



FRONTGRADE

DATASHEET

UT54ACS244/UT54ACTS244

Octal Buffers & Line Drivers,
Three-State Outputs

11/1/2010
Version #: 1.0

Features

- Three-state outputs drive bus lines or buffer memory address registers
- 1.2μ CMOS
 - > Latchup immune
- High speed
- Low power consumption
- Single 5-volt supply
- Available QML Q or V processes
- Flexible package
 - > 20-pin DIP
 - > 20-lead flatpack
- UT54ACS244 – SMD 5962-96570
- UT54ACTS244 – SMD 5962-96571

Description

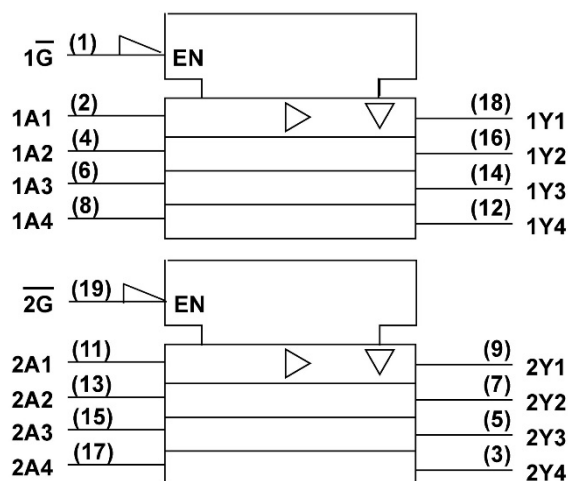
The UT54ACS244 and the UT54ACTS244 are non-inverting octal buffer and line drivers which improve the performance and density of three-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters.

The devices are characterized over full military temperature range of -55°C to +125°C.

Function Table

| Inputs | | Output |
|--------------------------------|---|--------|
| $\overline{1G}, \overline{2G}$ | A | Y |
| L | L | H |
| L | H | L |
| H | X | Z |

Logic Symbol



Note:

