

磁気比例式 / 貫通型

Magnetic Proportion System / Through Type

L52S D15S SERIES



【STANDARDS】

- ・UL508
- ・EN 62477-1

RoHS指令  
適合品

絶対最大定格 ABSOLUTE MAXIMUM RATINGS

仕様項目 Parameters	記号 Symbol	単位 Unit	規格値 Value	備考 Comment
電源電圧 Supply voltage	V <sub>CC</sub>	V	±18V	
一次側導体温度 Primary conductor temperature	T <sub>B</sub>	°C	120	
静電耐圧 (HBM:人体モデル) ESD (HBM: Human Body Model)	V <sub>ESD</sub>	kV	2	

絶縁性能 ISOLATION CHARACTERISTICS

仕様項目 Parameters	記号 Symbol	単位 Unit	規格値 Value	備考 Comment
絶縁耐圧 Insulation voltage	V <sub>d</sub>	—	AC3000V, 1分間 (感応電流0.5mA) AC3000V, for 1minute (Sensing current 0.5mA)	一次 ⇔ 二次間 Primary ⇔ Secondary
絶縁抵抗 Insulation resistance	R <sub>IS</sub>	—	≥ 500MΩ (at DC500V)	一次 ⇔ 二次間 Primary ⇔ Secondary
インパルス耐電圧 Impulse withstand voltage	V <sub>w</sub>	kV	6	一次 ⇔ 二次間 Primary ⇔ Secondary 入力波形 Input waveform: ・波頭長 Front time 1.2 μs ・波尾長 Time to half value 50 μs ・一回 single
空間距離 Clearance distance	d <sub>Cl</sub>	—	5.5mm (MIN)	一次 ⇔ 二次間 Primary ⇔ Secondary
沿面距離 Creepage distance	d <sub>Cp</sub>	—	5.5mm (MIN)	一次 ⇔ 二次間 Primary ⇔ Secondary
ケース材料 Case material	—	—	UL94 V-0	
充填材料 Filler material	—	—	UL94 V-0	
比較トラッキング指数 (CTI) Comparative Tracking Index; (CTI)	Case	CTI	V	600 ( group I )
	Filler	CTI	V	600 ( group I )

環境及び機械的性能 ENVIRONMENTAL AND MECHANICAL CHARACTERISTICS

仕様項目 Parameters	記号 Symbol	単位 Unit	規格値 Value			備考 Comment
			MIN	TYP	MAX	
動作温度範囲 *1 Ambient operating temperature	T <sub>A</sub>	°C	-40		+105	
保存温度範囲 Ambient storage temperature	T <sub>S</sub>	°C	-40		+105	
製品重量 Mass	m	g		225		
内部磁性体 Internal magnetic core	—	—	珪素鋼板 Silicon steel			

\*1 インターフェースのコネクタ温度は、+105°C以内でお使いください。コネクタ単体の絶対最大定格温度は+105°Cです。  
Temperature of the connector should not exceed +105°C because the absolute maximum temperature of the connector is +105°C.

