


**DESCRIPTION :** **10W 4KV Isolation Wide Input AC/DC Converters**

The rated output power of TP10AC series is 10W with wide input voltage range, for both AC input and DC input application. High reliability, precision, large power density, ultra-small size, no external heat sink required, stable output voltage and etc, with over current protection, EMI filter circuit, the rectifier filter circuit, 4000V isolation voltage, short circuit, overload, internal thermal protection, Widely used in telecommunications, industrial control, instrument, data acquisition, signal control and other electronic systems.

**FEATURES**

| Universal input voltage range |               |         | Both for AC and DC input voltage |             | Wide input voltage: 4:1            |  |
|-------------------------------|---------------|---------|----------------------------------|-------------|------------------------------------|--|
| Fixed switching frequency     |               |         | Overheat protection              |             | Over current protection            |  |
| Short circuit protection      |               |         | RoHS compliant                   |             | Operating temperature :-40℃ to 80℃ |  |
| Part Number                   | Input Voltage |         | Output                           |             | Efficiency (Typ. )                 |  |
|                               | Rated         |         | Voltage (VDC)                    | Current (A) |                                    |  |
|                               | (VAC)         | (VDC)   |                                  |             |                                    |  |
| TP10AC220S05W                 | 85-300        | 110-370 | 5                                | 2.0         | 69                                 |  |
| TP10AC220S09W                 | 85-300        | 110-370 | 9                                | 1.11        | 73                                 |  |
| TP10AC220S12W                 | 85-300        | 110-370 | 12                               | 0.83        | 75                                 |  |
| TP10AC220S15W                 | 85-300        | 110-370 | 15                               | 0.66        | 76                                 |  |
| TP10AC220S24W                 | 85-300        | 110-370 | 24                               | 0.41        | 78                                 |  |

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

**GENERAL CHARACTERISTICS**

| Parameter               | Conditions                                   | Min.          | Typ. | Max. | Units |
|-------------------------|----------------------------------------------|---------------|------|------|-------|
| Isolation voltage       | Input / Output 1 minute, leakage current 2mA |               | 4000 |      | VAC   |
| Input Frequency         | 10~55Hz                                      | 47            |      | 63   | HZ    |
| Over current protection | Full input range                             | Auto recovery |      |      |       |
| Cooling                 | Free air convection                          |               |      |      |       |
| Case material           | Flame-retardant plastic                      |               |      |      |       |

**INPUT CHARACTERISTICS**

| Parameter                                                                    | Conditions               | Min.                                                        | Typ. | Max. | Units |
|------------------------------------------------------------------------------|--------------------------|-------------------------------------------------------------|------|------|-------|
| Startup voltage                                                              | VAC In module(85V-300V)  | 85                                                          | 220  | 300  | VAC   |
| Startup voltage                                                              | VDC In module(110V-370V) | 110                                                         | 220  | 375  | VDC   |
| External fuse recommended value(wiring, rail type Package has included fuse) |                          | Fuse must be connected, recommended 1A / 250V slow-off type |      |      |       |

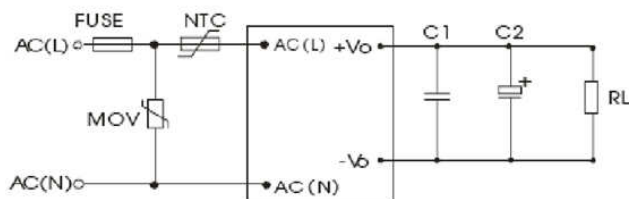
**OUTPUT CHARACTERISTICS**

| Parameter                 | Conditions                                            | Min. | Typ. | Max. | Units |
|---------------------------|-------------------------------------------------------|------|------|------|-------|
| Voltage accuracy          |                                                       |      |      | ±2   | %     |
| Line regulation           | Full load                                             |      | ±0.5 |      | %     |
| Load regulation           | 10%~100% load                                         |      | ±1   |      | %     |
| Standby power consumption |                                                       |      |      | 0.3  | W     |
| Over current protection   | ≥110% I <sub>o</sub> , self-recovery                  |      |      |      |       |
| Over voltage protection   | Over-voltage shutdown output                          |      |      |      |       |
| Ripple and noise          | 20MHz bandwidth                                       |      | 50   | 100  | mv    |
| Short-circuit protection  | Hiccup-type, sustainable short-circuit, self-recovery |      |      |      |       |
| Switch frequency          |                                                       |      | 140  |      | Hz    |
| Power-down hold time      | 110VAC                                                |      | 12   |      | ms    |
|                           | 230VAC                                                |      | 80   |      | ms    |



