Industry Smallest and Low Profile 3W 0.6A DC/DC Boost Converter with High Output Power Density
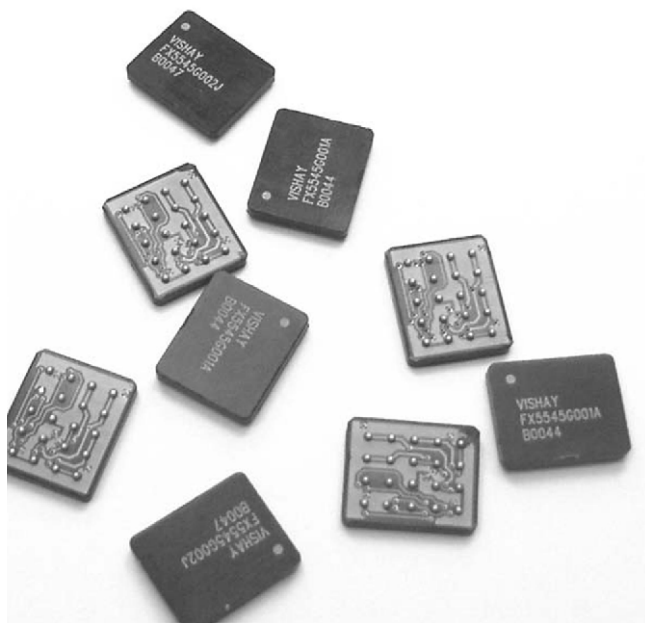

FEATURES

- Fully integrated DC/DC converter
- High efficiency over large load range
- 2MHz switching frequency
- 100% duty cycle
- Power density - more than 100W/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/LGA construction
- Temperature range: - 40°C to + 85°C
- No external components needed
- Output power 3W
- Maximum current 600mA
- Low profile
- UL recognized component E250930
- **** Note:** For higher output voltage please consult factory at FunctionPAK@Vishay.com

RoHS* COMPLIANT

The DC/DC converter provides fully integrated synchronous boost converter solution for the latest one-cell lithium ion cellular phones. Its input voltage is between 2.5V to 6V, capable of delivering up to 600mA of output current at 3.3V to 6V.

The DC/DC converter combines the 2MHz-switching controller with fully integrated passive components needed to deliver the smallest and most efficient converter available today. The high switching frequency minimizes the output capacitance with peak to peak output ripple as low as 20mV. The DC/DC converter delivers efficiency up to 95%.

The programmable pulse-skipping mode ($\overline{\text{PSM}}$) maintains this high efficiency even during the standby and idle modes to increase overall battery life and talktime. In order to extract the last ounce of power from the battery, the DC/DC converter is designed with 100% duty cycle control for this mode. This function enables the DC/DC converter to operate like a saturated linear regulator delivering the highest potential output voltage for longer talk time.

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
- Routers
- Fiber optics
- LANS
- Image processing

ORDERING INFORMATION

| FX | 5545 | G202 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

FUNCTION

SIZE

CIRCUIT IDENTIFIER

OUTPUT VOLTAGE - 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. Leave blank for regular SnPb.

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

Document Number: 10105
Revision: 05-Sep-06

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FX5545G202

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| 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
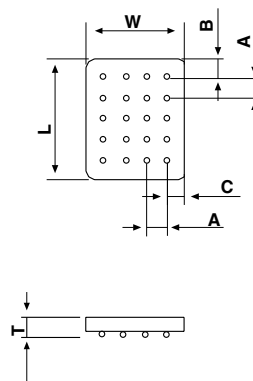
Marked on Upper Side
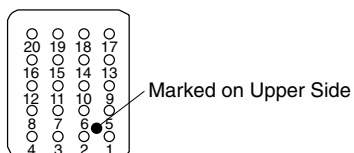
*Note: Pin Description application note is available at www.vishay.com/doc?10119

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

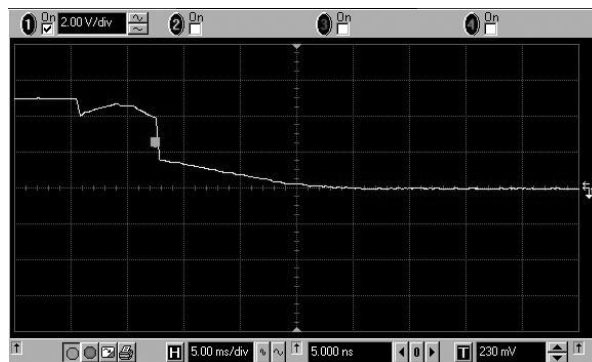| RECOMMENDED PAD PATTERN in inches [millimeters]		
A	D	F
0.1 ± 0.01 [2.54 ± 0.25]	0.03 ± 0.001 [0.8 ± 0.02]	0.02 ± 0.001 [0.5 ± 0.02]
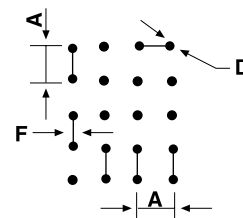
TAPE AND REEL

