

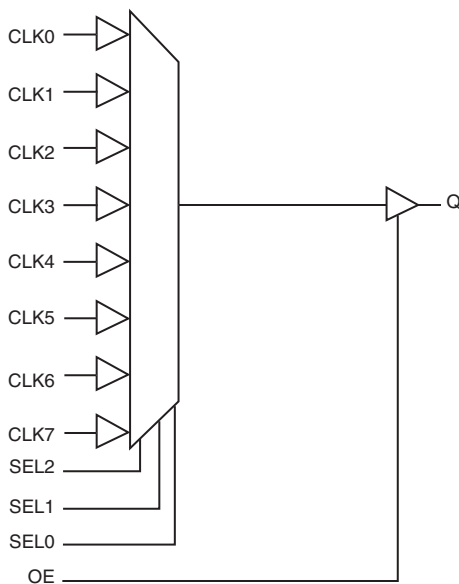
## GENERAL DESCRIPTION

The 83058I is a low skew, 8:1, Single-ended Multiplexer and a member of the family of High Performance Clock Solutions from IDT. The 83058I has eight selectable single-ended clock inputs and one single-ended clock output. The output has a  $V_{DDO}$  pin which may be set at 3.3V, 2.5V, or 1.8V, making the device ideal for use in voltage translation applications. An output enable pin places the output in a high impedance state which may be useful for testing or debug purposes. The device operates up to 250MHz and is packaged in a 16 TSSOP package.

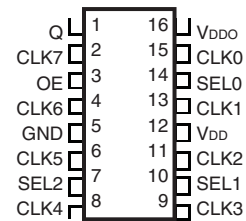
## FEATURES

- 8:1 single-ended multiplexer
- Q nominal output impedance:  $7\Omega$  ( $V_{DDO} = 3.3V$ )
- Maximum output frequency: 250MHz
- Propagation delay: 3ns (maximum),  $V_{DD} = V_{DDO} = 3.3V$
- Input skew: 225ps (maximum),  $V_{DD} = V_{DDO} = 3.3V$
- Part-to-part skew: 475ps (maximum),  $V_{DD} = V_{DDO} = 3.3V$
- Additive phase jitter, RMS: 0.19ps (typical), 3.3V/3.3V
- Operating supply modes:  
 $V_{DD}/V_{DDO}$   
 3.3V/3.3V  
 3.3V/2.5V  
 3.3V/1.8V  
 2.5V/2.5V  
 2.5V/1.8V
- -40°C to 85°C ambient operating temperature
- Available in lead-free (RoHS 6) package

## BLOCK DIAGRAM



## PIN ASSIGNMENT



**83058I**  
**16-Lead TSSOP**  
 4.4mm x 5.0mm x 0.92mm package body  
**G Package**  
 Top View

**TABLE 1. PIN DESCRIPTIONS**

| Number                    | Name   | Type   |          | Description   |
|---------------------------|--|--------|----------|---|
| 1                         | Q  | Output |          | Single-ended clock output. LVCMOS/LVTTL interface levels.   |
| 2, 4, 6, 8, 9, 11, 13, 15 | CLK7, CLK6, CLK5, CLK4, CLK3, CLK2, CLK1, CLK0 | Input  | Pulldown | Single-ended clock inputs. LVCMOS/LVTTL interface levels.   |
| 3                         | OE   | Input  | Pullup   | Output enable. When LOW, outputs are in HIGH impedance state. When HIGH, outputs are active. LVCMOS / LVTTL interface levels. |
| 5                         | GND  | Power  |          | Power supply ground.  |
| 7, 10, 14                 | SEL2, SEL1, SEL0                               | Input  | Pulldown | Clock select input. See Control Input Function Table. LVCMOS / LVTTL interface levels.  |
| 12                        | V <sub>DD</sub>                                | Power  |          | Core and input supply pin.  |
| 16                        | V <sub>DDO</sub>                               | Power  |          | Output supply pin.  |

NOTE: *Pullup* and *Pulldown* refer to internal input resistors. See Table 2, Pin Characteristics, for typical values.

**TABLE 2. PIN CHARACTERISTICS**

| Symbol                | Parameter                                  | Test Conditions           | Minimum | Typical | Maximum | Units |
|-----------------------|--|---------------------------|---------|---------|---------|-------|
| C <sub>IN</sub>       | Input Capacitance                          |                           |         | 4       |         | pF    |
| R <sub>PULLUP</sub>   | Input Pullup Resistor                      |                           |         | 51      |         | kΩ    |
| R <sub>PULLDOWN</sub> | Input Pulldown Resistor                    |                           |         | 51      |         | kΩ    |
| C <sub>PD</sub>       | Power Dissipation Capacitance (per output) | V <sub>DDO</sub> = 3.465V |         | 18      |         | pF    |
|                       |  | V <sub>DDO</sub> = 2.625V |         | 20      |         | pF    |
|                       |  | V <sub>DDO</sub> = 1.89V  |         | 30      |         | pF    |
| R <sub>OUT</sub>      | Output Impedance                           | V <sub>DDO</sub> = 3.465V |         | 7       |         | Ω     |
|                       |  | V <sub>DDO</sub> = 2.625V |         | 7       |         | Ω     |
|                       |  | V <sub>DDO</sub> = 1.89V  |         | 10      |         | Ω     |

