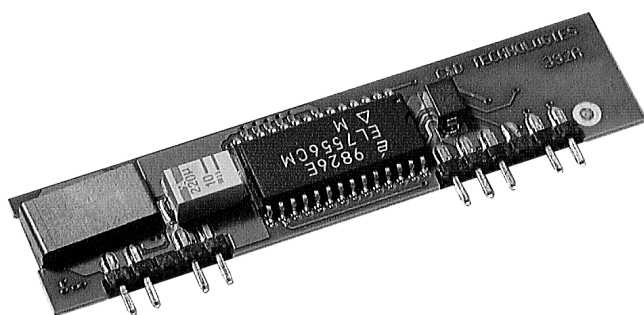


## 5 V<sub>DC</sub> INPUT, 3.3 V<sub>DC</sub> OUTPUT DC/DC CONVERTER

### SS26 (SuperSIP™)



#### Description

The SS26 (SuperSIP™) DC/DC converter accepts a regulated 5V input ( $\pm 10\%$ ) and provides 1.8Vdc to 3.6Vdc at 6A. The circuit is optimized for high efficiency and fast load transient response needed by telecom, DSP, and microprocessor applications. Advanced thermal design, monolithic power circuitry, planar magnetics, and synchronous rectification result in outstanding performance and value. Pins are staked for wave solderability. Multiple programming, power good and on/off options allow superior flexibility and drop in compatibility for most existing designs.

#### Features

- Non isolated DC/DC Converter designed to operate from a regulated 5V bus
- Output voltage Range: 1.8V - 3.6V
- Easy resistive programming for desired output
- No resistive programming gives 3.3Vdc output
- Wave solderable

More product information and application notes are available  
on our website at [www.cdpowerelectronics.com](http://www.cdpowerelectronics.com)

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## Electrical Specifications

Unless otherwise specified, operating conditions are as follows:  $V_{in}=5V$ ,  $V_o=3.3V$ ,  $I_o=6A$ ,  $T_A=25^{\circ}C$ ,  $C_{in}=100\mu F$ ,  $C_o=0F$ .

| Parameters                                                                | Conditions                                                         | Min. | Typ.      | Max. | Units          |
|---------------------------------------------------------------------------|--------------------------------------------------------------------|------|-----------|------|----------------|
| Input                                                                     |                                                                    |      |           |      |                |
| Input Voltage $V_{in}$                                                    |                                                                    | 4.5  | 5.0       | 5.5  | $V_{DC}$       |
| Input Current Ripple                                                      |                                                                    |      | 200       |      | $mA_{RMS}$     |
| Required Capacitance $C_{in}$                                             | Note 1                                                             | 0    | 100       |      | $\mu F$        |
| Output                                                                    |                                                                    |      |           |      |                |
| Output Voltage $V_o$                                                      | Nominal                                                            | 3.25 | 3.3       | 3.35 | $V_{DC}$       |
| Output Program Range                                                      | Note 2                                                             | 1.8  |           | 3.6  | $V_{DC}$       |
| Output Current $I_o$                                                      | $T_A=25^{\circ}C$                                                  | 0    |           | 6    | Amps           |
| Output Ripple                                                             | 20 Mhz BW                                                          |      | 15        | 50   | mVp-p          |
| Output Rise time $T$                                                      |                                                                    |      | 700       |      | $\mu S$        |
| Output Capacitance Range $C_o$                                            |                                                                    | 0    |           | 5000 | $\mu F$        |
| Line Regulation                                                           |                                                                    |      | $\pm 0.5$ |      | %              |
| Load Regulation                                                           | $I_o$ min- $I_o$ max                                               |      | $\pm 1.0$ |      | %              |
| Temperature Coefficient $T_c$                                             |                                                                    |      | 0.01      |      | $\%/^{\circ}C$ |
| Combined variation                                                        | $V_{in}$ min-max<br>$I_o$ min-max<br>$T_A=25^{\circ}C-85^{\circ}C$ | -2   |           | +2   | %              |
| Current Limit $I_{limit}$                                                 | $V_{in} = 4.75V_{dc}$                                              | 6.5  | 9         | 12   | A              |
| General                                                                   |                                                                    |      |           |      |                |
| Switching Frequency                                                       |                                                                    |      | 800       |      | kHz            |
| Dynamic Response                                                          |                                                                    |      |           |      |                |
| $\Delta I_o/\Delta t = 1A/10\mu sec$ , $V_i = 5.0V$ , $T_A = 25^{\circ}C$ |                                                                    |      |           |      |                |
| Load Change from $I_o = 0\%$ to $I_o = 100\%$                             |                                                                    |      |           |      |                |
| Peak Deviation                                                            |                                                                    |      | 30        |      | mV             |
| Settling time ( $V_o < 10\%$ Peak Deviation)                              |                                                                    |      | 100       |      | $\mu sec$      |
| Load change from $I_o = 100\%$ to $I_o = 0\%$                             |                                                                    |      |           |      |                |
| Peak Deviation                                                            |                                                                    |      | 30        |      | mV             |
| Settling time ( $V_o < 10\%$ Peak Deviation)                              |                                                                    |      | 100       |      | $\mu sec$      |
| Temperature                                                               |                                                                    |      |           |      |                |
| Operating Temperature                                                     | Note 3                                                             | 0    |           | +60  | $^{\circ}C$    |
| Storage Temperature                                                       |                                                                    | -40  |           | +125 | $^{\circ}C$    |

