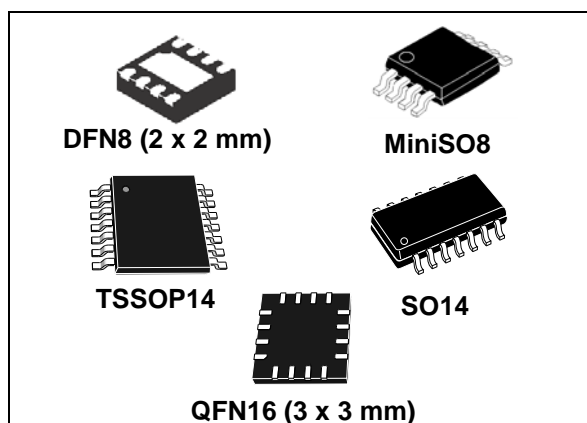


Rail-to-rail 1.1 V dual and quad nanopower comparators

Datasheet - production data



Related product

- See the TS881 datasheet for single operator with smaller package.

Applications

- Portable systems
- Signal conditioning
- Medical
- Automotive

Description

The TS882 is a dual and the TS884 device a quad comparator featuring ultra-low supply current (220 nA typical per operator with output high, $V_{CC} = 1.2$ V, no load) with rail-to-rail input and output capability. The performance of these comparators allows them to be used in a wide range of portable applications. The TS882 and TS884 devices minimize battery supply leakage and therefore enhance battery lifetime.

Operating from 1.1 to 5.5 V supply voltage, these comparators can be used over a wide temperature range (-40 to +125 °C) keeping the current consumption at an ultra-low level.

Features

- Ultra-low current consumption: 220 nA typ./op.
- Propagation delay: 2 μ s typ.
- Rail-to-rail inputs
- Push-pull outputs
- Supply operation from 1.1 V to 5.5 V
- Wide temperature range: -40 to +125 °C
- ESD tolerance: 8 kV HBM / 300 V MM
- Dual version available in MiniSO8 and DFN8 (2 x 2 mm) package
- Quad version available in SO14, TSSOP14 and QFN16 3 x 3 mm package

Table 1. Device summary

| Order code | Temperature range | Package | Packaging | Marking |
|--------------------------|-------------------|----------------------------|---------------|---------|
| TS882IST | -40 to +125 °C | MiniSO8 | Tape and reel | K514 |
| TS882IYST ⁽¹⁾ | | MiniSO8 (Automotive grade) | | K524 |
| TS882IQ2T | | DFN8 2 x 2 mm | | K56 |
| TS884IDT | -40 to +125 °C | SO14 | Tape and reel | S884I |
| TS884IPT | | TSSOP14 | | S884I |
| TS884IQ4T | | QFN16 3 x 3 mm | | K514 |

1. Qualified and characterized according to AEC Q100 and Q003 or equivalent, advanced screening according to AEC Q001 & Q002 or equivalent

Contents

| | | |
|----------|----------------------------------------------------------------|-----------|
| 1 | Pin description | 3 |
| 2 | Absolute maximum ratings and operating conditions | 4 |
| 3 | Electrical characteristics | 5 |
| 4 | Package information | 15 |
| 4.1 | DFN8 2 x 2 mm package information | 16 |
| 4.2 | MiniSO8 package information | 18 |
| 4.3 | SO14 package information | 19 |
| 4.4 | QFN16 3 x 3 package information | 20 |
| 4.5 | TSSOP14 package information | 23 |
| 5 | Revision history | 24 |

1 Pin description

Figure 1. Pin connections TS882 (top view)

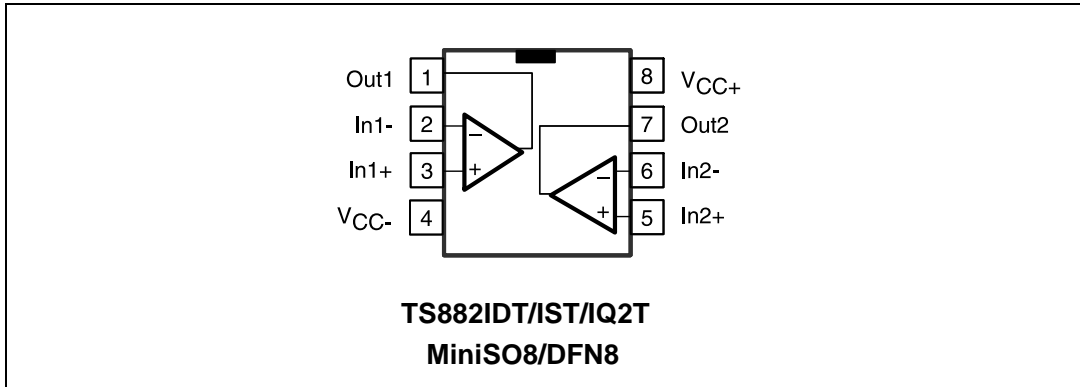
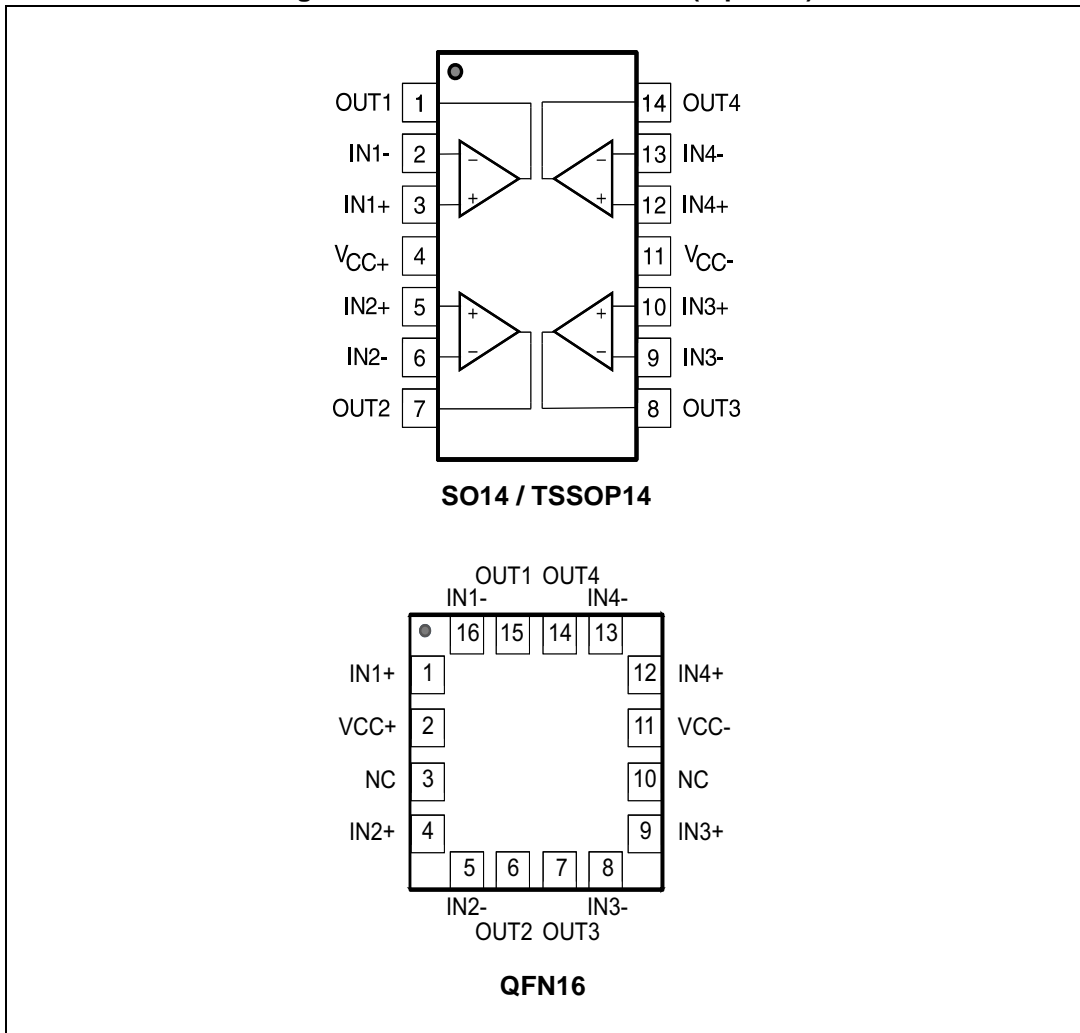


Figure 2. Pin connections TS884 (top view)



2 Absolute maximum ratings and operating conditions

Table 2. Absolute maximum ratings

| Symbol | Parameter | Value | Unit |
|------------|--------------------------------------------------------------------------|----------------------------------------|------|
| V_{CC} | Supply voltage ⁽¹⁾ | 6 | V |
| V_{ID} | Differential input voltage ⁽²⁾ | ±6 | V |
| V_{IN} | Input voltage range | $(V_{CC-}) - 0.3$ to $(V_{CC+}) + 0.3$ | V |
| R_{THJA} | Thermal resistance junction to ambient (TS882) ⁽³⁾ MiniSO8 | 190 | °C/W |
| | DFN8 2 x 2 mm | 57 | |
| | Thermal resistance junction to ambient (TS884) ⁽³⁾ SO14 | 105 | |
| | TSSOP14 | 100 | |
| | QFN16 3 x 3 mm | 45 | |
| T_{STG} | Storage temperature | -65 to +150 | °C |
| T_J | Junction temperature | 150 | °C |
| T_{LEAD} | Lead temperature (soldering 10 seconds) | 260 | °C |
| ESD | Human body model (HBM) ⁽⁴⁾ | 8 | kV |
| | Machine model (MM) ⁽⁵⁾ | 300 | V |
| | Charged device model (CDM) ⁽⁶⁾ | 1300 | |
| | Latch-up immunity | 200 | mA |

1. All voltage values, except differential voltages, are referenced to V_{CC-} . V_{CC} is defined as the difference between V_{CC+} and V_{CC-} .
2. The magnitude of input and output voltages must never exceed the supply rail ±0.3 V.
3. Short-circuits can cause excessive heating. These values are typical.
4. According to JEDEC standard JESD22-A114F.
5. According to JEDEC standard JESD22-A115A.
6. According to ANSI/ESD STM5.3.1.