**TABLE 3. CONTROL INPUT FUNCTION TABLE**

| Control Inputs |      |      | Input Selected to Q |
|----------------|------|------|---------------------|
| SEL2           | SEL1 | SEL0 |                     |
| 0              | 0    | 0    | CLK0                |
| 0              | 0    | 1    | CLK1                |
| 0              | 1    | 0    | CLK2                |
| 0              | 1    | 1    | CLK3                |
| 1              | 0    | 0    | CLK4                |
| 1              | 0    | 1    | CLK5                |
| 1              | 1    | 0    | CLK6                |
| 1              | 1    | 1    | CLK7                |

**ABSOLUTE MAXIMUM RATINGS**

|  |                           |
|--|---------------------------|
| Supply Voltage, $V_{DD}$                 | 4.6V                      |
| Inputs, $V_I$                            | -0.5V to $V_{DD} + 0.5V$  |
| Outputs, $V_O$                           | -0.5V to $V_{DDO} + 0.5V$ |
| Package Thermal Impedance, $\theta_{JA}$ | 89°C/W (0 lfm)            |
| Storage Temperature, $T_{STG}$           | -65°C to 150°C            |

NOTE: Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These ratings are stress specifications only. Functional operation of product at these conditions or any conditions beyond those listed in the *DC Characteristics* or *AC Characteristics* is not implied. Exposure to absolute maximum rating conditions for extended periods may affect product reliability.

**TABLE 4A. POWER SUPPLY DC CHARACTERISTICS,  $V_{DD} = V_{DDO} = 3.3V \pm 5\%$ ,  $T_A = -40^\circ\text{C}$  TO  $85^\circ\text{C}$** 

| Symbol    | Parameter             | Test Conditions | Minimum | Typical | Maximum | Units |
|-----------|-----------------------|-----------------|---------|---------|---------|-------|
| $V_{DD}$  | Power Supply Voltage  |                 | 3.135   | 3.3     | 3.465   | V     |
| $V_{DDO}$ | Output Supply Voltage |                 | 3.135   | 3.3     | 3.465   | V     |
| $I_{DD}$  | Power Supply Current  |                 |         |         | 40      | mA    |
| $I_{DDO}$ | Output Supply Current |                 |         |         | 5       | mA    |

**TABLE 4B. POWER SUPPLY DC CHARACTERISTICS,  $V_{DD} = 3.3V \pm 5\%$ ,  $V_{DDO} = 2.5V \pm 5\%$ ,  $T_A = -40^\circ\text{C}$  TO  $85^\circ\text{C}$** 

| Symbol    | Parameter             | Test Conditions | Minimum | Typical | Maximum | Units |
|-----------|-----------------------|-----------------|---------|---------|---------|-------|
| $V_{DD}$  | Power Supply Voltage  |                 | 3.135   | 3.3     | 3.465   | V     |
| $V_{DDO}$ | Output Supply Voltage |                 | 2.375   | 2.5     | 2.625   | V     |
| $I_{DD}$  | Power Supply Current  |                 |         |         | 40      | mA    |
| $I_{DDO}$ | Output Supply Current |                 |         |         | 5       | mA    |

**TABLE 4C. POWER SUPPLY DC CHARACTERISTICS,  $V_{DD} = 3.3V \pm 5\%$ ,  $V_{DDO} = 1.8V \pm 0.2V$ ,  $T_A = -40^\circ\text{C}$  TO  $85^\circ\text{C}$** 

| Symbol    | Parameter             | Test Conditions | Minimum | Typical | Maximum | Units |
|-----------|-----------------------|-----------------|---------|---------|---------|-------|
| $V_{DD}$  | Power Supply Voltage  |                 | 3.135   | 3.3     | 3.465   | V     |
| $V_{DDO}$ | Output Supply Voltage |                 | 1.71    | 1.8     | 1.89    | V     |
| $I_{DD}$  | Power Supply Current  |                 |         |         | 40      | mA    |
| $I_{DDO}$ | Output Supply Current |                 |         |         | 5       | mA    |

**TABLE 4D. POWER SUPPLY DC CHARACTERISTICS,  $V_{DD} = V_{DDO} = 2.5V \pm 5\%$ ,  $T_A = -40^\circ\text{C}$  TO  $85^\circ\text{C}$** 

| Symbol    | Parameter             | Test Conditions | Minimum | Typical | Maximum | Units |
|-----------|-----------------------|-----------------|---------|---------|---------|-------|
| $V_{DD}$  | Power Supply Voltage  |                 | 2.375   | 2.5     | 2.625   | V     |
| $V_{DDO}$ | Output Supply Voltage |                 | 2.375   | 2.5     | 2.625   | V     |
| $I_{DD}$  | Power Supply Current  |                 |         |         | 35      | mA    |
| $I_{DDO}$ | Output Supply Current |                 |         |         | 5       | mA    |

**TABLE 4E. POWER SUPPLY DC CHARACTERISTICS,  $V_{DD} = 2.5V \pm 5\%$ ,  $V_{DDO} = 1.8V \pm 0.2V$ ,  $T_A = -40^\circ\text{C}$  TO  $85^\circ\text{C}$** 

| Symbol    | Parameter             | Test Conditions | Minimum | Typical | Maximum | Units |
|-----------|-----------------------|-----------------|---------|---------|---------|-------|
| $V_{DD}$  | Power Supply Voltage  |                 | 2.375   | 2.5     | 2.625   | V     |
| $V_{DDO}$ | Output Supply Voltage |                 | 1.71    | 1.8     | 1.89    | V     |
| $I_{DD}$  | Power Supply Current  |                 |         |         | 35      | mA    |
| $I_{DDO}$ | Output Supply Current |                 |         |         | 5       | mA    |

