


**DESCRIPTION: 30W 1.5KVDC Isolated Wide Voltage Input DC/DC Converters**

The rated output power of TP30DG converters is 30W, 2:1 and 4:1 wide input voltage range ,the voltage range is 9V-18V,18V-36V,36V-72V,9V-36V and 18V-72VDC.The accuracy of the converter can reach  $\pm 1\%$ ,It can be widely used in telecommunications ,railway transportation, instrument and etc.

## FEATURES

|                           |                                      |                                       |
|---------------------------|--------------------------------------|---------------------------------------|
| 30W output power          | 2:1 and 4:1 wide input voltage range | Long term short-circuit protection    |
| 1.5KVDC isolation         | Input under voltage protection       | Super capability with capacitive load |
| Fixed switching frequency | Operating temperature: -40℃ to 85℃   | Metal shielding package               |
| RoHs compliance           | /                                    | /                                     |

## SELECTION GUIDE

| Part Number  | Input Voltage |              | Output        |             | Efficiency(Typ.)<br>% |
|--------------|---------------|--------------|---------------|-------------|-----------------------|
|              | voltage (VDC) |              | Voltage (VDC) | Current (A) |                       |
|              | Rated         | Range values |               |             |                       |
| TP30DG12S03  | 12(2:1)       | 9-18         | 3.3           | 6           | 85                    |
| TP30DG12S05  | 12(2:1)       | 9-18         | 5             | 6           | 83                    |
| TP30DG12S12  | 12(2:1)       | 9-18         | 12            | 2.5         | 86                    |
| TP30DG12S15  | 12(2:1)       | 9-18         | 15            | 2           | 86                    |
| TP30DG12S24  | 12(2:1)       | 9-18         | 24            | 1.25        | 85                    |
| TP30DG12D05  | 12(2:1)       | 9-18         | ±5            | ±3          | 83                    |
| TP30DG12D12  | 12(2:1)       | 9-18         | ±12           | ±1.25       | 86                    |
| TP30DG24S03  | 24(2:1)       | 18-36        | 3.3           | 6           | 85                    |
| TP30DG24S05  | 24(2:1)       | 18-36        | 5             | 6           | 84                    |
| TP30DG24S12  | 24(2:1)       | 18-36        | 12            | 2.5         | 87                    |
| TP30DG24S15  | 24(2:1)       | 18-36        | 15            | 2           | 87                    |
| TP30DG24S24  | 24(2:1)       | 18-36        | 24            | 1.25        | 86                    |
| TP30DG24D05  | 24(2:1)       | 18-36        | ±5            | ±3          | 83                    |
| TP30DG24D12  | 24(2:1)       | 18-36        | ±12           | ±1.25       | 86                    |
| TP30DG24D15  | 24(2:1)       | 18-36        | ±15           | ±1          | 86                    |
| TP30DG48S03  | 48(2:1)       | 36-72        | 3.3           | 6           | 85                    |
| TP30DG48S05  | 48(2:1)       | 36-72        | 5             | 6           | 84                    |
| TP30DG48S12  | 48(2:1)       | 36-72        | 12            | 2.5         | 87                    |
| TP30DG48S15  | 48(2:1)       | 36-72        | 15            | 2           | 87                    |
| TP30DG48S24  | 48(2:1)       | 36-72        | 24            | 1.25        | 86                    |
| TP30DG48D05  | 48(2:1)       | 36-72        | ±5            | ±3          | 83                    |
| TP30DG48D12  | 48(2:1)       | 36-72        | ±12           | ±1.25       | 86                    |
| TP30DG48D15  | 48(2:1)       | 36-72        | ±15           | ±1          | 86                    |
| TP30DG24S05W | 24(4:1)       | 9-36         | 5             | 6           | 81                    |
| TP30DG24S12W | 24(4:1)       | 9-36         | 12            | 2.5         | 85                    |
| TP30DG24S15W | 24(4:1)       | 9-36         | 15            | 2           | 85                    |
| TP30DG24S24W | 24(4:1)       | 9-36         | 24            | 1.25        | 85                    |
| TP30DG24D05W | 24(4:1)       | 9-36         | ±5            | ±3          | 81                    |
| TP30DG24D12W | 24(4:1)       | 9-36         | ±12           | ±1.25       | 84                    |
| TP30DG24D15W | 24(4:1)       | 9-36         | ±15           | ±1          | 84                    |
| TP30DG48S05W | 48(4:1)       | 18-72        | 5             | 6           | 81                    |
| TP30DG48S12W | 48(4:1)       | 18-72        | 12            | 2.5         | 85                    |
| TP30DG48S15W | 48(4:1)       | 18-72        | 15            | 2           | 85                    |
| TP30DG48S24W | 48(4:1)       | 18-72        | 24            | 1.25        | 85                    |
| TP30DG48D05W | 48(4:1)       | 18-72        | ±5            | ±3          | 81                    |
| TP30DG48D12W | 48(4:1)       | 18-72        | ±12           | ±1.25       | 84                    |
| TP30DG48D15W | 48(4:1)       | 18-72        | ±15           | ±1          | 84                    |

Input voltage 9-18VDC, start-up voltage 9.5-18VDC, input voltage 9-36VDC, start-up voltage 9.5-36VDC.

