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CD4067B, CD4097B Types

CMOS Analog Multiplexers/Demultiplexers

High-Voltage Types (20-Volt Rating)

CD4067B – Single 16-Channel Multiplexer/Demultiplexer

CD4097B – Differential 8-Channel Multiplexer/Demultiplexer

CD4067B and CD4097B CMOS

analog multiplexers/demultiplexers* are digitally controlled analog switches having low ON impedance, low OFF leakage current, and internal address decoding. In addition, the ON resistance is relatively constant over the full input-signal range.

The CD4067B is a 16-channel multiplexer with four binary control inputs, A, B, C, D, and an inhibit input, arranged so that any combination of the inputs selects one switch.

The CD4097B is a differential 8-channel multiplexer having three binary control inputs A, B, C, and an inhibit input. The inputs permit selection of one of eight pairs of switches.

A logic "1" present at the inhibit input turns all channels off.

The CD4067B and CD4097B types are supplied in 24-lead hermetic dual-in-line ceramic packages (F3A suffix), 24-lead dual-in-line plastic packages (E suffix), 24-lead small-outline packages (M, M96, and NSR suffixes), and 24-lead thin shrink small-outline packages (P and PWR suffixes).

*When these devices are used as demultiplexers, the channel in/out terminals are the outputs and the common out/in terminals are the inputs.

Recommended Operating Conditions at $T_A = 25^\circ\text{C}$ (Unless Otherwise Specified)

For maximum reliability, nominal operating conditions should be selected so that operation is always within the following ranges. Values shown apply to all types except as noted.

| Characteristic | Min. | Max. | Units |
|---|------|------|----------|
| Supply-Voltage Range (T_A =Full Package-Temp. Range) | 3 | 18 | V |
| Multiplexer Switch Input Current Capability | – | 25 | mA |
| Output Load Resistance | 100 | – | Ω |

NOTE:

In certain applications, the external load-resistor current may include both V_{DD} and signal-line components. To avoid drawing V_{DD} current when switch current flows into the transmission gate inputs, the voltage drop across the bidirectional switch must not exceed 0.8 volt (calculated from R_{ON} values shown in ELECTRICAL CHARACTERISTICS CHART). No V_{DD} current will flow through R_L if the switch current flows into terminal 1 on the CD4067; terminals 1 and 17 on the CD4097.

Features:

- Low ON resistance: 125Ω (typ.) over 15 V_{pp} signal-input range for $V_{DD}-V_{SS}=15 \text{ V}$
- High OFF resistance: channel leakage of $\pm 10 \text{ pA}$ (typ.) @ $V_{DD}-V_{SS}=10 \text{ V}$
- Matched switch characteristics: $R_{ON}=5 \Omega$ (typ.) for $V_{DD}-V_{SS}=15 \text{ V}$
- Very low quiescent power dissipation under all digital-control input and supply conditions: $0.2 \mu\text{W}$ (typ.) @ $V_{DD}-V_{SS}=10 \text{ V}$
- Binary address decoding on chip
- 5-V, 10-V, and 15-V parametric ratings
- 100% tested for quiescent current at 20 V
- Standardized symmetrical output characteristics
- Maximum input current of $1 \mu\text{A}$ at 18 V over full package temperature range; 100 nA at 18 V and 25°C
- Meets all requirements of JEDEC Tentative Standard No. 13B, "Standard Specifications for Description of 'B' Series CMOS Devices"

Applications:

- Analog and digital multiplexing and demultiplexing
- A/D and D/A conversion
- Signal gating

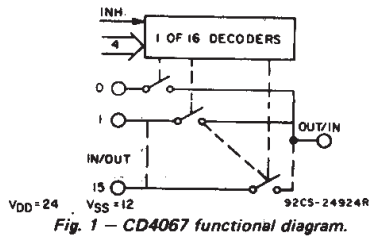
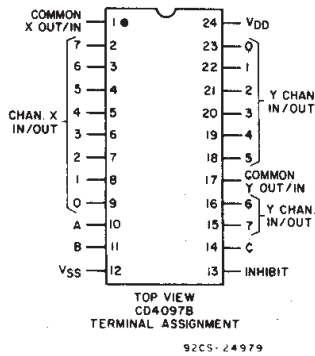
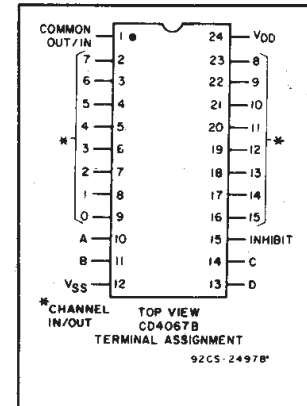


Fig. 1 – CD4067 functional diagram.

CD4067 TRUTH TABLE

| A | B | C | D | Inh | Selected Channel |
|---|---|---|---|-----|------------------|
| X | X | X | X | 1 | None |
| 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 1 |
| 0 | 1 | 0 | 0 | 0 | 2 |
| 1 | 1 | 0 | 0 | 0 | 3 |
| 0 | 0 | 1 | 0 | 0 | 4 |
| 1 | 0 | 1 | 0 | 0 | 5 |
| 0 | 1 | 1 | 0 | 0 | 6 |
| 1 | 1 | 1 | 0 | 0 | 7 |
| 0 | 0 | 0 | 1 | 0 | 8 |
| 1 | 0 | 0 | 1 | 0 | 9 |
| 0 | 1 | 0 | 1 | 0 | 10 |
| 1 | 1 | 0 | 1 | 0 | 11 |
| 0 | 0 | 1 | 1 | 0 | 12 |
| 1 | 0 | 1 | 1 | 0 | 13 |
| 0 | 1 | 1 | 1 | 0 | 14 |
| 1 | 1 | 1 | 1 | 0 | 15 |

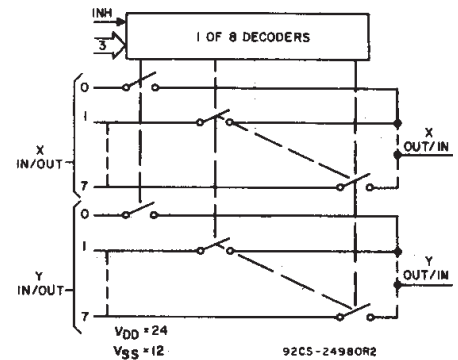


Fig. 2 – CD4097 functional diagram.

