SNL2 Series

2W Unregulated Single output

Features

- 4 Pin SIL Package
- Continuous Short Circuit Protection
- 3000 VDC Isolation
- Efficiency up to 86%
- Operation Temperature Range -40 ~ 90°C max.
- Non-Conductive Black Plastic Case

PART NUMBER STRUCTURE

SNL2 - 12 12 S

(1) (2) (3) (4)

(1) Series

(2) Input Voltage Range

3R3 - 2.97-3.63 V
05 - 4.5-5.5 V
12 - 10.8-13.2 V
24 - 21.6-26.4 V

(3) Output Voltage Range

3R3 - 3.3 V
05 - 5 V
12 - 12 V
15 - 15 V

(4) Output Type

S - Single Output

ALL SPECIFICATIONS ARE TYPICAL AT 25°C, NOMINAL INPUT AND FULL LOAD UNLESS OTHERWISE NOTED

Model Number	Input Voltage Range (VDC)	Input Current		Output Voltage (VDC)	Output Current Full Load (mA)	Efficiency @FL(%)	Capacitive Load (μF)
		No-Load (mA), max.	Full Load (mA), typ.				
SNL2-3R33R3S	2.97-3.63	60	657.89	3.3	500	76	3300
SNL2-3R305S	2.97-3.63	60	767.16	5	400	79	2200
SNL2-3R312S	2.97-3.63	75	757.57	12	167	80	470
SNL2-3R315S	2.97-3.63	75	739.09	15	133	82	470
SNL2-053R3S	4.5-5.5	45	417.72	3.3	500	79	3300
SNL2-0505S	4.5-5.5	50	487.8	5	400	82	2200
SNL2-0512S	4.5-5.5	50	470.58	12	167	85	470
SNL2-0515S	4.5-5.5	55	465.11	15	133	86	470
SNL2-123R3S	10.8-13.2	30	174.05	3.3	500	79	3300
SNL2-1205S	10.8-13.2	30	203.25	5	400	82	2200
SNL2-1212S	10.8-13.2	30	193.79	12	167	86	470
SNL2-1215S	10.8-13.2	30	193.79	15	133	86	470
SNL2-243R3S	21.6-26.4	15	88.14	3.3	500	78	3300
SNL2-2405S	21.6-26.4	15	101.62	5	400	82	2200
SNL2-2412S	21.6-26.4	15	96.89	12	167	86	470
SNL2-2415S	21.6-26.4	15	96.89	15	133	86	470

INPUT SPECIFICATIONS					
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Input Voltage Range	3.3 V Input	2.97	3.3	3.63	VDC
	5 V Input	4.5	5	5.5	
	12 V Input	10.8	12	13.2	
	24 V Input	21.6	24	26.4	
Input Filter		Capacitors			
Input Reflected Ripple Current (1)			20		mApk-pk
Start up Time	Nominal Vin and constant resistive load			10	ms
Recommended input fuse (slow blow)	3.3 V Input	1.5			A
	05 V Input	1.0			A
	12 V Input	0.5			A
	24 V Input	0.2			A

Note：

1. Measured with a simulated source inductance of 12μH and a source capacitor Cin(47μF, ESR<1.0Ω at 100KHz).

OUTPUT SPECIFICATIONS							
Parameter	**Conditions**			**Min.**	**Typ.**	**Max.**	**Unit**
Output Voltage Accuracy	Nominal Vin			-3.0		+3.0	%
Line Regulation	For 1% Vin Change			-1.2		+1.2	%
Load Regulation	From 10% to 100% Load	3.3V Input				20	%
		5V Input	3.3 V , 5V Output			20	
			12 V , 15V Output			15	
		Other Input	3.3 V , 5V Output			15	
			12 V , 15V Output			10	
	From 0% to 100% Load					35	
Ripple & Noise	20MHz bandwidth					200	mVpk-pk
Short Circuit Protection				Continuous and automatic recovery			
Temperature Coefficient				-0.02		+0.02	%/°C
Capacitive Load	Nominal Vin and constant resistive load			See Table			
Note： 1.　Measured with a 0.1μF MLCC.							

