

FIXED FREQUENCY STEP-UP DC/DC CONVERTER

- **1.2MHz Fixed Frequency Switching**
- **Inherently Matched LED Current**
- **Adjustable Control of LED Current**
- **Drives Five White LEDs from 2V**
- **Drives Six White LEDs from 2.7V**
- **Drives Eight White LEDs from 3V**
- **Disconnects LEDs In Shutdown**
- **Uses Tiny Ceramic Capacitors**
- **Uses Tiny 1mm-Tall Inductors**
- **Regulates Current Even When $V_{IN} > V_{OUT}$**
- **Operates with V_{IN} as Low as 1V**
- **Up to 80% Efficiency**

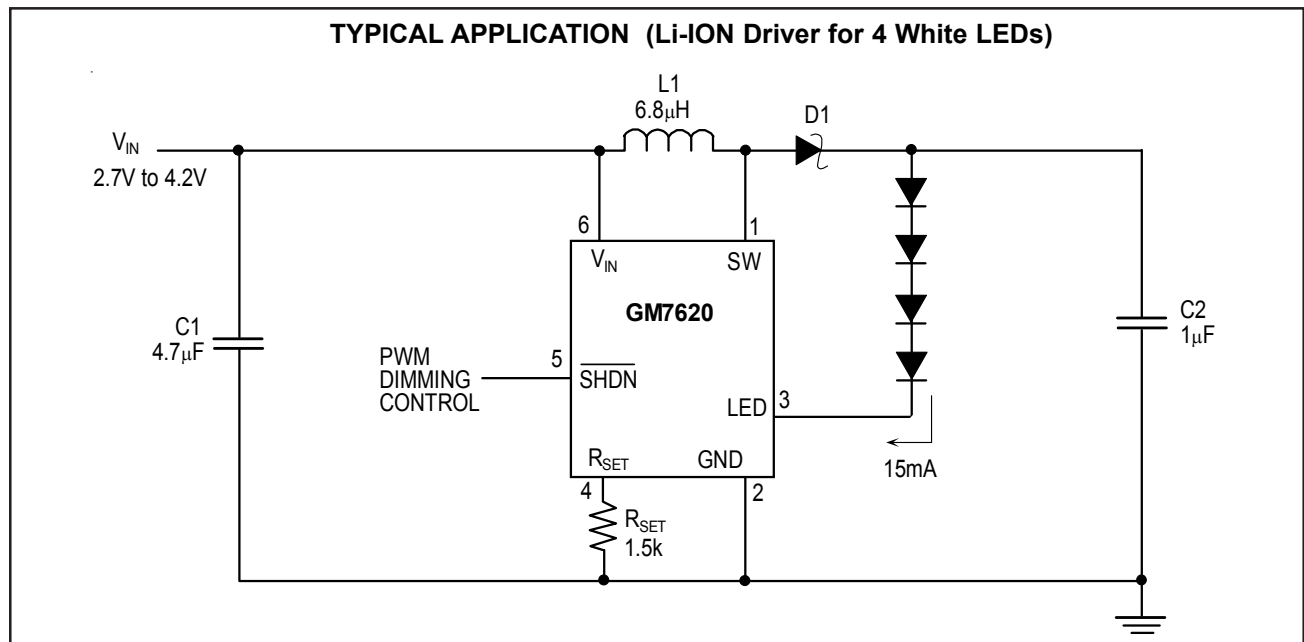
The GM7620 is a fixed frequency step-up DC/DC converter designed to operate as a constant-current source. Because it directly regulates output current, the GM7620 is ideal for driving light emitting diodes (LEDs) whose light intensity is proportional to the current passing through them, not the voltage across their terminals.