CD4097 TRUTH TABLE

| A | B | C | Inh | Selected Channel |
|---|---|---|-----|------------------|
| X | X | X | 1 | None |
| 0 | 0 | 0 | 0 | 0X, 0Y |
| 1 | 0 | 0 | 0 | 1X, 1Y |
| 0 | 1 | 0 | 0 | 2X, 2Y |
| 1 | 1 | 0 | 0 | 3X, 3Y |
| 0 | 0 | 1 | 0 | 4X, 4Y |
| 1 | 0 | 1 | 0 | 5X, 5Y |
| 0 | 1 | 1 | 0 | 6X, 6Y |
| 1 | 1 | 1 | 0 | 7X, 7Y |

CD4067B, CD4097B Types

ELECTRICAL CHARACTERISTICS

| CHARACTERISTIC | CONDITIONS | | | LIMITS AT INDICATED TEMPERATURES (°C) | | | | | | Units | |
|--|----------------------------|--|------------------------|---------------------------------------|--------|------|------|------|-------|-------|------|
| | V _{is} (V) | V _{SS} (V) | V _{DD} (V) | -55 | -40 | +85 | +125 | +25 | | | |
| | | | | | | | | Min. | Typ. | | Max. |
| SIGNAL INPUTS (V_{is}) AND OUTPUTS (V_{OS}) | | | | | | | | | | | |
| Quiescent Device Current, I _{DD} Max. | | | 5 | 5 | 5 | 150 | 150 | — | 0.04 | 5 | μA |
| | | | 10 | 10 | 10 | 300 | 300 | — | 0.04 | 10 | |
| | | | 15 | 20 | 20 | 600 | 600 | — | 0.04 | 20 | |
| | | | 20 | 100 | 100 | 3000 | 3000 | — | 0.08 | 100 | |
| ON-state Resistance V _{SS} ≤ V _{is} ≤ V _{DD} r _{on} Max. | | 0 | 5 | 800 | 850 | 1200 | 1300 | — | 470 | 1050 | Ω |
| | | 0 | 10 | 310 | 330 | 520 | 550 | — | 180 | 400 | |
| | | 0 | 15 | 200 | 210 | 300 | 320 | — | 125 | 240 | |
| Change in on-state Resistance (Between Any Two Channels) Δr _{on} | | 0 | 5 | — | — | — | — | — | 15 | — | Ω |
| | | 0 | 10 | — | — | — | — | — | 10 | — | |
| | | 0 | 15 | — | — | — | — | — | 5 | — | |
| OFF Channel Leakage Current: Any Channel OFF (Common OUT/IN) Max. or All Channels OFF (Common OUT/IN) Max. | | 0 | 18 | ±100* | ±1000* | — | — | ±0.1 | ±100* | nA | |
| Capacitance: Input, C _{is} | | | | — | — | — | — | — | 5 | — | pF |
| Output, C _{os} | | | | — | — | — | — | — | 55 | — | |
| CD4067 | | | | — | — | — | — | — | 35 | — | |
| CD4097 | | -5 | 5 | — | — | — | — | — | — | — | |
| Feed-through, C _{ios} | | | | — | — | — | — | — | 0.2 | — | |
| Propagation Delay Time (Signal Input to Output) | V _{DD} | R _L = 200 KΩ C _L = 50 pF t _r , t _f = 20 ns | 5 | — | — | — | — | — | 30 | 60 | ns |
| | | | 10 | — | — | — | — | — | 15 | 30 | |
| | | | 15 | — | — | — | — | — | 10 | 20 | |
| CONTROL (ADDRESS or INHIBIT) V_C | | | | | | | | | | | |
| Input Low Voltage, V _{IL} Max. | =V _{DD} thru 1 KΩ | R _L = 1 KΩ to V _{SS} I _{IS} < 2 μA on all OFF Channels | 5 | 1.5 | — | — | — | — | — | 1.5 | V |
| | | | 10 | 3 | — | — | — | — | 3 | | |
| | | | 15 | 4 | — | — | — | — | 4 | | |
| Input High Voltage, V _{IH} Min. | 1 KΩ | R _L = 1 KΩ to V _{SS} I _{IS} < 2 μA on all OFF Channels | 5 | 3.5 | 3.5 | — | — | — | — | — | |
| | | | 10 | 7 | 7 | — | — | — | — | | |
| | | | 15 | 11 | 11 | — | — | — | — | | |

* Determined by minimum feasible leakage measurement for automatic testing.

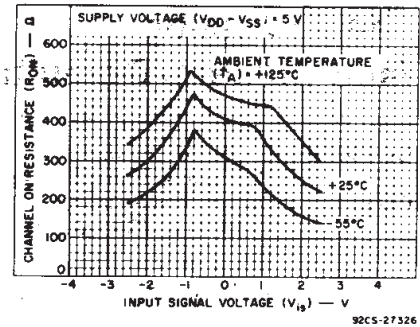


Fig. 3—Typical ON resistance vs. input signal voltage (all types).

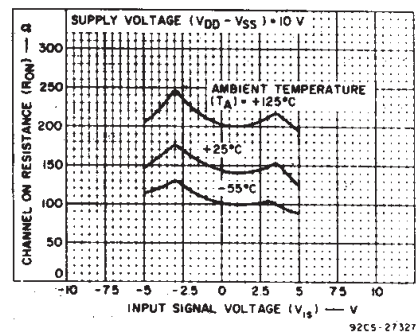


Fig. 4—Typical ON resistance vs. input signal voltage (all types).

