

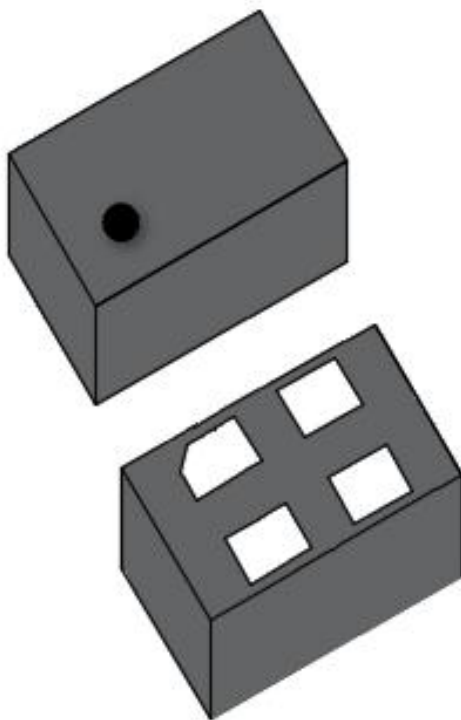
Product Data Sheet

TMR sensor chip

Product Series: FFZ-001F58T22V TMR sensors

Part Number: FFZ-001F58T22V

Version: Ver 1.1



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1. General Description

FFZ-001F58T22V TMR sensor is Tunneling Magneto Resistance (TMR) sensor which consists of 1 Wheatstone bridges in a DFN0805-4L package. The sensor detects vertical magnetic field strength. This sensor is suitable for position sensing in mobile applications.

2. Key Features

- Magnetic TMR sensor, employing the TMR effect.
- Compatible with a wide range of supply voltages
- Superior temperature stability
- 1 full bridge in DFN0805-4L package.
- High output signal without amplifier.

3. Typical Application

- Magnetic field strength sensing in OA/mobile module
- Position sensing for camera module

4. Absolute Maximum Parameters

Parameter	Symbol	Limit value	unit
Supply voltage	V _{cc}	5	V
Input current	I _c	0.5	mA
ESD (Human Body Model).	ESD(HBM)	2	kV
Storage temperature	T _{stg}	-40 ~ +85	°C
Operating temperature	T _{opt}	-40 ~ +85	°C
Reflow temperature	T _{reflow}	260	°C

Remark: When the operating conditions of the product exceed the limit parameters, it may cause irreparable damage to the product. Working at the limit parameters for a long time may lead to a decline in product performance and product reliability.

5. Magnetic recommended Operating Condition

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Magnetic field Range Z	Bz	-150	—	150	mT	Z-axis(sensing axis):Detection range
Magnetic field Range Y	By	-50	—	50	mT	Y-axis(shielded axis):Shield limitation
Magnetic field Range X	Bx	-200	—	200	mT	X-axis(shielded axis):Shield limitation

6. Electrical Characteristics

Conditions (unless otherwise noted): Vcc = 1 V; Hext = 30 mT; T_{opt} = 25°C.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit	Remarks
Operating voltage	Vcc		—	1	5	V	
Between Vcc and GND resistance	Rs	Bz=0mT	5	10	15	kOhm	
Sensitivity (Difference)	Sen	Bz=±50mT	-1.4	-1.0	-0.7	mV/V/mT	1)
Difference between the mid voltages of two outputs	offset	Bz=±50mT	-20	—	20	mV/V	2)
Resistance Temp.Coefficient	TC_R	TL=25°C TH=65°C	—	-0.05	—	%/K	3)
Sensitivity Temp.Coefficient	TC_Sen	TL=25°C TH=65°C	—	-0.01	—	%/K	4)
Offset Temp.Coefficient	TC_off	TL=25°C TH=65°C	—	-0.01	—	%/K	5)

Remark:

$$1) \text{ Sen} = \frac{[V1_{\max} - V2_{\max}] - [V1_{\min} - V2_{\min}]}{H_{\max} - H_{\min}}$$

