

- 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 1500 VDC, up to 3000 VDC
- Remote ON OFF Control
- Operation Temperature Range -40 ~ 97 °C max.
- Non Conductive Black Plastic Case

RoHS



Picture similar

Number Structure

RS5	-	48	05	RS	60	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.	60 = 6 W	Logistics Code	1 = 1500 Vdc 3 = 3000 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)		
RS5-2403RS60A1W	9-36	6	261	3.3	0	1500	79	4700
RS5-2405RS60A1W	9-36	6	298	5	0	1200	84	2200
RS5-2409RS60A1W	9-36	6	290	9	0	666	86	1000
RS5-2412RS60A1W	9-36	6	287	12	0	500	87	470
RS5-2415RS60A1W	9-36	6	287	15	0	400	87	220
RS5-2424RS60A1W	9-36	6	287	24	0	250	87	100
RS5-4803RS60A1W	18-75	6	131	3.3	0	1500	79	4700
RS5-4805RS60A1W	18-75	6	151	5	0	1200	83	2200
RS5-4809RS60A1W	18-75	6	147	9	0	666	85	1000
RS5-4812RS60A1W	18-75	6	144	12	0	500	87	470
RS5-4815RS60A1W	18-75	6	144	15	0	400	87	220
RS5-4824RS60A1W	18-75	6	144	24	0	250	87	100
RS5-2405RD60A1W	9-36	6	298	±5	0	±600	84	±330
RS5-2412RD60A1W	9-36	6	291	±12	0	±250	86	±220
RS5-2415RD60A1W	9-36	6	287	±15	0	±200	87	±100
RS5-4805RD60A1W	18-75	6	152	±5	0	±600	82	±330
RS5-4812RD60A1W	18-75	6	147	±12	0	±250	85	±220
RS5-4815RD60A1W	18-75	6	145	±15	0	±200	86	±100

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	
Input Current (No Load)		See Table			mA
Input Current (Full Load)		See Table			mA
Input Filter		Capacitor			-
Input Reflected Ripple Current ⁽¹⁾	24 Vdc Input		20		mApk-pk
	48 Vdc Input		40		
Start up Time	Nominal Vin and constant resistive load		30		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		2.5		A
	48 Vdc Input		1.5		
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 & 5V & Dual Output	-1.0		+1.0	
Cross Regulation	Asymmetrical Load 25 % / 100 % for Dual		-5		+5	%
Ripple & Noise ⁽¹⁾	20 MHz Bandwidth				125	mVpk-pk
Short Circuit Protection			Indefinite (hiccup) (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 0.1 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”	1500			VDC
		Suffix “3”	3000			
Isolation Resistance	Input-output		1000			MΩ
Isolation Capacitance	Input-output				50	pF
Switching Frequency				580		kHz
Reliability Calculated MTBF	MIL-HDBK-217 F @ 25 °C		800			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		97	°C
Maximum Case Temperature				100	°C
Thermal Impedance	3.3 Vdc Output	26			°C/W
	Other Output	29.5			
Storage Humidity				95	% rel. H
Storage Temperature		-55		125	°C
Cooling	Natural Convection	30 - 65 LFM			

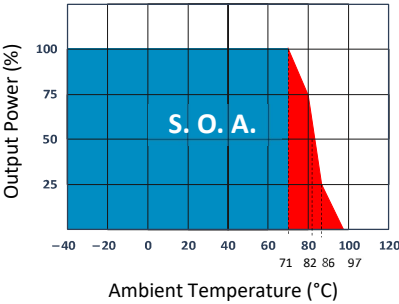
EMC Specifications			
Parameter	Standard	Condition	Criterion
Conducted Emissions	EN55032	with external components	A
Radiated Emissions	EN55032	with external components	A
ESD	IEC 61000-4-2	Air: ±8 kV / Contact: ±6 kV	A
RS	IEC 61000-4-3	20 V/m	A
EFT	IEC 61000-4-4	±2 kV with external components	A
Surge	IEC 61000-4-5	±2 kV with external components	A
CS	IEC 61000-4-6	10 Vrms	A
PFMF	IEC 61000-4-8	10 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	4.5 g , typ.
Dimensions	0.86" x 0.36" x 0.44"

Thermal Derating

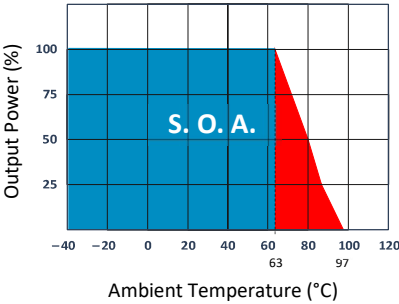
To enhance the system reliability, the power module should always be operated below the maximum operating temperature. If the temperature exceeds the maximum operating temperature, reliability of the unit may be affected.

