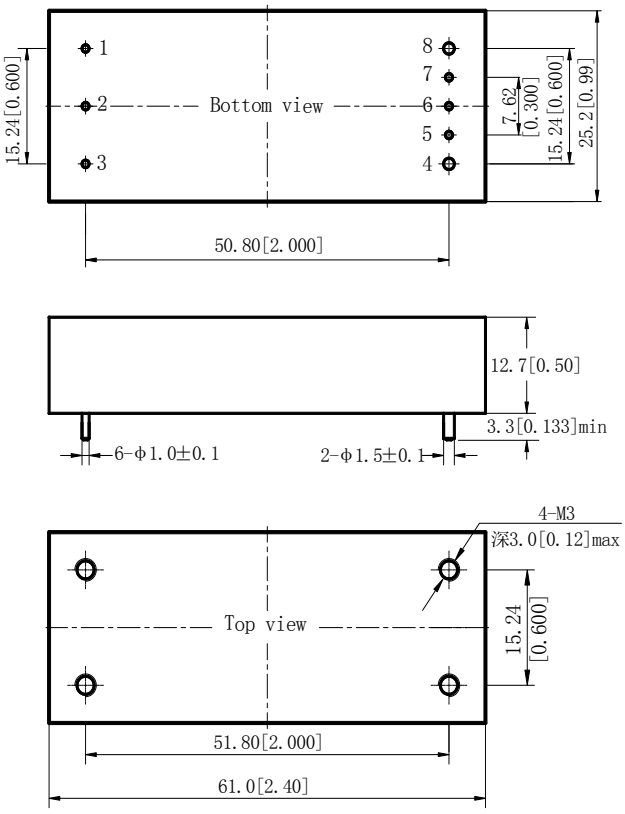
DC300-28S28C

Features

- *1/8-inch Brick (61.0mm × 25.2mm × 12.7mm)*
- *Input Under Voltage Protection (13 to 16Vdc Turn off)*
- *Positive Logic (3.5V to 15V or floating Turn on)*
- *Output Over Voltage Protection (32.2 ~ 37.2Vdc)*
- *Output Voltage Adjust Range: ±10% Vo*
- *Output Over Current Protection*
- *Output Short-Circuit Protection, automatic recovery*
- *High Efficiency up to 93% (Input 28V, Full load)*
- *1500Vdc Isolation Voltage*
- *Operation Baseplate Temperature : -40℃ to +105℃*
- *Applications: telecommunication applications, electronic data Processing, distributed power architecture and Industry systems ,etc.*

Outline Diagram



Pin	Symbol	Function
1	-Vin	Negative Input
2	CNT	Remote Control Pin
3	+Vin	Positive Input
4	+Vo	Positive Output
5	+S	Positive Remote Sense
6	Trim	Output voltage adjust
7	-S	Negative Remote Sense
8	-Vo	Negative Output

Case material: Aluminum with shielding plate, black.
Pin: Copper with golden plating.
Unit: mm (inches)
Tolerances: X.X±0.5mm (X.XX±0.02)
X.XX±0.25mm (X.XXX±0.010)
Note: To avoid damaging internal components, the installation depth of the M3 screws should be less than **3** mm.

DC300-28S28C

Model Code

DC	300	-	28	S	28	N	C
Series	Total Power 300W		Input 16~40V	Single Output	Output 28V	Logic : Default–Positive N–Negative	Case

Specification

Unless otherwise specified, all values are given at 25℃, standard atmosphere pressure, with a pure resistive load , and in the basic connection diagram.

Input		Symbol	Min	Typ	Max	Unit	Conditions
Input Voltage①		V_{in}	16	28	40	V	Input voltage limits
		V_{in}	18	28	40	V	Recommended input voltage
Maximum Input Voltage		—	–	–	50	V	100ms max
Input Capacitor (External)		C_{in}	–	220	–	μF	Ceramic or electrolytic capacitor, close to the input pin
No-Load Input Current		$I_{in\ nl}$	–	–	200	mA	V_{in}=16V, I_O=0A
Input Current		I_{in}	–	–	22.6	A	V_{in}=16V, I_O=10.72A
Positive Logic Remote Control	ON	—	3.5	–	15	V	Refer to $-V_{in}$ Also turn on when CNT floating.
	Input Current	—	–	–	1.0	mA	CNT input current when Active-High
	OFF	—	0	–	1.0	V	Refer to $-V_{in}$
	Output Current	—	–	–	1.0	mA	CNT output current when Active-Low shutdown
Negative Logic Remote Control	ON	—	0	–	1.0	V	Refer to $-V_{in}$
	Input Current	—	–	–	1.0	mA	CNT output current when Active-Low
	OFF	—	3.5	–	15	V	Refer to $-V_{in}$ Also turn off when CNT floating.
	Output Current	—	–	–	1.0	mA	CNT input current when Active-High shutdown
Start-up Delay Time		T_{delay}	–	15	40	ms	—
Under Voltage Threshold		V_{UVLO}	13	–	16	V	50% load test
Under Voltage Protection Hysteresis		ΔV_{UVLO}	1	1.5	2	V	—