ABSOLUTE MAXIMUM RATINGS					
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Input Surge Voltage (100 ms)	3.3 V Input			6	VDC
	5 V Input			9	
	12 V Input			18	
	24 V Input			30	
Soldering Temperature	1.5mm from case 10sec max.			260	°C
Note：These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.					

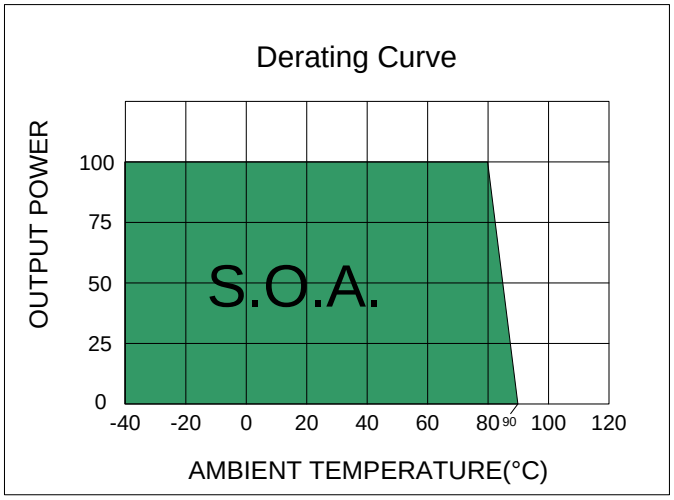
GENERAL SPECIFICATIONS					
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Isolation Voltage	Input-output, and rated for 60sec	3000			VDC
Isolation Resistance	Input-output	1000			MΩ
Isolation Capacitance	Input-output			65	pF
Switching Frequency			100		kHz
MTBF	MIL-HDBK-217 F @ 25°C	2.1			M hours
Safety Standard	IEC / EN / UL 62368-1	Designed to meet			
Environmental compliance		RoHS			

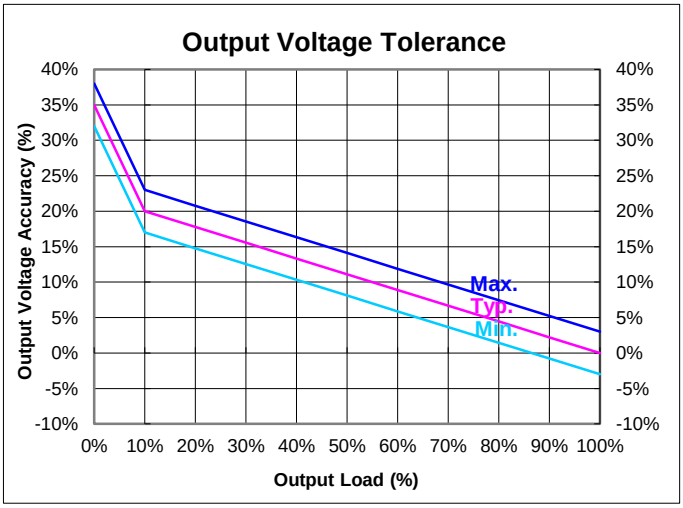
ENVIRONMENT SPECIFICATIONS					
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Operating Ambient Temperature	See The Derating Curve	-40		90	°C
Maximum Case Temperature				115	°C
Thermal Impedance		45			°C/W
Storage Humidity				95	% rel. H
Storage Temperature		-55		125	°C
Cooling	Natural Convection	30-65 LFM			

EMC SPECIFICATIONS			
Parameter	**Standard**	**Condition**	Perf. Criteria
Conducted Emissions	EN55032	with external components	B
Radiated Emissions	EN55032		B
ESD	IEC 61000-4-2	Air: ±15kV / Indirect: ±8kV	A
RS	IEC 61000-4-3	10V/m	A
EFT	IEC 61000-4-4	±2.0kV with external components	A
Surge	IEC 61000-4-5	±2.0kV with external components	A
CS	IEC 61000-4-6	10Vrms	A
PFMF	IEC 61000-4-8	100A/m	A

