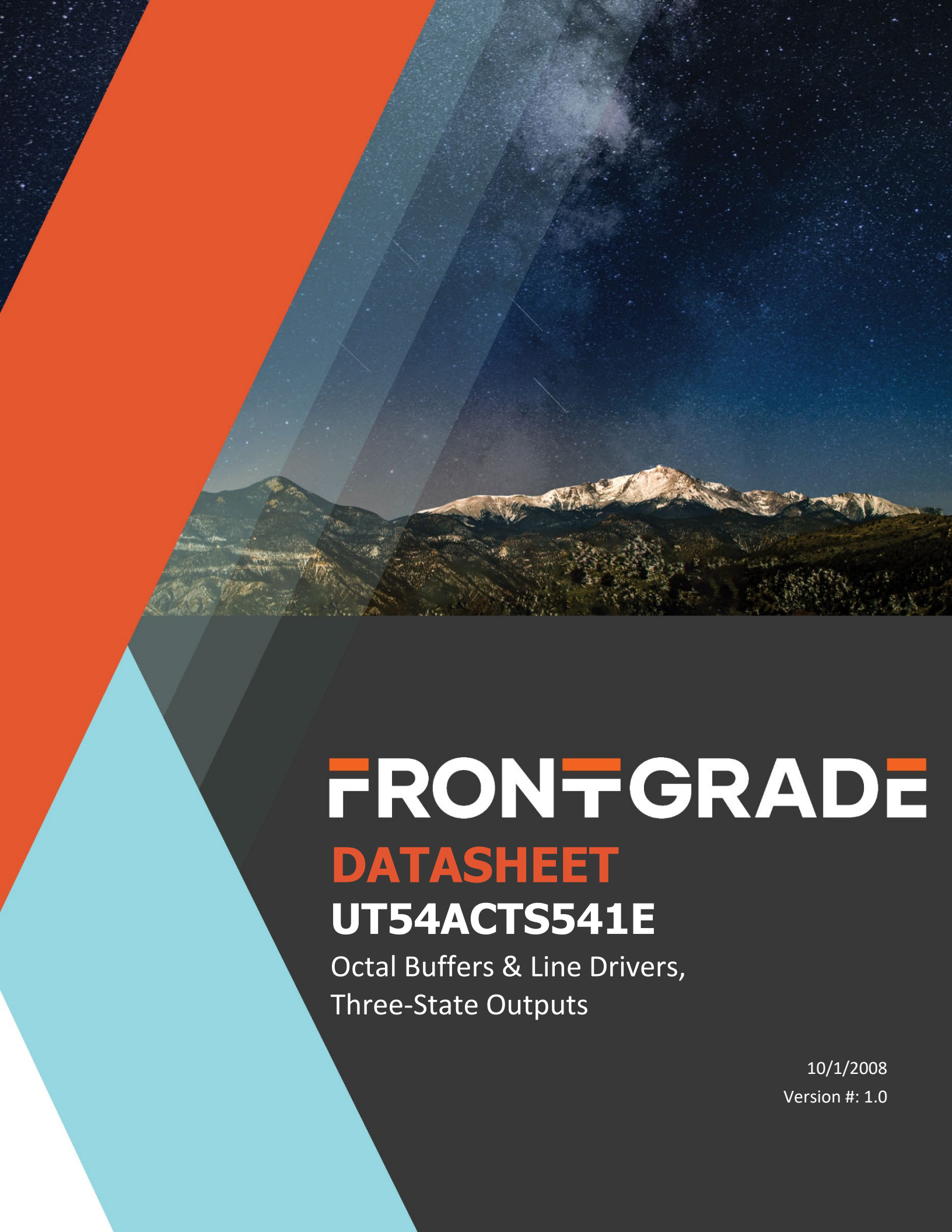




FRONTGRADE

DATASHEET

UT54ACTS541E

Octal Buffers & Line Drivers,
Three-State Outputs

10/1/2008
Version #: 1.0

Features

- Three-state outputs drive bus lines or buffer memory address registers
- 0.6μm CRH CMOS Process
 - > Latchup immune
- High speed
- Low power consumption
- Wide operating power supply from 3.0V to 5.5V
- Available QML Q or V processes
- 20-lead flatpack

Description

The UT54ACTS541E is a non-inverting octal buffer and line driver which improves the performance and density of three-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters.

The device is characterized over full HiRel temperature range of -55°C to +125°C.

