

- SIL8 Package
- Wide Input Range 2:1
- Regulated Output
- Efficiency up to 88 %
- Low Ripple and Noise
- Isolation 1500 VDC, up to 3000 VDC
- Continuous Short Circuit Protection
- Remote ON OFF Control (Optional)
- Operation Temperature Range -40 ~ 95 °C max.
- Non Conductive Black Plastic Case

RoHS



Picture similar

Number Structure

RS5	-	05	05	RS	60	A	1	(C)
Series / Package		Input Voltage	Output Voltage	Output Type	Power	Int. Code	Isolation Voltage	Pinning
RS5 = SIL8		05 = 5.0 Vdc 12 = 12 Vdc 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	C = Optional Control Pin

* Control Pin (Optional)

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)		
RS5-0503RS60AX	4.5 ~ 9	15	1129	3.3	0	1300	76	6600
RS5-0505RS60AX	4.5 ~ 9	15	1558	5	0	1200	77	3300
RS5-0509RS60AX	4.5 ~ 9	25	1481	9	0	666	81	2000
RS5-0512RS60AX	4.5 ~ 9	25	1446	12	0	500	83	1600
RS5-0515RS60AX	4.5 ~ 9	30	1446	15	0	400	83	1400
RS5-0524RS60AX	4.5 ~ 9	60	1429	24	0	250	84	680
RS5-1203RS60AX	9 ~ 18	10	462	3.3	0	1300	77	6600
RS5-1205RS60AX	9 ~ 18	15	610	5	0	1200	82	3300
RS5-1209RS60AX	9 ~ 18	20	588	9	0	666	85	2000
RS5-1212RS60AX	9 ~ 18	30	575	12	0	500	87	1600
RS5-1215RS60AX	9 ~ 18	35	575	15	0	400	87	1400
RS5-1224RS60AX	9 ~ 18	40	568	24	0	250	88	680
RS5-2403RS60AX	18 ~ 36	10	226	3.3	0	1300	79	6600
RS5-2405RS60AX	18 ~ 36	10	298	5	0	1200	84	3300
RS5-2409RS60AX	18 ~ 36	15	291	9	0	666	86	2000
RS5-2412RS60AX	18 ~ 36	15	284	12	0	500	88	1600
RS5-2415RS60AX	18 ~ 36	15	284	15	0	400	88	1400
RS5-2424RS60AX	18 ~ 36	20	284	24	0	250	88	680
RS5-4803RS60AX	36 ~ 75	5	118	3.3	0	1300	76	6600
RS5-4805RS60AX	36 ~ 75	5	154	5	0	1200	81	3300
RS5-4809RS60AX	36 ~ 75	5	147	9	0	666	85	2000
RS5-4812RS60AX	36 ~ 75	5	147	12	0	500	85	1600
RS5-4815RS60AX	36 ~ 75	5	144	15	0	400	87	1400
RS5-4824RS60AX	36 ~ 75	10	147	24	0	250	85	680
RS5-0505RD60AX	4.5 ~ 9	25	1519	±5	0	±600	79	±2000
RS5-0512RD60AX	4.5 ~ 9	40	1429	±12	0	±250	84	±900
RS5-0515RD60AX	4.5 ~ 9	100	1429	±15	0	±200	84	±660
RS5-1205RD60AX	9 ~ 18	25	617	±5	0	±600	81	±2000
RS5-1212RD60AX	9 ~ 18	35	575	±12	0	±250	87	±900
RS5-1215RD60AX	9 ~ 18	35	568	±15	0	±200	88	±660
RS5-2405RD60AX	18 ~ 36	10	305	±5	0	±600	82	±2000
RS5-2412RD60AX	18 ~ 36	20	294	±12	0	±250	85	±900
RS5-2415RD60AX	18 ~ 36	20	294	±15	0	±200	85	±660
RS5-4805RD60AX	36 ~ 75	10	154	±5	0	±600	81	±2000
RS5-4812RD60AX	36 ~ 75	10	147	±12	0	±250	85	±900
RS5-4815RD60AX	36 ~ 75	10	147	±15	0	±200	85	±660

