

## 2Gsps Dual-Stage Differential Track-and-Hold TH723

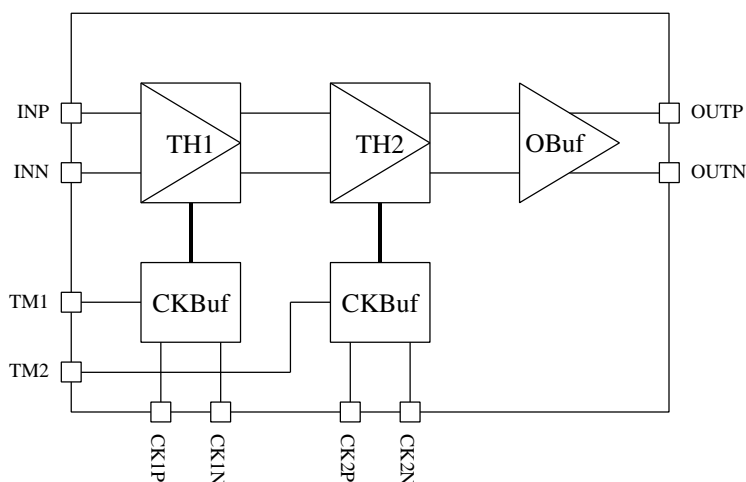
### PRODUCT DESCRIPTION

TH723 is a dual-stage differential Track-and-Hold amplifier with independent clock inputs. TH723 is able to sample 2 GHz signal with 11 bits of resolution, making it an ideal solution for high-speed high-resolution data acquisition systems like instrumentation, radio, radar, tester, etc.

### KEY FEATURES

- > 9 GHz small-signal bandwidth
- > 8 GHz large-signal bandwidth (1 V<sub>p-p</sub> differential)
- 200-2000 MHz sampling rate
- -70 dB THD (single-ended 250mV<sub>p-p</sub> 2GHz input)
- -59 dB THD (single-ended 250mV<sub>p-p</sub> 4GHz input)
- -56 dB THD (single-ended 250mV<sub>p-p</sub> 6GHz input)
- < 70 fs aperture jitter
- < 200 ps acquisition time
- < 30 ps rise time (20-80%)
- Differential analog input/output
- Excellent performance with single-ended input
- Adjustable output common mode voltage
- Independent track mode enable on both stages

### BLOCK DIAGRAM



## ELECTRICAL SPECIFICATIONS

| Parameter                  | Conditions/Note                                   | Min  | Typical | Max  | Unit             |
|----------------------------|---|------|---------|------|------------------|
| <b>ANALOG INPUT</b>        |   |      |         |      |                  |
| Full Scale Range           | Differential                                      |      | 1       |      | V <sub>p-p</sub> |
| Common Mode Voltage        |   | -100 | 0       | 100  | mV               |
| Input Resistance           | Single-ended to GND                               | 45   | 50      | 55   | Ω                |
| Input Capacitance          | Single-ended to GND                               |      | 100     |      | fF               |
| <b>CLOCK INPUT</b>         |   |      |         |      |                  |
| Amplitude                  | Differential, sinusoidal                          | 250  | 500     | 1000 | mV               |
| Common Mode Voltage        |   | -200 | 0       | 200  | mV               |
| Input Resistance           |   | 45   | 50      | 55   | Ω                |
| Input Capacitance          |   |      | 100     |      | fF               |
| <b>DIGITAL INPUT</b>       |   |      |         |      |                  |
| TM1/2 High                 | Track mode  | -0.5 | 0       | 0.3  | V                |
| TM1/2 Low                  | Hold mode   | -5   | Open    | -2   | V                |
| Max Current Draw           | Into each lead, TM1/2 high                        |      | 0.6     |      | mA               |
| <b>ANALOG OUTPUT</b>       |   |      |         |      |                  |
| Ext. Termination Voltage   | V <sub>to</sub>                                   | 1.5  |         | 3.5  | V                |
| Ext. Termination Resistor  | R <sub>to</sub> , from outputs to V <sub>to</sub> |      | 50      |      | Ω                |
| Max Swing                  | Differential                                      |      | 1       |      | V <sub>p-p</sub> |
| Common Mode Voltage        | Relative to GND                                   | 0.5  |         | 2.5  | V                |
| Average Current            | Into each output lead                             |      | TBD     |      | mA               |
| Max Current                | Into each output lead                             |      | TBD     |      | mA               |
| <b>DC CHARACTERISTIC</b>   |   |      |         |      |                  |
| Gain                       |   |      | 1       |      |                  |
| Offset Voltage             |   | -15  |         | 15   | mV               |
| <b>DYNAMIC PERFORMANCE</b> |   |      |         |      |                  |
| Bandwidth, small signal    | -3dB, signal < 0.1V <sub>pp</sub>                 | 9    |         | TBD  | GHz              |
| Bandwidth, large signal    | -3dB, signal=1V <sub>pp</sub>                     | 8    |         | TBD  | GHz              |
| Gain Variation             | 100MHz to 800MHz                                  | -0.5 |         | 0.5  | dB               |
| Integrated Noise           | Input referred                                    |      | TBD     |      | μV               |
| Noise Floor                | Input referred                                    |      | TBD     |      | nV/ns            |
| TH1 Hold Feedthrough       | 1V <sub>pp</sub> 500MHz input                     |      | -75     |      | dB               |

Notes:

-Above measurements are with differential 1000MHz out-of-phase CK1 &amp; CK2.

