SP1937
DC-DC Step-Up Converter for White LED

DESCRIPTION

The SP1937 is a step-up DC/DC converter for white LED driver with constant current. The device can driver one to four LEDs in series from a single cell Lithium Ion battery. Internal functions include current limiting; thermal shutdown and soft-start to prevent damage operate status. The SP1937 DC/DC converter operates at 1.2MHz and low output capacitor as small as 0.22uF; apply to Lithium-Ion powered systems. A low 95mV (Typ) reference voltage minimizes power loss in the current setting resistor for better efficiency.

APPLICATIONS

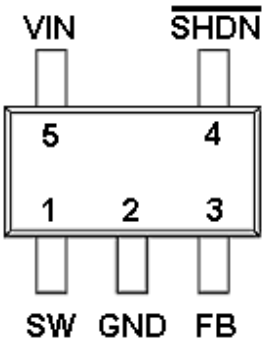
- Battery Power Equipment
- Notebook Computers
- PDA
- Cellular Phone
- Digital Cameras
- MP3 Players
- GPS Receivers

FEATURES

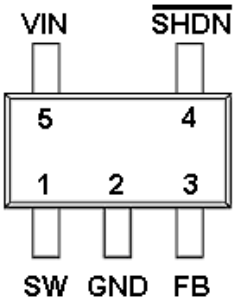
- Fast 1.2MHz Switching Frequency
- High Efficiency up to 85%
- Drives up to seven LEDs From 2.5V Supply
- Low Quiescent Current
- Disconnects LEDs in Shutdown Mode
- Internal Over Temperature and Current Limiting Shutdown Function
- 36V Rugged Bipolar Switch
- Small Package SOT-23-5L & SOT-353

PIN CONFIGURATION

SOT-23-5L

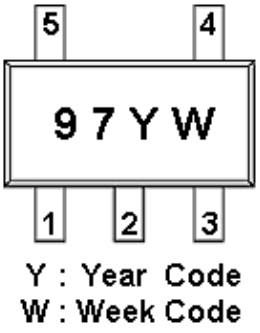


SOT-353 (SC-70-5L)

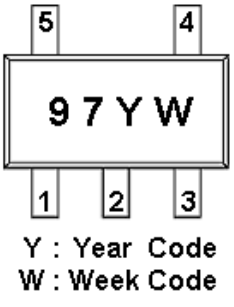


PART MARKING

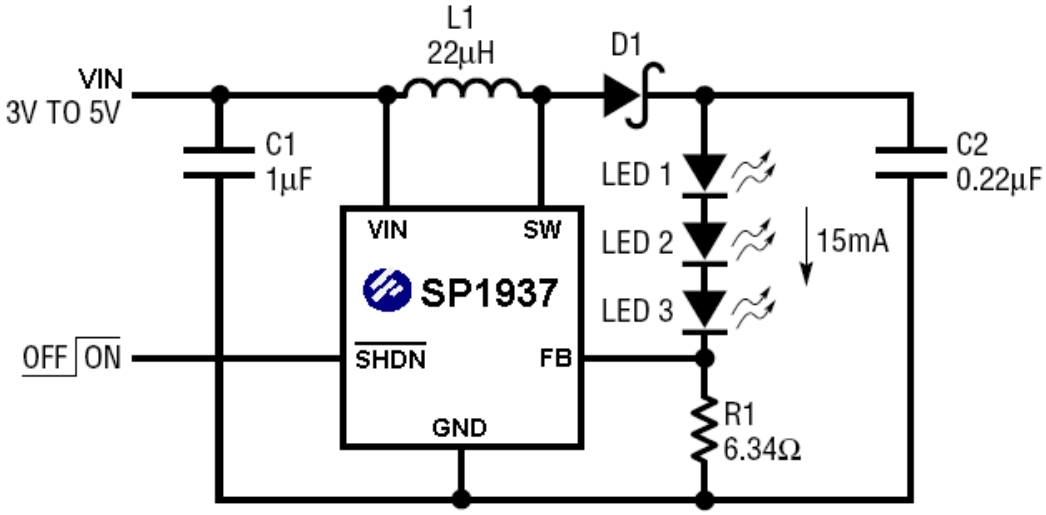
SOT-23-5L



SOT-353 (SC-70-5L)



