

- SIL7 / DIL14 Package
- Input Range $\pm 10 \%$
- Efficiency up to 82 %
- Low Ripple and Noise
- Isolation 1000 VDC, up to 3000 VDC
- Operation Temperature Range -40 ~ 100 °C max.
- Non Conductive Black Plastic Case

RoHS



Picture similar

Number Structure							
RS2	-	05	05	E	10	A	1
Series / Package	Input Voltage		Output Voltage	Output Type	Power	Int. Code	Isolation Voltage
RS2 = SIL7	05 = 5.0 Vdc		03 = 3.3 Vdc	E = Dual Separate	10 = 1 W	Logistics Code	1 = 1000 Vdc
RD2 = DIL14	12 = 12 Vdc		05 = 5.0 Vdc	T = Dual Split			3 = 3000 Vdc
	24 = 24 Vdc		07 = 7.2 Vdc	(+15 /−9 Vdc)			
			09 = 9.0 Vdc				
			12 = 12 Vdc				
			15 = 15 Vdc				

Model Selection Guide							
Model Number	Input Voltage Range (VDC)	Input Current		Output Voltage (VDC)	Output Current Full Load (mA)	Efficiency @ FL (%, typ.)	Capacitive Load @ FL (μF, max.)
		No-Load (mA, max.)	Full Load (mA, typ.)				
RS2-0505E10AX	4.5 ~ 5.5	22	278	5 , 5	100 , 100	72	100
RS2-0507E10AX	4.5 ~ 5.5	25	267	7.2 , 7.2	69 , 69	75	100
RS2-0509E10AX	4.5 ~ 5.5	23	256	9 , 9	56 , 56	78	100
RS2-0512E10AX	4.5 ~ 5.5	22	250	12 , 12	42 , 42	80	100
RS2-0515E10AX	4.5 ~ 5.5	25	250	15 , 15	33 , 33	80	100
RS2-1205E10AX	10.8 ~ 13.2	14	116	5 , 5	100 , 100	72	100
RS2-1207E10AX	10.8 ~ 13.2	10	105	7.2 , 7.2	69 , 69	79	100
RS2-1209E10AX	10.8 ~ 13.2	12	108	9 , 9	56 , 56	77	100
RS2-1212E10AX	10.8 ~ 13.2	15	110	12 , 12	42 , 42	76	100
RS2-1215E10AX	10.8 ~ 13.2	16	111	15 , 15	33 , 33	75	100
RS2-2405E10AX	21.6 ~ 26.4	7	58	5 , 5	100 , 100	72	100
RS2-2407E10AX	21.6 ~ 26.4	9	58	7.2 , 7.2	69 , 69	72	100
RS2-2409E10AX	21.6 ~ 26.4	9	56	9 , 9	56 , 56	75	100
RS2-2412E10AX	21.6 ~ 26.4	8	53	12 , 12	42 , 42	79	100
RS2-2415E10AX	21.6 ~ 26.4	10	56	15 , 15	33 , 33	75	100
RD2-0505E10AX	4.5 ~ 5.5	22	278	5 , 5	100 , 100	72	100
RD2-0507E10AX	4.5 ~ 5.5	25	267	7.2 , 7.2	69 , 69	75	100
RD2-0509E10AX	4.5 ~ 5.5	25	267	9 , 9	56 , 56	75	100
RD2-0512E10AX	4.5 ~ 5.5	23	267	12 , 12	42 , 42	75	100
RD2-0515E10AX	4.5 ~ 5.5	28	253	15 , 15	33 , 33	79	100
RD2-1205E10AX	10.8 ~ 13.2	15	111	5 , 5	100 , 100	75	100
RD2-1207E10AX	10.8 ~ 13.2	15	111	7.2 , 7.2	69 , 69	75	100
RD2-1209E10AX	10.8 ~ 13.2	15	111	9 , 9	56 , 56	75	100
RD2-1212E10AX	10.8 ~ 13.2	18	111	12 , 12	42 , 42	75	100
RD2-1215E10AX	10.8 ~ 13.2	15	111	15 , 15	33 , 33	75	100
RD2-2405E10AX	21.6 ~ 26.4	15	56	5 , 5	100 , 100	75	100
RD2-2407E10AX	21.6 ~ 26.4	15	56	7.2 , 7.2	69 , 69	75	100
RD2-2409E10AX	21.6 ~ 26.4	15	56	9 , 9	56 , 56	75	100
RD2-2412E10AX	21.6 ~ 26.4	15	56	12 , 12	42 , 42	75	100
RD2-2415E10AX	21.6 ~ 26.4	10	52	15 , 15	33 , 33	80	100