-V<sub>to</sub>=2V

## ELECTRICAL SPECIFICATIONS (CONTINUED)

| Parameter                       | Conditions/Note            | Min | Typical | Max | Unit |
|---------------------------------|----------------------------|-----|---------|-----|------|
| DYNAMIC PERFORMANCE (continued) |                            |     |         |     |      |
| SFDR, 60 MHz input              | Single-ended 250mVpp input |     | 81      |     | dB   |
| SFDR, 2060 MHz input            | Single-ended 250mVpp input |     | 68      |     | dB   |
| SFDR, 4060 MHz input            | Single-ended 250mVpp input |     | 56      |     | dB   |
| SFDR, 6060 MHz input            | Single-ended 250mVpp input |     | 53      |     | dB   |
| THD, 60 MHz input               | Single-ended 250mVpp input |     | -78     |     | dB   |
| THD, 2060 MHz input             | Single-ended 250mVpp input |     | -63     |     | dB   |
| THD, 4060 MHz input             | Single-ended 250mVpp input |     | -52     |     | dB   |
| THD, 6060 MHz input             | Single-ended 250mVpp input |     | -49     |     | dB   |
| SFDR, 60 MHz input              | Single-ended 500mVpp input |     | 75      |     | dB   |
| SFDR, 2060 MHz input            | Single-ended 500mVpp input |     | 57      |     | dB   |
| SFDR, 4060 MHz input            | Single-ended 500mVpp input |     | 47      |     | dB   |
| SFDR, 6060 MHz input            | Single-ended 500mVpp input |     | 43      |     | dB   |
| THD, 60 MHz input               | Single-ended 500mVpp input |     | -73     |     | dB   |
| THD, 2060 MHz input             | Single-ended 500mVpp input |     | -55     |     | dB   |
| THD, 4060 MHz input             | Single-ended 500mVpp input |     | -45     |     | dB   |
| THD, 6060 MHz input             | Single-ended 500mVpp input |     | -39     |     | dB   |
| SFDR, 60 MHz input              | Single-ended 1Vpp input    |     | 64      |     | dB   |
| SFDR, 2060 MHz input            | Single-ended 1Vpp input    |     | 44      |     | dB   |
| SFDR, 4060 MHz input            | Single-ended 1Vpp input    |     | 36      |     | dB   |
| SFDR, 6060 MHz input            | Single-ended 1Vpp input    |     | 31      |     | dB   |
| THD, 60 MHz input               | Single-ended 1Vpp input    |     | -64     |     | dB   |
| THD, 2060 MHz input             | Single-ended 1Vpp input    |     | -44     |     | dB   |
| THD, 4060 MHz input             | Single-ended 1Vpp input    |     | -38     |     | dB   |
| THD, 6060 MHz input             | Single-ended 1Vpp input    |     | -32     |     | dB   |

Notes:

-Above measurements are with single-ended 2000MHz out-of-phase CK1 &amp; CK2.

-Vto=2V

**ELECTRICAL SPECIFICATIONS (CONTINUED)**

| Parameter                       | Conditions/Note            | Min | Typical | Max | Unit |
|---------------------------------|----------------------------|-----|---------|-----|------|
| DYNAMIC PERFORMANCE (continued) |                            |     |         |     |      |
| SFDR, 60 MHz input              | Differential 250mVpp input |     | 80      |     | dB   |
| SFDR, 2060 MHz input            | Differential 250mVpp input |     | 67      |     | dB   |
| SFDR, 4060 MHz input            | Differential 250mVpp input |     | 64      |     | dB   |
| SFDR, 6060 MHz input            | Differential 250mVpp input |     | 56      |     | dB   |
| THD, 60 MHz input               | Differential 250mVpp input |     | -76     |     | dB   |
| THD, 2060 MHz input             | Differential 250mVpp input |     | -66     |     | dB   |
| THD, 4060 MHz input             | Differential 250mVpp input |     | -62     |     | dB   |
| THD, 6060 MHz input             | Differential 250mVpp input |     | -54     |     | dB   |
| SFDR, 60 MHz input              | Differential 500mVpp input |     | 74      |     | dB   |
| SFDR, 2060 MHz input            | Differential 500mVpp input |     | 54      |     | dB   |
| SFDR, 4060 MHz input            | Differential 500mVpp input |     | 48      |     | dB   |
| SFDR, 6060 MHz input            | Differential 500mVpp input |     | 44      |     | dB   |
| THD, 60 MHz input               | Differential 500mVpp input |     | -73     |     | dB   |
| THD, 2060 MHz input             | Differential 500mVpp input |     | -53     |     | dB   |
| THD, 4060 MHz input             | Differential 500mVpp input |     | -47     |     | dB   |
| THD, 6060 MHz input             | Differential 500mVpp input |     | -43     |     | dB   |
| SFDR, 60 MHz input              | Differential 1Vpp input    |     | 67      |     | dB   |
| SFDR, 2060 MHz input            | Differential 1Vpp input    |     | 42      |     | dB   |
| SFDR, 4060 MHz input            | Differential 1Vpp input    |     | 39      |     | dB   |
| SFDR, 6060 MHz input            | Differential 1Vpp input    |     | 32      |     | dB   |
| THD, 60 MHz input               | Differential 1Vpp input    |     | -65     |     | dB   |
| THD, 2060 MHz input             | Differential 1Vpp input    |     | -42     |     | dB   |
| THD, 4060 MHz input             | Differential 1Vpp input    |     | -38     |     | dB   |
| THD, 6060 MHz input             | Differential 1Vpp input    |     | -31     |     | dB   |

Notes:

-Above measurements are with differential 2000MHz out-of-phase CK1 &amp; CK2.

