

Features

- 3A Peak Output Current
- Wide Operating Voltage Range: 4.5V to 35V
- -40°C to +125°C Operating Temperature Range
- Latch-up Protected to 3A
- Fast Rise and Fall Times
- Low Power Consumption

Applications

- MOSFET Driver
- Switching Power Supplies
- Motor Controls
- DC to DC Converters
- Pulse Transformer Driver

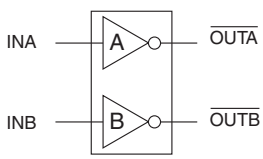
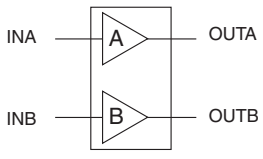
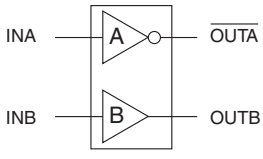
Description

The IX4423, IX4424, and IX4425 are dual high-speed, low-side gate drivers. Each of the two outputs can source and sink 3A of peak current with rise and fall times of less than 10ns. The inputs of each driver are TTL and CMOS compatible, and are virtually immune to latch-up. Low propagation delay times and fast, matched rise and fall times make the IX4423, IX4424, and IX4425 ideal for high-frequency and high-power applications.

The IX4423 is configured as a dual inverting driver; the IX4424 is configured as a dual non-inverting driver; and the IX4425 is configured with one inverting driver and one non-inverting driver. All three devices are available in a standard 8-pin SOIC package.



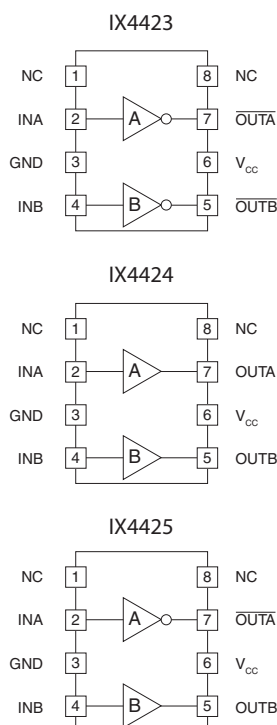
Ordering Information

Logic Configuration	Part Number	Package Type	Packing Method	Quantity
	IX4423N	8-Pin SOIC	Tube	100
	IX4423NTR	8-Pin SOIC	Tape & Reel	2000
	IX4424N	8-Pin SOIC	Tube	100
	IX4424NTR	8-Pin SOIC	Tape & Reel	2000
	IX4425N	8-Pin SOIC	Tube	100
	IX4425NTR	8-Pin SOIC	Tape & Reel	2000

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1 Specifications

1.1 Pin Configurations



1.2 Pin Definitions

Pin Name	Description
INA	Channel A Logic Input
INB	Channel B Logic Input
$\overline{\text{OUTA}}$	Channel A Output - Sources or sinks current to turn-on or turn-off a discrete MOSFET or IGBT
$\overline{\text{OUTB}}$	Channel B Output - Sources or sinks current to turn on or turn off a discrete MOSFET or IGBT
V_{CC}	Supply Voltage - Provides power to the device
GND	Ground - Common ground reference for the device
NC	No Connection

1.3 Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units
Supply Voltage	V_{CC}	-0.3	35	V
Input Voltage	V_{IN}	-5.0	$V_{CC}+0.3$	V
Output Current	I_{OUT}	-	± 3	A
Junction Temperature	T_J	-55	+150	°C
Storage Temperature	T_{STG}	-65	+150	°C

Unless otherwise specified, absolute maximum electrical ratings are at 25°C

Absolute maximum ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at conditions beyond those indicated in the operational sections of this data sheet is not implied.

1.4 Recommended Operating Conditions

Parameter	Symbol	Minimum	Maximum	Units
Supply Voltage	V_{CC}	4.5	30	V
Operating Temperature Range	T_A	-40	+125	°C

1.5 Electrical Characteristics: $T_A = 25^\circ\text{C}$

Test Conditions: $4.5\text{V} \leq V_{CC} \leq 18\text{V}$.

