

Features and Benefits

- **Single Current Sinking or Current Sourcing Output**
- **Ratiometric Rail to Rail Linear Output**
- **Precise Sensitivity and Temperature Compensation**
- **Sensitivity:**
1.5mV/Gauss (VDD=5V_{DC})
- **Specified Operating Temperature Range:**
From -40°C~150°C
- **Lead Free Package**
Flat TO-92, SOT-23, SOT-89B
- **High ESD Protection**
- **RoHS Compliant**
2011/65/EU

Applications

- Automotive, Home appliances, Industrial
- Speed Detection
- Position Detection
- Magnetic Encoder
- Solid-State Switch
- Ferrous metal sensing
- Vibration sensing
- Weight sensing

Family Members

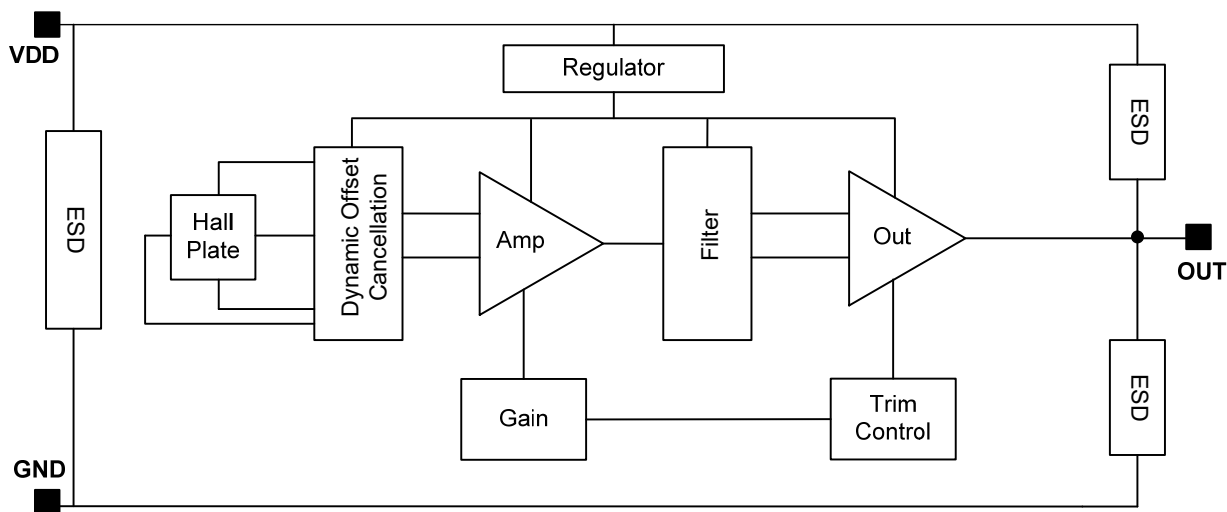
Part number	Description
MT1501A	Flat TO-92 package, bulk packaging (1000pcs/bag)
MT1501A-T	Flat TO-92 package, radial lead, bulk packaging (1000pcs/bag)
MT1501AT	SOT-23 package, tape and reel packaging (3000pcs/bag)
MT1501BT	SOT-89B package, tape and reel packaging (1000pcs/bag)
MT1501ET	SOT-23(thin outline)package, tape and reel packaging (3000pcs/bag)

General Description

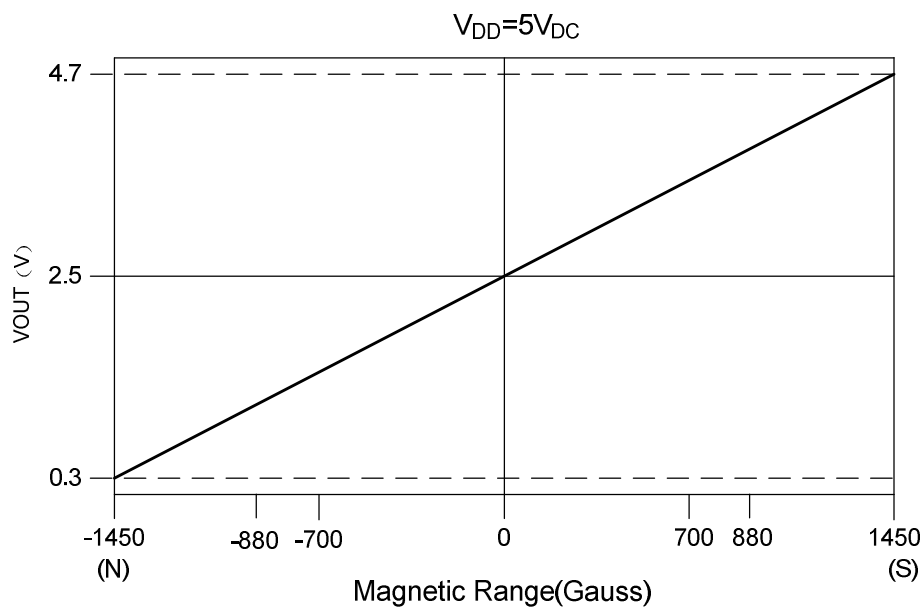
The MT1501 family, produced with CMOS technology, it is high performance small versatile linear Hall-effect devices which are operated by the magnetic field from a permanent magnet or an electromagnet. The ratiometric output voltage is set by the supply voltage and varies in proportion to the strength of the magnetic field. The MT1501 family has a quiescent output voltage that is 50% of the supply voltage.

