



Features

- 9A Peak Source/Sink Drive Current
- Wide Operating Voltage Range: 4.5V to 35V
- -40°C to +125°C Extended Operating Temperature Range
- Logic Input Withstands Negative Swing of up to 5V
- Matched Rise and Fall Times
- Low Propagation Delay Time
- Low, 10µA Supply Current
- Low Output Impedance

Applications

- Efficient Power MOSFET and IGBT Switching
- Switch Mode Power Supplies
- Motor Controls
- DC to DC Converters
- Class-D Switching Amplifiers
- Pulse Transformer Driver



Ordering Information

Part Number	Logic Configuration	Package Type	Packing Method	Quantity
IXDD609D2TR	 IN —————— OUT	8-Lead DFN	Tape & Reel	2000
IXDD609SI		8-Lead Power SOIC with Exposed Metal Back	Tube	100
IXDD609SITR		8-Lead Power SOIC with Exposed Metal Back	Tape & Reel	2000
IXDD609SIA		8-Lead SOIC	Tube	100
IXDD609SIATR		8-Lead SOIC	Tape & Reel	2000
IXDD609PI		8-Lead DIP	Tube	50
IXDD609CI		5-Lead TO-220	Tube	50
IXDD609YI		5-Lead TO-263	Tube	50
IXDI609SI	 IN —————— OUT	8-Lead Power SOIC with Exposed Metal Back	Tube	100
IXDI609SITR		8-Lead Power SOIC with Exposed Metal Back	Tape & Reel	2000
IXDI609SIA		8-Lead SOIC	Tube	100
IXDI609SIATR		8-Lead SOIC	Tape & Reel	2000
IXDI609PI		8-Lead DIP	Tube	50
IXDI609CI		5-Lead TO-220	Tube	50
IXDI609YI		5-Lead TO-263	Tube	50
IXDN609SI	 IN —————— OUT	8-Lead Power SOIC with Exposed Metal Back	Tube	100
IXDN609SITR		8-Lead Power SOIC with Exposed Metal Back	Tape & Reel	2000
IXDN609SIA		8-Lead SOIC	Tube	100
IXDN609SIATR		8-Lead SOIC	Tape & Reel	2000
IXDN609PI		8-Lead DIP	Tube	50
IXDN609CI		5-Lead TO-220	Tube	50
IXDN609YI		5-Lead TO-263	Tube	50

Description

The IXDD609/IXDI609/IXDN609 high-speed gate drivers are especially well suited for driving the latest IXYS MOSFETs and IGBTs. The IXD_609 high-current output can source and sink 9A of peak current while producing voltage rise and fall times of less than 25ns. The input is CMOS compatible, and is virtually immune to latch up. Proprietary circuitry eliminates cross-conduction and current "shoot-through." Low propagation delay and fast, matched rise and fall times make the IXD_609 family ideal for high-frequency and high-power applications.

The IXDD609 is configured as a non-inverting driver with an enable, the IXDN609 is configured as a non-inverting driver, and the IXDI609 is configured as an inverting driver.

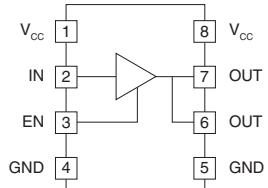
The IXD_609 family is available in a standard 8-lead DIP (PI); an 8-lead SOIC (SIA); an 8-lead Power SOIC with an exposed metal back (SI); an 8-lead DFN (D2); a 5-lead TO-263 (YI); and a 5-lead TO-220 (CI).

1. Specifications	3
1.1 Lead Configurations	3
1.2 Lead Definitions	3
1.3 Absolute Maximum Ratings	3
1.4 Recommended Operating Conditions	4
1.5 Electrical Characteristics: $T_A = 25^\circ\text{C}$	4
1.6 Electrical Characteristics: $T_A = -40^\circ\text{C}$ to $+125^\circ\text{C}$	5
2. Thermal Characteristics	5
3. Functional Description	6
3.1 IXDD609 Functional Block Diagram	6
3.2 IXDI609 Functional Block Diagram	6
3.3 IXdN609 Functional Block Diagram	6
3.4 Timing Diagrams	7
3.5 Characteristics Test Diagram	7
4. Performance Data	8
5. Manufacturing Information	11
5.1 Mechanical Dimensions	11

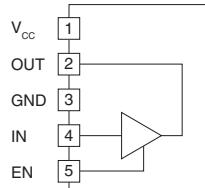
1 Specifications

1.1 Lead Configurations

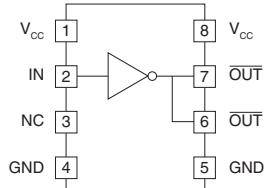
IXDD609 D2 / PI / SI / SIA



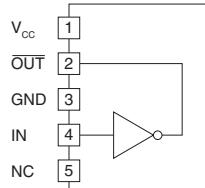
IXDD609 CI / YI



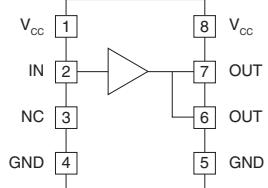
IXDI609 PI / SI / SIA



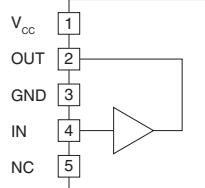
IXDI609 CI / YI



IXDN609 PI / SI / SIA



IXDN609 CI / YI



1.3 Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units
Supply Voltage	V_{CC}	-	40	V
All Other Leads	-	-0.3	$V_{CC}+0.3$	V
Output Current	I_{OUT}	-	± 9	A
Junction Temperature	T_J	-55	+150	°C
Storage Temperature	T_{STG}	-65	+150	°C

Unless stated otherwise, 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.