Table 3. Operating conditions

| Symbol | Parameter | Value | Unit |
|------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------|
| T_{oper} | Operating temperature range | -40 to +125 | °C |
| V_{CC} | Supply voltage -40 °C < T_{amb} < +125 °C | 1.1 to 5.5 | V |
| V_{ICM} | Common mode input voltage range -40 °C < T_{amb} < +85 °C -40 °C < T_{amb} < +125 °C | $(V_{CC-}) - 0.2$ to $(V_{CC+}) + 0.2$ (V_{CC-}) to $(V_{CC+}) + 0.2$ | V |

3 Electrical characteristics

Table 4. $V_{CC} = +1.2\text{ V}$, $T_{amb} = +25\text{ }^{\circ}\text{C}$, $V_{ICM} = V_{CC}/2$ (unless otherwise specified)⁽¹⁾

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|-----------------|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------|------------------------|--------------------------------|
| V_{IO} | Input offset voltage ⁽²⁾ | $T_{amb} = +25\text{ }^{\circ}\text{C}$ $-40\text{ }^{\circ}\text{C} < T_{amb} < +125\text{ }^{\circ}\text{C}$ | -6 | 1 | 6 | mV |
| ΔV_{IO} | Input offset voltage drift | $-40\text{ }^{\circ}\text{C} < T_{amb} < +125\text{ }^{\circ}\text{C}$ | | 3 | | $\mu\text{V}/^{\circ}\text{C}$ |
| V_{HYST} | Input hysteresis voltage ⁽³⁾ | $T_{amb} = +25\text{ }^{\circ}\text{C}$ $-40\text{ }^{\circ}\text{C} < T_{amb} < +125\text{ }^{\circ}\text{C}$ | 1.5 | 2.4 | 4.2 | mV |
| I_{IO} | Input offset current ⁽⁴⁾ | $T_{amb} = +25\text{ }^{\circ}\text{C}$ $-40\text{ }^{\circ}\text{C} < T_{amb} < +125\text{ }^{\circ}\text{C}$ | | | 10 100 | pA |
| I_{IB} | Input bias current ⁽⁴⁾ | $T_{amb} = +25\text{ }^{\circ}\text{C}$ $-40\text{ }^{\circ}\text{C} < T_{amb} < +125\text{ }^{\circ}\text{C}$ | | 1 | 10 100 | pA |
| I_{CC} | Supply current per operator | No load, output low, $V_{ID} = -0.1\text{ V}$ $-40\text{ }^{\circ}\text{C} < T_{amb} < +125\text{ }^{\circ}\text{C}$ No load, output high, $V_{ID} = +0.1\text{ V}$ $-40\text{ }^{\circ}\text{C} < T_{amb} < +125\text{ }^{\circ}\text{C}$ | | 300 220 | 450 350 | nA |
| I_{SC} | Short-circuit current | Source Sink | | 1.0 1.7 | | mA |
| V_{OH} | Output voltage high | $I_{source} = 0.2\text{ mA}$ $-40\text{ }^{\circ}\text{C} < T_{amb} < +85\text{ }^{\circ}\text{C}$ $-40\text{ }^{\circ}\text{C} < T_{amb} < +125\text{ }^{\circ}\text{C}$ | 1.13 1.10 1.00 | 1.15 | | V |
| V_{OL} | Output voltage low | $I_{sink} = 0.2\text{ mA}$ $-40\text{ }^{\circ}\text{C} < T_{amb} < +85\text{ }^{\circ}\text{C}$ $-40\text{ }^{\circ}\text{C} < T_{amb} < +125\text{ }^{\circ}\text{C}$ | | 35 | 50 60 70 | mV |
| CMRR | Common mode rejection ratio | $0 < V_{ICM} < V_{CC}$ $-40\text{ }^{\circ}\text{C} < T_{amb} < +125\text{ }^{\circ}\text{C}$ | 50 | 68 | | dB |
| T_{PLH} | Propagation delay (low to high) | $f = 1\text{ kHz}$, $C_L = 30\text{ pF}$, $R_L = 1\text{ M}\Omega$ Overdrive = 10 mV $-40\text{ }^{\circ}\text{C} < T_{amb} < +125\text{ }^{\circ}\text{C}$ Overdrive = 100 mV $-40\text{ }^{\circ}\text{C} < T_{amb} < +125\text{ }^{\circ}\text{C}$ | | 5.5 2.1 | 11 13 3.1 3.4 | μs |
| T_{PHL} | Propagation delay (high to low) | $f = 1\text{ kHz}$, $C_L = 30\text{ pF}$, $R_L = 1\text{ M}\Omega$ Overdrive = 10 mV $-40\text{ }^{\circ}\text{C} < T_{amb} < +125\text{ }^{\circ}\text{C}$ Overdrive = 100 mV $-40\text{ }^{\circ}\text{C} < T_{amb} < +125\text{ }^{\circ}\text{C}$ | | 5.1 1.9 | 8 10 2.6 3.1 | μs |
| T_R | Rise time (10% to 90%) | $C_L = 30\text{ pF}$, $R_L = 1\text{ M}\Omega$ | | 100 | | ns |

Table 4. $V_{CC} = +1.2\text{ V}$, $T_{amb} = +25\text{ °C}$, $V_{ICM} = V_{CC}/2$ (unless otherwise specified)⁽¹⁾ (continued)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|----------|------------------------|-------------------------------------------------|------|------|------|------|
| T_F | Fall time (90% to 10%) | $C_L = 30\text{ pF}$, $R_L = 1\text{ M}\Omega$ | | 110 | | ns |
| T_{ON} | Power-up time | | | 1.1 | 1.7 | ms |

1. All values over the temperature range are guaranteed through correlation and simulation. No production test is performed at the temperature range limits.
2. The offset is defined as the average value of positive and negative trip points (input voltage differences requested to change the output state in each direction).
3. The hysteresis is a built-in feature of the TS882 device. It is defined as the voltage difference between the trip points.
4. Maximum values include unavoidable inaccuracies of the industrial tests.

Table 5. $V_{CC} = +2.7\text{ V}$, $T_{amb} = +25\text{ °C}$, $V_{ICM} = V_{CC}/2$ (unless otherwise specified)⁽¹⁾

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|-----------------|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------|------------------------|-------------------------|
| V_{IO} | Input offset voltage ⁽²⁾ | $T_{amb} = +25\text{ °C}$ $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | -6 | 1 | 6 | mV |
| ΔV_{IO} | Input offset voltage drift | $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | | 3 | | $\mu\text{V}/\text{°C}$ |
| V_{HYST} | Input hysteresis voltage ⁽³⁾ | $T_{amb} = +25\text{ °C}$ $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | 1.6 | 2.7 | 4.2 | mV |
| I_{IO} | Input offset current ⁽⁴⁾ | $T_{amb} = +25\text{ °C}$ $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | | | 10 100 | pA |
| I_{IB} | Input bias current ⁽⁴⁾ | $T_{amb} = +25\text{ °C}$ $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | | 1 | 10 100 | pA |
| I_{CC} | Supply current per operator | No load, output low, $V_{ID} = -0.1\text{ V}$ $-40\text{ °C} < T_{amb} < +125\text{ °C}$ No load, output high, $V_{ID} = +0.1\text{ V}$ $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | | 310 220 | 450 350 | nA |
| I_{SC} | Short-circuit current | Source Sink | | 10 13 | | mA |
| V_{OH} | Output voltage high | $I_{source} = 2\text{ mA}$ $-40\text{ °C} < T_{amb} < +85\text{ °C}$ $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | 2.48 2.40 2.10 | 2.51 | | V |
| V_{OL} | Output voltage low | $I_{sink} = 2\text{ mA}$ $-40\text{ °C} < T_{amb} < +85\text{ °C}$ $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | | 130 | 210 230 310 | mV |
| CMRR | Common mode rejection ratio | $0 < V_{ICM} < V_{CC}$ $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | 55 | 74 | | dB |
| T_{PLH} | Propagation delay (low to high) | $f = 1\text{ kHz}$, $C_L = 30\text{ pF}$, $R_L = 1\text{ M}\Omega$ Overdrive = 10 mV $-40\text{ °C} < T_{amb} < +125\text{ °C}$ Overdrive = 100 mV $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | | 6.4 2.3 | 12 14 3.0 3.7 | μs |

Table 5. $V_{CC} = +2.7\text{ V}$, $T_{amb} = +25\text{ °C}$, $V_{ICM} = V_{CC}/2$ (unless otherwise specified)⁽¹⁾ (continued)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|-----------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|------|------|------------|---------------|
| T_{PHL} | Propagation delay (high to low) | $f = 1\text{ kHz}$, $C_L = 30\text{ pF}$, $R_L = 1\text{ M}\Omega$ Overdrive = 10 mV $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | | 6.4 | 12 14 | μs |
| | | Overdrive = 100 mV $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | | 2.2 | 3.0 3.7 | |
| T_R | Rise time (10% to 90%) | $C_L = 30\text{ pF}$, $R_L = 1\text{ M}\Omega$ | | 120 | | ns |
| T_F | Fall time (90% to 10%) | $C_L = 30\text{ pF}$, $R_L = 1\text{ M}\Omega$ | | 130 | | ns |
| T_{ON} | Power-up time | | | 1.1 | 1.7 | ms |

1. All values over the temperature range are guaranteed through correlation and simulation. No production test is performed at the temperature range limits.
2. The offset is defined as the average value of positive and negative trip points (input voltage differences requested to change the output state in each direction).
3. The hysteresis is a built-in feature of the TS882. It is defined as the voltage difference between the trip points.
4. Maximum values include unavoidable inaccuracies of the industrial tests.