The integrated circuitry provides increased temperature stability and sensitivity. The MT1501 provide high accuracy and temperature compensation. The linear hall sensors have an operating temperature range from -40 to +150°C, appropriate for home appliances, industrial and automotive environments. They respond to either South or North pole.

Functional Block Diagram



Transfer Characteristics



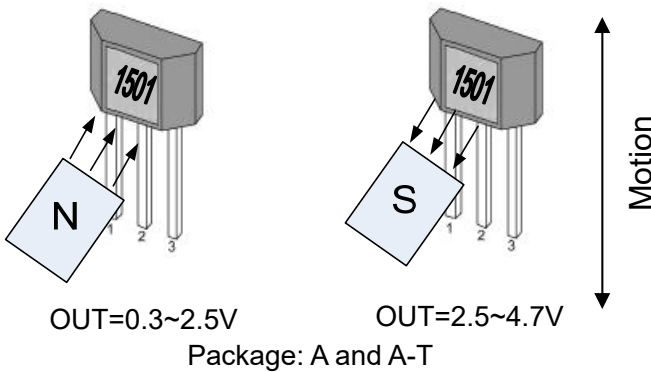
MT1501 Series

High Performance Ratiometric Linear Hall Effect Sensor



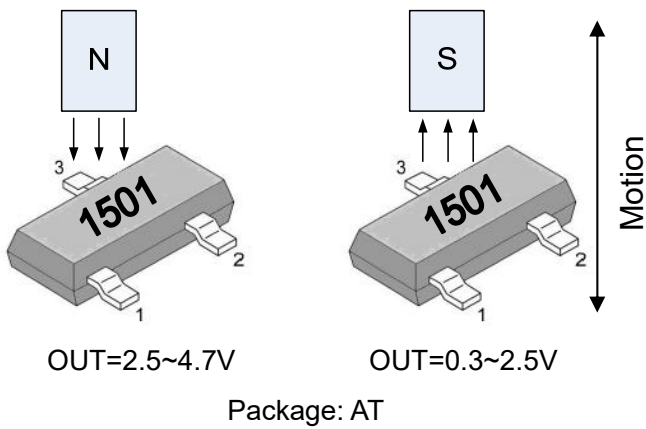
Application Note: Condition: VDD=5V

Pin Description



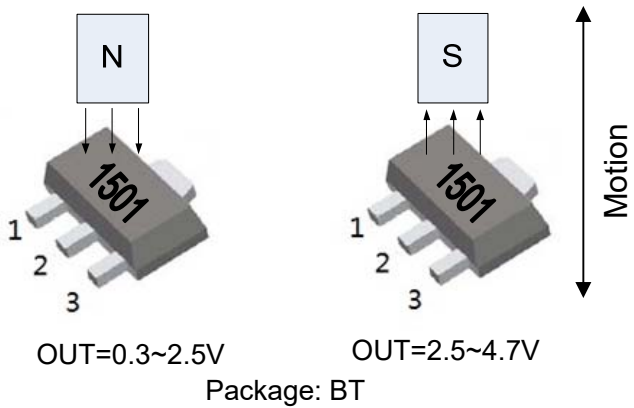
MT1501A (MT1501A-T)

