GoChip
Better Chips, Better Dreams

GH1817/GTS1817

UNIVERSAL GEARED HALL SENSOR IC

◆ General Description

GH1817/GTS1817 is an adaptive gear sensor designed for camshaft sensing and other speed sensing applications in automobiles. In practice, GH1817 requires a magnet at the back (non-marking surface) to detect the motion of a magnetic type (e. g., iron) gear. GTS1817 is an integrated product of chip and magnet that has completed the back magnetic process. GH1817 chip and magnetic circuit have optimized the design of the back bias magnet, which is sealed in a small shell made of high temperature resistant resin material. The small package shape makes installation easier and can meet the detection requirements of various gear shapes and sizes, making it the first choice for universal gear sensors.

GH1817/GTS1817 is a drain open with short circuit protection Circuit output structure, practical application, the output end needs to be connected with an external pull-up resistor, the output switch tube has a maximum current capacity of 50mA, output The current is compatible with any logic circuit. GH1817/GTS1817 tablets contain one for data collection Sample and hold A 10-bit A/D converter as well as a separate one for use A 4-bit A/D converter that provides stable hysteresis of magnetic switching points.The common chopper delay structure is not used in the chip A hall sensor thus solves the need for pairs between devices and gears Right question.GH1817/ GTS1817 is a working primitive based onall effect The working p oint and the release point can adapt to the strength of the back m agnet Adjust the unipolar type Hall switch circuit so thatzero spee d can be detected.

The strength and direction of the bias magnetic field passing through Hall integrated circuit chip will change with the constant change of the position of the tooth top and tooth valley (tooth clearance) of the moving gear, so that the magnetic field signal detected by Hall integrated sensor will be converted into a voltage signal. After filtering, amplification and self-adaptive comparison, the weak voltage signal will be transformed into a voltage signal. To trigger the switch unit circuit inside the circuit to open and close the action, so in the output end of the circuit produced a digital signal corresponding to the gear shape high and low level.

◆ Features

- Operating voltage range: 3.5~30V
- Wide operating temperature range：-40~+150℃
- Output short-circuit protection
- ADAPTS and adjusts the field range of abackbiased magnet
- Zero speed can be detected
- There is no need to worry about alignment and direction of rotation between devices and gears

◆ Applications

- Camshaft sensor
- Gear sensor
- Linear encoder
- Rotary encoder
- Speed and direction detection

GH1817

UA:SIP-3L(TO-92S)

GTS1817

VAB: SIP-4L(TO-94)-iBB

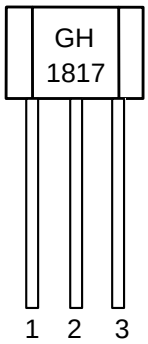
◆ Ordering Information

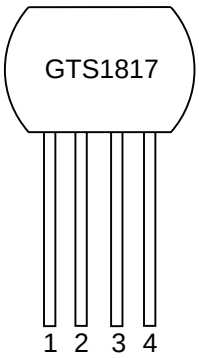
Part Number	Temperature range	Package	Packing Method
GH1817LUA	L(-40~+150℃)	UA(SIP-3L/TO-92S)	In bags：1000 PCS
GTS1817LVAB	L(-40~+150℃)	VAB(SIP-4L/TO-94-iBB)	Box-packed：500 PCS

GH1817/GTS1817

UNIVERSAL GEARED HALL SENSOR IC

◆ Pin Configuration





Pin Number	GH1817	GTS1817	Function
1	V_{DD}	V_{DD}	Power supply
2	GND	GND	GND
3	V_{OUT}	V_{OUT}	Open drain output
4		NC	Suspended or connected to GND