Model Selection Guide							
Model Number	Input Voltage Range (VDC)	Input Current		Output Voltage (VDC)	Output Current Full Load (mA)	Efficiency @ FL (%, typ.)	Capacitive Load @ FL (μF, max.)
		No-Load (mA, max.)	Full Load (mA, typ.)				
RS2-0503T10AX	4.5 ~ 5.5	25	250	5 , 3.3	100 , 152	80	100
RS2-0507T10AX	4.5 ~ 5.5	25	267	5 , 7.2	100 , 69	75	100
RS2-0509T10AX	4.5 ~ 5.5	20	263	5 , 9	100 , 56	76	100
RS2-0512T10AX	4.5 ~ 5.5	20	263	5 , 12	100 , 42	76	100
RS2-0515T10AX	4.5 ~ 5.5	25	267	5 , 15	100 , 33	75	100
RS2-1203T10AX	10.8 ~ 13.2	15	110	5 , 3.3	100 , 152	76	100
RS2-1207T10AX	10.8 ~ 13.2	15	110	5 , 7.2	100 , 69	76	100
RS2-1209T10AX	10.8 ~ 13.2	15	110	5 , 9	100 , 56	76	100
RS2-1212T10AX	10.8 ~ 13.2	15	107	5 , 12	100 , 42	78	100
RS2-1215T10AX	10.8 ~ 13.2	17	110	5 , 15	100 , 33	76	100
RS2-2403T10AX	21.6 ~ 26.4	12	56	5 , 3.3	100 , 152	75	100
RS2-2407T10AX	21.6 ~ 26.4	15	56	5 , 7.2	100 , 69	75	100
RS2-2409T10AX	21.6 ~ 26.4	15	56	5 , 9	100 , 56	75	100
RS2-2412T10AX	21.6 ~ 26.4	15	56	5 , 12	100 , 42	75	100
RS2-2415T10AX	21.6 ~ 26.4	15	56	5 , 15	100 , 33	75	100
RD2-0503T10AX	4.5 ~ 5.5	25	267	5 , 3.3	100 , 152	75	100
RD2-0507T10AX	4.5 ~ 5.5	25	267	5 , 7.2	100 , 69	75	100
RD2-0509T10AX	4.5 ~ 5.5	25	267	5 , 9	100 , 56	75	100
RD2-0512T10AX	4.5 ~ 5.5	25	267	5 , 12	100 , 42	75	100
RD2-0515T10AX	4.5 ~ 5.5	25	267	5 , 15	100 , 33	75	100
RD2-1203T10AX	10.8 ~ 13.2	15	111	5 , 3.3	100 , 152	75	100
RD2-1207T10AX	10.8 ~ 13.2	15	111	5 , 7.2	100 , 69	75	100
RD2-1209T10AX	10.8 ~ 13.2	15	111	5 , 9	100 , 56	75	100
RD2-1212T10AX	10.8 ~ 13.2	15	111	5 , 12	100 , 42	75	100
RD2-1215T10AX	10.8 ~ 13.2	15	111	5 , 15	100 , 33	75	100
RD2-2403T10AX	21.6 ~ 26.4	13	56	5 , 3.3	100 , 152	74	100
RD2-2407T10AX	21.6 ~ 26.4	15	56	5 , 7.2	100 , 69	75	100
RD2-2409T10AX	21.6 ~ 26.4	15	56	5 , 9	100 , 56	75	100
RD2-2412T10AX	21.6 ~ 26.4	15	56	5 , 12	100 , 42	75	100
RD2-2415T10AX	21.6 ~ 26.4	15	56	5 , 15	100 , 33	75	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
	12 Vdc Input	10.8	12	13.2	
	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		0.75		A
	12 Vdc Input		0.3		
	24 Vdc Input		0.15		
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	3.3 Vdc Output			20	%
	From 20 % to 100 % Load			11	
Ripple & Noise ⁽¹⁾	20 MHz Bandwidth			75	mVpk-pk
Short Circuit Protection		Short Term (1 sec.)			
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			7	VDC
	12 Vdc Input			15	
	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 "1"	1000		VDC
		Suffix "3"	3000		
	Output1-output2, and rated for 60 sec.		1000		
Isolation Resistance	Input-output		1000		MΩ
Isolation Capacitance	Input-output			60	pF
Switching Frequency				80	kHz
Reliability Calculated MTBF	MIL-HDBK-217 F @ 25 °C		1121		k hours
Safety Standard	IEC / EN / UL 62368-1		Designed to meet		
Environmental compliance	RoHS		Designed to meet		

