



STANDARD TYPE



SUFFIX -A

**APPLICATIONS**

- Wireless Network
- Telecom/Datacom
- Industry Control System
- Distributed Power Architectures
- Semiconductor Equipment
- Microprocessor Power Applications

**FEATURES**

- PIN-OUT COMPATIBLE WITH LM78XX LINEAR REGULATORS
- SMALL SIZE AND LOW PROFILE :  
SIP3 L X W X H = 0.46" X 0.30" X 0.40"
- HIGH EFFICIENCY UP TO 95.5%
- LOW STANDBY CURRENT
- WIDE INPUT RANGE: 4.6 – 36VDC
- OVER-CURRENT PROTECTION
- SHORT CIRCUIT PROTECTION
- OVER-TEMPERATURE PROTECTION
- LOW OUTPUT RIPPLE AND NOISE
- FIXED SWITCHING FREQUENCY
- NEGATIVE OUTPUT APPLICATION
- DESIGN MEETS UL60950-1, EN60950-1 AND IEC60950-1
- COMPLIANT TO RoHS EU DIRECTIVE 2002/95/EC

**DESCRIPTION**

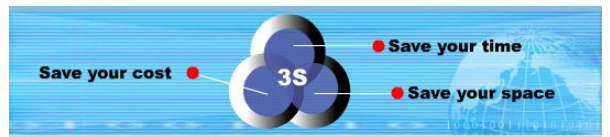
The NSR01-SERIES are high performance switching regulators are suited to replace 78xx linear regulators and pin compatible. It provides 1A output current and high efficiency up to 95.5%. The NSR01 series also can be used to converter a positive voltage into negative voltage.

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

OUTPUT SPECIFICATIONS			
Output current	See table		1000mA, max.
Voltage accuracy	Full Load		±2%Vo, max.
Minimum load			0%
Line regulation			± 0.2%Vo, typ.
Load regulation		1.5V(Standard)	± 0.6%Vo, typ.
	10% to 100% of F.L	Others(Standard)	± 0.4%Vo, typ.
		1.5V,1.8V(Suffix-A)	± 1.2%Vo, typ.
		Others(Stuffix-A)	± 0.4%Vo, typ.
Ripple and noise	Vout = 1.5V to 6.5V		50mVp-p
	20MHz bandwidth	Vout = 9 to 15V	75mVp-p
Temperature coefficient			±0.015%/°C, max.
Dynamic load response	Load change step	Peak deviation	150mV
	50%↔100% of F.L.	Recovery time	250µS
Output current limit			2.0A,typ
Output short-circuit			Continuous, automatics recovery
Capacitor Load (Note 4)			470µF, max.
Output voltage overshoot-startup	Full Load		1%Vo, max.

GENERAL SPECIFICATIONS			
Efficiency (Note 3)			See table
Isolation voltage			None
Switching frequency			See table
Design meet safety standard			IEC60950-1, UL60950-1, EN60950-1
Case material			Non-conductive black plastic
Base material			None
Potting material			Silicon (UL94-V0)
Dimensions			0.46 X 0.30 X 0.40 Inch (11.7 X 7.5 X 10.1 mm)
Weight			1.9g(0.07oz)
MTBF (Note 1)	BELLCORE-TR-NWT-000332		2.849 x 10 <sup>7</sup> hrs
	MIL-HDBK-217F		5.358 x 10 <sup>6</sup> hrs

INPUT SPECIFICATIONS			
Input voltage range for Positive output	See table		4.6 – 36VDC
Input voltage range for Negative output	See table		4.6 – 32VDC
Maximum input current	Vin=Vin(min); Io=Io(max)		1A
Input filter			C filter
Input reflected ripple current			150mA, typ.
ENVIRONMENTAL SPECIFICATIONS			
Operating temperature range			-40°C ~ +85°C(with derating)
Storage temperature range			-55°C ~ +125°C
Thermal shock			MIL-STD-810F
Vibration			MIL-STD-810F
Relative humidity(non-condensing)			0% to 90% RH
Over temperature protection (Internal IC junction)			170°C,typ.
FEATURE SPECIFICATIONS			
Rise time	Time for Vo to rise from 10% to 90%of Vo		2mS,max



