National Semiconductor

MILITARY DATA SHEET

MN54ACTQ827-X REV 1A0

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10-Bit Buffer/Line Driver with TRI-STATE Outputs

General Description

The ACTQ827 10-bit bus buffer provides high performance bus interface buffering for wide data/address paths or buses carrying parity. The 10-bit buffers have NOR output enables for maximum control flexibility. The ACTQ827 utilizes NSC Quiet Series technology to guarantee quiet output switching and improved dynamic threshold performance. FACT Quiet Series TM feature GTO TM output control and undershoot corrector in addition to a split ground bus for superior performance.

Industry Part Number

54ACTQ827

NS Part Numbers

54ACTQ827DMQB
54ACTQ827FMQB
54ACTQ827LMQB

Prime Die

D827

Processing

MIL-STD-883, Method 5004

Quality Conformance Inspection

MIL-STD-883 5005

Subgrp	Description	Temp (°C)
1	Static tests at	+25 C
2	Static tests at	+125 C
3	Static tests at	-55 C
4	Dynamic tests at	+25 C
5	Dynamic tests at	+125 C
6	Dynamic tests at	-55 C
7	Functional tests at	+25 C
8A	Functional tests at	+125 C
8B	Functional tests at	-55 C
9	Switching tests at	+25 C
10	Switching tests at	+125 C
11	Switching tests at	-55 C

Features

- Guaranteed simultaneous switching noise level and dynamic threshold performance
- Guaranteed pin-to-pin skew AC performance
- Inputs and outputs on opposite sides of package allow easy interface with

  microprocessors.
- Improved latch-up immunity
- Outputs source/sink 24 mA
- Functionally and pin-compatible to AMD's AM29827
- ACTQ827 has TTL-compatible inputs
- 4kV minimum ESD immunity
- Standard Military Drawing (SMD)
  - ACTQ827: 5962-92199

(Absolute Maximum Ratings)

(Note 1)

Supply Voltage (Vcc)	
	-0.5V to +7.0V
DC Input Diode Current (Iik)	
Vi = -0.5V	-20 mA
Vi = Vcc +0.5V	+20 mA
DC Input Voltage (Vi)	
	-0.5V to Vcc +0.5V
DC Output Diode Current (Iok)	
Vo = -0.5V	-20 mA
Vo = Vcc +0.5V	+20 mA
DC Output Voltage (Vo)	
	-0.5 to Vcc +0.5V
DC Output Source or Sink Current (Io)	
	±50 mA
DC Vcc or Ground Current per Output Pin (Icc or Ignd)	
	±50 mA
Storage Temperature (Tstg)	
	-65 C to + 150 C
DC Latch-Up Source or Sink Current	
	±300 mA
Junction Temperature (Tj)	
CDIP	175 C

Note 1: Absolute maximum ratings are those values beyond which damage to the device may occur. The databook specifications should be met, without exception, to ensure that the system design is reliable over its power supply, temperature, and output/input loading variables. National does not recommend operation of FACT TM circuits outside databook specifications.

Recommended Operating Conditions

(Note 1)

Input Voltage (Vi)	
	0V to Vcc
Output Voltage (Vo)	
	0V to Vcc
Supply Voltage (Vcc)	
	4.5V to 5.5V
Minimum Input Edge Rate (Delta v/Delta t)	
ACTQ Devices	
Vin from 0.8V to 2.0V	
Vcc @ 4.5V, 5.5V	125 mV/ns
Operating Temperature (Ta)	
	-55 C to + 125 C

Note 1: All commercial packaging is not recommended for applications requiring greater than 2000 temperature cycles from -40C to +125C.

Electrical Characteristics

DC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: VCC 4.5V to 5.5V, Temp. Range: -55C to 125C. NOTE: -55C TEMPERATURE, SUBGROUP 3 IS GUARANTEED BUT NOT TESTED.