V1_{max}/V2_{max}=Vout1/Vout2 output voltage at H_{max}; V1_{min}/V2_{min}=Vout1/Vout2 output voltage at H_{min}

$$2) \text{ Offset} = V_{\text{out1}} - V_{\text{out2}} \text{ @ } B_z = 0 \text{ mT; } V_{\text{cc}} = 1 \text{ V}$$

$$3) \text{ TC}_R = \frac{[R_{s, 65^\circ\text{C}} - R_{s, 25^\circ\text{C}}]}{R_{s, 25^\circ\text{C}} * [65 - 25]}$$

$$4) \text{ TC}_{\text{Sen}} = \frac{[\text{Sen}_{65^\circ\text{C}} - \text{Sen}_{25^\circ\text{C}}]}{\text{Sen}_{25^\circ\text{C}} * [65 - 25]}$$

$$5) \text{ TC}_{\text{Off}} = \frac{[\text{Offset}_{65^\circ\text{C}} - \text{Offset}_{25^\circ\text{C}}]}{\text{Offset}_{25^\circ\text{C}} * [65 - 25]}$$

7. Internal circuit and Pin direction

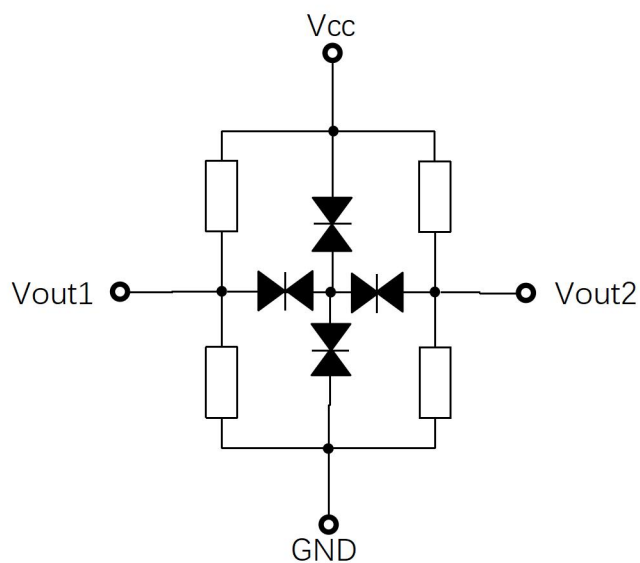


Fig. 1 Schematic diagram of the circuit of the FFZ-001F58T22V sensor.