◆ Functinal Block Diagram

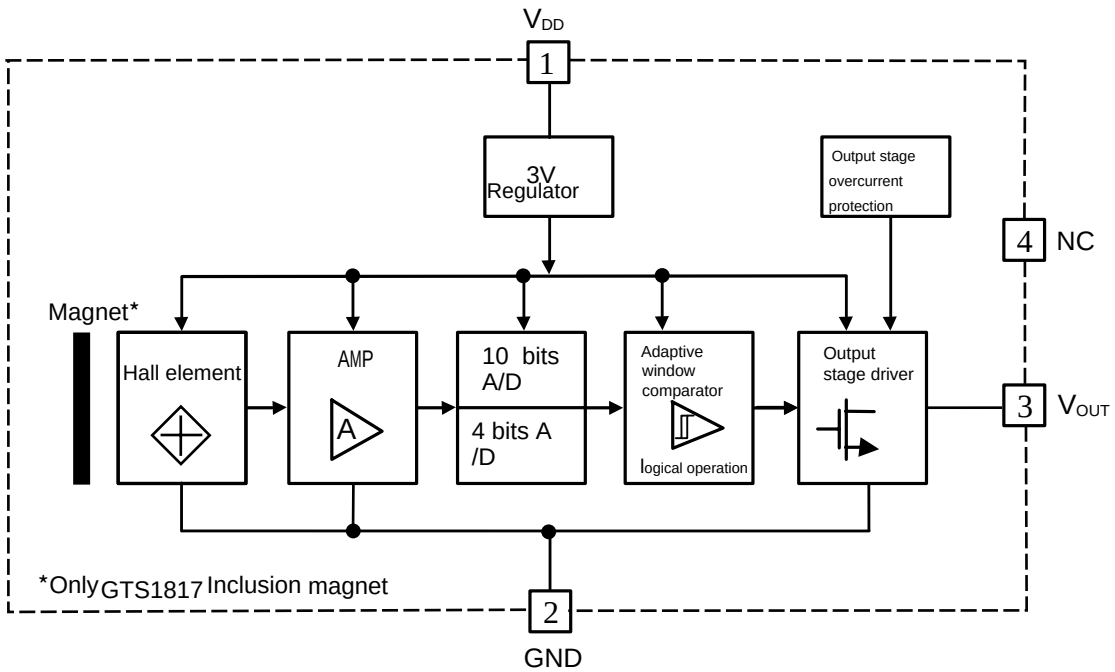


Fig 1, GH1817/GTS1817 Block Diagram

GH1817/GTS1817

UNIVERSAL GEARED HALL SENSOR IC

◆ Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Value	Unit
Supply Voltage	V_{DD}	-0.3 ~+40	V
Output voltage	$V_{OUT(OFF)}$	-0.3~+40，Output off	V
Output low levelcurrent	$I_{OUT(SINK)}$	50	mA
Max power dissipation	P_D	150	mW
Operation temperature	T_{OP}	-40 ~ +150	℃
Junction temperature	Tj(max)	+165 (1000小时)	℃
Storage temperature	T_{ST}	-65 ~ +170	℃

◆ Electrical Characteristics

VCC=12V, TA =25°C, unlessotherwisespecified.

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Supply voltage(2)	V_{DD}	Work	3.5	--	30	V
Supply current	I_{DD}	V_{DD}=3.5~30V	1.0	--	6.0	mA
Output leakage current	I_{OL}	V_{OUT} =30V，Output off	--	--	10	uA
Output low voltage	$V_{OUT(SAT)}$	I_{OUT} =25mA Output conduction	--	250	500	mV
Output short-circuit current	I_{FAULT}	pull-up resistance decreases gradually	75	125	175	mA
Short circuit protection response time	T_{FAULT}	V_{OUT} 和 V_{DD} short circuit	100	--	200	uS
Output rise time(3)	t_r	R_L=880Ω C_{OUT}=20pF, 10%~90%	--	--	400	nS
Output fall time	t_f	R_L=880Ω C_{OUT}=20pF, 90%~10%	--	--	400	nS
Bandwidth	BW	Work	--	--	15	kHz
Intensity range of back magnetic field	B_{BIAS}		-300		+4000	Gs
Hysteresis	B_{HYS}	V_{DD}=3.5~30V	15	30	45	Gs

Note:
1)If any one of the maximum ratings is exceeded, the device may be damaged.
2)The maximum power supply voltage that can work normally must be adjusted according to the constraints of junction temperature and power consumption.
3)This parameter is not mainly affected by the internal circuit of GH1817/GTS1817, it is mainly determined by the external interface circuit.

