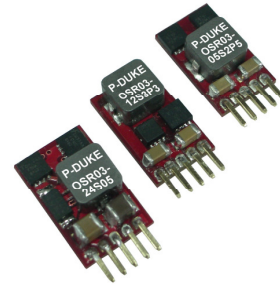


OSR03-SERIES

DC-DC CONVERTER

2.5VDC~30VDC WIDE INPUT RANGE
UP TO 45Watts



FEATURES

- SMALL SIZE AND LOW PROFILE : 0.37 X 0.24 X 0.61: 0.41 X 0.24 X 0.65 INCH
- OPEN FRAME PACKAGES
- NEGATIVE OUTPUT APPLICATION
- REMOTE ON/OFF
- ADJUSTABLE OUTPUT VLOTAGE
- SHORT CIRCUIT PROTECTION
- OVER-TEMPERATURE PROTECTION
- SAFETY MEETS UL60950-1, EN60950-1 AND IEC60950-1
- COMPLIANT TO RoHS EU DIRECTIVE 2011/65/EU

APPLICATIONS

- WIRELESS NETWORK
- TELECOM/DATACOM
- INDUSTRY CONTROL SYSTEM
- DISTRIBUTED POWER ARCHITECTURES
- SEMICONDUCTOR EQUIPMENT

NON IOSULATION	REMOTE CONTROL	OCP	SCP	OTP
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TECHNICAL SPECIFICATION

All specifications are typical at nominal input, full load and 25°C otherwise noted

Positive output application

Model Number	Input Range VDC	Output Voltage VDC	Output Current @FullLoad A	Input Current @ No Load mA	Efficiency %	Maximum Capacitor Load	
						ESR ≥ 1mΩ μF	ESR ≥ 10mΩ μF
OSR03-05S2P5	2.5 ~ 5.5	0.6 ~ 3.3	3	20	95.0@2.5Vo	1000	3000
OSR03-12S3P3	4.5 ~ 14	0.59 ~ 6.0	3	25	93.0@3.3Vo	1000	3000
OSR03-24S05	10 ~ 30	3.0 ~ 6.0	3	25	91.0@5.0Vo	1000	3000
OSR03-24S12	10 ~ 30	5.0 ~ 15	3	30	95.0@12Vo	500	1200

Negative output application

Model Number	Input Range VDC	Output Voltage VDC	Output Current ⁽²⁾ @FullLoad A	Input Current @ No Load mA	Efficiency %	Maximum Capacitor Load
						μF
OSR03-12S3P3	4.7 ~ 13	-0.59 ~ -6.0	2.2	35	90.0@-3.3Vo	780
OSR03-24S05	10 ~ 27	-3.0 ~ -6.0	2.2	35	90.0@-5.0Vo	2200
OSR03-24S12	10 ~ 25	-5.0 ~ -15	1.2	60	91.0@-12Vo	580

*Please see page 2 input specifications for input range details.

PART NUMBER STRUCTURE

Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Assembly Option
Positive	05: 2.5~5.5 12: 4.5~14 24: 10~ 30	S: Single	2P5: 0.6~ 3.3 3P3: 0.59~6.0 05: 3.0~6.0 12: 5.0~15	□:Standard A:Horizontal type
	Negative		05: 4.7~13 12: 10~ 27 24: 10~ 25	

INPUT SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating input voltage range ⁽³⁾	Positive output application 05S2P5 (Vin>Vo+0.5V) 05Vin(nom), 0.6 ~ 3.3Vout 12S3P3 (Vin>Vo+2.0V) 12Vin(nom), 0.59 ~ 6.0Vout 24S05 (Vin>Vo+3.0V) 24Vin(nom), 3.0 ~ 6.0Vout 24S12 (Vin>Vo+3.0V) 24Vin(nom), 5.0 ~ 15Vout	2.5		5.5	VDC
	Negative output application 12S3P3 (Vin.max=14- Vo) 12Vin(nom), -0.59 ~ -6.0Vout 24S05 (Vin.max=30- Vo) 12Vin(nom), -3.0 ~ -6.0Vout 24S12 (Vin.max=30- Vo) 12Vin(nom), -5.0 ~ -15Vout	4.7		13	
Input reflected ripple current	To minimize input reflected ripple. External π filter is recommended at the input of the module. See datasheet.		30		mAp-p
Maximum input current	05S2P5			3.0	A
	Vin=Vin(min); Io=Io(max)	12S3P3		2.6	
	24S05			2.2	
	24S12			3.0	
Input filter			Capacitor type		