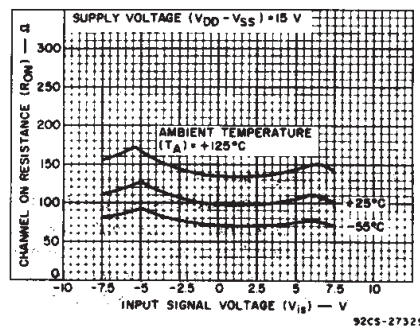


Fig. 5—Typical ON resistance vs. input signal voltage (all types).

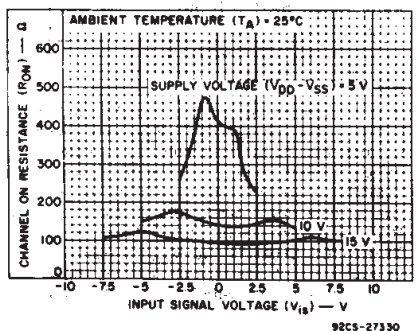


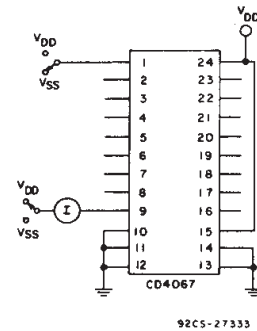
Fig. 6—Typical ON resistance vs. input signal voltage (all types).

CD4067B, CD4097B Types

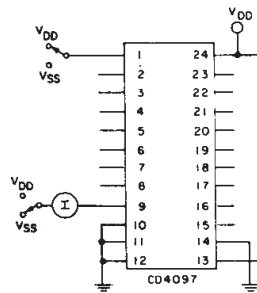
ELECTRICAL CHARACTERISTICS (Cont'd)

| CHARACTERISTIC | CONDITIONS | | | LIMITS AT INDICATED TEMPERATURES (°C) | | | | | | | Units |
|---|---|------------------------|------------------------|---------------------------------------|------|-----|------|------|-------------------|------|-------|
| | V _{is} (V) | V _{SS} (V) | V _{DD} (V) | -55 | -40 | +85 | +125 | +25 | | | |
| | | | | | | | | Min. | Typ. | Max. | |
| Input Current, I _{IN} Max. | V _{IN} = 0, 18 V | | | ±0.1 | ±0.1 | ±1 | ±1 | — | ±10 ⁻⁵ | ±0.1 | μA |
| Propagation Delay Time: Address or Inhibit-to-Signal OUT (Channel turning ON) | R _L = 10 KΩ, C _L = 50 pF, t _r , t _f = 20 ns | | | — | — | — | — | — | 325 | 650 | ns |
| | 0 | 5 | — | — | — | — | — | — | 135 | 270 | |
| | 0 | 10 | — | — | — | — | — | — | 95 | 190 | |
| Address or Inhibit-to-Signal OUT (Channel turning OFF) | R _L = 300 Ω, C _L = 50 pF, t _r , t _f = 20 ns | | | — | — | — | — | — | 220 | 440 | ns |
| | 0 | 5 | — | — | — | — | — | — | 90 | 180 | |
| | 0 | 15 | — | — | — | — | — | — | 65 | 130 | |
| Input Capacitance, C _{IN} | Any Address or Inhibit Input | | | — | — | — | — | — | 5 | 7.5 | pF |

TEST CIRCUITS



92CS-27333

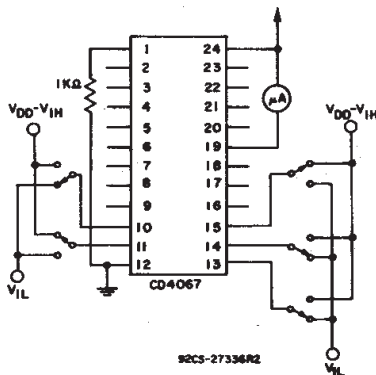


92CS-27332

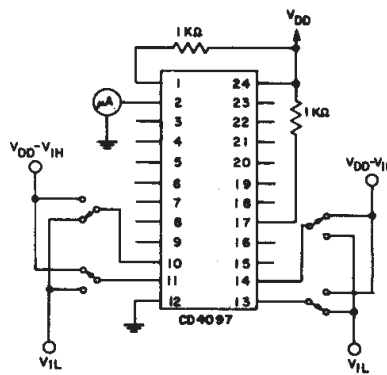
Fig. 7—OFF channel leakage current—any channel OFF.

MAXIMUM RATINGS, Absolute-Maximum Values:

- DC SUPPLY-VOLTAGE RANGE, (V_{DD})
Voltages referenced to V_{SS} Terminal) -0.5V to +20V
- INPUT VOLTAGE RANGE, ALL INPUTS -0.5V to V_{DD} +0.5V
- DC INPUT CURRENT, ANY ONE INPUT ±10mA
- POWER DISSIPATION PER PACKAGE (P_D):
For T_A = -55°C to +100°C 500mW
For T_A = +100°C to +125°C Derate Linearly at 12mW/°C to 200mW
- DEVICE DISSIPATION PER OUTPUT TRANSISTOR
FOR T_A = FULL PACKAGE-TEMPERATURE RANGE (All Package Types) 100mW
- OPERATING-TEMPERATURE RANGE (T_A) -55°C to +125°C
- STORAGE TEMPERATURE RANGE (T_{stg}) -65°C to +150°C
- LEAD TEMPERATURE (DURING SOLDERING):
At distance 1/16 ± 1/32 inch (1.59 ± 0.79mm) from case for 10s max +265°C

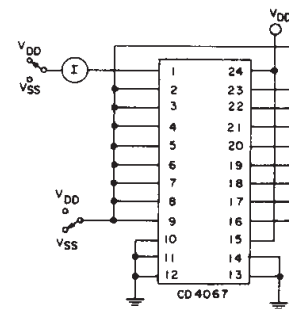


92CS-27336R2

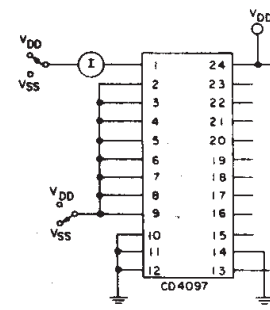


92CS-27337R2

Fig. 8—Input voltage—measure < 2 μA on all OFF channels (e.g., channel 12).