Parameter	Conditions	Symbol	Minimum	Typical	Maximum	Units
Input Voltage, High	-	V_{IH}	3	-	-	V
Input Voltage, Low	-	V_{IL}	-	-	0.8	
Input Current	$0\text{V} \leq V_{IN} \leq V_{CC}$	I_{IN}	-	-	± 10	μA
Output Voltage, High	-	V_{OH}	$V_{CC}-0.025$	-	-	V
Output Voltage, Low	-	V_{OL}	-	-	0.025	
Output Resistance, High State	$V_{CC}=18\text{V}, I_{OUT}=-100\text{mA}$	R_{OH}	-	2.5	4	Ω
Output Resistance, Low State	$V_{CC}=18\text{V}, I_{OUT}=100\text{mA}$	R_{OL}	-	1.5	3	
Rise Time	$V_{CC}=18\text{V}, C_{LOAD}=1000\text{pF}$	t_R	-	18	35	ns
Fall Time	$V_{CC}=18\text{V}, C_{LOAD}=1000\text{pF}$	t_F	-	18	35	
On-Time Propagation Delay	$V_{CC}=18\text{V}, C_{LOAD}=1000\text{pF}$	t_{on}	-	35	75	
Off-Time Propagation Delay	$V_{CC}=18\text{V}, C_{LOAD}=1000\text{pF}$	t_{off}	-	38	75	
Power Supply Current	$V_{INA}=V_{INB}=3.5\text{V}$	I_{CC}	-	1	3	mA
	$V_{INA}=V_{INB}=0\text{V}$		-	0.001	0.01	

1.6 Electrical Characteristics: $T_A = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$

Test Conditions: $4.5\text{V} \leq V_{CC} \leq 18\text{V}$.

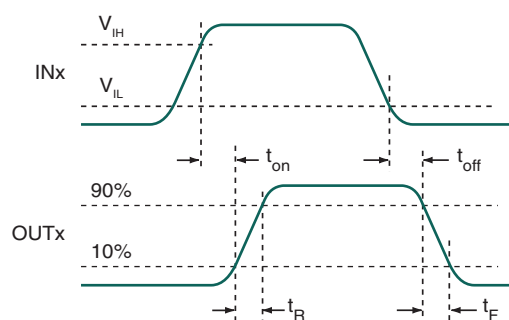
Parameter	Conditions	Symbol	Minimum	Maximum	Units
Input Voltage, High	-	V_{IH}	3.3	-	V
Input Voltage, Low	-	V_{IL}	-	0.65	
Input Current	$0\text{V} \leq V_{IN} \leq V_{CC}$	I_{IN}	-	± 10	μA
Output Voltage, High	-	V_{OH}	$V_{CC}-0.025$	-	V
Output Voltage, Low	-	V_{OL}	-	0.025	
Output Resistance, High State	$V_{CC}=18\text{V}, I_{OUT}=-100\text{mA}$	R_{OH}	-	6	Ω
Output Resistance, Low State	$V_{CC}=18\text{V}, I_{OUT}=100\text{mA}$	R_{OL}	-	5	
Rise Time	$V_{CC}=18\text{V}, C_{LOAD}=1000\text{pF}$	t_R	-	60	ns
Fall Time	$V_{CC}=18\text{V}, C_{LOAD}=1000\text{pF}$	t_F	-	60	
On-Time Propagation Delay	$V_{CC}=18\text{V}, C_{LOAD}=1000\text{pF}$	t_{on}	-	100	
Off-Time Propagation Delay	$V_{CC}=18\text{V}, C_{LOAD}=1000\text{pF}$	t_{off}	-	100	
Power Supply Current	$V_{INA}=V_{INB}=3.5\text{V}$	I_{CC}	-	3.5	mA
	$V_{INA}=V_{INB}=0\text{V}$		-	0.15	