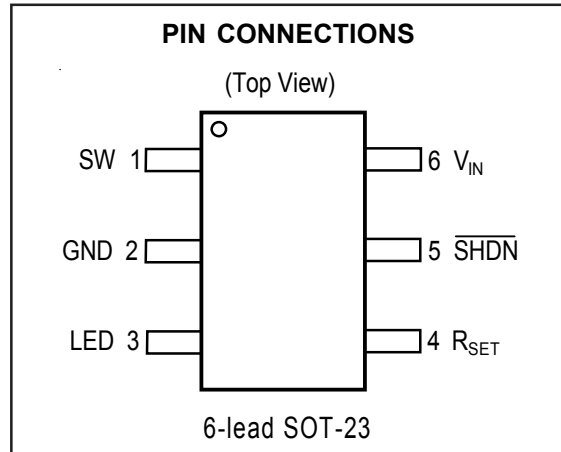
With an input voltage range of 1V to 10V, the device works from a variety of input sources. The GM7620 accurately regulates LED current even when the input voltage is higher than the LED voltage, greatly simplifying battery-powered designs. A single external resistor sets LED current between 5mA and 40mA, which can then be easily adjusted using either a DC voltage or a pulse width modulated (PWM) signal. When the GM7620 is placed in shutdown, the LEDs are disconnected from the output, ensuring a quiescent current of under 1mA for the entire circuit. The device's 1.2MHz switching frequency permits the use of tiny, low profile chip inductors and capacitors to minimize footprint and cost in space-conscious portable applications.

Applications:

- **Handheld Computers**
- **Cellular Telephones**
- **Digital Cameras**
- **Portable MP3 Players**

The GM7620 is available in 6-lead plastic SOT-23 package.



FIXED FREQUENCY STEP-UP DC/DC CONVERTER
■ PIN CONNECTIONS AND FUNCTIONS


PIN	PARAMETER	DESCRIPTION
1	SW	Switch Pin. This is the collector of the internal NPN power switch. Minimize the metal trace area connected to this pin to minimize EMI.
2	GND	Ground Pin. Tie this pin directly to local ground plane.
3	LED	LED Pin. This is the collector of the internal NPN LED switch. Connect the cathode of the bottom LED to this pin.
4	R_{SET}	A resistor between this pin and ground programs the LED current (that flows into the LED pin). This pin is also used to provide LED dimming.
5	SHDN	Shutdown Pin. Tie this pin higher than 0.85V to turn on the GM7620; tie below 0.25V to turn it off.
6	V_{IN}	Input Supply Pin. Bypass this pin with a capacitor to ground as close to the device as possible.

■ ORDERING INFORMATION

GM7620	PACKAGE	PART No.
	SOT23-6	GM7620ST26

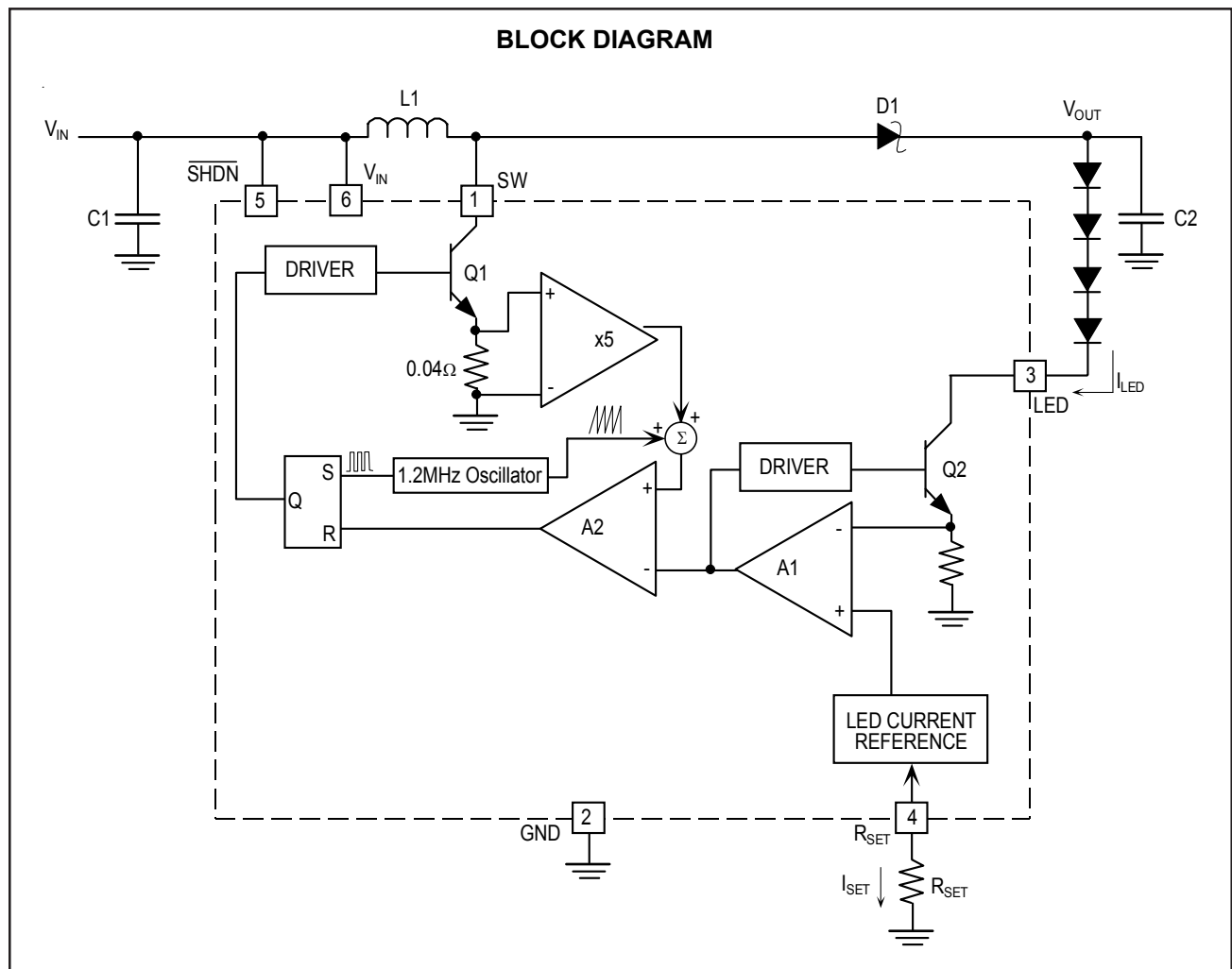
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■ ELECTRICAL CHARACTERISTICS ($V_{IN} = 1.2V$, $V_{\overline{SHDN}} = 1.2V$, unless otherwise specified)

