | 2.25 | - | 0.9 | - | |
| 15 | V _{OL} = 1.5V | 3.6 | - | 3.0 | 8.8 | - | 2.4 | - | | | |
| Input Current | I _{in} | 15 | | - | ±0.3 | - | ±0.0001 | ±0.3 | - | ±1.0 | μA |
| Input Capacitance | C _{in} | - | V _{in} = 0 | - | - | - | 5.0 | 7.5 | - | - | pF |
| Quiescent Current | I _{DD} | 5.0 | Zero Signal, per Package | - | 1.0 | - | 0.0005 | 1.0 | - | 7.5 | μA |
| | | 10 | | - | 2.0 | - | 0.0010 | 2.0 | - | 15.0 | |
| | | 15 | | - | 4.0 | - | 0.0015 | 4.0 | - | 30.0 | |
| Total Supply Current* | I _T | 5.0 | Dynamic + I _{DD} , per Gate, C _L = 50pF, f = 1kHz | - | - | - | 0.3 | - | - | - | μA |
| | | 10 | | - | - | - | 0.6 | - | - | - | |
| | | 15 | | - | - | - | 0.9 | - | - | - | |

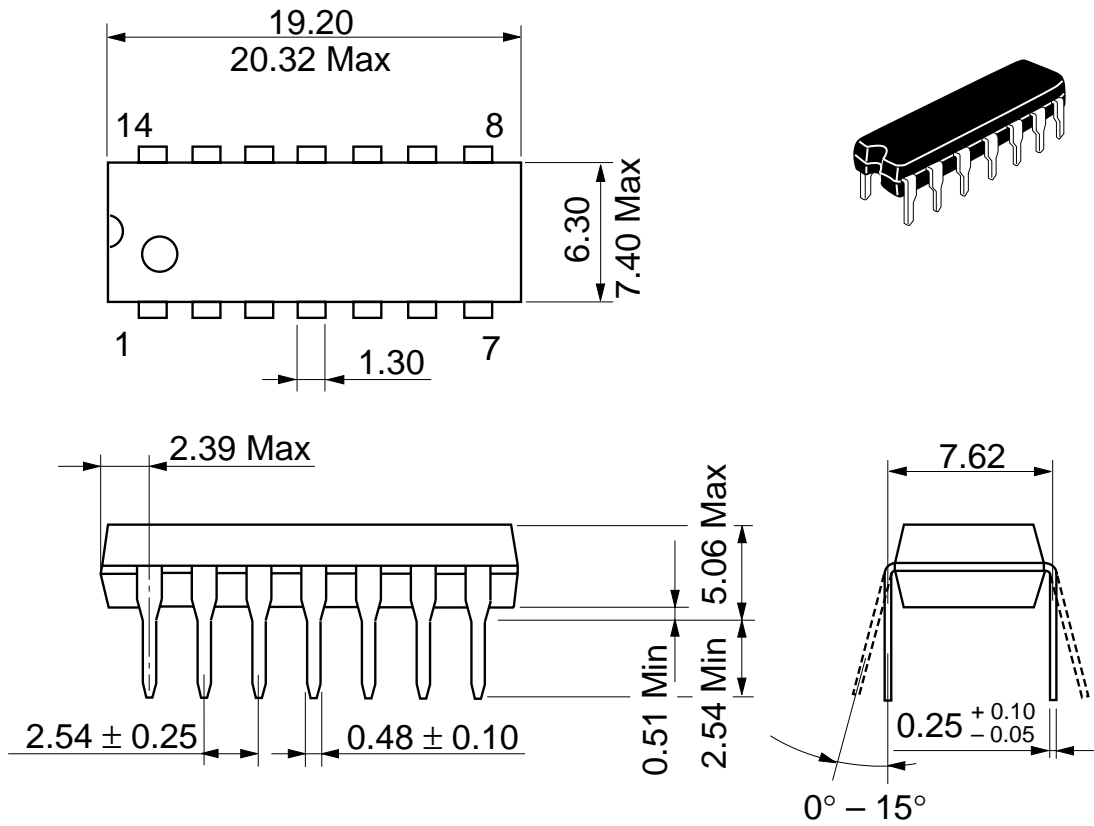
* To calculate total supply current at frequency other than 1kHz.

