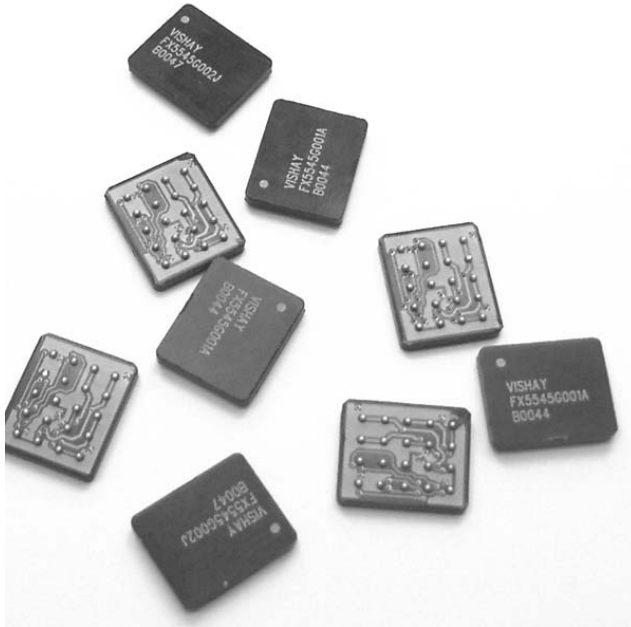


## Industry Smallest and Low Profile 9W 1.5A DC/DC Boost Converter with High Output Power Density



### FEATURES

- Fully integrated DC/DC converter
- High efficiency over large load range
- 100% duty cycle
- Power density - more than 330W/inch<sup>3</sup>
- 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

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 programmability 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.

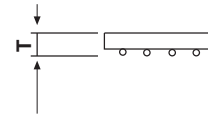
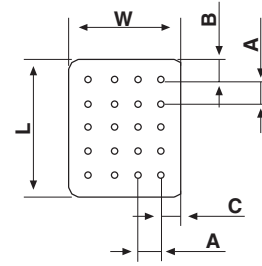
### APPLICATION

- 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

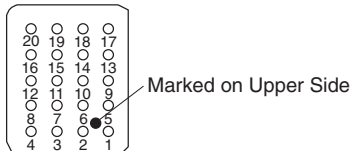
### ORDERING INFORMATION

	<b>EX</b>	<b>5545</b>	<b>G006</b>	□	□	□	□	□
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.								

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**

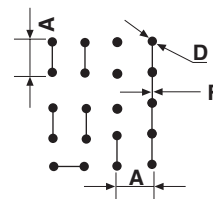


PIN CONFIGURATION*	
PIN	CONNECTION
1, 2	$\overline{SD}$
3, 7	SYNC**
4, 8	N/C
5, 9	Vin
6, 10	PWM/PSM
11, 12	N/C
13, 17	GND
14, 18	Vout
15, 19	N/C
16, 20	GND

\*Note: Pin Description application note is available at [www.vishay.com/doc?10119](http://www.vishay.com/doc?10119)

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

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]

