Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

IX2R11

500 Volt, 2 Ampere High & Low-side Driver for N-Channel MOSFETs and IGBTs

Features

- Floating High Side Driver with boot-strap power supply along with a Low Side Driver.
- Fully operational to 500V
- ± 50V/ns dV/dt immunity
- Gate drive power supply range: 10 - 35V
- Undervoltage lockout for both output drivers
- Separate logic power supply range: 3.3V to V_{CL}
- Built using the advantages and compatibility of CMOS and IXYS HDMOS™ processes
- Latch-Up protected over entire operating range
- Matched propagation delay for both outputs
- High peak output current: 2A
- Low output impedance
- Low power supply current
- Immune to negative voltage transients

Applications

- Driving MOSFETs and IGBTs in half-bridge circuits
- High voltage, high side and low side drivers
- Motor Controls
- Switch Mode Power Supplies (SMPS)
- DC to DC Converters
- Class D Switching Amplifiers

General Description

The IX2R11 High Side and Low Side Driver is for driving N-channel MOSFETs and IGBTs with high side and low side outputs, whose input signals reference the low side. The High Side driver can control a MOSFET or IGBT connected to a positive bus voltage up to 500V. The logic input stages are compatible with TTL or CMOS, have built-in hysteresis and are fully immune to latch up over the entire operating range. The IX2R11 can withstand dV/dt on the output side up to ± 50V/ns.

The IX2R11 comes in either the 16-PIN SOIC package (IX2R11S3) or the 14-PIN DIP through-hole package (IX2R11P7).

Ordering Information	
Part Number	**Package Type**
IX2R11P7	14-PIN DIP
IX2R11S3	16-PIN SOIC

Warning: The IX2R11 is ESD sensitive.

Precaution: When performing the High-Voltage tests, adequate safety precautions should be taken.

* Operational voltage rating of 500V determined in a typical half-bridge circuit configuration (refer to Figure 10 and Figure 11). Operational voltage in other circuit configurations may vary

Figure 1. Typical Circuit Connection

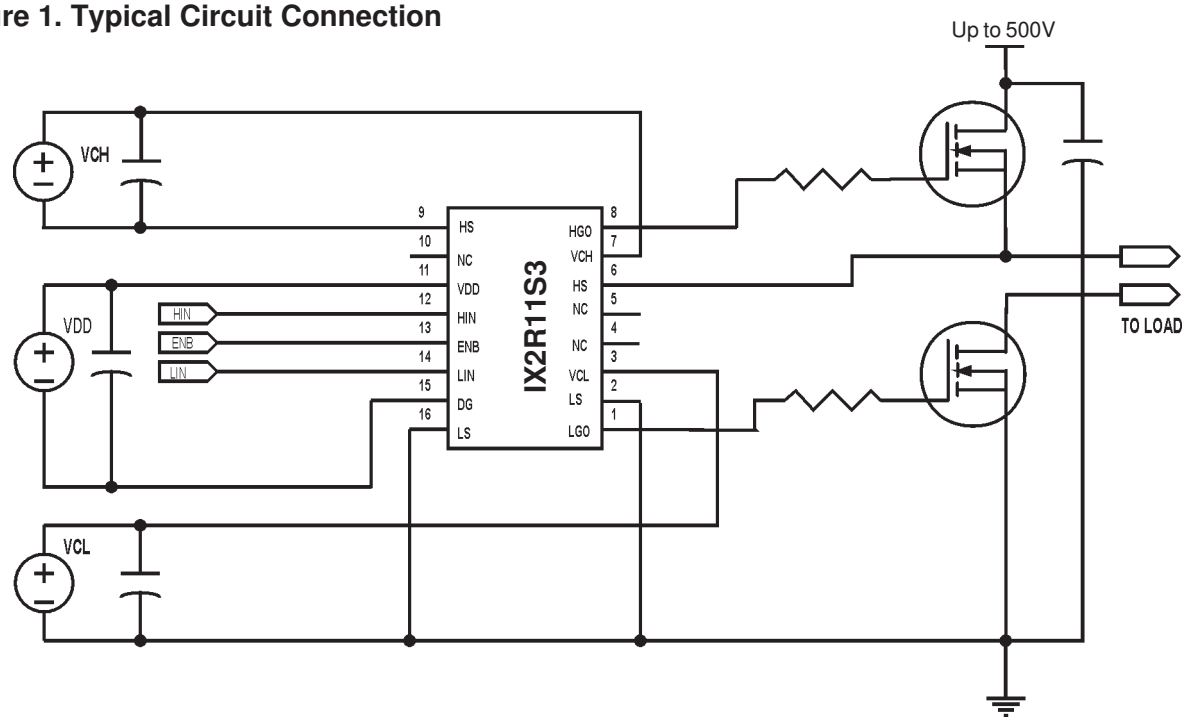
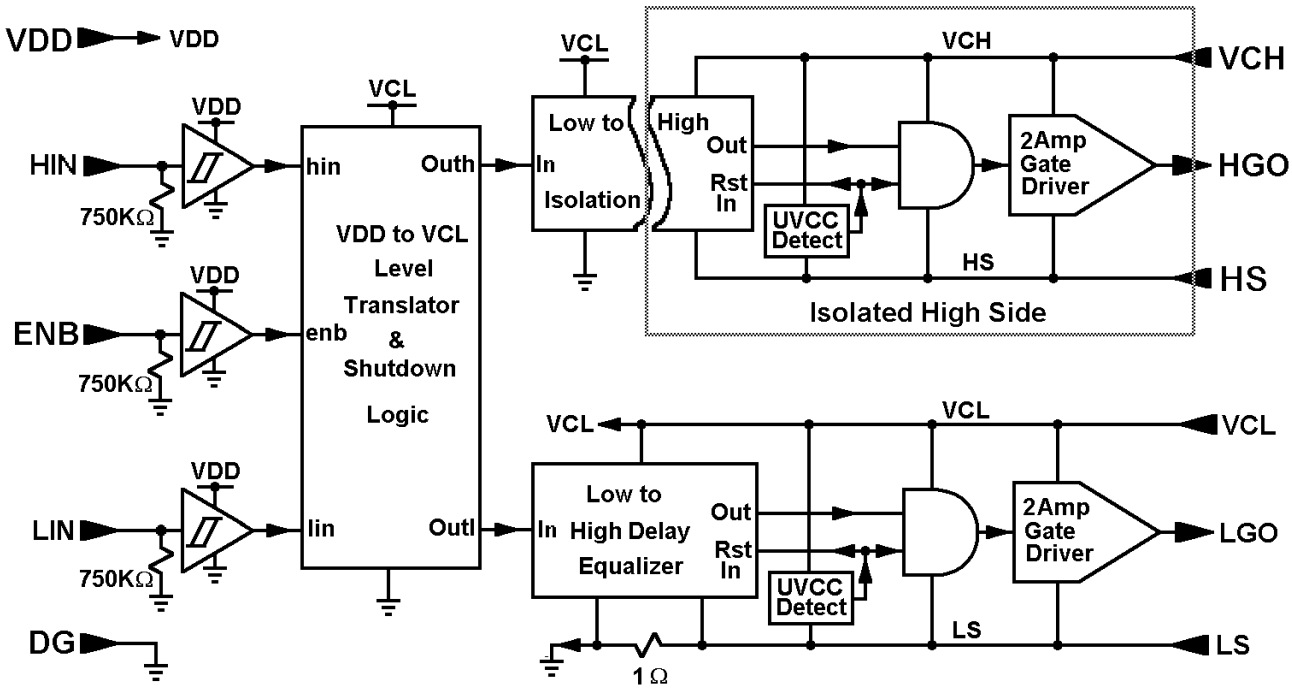


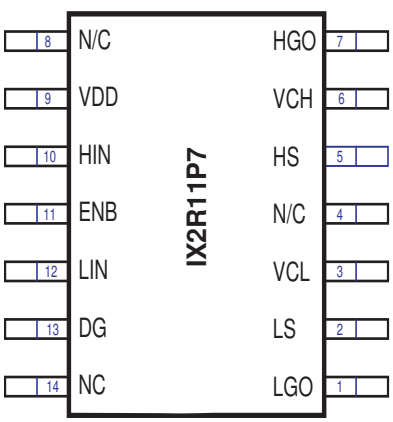
Figure 2 - IX2R11 Functional Block Diagram



