Performance/Functional Specifications

All specifications are typical unless noted See Note 1.

Input	
Input Voltage Range	See Ordering Guide.
Recommended External Fuse	6 Amps
Reverse Polarity Protection (Note 9)	None. Use an external fuse.
Isolation	Not isolated. The input and output commons are internally connected.
Start-Up Voltage	4.2 Volts
Undervoltage Shutdown	3.4 Volts
Reflected (Back) Ripple Current (Note 2)	20 mA pk-pk
Internal Input Filter Type	Capacitive
Input Current:	
Full Load Conditions	See Ordering Guide
Inrush Transient	0.4 A^2Sec.
Shutdown Mode (Off, UV, OT)	5 mA
Output Short Circuit	60 mA
No Load, 5V out	80 mA
Low Line (Vin=Vmin, 5Vout)	2.26 Amps
Remote On/Off Control (Note 5)	**[Standard version]**
Positive Logic	ON = +2 V. to +Vin max. or open pin OFF = –0.3 to +0.4 V. max. or ground pin
Current	1 mA
Remote On/Off Control	**["E" version]**
Positive Logic	ON = +2 V. to +Vin max., 100KΩ pulldown to ground OFF = open pin or –0.3 to +0.4 V. max.
Current	1 mA max.
Turn-on Time:	
Vin on to Vout regulated	6 mSec
Remote On to Vout regulated	6 mSec

Output	
Minimum Loading	No minimum load
Output Current Range (to rated specifications)	0 to 3 Amps
Accuracy (50% load, no trim)	±2 % of Vnom
Temperature Coefficient	±0.02% per °C. of Vout range
Ripple/Noise (20 MHz bandwidth)	See Ordering Guide and note 14
Line/Load Regulation	See Ordering Guide and note 10
Efficiency	See Ordering Guide and performance graphs
Maximum Capacitive Loading	
Cap-ESR=0.001 to 0.015 Ohms	200 µF
Cap-ESR >0.015 Ohms	1000 µF
Current Limit Inception (98% of Vout setting, after warm up)	8 Amps
Short Circuit Mode (Notes 6, 12)	
Short Circuit Current Output	0.6 Amp
Protection Method	Hiccup autorecovery upon overload
removal. (Note 8)	
Short Circuit Duration (output shorted to ground)	Continuous, no damage
Overvoltage protection	None

Dynamic Characteristics	
Dynamic Load Response (50 to 100% load step, no external caps)	
di/dt = 1 A/µSec	20 µSec to within ±2% of final value
Switching Frequency	600 KHz

Environmental	
Calculated MTBF (Note 4)	
OKR-T/3-W12-C	12,230,400 hours (4a)
OKR-T/3-W12-C	5,273,231 hours (4b)
Operating Temperature Range	
(Ambient temp., Vout=5 V., vertical mount)	
Full power, see derating curves	-40 to +85 °C.
Operating PC Board Range, no derating	-40 to +100 °C.
Storage Temperature Range	-55 to +125 °C.
Thermal Protection/Shutdown	+130 °C.
Relative Humidity	to 85%/+85 °C.
Restriction of Hazardous Substances	RoHS-6 (does not claim EU RoHS exemption 7b–lead in solder)

Physical	
Outline Dimensions	See Mechanical Specifications
Weight	0.07 ounces (2 grams)
Safety	Certified to UL/cUL 60950-1 CSA-C22.2 No. 60950-1 IEC/EN 60950-1, 2nd edtion

Absolute Maximum Ratings	
Input Voltage	
Continuous or transient	15 Volts max.
Output Power	15 Watts max.
On/Off Control	0 Volts. min. to +Vin. max.
Input Reverse Polarity Protection	See Fuse section
Output Current	Current-limited. Devices can withstand sustained short circuit without damage.
Storage Temperature	-40 to +125 deg. C.

Absolute maximums are stress ratings. Exposure of devices to greater than 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 or recommended.