92CS-27334



92CS-27335

Fig. 9—OFF channel leakage current—all channels OFF.

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HIGH VOLTAGE ICs

CD4067B, CD4097B Types

ELECTRICAL CHARACTERISTICS (Cont'd)

| CHARACTERISTIC | TEST CONDITIONS | | | TYPICAL VALUES | UNITS | |
|---|--|---------------------|---------------------|-------------------------------------|-------------------------|-----------|
| | V _{is} (V) | V _{DD} (V) | R _L (KΩ) | | | |
| Cutoff (-3 dB) Frequency Channel ON (Sine Wave Input) | 5 [●] | 10 | 1 | CD4067 | 14 | MHz |
| | 20 log $\frac{V_{os}}{V_{is}} = -3$ dB | | | CD4097 | 20 | |
| V _{os} at Common OUT/IN | | | | 60 | | MHz |
| V _{os} at Any Channel | | | | 60 | | |
| Total Harmonic Distortion, THD | 2 [●] | 5 | 10 | 0.3 | | % |
| | 3 [●] | 10 | | 0.2 | | |
| | 5 [●] | 15 | | 0.12 | | |
| | f _{is} = 1 kHz sine wave | | | | | |
| -40 dB Feedthrough Frequency (All Channels OFF) | 5 [●] | 10 | 1 | CD4067 | 20 | MHz |
| | 20 log $\frac{V_{os}}{V_{is}} = -40$ dB | | | CD4097 | 12 | |
| V _{os} at Any Channel | | | | 8 | | MHz |
| Signal Crosstalk (Frequency at -40 dB) | 5 [●] | 10 | 1 | Between Any 2 Channels [▲] | | |
| | 20 log $\frac{V_{os}}{V_{is}} = -40$ dB | | | Between Sections CD4097 Only | Measured on Common | 10 |
| | | | | | Measured on Any Channel | 18 |
| Address-or-Inhibit-to-Signal Crosstalk | V _{SS} =0, t _r , t _f =20 ns, V _C =V _{DD} -V _{SS} (Square Wave) | | | 75 | | mV (Peak) |

● Peak-to-peak voltage symmetrical about $\frac{V_{DD}-V_{SS}}{2}$.

▲ Worst case.

* Both ends of channel.

TEST CIRCUITS (Cont'd)

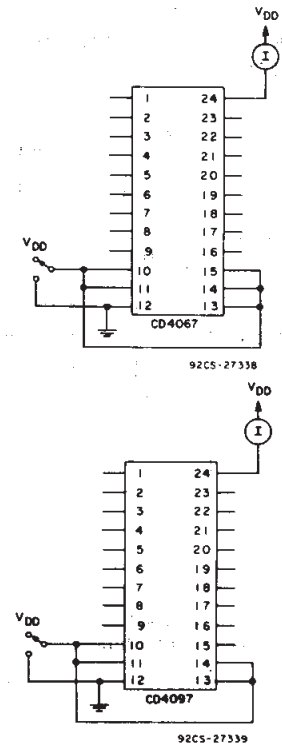


Fig. 10—Quiescent device current.

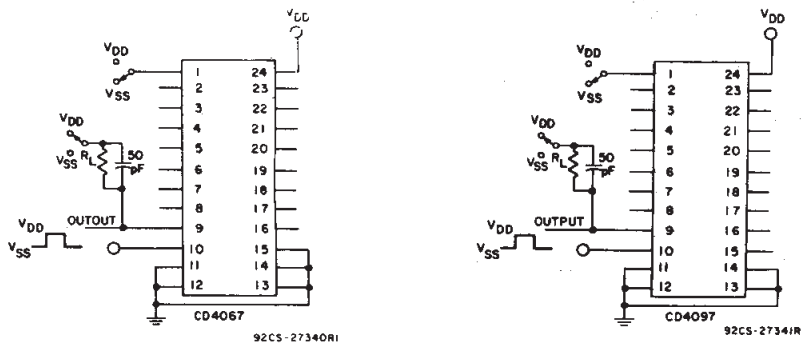


Fig. 11—Turn-on and turn-off propagation delay—address select input to signal output (e.g. measured on channel 0).

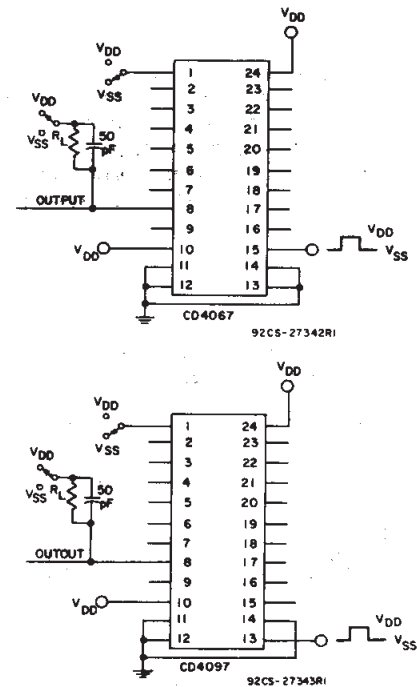


Fig. 12—Turn-on and turn-off propagation delay—
inhibit input to signal output (e.g. measured on channel 1).

CD4067B, CD4097B Types

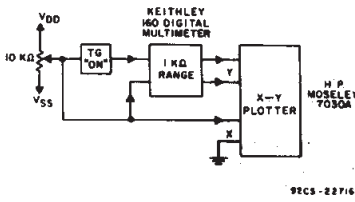


Fig. 13- Channel ON resistance measurement circuit.

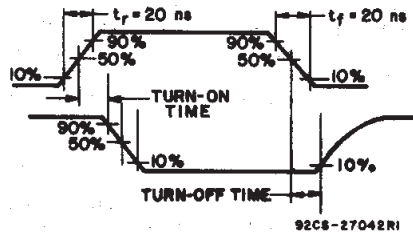


Fig. 14- Propagation delay waveform channel being turned ON ($R_L = 10\text{ K}\Omega$, $C_L = 50\text{ pF}$).

