

## Industry Smallest and Low Profile 5W 1A DC/DC Boost Converter with High Output Density Power



### FEATURES

- Fully integrated DC/DC converter
- High efficiency over large load range
- 2MHz switching frequency
- 100% duty cycle
- Power density - more than 150W/inch<sup>3</sup>
- 1uA shutdown current
- 2.5V to 6V input range (1Li+ and 3-cell NiCd or NiMH cells)
- 3.3V to 6V output voltage
- Programmable PWM/P<sub>SM</sub> controls
- Low output ripple
- BGA/LGA construction
- Temperature range: - 40°C to + 85°C
- No external components needed
- Output power 5W.
- Maximum current 1000mA
- Low profile

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 1000mA 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 (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.

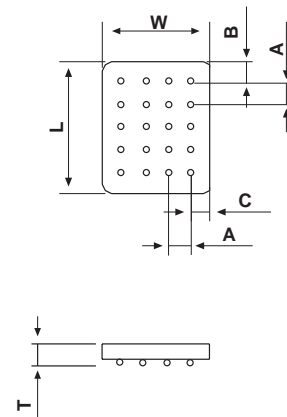
### APPLICATION

- 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

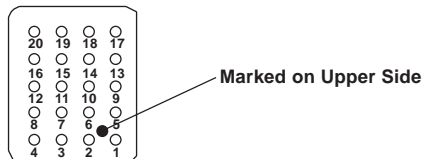
### ORDERING INFORMATION

	<b>FX</b>	<b>5545</b>	<b>G402</b>	□ □ □	□ □
FUNCTION					
SIZE					
CIRCUIT IDENTIFIER					
OUTPUT VOLTAGE-Example: 5.0V should be written as 5V0 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.					

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]



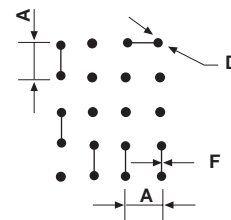
BOTTOM SIDE



\*Note: Pin Description application note is available on page 32.

PIN CONFIGURATION (Bottom Side)*	
PIN	CONNECTION
1	N/C
2, 6	$\overline{SD}$
3, 7	PWM/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]



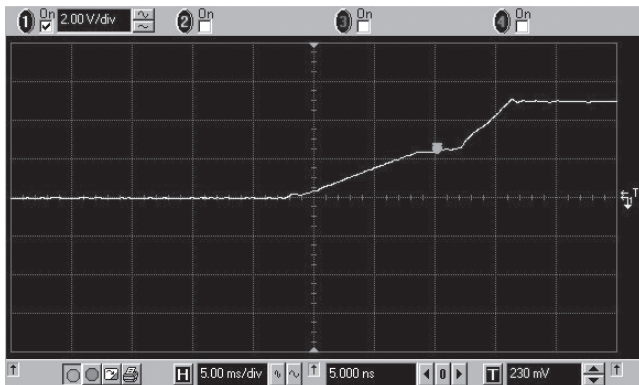
## TAPE AND REEL

See Tape and Reel Information - Type B

STANDARD ELECTRICAL SPECIFICATIONS					
PARAMETER	UNIT	CONDITION	MIN	TYP	MAX
<b>Input</b>					
Voltage Range	$V_{DC}$		2.5		6
Quiescent Current	A	PSM mode		200	
Soft Start Time	ms	$T_{SS}$		19	
<b>SD, PWM/PSM, SYNC</b>					
Logic High	V	$V_H$	2.4		
Logic Low	V	$V_L$			0.8
Normal Mode	A	$I_{DD}$			750
PSM Mode	A	$I_{DD}$			250
Shutdown Mode	A	$I_{DD}$			1
Shutdown Time	ms	$T_{SS}$		17	
<b>Insulation</b>					
Test Voltage	$V_{AC}$	60Hz 60sec	750		
Resistance	$\Omega$	$V_{ISO} = 500V_{DC}$	$1 \times 10^{11}$		
Leakage Current	nA	$V_{ISO} = 500V_{DC}$			5
<b>Output</b>					
Power	W			5	
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		50	
<b>General</b>					
Package Weight	gr.				1.5
<b>Oscillator</b>					
Frequency	MHz			2	
SYNC Range		$F_{sync}/F_{OSC}$	1.2		1.5
<b>Temperature</b>					
Operation	°C		- 40		+ 85
Storage	°C		- 55		+ 125
Operating Junction Temp.	°C	$T_J$		150	
Thermal Impedance	°C/W <sub>D</sub> *	$\theta_{JA}$		82	