Note

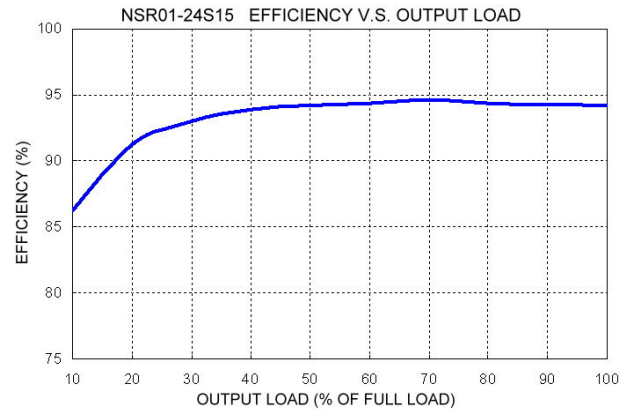
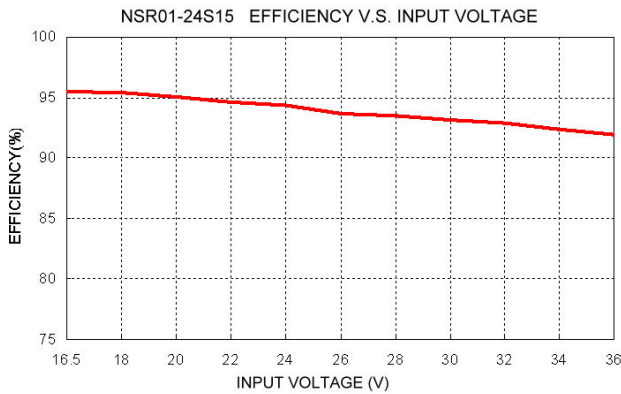
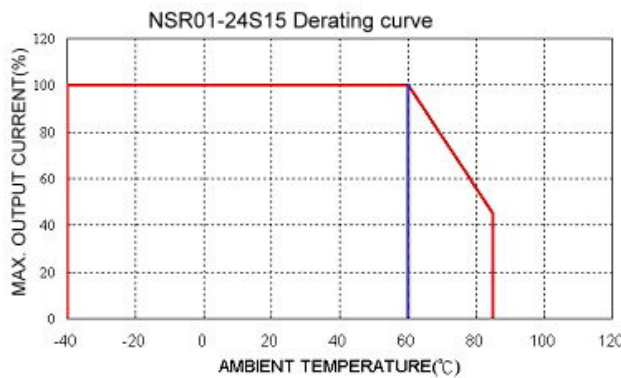
1. BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C. (Ground fixed and controlled environment)  
MIL-HDBK-217F Notice2 @Ta=25 °C, Full load (Ground, Benign, controlled environment)
2. Typical value at nominal. input voltage and no load.
3. Typical value at min. or max. input voltage and full load.
4. Tested with min. input voltage and constant resistive load.

