

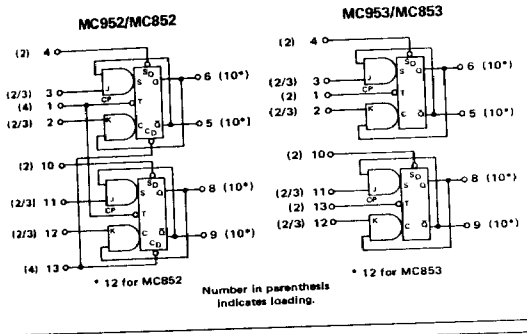
DUAL J-K FLIP-FLOP

MC952F · MC852F, P
MC953F · MC853F, P
MC955F · MC855F, P
MC956F · MC856F, P

Each section of the monolithic MC952/MC852 and MC953/MC853 dual J-K clocked flip-flops consists of two directly-coupled flip-flops operating on the "master-slave" principle. Operation depends only on voltage levels, so the rise and fall times of the input clock are unimportant in determining the state of the flip-flop. Input information is stored in the "master" flip-flop when the clock voltage is high and is transferred to the "slave" when the clock voltage goes low.

The MC952/MC852 has a common clock input which makes this device suitable for clocked counters and shift register applications. A common direct clear (C_D) and separate direct sets (S_D) are available. The direct inputs override all asynchronous inputs.

The MC953/MC853 has separate clock inputs to each flip-flop, which makes the device suitable for ripple counter applications. Separate direct set inputs which override the synchronous inputs are also provided. The outputs of the flip-flops are buffered, thereby reducing the possibility of circuit disturbance from external line noise.



Total Power Dissipation
 MC952/MC852, MC953/MC853
 - 120 mW typ/pkg
 MC955/MC855, MC956/MC856
 - 140 mW typ/pkg
 Propagation Delay Time = 40 ns typ

ASYNCHRONOUS TRUTH TABLE
 MC952/MC852 and MC955/MC855

| S _D | C _D | Q | \bar{Q} |
|----------------|----------------|----|-----------|
| 1 | 1 | NC | NC |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 |
| 0 | 0 | 1 | 1 |

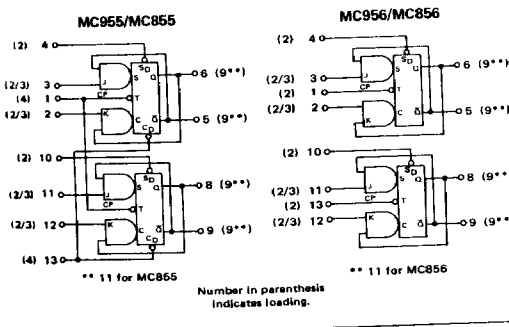
ASYNCHRONOUS TRUTH TABLE
 MC953/MC853 and MC956/MC856

| S _D | Q | \bar{Q} |
|----------------|----|-----------|
| 1 | NC | NC |
| 0 | 1 | 0 |

Each section of the monolithic MC955/MC855 and MC956/MC856 dual J-K clocked flip-flops consists of two directly-coupled flip-flops operating on the "master-slave" principle. Input information is stored in the "master" flip-flop when the clock voltage is high and is transferred to the "slave" when the clock voltage goes low.

The MC955/MC855 has a common clock input which makes this device suitable for clocked counters and shift register applications. A common direct clear (C_D) and separate direct sets (S_D) are available. The direct inputs override all asynchronous inputs.

The MC956/MC856 has separate clock inputs to each flip-flop, which makes the device suitable for ripple counter applications. Separate direct set inputs which override the synchronous inputs are also provided. The outputs of the flip-flops are buffered, thereby reducing the possibility of circuit disturbance from external line noise. The output pull-up resistor has been changed from that utilized in the MC952/MC852 and MC953/MC853 in order to improve the propagation delay versus capacitance characteristics.