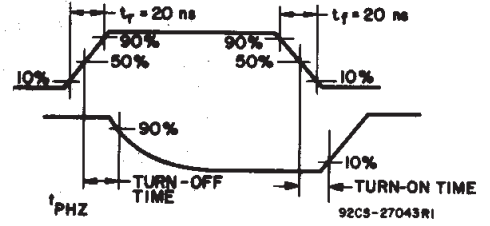


Fig. 15- Propagation delay waveform, channel being turned OFF ($R_L = 300\Omega$, $C_L = 50\text{ pF}$).

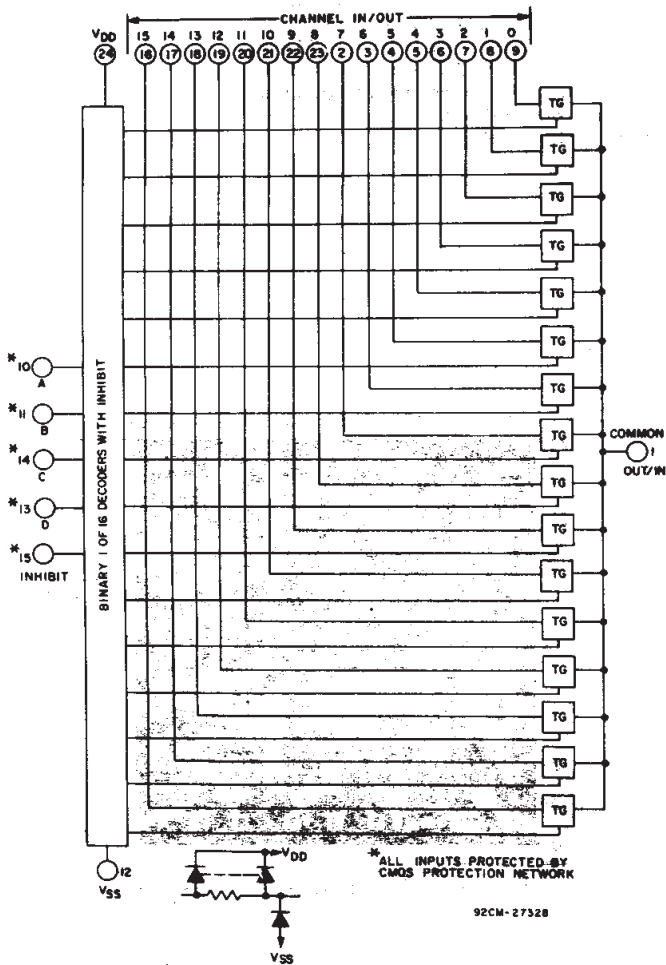


Fig. 16- CD4067 logic diagram.

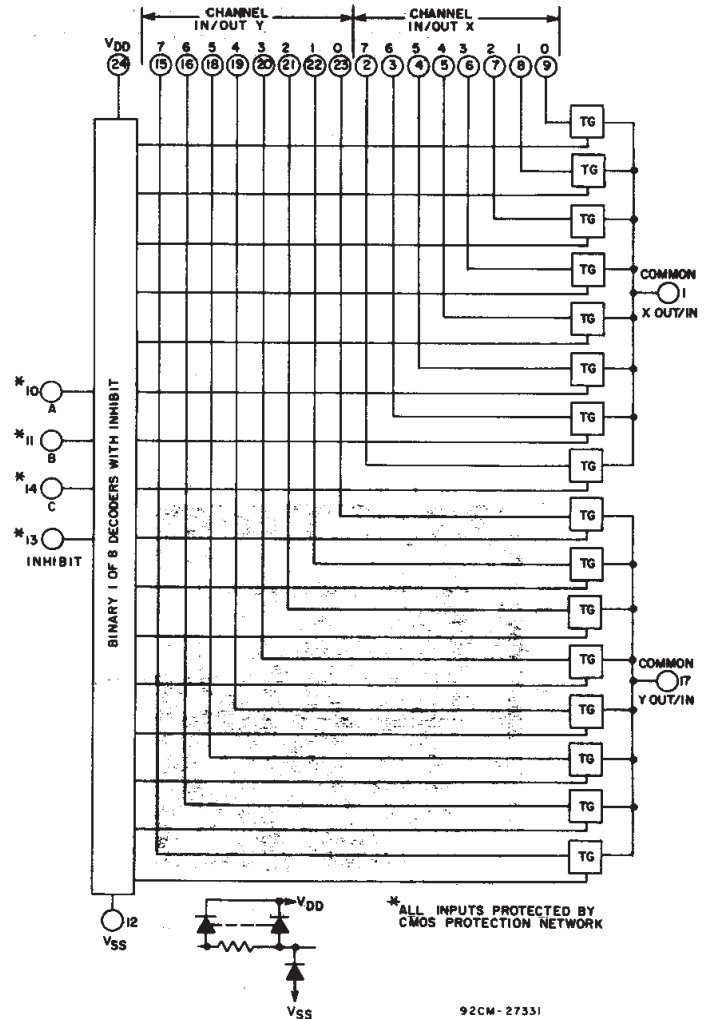


Fig. 17- CD4097 logic diagram.

