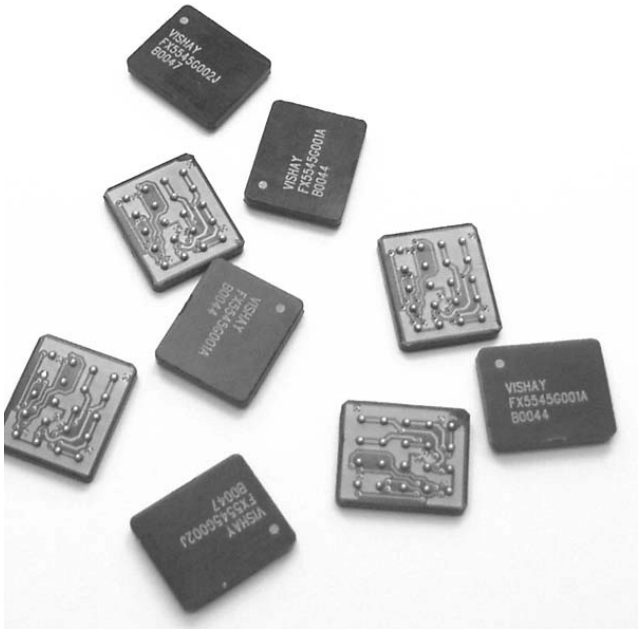
Industry Smallest and Low Profile 9W 1.5A DC/DC Boost Converter with High Output Power Density



FEATURES

- Fully integrated DC/DC converter
- High efficiency over large load range
- 100% duty cycle
- Power density - more than 330W/inch^3
- 1µA shutdown current
- 2.5V to 6V input range (1Li+ and 3-cell NiCd or NiMH cells)
- 3.3V to 6V output voltage
- Programmable PWM/$\overline{\text{PSM}}$ controls
- Low output ripple
- BGA construction
- Temperature range: - 40°C to + 85°C
- No external components needed
- Output power 9W
- Maximum current 1.5A
- Low profile
- UL recognized component E250930

Pb Available

RoHS* COMPLIANT

c UL us

The DC/DC converter is a programmable topology synchronized Boost converter for today's continuous changing portable electronic market. The DC/DC converter provides flexibility of utilizing various battery configurations and chemistries such as NiCd, NiMH, or Li+ with an input voltage range of 2.5V to 6V. An additional flexibility is provided with topology programmibility to power multiple loads such as power amplifiers, microcontrollers, or baseband logic IC's. For ultra-high efficiency, converters are designed to operate in synchronous rectified PWM mode under full load while transforming into externally controlled pulse-skipping mode ($\overline{\text{PSM}}$) under light load.

The DC/DC converter is available in 20-ports BGA package. In order to satisfy the stringent ambient temperature requirements, the DC/DC converter is designed to handle the industrial temperature range of - 40°C to + 85°C.

APPLICATION

- Point of Load (POL) applications such as drivers for FPGA's, microprocessors, DSP's amplifiers, etc.
- Cordless phones, PDAs and others
- Supply voltage source for low-voltage chip sets
- Portable computers
- Battery back-up supplies
- Cameras

ORDERING INFORMATION

FX	5545	G006	□	□	□	□	□

FUNCTION

SIZE

CIRCUIT IDENTIFIER

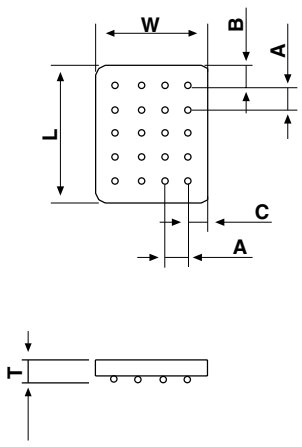
OUTPUT VOLTAGE - Example: 2.7V should be written as 2V7 as the V indicates the decimal point, or ADJ for adjustable version - self selectable output voltage.

PACKAGING - B1 = 10pcs in bulk; B5 = 50pcs in bulk; T1 = 13" reel; T2 = 7" reel.

