SL2 Series

2W Unregulated Single & Dual output

Features

- 7 Pin SIL Package
- 5200 VDC High Isolation
- Low coupling capacity
- Low Ripple and Noise
- Efficiency up to 85%
- Long Term Short Circuit Protection
- -40 ~ 95°C Operation Temperature Range

The SL2 series is a family of cost effective 2W single & dual output DC-DC converters. These converters achieve low cost and miniature SIP size without compromising performance .Devices are encapsulated with flame retardant resin. Input voltages are 5V,12V,15V,24Vdc. with output voltage of 3.3V,5V,9V,12V,15V, ±5V, ±9V, ±12V, ±15V, +15V/-9Vdc. Special featuring long term output short circuit protection . Standard features include an input range of ±10% tolerance and low output noise and ripple.

All specifications typical at Ta=25°C, nominal input voltage and full load unless otherwise specified

OUTPUT SPECIFICATIONS

Voltage Accuracy	±5%, max.
Output Current	See table, max.
Line Regulation	±1.2% / Per 1% Vin Change, max.
Load Regulation (From 20% to 100% Load)	(SL2-053R3SS & SL2-0505SS) ±12%, max . (other models) ±10%, max.
Cross Regulation (Dual Output) (1)	±5%, typ.
Ripple & Noise (20 MHz bandwidth) (2)	150mVpk-pk, max.
Short Circuit Protection	Indefinite (Automatic Recovery)
Temperature Coefficient	±0.03%/°C
Capacitor Load (3)	See table, max.

INPUT SPECIFICATIONS

Input Voltage Range	±10%, max.
Input Current (No-Load)	See table, max.
Input Current (Full-Load)	See table, typ.
Input Filter	Capacitor
Input Reflected Ripple Current (4)	20mApk-pk, typ.
Start up Time (Nominal Vin and constant resistive load)	20mS, typ.

GENERAL SPECIFICATIONS

Efficiency	See table,typ.
I/O Isolation Voltage (60sec)	5200Vdc
I/O Isolation Resistance	1000M Ohm, min.
I/O Isolation Capacitance	7 pF, typ.
Switching Frequency	50~100kHz, typ.
Humidity	95% rel H
Reliability Calculated MTBF (MIL-HDBK-217 F)	>3.3Mhrs
Safety Standard (designed to meet)	IEC/EN 60950-1

PHYSICAL SPECIFICATIONS

Case Material	Non-conductive Black Plastic(UL94V-0 rated)
Pin Material	C5191R-H Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	2.7g
Dimensions	0.76"x0.28"x0.39"

ENVIRONMENT SPECIFICATIONS

Operating Temperature	-40°C ~ +95°C (See Derating Curve) -40°C ~ +65°C (For 100% load)
Maximum Case Temperature	100°C
Storage Temperature	-55°C ~ +125°C
Cooling (5)	Nature Convection

ABSOLUTE MAXIMUM RATINGS (6)

These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.

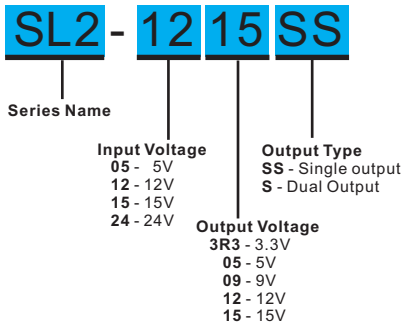
Input Surge Voltage (1000mS)	
5 Models	9 Vdc, max.
12 Models	18 Vdc, max.
15 Models	20 Vdc, max.
24 Models	30 Vdc, max.
Soldering Temperature (1.5mm from case 10sec max.)	260°C, max.

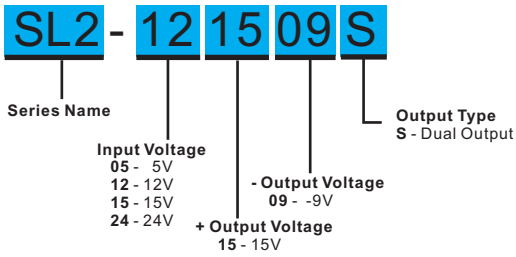
EMC SPECIFICATIONS

Conducted Emissions (7)	EN55032	CLASS B
Radiated Emissions	EN55032	CLASS B
ESD	IEC 61000-4-2	Perf. Criteria A
RS	IEC 61000-4-3	Perf. Criteria A
EFT (8)	IEC 61000-4-4	Perf. Criteria A
Surge (8)	IEC 61000-4-5	Perf. Criteria A
CS	IEC 61000-4-6	Perf. Criteria A
PFMF	IEC 61000-4-8	Perf. Criteria A

