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Power Solutions

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VKQ100MS1V8

40 Amp, 1.8 Vout, Quarter Brick DC/DC Converter

FEATURES

- 36 - 75V Input Range
- Small Size: 1.5" x 2.3" x .50"
- High Efficiency: ≥85%
- Fixed Frequency Operation 400kHz
- Primary Remote On/Off
- Adjustable Output Voltage
- Brick Wall Current Limiting
- On Board Input Differential Filter
- Synchronous Rectification
- No Minimum Load Requirement
- Remote Sense
- No Heatsink Required
- No External Components Required
- Safety per UL/CUL 60950, EN 60950, Operational Insulation Meets TNV-SELV Isolation Requirements

APPLICATIONS

- Distributed Power Architectures
- Telecommunications
- Battery Powered Systems
- Workstations

The VKQ100MS1V8 DC/DC converter presents an economical and practical solution for distributed power system architectures which require high power density and efficiency while maintaining system modularity and upgradeability. With the ability to operate over a wide input voltage range of 36 to 75 Vdc, this module is ideal for telecommunications and battery backup applications where input flexibility must be combined with output voltage regulation. In addition, the output is fully isolated from the input, allowing for a variety of polarity and grounding configurations.

Innovative circuit design using surface mount components results in a compact, efficient and reliable solution to DC/DC conversion needs. Internal power dissipation is minimized by the VKQ100MS1V8's high efficiency and is aided by a metal baseplate to which all heat dissipative elements are coupled.

The control circuitry of the VKQ100MS1V8 has been designed to provide overvoltage protection as well as current limiting for continuous short-circuit protection.

PRODUCT SELECTION CHART

MODEL	NOMINAL INPUT VOLTAGE (VDC)	RATED OUTPUT VOLTAGE (VDC)	RATED OUTPUT CURRENT (A)	INPUT CURRENT NOM (A)	EFFICIENCY MIN (%)	EFFICIENCY TYP (%)
VKQ100MS1V8	48	1.80	40	1.90	85	85.5

ORDERING INFORMATION

MODEL NO.	PART NO.
VKQ100MS1V8	6064912

ABSOLUTE MAX. RATINGS

Output Short-Circuit Duration	Continuous
Internal Power Dissipation	12.7 Watts
Lead Temperature (soldering, 10 seconds max)	+300°C
Continuous Input Voltage	75 VDC
Storage Temperature	+125°C
Input to Output Isolation	1500 VDC
Input Voltage (non-operating)	100 VDC

SPECIFICATIONS

Unless otherwise specified, all specifications are at T_A = +25°C.