1.7 Thermal Characteristics

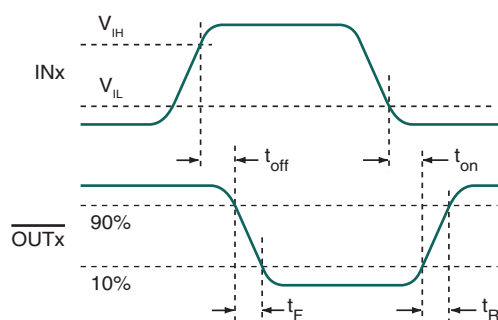
Package	Parameter	Symbol	Rating	Units
8-Pin SOIC	Thermal Resistance, Junction-to-Ambient	θ_{JA}	120	°C/W

2 IX4423-24-25 Performance

2.1 Timing Diagrams

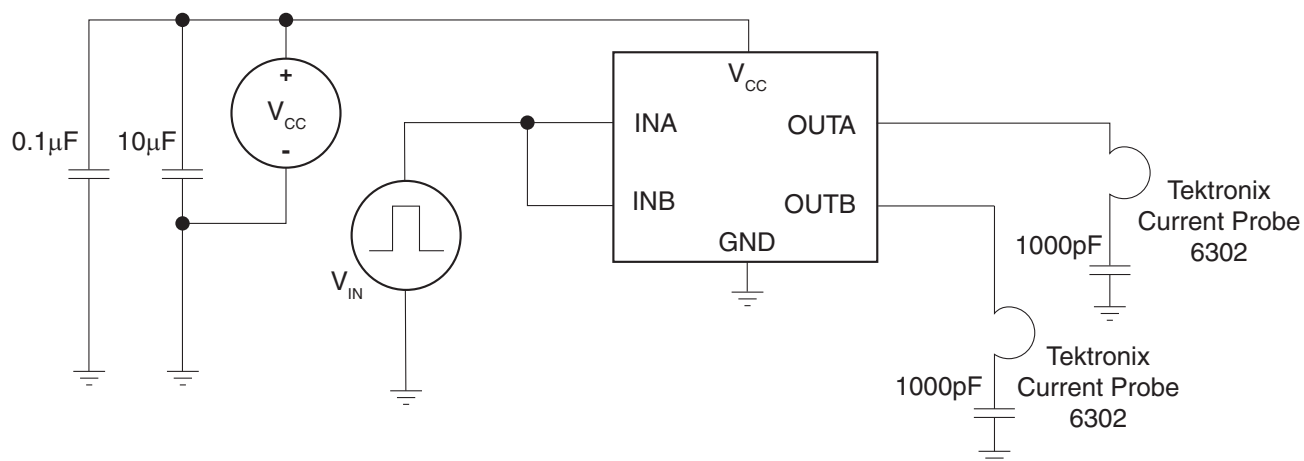


Non-Inverting Driver Waveforms



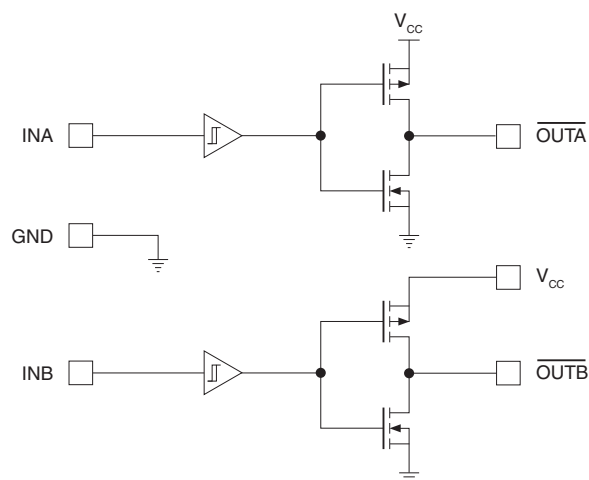