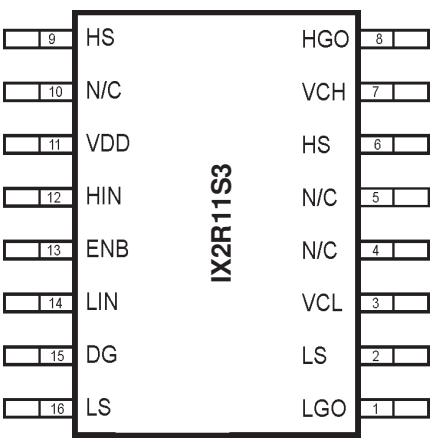
Pin Description And Configuration

SYMBOL	FUNCTION	DESCRIPTION
V_{DD}	Logic Supply	Positive power supply for the chip CMOS functions
HIN	HS Input	High side Input signal, TTL or CMOS compatible; HGO in phase
LIN	LS Input	Low side Input signal, TTL or CMOS compatible; LGO in phase
ENB	Enable	Chip enable, active low. When driven high, both outputs go low.
DG	Ground	Logic reference ground
V_{CH}	Supply Voltage	High side power supply, referenced to HS
HGO	Output	High side driver output
HS	Return	High side voltage return
V_{CL}	Supply Voltage	Low side power supply, referenced to LS
LGO	Output	Low side driver output
LS	Ground	Low side return

14-PIN DIP



16-PIN SOIC



Absolute Maximum Ratings*

Symbol	Definition	Min	Max	Units
V_{CH}	High side floating supply voltage	-0.3	+ 35	V
V_{HS}	High side floating supply offset voltage	-200	+500	V
V_{HGO}	High side floating output voltage	V_{HS} - 0.3	V_{CH} + 0.3	V
V_{CL}	Low side fixed supply voltage	-0.3	+35	V
V_{LGO}	Low side output voltage	-0.3	V_{CL} + 0.3	V
V_{DD}	Logic supply voltage	-0.3	V_{CL} + 0.3	V
V_{DG}	Logic supply offset voltage	V_{LS} - 1	V_{LS} + 1	V
V_{IN}	Logic input voltage(HIN, LIN, ENB)	V_{LS} - 0.3	V_{CL} + 0.3	V
dV_{HS}/dt	Allowable offset supply voltage transient	---	50	V/ns
P_D	Package power dissipation@ $T_{AMBIENT} \leq 25^oC$	---	1.25	W
P_D	Package power dissipation@ $T_{CASE} \leq 25^oC$	---	2.5	W
R_{THJA}	Thermal resistance, junction-to-ambient	---	100	$^oC/W$
R_{THJC}	Thermal resistance, junction-to-case	---	50	$^oC/W$
T_J	Junction Temperature	---	150	^oC
T_S	Storage temperature	-55	150	^oC
T_L	Lead temperature (soldering, 10 secs.)	---	300	^oC

Recommended Operating Conditions

Symbol	Definition	Min	Max	Units
V_{CH}	High side floating supply absolute voltage	V_{HS}+10	V_{HS}+20	V
V_{HS}	High side floating supply offset voltage	-250	+500	V
V_{HGO}	High side floating output voltage	V_{HS}	V_{HS}+V_{CH}	V
V_{CL}	Low side fixed supply voltage	10	20	V
V_{LGO}	Low side output voltage	0	V_{CL}	V
V_{DD}	Logic supply voltage	V_{DG}+3	V_{DG}+V_{CL}	V
V_{DG}	Logic supply offset voltage	V_{LS}-0.3	V_{LS}+0.3	V
V_{IN}	Logic input voltage(HIN, LIN, ENB)	V_{DG}	V_{DD}	V
T_A	Ambient Temperature	-40	125	^oC

***Note:** Operating the device beyond parameters with listed "absolute maximum ratings" may cause permanent damage to the device. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.

Dynamic Electrical Characteristics*

Symbol	Definition	Test Conditions	Min	Typ	Max	Units
t_{on}	Turn-on propagation delay	C_{load} = 1nF V_{DD}, V_{CL},V_{CH}=15V	---	140	170	ns
t_{off}	Turn-off propagation delay	C_{load}= 1nF V_{DD}, V_{CL},V_{CH}=15V	---	100	120	ns
t_{enb}	Enable delay, active low	V_{DD}=15V V_{CL},V_{CH}=18V	---	90	110	ns
t_r	Turn-on rise time	C_{load}= 1nF $V_{CH,}$ V_{CL}=15V	---	8	11	ns
t_f	Turn-off fall time	C_{load}= 1nF $V_{CH,}$ V_{CL}=15V	---	7	10	ns
t_{dm}	Delay matching, HS & LS turn-on/off		---	30	40	ns

Static Electrical Characteristics

Symbol	Definition	Test Conditions	Min	Typ	Max	Units
V_{INH}	Logic "1" input voltage	V_{DD},V_{CL},V_{CH}=15V	9.5	9.8	---	V
V_{INL}	Logic "0" input voltage	V_{DD},V_{CL},V_{CH}=15V	---	5.8	6	V
V_{HLGO} / V_{HHGO}	High level output voltage, V_{CH}-V_{HGO} or V_{CL}-V_{LGO}	I_O= 20mA	---	0.3	1	V
V_{LLGO} / V_{LHGO}	Low level output voltage, V_{HGO} or V_{LGO}	I_O= 20mA	---	0.04	0.1	V
I_{HL}	HS to LS bias (leakage) current.	V_{HS} Offset = 600V	---	100	150	uA
I_{QHS}	Quiescent V_{CH} supply current	V_{IN}= 0V, V_{CH} =15V	---	700	1000	uA
I_{QLS}	Quiescent V_{CL} supply current	V_{IN}= 0V, V_{CL}=15V	---	160	300	uA
I_{QDD}	Quiescent V_{DD} supply current	V_{IN}= 0V, V_{DD}=15V	---	0.2	5	uA
I_{IN}+	Logic "1" input bias current	V_{IN}= V_{DD} = 15V	---	11	25	uA
I_{IN}-	Logic "0" input bias current	V_{IN}= 0V	---	---	1	uA
V_{CHUV}+	V_{CH} supply under-voltage positive going threshold.		7	8.1	9	V
V_{CHUV}-	V_{CH} supply under-voltage negative going threshold.		7	8	9	V
V_{CLUV}+	V_{CL} supply under-voltage positive going threshold		9	9.9	11	V
V_{CLUV}-	V_{CL} supply under-voltage negative going threshold.		8.2	9.2	10.5	V
I_{GO}+	HS or LS output high short circuit sourcing current; V_{GO}= 15V, PW<10us		2	2.5	---	A
I_{GO}-	HS or LS output low short circuit sinking current; V_{GO}= 0V, PW<10us		---	-2.5	-2	A

* These characteristics are guaranteed by design only. Tested on a sample basis.