**TABLE 4F. LVCMOS/LVTTL DC CHARACTERISTICS,  $T_A = -40^{\circ}\text{C}$  TO  $85^{\circ}\text{C}$** 

| Symbol   | Parameter           | Test Conditions                          | Minimum   | Typical | Maximum        | Units         |
|----------|---------------------|--|---|---------|----------------|---------------|
| $V_{IH}$ | Input High Voltage  | $V_{DD} = 3.3\text{V} \pm 5\%$           | 2   |         | $V_{DD} + 0.3$ | V             |
|          |                     | $V_{DD} = 2.5\text{V} \pm 5\%$           | 1.7   |         | $V_{DD} + 0.3$ | V             |
| $V_{IL}$ | Input Low Voltage   | $V_{DD} = 3.3\text{V} \pm 5\%$           | -0.3  |         | 0.8            | V             |
|          |                     | $V_{DD} = 2.5\text{V} \pm 5\%$           | -0.3  |         | 0.7            | V             |
| $I_{IH}$ | Input High Current  | CLK0:CLK5,<br>SEL0:SEL2                  | $V_{DD} = 3.3\text{V}$ or $2.5\text{V} \pm 5\%$ |         | 150            | $\mu\text{A}$ |
|          |                     | OE                                       | $V_{DD} = 3.3\text{V}$ or $2.5\text{V} \pm 5\%$ |         | 5              | $\mu\text{A}$ |
| $I_{IL}$ | Input Low Current   | CLK0:CLK5,<br>SEL0:SEL2                  | $V_{DD} = 3.3\text{V}$ or $2.5\text{V} \pm 5\%$ | -5      |                | $\mu\text{A}$ |
|          |                     | OE                                       | $V_{DD} = 3.3\text{V}$ or $2.5\text{V} \pm 5\%$ | -150    |                | $\mu\text{A}$ |
| $V_{OH}$ | Output High Voltage | $V_{DDO} = 3.3\text{V} \pm 5\%$ ; NOTE 1 | 2.6   |         |                | V             |
|          |                     | $V_{DDO} = 2.5\text{V} \pm 5\%$ ; NOTE 1 | 1.8   |         |                | V             |
|          |                     | $V_{DDO} = 1.8\text{V} \pm 5\%$ ; NOTE 1 | $V_{DD} - 0.3$                                  |         |                | V             |
| $V_{OL}$ | Output Low Voltage  | $V_{DDO} = 3.3\text{V} \pm 5\%$ ; NOTE 1 |   |         | 0.5            | V             |
|          |                     | $V_{DDO} = 2.5\text{V} \pm 5\%$ ; NOTE 1 |   |         | 0.45           | V             |
|          |                     | $V_{DDO} = 1.8\text{V} \pm 5\%$ ; NOTE 1 |   |         | 0.35           | V             |

NOTE 1: Outputs terminated with  $50\Omega$  to  $V_{DDO}/2$ . See Parameter Measurement section, "Load Test Circuit" diagrams.

**TABLE 5A. AC CHARACTERISTICS,  $V_{DD} = V_{DDO} = 3.3\text{V} \pm 5\%$ ,  $T_A = -40^{\circ}\text{C}$  TO  $85^{\circ}\text{C}$** 

| Symbol       | Parameter   | Test Conditions                | Minimum | Typical | Maximum | Units |
|--------------|---|--------------------------------|---------|---------|---------|-------|
| $f_{MAX}$    | Output Frequency  |                                |         |         | 250     | MHz   |
| $tp_{LH}$    | Propagation Delay, Low to High; NOTE 1  |                                | 1.8     | 2.4     | 3.0     | ns    |
| $tp_{HL}$    | Propagation Delay, High to Low; NOTE 1  |                                | 2.5     | 2.7     | 2.9     | ns    |
| $tsk(i)$     | Input Skew; NOTE 2  |                                |         | 55      | 225     | ps    |
| $t_{jit}$    | Buffer Additive Phase Jitter, RMS;<br>refer to Additive Phase Jitter Section;<br>NOTE 3 | 155.52MHz,<br>(12kHz to 20MHz) |         | 0.19    |         | ps    |
| $tsk(pp)$    | Part-to-Part Skew; NOTE 2, 4  |                                |         |         | 475     | ps    |
| $t_r / t_f$  | Output Rise/Fall Time   | 20% to 80%                     | 50      |         | 500     | ps    |
| odc          | Output Duty Cycle   |                                | 45      |         | 55      | %     |
| $MUX_{ISOL}$ | MUX Isolation   | @ 100MHz                       |         | 45      |         | dB    |

NOTE 1: Measured from  $V_{DD}/2$  of the input to  $V_{DDO}/2$  of the output.

NOTE 2: This parameter is defined in accordance with JEDEC Standard 65.

NOTE 3: Driving only one input clock.