Inverting Driver Waveforms

2.2 Characteristics Test Diagram



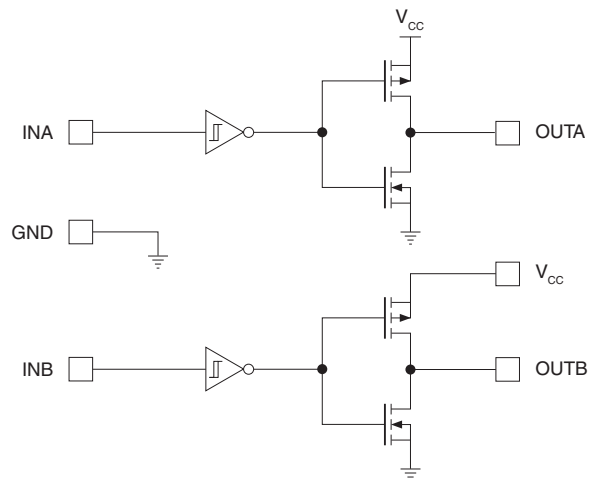
3 Block Diagrams & Truth Tables

3.1 IX4423



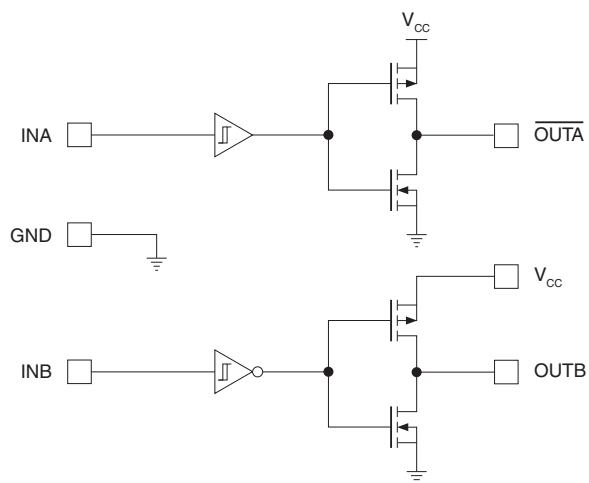
IN _x	OUT _x
0	1
1	0

3.3 IX4424



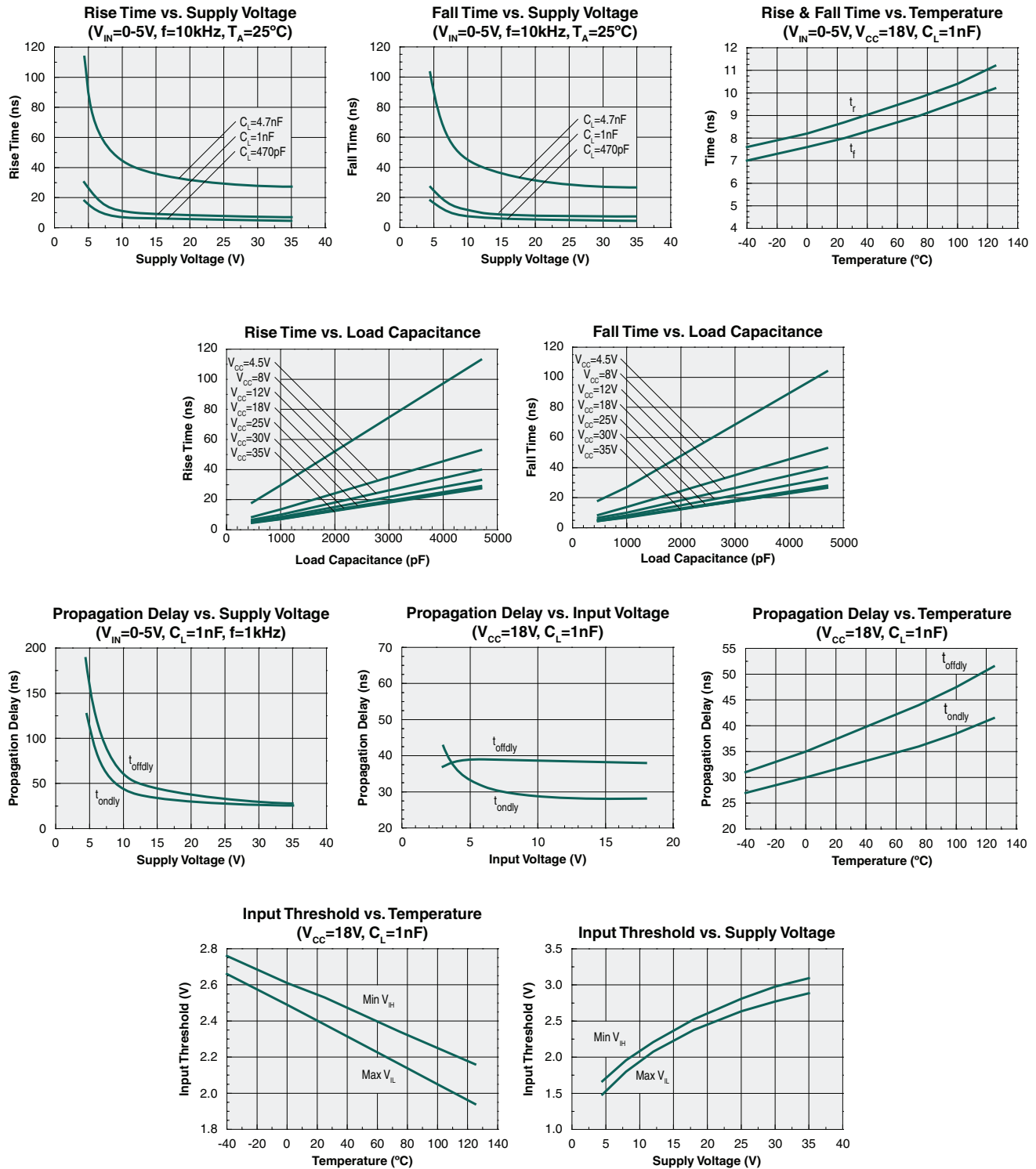
IN _x	OUT _x
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1	1