1. Logic symbol in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

Pinouts

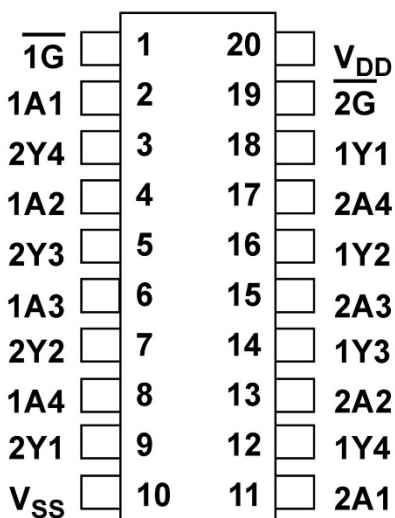


Figure 1: 20-Pin DIP, Top View

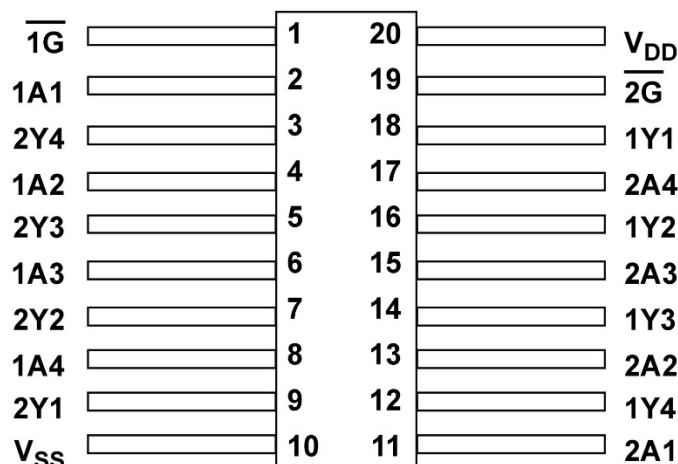
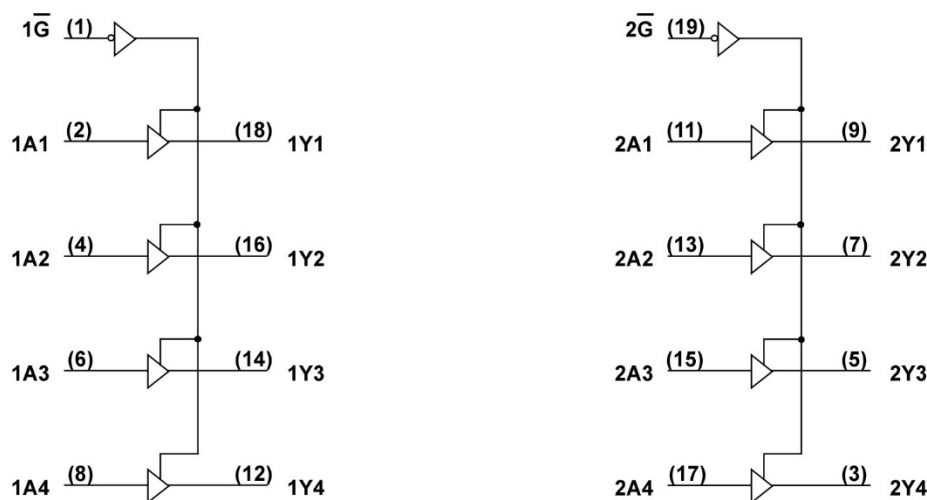


Figure 2: 20-Lead Flatpack Top View

Logic Diagram



Operational Environment¹

| Parameter | Limit | Units |
|----------------------------|--------|-------------------------|
| Total Dose | 1.0E6 | rads(Si) |
| SEU Threshold ² | 80 | MeV-cm ² /mg |
| SEL Threshold | 120 | MeV-cm ² /mg |
| Neutron Fluence | 1.0E14 | n/cm ² |

Notes:

- Logic will not latchup during radiation exposure within the limits defined in the table.
- Device storage elements are immune to SEU affects.

Absolute Maximum Ratings

| Symbol | Parameter | Limit | Units |
|---------------|--|----------------------|-------|
| V_{DD} | Supply voltage | -0.3 to 7.0 | V |
| $V_{I/O}$ | Voltage any pin | -.3 to $V_{DD} + .3$ | V |
| T_{STG} | Storage Temperature range | -65 to +150 | °C |
| T_J | Maximum junction temperature | +175 | °C |
| T_{LS} | Lead temperature (soldering 5 seconds) | +300 | °C |
| Θ_{JC} | Thermal resistance junction to case | 20 | °C/W |
| I_I | DC input current | ± 10 | mA |
| P_D | Maximum power dissipation | 1 | W |

Note:

- Stresses outside the listed absolute maximum ratings may cause permanent damage to the device. This is a stress rating only, functional operation of the device at these or any other conditions beyond limits indicated in the operational sections is not recommended. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Recommended Operating Conditions

| Symbol | Parameter | Limit | Units |
|----------|-----------------------|---------------|-------|
| V_{DD} | Supply voltage | 4.5 to 5.5 | V |
| V_{IN} | Input voltage any pin | 0 to V_{DD} | V |
| T_C | Temperature range | -55 to + 125 | °C |

DC Electrical Characteristics⁷

($V_{DD} = 5.0V \pm 10\%$; $V_{SS} = 0V^6$, $-55^\circ C < T_C < +125^\circ C$); Unless otherwise noted, T_C is per the temperature range ordered.