J-K TRUTH TABLE - All Types †

| t _n | | t _{n+1} |
|----------------|---|------------------|
| J | K | Q |
| 0 | 0 | Q _n |
| 1 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 1 | \bar{Q}_n |

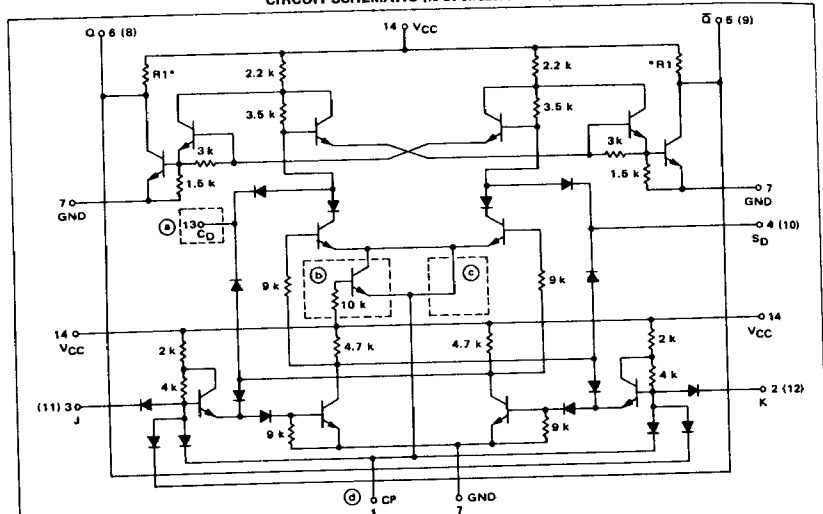
Asynchronous inputs, direct set (S_D) and direct clear (C_D), override the synchronous inputs, they are independent of all other inputs.

† Valid only when J and K inputs remain unchanged during period while CP is high.

MC952F/MC852F, P, MC953F/MC853F, P (continued)
 MC955F/MC855F, P, MC956F/MC856F, P (continued)

C10775

CIRCUIT SCHEMATIC (1/2 of circuit shown)

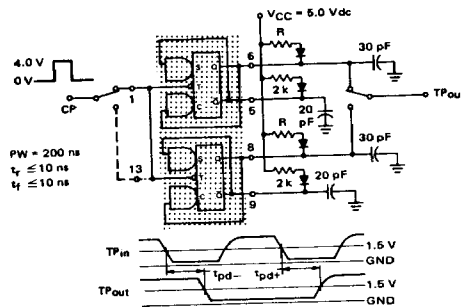


- (*) Used only on MC952/MC852 and MC955/MC855
- (b) Used only on MC952/MC852 and MC953/MC853
- (c) Used only on MC955/MC855 and MC956/MC856
- (d) Pin 13 used for other side of MC953/MC853 and MC956/MC856

NOTE: Number in parenthesis indicates pin number for other half of the schematic. Ground and VCC pins are common to both sides.

* MC952/MC852 and MC953/MC853 - 6 k
 MC955/MC855 and MC956/MC856 - 2 k

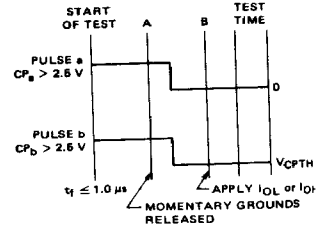
PROPAGATION DELAY TIME TEST
 CIRCUIT AND WAVEFORMS



Test circuit shown for MC952/MC852 and MC955/MC855.
 Use dotted-line connection for MC953/MC853 and MC956/MC856, which have separate toggle inputs. Ground pin 7. Only connected inputs are shown. All others are open.
 MC833 or equivalent used for diodes.

| TEST | R |
|-----------|------------|
| t_{pd+} | 3.9 k ohms |
| t_{pd-} | 400 ohms |