1.2 Lead Definitions

Lead Name	Description
IN	Logic Input
EN	Output Enable - Drive lead low to disable output, and force output to a high impedance state
OUT	Output - Sources or sinks current to turn-on or turn-off a discrete MOSFET or IGBT
\overline{OUT}	Inverted 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	Not connected

1.4 Recommended Operating Conditions

Parameter	Symbol	Minimum	Maximum	Units
Supply Voltage	V _{CC}	4.5	35	V
Operating Temperature Range	T _A	-40	+125	°C

1.5 Electrical Characteristics: T_A = 25°C

Test Conditions: 4.5V ≤ V_{CC} ≤ 35V (unless otherwise noted).

Parameter	Conditions	Symbol	Minimum	Typical	Maximum	Units
Input Voltage, High	4.5V ≤ V _{CC} ≤ 18V	V _{IH}	3.0	-	-	V
Input Voltage, Low	4.5V ≤ V _{CC} ≤ 18V	V _{IL}	-	-	0.8	
Input Voltage Range	-	V _{IN}	-5	-	V _{CC} +0.3	
Input Current	0V ≤ V _{IN} ≤ V _{CC}	I _{IN}	-10	-	10	μA
EN Input Voltage, High	IXDD609 only	V _{ENH}	2/3V _{CC}	-	-	V
EN Input Voltage, Low	IXDD609 only	V _{ENL}	-	-	1/3V _{CC}	
Output Voltage, High	-	V _{OH}	V _{CC} -0.025	-	-	V
Output Voltage, Low	-	V _{OL}	-	-	0.025	
Output Resistance, High State	V _{CC} =18V, I _{OUT} =-10mA	R _{OH}	-	0.6	1	Ω
Output Resistance, Low State	V _{CC} =18V, I _{OUT} =10mA	R _{OL}	-	0.4	0.8	
Output Current, Continuous	Limited by package power dissipation	I _{DC}	-	-	±2	A
Rise Time	C _{LOAD} =10nF, V _{CC} =18V	t _R	-	22	35	ns
Fall Time	C _{LOAD} =10nF, V _{CC} =18V	t _F	-	15	25	
On-Time Propagation Delay	C _{LOAD} =10nF, V _{CC} =18V	t _{ONDLY}	-	40	60	
Off-Time Propagation Delay	C _{LOAD} =10nF, V _{CC} =18V	t _{OFFDLY}	-	42	60	
Enable to Output-High Delay Time (IXDD609 Only)	V _{CC} =18V	t _{ENOH}	-	25	60	
Disable to High Impedance State Delay Time (IXDD609 Only)	V _{CC} =18V	t _{DOLD}	-	35	60	
Enable Pull-Up Resistor	-	R _{EN}	-	200	-	kΩ
Power Supply Current	V _{CC} =18V, V _{IN} =3.5V	I _{CC}	-	1	2	mA
	V _{CC} =18V, V _{IN} =0V		-	-	10	
	V _{CC} =18V, V _{IN} =V _{CC}		-	-	10	μA

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

Test Conditions: $4.5V \leq V_{CC} \leq 35V$, $T_J < 150^\circ\text{C}$ (unless otherwise noted).

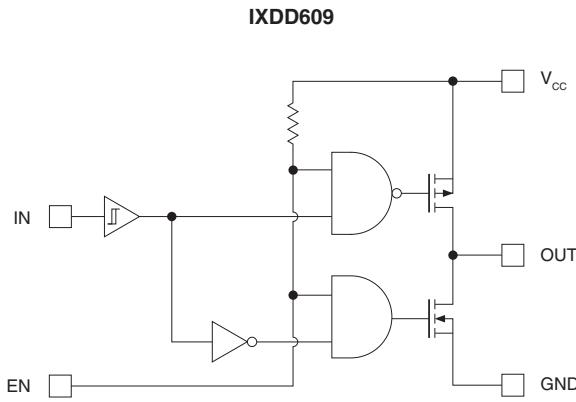
Parameter	Conditions	Symbol	Minimum	Typical	Maximum	Units
Input Voltage, High	$4.5V \leq V_{CC} \leq 18V$	V_{IH}	3.3	-	-	V
Input Voltage, Low	$4.5V \leq V_{CC} \leq 18V$	V_{IL}	-	-	0.65	
Input Voltage Range	-	V_{IN}	-5	-	$V_{CC}+0.3$	
Input Current	$0V \leq V_{IN} \leq V_{CC}$	I_{IN}	-10	-	10	μA
Output Voltage, High	-	V_{OH}	$V_{CC}-0.025$	-	-	V
Output Voltage, Low	-	V_{OL}	-	-	0.025	
Output Resistance, High State	$V_{CC}=18V$, $I_{OUT}=-10mA$	R_{OH}	-	-	2	
Output Resistance, Low State	$V_{CC}=18V$, $I_{OUT}=10mA$	R_{OL}	-	-	1.5	Ω
Output Current, Continuous	Limited by package power dissipation	I_{DC}	-	-	± 1	A
Rise Time	$C_{LOAD}=10nF$, $V_{CC}=18V$	t_R	-	-	40	ns
Fall Time	$C_{LOAD}=10nF$, $V_{CC}=18V$	t_F	-	-	30	
On-Time Propagation Delay	$C_{LOAD}=10nF$, $V_{CC}=18V$	t_{ONDLY}	-	-	75	
Off-Time Propagation Delay	$C_{LOAD}=10nF$, $V_{CC}=18V$	t_{OFFDLY}	-	-	75	
Enable to Output-High Delay Time	IXDD609 only	t_{ENOH}	-	-	75	
Disable to High Impedance State Delay Time	IXDD609 only	t_{DOLD}	-	-	75	
Power Supply Current	$V_{CC}=18V$, $V_{IN}=3.5V$	I_{CC}	-	1	2.5	mA
	$V_{CC}=18V$, $V_{IN}=0V$		-	-	150	μA
	$V_{CC}=18V$, $V_{IN}=V_{CC}$		-	-	150	

