



## INPUT

| parameter        | conditions/description  | min  | typ    | max    | units |
|------------------|-------------------------|------|--------|--------|-------|
| input voltage    | 12 Vdc input models     | 9    | 12     | 18     | Vdc   |
|                  | 24 Vdc input models     | 18   | 24     | 36     | Vdc   |
| start-up voltage | 12 Vdc input models     |      |        | 9      | Vdc   |
|                  | 24 Vdc input models     |      |        | 18     | Vdc   |
| surge voltage    | for maximum of 1 second |      |        |        |       |
|                  | 12 Vdc input models     | -0.7 |        | 25     | Vdc   |
|                  | 24 Vdc input models     | -0.7 |        | 50     | Vdc   |
| filter           | capacitance filter      |      |        |        |       |
| current          | 12 Vdc input models     |      | 321/30 | 338/50 | mA    |
|                  | 24 Vdc input models     |      | 156/20 | 165/40 | mA    |

## OUTPUT

| parameter               | conditions/description   | min | typ  | max   | units |
|-------------------------|--------------------------|-----|------|-------|-------|
| line regulation         | min to max Vin           |     | ±0.2 | ±0.5  | %     |
| load regulation         | 5% ~ 100% load           |     | ±0.5 | ±1    | %     |
| set-point accuracy      | 5% ~ 100% load           |     |      |       |       |
|                         | positive outputs         |     | ±1   | ±3    | %     |
|                         | negative outputs         |     | ±3   | ±5    | %     |
| switching frequency     | full load, nominal input |     | 300  |       | kHz   |
| transient response      | 25% load step change     |     | ±2.5 | ±5    | %     |
| temperature coefficient | full load                |     |      | ±0.03 | %/°C  |

## PROTECTIONS

| parameter                | conditions/description    | min | typ | max | units |
|--------------------------|---------------------------|-----|-----|-----|-------|
| short circuit protection | continuous, self-recovery |     |     |     |       |

## SAFETY AND COMPLIANCE

| parameter             | conditions/description   | min  | typ | max | units  |
|-----------------------|--|------|-----|-----|--------|
| isolation voltage     | input-output electric strength test for 1 minute                               | 1500 |     |     | Vdc    |
| isolation resistance  | input-output insulation at 500 Vdc   | 1000 |     |     | MΩ     |
| isolation capacitance | input-output capacitance at 100 KHz / 0.1 V                                    |      | 100 |     | pF     |
| safety approvals      | EN62368  |      |     |     |        |
| EMC                   | CISPR32/EN55032 Class B (see recommended circuit)                              |      |     |     |        |
| ESD                   | IEC/EN61000-4-2, Contact ±6K, perf. Criteria B                                 |      |     |     |        |
| radiated immunity     | CISPR32/EN55032  |      |     |     |        |
| EFT/burst             | IEC/EN61000-4-4, ±2KV, perf. Criteria B (see recommended circuit)              |      |     |     |        |
| surge                 | IEC/EN61000-4-5, line to line ±2KV, perf. Criteria B (see recommended circuit) |      |     |     |        |
| conducted immunity    | IEC/EN61000-4-6 3 Vrms   |      |     |     |        |
| RoHS                  | yes  |      |     |     |        |
| MTBF                  | MIL-HDBK-217F @ 25°C   | 1000 |     |     | kHours |

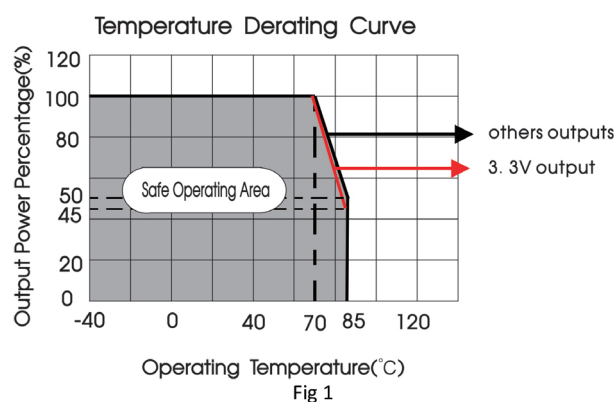
## ENVIRONMENTAL

| parameter             | conditions/description | min | typ | max | units |
|-----------------------|------------------------|-----|-----|-----|-------|
| operating temperature |                        | -40 |     | 85  | °C    |
| storage temperature   |                        | -55 |     | 125 | °C    |
| humidity              | non-condensing         | 5   |     | 95  | %     |

## SOLDERABILITY

| parameter        | conditions/description          | min | typ | max | units |
|------------------|---------------------------------|-----|-----|-----|-------|
| hand soldering   | 1.5 mm from case for 10 seconds |     |     | 300 | °C    |
| reflow soldering | 60 s max                        |     |     | 245 | °C    |