OUTPUT SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Voltage accuracy		-2.0		+2.0	%
Line regulation	Vo \geq 2.5V		0.2		%
	Vo<2.5V		5		mV
Load regulation	0% to 100% of F.L.		0.8		%
			20		mV
	10% to 90% of F.L.		0.6		%
			15		mV
Ripple and noise	Positive output application Measured by 20MHz bandwidth				mVp-p
		05S2P5	30		
		12S3P3	60		
	With a 2.2 μ F MLCC	24S05	75		
	With a 2.2 μ F MLCC	24S12	150		
	Negative output application (In Figure 1)				
	12S3P3	60		mVp-p	
	With a C1=10 μ F/50V MLCC and a C2=10 μ F/25V MLCC	24S05	75		
		24S12	150		
Temperature coefficient		-1		+1	%/°C
Dynamic load response	Peak deviation Others		150		mV
	50% load step change	Peak deviation 24S12	250		mV
		Recovery time	120		μ s
Over load protection	% of Iout rated; Hiccup mode		05S2P5 12S3P3 ; 24S05 ; 24S12	280 220	%
Short circuit protection		Continuous, automatics recovery			
Output voltage overshoot-startup				1	%
Voltage adjustability ⁽¹⁾		05S2P5	0.6	3.3	VDC
	(See Figure 2)	12S3P3	0.59	6	
		24S05	3	6	
		24S12	5	15	

FEATURE SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Rise time	Time for Vo to rise from 10% to 90% Vo			6 10	ms
Remote on/off	The ON/OFF control pin voltage is referenced to GND (Positive logic)	05S2P5		ON = Open or Vin(max) OFF=0V < Vr < 0.3V	
		Others		ON = 1V < Vr < 12V OFF=0V < Vr < 0.3V	

GENERAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Switching frequency	05S2P5 ; 12S3P3 24S05 ; 24S12	540 270	600 300	660 330	kHz
Design meet safety standard		IEC60950-1, UL60950-1, EN60950-1			
Case material		Open frame			
Potting material		None			
Dimensions	05S2P5 ; 12S3P3 24S05 ; 24S12	0.37 X 0.24 X 0.61 Inch (9.4 X 6.0 X 15.5mm) 0.41 X 0.24 X 0.65 Inch (10.4 X 6 X 16.5mm)			
Weight	05S2P5 ; 12S3P3 24S05 ; 24S12	1.7g(0.060oz) 2.1g(0.074oz)			
MTBF	BELLCORE TR-NWT-000332 Case 1: 50% Stress, Ta= 40°C. MIL-HDBK-217F Ta=25°C, Full load (G/B, controlled environment)	6.25 x 10 ⁶ hrs 1.638 x 10 ⁶ hrs			

ENVIRONMENTAL SPECIFICATIONS

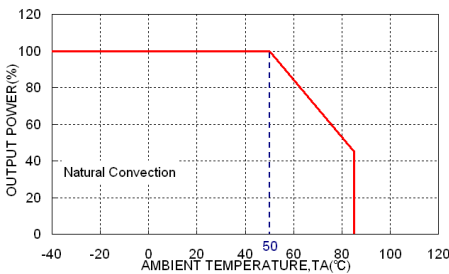
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating temperature range		-40		+85	°C
Over temperature protection	Internal IC junction		+150		°C
Storage temperature range		-55		+125	°C
Thermal shock		MIL-STD-810F			

