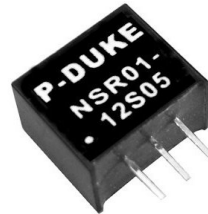


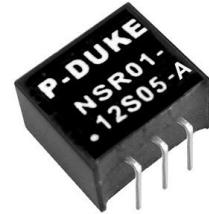
# NSR01 SERIES

NON-ISOLATION DC-DC CONVERTER

4.6~36VDC WIDE INPUT RANGE



STANDARD  
VERTICAL MOUNTING



SUFFIX -A  
HORIZONTAL MOUNTING



## FEATURES

- PIN\_OUT COMPATIBLE WITH LM78XX LINEAR REGULATORS
- NO MINIMUM LOAD REQUIRED
- SMALL SIZE AND LOW PROFILE: 0.46 X 0.30 X 0.40 INCH
- NEGATIVE OUTPUT APPLICATION
- SAFETY MEETS UL60950-1, EN60950-1, & IEC60950-1
- CE MARKED
- COMPLIANT TO RoHS II & REACH

## APPLICATIONS

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

NON ISOLATION	OCP	SCP	OTP	LOW STANDBY POWER
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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 @Full Load A	Input Current @ No Load mA	Efficiency		Maximum Capacitor Load μF
					Min. Vin	Max. Vin	
NSR01-12S1P5	4.6 ~ 36	1.5	1	1.0	77.0	66.5	470
NSR01-12S1P8	4.6 ~ 36	1.8		1.0	80.5	70.0	
NSR01-12S2P5	4.6 ~ 36	2.5		1.0	83.5	75.5	
NSR01-12S3P0	4.6 ~ 36	3.0		1.5	86.5	78.5	
NSR01-12S3P3	4.6 ~ 36	3.3		1.5	87.5	79.5	
NSR01-12S05	6.5 ~ 36	5.0		2.5	91.5	83.0	
NSR01-12S6P5	8.0 ~ 36	6.5		3.0	93.0	86.0	
NSR01-12S09	10.5 ~ 36	9.0		3.5	94.5	88.5	
NSR01-24S12	13.5 ~ 36	12		2.5	95.0	91.5	
NSR01-24S15	16.5 ~ 36	15		3.5	95.5	92.5	

Negative output application

Model Number	Input Range VDC	Output Voltage VDC	Output Current @Full Load A	Input Current @ No Load mA	Efficiency		Maximum Capacitor Load μF
					Min. Vin	Max. Vin	
NSR01-12S1P5	4.6 ~ 32	-1.5	-0.6	1.0	69.5	64.5	470
NSR01-12S1P8	4.6 ~ 32	-1.8	-0.6	1.0	72.0	67.5	
NSR01-12S2P5	4.6 ~ 32	-2.5	-0.6	1.0	72.0	74.0	
NSR01-12S3P0	4.6 ~ 32	-3.0	-0.6	2.0	73.0	76.5	
NSR01-12S3P3	4.6 ~ 32	-3.3	-0.6	2.0	74.0	77.5	
NSR01-12S05	4.6 ~ 31	-5.0	-0.4	3.0	79.5	78.5	
NSR01-12S6P5	7.0 ~ 29	-6.5	-0.3	4.0	84.5	80.0	
NSR01-12S09	7.0 ~ 27	-9.0	-0.3	7.0	85.0	82.0	
NSR01-24S12	7.0 ~ 24	-12	-0.3	8.0	85.0	85.5	
NSR01-24S15	7.0 ~ 21	-15	-0.2	10	85.5	84.5	

## PART NUMBER STRUCTURE

NSR01	-	12	S	05	-	A
Series Name		Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)		Mounting Options
		See table	S:Single	See table		□: Vertical Mounting A: Horizontal Mounting

**INPUT SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating input voltage range	Positive application	4.6		36	VDC
	Negative application	4.6		32	
Start up time	Constant resistive load		5		ms
Rise time	Time for Vout rises from 10% to 90% of Vout		3.5		ms
Input filter					Capacitor type
Input reflected ripple current			100		mAp-p

