

- SIL7 Package
- Input Range $\pm 10\%$
- Efficiency up to 86 %
- Low Coupling Capacity
- Isolation 6000 VDC
- Long Term Short Circuit Protection
- Operation Temperature Range $-40 \sim 90\text{ }^{\circ}\text{C}$ max.
- Physical Clearance of Isolation Barrier 2.5mm
- Dedicated for IGBT Applications

RoHS



Picture similar

Number Structure

RS7	-	05	05	S	10	A	6
Series / Package		Input Voltage	Output Voltage	Output Type	Power	Int. Code	Isolation Voltage
RS7 = SIL7		05 = 5.0 Vdc	03 = 3.3 Vdc	S = Single Output	10 = 1 W	Logistics	6 = 6000 Vdc
		09 = 9.0 Vdc	05 = 5.0 Vdc	D = Dual Output		Code	
		12 = 12 Vdc	09 = 9.0 Vdc	T = Dual Split			
		15 = 15 Vdc	12 = 12 Vdc	(+15 / -9 Vdc)			
		24 = 24 Vdc	15 = 15 Vdc				
			24 = 24 Vdc				

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)		
RS7-0503S10A6	4.5-5.5	30	270.27	3.3	-	303.03	74	220
RS7-0505S10A6	4.5-5.5	30	256.41	5	-	200	78	220
RS7-0509S10A6	4.5-5.5	30	250.00	9	-	111.11	80	220
RS7-0512S10A6	4.5-5.5	45	253.16	12	-	83.33	79	220
RS7-0515S10A6	4.5-5.5	40	250.00	15	-	66.67	80	220
RS7-0903S10A6	8.1-9.9	20	148.15	3.3	-	303.03	75	220
RS7-0905S10A6	8.1-9.9	25	142.45	5	-	200	78	220
RS7-0909S10A6	8.1-9.9	25	138.89	9	-	111.11	80	220
RS7-0912S10A6	8.1-9.9	25	135.50	12	-	83.33	82	220
RS7-0915S10A6	8.1-9.9	25	135.50	15	-	66.67	82	220
RS7-1203S10A6	10.8-13.2	20	112.61	3.3	-	303.03	74	220
RS7-1205S10A6	10.8-13.2	20	109.65	5	-	200	76	220
RS7-1209S10A6	10.8-13.2	20	106.84	9	-	111.11	78	220
RS7-1212S10A6	10.8-13.2	20	105.49	12	-	83.33	79	220
RS7-1215S10A6	10.8-13.2	20	104.17	15	-	66.67	80	220
RS7-1503S10A6	13.5-16.5	15	86.58	3.3	-	303.03	77	220
RS7-1505S10A6	13.5-16.5	15	83.33	5	-	200	80	220
RS7-1509S10A6	13.5-16.5	15	82.30	9	-	111.11	81	220
RS7-1512S10A6	13.5-16.5	15	81.30	12	-	83.33	82	220
RS7-1515S10A6	13.5-16.5	15	80.32	15	-	66.67	83	220
RS7-2403S10A6	21.6-26.4V	15	56.31	3.3	-	303.03	74	220
RS7-2405S10A6	21.6-26.4V	15	55.56	5	-	200	75	220
RS7-2409S10A6	21.6-26.4V	15	55.56	9	-	111.11	75	220
RS7-2412S10A6	21.6-26.4V	15	52.74	12	-	83.33	79	220
RS7-2415S10A6	21.6-26.4V	15	53.42	15	-	66.67	78	220
RS7-2424S10A6	21.6-26.4V	20	53.42	24	-	41.67	78	220