2 Thermal Characteristics

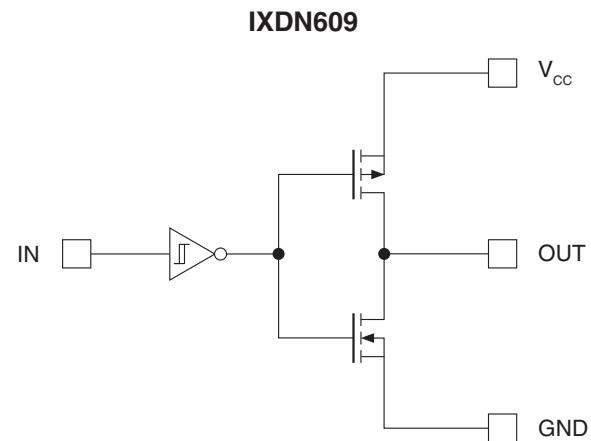
Package	Parameter	Symbol	Rating	Units
D2 (8-Lead DFN)	Thermal Resistance, Junction-to-Ambient	θ_{JA}	35	$^\circ\text{C}/\text{W}$
Cl (5-Lead TO-220)			36	
PI (8-Lead DIP)			125	
SI (8-Lead Power SOIC)			85	
SIA (8-Lead SOIC)			120	
YI (5-Lead TO-263)			46	
Cl (5-Lead TO-220)	Thermal Resistance, Junction-to-Case	θ_{JC}	3	$^\circ\text{C}/\text{W}$
SI (8-Lead Power SOIC)			10	
YI (5-Lead TO-263)			2	