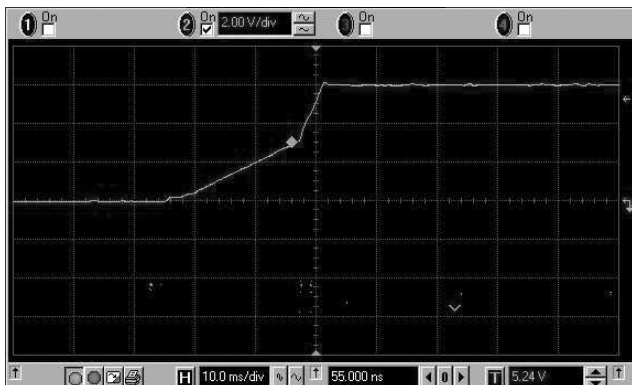


TAPE AND REEL
See Tape and Reel Information - Type B

<b>STANDARD ELECTRICAL SPECIFICATIONS</b>					
PARAMETER	UNIT	CONDITION	MIN	TYP	MAX
<b>Input</b>					
Voltage Range	V <sub>DC</sub>		2.5		6
Quiescent Current	μA	PSM mode		200	
Soft Start Time	ms	T <sub>SS</sub> for Vout = 6.0V		19	
		T <sub>SS</sub> for Vout = 5.0V		19	
		T <sub>SS</sub> for Vout = 3.3V		19	
<b>SD, PWM/PSM, SYNC</b>					
Logic High	V	V <sub>H</sub>	2.4		
Logic Low	V	V <sub>L</sub>			0.8
Normal Mode	μA	I <sub>DD</sub>			750
PSM Mode	μA	I <sub>DD</sub>			250
Shutdown Mode	μA	I <sub>DD</sub>			1
Shutdown Time	ms	T <sub>SS</sub> for Vout = 6.0V		15	
		T <sub>SS</sub> for Vout = 5.0V		14	
		T <sub>SS</sub> for Vout = 3.3V		14	
<b>Insulation</b>					
Test Voltage	V <sub>AC</sub>	60Hz 60sec	750		
Resistance	Ω	V <sub>ISO</sub> = 500V <sub>DC</sub>	1 x 10 <sup>11</sup>		
Leakage Current	nA	V <sub>ISO</sub> = 500V <sub>DC</sub>			5
<b>Output</b>					
Power	W			9	
Voltage	V <sub>DC</sub>			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	
<b>General</b>					
Package Weight	gr.				1.5
<b>Oscillator</b>					
Frequency	KHz			670	
SYNC Range	KHz	F <sub>SYNC</sub> /F <sub>OSC</sub>	1.2		1.5
<b>Temperature</b>					
Operation	°C		- 40		+ 85
Storage	°C		- 55		+ 125
Operating Junction Temp.	°C	T <sub>j</sub>		150	
Thermal Impedance	°C/W <sub>D</sub> *	θ <sub>JA</sub>		82	

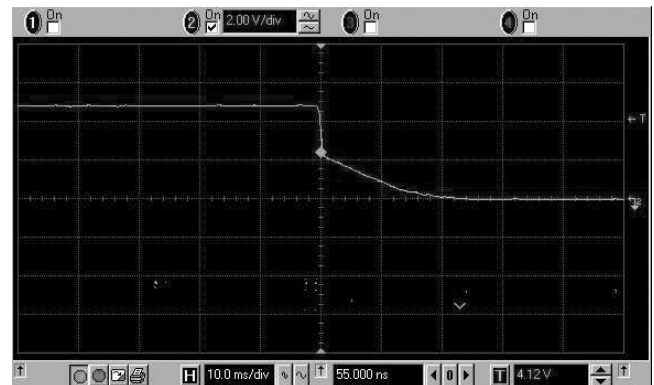
\*Note: W<sub>D</sub> = Power Dissipated

### Rise Time



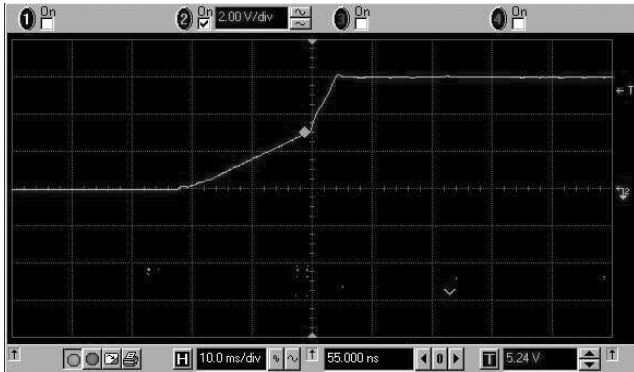
Rise Time (PWM mode): Vin = 5V; Vout = 6V; Iout = 1A

### Fall Time



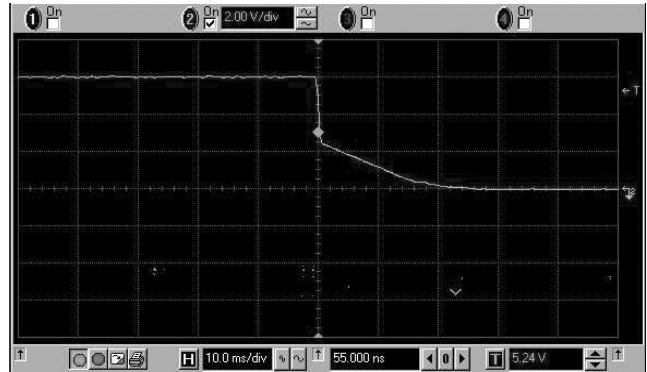
Fall Time (PWM mode): Vin = 5V; Vout = 6V; Iout = 1A