仕様 SPECIFICATIONS

T<sub>A</sub>=+25°C, R<sub>L</sub>=10kΩ, V<sub>CC</sub>=±15V

仕様項目 Parameters	記号 Symbol	単位 Unit	規格値 Value			備考 Comment	
			MIN	TYP	MAX		
定格電流 Primary nominal current	L52S300D15S	I <sub>PN</sub>	A		300		
	L52S600D15S				600		
	L52S1T2D15S				1200		
	L52S1T5D15S				1500		
直線性範囲 Range of linearity	L52S300D15S	I <sub>PL</sub>	A	-900		900	
	L52S600D15S			-1000		1000	
	L52S1T2D15S			-1920		1920	
	L52S1T5D15S			-2400		2400	
1次電流測定範囲 *2,3 Primary current, measuring range	L52S300D15S	I <sub>PM</sub>	Apeak	-900		900	
	L52S600D15S			-1800		1800	
	L52S1T2D15S			-2800		2800	
	L52S1T5D15S			-4500		4500	
電源電圧 Supply voltage		V <sub>CC</sub>	V	±12(±5%)	±15(±5%)		
消費電流 Consumption current		I <sub>CC</sub>	mA		18	25	at I <sub>p</sub> = 0A, I <sub>CC</sub> = 18 + V <sub>out</sub> / R <sub>L</sub>
定格出力電圧 Rated output voltage		V <sub>O</sub>	V	3.960	4.000	4.040	at I <sub>PN</sub>
オフセット電圧 *4 Offset voltage	L52S300D15S	V <sub>of</sub>	V	-0.030	0.000	+0.030	at I <sub>p</sub> = 0A
	L52S600D15S						
	L52S1T2D15S						
	L52S1T5D15S						
磁気的オフセット電圧 Magnetic offset voltage		V <sub>OH</sub>	mV	-10		10	at 0A → I <sub>PN</sub> → 0A
出力電圧温度特性 Temperature coefficient of V <sub>O</sub>		T <sub>cV<sub>O</sub></sub>	%/k	-0.05		+0.05	Without T <sub>cV<sub>of</sub></sub>
オフセット電圧温度特性 Temperature coefficient of V <sub>of</sub>		T <sub>cV<sub>of</sub></sub>	mV/k	-1		+1	at I <sub>p</sub> = 0A
出力直線性 (0A~I <sub>PL</sub> ) Linearity error (0A~I <sub>PL</sub> )		ε <sub>L</sub>	%	-1		+1	
出力負荷抵抗 Output load resistance		R <sub>L</sub>	kΩ		10		
di/dt 応答速度 (@90% of I <sub>PN</sub> ) *5 Response time (@90% of I <sub>PN</sub> )		t <sub>r</sub>	μs			5	di/dt=100A/μs
周波数特性 (-3dB) *6 Frequency bandwidth (-3dB)		BW	kHz	25			

\*2 L52S300/600/1T5D15Sを電源電圧±12Vでご使用される場合には、測定範囲が定格電流の2.5倍に狭くなります。  
If L52S300/600/1T5D15S operate at V<sub>CC</sub> = ±12V power supplies, measuring range reduced to 2.5 × I<sub>PN</sub>.

\*3 出力理論値からの出力のずれが5%を超える被測定電流値を示す。  
The value of measured current which indicates an output with a greater than ±5% deviation from the theoretical output value.

\*4 オフセット電圧はコアヒステリシス除去後の値とする。  
Offset voltage value is after removal of core hysteresis.

\*5 測定条件: 1次導体の断面積は製品貫通穴面積と同じで、貫通1ターンとする。  
Measurement condition: Primary conductor cross sectional area is as same as through hole, and penetration with 1turn in through hole.

\*6 被測定電流の基本周波数が高い場合や高調波電流が重畳している場合には、磁性体コア(珪素鋼板)の発熱が大きくなります。  
High fundamental frequency primary current and/or harmonic current may result in excessive heating in magnetic core (Silicon steel).