Timing Waveform Definitions

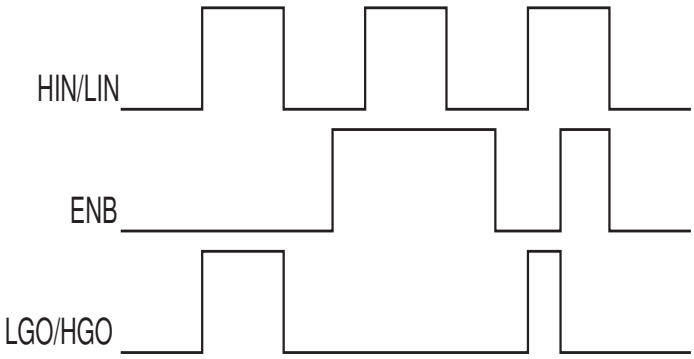


Figure 3. INPUT/OUTPUT Timing Diagram

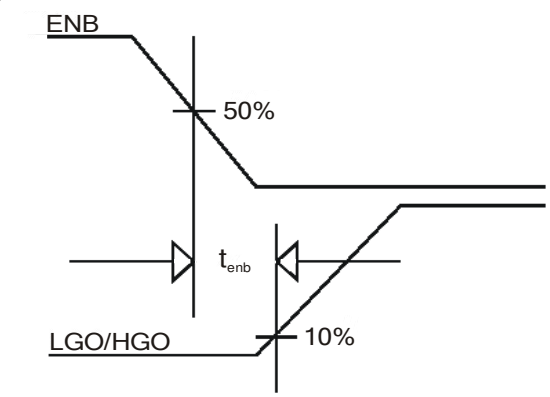


Figure 4. ENABLE Waveform Definitions

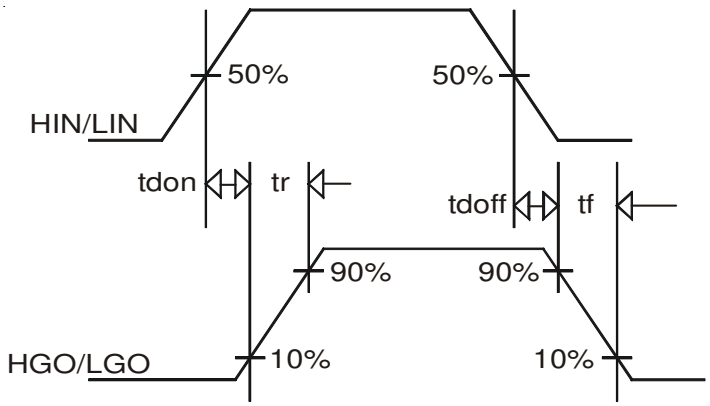


Figure 5. Definitions of Switching Time Waveforms

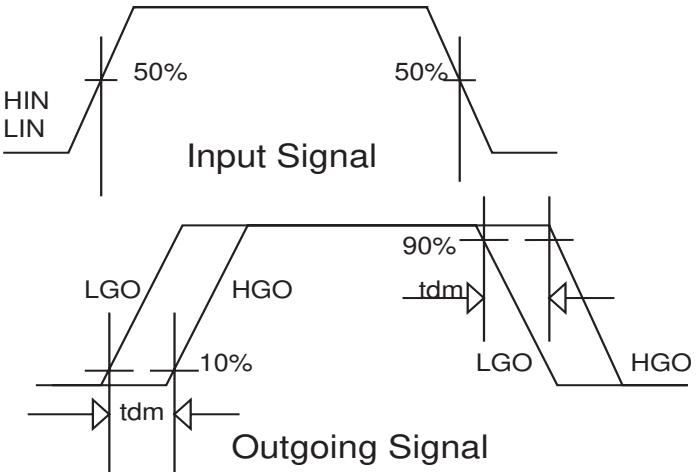


Figure 6. Definitions of Delay Matching Waveforms

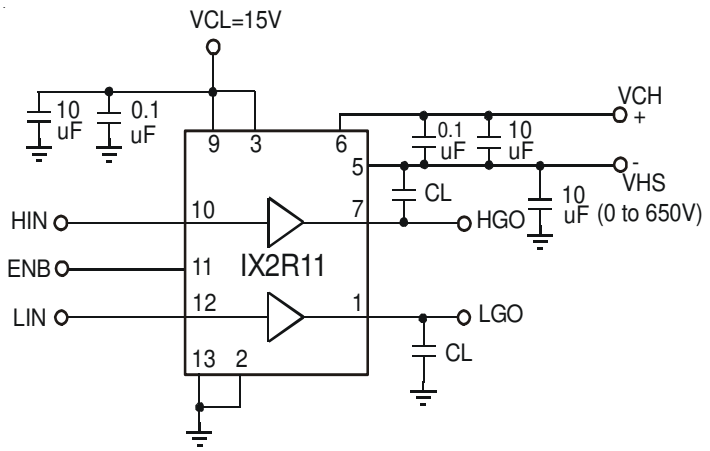


Figure 7. Switching Time Test Circuit

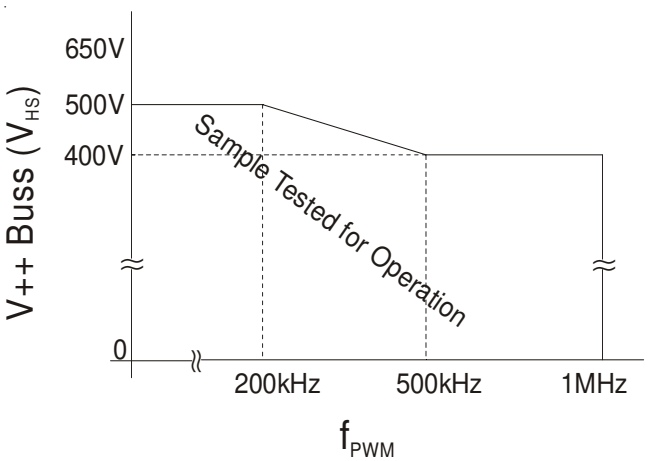


Figure 8. Device operating range: Buss voltage vs. Frequency
Tested in typical circuit configuration (refer to Figures 10 & 11)

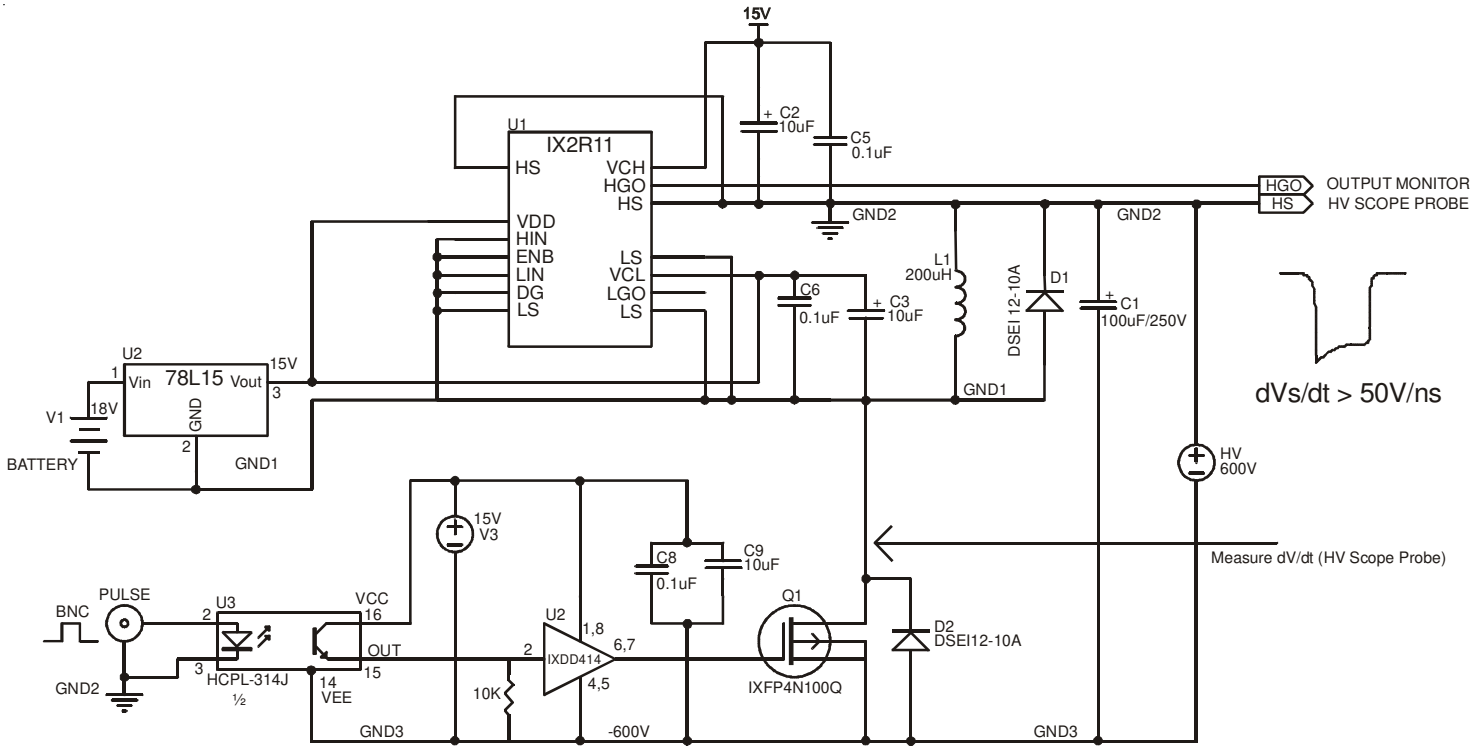


Figure 9. Test circuit for allowable offset supply voltage transient.

