Data Sheet
Angle Sensor
KMT32B

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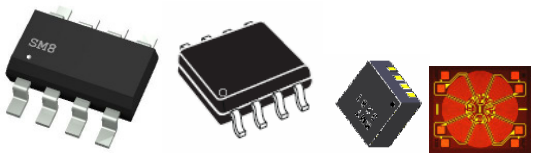
FEATURES

- Contactless angular position
- Ideal for harsh environments due to magnetic sensing
- Factory optimized linearity
- Low Cost
- High Accuracy
- High rotational speed up to 30,000 rpm
- Extended operating temperature range (-40 ℃ to +150 ℃)
- Low Power
- RoHS compliant (lead free)
- SMD package

APPLICATIONS

- Absolute and incremential angle
- Angle Mesuarement
- Motor motion control
- Robotics
- Camera positioning
- Potentiometer replacement
- Automotive

PACKAGES



SM8 SO8 TDFN Die

General Description

The KMT32B is a magnetic field sensor based on the anisotropic magnetoresistance effect. The sensor contains two parallel supplied Wheatstone bridges, which enclose a sensitive angle of 45 degrees.

A rotating magnetic field in the surface parallel to the chip (x-y plane) will deliver two independent sinusoidal output signals, one following a cos(2α) and the second following a sin(2α) function, α being the angle between sensor and field direction (see Figure 1).

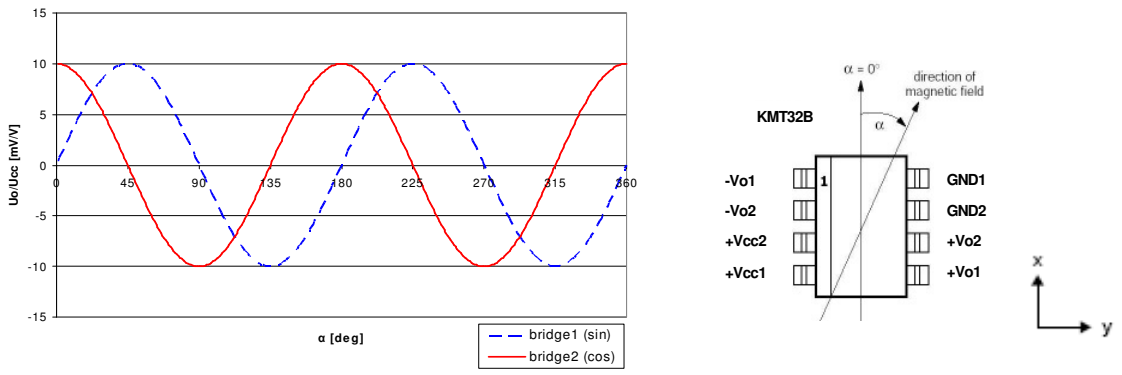


Figure 1: Characteristic curves for KMT32B

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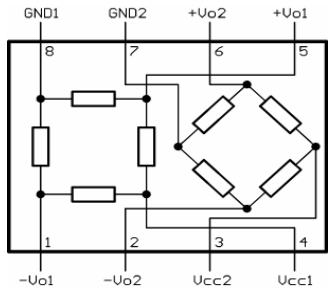
MAGNETIC ANGLE SENSOR

The KMT32B magnetic field sensor is suited for high precision angle measurement applications under low field conditions (regularly H_0 = 25 kA/m, with reduced accuracy applicable down to H_0 = 8 kA/m; beware of earth's magnetic field !).