Table 6. $V_{CC} = +5\text{ V}$, $T_{amb} = +25\text{ °C}$, $V_{ICM} = V_{CC}/2$ (unless otherwise specified)⁽¹⁾

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|-----------------|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------|----------|-------------------|-------------------------|
| V_{IO} | Input offset voltage ⁽²⁾ | $T_{amb} = +25\text{ °C}$ $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | -6 | 1 | 6 | mV |
| ΔV_{IO} | Input offset voltage drift | $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | | 3 | | $\mu\text{V}/\text{°C}$ |
| V_{HYST} | Input hysteresis voltage ⁽³⁾ | $T_{amb} = +25\text{ °C}$ $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | 1.6 | 3.1 | 4.2 | mV |
| I_{IO} | Input offset current ⁽⁴⁾ | $T_{amb} = +25\text{ °C}$ $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | | | 10 100 | pA |
| I_{IB} | Input bias current ⁽⁴⁾ | $T_{amb} = +25\text{ °C}$ $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | | 1 | 10 100 | pA |
| I_{CC} | Supply current per operator | No load, output low, $V_{ID} = -0.1\text{ V}$ $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | | 350 | 500 | nA |
| | | No load, output high, $V_{ID} = +0.1\text{ V}$ $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | | 250 | 400 | |
| I_{SC} | Short-circuit current | Source Sink | | 32 32 | | mA |
| V_{OH} | Output voltage high | $I_{source} = 2\text{ mA}$ $-40\text{ °C} < T_{amb} < +85\text{ °C}$ $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | 4.86 4.75 4.60 | 4.88 | | V |
| V_{OL} | Output voltage low | $I_{sink} = 2\text{ mA}$ $-40\text{ °C} < T_{amb} < +85\text{ °C}$ $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | | 90 | 130 170 280 | mV |
| CMRR | Common mode rejection ratio | $0 < V_{ICM} < V_{CC}$ $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | 55 | 78 | | dB |

Table 6. $V_{CC} = +5\text{ V}$, $T_{amb} = +25\text{ °C}$, $V_{ICM} = V_{CC}/2$ (unless otherwise specified)⁽¹⁾ (continued)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|-----------|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|------|------|------------|---------------|
| SVR | Supply voltage rejection | $\Delta V_{CC} = 1.2\text{ V to }5\text{ V}$ $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | 65 | 80 | | dB |
| T_{PLH} | Propagation delay (low to high) | $f = 1\text{ kHz}$, $C_L = 30\text{ pF}$, $R_L = 1\text{ M}\Omega$ Overdrive = 10 mV $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | | 8.3 | 13 22 | μs |
| | | Overdrive = 100 mV $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | | 2.5 | 3.4 4.1 | |
| T_{PHL} | Propagation delay (high to low) | $f = 1\text{ kHz}$, $C_L = 30\text{ pF}$, $R_L = 1\text{ M}\Omega$ Overdrive = 10 mV $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | | 9.0 | 16 19 | μs |
| | | Overdrive = 100 mV $-40\text{ °C} < T_{amb} < +125\text{ °C}$ | | 2.6 | 3.5 4.2 | |
| T_R | Rise time (10% to 90%) | $C_L = 30\text{ pF}$, $R_L = 1\text{ M}\Omega$ | | 160 | | ns |
| T_F | Fall time (90% to 10%) | $C_L = 30\text{ pF}$, $R_L = 1\text{ M}\Omega$ | | 150 | | ns |
| T_{ON} | Power-up time | | | 1.1 | 1.7 | ms |

1. All values over the temperature range are guaranteed through correlation and simulation. No production test is performed at the temperature range limits.
2. The offset is defined as the average value of positive and negative trip points (input voltage differences requested to change the output state in each direction).
3. The hysteresis is a built-in feature of the TS882 device. It is defined as the voltage difference between the trip points.
4. Maximum values include unavoidable inaccuracies of the industrial tests.

Figure 3. Current consumption per operator vs. supply voltage - output low

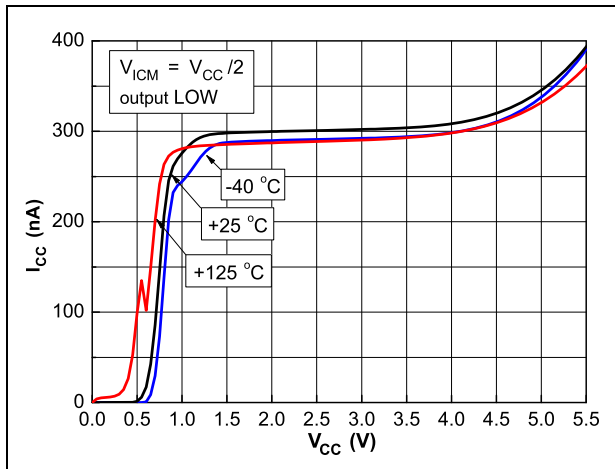


Figure 4. Current consumption per operator vs. supply voltage - output high

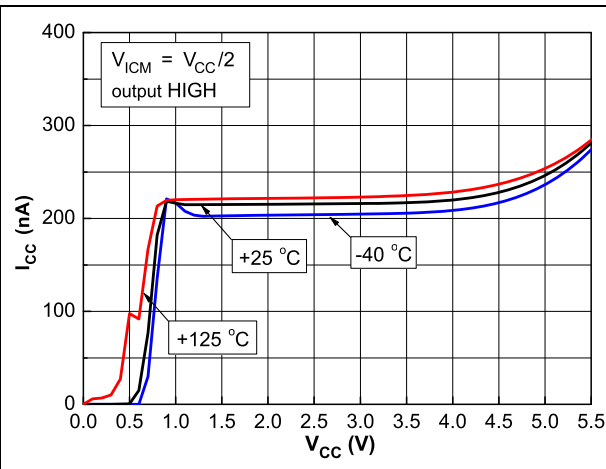


Figure 5. Current consumption per operator vs. input common mode voltage at V_{CC} = 1.2 V

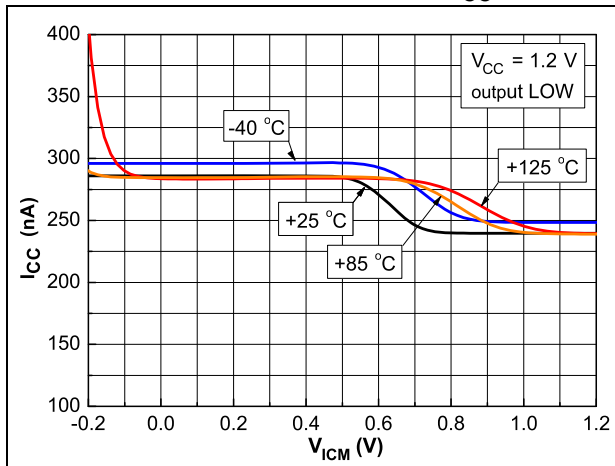


Figure 6. Current consumption per operator vs. input common mode voltage at V_{CC} = 5 V

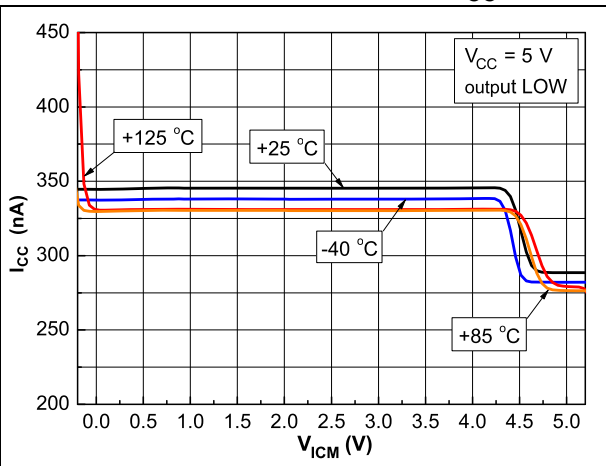


Figure 7. Current consumption per operator vs. temperature

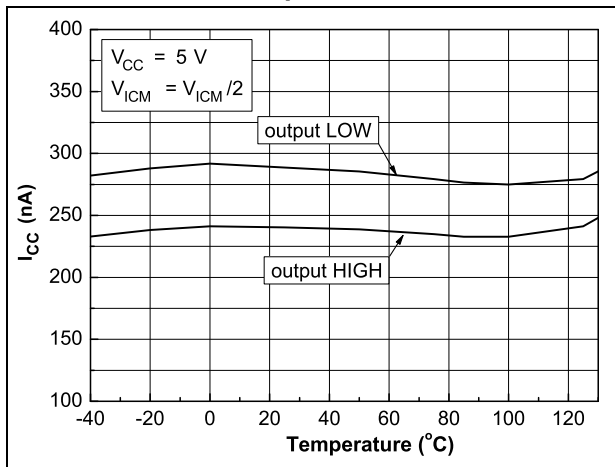


Figure 8. Current consumption per operator vs. toggle frequency

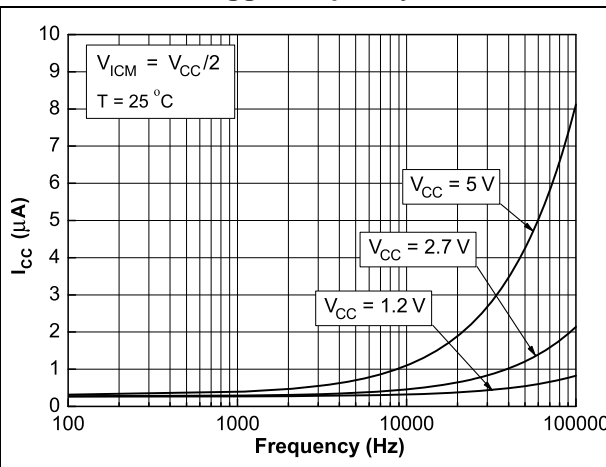


Figure 9. Input offset voltage vs. input common mode voltage at $V_{CC} = 1.2\text{ V}$