NOTE 4: Defined as skew between outputs on different devices operating at the same supply voltages and with equal load conditions. Using the same type of input on each device, the output is measured at  $V_{DDO}/2$ .

**TABLE 5B. AC CHARACTERISTICS,  $V_{DD} = 3.3V \pm 5\%$ ,  $V_{DDO} = 2.5V \pm 5\%$ ,  $T_A = -40^\circ C$  TO  $85^\circ C$** 

| Symbol       | Parameter   | Test Conditions                | Minimum | Typical | Maximum | Units |
|--------------|---|--------------------------------|---------|---------|---------|-------|
| $f_{MAX}$    | Output Frequency  |                                |         |         | 250     | MHz   |
| $tp_{LH}$    | Propagation Delay, Low to High; NOTE 1  |                                | 2.0     | 2.5     | 3.1     | ns    |
| $tp_{HL}$    | Propagation Delay, High to Low; NOTE 1  |                                | 2.6     | 2.8     | 3.0     | ns    |
| $t_{sk(i)}$  | Input Skew; NOTE 2  |                                |         | 45      | 150     | ps    |
| $t_{jit}$    | Buffer Additive Phase Jitter, RMS; refer to Additive Phase Jitter Section; NOTE 3 | 155.52MHz,<br>(12kHz to 20MHz) |         | 0.14    |         | ps    |
| $t_{sk(pp)}$ | Part-to-Part Skew; NOTE 2, 4  |                                |         |         | 400     | ps    |
| $t_R / t_F$  | Output Rise/Fall Time   | 20% to 80%                     | 50      |         | 500     | ps    |
| odc          | Output Duty Cycle   |                                | 45      |         | 55      | %     |
| $MUX_{ISOL}$ | MUX Isolation   | @ 100MHz                       |         | 45      |         | dB    |

NOTE 1: Measured from  $V_{DD}/2$  of the input to  $V_{DDO}/2$  of the output.

NOTE 2: This parameter is defined in accordance with JEDEC Standard 65.

NOTE 3: Driving only one input clock.

NOTE 4: Defined as skew between outputs on different devices operating at the same supply voltages and with equal load conditions. Using the same type of input on each device, the output is measured at  $V_{DDO}/2$ .

**TABLE 5C. AC CHARACTERISTICS,  $V_{DD} = 3.3V \pm 5\%$ ,  $V_{DDO} = 1.8V \pm 5\%$ ,  $T_A = -40^\circ C$  TO  $85^\circ C$** 

| Symbol       | Parameter   | Test Conditions                | Minimum | Typical | Maximum | Units |
|--------------|---|--------------------------------|---------|---------|---------|-------|
| $f_{MAX}$    | Output Frequency  |                                |         |         | 250     | MHz   |
| $tp_{LH}$    | Propagation Delay, Low to High; NOTE 1  |                                | 2.3     | 2.9     | 3.8     | ns    |
| $tp_{HL}$    | Propagation Delay, High to Low; NOTE 1  |                                | 2.8     | 3.3     | 3.8     | ns    |
| $t_{sk(i)}$  | Input Skew; NOTE 2  |                                |         | 50      | 150     | ps    |
| $t_{jit}$    | Buffer Additive Phase Jitter, RMS; refer to Additive Phase Jitter Section; NOTE 3 | 155.52MHz,<br>(12kHz to 20MHz) |         | 0.16    |         | ps    |
| $t_{sk(pp)}$ | Part-to-Part Skew; NOTE 2, 4  |                                |         |         | 475     | ps    |
| $t_R / t_F$  | Output Rise/Fall Time   | 20% to 80%                     | 100     |         | 700     | ps    |
| odc          | Output Duty Cycle   |                                | 45      |         | 55      | %     |
| $MUX_{ISOL}$ | MUX Isolation   | @ 100MHz                       |         | 45      |         | dB    |

NOTE 1: Measured from  $V_{DD}/2$  of the input to  $V_{DDO}/2$  of the output.

NOTE 2: This parameter is defined in accordance with JEDEC Standard 65.

NOTE 3: Driving only one input clock.

NOTE 4: Defined as skew between outputs on different devices operating at the same supply voltages and with equal load conditions. Using the same type of input on each device, the output is measured at  $V_{DDO}/2$ .

**TABLE 5D. AC CHARACTERISTICS,  $V_{DD} = V_{DDO} = 2.5V \pm 5\%$ ,  $T_A = -40^{\circ}C$  TO  $85^{\circ}C$** 

| Symbol       | Parameter   | Test Conditions                | Minimum | Typical | Maximum | Units |
|--------------|---|--------------------------------|---------|---------|---------|-------|
| $f_{MAX}$    | Output Frequency  |                                |         |         | 250     | MHz   |
| $tp_{LH}$    | Propagation Delay, Low to High; NOTE 1  |                                | 1.9     | 2.7     | 3.5     | ns    |
| $tp_{HL}$    | Propagation Delay, High to Low; NOTE 1  |                                | 2.5     | 2.9     | 3.4     | ns    |
| $tsk(i)$     | Input Skew; NOTE 2  |                                |         | 60      | 175     | ps    |
| $tjit$       | Buffer Additive Phase Jitter, RMS; refer to Additive Phase Jitter Section; NOTE 3 | 155.52MHz,<br>(12kHz to 20MHz) |         | 0.21    |         | ps    |
| $tsk(pp)$    | Part-to-Part Skew; NOTE 2, 4  |                                |         |         | 300     | ps    |
| $t_R / t_F$  | Output Rise/Fall Time   | 20% to 80%                     | 100     |         | 500     | ps    |
| odc          | Output Duty Cycle   |                                | 40      |         | 60      | %     |
| $MUX_{ISOL}$ | MUX Isolation   | @ 100MHz                       |         | 45      |         | dB    |

NOTE 1: Measured from  $V_{DD}/2$  of the input to  $V_{DDO}/2$  of the output.

