

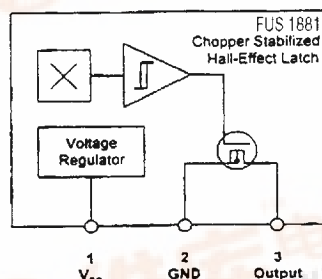
**FOI Semiconductor** FUS1881 CMOS Chopper Stabilized, Hall-Effect Sensor (Latch)

**Features**

- Optimized for BCD Motor Application
- Operating Voltage Range: 3.5V to 18V
- CMOS Device for Optimal Stability
- Chopper Stabilized: No Amplifier Offset Voltage
- Activate With Commercially Available Permanent Magnets
- Thin, High Reliability SIP Package
- Available in SQT23 Package
- Solid State Switch with  $I_{CC} = 20\text{mA}$

The FUS1881 Hall-Effect sensor IC family is designed in CMOS technology providing chopper stabilized amplifiers with switched capacitors. Therefore these magnetic field sensor devices have no amplifier offset voltage which in bipolar designed devices is the main reason for temperature sensitive output signal drift.

Typical applications for these devices are: sensing of speed, linear position, and angular position. Though there are many applications where the FUS1881 sensor IC can be used, its performances have been optimized for commutation applications of 5V and 12V brushless DC motors.



The SIP (U Series) sensors output transistor will be in the "latched-on" state ( $B_{OP}$ ) in the presence of a sufficiently strong South-Pole magnetic field, facing the marked side of the SIP package. The sensor output will be in the "latched-off state ( $B_{RP}$ )" in the presence of a North-Pole field.

**NOTE: The Convention changes for the SOT23** The SOT23 (S Series) sensors output transistor will be in the "Latched-on" state ( $B_{OP}$ ) in the presence of a sufficiently strong North-Pole magnetic field, facing the marked side of the SOT23 package. The sensor output will be in the "latched-off" state ( $B_{RP}$ ) in the presence of a South Pole field.

The FUS 1881 sensor family comes in four guaranteed temperature specifications to meet the needs of various commercial and industrial applications.

**Absolute Maximum Ratings**

Characteristic	Symbol	Device	Rating	Unit
Power Supply Voltage	$V_{cc}$	All	20	V
Supply Current	$I_{cc}$	All	10	mA
Output Switch Current	$I_{out}$	All	20	mA
Power Dissipation	$P_D$	All	100	mW
Operating Ambient Temperature Range	$T_A$	FUS1881US /S0	0 ... +70	°C
		FUS1881SUA/SS0	-20 ... +85	
		FUS1881EUA/ESO	-40 ... +85	
		FUS1881KUA/KSO	-40 ... +125	
Storage Temperature Range	$T_s$	All	-65 ... +150	°C





## FUS1881 CMOS Chopper Stabilized, Hall-Effect Sensor (Latch)

The FUS1881 sensor family comes in four guaranteed temperature specifications to meet the needs of various commercial and industrial applications.

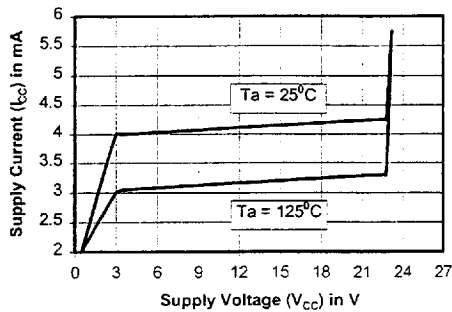
### Electrical Characteristics at $T_A = 25^{\circ}\text{C}$ , $\pm 2^{\circ}\text{C}$ , $V_{DD} = 12\text{V}$ (unless otherwise noted)

Characteristics	Symbol	Applicable Devices	Test Conditions	Limits			
				Min.	Typ.	Max.	Units
Supply Voltage	$V_{DD}$	All	Operating	3.5		20	V
Supply Current	$I_{DD}$	All	$B < B_{RP}$	4	6	10	mA
Saturation Voltage	$V_{DS(on)}$	All	$I_{OUT} = 10\text{mA}$ $B > B_{OP}$		0.4	0.5	V
Output Leakage Current	$I_R$	All	$B < BRP$ $V_{OUT} = 20\text{V}$		0.01	4	$\mu\text{A}$
Propagation Delay Low to High (Turn-On)	$t_{PLH}$	All	$R_I = 1.1\text{k}\Omega$ $C_I = 20\text{pF}$		0.04		$\mu\text{s}$
Propagation Delay High to Low (Turn-Off)	$t_{PHL}$	All	$R_I = 1.1\text{k}\Omega$ $C_I = 20\text{pF}$		0.04	1.0	$\mu\text{s}$

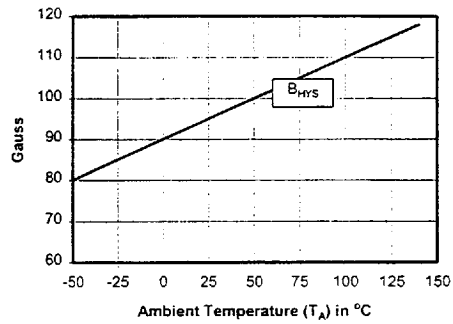
### Magnetic Characteristics at $V_{DD} = 12\text{V}$ (unless otherwise noted)