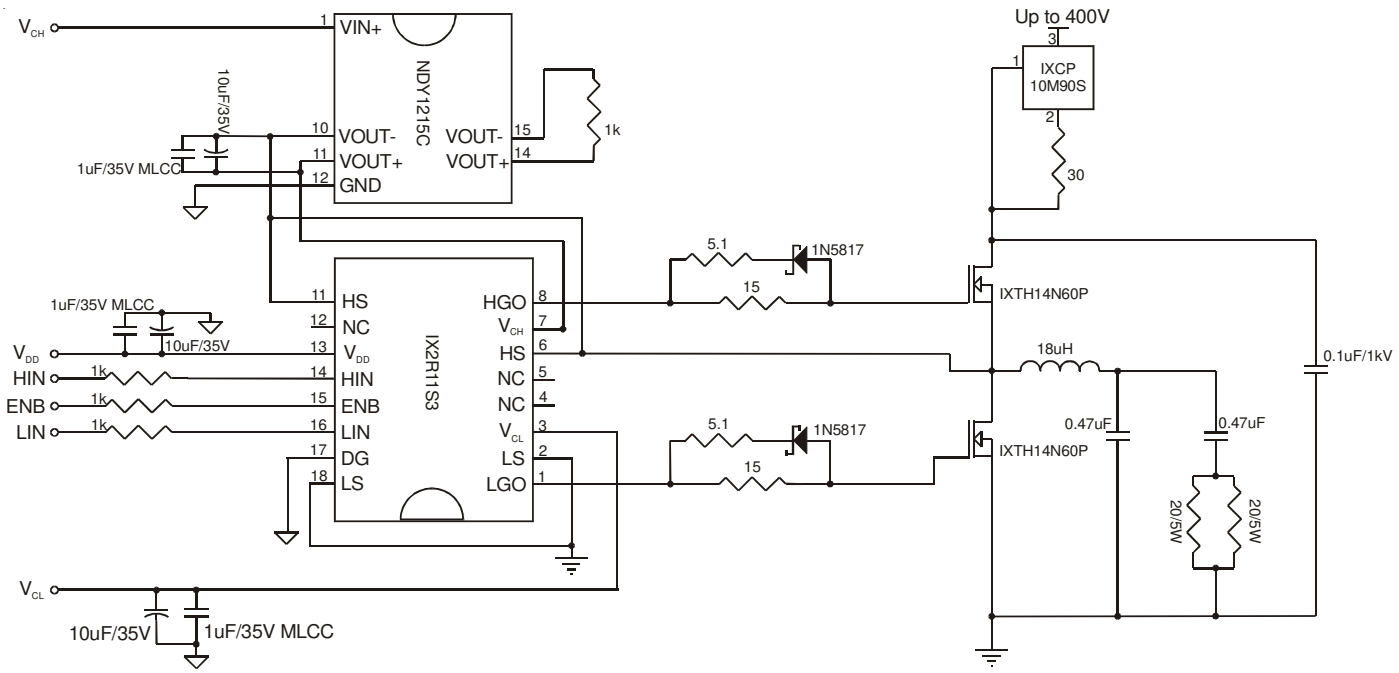


Figure 10. Test circuit for high frequency, 750kHz, operation.
V_{DD}, V_{CH}, V_{CL} = 15V

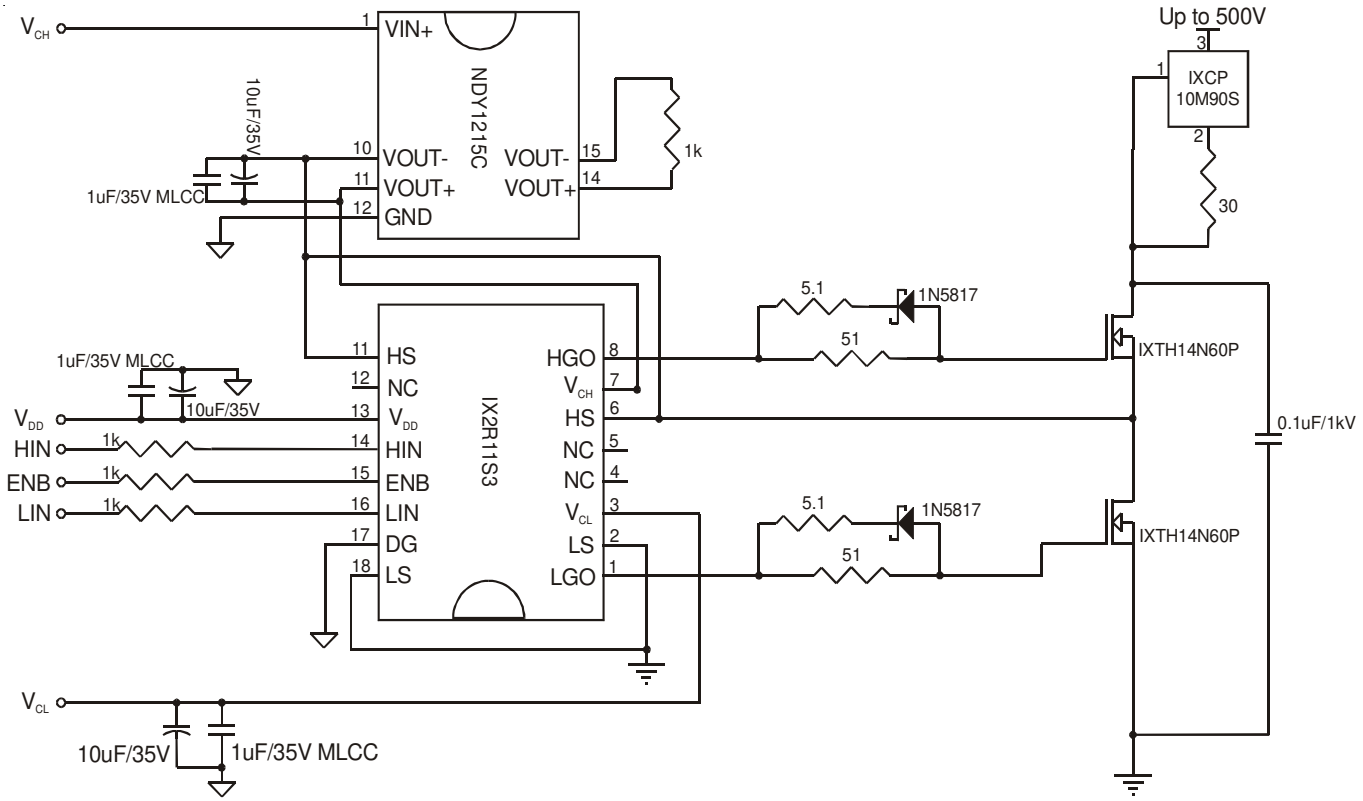


Figure 11. Test circuit for low frequency, 75kHz, operation.
V_{DD}, V_{CH}, V_{CL} = 15V