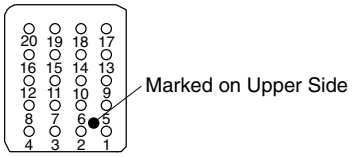
For lead (Pb)-free solder please add E2 suffix.

* Pb containing terminations are not RoHS compliant, exemptions may apply

DIMENSIONS in inches [millimeters]	
L	0.58 ± 0.01 [14.7 ± 0.25]
W	0.48 ± 0.01 [12.2 ± 0.25]
A	0.1 ± 0.01 [2.54 ± 0.25]
B	0.09 ± 0.01 [2.29 ± 0.25]
C	0.09 ± 0.01 [2.27 ± 0.25]
T	0.126 max [3.2 max]
Ball Diameter	0.03 ± 0.001 [0.762 ± 0.025]



BOTTOM SIDE

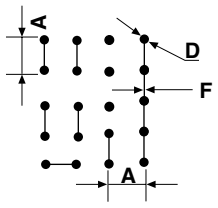


*Note: Pin Description application note is available at www.vishay.com/doc?10119

**Note: if not used must be connected to Vin.

PIN CONFIGURATION*	
PIN	**CONNECTION**
1, 2	$\overline{SD}$
3, 7	SYNC**
4, 8	N/C
5, 9	Vin
6, 10	PWM/$\overline{PSM}$
11, 12	N/C
13, 17	GND
14, 18	Vout
15, 19	N/C
16, 20	GND

RECOMMENDED PAD PATTERN in inches [millimeters]		
A	**D**	**F**
0.1 ± 0.01 [2.54 ± 0.25]	0.03 ± 0.001 [0.8 ± 0.02]	0.02 ± 0.001 [0.5 ± 0.02]



TAPE AND REEL
See Tape and Reel Information - Type B

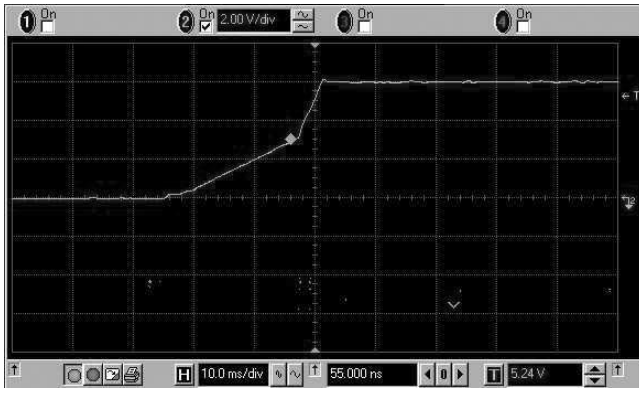
For technical questions, contact: FunctionPAK@vishay.com
For marketing questions, contact: FunctionPAK.marketing@vishay.com
Document Number: 10122
Revision: 22-Apr-09

STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	UNIT	CONDITION	MIN	TYP	MAX
Input					
Voltage Range	V_{DC}		2.5		6
Quiescent Current	µA	$\overline{PSM}$ mode		200	
Soft Start Time	ms	T_{SS} for Vout = 6.0V		19	
		T_{SS} for Vout = 5.0V		19	
		T_{SS} for Vout = 3.3V		19	
SD, PWM/PSM,SYNC					
Logic High	V	V_H	2.4		
Logic Low	V	V_L			0.8
Normal Mode	µA	I_{DD}			750
$\overline{PSM}$ Mode	µA	I_{DD}			250
Shutdown Mode	µA	I_{DD}			1
Shutdown Time	ms	T_{SS} for Vout = 6.0V		15	
		T_{SS} for Vout = 5.0V		14	
		T_{SS} for Vout = 3.3V		14	
Insulation					
Test Voltage	V_{AC}	60Hz 60sec	750		
Resistance	Ω	V_{ISO} = 500V_{DC}	1 x 10^{11}		
Leakage Current	nA	V_{ISO} = 500V_{DC}			5
Output					
Power	W			9	
Voltage	V_{DC}			3.3 to 6	
Voltage Tolerance	%	at 25°C Ambient Temperature	- 3		3
Temp. Coefficient	%/°C				0.03
Ripple and Noise	mVpp	DC to 20MHz		60	
General					
Package Weight	gr.				1.5
Oscillator					
Frequency	KHz			670	
SYNC Range	KHz	F_{SYNC}/F_{OSC}	1.2		1.5
Temperature					
Operation	°C		- 40		+ 85
Storage	°C		- 55		+ 125
Operating Junction Temp.	°C	T_j		150	
Thermal Impedance	°C/W_D*	θ_{JA}		82	