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)		
RS7-0503D10A6	4.5-5.5	30	270.27	±3.3	-	±151.52	74	±100
RS7-0505D10A6	4.5-5.5	30	253.16	±5	-	±100	79	±100
RS7-0509D10A6	4.5-5.5	30	246.91	±9	-	±55.56	81	±100
RS7-0512D10A6	4.5-5.5	40	250.00	±12	-	±41.67	80	±100
RS7-0515D10A6	4.5-5.5	40	250.00	±15	-	±33.33	80	±100
RS7-0903D10A6	8.1-9.9	25	146.20	±3.3	-	±151.52	76	±100
RS7-0905D10A6	8.1-9.9	25	138.89	±5	-	±100	80	±100
RS7-0909D10A6	8.1-9.9	25	135.50	±9	-	±55.56	82	±100
RS7-0912D10A6	8.1-9.9	25	135.50	±12	-	±41.67	82	±100
RS7-0915D10A6	8.1-9.9	25	133.87	±15	-	±33.33	83	±100
RS7-1203D10A6	10.8-13.2	20	109.65	±3.3	-	±151.52	76	±100
RS7-1205D10A6	10.8-13.2	20	108.23	±5	-	±100	77	±100
RS7-1209D10A6	10.8-13.2	20	104.17	±9	-	±55.56	80	±100
RS7-1212D10A6	10.8-13.2	20	104.17	±12	-	±41.67	80	±100
RS7-1215D10A6	10.8-13.2	20	102.88	±15	-	±33.33	81	±100
RS7-1503D10A6	13.5-16.5	15	86.58	±3.3	-	±151.52	77	±100
RS7-1505D10A6	13.5-16.5	15	82.30	±5	-	±100	81	±100
RS7-1509D10A6	13.5-16.5	15	80.32	±9	-	±55.56	83	±100
RS7-1512D10A6	13.5-16.5	15	79.37	±12	-	±41.67	84	±100
RS7-1515D10A6	13.5-16.5	15	79.37	±15	-	±33.33	84	±100
RS7-2403D10A6	21.6-26.4V	15	58.69	±3.3	-	±151.52	71	±100
RS7-2405D10A6	21.6-26.4V	15	54.11	±5	-	±100	77	±100
RS7-2409D10A6	21.6-26.4V	15	53.42	±9	-	±55.56	78	±100
RS7-2412D10A6	21.6-26.4V	15	53.42	±12	-	±41.67	78	±100
RS7-2415D10A6	21.6-26.4V	15	52.08	±15	-	±33.33	80	±100
RS7-051509T10A6	4.5-5.5	40	250.00	+15/-9	-	+33.33/-55.55	80	±100
RS7-091509T10A6	8.1-9.9	25	135.50	+15/-9	-	+33.33/-55.55	82	±100
RS7-121509T10A6	10.8-13.2	20	105.49	+15/-9	-	+33.33/-55.55	79	±100
RS7-151509T10A6	13.5-16.5	12	77.52	+15/-9	-	+33.33/-55.55	86	±100
RS7-241509T10A6	21.6-26.4V	15	54.82	+15/-9	-	+33.33/-55.55	76	±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	5.0 Vdc Input	4.5	5.0	5.5	VDC
	9.0 Vdc Input	8.1	9.0	9.9	
	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⁾			20		mApk-pk
Start up Time	Nominal Vin and constant resistive load		20		ms
Recommended input fuse (slow blow)	5.0 Vdc Input		0.6		A
	9.0 Vdc Input		0.6		
	12 Vdc Input		0.3		
	15 Vdc Input		0.2		
	24 Vdc Input		0.1		
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			+10	%
Ripple & Noise	20 MHz Bandwidth			200	mVpk-pk
Short Circuit Protection		Indefinite (Automatic Recovery)			-
Temperature Coefficient		-0.03		+0.03	%/°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			7	VDC
	9.0 Vdc Input			12	
	12 Vdc Input			15	
	15 Vdc Input			18	
	24 Vdc Input			28	
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 "6"	6000			VDC
Isolation Resistance	Input-output		1000			MΩ
Isolation Capacitance	Input-output			10		pF
Switching Frequency			20			kHz
Reliability Calculated MTBF	MIL-HDBK-217 F @ 25 °C		2390			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		90	°C
Maximum Case Temperature					100	°C
Thermal Impedance	Output 3.3 Vdc & ±3.3 Vdc Models		38.3			°C/W
	Other Models		24.5			
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	B
Radiated Emissions	EN55032		B
ESD	IEC 61000-4-2	Air: ±8 kV / Indirect: ±6 kV	A
RS	IEC 61000-4-3	20 V/m	A
EFT	IEC 61000-4-4	±2 kV with external components	A
CS	IEC 61000-4-6	10 Vrms	A
PFMF	IEC 61000-4-8	1 A/m	A

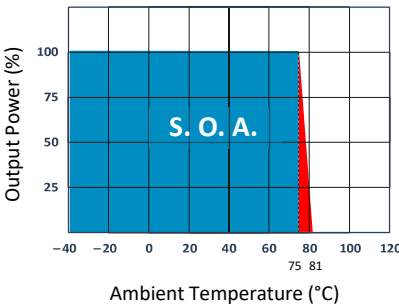
Physical Specifications	
Parameter	Value
Case Material	Nonconductive Black Plastic (UL94V-0 rated)
Clearance Distance	(Input to Output) 2.5 mm
Pin Material	Alloy 42
Potting Material	Epoxy (UL94V-0 rated)
Weight	4.3 g, typ.
Dimensions	0.77" x 0.39" x 0.49"

Electrical Characteristic Curves

Thermal Derating

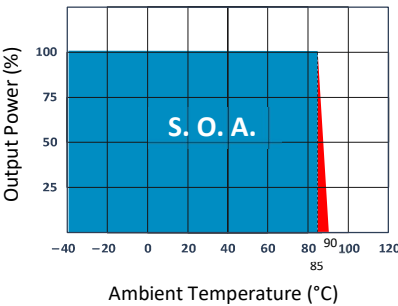
To enhance the system reliability, the power module should always be operated below the maximum operating temperature. If the temperature exceeds the maximum operating temperature, reliability of the unit may be affected.