CAUTION: This product is not internally fused. To comply with safety agency certifications and to avoid injury to personnel or equipment, the user **must** supply an external fast-blow fuse to the input terminals.

Notes

(1) All specifications are typical unless noted. General conditions for Specifications are +25 deg.C, Vin=nominal, Vout=nominal (no trim installed), full rated load. Adequate airflow must be supplied for extended testing under power.

All models are tested and specified with external 1µF and 22 µF paralleled output capacitors and a 22 µF external input capacitor. All capacitors are low ESR types. Caps are layout dependent These capacitors are necessary to accommodate our test equipment and may not be required in your applications. All models are stable and regulate within spec under no-load conditions.

(2) Input Back Ripple Current is tested and specified over a 5 Hz to 20 MHz bandwidth. Input filtering is Cin=2 x 100 µF, 100V tantalum, Cbus=1000 µF, 100V electrolytic, Lbus=1 µH. All caps are low ESR types.

(3) 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. All Derating curves are presented at sea level altitude. Be aware of reduced power dissipation with increasing altitude.

(4a) 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.

(4b) Mean Time Before Failure is calculated using the MIL-HDBK-217N2 method, ground benign, +25ºC., full output load, natural convection.

(5) The On/Off Control is normally controlled by a switch or open collector or open drain transistor. But it may also be driven with external logic or by applying appropriate external voltages which are referenced to Input Common.

(6) Short circuit shutdown begins when the output voltage degrades approximately 2% from the selected setting.

(7) The outputs are not intended to sink appreciable reverse current.

(8) "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.

(9) Input Fusing: If reverse polarity is accidentally applied to the input, to ensure reverse input protection with full output load, always connect an external input fast-blow fuse in series with the +Vin input. Use approximately twice the full input current rating with nominal input voltage.

(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) CAUTION: Since the converter is mounted on the end by its pins, do not subject it to high vibration, shock or acceleration.

(12) Output current limit and short circuit protection is non-latching. When the overcurrent fault is removed, the converter will immediately recover.

(13) Do not exceed maximum power specifications when adjusting the output trim. All published specifications are listed at rated nominal output current using published Derating curves. The maximum power specifications indicate brief operation before overcurrent shutdown occurs. Note particularly that current must be limited at higher output voltage in order to comply with maximum power requirements.

(14) 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.

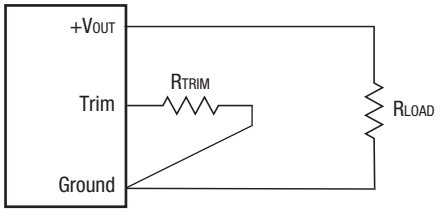
(15) The input and output are not isolated. They share a single COMMON power and signal return.

Trim Connections

Output Voltage Adustment

The output voltage may be adjusted over a limited range by connecting an external trim resistor (Rtrim) between the Trim pin and Ground. The Rtrim resistor must be a 1/10 Watt precision metal film type, ±0.5% accuracy or better with low temperature coefficient, ±100 ppm/oC. or better. Mount the resistor close to the converter with very short leads or use a surface mount trim resistor.

In the tables below, the calculated resistance is given. Do not exceed the specified limits of the output voltage or the converter's maximum power rating when applying these resistors. Also, avoid high noise at the Trim input. However, to prevent instability, you should never connect any capacitors to Trim.



$$R_{TRIM}\ (k\Omega) = \frac{1.182}{V_{OUT} - 0.591}$$

OKR-T/3-W12

Output Voltage	Calculated Rtrim (Ω)
6 V.	218.5
5 V.	268
3.3 V.	436
2.5 V.	619
1.8 V.	978
1.5 V.	1300
1.2 V.	1940
1.0 V.	2890
0.591 V.	∞ (open)

Resistor Trim Equation, OKR-T/3-W12 models:

$$R_{TRIM}\ (k\Omega) = \frac{1.182}{(V_{OUT} - 0.591)}$$