NOTE 2: This parameter is defined in accordance with JEDEC Standard 65.

NOTE 3: Driving only one input clock.

NOTE 4: Defined as skew between outputs on different devices operating at the same supply voltages and with equal load conditions. Using the same type of input on each device, the output is measured at  $V_{DDO}/2$ .

**TABLE 5E. AC CHARACTERISTICS,  $V_{DD} = 2.5V \pm 5\%$ ,  $V_{DDO} = 1.8V \pm -5\%$ ,  $T_A = -40^{\circ}C$  TO  $85^{\circ}C$** 

| Symbol       | Parameter   | Test Conditions                | Minimum | Typical | Maximum | Units |
|--------------|---|--------------------------------|---------|---------|---------|-------|
| $f_{MAX}$    | Output Frequency  |                                |         |         | 250     | MHz   |
| $tp_{LH}$    | Propagation Delay, Low to High; NOTE 1  |                                | 2.2     | 2.9     | 4.0     | ns    |
| $tp_{HL}$    | Propagation Delay, High to Low; NOTE 1  |                                | 2.7     | 3.3     | 4.0     | ns    |
| $tsk(i)$     | Input Skew; NOTE 2  |                                |         | 50      | 150     | ps    |
| $tjit$       | Buffer Additive Phase Jitter, RMS; refer to Additive Phase Jitter Section; NOTE 3 | 155.52MHz,<br>(12kHz to 20MHz) |         | 0.17    |         | ps    |
| $tsk(pp)$    | Part-to-Part Skew; NOTE 2, 4  |                                |         |         | 325     | ps    |
| $t_R / t_F$  | Output Rise/Fall Time   | 20% to 80%                     | 100     |         | 700     | ps    |
| odc          | Output Duty Cycle   |                                | 40      |         | 60      | %     |
| $MUX_{ISOL}$ | MUX Isolation   | @ 100MHz                       |         | 45      |         | dB    |

NOTE 1: Measured from  $V_{DD}/2$  of the input to  $V_{DDO}/2$  of the output.

NOTE 2: This parameter is defined in accordance with JEDEC Standard 65.

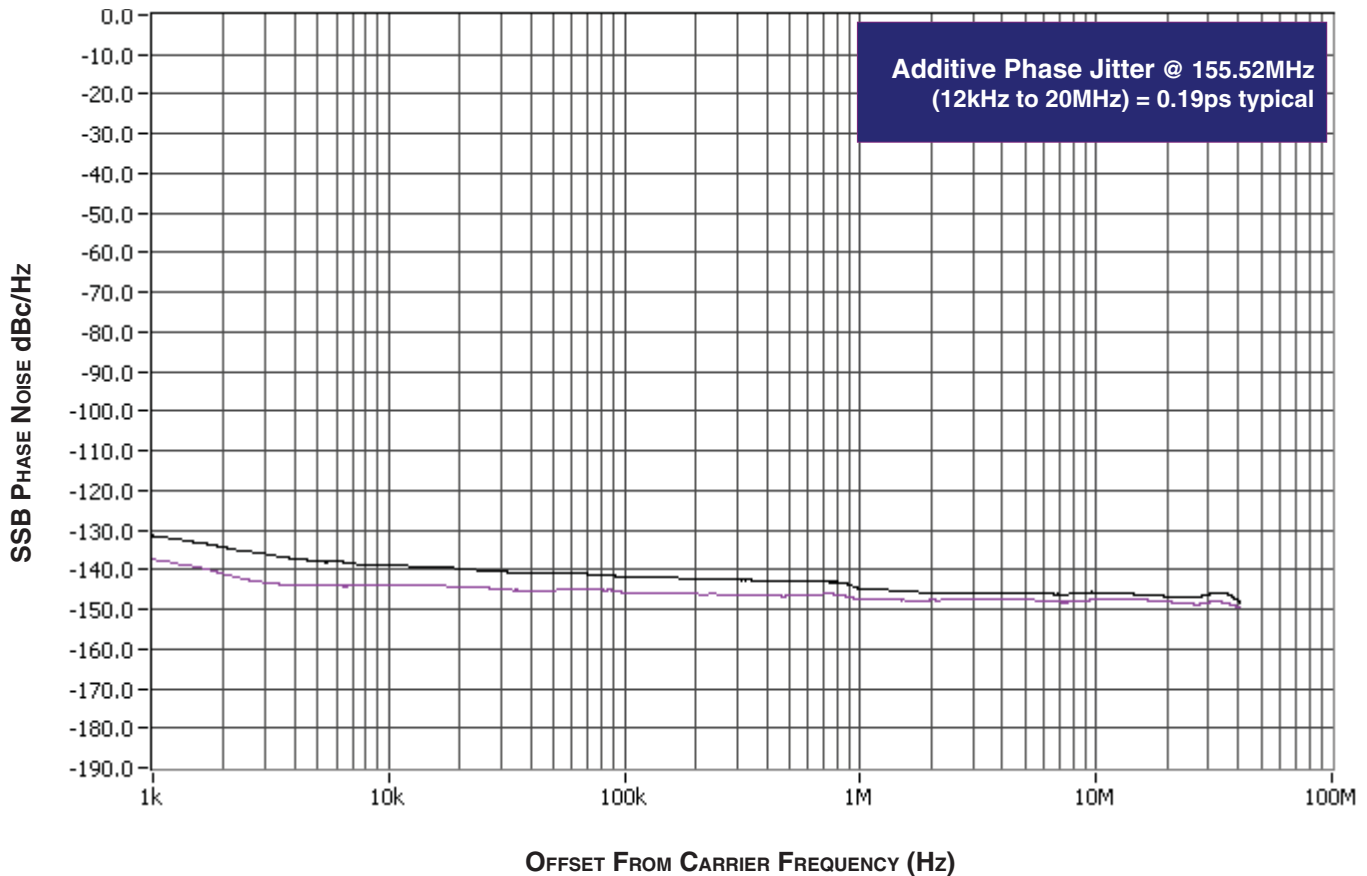
NOTE 3: Driving only one input clock.