All specifications typical at TA=25℃, nominal input voltage and rated output current unless otherwise specified.

**GENERAL CHARACTERISTICS**

| parameter                    | Test conditions     | Min                      | Typ               | Max  | Units |
|------------------------------|---------------------|--------------------------|-------------------|------|-------|
| Isolation voltage            | Input to output     |                          | 500               | 1500 | VDC   |
| Insulation resistance        | Input to output     | 100M                     |                   |      | Ohm   |
| Seismic                      | 10~55Hz             |                          | 5                 |      | G     |
| MTBF                         | MIL-HDBK-217F2      |                          | 5*10 <sup>5</sup> |      | hrs   |
| Over-current protection mode | All input range     | Burp, Automatic recovery |                   |      |       |
| Cooling                      | Free air convection |                          |                   |      |       |
| Case material                | Metal case          |                          |                   |      |       |

**INPUT CHARACTERISTICS**

| parameter          | Test conditions                          | Min      | Typ | Max | Units |
|--------------------|------------------------------------------|----------|-----|-----|-------|
| Input voltage      | 12V Input module(9V-18V)                 | 9.5      | 12  | 18  | VDC   |
| Input voltage      | 24V Input module(18V-36V)                | 18       | 24  | 36  | VDC   |
| Input voltage      | 48V Input module(36V-72V )               | 36       | 48  | 72  | VDC   |
| Input voltage      | 24V Input module(9V-36V)                 | 9.5      | 24  | 36  | VDC   |
| Input voltage      | 48V Input module(18V-72V)                | 18       | 48  | 72  | VDC   |
| Startup time       | Output rise time from 5% to 100%         | 20       |     |     | ms    |
| Remote control CTL | Remote CTL-Vin                           | Turn off |     |     |       |
| Remote control CTL | Remote CTL NC(The control level 12V-40V) | Turn on  |     |     |       |

**OUTPUT CHARACTERISTICS**

| parameter                  | Test conditions                                                                                                                         | Min | Typ | Max  | Units |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----|-----|------|-------|
| Voltage accuracy           | $I_o=0.1 \dots 1.0 \times I_{onom}$ $V_i=V_i$ rated                                                                                     |     |     | ±1   | %     |
| Line regulation            | $V_{imin} \leq V_i \leq V_{imax}$                                                                                                       |     |     | ±0.2 | %     |
| Load regulation            | $I_o=0.1 \dots 1.0 \times I_{onom}$<br>$V_{imin} \leq V_i \leq V_{imax}$                                                                |     |     | ±0.5 | %     |
| Auxiliary voltage accuracy | Main Load and auxiliary load differ 25%,the auxiliary circuit of the load carrying at least 25%, the main circuit running the full load |     |     | ±3   | %     |
| Ripple and noise           | 20MHz bandwidth                                                                                                                         |     |     | ±1   | %     |
| Over-current protection    | $V_{imin} \leq V_i \leq V_{imax}$                                                                                                       | 120 |     |      | %     |
| Output voltage trim range  | $V_{imin} \leq V_i \leq V_{imax}$                                                                                                       |     |     | 10   | %     |
| Transient recovery time    | 25% load changes                                                                                                                        |     |     | ±5   | %     |
| Transient overshoot time   | 25% load changes                                                                                                                        |     |     | 400  | us    |
| Switch frequency           | $V_{imin} \leq V_i \leq V_{imax}$                                                                                                       |     | 300 |      | KHz   |

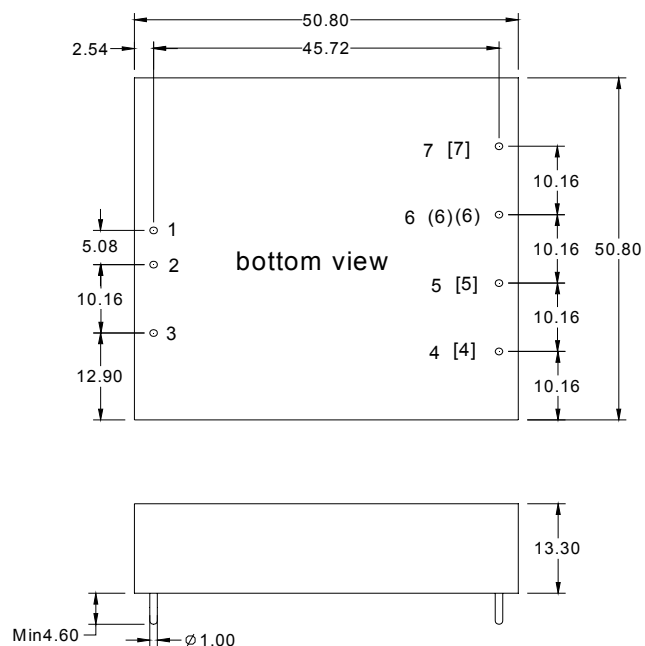
**ENVIRONMENT CHARACTERISTICS**

| parameter             | Test conditions                   | Min | Typ | Max  | Units |
|-----------------------|-----------------------------------|-----|-----|------|-------|
| Storage Humidity      | Non condensing                    | 5   |     | +95  | %     |
| Operating Temperature | Power derating (above 71℃)        | -40 |     | +85  | ℃     |
| Storage Temperature   |                                   | -55 |     | +125 | ℃     |
| Max. Case Temperature | Operating Temperature curve range |     |     | 105  | ℃     |
| Lead Temperature      | 1.5mm from case for 10 seconds    |     |     | 300  | ℃     |
| Cooling               | Free air convection               |     |     |      |       |

- Module in every environment temperature rating, case temperature under shall not exceed the maximum case temperature level.