-Vto=2V

**ELECTRICAL SPECIFICATIONS (CONTINUED)**

| Parameter                       | Conditions/Note            | Min | Typical | Max | Unit |
|---------------------------------|----------------------------|-----|---------|-----|------|
| DYNAMIC PERFORMANCE (continued) |                            |     |         |     |      |
| SFDR, 60 MHz input              | Single-ended 250mVpp input |     | 90      |     | dB   |
| SFDR, 1060 MHz input            | Single-ended 250mVpp input |     | 78      |     | dB   |
| SFDR, 2060 MHz input            | Single-ended 250mVpp input |     | 71      |     | dB   |
| SFDR, 3060 MHz input            | Single-ended 250mVpp input |     | 66      |     | dB   |
| SFDR, 4060 MHz input            | Single-ended 250mVpp input |     | 59      |     | dB   |
| SFDR, 5060 MHz input            | Single-ended 250mVpp input |     | 55      |     | dB   |
| SFDR, 6060 MHz input            | Single-ended 250mVpp input |     | 52      |     | dB   |
| SFDR, 7060 MHz input            | Single-ended 250mVpp input |     | 50      |     | dB   |
| SFDR, 60 MHz input              | Single-ended 500mVpp input |     | 80      |     | dB   |
| SFDR, 1060 MHz input            | Single-ended 500mVpp input |     | 68      |     | dB   |
| SFDR, 2060 MHz input            | Single-ended 500mVpp input |     | 60      |     | dB   |
| SFDR, 3060 MHz input            | Single-ended 500mVpp input |     | 54      |     | dB   |
| SFDR, 4060 MHz input            | Single-ended 500mVpp input |     | 50      |     | dB   |
| SFDR, 5060 MHz input            | Single-ended 500mVpp input |     | 46      |     | dB   |
| SFDR, 6060 MHz input            | Single-ended 500mVpp input |     | 41      |     | dB   |
| SFDR, 7060 MHz input            | Single-ended 500mVpp input |     | 40      |     | dB   |
| SFDR, 60 MHz input              | Single-ended 1Vpp input    |     | 69      |     | dB   |
| SFDR, 1060 MHz input            | Single-ended 1Vpp input    |     | 55      |     | dB   |
| SFDR, 2060 MHz input            | Single-ended 1Vpp input    |     | 47      |     | dB   |
| SFDR, 3060 MHz input            | Single-ended 1Vpp input    |     | 43      |     | dB   |
| SFDR, 4060 MHz input            | Single-ended 1Vpp input    |     | 40      |     | dB   |
| SFDR, 5060 MHz input            | Single-ended 1Vpp input    |     | 34      |     | dB   |
| SFDR, 6060 MHz input            | Single-ended 1Vpp input    |     | 32      |     | dB   |
| SFDR, 7060 MHz input            | Single-ended 1Vpp input    |     | 31      |     | dB   |

Notes:

-Above measurements are with single-ended 1000MHz out-of-phase CK1 &amp; CK2.

-Vto=2V

## ELECTRICAL SPECIFICATIONS (CONTINUED)

| Parameter                       | Conditions/Note            | Min | Typical | Max | Unit |
|---------------------------------|----------------------------|-----|---------|-----|------|
| DYNAMIC PERFORMANCE (continued) |                            |     |         |     |      |
| THD, 60 MHz input               | Single-ended 250mVpp input |     | -89     |     | dB   |
| THD, 1060 MHz input             | Single-ended 250mVpp input |     | -76     |     | dB   |
| THD, 2060 MHz input             | Single-ended 250mVpp input |     | -70     |     | dB   |
| THD, 3060 MHz input             | Single-ended 250mVpp input |     | -64     |     | dB   |
| THD, 4060 MHz input             | Single-ended 250mVpp input |     | -53     |     | dB   |
| THD, 5060 MHz input             | Single-ended 250mVpp input |     | -50     |     | dB   |
| THD, 6060 MHz input             | Single-ended 250mVpp input |     | -50     |     | dB   |
| THD, 7060 MHz input             | Single-ended 250mVpp input |     | -51     |     | dB   |
| THD, 60 MHz input               | Single-ended 500mVpp input |     | -82     |     | dB   |
| THD, 1060 MHz input             | Single-ended 500mVpp input |     | -67     |     | dB   |
| THD, 2060 MHz input             | Single-ended 500mVpp input |     | -60     |     | dB   |
| THD, 3060 MHz input             | Single-ended 500mVpp input |     | -54     |     | dB   |
| THD, 4060 MHz input             | Single-ended 500mVpp input |     | -47     |     | dB   |
| THD, 5060 MHz input             | Single-ended 500mVpp input |     | -41     |     | dB   |
| THD, 6060 MHz input             | Single-ended 500mVpp input |     | -40     |     | dB   |
| THD, 7060 MHz input             | Single-ended 500mVpp input |     | -43     |     | dB   |
| THD, 60 MHz input               | Single-ended 1Vpp input    |     | -77     |     | dB   |
| THD, 1060 MHz input             | Single-ended 1Vpp input    |     | -63     |     | dB   |
| THD, 2060 MHz input             | Single-ended 1Vpp input    |     | -56     |     | dB   |
| THD, 3060 MHz input             | Single-ended 1Vpp input    |     | -50     |     | dB   |
| THD, 4060 MHz input             | Single-ended 1Vpp input    |     | -45     |     | dB   |
| THD, 5060 MHz input             | Single-ended 1Vpp input    |     | -40     |     | dB   |
| THD, 6060 MHz input             | Single-ended 1Vpp input    |     | -41     |     | dB   |
| THD, 7060 MHz input             | Single-ended 1Vpp input    |     | -38     |     | dB   |

Notes:

-Above measurements are with single-ended 1000MHz out-of-phase CK1 &amp; CK2.

