

**SCOPE: +5V, +12V, +15V STEP-UP, CURRENT-MODE PWM DC-DC CONVERTER**

| <u>Device Type</u> | <u>Generic Number</u> | <u>Circuit Function</u> |
|--------------------|-----------------------|-------------------------|
| 01                 | MAX731(x)/883B        | +5V                     |
| 02                 | MAX732(x)/883B        | +12V                    |
| 03                 | MAX733(x)/883B        | +15V                    |

**Case Outline(s).** The case outlines shall be designated in Mil-Std-1835 and as follows:

| <u>Outline Letter</u> | <u>Mil-Std-1835</u> | <u>Case Outline</u>  | <u>Package Code</u> |
|-----------------------|---------------------|----------------------|---------------------|
| <b>Maxim</b>          | <b>SMD</b>          |                      |                     |
| JA                    | P                   | GDIP1-T8 or CDIP2-T8 | J8                  |
| LP                    | 2                   | CQCC1-N20            | L20                 |

**Absolute Maximum Ratings**

|                                                          |                       |
|----------------------------------------------------------|-----------------------|
| V+, LX to GND .....                                      | +17V, -0.3V           |
| V <sub>OUT</sub> .....                                   | ±25V                  |
| Input Voltage, SS, CC, SHDN .....                        | -0.3V to (V+ +0.3V)   |
| Peak Switch Current (I <sub>LX</sub> ) .....             | 1.5A                  |
| Reference Current (I <sub>VREF</sub> ) .....             | 2.5mA                 |
| Lead Temperature (soldering, 10 seconds) .....           | +300°C                |
| Storage Temperature .....                                | -65°C to +150°C       |
| Continuous Power Dissipation .....                       | T <sub>A</sub> =+70°C |
| 8 pin Cerdip(derate 8.0mW/°C above +70°C) .....          | 640mW                 |
| 20 pin LCC(derate 9.1mW/°C above +70°C) .....            | 727mW                 |
| Junction Temperature T <sub>J</sub> .....                | +150°C                |
| Thermal Resistance, Junction to Case, $\theta_{JC}$      |                       |
| 8 pin Cerdip .....                                       | 55°C/W                |
| 20 pin LCC .....                                         | 20°C/W                |
| Thermal Resistance, Junction to Ambient, $\theta_{JA}$ : |                       |
| 8 pin Cerdip .....                                       | 125°C/W               |
| 20 pin LCC .....                                         | 110°C/W               |

**Recommended Operating Conditions**

|                                                 |                 |
|-------------------------------------------------|-----------------|
| Ambient Operating Range (T <sub>A</sub> ) ..... | -55°C to +125°C |
|-------------------------------------------------|-----------------|

| PART   | INPUT SUPPLY RANGE | OUTPUT VOLTAGE | GUARANTEED OUTPUT CURRENT (mA) |
|--------|--------------------|----------------|--------------------------------|
| MAX731 | 2.7V to 4.65V      | +5V            | 200                            |
| MAX732 | 4.5V to 9.3V       | +12V           | 150                            |
| MAX732 | 6.0V to 9.3V       | +12V           | 200                            |
| MAX733 | 4.5V to 11.0V      | +15V           | 100                            |
| MAX733 | 6.0V to 11.0V      | +15V           | 200                            |

Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

|       |                                                                                   |                        |        |
|-------|-----------------------------------------------------------------------------------|------------------------|--------|
| ----- | Electrical Characteristics of MAX731/732/733/883B<br>For /883B and SMD 5962-94621 | 19-0076<br>Page 2 of 6 | Rev. D |
|-------|-----------------------------------------------------------------------------------|------------------------|--------|

**TABLE 1. ELECTRICAL TESTS:**

| TEST                           | Symbol             | CONDITIONS<br>-55 °C ≤ T <sub>A</sub> ≤ +125 °C <u>1/</u><br>V <sub>IN</sub> = +3V for 01, V <sub>+</sub> = 5V for<br>02, 03, GND = 0V, I <sub>LOAD</sub> = 0mA<br>Unless otherwise specified | Group A<br>Subgroup | Device<br>type | Limits<br>Min     | Limits<br>Max       | Units |
|--------------------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------------|-------------------|---------------------|-------|
| Output Voltage NOTE 1          | V <sub>OUT</sub>   | V <sub>IN</sub> = 2.7V to 4.65V, <u>2/</u><br>0mA < I <sub>LOAD</sub> < 200mA                                                                                                                 | 1,2,3               | 01             | 4.75              | 5.25                | V     |
|                                |                    | V <sub>+</sub> = 4.5V to 9.3V,<br>0mA < I <sub>LOAD</sub> < 150mA                                                                                                                             | 1,2,3               | 02             | 11.40             | 12.60               |       |
|                                |                    | V <sub>+</sub> = 6.0V to 9.3V,<br>0mA < I <sub>LOAD</sub> < 200mA                                                                                                                             |                     |                | 11.40             | 12.60               |       |
|                                |                    | V <sub>+</sub> = 4.5V to 11V,<br>0mA < I <sub>LOAD</sub> < 100mA                                                                                                                              | 1,2,3               | 03             | 14.25             | 15.75               |       |
|                                |                    | V <sub>+</sub> = 6.0V to 11V,<br>0mA < I <sub>LOAD</sub> < 125mA                                                                                                                              |                     |                | 14.25             | 15.75               |       |
| Input Voltage Range            | V <sub>IR</sub>    |                                                                                                                                                                                               | 1,2,3               | 01<br>02<br>03 | 2.7<br>4.0<br>4.0 | 4.65<br>9.3<br>11.0 | V     |
| Supply Current                 | I <sub>S</sub>     | Includes switch current                                                                                                                                                                       | 1,2,3               | 01<br>02,03    |                   | 4.0<br>3.0          | mA    |
| Standby Current                | I <sub>STDBY</sub> | SHDN = 0V, entire circuit                                                                                                                                                                     | 1,2,3               | All            |                   | 100.0               | μA    |
| Shutdown input threshold       |                    | V <sub>IH</sub>                                                                                                                                                                               | 1,2,3               | All            | 2.0               |                     | V     |
|                                |                    | V <sub>IL</sub>                                                                                                                                                                               |                     |                |                   | 0.25                |       |
| Shutdown input leakage current | I <sub>SIL</sub>   |                                                                                                                                                                                               | 1,2,3               | All            |                   | 1.0                 | μA    |
| Undervoltage Lockout           | V <sub>UL</sub>    |                                                                                                                                                                                               | 1,2,3               | 02,03          |                   | 4.0                 | V     |
| Reference Voltage              | V <sub>REF</sub>   |                                                                                                                                                                                               | 1,2,3               | All            | 1.15              | 1.30                | V     |
| Oscillator frequency           | f <sub>O</sub>     |                                                                                                                                                                                               | 1,2,3               | 01<br>02,03    | 125<br>130        | 215<br>210          | kHz   |
| Minimum Start-up Input Voltage |                    | I <sub>LOAD</sub> = 200mA                                                                                                                                                                     | 1,2,3               | 01             |                   | 2.5                 | V     |
| Output Current                 |                    |                                                                                                                                                                                               | 1,2,3               | 01             | 200               |                     | mA    |

