

- SIL6 Package
- Wide 2:1 Input Range
- Efficiency up to 84 %
- Isolation 1500 VDC
- Fully Regulated Output
- No Minimum Load Required
- Continuous Short Circuit Protection
- EMI Complies with EN55032 Class A
- Operation Temperature Range -40 ~ 90 °C max.
- Non Conductive Black Plastic Case

RoHS



Picture similar

Number Structure

| RS8              | - | 05                                                        | 05                                                                        | RS                                                               | 10       | A                 | 1                 |
|------------------|---|-----------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------|----------|-------------------|-------------------|
| Series / Package |   | Input Voltage                                             | Output Voltage                                                            | Output Type                                                      | Power    | Int. Code         | Isolation Voltage |
| RS8 = SIL6       |   | 05 = 5.0 Vdc<br>12 = 12 Vdc<br>24 = 24 Vdc<br>48 = 48 Vdc | 03 = 3.3 Vdc<br>05 = 5.0 Vdc<br>12 = 12 Vdc<br>15 = 15 Vdc<br>24 = 24 Vdc | RS = Regulated<br>- Single Out.<br>RD = Regulated<br>- Dual Out. | 10 = 1 W | Logistics<br>Code | 1 = 1500 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) |                            |                                 |
| RS8-0505RS10A1        | 4.5-9                     | 35                 | 250                  | 5                    | 0              | 200            | 80                         | 1680                            |
| RS8-0512RS10A1        | 4.5-9                     | 35                 | 241                  | 12                   | 0              | 83             | 83                         | 820                             |
| RS8-0515RS10A1        | 4.5-9                     | 35                 | 244                  | 15                   | 0              | 67             | 82                         | 680                             |
| RS8-0524RS10A1        | 4.5-9                     | 35                 | 244                  | 24                   | 0              | 42             | 82                         | 470                             |
| RS8-1203RS10A1        | 9-18                      | 20                 | 104                  | 3.3                  | 0              | 303            | 80                         | 1680                            |
| RS8-1205RS10A1        | 9-18                      | 20                 | 103                  | 5                    | 0              | 200            | 81                         | 1680                            |
| RS8-1212RS10A1        | 9-18                      | 20                 | 99                   | 12                   | 0              | 83             | 84                         | 820                             |
| RS8-1215RS10A1        | 9-18                      | 20                 | 100                  | 15                   | 0              | 67             | 83                         | 680                             |
| RS8-1224RS10A1        | 9-18                      | 20                 | 100                  | 24                   | 0              | 42             | 83                         | 470                             |
| RS8-2405RS10A1        | 18-36                     | 10                 | 51                   | 5                    | 0              | 200            | 81                         | 1680                            |
| RS8-2412RS10A1        | 18-36                     | 10                 | 50                   | 12                   | 0              | 83             | 83                         | 820                             |
| RS8-2415RS10A1        | 18-36                     | 10                 | 51                   | 15                   | 0              | 67             | 82                         | 680                             |
| RS8-2424RS10A1        | 18-36                     | 10                 | 50                   | 24                   | 0              | 42             | 83                         | 470                             |
| RS8-4805RS10A1        | 36-75                     | 7                  | 26                   | 5                    | 0              | 200            | 79                         | 1680                            |
| RS8-4812RS10A1        | 36-75                     | 7                  | 26                   | 12                   | 0              | 83             | 79                         | 820                             |
| RS8-4815RS10A1        | 36-75                     | 7                  | 26                   | 15                   | 0              | 67             | 79                         | 680                             |
| RS8-4824RS10A1        | 36-75                     | 7                  | 27                   | 24                   | 0              | 42             | 78                         | 470                             |
|                       |                           |                    |                      |                      |                |                |                            |                                 |
| RS8-0512RD10A1        | 4.5-9                     | 35                 | 250                  | ±12                  | 0              | ±42            | 80                         | ±470                            |
| RS8-0515RD10A1        | 4.5-9                     | 35                 | 250                  | ±15                  | 0              | ±33            | 80                         | ±330                            |
| RS8-1205RD10A1        | 9-18                      | 20                 | 103                  | ±5                   | 0              | ±100           | 81                         | ±470                            |
| RS8-1212RD10A1        | 9-18                      | 20                 | 102                  | ±12                  | 0              | ±42            | 82                         | ±470                            |
| RS8-1215RD10A1        | 9-18                      | 20                 | 104                  | ±15                  | 0              | ±33            | 80                         | ±330                            |
| RS8-2412RD10A1        | 18-36                     | 10                 | 51                   | ±12                  | 0              | ±42            | 81                         | ±470                            |
| RS8-2415RD10A1        | 18-36                     | 10                 | 51                   | ±15                  | 0              | ±33            | 81                         | ±330                            |
| RS8-4812RD10A1        | 36-75                     | 7                  | 26                   | ±12                  | 0              | ±42            | 79                         | ±470                            |
| RS8-4815RD10A1        | 36-75                     | 7                  | 27                   | ±15                  | 0              | ±33            | 78                         | ±330                            |