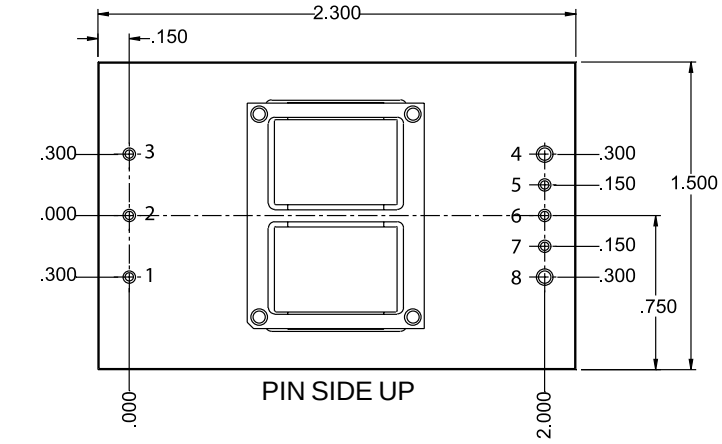
	PARAMETER	CONDITIONS	MIN	NOM	MAX	UNITS
INPUT	Voltage Range (Vin)		36	48	75	Vdc
	Reflected Ripple Current[1]	Vin = 48 Vdc; Io = 40 A.			3	A pk-pk
	Input Ripple Rejection (100 Hz – 1KHz)	Vin = 48 Vdc; Io = 40 A.	-30			dB
	No Load Input Current	Vin = 48 Vdc; Io = 0 A.		90	100	mA
	Quiescent Input Current Primary On/Off Disabled	Vin = 48 Vdc; Io = 40 A.			4	mA
	Power Dissipation No Load	Vin = 48 Vdc.		4.00	4.50	W
	Standby, Primary On/Off Disabled				0.20	W
	Maximum Input Current	Vin = 36 Vdc; Io = 40 A.			2.50	A
	Inrush Charge	Vin = 75 Vdc.			0.165	mC
	Input Under Voltage Protection Shut down	Tamb = -40°C to +60°C; Io = 0 A to 40 A	31.50		32.50	Vdc
	Turn On		32.50		33.70	Vdc
	Input Over Voltage Protection Shut down	Tamb = -40°C to +60°C; Io = 0 A to 40 A	76.50		79.00	Vdc
	Turn On		76.00		78.00	Vdc
	Input Under Voltage Protection Shutdown	Tamb = +25°C; Io = 0A to 40A	32.00		32.25	Vdc
	Turn On		33.00		33.50	Vdc
	Input Over Voltage Protection Shut down	Tamb = -40°C to +60°C; Io = 0 A to 40 A	77.70		79.00	Vdc
	Turn On		76.20		77.60	Vdc
OUTPUT	**OUTPUT** Nominal Voltage (Vnom)			1.800		Vdc
	Output Current (Io) [2]	Vin = 36 Vdc to 75 Vdc.	0		40	A
	Rated Power [2]	Vin = 36 Vdc to 75 Vdc.	0		72	W
	Set Point Accuracy	Vin = 48 Vdc; Io = 20 A; Tamb = -40°C to +60°C. Tamb = +25°C			1.5 1.0	% of Vnom % of Vnom
	Line Regulation	Vin = 36 Vdc to 75 Vdc; Tamb = -40°C to +60°C; Io = 40 A.		0.30	0.50	% of Vnom
		Tamb = +25°C		0.20	0.30	% of Vnom
	Load Regulation	Vin = 36 Vdc to 75 Vdc; Io = 0 A to 40 A. Tamb = -40°C to +60°C;		0.50	0.75	% of Vnom
		Tamb = +25°C; Vin = 48Vdc		0.30	0.60	% of Vnom
	Ripple & Noise[3]	Vin = 36-75 Vdc; Io = 0-40 A; T_A = -40°C to +60°C f ≤ 20 MHz Bandwidth.			160	mV pk-pk
	Temperature Drift	Tamb = -40°C to +60°C; Vin = 48 Vdc; Io = 40 A.		0.005	0.01	%/°C
	Current Limit Inception	Vin = 48 Vdc.	42		55	A
	Output Voltage Adjust Range	Vin = 48 Vdc; Io = 0-40 A	-5		+10	%Vnom
	Short Circuit Current	Vin = 48 Vdc.	40		60	A
	Turn – On Time	Vin = 48 Vdc; Io = 0-40 A Output to within 1% of Vnom		40	50	ms
	Over Voltage Protection Set Point	Vin = 48 Vdc; Io = 30 A.	2.15		2.90	Vdc
	Transient Response Peak Deviation	50% to 100% Load Step to di/dt = 75A/µS; Co = 470µF; Vin = 48Vdc			260	mV
	Settling Time				110	µS
GENERAL	**GENERAL** Efficiency[4]	Vin = 48 Vdc; Io = 40 A.	85			%
	Switching Frequency	Vin = 36 Vdc-75 Vdc; Io = 0-40 A	380	400	420	KHz
	Remote Sense Compensation	Vin = 48 Vdc			0.200	Vdc
	Remote On / Off Control Inputs	Vin = 36 Vdc-48 Vdc; Io = 0-40 A Tamb = -40°C to +60°C				
	Primary Sink Current – Logic Low		0.60		1.60	mA
	Vlow			0.70	0.75	Vdc
	Vhigh		N/A	N/A	N/A	Open Collector
	Calculated MTTF Per Telcordia TR-NWT-000332	Vin = 48 Vdc; Io = 40 A	TBD			Hours
	Per MIL=HDBK217E		TBD			Hours
	Operating Ambient Temperature		-40		+70	°C

SPECIFICATIONS Unless otherwise specified, all specifications are at T_A = +25°C.

