TOKIN

Vol.1

Tokin sensors

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INTRODUCTION

Advances in LSIs, microcomputers and power devices enable ever more efficient use of energy, finer control and greater ease of use. In this way industry is promoting consumer appliances with increasingly sophisticated “intelligent” functions. And with these developments there is a burgeoning need for advanced, highly reliable sensors with capabilities corresponding to the human five senses.

Tokin seeks to commercialize creative products fusing new material technologies with new applications, developing and commercializing a broad range of sensor devices based on outstanding materials technologies covering properties such as magnetism, piezoelectronics and optics.

This catalog introduces different kinds of sensors, including thermosensors, current sensors and magnetic sensors. Besides the items shown here we also offer an extensive line of sensor-related products and are continually developing new sensors, so please feel free to ask us about anything you might need. We look forward to being able to serve you.

Thermal Reed Switch (TRS®)

Outline

Tokin led the world in recognizing and realizing the potential of ferrite's Curie temperature. The result is Thermorite®, a temperature-sensing magnetic material. Ever since the introduction of this product, Tokin has reigned as the top manufacturer of Curie-temperature-utilizing control devices, developing many products with new functions. Among these, the Thermal Reed Switch (TRS®) is the chief product, with patents in the United States and Japan. Its superiority as a highly reliable, precise temperature-sensitive switch ideal for promoting energy conservation has been attested to by the International Relay Association. There are already more than 300 million in use, and with the addition of TRS® varieties approved by UL, CSA, VDE and other safety standards, the lineup just keeps getting better.

Features

- High relaibility (rated life of 10^5 times switching when used under appropriate conditions: cumulative fault rate 10%)
- Excellent temperature accuracy (±2.5°C, ±1°C)
- Wide range of operating temperature available (–10°C to +130°C)
- Excellent environmental resistance (contacts are encased in a glass tube)

Markings

Electrical Ratings (Standard)

Reed switch type	For 100 V					For 200 V			For 100 V / 220 V	
Reed switch rating	TRS06-	TRS1	TRS3-	TRS5-	TRS10-	TRS5-	TRS1-	TRS10-	TRS5-	TRS10-
Maximum opening/closing voltage (V)	110 AC•DC	140 AC 200 DC	140 AC 200 DC	140 AC 200 DC	120 AC	264 AC	220 AC	264 AC	242 AC	264 AC
Maximum opening/closing current (A)	0.3 AC•DC	0.5 AC•DC	0.5 AC•DC	0.5 AC•DC	1 AC	0.275 AC	0.045 AC	0.7 AC	0.45 AC	0.714 AC
Maximum opening/closing power (W)	6 AC•DC	10 AC•DC	35 AC 10 DC	50 AC 10 DC	100 AC	60.5 AC	10 AC	100 AC	121V-55 242V-60	121V-72 264V-100

Structures and Principles of Operation

Thermal Reed Switches (TRS®) are temperature-sensing switches composed of a magnet and a temperature-sensing soft ferromagnetic substance called Thermorite®. This material's saturation magnetic flux density decreases as the temperature increases, and it turns into a paramagnetic substance at the Curie temperature.

(a) Normally closed type

(b) Normally open type

Before Using Thermal Reed Switch (TRS®)

- Do not use in close proximity to strongly magnetized parts.
- Do not use if dropped or strongly shocked.
- Do NOT use with greater load than specified. When installing these switches in circuits prone to producing surge voltage (inductive load) or rush current (in lamps and motors), an appropriate switch type should be used, or a contact point protection circuit added.
- Avoid stress (especially torsion) in case of additional processing.
- Each reed switch has a specific resonance frequency. Please contact us when an oscillation is added.
- Please contact us before deciding your specifications.

Part Number / Shape / Dimensions	Operating temperature range	Temperature tolerance	Application(s)	Features
● **TRS06- ○○ BLR001** ● **TRS06- ○○ MLR001** ● **TRS06- ○○ BCR001** (mm)	30°C to 130°C	±5°C	Power supplies Recharge temperature detection	Compact
● **TRS5- ○○ BCR01** ● **TRS5- ○○ BCR01V, 01W** ● **TRS1- ○○ MCR01, 01V** ● **TRS3- ○○ MCR01** ● **TRS5- ○○ BCR00, 00V, 00W** ● **TRS3- ○○ MCR00, TRS1- ○○ MCR00V** (mm)	0°C to 120°C	±2.5°C	Rice cookers Yogurt makers Hot water heaters Photocopiers	General-purpose
● **TRS5- ○○ BLR00** ● **TRS5- ○○ BLR00V, 00W** (mm)	0°C to 130°C	±2.5°C	Rice cookers Hot water heaters Thermos-type hot water heaters	General-purpose
● **TRS5- ○○ BLR000** ● **TRS10- ○○ BLR000** (mm)	40°C to 100°C	±1°C		High-precision
● **TRS10- ○○ BLR00, 00V** (mm)	40°C to 130°C	±2.5°C		High opening/ closing power

●TRS3- ○○ MLR00, TRS1- ○○ MLR00V (mm)	0°C to 130°C	±2.5°C	Power supplies Computers & peripherals	General-purpose
● TRS5- ○○ BSR00, 00V, 00W ● TRS3- ○○ MSR00, TRS1- ○○ MSR00V ● TRS5- ○○ BSR01E, 01EV, 01EW ● TRS3- ○○ MSR01E, TRS1- ○○ MSR01EV (mm)	–10°C to 100°C	±2.5°C	Air conditioners Freezers Vending machines Refrigerators Anti_freeze heaters	Humidity-and moisture-resistant
● TRS5- ○○ BTR01, 01V, 01W ● TRS3- ○○ MTR01, TRS1- ○○ MTR01V (mm) Value inside parentheses ( ) is MTR	–10°C to 60°C	±2.5°C		
● TRS1- ○○ BPR01 ● TRS1- ○○ MPR01 ● TRS1- ○○ BPR02 ● TRS1- ○○ MPR02 (mm)	30°C to 110°C	±3°C	Automobile engine compartments Hot water heaters Boilers	Shielded for automotive use
● M-TRS5- ○○ B ● M-TRS10- ○○ B (mm)	–10°C to 130°C	±2.5°C	Anti-freeze heaters Aquarium heaters	Molded plastic
●TRS5- ○○ BLRWU (mm)	0°C to 130°C	±2.5°C	Photocopiers Rice cookers	Satisfies overseas safety standards- UL, CSA, VDE