Name	Number	Description
VDD	1	Power
GND	2	Ground
OUT	3	Output



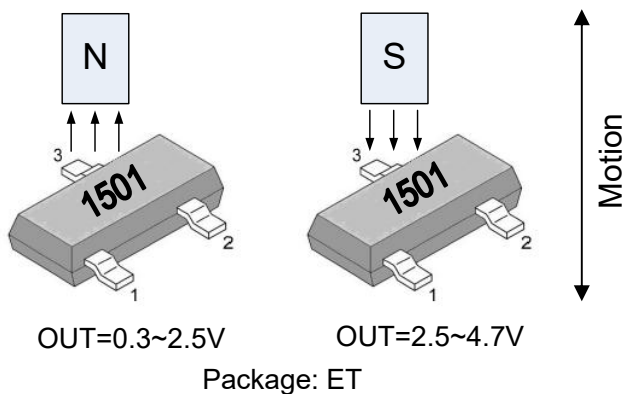
MT1501AT

Name	Number	Description
VDD	1	Power
OUT	2	Output
GND	3	Ground



MT1501BT

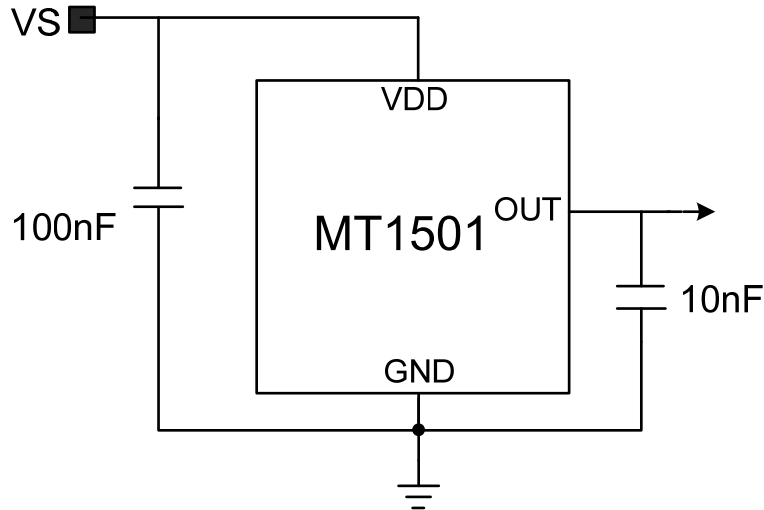
Name	Number	Description
VDD	1	Power
GND	2	Ground
OUT	3	Output



MT1501ET

Name	Number	Description
VDD	1	Power
OUT	2	Output
GND	3	Ground

Typical Application Circuit



Electrical and Magnetic Characteristics

Absolute Maximum Ratings

Absolute maximum ratings are limiting values to be applied individually, and beyond which the serviceability of the circuit may be impaired. Functional operability is not necessarily implied. Exposure to absolute maximum rating conditions for an extended period of time may affect device reliability.

Absolute maximum ratings: all voltages listed are referenced to GND.

Symbol	Parameters	Notes	Rating	Units
VDD	Supply Voltage	Additional Current draw and linearity distortion may be observed at voltages above the maximum voltage	8	V
V _{OUT}	Output Voltage	--	8	V
V _{RDD}	Reverse Supply Voltage	--	-8	V
V _{ROUT}	Reverse Output Voltage	--	-0.2	V
I _{OUT}	Output Current	--	5	mA
T _A	Operating Ambient Temperature	--	-40~150	°C
T _J	Maximum Junction Temperature	--	165	°C
T _{STG}	Storage Temperature	--	-65~170	°C

