# 2A, DC/DC Power Converter

SDX20S


## Introduction

The SDX20S series are 2A rated non-isolated switching regulators, pin to pin compatible with LM78 family linear regulators. Unlike those linear regulators, the switching regulators are high efficiency. They do not need for any heatsinks because very little energy is wasted as heat. Besides, these converters accept ultra-wide input range, operate over wide ambient temperature range, and are continuous short circuit protected. These converters are especially suitable for applications where energy saving, space saving and high performance are essential.

## Features

- Rated current: 2A Max
- Non-isolated, step-down switching regulators
- Input range: 4.5~36VDC
- Regulated single output
- High efficiency up to 96%
- Low ripple and noise
- Low no load input current, 0.2mA only
- Operating temperature range: -40 ~ +85°C ambient
- RoHS compliant
- Compact SIP3 package
- Compatible with LM78 linear regulators
- Continuous short circuit protection
- Designed to meet: UL/IEC/EN 62368-1
- 3 year warranty

## Part numbers

| Model Number | Input Voltage Range [VDC] | | | $V_{OUT}$ [VDC] | $I_{OUT}$ [mA] Max. | Efficiency [%] Typ. | | Capacitive Load [uF] Max. |
|---|---|---|---|---|---|---|---|---|
| | Nom. | Min. | Max. | | | Min. $V_{IN}$ | Max. $V_{IN}$ | |
| **SDX20S018** | 24 | 4.5 | 28 | 1.8 | 2000 | 83 | 79 | 2000 |
| **SDX20S025** | 24 | 4.5 | 36 | 2.5 | 2000 | 89 | 83 | 2000 |
| **SDX20S033** | 24 | 6 | 36 | 3.3 | 2000 | 89 | 85 | 1800 |
| **SDX20S050** | 24 | 8 | 36 | 5.0 | 2000 | 92 | 89 | 1000 |
| **SDX20S065** | 24 | 10 | 36 | 6.5 | 2000 | 92 | 89 | 1000 |
| **SDX20S090** | 24 | 13 | 36 | 9.0 | 2000 | 95 | 92 | 680 |
| **SDX20S120** | 24 | 16 | 36 | 12 | 2000 | 96 | 94 | 470 |
| **SDX20S150** | 24 | 18 | 36 | 15 | 2000 | 96 | 94 | 470 |

* Only typical models are listed. Contact our sales agent for availability of other models.
* Add suffix “L” for pins bended to L shape. See Mechanical Specifications for details. E.g. SDX20S033L.

## Electrical characteristics

Unless otherwise indicated, specifications are measured at $T_A$=25°C, nominal input voltage, full load after warm up.

| Parameter | Condition | Min. | Type | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| **No load input current** | $V_{IN}$ = Min. to Max. | - | 0.2 | 1.0 | mA | |
| **Output voltage accuracy** | $V_{OUT}$ = 1.8 … 3.3V<br>Others | - | ±2<br>±2 | ±4<br>±3 | % | |
| **Line regulation** | $V_{IN}$ = Min. to Max. | - | ±0.4 | ±0.8 | % | |
| **Load regulation** | $I_{OUT}$ = 10%~100% | - | ±0.5 | ±1.5 | % | |
| **Temperature coefficiency** | -40°C~+85°C | - | - | 0.03 | %/°C | |
| **Output ripple and noise*** | 20MHz bandwidth | - | 30 | 75 | mVp-p | |
| **Dynamic load response $I_{OUT}$ = 25%~50%~25% or 50%~75%~50% step of $I_{OUT, rated}$** | Peak deviation<br>Peak deviation<br>Recovery time | - | ±80<br>±50<br>0.2 | ±150<br>±150<br>1 | mV<br>mV<br>mS | $V_{OUT}$=1.8, 2.5V<br>$V_{OUT}$=Others |
| **Output short circuit protection** | | Continuous, automatic recovery | | | | |