TRS Series Approved by UL,CSA,and VDE

Specifications

Recog-nized by:	Model	Max.Make/Break Current	Max.Make/Break Voltage	Max.Make/Break Power	Shape No.	Set Operating Temperature Range (˚C)	Tolerances for Operating Temperature (˚C)	Temperature Differential (deg.)*1
UL	BLR Series TRS5- ○○○BCR01U	0.5A	140V AC	50W AC	A	0~120	±2.5	10
	TRS5- ○○○BCR01WU	0.45A/0.25A	121V AC / 242V AC	55W AC / 60.5W AC				
	TRS5- ○○○BCR01VU	0.275A	264V AC	60.5W AC				
	TRS5- ○○○BCR00WU	0.45A/0.25A	121V AC / 242V AC	55W AC / 60.5W AC	C	0~120	±2.5	10
	BLR Series TRS5- ○○○BLR U	0.5A	140V AC	50W AC	B	0~30	±2.5	10
	TRS5- ○○○BLR WU	0.45A/0.25A	121V AC / 242V AC	55W AC / 60.5W AC				
	TRS5- ○○○BLR VU	0.275A	264V AC	60.5W AC				
CSA	BLR Series TRS5- ○○○BLR U	0.5A	120V AC	50W	B	0~129	±2.5	10
	TRS5- ○○○BLR XU	0.25A	240V AC	60W				
	TRS5- ○○○BLR WU	0.45A/0.25A	121V AC / 242V AC	55W AC / 60.5W AC				
	BCR Series TRS5- ○○○BCR00 WU	0.45A/0.25A	121V AC / 242V AC	55W AC / 60.5W AC	C			
VDE	BLR Series TRS5- ○○○BLR WU	0.45A/0.25A	120V AC / 250V AC	55W AC / 60.5W AC	B	–10~130	±2.5	10
	BCR Series TRS5- ○○○BCR01 WU	0.45A/0.25A	120V AC / 250V AC	55W AC / 60.5W AC	A	–10~130	±2.5	10
	TRS5- ○○○BCR00 WU	0.45A/0.25	120V AC / 250V AC	55W AC / 60.5W AC	C	0~130	±2.5	10

UL : File No.E67648
CSA : File No.LR50414-2
VDE : File No.11443-4510-1001

*1.No values specified in the international safety standard.
*○○○ indicates the operating temperature

Shape and Dimensions

● A

● B

● C

[mm]

Thermal Guard (OHD®)

Outline

In addition to the lineup of thermal guards (OHD), widely lauded as overheating detectors, this new series includes the SMD type (OHD5S- ○○B), DIP type (OHD5D- ○○B) and radial type (OHD5R- ○○B, OHD5RB- ○○M).

Features

- Extremely simple circuit design (as no adjustment needed).
- Reliable ON-OFF operation (special temperature-sensitive materials and highly-reliable switches give reproducible, reliable ON-OFF action).
- Usable with extremely low (0.1 mW or lower) signals to high power (6 W) levels, making them ideal as built-in overheating detectors in electronic circuits. (OHD5S- ○○B, OHD5D- ○○B, OHD5R- ○○B have a maximum rating of 1 W.)
- High speed response (three times higher than previous Tokin products).
- Compact, light and easy to handle.
- Dust-proof, explosion-proof, and corrosion-proof.
- Wide range of operating temperatures available (in 5 °C increments from 30 to 130 °C)

Applications

- Monitoring overheating of power transistors and power modules in power supplies, office automation equipment and other electronic appliances.
- Atmospheric temperature detection and overheating monitoring in room heaters, gas hot water heaters, PPCs, amplifiers, motors, HDDs, FDDs and other general appliances.

Specifications

Product name		Features	Contact shape	Contact capacity		Set temperature	Operating temperature precision	DiFF
OHD1- ○○ B ○○ M		General-purpase	B:Break M:Make	Maximum opening/closing voltage Maximum opening/closing current Maximum opening/closing power	110 V AC/DC 0.3 A AC/DC 6 W AC/DC	Fixed in 5°C increments from 30°C to 130°C	±5°C	10°C Max
OHD3- ○○ B ○○ M								
OHD5S- ○○ B		Compact SMD type	B:Break	Maximum opening/closing voltage Maximum opening/closing current Maximum opening/closing power	30 V.DC 0.1 A DC 1 W DC			
OHD5D- ○○ B		Compact DIP type						
OHD5R- ○○ B		Compact radial type						
OHD5RB- ○○ M		Radial type	M:Make	Maximum opening/closing voltage Maximum opening/closing current Maximum opening/closing power	110 V AC/DC 0.3 A AC/DC 6 W AC/DC			
OHD11R- ○○ B		Radial type	B:Break	Maximum opening/closing voltage Maximum opening/closing current Maximum opening/closing power	110 V AC/DC 0.3 A AC/DC 6 W AC/DC			

UL : E67648
CSA : LR50414
TÜV : OHD1·3 R 9750955
OHD5R·5D R 9750944
OHD11R R 9750950

Markings

OHD○ – ○○ ○

- Contact type — B: Break, M: Make
- Operating temperature
- Thermal guard addreviation

Shape and Dimensions

● **OHD1**

● **OHD3**

● **OHD5S**

● **OHD5RB**

● **OHD5D**

● **OHD5R**

● **OHD11R**

(mm)

Before Using Thermal Guard (OHD®)

- Do NOT use with greater load than specified.
- Do not affix in close proximity to strongly magnetized parts and avoid using in a magnetic field.
- Do not use if dropped or strongly shocked.
- The OHD1 is designed to be inserted into printed circuit boards. If a wire harness is required, we recommend the OHD3 type.

Thermistor Sensors

Outline

"Thermistor" is the generic term for thermally sensitive resistors composed of sintered oxides of two to four different types of materials. Negative temperature coefficient thermistors are referred to as NTC thermistors. Tokin's extensive know-how and technology in the field of thermal reed switches (TRS®) and different types of assembly technology are used in our thermistors for a wide variety of applications.

Markings

THS- ○○○○△□□

TCS- ○○○○△□□

- Thermistor shape classification number
- Accessory number [S : Sealing]
- Resistance : Representative value; the upper two digits of the resitance at 25ºC.
- Constant : Representative value; the upper B constant at 25ºC and 85ºC

Product Names and Characteristics

Diode type thermistors are encased in glass and are therefore resistant to high temperatures and highly reliable. They are well-suited to mass production.

