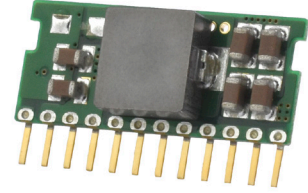


**SERIES:** P783F-S | **DESCRIPTION:** NON-ISOLATED SWITCHING REGULATOR

**FEATURES**

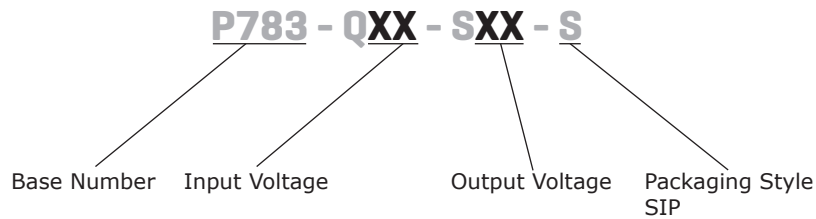
- 3A of output current
- open frame design
- high efficiency up to 97%
- no-load input current as low as 2mA
- output short circuit protection
- wide operating temp: -40°C to +85°C
- designed to meet 62368: EN/BS EN



MODEL	input voltage		output voltage (Vdc)	output current max (mA)	output power max (W)	ripple and noise <sup>1</sup> max (mVp-p)	efficiency typ (%)
	typ (Vdc)	range (Vdc)					
P783F-Q24-S3-S	24	8~36	3.3	3000	9.9	70	90
P783F-Q24-S5-S	24	8~36	5	3000	15	70	93
P783F-Q24-S6-S	24	10~36	6.5	3000	19.5	70	94
P783F-Q24-S9-S	24	13~36	9	3000	27	70	95
P783F-Q24-S12-S	24	16~36	12	3000	36	100	97
P783F-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		4.5	14	Vdc
	module off: CTRL low to GND		0	0.8	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

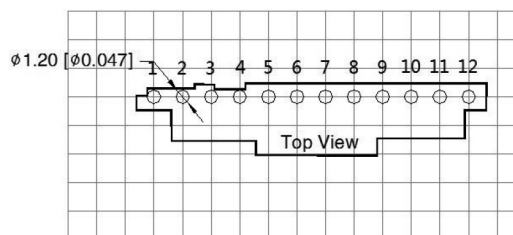
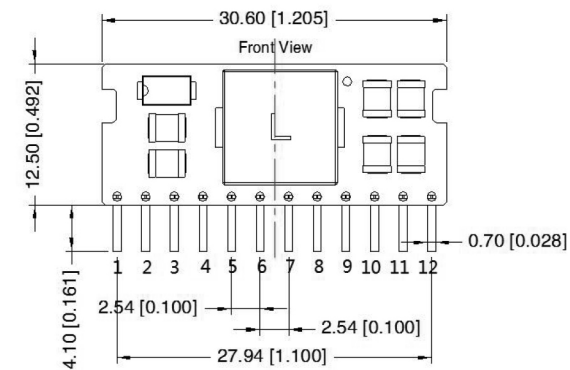
parameter	conditions/description	min	typ	max	units
dimensions	32.15 x 14.85 x 9.05				mm
case material	flame retardant and heat-resistant plastic (UL94 V-0)				
weight			4.0		g

## MECHANICAL DRAWING

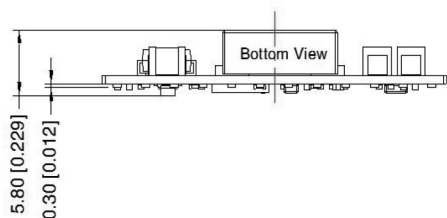
units: mm [inches]

tolerance: ±0.50 [±0.020]

pin section tolerance: ±0.10 mm [±0.004]