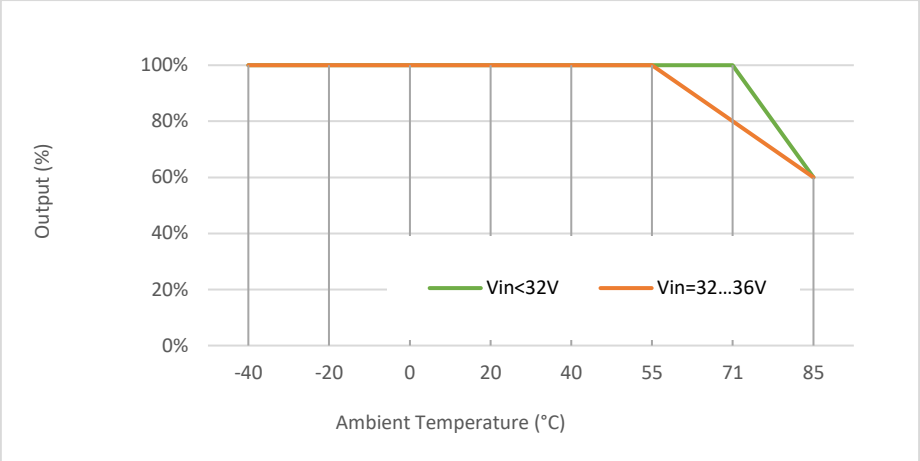
## General Specifications

| Parameters | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| **Operating temperature** | | -40 | - | +85 | °C |
| **Storage temperature** | | -55 | - | +125 | °C |
| **Storage humidity** | Non-condensing | 5 | - | 95 | %RH |
| **Switching frequency** | Full load | - | 400 | - | KHz |
| **Pin soldering resistance** 1.5mm away from case for 10 sec | | - | - | 260 | °C |
| **Cooling method** | | Free air convection | | | |
| **Case material** | | Black plastic UL94-V0 | | | |
| **Design based on standards** | | UL/EN/IEC 62368-1 | | | |
| **Safety certifications** | | EN/IEC 62368-1 | | | |
| **EMC** | Emissions<br>Immunity | CISPR32, EN55032 Class B* (external circuit required)<br>IEC/EN61000-4-2, 3, 4, 6 | | | |
| **MTBF** | MIL-HDBK-217F | >2,000,000 Hours, $T_A$=25°C | | | |
| **Size & Weight** | Standard models<br>Suffix “L” models | 11.5 x 9.0 x 17.5 mm, 4g<br>17.5 x 11.5 x 9.0 mm, 4g | | | |

