FUNCTIONAL SPECIFICATIONS, OKX-T/5-D12-C

ABSOLUTE MAXIMUM RATINGS	Conditions ①	Minimum	Typical/Nominal	Maximum	Units
Input Voltage, Continuous	Full power operation	0		15	Vdc
Input Reverse Polarity	None, install external fuse		None		Vdc
On/Off Remote Control	Power on or off, referred to -Vin	0		13.8	Vdc
Output Power		0	25	25.5	W
Output Current	Current-limited, no damage, short-circuit protected	0		5	A
Storage Temperature Range	Vin = Zero (no power)	-55		125	°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.					
INPUT	**Conditions ① ③**				
Operating voltage range	Vin ≥ Vout +2	8.3	12	13.8	Vdc
Recommended External Fuse	Fast blow			6	A
Turn On/Start-up threshold	Rising input voltage, 0A load @1Vout	7.5		8.3	Vdc
Turn Off/Undervoltage lockout ⑮	Falling input voltage, 0A load @1Vout	7.3	7.8	8.15	Vdc
Reverse Polarity Protection	None, install external fuse		None		Vdc
Internal Filter Type			C-TYPE		
Input current					
Full Load Conditions	Vin = nominal (5Vo set)		2.24	2.322	A
Low Line	Vin @ min, 5 Vout		3.204	3.321	A
Inrush Transient					A2-Sec.
Short Circuit Input Current					mA
No Load Input Current	5Vout, Iout @ 0		45	75	mA
No Load Input Current	0.75V, Iout @ 0		20	35	
Shut-Down Mode Input Current			5		mA
Reflected (back) ripple current ②	Measured at input with specified filter		20		mA, pk-pk
GENERAL and SAFETY					
Efficiency	@ Vin nom, 5Vout	91.5	93		%
	@ Vin min, 5Vout	92.5	94		%
	@ Vin nom, 3.3Vout	89	91		%
	@ Vin nom, 2.5Vout	87	89		%
	@Vin nom, 1.8Vout	84	86		%
	@Vin nom, 1.5Vout	82	84		%
	@Vin nom, 1.2Vout	79	81		%
	@Vin nom, 1Vout	76	78		%
Safety	Certified to UL-60950-1, CSA-C22.2 No.60950-1, IEC/EN60950-1, 2nd edition (pending)		Yes		
Calculated MTBF ④	Per Telcordia SR332, issue 1 class 3, ground fixed, Tambient=+25°C		TBD		Hours x 10^6
DYNAMIC CHARACTERISTICS					
Fixed Switching Frequency		290	320	350	KHz
Startup Time	Power On, to Vout regulation band, 100% resistive load		8	10	mS
Startup Time	Remote ON to 10% Vout (50% resistive load)		6		mS
Dynamic Load Response	50-100-50% load step, settling time to within ±2% of Vout di/dt = 2.5 A/µSec			80	µSec
Dynamic Load Peak Deviation	same as above			±200	mV
FEATURES and OPTIONS					
Remote On/Off Control ⑤					
"N" suffix:					
Negative Logic, ON state	Pin open=ON	0		0.4	V
Negative Logic, OFF state		1.5		+Vin	V
Control Current	open collector/drain		1		mA
"P" suffix:					
Positive Logic, ON state	Pin open=ON	7.8		+Vin	V
Positive Logic, OFF state		0		0.4	V
Control Current	open collector/drain		1		mA

FUNCTIONAL SPECIFICATIONS, OKX-T/5-D12-C (CONT.)

OUTPUT	Conditions ①	Minimum	Typical/Nominal	Maximum	Units
Total Output Power		0	25	25.5	W
Voltage					
Nominal Output Voltage Range ⑬	See trim formula	0.7525		5.5	Vdc
Setting Accuracy	At 50% load	-2		2	% of Vnom.
Output Voltage Overshoot - Startup:				1	%Vo nom
Current					
Output Current Range		0	5	5	A
Minimum Load			No minimum load		
Current Limit Inception ⑥	98% of Vnom., after warmup @5Vout	9	11.5	14.5	A
Short Circuit					
Short Circuit Current ⑦	Hiccup technique, autorecovery within ±1% of Vout		2		A
Short Circuit Duration (remove short for recovery)	Output shorted to ground, no damage		Continuous		
Short circuit protection method	Current limiting				
Regulation ⑩					
Total Regulation Band	Over all line, load and temp conditions		2		% Vo set
Line Regulation	Vin=min. to max. Vout=nom.			±0.2	%
Load Regulation	Iout=min. to max. Vin=48V.			±0.5	%
Ripple and Noise ⑧	5Vo, 12Vin			70	mV pk-pk
Ripple and Noise	3.3Vo, 12Vin			50	mV pk-pk
Ripple and Noise	1.8Vo, 12Vin			30	mV pk-pk
Ripple and Noise	1Vo, 12Vin			25	mV pk-pk
Temperature Coefficient	At all outputs		±0.02		% of Vnom./°C
Maximum Capacitive Loading ⑭	low ESR; >0.001, <0.01 ohm		1000		uF
Maximum Capacitive Loading	0.01 ohm		3000		µF
MECHANICAL (Through Hole Models)					
Outline Dimensions			0.40x0.90x0.282		Inches
			10.2x22.9x8.85		mm
Weight			0.1		Ounces
			2.8		Grams
ENVIRONMENTAL					
Operating Ambient Temperature Range ⑨	Full power, all output voltages, see derating curves	-40		85	°C
Operating PCB Temperature ⑫	No derating	-40		100	°C
Storage Temperature	Vin = Zero (no power)	-55		125	°C
Thermal Protection/Shutdown	Measured in center	130	130	135	°C
Electromagnetic Interference					
Conducted, EN55022/CISPR22	External filter is required		B		Class
Radiated, EN55022/CISPR22			B		Class

Notes

① Specifications are typical at +25 deg.C, Vin=nominal (+12V.), Vout=nominal (+5V), full load, external caps and natural convection unless otherwise indicated. Extended tests at higher power must supply substantial forced airflow. All models are tested and specified with external 1 µF paralleled with 10 µF 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.

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 tantalum, Cbus=1000 µF electrolytic, Lbus=1 µH.

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.

④ Mean Time Before Failure is calculated using the Telcordia (Belcore) SR-332 Method 1, Case 3, ISSUE 2, ground fixed controlled conditions, Tambient=+25 deg.C, full output load, natural air convection.

⑤ 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 not exceed +Vin.

⑥ Short circuit shutdown begins when the output voltage degrades approximately 1% from the selected setting.

⑦ "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.

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.