TYPICAL APPLCATION CIRCUIT



PIN DESCRIPTION

SP1937S25RGB

Pin	Symbol	Description
1	SW	Switch Pin.
2	GND	Ground Pin
3	FB	Feedback Pin.
4	SHDN	Shutdown Pin. Active-low enable
5	VIN	Supply Voltage Input

SP1937S35RGB

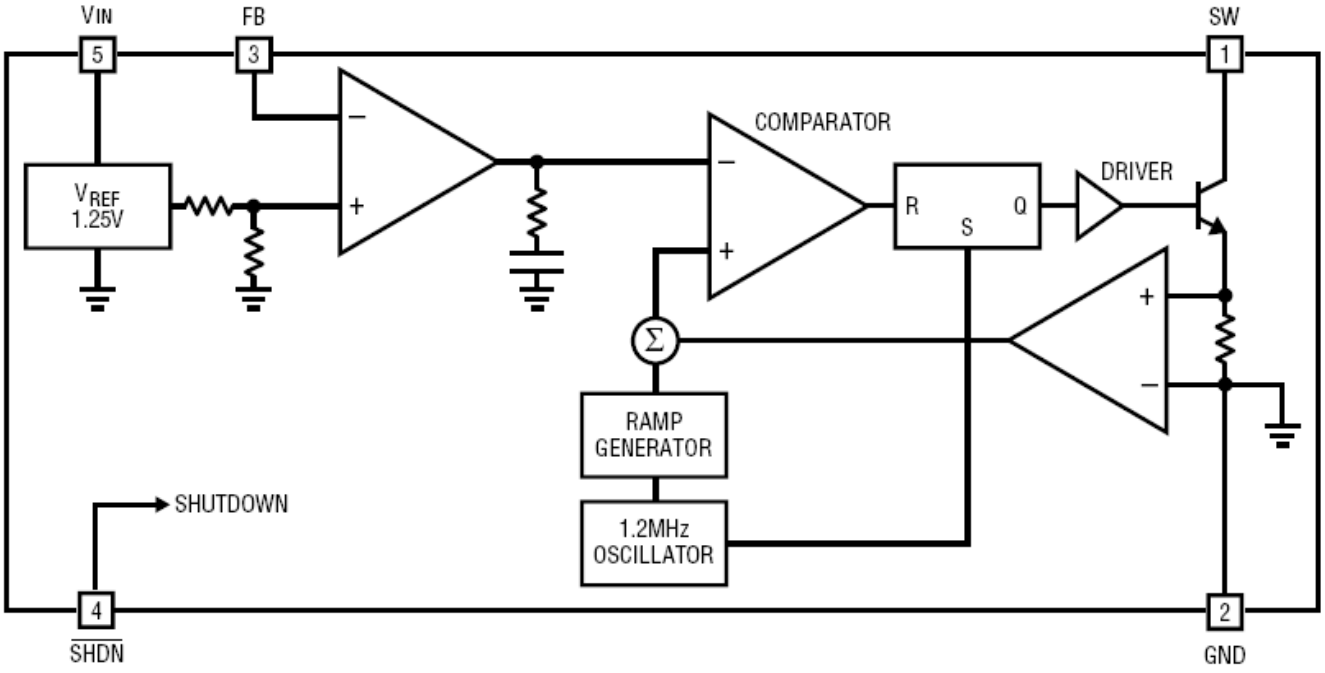
Pin	Symbol	Description
1	SW	Switch Pin.
2	GND	Ground Pin
3	FB	Feedback Pin.
4	SHDN	Shutdown Pin. Active-low enable
5	VIN	Supply Voltage Input

ORDERING INFORMATION

Part Number	Package	Part Marking
SP1937S25RGB	SOT-23-5L	97
SP1937S35RGB	SOT-353 (SC-70-5L)	97

※ Week Code : A ~ Z(1 ~ 26) ; a ~ z(27 ~ 52)
※ SP1937S25RGB : Tape Reel ; Pb – Free ; Halogen - Free
※ SP1937S35RGB : Tape Reel ; Pb – Free ; Halogen - Free

BLOCK DIAGRAM



ABSOULTE MAXIMUM RATINGS

(TA=25℃ Unless otherwise specified)

Parameter	Symbol	Value	Unit
DC Supply Voltage	VIN	10	V
SW Voltage	VSW	36	V
FB Voltage	VFB	10	V
SHDN Voltage	VSHDN	10	V
Operating Temperature	TOPR	-40～85	℃
Maximum Junction Temperature	TJ(Max)	125	℃
Storage Temperature	TS	-65～150	℃

The IC has a protection circuit against static electricity. Do not apply high static electricity or high voltage that exceeds the performance of the protection circuit to the IC.