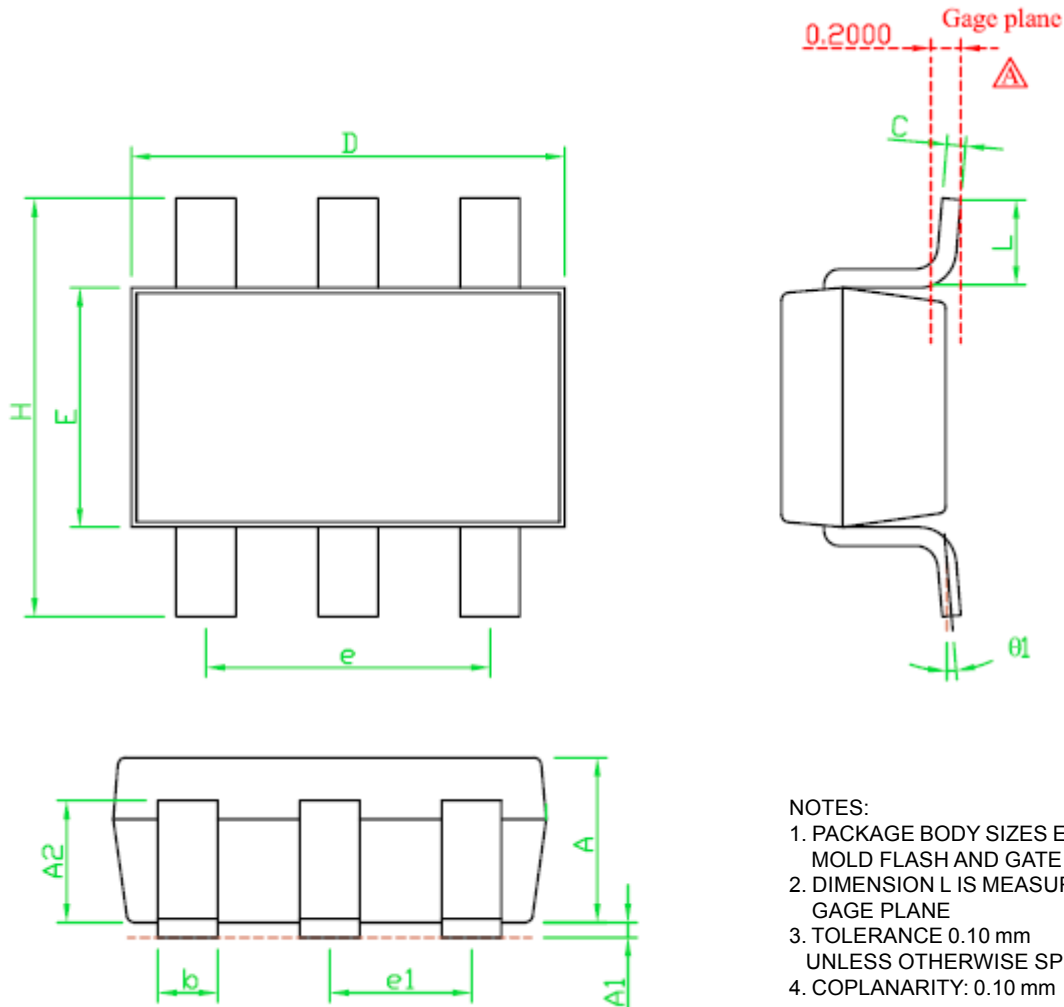
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
Minimum Input Voltage				1	V
Quiescent Current	$V_{RSET} = 0.2V$		1.2	1.6	mA
	$V_{\overline{SHDN}} = 0V$		0.1	1.0	μA
R_{SET} Pin Voltage	$R_{SET} = 1.50k$		100		mV
LED Pin Voltage	$R_{SET} = 1.50k$, $V_{IN} < V_{OUT}$		120	180	mV
LED Pin Current	$R_{SET} = 562\Omega$, $V_{IN} = 1.5V$	33	38	45	mA
	$R_{SET} = 750\Omega$, $V_{IN} = 1.2V$	25	30	36	
	$R_{SET} = 1.50k$, $V_{IN} = 1.2V$	12.5	15	17.5	
	$R_{SET} = 4.53k$, $V_{IN} = 1.2V$		5		
LED Pin Current Temperature Coefficient	$I_{LED} = 15mA$		-0.02		$mA/^{\circ}C$
Switching Frequency	$V_{IN} = 1V$	0.8	1.2	1.6	MHz
Maximum Switch Duty Cycle		*	90	95	%
Switch Current Limit		400	550	780	mA
Switch V_{CESAT}	$I_{SW} = 300mA$		150	200	mV
\overline{SHDN} Pin Current	$V_{\overline{SHDN}} = 0V$		0	0.1	μA
	$V_{\overline{SHDN}} = 2V$		15	30	
Start-Up Threshold (\overline{SHDN} Pin)		0.85			V
Shutdown Threshold (\overline{SHDN} Pin)				0.25	
Switch Leakage Current	Switch Off, $V_{SW} = 5V$		0.01	5	μA