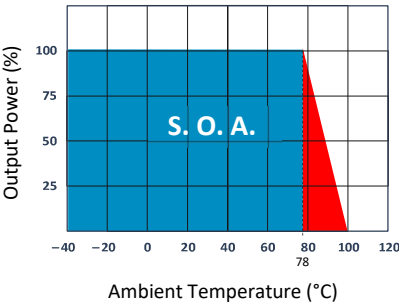
Environmental Specifications					
Parameter	Conditions		Min.	Typ.	Max. Unit
Operating Ambient Temperature	See the Derating Curve		-40		100 °C
Maximum Case Temperature					100 °C
Thermal Impedance			57.09		°C/W
Storage Humidity					95 % rel. H
Storage Temperature			-55		125 °C
Cooling	Natural Convection		30 - 65 LFM		

Physical Specifications		
Parameter		Value
Case Material		Nonconductive Black Plastic (UL94V-0 rated)
Pin Material		Alloy 42
Potting Material		Epoxy (UL94V-0 rated)
Weight	SIL	2.3 g, typ.
	DIL	2.7 g, typ.
Dimensions	SIL	0.76" x 0.24" x 0.39"
	DIL	0.80" x 0.40" x 0.27"

Thermal Derating

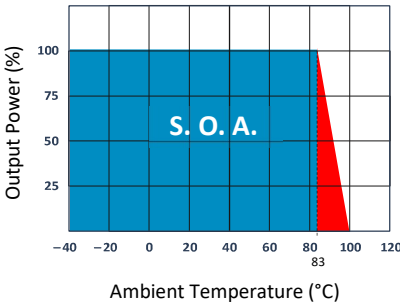
To enhance the system reliability, the power module should always be operated below the maximum operating temperature. If the temperature exceeds the maximum operating temperature, reliability of the unit may be affected.

Temperature Derating Curve



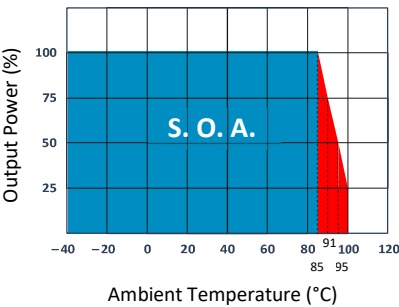
Dual Separate Models with Efficiency 72 % ~ 76 %

Temperature Derating Curve



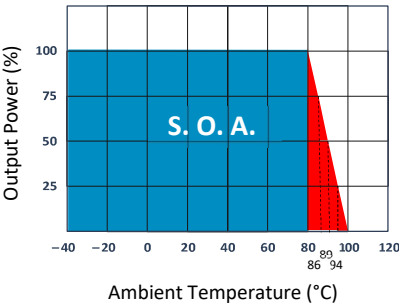
Dual Separate Models with Efficiency 77 % ~ 79 %

Temperature Derating Curve



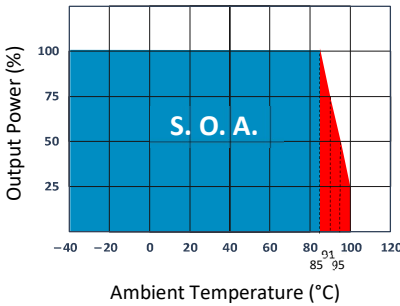
Dual Separate Models with Efficiency 80 %

Temperature Derating Curve



Dual Split Models with Efficiency 74 % ~ 79 %

Temperature Derating Curve

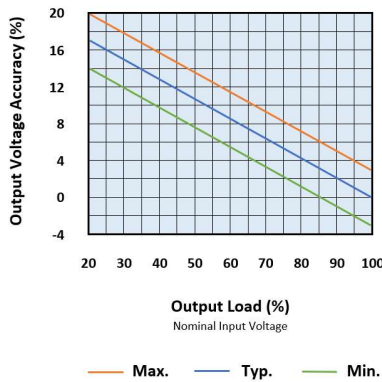


Dual Split Models with Efficiency 80 %

Output Voltage Tolerance Envelope Curve

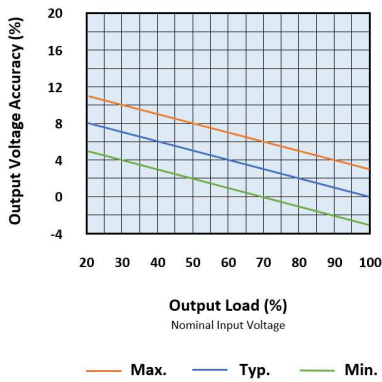
Output Voltage Tolerance Envelope Curve

Output Voltage Tolerance Envelope Curve



3.3 Vdc Output Models

Output Voltage Tolerance Envelope Curve

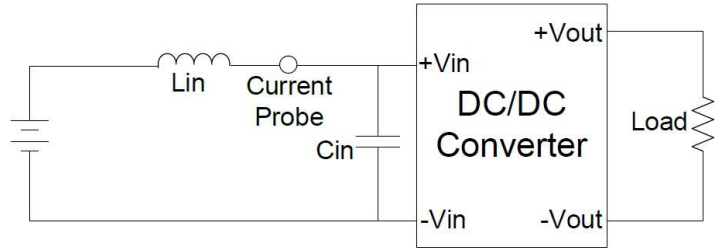


From 20% to 100% Load

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.



