

Hybrid Transient Suppression DC/DC Converter (HSSO28D Series)

1 Features

- High reliability
- Wide input voltage range: 12V~50V, typical
DC input voltage: 28V
- Maximum input transient voltage: 80V, 1s
- Output Power P_o : 1.5W
- Operating temperature range T_c : -55°C~+125°C
- Low Startup current
- No output overshoot
- Inhibit function
- Under-voltage input lock and output short circuit protection
- Hermetically sealed metal case



Size: 25.14×20.66×7.38
Weight: 11g

HSSO28D5

HSSO28D15

2 Scope of application

High-reliability electronic system for aviation , aerospace and some applications of high input transient suppression requirements.

3 Descriptions

This series products are high reliable DC/DC converters featured with transient protection (80 v, 1 s) . Single ended flyback, pulse width modulated and transformer magnetic feedback topology design are used in these products., The operating principle is that the sampling signal of output voltage, coupled by the transformer, works together with the sampling signal of input loop current to regulate the pulse width of the controller. The double loop control creates constant voltage output. Thick film hybrid techniques provide the HSSO28S Series converters with high reliability and optimum miniaturization. The design and manufacturing process of HSSO28S Series converters are in compliance with MIL-PRF-38534.

4 Technical Specifications

Table 2 Rated conditions and recommended operating conditions

Absolute Max. Rating

Input voltage: 12V~50V Input voltage (Transient,1s) : 80V Output Power: 1.62W Storage temperature: -65°C~150°C	Mechanical Shock: 1500g Lead resistance to welding temperature: 300°C (15s) Weight: 11g Antistatic intensity: 2000V
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表3-电特性 Table 3 Electric Characteristics

No.	Items	Condition (Unless other wise, -55°C ≤T _c ≤125°C, V _{IN} =28V±5%)		HSS028D5		HSS028D15	
				Min	Max	Min	Max
1	Input Voltage/V	Low、High、 Ambient Temperature		12	50	12	50
2	Output Voltage/V	Positive	Ambient, Full load	4.95	5.05	14.85	15.15
		Negative		-5.05	-4.95	14.40	15.60
		Positive	Low/high, Full load	4.8	5.2	-15.15	-14.85
		Negative		-5.2	-4.8	-15.60	-14.40
3	Output current/A	V _{IN} =15V~50V		—	0.15	—	0.05
4	Output Power/W			0	1.5	0	1.5
5	Output Ripple Voltage/mV	BW≤20MHz, Full load		—	50	—	100
6	Line Regulation/mV	Positive	V _{IN} =12V~50V, Full load	—	150	—	150
		Negative		—	150	—	150
7	Load Regulation/mV	Positive	10% load → full	—	400	—	700
		Negative		—	400	—	700
		Positive	50% load → full	—	250	—	250
		Negative		—	250	—	250
8	Input current/mA	Inhibited		—	3.5	—	3.5
		I _o =no load		—	10	—	14
9	Input Ripple current/mA	BW≤20MHz, Full load		—	30	—	30
10	Efficiency/%	Full load		72	—	73	—
11	Isolation/MΩ	Input to output or any pin to case at 500V, T _c =25°C		100	—	100	—
12	Inhibit voltage			0	0.7	0	0.7
13	Under voltage turn-on voltage/V	Full load		6.5	11.5	6.5	11.5
14	Short Circuit Protection			有		有	
15	Capacitive load /μF	T _c =25°C		—	500	—	200
16	Switching frequency/kHz	Full Load		325	475	325	475
17	Step Load Response Transient(mV pK)	50%load→full load or full load→50%load		—	300	—	300
18	Step Load Response Recovery(μs)	50%load→full load or full load→50%load		—	500	—	400
19	Step Line Response Transient(mV pK)	V _{IN} : 16V→40V, V _{IN} : 40V→16V, I _o =Full load		—	400	—	600
20	Step Line Response Recovery(μs)	V _{IN} : 16V→40V, V _{IN} : 40V→16V, I _o =Full load		—	600	—	600

21	Start-up Overshoot(mV pK)	$V_{IN}: 0 \rightarrow 28V$, $I_o = \text{Full load}$	—	25	—	50
22	Start-up Delay (ms)	$V_{IN}: 0 \rightarrow 28V$, $I_o = \text{Full load}$	—	20	—	20