**Rise Time**

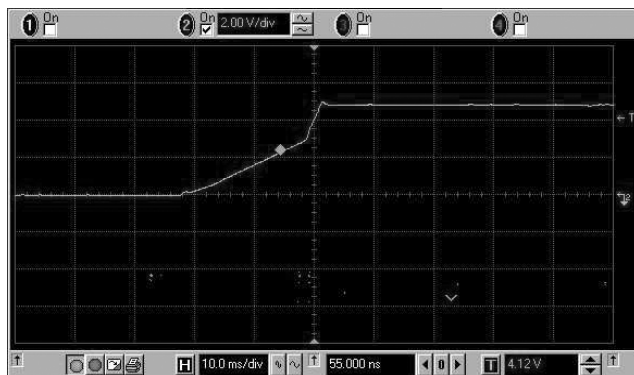


Rise Time (PWM mode): Vin = 4V; Vout = 6V; Iout = 1A

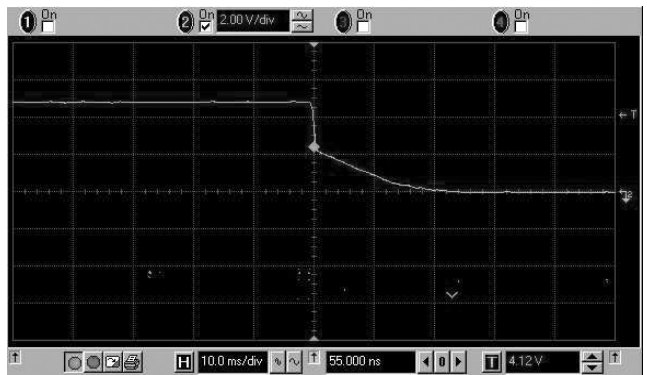
**Fall Time**



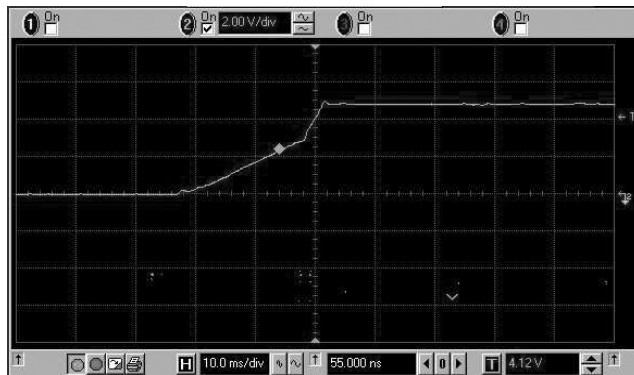
Fall Time (PWM mode): Vin = 4V; Vout = 6V; Iout = 1A



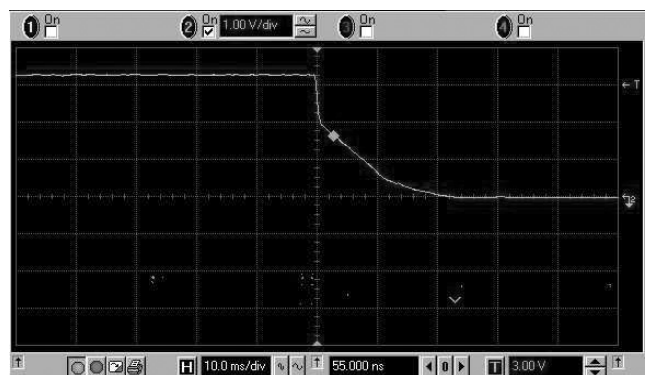
Rise Time (PWM mode): Vin = 4.5V; Vout = 5V; Iout = 1A