3 Functional Description

3.1 IXDD609 Functional Block Diagram



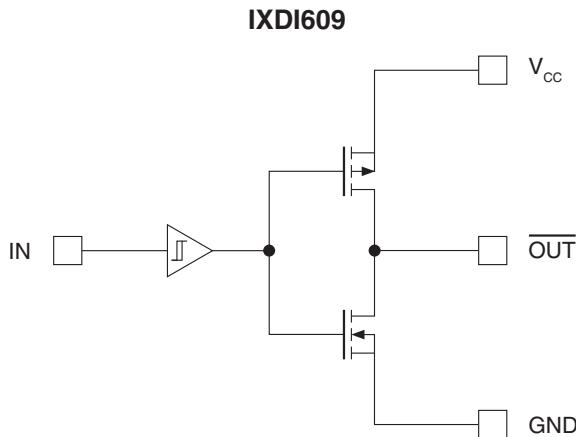
3.3 IXdN609 Functional Block Diagram



IN	EN	OUT
0	1 or open	0
1	1 or open	1
0	0	Z
1	0	Z

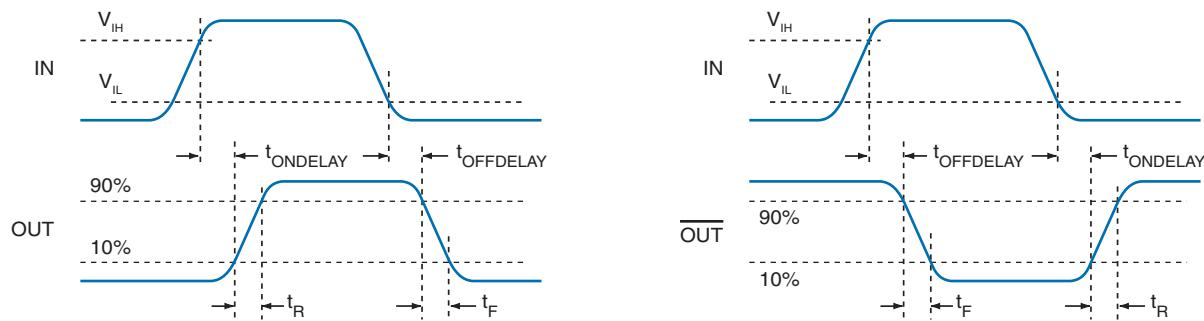
IN	OUT
0	0
1	1

3.2 IXDI609 Functional Block Diagram

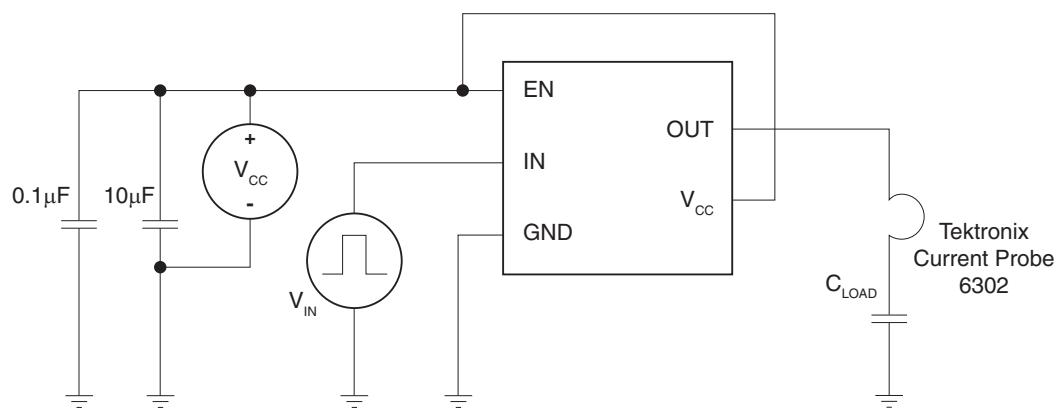


IN	OUT
0	1
1	0

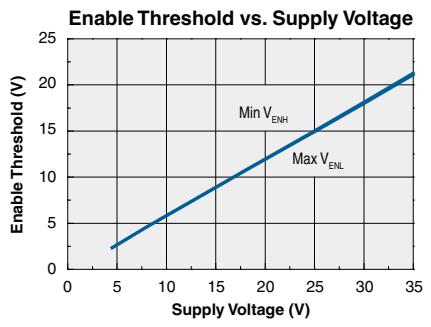
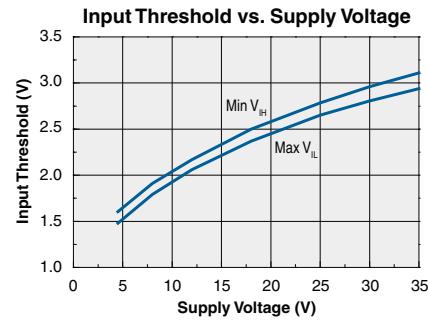
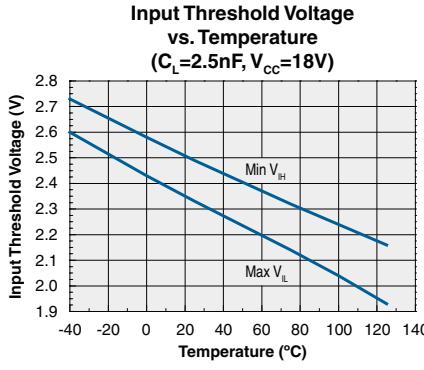
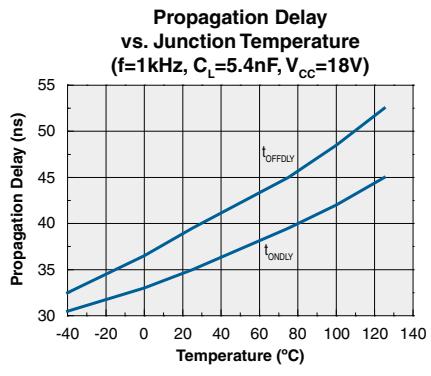
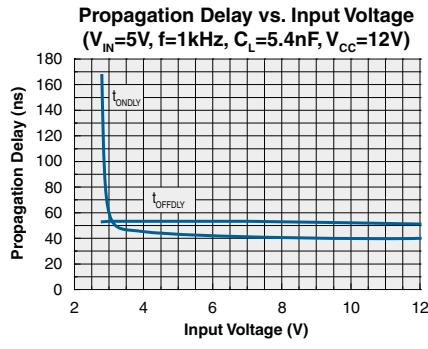
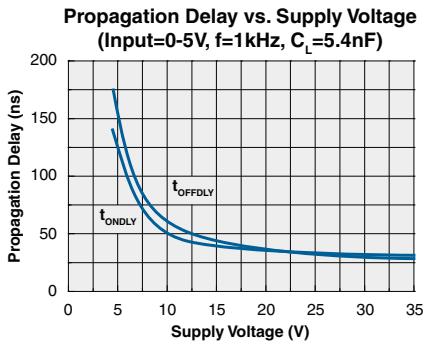
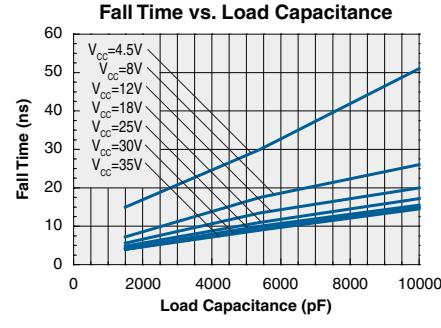
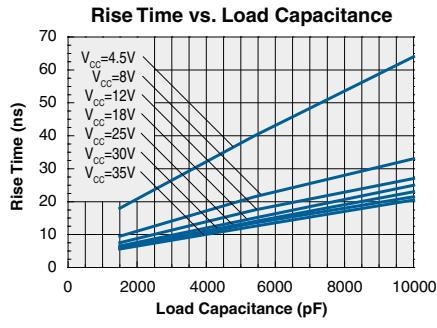
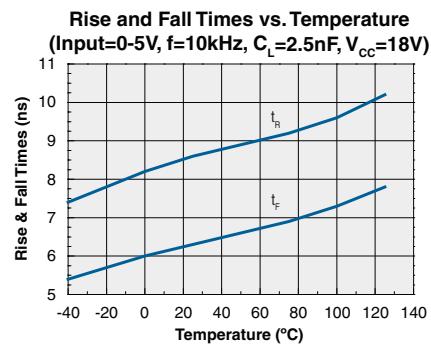
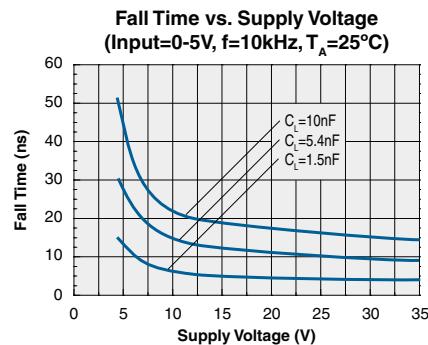
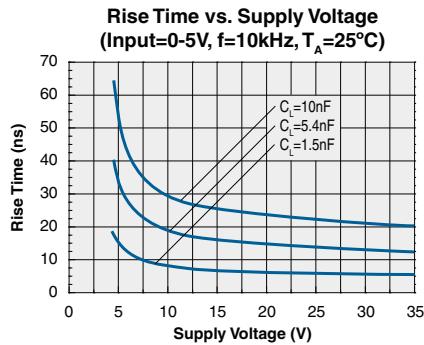
3.4 Timing Diagrams