MT1501 Series Specifications

Electrical Characteristics

VDD=5V, over operating temperature range, unless otherwise noted

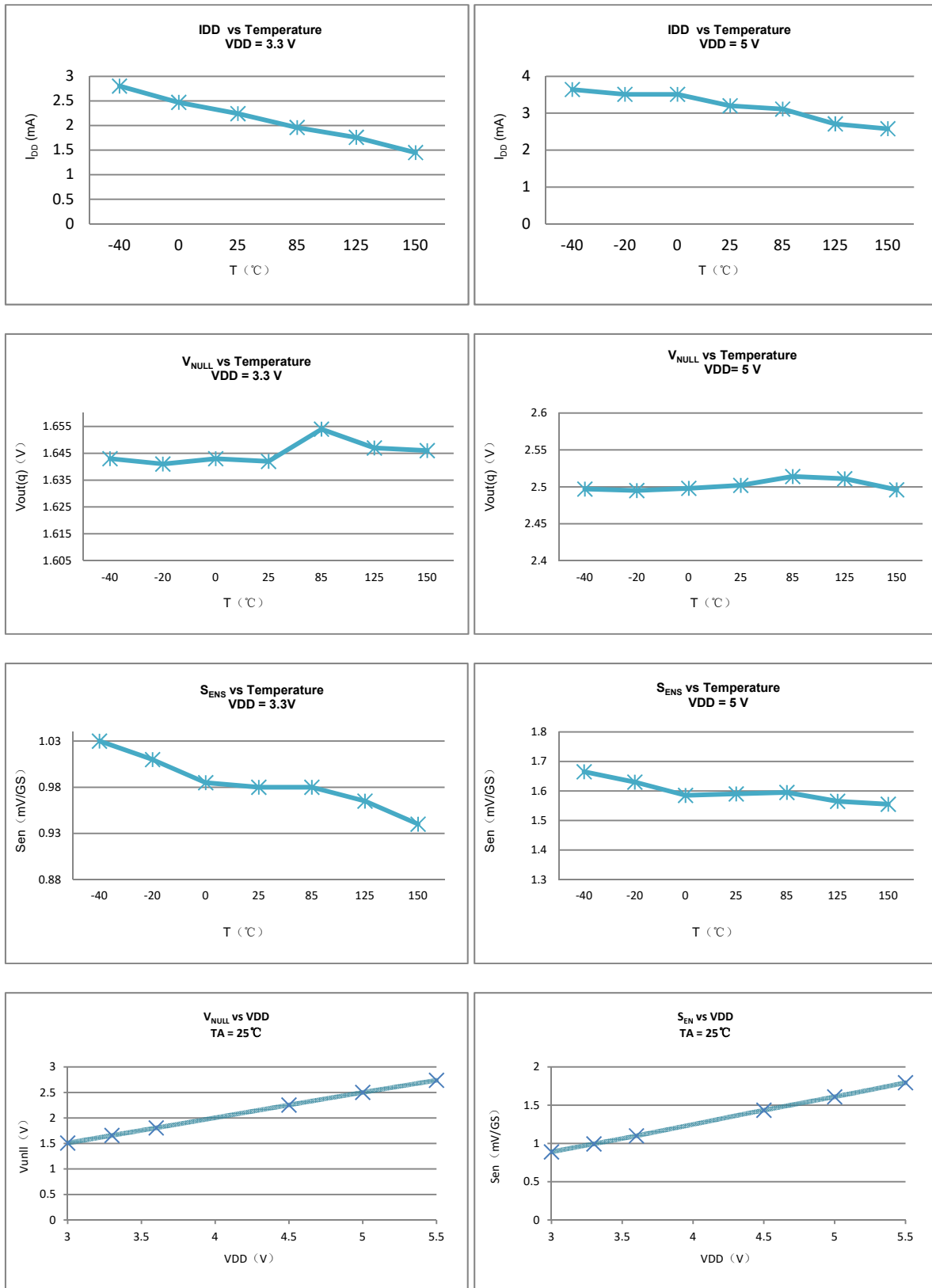
Symbol	Parameter	Test Condition	Min	Typ	Max	Units
VDD	Supply Voltage	$T_J < 165^\circ\text{C}$	3.0	5.0	5.5	V
I _{DD}	Supply Current	B=0	--	--	10	mA
V _H	Output Voltage	ISOURCE = -2 mA, B=+1450 G _S , T _A =25°C	4.7	--	--	V
V _L		ISINK = 1.2 mA, B=-1450 G _S , T _A =25°C	--	--	0.3	V
V _{NULL}	Quiescent Voltage	B=0, T _A =25°C (VDD = 5V)	2.45	2.5	2.55	V
		B=0, T _A =25°C (VDD = 3.3V)	1.62	1.65	1.68	V

Magnetic Characteristics

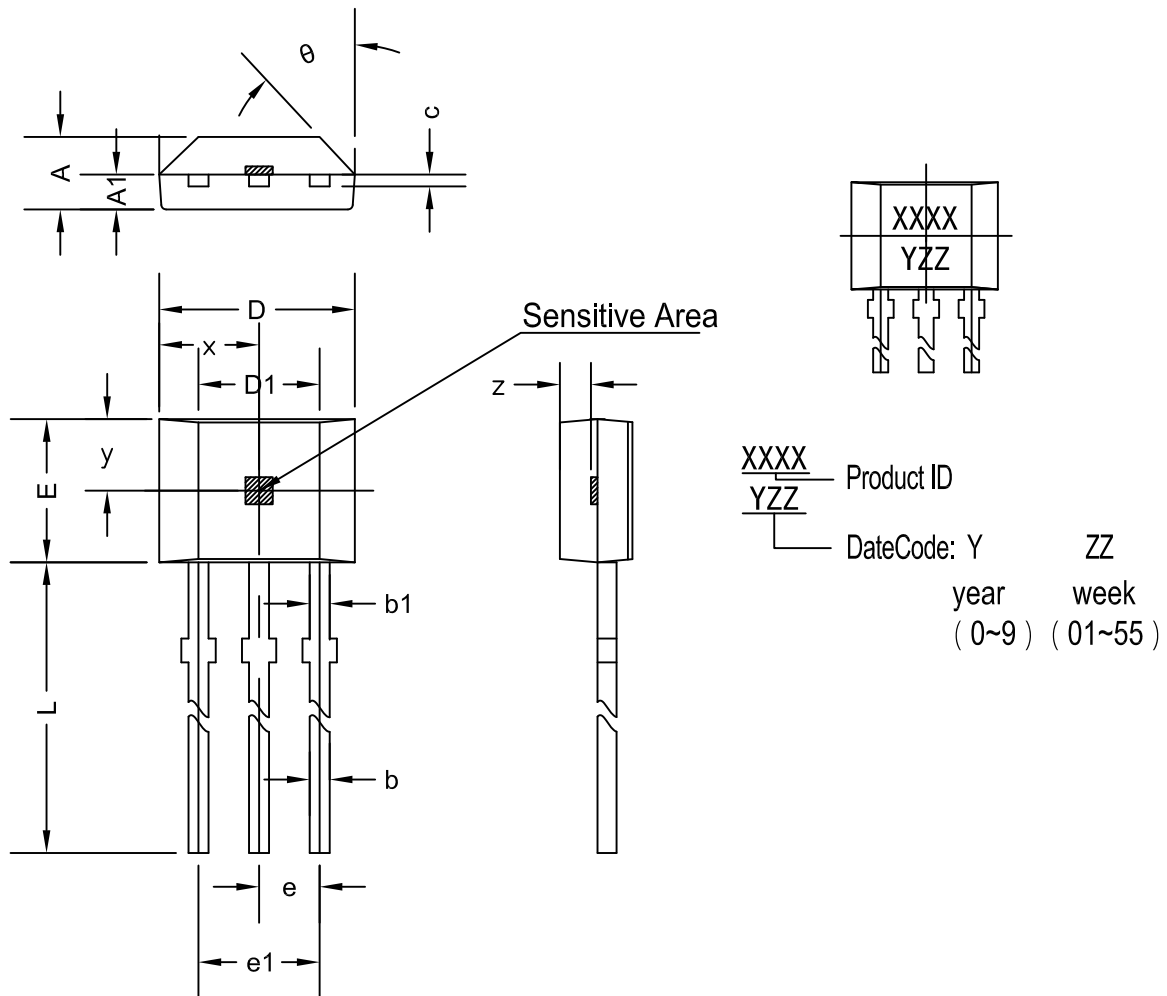
VDD=5V, over operating temperature range, unless otherwise noted