| Symbol | Parameter | Condition | MIN | MAX | Unit |
|------------------|---|--|--------------------------------|--------------------|---------|
| V_{IL} | Low-level input voltage ¹ ACTS ACS | | | 0.8 .3 V_{DD} | V |
| V_{IH} | High-level input voltage ¹ ACTS ACS | | .5 V_{DD} .7 V_{DD} | | V |
| I_{IN} | Input leakage current ACTS/ACS | $V_{IN} = V_{DD}$ or V_{SS} | -1 | 1 | μA |
| V_{OL} | Low-level output voltage ³ ACTS ACS | $I_{OL} = 12.0mA$ $I_{OL} = 100\mu A$ | | 0.40 0.25 | V |
| V_{OH} | High-level output voltage ³ ACTS ACS | $I_{OH} = -12.0mA$ $I_{OH} = -100\mu A$ | .7 V_{DD} $V_{DD} - 0.25$ | | V |
| I_{OL} | Output current ¹⁰ (Sink) | $V_{IN} = V_{DD}$ or V_{SS} $V_{OL} = 0.4V$ | 12 | | mA |
| I_{OH} | Output current ¹⁰ (Source) | $V_{IN} = V_{DD}$ or V_{SS} $V_{OH} = V_{DD} - 0.4V$ | -12 | | mA |
| I_{OZ} | Three-state output leakage current | $V_O = V_{DD}$ and V_{SS} | -30 | 30 | μA |
| I_{OS} | Short-circuit output current ^{2,4} ACTS/ACS | $V_O = V_{DD}$ and V_{SS} | -300 | 300 | mA |
| P_{total} | Power dissipation ^{2,8,9} | $C_L = 50pF$ | | 2.0 | mW/MHz |
| I_{DDQ} | Quiescent Supply Current | $V_{DD} = 5.5V$ | | 10 | μA |
| ΔI_{DDQ} | Quiescent Supply Current Delta ACTS | For input under test $V_{IN} = V_{DD} - 2.1V$ For all other inputs $V_{IN} = V_{DD}$ or V_{SS} $V_{DD} = 5.5V$ | | 1.6 | mA |
| C_{IN} | Input capacitance ⁵ | $f = 1MHz$ @ 0V | | 15 | pF |
| C_{OUT} | Output capacitance ⁵ | $f = 1MHz$ @ 0V | | 15 | pF |

Notes:

- Functional tests are conducted in accordance with MIL-STD-883 with the following input test conditions: $V_{IH} = V_{IH(min)} + 20\%$, -0% ; $V_{IL} = V_{IL(max)} + 0\%$, -50% , as specified herein, for TTL, CMOS, or Schmitt compatible inputs. Devices may be tested using any input voltage within the above specified range, but are guaranteed to $V_{IH(min)}$ and $V_{IL(max)}$.
- Supplied as a design limit but not guaranteed or tested.
- Per MIL-PRF-38535, for current density $\leq 5.0E5$ amps/cm², the maximum product of load capacitance (per output buffer) times frequency should not exceed 3,765pF/MHz.
- Not more than one output may be shorted at a time for maximum duration of one second.
- Capacitance measured for initial qualification and when design changes may affect the value. Capacitance is measured between the designated terminal and V_{SS} at frequency of 1MHz and a signal amplitude of 50mV rms maximum.
- Maximum allowable relative shift equals 50mV.
- All specifications valid for radiation dose $\leq 1E6$ rads(Si).
- Power does not include power contribution of any TTL output sink current.
- Power dissipation specified per switching output.
- This value is guaranteed based on characterization data, but not tested.

AC Electrical Characteristics²

($V_{DD} = 5.0V \pm 10\%$; $V_{SS} = 0V^6$, $-55^\circ C < T_C < +125^\circ C$); Unless otherwise noted, T_C is per the temperature range ordered.