**OUTPUT SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Unit	
Voltage accuracy		-2.0		+2.0	%	
Line regulation	Low Line to High Line at Full Load	-0.2		+0.2	%	
Load regulation	10% to 100% of Full Load	Vertical mounting	1.5Vout	-0.6	+0.6	%
			Others	-0.4	+0.4	
	Horizontal mounting	1.5Vout, 1.8Vout	Others	-1.2	+1.2	
			Others	-0.4	+0.4	
Ripple and noise	Measured by 20MHz bandwidth		50		mVp-p	
			75			
Temperature coefficient		-0.015		+0.015	%/°C	
Dynamic load response	50% load step change	Peak deviation	150		mV	
		Recovery time	250		µs	
Output start-up overshoot				+1	%	
Over load protection			2		A	
Short circuit protection			Continuous, automatic recovery			

**GENERAL SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Switching frequency	Vout ≤ 3.3VDC	240	300	360	kHz
	Vout ≥ 5.0VDC	464	580	696	
Safety meets					UL60950-1 EN60950-1 IEC60950-1
Case material					Non-conducted black plastic
Potting material					Silicone (UL94 V-0)
Weight					1.9g (0.067oz)
MTBF	MIL-HDBK-217F, Full load				2.009 x 10 <sup>7</sup> hrs

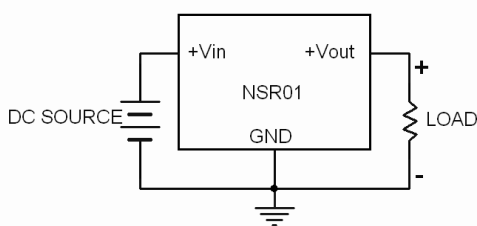
**ENVIRONMENTAL SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	With derating	-40		+100	°C
Over temperature protection	Internal IC junction		+170		°C
Storage temperature range		-55		+125	°C
Thermal shock					MIL-STD-810F
Vibration					MIL-STD-810F
Relative humidity					5% to 95% RH

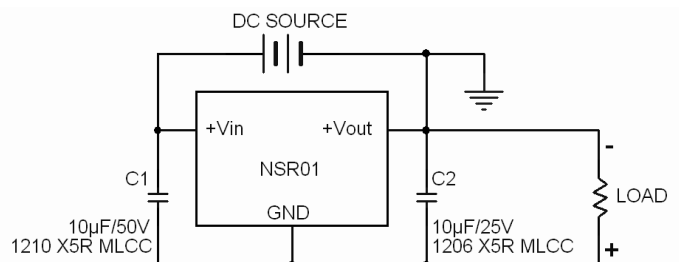
**CAUTION:** This power module is not internally fused. An input line fuse must always be used.

**APPLICATION CIRCUIT**

Positive application

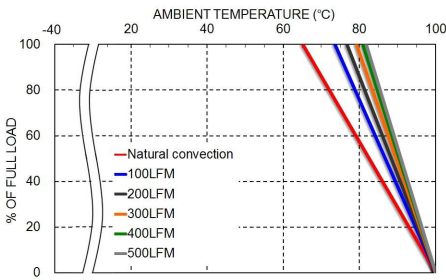


Negative application

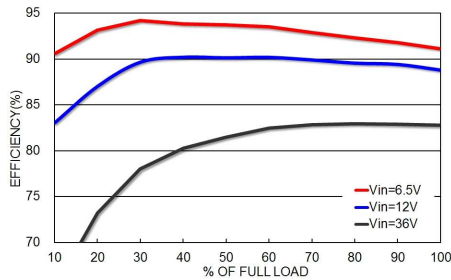


C1 and C2 are required that should be fitted close to the converter's pins. Maximum capacitive load including C2 is 470µF.