See Tape and Reel Information - Type B

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}		17	
SD, PWM/$\overline{PSM}$,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}		19	
Insulation					
Test Voltage	V_{AC}	60Hz 60sec	750		
Resistance	Ω	$V_{ISO} = 500\ V_{DC}$	1×10^{11}		
Leakage Current	nA	$V_{ISO} = 500\ V_{DC}$			5
Output					
Power	W			3	
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 20 MHz		45	
General					
Package Weight	gr.				1.3
Oscillator					
Frequency	MHz			1.8	
SYNC Range		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
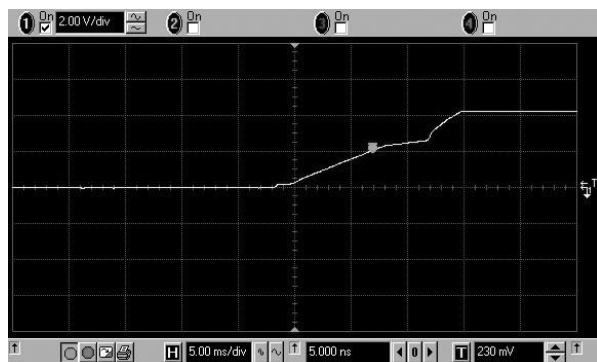
Rise Time (PWM mode): Vin = 3.5V; Vout = 5V; Iout = 0.7A

Fall Time

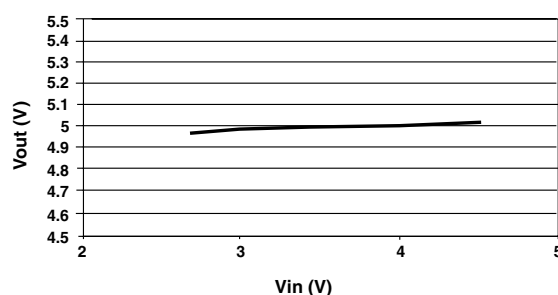
Fall Time (PWM mode): Vin = 3.5V; Vout = 5V; Iout = 0.7A

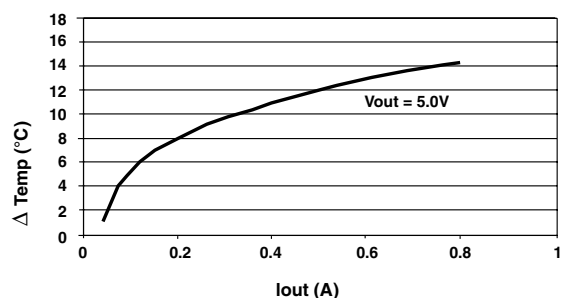Document Number: 10105
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PWM MODE

Vout Vs. Iout*
Vin = 3.6V
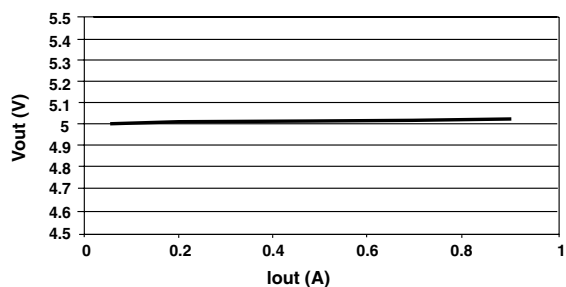
Vout Vs. Vin*
Iout = 500mA

△Temp. Vs. Iout*
Above 25°C Ambient Temperature

Vout = 5.0V

Efficiency Vs. Iout*
Vin = 3.6V; Vout = 5.0V
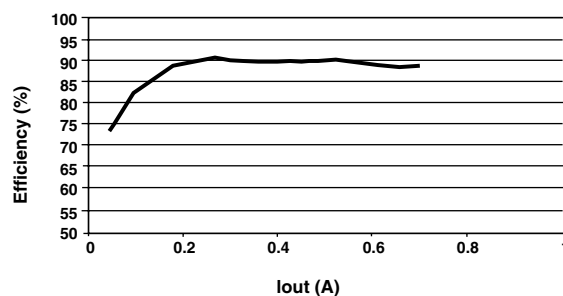
PSM MODE

Vout Vs. Vin*
Iout = 0.1A
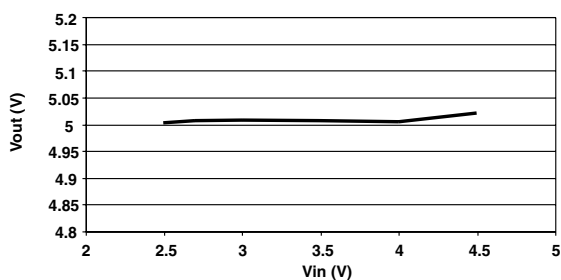
Vout Vs. Iout*
Vin = 3V

Efficiency Vs. Iout*

Vin = 4V

Vin = 3.5V
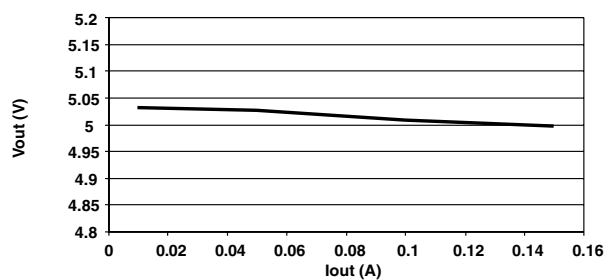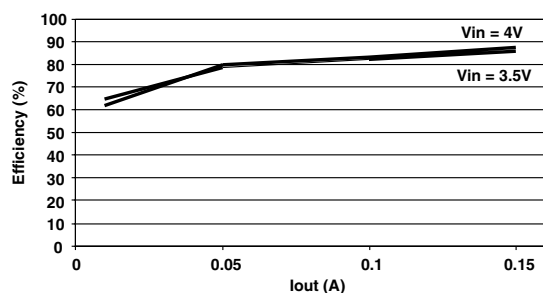
*Note: Measurements were taken with Power supply: ZUP 20-40 from Nemic Lambda; Electronic load: 6063B from Agilent; Multimeter: Fluke 45 from Fluke and 34401 digital multimeter from Agilent; Scope: Infiniium 54815A from Agilent.

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