SL2 2W Unregulated Single & Dual output

PART NUMBER STRUCTURE



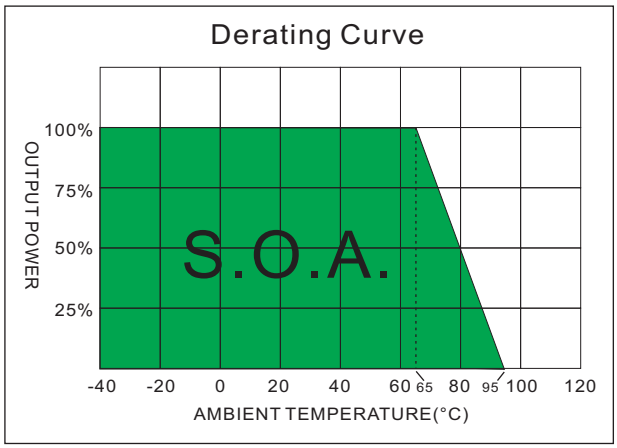


MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current No-Load (mA, max.)	INPUT Current Full Load (mA, typ.)	OUTPUT Voltage (Vdc)	OUTPUT Current Full load (mA)	EFFICIENCY @FL (%, typ.)	Capacitor Load @FL (μF, max.)
SL2-053R3SS	5 (4.5 ~ 5.5)	40	435	3.3	500	76	1000
SL2-0505SS	5 (4.5 ~ 5.5)	40	507	5	400	79	470
SL2-0509SS	5 (4.5 ~ 5.5)	40	482	9	222	83	470
SL2-0512SS	5 (4.5 ~ 5.5)	40	477	12	167	84	220
SL2-0515SS	5 (4.5 ~ 5.5)	40	471	15	133	85	220
SL2-123R3SS	12 (10.8 ~ 13.2)	30	186	3.3	500	74	1000
SL2-1205SS	12 (10.8 ~ 13.2)	30	211	5	400	79	470
SL2-1209SS	12 (10.8 ~ 13.2)	30	204	9	222	82	470
SL2-1212SS	12 (10.8 ~ 13.2)	30	204	12	167	82	220
SL2-1215SS	12 (10.8 ~ 13.2)	30	201	15	133	83	220
SL2-153R3SS	15 (13.5 ~ 16.5)	25	149	3.3	500	74	1000
SL2-1505SS	15 (13.5 ~ 16.5)	25	171	5	400	78	470
SL2-1509SS	15 (13.5 ~ 16.5)	25	165	9	222	81	470
SL2-1512SS	15 (13.5 ~ 16.5)	25	163	12	167	82	220
SL2-1515SS	15 (13.5 ~ 16.5)	25	161	15	133	83	220
SL2-243R3SS	24 (21.6 ~ 26.4)	20	95	3.3	500	73	1000
SL2-2405SS	24 (21.6 ~ 26.4)	20	107	5	400	78	470
SL2-2409SS	24 (21.6 ~ 26.4)	20	103	9	222	81	470
SL2-2412SS	24 (21.6 ~ 26.4)	20	103	12	167	81	220
SL2-2415SS	24 (21.6 ~ 26.4)	20	103	15	133	81	220
SL2-0505S	5 (4.5 ~ 5.5)	40	507	±5	±200	79	±220
SL2-0509S	5 (4.5 ~ 5.5)	40	488	±9	±111	82	±220
SL2-0512S	5 (4.5 ~ 5.5)	40	482	±12	±83.3	83	±100
SL2-0515S	5 (4.5 ~ 5.5)	40	477	±15	±66.7	84	±100
SL2-0515 09S	5 (4.5 ~ 5.5)	40	482	+15/-9	+66.7/-111	83	+100/-2 20
SL2-1205S	12 (10.8 ~ 13.2)	30	211	±5	±200	79	±220
SL2-1209S	12 (10.8 ~ 13.2)	30	206	±9	±111	81	±220
SL2-1212S	12 (10.8 ~ 13.2)	30	201	±12	±83.3	83	±100
SL2-1215S	12 (10.8 ~ 13.2)	30	201	±15	±66.7	83	±100
SL2-12 15 09S	12 (10.8 ~ 13.2)	30	209	+15/-9	+66.7/-111	80	+100 /-220
SL2-1505S	15 (13.5 ~ 16.5)	25	169	±5	±200	79	±220
SL2-1509S	15 (13.5 ~ 16.5)	25	165	±9	±111	81	±220
SL2-1512S	15 (13.5 ~ 16.5)	25	161	±12	±83.3	83	±100
SL2-1515S	15 (13.5 ~ 16.5)	25	163	±15	±66.7	82	±100
SL2-15 15 09S	15 (13.5 ~ 16.5)	25	165	+15/-9	+66.7/-111	81	+100 /-220
SL2-2405S	24 (21.6 ~ 26.4)	20	106	±5	±200	79	±220
SL2-2409S	24 (21.6 ~ 26.4)	20	105	±9	±111	80	±220
SL2-2412S	24 (21.6 ~ 26.4)	20	103	±12	±83.3	81	±100
SL2-2415S	24 (21.6 ~ 26.4)	20	102	±15	±66.7	82	±100
SL2-24 15 09S	24 (21.6 ~ 26.4)	20	105	+15/-9	+66.7/-111	80	+100 /-220