Product name	Resistance at 25°C (kW)	Resistance tolerances (%)	B Constant (K)	B Constant tolerances (%)	Maximum operating temperature (°C)
□□ **34**	2.7~3.3	±2	3450	±2	250
□□ **35**	9 ~11		3500		
□□ **36**	50 ~60	±3	3600		
□□ **38**	45 ~55		3800		
□□ **39**	18 ~22	±5	3900		
□□ **40**	63 ~77		4000		

• Please contact us to discuss the resistance and B constant values

Shape and Dimensions

- Example of assembled thermistor products

•THS-○○○○S○○

Application: Temperature maintenance detection in hot water pots
Operating temperature range: –10°C to + 140°C
Heat time constant: 60 seconds or less

We can accommodate assembly design of different shapes according to customer requirements for application and operating conditions.

• THS-○○

Application: Rice cookers
Operating temperature range: –10°C to +200°C
Heat time constant: 30 seconds or less

Before Using Thermister Sensors

- Do not use if dropped or subjected to strong shocks.

Center Thermo (TCT)

Outline

Center thermos (TCTs) are sensors used to detect the cooking temperatures of electric and electric/gas rice cookers.

Features

- Uses a heat-and shock-resistant thermally sensitive magnet.
- Little change occurs over time.

Markings

TCT- ○○○

Shape
- G : Standard shape
- AS : Compact shape
- BS : Other

Operating temperature

Principle

When at normal temperature (ON state)

During temperature detection (OFF state)

f1 : Spring's repulsive force
f2 : Thermalloy's attractive force

Product Name

Item			TCT- ○○○G	TCT- ○○○AS	TCT- ○○○BS	Comments
Operating temperature	**(°C)**		○○○ ±5	○○○ ±5		When increasing at 1 °C/min
Insertion force	**(g)**	**min.**	50	50		Switch lever insertion force when OFF
Attraction force	**(g)**	**min.**	150	90		When at normal temperature
Stroke	**(mm)**		17	16		Switch lever stroke (during ON → OFF)

Shape and Dimensions

● **TCT-○○○G**

● **TCT-○○○AS**

● **TCT-○○○BS**

(mm)

Before Using Center Thermo (TCT)

- Do not use if dropped or strongly shocked.

Current Transformers

Outline

TOKIN current transformers are compact, highly sensitive AC current detectors for mounting on printed circuit boards.

Features

- Compact, inexpensive,with high output voltages
- Broad frequency bandwidths (50 Hz to 100 kHz)
- Easy mounting on printed circuit boards
- Uses flame-retardant materials (UL94V-0 class)

Applications

- Electromagnetic cooking appliances microwave ovens, air-conditioners and other home appliances
- Current regulation in office equipment equipment and industrial equipment
- High-frequency switching power supplies

Product Names and Composition

	Primary pass-through type		Primary mounted type	
	Vertical type	**Horizontal type**	**Vertical type**	**Horizontal type**
CT10 Series	—	—	CT10V1-02	CT10H1-02
	—	—	CT10V1-15	CT10H1-15
	—	—	CT10V1-10S	—
CT19 Series	—	—	—	CT19H1-40
CT25 Series	CT25V-30	CT25H-30	CT25V1-30	CT25H1-30

Output Voltage Measurement Circuit

f : Frequency
I_1: Primary current (AT)
R_L: Load resistor (Ω)
Eo : Output voltage (V)
P : Primary side
S : Secondary side

Markings

Example) **CT10 V 1 - 15**

- 15 — Number of windings 1500T
- 1 — Primary pass-through type or Primary mounted type (1)
- V — Vertical type (V) or Horizontal type (H)
- CT10 — Series

CT-10 Series

Shape and Dimensions

(mm)

CT10V1-02 CT10V1-15	CT10H1-02 CT10H1-15	CT10V1-10S

Characteristics and Specifications

Product name			CT10V1-02 CT10H1-02	CT10V1-15 CT10H1-15	CT10V1-10S
Direct current resistance	**(Ω)**	**max.**	3.9	230	160
Insulation withstand voltage	**(VAC/1min)**		1500 / 1 min. resist (inter-coil, between coil and core)		3750 / 1 min. resist (inter-coil, between coil and core)
Insulation resistance	**(MΩ)**	**min.**	100 / min. at 500VDC mega (inter-coil, between coil and core)		
Safety standard (s) met			UL		UL, IEC, VDE

Output Voltage Characteristics

CT-25 Series

Shape and Dimensions

(mm)

CT25V-30

CT25V1-30

CT20H-30

CT25H1-30

Characteristics and Specifications

Product name	CT25V-30 CT25H-30	CT25V1-30 CT25H1-30
Direct current resistance (Ω) max.	600	620
Insulation withstand voltage (VAC/1min)	500VAC / 1 min. resist (inter-coil, between coil and core)	1500VAC / 1 min. resist (inter-coil, between coil and core)
Insulation resistance (MΩ) min.	100MΩ / min. at 500VDV mega (inter-coil, between coil and core)	100MΩ / min. at 500DCV mega (inter-coil, between coil and core)
Safety standard (s) met	UL	UL

Output Voltage Characteristics

CT-19 Series

Shape and Dimensions

(mm)

Output voltage Characteristics

Characteristics and Specifications

Product name	CT19H1-40
Direct current resistance (Ω) max.	3300
Insulation withstand voltage (VAC /1min)	1500VAC / 1 min. resist (inter-coil, between coil and core)
Insulation resistance (MΩ) min.	100 MΩ / min. at 500VAC mega (inter-coil, between coil and core)
Safety standard (s) met	UL, IEC

Before Using Current Transformers

- Strong physical shocks could damage the cores. Be careful not to drop or subject the units to any strong physical impact.
- Take adequate precautions to avoid electrical overheating.

Current Transformers (Low Current Type)

Outline

This series of compact current transformers (current sensors) can be used for detecting very low current levels and overcurrent protection in electronic appliances.

Applications

- Overcurrent detection in microcomputer-controlled equipment.
- Current detection in electric refrigerators, air conditioners and electromagnetic cookers.

Features

- High sensitivity (detection of low current) and high performance.
- Compact, lightweight.
- Mountable on printed circuit boards.

Specifications

Product name	CT-05	CT-06	CT-07
Core	Permalloy (TMB)	Permalloy (TMH)	Permalloy (TMB)
Lead wires	Pin connectors, annealed copper wire ϕ0.6 mm	Polyethylene sheath ϕ0.5 mm single wire	Pin connectors, solder-plated hard-drawn copper wire É"0.8 mm
Materials	Phenolic resin case. epoxy-filled	Phenolic resin case, silicon-filled	Phenolic resin case, epoxy-filled

Notes : (1)In the standard lineup there are three types of CT-06, depending on differences in secondary windings
(2)The CT-05 has 500T as standard.