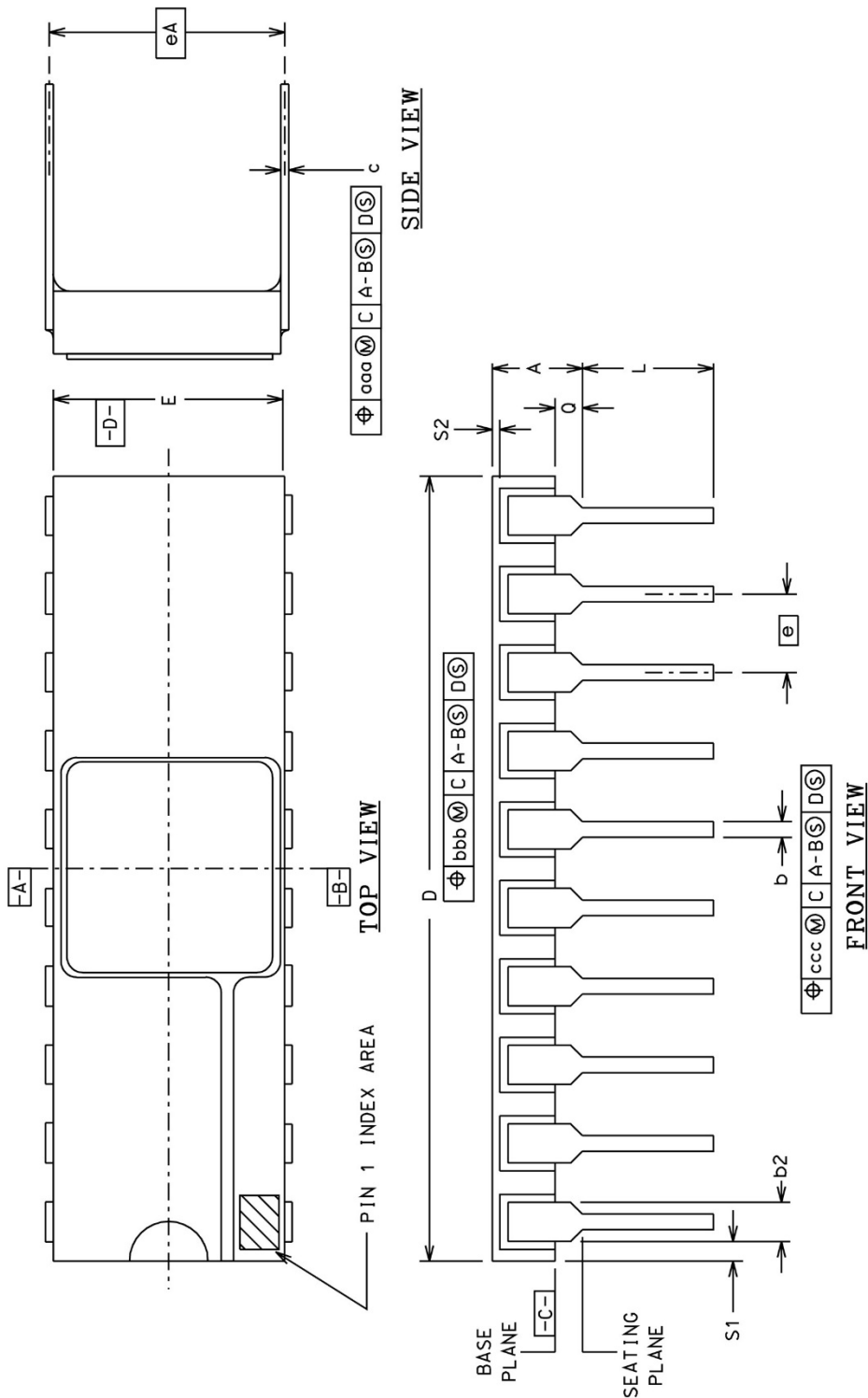
| Symbol | Parameter | Minimum | Maximum | Unit |
|-----------|---------------------------------------|---------|---------|------|
| t_{PLH} | Input to Yn | 1 | 11 | ns |
| t_{PHL} | Input to Yn | 1 | 11 | ns |
| t_{PZL} | \overline{G} low to Yn active | 2 | 12 | ns |
| t_{PZH} | \overline{G} low to Yn active | 2 | 12 | ns |
| t_{PLZ} | \overline{G} high to Yn three-state | 2 | 12 | ns |
| t_{PHZ} | \overline{G} high to Yn three-state | 2 | 12 | ns |

