

- SIL8 Package, Highest Power Density
- Wide Input Range 4:1
- Regulated Output
- Efficiency up to 88 %
- Low Ripple and Noise
- Continuous Short Circuit Protection
- Isolation 1600 VDC
- Remote ON OFF Control
- Operation Temperature Range -40 ~ 85 °C max.
- Metal Case

RoHS



Picture similar

Number Structure

RS5	-	48	05	RS	90	A	1	W
Series / Package	Input Voltage	Output Voltage	Output Type	Power	Int. Code	Isolation Voltage	Input Range	
RS5 = SIL8	24 = 24 Vdc 48 = 48 Vdc	03 = 3.3 Vdc 05 = 5.0 Vdc 09 = 9.0 Vdc 12 = 12 Vdc 15 = 15 Vdc 24 = 24 Vdc	RS = Regulated - Single Out. RD = Regulated - Dual Out.	90 = 6 W	Logistics Code	1 = 1600 Vdc	Wide 4:1	

Model Selection Guide

Model Number	Input Voltage Range (VDC)	Input Current		Output Voltage (VDC)	Output Current		Efficiency @ FL (% , typ.)	Capacitive Load @ FL (µF, max.)
		No-Load (mA, max.)	Full Load (mA, typ.)		Min. Load (mA)	Full Load (mA)		
RS5-2403RS90A1W	9-36	15	344	3.3	0	2000	80	2600
RS5-2405RS90A1W	9-36	15	402	5	0	1600	83	1300
RS5-2409RS90A1W	9-36	15	431	9	0	1000	87	800
RS5-2412RS90A1W	9-36	15	426	12	0	750	88	560
RS5-2415RS90A1W	9-36	15	431	15	0	600	87	560
RS5-2424RS90A1W	9-36	15	426	24	0	375	88	200
RS5-4803RS90A1W	18-75	10	174	3.3	0	2000	79	2600
RS5-4805RS90A1W	18-75	10	201	5	0	1600	83	1300
RS5-4809RS90A1W	18-75	10	221	9	0	1000	85	800
RS5-4812RS90A1W	18-75	10	216	12	0	750	87	560
RS5-4815RS90A1W	18-75	10	216	15	0	600	87	560
RS5-4824RS90A1W	18-75	10	216	24	0	375	87	200
RS5-2405RD90A1W	9-36	15	402	±5	0	±800	83	±800
RS5-2412RD90A1W	9-36	15	431	±12	0	±375	87	±390
RS5-2415RD90A1W	9-36	15	431	±15	0	±300	87	±200
RS5-4805RD90A1W	18-75	10	203	±5	0	±800	82	±800
RS5-4812RD90A1W	18-75	10	221	±12	0	±375	85	±390
RS5-4815RD90A1W	18-75	10	218	±15	0	±300	86	±200

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	24 Vdc Input		9	24	36	VDC
	48 Vdc Input		18	48	75	
Under Voltage Protection	24 Vdc Input	Module ON		8.9		VDC
		Module OFF		7.0		
	48 Vdc Input	Module ON		16.0		
		Module OFF		14.0		
Input Current (No Load)			See Table			mA
Input Current (Full Load)			See Table			mA
Input Filter			Capacitor			-
Input Reflected Ripple Current ⁽¹⁾					30	mApk-pk
Start up Time	Nominal Vin and constant resistive load			50		ms
Remote ON OFF Control	Module ON		open or high impedance			
	Module OFF		2 mA ~ 4 mA input current (via 1 kΩ)			
	OFF idle current			2.5		mA
Recommended input fuse (slow blow)	24 Vdc Input			2.2		A
	48 Vdc Input			1.0		
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			-1.0		+1.0	%
Line Regulation			-0.2		+0.2	%
Load Regulation	From 0 % to 100 % Load	Single Output	-0.5		+0.5	%
		3.3V Output & Dual Output (Balance load)	-1.0		+1.0	
Cross Regulation	Asymmetrical Load 25 % / 100 % for Dual		-5		+5	%
Ripple & Noise ⁽¹⁾	20 MHz Bandwidth				75	mVpk-pk
Over Voltage Protection				130		%
Over Load Protection				180		%
Short Circuit Protection			Indefinite (Automatic Recovery)			-
Temperature Coefficient			-0.02		+0.02	%/°C
Maximum Capacitive Load	Minimum Vin and constant resistive load		See Table			-
Transient Recovery Time ⁽²⁾	see Note 2	For All models		250		µs
Transient Response Deviation ⁽²⁾	see Note 2	3.3V & 5V Output	-5		+5	%
		Other Output	-3		+3	
Note : 1. Measured with a 1.0 µF MLCC and 10 µF Electrolytic capacitor.						
2. Nominal Vin and 25% load step change (75%-50%-25% of load)						