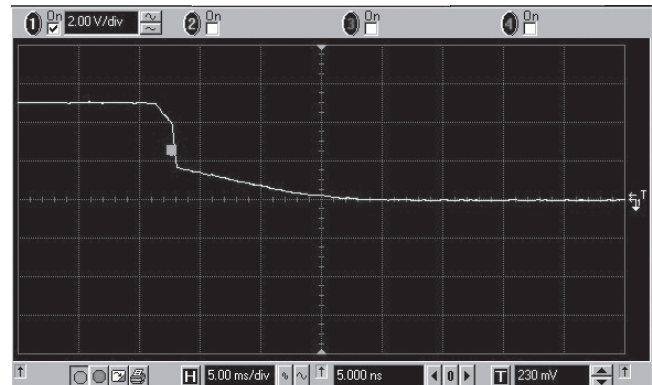
Note:  $W_D$  = Power Dissipated

### Rise Time



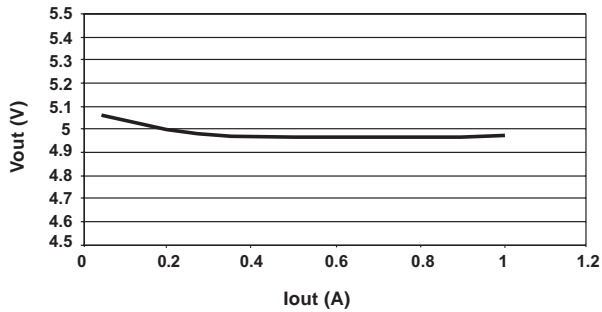
Rise Time (PWM mode):  $V_{in} = 3.5V$ ;  $V_{out} = 5V$ ;  $I_{out} = 1A$

### Fall Time

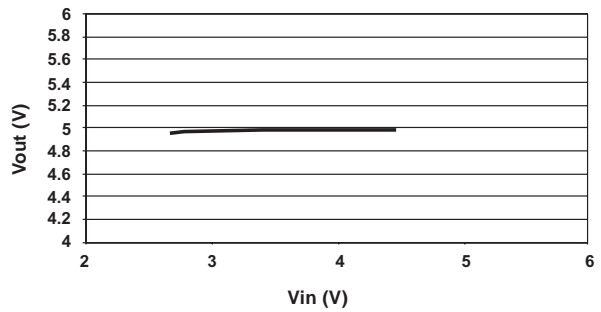


Fall Time (PWM mode):  $V_{in} = 3.5V$ ;  $V_{out} = 5V$ ;  $I_{out} = 1A$

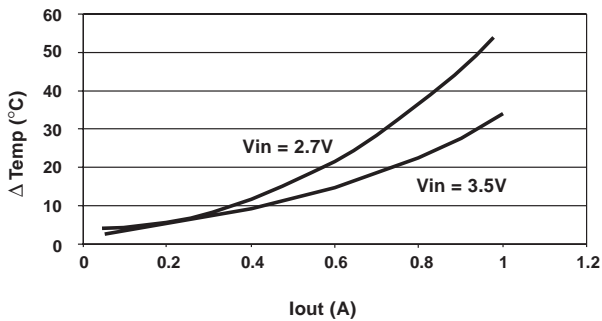
**Vout Vs. Iout**  
Vin = 3.5V; Vout = 5.0V



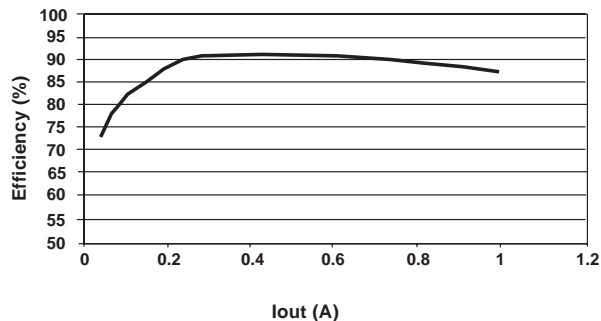
**Vout Vs. Vin**  
Iout = 1000mA



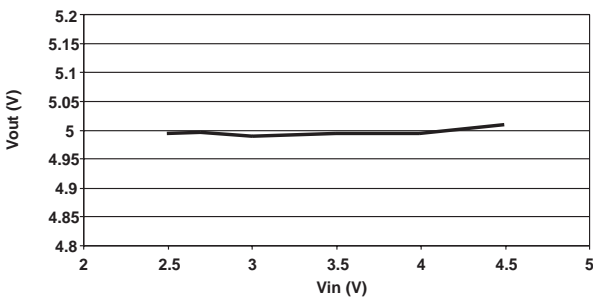
**Δ Temp Vs. Iout**  
Above 25°C Ambient Temperature



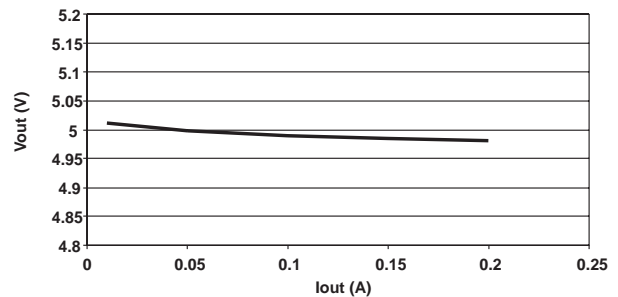
**Efficiency Vs. Iout**  
Vin = 3.5; Vout = 5.0V



**Vout Vs. Vin (PSM mode)**  
Iout = 0.1A



**Vout Vs. Iout (PSM mode)**  
Vin = 3V



**Efficiency Vs. Iout (PSM mode)**