3.2 IX4425

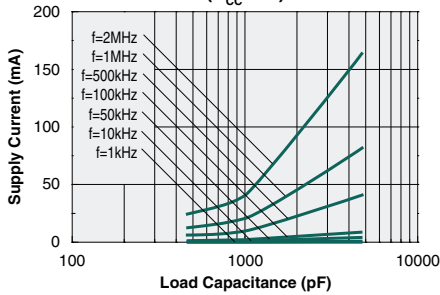


INA	OUTA
0	1
1	0
INB	OUTB
0	0
1	1

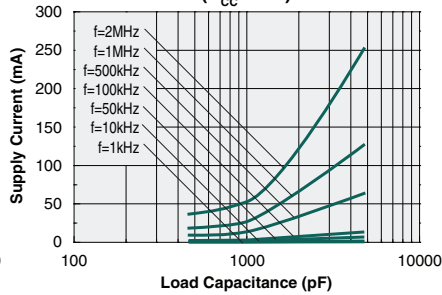
4 Typical Performance Characteristics



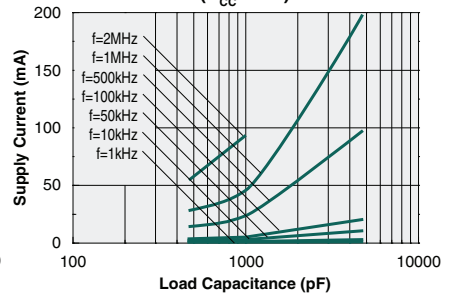
Supply Current vs. Load Capacitance
Both Outputs Active
($V_{CC}=8V$)



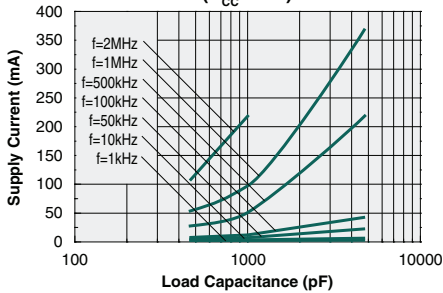
Supply Current vs. Load Capacitance
Both Outputs Active
($V_{CC}=12V$)