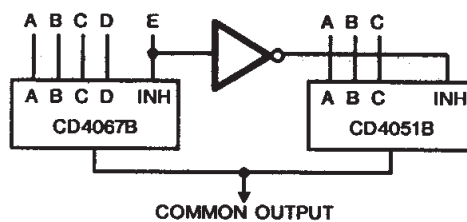


Fig. 18-24-to-1 MUX Addressing

3
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CD4067B, CD4097B Types

SPECIAL CONSIDERATIONS

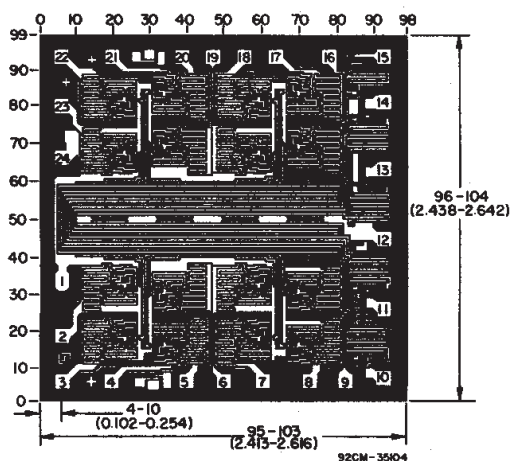
In applications where separate power sources are used to drive V_{DD} and the signal inputs, the V_{DD} current capability should exceed V_{DD}/R_L (R_L =effective external load). This provision avoids permanent current flow or clamp action on the V_{DD} supply when power is applied or removed from the CD4067B or CD4097B.

When switching from one address to another, some of the ON periods of the channels of the multiplexers will overlap momentarily, which may be objectionable in certain applications. Also when a channel is turned on or off by an address input, there is a momentary conductive path from the channel to V_{SS} , which will dump some charge from any capacitor connected to the input or output of the channel. The inhibit input turning on a channel will similarly dump some charge to V_{SS} .

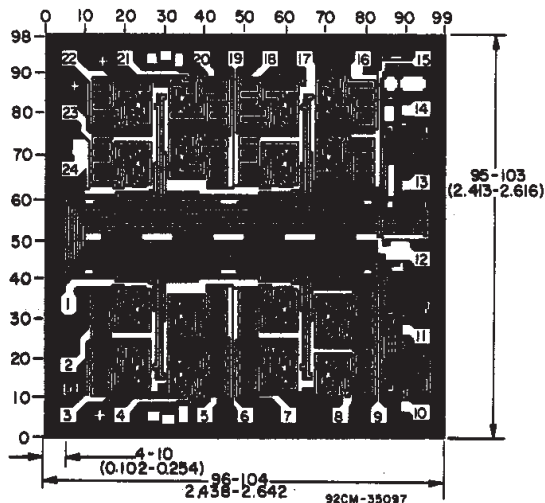
The amount of charge dumped is mostly a function of the signal level above V_{SS} . Typically, at $V_{DD}-V_{SS}=10$ V, a 100-pF

capacitor connected to the input or output of the channel will lose 3-4% of its voltage at the moment the channel turns on or off. This loss of voltage is essentially independent of the address or inhibit signal transition time, if the transition time is less than 1-2 μ s. When the inhibit signal turns a channel off, there is no charge dumping to V_{SS} . Rather, there is a slight rise in the channel voltage level (65 mV typ.) due to capacitive coupling from inhibit input to channel input or output. Address inputs also couple some voltage steps onto the channel signal levels.

In certain applications, the external load-resistor current may include both V_{DD} and signal-line components. To avoid drawing V_{DD} current when switch current flows into the transmission gate inputs, the voltage drop across the bidirectional switch must not exceed 0.8 volt (calculated from R_{ON} values shown in ELECTRICAL CHARACTERISTICS CHART). No V_{DD} current will flow through R_L if the switch current flows into terminal 1 on the CD4067B, terminals 1 and 17 on the CD4097B.



Dimensions and pad layout for CD4067BH.



Dimensions and pad layout for CD4097BH.

Dimensions in parentheses are in millimeters and are derived from the basic inch dimensions as indicated. Grid graduations are in mils (10^{-3} inch).

PACKAGING INFORMATION

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish | MSL Peak Temp (3) | Op Temp (°C) | Top-Side Markings (4) | Samples |
|------------------|---------------|--------------|--------------------|------|----------------|----------------------------|------------------|----------------------|--------------|--------------------------|-------------------------|
| CD4067BE | ACTIVE | PDIP | N | 24 | 15 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type | -55 to 125 | CD4067BE | Samples |
| CD4067BEE4 | ACTIVE | PDIP | N | 24 | 15 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type | -55 to 125 | CD4067BE | Samples |
| CD4067BF | ACTIVE | CDIP | J | 24 | 1 | TBD | Call TI | N / A for Pkg Type | -55 to 125 | CD4067BF | Samples |
| CD4067BF3A | ACTIVE | CDIP | J | 24 | 1 | TBD | Call TI | N / A for Pkg Type | -55 to 125 | CD4067BF3A | Samples |
| CD4067BM | ACTIVE | SOIC | DW | 24 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -55 to 125 | CD4067BM | Samples |
| CD4067BM96 | ACTIVE | SOIC | DW | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -55 to 125 | CD4067BM | Samples |
| CD4067BM96E4 | ACTIVE | SOIC | DW | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -55 to 125 | CD4067BM | Samples |
| CD4067BM96G4 | ACTIVE | SOIC | DW | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -55 to 125 | CD4067BM | Samples |
| CD4067BME4 | ACTIVE | SOIC | DW | 24 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -55 to 125 | CD4067BM | Samples |
| CD4067BMG4 | ACTIVE | SOIC | DW | 24 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -55 to 125 | CD4067BM | Samples |
| CD4067BPW | ACTIVE | TSSOP | PW | 24 | 60 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -55 to 125 | CM067B | Samples |
| CD4067BPWE4 | ACTIVE | TSSOP | PW | 24 | 60 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -55 to 125 | CM067B | Samples |
| CD4067BPWG4 | ACTIVE | TSSOP | PW | 24 | 60 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -55 to 125 | CM067B | Samples |
| CD4097BE | ACTIVE | PDIP | N | 24 | 15 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type | -55 to 125 | CD4097BE | Samples |
| CD4097BEE4 | ACTIVE | PDIP | N | 24 | 15 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type | -55 to 125 | CD4097BE | Samples |
| CD4097BF | ACTIVE | CDIP | J | 24 | 1 | TBD | Call TI | N / A for Pkg Type | -55 to 125 | CD4097BF | Samples |
| CD4097BM | ACTIVE | SOIC | DW | 24 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -55 to 125 | CD4097BM | Samples |