-Vto=2V

**ELECTRICAL SPECIFICATIONS (CONTINUED)**

| Parameter                       | Conditions/Note            | Min | Typical | Max | Unit |
|---------------------------------|----------------------------|-----|---------|-----|------|
| DYNAMIC PERFORMANCE (continued) |                            |     |         |     |      |
| SFDR, 60 MHz input              | Differential 250mVpp input |     | 94      |     | dB   |
| SFDR, 1060 MHz input            | Differential 250mVpp input |     | 80      |     | dB   |
| SFDR, 2060 MHz input            | Differential 250mVpp input |     | 74      |     | dB   |
| SFDR, 3060 MHz input            | Differential 250mVpp input |     | 67      |     | dB   |
| SFDR, 4060 MHz input            | Differential 250mVpp input |     | 65      |     | dB   |
| SFDR, 5060 MHz input            | Differential 250mVpp input |     | 59      |     | dB   |
| SFDR, 6060 MHz input            | Differential 250mVpp input |     | 56      |     | dB   |
| SFDR, 7060 MHz input            | Differential 250mVpp input |     | 60      |     | dB   |
| SFDR, 60 MHz input              | Differential 500mVpp input |     | 82      |     | dB   |
| SFDR, 1060 MHz input            | Differential 500mVpp input |     | 67      |     | dB   |
| SFDR, 2060 MHz input            | Differential 500mVpp input |     | 61      |     | dB   |
| SFDR, 3060 MHz input            | Differential 500mVpp input |     | 54      |     | dB   |
| SFDR, 4060 MHz input            | Differential 500mVpp input |     | 53      |     | dB   |
| SFDR, 5060 MHz input            | Differential 500mVpp input |     | 47      |     | dB   |
| SFDR, 6060 MHz input            | Differential 500mVpp input |     | 44      |     | dB   |
| SFDR, 7060 MHz input            | Differential 500mVpp input |     | 47      |     | dB   |
| SFDR, 60 MHz input              | Differential 1Vpp input    |     | 75      |     | dB   |
| SFDR, 1060 MHz input            | Differential 1Vpp input    |     | 57      |     | dB   |
| SFDR, 2060 MHz input            | Differential 1Vpp input    |     | 48      |     | dB   |
| SFDR, 3060 MHz input            | Differential 1Vpp input    |     | 43      |     | dB   |
| SFDR, 4060 MHz input            | Differential 1Vpp input    |     | 43      |     | dB   |
| SFDR, 5060 MHz input            | Differential 1Vpp input    |     | 39      |     | dB   |
| SFDR, 6060 MHz input            | Differential 1Vpp input    |     | 34      |     | dB   |
| SFDR, 7060 MHz input            | Differential 1Vpp input    |     | 37      |     | dB   |

Notes:

- Above measurements are with differential 1000MHz out-of-phase CK1 & CK2.
- Vto=2V

**ELECTRICAL SPECIFICATIONS (CONTINUED)**

| Parameter                              | Conditions/Note            | Min | Typical | Max | Unit |
|--|----------------------------|-----|---------|-----|------|
| <b>DYNAMIC PERFORMANCE (continued)</b> |                            |     |         |     |      |
| THD, 60 MHz input                      | Differential 250mVpp input |     | -90     |     | dB   |
| THD, 1060 MHz input                    | Differential 250mVpp input |     | -78     |     | dB   |
| THD, 2060 MHz input                    | Differential 250mVpp input |     | -71     |     | dB   |
| THD, 3060 MHz input                    | Differential 250mVpp input |     | -66     |     | dB   |
| THD, 4060 MHz input                    | Differential 250mVpp input |     | -64     |     | dB   |
| THD, 5060 MHz input                    | Differential 250mVpp input |     | -59     |     | dB   |
| THD, 6060 MHz input                    | Differential 250mVpp input |     | -54     |     | dB   |
| THD, 7060 MHz input                    | Differential 250mVpp input |     | -59     |     | dB   |
| THD, 60 MHz input                      | Differential 500mVpp input |     | -81     |     | dB   |
| THD, 1060 MHz input                    | Differential 500mVpp input |     | -66     |     | dB   |
| THD, 2060 MHz input                    | Differential 500mVpp input |     | -60     |     | dB   |
| THD, 3060 MHz input                    | Differential 500mVpp input |     | -53     |     | dB   |
| THD, 4060 MHz input                    | Differential 500mVpp input |     | -53     |     | dB   |
| THD, 5060 MHz input                    | Differential 500mVpp input |     | -47     |     | dB   |
| THD, 6060 MHz input                    | Differential 500mVpp input |     | -43     |     | dB   |
| THD, 7060 MHz input                    | Differential 500mVpp input |     | -47     |     | dB   |
| THD, 60 MHz input                      | Differential 1Vpp input    |     | -78     |     | dB   |
| THD, 1060 MHz input                    | Differential 1Vpp input    |     | -63     |     | dB   |
| THD, 2060 MHz input                    | Differential 1Vpp input    |     | -53     |     | dB   |
| THD, 3060 MHz input                    | Differential 1Vpp input    |     | -52     |     | dB   |
| THD, 4060 MHz input                    | Differential 1Vpp input    |     | -52     |     | dB   |
| THD, 5060 MHz input                    | Differential 1Vpp input    |     | -45     |     | dB   |
| THD, 6060 MHz input                    | Differential 1Vpp input    |     | -40     |     | dB   |
| THD, 7060 MHz input                    | Differential 1Vpp input    |     | -41     |     | dB   |

Notes:

-Above measurements are with differential 1000MHz out-of-phase CK1 &amp; CK2.