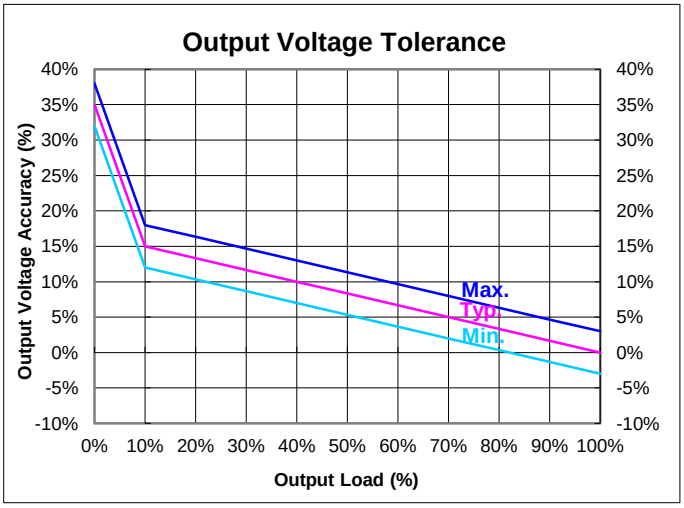
PHYSICAL SPECIFICATIONS	
Parameter	**Value**
Case Material	Nonconductive Black Plastic (UL94V-0 rated)
Pin Material	Tinned Copper
Potting Material	Silicone (UL94V-0 rated)
Weight	1.9 g, typ.
Dimensions	0.46" x 0.29" x 0.4"

ELECTRICAL CHARACTERISTIC CURVES

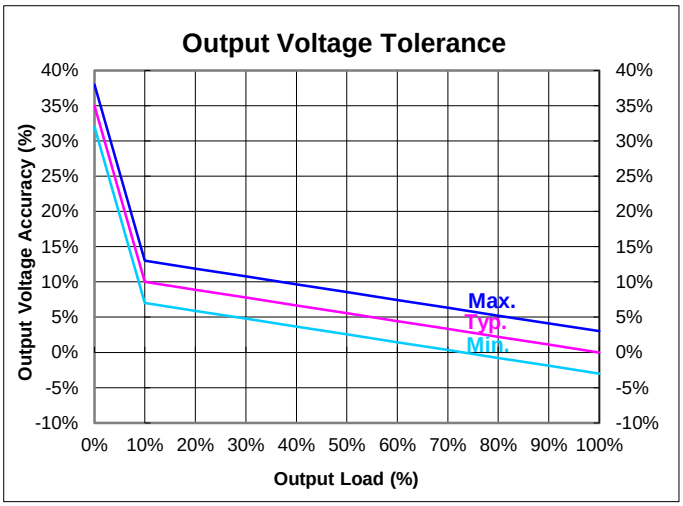




3.3V input and
5V input with 3.3 & 5V output



5V input with 12 & 15V output and
12 & 24V input with 3.3 & 5V output

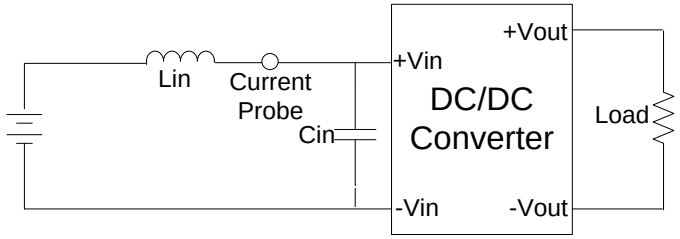


12 & 24V input with 12 & 15V output

TEST CONFIGURATIONS

Input Reflected Ripple Current Test Step

Input reflected ripple current is measured with a source inductor Lin (12μH) and a source capacitor Cin (47μF, ESR<1.0Ω at 100KHz) at nominal input and full load.



DESIGN & FEATURE CONFIGURATIONS

Isolation Voltage

This series is designed to meet the functional insulation of UL, both input and output should be maintained within SELV limits (less than 42.4V peak, or 60VDC).