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
IIH	High Level input Current	VCC=5.5V, VIH=5.5V	1, 2	INPUT		0.1	uA	1
			1, 2	INPUT		1.0	uA	2, 3
IIL	Low Level input Current	VCC=5.5V, VIL=0.0V	1, 2	INPUT		-0.1	uA	1
			1, 2	INPUT		-1.0	uA	2, 3
VOL	Low level output voltage	VCC=4.5V, VIL=0.8V, IOL=24.0mA, VIH=2.0V	1, 2	OUTPUT		.36	V	1
			1, 2	OUTPUT		.50	V	2, 3
		VCC=4.5V, VIL=0.8V, IOL=50.0uA, VIH=2.0V	1, 2	OUTPUT		.10	V	1, 2, 3
		VCC=5.5V, VIL=0.8V, IOL=24.0mA, VIH=2.0V	1, 2	OUTPUT		.36	V	1
			1, 2	OUTPUT		.50	V	2, 3
		VCC=5.5V, VIL=0.8V, IOL=50.0uA, VIH=2.0V	1, 2	OUTPUT		.10	V	1, 2, 3
VIOL	Dynamic Output Current LOW	VCC=5.5V, VIH=5.5V, VIL=0.0V, IOL=50.0mA	1, 2, 5	OUTPUT		1.65	V	1, 2, 3
VOH	High Level Output Voltage	VCC=4.5V, VIL=0.8V, IOL=-24.0mA, VIH=2.0V	1, 2	OUTPUT	3.86		V	1
			1, 2	OUTPUT	3.70		V	2, 3
		VCC=4.5V, VIL=0.8V, IOL=-50.0uA, VIH=2.0V	1, 2	OUTPUT	4.40		V	1, 2, 3
		VCC=5.5V, VIL=0.8V, IOL=-24.0mA, VIH=2.0V	1, 2	OUTPUT	4.86		V	1
			1, 2	OUTPUT	4.70		V	2, 3
		VCC=5.5V, VIL=0.8V, IOL=-50.0uA, VIH=2.0V	1, 2	OUTPUT	5.40		V	1, 2, 3
VIOH	Dynamic Output Current HIGH	VCC=5.5V, VIH=5.5V, VIL=0.0V, IOL=-50.0mA	1, 2, 5	OUTPUT	3.85		V	1, 2, 3
ICCH	Supply Current	VCC=5.5V, VIH=5.5V	1, 2	VCC		8.0	uA	1
			1, 2	VCC		160	uA	2, 3
ICCL	Supply Current	VCC=5.5V, VIH=0.0V	1, 2	VCC		8.0	uA	1
			1, 2	VCC		160	uA	2, 3
ICCZ	Supply Current	VCC=5.5V, VIH=5.5V	1, 2	VCC		8.0	uA	1
			1, 2	VCC		160	uA	2, 3
ICCT	Supply Current	VCC=5.5V, VINH=3.4V	1, 2	VCC		1.0	mA	1
			1, 2	VCC		1.6	mA	2, 3

Electrical Characteristics

DC PARAMETERS(Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: VCC 4.5V to 5.5V, Temp. Range: -55C to 125C. NOTE: -55C TEMPERATURE, SUBGROUP 3 IS GUARANTEED BUT NOT TESTED.

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
IOZH	Maximum TRI-STATE Leakage Current	VCC=4.5V, VIL=0.0V, VIH=2.0V	1, 2	OUTPUT		0.5	uA	1
			1, 2	OUTPUT		10.0	uA	2, 3
		VCC=5.5V, VIL=0.0V, VIH=2.0V	1, 2	OUTPUT		0.5	uA	1
			1, 2	OUTPUT		10.0	uA	2, 3
IOZL	Maximum TRI-STATE Leakage Current	VCC=4.5V, VIL=0.0V, VIH=2.0V	1, 2	OUTPUT		-0.5	uA	1
			1, 2	OUTPUT		-10.0	uA	2, 3
		VCC=5.5V, VIL=0.0V, VIH=2.0V	1, 2	OUTPUT		-0.5	uA	1
			1, 2	OUTPUT		-10.0	uA	2, 3
VIKL		VCC=4.5V, IKL=-18mA	1, 2	INPUT		-1.2	V	1, 2, 3
VIKH		VCC=4.5V, IKL=18mA	1, 2	INPUT		5.7	V	1, 2, 3
VILD	Maximum Low Level Dynamic Input Voltage	VCC=5.0V, LOAD 50pF / 500 OHMS	6, 9	INPUT		0.8	V	4
VIHD	Minimum High Level Dynamic Input Voltage	VCC=5.0V, LOAD 50pF / 500 OHMS	6, 9	INPUT	2.2		V	4
VOLP	Quiet Output Maximum Dynamic Vol	VCC=5.0V, LOAD 50pF / 500 OHMS	6, 8	OUTPUT		1.5	V	4
VOLV	Quiet Output Minimum Dynamic Vol	VCC=5.0V, LOAD 50pF / 500 OHMS	6, 8	OUTPUT		-1.2	V	4