CLOCK PULSE WAVEFORMS



TEST CONDITIONS

| T _A | V _{CPTH} | |
|-------------------|-------------------|--------------|
| | MC952, MC953 | MC955, MC956 |
| -55°C | 1.15 V | 1.30 V |
| +25°C | 0.95 V | 1.15 V |
| +125°C | 0.65 V | 0.85 V |
| V _{CPTH} | | |
| 0°C | 1.00 V | 1.20 V |
| +25°C | 0.95 V | 1.15 V |
| +75°C | 0.65 V | 0.85 V |

61

MC952F/MC852F, P, MC953F/MC853F, P (continued)
 MC955F/MC855F, P, MC956F/MC856F, P (continued)

TEST CURRENT / VOLTAGE APPLIED TO PINS LISTED BELOW.

| mA | | Volts | | | | | | | | | | | |
|-------|-------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | | I_{OH} | I_{OL} | V_{IH} | V_{IL} | V_{IH} | V_{IL} | V_{CC} | V_{CE} | V_{CC} | V_{CE} | V_{OH} | V_{OL} |
| MC953 | MC956 | MC953 | MC956 | MC953 | MC956 | MC953 | MC956 | MC953 | MC956 | MC953 | MC956 | MC953 | MC956 |
| 14.6 | 13.0 | -0.12 | -0.5 | 1.40 | 2.10 | 0 | 4.00 | - | 4.00 | 5.00 | 4.90 | 5.50 | - |
| 15.2 | 13.6 | -0.12 | -0.5 | 1.10 | 2.00 | 0 | 4.00 | 5.00 | 4.50 | 5.50 | 5.50 | 5.00 | 8.00 |
| 13.8 | 12.3 | -0.12 | -0.5 | 0.80 | 2.00 | 0 | 4.00 | - | 4.00 | 5.50 | 5.50 | - | - |

TEST CURRENT / VOLTAGE APPLIED TO PINS LISTED BELOW.

| mA | | Volts | | | | | | | | | | | |
|-------|-------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | | I_{OH} | I_{OL} | V_{IH} | V_{IL} | V_{IH} | V_{IL} | V_{CC} | V_{CE} | V_{CC} | V_{CE} | V_{OH} | V_{OL} |
| MC953 | MC956 | MC953 | MC956 | MC953 | MC956 | MC953 | MC956 | MC953 | MC956 | MC953 | MC956 | MC953 | MC956 |
| 16.8 | 15.4 | -0.12 | -0.5 | 1.20 | 2.00 | 0 | 4.50 | 4.00 | - | 5.00 | 5.00 | 5.00 | - |
| 16.8 | 15.4 | -0.12 | -0.5 | 1.10 | 1.80 | 0 | 4.50 | 4.00 | 5.00 | 5.00 | 5.00 | 5.00 | 8.00 |
| 14.6 | 14.6 | -0.12 | -0.5 | 0.80 | 1.80 | 0 | 5.00 | 4.00 | - | 5.00 | 5.00 | - | - |



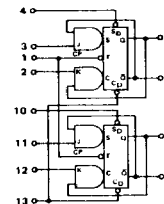
**MC953/MC853
 MC956/MC856
 ELECTRICAL
 CHARACTERISTICS**

Test procedures are shown for only one flip-flop. The other flip-flop is tested in the same manner.