## RECOMMEND CIRCUIT

### 1.the typical application circuit

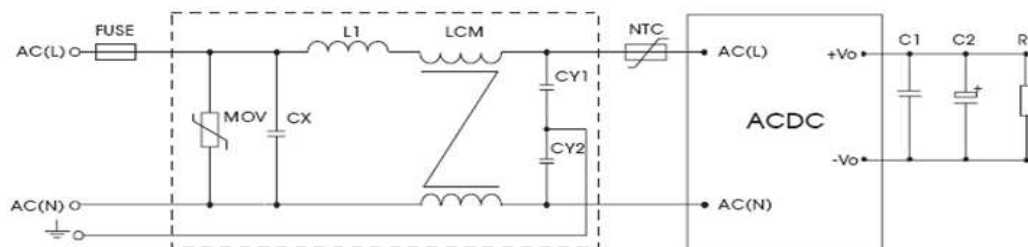


|               | C1( $\mu$ F)) | C2( $\mu$ F)) |
|---------------|---------------|---------------|
| TP10AC220S05W | 1             | 220           |
| TP10AC220S09W | 1             | 220           |
| TP10AC220S12W | 1             | 100           |
| TP10AC220S15W | 1             | 100           |
| TP10AC220S24W | 1             | 47            |

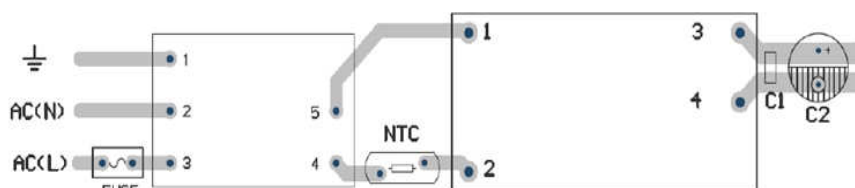
The output filter capacitor C2, the proposed use of high-frequency low-resistance electrolytic capacitors, capacity and flow of current refer to the manufacturers to provide technical specifications. The output capacitor withstanding voltage derating factor is greater than 80%. C1 is a ceramic capacitor to remove high frequency noise.

Recommended external N C thermistor, model: 12D-5. Recommended external MOV varistor, type: 14D561K.

### 2. EMC solutions - recommended circuit



### EMC Solutions - Recommended Circuit PCB Lavout



Note: safety regulations and the width of the proposed line:

line width  $\geq 3\text{mm}$ , line distance  $\geq 6\text{mm}$ , line distance  $\geq 6\text{mm}$

| Component | Recommended value                |
|-----------|----------------------------------|
| MOV       | 14D561K                          |
| CX        | 0.1 $\mu$ F/275VAC               |
| L1        | 4.7 $\mu$ H/2.0A                 |
| CY1       | 1nF/400VAC                       |
| CY2       | 1nF /400VAC                      |
| LC        |                                  |
| M         | 2.2mH                            |
| FUSE      | 1A/250V, Slow blow, must connect |

## EMC CHARATERISTICS

|     |                                                  |                                                                           |                  |
|-----|--------------------------------------------------|---------------------------------------------------------------------------|------------------|
| EMI | Conducted harassment                             | CISPR22/EN55022, CLASS B                                                  |                  |
| EMI | Radiation harassment                             | CISPR22/EN55022, CLASS B                                                  |                  |
| EMS | Electrostatic discharge                          | IEC/EN61000-4-2 $\pm 6\text{KV}/8\text{KV}$                               | perf. Criteria B |
| EMS | Radiation immunity                               | IEC/EN61000-4-3 10V/m                                                     | perf. Criteria A |
| EMS | Impulse group immunity                           | IEC/EN61000-4-4 $\pm 2\text{kV}$                                          | perf. Criteria B |
| EMS | Impulse group immunity                           | IEC/EN61000-4-4 $\pm 4\text{kV}$ (see recommended circuit)                | perf. Criteria B |
| EMS | Surge Immunity                                   | IEC/EN61000-4-5 $\pm 1\text{KV}$                                          | perf. Criteria B |
| EMS | Surge Immunity                                   | IEC/EN61000-4-5 $\pm 2\text{KV}/\pm 4\text{KV}$ (see recommended circuit) | perf. Criteria B |
| EMS | Conducted disturbance immunity                   | IEC/EN61000-4-6 10 Vr.m.s                                                 | perf. Criteria A |
| EMS | Power frequency magnetic field immunity          | IEC/EN61000-4-8 10A/m                                                     | perf. Criteria A |
| EMS | Voltage dips, drops and short interrupt immunity | IEC/EN61000-4-11 0%-70%                                                   | perf. Criteria B |