Pinout

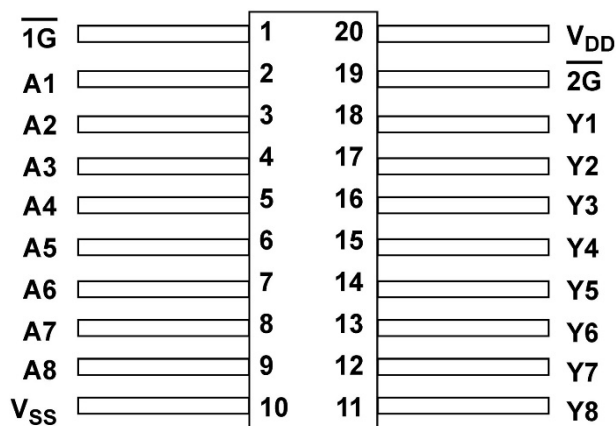
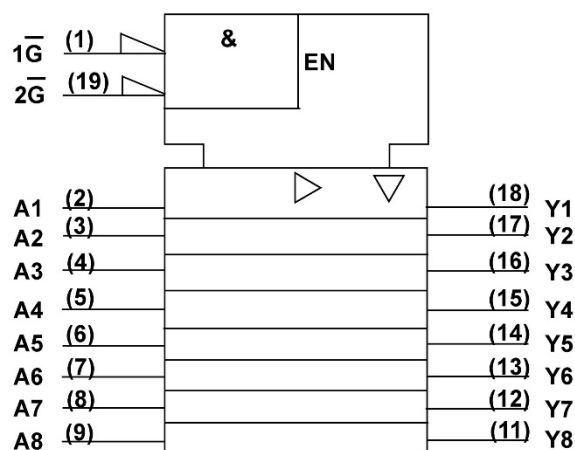


Figure 1: 20-Lead Flatpack Top View

Function Table

Inputs		Output	
$\overline{1G}$	$\overline{2G}$	A_n	Y_n
L	L	L	L
L	L	H	H
H	X	X	Z
X	H	X	Z

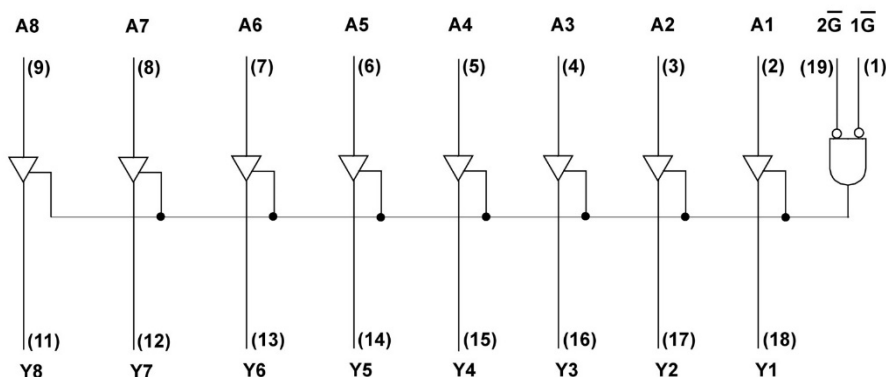
Logic Symbol



Note:

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

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:

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

Absolute Maximum Ratings¹

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:

- 1) 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 condition 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	3.0 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 Characteristics for the UT54ACTS541E⁷

($V_{DD} = 3.0V$ to $5.5V$; $V_{SS} = 0V^6$, $-55^{\circ}C < T_C < +125^{\circ}C$)

Symbol	Description	Condition	VDD	MIN	MAX	Unit
V_{IL}	Low-level input voltage ¹		3.0V		0.8	V
			5.5V		0.8	
V_{IH}	High-level input voltage ¹		3.0V	2.0		V
			5.5V	2.75		
I_{IN}	Input leakage current	$V_{IN} = V_{DD}$ or V_{SS}	5.5V	-1	1	μA
V_{OL}	Low-level output voltage ³	$I_{OL} = 8mA$	3.0V		0.4	V
		$I_{OL} = 12mA$	4.5V		0.4	V
V_{OH}	High-level output voltage ³	$I_{OH} = -8mA$	3.0V	2.4		V
		$I_{OH} = -12mA$	4.5V	3.15		V
I_{OS}	Short-circuit output current ^{2,4}	$V_O = V_{DD}$ and V_{SS}	3.0V	-150	150	mA
			5.5V	-300	300	
I_{OL}	Low level output current ¹⁰	$V_{IN} = V_{DD}$ or V_{SS} $V_{OL} = 0.4V$	3.0V	8		mA
			5.5V	12		
I_{OH}	High level output current ¹⁰	$V_{IN} = V_{DD}$ or V_{SS} $V_{OH} = V_{DD}-0.4V$	3.0V		-8	mA
			5.5V		-12	
P_{total}	Power dissipation ^{2,8,9}	$C_L = 50pF$	5.5V		2.1	mW/ MHz
			3.0V		0.84	
I_{DDQ}	Quiescent Supply Current	$V_{IN} = V_{DD}$ or V_{SS}	5.5V		10	μA
ΔI_{DDQ}	Quiescent Supply Current Delta	For input under test $V_{IN} = V_{DD} - 2.1V$ For all other inputs $V_{IN} = V_{DD}$ or V_{SS}	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) per MIL-STD-883 Method 1019 Condition A and section 3.11.2.
- 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 Characteristics for the UT54ACTS541E²