Figure 12

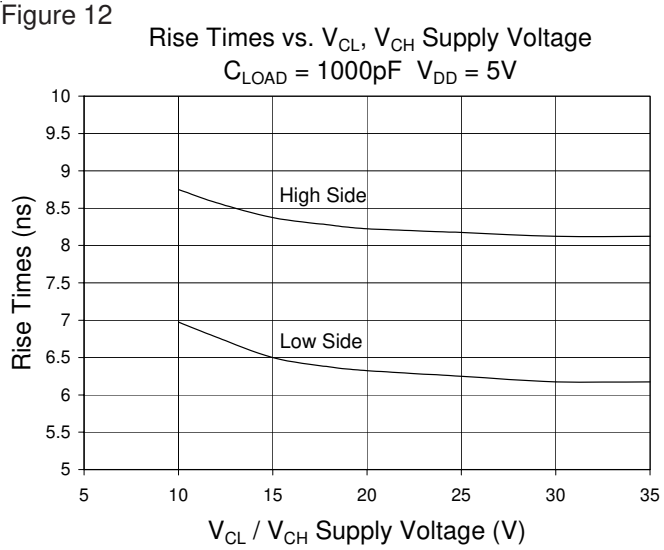


Figure 13

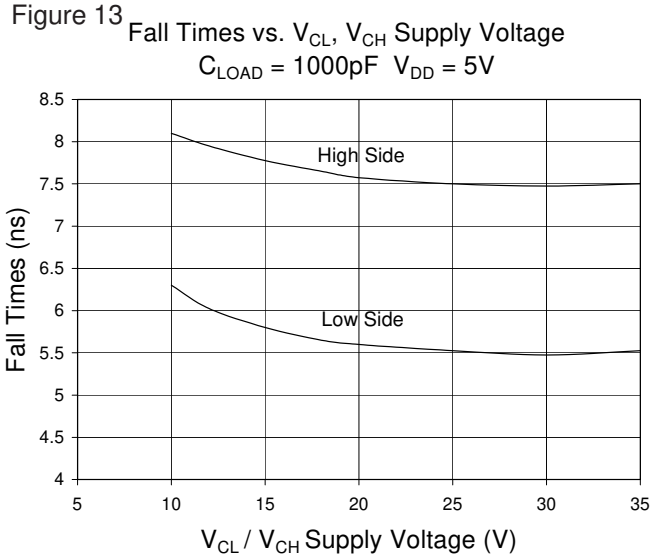


Figure 14

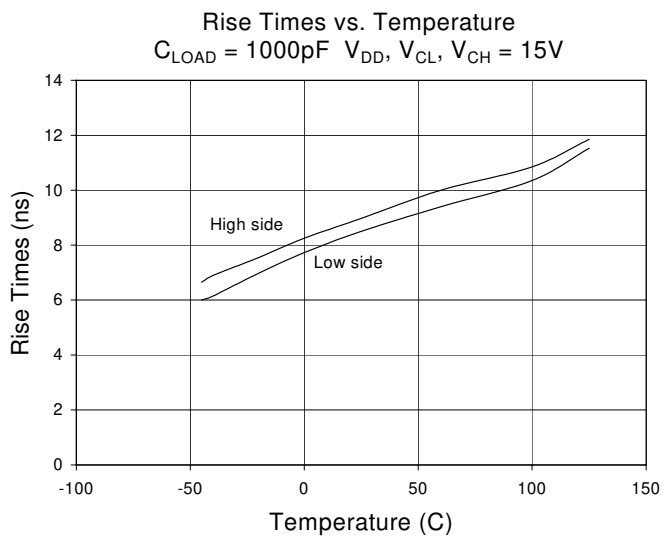


Figure 15

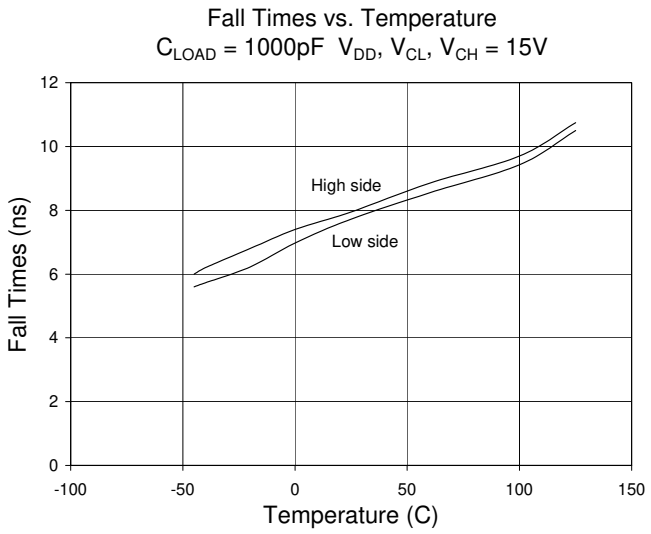


Figure 16

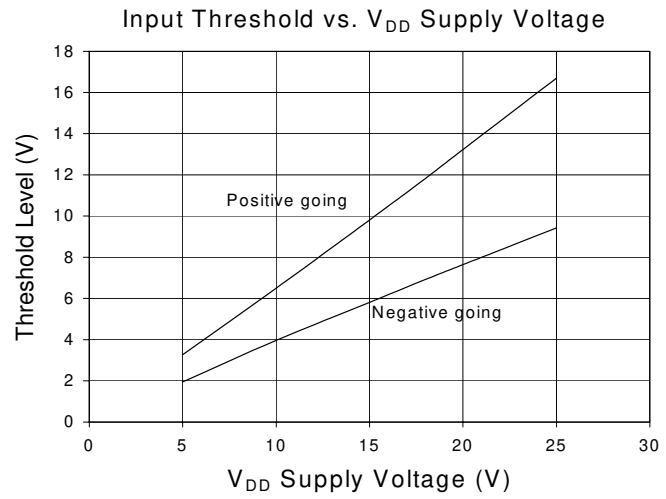


Figure 17

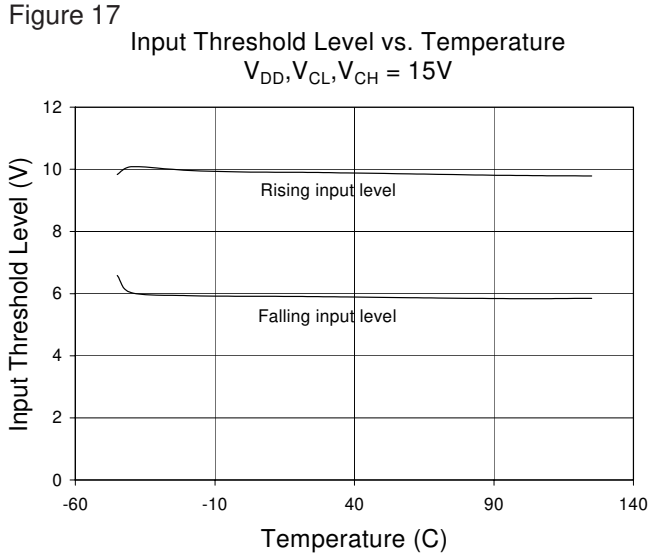


Figure 18

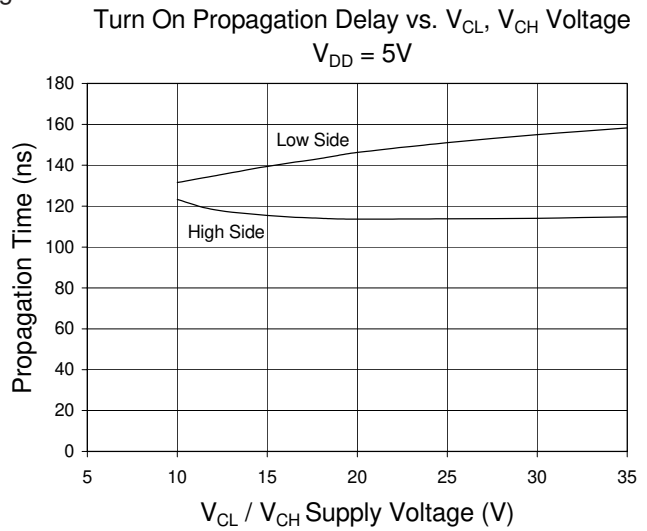


Figure 19

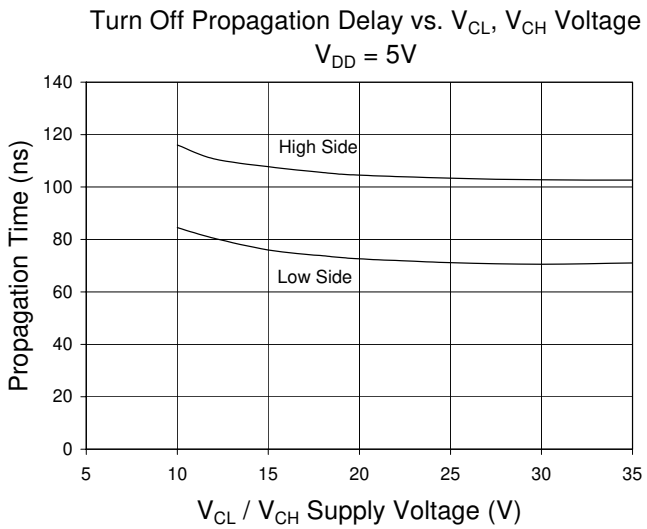


Figure 20

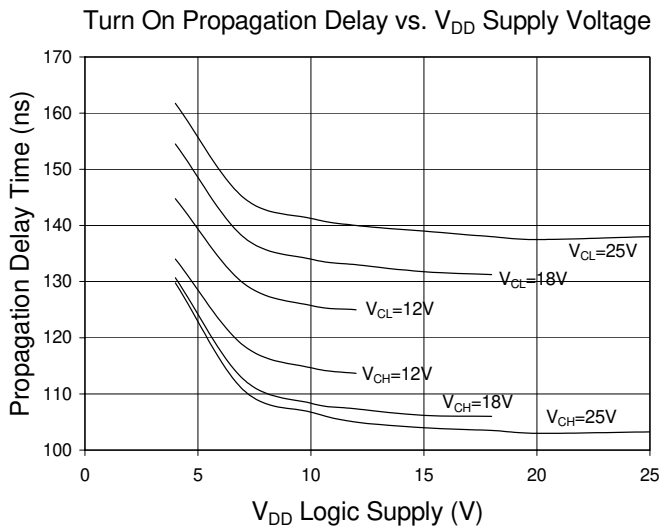


Figure 21

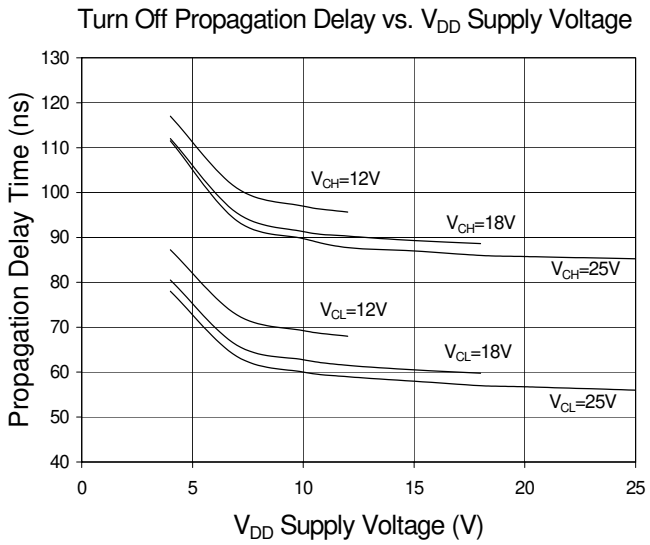


Figure 22

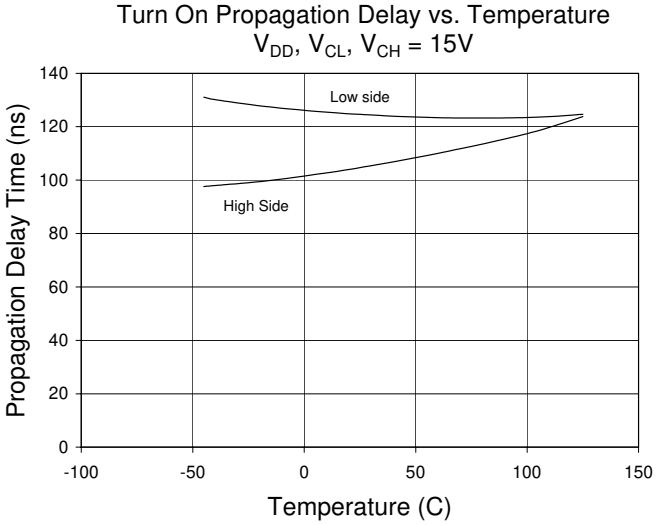


Figure 23

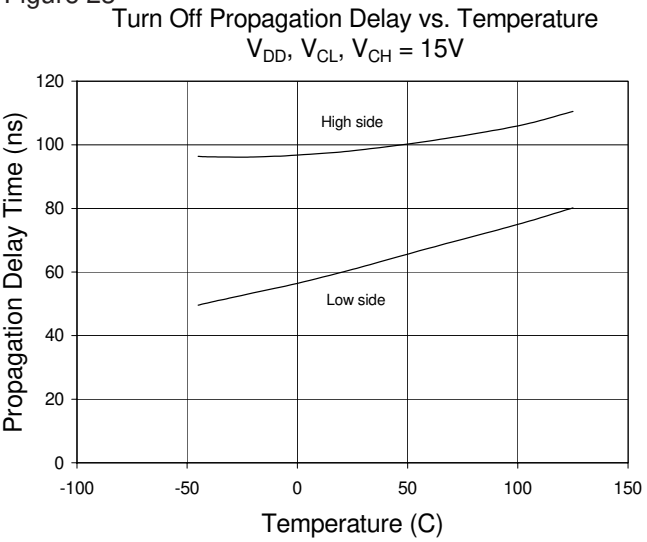


Figure 24