Symbol	Parameter	Test Condition	Min	Typ	Max	Units
L _{IN}	Linearity	--	--	--	±1.5	%
V _{NULL(T)}	Delta Vnull as temperature	--	--	--	±1.5	%
V _{NULL(V)}	Ratiometry, Vnull	--	--	--	±1.5	%
S _{ENS(T)}	Delta Sens as temperature	--	--	--	±10	%
	Output Type	Ratiometric				
S _{ENS}	Sensitivity	T _A =25°C (VDD = 5V)	1.4	1.5	1.6	mV/Gs
		T _A =25°C (VDD = 3.3V)	--	1.0	--	mV/Gs
B+	Magnetic Range	T _A =25°C	--	1450	--	Gauss
B-		T _A =25°C	--	-1450	--	Gauss

Typical Characteristics

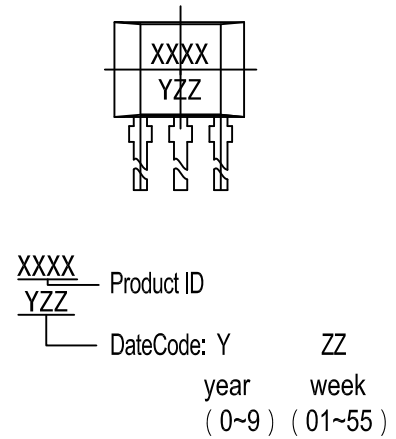
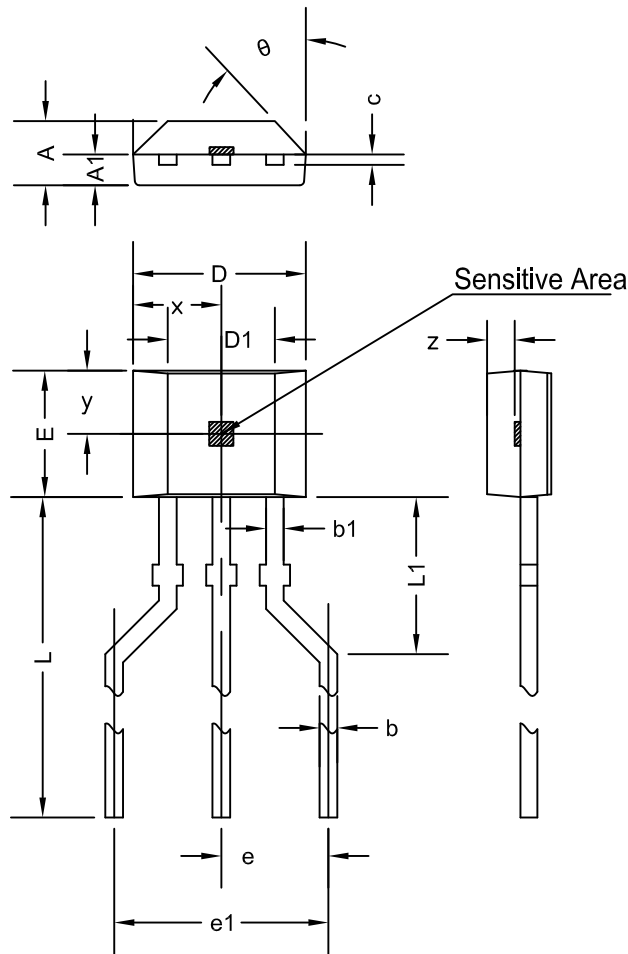