-Vto=2V



| TRACK-TO-HOLD AND HOLD STATE, TH1  |   |  |      |  |        |
|------------------------------------|---|--|------|--|--------|
| Aperture Delay                     | After CK1 goes negative                   |  | 50   |  | ps     |
| Aperture Jitter                    | Jitter free 0.5 V <sub>pp</sub> 1 GHz CK1 |  | 70   |  | fs     |
| Settling Time                      | To 1 mV                                   |  | 200  |  | ps     |
| Differential Pedestal              | Relative to Vin                           |  | -1   |  | %      |
| Differential Droop Rate            | Relative to Vin                           |  | -0.5 |  | %/ns   |
| Hold Noise                         |   |  | TBD  |  | μV/√Hz |
| Min Clock Frequency                | 50% duty cycle clock                      |  | 200  |  | MHz    |
| Max Clock Frequency                | 50% duty cycle clock                      |  | 2000 |  | MHz    |
| Max Hold Time                      |   |  | 5    |  | ns     |
| HOLD-TO-TRACK AND TRACK STATE, TH1 |   |  |      |  |        |
| Acquisition Time                   | To 1 mV, FSR step input                   |  | 200  |  | ps     |
| Max Acquisition Slew Rate          | FSR step input                            |  | 30   |  | V/ns   |
| Rise Time                          | 20-80%                                    |  | 30   |  | ps     |
| Min Track Time                     |   |  | 0.2  |  | ns     |
| Recovery Time                      |   |  | 1    |  | ns     |
| TRACK-TO-HOLD AND HOLD STATE, TH2  |   |  |      |  |        |
| Aperture Delay                     | After CK1 goes negative                   |  | 60   |  | ps     |
| Settling Time                      | To 1 mV                                   |  | 200  |  | ps     |
| Differential Pedestal              | Relative to Vin                           |  | -0.5 |  | %      |
| Differential Droop Rate            | Relative to Vin                           |  | -0.1 |  | %/ns   |
| Hold Noise                         |   |  | TBD  |  | μV/√Hz |
| Min Clock Frequency                | 50% duty cycle clock                      |  | 200  |  | MHz    |
| Max Clock Frequency                | 50% duty cycle clock                      |  | 2000 |  | MHz    |
| Max Hold Time                      |   |  | 5    |  | ns     |
| HOLD-TO-TRACK AND TRACK STATE, TH2 |   |  |      |  |        |
| Min Track Time                     | After TH1 in Hold Mode                    |  | 0.5  |  | ns     |
| Recovery Time                      |   |  | 2    |  | ns     |

Notes:

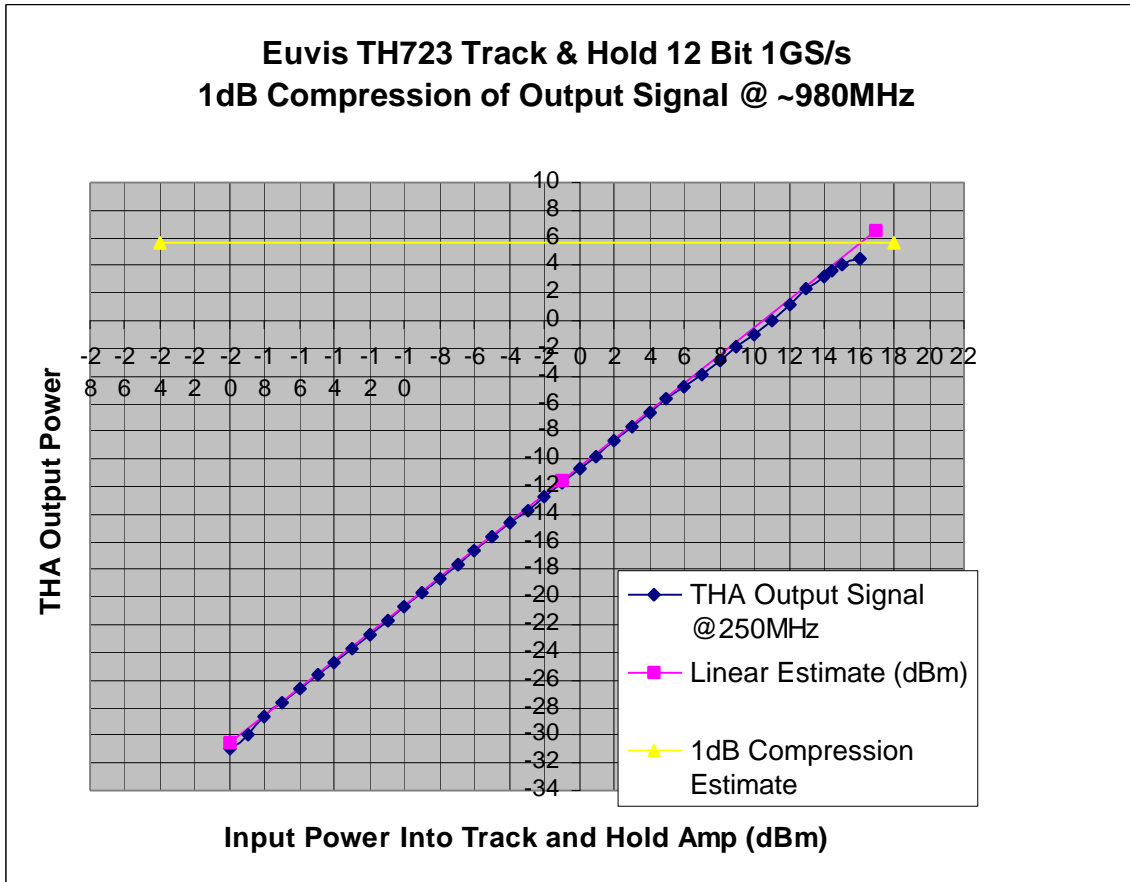
-Above measurements are with differential 1000MHz out-of-phase CK1 & CK2 clocks.