| Characteristic | Symbol | Pin | | MC953, MC853 TEST LIMITS | | | MC956, MC856 TEST LIMITS | | | MC953, MC853 TEST LIMITS | | | MC956, MC856 TEST LIMITS | | | CP ₁ (CP ₂) | CP ₂ (CP ₁) | Grd | | | |
|-------------------|----------|-------|------|--------------------------|-------|-------|--------------------------|-------|-------|--------------------------|-------|-------|--------------------------|-------|------------|------------------------------------|------------------------------------|-----|---|---|---|
| | | Under | Over | -55°C | +25°C | +75°C | -55°C | +25°C | +75°C | -55°C | +25°C | +75°C | -55°C | +25°C | +75°C | | | | | | |
| Output Voltage | V_{OH} | 5 | 6 | 0.40 | 1.00 | 0.45 | 1.00 | 0.45 | 1.00 | 0.45 | 1.00 | 0.45 | 1.00 | 0.50 | Vol. | 5 | 6 | 1 | 1 | 4 | 1 |
| | V_{OL} | 5 | 6 | 0.10 | 0.40 | 0.45 | 0.10 | 0.45 | 0.10 | 0.45 | 0.10 | 0.45 | 0.10 | 0.50 | Vol. | 5 | 6 | 1 | 1 | 4 | 1 |
| Short-Circuit | I_{SC} | 5 | 6 | -1.45 | -2.45 | -1.30 | -2.25 | -1.15 | -2.00 | -1.25 | -2.50 | -1.15 | -2.00 | -1.05 | mA | 5 | 6 | 1 | 1 | 4 | 1 |
| MC953, MC853 | | 5 | 6 | -1.45 | -2.45 | -1.30 | -2.25 | -1.15 | -2.00 | -1.25 | -2.50 | -1.15 | -2.00 | -1.05 | mA | 5 | 6 | 1 | 1 | 4 | 1 |
| MC956, MC856 | | 5 | 6 | -1.85 | -2.85 | -1.70 | -2.60 | -1.40 | -2.40 | -1.60 | -3.20 | -1.40 | -2.40 | -1.30 | mA | 5 | 6 | 1 | 1 | 4 | 1 |
| Reverse Current | I_R | 2 | 3 | 2.0 | 2.0 | 5.0 | 2.0 | 2.0 | 5.0 | 2.0 | 2.0 | 5.0 | 2.0 | 10 | μ Adc. | 2 | 3 | 1 | 1 | 4 | 1 |
| All Types | | 2 | 3 | 2.0 | 2.0 | 5.0 | 2.0 | 2.0 | 5.0 | 2.0 | 2.0 | 5.0 | 2.0 | 10 | μ Adc. | 2 | 3 | 1 | 1 | 4 | 1 |