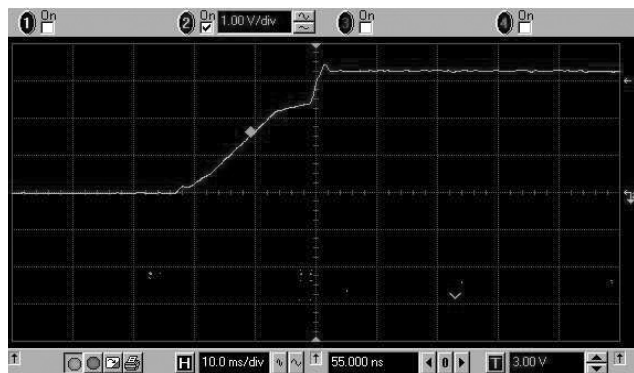
Fall Time (PWM mode): Vin = 4.5V; Vout = 5V; Iout = 1A



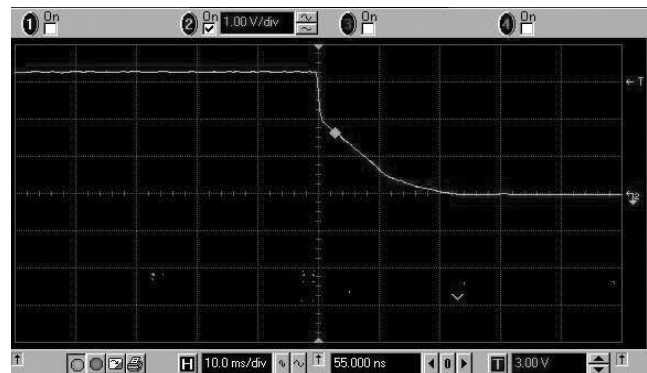
Rise Time (PWM mode): Vin = 3.5V; Vout = 5V; Iout = 1A



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



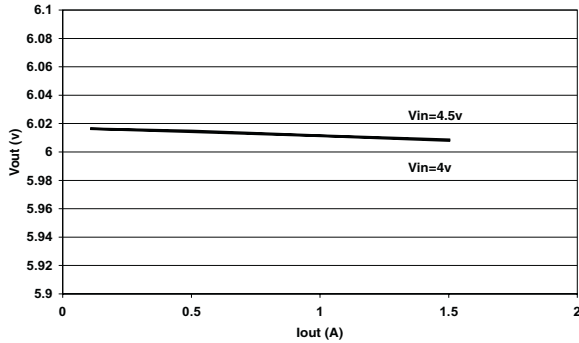
Rise Time (PWM mode): Vin = 3V; Vout = 3.3V; Iout = 1A



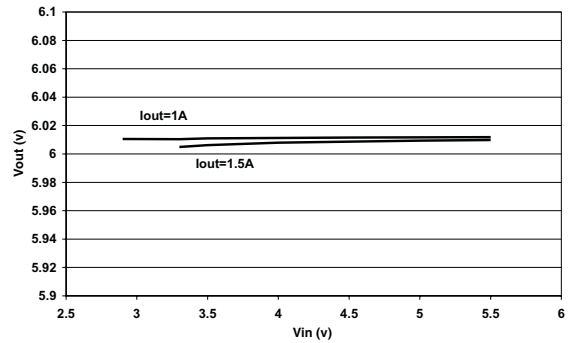
Fall Time (PWM mode): Vin = 3V; Vout = 3.3V; Iout = 1A