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	9	VDC
	12 Vdc Input	9	12	18	
	24 Vdc Input	18	24	36	
	48 Vdc Input	36	48	75	
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		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)	5.0 Vdc Input		3.0		A
	12 Vdc Input		1.6		
	24 Vdc Input		1.0		
	48 Vdc Input		0.5		
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 25 % to 100 % Load		-1.0		+1.0	%
Cross Regulation	Asymmetrical Load 25 % / 100 % for Dual		-5		+5	%
Ripple & Noise ⁽¹⁾	20 MHz Bandwidth				75	mVpk-pk
Short Circuit Protection			Continuous (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		500		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)	5.0 Vdc Input			15	VDC
	12 Vdc Input			25	
	24 Vdc Input			50	
	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			100			kHz
Reliability Calculated MTBF	MIL-HDBK-217 F @ 25 °C		770			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				105	°C
Thermal Impedance		36.3			°C/W
Storage Humidity				95	% rel. H
Storage Temperature		-55		125	°C
Cooling	Natural Convection	30 - 65 LFM			

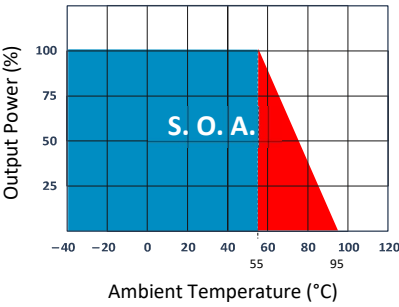
EMC Specifications			
Parameter	Standard	Condition	Criterion
Conducted Emissions	EN55032	with external components	A
Radiated Emissions	EN55032		A
ESD	IEC 61000-4-2	Air: ±8 kV / Contact: ±6 kV	A
RS	IEC 61000-4-3	10 V/m	A
EFT	IEC 61000-4-4	±2 kV with external components	A
Surge	IEC 61000-4-5	±1 kV with 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	4.5 g , typ.
Dimensions	0.86" x 0.36" x 0.44"

Thermal Derating

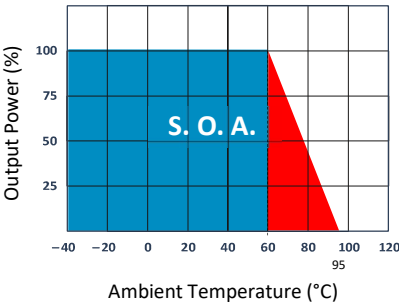
To enhance the system reliability, the power module should always be operated below the maximum operating temperature. If the temperature exceeds the maximum operating temperature, reliability of the unit may be affected.

