

4 Electrical performance of transient suppression DC-DC converter

Tabel2 Rated conditions and recommended operating conditions

Absolute Max. Rated value	
Input voltage: 15V~50V Input voltage (Transient,1s) : 80V Output Power: 6.5W Storage temperature: -65℃~150℃	Mechanical Shock: 1500g Weight (Non-flanged/Flanged) : 19g/24g The intensity of antistatic: 2000V

Table 3 Electric characteristics

No.	Parameter	Conditions	HSSA28D5 HSSA28D5F		HSSA28D12 HSSA28D12F		HSSA28D15 HSSA28D15F		
			Q/HW32168-2013		Q/HW32169-2013		Q/HW32170-2013		
			Min	Max	Min	Max	Min	Max	
1	Input Voltage/V	Low、High、 Ambient Temperature	15	50	15	50	15	50	
2	Output Voltage/V	Positive	Ambient Full load	4.95	5.05	11.88	12.12	14.85	15.15
		Negative		4.95	5.05	11.88	12.12	14.85	15.15
		Positive	Low/high Full load	4.925	5.075	11.82	12.18	14.775	15.225
		Negative		4.925	5.075	11.82	12.18	14.775	15.225
3	Output current/A	$V_{IN}=15V\sim 50V$	—	0.5	—	0.25	—	0.2	
4	Output Power/W		0	5	0	6	0	6	
5	Output Ripple Voltage/mV	$BW\leq 6MHz$, $I_o=Full$ load	—	50	—	50	—	50	
6	Line Regulation/mV	Positive	$V_{IN}=16V\sim 40V$, $I_o=Full$	—	50	—	50	—	50
		Negative		—	50	—	50	—	50
7	Lode Regulation/mV	Positive	$I_o=No$ load to full	—	50	—	50	—	50
		Negative		—	50	—	50	—	50
8	Input current/mA	Inhibited	—	6	—	6	—	6	
		$I_o=no$ load	—	60	—	60	—	60	
9	Input Ripple current/mA	$BW\leq 20MHz$, $I_o=Full$ load	—	50	—	50	—	50	
10	Efficiency/%	$I_o=Full$ load	66	—	72	—	73	—	
11	Isolation/MΩ	Input to output or any pin to case(except pin 7、8)at 500V, $T_c=25^\circ C$	100	—	100	—	100	—	
12	Inhibit Function		0	0.7	0	0.7	0	0.7	
13	Under voltage open voltage/V	$I_o=Full$ Load	12.0	14.8	12.0	14.8	12	14.8	
14	Under voltage cut-off voltage/V	$I_o=Full$ Load	11.0	14.5	11.0	14.5	11	14.5	
15	Short Circuit Protection								
16	Capacitive load/ μF	$T_c=25^\circ C$	—	500	—	500	—	500	
17	switching frequency/kHz	$I_o=Full$ Load	350	500	350	500	350	500	
18	Cross Regulation/mV	One road 30% load, The other Load 30%→70%	—	450	—	450	—	450	

19	Step Load Response Transient(mV pK)	50%load→full load or Full load →50% load	—	300	—	300	—	300
20	Step Load Response Recovery(μs)	50%load→full load or Full load →50% load	—	400	—	450	—	500
21	Step Line Response Transient(mV pK)	V _{IN} : 16V→40V, V _{IN} : 40V→16V, I _o =Full load	—	900	—	900	—	900
22	Step Line Response Recovery(μs)	V _{IN} : 16V→40V V _{IN} : 40V→16V I _o =Full load	—	700	—	500	—	500
23	Start-up Overshoot(mV pK)	V _{IN} : 0→28V, I _o =Full load	—	25	—	50	—	50
24	Start-up Delay (ms)	V _{IN} : 0→28V, I _o =Full load	—	20	—	20	—	20