**PWM MODE 6V**

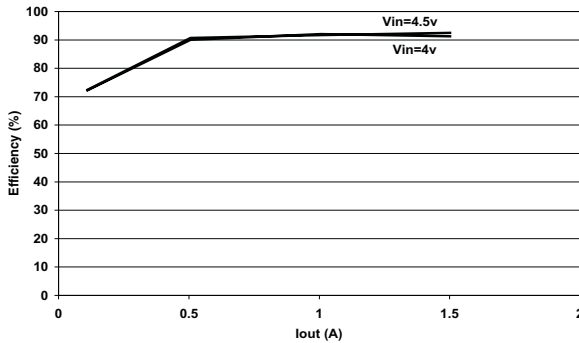
**Vout vs. Iout**



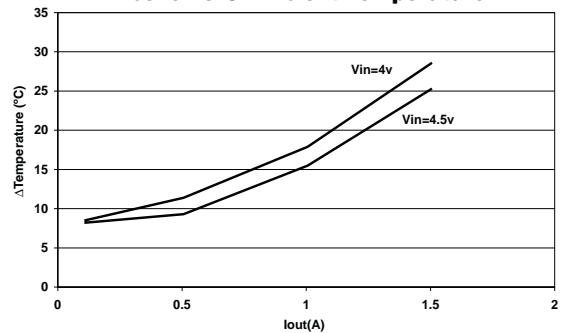
**Vout vs. Vin**



**Efficiency vs. Iout**

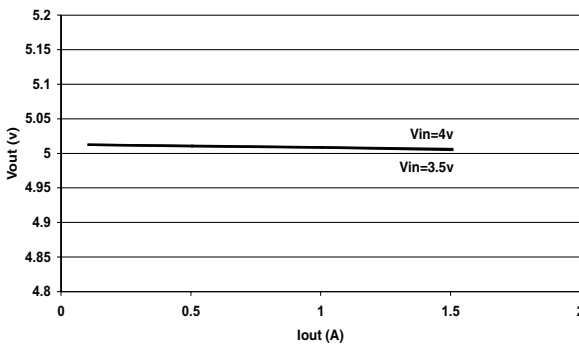


**ΔTemperature vs. Iout  
Above 25°C Ambient Temperature**

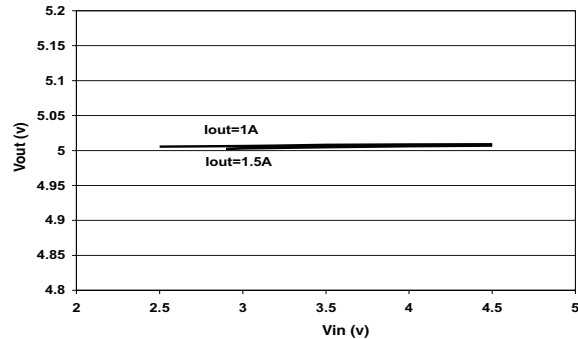


**PWM MODE 5V**

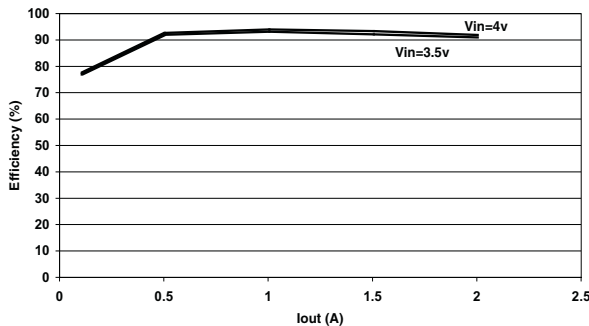
**Vout vs. Iout**



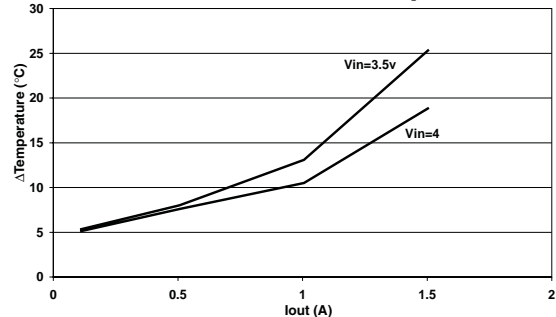
