


**CUI INC**

a bel group

**date** 11/02/2022

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## SERIES: P783-S | DESCRIPTION: NON-ISOLATED SWITCHING REGULATOR

### FEATURES

- 3A of output current
- high efficiency up to 97%
- no-load input current as low as 2mA
- output short circuit protection
- wide operating temp: -40°C to +85°C
- designed to meet EN 62368

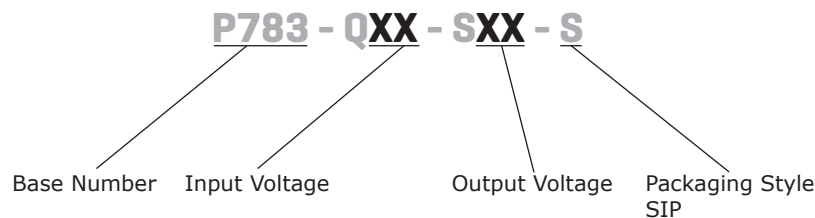


### MODEL

| MODEL          | input voltage |                | output voltage<br>(Vdc) | output current<br>max<br>(mA) | output power<br>max<br>(W) | ripple and noise <sup>1</sup><br>max<br>(mVp-p) | efficiency<br><br>typ (%) |
|----------------|---------------|----------------|-------------------------|-------------------------------|----------------------------|-------------------------------------------------|---------------------------|
|                | typ<br>(Vdc)  | range<br>(Vdc) |                         |                               |                            |                                                 |                           |
| P783-Q24-S3-S  | 24            | 8~36           | 3.3                     | 3000                          | 9.9                        | 70                                              | 90                        |
| P783-Q24-S5-S  | 24            | 8~36           | 5                       | 3000                          | 15                         | 70                                              | 93                        |
| P783-Q24-S6-S  | 24            | 10~36          | 6.5                     | 3000                          | 19.5                       | 70                                              | 94                        |
| P783-Q24-S9-S  | 24            | 13~36          | 9                       | 3000                          | 27                         | 70                                              | 95                        |
| P783-Q24-S12-S | 24            | 16~36          | 12                      | 3000                          | 36                         | 100                                             | 97                        |
| P783-Q24-S15-S | 24            | 19~36          | 15                      | 3000                          | 45                         | 100                                             | 97                        |

Notes: 1. ripple and noise are measured at 20 MHz BW

### PART NUMBER KEY



## INPUT

| parameter               | conditions/description | min | typ | max | units |
|-------------------------|------------------------|-----|-----|-----|-------|
| operating input voltage | 3.3 V output           | 8   | 24  | 36  | Vdc   |
|                         | 5 V output             | 8   | 24  | 36  | Vdc   |
|                         | 6.5 V output           | 10  | 24  | 36  | Vdc   |
|                         | 9 V output             | 13  | 24  | 36  | Vdc   |
|                         | 12 V output            | 16  | 24  | 36  | Vdc   |
|                         | 15 V output            | 19  | 24  | 36  | Vdc   |
| reverse polarity input  | avoid / not protected  |     |     |     |       |

## OUTPUT

| parameter               | conditions/description                                      | min | typ      | max       | units      |
|-------------------------|-------------------------------------------------------------|-----|----------|-----------|------------|
| capacitive load         | 3.3 V output                                                |     |          | 1,000     | μF         |
|                         | 5 V output                                                  |     |          | 680       | μF         |
|                         | 6.5 V output                                                |     |          | 330       | μF         |
|                         | 9 V output                                                  |     |          | 330       | μF         |
|                         | 12 V output                                                 |     |          | 330       | μF         |
|                         | 15 V output                                                 |     |          | 330       | μF         |
| line regulation         | full load, input voltage range                              |     | ±0.5     | ±1.0      | %          |
| load regulation         | from 10% to 100% load                                       |     | ±0.5     | ±1.0      | %          |
| voltage accuracy        | 0~100% load, input voltage range                            |     | ±2       | ±3        | %          |
| switching frequency     | PWM mode                                                    | 100 | 250      | 400       | kHz        |
| temperature coefficient | -40°C ~ 85°C                                                |     |          | ±0.03     | %/°C       |
| trimmability            | see trim table                                              |     |          |           |            |
| CTRL                    | module on: CTRL open or high<br>module off: CTRL low to GND |     | 4.5<br>0 | 14<br>0.8 | Vdc<br>Vdc |

