

- SIL7 Package
- Input Range $\pm 10 \%$
- Efficiency up to 90 %
- Semi-regulated Output
- Low Ripple and Noise
- Isolation 1000 VDC, up to 3000 VDC
- Operation Temperature Range -40 ~ 95 °C max.
- Non Conductive Black Plastic Case

RoHS



Picture similar

Number Structure

RS2	-	05	05	SS	10	A	1	v2
Series / Package		Input Voltage	Output Voltage	Output Type	Power	Int. Code	Isolation Voltage	Version
RS2 = SIL7		05 = 5.0 Vdc	05 = 5.0 Vdc	SS = Semi-Reg.	10 = 1 W	Logistics Code	1 = 1000 Vdc 3 = 3000 Vdc	
		12 = 12 Vdc	09 = 9.0 Vdc	- Single Out.				
		15 = 15 Vdc	12 = 12 Vdc	SD = Semi-Reg.				
		24 = 24 Vdc	15 = 15 Vdc	- Dual Out.				
		48 = 48 Vdc						

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.)					
RS2-0505SS10AXv2	4.5 ~ 5.5	20	235	5	200	6	85	220
RS2-0509SS10AXv2	4.5 ~ 5.5	20	233	9	111.1	5.5	86	220
RS2-0512SS10AXv2	4.5 ~ 5.5	20	230	12	83.3	5.5	87	100
RS2-0515SS10AXv2	4.5 ~ 5.5	23	227	15	66.7	5	88	100
RS2-1205SS10AXv2	10.8 ~ 13.2	15	98	5	200	4	85	220
RS2-1209SS10AXv2	10.8 ~ 13.2	15	96	9	111.1	3.5	87	220
RS2-1212SS10AXv2	10.8 ~ 13.2	15	94	12	83.3	3.5	89	100
RS2-1215SS10AXv2	10.8 ~ 13.2	15	94	15	66.7	3	89	100
RS2-1505SS10AXv2	13.5 ~ 16.5	10	78	5	200	4	86	220
RS2-1509SS10AXv2	13.5 ~ 16.5	10	76	9	111.1	3.5	88	220
RS2-1512SS10AXv2	13.5 ~ 16.5	10	75	12	83.3	3.5	89	100
RS2-1515SS10AXv2	13.5 ~ 16.5	10	74	15	66.7	3	90	100
RS2-2405SS10AXv2	21.6 ~ 26.4	7	51	5	200	4	81	220
RS2-2409SS10AXv2	21.6 ~ 26.4	7	50	9	111.1	3.5	84	220
RS2-2412SS10AXv2	21.6 ~ 26.4	7	48	12	83.3	3.5	86	100
RS2-2415SS10AXv2	21.6 ~ 26.4	7	48	15	66.7	2.5	86	100
RS2-4805SS10AXv2	43.2 ~ 52.8	5	27	5	200	4	78	220
RS2-4809SS10AXv2	43.2 ~ 52.8	5	26	9	111.1	3.5	80	220
RS2-4812SS10AXv2	43.2 ~ 52.8	5	26	12	83.3	3	81	100
RS2-4815SS10AXv2	43.2 ~ 52.8	5	26	15	66.7	3	81	100
RS2-0505SD10AXv2	4.5 ~ 5.5	30	238	±5	±100	6	84	±100
RS2-0509SD10AXv2	4.5 ~ 5.5	30	230	±9	±55.55	5.5	87	±100
RS2-0512SD10AXv2	4.5 ~ 5.5	25	230	±12	±41.67	5.5	87	±47
RS2-0515SD10AXv2	4.5 ~ 5.5	23	230	±15	±33.33	5	87	±47
RS2-1205SD10AXv2	10.8 ~ 13.2	15	97	±5	±100	4	86	±100
RS2-1209SD10AXv2	10.8 ~ 13.2	15	95	±9	±55.55	3.5	88	±100
RS2-1212SD10AXv2	10.8 ~ 13.2	15	94	±12	±41.67	3.5	89	±47
RS2-1215SD10AXv2	10.8 ~ 13.2	15	94	±15	±33.33	3.5	89	±47
RS2-1505SD10AXv2	13.5 ~ 16.5	10	77	±5	±100	3.5	87	±100
RS2-1509SD10AXv2	13.5 ~ 16.5	10	76	±9	±55.55	2.5	88	±100
RS2-1512SD10AXv2	13.5 ~ 16.5	10	75	±12	±41.67	2.5	89	±47
RS2-1515SD10AXv2	13.5 ~ 16.5	10	74	±15	±33.33	2.5	90	±47
RS2-2405SD10AXv2	21.6 ~ 26.4	7	50	±5	±100	3.5	83	±100
RS2-2409SD10AXv2	21.6 ~ 26.4	7	49	±9	±55.55	2.5	85	±100
RS2-2412SD10AXv2	21.6 ~ 26.4	7	48	±12	±41.67	2.5	86	±47
RS2-2415SD10AXv2	21.6 ~ 26.4	7	48	±15	±33.33	2.5	87	±47
RS2-4805SD10AXv2	43.2 ~ 52.8	5	26	±5	±100	3	80	±100
RS2-4809SD10AXv2	43.2 ~ 52.8	5	26	±9	±55.55	3	80	±100
RS2-4812SD10AXv2	43.2 ~ 52.8	5	26	±12	±41.67	3	81	±47
RS2-4815SD10AXv2	43.2 ~ 52.8	5	25	±15	±33.33	2	82	±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	
	48 Vdc Input	43.2	48	52.8	
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		20		mApk-pk
	12 Vdc Input		20		
	15 Vdc Input		30		
	24 Vdc Input		40		
	48 Vdc Input		50		
Recommended input fuse (slow blow)	5.0 Vdc Input		0.5		A
	12 Vdc Input		0.3		
	15 Vdc Input		0.3		
	24 Vdc Input		0.3		
	48 Vdc Input		0.3		
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		-3		+3	%
Line Regulation	For 1 % Vin Change	-1.2		+1.2	%
Load Regulation	From 10 % to 100 % Load	See Table			%
Ripple & Noise	20 MHz Bandwidth			50	mVpk-pk
Temperature Coefficient		-0.02		+0.02	%/°C
Maximum Capacitive Load	Minimum Vin and constant resistive load	See Table			