5 Circuit block diagram of transient suppression DC-DC converter

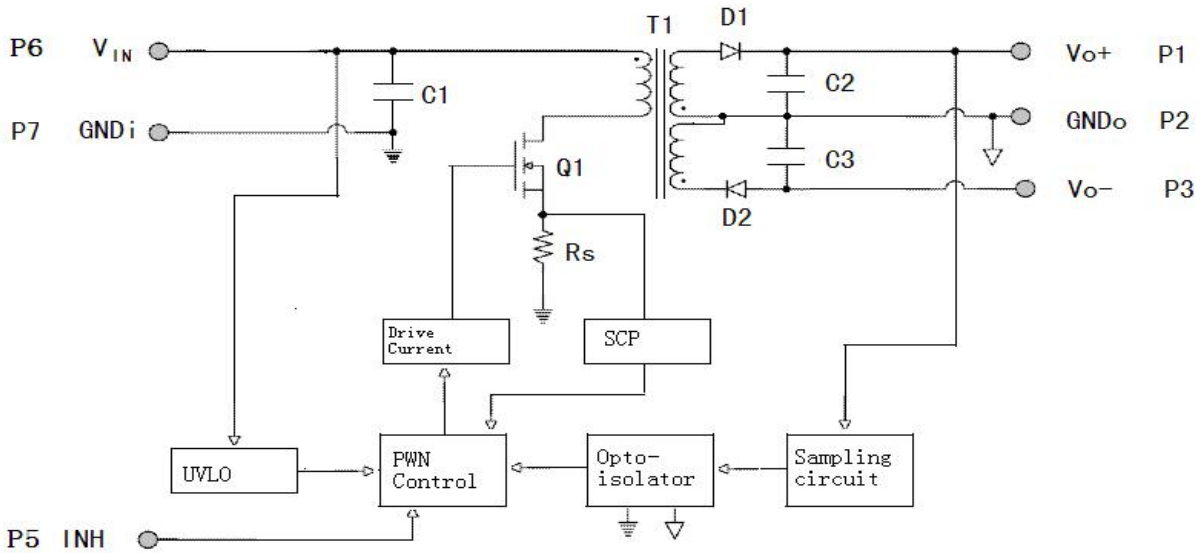


Figure 1 HSSA28D Series circuit block diagram

6. Typical Performance Curves of transient suppression DC-DC converter (Testing condition as per T_c=25°C , V_{IN}=28V±5%, unless otherwise specified)