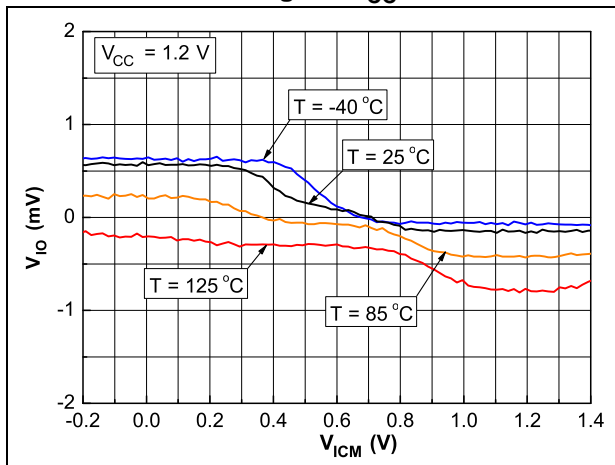


Figure 10. Input hysteresis voltage vs. input common mode voltage at $V_{CC} = 1.2\text{ V}$

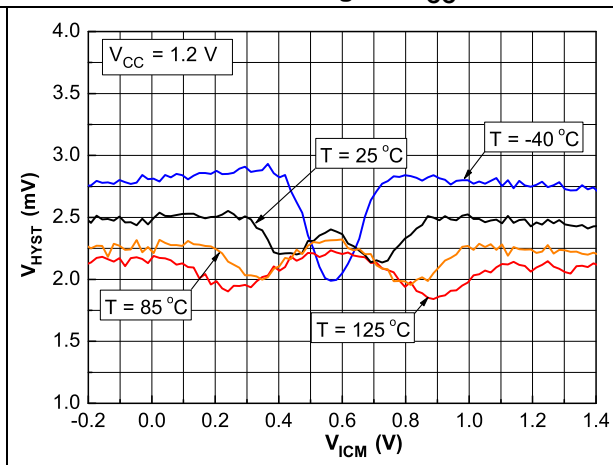


Figure 11. Input offset voltage vs. input common mode voltage at $V_{CC} = 5\text{ V}$

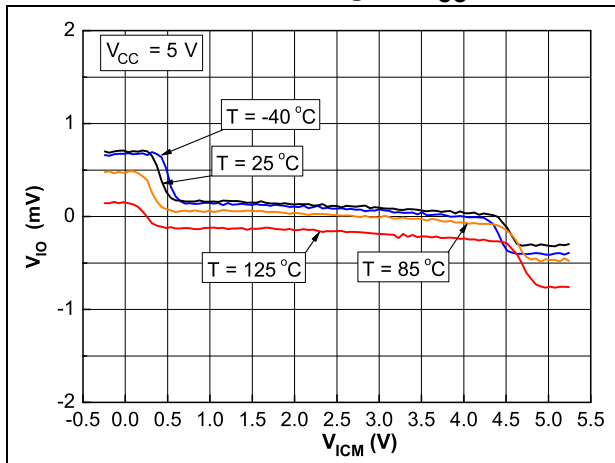


Figure 12. Input hysteresis voltage vs. input common mode voltage at $V_{CC} = 5\text{ V}$