### Notes

1. Input source <3" from SuperSIP™, Load transient <3A per SIP. 100 $\mu F$  low ESR capacitor for load transients >3A.
2. Optional programming 1.8 - 3.6 or  $\pm 10\%$  available. See Table.
3. 100 lfm air,  $V_o=3.3V$ ,  $I_o=6A$ . See Thermal Design Guide for other conditions.

## Programming

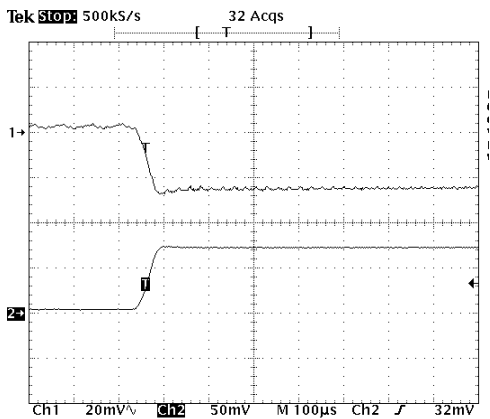
To program the SS26 SuperSIP™ for  $V_{out} < 3.3$ , connect resistor across pins 8 (TRIM) and 1 ( $V_o$ ). For  $V_{out} > 3.3$ , resistor is connected across pins 8 and 4 (Gnd).

**Table 2**

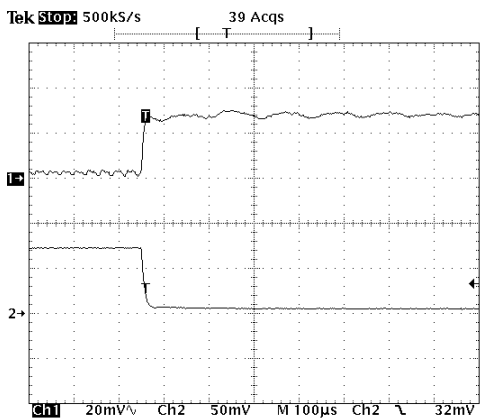
| $V_{out}$ | Resistor Value | $V_{out}$ | Resistor Value |
|-----------|----------------|-----------|----------------|
| 1.8       | 576 $\Omega$   | 2.8       | 18.2k          |
| 1.9       | 1.21k          | 2.9       | 24.3k          |
| 2.0       | 1.96k          | 3.0       | 34.8k          |
| 2.1       | 2.8k           | 3.1       | 54.9k          |
| 2.2       | 3.83k          | 3.2       | 110.0k         |
| 2.3       | 4.99k          | 3.3       | OPEN           |
| 2.4       | 6.49k          | 3.4       | 66.5k          |
| 2.5       | 8.25k          | 3.5       | 29.4k          |
| 2.6       | 10.7k          | 3.6       | 18.2k          |
| 2.7       | 13.7k          |           |                |

## Transient Response

Operating conditions are as follows:  $V_{in}=5V$ ,  $V_o=3.3V$ , Load change from  $I_o=0\%$  to  $I_o=100\%$ ,  $T_A=25^\circ C$ ,  $C_{in}=0F$ ,  $C_o=\mu F$ .



Operating conditions are as follows:  $V_{in}=5V$ ,  $V_o=3.3V$ , Load change from  $I_o=100\%$  to  $I_o=0\%$ ,  $T_A=25^\circ C$ ,  $C_{in}=0F$ ,  $C_o=\mu F$ .