UNIVERSAL GEARED HALL SENSOR IC

Functional Description

When GH1817 is used as a gear sensor, the back side (the side without marking) can only be used after the magnet is installed in accordance with the magnetic characteristics of the chip. It is suggested to use the South Pole of the magnet facing the back of the chip and the North Pole as the factory function test. When the chip is near the point of maximum magnetic field intensity and the magnetic circuit provides maximum magnetic field intensity, the best angular accuracy can be obtained. After the GH1817 back magnetic, its working principle is exactly the same as the integrated GTS1817, so the following is to describe the working principle of GTS1817

The GTS1817 all-in-one gear sensor contains a Hall integrated sensor and a back biased magnet. Hall sensor and its conditioning circuit are used to detect the magnetic field changes through the surface of the chip, and process and output the electrical signal formed after the conversion of the magnetoelectric signal. The typical working principle is shown in Figure 2. The direction of the magnetic field and the density of the magnetic field line will change with the movement of the iron target and the corresponding magnetic field change will trigger and control the output stage circuit, making it switch between the on-on (output low level) and cut-off (output high level) states.

Note that after the chip is powered, the output will be reset to a high level state (output drive tube off) regardless of the magnetic field strength, and the output will change only when the first sufficiently large magnetic field change is detected. If the chip voltage is powered on slowly, the reset process will be unstable and the correct output state will not be guaranteed until the first detection and reversal of the BOP (operating point) or BRP (release point) has been performed. FIG. 3 shows the relationship between the switching characteristics of the output state of GTS1817 and the width and position of the detected target teeth. As can be seen from Figure 3, after the power-on process is over and the initial state is stable, as long as the iron target teeth are facing the front of the sensor within the effective detection range, the output of the sensor will be low.

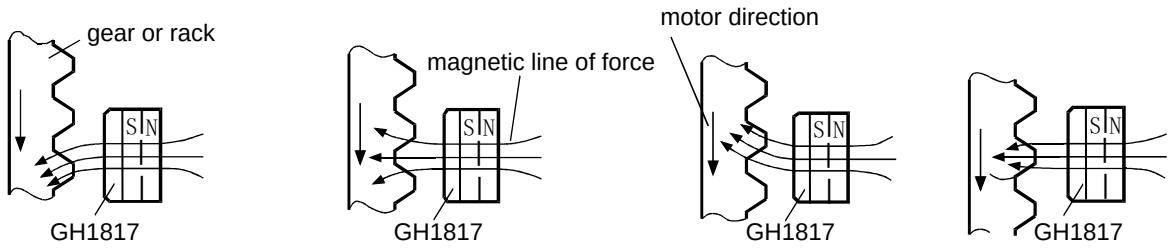


Fig 2，The formation and transformation principle of magnetic field signal on sensor with the movement of iron target

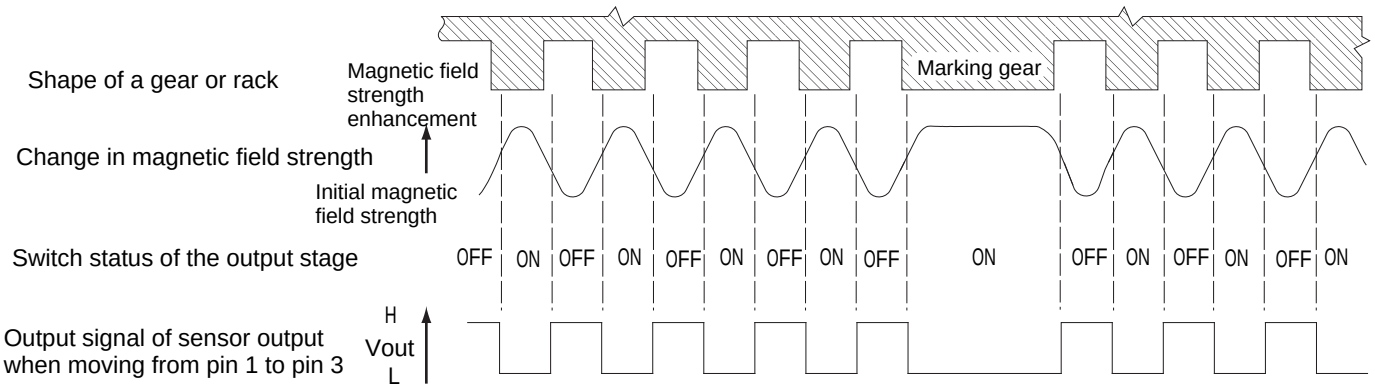


Fig 3，The change of magnetic field directly reflects the external profile of the detection target and outputs the precise digital signal response at the output end of the sensor