Shape and Dimensions

● **CT-05**

● **CT-06**

(mm)

● **CT-07V(vertical type)**

● **CT-07H(horizontal type)**

Output Characteristics

- CT-05 AC output characteristics (example)

- CT-06 AC output characteristics (example)

I1 : Primary current (AS)
R1 : Load resistance (Ω)
: (P1=1)
Eμ : Output voltage (mV) (rms)

- CT-05 AC output characteristics (example)

- CT-06-100 AC output characteristics (example)

Markings

- CT-07 AC output characteristics (example)

Before Using Current Transformers (Low Current Type)

Zero-Phase Current Transformers ZCT

■Zero-Phase Current Transformers ZCT

Outline

The ZCT Series of compact molded-type zero-phase current transformers is ideal for improving the sensitivity, compactness and light weight of electric shock prevention earth leakage breakers.

Features

- High sensitivity.
- Compact and light weight.
- Laminated iron core type.

Shape and Dimensions

●MR-1,2,3,4

●MR-1-P3,P5

Applications

- Electric shock prevention earth leakage breakers.
- Short circuit relays.

Product name	Each part's dimensions (mm)						
	D1 (±0.3)	D2 (±0.3)	D3 (±0.4)	H	L (±3.0)	A (±0.3)	B (±0.3)
MR-1	7.5	19.0	22.0	8.0±0.3	40.0	—	—
MR-2	9.2	21.5	24.3	8.0±0.3	80.0	—	—
MR-3	12.0	27.0	30.0	10.0±0.3	67.0	—	—
MR-4	17.0	31.3	33.7	10.5±0.3	67.0	—	—
MR-1-P3	7.7	19.0	21.0	8.5 max.	—	3.0	10.0
MR-1-P5	7.7	19.0	21.5	8.5 max.	—	5.0	10.5

Pin : 0.8ϕ solder-plated wire

Specifications

Product name	Rated current	Output voltage (mV) min.	Overload characteristics (–20°C to 80°C) (%) max.	Temperature characteristics (rated load) (%) max.	Unbalance characteristics (%) max.	Measurement conditions
MR-1	30 A	8	10	±10	13	R=0.3 kΩ Io=22.5 mA
MR-2	30A					
MR-3	60A					
MR-4	125A					
MR-1-P3	30A					
MR-1-P5	30A					

R : Output load, Io = Io: Detection current
Note : We can accommodate other specifications as well, so please ask if required.

Before Using Zero-Phase Current Transformers ZCT

- Strong shocks such as from being dropped may change the characteristics. Take care to avoid subjecting the transformers to any physical shocks.

Magnetic Direct Current Sensor MDCS

Applications

- Inverter-based home appliances (air conditioners, refrigerators, washing machines, etc.)
- General-purpose inverters
- Servo motors
- Industrial machines
- Automobiles
- FAX and other multifunction telephone series (H Series)

Outline

Magnetic direct current sensors (MDCS) use a magnetic substance and hole device for magnetic detection of direct current. They detect all currents (DC, AC and pulse), and the output voltage varies in proportion to the strength of the current measured.

Features

- Detection of both direct currents and alternating currents (including pulse currents)
- Fluctuations in output from changes in the power supply voltage and the ambient temperature are small
- Excellent linearity of measured current and the converted power output
- The measured current and the secondary output side are insulated

● MA12, SB15, KB15, MB15

Item		Marking	Rated value and conditions (Ta=25ºC)				
			Amplifier built-in type				
			Single power supply operating type		Double power supply operating type		
Model			KA15D	MA12	SBI5	KBI5	MBI5
Rated current	(AT)	If	–160 to +160	–40 to +40	–100 to +100	–50 to +50	–40 to +40
Output voltage	(V)	Vh	+4.500±0.050 (If = +160AT) +0.500±0.050 (If = +160AT)	+4.500±0.080 (If = +40AT) +0.500±0.080 (If = +40AT)	+4.000±0.080 (If = +100AT) –4.000±0.080 (If = –100AT)	+5.000±0.100 (If = +50AT) –5.000± 0.100 (If = –50AT)	+4.000±0.120 (If = +40AT) –4.000±0.120 (If = –40AT)
Offset voltage (remaining voltage)	(V)	Vo	+2.500±0.050 (If = 0AT)	+2.500±0.060 (If = 0AT)	±0.060 (If = 0AT)	±0.100 (If = 0AT)	±0.12 (If = 0AT)
Vh linearity	(%)		±1%	±3%	Within±1% (within rated current)		±3%
Power supply voltage	(V)	Vcc	+15±10%	+12±5%	±15±5%	±15±10%	±15±5%
Power supply input current	(mA) max.		40				
Pulse response	(µs) max.		15 (di/dt = 200AT/µs)	15 (di/dt = 200AT/µ s)	15 (di/dt = 200AT/µ s)	15 (di/dt = 100AT/µ s)	
Vh temperature characteristics	(mV / ˚C) max.		±2.0 (at +160AT)	±4.0 (at ±40AT)	±8.0 (at ±00AT)	±8.0 (at ±50AT)	±5.0 (at ±40AT)
Vo temperature characteristics	(mV / ˚C) max.		±2.0	±4.0	±5.0	±8.0	±4.0
Insulation withstand voltage	(V)		AC2000 for 1 minute at 50/60 Hz Leakage current within 5 mA (Between pass-through side and connectors)				
Insulation resistance	(MΩ) min.		500 (500VDC) (Between pass-through side and connectors)				
Operating temperature range	(˚C)	Ta	–10 to +80				
Storage temperature range	(˚C)	Ts	–15 to +85				
Primary side windings*			ϕ1.0 mm – 8 turns	ϕ1.0 mm – 4 turns	—	ϕ1.0 mm – 5 turns	ϕ1.0 mm – 4 turns
Comments			Positive/negative output				

Besides the standard windings (8 turns), any other windings within the rated current are possible. The rated current unit AT is designated as the primary side current (A) × number. of turns (Turn).