	PARAMETER	CONDITIONS	MIN	NOM	MAX	UNITS
ISOLATION	**ISOLATION**					
	Input to Output		1500			Vdc
	Input to Base Plate		1500			Vdc
	Output to Base Plate		500			Vdc
	Resistance	Input to Output	10			MΩ
	Capacitance	Input to Output		2000		pF
	Leakage Current	V(input – output) = 240 Vac, 60 Hz		180		µA, rms

Notes:
1. A future Application Note will detail the technique used to measure the reflected ripple current.
2. Refer to Power Derating Curve below for details on Output Current Derating with Ambient Temperature. A future Application Note will detail air flow characterization.
3. Refer to performance curves section (pages 4 and 5) for variation in output ripple and noise with Ambient Temperature, Input Voltage and Output Current. The unit requires a ceramic capacitor of 0.022µFacross measurement terminals. A future Application Note will detail measurement set up for output ripple and noise.
4. Refer to performance curves section for variation in efficiency against Input Voltage, Ambient Temperature, Output Load and Frequency.

MECHANICAL

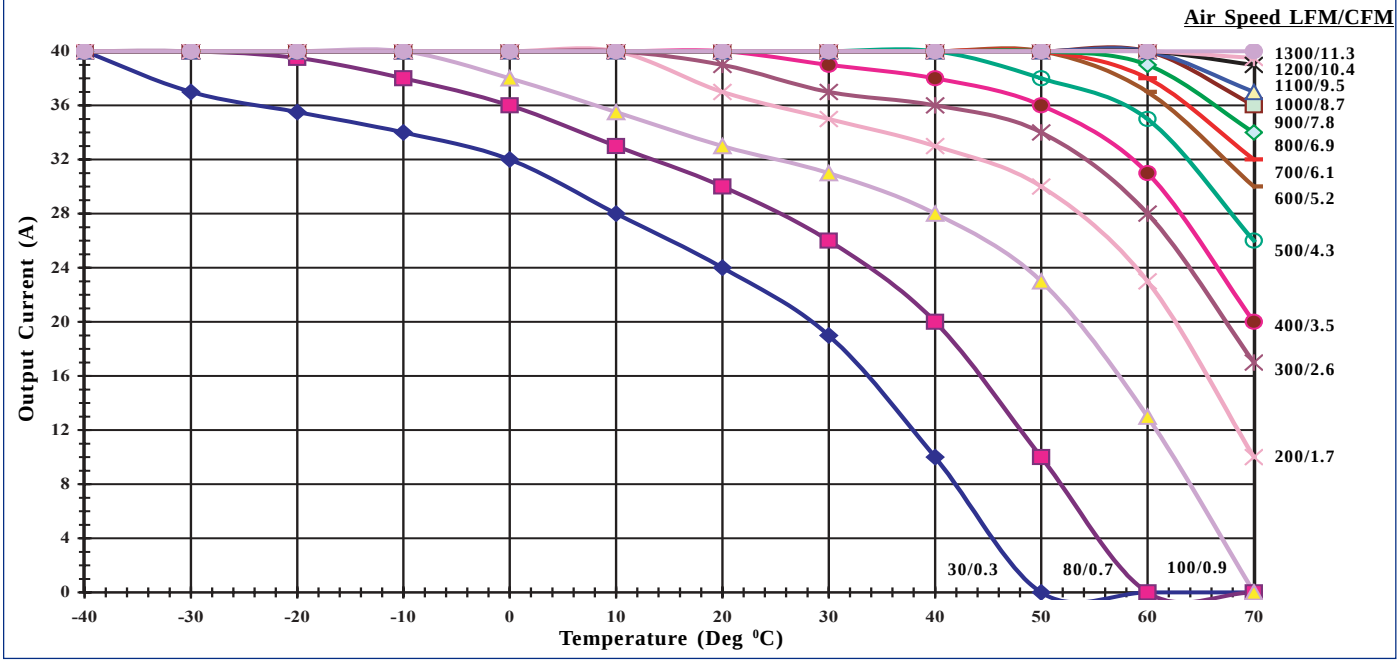


VKQ100MS1V8 (6064912)