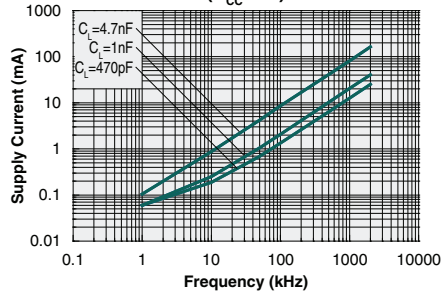
Supply Current vs. Load Capacitance
Both Outputs Active
($V_{CC}=18V$)



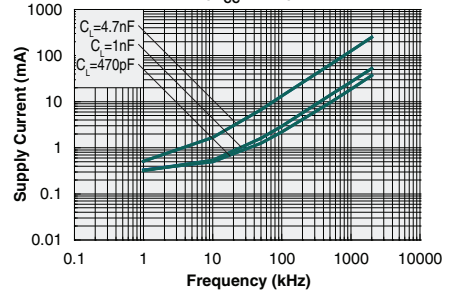
Supply Current vs. Load Capacitance
Both Outputs Active
($V_{CC}=35V$)



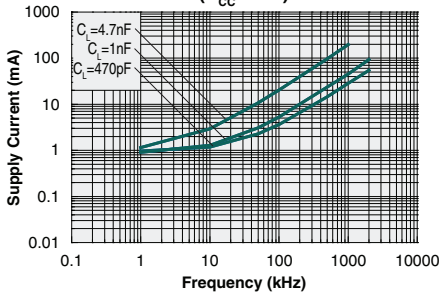
Supply Current vs. Frequency
Both Outputs Active
($V_{CC}=8V$)



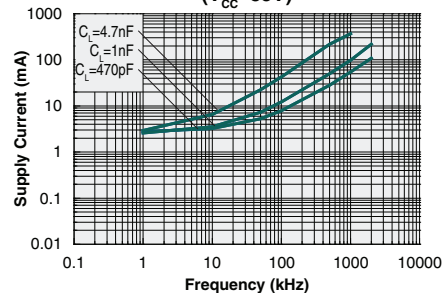
Supply Current vs. Frequency
Both Outputs Active
($V_{CC}=12V$)



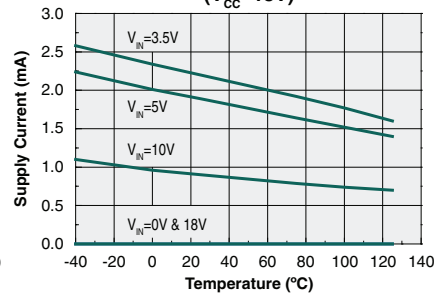
Supply Current vs. Frequency
Both Outputs Active
($V_{CC}=18V$)



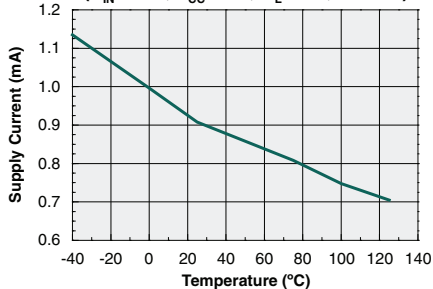
Supply Current vs. Frequency
Both Outputs Active
($V_{CC}=35V$)



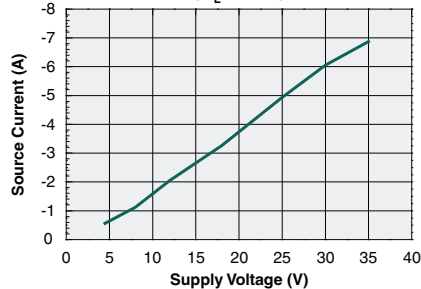
Quiescent Supply Current
vs. Temperature
($V_{CC}=18V$)



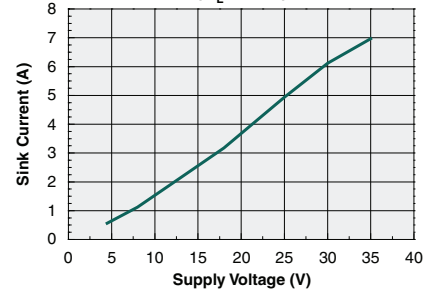
Dynamic Supply Current
vs. Temperature
($V_{IN}=0-5V$, $V_{CC}=18V$, $C_L=1nF$, $f=1kHz$)