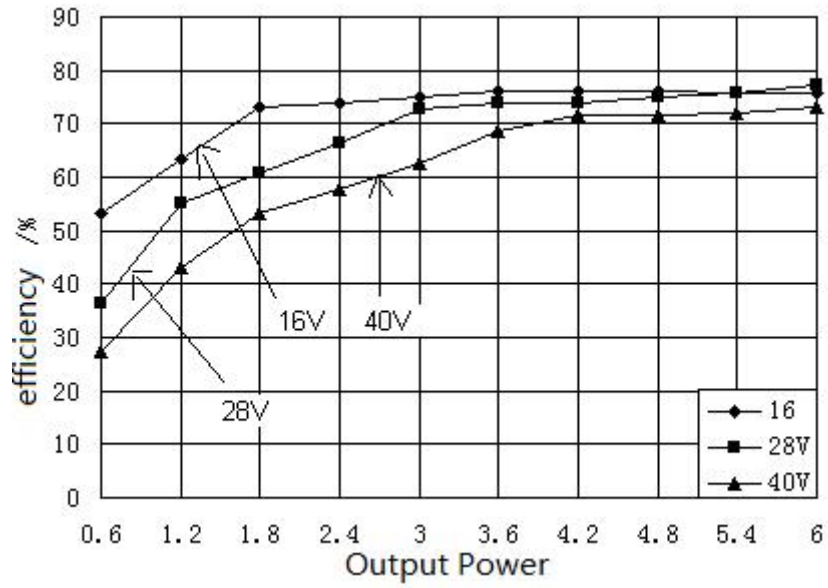


Figure 2 HSSA28D15 Efficiency

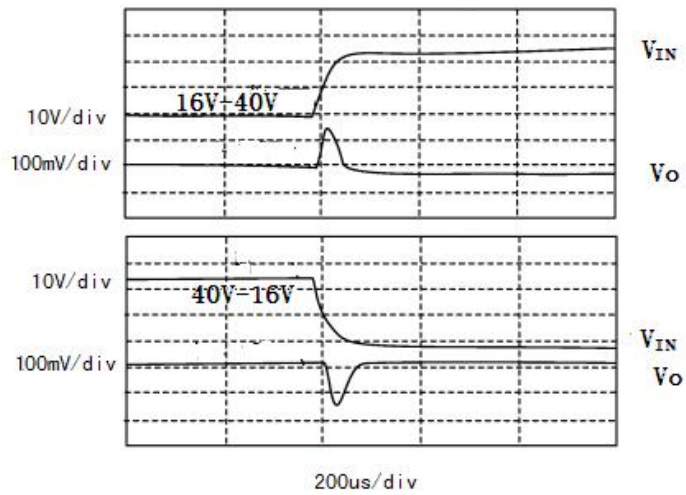


Figure 3 HSSA28D15 step line response

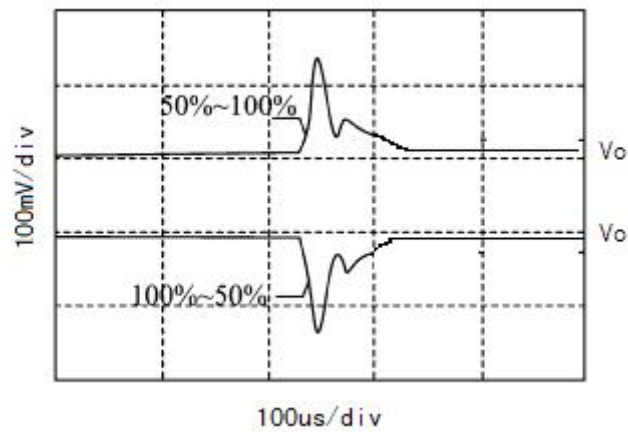


Figure 4 HSSA28D15 Step Load Response

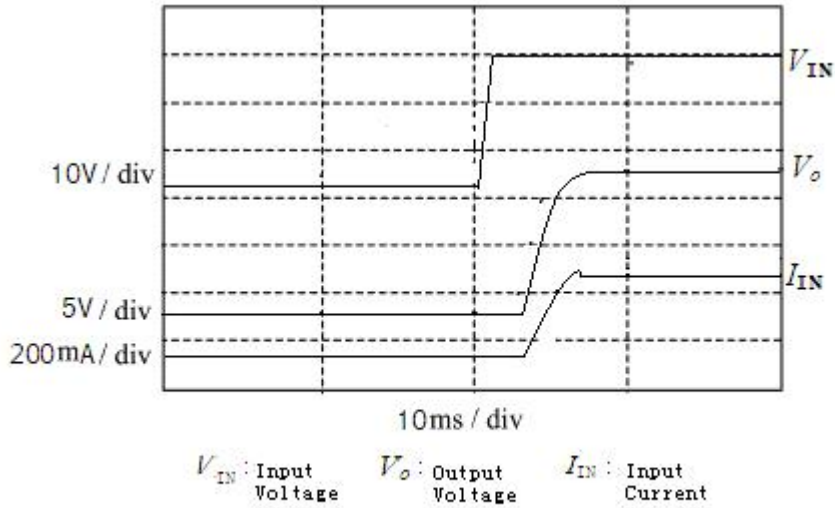


Figure 5 HSSA28D15 Start-up Overshoot/Start-up Delay

7.MTBF Curves of transient suppression DC-DC converter