PACKAGE DESIGNATOR (MT1501A) Flat TO-92



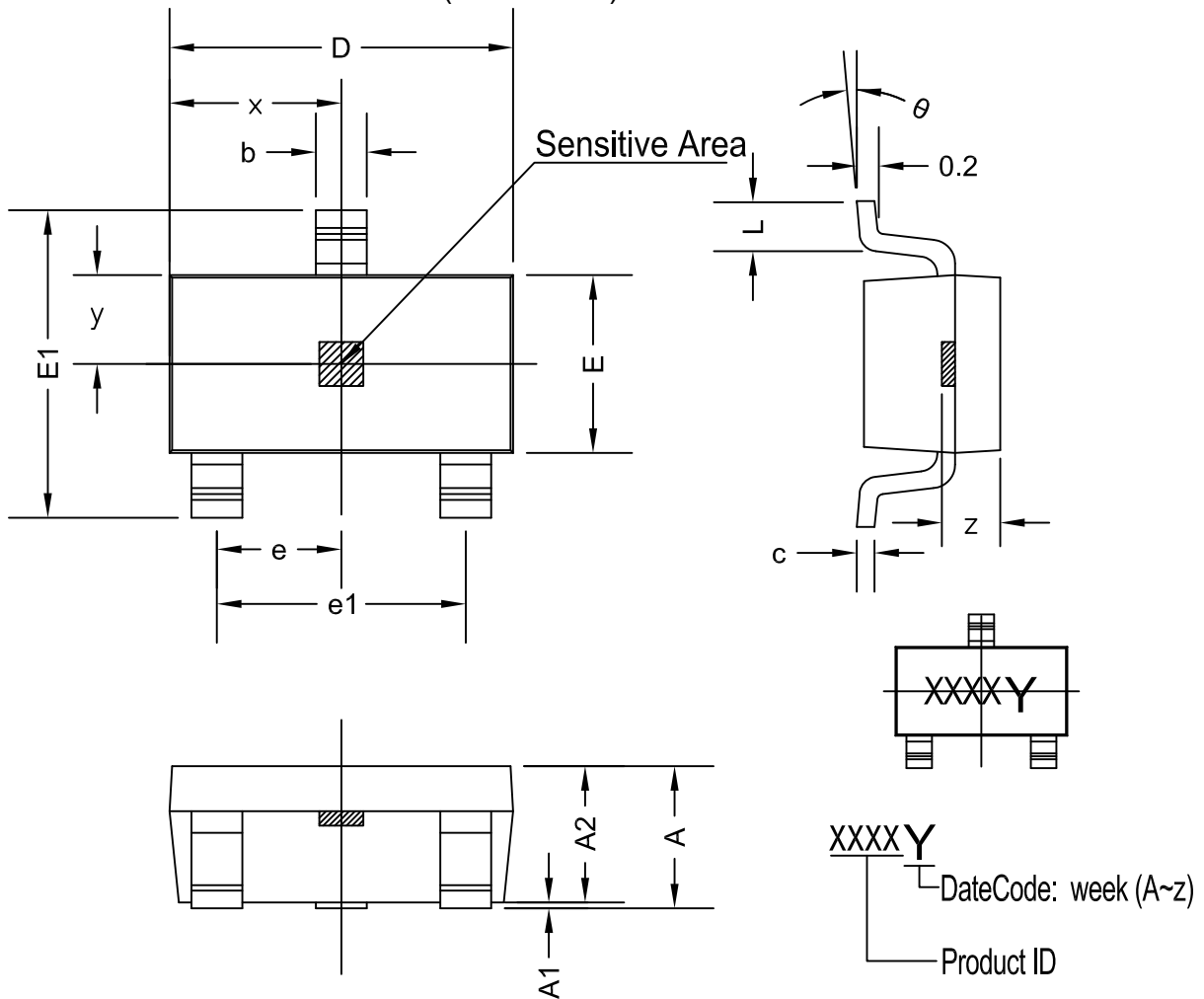
Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	1.420	1.670	0.056	0.066
A1	0.660	0.860	0.026	0.034
b	0.350	0.560	0.014	0.022
b1	0.400	0.550	0.016	0.022
C	0.360	0.510	0.014	0.020
D	3.900	4.200	0.154	0.165
D1	2.970	3.270	0.117	0.129
E	2.900	3.280	0.114	0.129
e	1.270 TYP		0.050 TYP	
e1	2.440	2.640	0.096	0.104
L	13.500	15.500	0.531	0.610
x	2.025TYP		0.080TYP	
y	1.545TYP		0.061TYP	
z	0.500TYP		0.020TYP	
θ	45°TYP		45°TYP	