8. Typical output curve

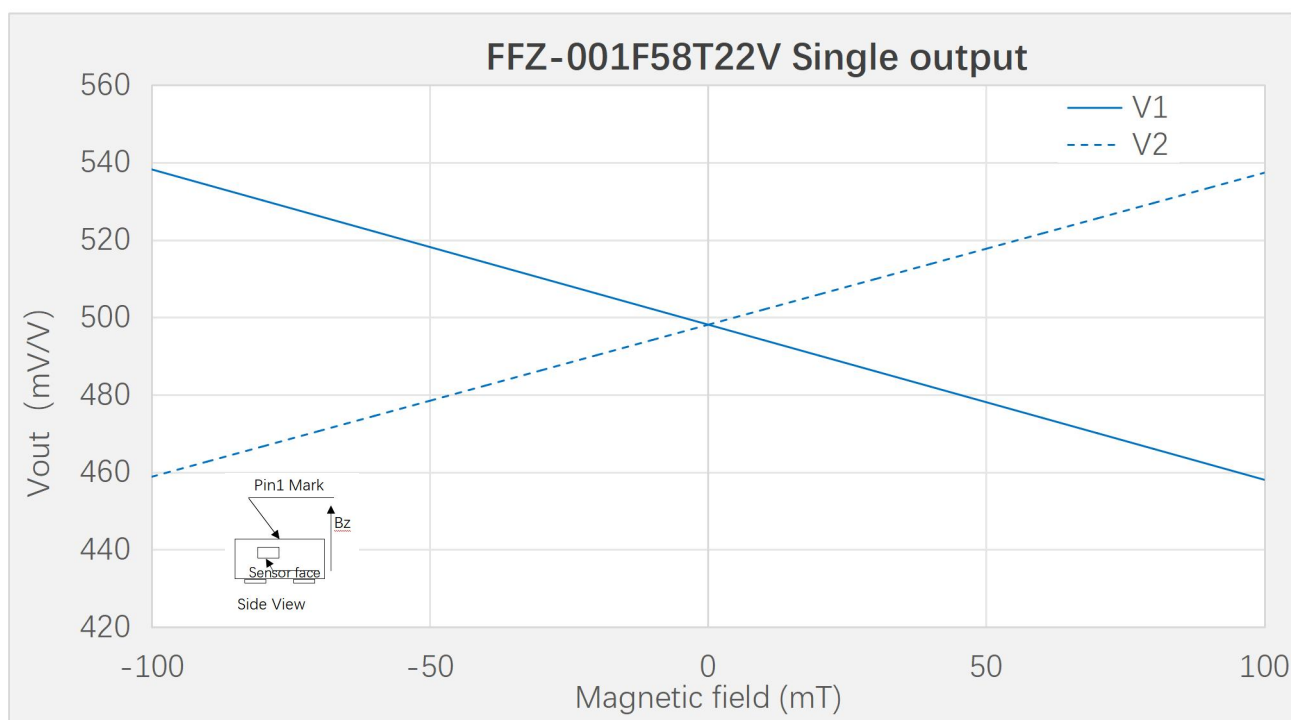


Fig. 2 Signals output voltage of Vout1 and Vout2.

9. Power-on response time

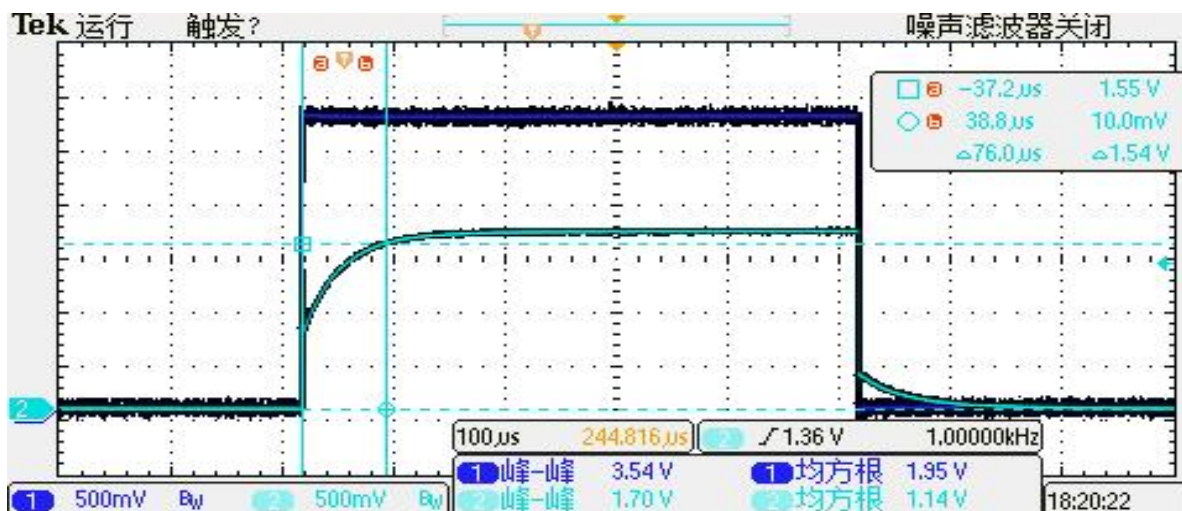


Fig.3 CH1 is Vcc voltage, and CH2 is output voltage; BBT-A907L358D16 series Power-on response time 76 μs (~100 μs)