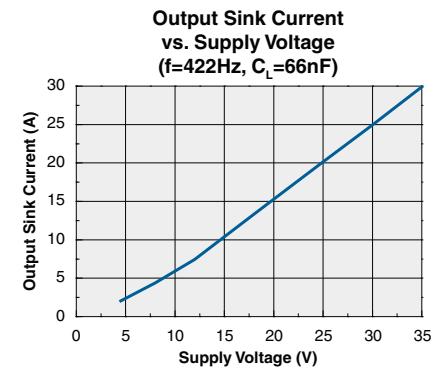
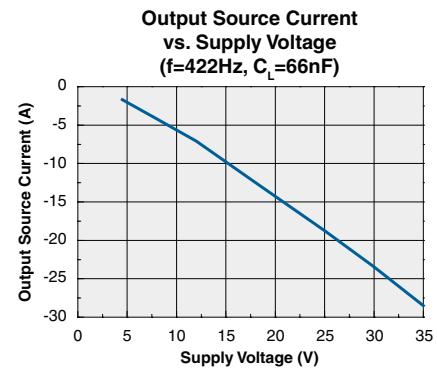
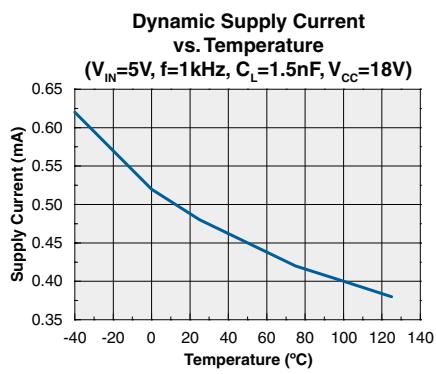
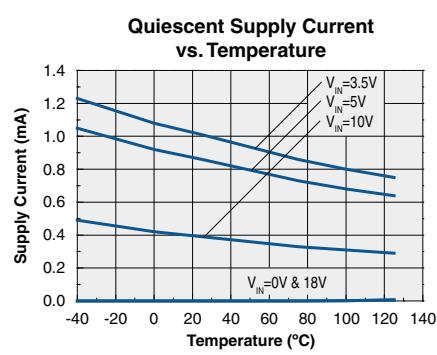
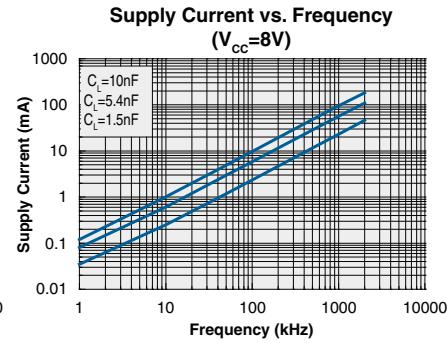
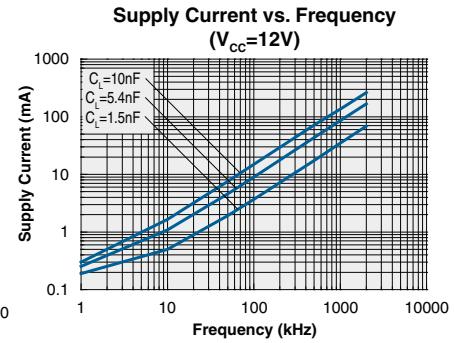
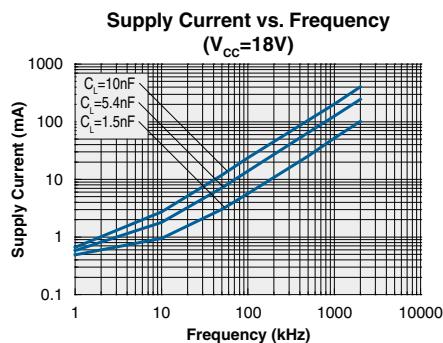
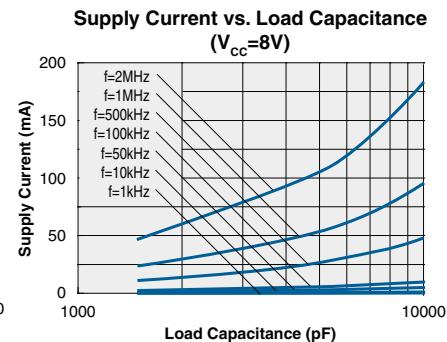
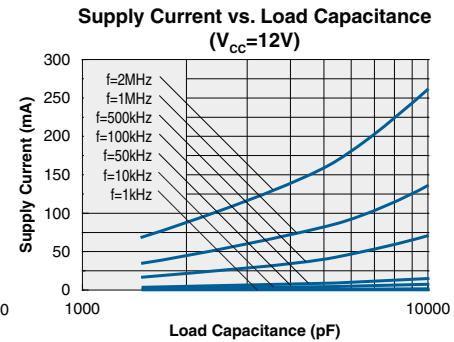
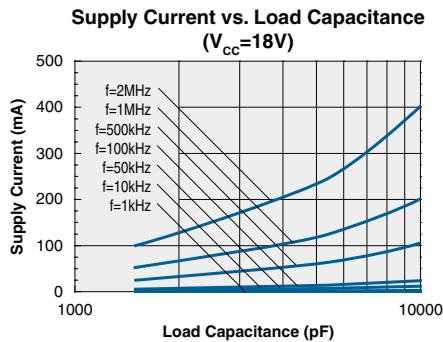