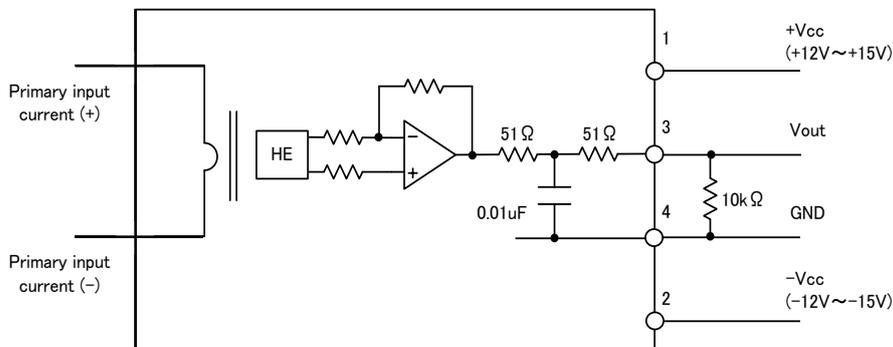
適用規格 STANDARDS



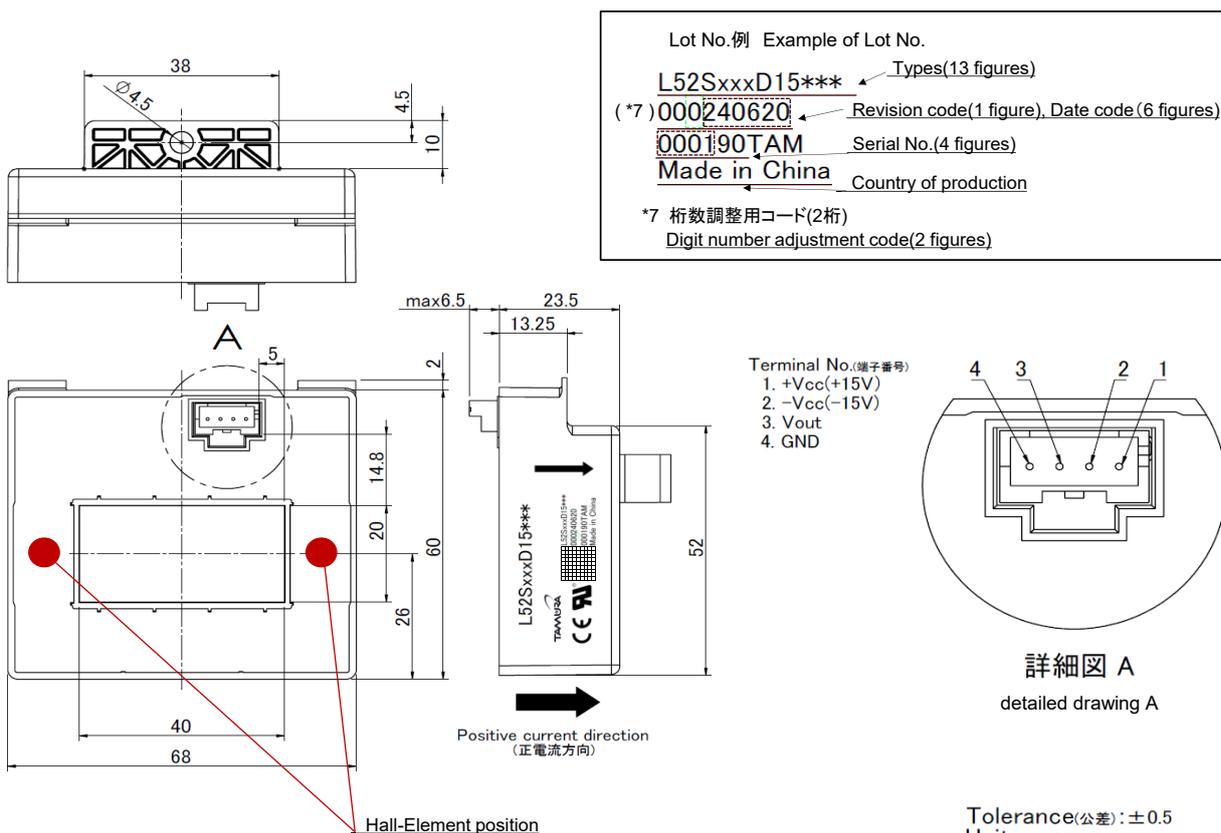
EN IEC 62477-1:2023  
 Rated voltage 300V, CAT III, PD2, Reinforced isolation, non uniform field  
 600V, CAT III, PD2, Basic isolation, non uniform field

UL508 (UL FILE No. E243511)  
 Rated voltage 600V, PD2

接続図 CONNECTION



外形図 DIMENSIONS(mm)



- 推奨固定ネジ: M4(平ワッシャー及びスプリングワッシャー)  
 Recommended fastening screw type: M4 with flat washer and spring washer
- 推奨締め付けトルク: < 0.75 N・m  
 Recommended fastening torque: < 0.75N・m