10. Output bandwidth

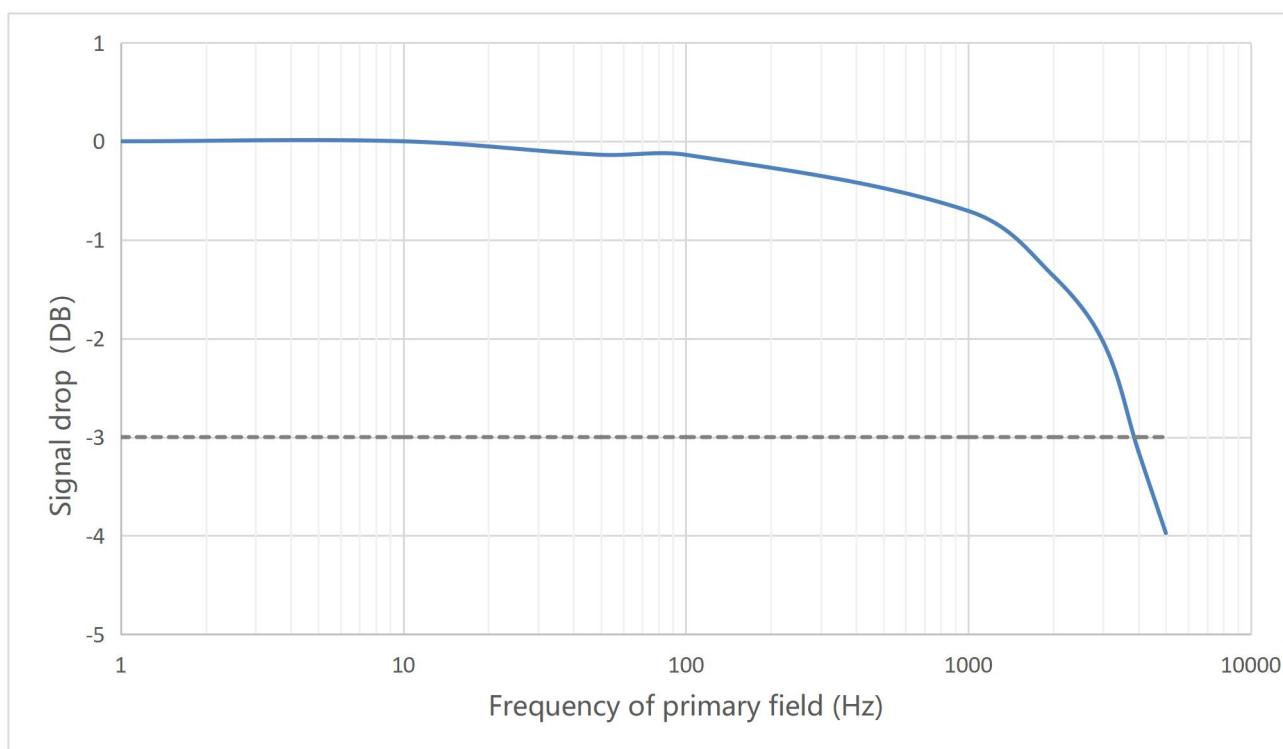


Fig.4 Output bandwidth 4kHz (dB)