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 <sup>(1)</sup>                                                                            |                                         |           | 35   |      | mApk-pk |
| Start up Time                                                                                                            | Nominal Vin and constant resistive load |           | 30   |      | ms      |
| Recommended input fuse<br>( slow blow )                                                                                  | 5.0 Vdc Input                           |           | 0.6  |      | A       |
|                                                                                                                          | 12 Vdc Input                            |           | 0.4  |      |         |
|                                                                                                                          | 24 Vdc Input                            |           | 0.2  |      |         |
|                                                                                                                          | 48 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                     |                                         | -2.0                              |      | +2.0  | %       |
| Line Regulation                             |                                         | -0.2                              |      | +0.2  | %       |
| Load Regulation                             | From 0 % to 100 % Load                  | Single Output                     | -1.0 | +1.0  | %       |
|                                             |                                         | Dual Output                       | -2.0 | +2.0  |         |
|                                             | From 5 % to 100 % Load                  | Dual Output                       | -1.0 | +1.0  |         |
| Cross Regulation                            | Asymmetrical Load 25% / 100% for Dual   | -5                                |      | +5    | %       |
| Ripple & Noise <sup>(1)</sup>               | 20 MHz Bandwidth                        |                                   |      | 50    | 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                     | Nominal Vin and 25% load step change    |                                   | 500  |       | $\mu$ s |
| Transient Response Deviation                | ( 75% - 50% - 25% of load )             | -3                                |      | +3    | %       |
| Note : 1. Measured with a 1.0 $\mu$ F MLCC. |                                         |                                   |      |       |         |

| 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     |
|                             | Case - I/O, and rated for 60 sec.   | Suffix "1" | 1500             |      |      |         |
| Isolation Resistance        | Input-output                        |            | 1000             |      |      | MΩ      |
| Isolation Capacitance       | Input-output                        |            |                  | 70   |      | pF      |
| Switching Frequency         |                                     |            | 150              |      | 550  | kHz     |
| Reliability Calculated MTBF | MIL-HDBK-217 F @ 25 °C              |            | 2800             |      |      | 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      |                        |  |             |      | 105  | °C       |
| Thermal Impedance             |                        |  | 47.7        |      |      | °C/W     |
| Storage Humidity              |                        |  |             |      | 95   | % rel. H |
| Storage Temperature           |                        |  | -55         |      | 125  | °C       |
| Cooling                       | Natural Convection     |  | 30 - 65 LFM |      |      |          |

