

**Features:**

- µPower Operation (15 µW typical at 25°C)
- Omni polar (switches with N or S pole)
- 2.5 to 5.5 Volt Operation
- Simple Digital Output Interfacing  
Open Drain
- Ultra Low Offset Canceling Amplifiers Provide Sensitive, Accurate, Stable Switching Points and Immunity to Mechanical Stress
- Solid State Circuitry
- Operating Temperature Range: -40°C to +85°C
- RoHS Compliant TSOT-23 3 Lead Package

**General Description**

The MX887D integrated Hall-Effect switch targets the requirements of low-power portable devices with battery operating voltages from 2.5V to 5.5V. On-chip power management circuitry reduces the effective average current to just 5µA at 3.0 V<sub>SUPPLY</sub>.

The switch output will turn “on” when either a north or south magnetic pole is applied. The absence of a magnetic field will turn the switch into a high impedance “off” state. Emulating the behavior of a traditional reed switch, together with the advantages of high integration and solid state reliability, makes the MX887D is an ideal replacement in low-power portable device applications.

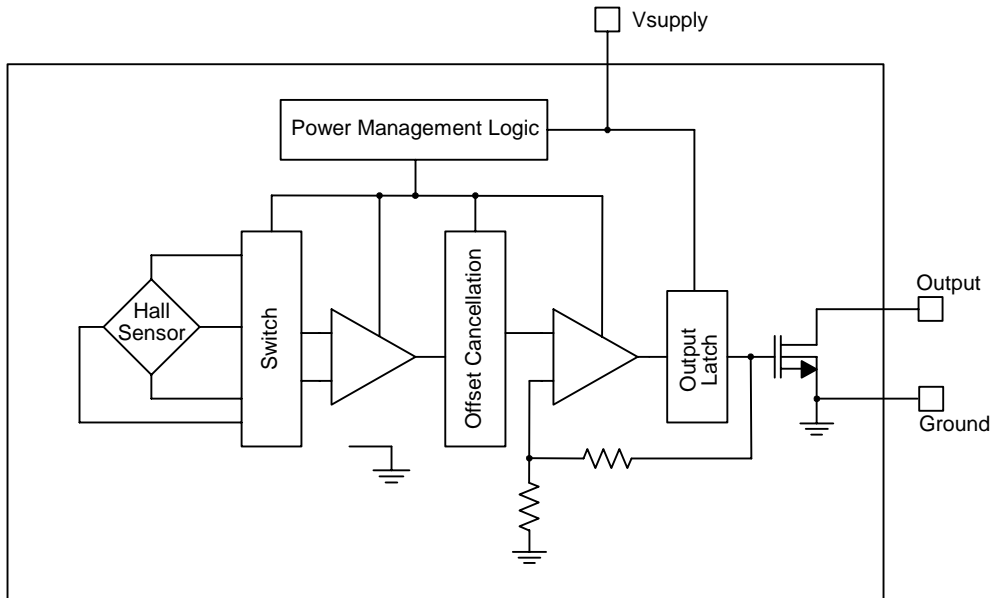
**Applications:**

- Handheld Portable Devices
- White Goods
- Automotive - Body Systems
- Security Systems
- High Reliability Reed Switch Replacement

**Ordering Information**

Part No.	Description	Qty
MX887DHTR	TSOT-23 3L Tape & Reel	3000

**Functional Block Diagram**



### Pin Description

Pin No.	Pin Name	Description
1	VSUPPLY	2.5 to 5.5 Volt
2	OUT	Open Drain N-Channel FET
3	GROUND	Ground

### Circuit Description

The MX887D  $\mu$ Power Hall-Effect Switch consists of a Hall element, small signal amplifier, latch, and n-channel open drain MOSFET driver. Offset cancellation rejects errors in signal stages and the influence of mechanical stress on the Hall element. This technique together with a precision threshold generator and comparator produce highly accurate magnetic switch points. The Hall element is activated for a small fraction of an operating cycle, then latched in that sample state for the remainder of the period. By using this technique, very low power consumption is achieved.

### Electrical Characteristics

Over operating voltage and temperature range unless otherwise noted.

Parameter	Condition	Min	Typ	Max	Unit
Supply Voltage		2.5		5.5	V
Output Leakage Current	$V_{OUT} = 5.5V, BRPN < B < BRPS$		<1.0	1.0	$\mu A$
Output On Voltage	$I_{OUT} = 1mA, V_{DD} = 3.0V$		100	300	mV
Awake Time				90	$\mu S$
Period				90	mS
Duty Cycle			0.1		%
Supply Current	Awake (enabled)			2.0	mA
	Asleep (disabled)			8.0	$\mu A$
	Average (Calculated)		5	15	$\mu A$
ESD	Human Body Model	2			kV

- Notes: 1. Operating and release points will vary with supply voltage.  
 2. BOPX = operating point (output turns ON); BRPX = release point (output turns OFF).  
 3. Typical Data is at  $T_A = 25^\circ C$  and  $V_{SUPPLY} = 3.0V$ .

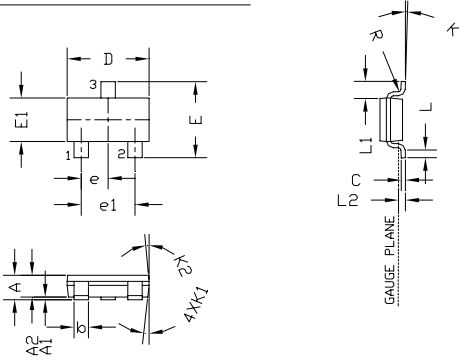
### Magnetic Characteristics

Over operating voltage and temperature range unless otherwise noted.