| MC953, MC853 | | 2 | 3 | 2.0 | 2.0 | 5.0 | 2.0 | 2.0 | 5.0 | 2.0 | 2.0 | 5.0 | 2.0 | 10 | μ Adc. | 2 | 3 | 1 | 1 | 4 | 1 |
| MC956, MC856 | | 2 | 3 | 2.0 | 2.0 | 5.0 | 2.0 | 2.0 | 5.0 | 2.0 | 2.0 | 5.0 | 2.0 | 10 | μ Adc. | 2 | 3 | 1 | 1 | 4 | 1 |
| Forward Current | I_{F1} | 2 | 3 | -1.07 | -1.07 | -1.05 | -1.00 | -1.00 | -1.00 | -0.95 | -0.95 | -0.90 | -0.90 | mA | 2 | 3 | 1 | 1 | 4 | 1 | 1 |
| | I_{F2} | 2 | 3 | -1.07 | -1.07 | -1.05 | -1.00 | -1.00 | -1.00 | -0.95 | -0.95 | -0.90 | -0.90 | mA | 2 | 3 | 1 | 1 | 4 | 1 | 1 |
| | I_{F3} | 2 | 3 | -1.20 | -1.20 | -1.20 | -1.20 | -1.20 | -1.20 | -1.20 | -1.20 | -1.20 | -1.20 | mA | 2 | 3 | 1 | 1 | 4 | 1 | 1 |
| | I_{F4} | 2 | 3 | -1.20 | -1.20 | -1.20 | -1.20 | -1.20 | -1.20 | -1.20 | -1.20 | -1.20 | -1.20 | mA | 2 | 3 | 1 | 1 | 4 | 1 | 1 |
| Power Dissipation | P_{D1} | 14 | 14 | - | - | 32 | - | - | 32 | - | - | 32 | - | mW | 14 | 14 | 1 | 1 | 4 | 1 | 1 |
| | P_{D2} | 14 | 14 | - | - | 32 | - | - | 32 | - | - | 32 | - | mW | 14 | 14 | 1 | 1 | 4 | 1 | 1 |
| MC953, MC853 | | 14 | 14 | - | - | 32 | - | - | 32 | - | - | 32 | - | mW | 14 | 14 | 1 | 1 | 4 | 1 | 1 |
| MC956, MC856 | | 14 | 14 | - | - | 32 | - | - | 32 | - | - | 32 | - | mW | 14 | 14 | 1 | 1 | 4 | 1 | 1 |
| Setup/hold Times | t_{SU} | 14 | 14 | - | - | 25 | 100 | - | - | 25 | 100 | - | - | ns | 14 | 14 | 1 | 1 | 4 | 1 | 1 |
| | t_{HD} | 14 | 14 | - | - | 15 | 55 | - | - | 15 | 55 | - | - | ns | 14 | 14 | 1 | 1 | 4 | 1 | 1 |
| MC953, MC853 | | 14 | 14 | - | - | 15 | 55 | - | - | 15 | 55 | - | - | ns | 14 | 14 | 1 | 1 | 4 | 1 | 1 |
| MC956, MC856 | | 14 | 14 | - | - | 15 | 55 | - | - | 15 | 55 | - | - | ns | 14 | 14 | 1 | 1 | 4 | 1 | 1 |