Notes:

1. Maximum allowable relative shift equals 50mV.
2. All specifications valid for radiation dose $\leq 1E6$ rads(Si).

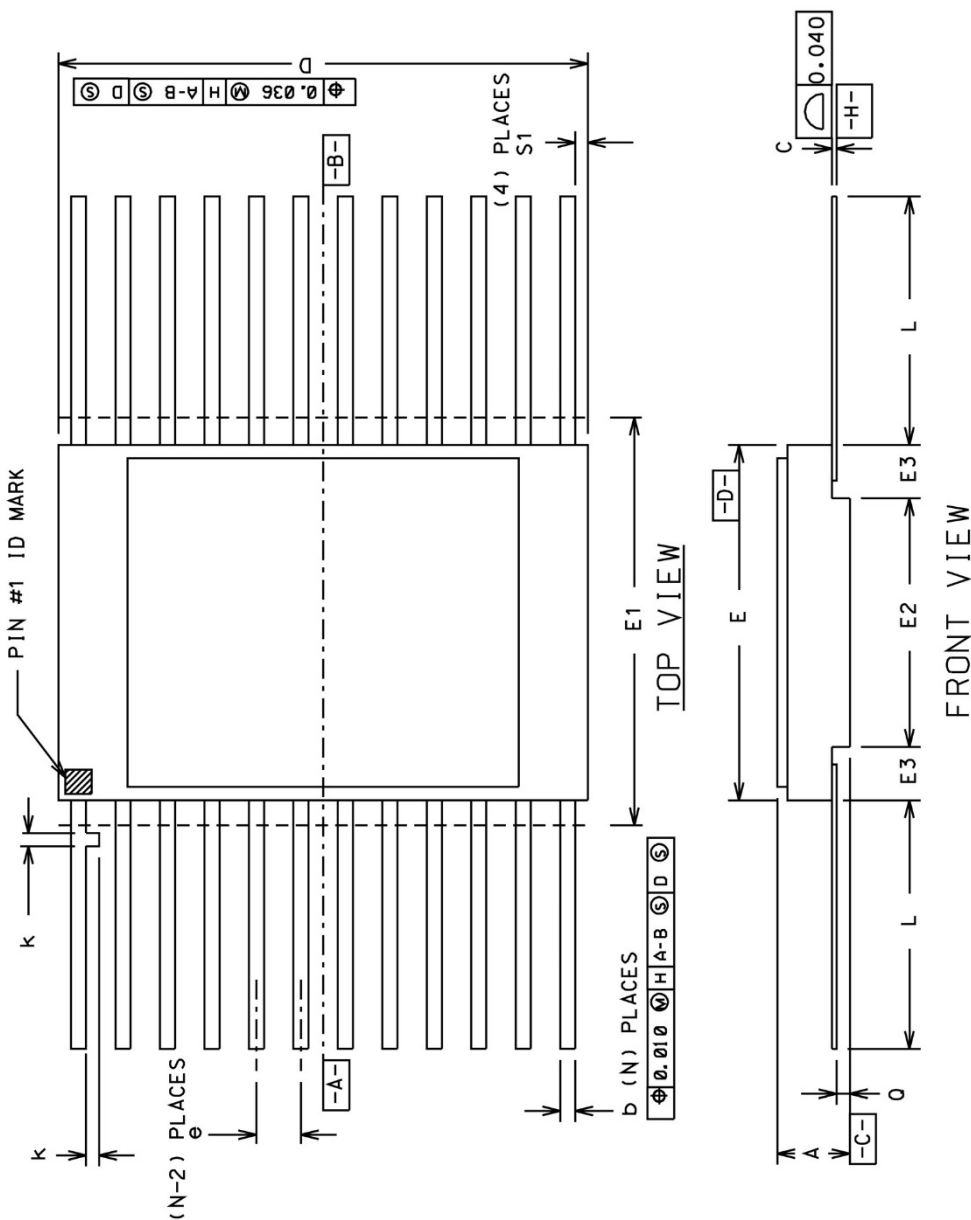
Packaging

Side-Brazed Packages



| PKG CONF IG | LEAD COUNT | MIL-STD- 1835 DWG CONF C | DIMENSION SYMBOLS | | | | | | | | | | | | | | |
|----------------|---------------|--------------------------------|-------------------|----------------|----------------|----------------|----------------|----------------|--------------|--------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | | A | b | b2 | c | D | E | e | eA | L | Q | S1 | S2 | oog | bbb | ccc |
| -01 | 14 | D-1 | 0.200 ----- | 0.026 0.014 | 0.065 0.045 | 0.018 0.008 | 0.785 ----- | 0.310 0.220 | 0.100 BSC | 0.300 BSC | 0.200 0.125 | 0.060 0.015 | ----- 0.005 | ----- 0.005 | 0.015 ----- | 0.030 ----- | 0.010 ----- |
| -02 | 16 | D-2 | 0.200 ----- | 0.026 0.014 | 0.065 0.045 | 0.018 0.008 | 0.840 ----- | 0.310 0.220 | 0.100 BSC | 0.300 BSC | 0.200 0.125 | 0.060 0.015 | ----- 0.005 | ----- 0.005 | 0.015 ----- | 0.030 ----- | 0.010 ----- |
| -03 | 20 | D-8 | 0.200 ----- | 0.026 0.014 | 0.065 0.045 | 0.018 0.008 | 1.060 ----- | 0.310 0.220 | 0.100 BSC | 0.300 BSC | 0.200 0.125 | 0.070 0.015 | ----- 0.005 | ----- 0.005 | 0.015 ----- | 0.030 ----- | 0.010 ----- |

