

Performance and Functional Specifications

See Note 1

| Input | |
|--|---|
| Input Voltage Range | See Ordering Guide and Note 7. |
| Isolation | Not isolated |
| Start-Up Voltage | 2.05 V |
| Undervoltage Shutdown (see Note 15) | 1.92 V |
| Overvoltage Shutdown | None |
| Reflected (Back) Ripple Current (Note 2) | TBD mA pk-pk |
| Internal Input Filter Type | Capacitive |
| Recommended External Fuse | TBD |
| Reverse Polarity Protection | None. See fuse information. |
| Input Current: | |
| Full Load Conditions | See Ordering Guide |
| Inrush Transient | TBD A ² Sec. |
| Shutdown Mode (Off, UV, OT) | 1 mA |
| Output in Short Circuit | 10 mA |
| Low Line (Vin=Vmin) | 1.48 A. |
| Remote On/Off Control (Note 5) | |
| Negative Logic | ON = Open pin or -0.2V to Vin -1.6V max. OFF = Vin -0.8V min. to +Vin |
| Positive Logic | ON = Open pin (internally pulled up) or +1.2V to +Vin max. OFF = -0.3V to +0.3V max. or ground |
| Current | TBD |
| Tracking/Sequencing (optional) | |
| Slew Rate | 2 Volts per millisecond, max. |
| Tracking accuracy, rising input | Vout = ±100 mV of Sequence In |
| Tracking accuracy, falling input | Vout = ±100 mV of Sequence In |
| Output | |
| Output Power | 10.1W max. |
| Output Voltage Range | See Ordering Guide |
| Minimum Loading | No minimum load |
| Accuracy (50% load, untrimmed) | ±2.5 % of Vnominal |
| Voltage Output Range (Note 13) | See Ordering Guide |
| Overvoltage Protection (Note 16) | None |
| Temperature Coefficient | TBD |
| Ripple/Noise (20 MHz bandwidth) | See Ordering Guide and note 8 |
| Line/Load Regulation | See Ordering Guide and note 10 |
| Efficiency | See Ordering Guide |
| Maximum Capacitive Loading (Note 14) | |
| Cap-ESR=0.001 to 0.01 Ohms | 200 μF |
| Cap-ESR >0.01 Ohms | TBD |
| Current Limit Inception (Note 6) | |
| (98% of Vout setting, after warm up) | 8 Amps |
| Short Circuit Mode | |
| Short Circuit Current Output | 10 mA |
| Protection Method | Hiccup autorecovery upon overload removal. (Note 17) |
| Short Circuit Duration | Continuous, no damage (output shorted to ground) |
| Prebias Startup | Converter will start up if the external output voltage is less than Vnominal. |
| Dynamic Characteristics | |
| Dynamic Load Response (50-100% load step, di/dt=1A/μSec) | 50μSec max. to within ±2% of final value (Note 1) |
| Peak Deviation | ±250 mV |
| Start-Up Time | 6 mSec for Vout=nominal (Vin On) |

| | |
|--------------------------------------|---|
| (Vin on or On/Off to Vout regulated) | 6 mSec for Vout=nominal (Remote On/Off) |
| Switching Frequency | 600 KHz |

| Environmental | | |
|--|---------------------------------------|-------------|
| Calculated MTBF (hours) | OKL Models | OKL2 Models |
| Telecordia method (4a) | 10,820,000 | 5,229,000 |
| Calculated MTBF (hours) | | |
| MIL-HDBK-217N2 method (4b) | 4,820,000 | 3,832,000 |
| Operating Temperature Range (Ambient, all output ranges) | | |
| See derating curves | -40 to +85 °C. with derating (Note 9) | |
| Storage Temperature Range | -55 to +125 deg. C. | |
| Thermal Protection/Shutdown | Included in PWM | |
| MSL Rating | 2 | |
| Relative Humidity | To 85%/+85 °C., non-condensing | |

| Physical | |
|-------------------------------------|---|
| Outline Dimensions | See Mechanical Specifications |
| Weight | 0.06 ounces (1.6 grams) |
| Plating Thickness | Gold overplate 1.18μ" (0.03μm) on Nickel subplate 118.1μ" (3.0μm) |
| Safety | Certified to UL/cUL 60950-1, CSA-C22.2 No. 60950-1, IEC/EN 60950-1, 2nd Edition |
| Restriction of Hazardous Substances | RoHS-6 (does not claim EU RoHS exemption 7b-lead in solder) |

