

**MV54ACTQ244-X REV 0A0**

 Original Creation Date: 06/05/97  
 Last Update Date: 08/05/99  
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**Octal Buffer/Line Driver with TRI-STATE Outputs**
**General Description**

The ACTQ244 is an octal buffer and line driver designed to be employed as a memory address driver, clock driver and bus oriented transmitter or receiver which provides improved PC board density. The ACTQ utilizes NSC Quiet Series technology to guarantee quiet output switching and improved dynamic threshold performance. FACT Quiet Series TM features GTO TM output control and undershoot corrector in addition to a split ground bus for superior performance.

**Industry Part Number**

54ACTQ244

**Prime Die**

D244

**NS Part Numbers**

 54ACTQ244E-QMLV\*  
 54ACTQ244ERQMLV\*  
 54ACTQ244J-QMLV\*\*  
 54ACTQ244JRQMLV\*\*  
 54ACTQ244W-QMLV\*\*\*  
 54ACTQ244WRQMLV\*\*\*

**Controlling Document**

5962-92186

**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
- Improved latch-up immunity
- TRI-STATE outputs drive bus lines or buffer memory address registers
- Outputs source/sink 24 mA
- 4 kV minimum ESD immunity
- Standard Military Drawing (SMD)
  - ACTQ244: 5962-9218601V2A\*, VRA\*\*, VSA\*\*\*
  - ACTQ244: 5962R9218601V2A\*, VRA\*\*, VSA\*\*\*

**(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)	-0.5V 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
Thermal Resistance, junction-to-case (jc)	see Mil-Std-1835
Maximum Power Dissipation (pd)	500 mW
Lead Temperature	
soldering, 10 seconds	+300 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™ circuits outside databook specifications.

**Recommended Operating Conditions**

Supply Voltage (Vcc)	4.5V to 5.5V
Input Voltage (Vi)	0V to Vcc
Output Voltage (Vo)	0V to Vcc
Operating Temperature (Ta)	-55 C to +125 C
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
Maximum High Level Output Current	-24 mA
Maximum Low Level Output Current	+24 mA

## 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.

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, VIH=2.0V, IOL=50.0uA	1, 2	OUTPUT		.10	V	1, 2, 3
		VCC=5.5V, VIL=0.8V, VIH=2.0V, IOL=50.0uA	1, 2	OUTPUT		.10	V	1, 2, 3
		VCC=4.5V, VIL=0.8V, VIH=2.0V, IOL=24.0mA	1, 2	OUTPUT		.36	V	1
			1, 2	OUTPUT		.50	V	2, 3
		VCC=5.5V, VIL=0.8V, VIH=2.0V, IOL=24.0mA	1, 2	OUTPUT		.36	V	1
			1, 2	OUTPUT		.50	V	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, VIH=2.0V, IOH=-50.0uA	1, 2	OUTPUT	4.40		V	1, 2, 3
		VCC=5.5V, VIL=0.8V, VIH=2.0V, IOH=-50.0uA	1, 2	OUTPUT	5.40		V	1, 2, 3
		VCC=4.5V, VIL=0.8V, VIH=2.0V, IOH=-24.0mA	1, 2	OUTPUT	3.86		V	1
			1, 2	OUTPUT	3.70		V	2, 3
		VCC=5.5V, VIL=0.8V, VIH=2.0V, IOH=-24.0mA	1, 2	OUTPUT	4.86		V	1
			1, 2	OUTPUT	4.70		V	2, 3
VIOH	Dynamic Output Current HIGH	VCC=5.5V, VIH=5.5V, VIL=0.0V, IOH=-50.0mA	1, 2, 5	OUTPUT	3.85		V	1, 2, 3
IOZH	Maximum TRI-STATE Leakage Current	VCC=4.5V, VM=4.5V, VINL=0.0V, VIH=2.0V	1, 2	OUTPUT		0.25	uA	1
			1, 2	OUTPUT		5.0	uA	2, 3
		VCC=5.5V, VM=5.5V, VINL=0.0V, VIH=2.0V	1, 2	OUTPUT		0.25	uA	1
			1, 2	OUTPUT		5.0	uA	2, 3
IOZL	Maximum TRI-STATE Leakage Current	VCC=4.5V, VM=0.0V, VINH=4.5V, VIH=2.0V	1, 2	OUTPUT		-0.25	uA	1
			1, 2	OUTPUT		-5.0	uA	2, 3
		VCC=5.5V, VM=0.0V, VINH=5.5V, VIH=2.0V	1, 2	OUTPUT		-0.25	uA	1
			1, 2	OUTPUT		-5.0	uA	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.