Circuit Diagram

CHARACTERISTIC VALUES

PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
A. Operating Limits						
max. supply voltage	$Vcc_{,max}$				10	V
max. current (single bridge)	$Icc_{,max}$				4	mA
operating temperature	T_{op}		-40		+150	°C
storage temperature	T_{st}		-40		+150	°C
B. Sensor Specifications (T=25 °C)						
Supply voltage	Vcc			5		V
Resistance (single bridge)	R_b		2400	3000	3600	Ω
Output signal range	$\Delta V_n/Vcc$	Condition A, B	16	20		mV/V
Offset voltage	$Voff/Vcc$	Condition A, B	-1	0	+1	mV/V
angular inaccuracy	$\Delta\alpha$	Condition A, B		0.05	0.2	deg
angular hysteresis	$\Delta\alpha H$	Condition A, B			0.1	deg
C. Sensor Specifications						
TC of amplitude	$TCSV$	Condition A, C	-0.36	-0.32	-0.28	%/K
TC of resistance	$TCBR$	Condition A, C	+0.27	+0.32	+0.37	%/K
TC of offset	$TCVoff$	Condition A, C	-4	0	+4	µV/V/K

Stress above one or more of the limiting values may cause permanent damage to the device. Exposure to limiting values for extended periods may affect device reliability.

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MEASUREMENT CONDITIONS

PARAMETER	SYMBOL	UNIT	CONDITION
A. Set Up Conditions			
ambient temperature	T	℃	T = 23±5 ℃ (unless otherwise noted)
supply voltage	*Vcc*	V	Vcc = 5 V
applied magnetic field	H	kA/m	H = 25 kA/m
B. Sensor Specifications (T=25 ℃, 360° turn , H=25 kA/m , Vo_{max}>0, Vo_{min}<0)			
Output signal range	$\Delta V_n/Vcc$	mV/V	ΔV_n/Vcc = (Vo_{max} - Vo_{min})/Vcc
Offset voltage	*Voff/Vcc*	mV/V	Voff = (Vo_{max} + Vo_{min})/Vcc
angular inaccuracy	$\Delta\alpha$	deg	$\Delta\alpha = MAX\lvert\alpha_0-\alpha\rvert$ max. angular difference between actual value α_0 and measured angle; offset voltage error contributions not included
angular hysteresis	$\Delta\alpha H$	deg	$\Delta\alpha H$ = MAX$\lvert\alpha_{left\ turn} - \alpha_{right\ turn}\rvert$ max. angular difference between left and right turn
C. Sensor Specifications (T=-25℃, +125℃)			
ambient temperatures	T	℃	T_1 = -25 ℃, T_0 = +25 ℃, T_2 = +125 ℃
TC of amplitude	*TCSV*	%/K	$TCV = \frac{1}{(T_2 - T_1)} \cdot \frac{\frac{\Delta Vn}{Vcc}(T_2) - \frac{\Delta Vn}{Vcc}(T_1)}{\frac{\Delta Vn}{Vcc}(T_1)} \cdot 100\%$
TC of resistance	*TCBR*	%/K	$TCR = \frac{1}{(T_2 - T_1)} \cdot \frac{R(T_2) - R(T_1)}{R(T_1)} \cdot 100\%$
TC of offset	*TCVoff*	µV/(VK)	$TCVoff = \frac{Voff(T_2) - Voff(T_1)}{(T_2 - T_1)}$

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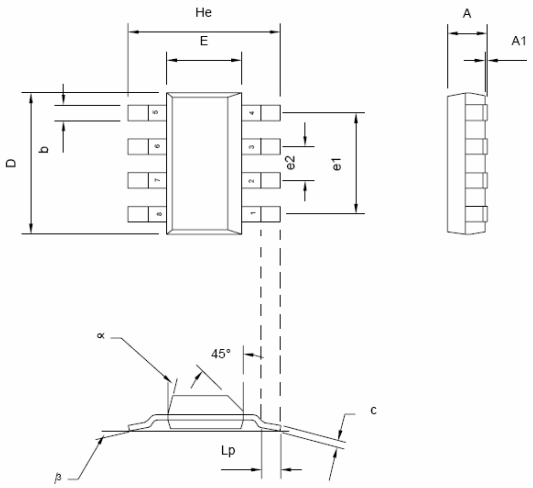
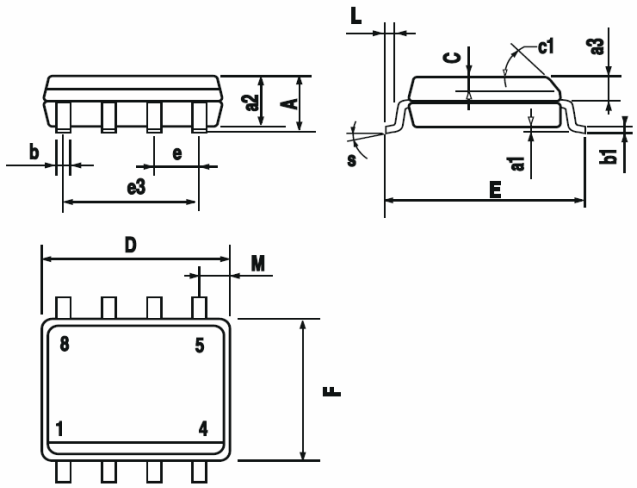
PACKAGES