● THS56,56F,65,63F

Electrical Characteristics (Ta=25°C, Vcc=+5V)

Item			Marking	Conditions	Rating min.	Rating typ.	Rating max.	Comments
Sensitivity current (mA)		56,65	I_L	Ta=+5°C~+45°C	2			
			I_H				15	
		56F,63F	I_L		5			
			I_H				10	
Primary side input current (mA)		56,56F,63F,65	Iin		–120		120	
Input direct current resistance (Ω)		56	Rin	Ta=–10°C~+70°C	2.5	3.5	4.5	
		56F,63F,65			2.5	3.9	5.0	
Input inductance (mH)		56	Lin	Ta=–10°C~+70°C	0.8	1.0	1.2	–10°C~+70°C
		56F,63F,65			0.8	1.1	1.4	
Output voltage (V)			V_{OH}	RL=10kΩ	3.5			
			V_{OL}			0.1	0.8	
Response (μS)			ton-off	RL=∞		60		
Power supply voltage (V)			Vcc		+4.5		+5.5	
Consumption current (mA)		56,56F,65	Icc			10		
		63F				12		
Effect of external magnetic field (mA)		56,56F,63F,65	Iin offset	Iin=0 B=1×10^{-3}T		3		
"Analog" out put	Loss (db)	56,65		Iin=0 ~120mA 1kHz,600Ω	30	34	38	
		56F			30	33	36	
		63F			–2	0	2	
	S/N (db)	56,56F,65		–45~+20dBm	15			
		63F		45~0dBm				

(Ta=25°C) Maximum Rating

Item		Marking	Rating	Comments
Power supply voltage (V)		V_{CC}	7.0	
Primary side input current (A)	56,56F,63F,65	Iin	0.5	10sec. max.
Withstand voltage between primary and secondary (kVAC) min.			2.2	60sec. 50Hz RH=65±5%
Operating temperature range (°C)		Topt.	–10 ~ +70	
Storage temperature range (°C)		Tstg.	–20 ~ +80	

Input Current - Output Voltage Characteristics

Shape and Dimensions

● **KA15D,KB15**

(mm)

● **MA12, MB15**

(mm)

● **SB15**

(mm)

● **THS-56,56F,65**

(mm)

●**THS-63F**

(mm)

Pin number	KA15D	MA12	SB15	KB15	MB15	THS56,56F,65,63F
1	Vcc (power supply input pin)	GND (Ground pin)	Vcc (⊕ power supply input pin)	Vee (⊖ power supply input pin)	Vee (-15V)	(Coil input)
2	GND (Ground pin)	Vcc (+12V)	Vee (⊖ power supply input pin)	GND (Ground pin)	GND (Ground pin)	(Coil input)
3	Vout (Output voltage pin)	Vout (Output voltage pin)	Vout (Output voltage pin)	Vcc (⊕ power supply input pin)	Vcc (i+15V)	GND (Ground pin)
4	(Cannot be connected)	(Cannot be connected)	GND (Ground pin)	Vout (Output voltage pin)	Vout (Output voltage pin)	"Analog" output
A	(Measured current ⊕ pin)	(Measured current ⊕ pin)	—	(Measured current ⊕ pin)	(Measured current ⊕ pin)	OUT2
B	(Measured current ⊖ pin)	(Measured current ⊖ pin)	—	(Measured current ⊖ pin)	(Measured current ⊖ pin)	OUT1
C	—		—	—	—	Vcc

Before Using Magnetic Direct Current Sensor MDCS

- Strong physical shocks could damage cores. Be careful not to drop or apply other strong simpact.
- Solder as quickly as possible. These products are heat resistant up to 260°C for 10 seconds. Be careful not to exceed this amount when soldering. Use a low-corrosion type flux when soldering.
- Because the circuit uses ICs, application of strong static electricity could cause damage. Take static electricity precautions when handling.
- Because these products are magnetic current detectors, application of strong external magnetic fields could cause their characteristics to change. Limit ambient magnetic fields to 50e or less.

Twin Reed Switch Type Safing Sensor NRS-603W

Outline

Tokin has produced two-element incorporated compact and high-performance reed switch type safing sensors responding to current needs in which special emphasis is placed on safety.

Features

- Allows the control of driver and passenger seats using one sensor, because two reed switches are included in the sensor
- Has about 55% the volume of conventional NRS-602 reed switch type safing sensors containing one element, thereby euabling substantially compact reed switch type safing sensors
- Use of a built-in reed switch ensures energizing currents (20A) twice as large as a conventional reed switch type safing sensor

Applications

- SRS air bag systyem
- Seat belt pre-tensioner

Specifications

Item				Standard	Remarks
Electrical operating characteristics, mechanical characteristics	Intercontact withstand voltage	(V)	min.	200	—
	Switching voltage	(V)	max.	40	—
	Switching current	(A)	max.	7	—
	Carry current	(A)	max.	20	—
	Contact resistance	(mΩ)	max.	150	When 100mA is applied
	Insulation resistance	(Ω)	min.	10^8	Applied voltage of 100VDC
	Operating time	(ms)	max.	24.2	7.2G-20ms (Half sine wave)
	ON-holding time	(ms)	min.	14	7.2G-20ms (Half sine wave)
	Retention temperature	(ºC)		–40~+100	—
	Operating temperature	(ºC)		–30~+80	—

Before Using Twin Reed Switch Type Safing Sensor NRS-603W

- Characteristics are subject to change when installed in the vicinity of magnetic fields or strong magnetic substances.
- Do NOT use sensors which have been dropped or subjected to a strong shock.
- For current running conditions, please contact us.
- Be sure to consult with us before deciding on your specifications.

Ceramic Gyro

Outline

Ceramic Gyro is a miniature angular rate sensor having a very simple construction that is made up of a single piezoelectric ceramic column printed with electrodes.

Features

- Miniature size
- High speed response
- Magnetic field proof

Applications

- Shake detector for hand-held video camera

Specifications

Model			CG -16D	CG - L35	CG - L33
Item		Condition	Specifications	Specifications	Specifications
Supply voltage	(V)		+5	+5	+3
Reference voltage output	(V)		+2.4	+2.4	+1.3
Current consumption	(mA) max.		7	7	7
Maximum detectable angular rate	(deg/sec)	25ºC	±90	±90	±90
Sensitivity	(mV/deg/sec)	25ºC	1.1 ±20%	1.1 ±20%	0.66 ±20%
Output voltage at zero angular rate	(mV) max.	25ºC	±300	±300	±300
		Any temperature	±500	±800	±500
Temperature characteristics of sensitivity	(%)		±15	±15	±15
Frequency response	(Hz) min.	–90 deg	100	100	100
Operating temperature range	(ºC)		–5 ~75	–5 ~75	–5 ~75
Storage temperature range	(ºC)		–40 ~ 80	–40 ~ 80	–40 ~80
Dimensions	(mm)		8 X 20 X 8	8 X 16 X 5	8 X 16 X 5

Vibrating Element Structure

Frequency - Phase Characteristics

Shape and Dimensions

• CG-16D

• CG-L35,CG-L33

1	Vcc
2	Vref
3	GND
4	OUT

Before Using Ceramic Gyro

- When transporting or handling a sensor, be careful not to drop it or subject it to any other physical shock. Failure to do so may lead to internal damage or deterioration of its characteristics.
- Avoid applying mounting voltages higher than the rating to the sensors pins. This will lead to overheating or damage to the sensors.
- As sensors are not water resistant, cleaning should be avoided.
- When handling sensors, anti-electrostatic precautions must be taken.