Temperature Derating Curve



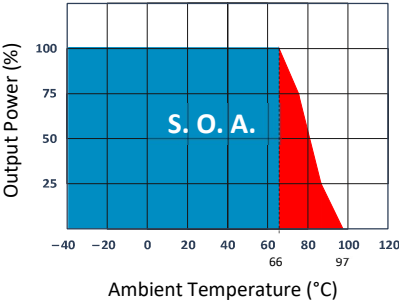
Efficiency $\geq 87\%$

Temperature Derating Curve



RS5-4805RS60A1W / RS5-4805RD60A1W

Temperature Derating Curve

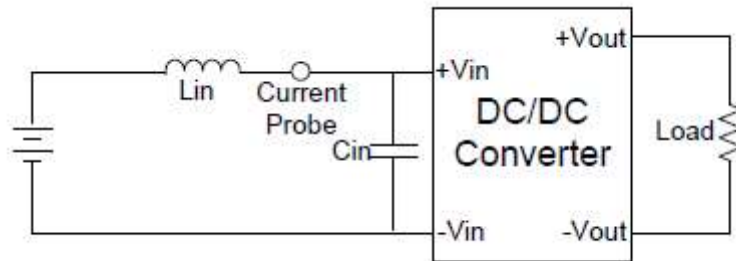


Other Models

Test Configurations

Input Reflected Ripple Current Test Step

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

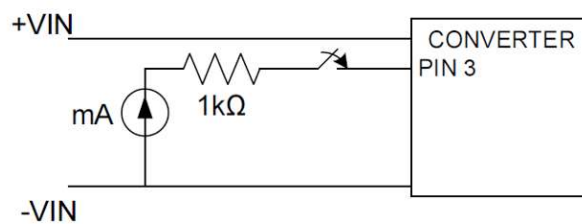


Remote Module ON / OFF

Remote Module ON / OFF

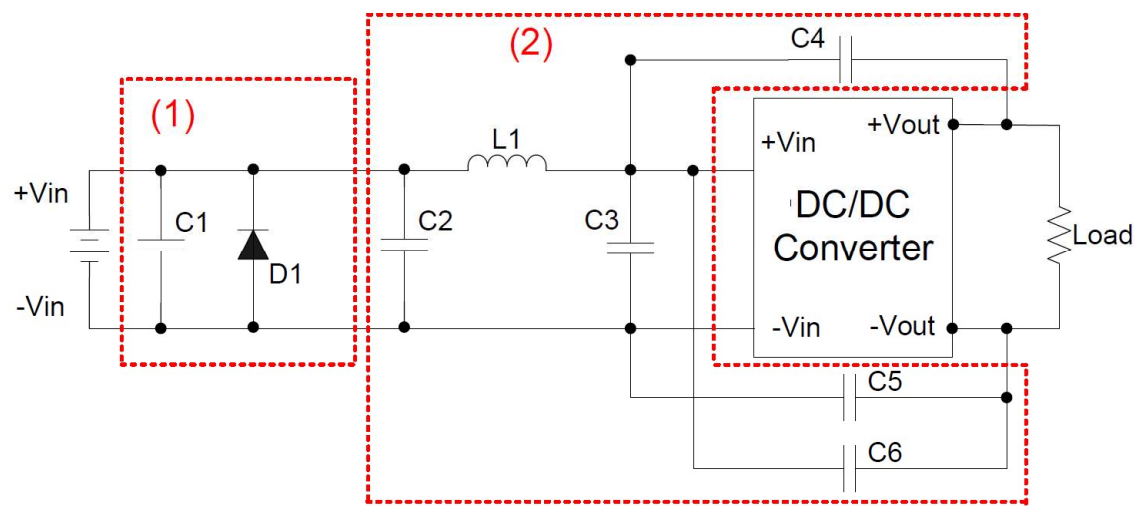
ON: Open or high impedance

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.



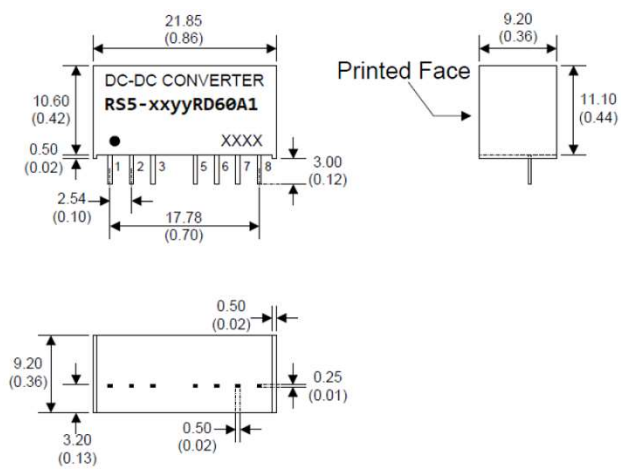
V in	C1	D1	C2, C3	L1	C4, C5	C6
24 V	Nippon Chemi-con KY-Series 330μF / 100V	SMDJ75A	MLCC 10μF / 35V	12μH	MLCC 470pF / 3kV	/
48 V	Nippon Chemi-con KY-Series 470μF / 100V	SMDJ130A	MLCC 2.2μF / 100V		MLCC 1000pF / 3kV	MLCC 1000pF / 3kV

Pin Connections

PIN CONNECTIONS				
Isolation	Suffix "1"		Suffix "3"	
PIN NUMBER	SINGLE	DUAL	SINGLE	DUAL
1	-Vin	-Vin	-Vin	-Vin
2	+Vin	+Vin	+Vin	+Vin
3	CTRL	CTRL	CTRL	CTRL
5	N.C.	N.C.	N.P.	N.P.
6	+Vout	+Vout	+Vout	+Vout
7	-Vout	COM	-Vout	COM
8	N.C.	-Vout	N.C.	-Vout
	*N.P. : No PIN			
	*N.C. : No Connection			
	*CTRL : Control Remote ON/OFF			

Mechanical Specifications

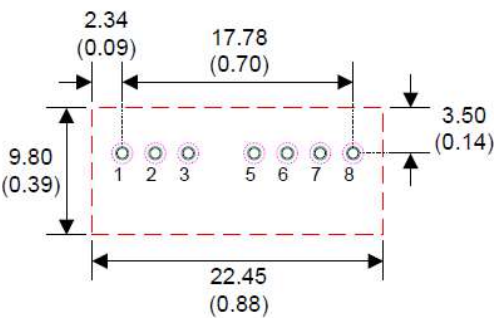
SIL Package



- 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 : 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.