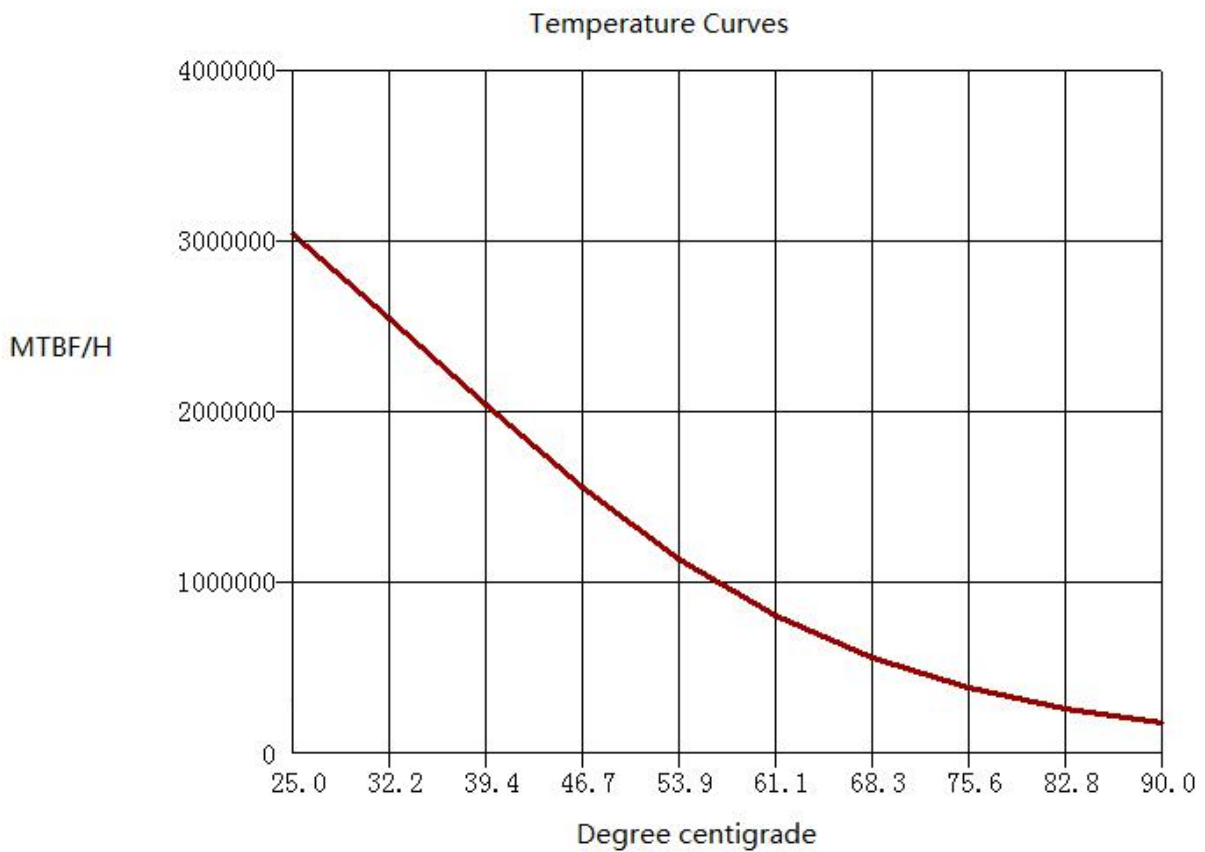


Figure 6 MTBF Temperature Curves (HSSA28D15)

8 Pin Designation of transient suppression DC-DC converter

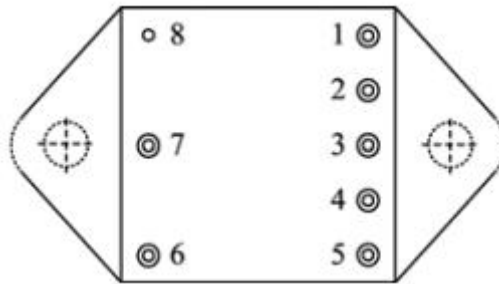


Figure 7 Pin Out Bottom View

Table 4 Pin Designation

Pin	Symbol	Designation
1	V_{O+}	Positive Output
2	GND_O	Output Common
3	V_{O-}	Negative Output
4	NC	NULL
5	INH	Inhibit
6	V_{IN}	Positive Input
7	GND_I	Input Common
8	GND_C	Case Ground