Pin not listed are left open.
 1. CP₁ = Clock Pulse 1.
 CP₂ = Clock Pulse 2.
 2. Applied after Clock Pulse 1.
 3. Momentary ground.
 4. See Clock Pulse Waveforms.

MC952F/MC852F, P, MC953F/MC853F, P (continued)
 MC955F/MC855F, P, MC956F/MC856F, P (continued)



MC952/MC852
 MC955/MC855
 ELECTRICAL
 CHARACTERISTICS

| Characteristic | Symbol | Pin Under Test | MC952, MC955 TEST LIMITS | | | | | | MC852, MC855 TEST LIMITS | | | | | | | |
|--------------------------------------|-------------|-------------------------------|--------------------------|-------|-------|-------|--------|-------|--------------------------|-------|-------|-------|-------|-------|-------|---------|
| | | | -55°C | | +25°C | | +125°C | | 0°C | | +25°C | | +75°C | | | |
| | | | Min | Max | Min | Max | Min | Max | Unit | Min | Max | Min | Max | Min | Max | Unit |
| Output Voltage | V_{OL} | 5 6 8 9 | - | 0.40 | - | 0.40 | - | 0.45 | Vdc | - | 0.45 | - | 0.45 | - | 0.50 | Va |
| | V_{OH} | 5 6 8 9 | 2.50 | - | 2.80 | - | 2.50 | - | 2.60 | - | 2.60 | - | 2.50 | - | - | - |
| Short-Circuit Current MC952/MC852 | I_{SC} | 5 6 8 9 | -1.45 | -2.45 | -1.30 | -2.25 | -1.15 | -2.00 | mAdc | -1.25 | -2.50 | -1.15 | -2.30 | -1.05 | -2.15 | mA |
| | | MC955/MC855 | 5 6 8 9 | -3.00 | -5.10 | -2.70 | -4.80 | -2.40 | -4.10 | - | -2.60 | -5.20 | -2.35 | -4.75 | -2.20 | -4.40 |
| Reverse Current All Types | I_R | 2 3 4 10 11 12 | - | 2.0 | - | 2.0 | - | 5.0 | μ Adc | - | 5.0 | - | 5.0 | - | 10 | μ A |
| | | All Types | 2 | - | 4.0 | - | 4.0 | - | 10 | - | 10 | - | 10 | - | 20 | - |
| | | MC952/MC852 | 2 | - | 20 | - | 20 | - | 40 | - | 40 | - | 40 | - | 60 | - |
| | | MC955/MC855 | 2 | - | 20 | - | 20 | - | 40 | - | 40 | - | 40 | - | 60 | - |
| Forward Current | I_F | 2 3 11 12 | - | -1.07 | - | -1.07 | - | -1.00 | mAdc | - | -0.95 | - | -0.95 | - | -0.90 | mA |
| | | 2 | - | -6.40 | - | -6.40 | - | -6.00 | - | -5.60 | - | -5.60 | - | -5.30 | - | |
| | | 1 | - | -6.40 | - | -6.40 | - | -6.00 | - | -5.60 | - | -5.60 | - | -5.30 | - | |
| | | 4 | - | -3.20 | - | -3.20 | - | -3.00 | - | -2.80 | - | -2.80 | - | -2.60 | - | |
| 10 | - | -3.20 | - | -3.20 | - | -3.00 | - | -2.80 | - | -2.80 | - | -2.60 | - | | | |
| 13 | - | -6.40 | - | -6.40 | - | -6.00 | - | -5.60 | - | -5.60 | - | -5.30 | - | | | |
| Power Drain Current | MC952/MC852 | I_{PDH} | 14 | - | - | 22 | - | - | mAdc | - | - | - | 28 | - | - | - |
| | | I_{max} | 14 | - | - | 32 | - | - | - | - | - | - | 36 | - | - | - |
| | MC955/MC855 | I_{PDH} | 14 | - | - | 27 | - | - | - | - | - | - | 34 | - | - | - |
| | | I_{max} | 14 | - | - | 38 | - | - | - | - | - | - | 45 | - | - | - |
| Switching Times MC952/MC852 | t_{pd+} | 1,6 | - | - | 25 | 100 | - | - | ns | - | - | 25 | 100 | - | - | - |
| | | 1,6 | - | - | 15 | 55 | - | - | - | - | - | 15 | 55 | - | - | - |
| | | 1,8 | - | - | 25 | 100 | - | - | - | - | - | 25 | 100 | - | - | - |
| | | 1,8 | - | - | 15 | 55 | - | - | - | - | - | 15 | 55 | - | - | - |
| | | 1,6 | - | - | 25 | 75 | - | - | - | - | - | 25 | 75 | - | - | - |
| | | 1,6 | - | - | 15 | 55 | - | - | - | - | - | 15 | 55 | - | - | - |
| | MC955/MC855 | t_{pd+} | 1,6 | - | - | 25 | 75 | - | - | - | - | 25 | 75 | - | - | - |
| | | t_{pd+} | 1,6 | - | - | 15 | 55 | - | - | - | - | 15 | 55 | - | - | - |
| | | t_{pd+} | 1,8 | - | - | 25 | 75 | - | - | - | - | 25 | 75 | - | - | - |
| | | t_{pd+} | 1,8 | - | - | 15 | 55 | - | - | - | - | 15 | 55 | - | - | - |
| | | t_{pd-} | 1,6 | - | - | 25 | 100 | - | - | - | - | 25 | 100 | - | - | - |
| | | t_{pd-} | 1,6 | - | - | 15 | 55 | - | - | - | - | 15 | 55 | - | - | - |

Pins not listed are left open.

\dagger CP_a = Clock Pulse a
 \ddagger CP_b = Clock Pulse b } See Clock Pulse Waveforms.

\dagger Applied after Clock Pulse.

\ddagger Momentary Ground.