Temperature Derating Curve



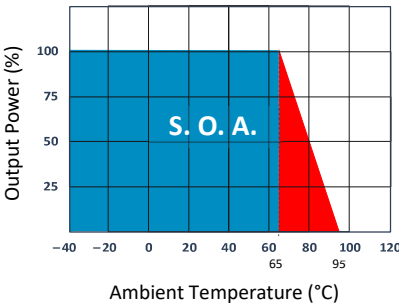
3.3 VDC & Efficiency 79 % ~ 80 % Models

Temperature Derating Curve



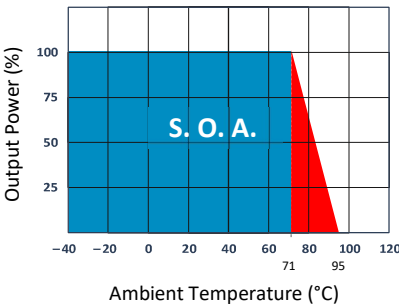
Efficiency 81 % ~ 83 % Models

Temperature Derating Curve



Efficiency 84 % ~ 86 % Models

Temperature Derating Curve

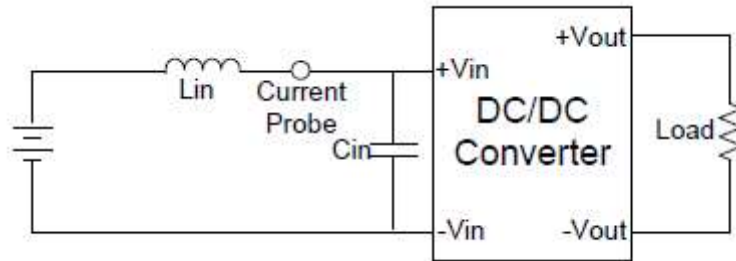


Efficiency 87 % ~ 88 % Models

Test Configurations

Input Reflected Ripple Current Test Step

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

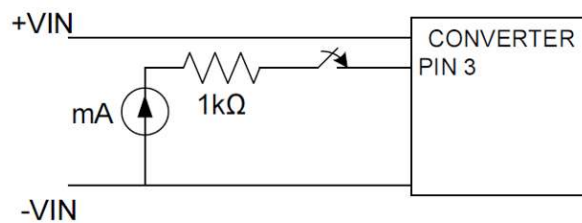


Remote Module ON / OFF

Remote Module ON / OFF

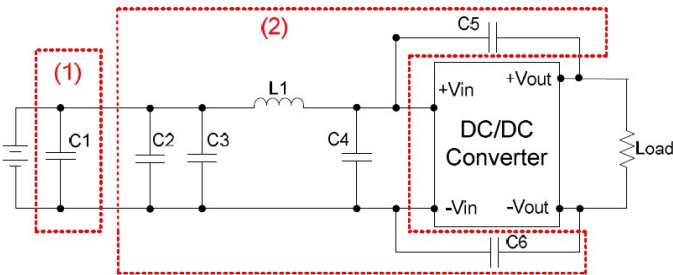
ON: Open or high impedance

OFF: Input current ($2\ \text{mA} \sim 4\ \text{mA}$) via $1\ \text{k}\Omega$ 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.



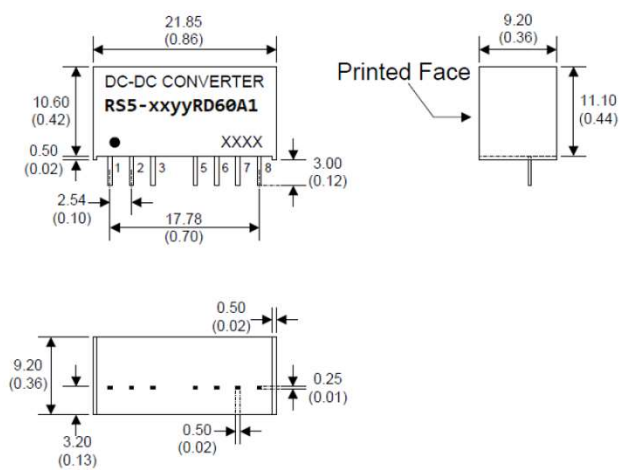
V in	C1	C2	C3, C4	L1	C5, C6
5 V	Nippon Chemi-con KY-Series 330μF / 100V	Nippon Chemi-con KY-Series 220μF / 100V	MLCC 22μF / 25V	10μH	MLCC 220pF / 3kV
12 V		/	MLCC 10μF / 50V		
24 V			MLCC 2.2μF / 100V	15μH	
48 V					

Pin Connections

PIN CONNECTIONS				
PIN NUMBER	SINGLE	DUAL	+ Control Pin	
			SINGLE	DUAL
1	-Vin	-Vin	-Vin	-Vin
2	+Vin	+Vin	+Vin	+Vin
3	N.P.	N.C.	CTRL	CTRL
5	N.P.	N.C.	N.C.	N.C.
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

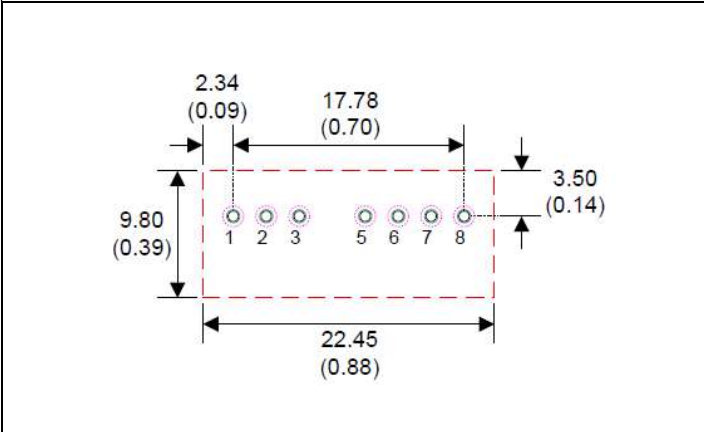
SIL Package



- 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

<u>SIL Package</u>	
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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)

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Notes

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