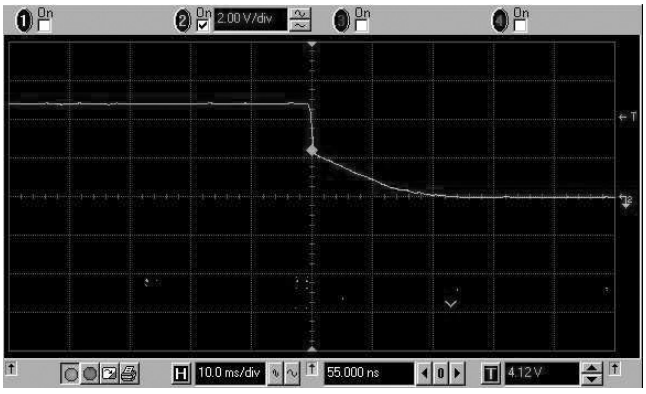
*Note: W_D = Power Dissipated

Rise Time



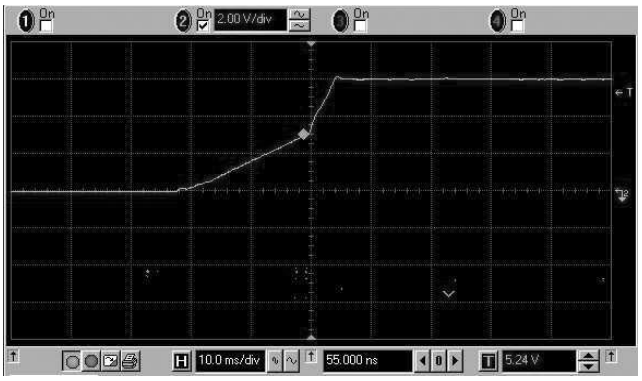
Rise Time (PWM mode): Vin = 5V; Vout = 6V; Iout = 1A