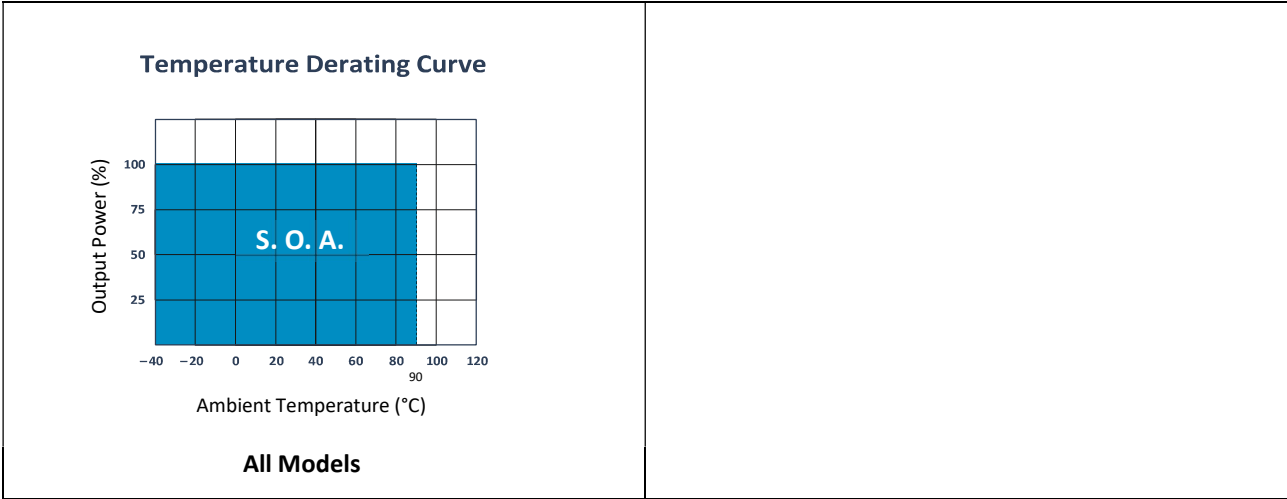
| EMC Specifications  |               |                                |           |
|---------------------|---------------|--------------------------------|-----------|
| Parameter           | Standard      | Condition                      | Criterion |
| Conducted Emissions | EN55032       | with external components       | A         |
| Radiated Emissions  | EN55032       |                                | A         |
| ESD                 | IEC 61000-4-2 | Air: ±8 kV / Indirect: ±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                  | 3.0 g, typ.                                   |
| Dimensions              | 0.67" x 0.30" x 0.43"                         |

Electrical Characteristic Curves

Thermal Derating

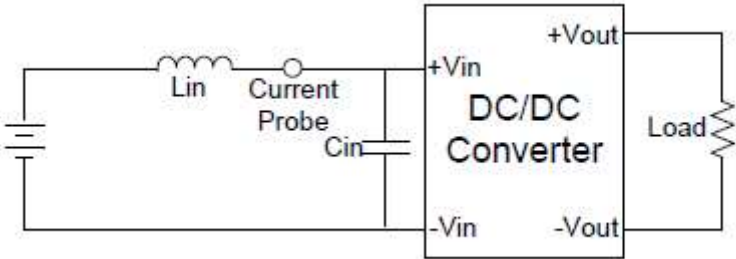
To enhance the system reliability, the power module should always be operated below the maximum operating temperature. If the temperature exceeds the maximum operating temperature, reliability of the unit may be affected.



Test Configurations

Input Reflected Ripple Current Test Step

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

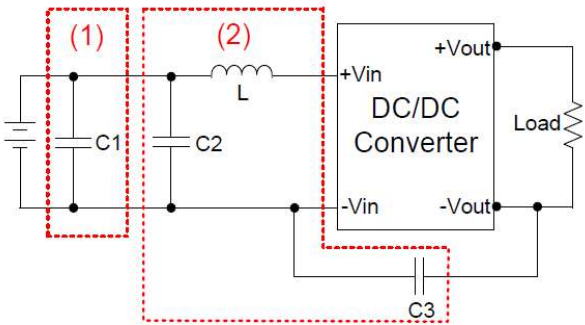


EMC Filter Details

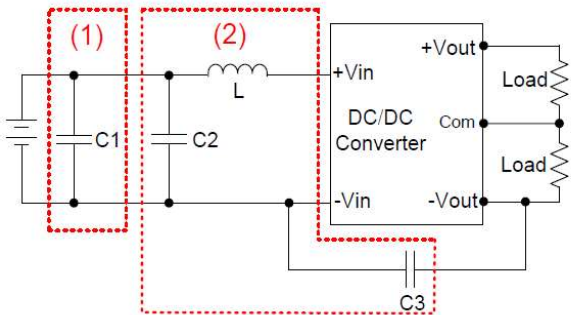
EMC Filter

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

Single:



Dual:



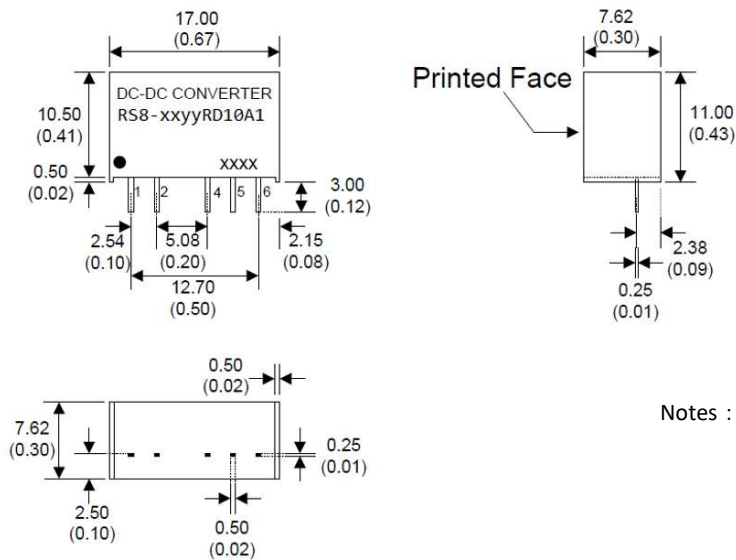
| V in | C1                                               | C2                   | L     | C3                  |
|------|--------------------------------------------------|----------------------|-------|---------------------|
| 5 V  | Nippon<br>Chemi-con<br>KY-Series<br>330μF / 100V | MLCC<br>4.7μF / 50V  | 4.7μH | MLCC<br>220pF / 3kV |
| 12 V |                                                  |                      |       |                     |
| 24 V |                                                  |                      |       |                     |
| 48 V |                                                  | MLCC<br>4.7μF / 100V | 18μH  |                     |

Pin Connections

| PIN CONNECTIONS |        |       |
|-----------------|--------|-------|
| PIN NUMBER      | SINGLE | DUAL  |
| 1               | -Vin   | -Vin  |
| 2               | +Vin   | +Vin  |
| 4               | +Vout  | +Vout |
| 5               | N.P.   | COM   |
| 6               | -Vout  | -Vout |
| *N.P. : No PIN  |        |       |

Mechanical Specifications

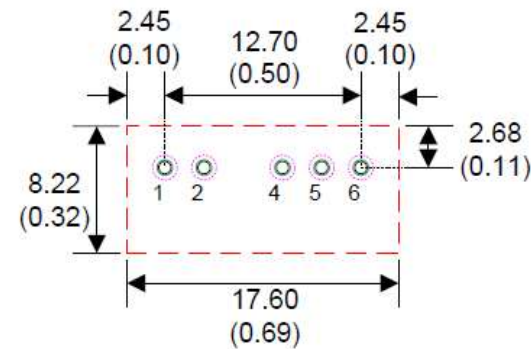
SIL Package



- Notes :
- All dimensions are typical in millimeters ( inches ).
  - Pin dimension tolerance:  $\pm 0.05$  (  $\pm 0.002$  )
  - Pin pitch and length tolerance:  $\pm 0.35$  (  $\pm 0.014$  )
  - Pin to case tolerance:  $\pm 0.5$  (  $\pm 0.02$  )
  - Case Tolerance:  $\pm 0.5$  (  $\pm 0.02$  )

Recommended Footprint Details

SIL Package



- Notes :
- All dimensions are typical in millimeters ( inches ).
  - Through hole ( black ):  $\varnothing 0.80$  ( 0.031 )
  - Top view pad ( green ):  $\varnothing 1.00$  ( 0.039 )
  - 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.