NOTE 4: Defined as skew between outputs on different devices operating at the same supply voltages and with equal load conditions. Using the same type of input on each device, the output is measured at  $V_{DDO}/2$ .

## ADDITIVE PHASE JITTER

The spectral purity in a band at a specific offset from the fundamental compared to the power of the fundamental is called the **dBc Phase Noise**. This value is normally expressed using a Phase noise plot and is most often the specified plot in many applications. Phase noise is defined as the ratio of the noise power present in a 1Hz band at a specified offset from the fundamental frequency to the power value of the fundamental. This ratio is expressed in decibels

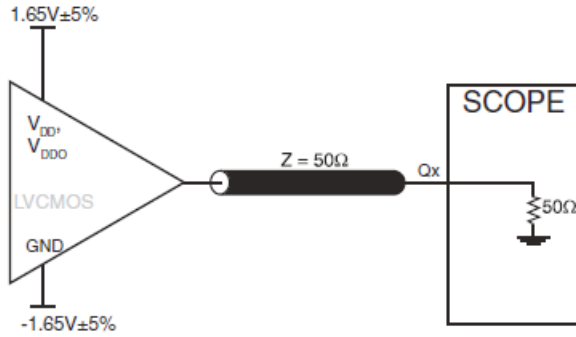
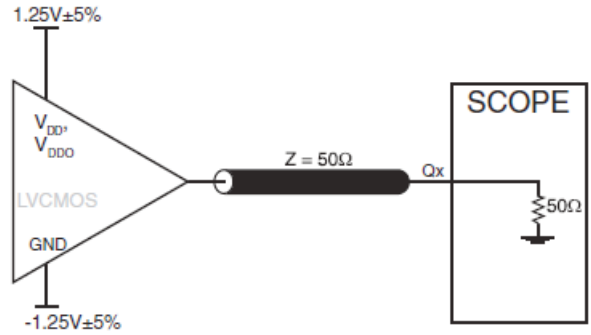
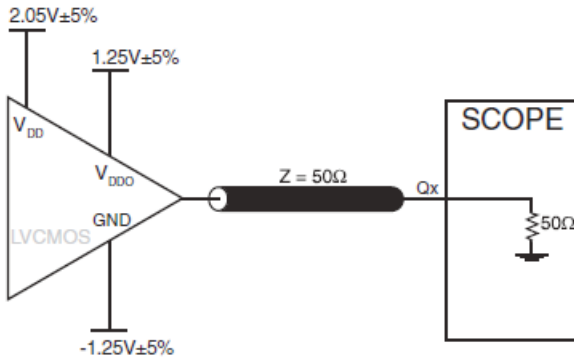
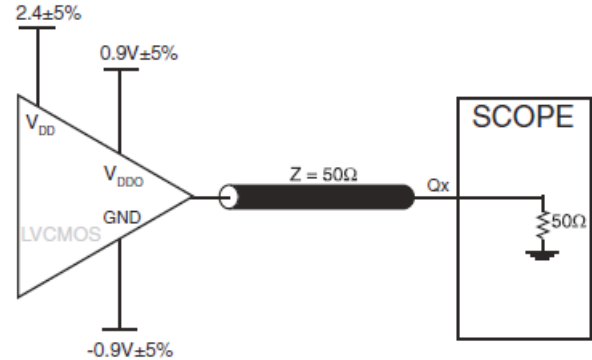
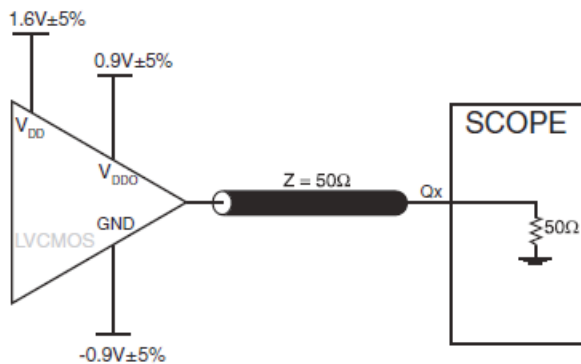
(dBm) or a ratio of the power in the 1Hz band to the power in the fundamental. When the required offset is specified, the phase noise is called a **dBc** value, which simply means dBm at a specified offset from the fundamental. By investigating jitter in the frequency domain, we get a better understanding of its effects on the desired application over the entire time record of the signal. It is mathematically possible to calculate an expected bit error rate given a phase noise plot.