-V<sub>to</sub>=2V

**ELECTRICAL SPECIFICATIONS (CONTINUED)**

| Parameter               | Conditions/Note | Min   | Typical | Max   | Unit |
|-------------------------|-----------------|-------|---------|-------|------|
| <b>POWER SUPPLY</b>     |                 |       |         |       |      |
| Positive Supply Voltage | Vcc             | 4.75  | 5       | 5.25  | V    |
| Vcc Current             | Icc             |       | 120     |       | mA   |
| Negative Supply Voltage | Vee             | -5.45 | -5.2    | -4.95 | V    |
| Vee Current             | Iee             |       | 270     |       | mA   |
| Vto Current             | Ivto            |       | 70      |       | mA   |
| Power Dissipation       |                 |       | 2.1     |       | W    |
| Warm Up Time            |                 |       | 10      |       | s    |

**LINEARITY MEASUREMENTS**

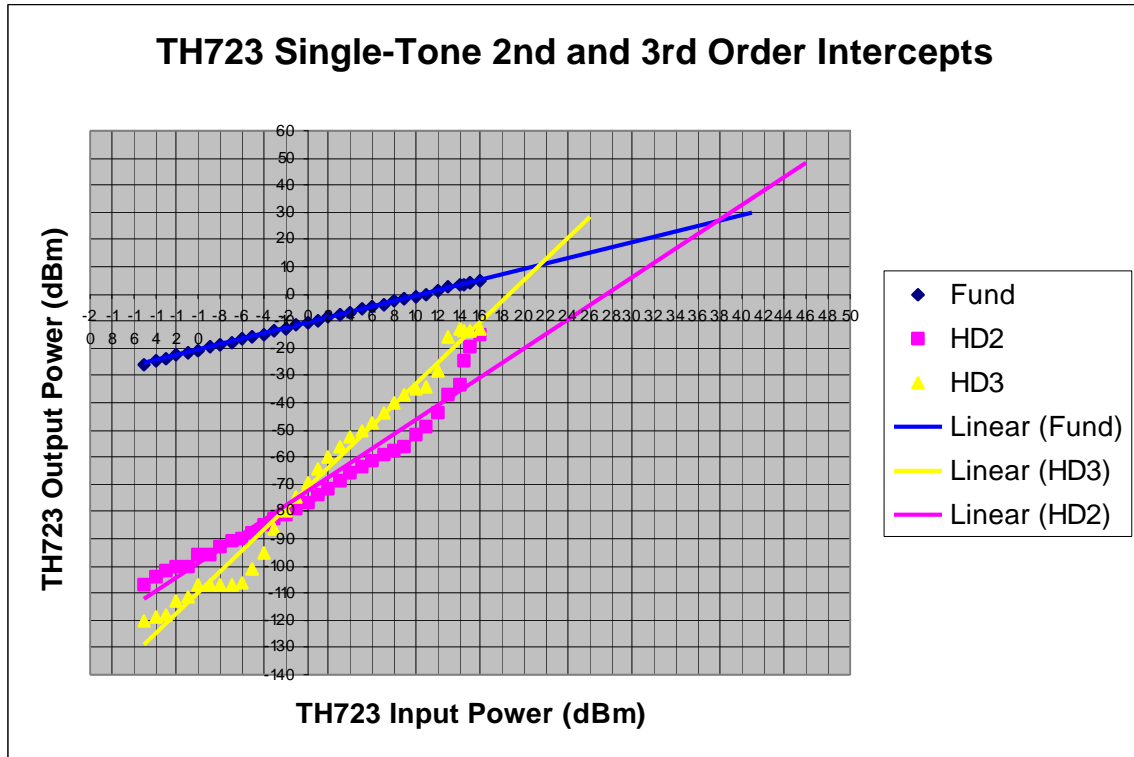


1 dB compression point = 5.6 dBm output  
 conversion gain @ 1 dB compression point = -5.5 dB

Notes:

-Input power into track and hold amplifier is single-ended. The single-ended output will be -6 dB lower than the single-ended input. Output power in the chart does not reflect the -6dB correction.