5 Circuit block diagram

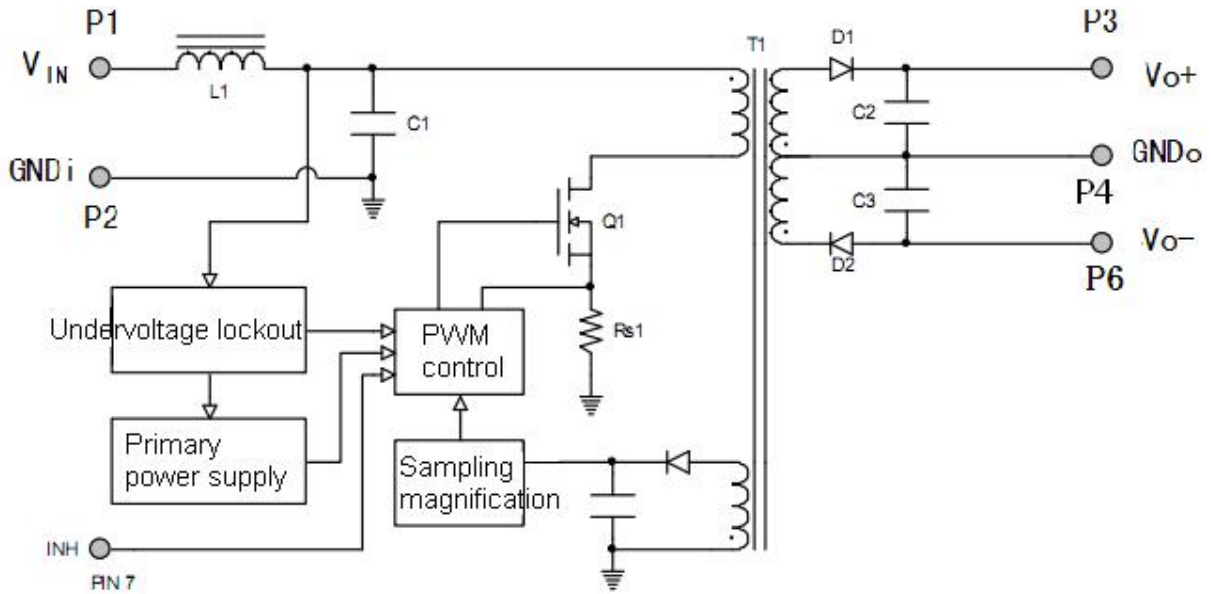


Fig 1 HSS028D Series circuit block diagram

6. Typical Characteristic Curve (Testing condition as per $T_c = 25^\circ C$, $V_{IN} = 28V \pm 5\%$, unless otherwise specified)