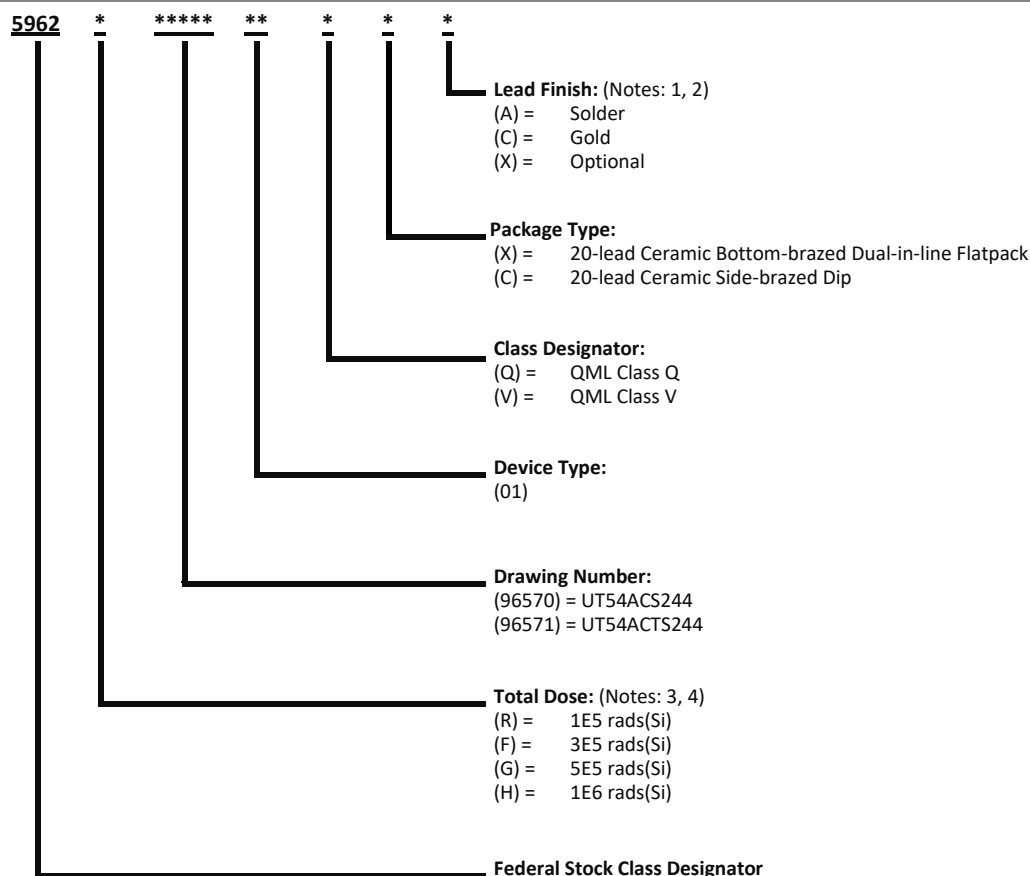
Flatpack Packages



| PKG CONFIG | LEAD COUNT | ML-STD 1835 DWG CONF B | DIMENSION SYMBOLS | | | | | | | | | | | | |
|---------------|---------------|------------------------------|-------------------|----------------|----------------|----------------|----------------|----------------|----------------|--------------|----------------|----------------|----------------|----------------|----|
| | | | A | b | c | D | E | E1 | E2 | E3 | e | k | L | Q | S1 |
| -03 | 14 | F-2A | 0.115 0.045 | 0.022 0.015 | 0.009 0.004 | 0.390 ----- | 0.260 0.235 | 0.290 ----- | 0.130 0.030 | 0.050 BSC | 0.015 0.008 | 0.370 0.270 | 0.045 0.026 | ----- 0.005 | |
| -04 | 16 | F-5A | 0.115 0.045 | 0.022 0.015 | 0.009 0.004 | 0.440 ----- | 0.285 0.245 | 0.315 ----- | 0.130 0.030 | 0.050 BSC | 0.015 0.008 | 0.370 0.250 | 0.045 0.026 | ----- 0.005 | |
| -05 | 20 | F-9A | 0.115 0.045 | 0.022 0.015 | 0.009 0.004 | 0.540 ----- | 0.300 0.245 | 0.330 ----- | 0.130 0.030 | 0.050 BSC | 0.015 0.008 | 0.370 0.250 | 0.045 0.026 | ----- 0.000 | |

Ordering Information

UT54ACS244/UT54ACTS244 SMD Part Number



Notes:

- Lead finish (A, C or X) must be specified.
- If an "X" is specified when ordering, part marking will match the lead finish and will be either "A" (solder) or "C" (gold).
- Total dose radiation must be specified when ordering. QML Q and QML V not available without radiation hardening. For prototype inquiries, contact factory.
- Device type 02 is only offered with a TID tolerance guarantee of 3E5 rads(Si) or 1E6 rads(Si) and is tested in accordance with MIL-STD-883 Test Method 1019 Condition A and section 3.11.2. Device type 03 is only offered with a TID tolerance guarantee of 1E5 rads(Si), 3E5 rads(Si), and 5E5 rads(Si), and is tested in accordance with MIL-STD-883 Test Method 1019 Condition A.

Revision History

| Date | Revision # | Author | Change Description | Page # |
|------|------------|--------|--------------------|--------|
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Datasheet Definitions

| | Definition |
|-----------------------|---|
| Advanced Datasheet | Frontgrade reserves the right to make changes to any products and services described herein at any time without notice. The product is still in the development stage and the datasheet is subject to change . Specifications can be TBD and the part package and pinout are not final . |
| Preliminary Datasheet | Frontgrade reserves the right to make changes to any products and services described herein at any time without notice. The product is in the characterization stage and prototypes are available. |
| Datasheet | Product is in production and any changes to the product and services described herein will follow a formal customer notification process for form, fit or function changes. |

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