Temperature Derating Curve



Output 3.3 Vdc & ±3.3 Vdc Models

Temperature Derating Curve

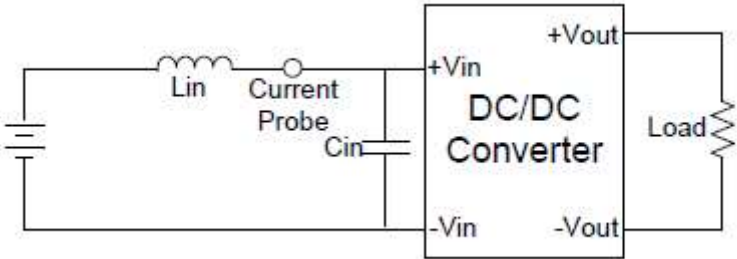


Other Models

Test Configurations

Input Reflected Ripple Current Test Step

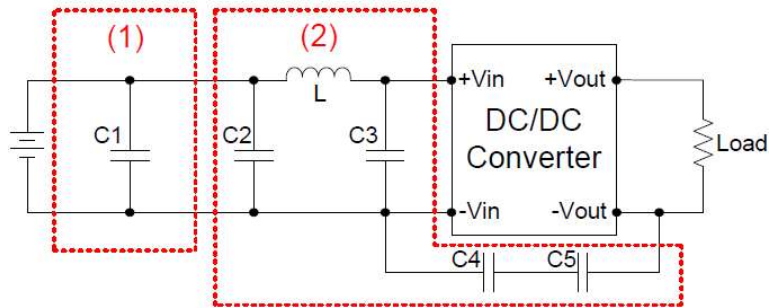
Input reflected ripple current is measured with a source inductor L_{in} (12 μ H) and a source capacitor C_{in} (47 μ F, ESR < 1.0 Ω at 100 kHz) at nominal input and full load.



EMC Filter Details

EMC Filter

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



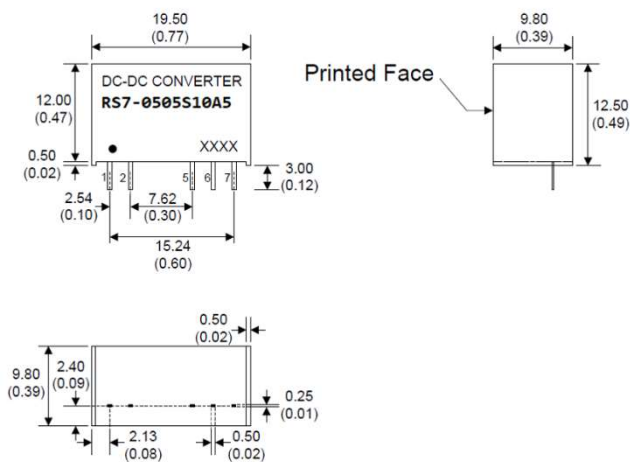
V in	C1	C2	L	C3	C4 + C5
5 V	Nippon Chemi-con KY-Series 470μF / 100V	MLCC 2.2μF / 100V	18μH	/	/
9 V					
12 V					
15 V					
24 V				MLCC 2.2μF / 100V	MLCC 1000pF / 3kV

Pin Connections

PIN CONNECTIONS		
PIN NUMBER	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
5	-Vout	-Vout
6	N.P.	COM
7	+Vout	+Vout
	*N.P. : No PIN	

Mechanical Specifications

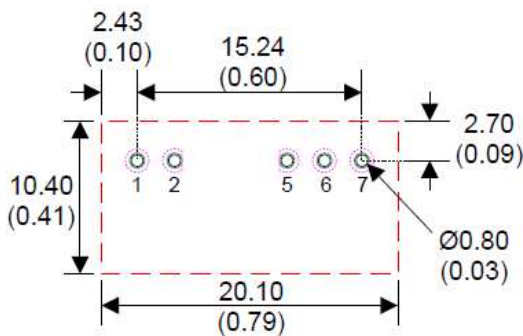
SIL Package



- 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): $\varnothing 0.80$ (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.