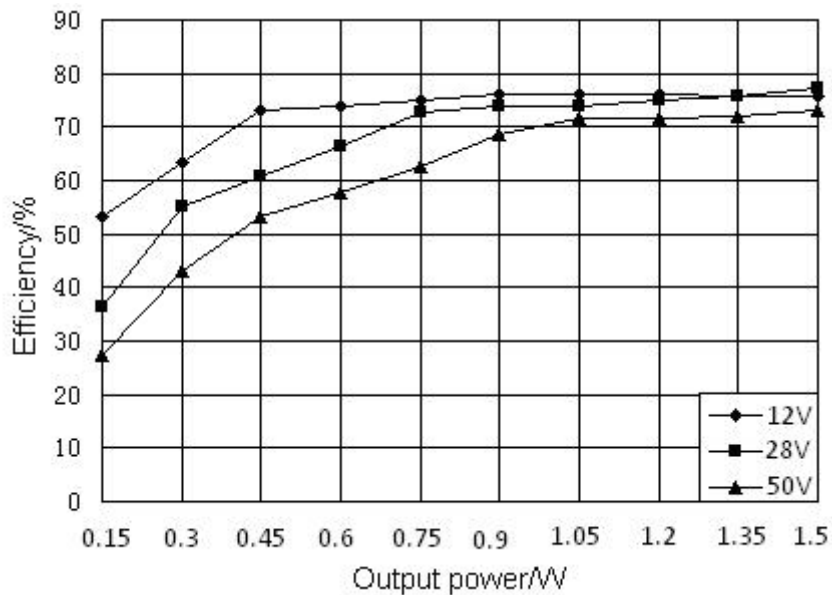


Fig 2 HSS028D15 Efficiency Curve

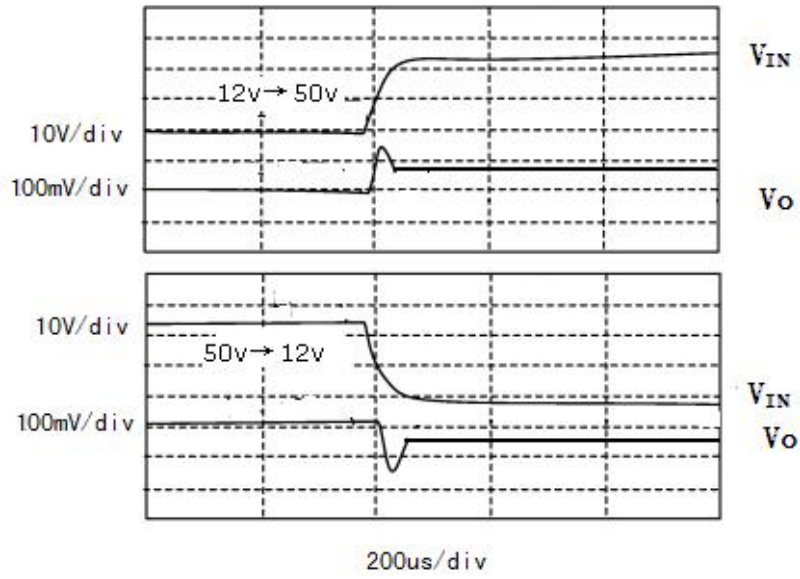


Fig 3 HSS028D15 Step Line Response

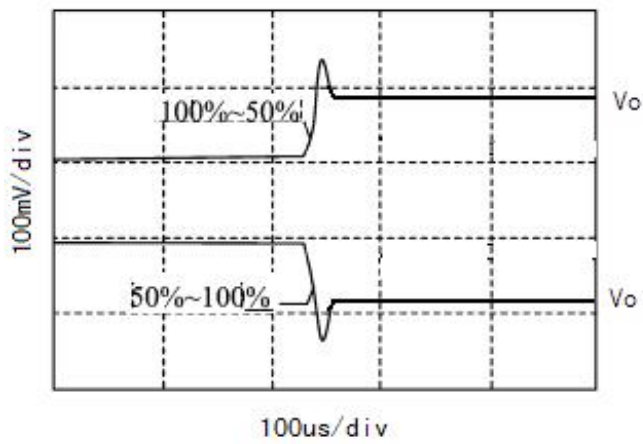


Fig 4 HSS028D15 Step Load Response

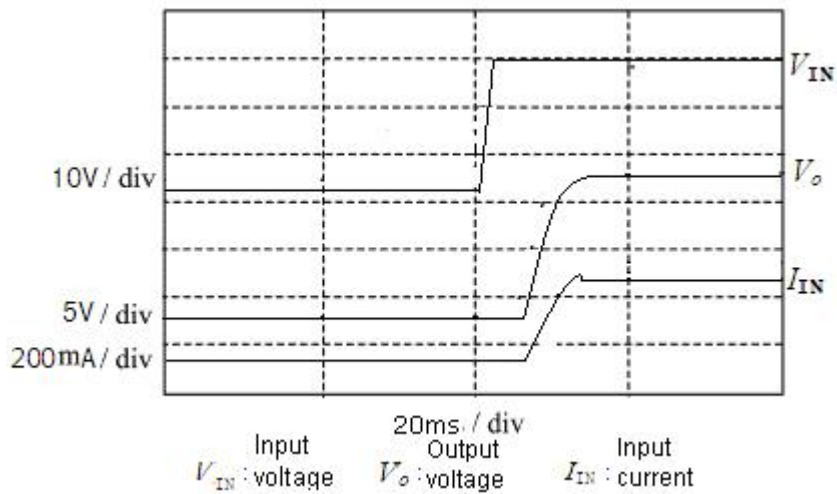


Fig 5 HSS028D15 Start-up Overshoot/Start-up Delay

7. MTBF Curve

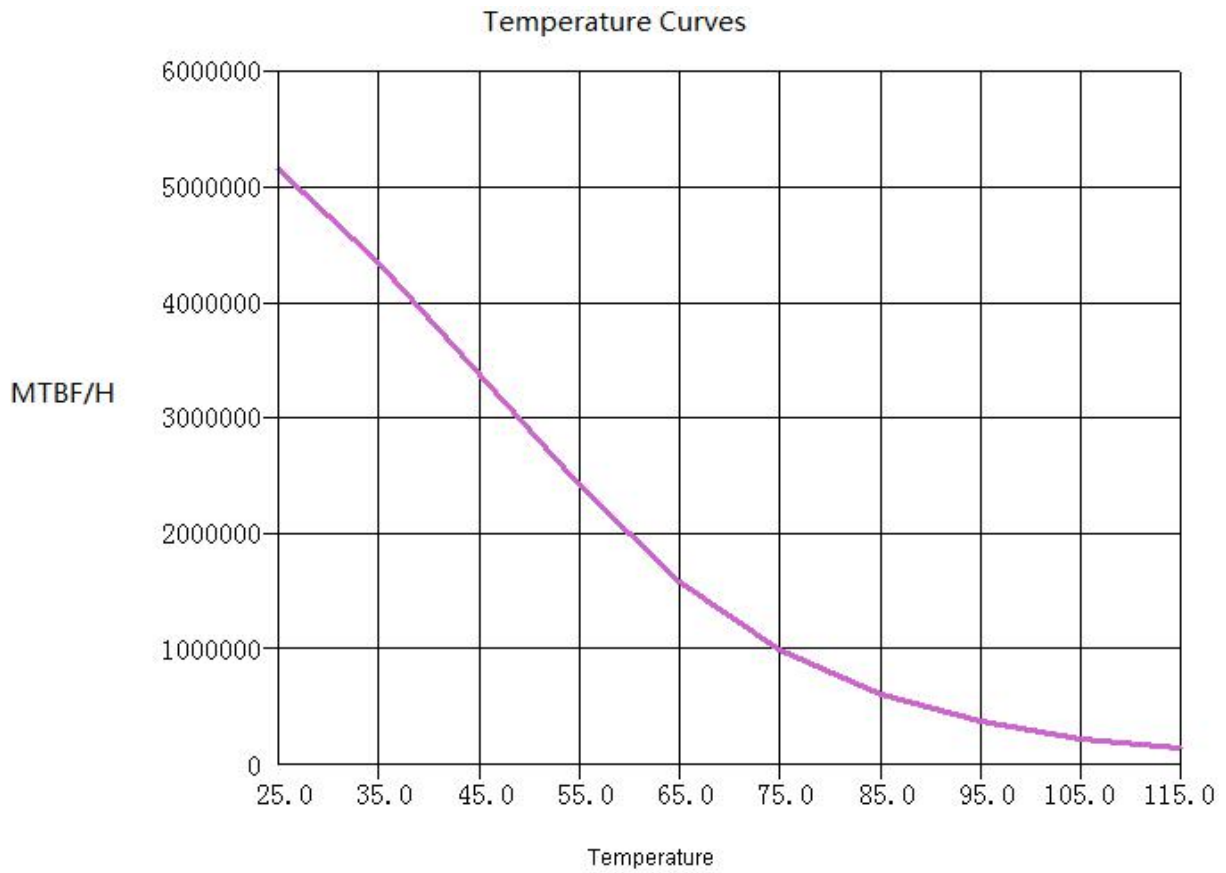


Fig 6 MTBF Temperature Curve (HSSA28D15)
(Well ground condition)

8 Pin Designations

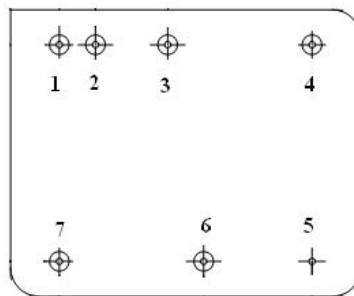


Fig 7 Bottom View

Table 4 Pin Designations

Pin	Symbol	Designation
1	V_{IN}	Positive input

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2	GND _I	Input ground
3	V _{o+}	Positive output
4	GND _O	Output ground
5	GND _C	Case ground
6	V _{o-}	NC
7	INH	Inhibit