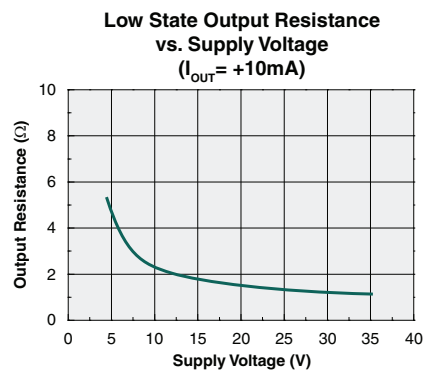
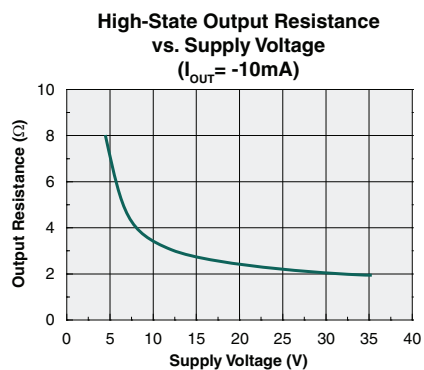
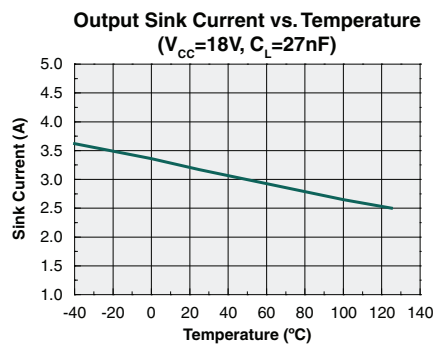
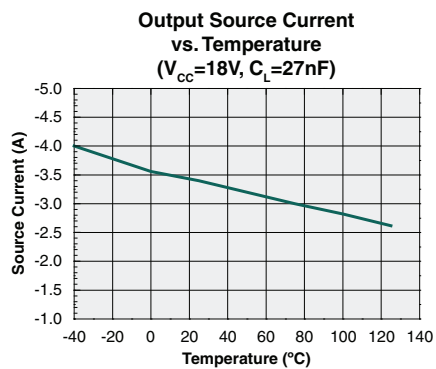


Output Source Current
vs. Supply Voltage
($C_L=27nF$)



Output Sink Current
vs. Supply Voltage
($C_L=27nF$)





5 Manufacturing Information

5.1 Moisture Sensitivity



All plastic encapsulated semiconductor packages are susceptible to moisture ingress. IXYS Integrated Circuits Division classified all of its plastic encapsulated devices for moisture sensitivity according to the latest version of the joint industry standard, **IPC/JEDEC J-STD-020**, in force at the time of product evaluation. We test all of our products to the maximum conditions set forth in the standard, and guarantee proper operation of our devices when handled according to the limitations and information in that standard as well as to any limitations set forth in the information or standards referenced below.

Failure to adhere to the warnings or limitations as established by the listed specifications could result in reduced product performance, reduction of operable life, and/or reduction of overall reliability.

This product carries a **Moisture Sensitivity Level (MSL) rating** as shown below, and should be handled according to the requirements of the latest version of the joint industry standard **IPC/JEDEC J-STD-033**.

Device	Moisture Sensitivity Level (MSL) Rating
IX4423N / IX4424N / IX4425N	MSL 1

5.2 ESD Sensitivity



This product is **ESD Sensitive**, and should be handled according to the industry standard **JESD-625**.