NOTE

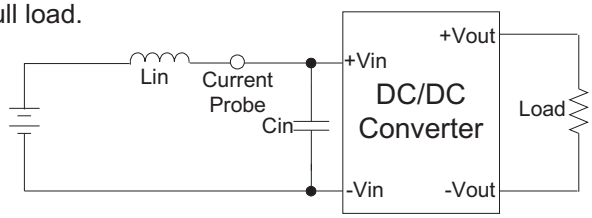
1. One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
2. Ripple/Noise measured with a 10μF electrolytic capacitor and 0.1μF ceramic capacitor.
3. Tested by minimal Vin and constant resistive load.
4. Measured Input reflected ripple current with a simulated source inductance of 12μH And a source capacitor Cin(47μF, ESR<1.0Ω at 100kHz).
5. "Nature Convection" is usually about 30-65 LFM but is not equal to still air (0 LFM).
6. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.
7. The SL2 series standard module meets EMI ClassB with external components. For more detail information, please contact with SCHMID-M
8. Input components (C1,D1) are used to help meet surge test requirement for the module. C1 and D1 recommended nichicon UHE series and Littelfuse SMDJ series.
9. Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.



TEST CONFIGURATIONS

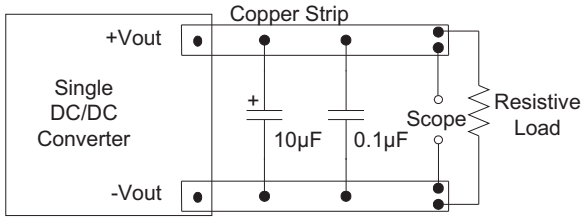
Input Reflected Ripple Current Test Step

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



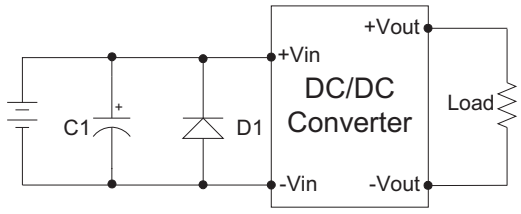
Output Ripple & Noise Measurement Test

Use a 10μF electrolytic capacitor and 0.1μF ceramic capacitor.
The Scope measurement bandwidth is 0-20MHz.



EFT & SURGE Filter

Input components (C1,D1) are used to help meet surge test requirement for the module.

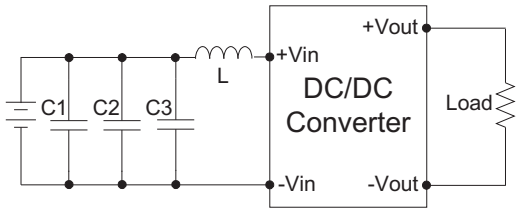


	C1	D1
SL2-05XXXX	330μF/50V	SMDJ9.0A
SL2-12XXXX	330μF/50V	SMDJ13A
SL2-15XXXX	330μF/50V	SMDJ18A
SL2-24XXXX	1000μF/35V	SMDJ24A

D1:Transient Voltage Suppression Diodes

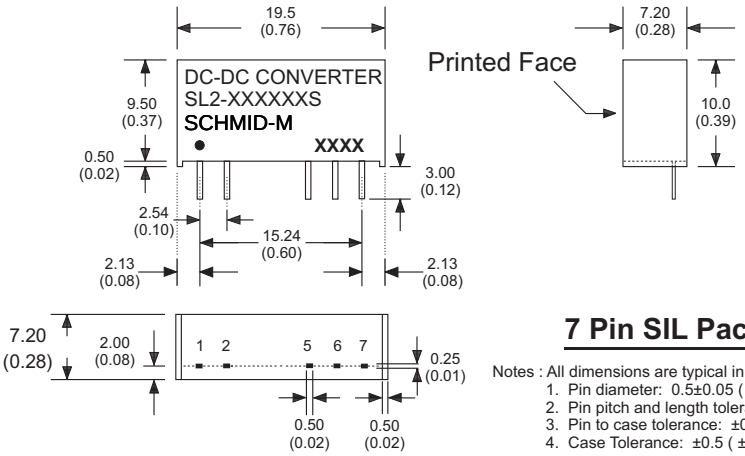
EMI Filter

Input filter components (C1,C2,C3,L) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



	C1	C2	C3	L
SL2-05XXXX	1206,4.7μF/16V	X	X	6.8μH
SL2-12XXXX	1206,22μF/25V	X	X	6.8μH
SL2-15XXXX	1206,22μF/25V	X	X	6.8μH
SL2-24XXXX	1210,10μF/35V	1210,10μF/35V	1210,10μF/35V	10μH

MECHANICAL SPECIFICATIONS



7 Pin SIL Package

Notes : All dimensions are typical in millimeters (inches).
1. Pin diameter: 0.5±0.05 (0.02±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)

PIN CONNECTIONS		
PIN NUMBER	SINGLE	DUAL
1	+V Input	+V Input
2	−V Input	−V Input
5	−V Output	−V Output
6	N.P.	Common
7	+V Output	+V Output