Characteristics	Symbol	Applicable Devices	Limits at 25°C				Applicable Devices	Limits at 25°C			
			Min.	Typ.	Max.	Units		SOT23	Min.	Typ.	Max.
Magnetic Thresholds Turn-On	$B_{OP}$	FUS 188 1UA	10	45	90	G	FUS 188 1S0	-90	-45	-10	G
		FUS 188 1SUA					FUS 188 1SS0				
		FUS 188 1EUA					FUS 188 1ES0				
		FUS 188 1KUA					FUS 188 1KS0				
Magnetic Thresholds Turn-Off	$B_{RP}$	FUS 188 1UA	-90	-45	-10	G	FUS 188 1S0	10	45	90	G
		FUS 188 1SUA					FUS 188 1SS0				
		FUS 188 1EUA					FUS 188 1ES0				
		FUS 188 1KUA					FUS 188 1KS0				
Hysteresis ( $B_{OP} - B_{RP}$ )	$B_{HRS}$	FUS 188 1UA	60	90	120	G	FUS 188 1S0	70	90	140	G
		FUS 188 1SUA					FUS 188 1SS0				
		FUS 188 1EUA					FUS 188 1ES0				
		FUS 188 1KUA					FUS 188 1KS0				

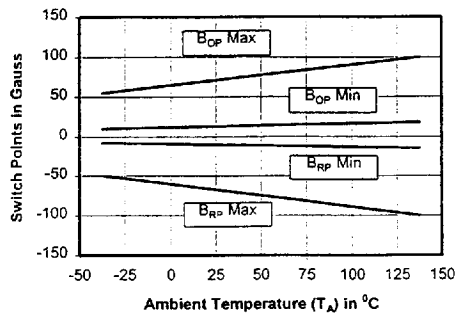
Supply Current vs Supply Voltage



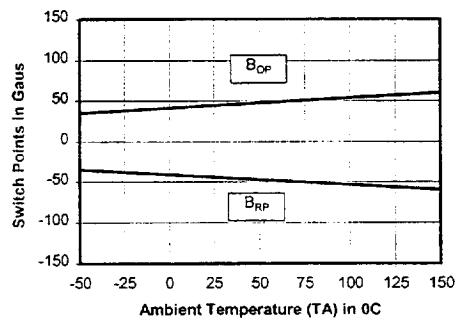
Typical Hysteresis vs Temperature



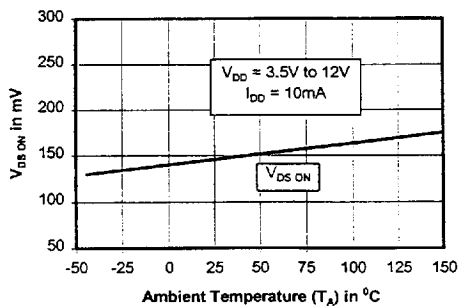
Magnetic Switch Points vs Temperature



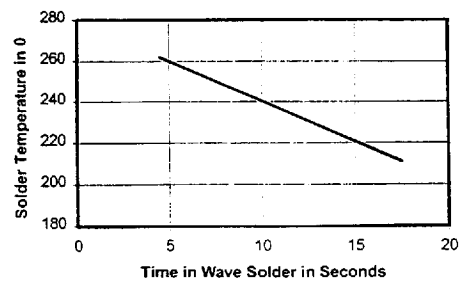
Typical Switch Points vs Temperature



Typical Saturation Voltage vs Temperature



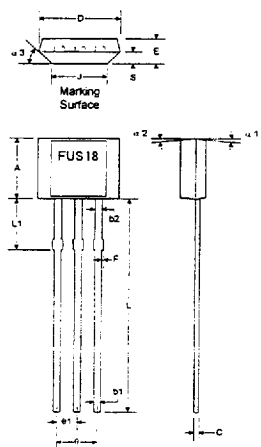
Wave Soldering Parameters



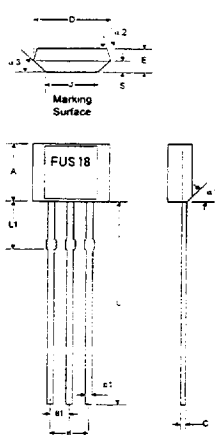


# FUS1881 CMOS Chopper Stabilized, Hall-Effect Sensor (Latch)

3 Lead SIP Package (Lingsen)



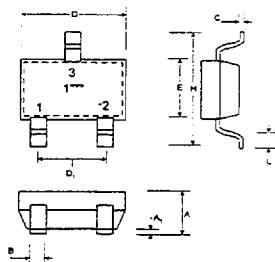
3 Lead SIP Package (AUK)



3 Lead Package

Symbol	Millimeters		
	Min	Typ	Max
$\alpha 1$		45°	
$\alpha 2$		45°	
$\alpha 3$		5°	
A	2.95	3.00	3.05
$B_1$		0.42	
C		0.40	
D	0	4.30	
E	1.45	1.50	1.55
J	2.55	2.60	2.65
$e$		2.54	
$\theta 1$		1.27	
L	10.45	10.50	10.55
L1		2.16	
S		0.79	

3 Lead Surface Mount Pack SOT23



3 Lead Surface Mount pack SOT23 for FUS1881 SO Series

LEG 1	$V_{DD}$
LEG 2	OUTPUT
LEG 3	GROUND

3 Lead Surface Mount pack SOT23 for FUS1881 SO Series

Symbol	Millimeters		
	Min	Typ	Max
A	1.05		1.1
$A_1$	0		0.1
B	0.37		0.46
C	0.085		0.13
D	2.8		3.04
$D_1$	1.76		2.05
E	1.5		1.6
H	2.8		2.9
L		0.65	