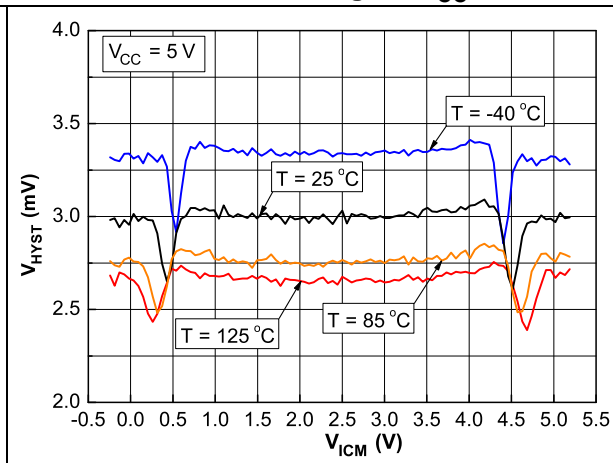


Figure 13. Input offset voltage vs. temperature

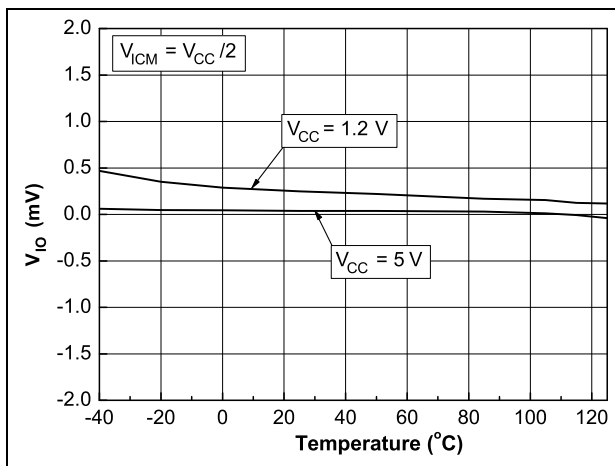


Figure 14. Input hysteresis voltage vs. temperature

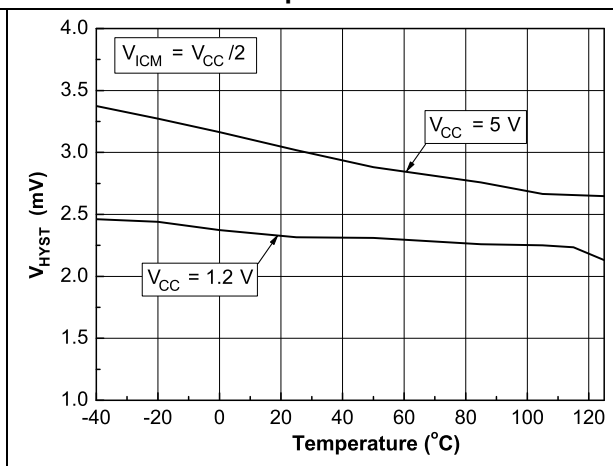


Figure 15. Output voltage drop vs. sink current at $V_{CC} = 1.2\text{ V}$

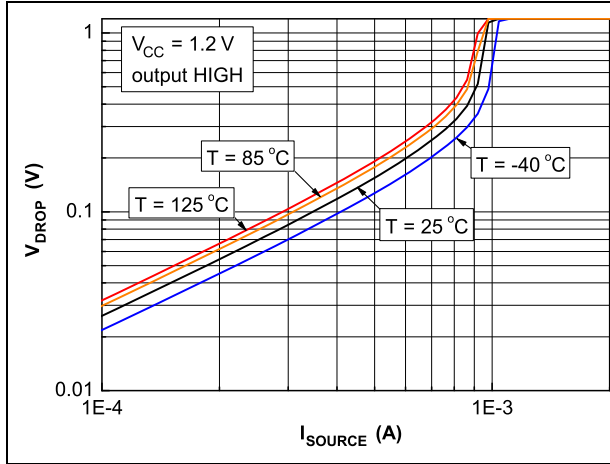


Figure 16. Output voltage drop vs. source current at $V_{CC} = 1.2\text{ V}$

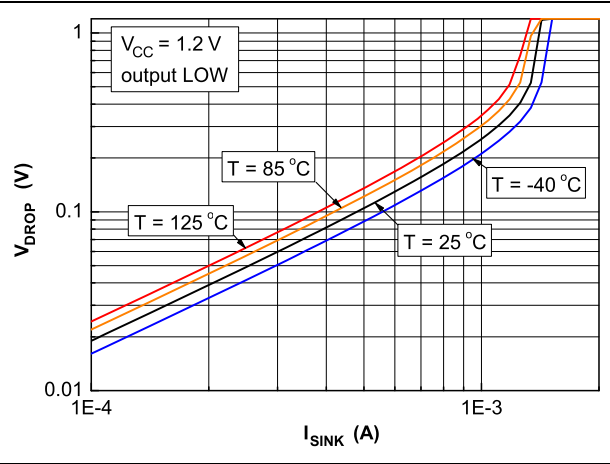


Figure 17. Output voltage drop vs. sink current at $V_{CC} = 2.7\text{ V}$

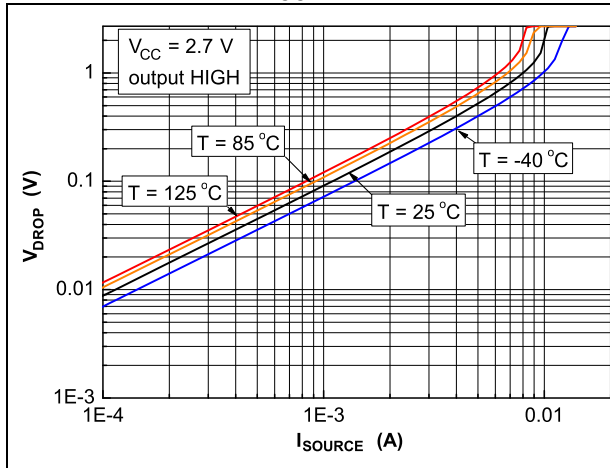


Figure 18. Output voltage drop vs. source current at $V_{CC} = 2.7\text{ V}$

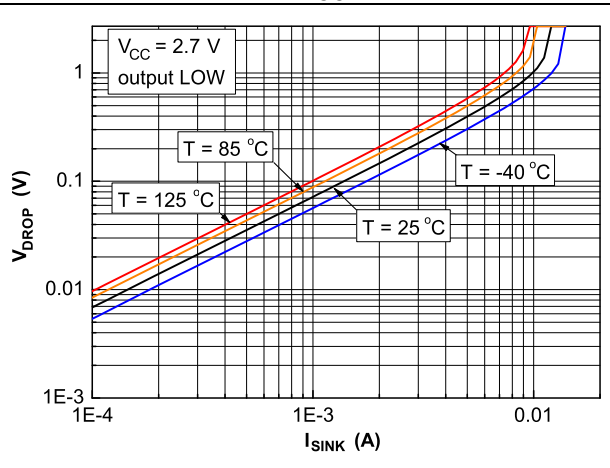


Figure 19. Output voltage drop vs. sink current at $V_{CC} = 5\text{ V}$

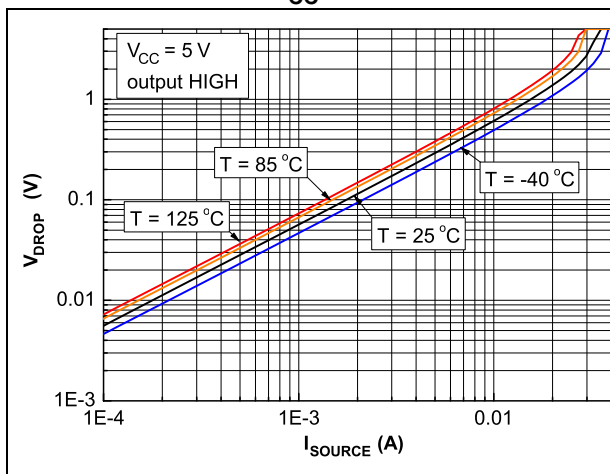


Figure 20. Output voltage drop vs. source current at $V_{CC} = 5\text{ V}$

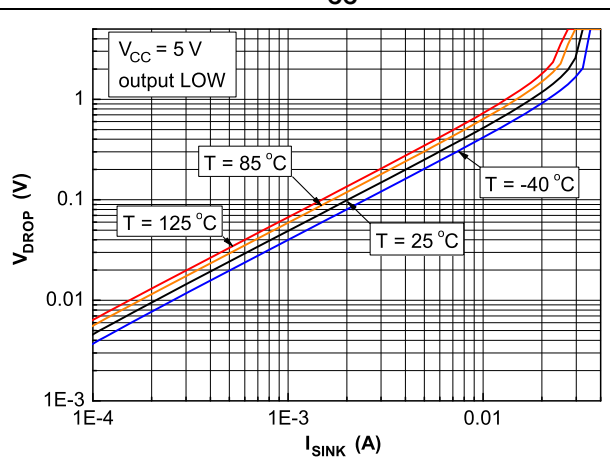


Figure 21. Propagation delay T_{PLH} vs. input common mode voltage at $V_{CC} = 1.2 V$

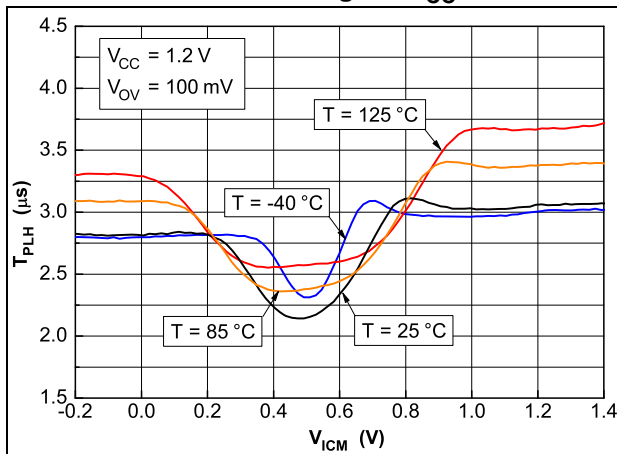


Figure 22. Propagation delay T_{PHL} vs. input common mode voltage at $V_{CC} = 1.2 V$

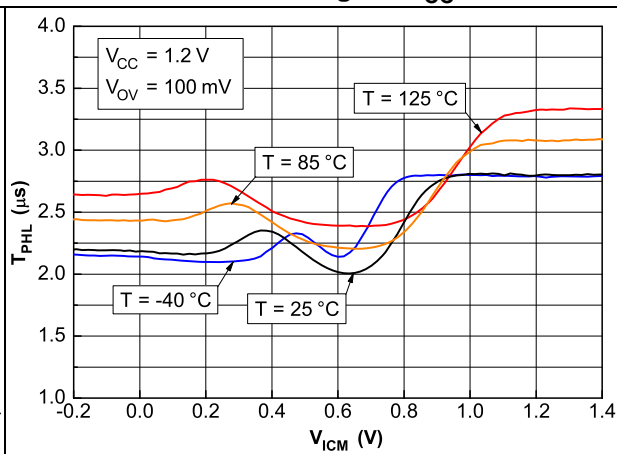


Figure 23. Propagation delay T_{PLH} vs. input common mode voltage at $V_{CC} = 5 V$

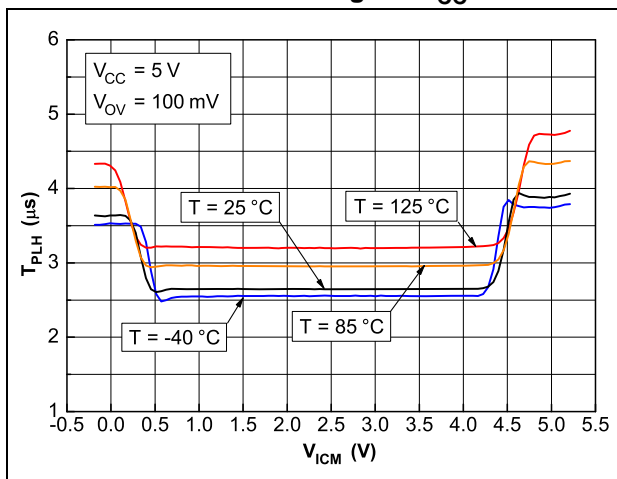


Figure 24. Propagation delay T_{PHL} vs. input common mode voltage at $V_{CC} = 5 V$

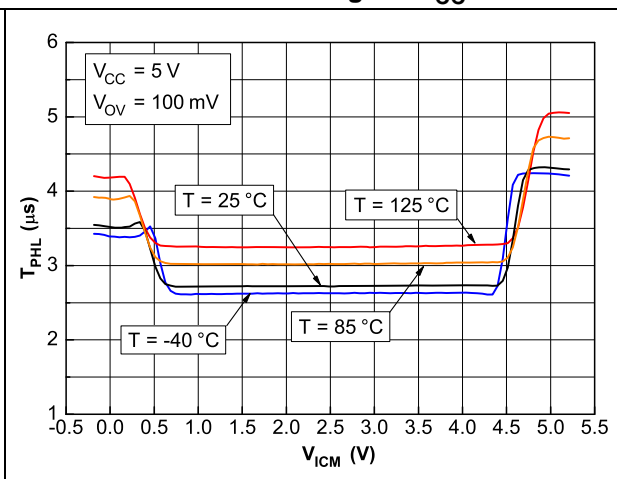


Figure 25. Propagation delay T_{PLH} vs. input signal overdrive at $V_{CC} = 1.2 V$

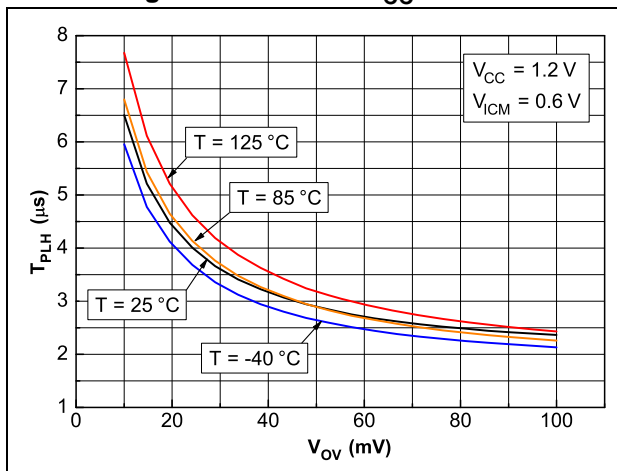


Figure 26. Propagation delay T_{PHL} vs. input signal overdrive at $V_{CC} = 1.2 V$

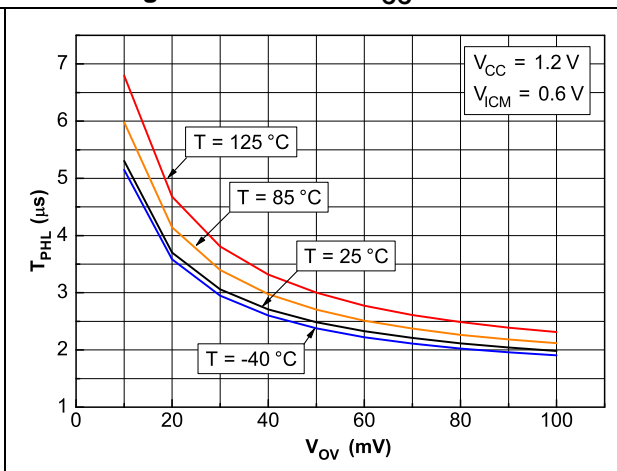


Figure 27. Propagation delay T_{PLH} vs. input signal overdrive at $V_{CC} = 5\text{ V}$

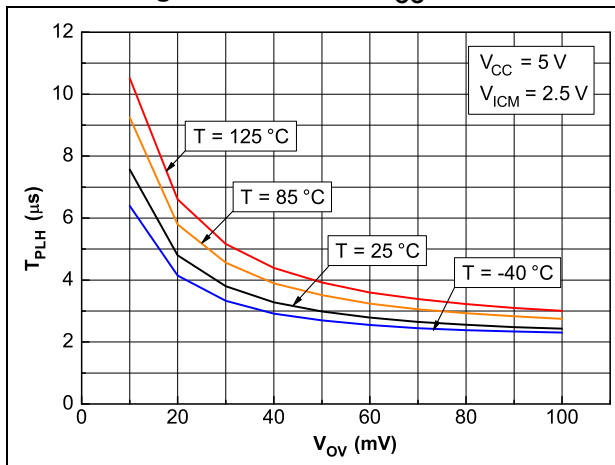


Figure 28. Propagation delay T_{PHL} vs. input signal overdrive at $V_{CC} = 5\text{ V}$

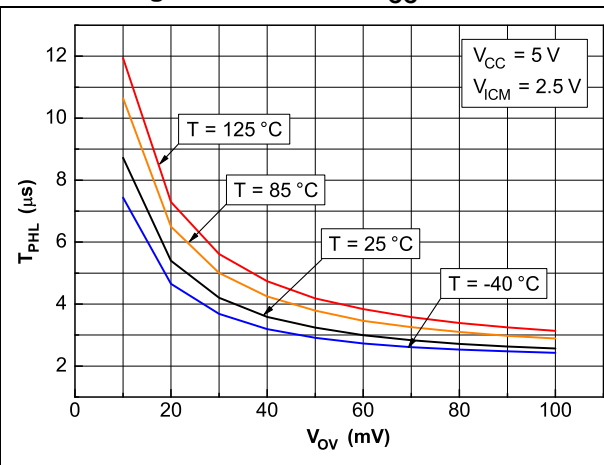


Figure 29. Propagation delay T_{PLH} vs. supply voltage for signal overdrive 10 mV