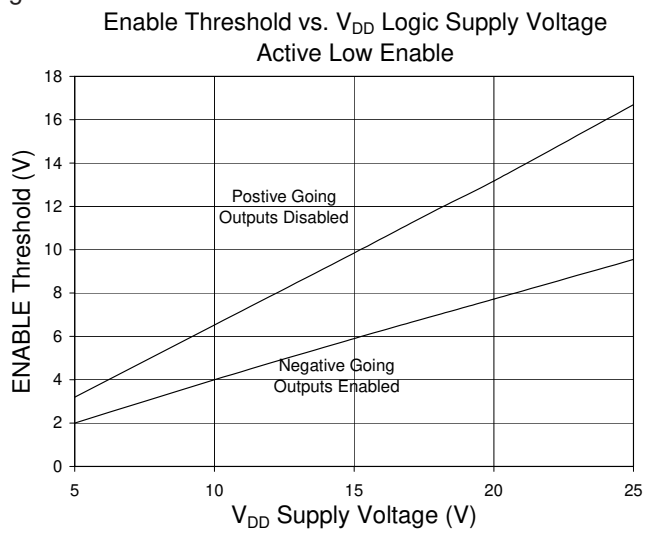


Figure 25

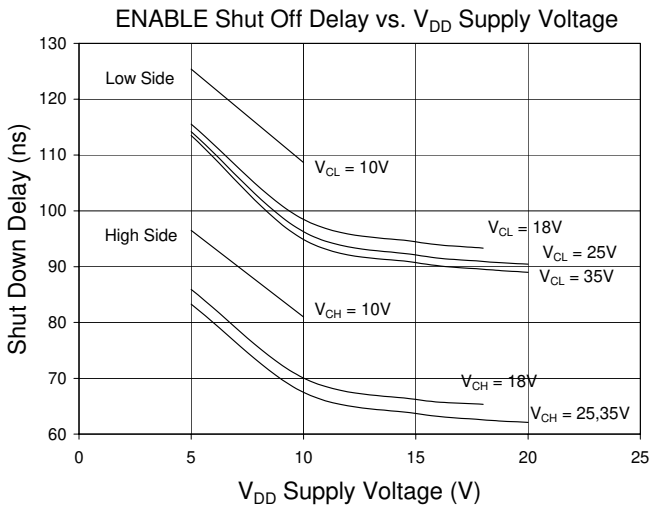


Figure 26

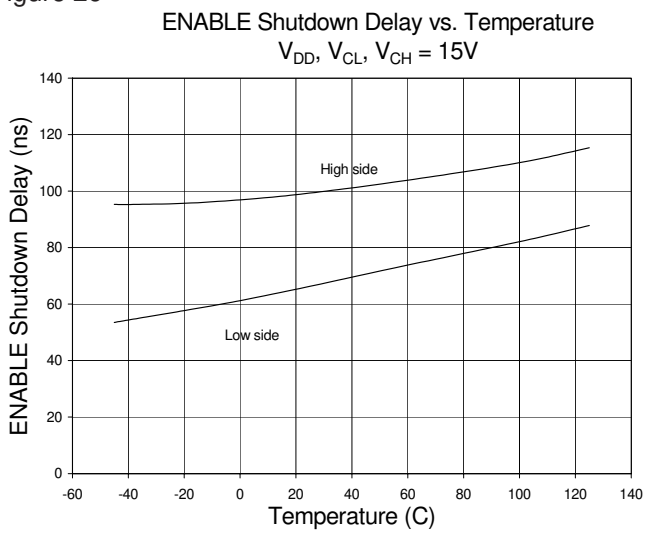


Figure 27

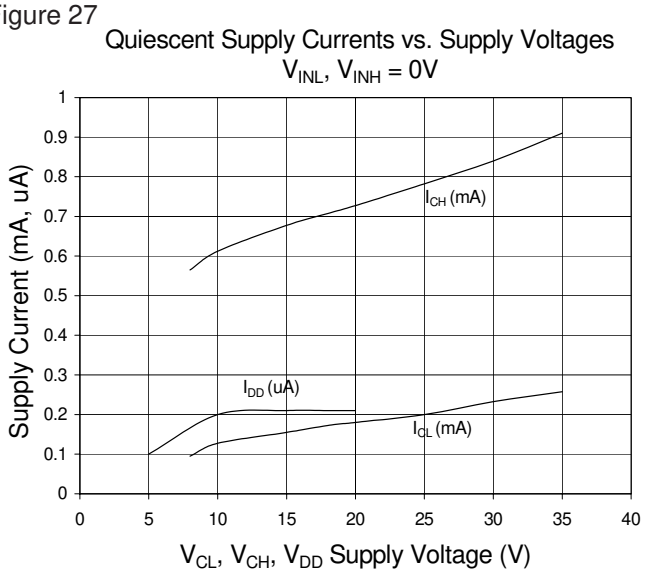


Figure 28

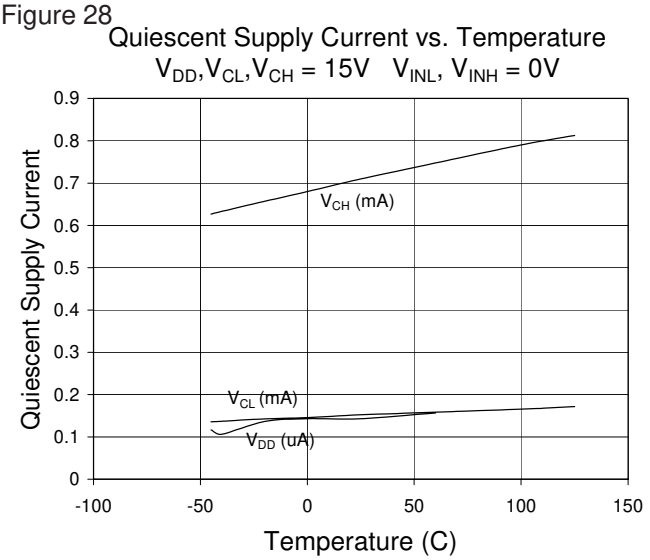


Figure 29

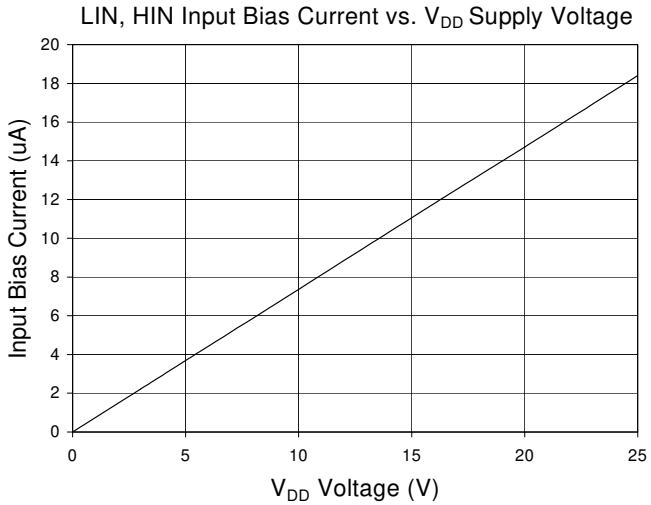


Figure 30

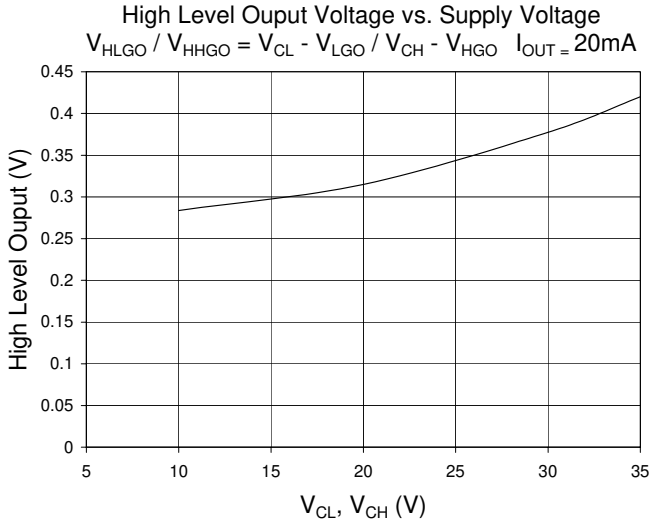


Figure 31

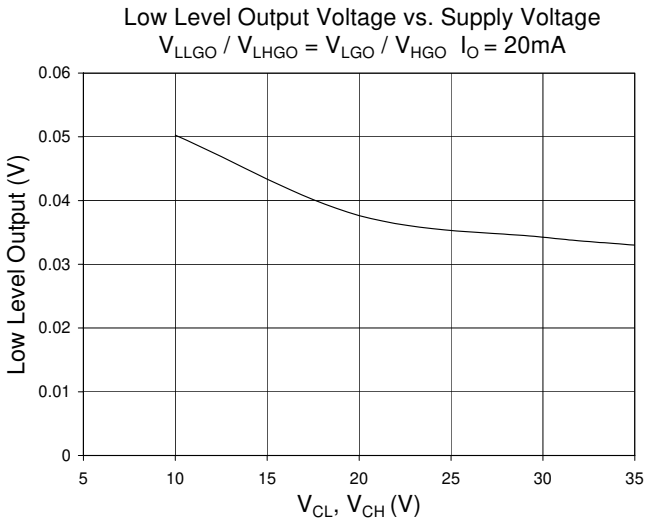


Figure 32

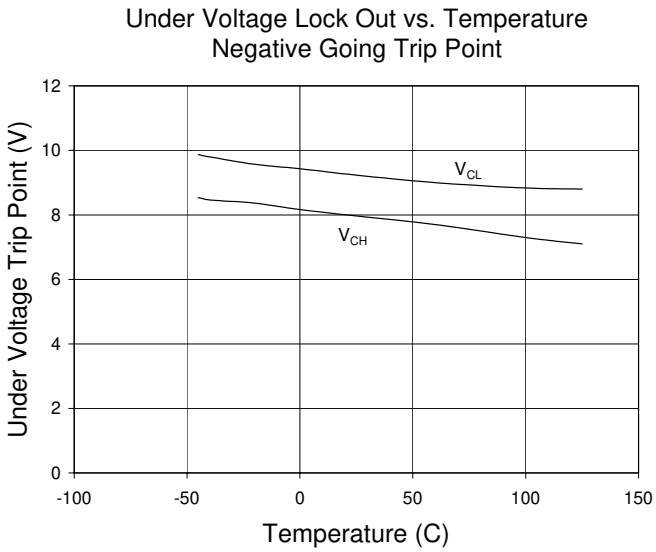


Figure 33

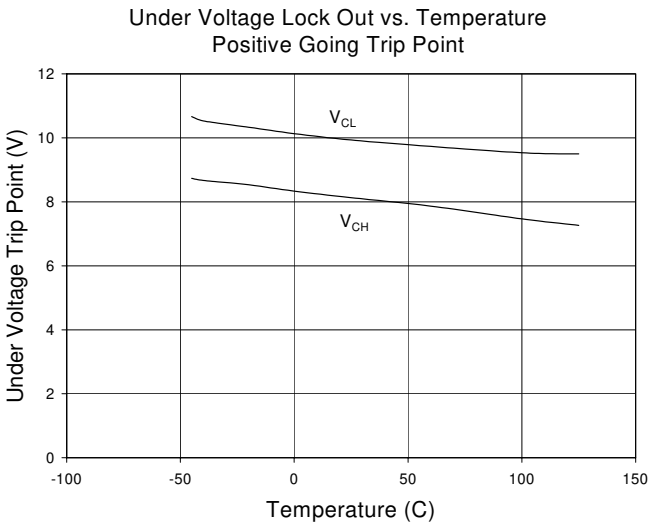


Figure 34

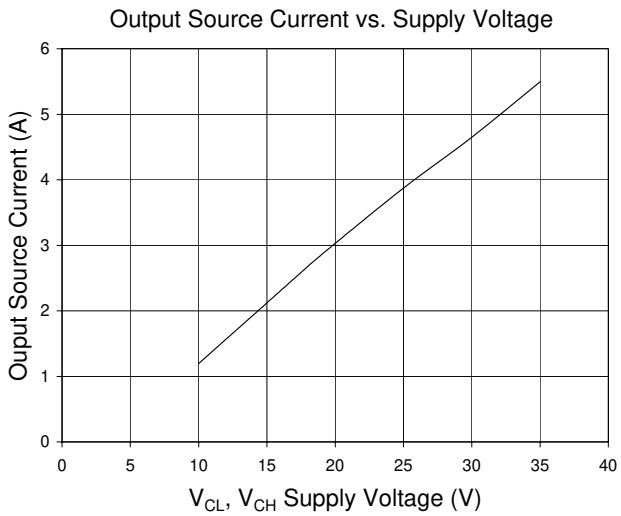


Figure 35

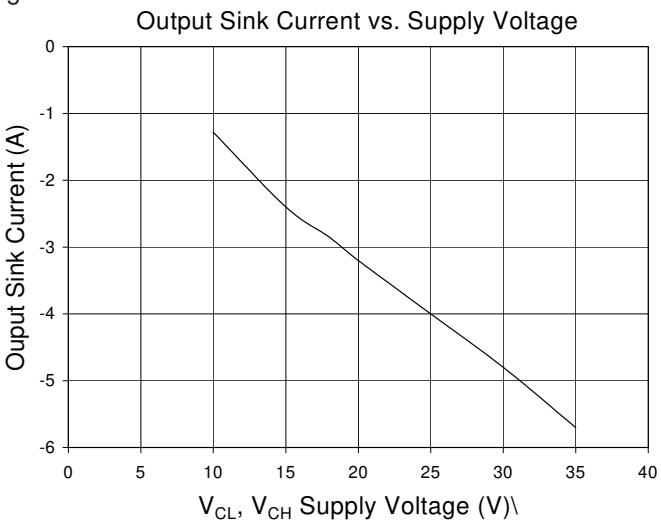


Figure 36

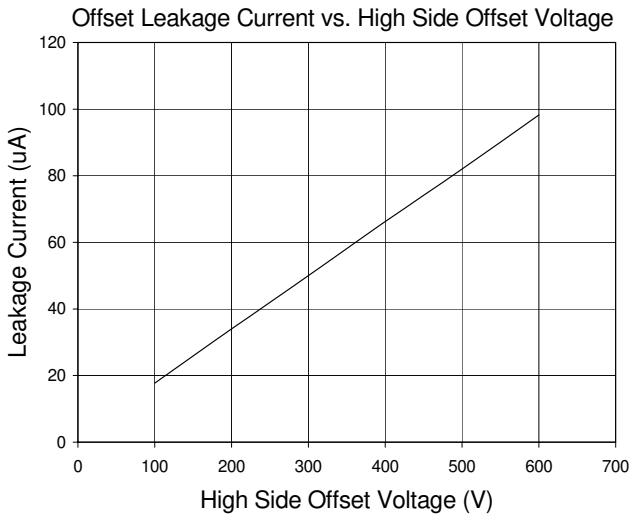