9 Typical Connection Diagram of transient suppression DC-DC converter

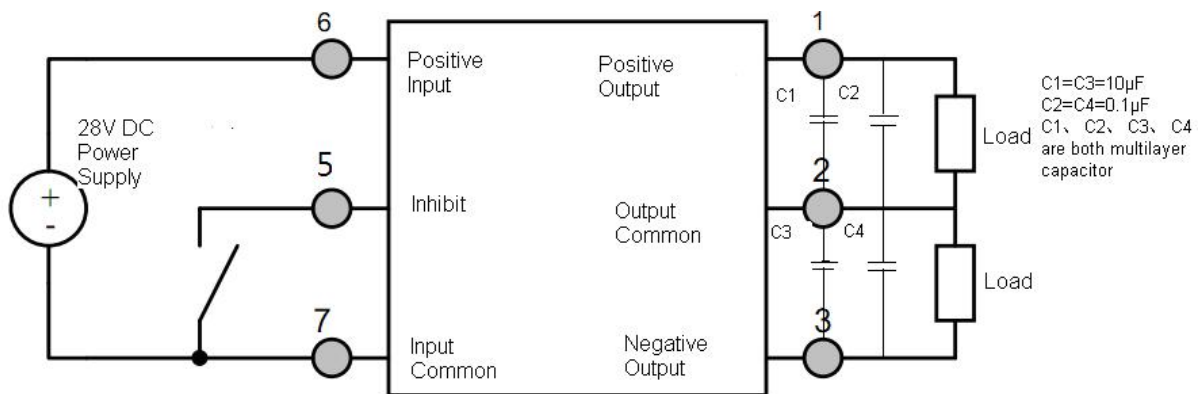


Figure 8 Product Connection Diagram

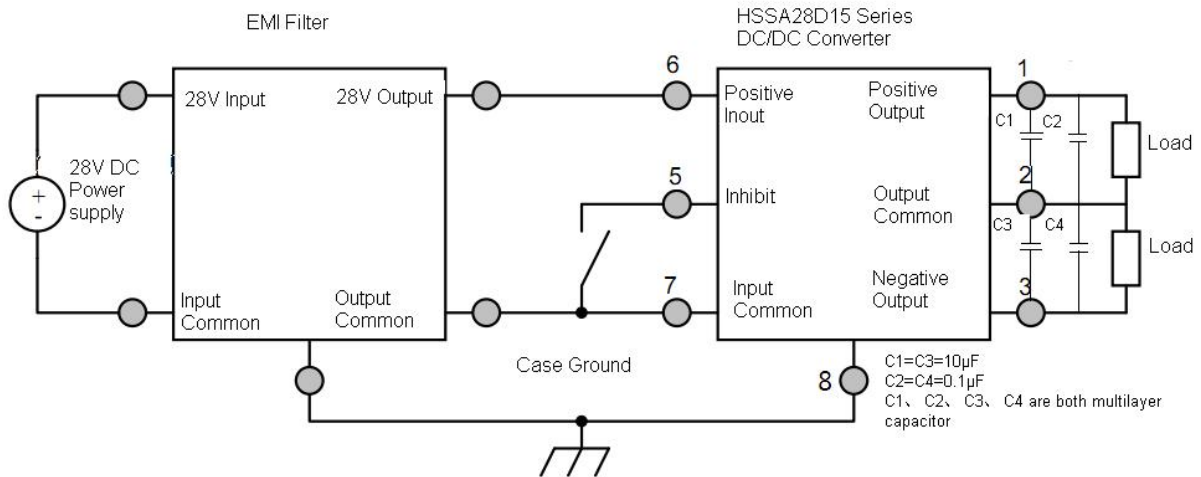


Figure 9 EMI Filter Connection Diagram

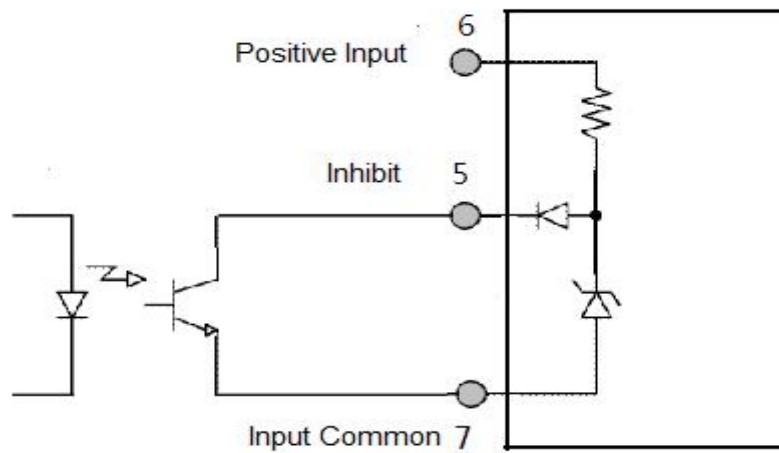


Figure 10 Inhibit Diver Diagram

10 . Package Specifications of transient suppression DC-DC converter (Unit: mm)