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	
	48 Vdc Input			54	
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		2000			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		95	°C
Maximum Case Temperature				100	°C
Thermal Impedance		59.5			°C/W
Storage Humidity				95	% rel. H
Storage Temperature		-55		125	°C
Cooling	Natural Convection	30 - 65 LFM			

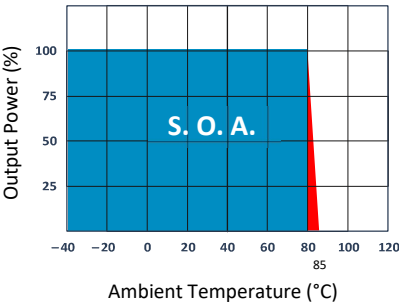
EMC Specifications			
Parameter	Standard	Condition	Criterion
Conducted Emissions	EN55032	with external components	B
Radiated Emissions	EN55032		B
ESD	IEC 61000-4-2	Air ±8 kV	A
RS	IEC 61000-4-3	10 V/m	A
EFT	IEC 61000-4-4	±2.0 kV with external components	A
CS	IEC 61000-4-6	10 Vrms	A
PFMF	IEC 61000-4-8	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	All V Input	2.4 g, typ.
	48 Vdc Input	2.8 g, typ.
Dimensions	All V Input	0.76" x 0.24" x 0.39"
	48 Vdc Input	0.76" x 0.28" x 0.39"

Thermal Derating

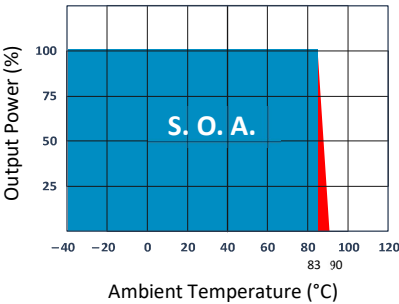
To enhance the system reliability, the power module should always be operated below the maximum operating temperature. If the temperature exceeds the maximum operating temperature, reliability of the unit may be affected.