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish | MSL Peak Temp (3) | Op Temp (°C) | Top-Side Markings (4) | Samples |
|------------------|---------------|--------------|-----------------|------|-------------|-------------------------|------------------|----------------------|--------------|--------------------------|-------------------------|
| CD4097BME4 | ACTIVE | SOIC | DW | 24 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -55 to 125 | CD4097BM | Samples |
| CD4097BMG4 | ACTIVE | SOIC | DW | 24 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -55 to 125 | CD4097BM | Samples |
| CD4097BPW | ACTIVE | TSSOP | PW | 24 | 60 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -55 to 125 | CM097B | Samples |
| CD4097BPWE4 | ACTIVE | TSSOP | PW | 24 | 60 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -55 to 125 | CM097B | Samples |
| CD4097BPWG4 | ACTIVE | TSSOP | PW | 24 | 60 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -55 to 125 | CM097B | Samples |
| CD4097BPWR | ACTIVE | TSSOP | PW | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -55 to 125 | CM097B | Samples |
| CD4097BPWRE4 | ACTIVE | TSSOP | PW | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -55 to 125 | CM097B | Samples |
| CD4097BPWRG4 | ACTIVE | TSSOP | PW | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -55 to 125 | CM097B | Samples |

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) Multiple Top-Side Markings will be inside parentheses. Only one Top-Side Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Top-Side Marking for that device.

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OTHER QUALIFIED VERSIONS OF CD4067B, CD4067B-MIL, CD4097B, CD4097B-MIL :

- Catalog: [CD4067B](#), [CD4097B](#)
- Military: [CD4067B-MIL](#), [CD4097B-MIL](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product
- Military - QML certified for Military and Defense Applications

TAPE AND REEL INFORMATION

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE


*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|--------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| CD4067BM96 | SOIC | DW | 24 | 2000 | 330.0 | 24.4 | 10.75 | 15.7 | 2.7 | 12.0 | 24.0 | Q1 |
| CD4067BM96G4 | SOIC | DW | 24 | 2000 | 330.0 | 24.4 | 10.75 | 15.7 | 2.7 | 12.0 | 24.0 | Q1 |
| CD4097BPWR | TSSOP | PW | 24 | 2000 | 330.0 | 16.4 | 6.95 | 8.3 | 1.6 | 8.0 | 16.0 | Q1 |

TAPE AND REEL BOX DIMENSIONS


*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|--------------|--------------|-----------------|------|------|-------------|------------|-------------|
| CD4067BM96 | SOIC | DW | 24 | 2000 | 367.0 | 367.0 | 45.0 |
| CD4067BM96G4 | SOIC | DW | 24 | 2000 | 367.0 | 367.0 | 45.0 |
| CD4097BPWR | TSSOP | PW | 24 | 2000 | 367.0 | 367.0 | 38.0 |

J (R-GDIP-T**)