Magnetic type Proximity Swithes TMRS/NRS

Outline

TOKIN's highly reliable magnetic non-contact switches are the result of combining reed switches and magnets, made possible by the contact technology, magnetic circuit technology and plastic molding technology developed through the production of 300 million temperature switches (TMRS/NRS).

Applications

- Position detection (air cylinders, automatic doors, etc.)
- Rotation detection

Features

- Sealed resin-molded structure makes for easy handling and mechanical strength.
- The contacts are encased in glass for excellent resistance to dust and corrosion.

Operation Characteristics

● Normally open type

When drive magnet M approaches, the reed switch contacts close and the circuit comes on.

● Normally closed type

When drive magnet M approaches, the magnetic field of magnet m (needed to keep the reed switch in the ON state) is cancelled so the circuit goes OFF.

Markings

● Switch

(1) TMRS Series

TMRS- ○○○○

- Classification number
- 0 : Normally open
  1 : Normally closed
- Shape

(2) NRS Series

NRS101 / 401 : Normally open
NRS501 : Normally closed

● Drive magnet

MG- ○○○○

- Classification number
- Material 1. Ferrite (non-isotropic)
  2. Ferrite (isotropic)
  3. Rare earth compound
- Shape

Specifications

	Product name	Features	Contact capacity	Life time
TMRS	TMRS-3	Compact wire harness	Maximum switching voltage110V AC/DC Maximum switching current 0.5V AC/DC Maximum switching power 10W AC/DC	12 VDC 5 mA (R) 10^7 times
	TMRS-4	General wire harness		
	TMRS-7.8	Micro SMD	Maximum switching voltage 30V AC/DC Maximum switching current 0.1V AC/DC Maximum switching power 1W AC/DC	DC5V 10mA (R) 10^7 times
NRS	NRS-101 401	General wire harness	Maximum switching voltage 110V AC/DC Maximum switching current 0.5V AC/DC Maximum switching power 10W AC/DC	12 VDC 5 mA (R) 10^7 times
	NRS-501	General wire harness Normally closed type		

Shape and Dimensions

(1) TMRS Series

● TMRS-3

● TMRS-4

● TMRS-7

● TMRS-8

(2) NRS Series

NRS-101, 501

NRS-401

● TMRS-7,8

Operating Characteristics

Magnet \ Switch		TMRS = 3.4 Detection distance
Specifications	Dimensions (mm)	Normally open (N.O.) 5 10 15 20 (mm)
MG-1101	5×4×30	10
MG-1103	15×4×30	20
MG-2201	8×4×10	4
MG-2203	10×3.5×16	9
MG-3101	5×5×7	6
MG-3102	7×7×7	10
MG-4301	ϕ6×20	20

• Detection distance: The distance between the detection side and the surface of the magnet at which the unit operates.

●NRS Series

Driving area for NRS-101 FM5/5/7

Driving area for NRS-401 FM5/5/7

Before Using Proximity Switch Series

[Fixing the Proximity Switch]

When fixing a proximity switch, avoid warping as shown in Figure 1 caused by rise of filler or an obstacle left on the mounting surface. Also, do not pull a reed wire.

Figure 1 Warping caused by an obstacle left between the proximity switch and the mounting surface.

[Cautions for Shock]

(1) As the characteristics of the proximity switch (especially sensitive) may deteriorate when the switch falls from above 30 cm height, caution must be taken.

(2) If many proximity switches are mounted on a large print board, caution must be taken when cutting the print board along the perforated line, because the shock of cutting may change the sensitivity of the switch.
(Along with an effort such as leaving the least part to reduce the shock, we recommend that you confirm that the sensitivity has not changed before use.)

[Contact Protection Circuit]

For improving the reliability of the proximity switch, insert one of the following contact protection circuits when using the switch at a load which causes a surge current.

- Inductive load
  If an inductance (coil, electromagnetic relay, motor, etc.) is used as a load, hundred of volts of counter electromotive force (the energy stored in the inductance) will occur to shorten the lifetime of the contact (for the resistance load, that is also true when an inductance is used at a high voltage or a large current). For protection circuits, refer to Figure 2.

Figure 2

- Capacity load
  If a condenser is used as a load, charge/discharge at the capacitance will cause a rush current when the switch is closed, which may make switch opening impossible. In this case, as shown in Figure 3, the method in which a protection resistance R is inserted can be used.

Figure 3

- Lamp load
  In general, the filament of the lamp is made of tungsten. With the tungsten filament, the resistance is low when the lamp is turned on and becomes higher as it reaches the stationary current. When this lamp is used with a proximity switch, a rush current (at five to ten times the stationary current) will be caused immediately after lighting, which may result in welding or adhering of the contact. In this case, as shown in Figure 4, a protection resistor R can be inserted can be used.

- Wiring capacity load
  If a contact and a load are combined by long wires or cable, the floating capacity will cause a rush current when the contact is closed, which largely affects the lifetime of the contact. In this case, as shown in Figure 5, a protection circuit in which a resistance or inductance is added can be used.

R: In general, the value at which a surge current becomes lower than the maximum switching current of the proximity switch.
L: 1 (Approx. 10mH of inductance)

[Cautions for Ultrasonic]

- Ultrasonic cleaning
  After mounting a proximity switch on a printed circuit board or the like, avoid ultrasonic cleaning because ultrasonic cleaning may change the sensitivity of the switch or crack the seal of the glass tube.
- Ultrasonic welding
  Also, avoid ultrasonic welding because, by the same reason as ultrasonic cleaning, the performance of the proximity switch may deteriorate.

Built-in Type Magnetic Direction Sensor TMC-2000

Outline

TOKIN's magnetic direction sensor uses a flux gate type detector to detect the earth's magnetism. It detects the horizontal component of the earth's magnetism divided into two components that intersect each other at right angles and determines the direction angle from the result out vector amount. This allows absolute direction angle measurement with reference to magnetic North.
Moreover, there is little drift error in the direction signal, for high precision over time. Further, the absence of moving parts gives it excellent durability, vibration resistance and physical shock resistance. It needs no setting or adjustment when starting thus giving superb directional measurement right out of the box. Besides all these merits, it also achieves excellent compactness, light weight and low cost.

Applications

- Automobile / ship compasses
- Portable compasses
- Sonar / buoy compasses
- Unmanned transport vehicle compasses

Specifications

Product name	Output voltage (V)	Directional accuracy (°C) max.	Detected magnetic field (T)	Operating temperature (°C)	Storage temperature range (°C)	Rated voltage DC (V)	Consumption current (mA) max.
TMC-200	1 / 100μT	±2	10μ~ 20m	–10 ~ 70	–20 ~ 85	12	50

Shape and Dimensions (Example)

No	NAME
1	NOUT
2	YOUT
3	XOUT
4	GND
5	12VIN

We can also accommodate design and development of different performance specifications and shapes according to customer requirements.