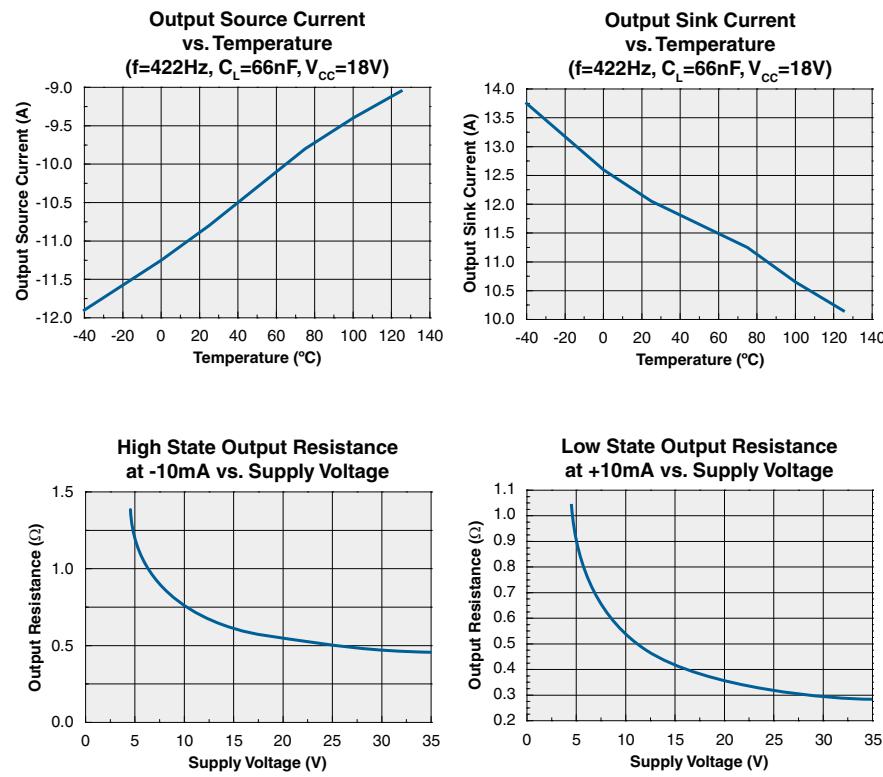
3.5 Characteristics Test Diagram



4 Performance Data



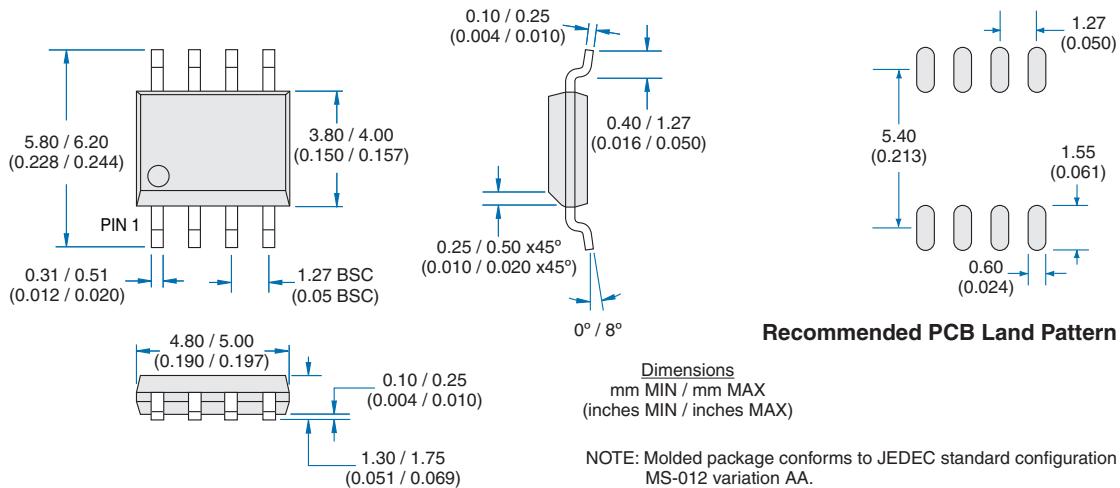




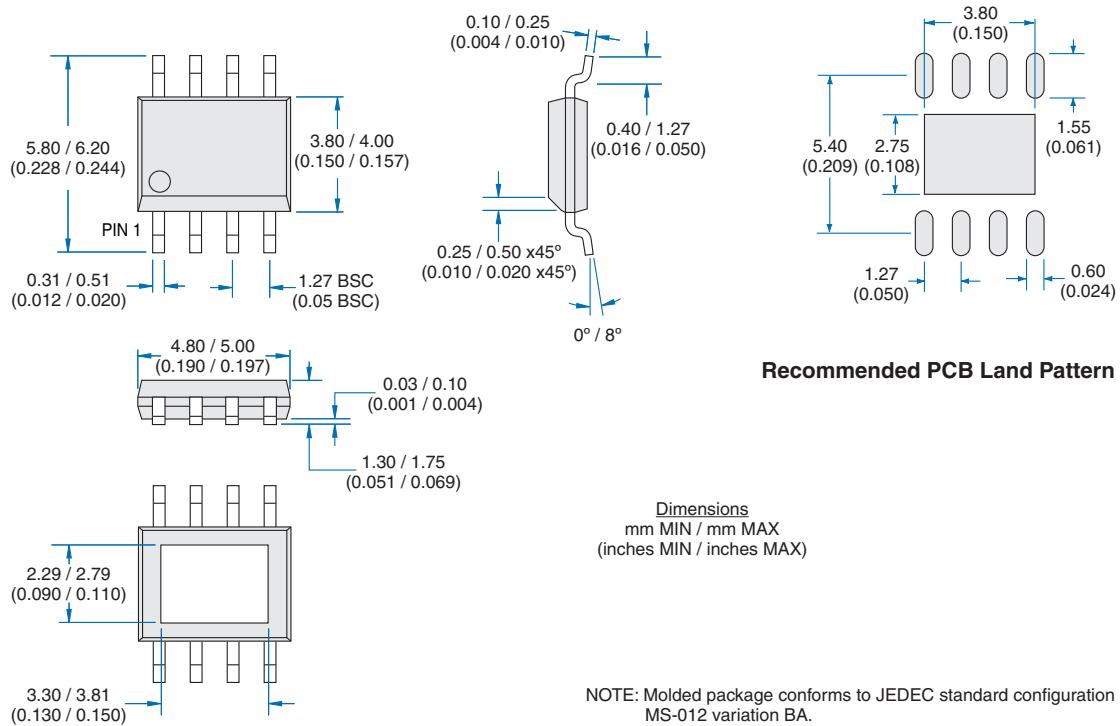
5 Manufacturing Information

