RS2-SS/SD20v2

2 W Semi-regulated Single & Dual Output DC/DC Converter

- SIL7 Package
- Input Range ± 10 %
- Efficiency up to 91 %
- Semi-regulated Output
- Low Ripple and Noise
- Isolation 1000 VDC, up to 3000 VDC
- Operation Temperature Range -40 ~ 89 °C max.
- Non Conductive Black Plastic Case

RoHS

Picture similar

Number Structure

RS2	-	05	05	SS	20	A	1	v2
Series / Package		**Input Voltage**	**Output Voltage**	**Output Type**	**Power**	**Int. Code**	**Isolation Voltage**	**Version**
RS2 = SIL7		05 = 5.0 Vdc 12 = 12 Vdc 15 = 15 Vdc 24 = 24 Vdc	05 = 5.0 Vdc 09 = 9.0 Vdc 12 = 12 Vdc 15 = 15 Vdc	SS = Semi-Reg. - Single Out. SD = Semi-Reg. - Dual Out.	20 = 2 W	Logistics Code	1 = 1000 Vdc 3 = 3000 Vdc	

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Model Selection Guide

Model Number	Input Voltage Range (VDC)	Input Current		Output Voltage (VDC)	Output Current Full Load (mA)	Load Regulation (%)	Efficiency @ FL (%, typ.)	Capacitive Load @ FL (µF, max.)
		No-Load (mA, max.)	Full Load (mA, typ.)					
RS2-0505SS20AXv2	4.5 ~ 5.5	50	482	5	400	6	83	220
RS2-0509SS20AXv2	4.5 ~ 5.5	50	455	9	222.2	4.2	88	220
RS2-0512SS20AXv2	4.5 ~ 5.5	50	455	12	166.6	3.7	88	100
RS2-0515SS20AXv2	4.5 ~ 5.5	50	455	15	133.3	4.5	88	100
RS2-1205SS20AXv2	10.8 ~ 13.2	40	194	5	400	4.2	86	220
RS2-1209SS20AXv2	10.8 ~ 13.2	40	189	9	222.2	3.5	88	220
RS2-1212SS20AXv2	10.8 ~ 13.2	40	185	12	166.6	2.4	90	100
RS2-1215SS20AXv2	10.8 ~ 13.2	40	185	15	133.3	2.2	90	100
RS2-1505SS20AXv2	13.5 ~ 16.5	30	155	5	400	4	86	220
RS2-1509SS20AXv2	13.5 ~ 16.5	30	150	9	222.2	3.5	89	220
RS2-1512SS20AXv2	13.5 ~ 16.5	30	150	12	166.6	2.4	89	100
RS2-1515SS20AXv2	13.5 ~ 16.5	30	147	15	133.3	2	91	100
RS2-2405SS20AXv2	21.6 ~ 26.4	20	100	5	400	4.5	83	220
RS2-2409SS20AXv2	21.6 ~ 26.4	20	97	9	222.2	3.5	86	220
RS2-2412SS20AXv2	21.6 ~ 26.4	20	94	12	166.6	3	89	100
RS2-2415SS20AXv2	21.6 ~ 26.4	20	94	15	133.3	2.8	89	100
RS2-0505SD20AXv2	4.5 ~ 5.5	50	482	±5	±200	5	83	±100
RS2-0509SD20AXv2	4.5 ~ 5.5	50	460	±9	±111.1	3.9	87	±100
RS2-0512SD20AXv2	4.5 ~ 5.5	50	455	±12	±83.3	3.7	88	±47
RS2-0515SD20AXv2	4.5 ~ 5.5	50	449	±15	±66.6	4	89	±47
RS2-1205SD20AXv2	10.8 ~ 13.2	40	194	±5	±200	4.2	86	±100
RS2-1209SD20AXv2	10.8 ~ 13.2	40	194	±9	±111.1	3.5	86	±100
RS2-1212SD20AXv2	10.8 ~ 13.2	40	183	±12	±83.3	2.2	91	±47
RS2-1215SD20AXv2	10.8 ~ 13.2	20	183	±15	±66.6	1.9	91	±47
RS2-1505SD20AXv2	13.5 ~ 16.5	30	153	±5	±200	3.4	87	±100
RS2-1509SD20AXv2	13.5 ~ 16.5	30	150	±9	±111.1	2.4	89	±100
RS2-1512SD20AXv2	13.5 ~ 16.5	30	150	±12	±83.3	2.2	89	±47
RS2-1515SD20AXv2	13.5 ~ 16.5	30	148	±15	±66.6	1.9	90	±47
RS2-2405SD20AXv2	21.6 ~ 26.4	20	97	±5	±200	3.5	86	±100
RS2-2409SD20AXv2	21.6 ~ 26.4	20	96	±9	±111.1	2.4	87	±100
RS2-2412SD20AXv2	21.6 ~ 26.4	20	96	±12	±83.3	2.2	87	±47
RS2-2415SD20AXv2	21.6 ~ 26.4	20	94	±15	±66.6	1.9	89	±47