Figure 37

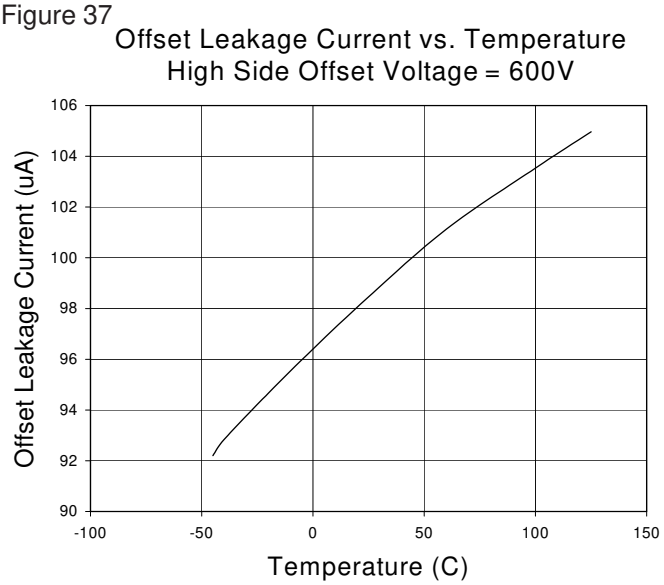


Figure 38

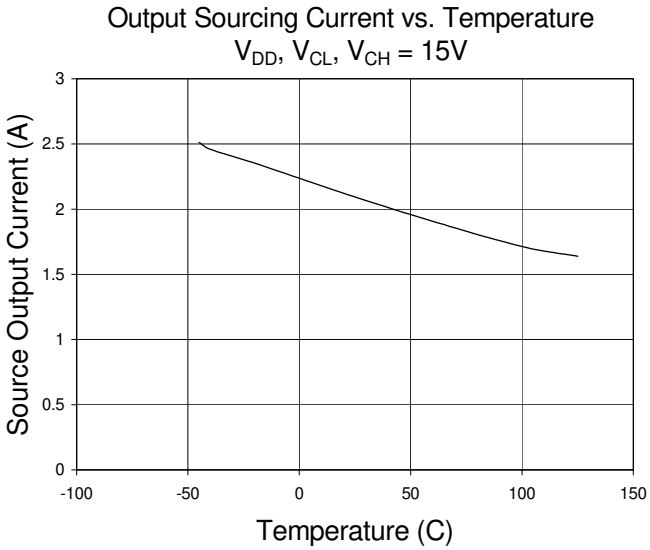
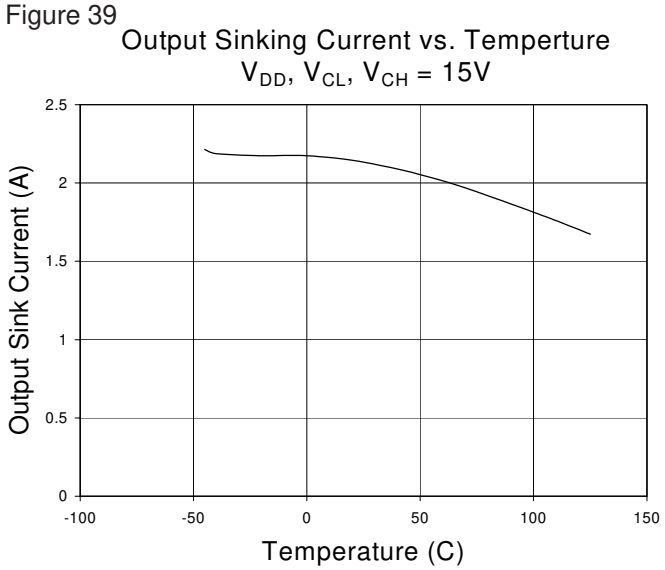
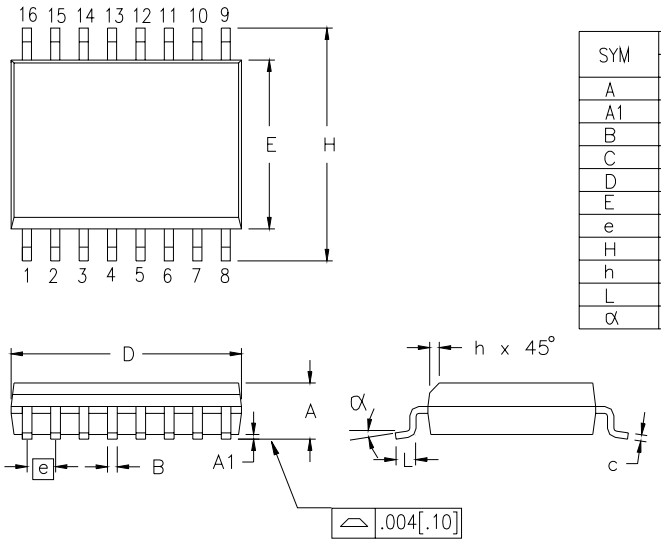


Figure 39



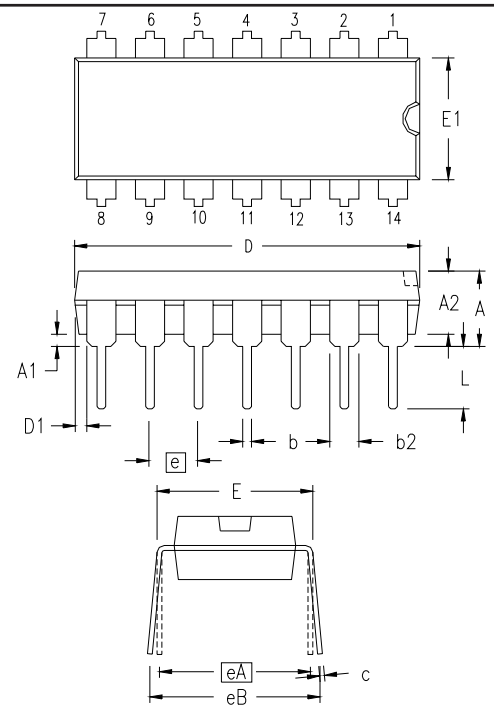
IX2R11S3 Package Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.093	.104	2.35	2.65
A1	.004	.012	.10	.30
B	.013	.020	.33	.51
C	.009	.013	.23	.32
D	.398	.413	10.10	10.50
E	.291	.299	7.40	7.60
e	.050BSC		1.27BSC	
H	.394	.419	10.00	10.65
h	.010	.029	.25	.75
L	.016	.050	.40	1.27
α	0°	8°	0°	8°

NOTE: This drawing will meet all dimensions requirement of JEDEC MS-013 AA.

IX2R11P7 Package Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.140	.180	3.56	4.57
A1	.015	.040	0.38	1.02
A2	.125	.145	3.18	3.68
b	.015	.020	0.38	0.51
b2	.055	.065	1.40	1.65
c	.009	.012	0.23	0.30
D	.735	.775	18.67	19.69
D1	.005	.040	0.13	1.02
E	.300	.325	7.62	8.26
E1	.240	.270	6.10	6.86
e	.100 BSC		2.54 BSC	
eA	.300 BSC		7.62 BSC	
eB	.300	.430	7.62	10.92
L	.120	.140	3.05	3.56

NOTE: THIS DRAWING MEETS ALL REQUIREMENT OF JEDEC OUTLINES MS-001 AA.

IXYS Corporation
3540 Bassett St; Santa Clara, CA 95054
Tel: 408-982-0700; Fax: 408-496-0670
e-mail: sales@ixys.net
www.ixys.com

IXYS Semiconductor GmbH
Edisonstrasse15 ; D-68623; Lampertheim
Tel: +49-6206-503-0; Fax: +49-6206-503627
e-mail: marcom@ixys.de