UNIVERSAL GEARED HALL SENSOR IC

◆ Typical Application

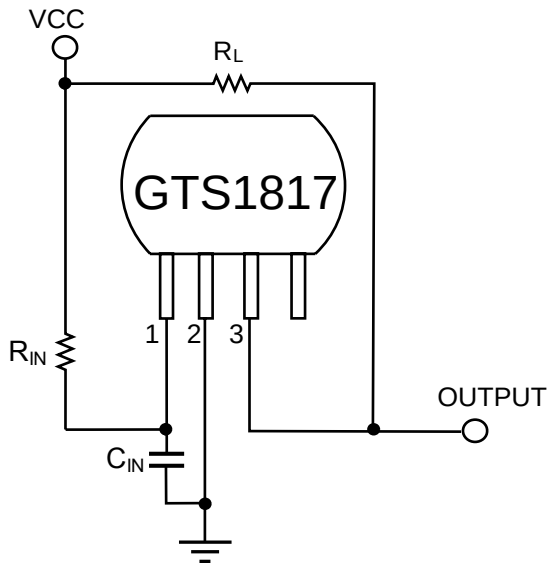
Application under stable power supply

The GTS1817 generally does not require additional complex protection circuitry because it contains internal on-chip regulators that can withstand changes and fluctuations in the 3.5-30V range of the external power supply. However, it is recommended to add A basic RC low-pass filter (RIN&CIN) to the power line when it is used in the environment with high stray noise, as shown in Figure 4(A). Because the GTS1817 adopts the open-drain output stage structure, the output pull-up resistance RL is essential

Application under unstable power supply

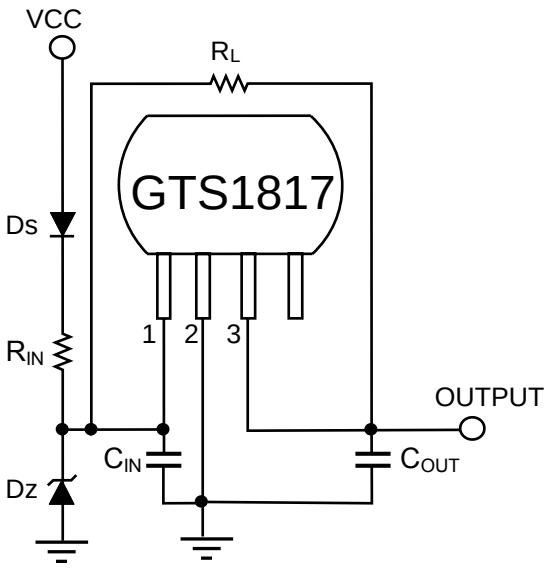
For applications in complex and harsh environments such as automobiles, the GTS1817 sensor is powered by unstable power sources such as batteries, which generally require adequate protection so that the sensor can withstand transient changes and interference from the positive and negative terminals of the power supply

The specifications for this voltage transient change and interference will vary from manufacturer to manufacturer, so the protection circuit should be optimized for each specific application. FIG. 4(B) is a simple protection circuit using discrete components. The RC low-pass filter (RIN&CIN) on the power line is used to filter EMI/RFI interference, and the voltage regulator diode (Dz) is used to protect against overvoltage over 30V. For voltage protection below 30V, the internal circuit of the GTS1817 is sufficient to guarantee. The series resistance (RIN) provides current limiting and, together with the capacitor (CIN), forms a low frequency noise filter. The size of the voltage regulator diode and current limiting resistance should take power consumption into account. The series diode (DS) is used as the reverse protection to avoid the impact of reverse instantaneous voltage on the external regulator diode and the internal circuit of the GTS1817, so the series diode must have a large enough reverse breakdown voltage



R_L=5.6kΩ
R_{IN}=100Ω， R_{IN} is optional, not required
C_{IN}=10nF，C_{IN} is optional, not required

（A）**Application under stable power supply**



R_L=5.6kΩ
R_{IN}=100Ω
C_{IN}=10nF
C_{OUT}=2.2nF

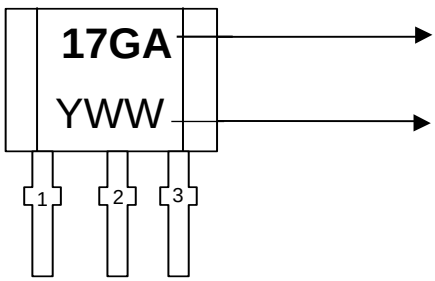
（B）Application under unstable power supply