PACKAGE DESIGNATOR (MT1501A-T) Flat TO-92 Radial Lead



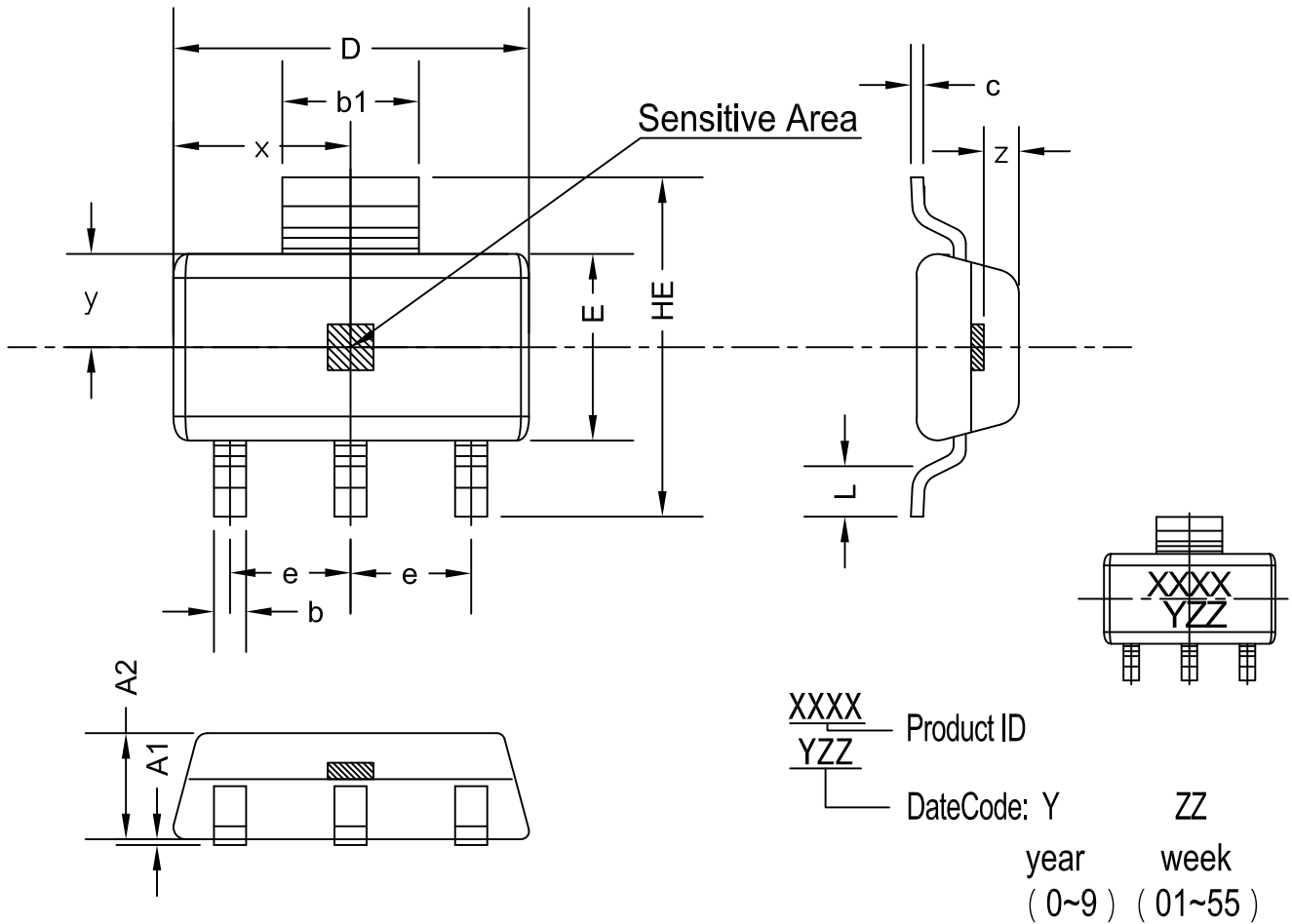
Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	1.420	1.670	0.056	0.066
A1	0.660	0.860	0.026	0.034
b	0.350	0.560	0.014	0.022
b1	0.400	0.550	0.016	0.022
c	0.360	0.510	0.014	0.020
D	3.900	4.200	0.154	0.165
D1	2.970	3.270	0.117	0.129
E	2.900	3.280	0.114	0.129
e	2.540TYP		0.100TYP	
e1	5.080TYP		0.200TYP	
L	14.300REF		0.563REF	
L1	2.150REF		0.085REF	
x	2.025TYP		0.080TYP	
y	1.545TYP		0.061TYP	
z	0.500TYP		0.020TYP	
θ	45°TYP		45°TYP	