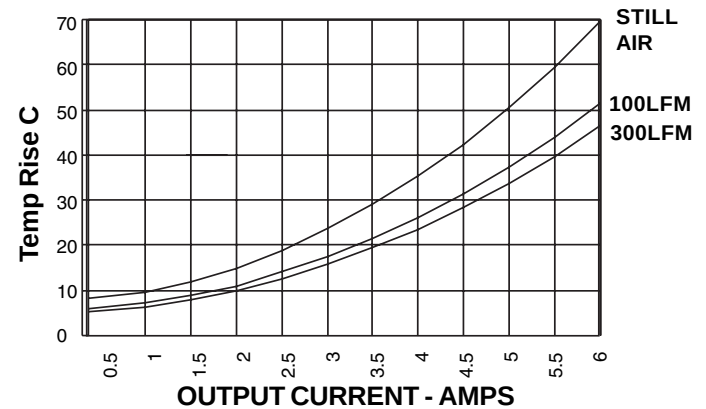


## Thermal Design Guide

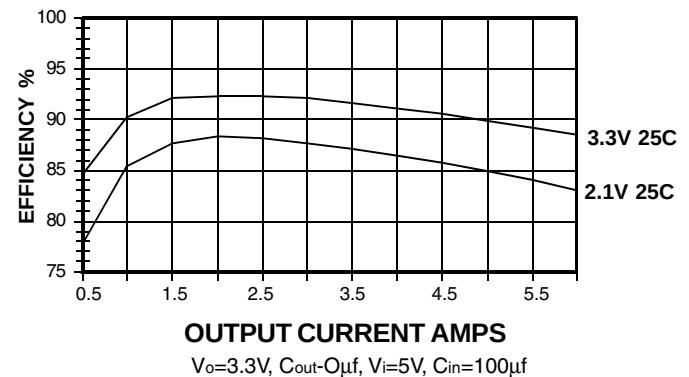
Locate your operating current, read the junction temp rise from the graph and add to your maximum ambient.  $135^\circ C$  is the maximum allowable operating junction temperature. Test conditions: Device soldered into 4" x 4" PCB, 2 sided with power and ground planes for heat conduction. Due to the difficulty in predicting the thermal effects of airflow velocity and direction, and thermal conduction through ground planes it is important that the SS26 SuperSIP™ be evaluated thermally in each application. For high ambient temperature/high current application please request our Application Note 35-118-01, "Accurate Measurements of SS26 SuperSIP™ Junction Temperature", for further assistance.

### $T_j$ Rise vs. $I_o$

(Junction Temp Rise vs. Output Current)



### Efficiency



$V_o=3.3V$ ,  $C_{out}=0\mu f$ ,  $V_i=5V$ ,  $C_{in}=100\mu f$

# Ordering Information

Typical examples:

SS 26 - A - A - A

Standard configuration 5V to 3.3V  
with 1.8V-3.6V trim range

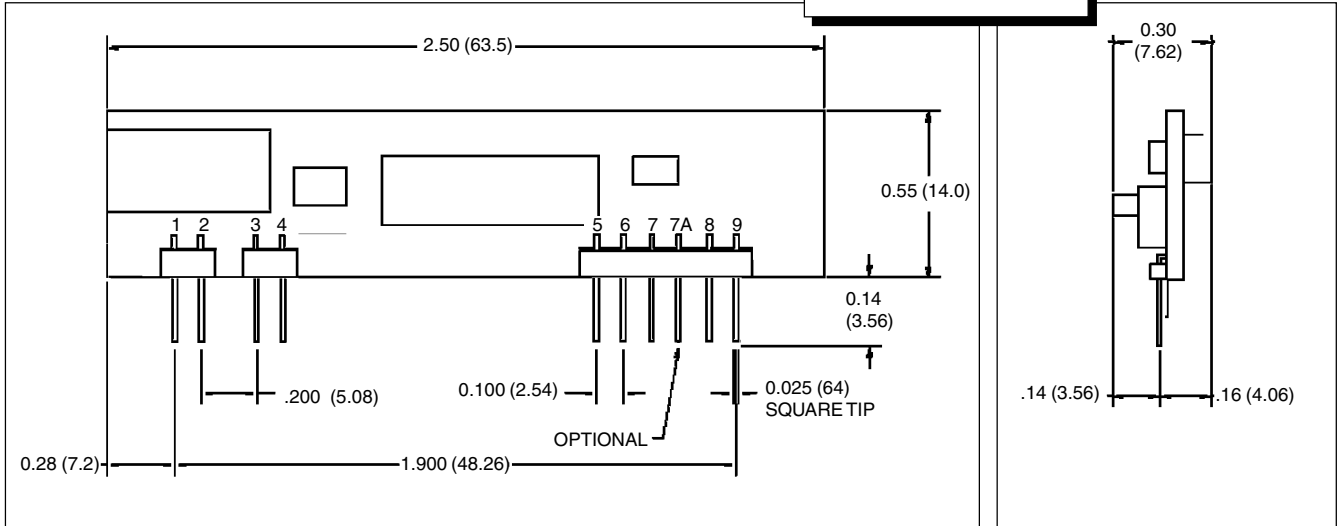
SS 26 - B - A - A

| Power Good                                                                        | Enable                                                                                      | Programming (See Table 2)                                    |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| A = Pin 7A installed for Power Good option<br>B = Pin omitted (industry standard) | A = logic1 or open = ON<br>logic 0 or gnd = OFF<br>B = logic 0 or gnd = ON<br>logic 1 = OFF | A = Standard 3.3V with Pin 8 open<br>or program per Table 2. |

## Pin Out

| Pin | Function          | Description           |
|-----|-------------------|-----------------------|
| 1   | V <sub>o</sub>    | Output Voltage        |
| 2   | V <sub>o</sub>    | Output Voltage        |
| 3   | V <sub>o</sub>    | Output Voltage        |
| 4   | GND               | Ground                |
| 5   | GND               | Ground                |
| 6   | V <sub>IN</sub>   | Input Voltage         |
| 7   | V <sub>IN</sub>   | Input Voltage         |
| 7A  | P <sub>good</sub> | Power Good Option     |
| 8   | Trim              | Output Voltage Adjust |
| 9   | Enable            | Enable Option         |

## Mechanical



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