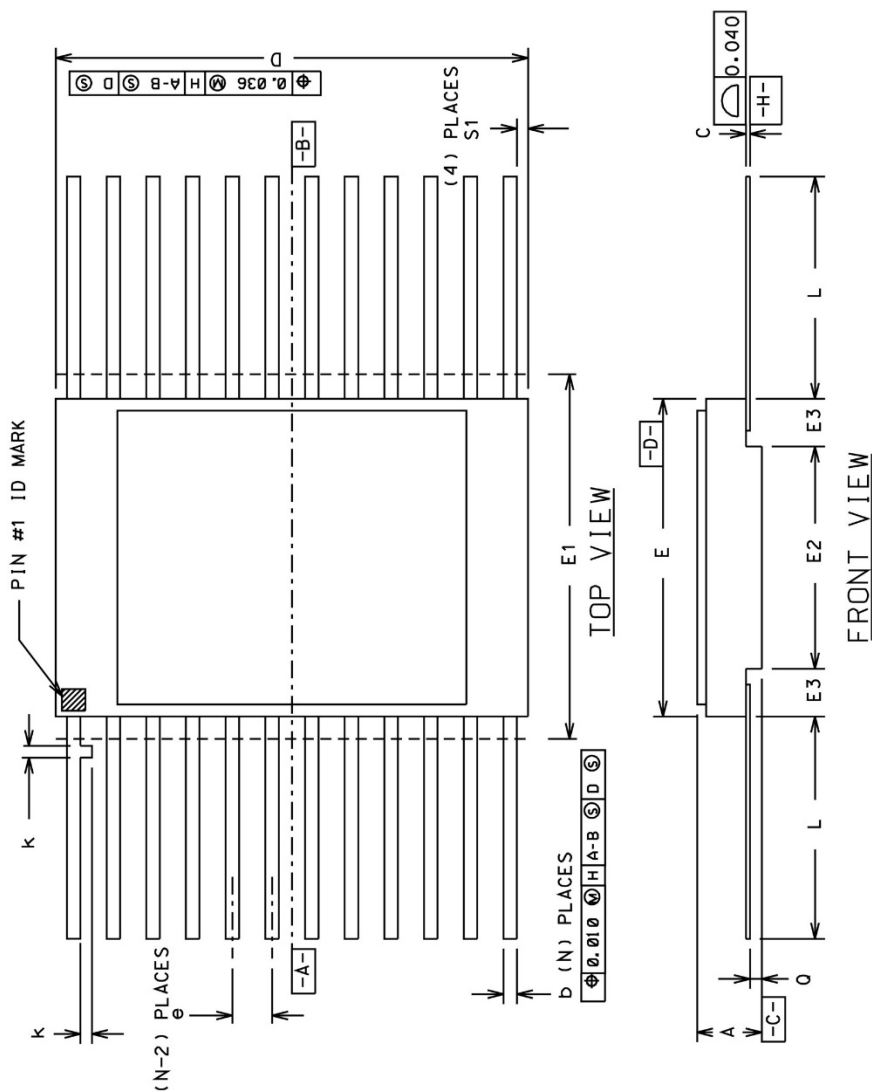
 $(V_{DD} = 3.0V \text{ to } 5.5V; V_{SS} = 0V^1, -55^\circ C < T_C < +125^\circ C)$

Symbol	Parameter	Condition	V_{DD}	Minimum	Maximum	Unit
t_{PLH}	An to Yn	$C_L = 30pF$	3.0V & 3.6V	1	11	ns
			4.5V & 5.5V	1	8	
		$C_L = 50pF$	3.0V & 3.6V	1	15	ns
			4.5V & 5.5V	1	11	
t_{PHL}	An to Yn	$C_L = 30pF$	3.0V & 3.6V	1	14	ns
			4.5V & 5.5V	1	10	
		$C_L = 50pF$	3.0V & 3.6V	1	18	ns
			4.5V & 5.5V	1	14	
t_{PZH}	$\overline{G}$ low to Yn active	$C_L = 30pF$	3.0V & 3.6V	2	15	ns
			4.5V & 5.5V	2	11	
		$C_L = 50pF$	3.0V & 3.6V	2	19	ns
			4.5V & 5.5V	2	15	
t_{PZL}	$\overline{G}$ low to Yn active	$C_L = 30pF$	3.0V & 3.6V	2	14	ns
			4.5V & 5.5V	2	10	
		$C_L = 50pF$	3.0V & 3.6V	2	18	ns
			4.5V & 5.5V	2	14	
t_{PHZ}	$\overline{G}$ low to Yn active	$C_L = 30pF$	3.0V & 3.6V	1	13	ns
			4.5V & 5.5V	1	9	
		$C_L = 50pF$	3.0V & 3.6V	2	17	ns
			4.5V & 5.5V	2	13	
t_{PLZ}	$\overline{G}$ low to Yn active	$C_L = 30pF$	3.0V & 3.6V	2	12	ns
			4.5V & 5.5V	2	8	
		$C_L = 50pF$	3.0V & 3.6V	2	16	ns
			4.5V & 5.5V	2	12	