## PROTECTIONS

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

## SAFETY AND COMPLIANCE

| parameter           | conditions/description                                                       | min   | typ | max | units   |
|---------------------|------------------------------------------------------------------------------|-------|-----|-----|---------|
| safety approvals    | designed to meet 62368: EN, BS EN                                            |       |     |     |         |
| conducted emissions | CISPR32/EN55032 Class B                                                      |       |     |     |         |
| ESD                 | IEC/EN 61000-4-2, contact ±6 kV, perf. criteria B                            |       |     |     |         |
| radiated immunity   | IEC/EN 61000-4-3, 10V/m, perf. criteria A                                    |       |     |     |         |
| EFT/burst           | IEC/EN 61000-4-4, ±1 kV, perf. criteria B (see recommended circuit)          |       |     |     |         |
| surge               | IEC/EN 61000-4-5, Class B, line to line ±1 kV, perf. criteria B              |       |     |     |         |
| EMI/EMC             | IEC/EN 61000-4-6 Class A, 3 Vr.ms (see recommended circuit) perf. criteria A |       |     |     |         |
| MTBF                | as per MIL-HDBK-217F @ 25°C                                                  | 2,000 |     |     | K hours |
| RoHS                | yes                                                                          |       |     |     |         |

## ENVIRONMENTAL

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

## SOLDERABILITY

| parameter     | conditions/description | min | typ | max | units |
|---------------|------------------------|-----|-----|-----|-------|
| pin soldering | for 10 seconds         |     |     | 260 | °C    |

## MECHANICAL

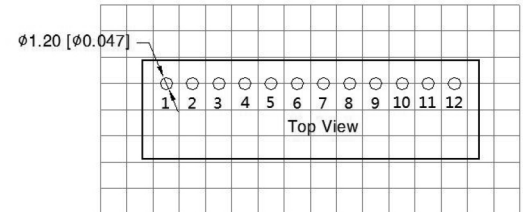
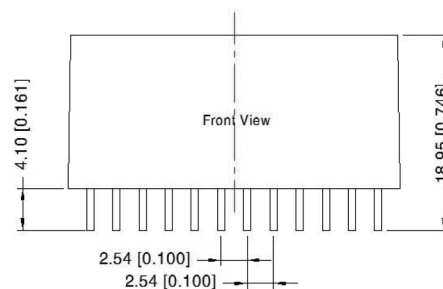
| parameter     | conditions/description                                | min | typ | max | units |
|---------------|-------------------------------------------------------|-----|-----|-----|-------|
| dimensions    | 32.15 x 14.85 x 9.05                                  |     |     |     | mm    |
| case material | flame retardant and heat-resistant plastic (UL94 V-0) |     |     |     |       |
| weight        |                                                       |     | 9.3 |     | g     |

## MECHANICAL DRAWING

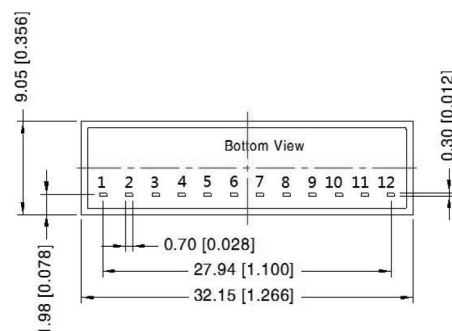
units: mm [inches]

tolerance:  $\pm 0.50$  [ $\pm 0.020$ ]pin section tolerance:  $\pm 0.10$  mm [ $\pm 0.004$ ]

| PIN CONNECTIONS |          |
|-----------------|----------|
| Pin             | Function |
| 1               | Ctrl     |
| 2, 3, 4         | Vin      |
| 5, 6, 7, 8      | GND      |
| 9, 10           | +Vo      |
| 11              | +Vo      |
| 12              | Trim     |