9 Typical Connection Diagram

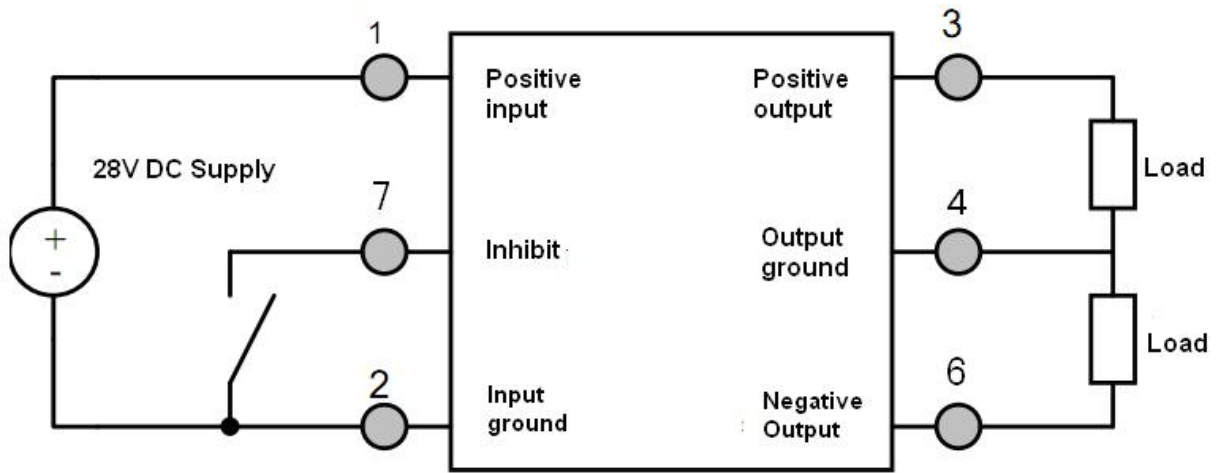


Fig 8 Connection Diagram

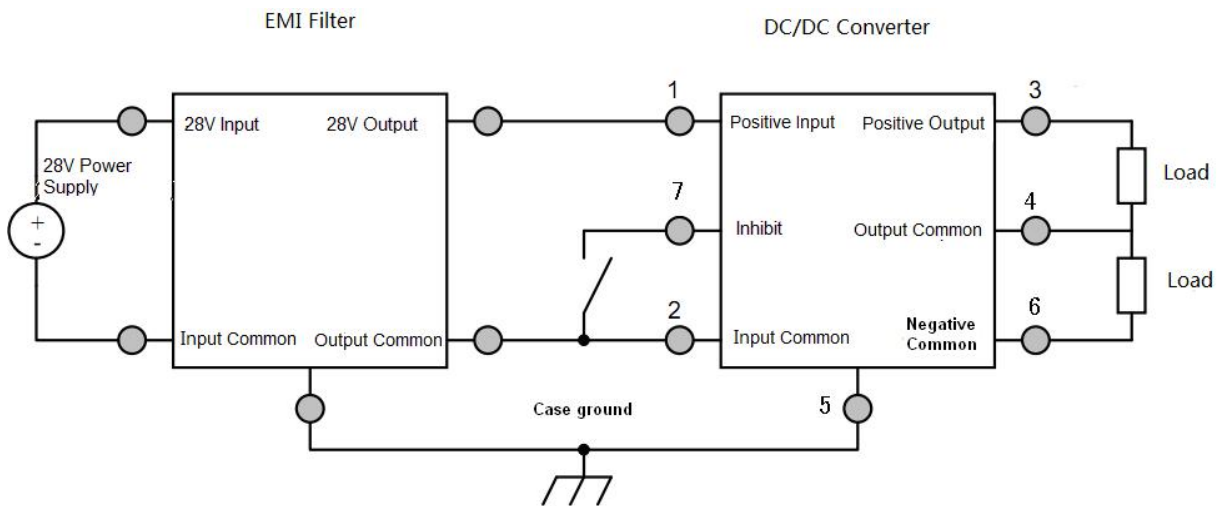


Fig 9 EMI Filter Connection Diagram

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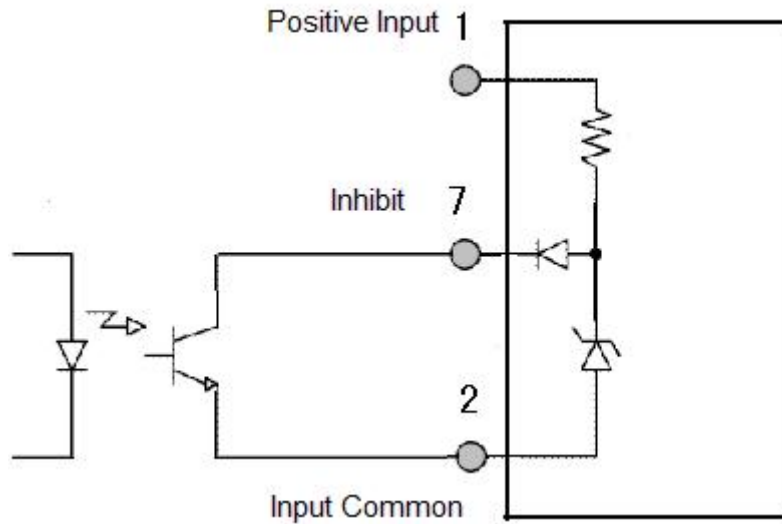


Fig 10 Inhibit Driver Circuit Diagram