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Operating Points	BOPS	South pole to branded side			60	G
	BOPN	North pole to branded side	-60			G
Release Points	BRPS	South pole to branded side	6			G
	BRPN	North pole to branded side			-6	G
Hysteresis	BHYS	$ BOPX - BRPX $		5		G

- Notes: 1. As use here, negative flux densities are defined as less than zero (algebraic convention) and -50G is less than +10G.  
 2. BOPX = operating point (output turns ON); BRPX = release point (output turns OFF).  
 3. Typical Data is at  $T_A = 25^\circ C$  and  $V_{SUPPLY} = 3.0V$ .

TSOT23 - 3 LEAD



3. PACKAGE TOP MAY BE SMALLER THAN PACKAGE BOTTOM. DIMENSIONS D AND E1 ARE DETERMINED AT THE OUTERMOST EXTREME OF THE PLASTIC BODY EXCLUDING MOLD FLASH, TIE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN TOP AND BOTTOM OF THE PLASTIC BODY.
2. DIMENSION "E" DOES NOT INCLUDE INTER-LEAD FLASH OR PROTRUSIONS. INTER-LEAD FLASH AND PROTRUSION SHALL NOT EXCEED .006" (0.15MM) PER SIDE.
1. DIMENSION "D" DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS AND GATE BURRS SHALL NOT EXCEED .004 IN. (0.10MM) PER SIDE.

NOTES: (UNLESS OTHERWISE SPECIFIED)

DIM.	DIMENSIONS					
	INCH			MILLIMETER		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.030	-	0.035	0.75	-	0.90
A1	0.000	-	0.004	0.00	-	0.10
A2	0.028	0.030	0.031	0.70	0.75	0.80
b	0.014	-	0.020	0.35	-	0.51
c	0.004	-	0.010	0.10	-	0.25
D	0.110	0.114	0.118	2.80	2.90	3.00
E	0.102	0.110	0.118	2.60	2.80	3.00
E1	0.059	0.063	0.067	1.50	1.60	1.70
e	0.0374 BSC			0.95 BSC		
e1	0.0748 BSC			1.90 BSC		
L	0.015	-	-	0.37	-	-
L1	0.0236 REF			0.60 REF		
L2	0.0098 BSC			0.25 BSC		
y	-	-	0.004	-	-	0.10
R	0.004	-	-	0.10	-	-
K	0°	-	8°	0°	-	8°
K1	7° NOM			7° NOM		
K2	5° NOM			5° NOM		

IXYS Corporation 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 IXYS' Standard Terms and Conditions of Sale, IXYS Corporation assumes no liability whatsoever, and disclaims any expressed 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.

**IXYS Corporation**

3540 Bassett Street  
Santa Clara, CA 925054  
Tel: 1-408-892-0700  
Fax: 1-408-496-0670  
e-mail:sales@ixys.net

**Micronix****An IXYS Company**

145 Columbia  
Aliso Viejo, CA 92656-1490  
Tel: 1-949-831-4622  
Fax: 1-949-831-4628

**SALES OFFICES AMERICAS****Eastern Region**

[Eastern North America, Mexico, South America]  
IXYS Corporation  
Beverly, MA  
Tel: 508-528-6883  
Fax: 508-528-4562  
wgh@ixys.net

**Central Region**

[Central North America]  
IXYS Corporation  
Greensburg, PA  
Tel: 724-836-8530  
Fax: 724-836-8540  
neil.lejeune@westcode.com

**Western Region**

[Western North America]  
IXYS Corporation  
Solana Beach, CA  
Tel: 858-792-1101  
slodor@ix.netcom.com

**SALES OFFICES EUROPE****European Headquarters**

IXYS Semiconductor GMBH  
Edisonstrasse 15  
D- 68623 Lampertheim  
Germany  
Tel: 49-6206-503203  
Fax: 49-6206-503286  
marcom@ixys.de

**United Kingdom**

IXYS Semiconductor Limited  
Langley Park Way  
Langley Park  
Chippenham  
Wiltshire SN 15 1GE - England  
Tel: 44 1249 444524  
Fax: 44 1249 659448  
sales@ixys.co.uk

**SALES OFFICES ASIA / PACIFIC****Asian Headquarters**

IXYS  
Room 1016, Chia-Hsin, Bldg II,  
10F, No. 96, Sec. 2  
Chung Shan North Road  
Taipei, Taiwan R.O.C.  
Tel: 886-2-2523-6368  
Fax: 886-2-2523-6368  
bradley.green@ixys.co.uk  
Jhong@clare.com

Check the IXYS Website for the local sales office nearest you. ([www.ixys.com](http://www.ixys.com))

<http://www.claremicronix.com>

---

IXYS cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in this IXYS product. No circuit patent licenses nor indemnity are expressed or implied. IXYS reserves the right to change the specification and circuitry, without notice at any time. The products described in this document are not intended for use in medical implantation or other direct life support applications where malfunction may result in direct physical harm, injury or death to a person.

---

Specification: MX887D  
©Copyright 2007, IXYS Corporation  
All rights reserved. Printed in USA.