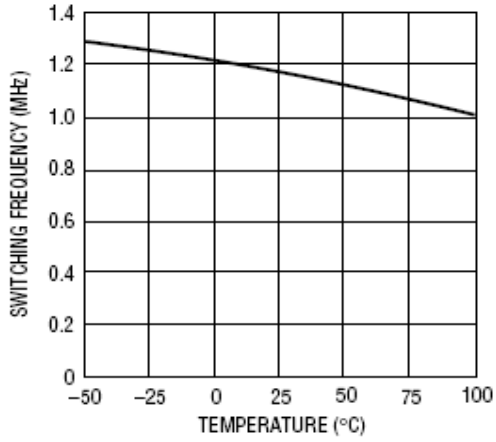
ELECTRICAL CHARACTERISTICS

(T_A=25℃, V_{IN}=3V, V_{SHDN}=3V, Unless otherwise specified)

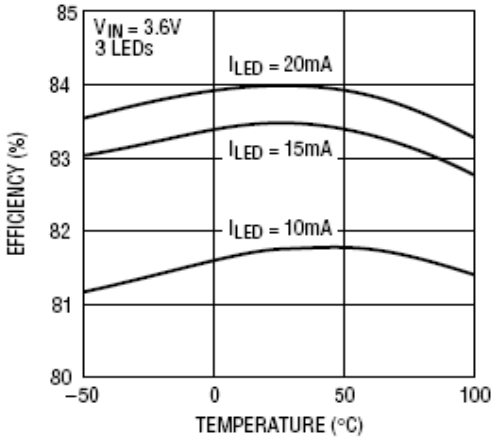
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating Voltage		2.5		9	V
Out Voltage				27	V
Feedback Voltage	I_{SW}=100mA, Duty Cycle = 66%	86		110	mV
FB Pin Bias Current				150	nA
Supply Current			2.8	3.5	mA
	V_{SHDN} = 0V		0.1	1.0	μA
Switching Frequency		0.8	1.2	1.6	MHz
Maximum Duty Cycle			85		%
Switch Current Limit			320		mA
Switch Leakage Current	V_{SW}= 5V		0.01	5	μA
Switch Vcesat	I_{SW} = 200mA		150		mV
SHDN Voltage High		1.5			V
SHDN Voltage Low				0.4	V
SHDN Pin Bias Current			90		uA