NOTE ① : When the input voltage is in the 16 V ~ 18 V range, indicators such as output voltage accuracy, line regulation, load regulation, and output dynamic response may degrade;

When the input voltage steps up from ≤ 18 V to the target voltage, a significant overshoot will occur at the output and may trigger the overvoltage protection(OVP).

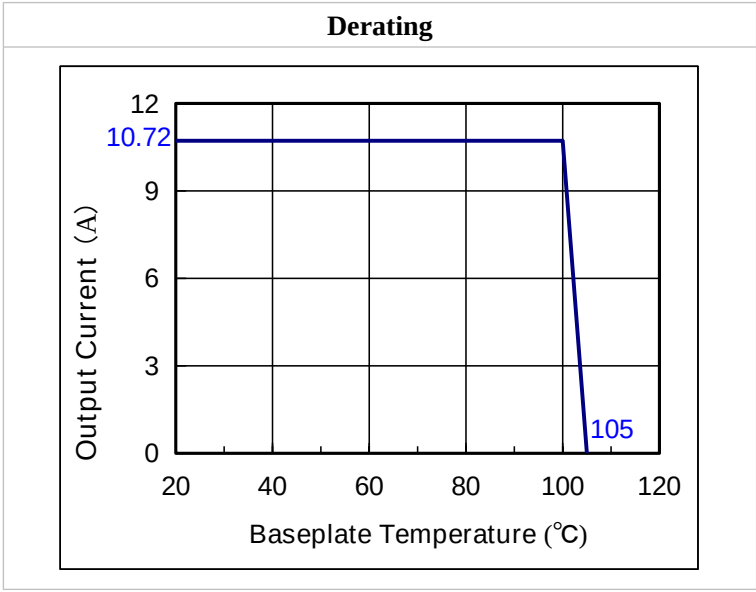
DC300-28S28C

Output	Symbol	Min	Typ	Max	Unit	Conditions
Output Voltage Set Point	V_O	27.72	28.00	28.28	V	V_{in}=28V, 50% load test
Total Output Voltage Range	V_0	27.58	28.00	28.42	V	Considering factors such as line loss, Temperature, and Input limits
Output Current	$I_{O,nom}$	–	10.72	–	A	—
Output Voltage Adjust Range	V_{trim}	25.2	–	30.8	V	Adjust up : Po≤300W Adjust down : Io≤10.72A
Line Regulation	S_V	–	–	±0.2	% V_O	Recommended Input: 18V ~ 40V, Io=10.72A
Load Regulation	S_I	–	–	±0.5	% V_O	V_{in}=28V, I_O: 0 ~ 10.72A
Output Over Voltage Protection Set Point	$V_{ov,set}$	32.2	–	37.2	V	Hiccup mode
Output Over Current Protection Range	$I_{O,lim}$	11.8	–	19.3	A	Hiccup mode
Output Short-circuit Protection	Hiccup mode, Auto-recovery					—
Peak to Peak Ripple and Noise	ΔV_{pp}	–	–	280	mV	V_{in}=28Vdc, Io,nom , 20MHz bandwidth, parallel line tooling test, a 1μF and a 10μF ceramic capacitor applied at output
Output Rise Time	T_{rise}	–	30	60	ms	Vin=28V, $I_{O,nom}$, pure resistive load
Output Overshoot	V_{TO}	0	–	2.8	V	Vin=28V, $I_{O,nom}$, pure resistive load
Capacitive Load	C_O	100	–	1000	μF	pure resistive load
Output Dynamic Response – Recovery Time	t_{tr}	–	300	600	μs	25% ~ 50% ~ 25% Io,nom or 50% ~ 75% ~ 50% Io,nom; 0.1A /μs
Output Dynamic Response – Voltage Deviation	ΔV_{tr}	–	±1400	±2100	mV	25% ~ 50% ~ 25% Io,nom or 50% ~ 75% ~ 50% Io,nom; 0.1A /μs