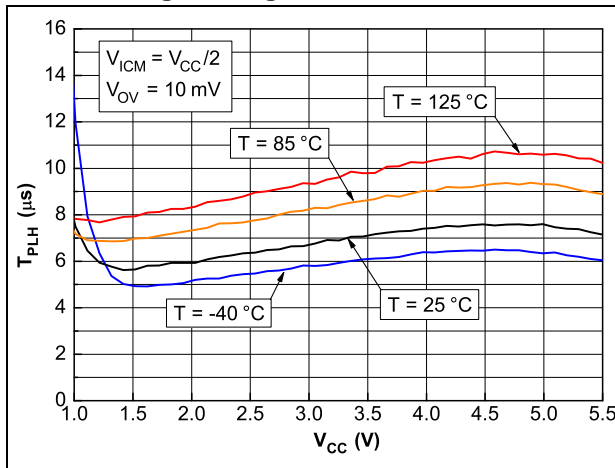


Figure 30. Propagation delay T_{PHL} vs. supply voltage for signal overdrive 10 mV

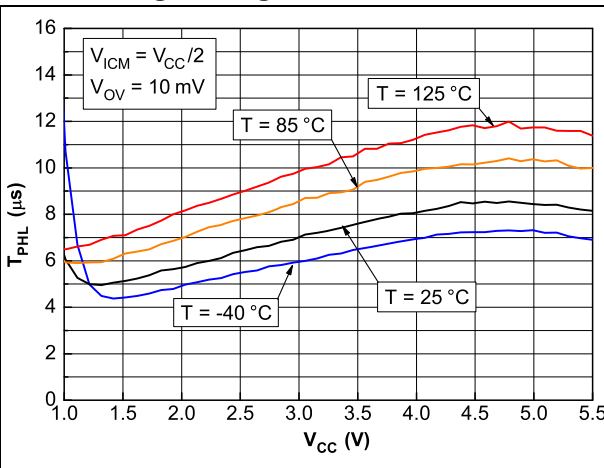


Figure 31. Propagation delay T_{PLH} vs. supply voltage for signal overdrive 100 mV

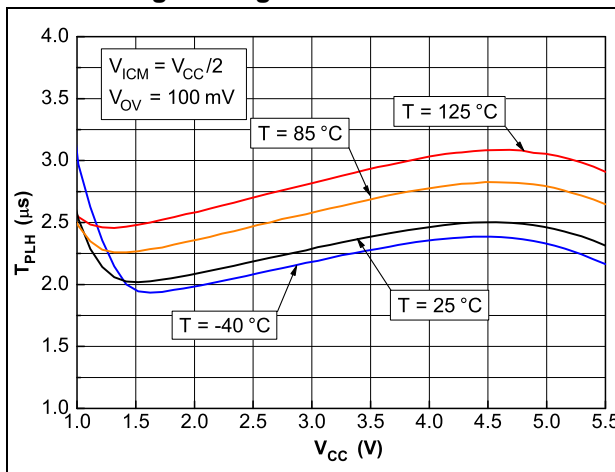


Figure 32. Propagation delay T_{PHL} vs. supply voltage for signal overdrive 100 mV

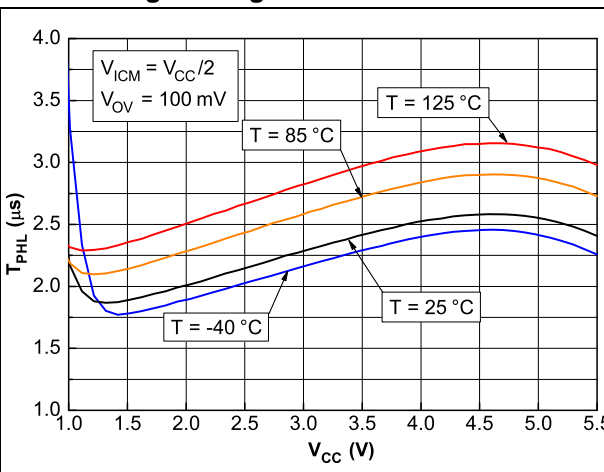


Figure 33. Propagation delay vs. temperature for signal overdrive 10 mV

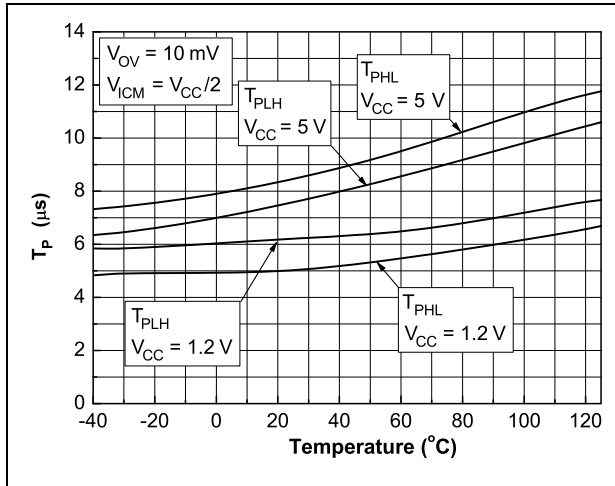
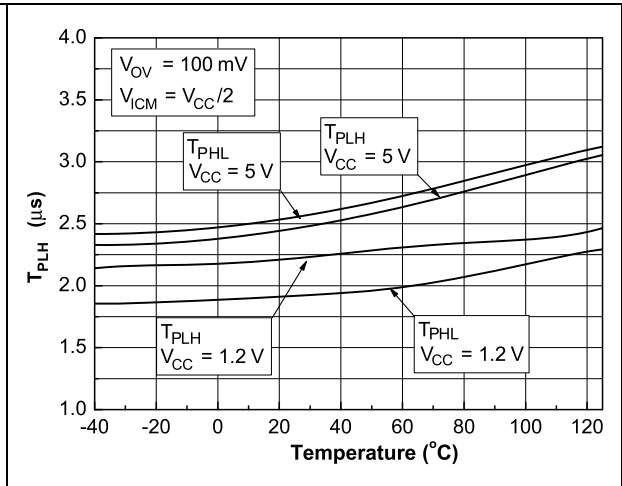


Figure 34. Propagation delay vs. temperature for signal overdrive 100 mV



4 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK[®] packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions and product status are available at: www.st.com. ECOPACK is an ST trademark.

4.1 DFN8 2 x 2 mm package information

Figure 35. DFN8 2 x 2 mm package outline

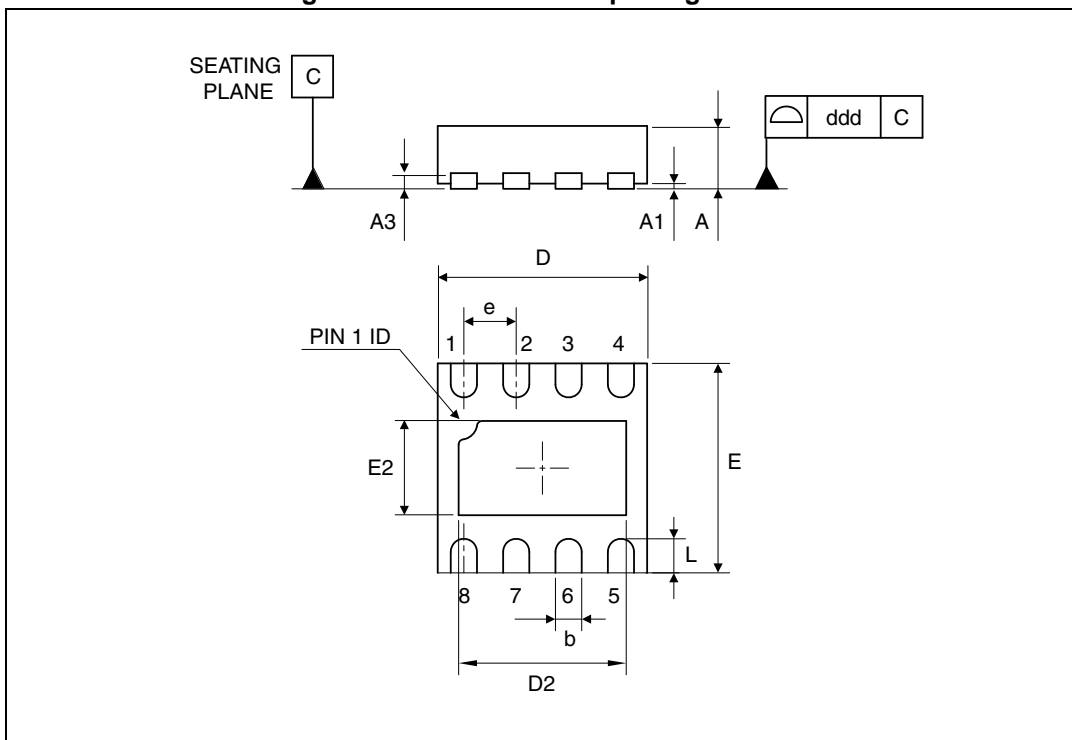
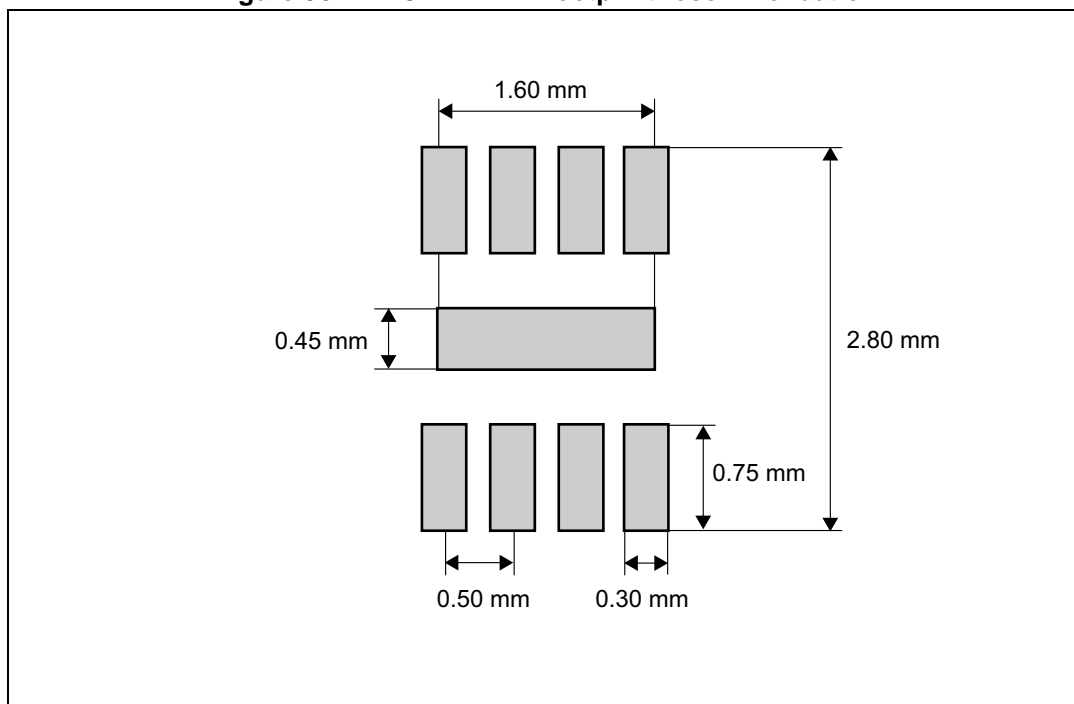