TYPICAL PERFORMERCE CHARACTERISTICS

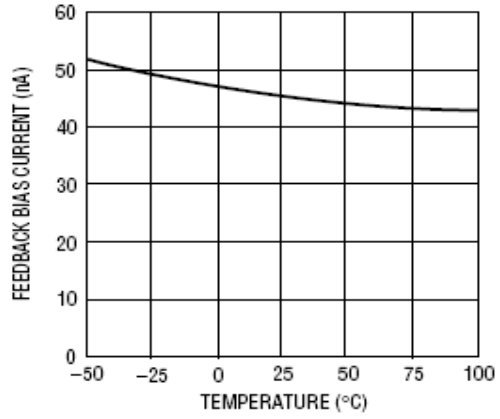
Switching Frequency



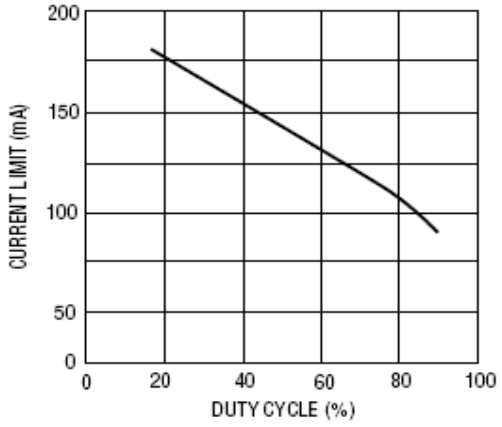
Efficiency vs Temperature



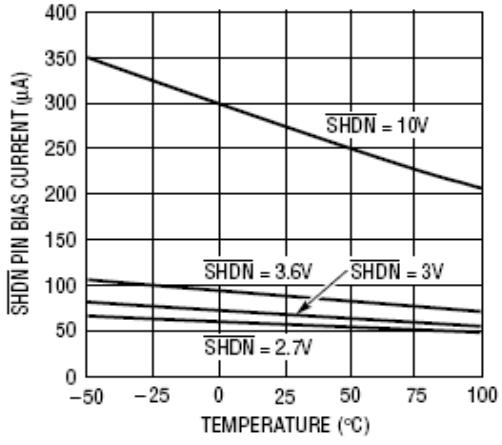
Feedback Bias Current



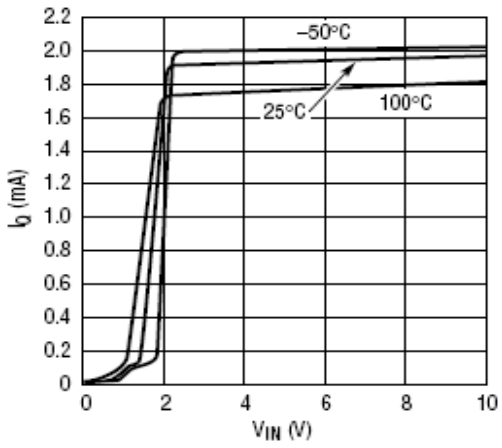
Current Limit vs Duty Cycle



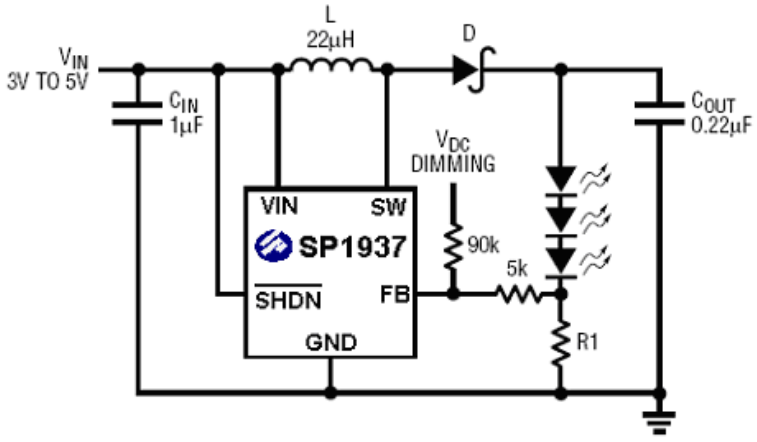