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

Input Specifications					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	5.0 Vdc Input	4.5	5.0	5.5	VDC
	12 Vdc Input	10.8	12	13.2	
	15 Vdc Input	13.5	15	16.5	
	24 Vdc Input	21.6	24	26.4	
Input Current (No Load)		See Table			mA
Input Current (Full Load)		See Table			mA
Input Filter		Capacitor			-
Input Reflected Ripple Current (1)	5.0 Vdc Input		25		mApk-pk
	12 Vdc Input		25		
	15 Vdc Input		30		
	24 Vdc Input		40		
Recommended input fuse (slow blow)	5.0 Vdc Input		0.63		A
	12 Vdc Input		0.315		
	15 Vdc Input		0.315		
	24 Vdc Input		0.315		
Note：1. Measured with a simulated source inductance of 12 µH and a source capacitor Cin (47 µF, ESR < 1 Ω at 100 kHz).					

Output Specifications					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		-4		+2	%
Line Regulation	For 1 % Vin Change	-1.2		+1.2	%
Load Regulation	From 10 % to 100 % Load	See Table			%
Ripple & Noise (1)	20 MHz Bandwidth			50	mVpk-pk
Temperature Coefficient		-0.02		+0.02	%/°C
Maximum Capacitive Load	Minimum Vin and constant resistive load	See Table			
Note：1. Measured with a 1.0µF MLCC.					

Absolute Maximum Ratings					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (100 ms)	5.0 Vdc Input			9	VDC
	12 Vdc Input			18	
	15 Vdc Input			20	
	24 Vdc Input			30	
Soldering Temperature	1.5 mm from case 10 sec. 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
Efficiency				See Table		%
Isolation Voltage	Input-output, and rated for 60 sec.	Suffix “1”	1000			VDC
		Suffix “3”	3000			
Isolation Resistance	Input-output		1000			MΩ
Isolation Capacitance	Input-output			60		pF
Switching Frequency				70		kHz
Reliability Calculated MTBF	MIL-HDBK-217 F @ 25 °C		1900			k hours
Safety Standard	IEC / EN / UL 62368-1		Designed to meet			
Environmental compliance	RoHS		Designed to meet			

Environmental Specifications					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating Ambient Temperature	See the Derating Curve	-40		89	°C
Maximum Case Temperature				100	°C
Thermal Impedance		50			°C/W
Storage Humidity				95	% rel. H
Storage Temperature		-55		125	°C
Cooling	Natural Convection	30 - 65 LFM			

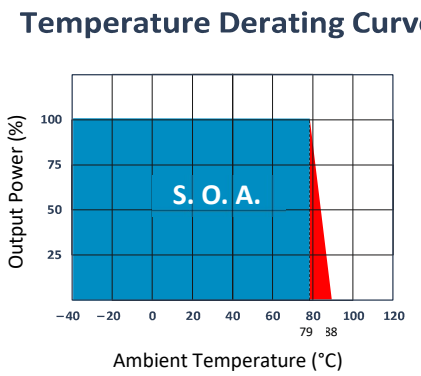
EMC Specifications			
Parameter	Standard	Condition	Criterion
Conducted Emissions	EN55032	with external components	B
Radiated Emissions	EN55032		B
ESD	IEC 61000-4-2	Air ±8 kV, Contact: ±6 KV	A
RS	IEC 61000-4-3	10 V/m	A
EFT	IEC 61000-4-4	±2.0 kV with external components	A
CS	IEC 61000-4-6	10 Vrms	A
PFMF	IEC 61000-4-8	1 A/m	A

Physical Specifications	
Parameter	Value
Case Material	Nonconductive Black Plastic (UL94V-0 rated)
Pin Material	Tinned copper
Potting Material	Epoxy (UL94V-0 rated)
Weight	2.8 g, typ.
Dimensions	0.76" x 0.28" x 0.39"

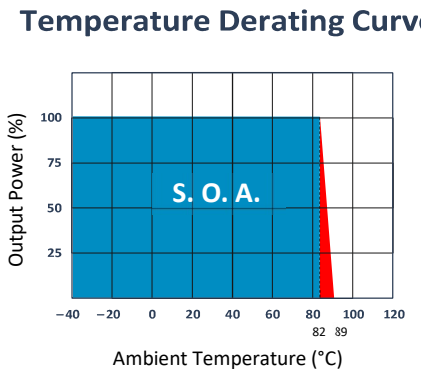
Electrical Characteristic Curves SIL 4 Package