Absolute Maximum Ratings					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (100 ms)	24 Vdc Input			50	VDC
	48 Vdc Input			100	
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"	1600			VDC
	Case I/O, and rated for 60 sec.		1000			
Isolation Resistance	Input-output		1000			MΩ
Isolation Capacitance	Input-output				50	pF
Switching Frequency	24 Vdc Input			400		kHz
	48 Vdc Input			500		
Reliability Calculated MTBF	MIL-HDBK-217 F @ 25 °C		900			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		85	°C
Maximum Case Temperature					100	°C
Thermal Impedance	3.3 Vdc Output		29.3			°C/W
	Other Output		16.6			
Storage Humidity					95	% rel. H
Storage Temperature			-55		125	°C
Cooling	Natural Convection		30 - 65 LFM			

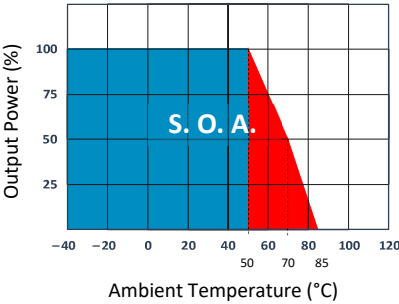
EMC Specifications			
Parameter	Standard	Condition	Criterion
Conducted Emissions	EN55032	with external components	A
Radiated Emissions	EN55032	with external components	A
ESD	IEC 61000-4-2	Contact: ±6 kV	B
RS	IEC 61000-4-3	20 V/m	A
EFT	IEC 61000-4-4	±2 kV with external components	A
Surge	IEC 61000-4-5	±2 kV with external components	A
CS	IEC 61000-4-6	10 Vrms	A
PFMF	IEC 61000-4-8	100 A/m	A

Physical Specifications	
Parameter	Value
Case Material	Copper
Pin Material	Tinned copper
Potting Material	Epoxy (UL94V 0 rated)
Weight	7.3 g , typ.
Dimensions	0.86" x 0.38" x 0.44"

Thermal Derating

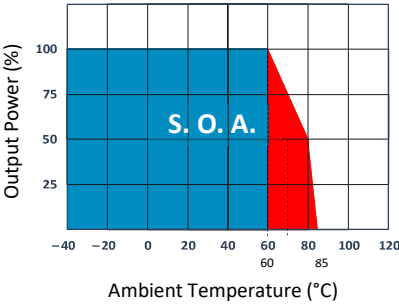
To enhance the system reliability, the power module should always be operated below the maximum operating temperature. If the temperature exceeds the maximum operating temperature, reliability of the unit may be affected.

Temperature Derating Curve



3.3 Vdc Output Models

Temperature Derating Curve

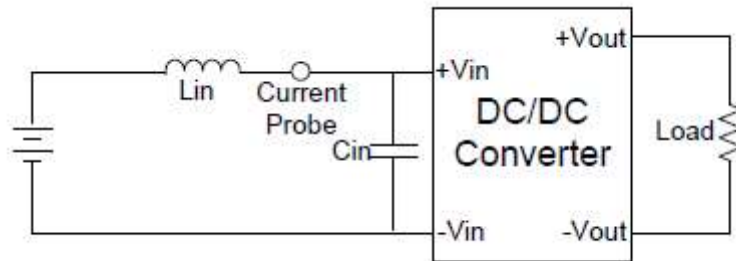


Other Output Models

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.