Temperature Derating Curve



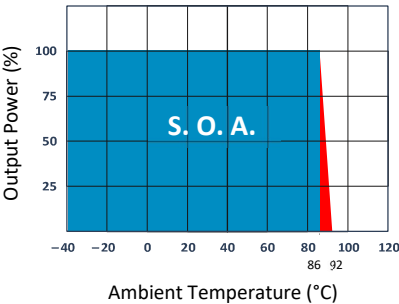
Efficiency 78 % ~ 81 % Models

Temperature Derating Curve



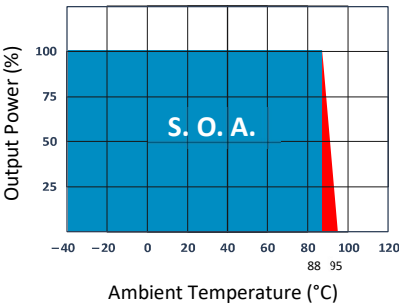
Efficiency 82 % ~ 85 % Models

Temperature Derating Curve



Efficiency 86 % ~ 89 % Models

Temperature Derating Curve

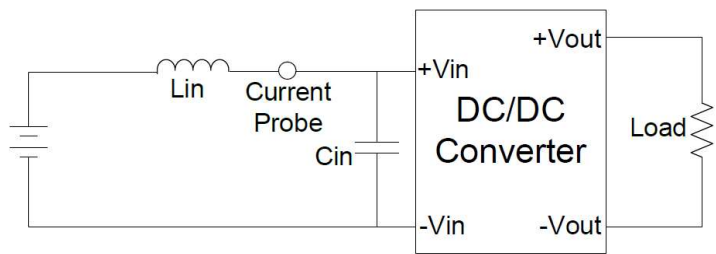


Efficiency 90 % ~ 91 % Models

Test Configurations

Input Reflected Ripple Current Test Step

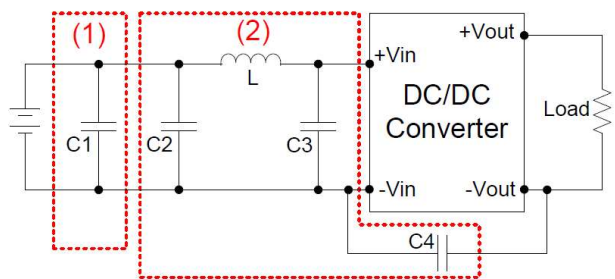
Input reflected ripple current is measured with a source inductor L_{in} (12 μ H) and a source capacitor C_{in} (47 μ F, ESR < 1.0 Ω at 100 kHz) at nominal input and full load.



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.



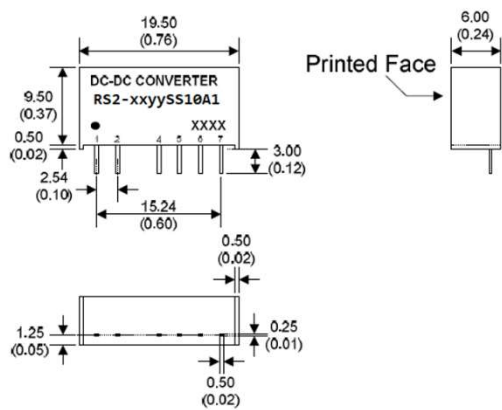
V in	C1	C2	L	C3	C4
05 V	Nippon Chemi-con KY-Series 220 μ F / 100V	MLCC 2,2 μ F / 100V	18 μ H	/	/
12 V					
15 V					
24 V				MLCC 2,2 μ F / 100V	MLCC 470pF / 3 kV
48 V					

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

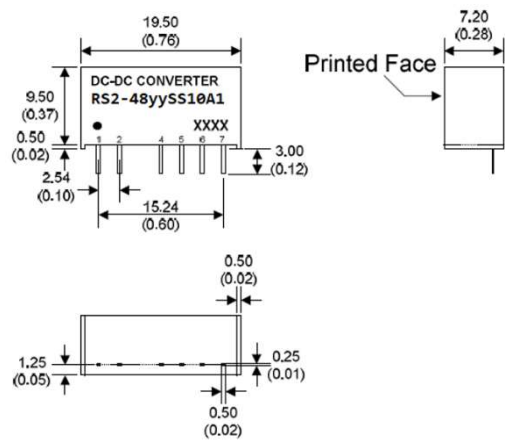
SIL Package for all Vin except 48V



- Notes :
- All dimensions are typical in millimeters (inches).
 - Pin dimension tolerance: ± 0.05 (± 0.002)
 - Pin pitch and length tolerance: ± 0.35 (± 0.014)
 - Pin to case tolerance: ± 0.5 (± 0.02)
 - Case Tolerance: ± 0.5 (± 0.02)

Mechanical Specifications

SIL Package only Vin 48 Vdc



- 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 for all Vin except 48V	SIL Package only Vin 48 Vdc
The footprint diagram shows a rectangular footprint with a width of 20.10 mm (0.79 inches) and a length of 6.60 mm (0.26 inches). The pin pitch is 2.43 mm (0.10 inches). The pin length is 1.55 mm (0.06 inches). The pin diameter is 0.80 mm (0.031 inches). The top view pad is green, the bottom view pad is pink, and the through hole is black.	The footprint diagram shows a rectangular footprint with a width of 20.10 mm (0.79 inches) and a length of 7.80 mm (0.31 inches). The pin pitch is 2.43 mm (0.10 inches). The pin length is 1.55 mm (0.06 inches). The pin diameter is 0.80 mm (0.031 inches). The top view pad is green, the bottom view pad is pink, and the through hole is black.
Notes : All dimensions are typical in millimeters (inches). 1. Through hole (black): $\varnothing 0.80$ (0.031) 2. Top view pad (green): $\varnothing 1.00$ (0.039) 3. Bottom view pad (pink): $\varnothing 1.60$ (0.063)	Notes : All dimensions are typical in millimeters (inches). 1. Through hole (black): $\varnothing 0.80$ (0.031) 2. Top view pad (green): $\varnothing 1.00$ (0.039) 3. Bottom view pad (pink): $\varnothing 1.60$ (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.