$\overline{SHDN}$ Pin Bias Current

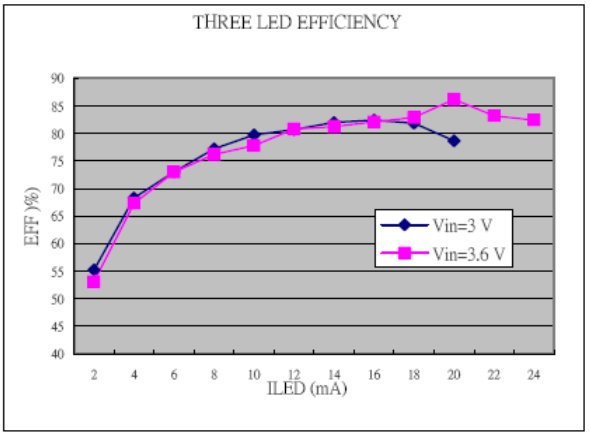


Quiescent Current

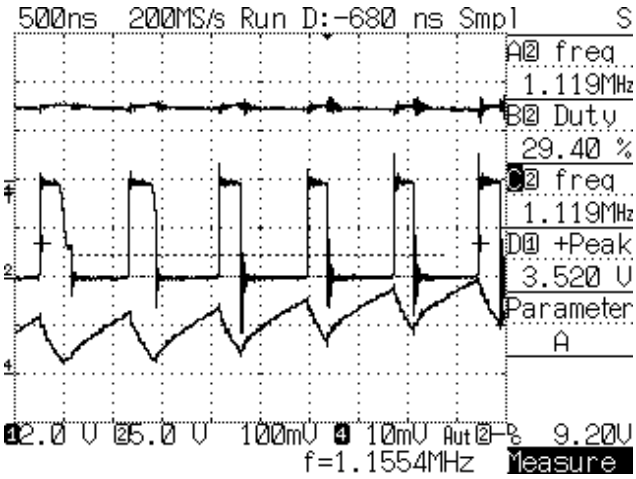


APPLICATION INFORMATION

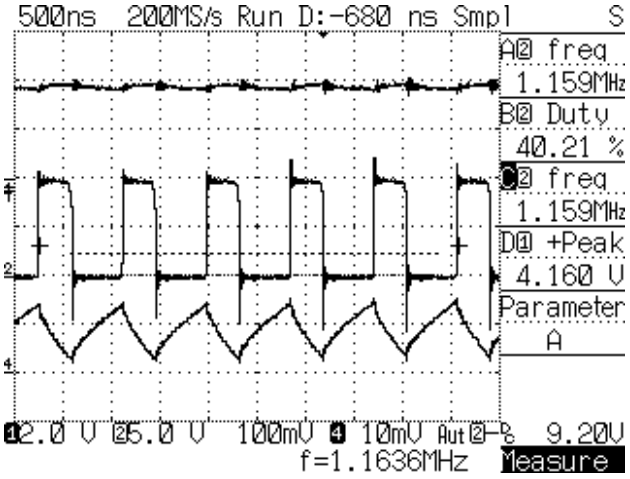




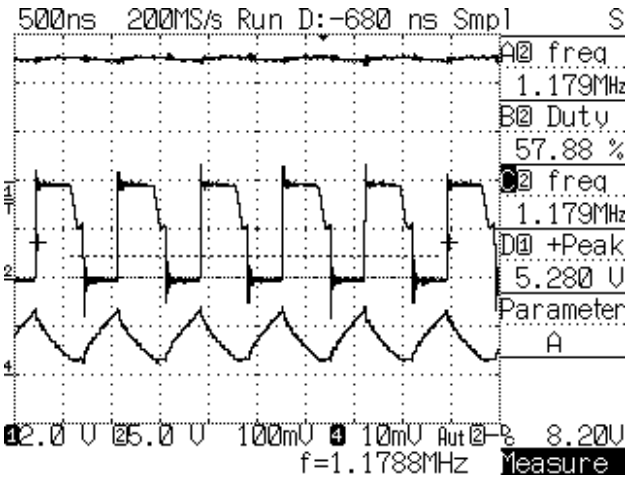
CH1: VCC / CH2: Vsw / CH3: Inductor current / R1= 6.8Ω