5.3 Reflow Profile

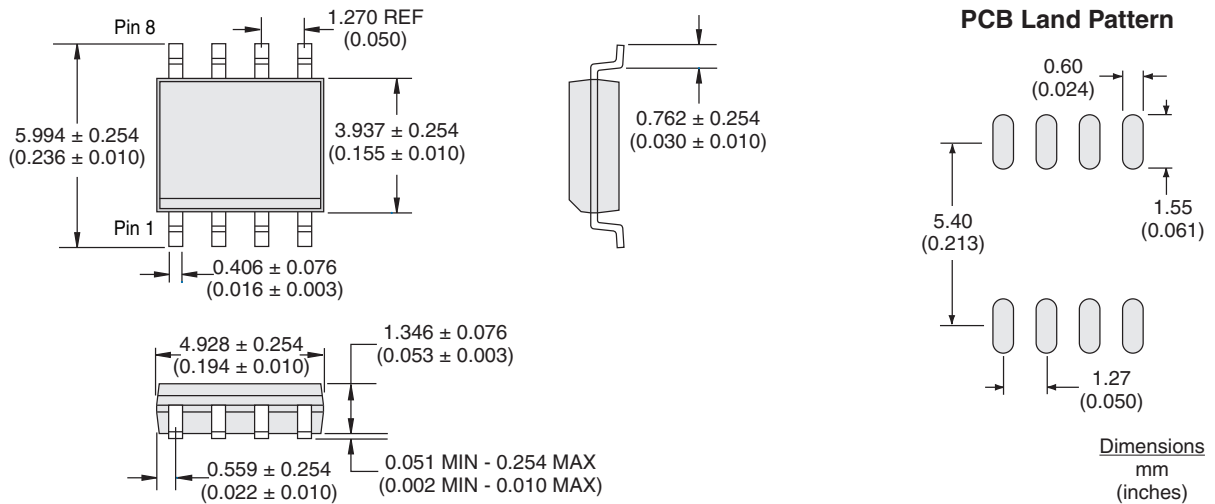
This product has a maximum body temperature and time rating as shown below. All other guidelines of **J-STD-020** must be observed.

Device	Maximum Temperature x Time
IX4423N / IX4424N / IX4425N	260°C for 30 seconds

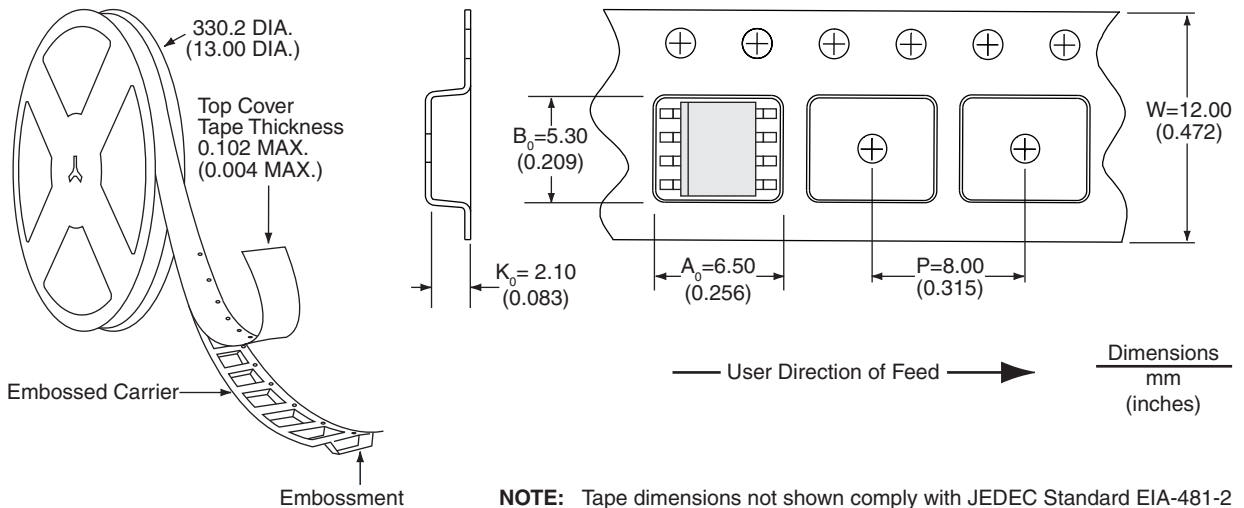


5.4 Mechanical Dimensions

5.4.1 "N" Package (8-Pin SOIC)



5.4.2 "N" Package Tape & Reel



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