LINEARITY MEASUREMENTS CONTINUED

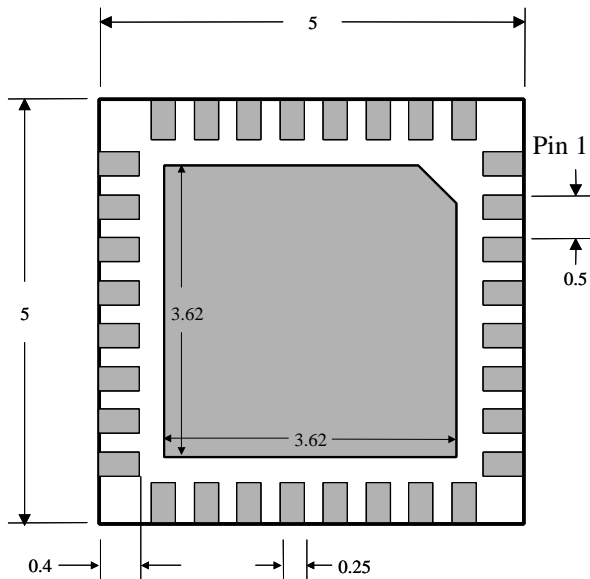
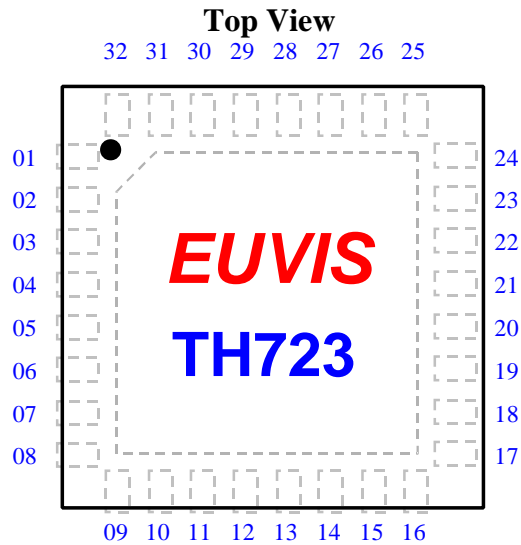


2<sup>nd</sup> Order intercept located: (21.25 dBm input, 10.25 dBm output)

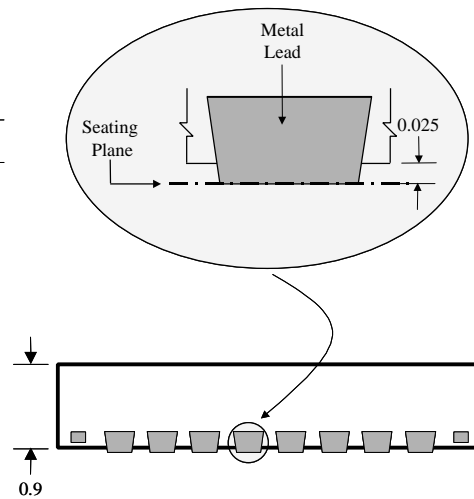
3<sup>rd</sup> Order intercept located: (37.8 dBm input, 26.6 dBm output)

**PACKAGE OUTLINE DIMENSIONS**

- Unit: mm
- Package Format: 32-pin QFN
- Package Size: 5 mm x 5 mm
- Pin Pitch: 0.5 mm



**Bottom View**



**Side View**

## PIN DESCRIPTION

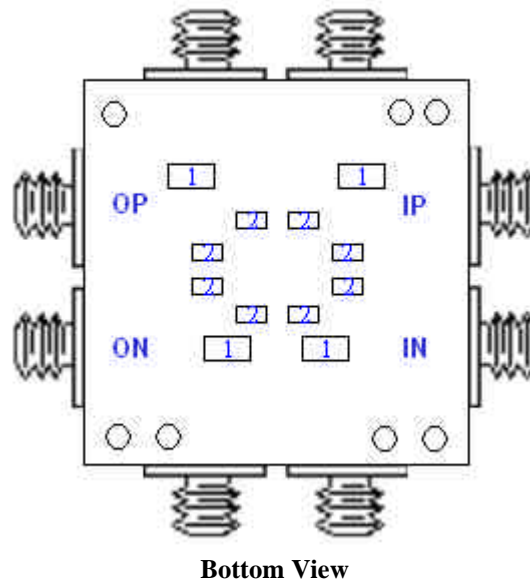
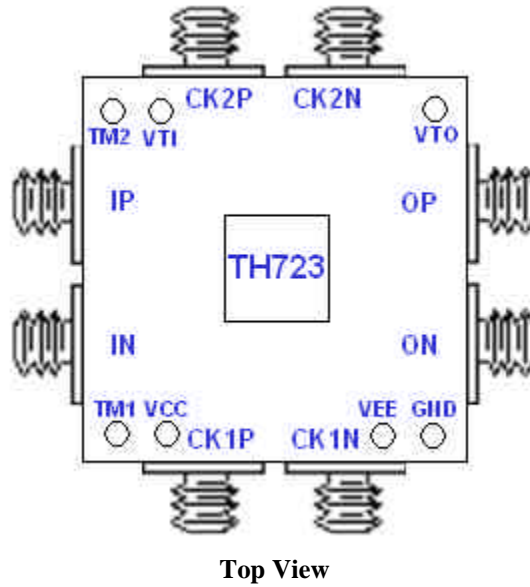
| Pin   | Name | Function                          |
|---|------|-----------------------------------|
| 2, 23   | VCC  | Positive power supply             |
| 7, 18   | VEE  | Negative power supply             |
| 8, 17   | VTO  | Output termination voltage        |
| 28  | INP  | Positive input                    |
| 29  | INN  | Negative input                    |
| 13  | OUTP | Positive output                   |
| 12  | OUTN | Negative output                   |
| 4   | CK1P | Clock 1 positive input            |
| 5   | CK1N | Clock 1 negative input            |
| 21  | CK2P | Clock 2 positive input            |
| 20  | CK2N | Clock 2 negative input            |
| 31  | TM1  | Track mode select for T/H stage 1 |
| 26  | TM2  | Track mode select for T/H stage 2 |
| 3, 6, 9, 11, 14, 16,<br>19, 22, 25, 27, 30,<br>32 | GND  | Ground                            |
| 1, 10, 15, 24                                     | NC   | No connection                     |