CERAMIC DUAL-IN-LINE PACKAGE

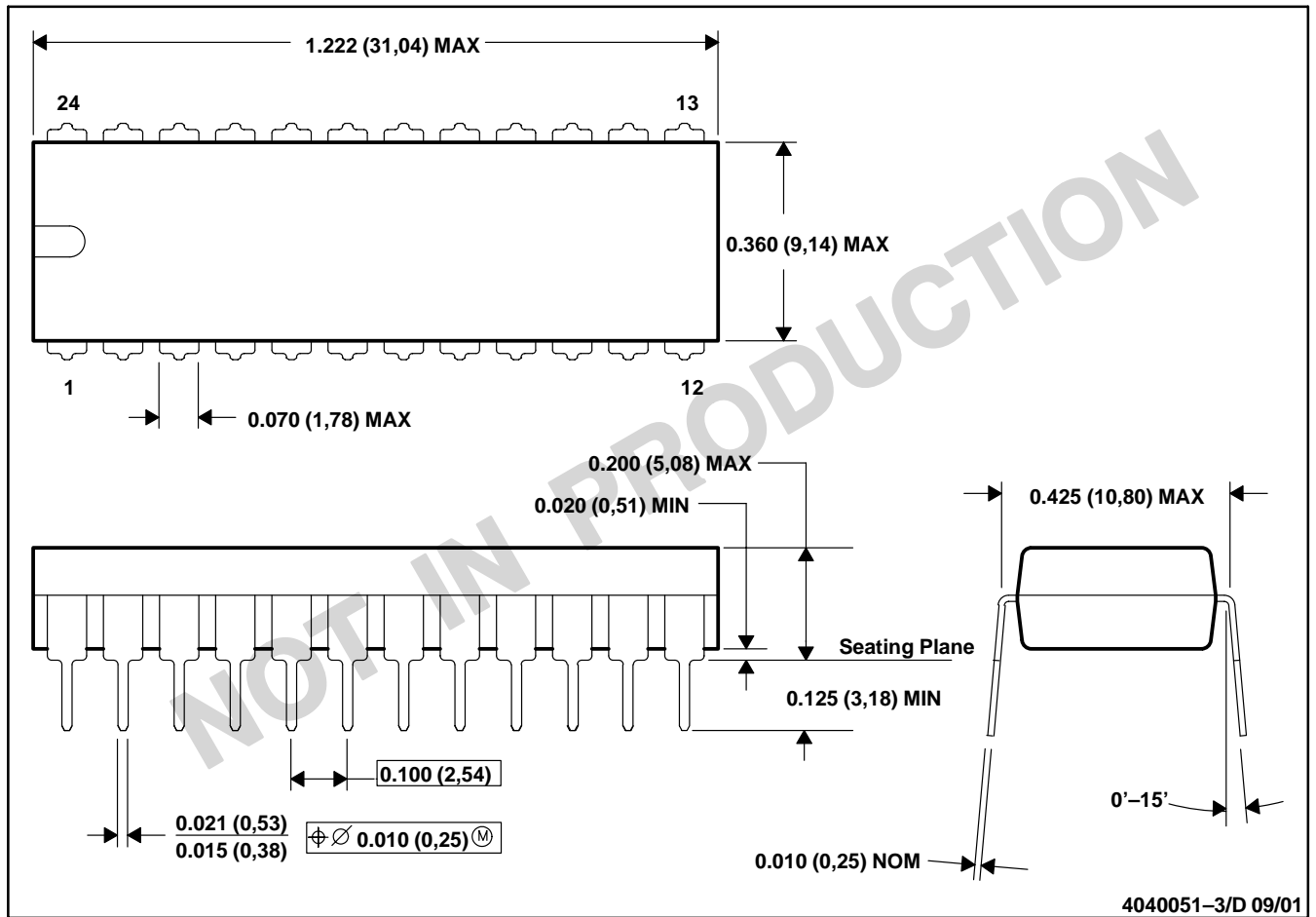
24 PINS SHOWN



- NOTES: A. All linear dimensions are in inches (millimeters).
 B. This drawing is subject to change without notice.
 C. Window (lens) added to this group of packages (24-, 28-, 32-, 40-pin).
 D. This package can be hermetically sealed with a ceramic lid using glass frit.
 E. Index point is provided on cap for terminal identification.

N (R-PDIP-T24)

PLASTIC DUAL-IN-LINE



- NOTES: A. All linear dimensions are in inches (millimeters).
 B. This drawing is subject to change without notice.
 C. Falls within JEDEC MS-010

DW (R-PDSO-G24)

PLASTIC SMALL OUTLINE



- NOTES:
- A. All linear dimensions are in inches (millimeters). Dimensioning and tolerancing per ASME Y14.5M-1994.
 - B. This drawing is subject to change without notice.
 - C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
 - D. Falls within JEDEC MS-013 variation AD.

PW (R-PDSO-G24)

PLASTIC SMALL OUTLINE

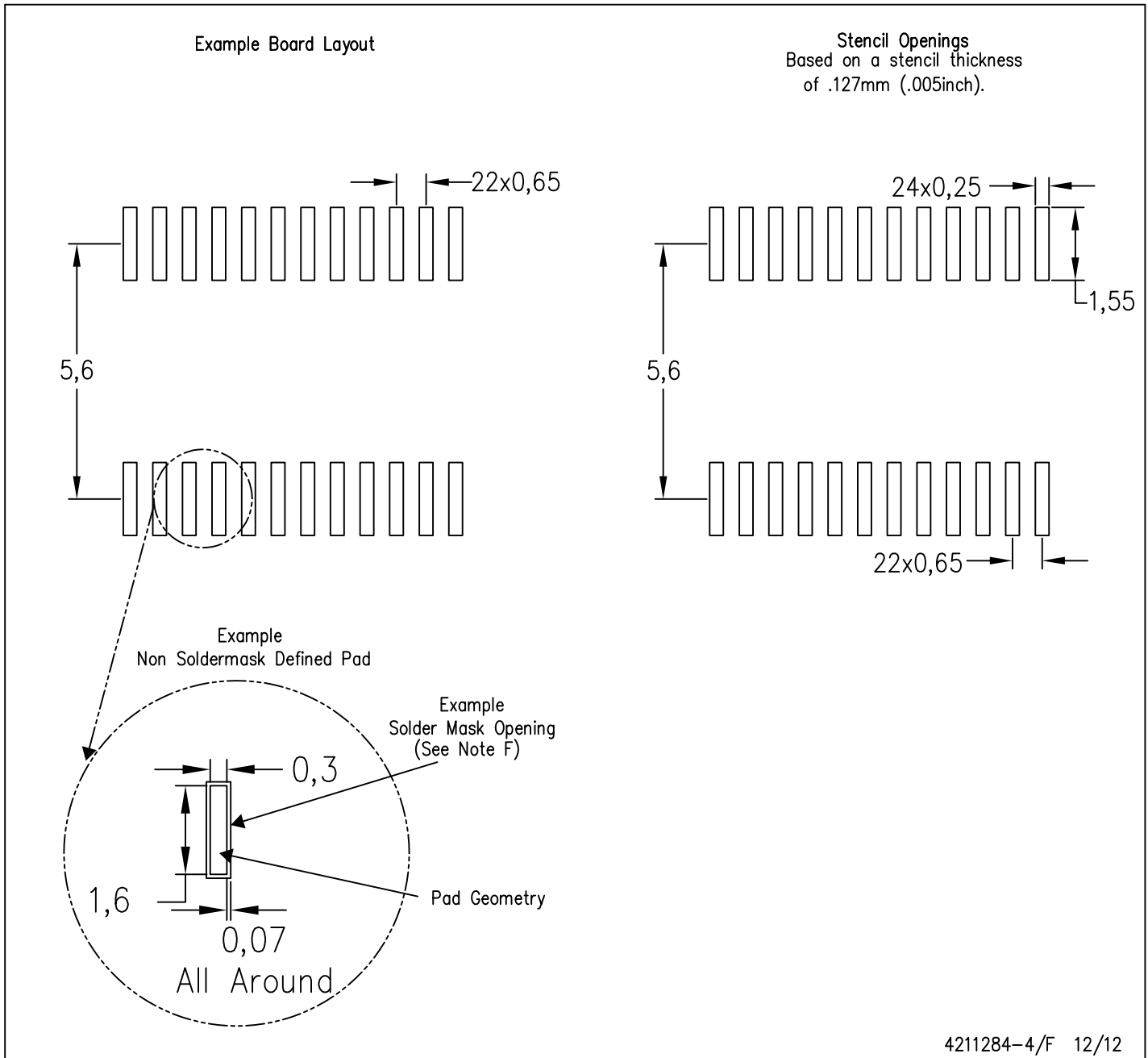


4040064-6/G 02/11

- NOTES:
- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
 - B. This drawing is subject to change without notice.
 - Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0,15 each side.
 - Body width does not include interlead flash. Interlead flash shall not exceed 0,25 each side.
 - E. Falls within JEDEC MO-153

PW (R-PDSO-G24)

PLASTIC SMALL OUTLINE



- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Publication IPC-7351 is recommended for alternate design.
 - D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
 - E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

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