The isolation test voltage represents a measure of immunity to transient voltages and the part should never be used as an element of a safety isolation system. The part could be expected to function correctly with hundreds of volts offset applied continuously across the isolation barrier; but then the circuitry on both sides of the barrier must be regarded as operating at an unsafe voltage and further isolation/insulation systems must form a barrier between these circuits and any user-accessible circuitry according to safety standard requirements.

Repeated High-Voltage Isolation Testing

Repeated high-voltage isolation testing of a barrier component can actually degrade isolation capability, to a lesser or greater degree depending on materials, construction and environment.

This series has isolation transformers without additional insulation between primary and secondary windings of enameled wire.

While parts can be expected to withstand several times the stated test voltage, the isolation capability does depend on the wire insulation.

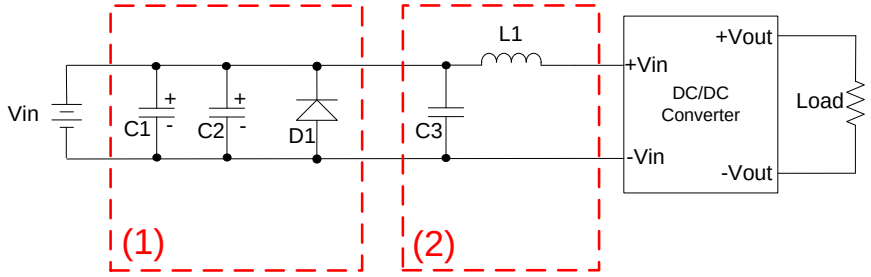
Any material including the enamel (typically polyurethane) is susceptible to eventual chemical degradation when subject to very high applied voltage, thus implying that the number of tests should be strictly limited.

We strongly advise against repeated high voltage isolation testing, but if it is absolutely required, the isolation test voltage should be reduced by 20% from specified test voltage.

DESIGN & FEATURE CONFIGURATIONS

EMC Filter

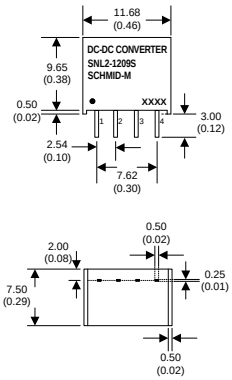
The part (1) Circuit is used to meet Surge & EFT test, and the part (2) Circuit is used to meet EMI test.

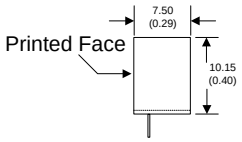


Vin	C1	C2	D1	C3	L1
5V	NIPPON Chemi-con KY Series 470μF, 100V	DNP	SMDJ6.0A	MLCC 10μF, 50V	10μH
12V			SMDJ9.0A		
15V			SMDJ18.0A		
24V		NIPPON Chemi-con KY Series 680μF, 100V	SMDJ30.0A		22μH

DESIGN & FEATURE CONFIGURATIONS

4 Pin SIL Package



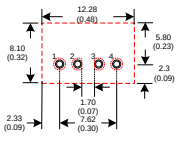


PIN CONNECTIONS	
PIN NUMBER	SINGLE
1	-Vin
2	+Vin
3	-Vout
4	+Vout

Notes：All dimensions are typical in millimeters (inches).

1. Pin dimension tolerance : ±0.05 (±0.002)
2. Pin pitch and length tolerance: ±0.35 (±0.014)
3. Pin to case tolerance: ±0.5 (±0.02)
4. Case tolerance: ±0.5 (±0.02)

RECOMMEND FOOTPRINT DETAILS



Notes：All dimensions are typical in millimeters (inches).
Pad size(lead free recommended)

1. Through hole 1.2.3.4:Φ0.031[0.80]
2. Top view pad 1.2.3.4:Φ0.039[1.10]
   pad 2 to pad 3 spacing:0.067[1.70]
3. Bottom view pad 1.2.3.4:Φ0.063[1.60]
   pad 2 to pad 3 spacing:0.067[1.70]
4. The extra protection of the pads between input(PIN 2) and output(PIN 3) should be needed in order to ensure that the isolation function won't be affected after the module mounts on the PCB.