NOTE 1: Capacitors used in automatic test setup may be different from value suggested.

Capacitor suggested values are:

V<sub>+</sub> to GND: 150μF & 0.1μF (01,02,03).    Output to GND: 300μF (02,03), 150μF (01).

V<sub>OUT</sub> to CC: 0.15μF (01,02,03).    CC to GND: 2200μF (02,03), 0.15μF (01).

V<sub>REF</sub> to GND: 0.01μF (02,03), 4.7μF (01).    SS to GND: 0.1μF (02,03), 0.15μF (01).

NOTE 2: Circuit will regulate properly with input voltage as high as 5.25V due to voltage drop across the external diode.

|                              |
|------------------------------|
| <b>ORDERING INFORMATION:</b> |
|------------------------------|

| Package      | Device | Part #         | SMD #           |
|--------------|--------|----------------|-----------------|
| 8 pin Cerdip | 01     | MAX731MJA/883B | 5962-9462101MPA |
| 20 pin LCC   | 01     | MAX731MLP/883B | 5962-9462101M2C |
| 8 pin Cerdip | 02     | MAX732MJA/883B | 5962-9462102MPA |
| 20 pin LCC   | 02     | MAX732MLP/883B | 5962-9462102M2C |
| 8 pin Cerdip | 03     | MAX733MJA/883B | 5962-9462103MPA |
| 20 pin LCC   | 03     | MAX733MLP/883B | 5962-9462103M2C |

TERMINAL CONNECTIONS

|    | J8               | L20              |
|----|------------------|------------------|
| 1  | SHDN             | SHDN             |
| 2  | V <sub>REF</sub> | NC               |
| 3  | SS               | NC               |
| 4  | CC               | V <sub>REF</sub> |
| 5  | GND              | NC               |
| 6  | LX               | NC               |
| 7  | V <sub>OUT</sub> | SS               |
| 8  | V+               | NC               |
| 9  |                  | CC               |
| 10 |                  | GND              |
| 11 |                  | GND              |
| 12 |                  | GND              |
| 13 |                  | NC               |
| 14 |                  | NC               |
| 15 |                  | NC               |
| 16 |                  | LX               |
| 17 |                  | NC               |
| 18 |                  | VOUT             |
| 19 |                  | NC               |
| 20 |                  | V+               |

## QUALITY ASSURANCE

Sampling and inspection procedures shall be in accordance with MIL-Prf-38535, Appendix A as specified in Mil-Std-883.

Screening shall be in accordance with Method 5004 of Mil-Std-883. Burn-in test Method 1015:

1. Test Condition, A, B, C, or D.
2. TA = +125°C minimum.
3. Interim and final electrical test requirements shall be specified in Table 2.

Quality conformance inspection shall be in accordance with Method 5005 of Mil-Std-883, including Groups A, B, C, and D inspection.

Group A inspection:

1. Tests as specified in Table 2.
2. Selected subgroups in Table 1, Method 5005 of Mil-Std-883 shall be omitted.

Group C and D inspections:

- a. End-point electrical parameters shall be specified in Table 1.
- b. Steady-state life test, Method 1005 of Mil-Std-883:
  1. Test condition A, B, C, D.
  2. TA = +125°C, minimum.
  3. Test duration, 1000 hours, except as permitted by Method 1005 of Mil-Std-883.

**TABLE 2. ELECTRICAL TEST REQUIREMENTS**

| Mil-Std-883 Test Requirements                                | Subgroups<br>per Method 5005, Table 1 |
|--------------------------------------------------------------|---------------------------------------|
| Interim Electric Parameters<br>Method 5004                   | 1                                     |
| Final Electrical Parameters<br>Method 5005                   | 1*, 2, 3                              |
| Group A Test Requirements<br>Method 5005                     | 1, 2, 3                               |
| Group C and D End-Point Electrical Parameters<br>Method 5005 | 1                                     |

\* PDA applies to Subgroup 1 only.