| | | TEST CURRENT / VOLTAGE VALUES | | | | | | | | | | | | | | | | |
|--------------------|-------------------|--|----------|----------|-----------|----------|----------|----------|-------|----------|-----------|-----------|-----------|-----------|--------|---------------------|------------|---|
| | | mA | | | | Volts | | | | | | | | | | | | |
| | | I_{OL} | | I_{OH} | | V_{IL} | V_{IH} | V_F | V_R | V_{CC} | V_{CCL} | V_{CCH} | V_{max} | | | | | |
| @ Test Temperature | | MC952 | MC955 | MC952 | MC955 | | | | | | | | | | | | | |
| MC952, MC955 | -55°C | 14.6 | 13.0 | -0.12 | -0.5 | 1.40 | 2.10 | 0 | 4.00 | 4.50 | 5.50 | 8.00 | | | | | | |
| | +25°C | 15.2 | 13.6 | -0.12 | -0.5 | 1.10 | 2.00 | 0 | 4.00 | 5.00 | 5.00 | 8.00 | | | | | | |
| | +125°C | 13.8 | 12.3 | -0.12 | -0.5 | 0.80 | 2.00 | 0 | 4.00 | 4.50 | 5.50 | | | | | | | |
| MC852, MC855 | 0°C | 16.8 | 15.4 | -0.12 | -0.5 | 1.20 | 2.00 | 0.45 | 4.00 | 5.00 | 5.00 | 8.00 | | | | | | |
| | +25°C | 16.8 | 15.4 | -0.12 | -0.5 | 1.10 | 1.90 | 0.45 | 4.00 | 5.00 | 5.00 | 8.00 | | | | | | |
| | +75°C | 16.0 | 14.6 | -0.12 | -0.5 | 0.95 | 1.80 | 0.50 | 4.00 | 5.00 | 5.00 | | | | | | | |
| | | TEST CURRENT / VOLTAGE APPLIED TO PINS LISTED BELOW: | | | | | | | | | | | | | | | | |
| Characteristic | Symbol | Pin Under Test | I_{OL} | | I_{OH} | | V_{IL} | V_{IH} | V_F | V_R | V_{CC} | V_{CCL} | V_{CCH} | V_{max} | CP_a | CP_b | Gnd | |
| | | | | | | | | | | | | | | | | | | |
| Output Voltage | VOL | 5 | 5† | - | - | 2 | - | - | - | - | 14 | - | - | - | 1 | 7,13† | | |
| | | 6 | 6† | - | - | 3 | - | - | - | - | - | - | - | - | - | 4,13† | | |
| | | 8 | 8† | - | - | 11 | - | - | - | - | - | - | - | - | - | - | 7,10† | |
| | | 9 | 9† | - | - | 12 | - | - | - | - | - | - | - | - | - | - | 7,13† | |
| | | 5 | - | 5† | 5 | 3 | 2 | - | - | - | - | - | - | - | 1 | 4,7 | | |
| | | 5 | - | - | 5 | 2,13 | 4 | - | - | - | - | - | - | - | - | - | 7 | |
| | VOH | 6 | - | - | 6† | 2 | 3 | - | - | - | - | - | - | - | - | - | 7,13† | |
| | | 8 | - | - | 8† | 3,4 | 13 | - | - | - | - | - | - | - | - | - | 7 | |
| | | 9 | - | - | 9† | 12 | 11 | - | - | - | - | - | - | - | - | - | 7,13† | |
| | | 6 | - | - | - | 8 | 10,11 | 13 | - | - | - | - | - | - | - | - | 7 | |
| | | 8 | - | - | - | 8 | 11 | 12 | - | - | - | - | - | - | - | - | 7 | |
| | | 9 | - | - | - | 9† | 12 | 10 | - | - | - | - | - | - | - | - | 7,10† | |
| No. Current | ISC | 5 | - | - | - | - | - | - | - | - | - | 14 | - | - | - | 5,7 | | |
| | | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | 6,7 | | |
| | | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 7,8 | |
| | | 9 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 7,9 | |
| | | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 5,7 | |
| | | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 6,7 | |
| No. Current | IR | 2 | - | - | - | - | - | - | 2 | - | - | 14 | - | - | - | 1,7 | | |
| | | 3 | - | - | - | - | - | - | 3 | - | - | - | - | - | - | 1,7 | | |
| | | 4 | - | - | - | - | - | - | 4 | - | - | - | 1 | - | - | 2,6,7 | | |
| | | 10 | - | - | - | - | - | - | 10 | - | - | - | - | - | - | 7,8,12 | | |
| | | 11 | - | - | - | - | - | - | 11 | - | - | - | - | - | - | 1,7 | | |
| | | 12 | - | - | - | - | - | - | 12 | - | - | - | - | - | - | - | 1,7 | |
| No. Type | 2IR | 13 | - | - | - | - | - | - | 13 | - | - | - | 1 | - | - | 3,5,7,9,11 | | |
| | | 1 | - | - | - | - | - | - | 1,14 | - | - | - | - | - | - | 2,3,5,6,7,8,9,11,12 | | |