Note:

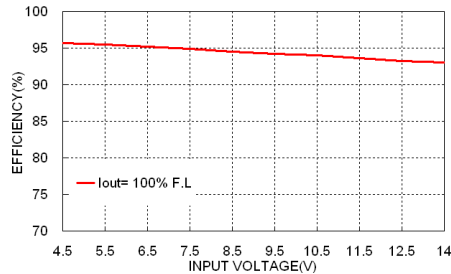
- Output voltage can be adjusted by connecting a single resistor between the TRIM and GND pins of the module. To calculate the value of the resistor **Rtrim** for a particular output voltage **Vo**, use the following equation: in **Table1**
- OSR03-12S3P3: When use negative output application and |Vo| trim up >3.3V, the Output Current maximum is 1.5A
- OSR03-12S3P3 : When Vo,set < 0.9V, the input voltage range is 4.5V to 9V.

CAUTION: This power module is not internally fused. An input line fuse must always be used.

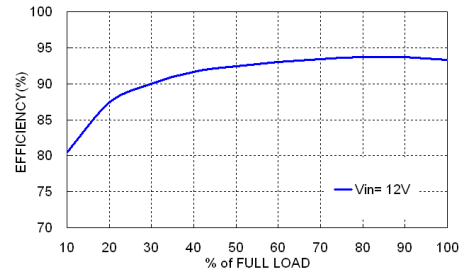
CHARACTERISTIC CURVE



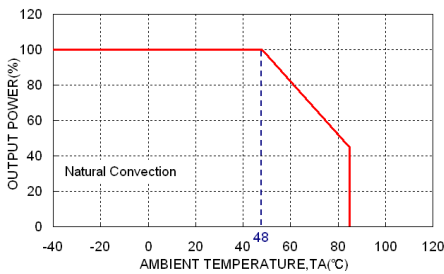
OSR03-12S3P3 Derating Curve
Positive output application



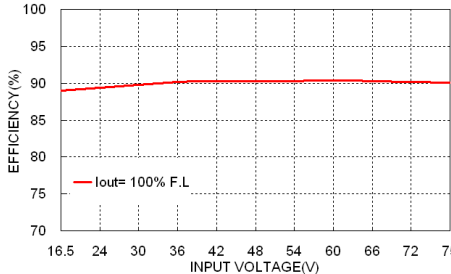
OSR03-12S3P3 Efficiency VS Input Voltage
Positive output application



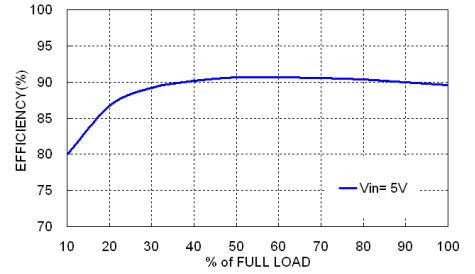
OSR03-12S3P3 Efficiency VS Output Load
Positive output application



OSR03-12S3P3 Derating Curve
Negative output application



OSR03-12S3P3 Efficiency VS Input Voltage
Negative output application



OSR03-12S3P3 Efficiency VS Output Load
Negative output application

NEGATIVE OUTPUT APPLICATION

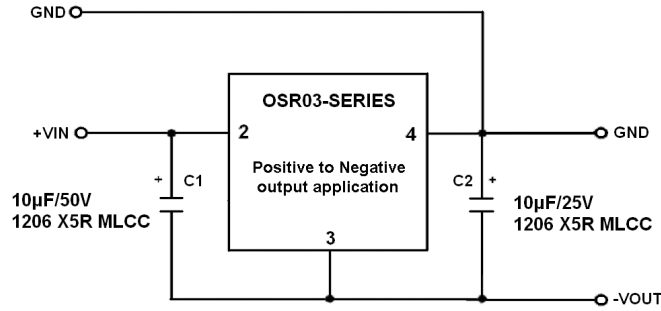


Figure 1

C1 and C2 are required and should be fitted close to the converter pins.

