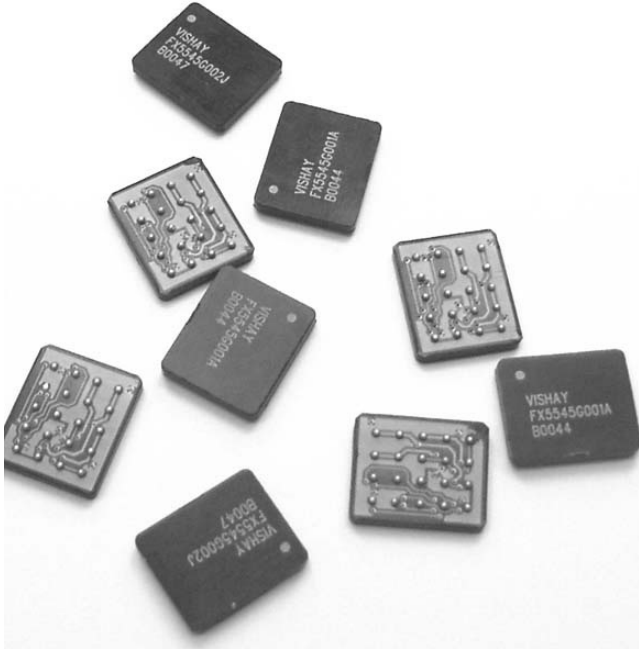


## Industry Smallest and Low Profile 5W 1.5A DC/DC Buck Converter with High Output Power Density



### FEATURES

- Fully integrated DC/DC converter
- High efficiency over large load range
- 100% duty cycle
- Power density - more than 100W/inch<sup>3</sup>
- 1µA shutdown current
- 2.7V to 6V input range (1 Li+ and 3-cell NiCd or NiMH cells)
- 1.35V to 4.5V\* output voltage
- Programmable PWM/PSM controls
- Low output ripple
- BGA/LGA construction
- Temperature range: - 40°C to + 85°C
- Output power 5W
- Maximum current 1.5A
- No external components needed
- Low profile

\***Note:** For higher output voltage please consult factory at [FunctionPAK@Vishay.com](mailto:FunctionPAK@Vishay.com)

The DC/DC converter is a programmable topology synchronized Buck 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 2.7V 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 (PSM) under light load.

The DC/DC converter is available in 20-ports BGA/LGA 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.

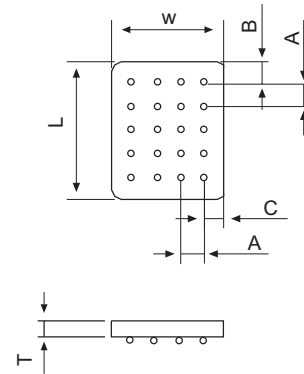
### APPLICATION

- 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
- Routers
- Fiber optics
- LANS
- Image processing

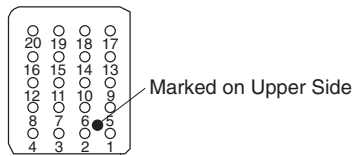
### ORDERING INFORMATION

	<b>FX</b>	<b>5545</b>	<b>G005</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	0.12 max [3 max]
Ball Diameter	0.03 ± 0.001 [0.762 ± 0.025]



**BOTTOM SIDE**

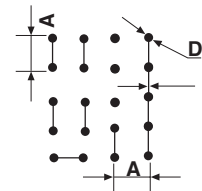


\*Note: Pin Description application note is available at [www.vishay.com/doc?10119](http://www.vishay.com/doc?10119)

\*\*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

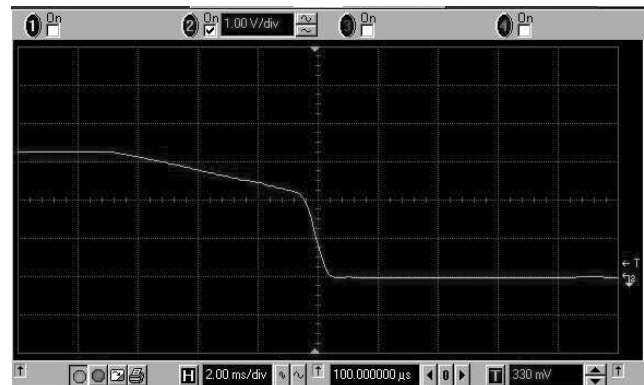
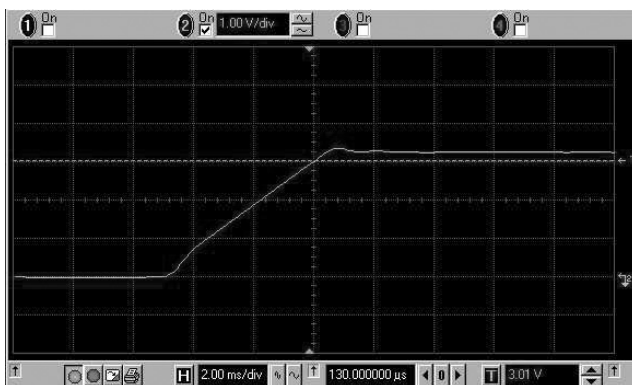