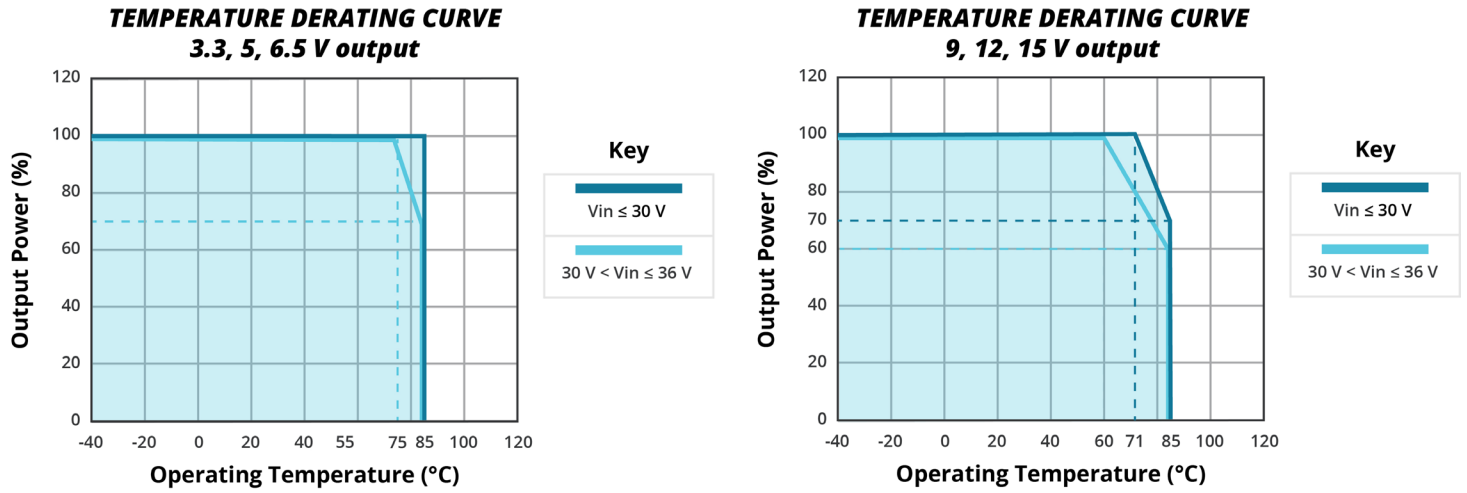
Note: Grid 2.54\*2.54mm



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

## DERATING CURVES

Figure 1



## TYPICAL APPLICATION CIRCUIT

Figure 2

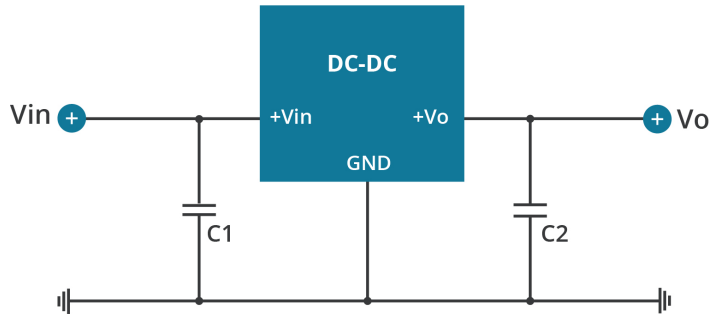


Table 1

Part No.	C1 (ceramic capacitor)	C2 (ceramic capacitor)
P783-Q24-S3-S	100 $\mu$ F/50V	22 $\mu$ F/10V
P783-Q24-S5-S		22 $\mu$ F/10V
P783-Q24-S6-S		22 $\mu$ F/10V
P783-Q24-S9-S		22 $\mu$ F/16V
P783-Q24-S12-S		22 $\mu$ F/25V
P783-Q24-S15-S		22 $\mu$ F/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