TRIM APPLICATION

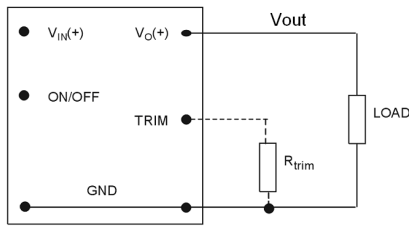
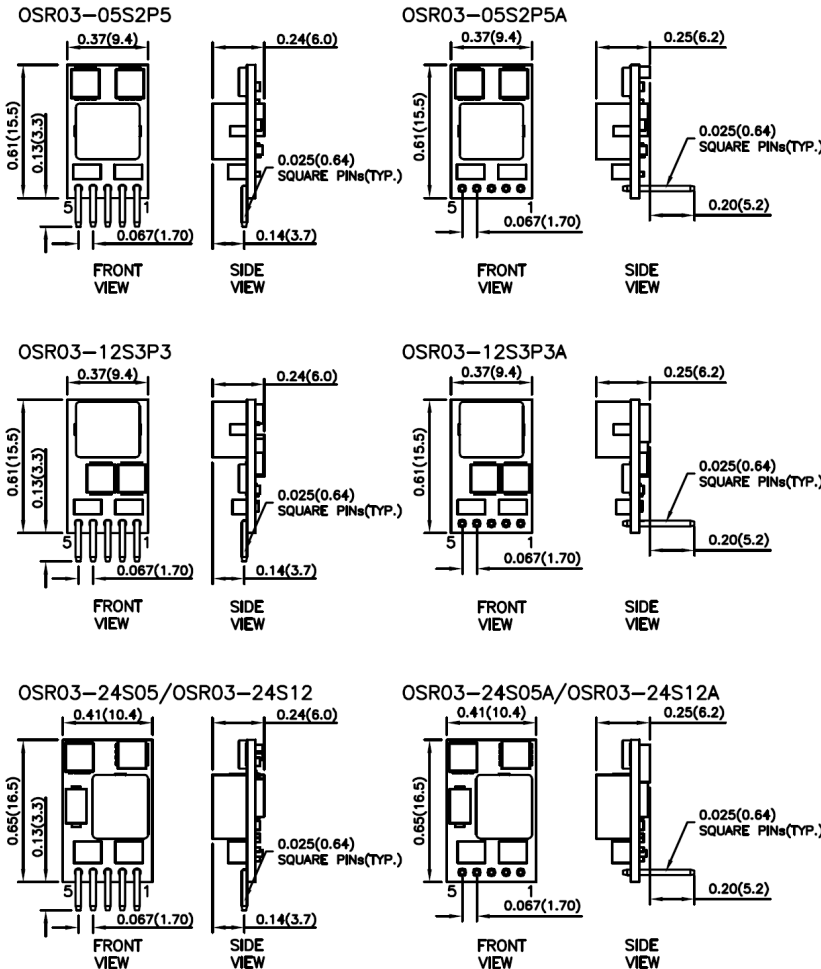


Figure 2

Model Name	R _{trim_up} (kΩ)
OSR03-05S2P5	$\frac{1.2}{V_o - 0.6} - 0.01$
OSR03-12S3P3	$\frac{1.18}{V_o - 0.59}$
OSR03-24S05	$\frac{11.2}{V_o - 3}$
OSR03-24S12	$\frac{8.4}{V_o - 5}$

Table 1

MECHANICAL DRAWING FOR STARDANDS



PIN CONNECTION	
PIN	DEFINE
1	CTRL
2	+INPUT
3	GND
4	+OUTPUT
5	TRIM

1. All dimensions in inch (mm)
2. Tolerance :x.xx±0.02 (x.x±0.5)
x.xxx±0.01 (x.xx±0.25)
3. Pin pitch tolerance ±0.01 (0.25)
4. Pin dimension tolerance ±0.004(0.1)