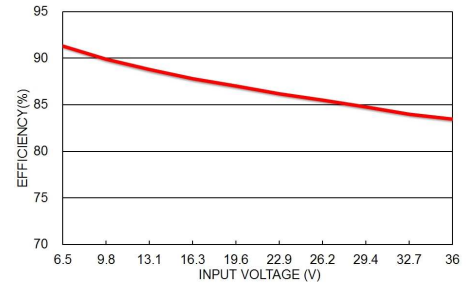
**CHARACTERISTIC CURVE**



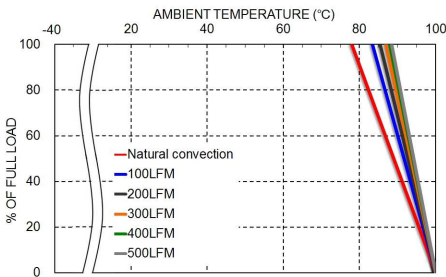
NSR01-12S05; Derating Curve  
Positive application



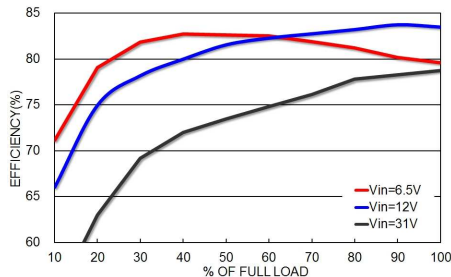
NSR01-12S05; Efficiency vs. load  
Positive application



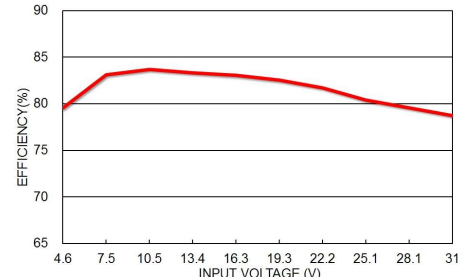
NSR01-12S05; Efficiency vs. line  
Positive application



NSR01-12S05; Derating Curve  
Negative application



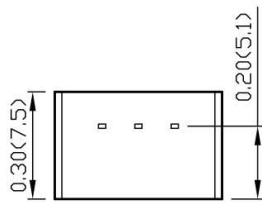
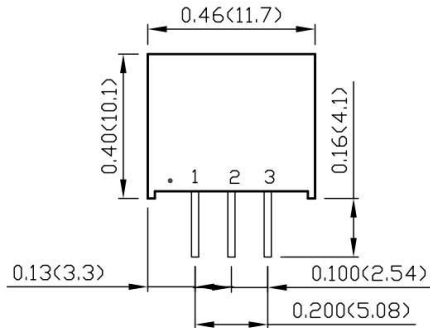
NSR01-12S05; Efficiency vs. load  
Negative application



NSR01-12S05; Efficiency vs. line  
Negative application

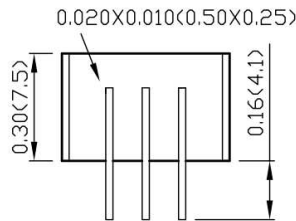
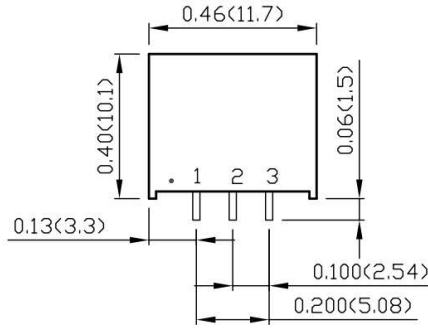
**MECHANICAL DRAWING**

Standard type: Vertical mounting



BOTTOM VIEW

Suffix-A: Horizontal mounting



BOTTOM VIEW

**PIN CONNECTION**

PIN	DEFINE
1	+Vin
2	GND
3	+Vout

1. All dimensions in inch (mm)
2. Tolerance : x.xxx±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)