10. Package Specifications (Unit: mm)

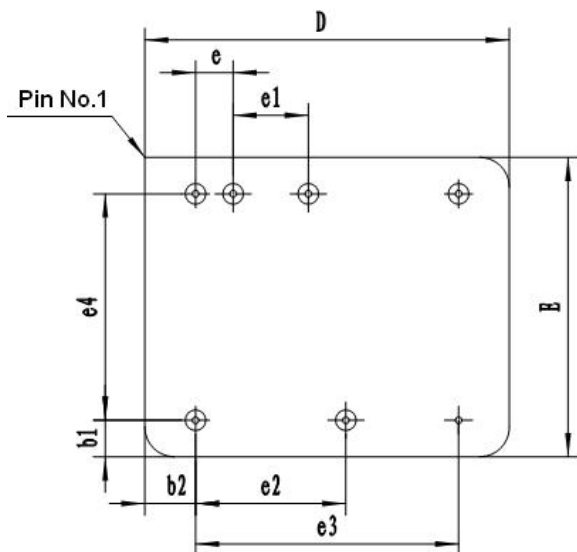


Fig 11 Bottom View

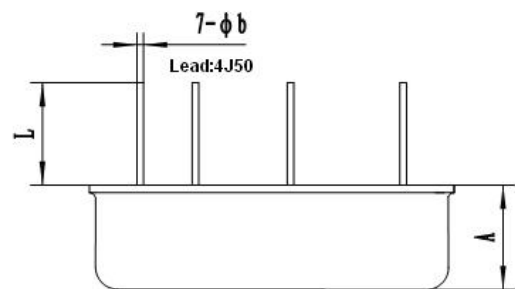


Fig 12 Side View

Table 5 Package Outline

Symbols	Unit/mm		
	Minimum	Nominal	Maximum
<i>A</i>	-	-	7.38
<i>φ b</i>	0.32	-	0.58
<i>b1</i>	2.16	-	2.76
<i>b2</i>	3.13	-	3.73
<i>D</i>	-	-	25.14