SM8



Dim	Millimetres			Inches		
	Min	Typ	Max	Min	Typ	Max
A	–	–	1.7	–	–	0.067
A1	0.02	–	0.1	0.0008	–	0.004
b	–	0.7	–	–	0.028	–
c	0.24	–	0.32	0.009	–	0.013
D	6.3	–	6.7	0.248	–	0.264
E	3.3	–	3.7	0.130	–	0.145
e1	–	4.59	–	–	0.180	–
e2	–	1.53	–	–	0.060	–
He	6.7	–	7.3	0.264	–	0.287
Lp	0.9	–	–	0.035	–	–
α	–	–	15°	–	–	15°
β	–	10°	–	–	10°	–

SO8



DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.069
a1	0.1		0.25	0.004		0.010
a2			1.65			0.065
a3	0.65		0.85	0.026		0.033
b	0.35		0.48	0.014		0.019
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.020
c1	45° (typ.)					
D (1)	4.8		5.0	0.189		0.197
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F (1)	3.8		4.0	0.15		0.157
L	0.4		1.27	0.016		0.050
M			0.6			0.024
S	8° (max.)					

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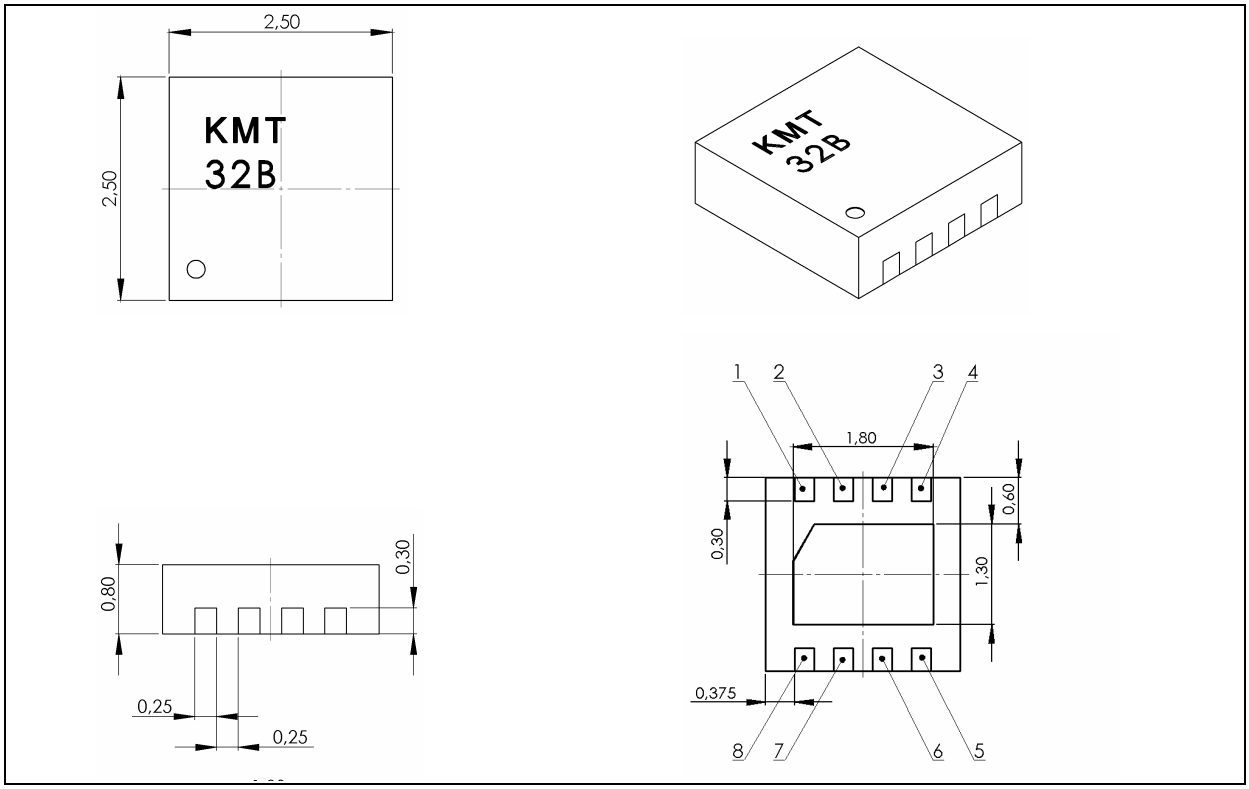
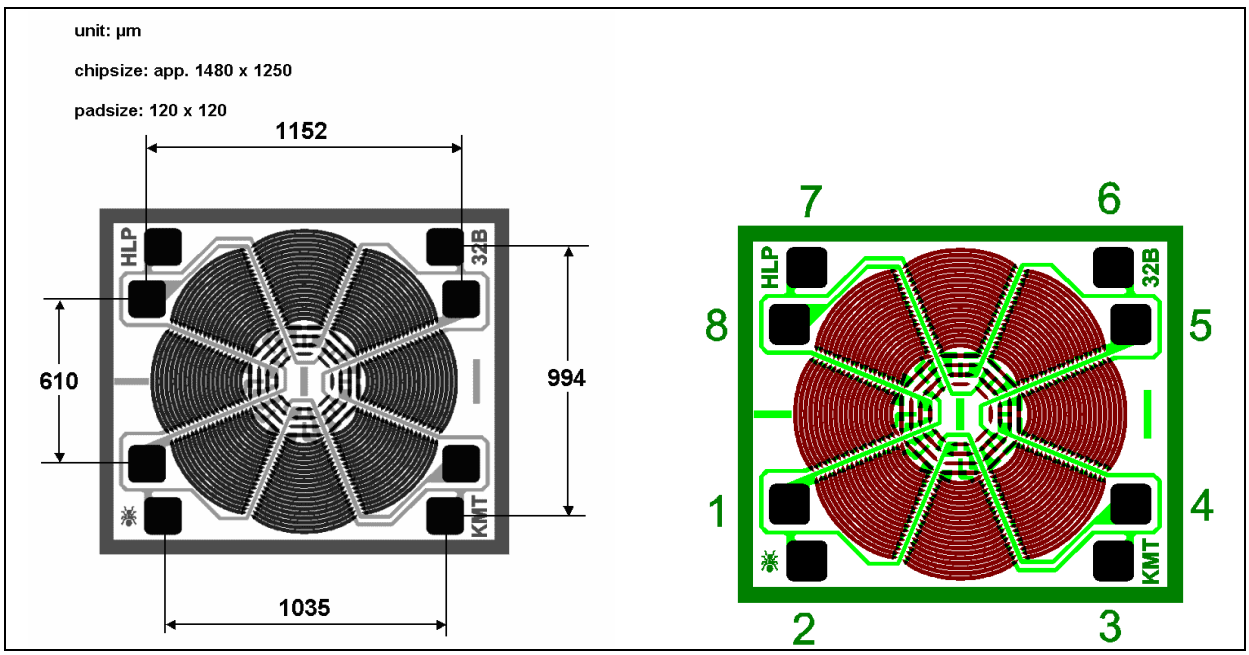
TDFN8



DIE



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ORDERING CODE

DEVICE	PACKAGE	PART NUMBER
KMT32B/SM	SM8	G-MRCO-014
KMT32B/SO	SO8	G-MRCO-015
KMT32B/TD	TDFN8	G-MRCO-016
KMT32B	Die	G-MRCH-011

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