Fig4，Typical application circuit diagram

GH1817/GTS1817

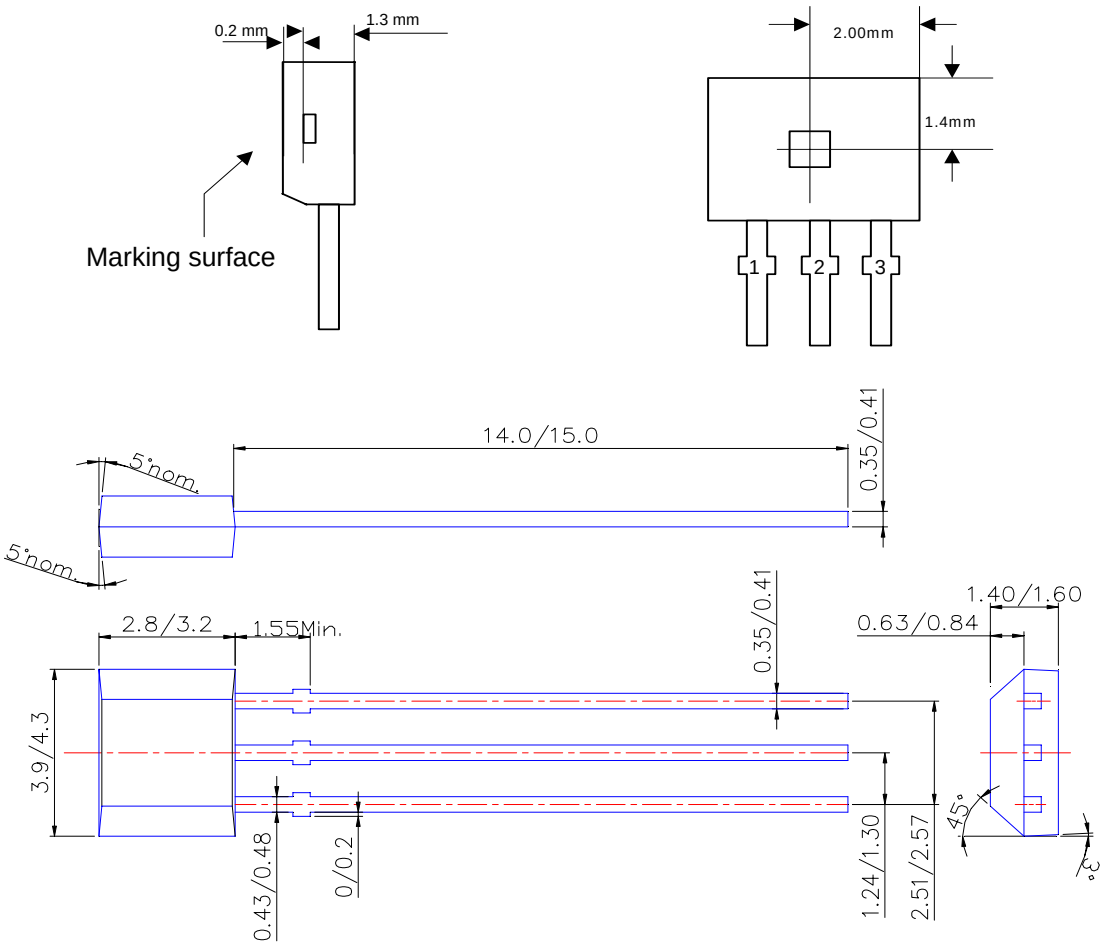
UNIVERSAL GEARED HALL SENSOR IC

◆Marking Information (GH1817)



G：Supplier identification
17：Part Number GH1817
A：Version number
Y：Year Number，0~9，“5”=2015
WW：Week Number，01~52