STANDARD ELECTRICAL SPECIFICATIONS					
PARAMETER	UNIT	CONDITION	MIN	TYP	MAX
<b>Input</b>					
Voltage Range	V <sub>DC</sub>		2.7		6
Quiescent Current	μA	PSM mode		200	
Soft Start Time	ms	T <sub>SS</sub>		4.3	
<b>SD, PWM/PSM,SYNC</b>					
Logic High	V	V <sub>H</sub>	2.4		
Logic Low	V	V <sub>L</sub>			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>		5	
<b>Insulation</b>					
Test Voltage	V <sub>AC</sub>	60Hz 60sec	750		
Resistance	Ω	V <sub>ISO</sub> = 500 V <sub>DC</sub>	1 x 10 <sup>11</sup>		
Leakage Current	nA	V <sub>ISO</sub> = 500 V <sub>DC</sub>			5
<b>Output</b>					
Power	W			5	
Voltage	V <sub>DC</sub>			1.35 to 4.5	
Voltage Tolerance	%	at 25 °C Ambient Temperature	- 3		+ 3
Temp. Coefficient	%/°C				0.03
Ripple and Noise	mVpp	DC to 20 MHz		100	
<b>General</b>					
Package Weight	gr.				1.4
<b>Oscillator</b>					
Frequency	KHz			670	
SYNC Range		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**

**Fall Time**



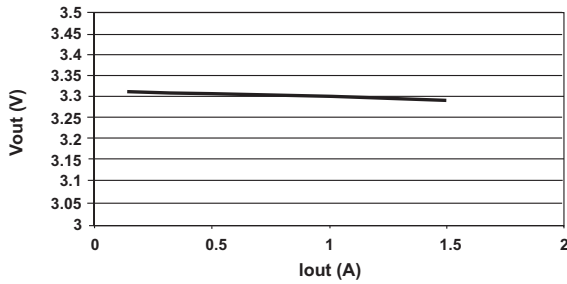
Rise Time (PWM mode): Vin = 6V; Vout = 3.3V; Iout = 1.5A

Fall Time (PWM mode): Vin = 6V; Vout = 3.3V; Iout = 1.5A

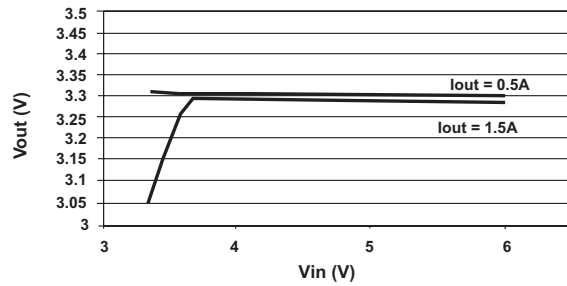


**PWM MODE**

**Vout Vs. Iout\***  
Vin = 3.6V

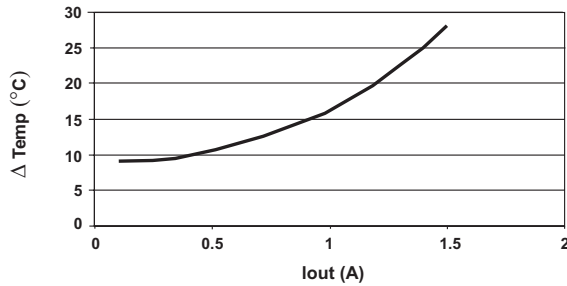


**Vout Vs. Vin\***



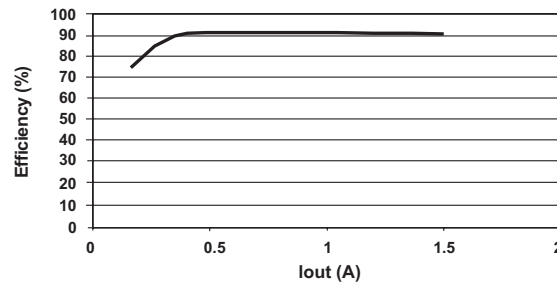
**Δ Temp. Vs. Iout\***

Above 25°C Ambient Temperature: For Vout = 3.3V; Vin = 6V



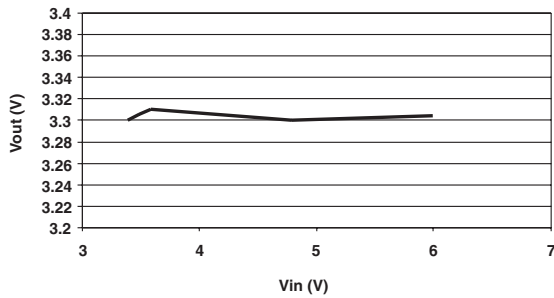
**Efficiency Vs. Iout\***

Vout = 3.3V; Vin = 3.6V

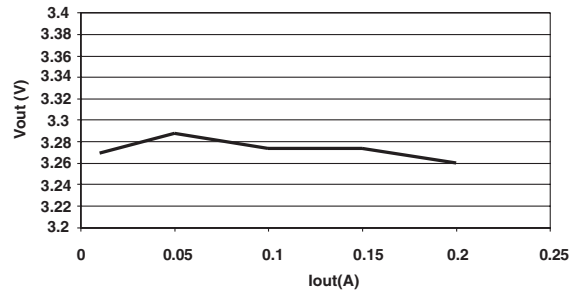


**PSM MODE**

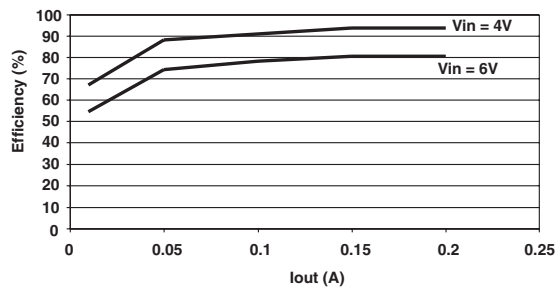
**Vout Vs. Vin\***  
Iout = 0.1A



**Vout Vs. Iout\***  
Vin = 6V



**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.