11. Typical output response time

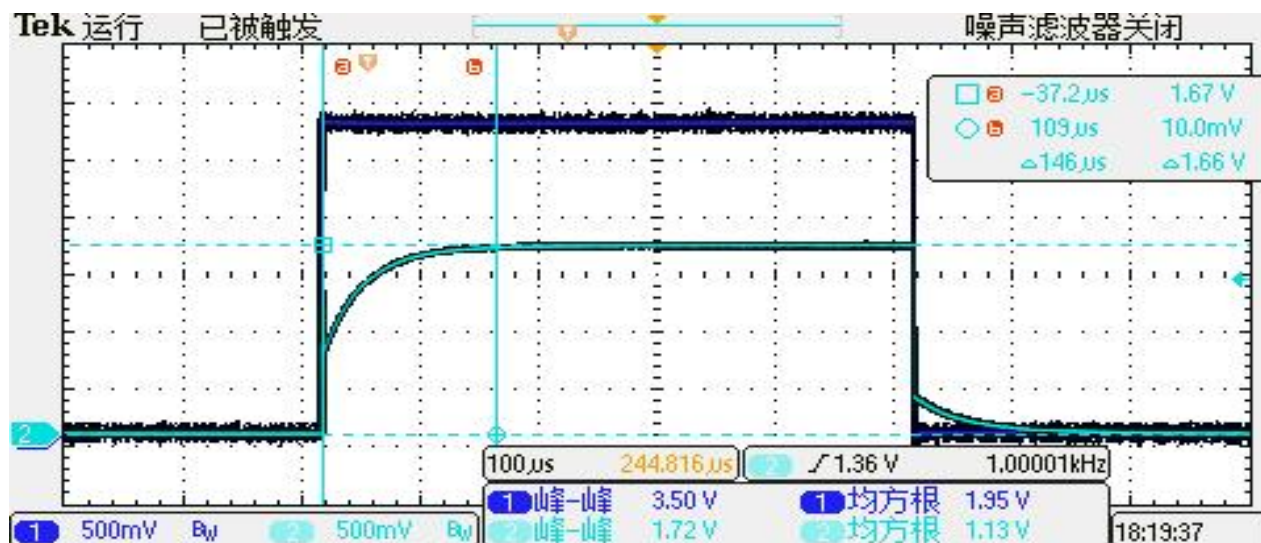
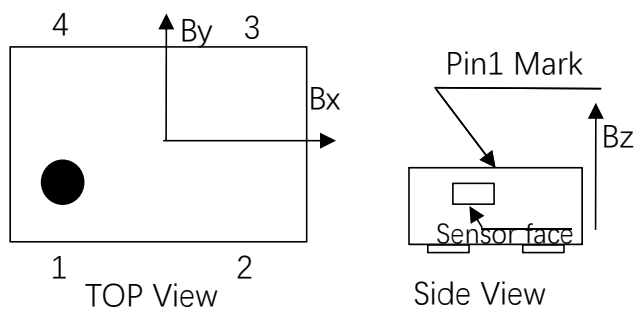


Fig.5 CH1 is primary magnetic field, and CH2 is output voltage; BBT-A907D16JR series output response time is 146μs (< 150μs)

12. Package information

12.1 Pin configuration & Pin description



Pin	Symbol	Function
1	Vcc	Supply voltage bridge
2	Vout1	Negative output
3	GND	Ground of bridge
4	Vout2	Positive output