PIN ASSIGNMENT	
No.	**Function**
1	+Vin
2	On/Off
3	-Vin
4	-Vout
5	-Sense
6	Trim
7	+Sense
8	+Vout

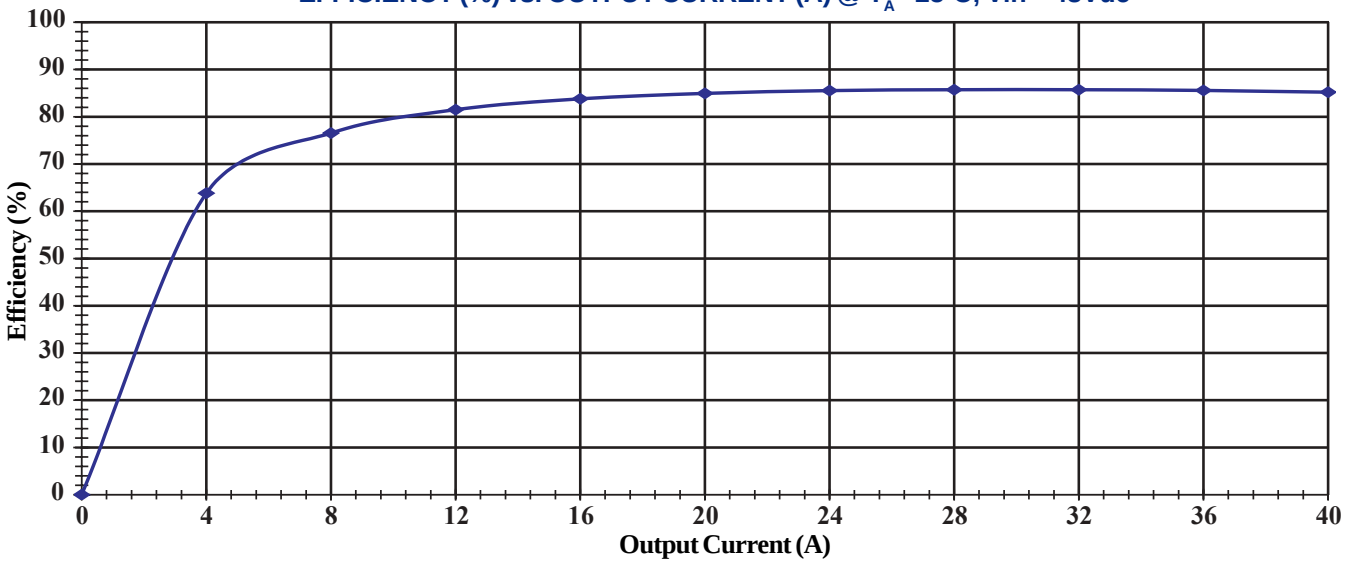
NOTES:
General Tolerance: ±.020
Pin Location Tolerance: ±.010
Unit Weight: 34g / 1.2oz.
PIN MATERIAL: COPPER
PIN FINISH: TIN-LEAD

POWER DERATING CURVE (Vin = 36Vdc - 75Vdc)