PACKAGE DESIGNATOR (MT1501AT) SOT-23



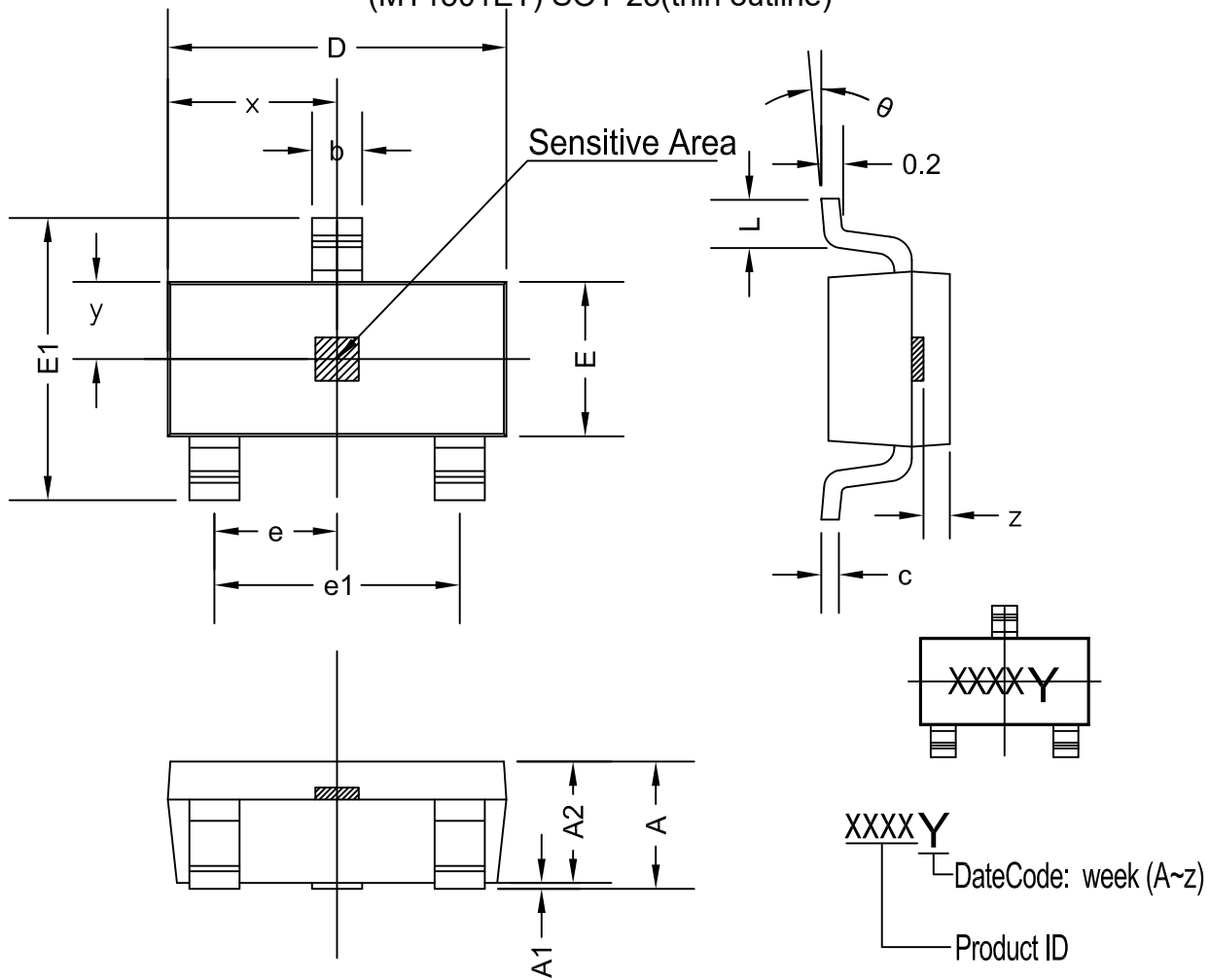
Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
x	1.460 TYP		0.057 TYP	
y	0.800 TYP		0.032 TYP	
z	0.600 TYP		0.024 TYP	
θ	0°	8°	0°	8°

PACKAGE DESIGNATOR (MT1501BT) SOT-89B



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A1	0.000	0.100	0.000	0.004
A2	1.220	1.420	0.048	0.056
b	0.300	0.500	0.012	0.020
b1	1.600	1.800	0.063	0.070
D	4.400	4.600	0.173	0.181
c	1.152 REF		0.045 REF	
E	2.400	2.600	0.094	0.102
HE	4.000	4.400	0.157	0.173
e	1.500 TYP		0.060 TYP	
L	0.350	0.550	0.014	0.022
x	2.250TYP		0.089TYP	
y	1.250TYP		0.049TYP	
z	0.300TYP		0.012TYP	

PACKAGE DESIGNATOR
(MT1501ET) SOT-23(thin outline)



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550REF		0.022REF	
x	1.460TYP		0.057TYP	
y	0.650TYP		0.026 TYP	
z	0.500TYP		0.020TYP	
θ	0°	8°	0°	8°