12.2 Package Outline

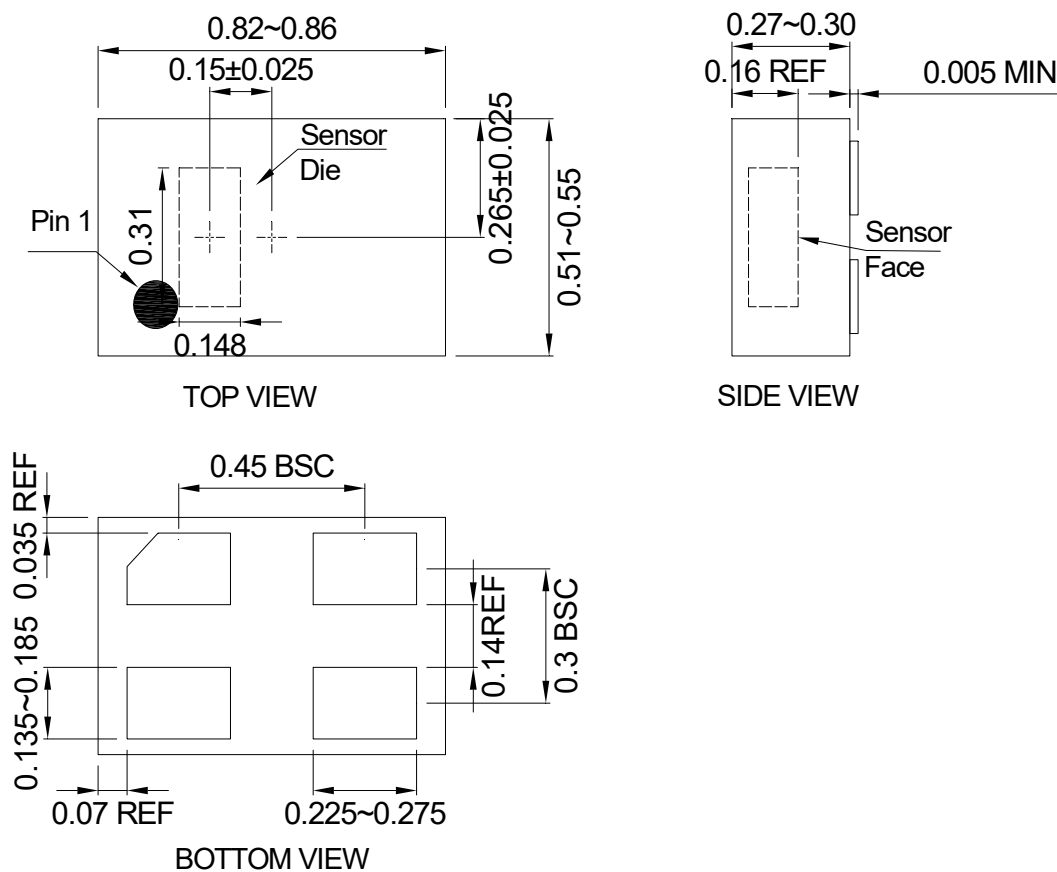


Fig.6 Outline package diagram of FFZ-001F58T22V series sensor (unit: mm).

Note: The pin plating is electroplated tin-plated $\geq 3\mu\text{m}$.

12.3 Footprint

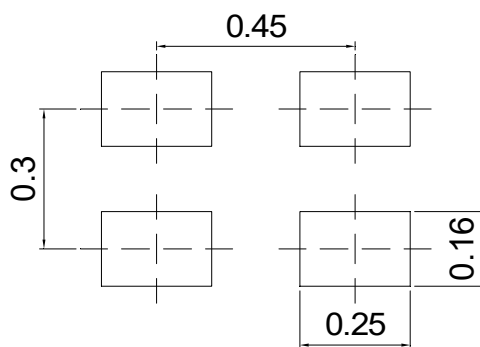


Fig.7 footprint of the sensor chips with this package(unit: mm).

13. Product packaging

Item	Request	Remark
Reels	7 inch	See Figure 6
Carrier tape	8mm wide	See Figure 6
Empty front length	400 mm	Refer to EIA-481 requirements
Trail length	160 mm	Refer to EIA-481 requirements
Number of standard packages	13000 / 7" Reel	Planning criteria for volume products
MSL Level	MSL 3	J-STD-020E