Electrical Characteristics

AC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)
AC: CL=50pF, RL=500 OHMS, TR/TF= 3.0ns, Temp range: -55C to +125C. NOTE: -55C TEMPERATURE, SUBGROUP 11 IS GUARANTEED BUT NOT TESTED.

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tpLH	Propagation Delay	VCC=4.5V	3, 4, 7	Dn to On	2.0	8.0	ns	9
			3, 4, 7	Dn to On	2.0	9.0	ns	10, 11
tpHL	Propagation Delay	VCC=4.5V	3, 4, 7	Dn to On	2.0	8.5	ns	9
			3, 4, 7	Dn to On	2.0	9.5	ns	10, 11
tpZH	Output Enable Time	VCC=4.5V	3, 4, 7	$\overline{OE}$ to On	2.0	10.5	ns	9
			3, 4, 7	$\overline{OE}$ to On	2.0	12.5	ns	10, 11
tpZL	Output Enable Time	VCC=4.5V	3, 4, 7	$\overline{OE}$ to On	2.0	10.5	ns	9
			3, 4, 7	$\overline{OE}$ to On	2.0	12.5	ns	10, 11
tpHZ	Output Disable Time	VCC=4.5V	3, 4, 7	$\overline{OE}$ to On	1.0	8.0	ns	9
			3, 4, 7	$\overline{OE}$ to On	1.0	9.0	ns	10, 11
tpLZ	Output Disable Time	VCC=4.5V	3, 4, 7	$\overline{OE}$ to On	1.0	8.0	ns	9
			3, 4, 7	$\overline{OE}$ to On	1.0	9.0	ns	10, 11

Note 1: SCREEN TESTED 100% ON EACH DEVICE AT +25C & +125C TEMPERATURE, SUBGROUPS 1, 2, 7, & 8.
Note 2: SAMPLE TESTED (METHOD 5005, TABLE 1) ON EACH MFG. LOT AT +25C & +125C TEMPERATURE, SUBGROUPS A1, 2, 7, & 8.
Note 3: SCREEN TESTED 100% ON EACH DEVICE AT +25C TEMPERATURE ONLY SUBGROUP A9.
Note 4: SAMPLE TESTED (METHOD 5005, TABLE 1) ON EACH MFG. LOT AT +25C & +125C TEMPERATURE, SUBGROUPS A9 & 10.
Note 5: TRANSMISSION LINE DRIVING TEST, GUARDBANDED LIMITS SET FOR +25C, 2 MSEC DURATION MAX.

Note 6: GUARANTEED BUT NOT TESTED. (DESIGN CHARACTERIZATION DATA)
Note 7: +25C & +125C MIN LIMITS GUARANTEED FOR 5.5V BY GUARDBANDING 4.5V MIN. LIMITS.
Note 8: MAX NUMBER OF OUTPUTS DEFINED AS (N). DATA INPUTS ARE DRIVEN 0V TO 3V. ONE OUTPUT @ VOL.
Note 9: MAX NUMBER OF DATA INPUTS (N) SWITCHING. (N-1) INPUTS SWITCHING 0V TO 3V. INPUT-UNDER-TEST SWITCHING 3V TO THRESHOLD (VILD), 0V TO THRESHOLD (VIHD), FREQ= 1 MHZ.