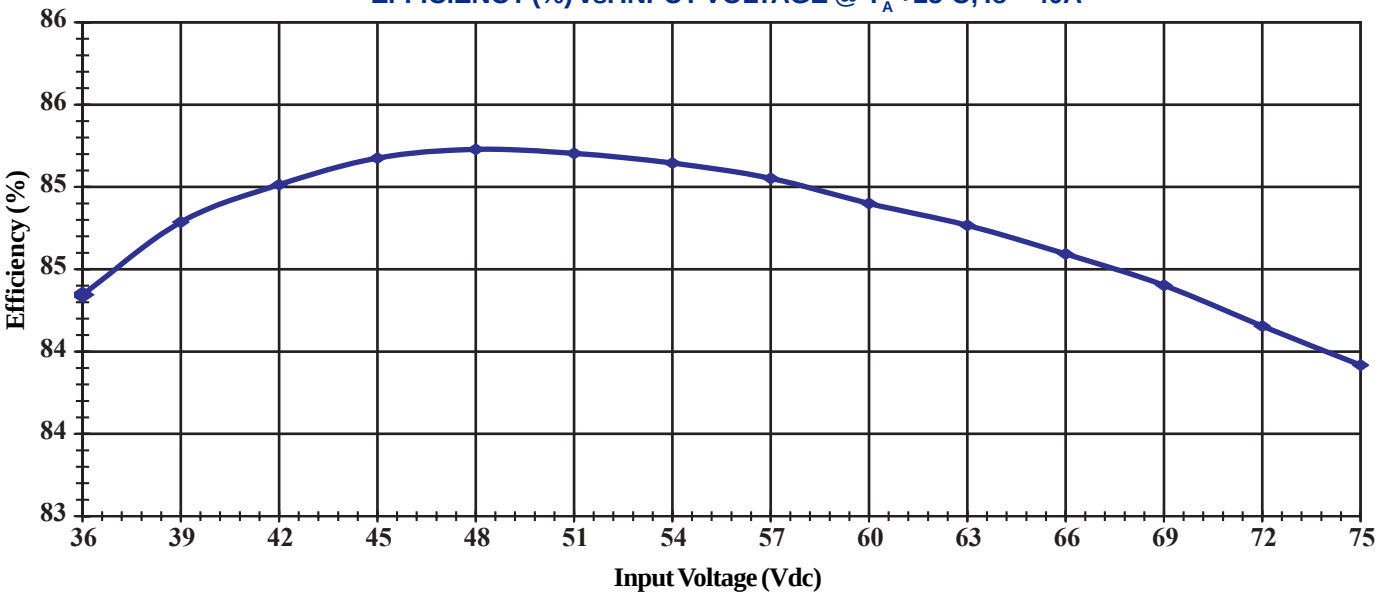


TYPICAL PERFORMANCE CURVES

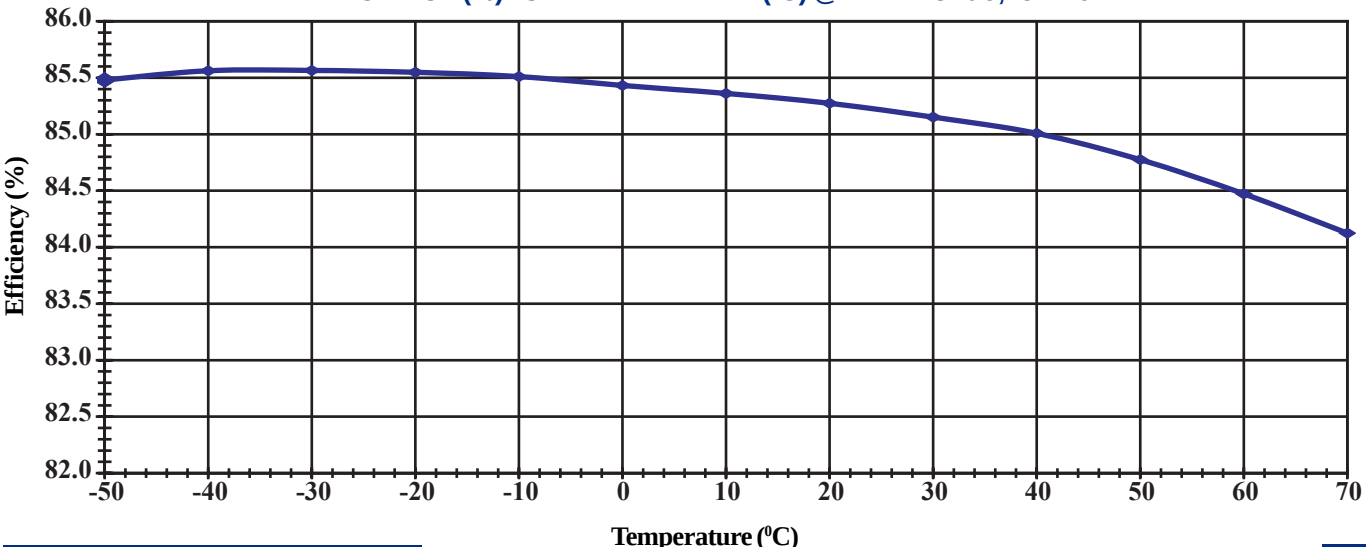
EFFICIENCY (%) vs. OUTPUT CURRENT (A) @ T_A +25°C; Vin = 48Vdc