As with most timing specifications, phase noise measurements has issues relating to the limitations of the equipment. Often the noise floor of the equipment is higher than the noise floor of the device.

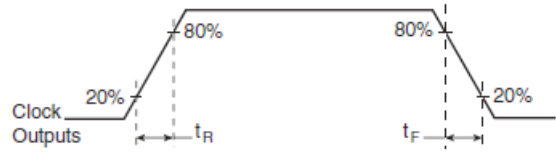
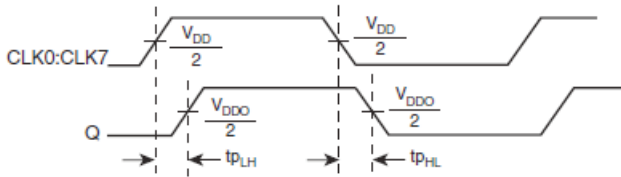
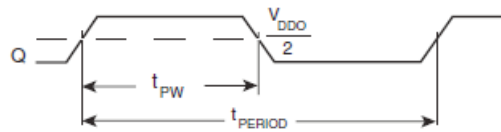
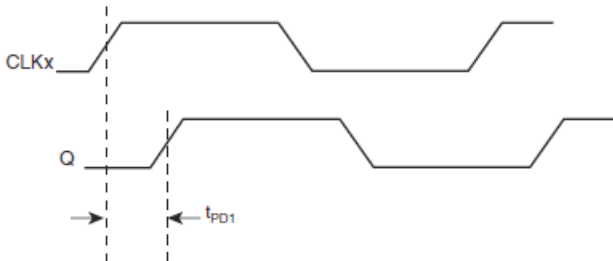
This is illustrated above. The device meets the noise floor of what is shown, but can actually be lower. The phase noise is dependent on the input source and measurement equipment.

## PARAMETER MEASUREMENT INFORMATION


**3.3V CORE/3.3V OUTPUT LOAD AC TEST CIRCUIT**

**2.5V CORE/2.5V OUTPUT LOAD AC TEST CIRCUIT**

**3.3V CORE/2.5V OUTPUT LOAD AC TEST CIRCUIT**

**3.3V CORE/1.8V OUTPUT LOAD AC TEST CIRCUIT**

**2.5 CORE/1.8V OUTPUT LOAD AC TEST CIRCUIT**

**PART-TO-PART SKEW**




**PROPAGATION DELAY**
**OUTPUT RISE/FALL TIME**


$$\text{odc} = \frac{t_{PW}}{t_{PERIOD}} \times 100\%$$

$$\text{tsk}(i) = |t_{PD2} - t_{PD1}|$$

**INPUT SKEW**
**OUTPUT DUTY CYCLE/PULSE WIDTH/PERIOD**

## APPLICATION INFORMATION

### RECOMMENDATIONS FOR UNUSED INPUT PINS

#### INPUTS:

##### CLK INPUTS

For applications not requiring the use of a clock input, it can be left floating. Though not required, but for additional protection, a 1k $\Omega$  resistor can be tied from the CLK input to ground.

##### LVC MOS CONTROL PINS

All control pins have internal pull-ups or pull-downs; additional resistance is not required but can be added for additional protection. A 1k $\Omega$  resistor can be used.

## RELIABILITY INFORMATION

TABLE 6.  $\theta_{JA}$  VS. AIR FLOW TABLE FOR 16 LEAD TSSOP

| $\theta_{JA}$ by Velocity (Linear Feet per Minute) |           |           |           |
|--|-----------|-----------|-----------|
|  | 0         | 200       | 500       |
| Single-Layer PCB, JEDEC Standard Test Boards       | 137.1°C/W | 118.2°C/W | 106.8°C/W |
| Multi-Layer PCB, JEDEC Standard Test Boards        | 89.0°C/W  | 81.8°C/W  | 78.1°C/W  |