General	Symbol	Min	Typ	Max	Unit	Conditions
Efficiency	η	91	93	–	%	V_{in}=28V, $I_{O,nom}$
Switching Frequency	f_s	–	210	–	kHz	—
Isolation Resistance	R_{iso}	50	–	–	MΩ	500Vdc,90%RH
Isolation Voltage	V_{iso}	1500	–	–	V_{dc}	Input to Output Leak Current: 1mA
		1050	–	–	V_{dc}	Input to Case Leak Current: 1mA
		500	–	–	V_{dc}	Output to Case Leak Current: 1mA
MTBF	—	–	2×10^6	–	h	Bellcore TR332, 25℃
Baseplate Temperature	—	-40	–	+105	℃	—
Storage Temperature	—	-55	–	+125	℃	—
Temperature Coefficient	S_T	–	–	±0.02	%/℃	—

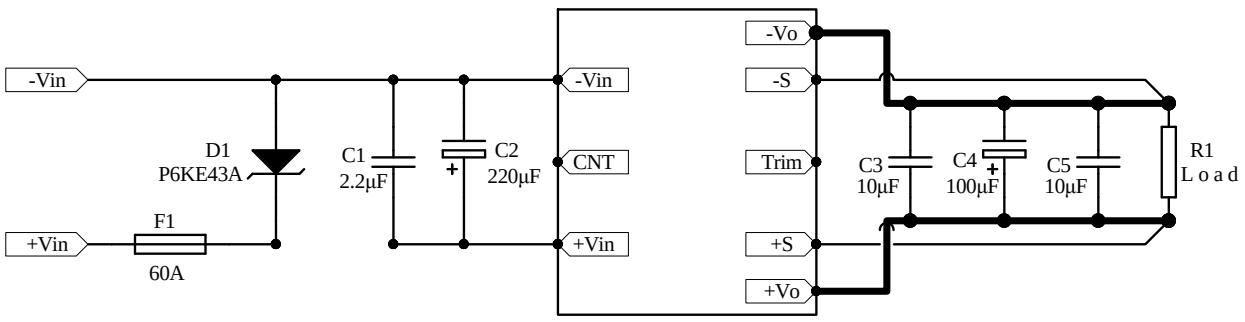
General	Symbol	Min	Typ	Max	Unit	Conditions
Relative Humidity	—	10	–	90	%	No condensing, 40℃±2℃
Over Temperature Protection Point	T_{ref}	106	110	120	℃	Maximum case surface temperature
Over Temperature Protection Hysteresis	ΔT_{ref}	–	5	–	℃	
Hand Soldering	Maximum soldering Temperature < 425℃, and duration < 5s					
Wave Soldering	Maximum soldering Temperature < 255℃, and duration < 10s					
Weight	—	–	61.5	–	g	—

Characteristic Curves



Design Considerations

Basic Connection Diagram



Notes: The basic connection indicates the basic requirements that the power module can provide rated output voltage and rated power only. Please refer the instruction followed for further information.

Remote Sense

The remote sense can be used to compensate for the voltage drop between the output pins of the converter and the load input pins by +S / -S pins. The +S and –S pins should be connected to the input pins of the load respectively. The remote sense circuit will compensate for up to 10% voltage drop between the sense voltage and the voltage at the output pins. If the remote sense is not needed, the –S should be connected to -Vo and +S should be connected to +Vo.

The anti-interference design should be considered when the +S / -S pins are connected to the pins to be compensated. The +S and -S traces should be located close to a ground trace or ground plane, and the area they surrounded should be minimized (just for electrical isolation); If cable connection presents, twisted pair wires should be used, EMI core are equipped with the twisted pair wires to reduce common mode noise when necessary, the sense leads should not be longer than 200mm,or the system characteristics may not be assured.

The sense leads only can carry very little current, and are not used for converter power output. Care should be taken in operation to avoid damaging the converter.

Remote Control

Remote control can be offered by setting right control voltage level (or floating) to CNT pin. DC300-28S28C is provided with positive logic remote control.When the level is higher than 3.5V or be left floating, the converter will be turned on. When the level is less than 1.2V, the converter will be turned off. When low voltage level is applied, the output current of the CNT is less than 5mA.When high voltage level (3.5V ~ 15V) is applied, the input current of the CNT is less than 1mA.