5.1 Mechanical Dimensions

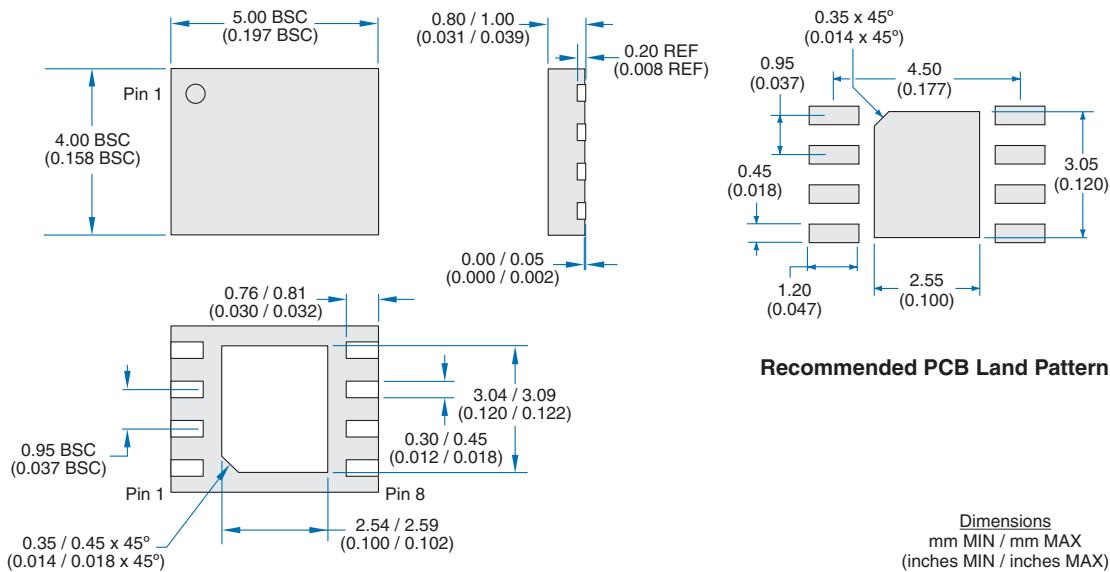
5.1.1 IXD_609SIA (8-Lead SOIC)



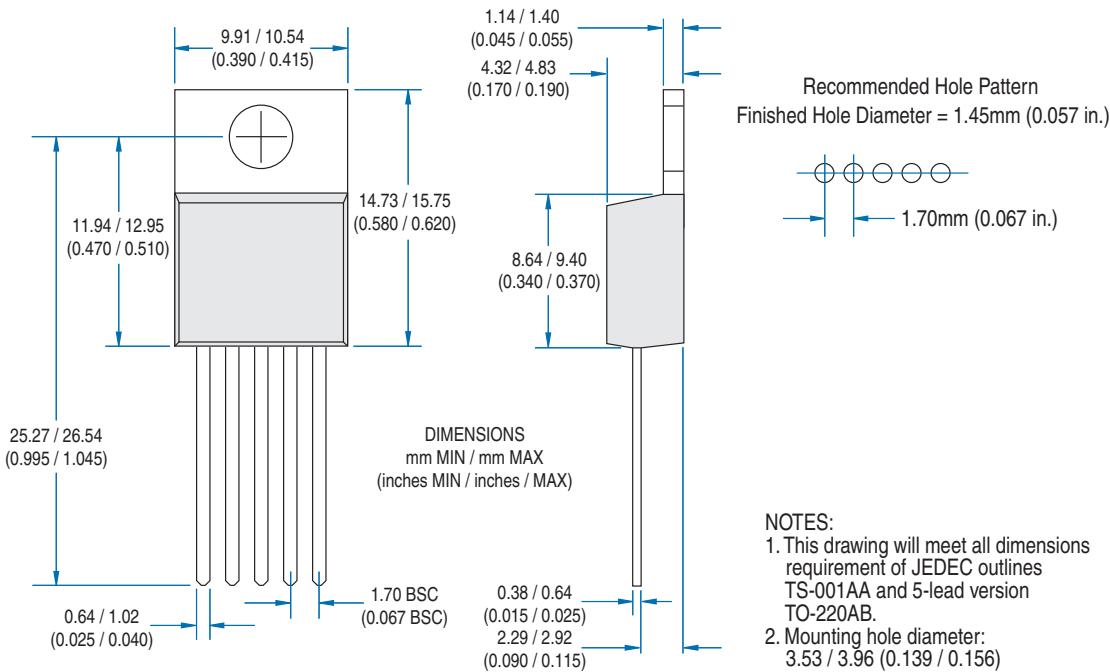
5.1.2 IXD_609SI (8-Lead Power SOIC with Exposed Metal Back)