## DERATING CURVE



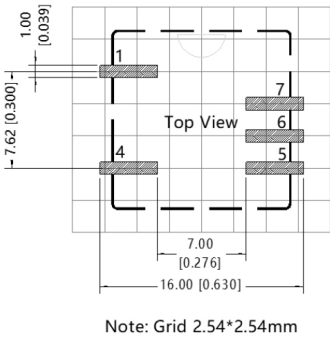
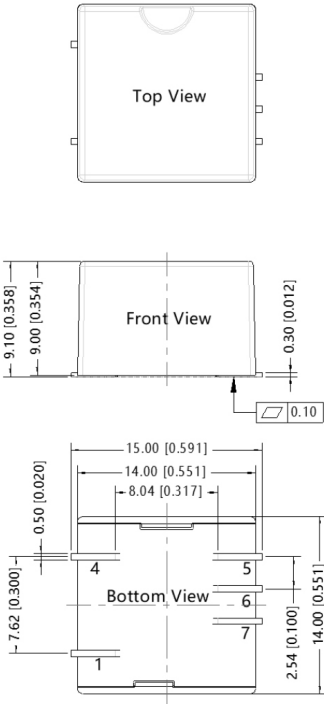
MECHANICAL

| parameter     | conditions/description                                      | min | typ | max | units |
|---------------|---|-----|-----|-----|-------|
| dimensions    | 14 x 14 x 9   |     |     |     | mm    |
| case material | Black plastic; flame-retardant and heat-resistant (UL94-V0) |     |     |     |       |
| weight        |   |     | 2.2 |     | g     |

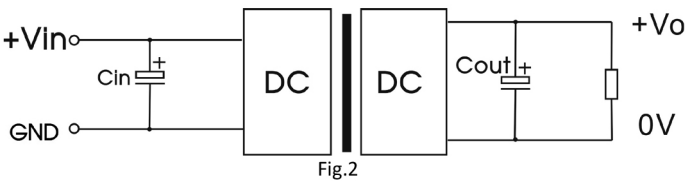
MECHANICAL DRAWING

units: inches [mm]  
tolerance: ± 0.50 [±0.020]

| PIN CONNECTIONS |        |      |
|-----------------|--------|------|
| PIN             | Single | Dual |
| 1               | GND    | GND  |
| 4               | Vin    | Vin  |
| 5               | +Vo    | +Vo  |
| 6               | NC     | 0V   |
| 7               | 0V     | -Vo  |



RECOMMENDED CIRCUITS



| Parameter Description |          |          |
|-----------------------|----------|----------|
| Vin (Vdc)             | 12       | 24       |
| Cin                   | 47uF/25V | 47uF/50V |

|          |            |            |
|----------|------------|------------|
| Vo (Vdc) | 3.3, 5     | 12, 15, 24 |
| Cout     | 100uF/6.3V | 27uF/35V   |

EMC COMPLIANCE CIRCUITS

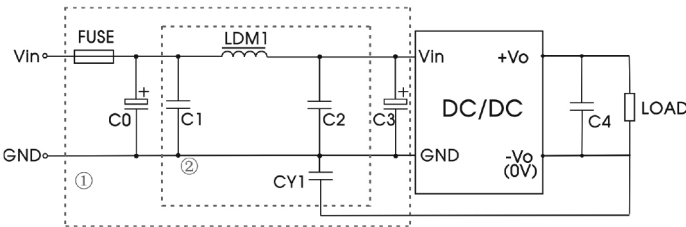


Fig.3

| Parameter Description |   |   |           |    |    |             |   |           |    |    |
|-----------------------|---|---|-----------|----|----|-------------|---|-----------|----|----|
| Part No.              | Vin: 12 Vdc   |   |           |    |    | Vin: 24 Vdc |   |           |    |    |
| Vo (Vdc)              | 3.3   | 5 | 12        | 15 | 24 | 3.3         | 5 | 12        | 15 | 24 |
| FUSE                  | slow blow, choose according to actual input current |   |           |    |    |             |   |           |    |    |
| C0                    | 1000μF/25V  |   |           |    |    | 680μF/50V   |   |           |    |    |
| C1                    | 10μF/50V  |   | 4.7μF/50V |    |    | 10μF/50V    |   | 4.7μF/50V |    |    |
| LDM1                  | 15μH  |   |           |    |    |             |   |           |    |    |
| C2                    | 4.7μF/50V   |   |           |    |    |             |   |           |    |    |
| C3                    | 330μF/50V   |   |           |    |    |             |   |           |    |    |
| CY1                   | 1nF/2KV   |   |           |    |    |             |   |           |    |    |
| C4                    | Refer to the Cout Fig.2                             |   |           |    |    |             |   |           |    |    |

Note: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

## REVISION HISTORY

| rev. | description     | date       |
|------|-----------------|------------|
| 1.0  | initial release | 03/28/2020 |

The revision history provided is for informational purposes only and is believed to be accurate.



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