**Vout vs. Vin**



**Efficiency vs. Iout**

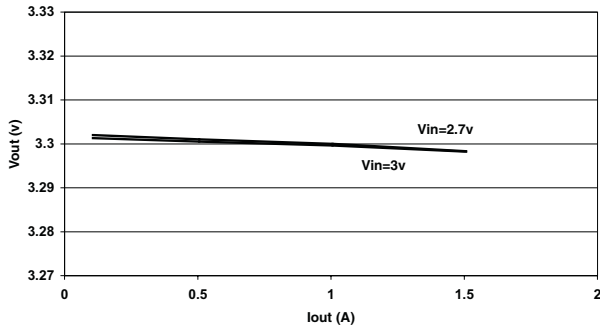


**ΔTemperature vs. Iout  
Above 25°C Ambient Temperature**

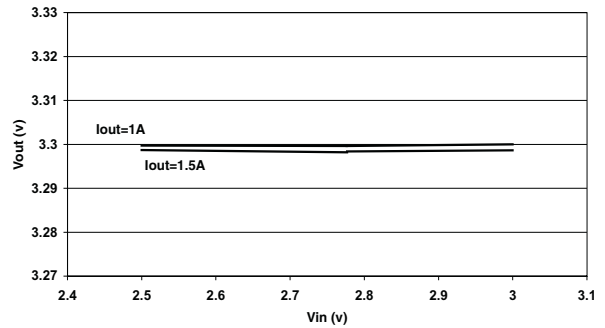


**PWM MODE 3.3V**

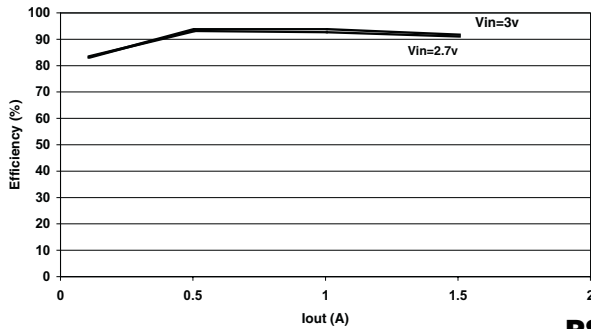
**Vout vs. Iout**



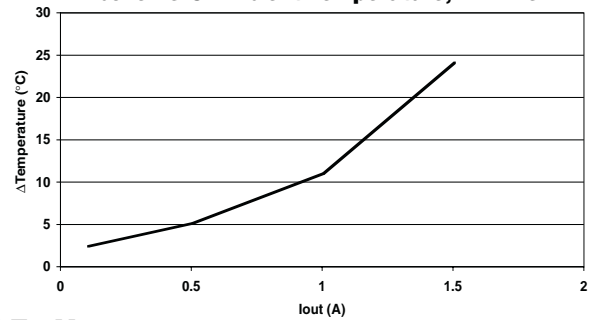
**Vout vs. Vin**



**Efficiency vs. Iout**

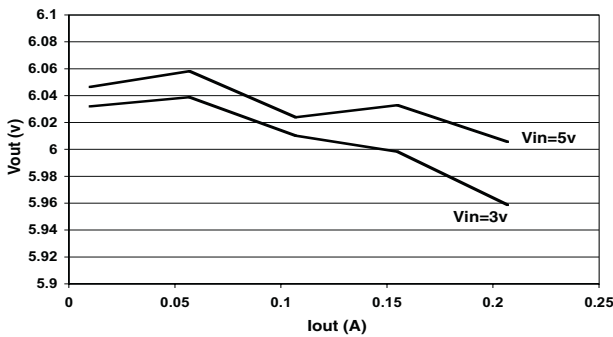


**ΔTemperature vs. Iout**  
Above 25°C Ambient Temperature; Vin=2.5V

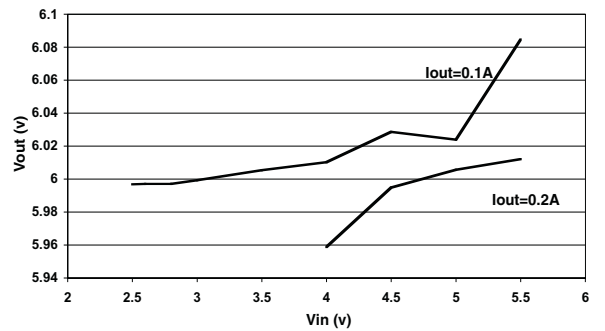