Fall Time

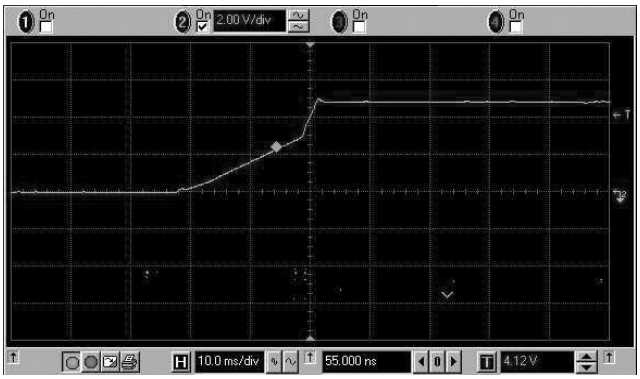


Fall Time (PWM mode): Vin = 5V; Vout = 6V; Iout = 1A

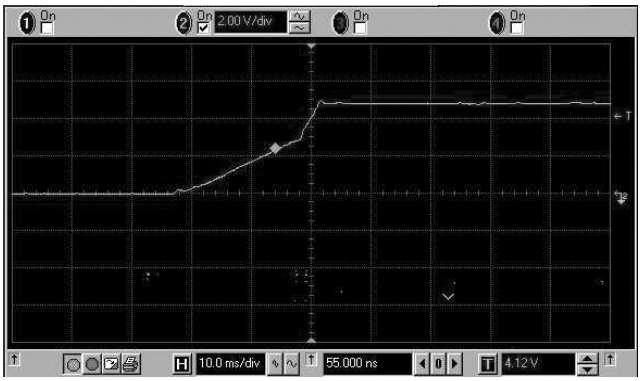
Rise Time



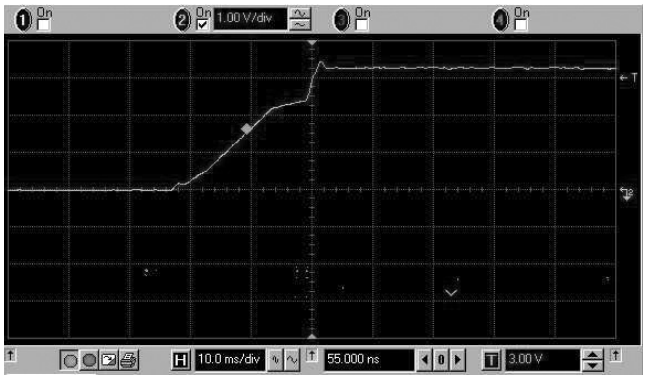
Rise Time (PWM mode): Vin = 4V; Vout = 6V; Iout = 1A