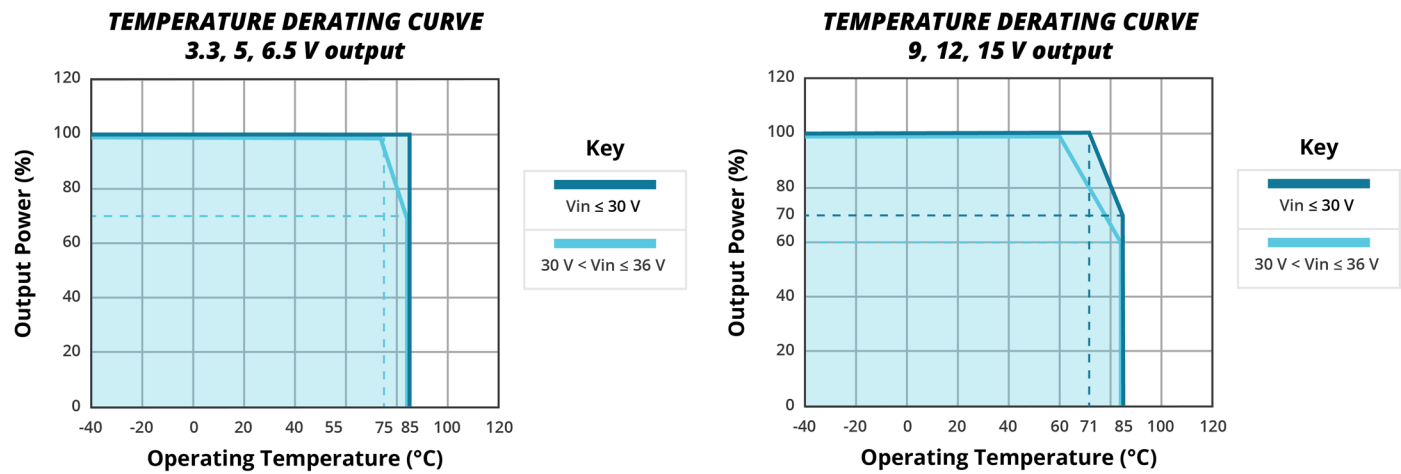


Note: Grid 2.54\*2.54mm



## DERATING CURVES

Figure 1



## TYPICAL APPLICATION CIRCUIT

Figure 2

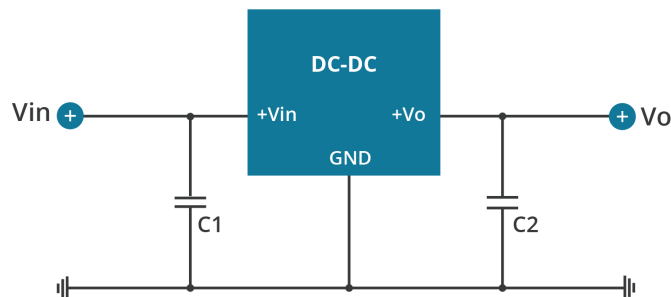


Table 1

| Part No.       | C1<br>(ceramic capacitor) | C2<br>(ceramic capacitor) |
|----------------|---------------------------|---------------------------|
| P783-Q24-S3-S  | 100μF/50V                 | 22μF/10V                  |
| P783-Q24-S5-S  |                           | 22μF/10V                  |
| P783-Q24-S6-S  |                           | 22μF/10V                  |
| P783-Q24-S9-S  |                           | 22μF/16V                  |
| P783-Q24-S12-S |                           | 22μF/25V                  |
| P783-Q24-S15-S |                           | 22μF/25V                  |

- Note:
1. The required capacitors C1 and C2 must be connected as close as possible to the terminals of the module;
  2. Refer to Table 1 for C1 and C2 capacitor values. For certain applications, increased values and/or tantalum or low ESR electrolytic capacitors may also be used instead;
  3. Converter cannot be used for hot swap and with output in parallel.