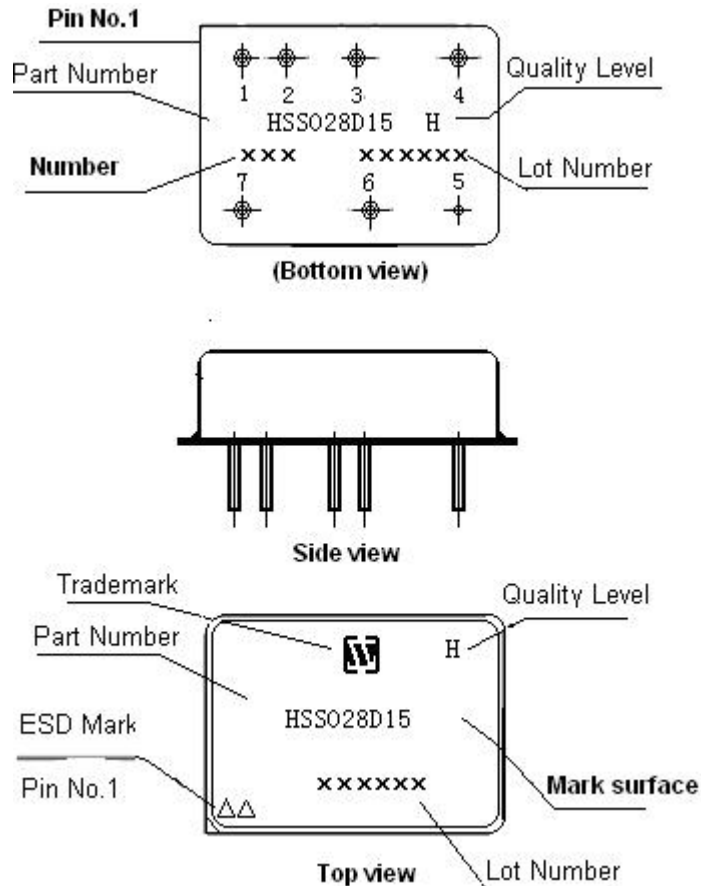
<i>E</i>	-	-	20.66
<i>e</i>	2.24	2.54	2.84
<i>e1</i>	4.78	5.08	5.38
<i>e2</i>	9.86	10.16	10.46
<i>e3</i>	17.28	17.78	18.28
<i>e4</i>	14.74	15.24	15.74
<i>L</i>	5.86	-	-

Notes: *e*, *e1*, *e2*, *e3*, *e4* are interchangeable size, made by the shell manufacturing and inspection, this specification does not do the assessment requirements.

Table 6 Case Materials

Case Model	Header	Header Plating	Cover	Cover Plating	Pin	Pin Plating	Sealing	Notes
UPP2520-07	High quality carbon structural steel (08AL)	Au	SPCC-SD	Au	4J50	Au	Energy storage welding	

11 Ordering Information



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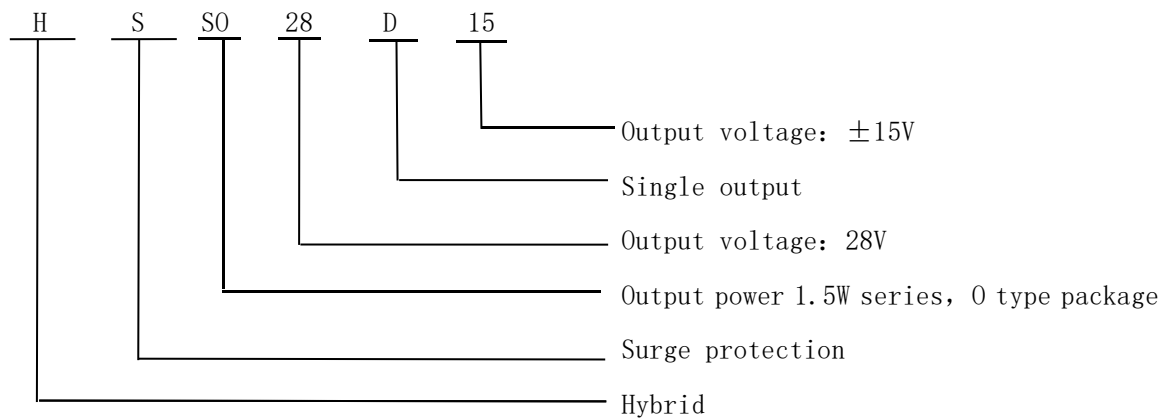


Fig 13 Part Numbering Key

Application Notes:

- ☆ Both positive and negative terminals for power supply shall be correctly connected when power is applied so as to avoid permanent damage to the device.
- ☆ Testing position shall be the root of the pin of the device when the electrical characteristic is measured.
- ☆ The baseplate of the device shall be closely attached to the circuit board during device mounting so as to avoid the damage on pins. The shockproof actions shall be adopted when necessary.
- ☆ Pins shall not be bended to avoid the glass insulator cracking and case leaking.
- ☆ Pins at inhibit terminal shall be hung in the air during no operation.
- ☆ When using ,the output load should not be less than 10% of the rated load
- ☆ When ordering this device , the detail electrical specification shall be based on relevant standards. While data offered in this document shall be for reference only.