Rise Time (PWM mode): Vin = 4.5V; Vout = 5V; Iout = 1A

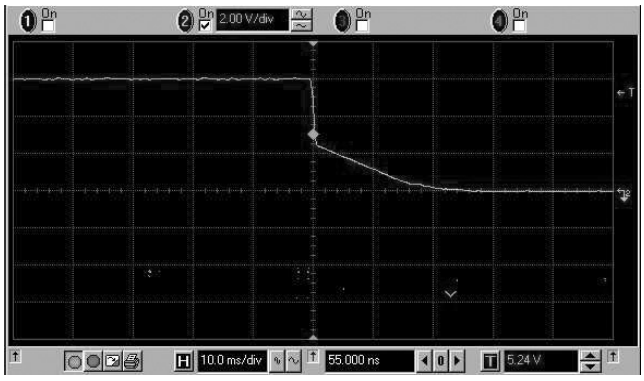


Rise Time (PWM mode): Vin = 3.5V; Vout = 5V; Iout = 1A

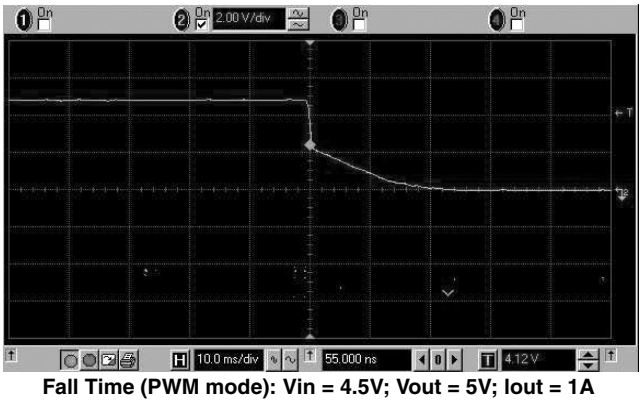


Rise Time (PWM mode): Vin = 3V; Vout = 3.3V; Iout = 1A

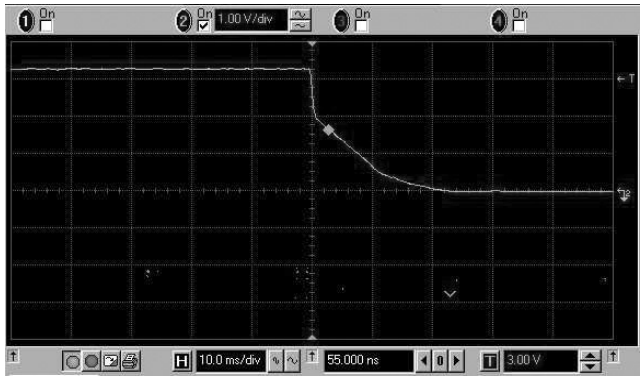
Fall Time



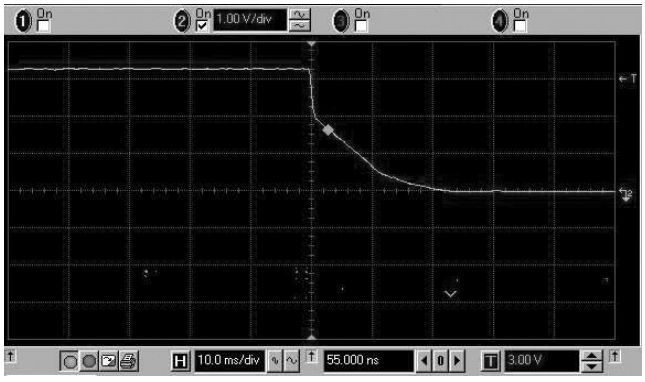
Fall Time (PWM mode): Vin = 4V; Vout = 6V; Iout = 1A



Fall Time (PWM mode): Vin = 4.5V; Vout = 5V; Iout = 1A



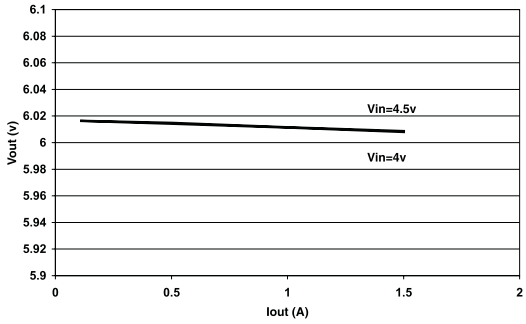
Fall Time (PWM mode): Vin = 3.5V; Vout = 5V; Iout = 1A



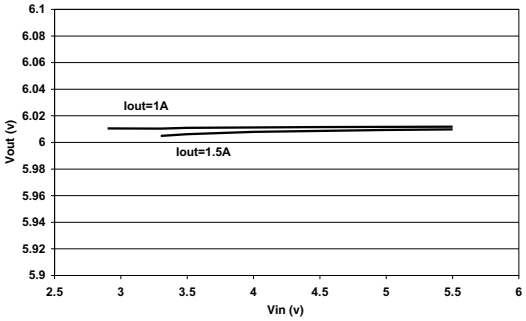
Fall Time (PWM mode): Vin = 3V; Vout = 3.3V; Iout = 1A