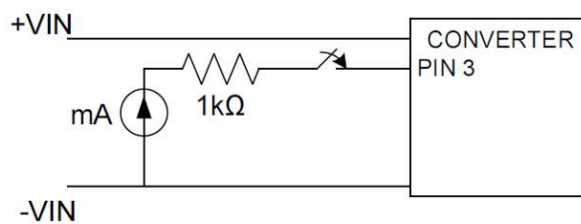


Remote Module ON / OFF

Remote Module ON / OFF

ON: Open or high impedance

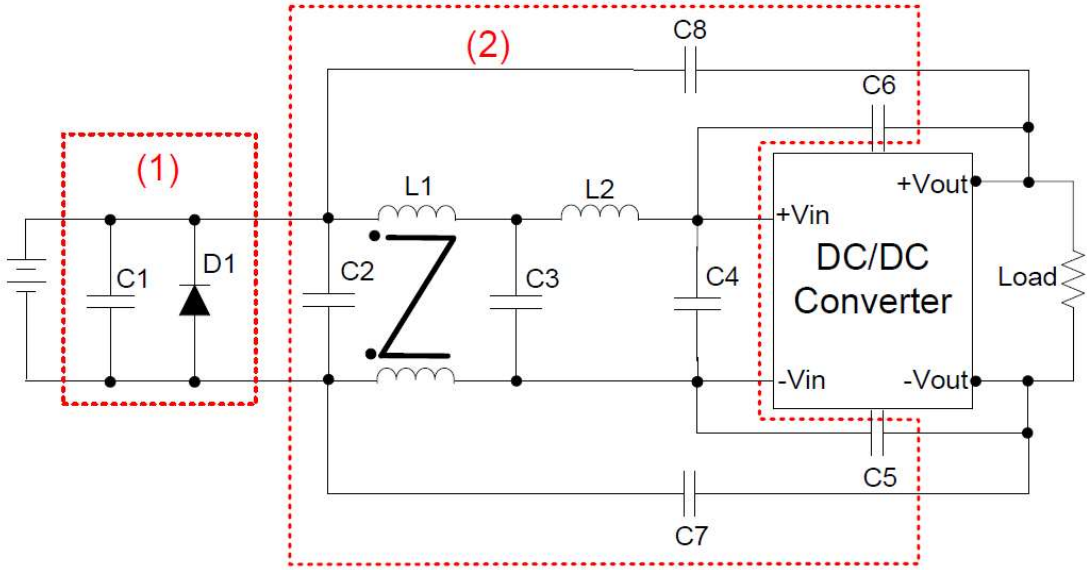
OFF: Input current (2 mA ~ 4 mA) via 1 k Ω to Pin3



EMC Filter

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

Single Output Models:

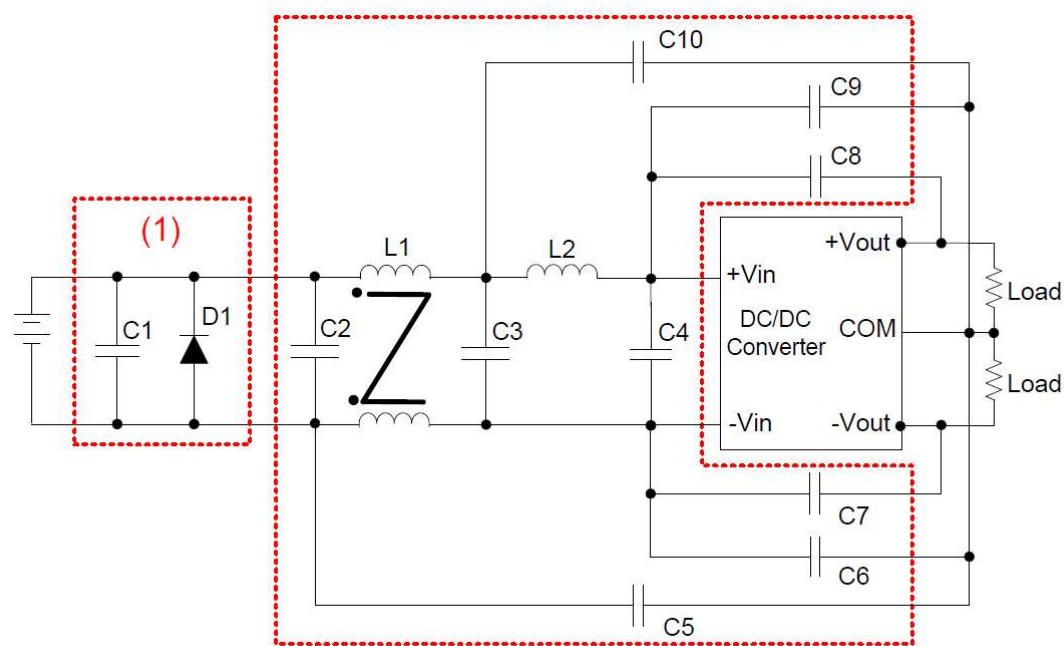


V in	C1	D1	C2, C3, C4	L1	L2	C5, C6, C7, C8
24 V	NIPPON Chemi-con KY series 330μF / 100V	SMDJ70A	MLCC 10μF / 35V	20μH	20μH	MLCC 220pF / 3kV
48 V		SMDJ120A	MLCC 4.7μF / 100V	132.8μH	10μH	MLCC 1000pF / 3kV

EMC Filter

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

Dual Output Models:



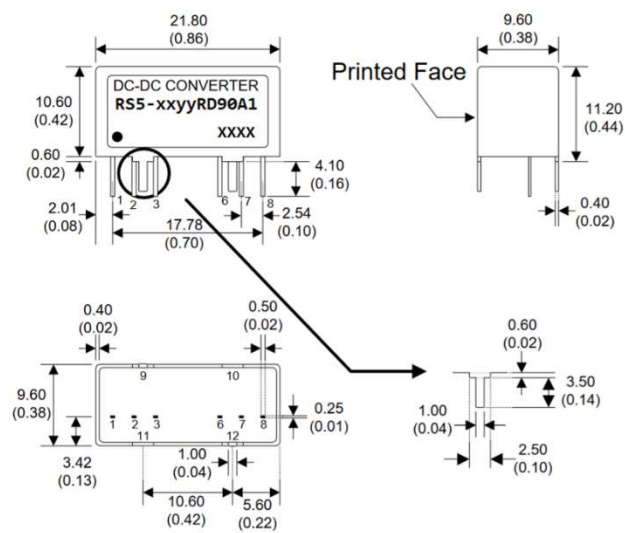
V in	C1	D1	C2, C3, C4	L1	L2	C5	C6, C10	C7, C8	C9
24 V	NIPPON Chemi-con KY series 330μF / 100V	SMDJ70A	MLCC 10μF / 35V	20μH	20μH	MLCC 220pF / 3kV	/	MLCC 220pF / 3kV	MLCC 1000pF / 3kV
48 V		SMDJ120A	MLCC 4.7μF / 100V	132.8μH	10μH	/	MLCC 220pF / 3kV	MLCC 1000pF / 3kV	/

Pin Connections

PIN CONNECTIONS		
PIN NUMBER	SINGLE	DUAL
1	-Vin	-Vin
2	+Vin	+Vin
3	CTRL	CTRL
6	+Vout	+Vout
7	-Vout	COM
8	N.C.	-Vout
9	Case	Case
10	Stand Off	Stand Off
11	Stand Off	Stand Off
12	Case	Case
*N.C. : No Connection		
*CTRL : Control Remote ON/OFF		

Mechanical Specifications

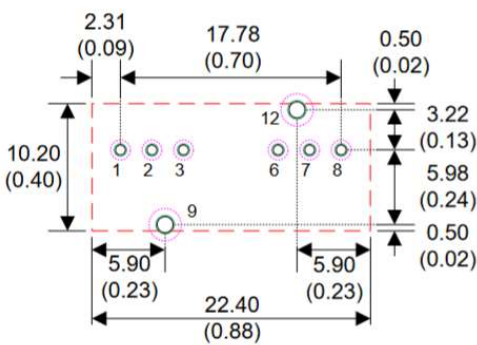
SIL Package



- 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)
 - 5. Stand-off tolerance: ± 0.1 (± 0.004)

Recommended Footprint Details

SIL Package



Notes :

- 1. All dimensions are typical in millimeters (inches).
Through hole (black) 1 ~ 8: Ø 0.80 (0.031)
Top view pad (green) 1 ~ 8: Ø 1.00 (0.039)
Bottom view pad (pink) 1 ~ 8: Ø 1.60 (0.063)
- 2. All dimensions are typical in millimeters (inches).
Through hole (black) 9 & 12: Ø 1.3 (0.051)
Top view pad (green) 9 & 12: Ø 1.5 (0.059)
Bottom view pad (pink) 9 & 12: Ø 2.6 (0.102)

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.