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



Positive output

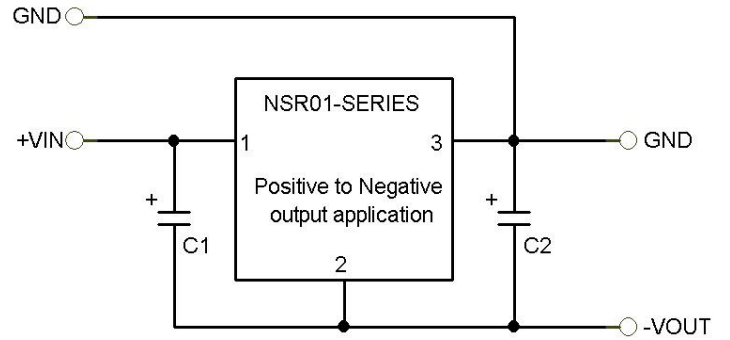
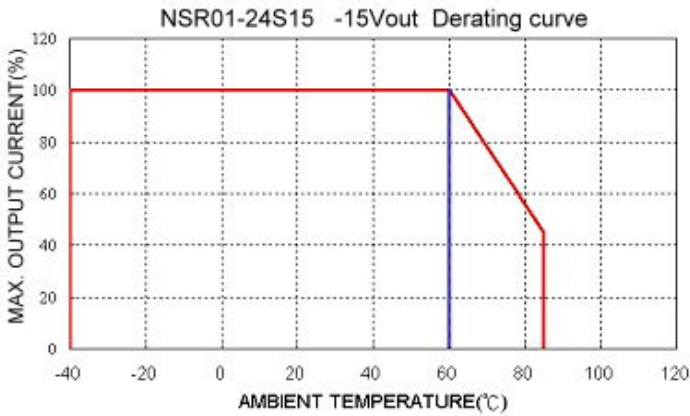
Model Name	Input Voltage	Nominal Input	Output Voltage	Frequency	Output Current		No Load Current(2)	Efficiency (%) (3)	
					Min. Load	Max. Load		Min. Vin	Max. Vin
NSR01-12S1P5	4.6 – 36Vdc	12Vdc	1.5Vdc	300KHz	0A	1A	1.5mA	75.0	66.5
NSR01-12S1P8	4.6 – 36Vdc	12Vdc	1.8Vdc	300KHz			1.5mA	78.5	70.0
NSR01-12S2P5	4.6 – 36Vdc	12Vdc	2.5Vdc	300KHz			1.5mA	84.0	75.5
NSR01-12S3P3	4.6 – 36Vdc	12Vdc	3.3Vdc	300KHz			1.5mA	87.5	80.0
NSR01-12S05	6.5 – 36Vdc	12Vdc	5.0Vdc	580KHz			1.5mA	91.5	83.5
NSR01-12S6P5	8.0 – 36Vdc	12Vdc	6.5Vdc	580KHz			1.5mA	93.5	86.0
NSR01-12S09	10.5 – 36Vdc	12Vdc	9.0Vdc	580KHz			1.5mA	94.5	88.5
NSR01-24S12	13.5 – 36Vdc	24Vdc	12Vdc	580KHz			3mA	95.5	91.5
NSR01-24S15	16.5 – 36Vdc	24Vdc	15Vdc	580KHz			6mA	95.5	92.0



Negative output application

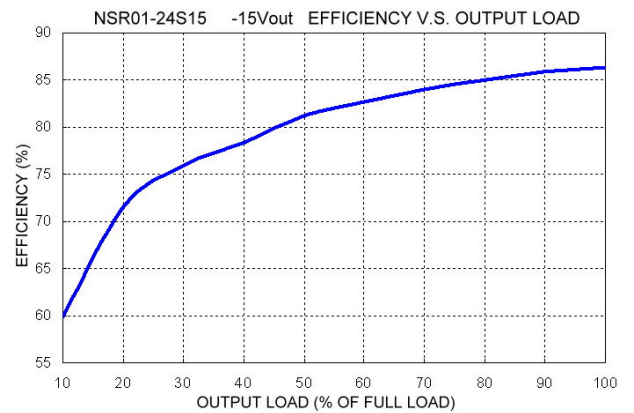
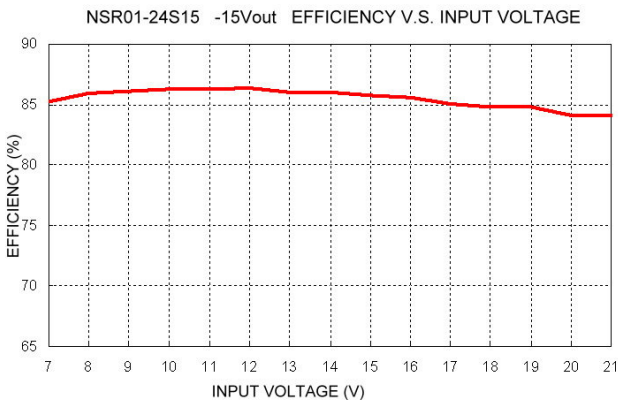
Model Name	Input Voltage	Nominal Input	Output Voltage	Frequency	Output Current		No Load Current(2)	Efficiency (%) (3)	
					Min. Load	Max. Load		Min. Vin	Max. Vin
NSR01-12S1P5	4.6 – 32Vdc	12Vdc	-1.5Vdc	300KHz	0 A	0.6	1mA	52.5	65.5
NSR01-12S1P8	4.6 – 32Vdc	12Vdc	-1.8Vdc	300KHz	0 A	0.6	1mA	69.0	69.0
NSR01-12S2P5	4.6 – 32Vdc	12Vdc	-2.5Vdc	300KHz	0 A	0.6	2mA	72.5	74.0
NSR01-12S3P3	4.6 – 32Vdc	12Vdc	-3.3Vdc	300KHz	0 A	0.6	3mA	74.0	77.5
NSR01-12S05	4.6 – 31Vdc	12Vdc	-5.0Vdc	580KHz	0 A	0.4	3mA	80.5	78.5
NSR01-12S6P5	7 – 29Vdc	12Vdc	-6.5Vdc	580KHz	0 A	0.3	3mA	84.5	81.0
NSR01-12S09	7 – 27Vdc	12Vdc	-9.0Vdc	580KHz	0 A	0.25	5mA	86.0	81.5
NSR01-24S12	7 – 24Vdc	12Vdc	-12Vdc	580KHz	0 A	0.3	5mA	85.5	85.5
NSR01-24S15	7 – 21Vdc	12Vdc	-15Vdc	580KHz	0 A	0.2	10mA	84.0	83.0