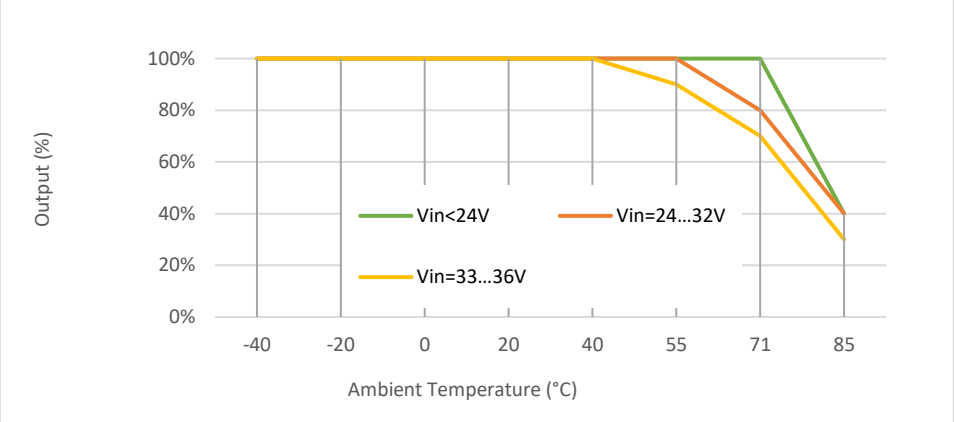
## Characteristics Curves

**Derating Curve**

**Output vs Ambient Temperature**

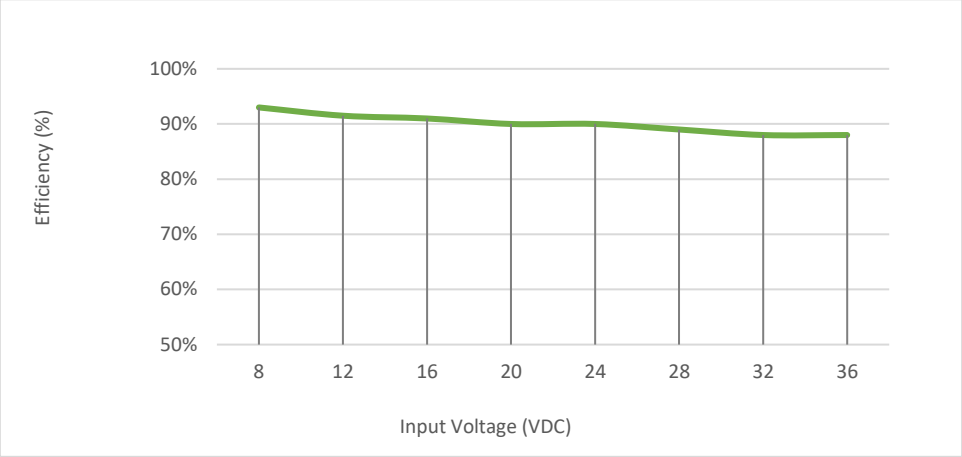



$V_{OUT}$ = 1.8 ... 5V

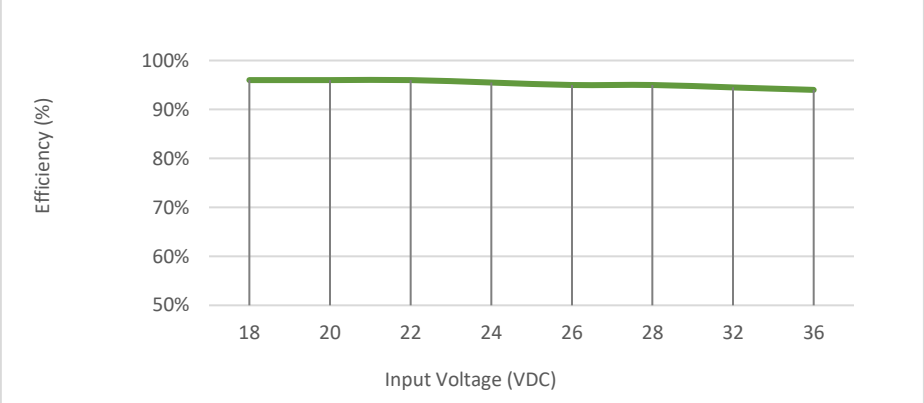



$V_{OUT}$ = 6.5 ... 15V

**Efficiency vs Input Voltage**

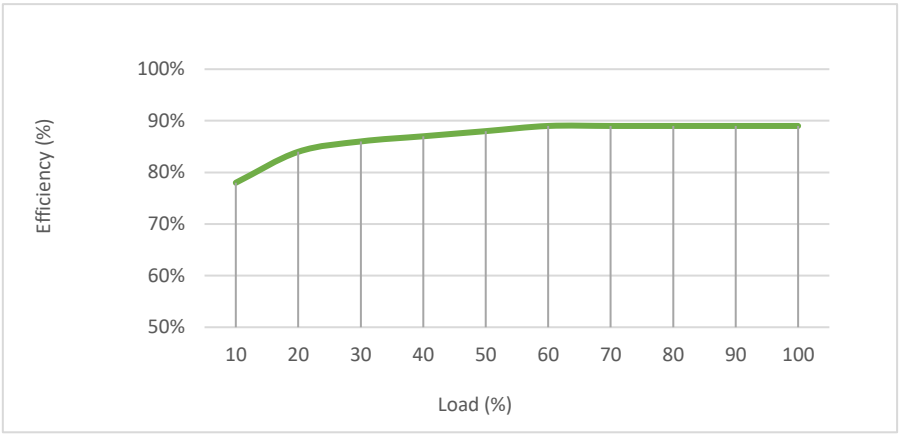



Full Load, SDX20SN050

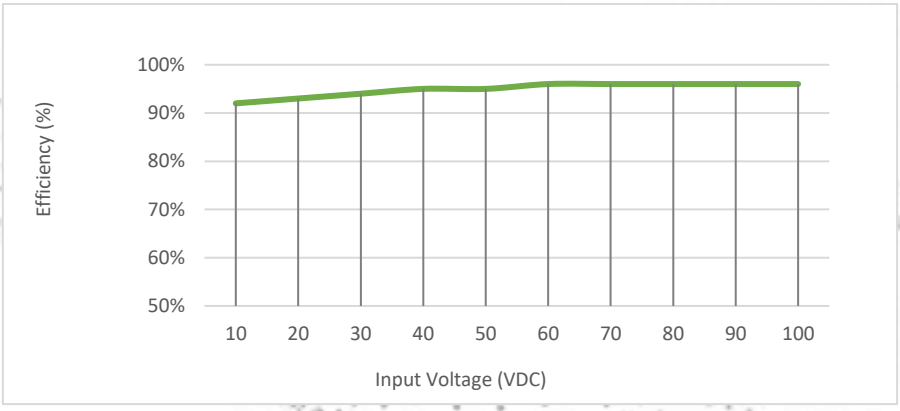



Full Load, SDX20SN150

**Efficiency vs Load**




SDX20S050, $V_{IN}$=24V




SDX20S150, $V_{IN}$=24V

## Recommended External Circuit

**Typical Application Circuit**

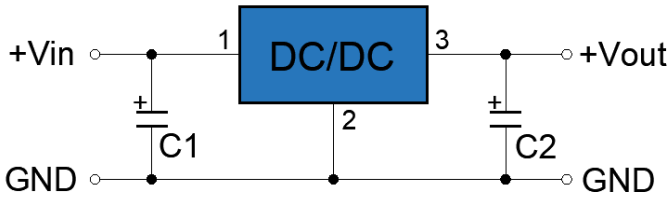



Figure 1: Typical application circuit

**Notes:**

1. C1, C2 are ceramic capacitors. They are mandatory for the operating of the converter. They can also be tantalum or low ESR electrolytic capacitors. Recommended specs listed in the table on right can be changed according to the needs in the circuits.

   These converters are not allowed to use in parallel or hot plug without support from properly designed external circuits.

**Recommend component specifications**

| Model Number | C1, C3 | C2, C4 |
|---|---|---|
| **$V_{OUT}$=1.8 … 6.5V** | 22uF, 50V | 22uF, 10V |
| **$V_{OUT}$=9V** | 22uF, 50V | 22uF, 16V |
| **$V_{OUT}$=12, 15V** | 22uF, 50V | 22uF, 25V |