* specification that apply over the full operating temperature range (The GM7620 is guaranteed to meet specifications from 0°C to 70°C. Specifications over the – 40°C to 85°C operating temperature range are assured by design, characterization and correlation with statistical process controls), otherwise specifications are $T_A = 25^{\circ}C$.

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ABSOLUTE MAXIMUM RATINGS

RATING	VALUE	UNIT
V_{IN} Voltage	10	V
SHDN Voltage Range	10	V
SW Voltage	36	V
LED Voltage ($V_{Pin1} = 40$ V)	36	V
R_{SET} Voltage	1	V
Junction Temperature	+125	°C
Operating Temperature Range	0 to +70	°C
Storage Temperature Range	-65 to +150	°C
Lead Temperature (soldering, 10 sec.)	+300	°C



FIXED FREQUENCY STEP-UP DC/DC CONVERTER
■ SOT-23-6 PACKAGE OUTLINE DIMENSIONS

NOTES:

1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS
2. DIMENSION L IS MEASURED IN GAGE PLANE
3. TOLERANCE 0.10 mm UNLESS OTHERWISE SPECIFIED
4. COPLANARITY: 0.10 mm

SYMBOL	Dimensions In Millimeters		
	MIN	NOM	MAX
A	1.00	1.10	1.30
A1	0	-	0.10
A2	0.70	0.80	0.90
b	0.35	0.40	0.50
C	0.10	0.15	0.25
D	2.70	2.90	3.10
E	1.40	1.60	1.80
e	1.90 TYP.		
H	2.60	2.80	3.00
L	0.37	-	-
e1	0.95 TYP.		
$\theta 1$	1°	5°	9°