PWM MODE 6V

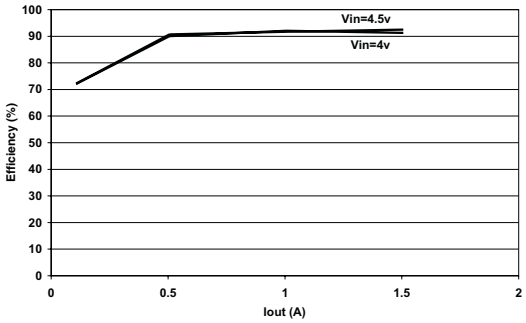
Vout vs. Iout *



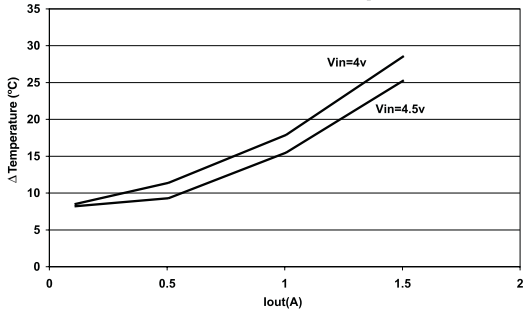
Vout vs. Vin *



Efficiency vs. Iout *

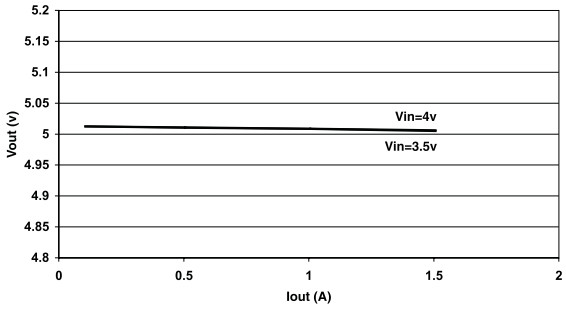


ΔTemperature vs. Iout *
Above 25°C Ambient Temperature

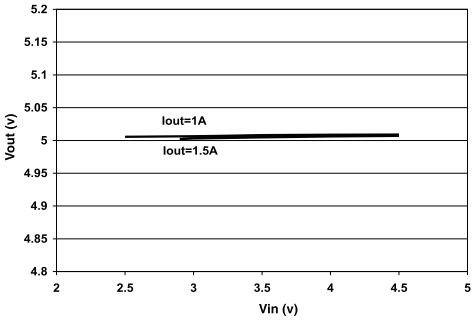


PWM MODE

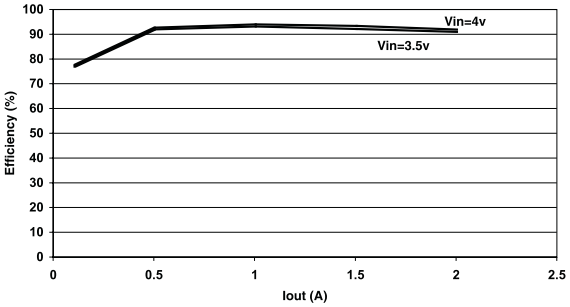
Vout vs. Iout *



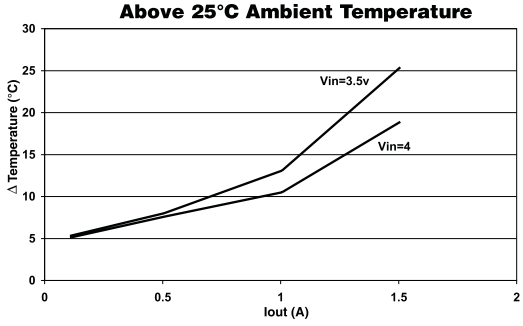
Vout vs. Vin *



Efficiency vs. Iout *



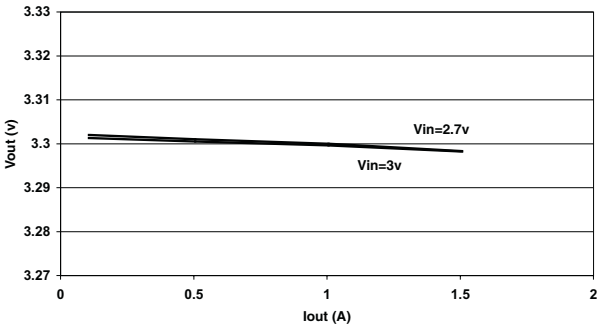
Δ Temperature vs. Iout *
Above 25°C Ambient Temperature



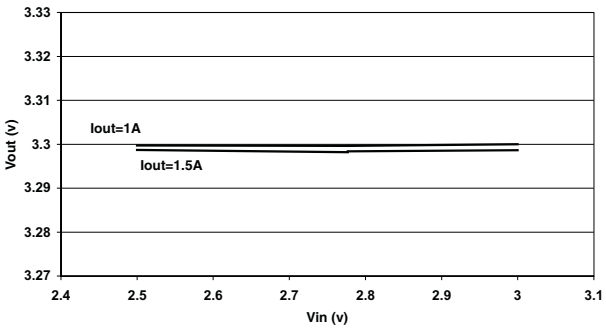
*Note: Measurements were taken with Power supply: ZUP 20-40 from Nemic Lambda; Electronic load: 6063B from Agilent; Multimeter: Fluke 45 from Fluke and 34401 digital multimeter from Agilent; Scope: Infiniium 54815A from Agilent.