**MECHANICAL DIMENSIONS**

**DIP Package**



Units: mm

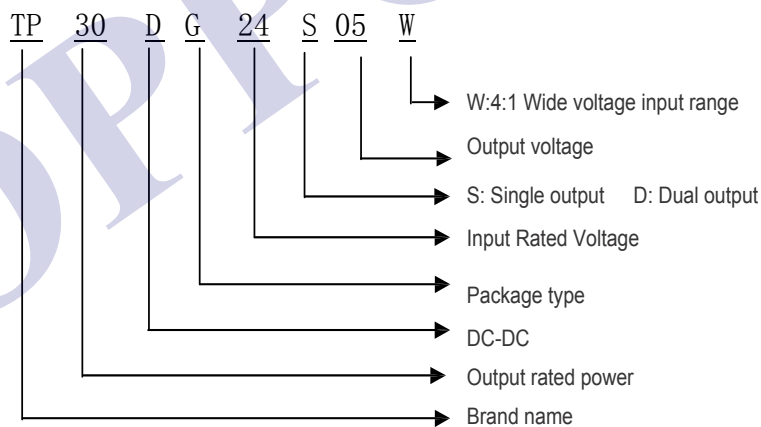
Pin diameter tolerances:  $\pm 0.1\text{mm}$

General Tolerance:  $\pm 0.5\text{mm}$

**PIN CONNECTIONS**

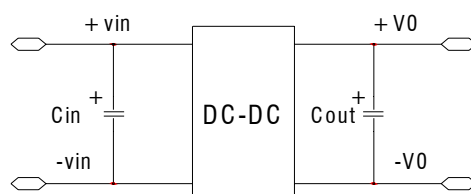
| Pin | Single output | Dual output |
|-----|---------------|-------------|
| 1   | +Vin          | +Vin        |
| 2   | -Vin          | -Vin        |
| 3   | CTL           | CTL         |
| 4   | TRM           | TRM         |
| [4] | /             | /           |
| 5   | -Vout         | -Vout       |
| [5] | /             | /           |
| 6   | +Vout         | /           |
| (6) | /             | Com         |
| [6] | /             | /           |
| 7   | /             | +Vout       |
| [7] | /             | /           |

**MODEL SELECTION**



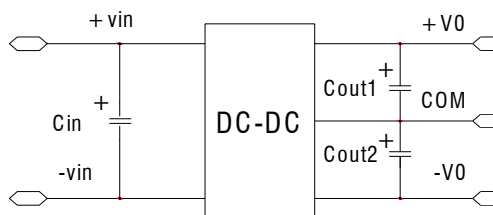
**RECOMMEND CIRCUIT**

**Single Output:**



## RECOMMEND CIRCUIT

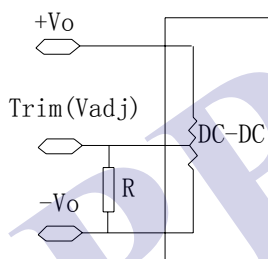
Dual Output:



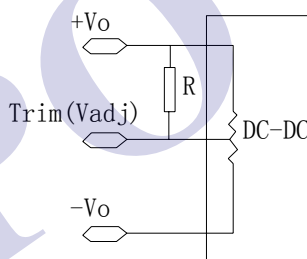
- Add input capacitance  $C_{in}$  is helpful to improve the electromagnetic compatibility, recommend  $C_{in}$  use 47  $\mu F$ -100 $\mu F$  of the electrolytic capacitors.
- If the module connect to the digital circuits, please add the  $C_{out}$ ,  $C_{out1}$ ,  $C_{out2}$ .
- If  $C_{out}$ ,  $C_{out1}$ ,  $C_{out2}$  value is too high or lower ESR, it will cause the module instable,
- The recommended value of  $C_{out}$ ,  $C_{out1}$ ,  $C_{out2}$  should be 100  $\mu F/A$ , the current here means the output current.

## Trim application & Trim Resistance

Raise the output Voltage



Down the output voltage



- In dual and triple output modules, this application can just used in the main load(auxiliary road change together with the main load)

## USING ATTENTIONS

- Module will cause irreversible damage when in the state of the input reverse polarity.
- Module will cause irreversible damage when in the long-term overload conditions.
- Module will cause irreversible damage when out of the maximum input voltage range.

TEMPERATURE RATED 0~70℃