発注型番とコネクタ端子メッキ Order number and Connector number (terminal plating)

型番 Types	コネクタ Connector			
	メーカー Manufacturer	製品番号 Part Number	旧製品番号 Old Part Number	端子メッキ Plating of terminal
L52Sxxx D15S	JST	B04B-XASK-1-A-GW	—	Au

\* "xxx"は定格電流記号 Rated current(3 figures)

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  - Use that involves exposure to direct sunlight, outdoor exposure, or dusty conditions.
  - Use in locations where corrosive gases such as sea winds, Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, or NO<sub>2</sub>, are present. (Some product improves durability)
  - Use in environments with strong static electricity or electromagnetic radiation.
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# Application notes

## <General Considerations>

1. The sensor uses polar electronic components. When the polarity of the power supply is mistaken, the sensor is damaged.
2. Static electricity or excessive voltage can increase an offset voltage in the Hall element, and cause offset voltage to change. Please exercise care in handling and application.
3. In order to prevent the influence of noise, the use of twisted cable or shielded cable for the output line is recommended
4. If using this device within a magnetic field generated by other devices, the specified accuracy may not be obtainable.
5. Our products (several models are excluded ) are adjusted with the trimming method by the measurement condition (Load resistance, Power supply voltage) of specification sheets. Therefore, characteristics (Offset, Output, etc.) and its deviation may be changed in different circuit conditions from the measurement condition. All change characteristic items are not indicated on specification sheets.
6. The performance of current sensors with through-hole (aperture) is dependent on the position of the primary conductor. Tamura specifications are based on a primary conductor completely filling the through-hole (aperture) area.
7. The current sensor rated current in DC Amps.
8. Please use mating connector with equivalent terminal plating material to insure proper operation and avoid possibility of 'galvanic corrosion' .
9. Please do not store in high-temperature and high-humidity storage environment. Please use it after confirming soldering when it is kept for six months or more. (product soldered with substrate)
10. We recommend performing a zero offset adjustment by measuring the offset voltage at startup. In continuously operation for a few months, or at change of ambient temperature or humidity is large, we recommend regularly performing a zero offset adjustment at being idling (it is clear that the current is not apply) .
11. The current sensor doesn't have built-in protection circuit (devices and fuses, etc.). As a failure mode of the sensor, there is a short circuit and open state. In the case of a short-circuit state, the abnor-mal temperature rise of the internal parts is assumed, and there is a possibility to smoke and to ignite. If it is used in safety critical circuit blocks, please take appropriate measures by protection devices, protection circuits, etc. For closed loop -type sensors and flux gate (closed loop type) sensors, the consumption current of the secondary power supply varies in proportion to the measurement current.

## <Open loop>

1. High frequency primary current may result in excessive heating in iron magnetic core and cause damage to internal circuitry; for high frequency applications select current sensor with ferrite core material.
2. If the measured current exceeds the rated current, magnetic core saturation will occur and the output voltage signal will not be linearly proportional to the measured current.

## <Closed Loop>

1. For closed loop current sensors please insure the power supply voltage is balanced, symmetrical, and, applied simultaneously to avoid potential increase in DC offset error.
2. Maximum rated current measurement duration is timedependent. Maximum rated current applied in excess of the time limit can result in damage to internal electronic circuitry; please consult Tamura for assistance.
3. When using a measurement resistor to convert current output to voltage output select a resistor with stable temperature characteristic to insure accuracy of the output voltage.
4. Compensation current supplied to the secondary winding varies in proportion to the measured current based on the conversion ratio. (If/KN; KN = secondary turns) Please insure the PSU has required current capacity to supply compensation current to the secondary winding.

## <Flux-Gate>

1. Compensation current supplied to the secondary winding varies in proportion to the measured current. Please insure the PSU has required current capacity to supply compensation current to the secondary winding.
2. There is 450kHz ripple voltage present on the output and reference output voltage signals . An external capacitor maybe added if necessary.