PWM MODE 3.3V

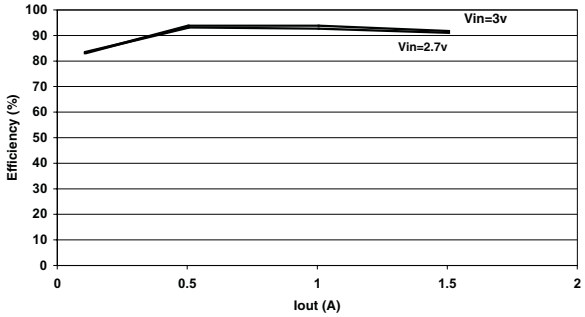
Vout vs. Iout*



Vout vs. Vin*

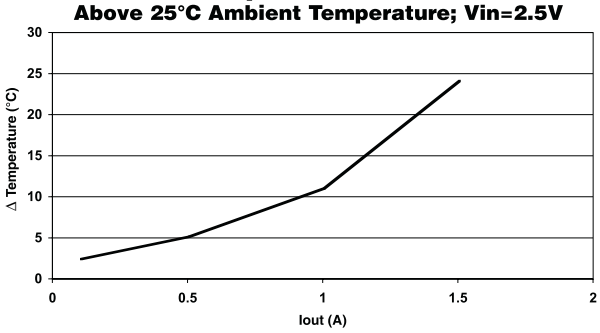


Efficiency vs. Iout *

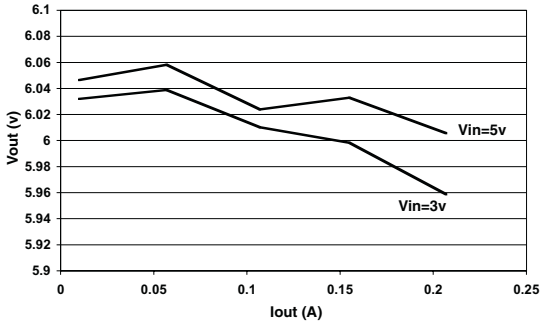


ΔTemperature vs. Iout *

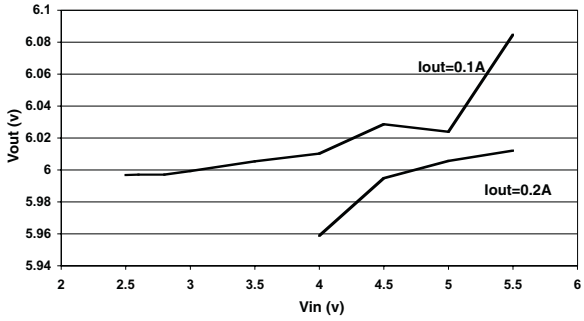
Above 25°C Ambient Temperature; Vin=2.5V