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
ICCH	Supply Current	VCC=5.5V, VINH=5.5V, VINL=0.0V	1, 2	VCC		100	nA	1
			1, 2	VCC		80	uA	2, 3
ICCL	Supply Current	VCC=5.5V, VINL=0.0V	1, 2	VCC		100	nA	1
			1, 2	VCC		80	uA	2, 3
IC CZ	Supply Current	VCC=5.5V, VINH=5.5V, VINL=0.0V	1, 2	VCC		100	nA	1
			1, 2	VCC		80	uA	2, 3
ICCF	Supply Current Functional	VCC=5.5V, VINH=5.5V, VINL=0.0V	1, 2	VCC		100	nA	1
			1, 2	VCC		80	uA	2, 3
ICCT	Supply Current	VCC=5.5V, VIHT=VCC-2.1V	1, 2	VCC		1.0	mA	1
			1, 2	VCC		1.6	mA	2, 3
VIC+	Positive Input Clamp Voltage	VCC=0.0V, IM=1.0mA	10, 11	INPUT	0.40	1.50	V	1
VIC-	Negative Input Clamp Voltage	VCC=OPEN, IM=-1.0mA	10, 11	INPUT	-0.40	-1.50	V	1
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=3.0ns & TF=3.0 ns, Temp Range: -55C to+125C.

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tpLH	Propagation Delay	VCC= 4.5V	3, 4, 7	In to On	1.5	8.0	ns	9, 11
			3, 4, 7	In to On	1.5	9.0	ns	10
tpHL	Propagation Delay	VCC= 4.5V	3, 4, 7	In to On	1.5	8.0	ns	9, 11
			3, 4, 7	In to On	1.5	9.0	ns	10
tpZL	Output Enable Time	VCC= 4.5V	3, 4, 7	OE1/OE2 to On	1.5	9.5	ns	9, 11
			3, 4, 7	OE1/OE2 to On	1.5	10.5	ns	10
tpZH	Output Enable Time	VCC= 4.5V	3, 4, 7	OE1/OE2 to On	1.5	9.5	ns	9, 11
			3, 4, 7	OE1/OE2 to On	1.5	10.5	ns	10
tpHZ	Output Disable Time	VCC= 4.5V	3, 4, 7	OE1/OE2 to On	1.5	9.0	ns	9, 11
			3, 4, 7	OE1/OE2 to On	1.5	10.5	ns	10
tpLZ	Output Disable Time	VCC= 4.5V	3, 4, 7	OE1/OE2 to On	1.5	9.0	ns	9, 11
			3, 4, 7	OE1/OE2 to On	1.5	10.5	ns	10

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, -55C TEMPERATURE, SUBGROUPS A1, 2, 3, 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, & -55C TEMPERATURE, SUBGROUPS A9, 10 & 11.

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: MIN LIMITS GUARANTEED FOR 5.5V BY GUARDBANDING 4.5V MINIMUM 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.

Note 10: Screen tested 100% on each device at +25C only.

Note 11: Sample tested (Method 5005, Table 1) at +25C only.

**Revision History**

Rev	ECN #	Rel Date	Originator	Changes
0A0	M0001525	08/05/99	Linda Collins	Initial MDS Release