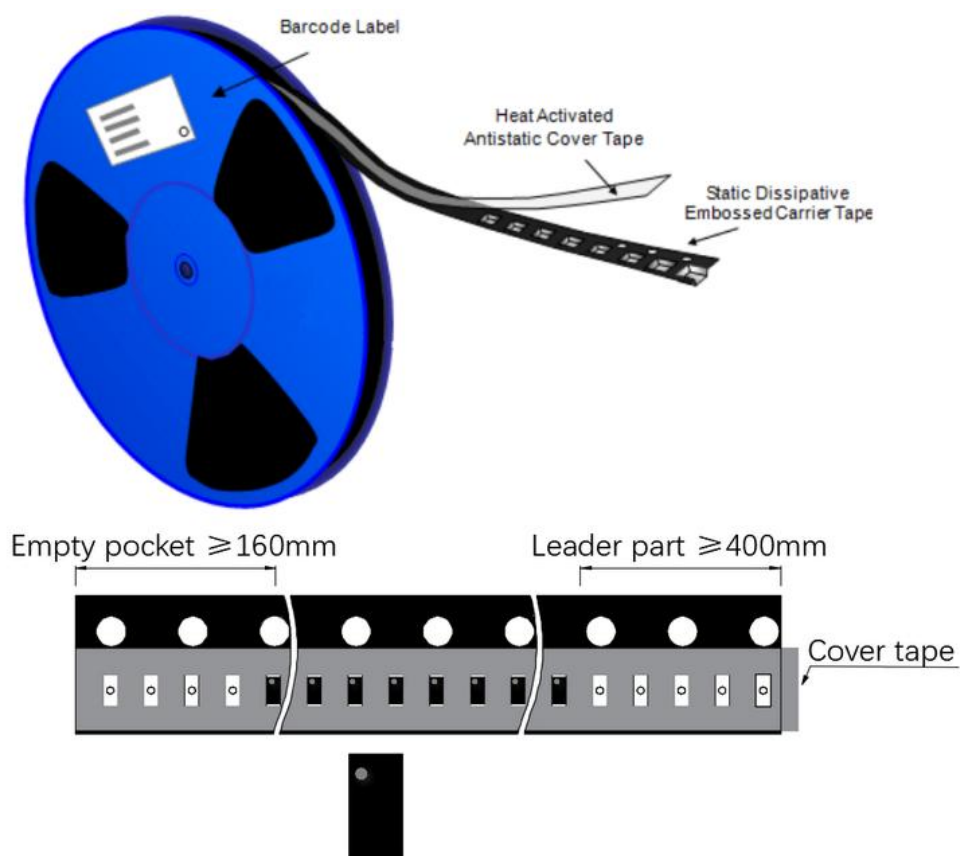
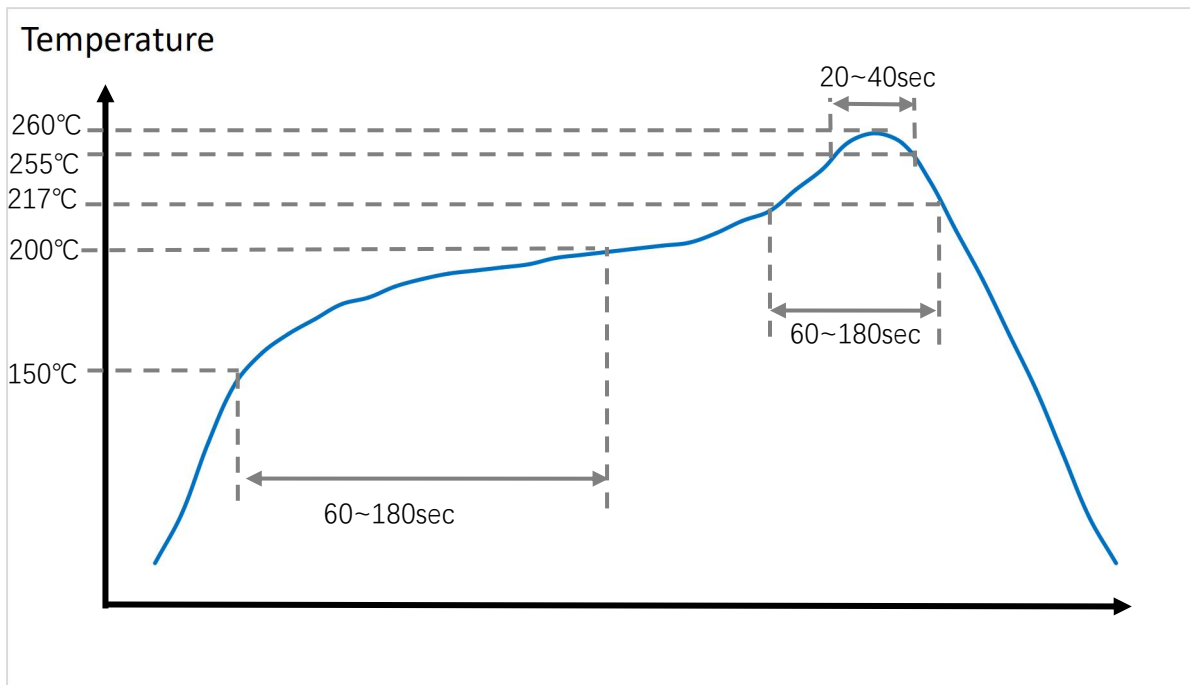


Figure.8 Reels and Carrier tape

14. Reflow Profile (Reference)

Peak Temperature should not exceed 260 degC.

Below Profile is Reference. Please confirm productivity in assembly process.



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