Table 7. DFN8 2 x 2 mm package mechanical data (pitch 0.5 mm)

| Symbol | Dimensions | | | | | |
|--------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 0.51 | 0.55 | 0.60 | 0.020 | 0.022 | 0.024 |
| A1 | | | 0.05 | | | 0.002 |
| A3 | | 0.15 | | | 0.006 | |
| b | 0.18 | 0.25 | 0.30 | 0.007 | 0.010 | 0.012 |
| D | 1.85 | 2.00 | 2.15 | 0.073 | 0.079 | 0.085 |
| D2 | 1.45 | 1.60 | 1.70 | 0.057 | 0.063 | 0.067 |
| E | 1.85 | 2.00 | 2.15 | 0.073 | 0.079 | 0.085 |
| E2 | 0.75 | 0.90 | 1.00 | 0.030 | 0.035 | 0.039 |
| e | | 0.50 | | | 0.020 | |
| L | | | 0.50 | | | 0.020 |
| ddd | | | 0.08 | | | 0.003 |

Figure 36. DFN8 2 x 2 mm footprint recommendation



4.2 MiniSO8 package information

Figure 37. MiniSO8 package outline

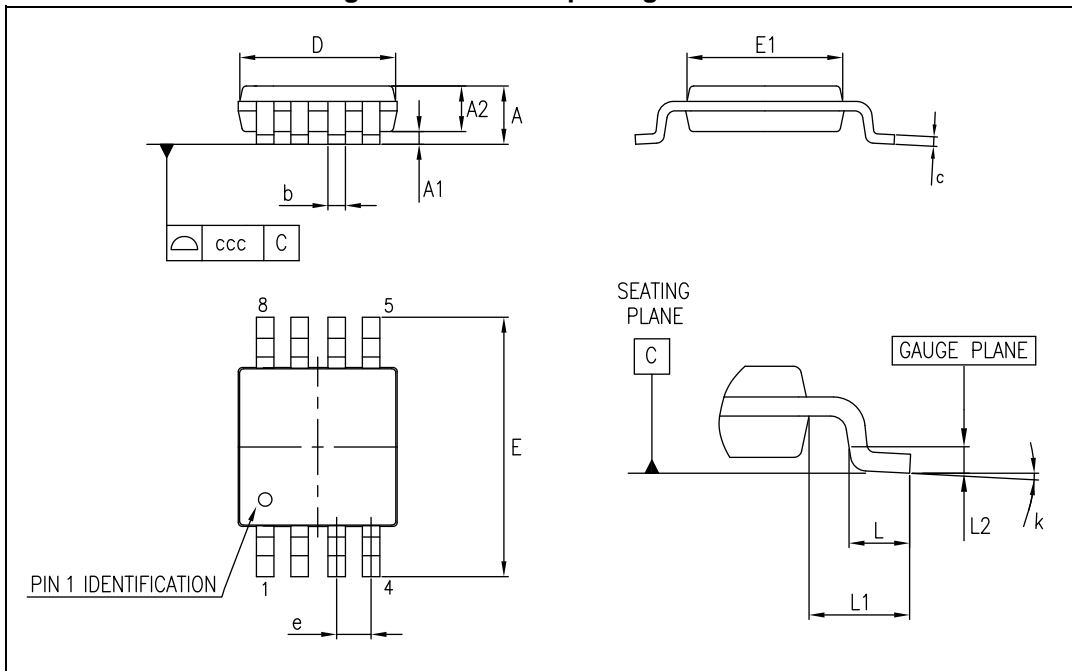


Table 8. MiniSO8 package mechanical data

| Symbol | Dimensions | | | | | |
|--------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | | | 1.10 | | | 0.043 |
| A1 | 0 | | 0.15 | 0 | | 0.006 |
| A2 | 0.75 | 0.85 | 0.95 | 0.030 | 0.033 | 0.037 |
| b | 0.22 | | 0.40 | 0.009 | | 0.016 |
| c | 0.08 | | 0.23 | 0.003 | | 0.009 |
| D | 2.80 | 3.00 | 3.20 | 0.11 | 0.118 | 0.126 |
| E | 4.65 | 4.90 | 5.15 | 0.183 | 0.193 | 0.203 |
| E1 | 2.80 | 3.00 | 3.10 | 0.11 | 0.118 | 0.122 |
| e | | 0.65 | | | 0.026 | |
| L | 0.40 | 0.60 | 0.80 | 0.016 | 0.024 | 0.031 |
| L1 | | 0.95 | | | 0.037 | |
| L2 | | 0.25 | | | 0.010 | |
| k | 0° | | 8° | 0° | | 8° |
| ccc | | | 0.10 | | | 0.004 |

4.3 SO14 package information

Figure 38. SO14 package outline

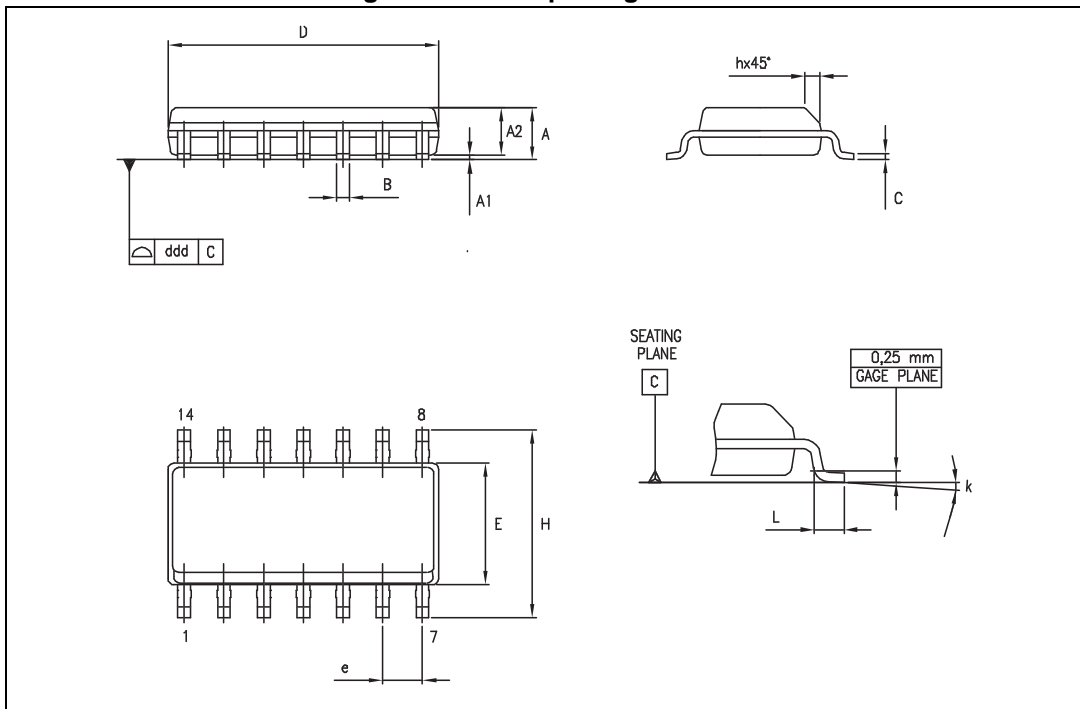


Table 9. SO14 package mechanical data

| Dimensions ⁽¹⁾ | | | | | | | |
|---------------------------|-------------|------|------|--------|------|-------|------|
| Symbol | Millimeters | | | Inches | | | Note |
| | Min. | Typ. | Max. | Min. | Typ. | Max. | |
| A | 1.35 | | 1.75 | 0.05 | | 0.068 | |
| A1 | 0.10 | | 0.25 | 0.004 | | 0.009 | |
| A2 | 1.10 | | 1.65 | 0.04 | | 0.06 | |
| B | 0.33 | | 0.51 | 0.01 | | 0.02 | |
| C | 0.19 | | 0.25 | 0.007 | | 0.009 | |
| D | 8.55 | | 8.75 | 0.33 | | 0.34 | (2) |
| E | 3.80 | | 4.0 | 0.15 | | 0.15 | |
| e | | 1.27 | | | 0.05 | | |
| H | 5.80 | | 6.20 | 0.22 | | 0.24 | |
| L | 0.40 | | 1.27 | 0.015 | | 0.05 | |
| k | 0° | | 8° | 0° | | 8° | |
| ddd | | | 0.10 | | | 0.004 | |

1. Drawing dimensions include "Single" and "Matrix" versions.
2. Dimension "D" does not include mold flash, protrusions or gate burrs. Mold flash, protrusions or gate burrs shall not exceed 0.15 mm per side.