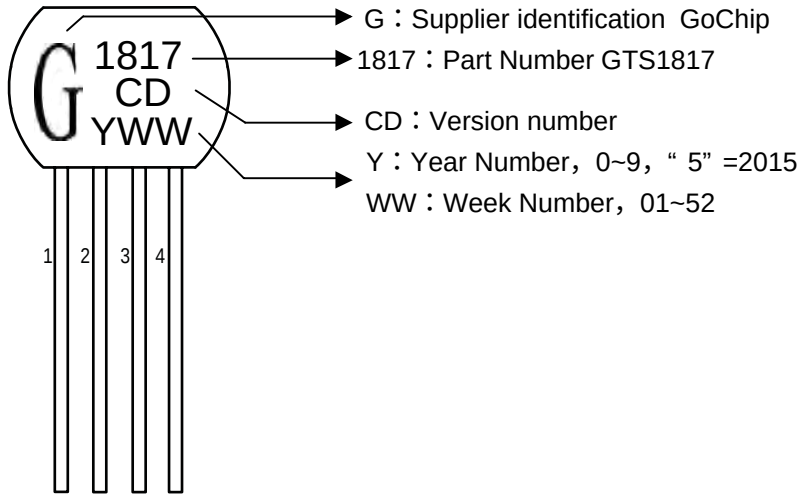
◆ Package Information (GH1817: SIP-3L/TO-92S) Unit：mm



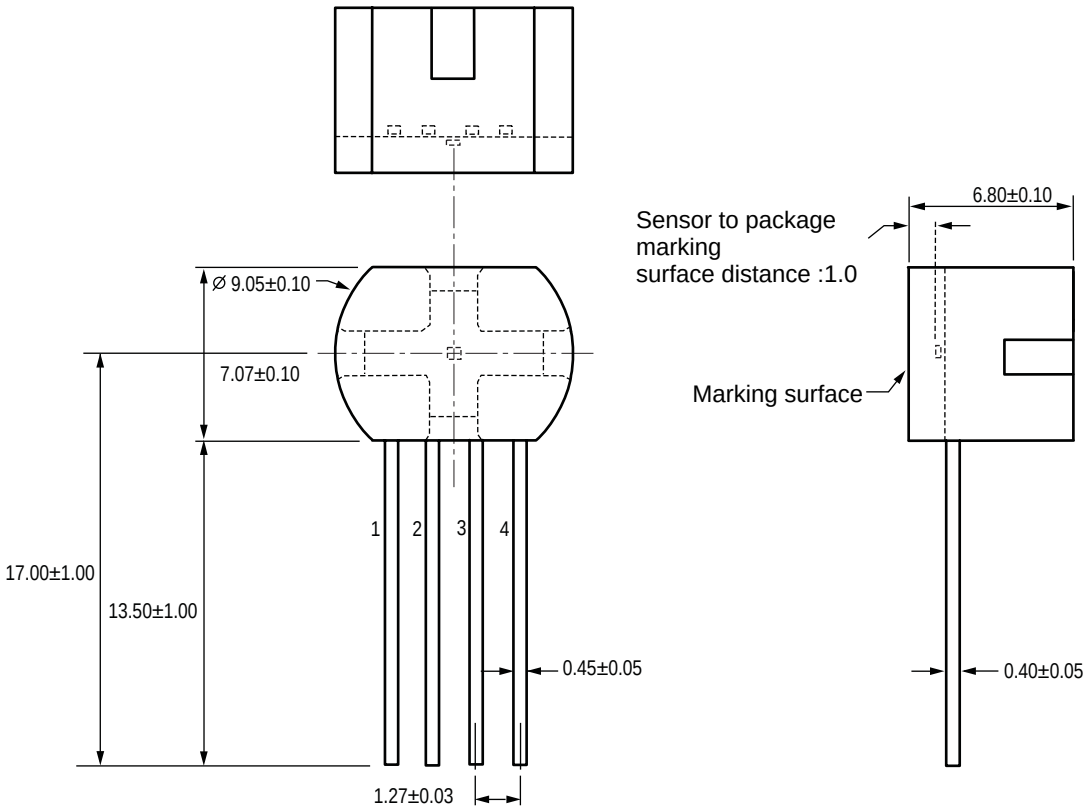
GH1817/GTS1817

UNIVERSAL GEARED HALL SENSOR IC

◆Marking Information (GTS1817)



◆ Package Information (GTS1817: SIP-4L/TO-94-iBB) Unit：mm



Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

- View GH1817LUA on WIN SOURCE
- GoChip Information

Optimize Your Supply Chain with WIN SOURCE Solutions

- Global Sourcing Solution
- Obsolete Management
- Cost Control Management
- Shortage Management
- Alternative Solution
- Excess Inventory Management