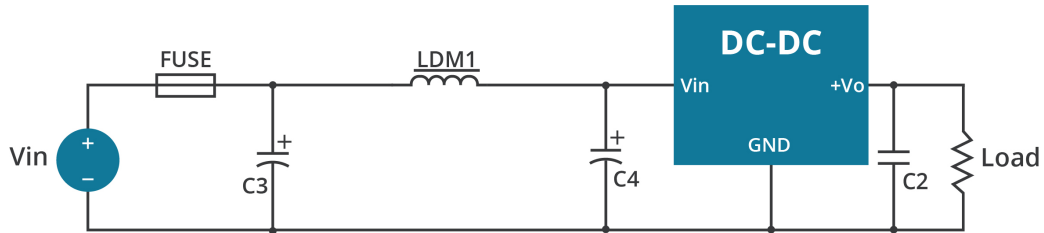


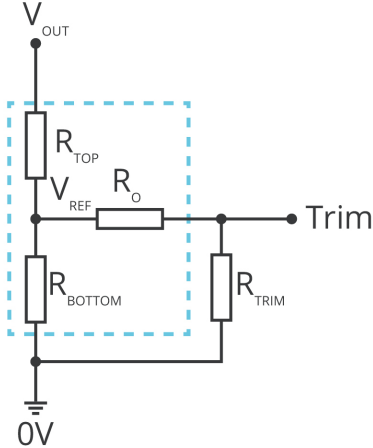
Table 2

	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	

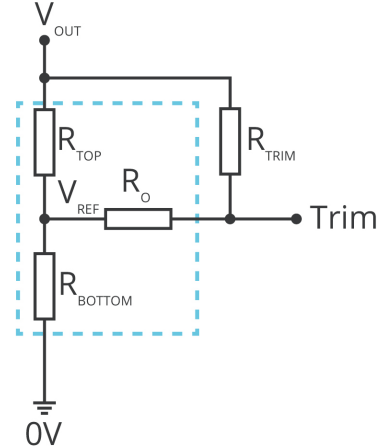
## TRIM FUNCTION FOR OUTPUT VOLTAGE ADJUSTMENT

Figure 4

Trim up



Trim down



$$R_{TRIM} = \frac{a \cdot R_{BOTTOM}}{R_{BOTTOM} - a} - R_O \quad a = \frac{V_{REF}}{V_{OUT} - V_{REF}} \cdot R_{TOP}$$

Formula for Trim up

$$R_{TRIM} = \frac{a \cdot R_{TOP}}{R_{TOP} - a} - R_O \quad a = \frac{V_{OUT} - V_{REF}}{V_{REF}} \cdot R_{BOTTOM}$$

Formula for Trim down

Table 3

$V_{OUT}$ (Vdc)	$R_{TOP}$ (k $\Omega$ )	$R_{BOTTOM}$ (k $\Omega$ )	$R_O$ (k $\Omega$ )	$V_{REF}$ (V)
3.3	75	32.68	10	1
5	68	17.01	10	1
6.5	75	13.64	10	1
9	75	9.38	10	1
12	120	10.91	10	1
15	100	7.14	10	1

Note: Value for  $R_{TOP}$ ,  $R_{BOTTOM}$ ,  $R_O$ , and  $V_{REF}$  refer to Table 3 (fixed internal values).  
 $R_{TRIM}$ : Trim resistance  
 a: User-defined parameter, no actual meanings  
 $V_{OUT}$ : Nominal output voltage

## TRIM FUNCTION FOR OUTPUT VOLTAGE ADJUSTMENT (CONTINUED)

Figure 5

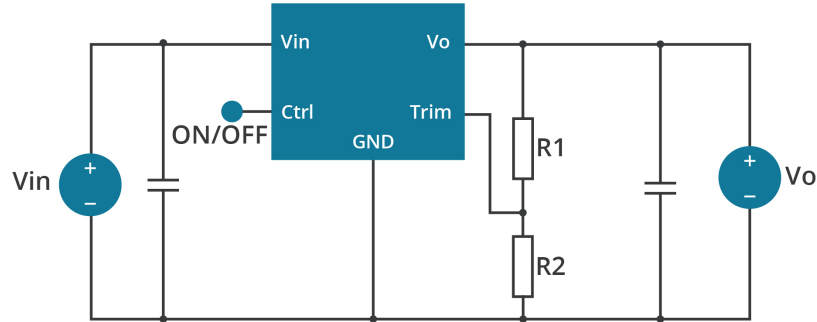


Table 4

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	weight updated in the mechanical section	04/07/2021
1.02	derating curves and circuit figures updated	09/23/2021
1.03	trim resistor equations added	05/19/2022
1.04	trim resistor equations and figures updated	10/14/2022
1.05	CE removed	03/17/2023

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



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