System Outline

The magnetic direction sensor's X, Y analog outputs can be input to an external computing apparatus to determine the directional angle.

Before Using Magnetic Direction Sensor TMC-2000

- Do not use if dropped or subjected to strong physical shock.
- Do not use in close proximity to strong magnetic fields. Otherwise, the characteristics may be changed.
- Values up to but not beyond 20e can be measured.

Magnetic Direction Sensor TFMS

Outline

TOKIN terrestrial magnetism sensors use a flux gate type detector to detect terrestrial magnetism. It detects the horizontal component of the earth's magnetic field and divides it into two perpendicular components, and determines the angle of direction from the resulting vector. This allows absolute direction angle measurements with reference to magnetic North.

Features

- Little drift error
- Excellent resistance to vibration and impact

Applications

- Compasses for automobiles and ships
- Portable compasses
- Magnetic field detectors

Specifications

Item			Specifications
Driving frequency	(kHz)		7~10
Directional accuracy	(°C)	max.	2
Range of detected magnetic field	(mG)		2000
Sensitivity	(mV/mG)		1

* The specifications shown in the above table are with our own measurement circuits. Bear in mind that the characteristics change depending on the drive circuit.·

Circuit Block Diagram

Shapes and Dimensions

● TFMS-25201S

(mm)

● TFMS-18201S

(mm)

Product number

● TFMS-25201S
Shape (25X25X5)

● TFMS-18201S
Shape (18X18X5)

Before Using Magnetic Direction Sensor

TFMS

- Do NOT use sensors which have been dropped or subjected to a strong shock.
- Do NOT store in the vicinity of strong magnetic objects.
- Magnetic fields up to 20e can be measured, depending on the driving circuit method.

Industrial Magnetic Head

Features

- The core material uses Sendust®, which TOKIN lead the world in developing and commercializing.
- Outstanding sliding characteristics and wear resistance
- Excellent environmental resistance makes these ideal as magnetic heads in motor vehicles and outdoor equipment. Because TOKlN is active in all stages of integrated head manufacturing, including original magnetic material development, processing and assembly, we are able to accommodate a wide range of customer requirements.

Outline

TOKIN's outstanding magnetic heads represent a further fruition of the Company's formidable technology and know-how accrued through independently developing and producing magnetic core materials, magnetic recording media and magnetic card reader/writers. These industrial-use magnetic heads are suitable for use in many advanced devices in the limelight recently, such as prepaid card systems, computer magnetic media I/O, automated ticket wickets and paper money recognition devices. TOKlN's originally-developed high performance metal magnetic material Sendust''' is used as the core material, for high reliability proven in extensive deliveries over the years.

Markings

○ △ ○○ □□ ○

- Design No.
- Number of tracks
- Functions
  - R/W : Double duty read and write
  - R : Read only
  - W : Write only
  - RW : Combination read and write
- Applications
  - C : cards
  - M : Manual cards
  - B : Paper money
- Number of gaps
  - S : 1
  - D : 2

Specifications

Product name	Applications	Recording density	Track width / track format
SCRW001-02 SCRW001-01	JIS II / ISO Standard Magnetic card reader/writer	to 210BPI	
SCRW002-01 SMR002-01	ISO Standard Magnetic card reader/writer		
SMR001-02	Manual magnetic card reader		
SCW10-04 SCR10-04 SCRW4-04 SCR8-04	Cybernetics Standard Automated ticket wickets (Passes and tickets)	to 30BPI	
SBR001-07SD SBR001-03SD SBR001-09SD SBR001-08SD	Paper money recognition devices	DC bias application method	10 mm 8 mm 4 mm 1.5 mm

(mm)

Shape and Dimensions (Example)

● SCR8-04 (Cybernetics)

● SCRW(JIS-II)
● SBR001-03SD,SBR001-07SD

● SBR001-08SD

(mm)

Before Using Industrial Magnetic Head

Note

Before using this product, be sure to read the catalog and the specifications.

Cautions on operating

(1) A flaw or dirt, etc. on the surface with which the card will make contact (the slide face) may bring about a flaw on the card face, so caution must be taken.

(2) When a current higher than the allowable current is supplied in a winding, breaking of wire or abnormal heating may occur. Refer to the specifications shipped with the product.

(3) A force large enough to change the shape of the product may result in deteriorating the characteristics of the product. For operating conditions, please contact us before use.

(4) An excessive shock around the magnetic gap of the core may damage the core, which results in deteriorating the characteristics of the product. Caution must be taken.

(5) The core and the case of the slide face are made from the metal. If water is left on the surface, rust occurring on the surface may lead to flaws on the card face. Caution mast be taken.

High-Security Card-Reading Magnetic Head

Features

- Enables saturation recording of high security cards
- Excellent resistance to spacing loss during recording
- Excellent wear resistance
- Excellent environmental resistance makes these ideal as magnetic heads in motor vehicles and outdoor equipment.

Applications

- High security magnetic card systems
- High security card issuing machines
- High-speed card reader/writers

Shape and Dimensions

(mm)

Specifications

		SCW001-01H	SCRW001-01H		SCRW002-01H		SCRW002-02H	
Effective track width	(mm)	W : 6.0 ± 0	W : 6.0 ± 0.1 R : 2.0 ± 0.1		W : 3.0 ± 0.1 R : 1.0 ± 0.1		W : 2.4 ± 0.1 R : 1.0 ± 0.1	
Inductance (1 kHz)	(mH)	W side 6.0 ± 25%	W side	8.0 ± 25%	W side	1.4 ± 25%	W side	0.6 ± 25%
			R side	194 ± 25%	R side	257 ± 25%	R side	220 ± 25%
Direct current resistance	(Ω)		W side	7.0 ± 15%	W side	2.0 ± 15%	W side	2.5 ± 15%
			R side	140 ± 15%	R side	135 ± 15%	R side	142 ± 15%
Insulation resistance	(MΩ)	50 or better (DC 500V)between pins and sealed case						
Resolution		105 / 52, 5BPI 85%						
Saturation recording current	(mA)	High security card Is = 200 p-p	Is = 200 p–p		High security card Is = 430 p-p		Is = 430 p–p	
Playback/record voltage	(mV)	—	50 p-p		30 p-p		30 p-p	
Storage temperature	(°C)	–20 to 75						

Track Format

(mm)

SCW001-01H	SCRW001-01H	SCRW002-01H	SCRW002-02H

Before Using High-Security Card-Reading Magnetic Head

Note

Before using this product, be sure to read the catalog and the specifications.