Thermal Derating

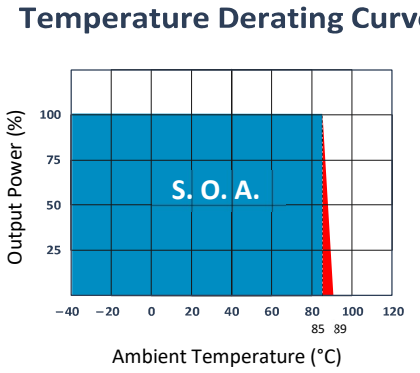
To enhance the system reliability, the power module should always be operated below the maximum operating temperature. If the temperature exceeds the maximum operating temperature, reliability of the unit may be affected.



Efficiency 83 % ~ 85 % Models



Efficiency 86 % ~ 88 % Models

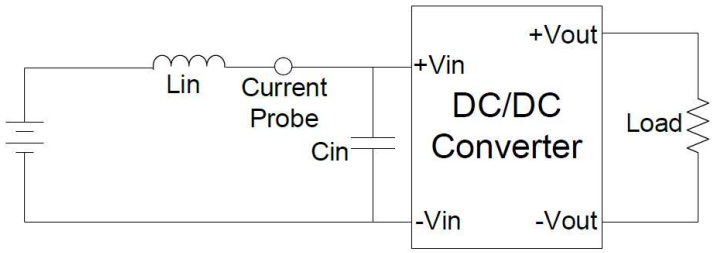


Efficiency 89 % ~ 91 % Models

Test Configurations

Input Reflected Ripple Current Test Step

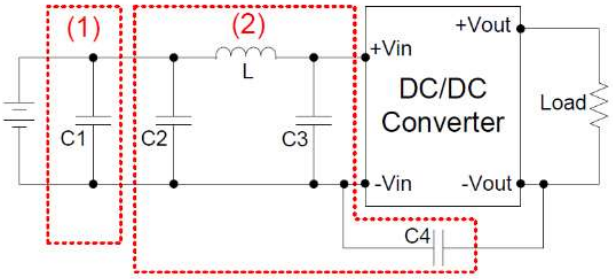
Input reflected ripple current is measured with a source inductor Lin (12 µH) and a source capacitor Cin (47 µF, ESR < 1.0 Ω at 100 kHz) at nominal input and full load.



Test 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.



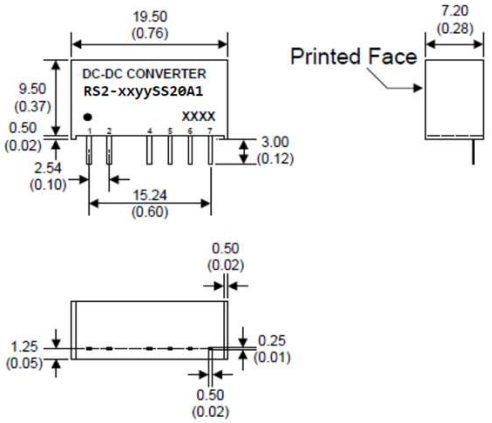
V in	C1	C2	L	C3	C4
05 V	Nippon Chemi-con KY-Series 220µF / 100V	MLCC 2,2µF / 100V	18µH	/	/
12 V					
15 V					
24 V				MLCC 2,2µF / 100V	MLCC 470pF / 3 kV

Pin Connections

SIL 7 Package				
	Suffix “1”		Suffix “3”	
PIN NUMBER	SINGLE	DUAL	SINGLE	DUAL
1	+Vin	+Vin	+Vin	+Vin
2	-Vin	-Vin	-Vin	-Vin
4	-Vout	-Vout	N.P.	N.P.
5	N.P.	COM	-Vout	-Vout
6	+Vout	+Vout	N.P.	COM
7	N.P.	N.P.	+Vout	+Vout
	*N.P. : No Pin			

Mechanical Specifications

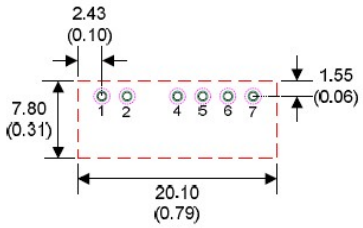
SIL Package



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)

Recommended Footprint Details

SIL Package



Notes : All dimensions are typical in millimeters (inches).
1. Through hole (black): Ø 0.80 (0.031)
2. Top view pad (green): Ø 1.00 (0.039)
3. Bottom view pad (pink): Ø 1.60 (0.063)

Notes

The information and specification contained in this data sheet are believed to be correct at time of publication. However, Acal BFi accepts no responsibility for consequences arising from printing errors or inaccuracies. Specifications are subject to change without notice.