**PSM MODE 6V**

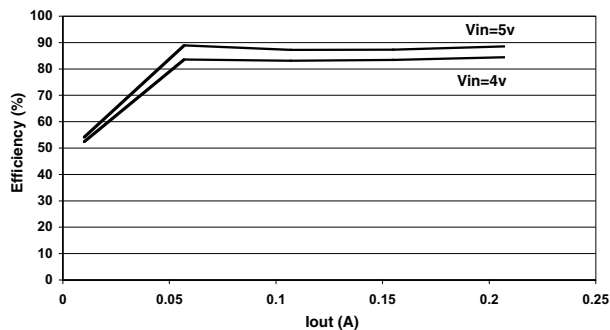
**Vout vs. Iout**

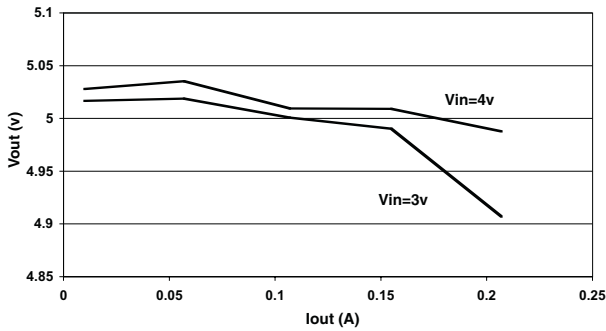
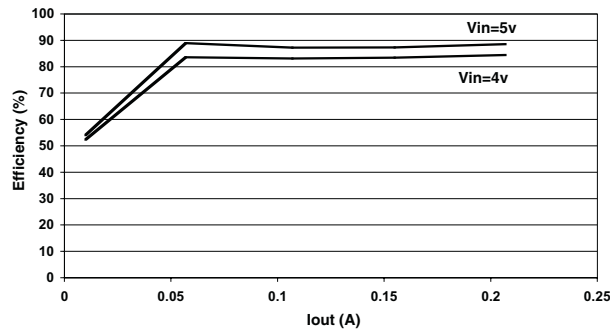
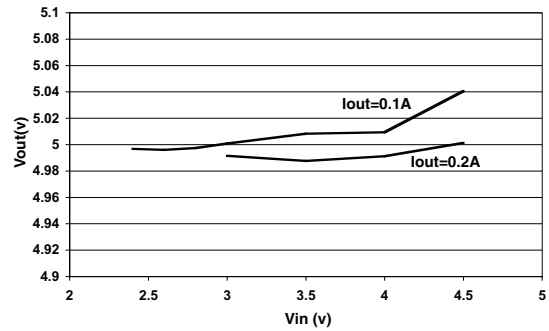
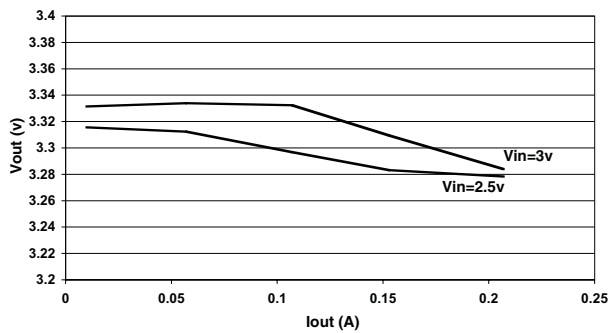
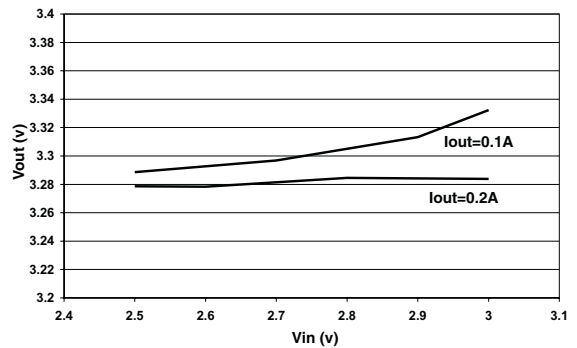


**Vout vs. Vin**



**Efficiency vs. Iout**



**PSM MODE 5V**
**Vout vs. Iout**

**Vout vs. Vin**

**PSM MODE 3.3V**
**Vout vs. Iout**

**Vout vs. Vin**

**Efficiency vs. Iout**