Cautions on operating

(1) A flaw or dirt, etc. on the surface with which the card will make contact (the slide face) may bring about a flaw on the card face, so caution must be taken.

(2) When a current higher than the allowable current is supplied in a winding, breaking of wire or abnormal heating may occur. Refer to the specifications shipped with the product.

(3) A force large enough to change the shape of the product may result in deteriorating the characteristics of the product. For operating conditions, please contact us before use.

(4) An excessive shock around the magnetic gap of the core may damage the core, which results in deteriorating the characteristics of the product. Caution must be taken.

(5) The core and the case of the slide face are made from the metal. If water is left on the surface, rust occurring on the surface may lead to flaws on the card face. Caution mast be taken.

POS System Standard Magnetic Head

Features

- Enables saturation recording
- Excellent resistance to spacing loss during recording
- Excellent wear resistance
- Excellent environmental resistance makes these ideal as magnetic heads in motor vehicles and outdoor equipment.

Applications

- POS systems
- Vending machines

Specifications

		SCW003-01H	SCRW003-02H	SCRW003-01H
Effective track width (mm)	1ch - W side	3.0±0.1	3.0±0.1	1.0±0.1
	2ch - W side			
	3ch - W side			3.0±0.1
	1ch - R side	3.0±0.1	1.0±0.1	1.0±0.1
	2ch - R side			
	3ch - R side			
Inductance (1 kHz) (mH)	1ch - W side	1.0 ±25%	1.0 ±25%	—
	2ch - W side			
	3ch - W side			1.0 ±25%
	1ch - R side	—	220 ±25%	85.0 ±25%
	2ch - R side			
	3ch - R side			220 ±25%
Direct current resistance (Ω)	1ch - W side	1.2 ±15%	1.2 ±15%	—
	2ch - W side			
	3ch - W side			1.2 ±15%
	1ch - R side	—	175 ±15%	175 ±15%
	2ch - R side			
	3ch - R side			
Insulation resistance (MΩ)		50 or better (500VDC) between pins and sealed case		
Resolution (%) min.		210 / 105 BPI 85		
Saturation recording current (mA)		Is = 430 p-p		
Playback/ record voltage (mV)		25 p-p		
Storage temperature (°C)		–20 to 75		

Shape and Dimensions

Track Format

(mm)

SCW003-01H	SCRW003-02H	SCRW003-01H

Shape and Dimensions

(mm)

Track Format

Before Using POS System Standard Magnetic Head

Note

Before using this product, be sure to read the catalog and the specifications.

Cautions on operating

(1) A flaw or dirt, etc. on the surface with which the card will make contact (the slide face) may bring about a flaw on the card face, so caution must be taken.

(2) When a current higher than the allowable current is supplied in a winding, breaking of wire or abnormal heating may occur. Refer to the specifications shipped with the product.

(3) A force large enough to change the shape of the product may result in deteriorating the characteristics of the product. For operating conditions, please contact us before use.

(4) An excessive shock around the magnetic gap of the core may damage the core, which results in deteriorating the characteristics of the product. Caution must be taken.

(5) The core and the case of the slide face are made from the metal. If water is left on the surface, rust occurring on the surface may lead to flaws on the card face. Caution mast be taken.

Magnetic Recording Heads For Super High Hc Media

Outline

These products feature newly developed high performance Hi-B head cores. The high density recording magnet head with excellent recording ability is also developed for ultra-high coercive media (Hc = 3000 to 4000 Oe) and for high coercive print media that have non-orientation magnetic layers.

Features

- Enables saturation recording of ultra-high magnet coercive cards (3000 to 4000 Oe)
- Enables saturation recording of non-orientation print media (2750 Oe)
- Excellent resistance to spacing loss during recording
- High overwrite characteristics (40 dB or better on 2750 Oe non-orientation print media)
- Excellent wear resistance and environmental resistance

Applications

- High security card systems
- Non-orientation magnetic print card systems
- POS systems
- Vending machines

Specifications

			STW001-01HL	SCW003-01HL
Effective track width		(mm)	6.0±0.1	3.0±0.1
Inductance (1 kHz)		(mH)	1.6±25%	0.33±25%
Direct current resistance		(Ω)	3.3±15%	0.43±15%
Insulation resistance		(M)	50 or better (DC 500 V) between pins and sealed case	
Recording density		(BPI)	210	210
Saturation recording current	I_S	(A_{P-P})	1 < 2750 Oe non-orientation print media >	1.35 < 4000 Oe card >
Storage temperature		(°C)	-20 to 75	

Shape and Dimensions

(mm)

Track Format

Before Using Magnetic Recording Heads For Super High Hc Media

Note

Before using this product, be sure to read the catalog and the specifications.

Cautions on operating

(1) A flaw or dirt, etc. on the surface with which the card will make contact (the slide face) may bring about a flaw on the card face, so caution must be taken.

(2) When a current higher than the allowable current is supplied in a winding, breaking of wire or abnormal heating may occur. Refer to the specifications shipped with the product.

(3) A force large enough to change the shape of the product may result in deteriorating the characteristics of the product. For operating conditions, please contact us before use.

(4) An excessive shock around the magnetic gap of the core may damage the core, which results in deteriorating the characteristics of the product. Caution must be taken.

(5) The core and the case of the slide face are made from the metal. If water is left on the surface, rust occurring on the surface may lead to flaws on the card face. Caution mast be taken.

Precautions

- The names of the products and the specifications in this catalog are subject to change without notice for the sake of improvement. The manufacturer also reserves the right to discontinue any of these products. At the time of delivery, please ask for specifications sheets to check the contents in order to use the products properly and safely.
- Descriptions in this catalog regarding product characteristics and quality are based solely on discrete components. When using these components, be sure to check the specifications with the component in question mounted onto the products.
- Each sensor in this catalog may malfunction or break down in a particular mode. When designing products, be sure to include a countermeasure for this eventuality.
- The manufacturer's warranty will not cover any disadvantage or damage caused by improper use of the products that deviates from the characteristics, specifications, or conditions for use described in this catalog.
- The products in this catalog are intended for use in ordinary electronic products. If any of these products are to be used in special applications requiring extremely high reliability, such as in aviation equipment and nuclear power controllers where product defects might pose a safety risk, please consult your TOKIN sales representatives.
- Though the manufacturer has taken all possible precautions to ensure the quality and reliability of its products, improper use of products may result in bodily injury, fire, or similar accident. If you have any questions regarding the use of the products in question, please consult your TOKIN sales representatives.
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