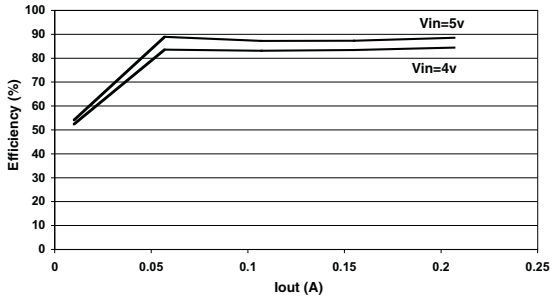
Vout vs. Iout*



Vout vs. Vin*



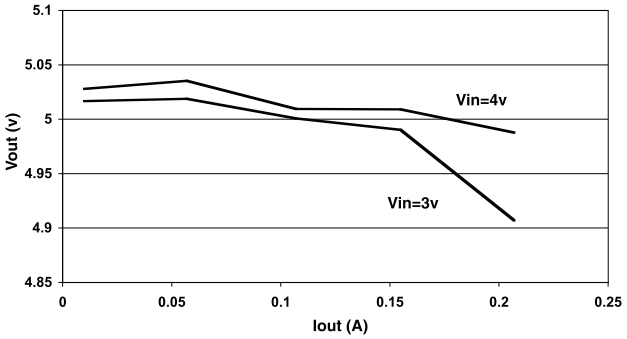
Efficiency vs. Iout*



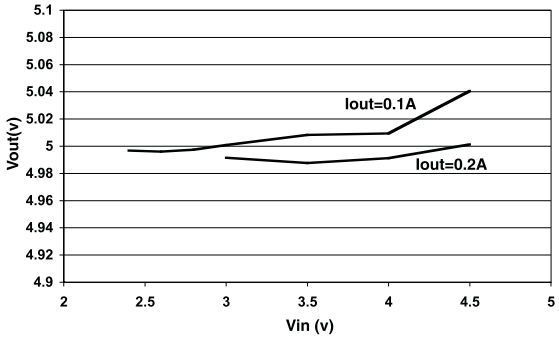
*Note: Measurements were taken with Power supply: ZUP 20-40 from Nemic Lambda; Electronic load: 6063B from Agilent; Multimeter: Fluke 45 from Fluke and 34401 digital multimeter from Agilent; Scope: Infiniium 54815A from Agilent.

PSM MODE 5V

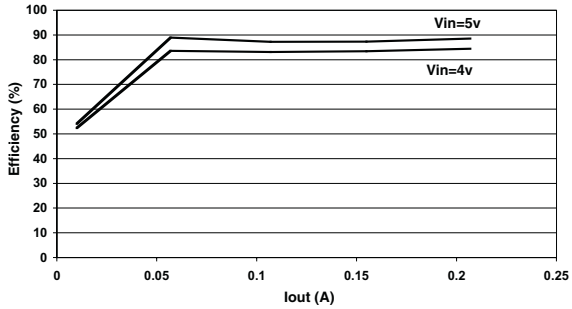
Vout vs. Iout*



Vout vs. Vin*

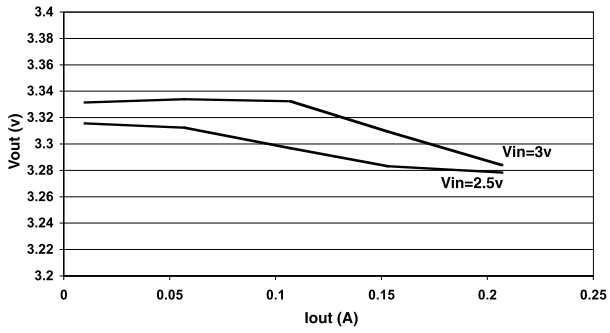


Efficiency vs. Iout *

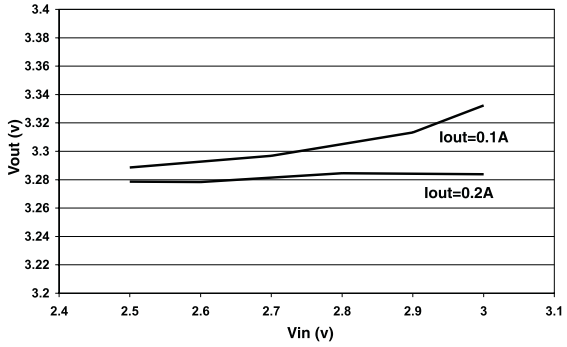


PSM MODE 3.3V

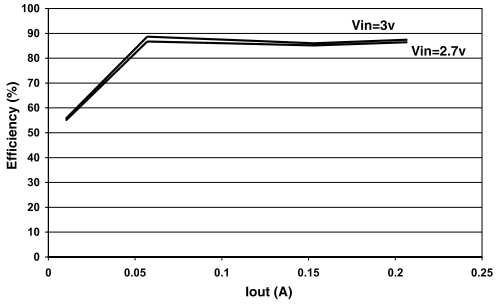
Vout vs. Iout*



Vout vs. Vin *



Efficiency vs. Iout *



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