**Circuit for EMC Enhancement**

* This application circuit is recommended in order to meet EN55032 Class B

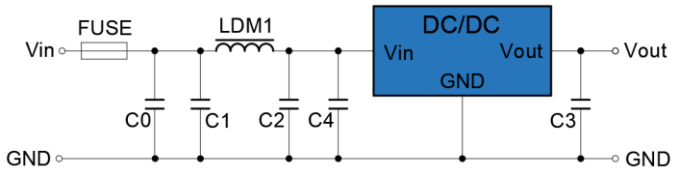


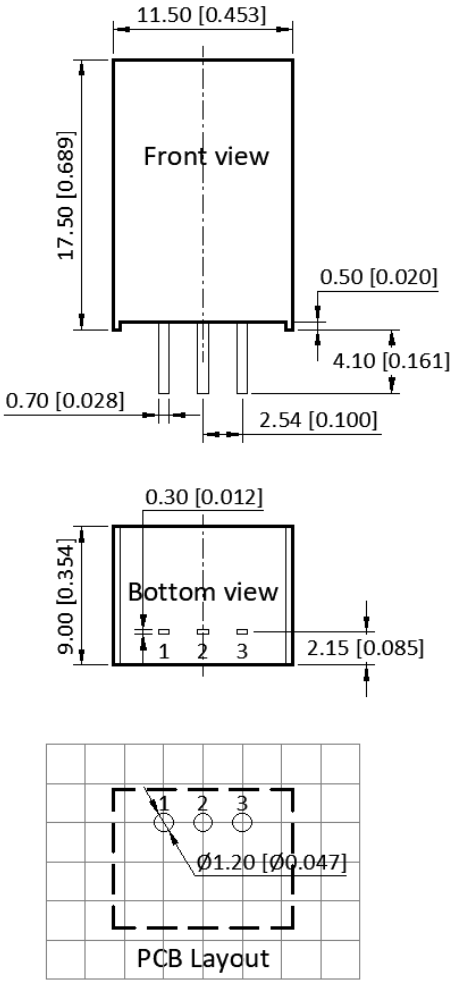

Figure 2. Recommended circuit diagram

**Recommended component spec**

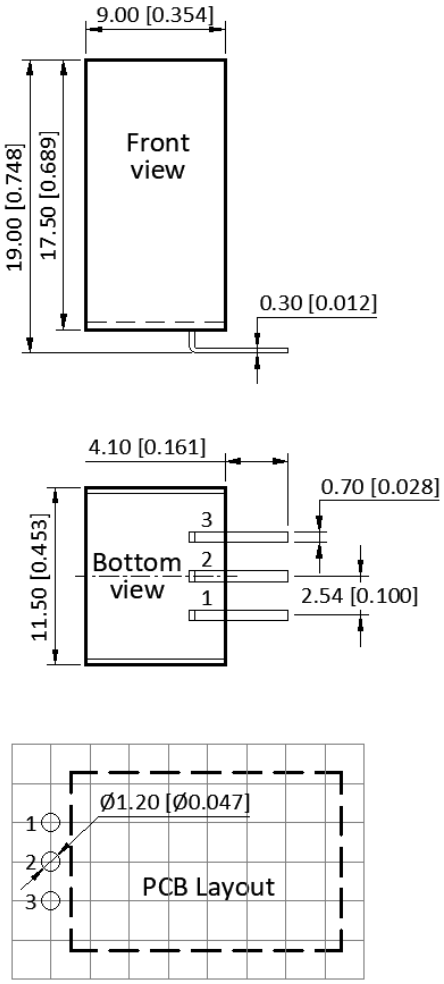
| Items | LDM1 | C0 | C1, C2 | C3 | C4 |
|---|---|---|---|---|---|
| **Spec** | 22uH | 100uF, 100V | 10uF, 50V | 22uF, 25V | 680uF, 50V |

## Mechanical Specifications

Default Package




Suffix "L" Package




**Note:**

* Unless otherwise specified unit: mm [inch]
* General tolerance: ±0.50 [±0.020]
* Pin thickness tolerance: ±0.10 [±0.004]
* Footprint grid: 2.54 x 2.54 mm

**Pin Definition**

| Pin # | Single Out | |
|---|---|---|
| **1** | $+V_{IN}$ | |
| **2** | GND | |
| **3** | $+V_{OUT}$ | |

## Ordering information

Ordering can be done via www.summit-electronics.com or via info@summit-electronics.com. Please contact us for more information. Customisation of the product is available on request.

## Technical support

For all product questions please contact us via info@summit-electronics.com

## Document revision

| Rev | Date | Changes |
|---|---|---|
| **2025v0.1** | 27-08-2025 | First issue of document |