| Absolute Maximum Ratings | |
|---|--|
| Input Voltage (Continuous or transient) | 0 V. to +6 Volts max. |
| On/Off Control | 0 V. min. to +Vin max. |
| Input Reverse Polarity Protection | See Fuse section |
| Output Current (Note 7) | Current-limited. Devices can withstand a sustained short circuit without damage. The outputs are not intended to accept appreciable reverse current. |
| Storage Temperature | -55 to +125 °C. |
| Lead Temperature | See soldering specifications |
| Absolute maximums are stress ratings. Exposure of devices to greater than any of any of these conditions may adversely affect long-term reliability. Proper operation under conditions other than those listed in the Performance/Functional Specifications Table is not implied nor recommended. | |

Specification Notes:

- Specifications are typical at +25 °C, Vin=nominal (+5V), Vout=nominal (+3.3V), full load, external caps and natural convection unless otherwise indicated. Extended tests at full power must supply substantial forced airflow.
All models are tested and specified with external 10μF ceramic output capacitors and a 22 μF external input capacitor. All capacitors are low ESR types. These capacitors are necessary to accommodate our test equipment and may not be required to achieve specified performance in your applications. However, Murata Power Solutions recommends installation of these capacitors. All models are stable and regulate within spec under no-load conditions.
- Input Back Ripple Current is tested and specified over a 5 Hz to 20 MHz bandwidth. Input filtering is Cin=2 x 100 μF ceramic, Cbus=1000 μF electrolytic, Lbus=1 μH.
- Note that Maximum Power Derating curves indicate an average current at nominal input voltage. At higher temperatures and/or lower airflow, the DC/DC converter will tolerate brief full current outputs if the total RMS current over time does not exceed the Derating curve.
- Mean Time Before Failure is calculated using the Telcordia (Belcore) SR-332 Method 1, Case 3, ground fixed conditions, Tpcboard=+25 °C, full output load, natural air convection.
- Mean Time Before Failure is calculated using the MIL-HDBK-217N2 method, ground benign, +25°C., full output load, natural convection.
- The On/Off Control Input should use either a switch or an open collector/open drain transistor referenced to -Input Common. A logic gate may also be used by applying appropriate external voltages which do not exceed +Vin.
- Short circuit shutdown begins when the output voltage degrades approximately 2% from the selected setting.

Specification Notes, Cont.:

- (7) Please observe the voltage input and output specifications in the Voltage Range Graph on page 17.
- (8) Output noise may be further reduced by adding an external filter. At zero output current, the output may contain low frequency components which exceed the ripple specification. The output may be operated indefinitely with no load.
- (9) All models are fully operational and meet published specifications, including "cold start" at -40° C.
- (10) Regulation specifications describe the deviation as the line input voltage or output load current is varied from a nominal midpoint value to either extreme.
- (11) Other input or output voltage ranges will be reviewed under scheduled quantity special order.
- (12) Maximum PC board temperature is measured with the sensor in the center of the converter.
- (13) Do not exceed maximum power specifications when adjusting the output trim.
- (14) The maximum output capacitive loads depend on the the Equivalent Series Resistance (ESR) of the external output capacitor and, to a lesser extent, the distance and series impedance to the load. Larger caps will reduce output noise but may change the transient response. Newer ceramic caps with very low ESR may require lower capacitor values to avoid instability. Thoroughly test your capacitors in the application. Please refer to the Output Capacitive Load Application Note.
- (15) Do not allow the input voltage to degrade lower than the input undervoltage shutdown voltage at all times. Otherwise, you risk having the converter turn off. The undervoltage shutdown is not latching and will attempt to recover when the input is brought back into normal operating range.
- (16) The outputs are not intended to sink appreciable reverse current.
- (17) "Hiccup" overcurrent operation repeatedly attempts to restart the converter with a brief, full-current output. If the overcurrent condition still exists, the restart current will be removed and then tried again. This short current pulse prevents overheating and damaging the converter. Once the fault is removed, the converter immediately recovers normal operation.