## EMC RECOMMENDED CIRCUIT

Figure 3

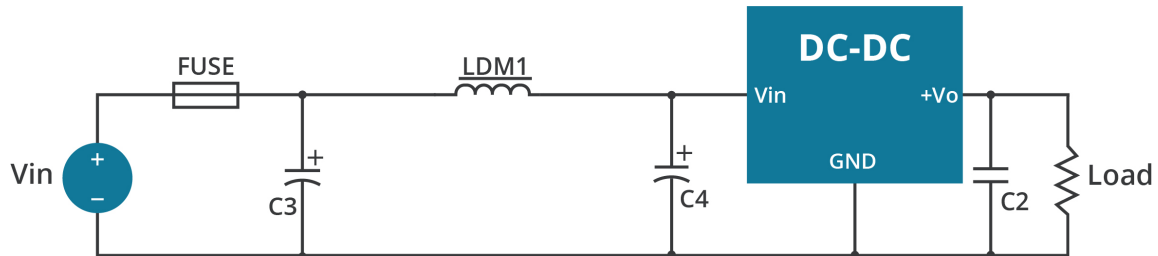


Table 2

|           | FUSE                                                | C3              | LDM1       | C4              | C2                          |
|-----------|-----------------------------------------------------|-----------------|------------|-----------------|-----------------------------|
| Emissions | select fuse value according to actual input current | 100 $\mu$ F/50V | 22 $\mu$ H | 100 $\mu$ F/50V | refer to the C2 in Figure X |
| Immunity  |                                                     |                 |            | 680 $\mu$ F/50V |                             |

## TRIM FUNCTION FOR OUTPUT VOLTAGE ADJUSTMENT

Figure 4

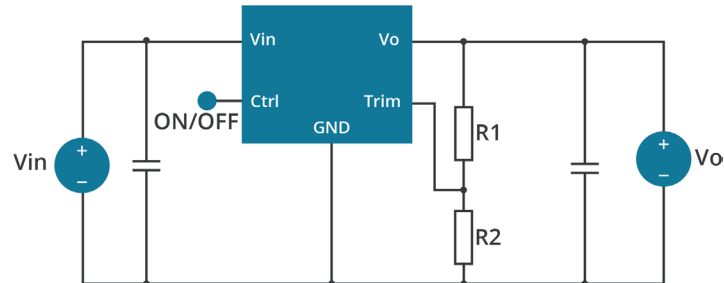


Table 3

| Vout nom. | 3.3 Vdc |     | 5.0 Vdc |      | 6.5 Vdc |      | 9.0 Vdc |     | 12 Vdc |      | 15 Vdc |     |
|-----------|---------|-----|---------|------|---------|------|---------|-----|--------|------|--------|-----|
| Vout adj. | R1      | R2  | R1      | R2   | R1      | R2   | R1      | R2  | R1     | R2   | R1     | R2  |
| 3         | 500K    |     |         |      |         |      |         |     |        |      |        |     |
| 3.3       |         |     |         |      |         |      |         |     |        |      |        |     |
| 4         |         | 95K | 195K    |      |         |      |         |     |        |      |        |     |
| 4.5       |         | 52K | 470K    |      |         |      |         |     |        |      |        |     |
| 5         |         |     |         |      |         |      |         |     |        |      |        |     |
| 5.5       |         |     |         | 125K | 330K    |      |         |     |        |      |        |     |
| 6         |         |     |         | 58K  | 750K    |      |         |     |        |      |        |     |
| 6.5       |         |     |         |      |         |      |         |     |        |      |        |     |
| 7         |         |     |         |      |         | 140K | 220K    |     |        |      |        |     |
| 8         |         |     |         |      |         | 40K  | 520K    |     |        |      |        |     |
| 9         |         |     |         |      |         |      |         |     |        |      |        |     |
| 10        |         |     |         |      |         |      |         | 65K | 530K   |      |        |     |
| 11        |         |     |         |      |         |      |         | 28K | 1180K  |      |        |     |
| 12        |         |     |         |      |         |      |         |     |        |      |        |     |
| 13        |         |     |         |      |         |      |         |     |        | 110K | 590K   |     |
| 14        |         |     |         |      |         |      |         |     |        | 50K  | 1290K  |     |
| 15        |         |     |         |      |         |      |         |     |        |      |        |     |
| 16        |         |     |         |      |         |      |         |     |        |      |        | 90K |
| 17        |         |     |         |      |         |      |         |     |        |      |        | 40K |

## REVISION HISTORY

| rev. | description                                 | date       |
|------|---------------------------------------------|------------|
| 1.0  | initial release                             | 06/29/2020 |
| 1.01 | derating curves and circuit figures updated | 09/23/2021 |
| 1.02 | CE certification removed                    | 11/02/2022 |

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



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