EFFICIENCY (%) vs. INPUT VOLTAGE @ T_A +25°C; Io = 40A

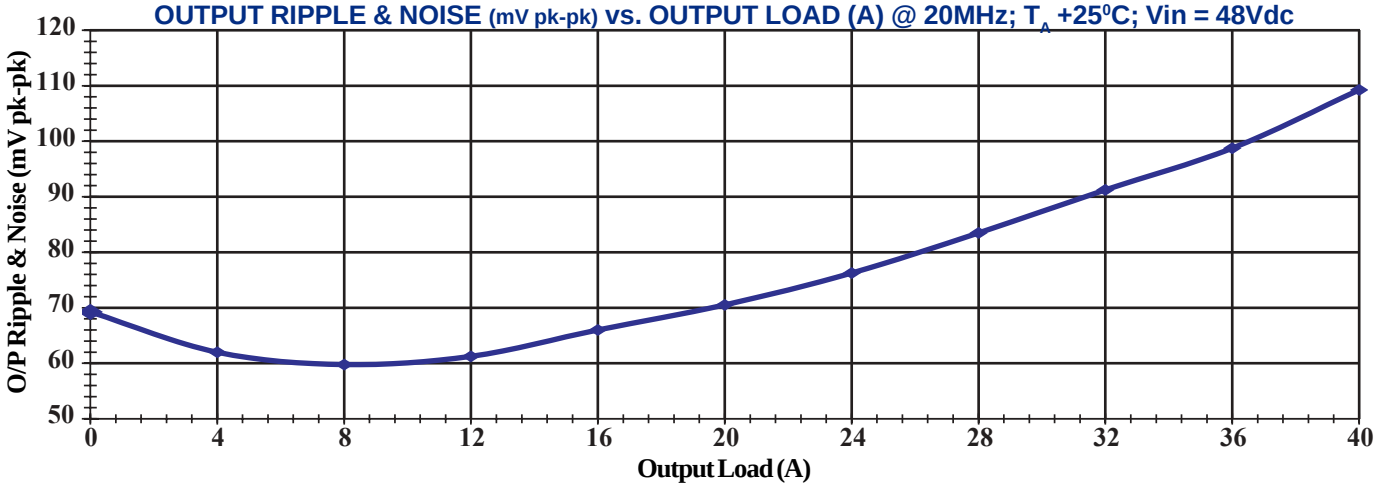


EFFICIENCY (%) vs. AMBIENT TEMP. (°C) @ Vin = 48Vdc; Io = 40A

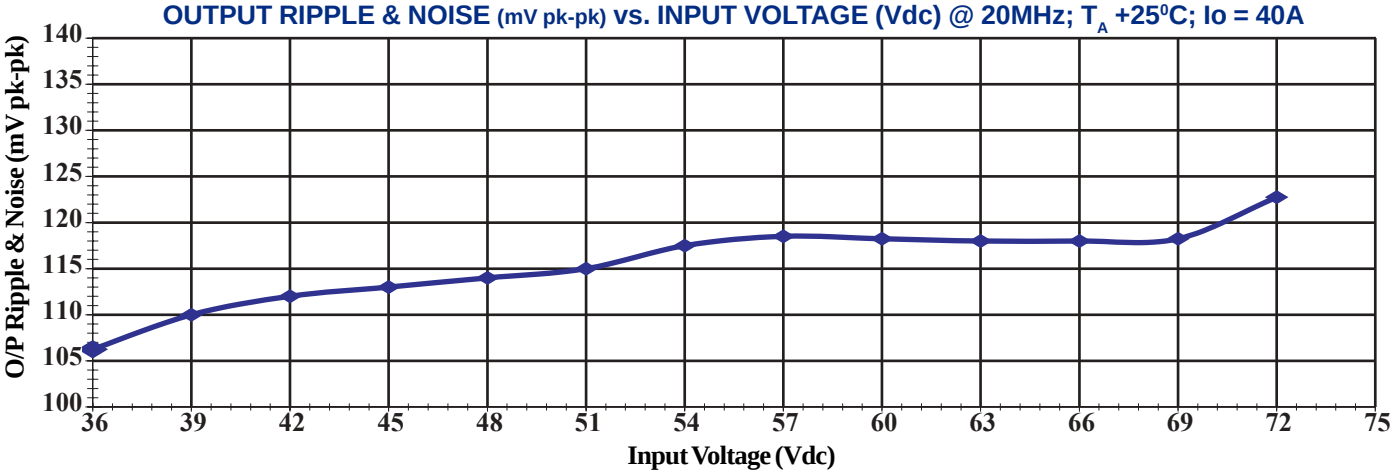


TYPICAL PERFORMANCE CURVES

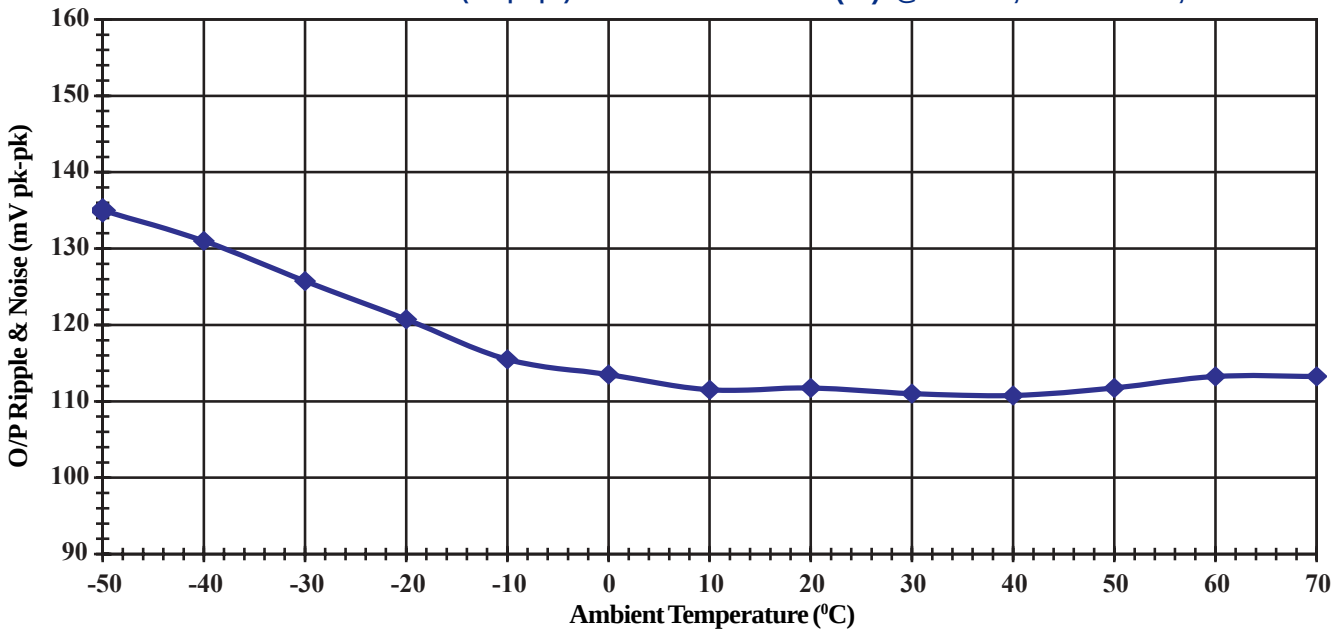
OUTPUT RIPPLE & NOISE (mV pk-pk) vs. OUTPUT LOAD (A) @ 20MHz; T_A +25°C; Vin = 48Vdc



OUTPUT RIPPLE & NOISE (mV pk-pk) vs. INPUT VOLTAGE (Vdc) @ 20MHz; T_A +25°C; Io = 40A



OUTPUT RIPPLE & NOISE (mV pk-pk) vs. AMBIENT TEMP. (°C) @ 20MHz; Vin = 48Vdc; Io = 40A



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