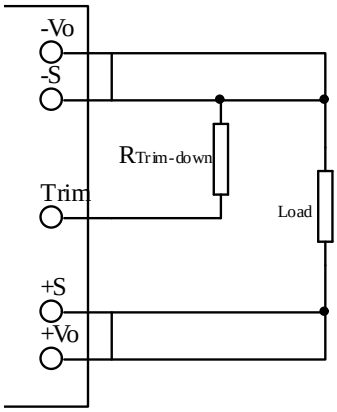
Since the logic comparator is a semiconductor integrated circuit, it has low surge endurance. Care should be taken to protect CNT from surges. A TVS diode should be used where necessary. When the pin is left floating, a voltage of 2.0 V to 6.0 V may appear on the pin.

DC300-48S28NC is provided with negative logic remote control. It has the same characteristic as DC300-28S28C , except control logic.When the level is higher than 3.5V or be left floating, the converter will be turned off. When the level is less than 1.2V, the converter will be turned on . Like positive logic control converters, care should be taken to prevent CNT from surge. When the pin is left floating, the voltage of the pin is 2.0V-6.0V.

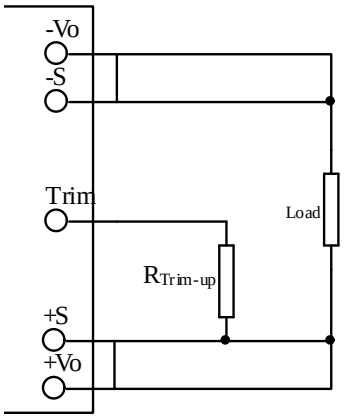
In some applications, extra controls will be designed for the converter in user's PCB, such as output short circuit protection, over voltage protection, under voltage protection, and so on, remote control will give you help. The controls can be achieved by external circuit applied to the CNT pin.

In some applications it is necessary to have a precise turn on and turn off level, or the level which can be received has a very narrow range, the aux. circuit will be required. Please contact us for more information.

Output Voltage Adjust



Connection for Trimming Down



Connection of Trimming Up

The converters have an Output Voltage adjust pin (Trim). This pin can be used to adjust the output voltage above or below Output voltage initial setting. When increasing the output voltage, the voltage at the output pins (including any remote sense offset) must be kept below the maximum output adjust range, or the characteristics will not be assured in compliant with the specification, even the over voltage protection may be triggered. Also note that at increased output voltages the maximum power rating of the converter 300W remains the same, and the output current capability will decrease correspondingly, at decrease output voltages the maximum current should not exceed 10.72A. When the trim pins are not used, they should be floated.

External circuit is connected as the figure shown, the resistance is calculated as the formula below, please note that the formula will be invalid when $R_{Trim-up}$、$R_{Trim-down}$ are used simultaneously, users adjust the value based on the resistance applied.

Resistance for trimming up: $R_{Trim-up} = \left(\frac{5.11 \times Vo(100(\%) + \Delta(\%))}{1.24 \times \Delta(\%)} - \frac{5.11 \times 100(\%)}{\Delta(\%)} - 10.22 \right) (k\Omega)$

Resistance for trimming down: $R_{Trim-down} = \left(\frac{5.11 \times 100(\%)}{\Delta(\%)} - 10.22 \right) (k\Omega)$

Vo : Rated output voltage 28V ;

$R_{Trim-up}$、$R_{Trim-down}$: Resistance for trimming up or down (unit kΩ) ;

$\Delta(\%)$: Change rate, divide output voltage by rated output voltage.

For example, trimmed down voltage to 26.6V, then $\Delta(\%)$ = [(28-26.6) / 28] x 100%=5% ;

$R_{Trim-down}$ = 5.11×100% / 5%-10.22=91.98(kΩ), it can be taken as 92KΩ.

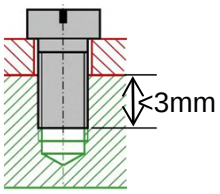
Cautions

1) The enclosure of DC300-28S28C is not fully sealed. Immersion or washing may allow liquid to penetrate the enclosure, thereby causing performance degradation or damage. It is therefore recommended to clean solder joints and exterior surfaces with alcohol only.

2) The product features a wide input range. When the supply-side input impedance is high, ensure that the supply voltage does not fall below 16Vdc. When the input inductance is high, add appropriate filter capacitors near the input pins for impedance matching.

3) Prolonged soldering on the pins may cause internal connections to loosen. The soldering time should not exceed 5 seconds.

4) During assembly, the product should be mounted before soldering, to avoid mechanical stress on the pins. When mounting parts (e.g., the heat-sink), to prevent damage to the product's internal components, the screw insertion depth must be less than 3 mm.



5) For more detailed information, please contact us.