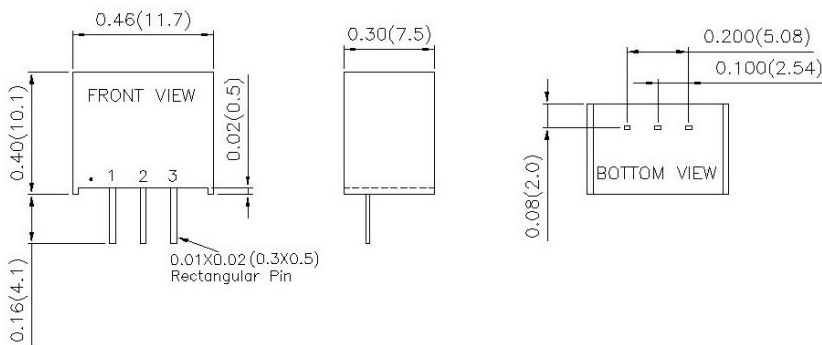


C1 and C2 are required and should be fitted close to the converter pins. Maximum capacitive load including C2 is 470uF.

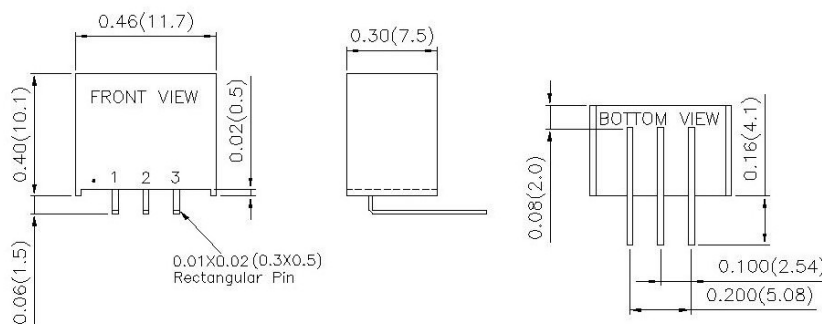
C1	10uF / 50V	1210 X5R MLCC
C2	10uF / 35V	1206 X5R MLCC



## Standard



## Suffix-A



### PIN CONNECTION

PIN	DEFINE
1	+Vin
2	GND
3	+Vout

- All dimensions in Inches (mm)  
Tolerance: X.XX±0.02 (X.X±0.5)  
X.XXX±0.01 (X.XX±0.25)
- Pin pitch tolerance ±0.01(0.25)
- Pin dimension tolerance ±0.004 (0.1)