**ABSOLUTE MAXIMUM RATINGS**

|                                |                        |
|--------------------------------|------------------------|
| V <sub>cc</sub>                | 0V to 6V               |
| V <sub>ee</sub>                | -6V to 0V              |
| V <sub>to</sub>                | 0V to 6V               |
| Inputs (INP/N, CK1P/N, CK2P/N) | -1V to 1V              |
| Outputs (OUTP/N)               | -2V to V <sub>cc</sub> |
| $\theta_{JA}$                  | TBD                    |
| Maximum Junction Temperature   | 150°C                  |
| Operating Temperature Range    | 0°C to +70°C           |
| Storage Temperature Range      | -40°C to +125°C        |

**LEAD TEMPERATURE RANGE (SOLDERING 60 SEC)                      TBD**

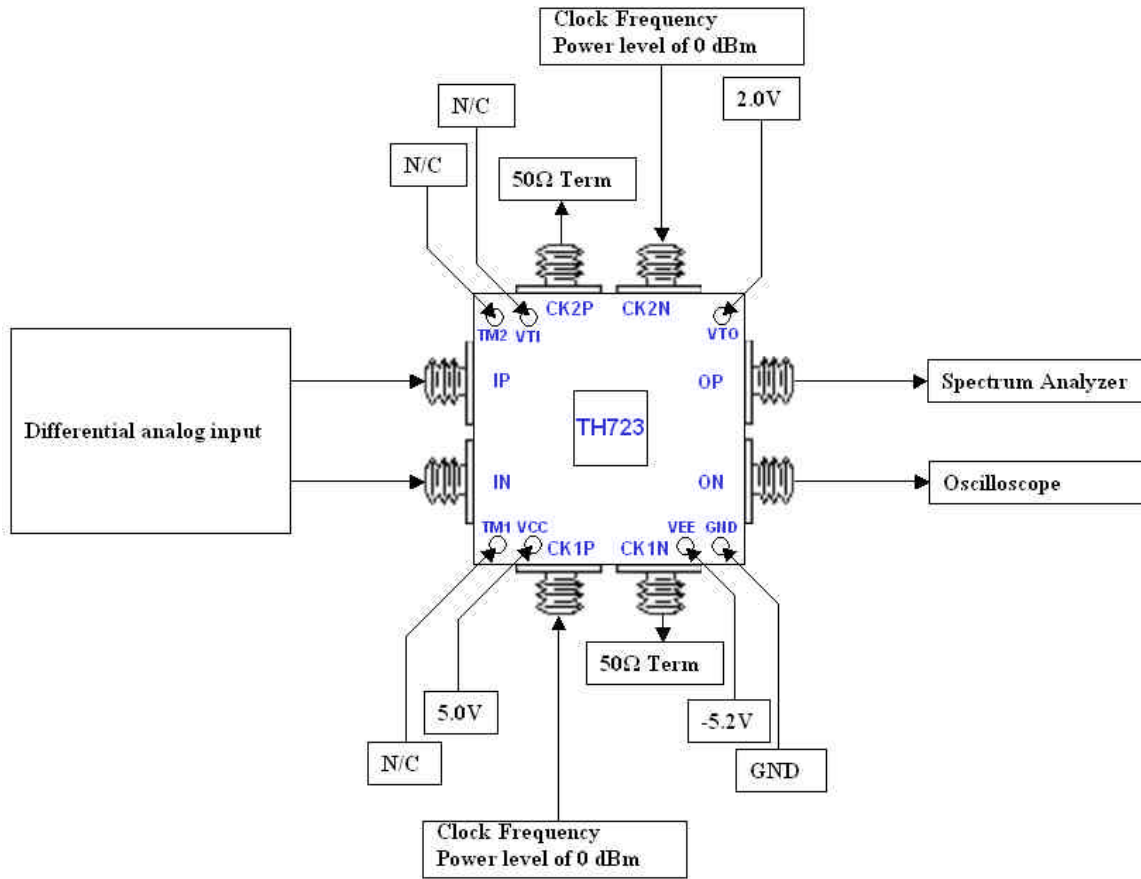
**EVALUATION PCB LAYOUT**



- Notes:
- Parts labeled "1" are 0603 10 uF Capacitors.
  - Parts labeled "2" are 0402 100 nF Capacitors.



## TYPICAL CONNECTION DIAGRAM



## Description:

The measurements in the TH723 data sheet were taken using the setup above. First, connect the output OP to a spectrum analyzer and output ON to an oscilloscope. Then, connect the differential analog input to IP and IN. Connect the clock frequency to CK1P and CK2N. Terminate the unconnected SMA connectors with a 50Ω termination caps. After the SMA connections are properly made, connect power supply outputs to the corresponding DC pins without turning on the power. When ready to use, supply a DC voltage of +5.0V to VCC, +2.0V to VTO, and -5.2V to VEE.

## Notes:

-Using appropriate band-pass filters for the input signal may improve performance.

**ORDERING INFORMATION**

E-mail: [sales@euvis.com](mailto:sales@euvis.com)

Tel: (805) 583-9888

Fax: (805) 583-9889

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