Isolation Voltage

This series is designed to meet the functional insulation of UL, both input and output should be maintained within SELV limits (less than 42.4 V peak, or 60 Vdc).

The isolation test voltage represents a measure of immunity to transient voltages and the part should never be used as an element of a safety isolation system. The part could be expected to function correctly with hundreds of volts offset applied continuously across the isolation barrier; but then the circuitry on both sides of the barrier must be regarded as operating at an unsafe voltage and further isolation/insulation systems must form a barrier between these circuits and any user-accessible circuitry according to safety standard requirements.

Repeated High-Voltage Isolation Testing

Repeated high-voltage isolation testing of a barrier component can actually degrade isolation capability, to a lesser or greater degree depending on materials, construction and environment. This series has isolation transformers without additional insulation between primary and secondary windings of enameled wire.

While parts can be expected to withstand several times the stated test voltage, the isolation capability does depend on the wire insulation.

Any material including the enamel (typically polyurethane) is susceptible to eventual chemical degradation when subject to very high applied voltage, thus implying that the number of tests should be strictly limited.

We strongly advise against repeated high voltage isolation testing, but if it is absolutely required, the isolation test voltage should be reduced by 20 % from specified test voltage.

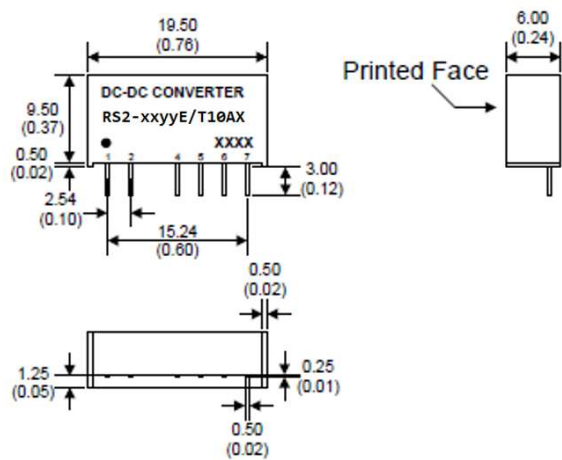
Pin Connections

SIL Package		DIL Package	
PIN NUMBER	DUAL	PIN NUMBER	DUAL
1	+Vin	1	-Vin
2	-Vin	7	N.C
4	+V1out	8	-V2out
5	-V1out	9	+V2out
6	+V2out	10	-V1out
7	-V2out	11	+V1out
		14	+Vin
		*N.C. : No Connection	

(The Pin Connection of high isolation one is the same with normal one.)

Mechanical Specifications

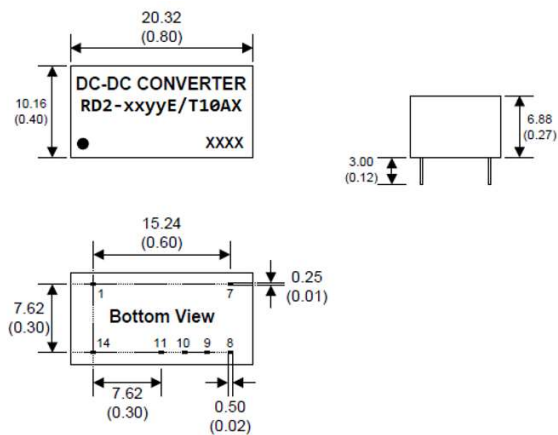
SIL Package



- 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)

Mechanical Specifications

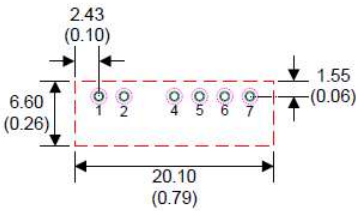
DIL Package



- 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)

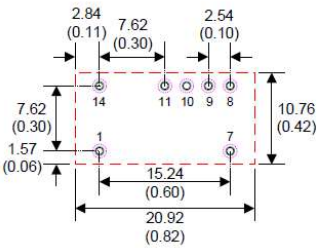
Recommended Footprint Details

SIL Package



SIL 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)

DIL Package



DIL 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.