① V_{DD} = 5.0V I_T = 0.3μA/kHz · f + I_{DD}/6 ② V_{DD} = 10V I_T = 0.6μA/kHz · f + I_{DD}/6 ③ V_{DD} = 15V I_T = 0.9μA/kHz · f + I_{DD}/6

SWITCHING CHARACTERISTICS (C_L = 50pF, T_a = 25°C)

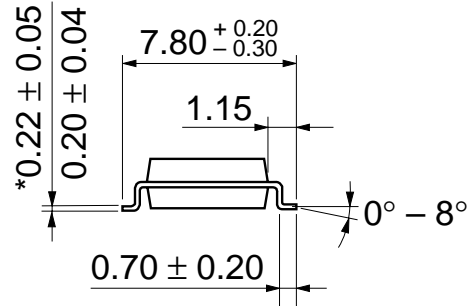
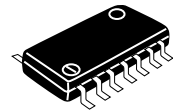
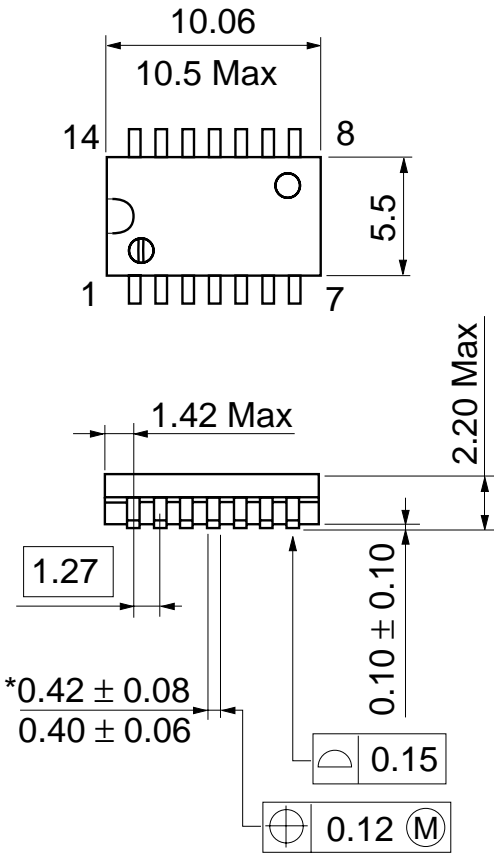
| Characteristic | Symbol | V _{DD} (V) | min | typ | max | Unit |
|------------------------|------------------|---------------------|-----|-----|-----|------|
| Output Rise Time | t _r | 5.0 | - | 100 | 200 | ns |
| | | 10 | - | 50 | 100 | |
| | | 15 | - | 40 | 80 | |
| Output Fall Time | t _f | 5.0 | - | 100 | 200 | ns |
| | | 10 | - | 50 | 100 | |
| | | 15 | - | 40 | 80 | |
| Propagation Delay Time | t _{PLH} | 5.0 | - | 65 | 125 | ns |
| | | 10 | - | 40 | 80 | |
| | | 15 | - | 30 | 60 | |
| | t _{PHL} | 5.0 | - | 65 | 125 | ns |
| | | 10 | - | 40 | 80 | |
| | | 15 | - | 30 | 60 | |

Unit: mm



| | |
|--------------------------|----------|
| Hitachi Code | DP-14 |
| JEDEC | Conforms |
| EIAJ | Conforms |
| Weight (reference value) | 0.97 g |

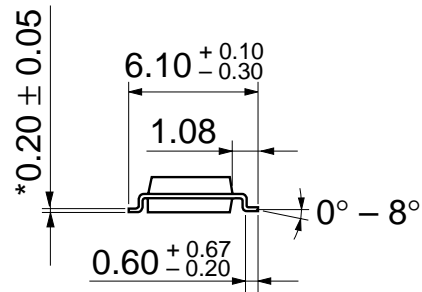
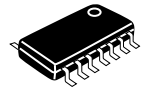
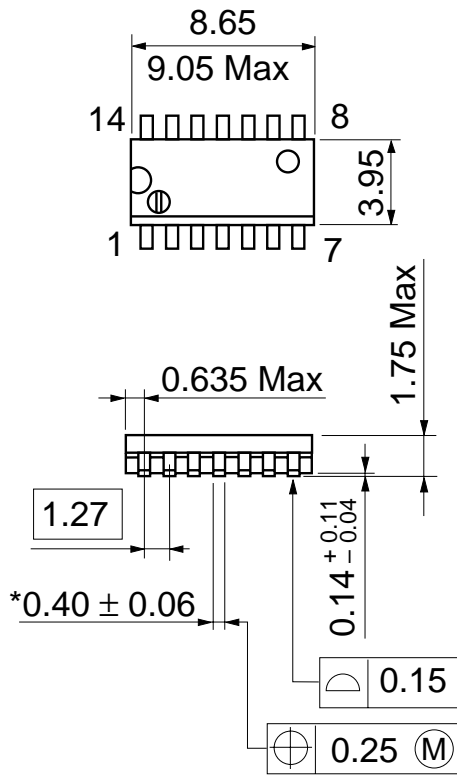
Unit: mm



*Dimension including the plating thickness
 Base material dimension

| | |
|--------------------------|----------|
| Hitachi Code | FP-14DA |
| JEDEC | — |
| EIAJ | Conforms |
| Weight (reference value) | 0.23 g |

Unit: mm



| | |
|--------------------------|----------|
| Hitachi Code | FP-14DN |
| JEDEC | Conforms |
| EIAJ | Conforms |
| Weight (reference value) | 0.13 g |

*Pd plating

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