4.4 QFN16 3 x 3 package information

Figure 39. QFN16 3 x 3 mm (pitch 0.5 mm) package outline

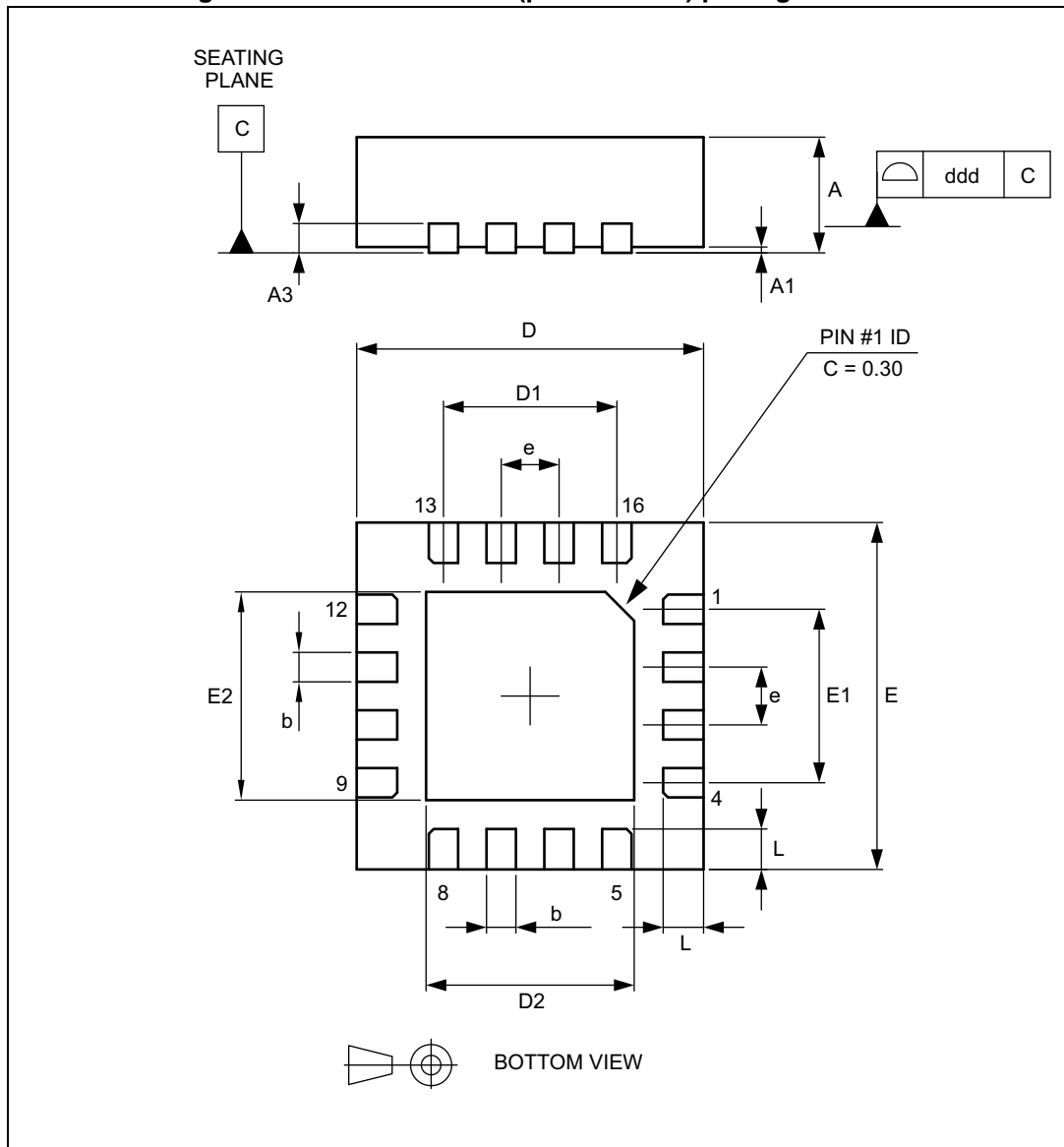


Table 10. QFN16 3 x 3 mm (pitch 0.5 mm) package mechanical data

| Symbol | Dimensions | | | | | |
|--------|---------------------------|------|------|---------------------------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 0.80 | 0.90 | 1.00 | 0.031 | 0.035 | 0.039 |
| A1 | | 0.02 | 0.05 | | 0.001 | 0.002 |
| A3 | | 0.20 | | | 0.008 | |
| b | 0.18 | 0.25 | 0.30 | 0.007 | 0.010 | 0.012 |
| D | 2.85 | 3.00 | 3.15 | 0.112 | 0.118 | 0.124 |
| D1 | | 1.50 | | | 0.059 | |
| D2 | See exposed pad variation | | | See exposed pad variation | | |
| E | 2.85 | 3.00 | 3.15 | 0.112 | 0.118 | 0.124 |
| E1 | | 1.50 | | | 0.059 | |
| E2 | See exposed pad variation | | | See exposed pad variation | | |
| e | 0.45 | 0.50 | 0.55 | 0.018 | 0.020 | 0.022 |
| L | 0.30 | 0.40 | 0.50 | 0.012 | 0.016 | 0.020 |
| ddd | | | 0.08 | | | 0.003 |

4.5 TSSOP14 package information

Figure 41. TSSOP14 package outline

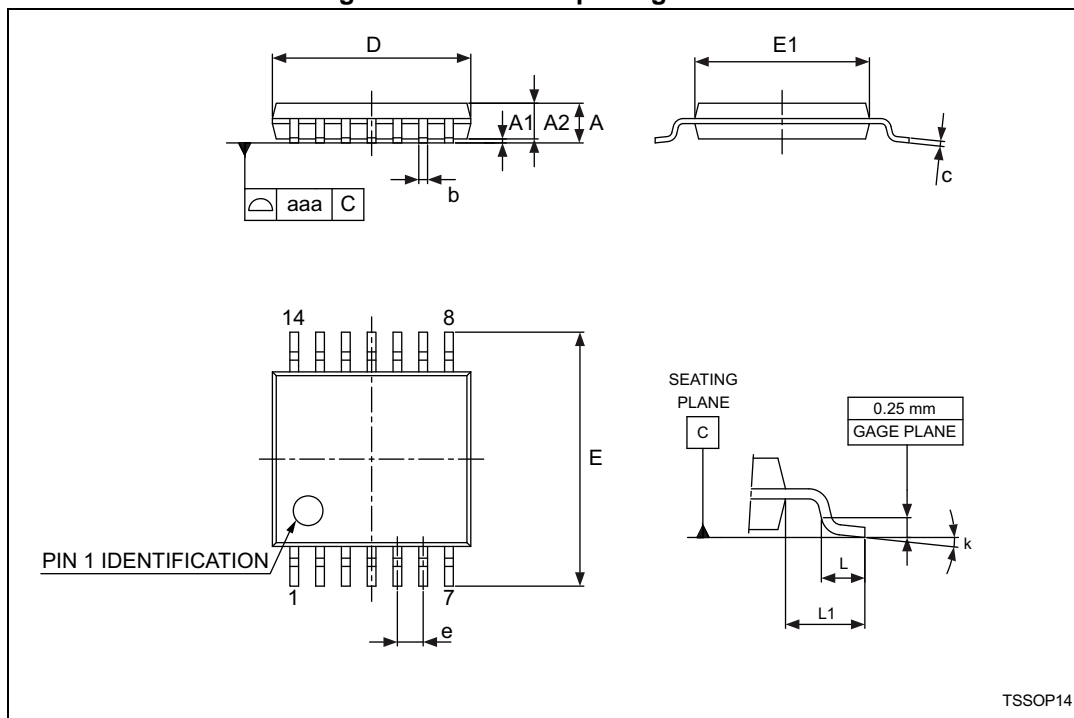


Table 11. TSSOP14 package mechanical data

| Symbol | Dimensions | | | | | |
|--------|-------------|------|------|--------|--------|--------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | | | 1.20 | | | 0.047 |
| A1 | 0.05 | | 0.15 | 0.002 | 0.004 | 0.006 |
| A2 | 0.80 | 1.00 | 1.05 | 0.031 | 0.039 | 0.041 |
| b | 0.19 | | 0.30 | 0.007 | | 0.012 |
| c | 0.09 | | 0.20 | 0.004 | | 0.0089 |
| D | 4.90 | 5.00 | 5.10 | 0.193 | 0.197 | 0.201 |
| E | 6.20 | 6.40 | 6.60 | 0.244 | 0.252 | 0.260 |
| E1 | 4.30 | 4.40 | 4.50 | 0.169 | 0.173 | 0.176 |
| e | | 0.65 | | | 0.0256 | |
| L | 0.45 | 0.60 | 0.75 | 0.018 | 0.024 | 0.030 |
| L1 | | 1.00 | | | 0.039 | |
| k | 0° | | 8° | 0° | | 8° |
| aaa | | | 0.10 | | | 0.004 |

5 Revision history

Table 12. Document revision history

| Date | Revision | Changes |
|-------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 18-Jan-2013 | 1 | Initial release. |
| 02-May-2013 | 2 | <p>Added TS884 device to header, Description, and Table 1: Device summary.</p> <p>Updated title (added "quad" comparator).</p> <p>Updated Features and Table 2 (ESD tolerance: "6 kV" HBM replaced by "8 kV" HBM).</p> <p>Updated Description in accordance with added TS884 device.</p> <p>Added SO14, TSSOP14 and QFN16 3 x 3 mm package to Features, figure on page 1, Section 4: Package information. and Table 1: Device summary.</p> <p>Moved Figure 1: Pin connections TS882 (top view) to page 3.</p> <p>Added Figure 2: Pin connections TS884 (top view).</p> <p>Updated Table 2: Absolute maximum ratings (added TS884 device RTHJA values).</p> <p>Minor corrections throughout document.</p> |
| 14-Jul-2014 | 3 | Updated Table 1: Device summary on page 1. |
| 06-Jul-2017 | 4 | Added order code TS882IYST in Table 1: Device summary and "Automotive" in Applications . |