| | | 1 | - | - | - | - | - | - | 1 | - | - | 14 | - | - | - | 2,3,5,6,7,8,9,11,12 | | |
| | | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 7 | |
| | | 2 | - | - | - | - | - | - | 2 | - | - | 14 | - | - | - | - | 7 | |
| | | 3 | - | - | - | - | - | - | 3 | - | - | - | - | - | - | - | 7 | |
| Forward Current | 2I _{FCP} | 11 | - | - | - | - | - | - | 11 | - | - | - | - | - | - | - | 7 | |
| | | 12 | - | - | - | - | - | - | 12 | - | - | - | - | - | - | - | 7 | |
| | | 1 | - | - | - | - | 4,10 | 1 | - | - | - | - | - | - | - | - | 2,3,7,13 | |
| | | 1 | - | - | - | - | 13 | 1 | - | - | - | - | - | - | - | - | 1,11,12,13 | |
| | | 4 | - | - | - | - | - | 4 | - | - | - | - | - | - | - | - | 2,3,4,7 | |
| | | 10 | - | - | - | - | - | 10 | - | - | - | - | - | - | - | - | 2,3,4,7 | |
| Sustain Current | I _{PDH} | 14 | - | - | - | - | - | - | - | - | 14 | - | - | - | - | 7 | | |
| | | 14 | - | - | - | - | - | - | - | - | - | 14 | - | - | - | 1,2,3,4,7,10,11,12 | | |
| | | 14 | - | - | - | - | - | - | - | - | - | 14 | - | - | - | 7 | | |
| | | 14 | - | - | - | - | - | - | - | - | - | 14 | - | - | - | 1,2,3,4,7,10,11,12 | | |
| | | 14 | - | - | - | - | - | - | - | - | - | 14 | - | - | - | 7 | | |
| | | 14 | - | - | - | - | - | - | - | - | - | 14 | - | - | - | 1,2,3,4,7,10,11,12 | | |
| Rising Times | t _{pd-} | 1 | Pulse In | | Pulse Out | | | | | | | | | | | | | |
| | | | 1 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | 7 | |
| | | | 1 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | 7 |
| | | 2 | 1 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | 7 |
| | | | 1 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | 7 |
| | | | 1 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | 7 |
| | t _{pd+} | 1 | Pulse In | | Pulse Out | | | | | | | | | | | | | |
| | | | 1 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | 7 |
| | | | 1 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | 7 |
| | | 2 | 1 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | 7 |
| | | | 1 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | 7 |
| | | | 1 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | 7 |

Pins not listed are left open.
 1 - V_{CC} - Clock Pulse a
 2 - V_{CC} - Clock Pulse b. See Clock Pulse Waveforms.
 † Applied after Clock Pulse.
 ‡ Momentary Ground.

PRODUCT DOCUMENTATION

The three documents listed in the following table are required for a complete description of the DSP56301 and are necessary to design properly with the part. Documentation is available from one of the following locations (see back cover for detailed information):

- A local Motorola distributor
- A Motorola semiconductor sales office
- A Motorola Literature Distribution Center
- The World Wide Web (WWW)

See the **Additional Support** section of the *DSP56300 Family Manual* for detailed information on the multiple support options available to you.

Table 1 DSP56301 Documentation

| Name | Description | Order Number |
|-------------------------|---|---------------|
| DSP56300 Family Manual | Detailed description of the DSP56300 family processor core and instruction set | DSP56300FM/AD |
| DSP56301 User's Manual | Detailed functional description of the DSP56301 memory configuration, operation, and register programming | DSP56301UM/AD |
| DSP56301 Technical Data | DSP56301 features list and physical, electrical, timing, and package specifications | DSP56301/D |