**NOTE:** Most modern PCB designs use multi-layered boards. The data in the second row pertains to most designs.

### TRANSISTOR COUNT

The transistor count for 83058I is: 874

## PACKAGE OUTLINE AND PACKAGE DIMENSIONS

### PACKAGE OUTLINE - G SUFFIX FOR 16 LEAD TSSOP

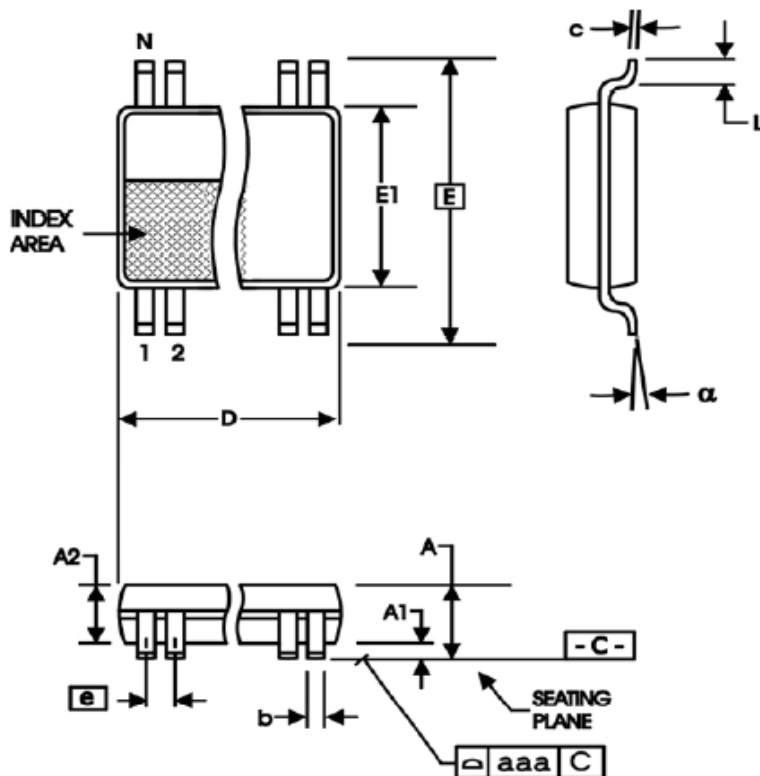


TABLE 7. PACKAGE DIMENSIONS

| SYMBOL   | Millimeters |         |
|----------|-------------|---------|
|          | Minimum     | Maximum |
| N        | 16          |         |
| A        | --          | 1.20    |
| A1       | 0.05        | 0.15    |
| A2       | 0.80        | 1.05    |
| b        | 0.19        | 0.30    |
| c        | 0.09        | 0.20    |
| D        | 4.90        | 5.10    |
| E        | 6.40 BASIC  |         |
| E1       | 4.30        | 4.50    |
| e        | 0.65 BASIC  |         |
| L        | 0.45        | 0.75    |
| $\alpha$ | 0°          | 8°      |
| aaa      | --          | 0.10    |

Reference Document: JEDEC Publication 95, MO-153

**TABLE 8. ORDERING INFORMATION**

| <b>Part/Order Number</b> | <b>Marking</b> | <b>Package</b>            | <b>Shipping Packaging</b> | <b>Temperature</b> |
|--------------------------|----------------|---------------------------|---------------------------|--------------------|
| 83058AGILF               | 83058AIL       | 16 Lead "Lead-Free" TSSOP | tube                      | -40°C to 85°C      |
| 83058AGILFT              | 83058AIL       | 16 Lead "Lead-Free" TSSOP | tape & reel               | -40°C to 85°C      |

| REVISION HISTORY SHEET |                 |                 |  |          |
|------------------------|-----------------|-----------------|--|----------|
| Rev                    | Table           | Page            | Description of Change  | Date     |
| B                      | T5A - T5E       | 1<br>4 - 6<br>7 | Features Section - added Additive Phase Jitter bullet.<br>AC Characteristics Tables - added tjit row and spec.<br>Added Additive Phase Jitter section.               | 01/04/07 |
| C                      | T5A - T5E<br>T8 | 4 - 6<br>12     | AC Characteristics Tables - changed minimum and typical propagation delay specs.<br>Ordering Informaiton Table - added lead-free marking.                            | 03/10/08 |
| D                      | T8              | 12              | Ordering information - removed leaded devices and removed ICS in the Part/Order Number.<br>Updated datasheet format  | 11/21/14 |
| D                      | T8              | 1<br>12         | General Description - removed HiPerClockS.<br>Ordering Information - removed 2500 from Tape and Reel. Removed LF note below the table.<br>Updated Header and Footer. | 12/15/15 |



Corporate Headquarters  
6024 Silver Creek Valley Road  
San Jose, CA 95138 USA  
[www.IDT.com](http://www.IDT.com)

Sales  
1-800-345-7015 or 408-284-8200  
Fax: 408-284-2775  
[www.IDT.com/go/sales](http://www.IDT.com/go/sales)

Tech Support  
[www.idt.com/go/support](http://www.idt.com/go/support)

DISCLAIMER Integrated Device Technology, Inc. (IDT) reserves the right to modify the products and/or specifications described herein at any time, without notice, at IDT's sole discretion. Performance specifications and operating parameters of the described products are determined in an independent state and are not guaranteed to perform the same way when installed in customer products. The information contained herein is provided without representation or warranty of any kind, whether express or implied, including, but not limited to, the suitability of IDT's products for any particular purpose, an implied warranty of merchantability, or non-infringement of the intellectual property rights of others. This document is presented only as a guide and does not convey any license under intellectual property rights of IDT or any third parties.

IDT's products are not intended for use in applications involving extreme environmental conditions or in life support systems or similar devices where the failure or malfunction of an IDT product can be reasonably expected to significantly affect the health or safety of users. Anyone using an IDT product in such a manner does so at their own risk, absent an express, written agreement by IDT.

Integrated Device Technology, IDT and the IDT logo are trademarks or registered trademarks of IDT and its subsidiaries in the United States and other countries. Other trademarks used herein are the property of IDT or their respective third party owners.

For datasheet type definitions and a glossary of common terms, visit [www.idt.com/go/glossary](http://www.idt.com/go/glossary).

Copyright ©2015 Integrated Device Technology, Inc. All rights reserved.