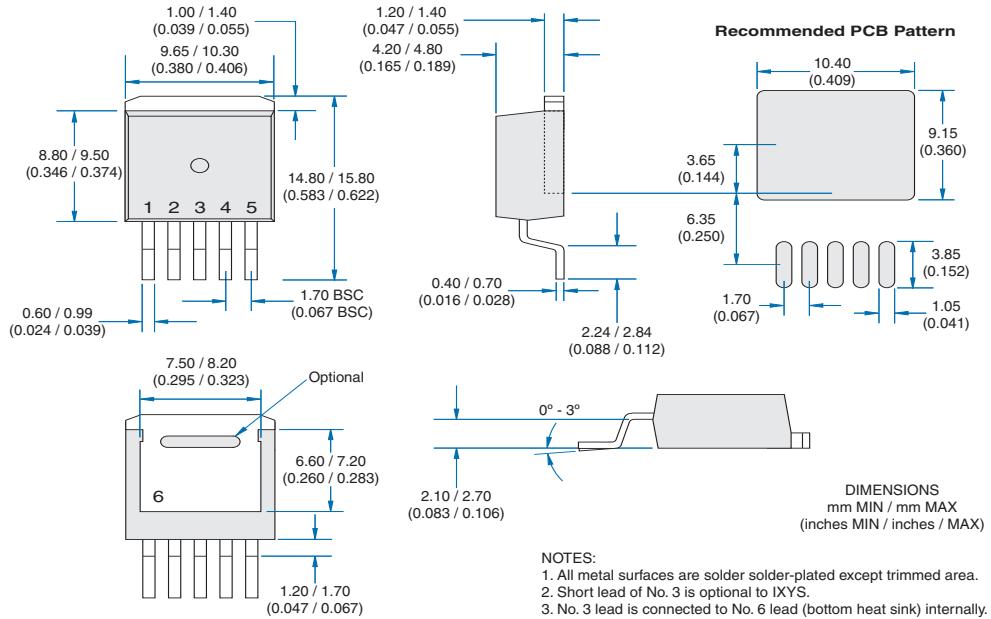
5.1.3 IXDD609D2 (8-Lead DFN)



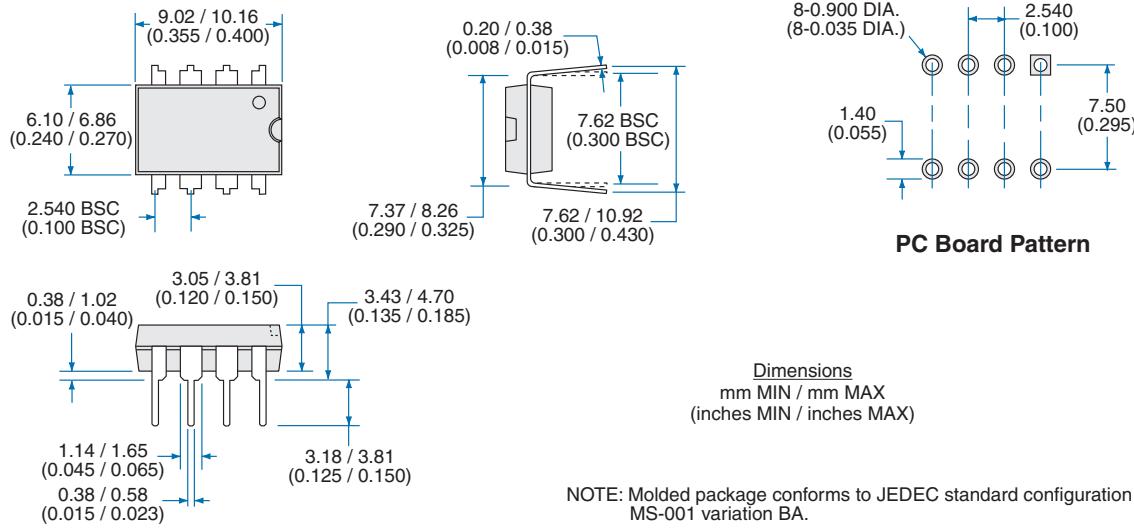
5.1.4 IXD_609Cl (5-Lead TO-220)



5.1.5 IXD_609YI (5-LeadTO-263)



5.1.6 IXD_609PI (8-Lead DIP)



For additional information please visit our website at: www.clare.com

Clare, Inc. makes no representations or warranties with respect to the accuracy or completeness of the contents of this publication and reserves the right to make changes to specifications and product descriptions at any time without notice. Neither circuit patent licenses nor indemnity are expressed or implied. Except as set forth in Clare's Standard Terms and Conditions of Sale, Clare, Inc. assumes no liability whatsoever, and disclaims any express or implied warranty, relating to its products including, but not limited to, the implied warranty of merchantability, fitness for a particular purpose, or infringement of any intellectual property right.

The products described in this document are not designed, intended, authorized or warranted for use as components in systems intended for surgical implant into the body, or in other applications intended to support or sustain life, or where malfunction of Clare's product may result in direct physical harm, injury, or death to a person or severe property or environmental damage. Clare, Inc. reserves the right to discontinue or make changes to its products at any time without notice.

Specification: DS-IXD_609-R00F
 ©Copyright 2010, Clare, Inc.
 All rights reserved. Printed in USA.
 8/24/2010