Notes:

1. Maximum allowable relative shift equals 50mV.
2. All specifications valid for radiation dose $\leq 1\text{E6}$ rads(Si) per MIL-STD-883 Method 1019 Condition A and section 3.11.2.

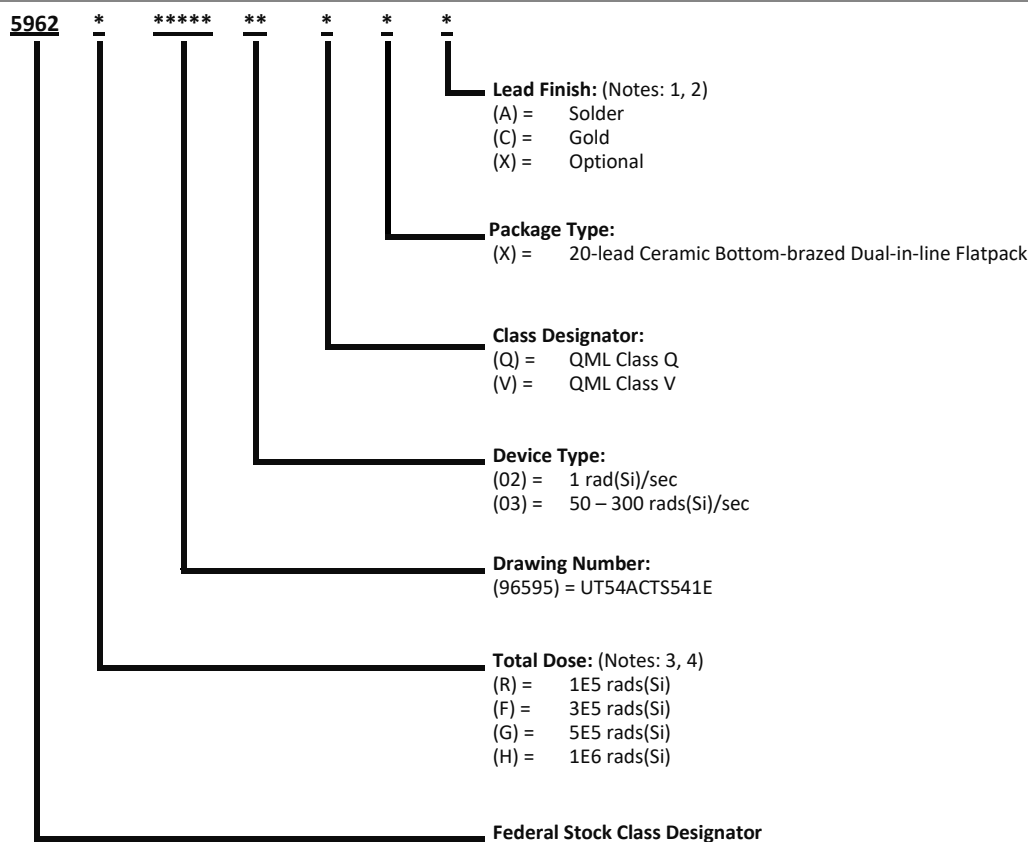
Packaging



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	0.022	0.009	0.390	0.260	0.290	----	----	----	0.015	0.370	0.045	----	
			0.045	0.015	0.004	----	0.285	----	0.130	0.030	BSC	0.008	0.270	0.026	0.005	
-04	16	F-5A	0.115	0.022	0.009	0.440	0.295	0.315	----	----	----	0.015	0.370	0.045	----	
			0.045	0.015	0.004	----	0.245	----	0.130	0.030	BSC	0.008	0.250	0.026	0.005	
-05	20	F-9A	0.115	0.022	0.009	0.540	0.300	0.330	----	----	----	0.015	0.370	0.045	----	
			0.045	0.015	0.004	----	0.245	----	0.130	0.030	BSC	0.008	0.250	0.026	0.005	

Ordering Information

UT54ACTS541E SMD Part Number Ordering Information



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 #

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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