① Package without flanged

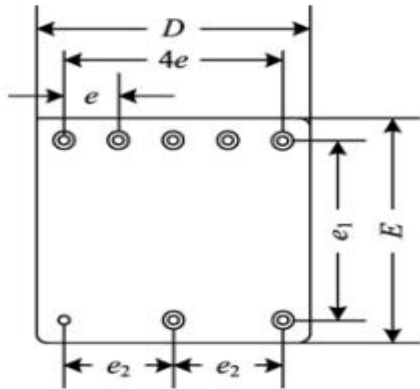


Figure 11 Bottom View

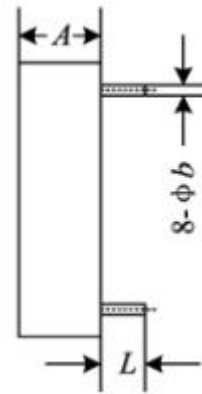


Figure 12 Side View

② Package with Flanged

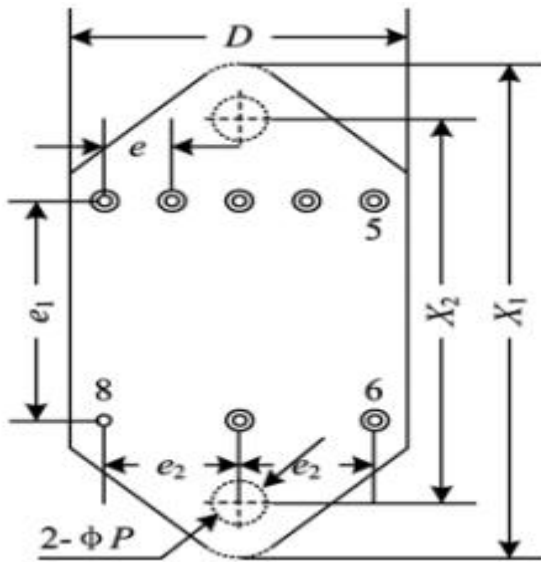


Figure 13 Bottom View

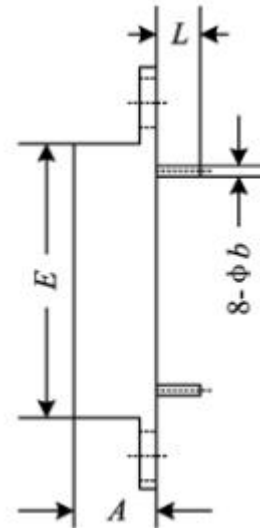


Figure 14 Side View

Table 5 Package Outline

Dimension Symbols	Unit/mm		
	Minimum	Nominal	Maximum
<i>A</i>	-	6.86	7.16
Φb	0.51	0.64	0.77
<i>D</i>	-	27.23	27.57
<i>E</i>	-	27.23	27.57
<i>e</i>	-	5.08	-
<i>e1</i>	-	20.32	-
<i>e2</i>	-	10.16	-
<i>L</i>	4.95	5.21	-
ΦP	2.50	2.80	3.10
<i>X1</i>	-	39.0	39.50

X2	32.90	33.20	33.50
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Table 6 Case Materials

Case Model	Header	Header Plating	Cover	Cover Plating	Pin	Pin Plating	Sealing Style	Notes
UPP2727-08a (Non-Flanged)	Cold Rolled Steel (10#)	Nickel	Kovar (4J42)	Nickel	Copper -core Compound	Ni/Au	Compression Seal	Nickel Plating is for case ground pin
UPP2727-08u (Flanged)	Cold Rolled Steel (10#)	Nickel	Kovar (4J42)	Nickel	Copper -core Compound	Ni/Au	Compression Seal	Nickel Plating is for case ground pin

11 Ordering Information of transient suppression DC-DC converter

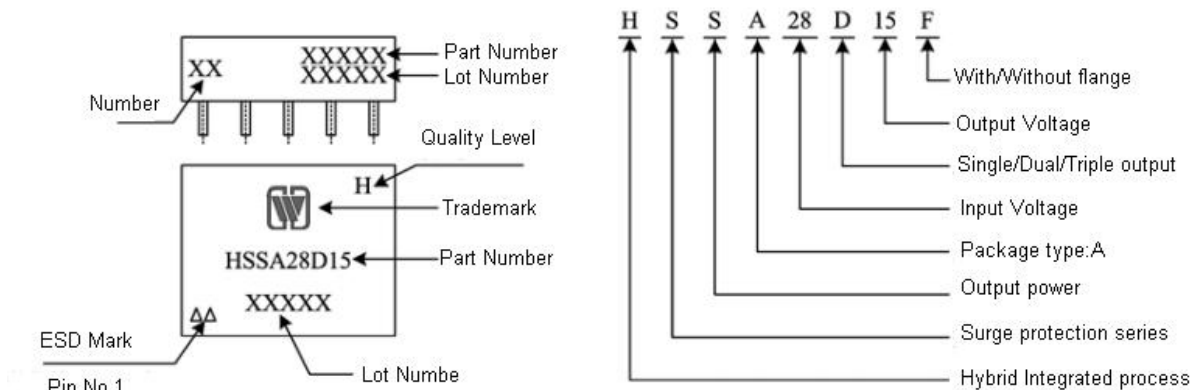


Figure 15 Part Numbering Key

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 ordering this device , the detail electrical specification shall be based on relevant standards. While data offered in this document shall be for reference only.