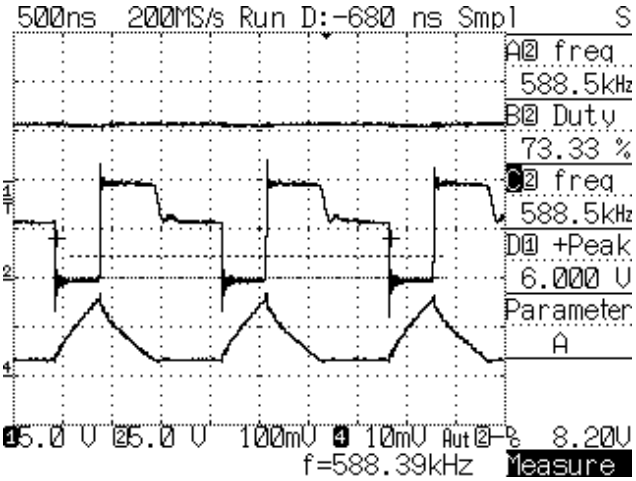
Vin=3V；Vout=8.972V；Iout=14.624mA



Vin=3.75V；Vout=8.957V；Iout=14.698mA



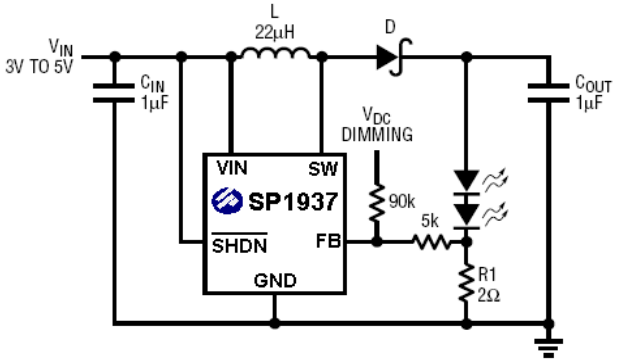
Vin=5V；Vout=8.963V；Iout=14.869mA

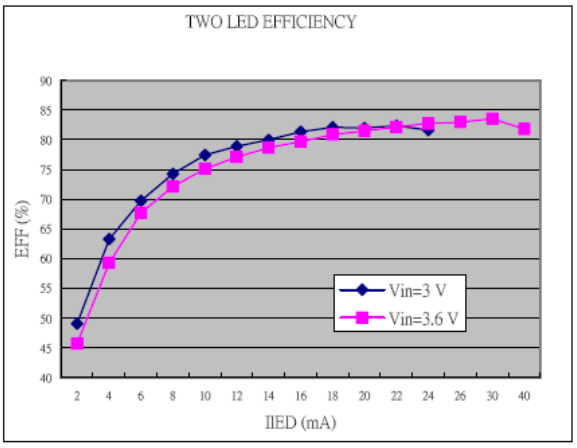


Vin=5.5V；Vout=8.959V；Iout=14.836mA

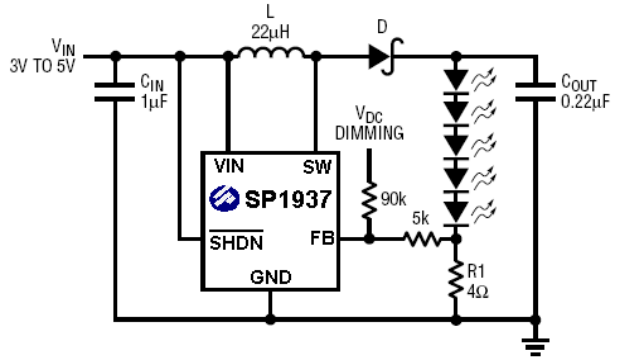
APPLICATION CIRCUIT (For Portable System --- Series)

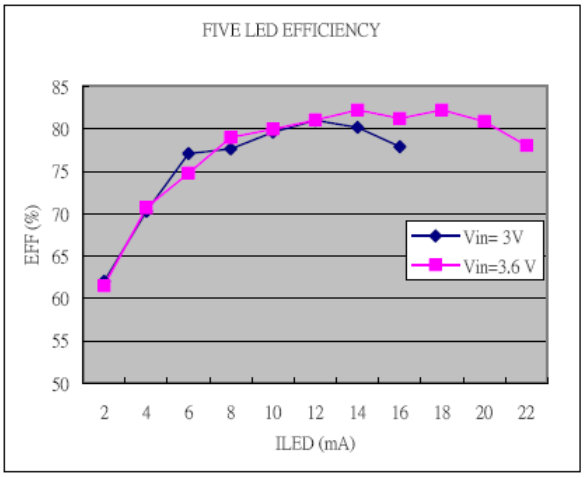
Li-Ion to Two White LEDs



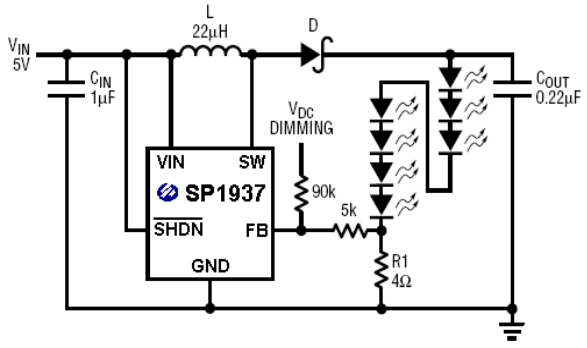


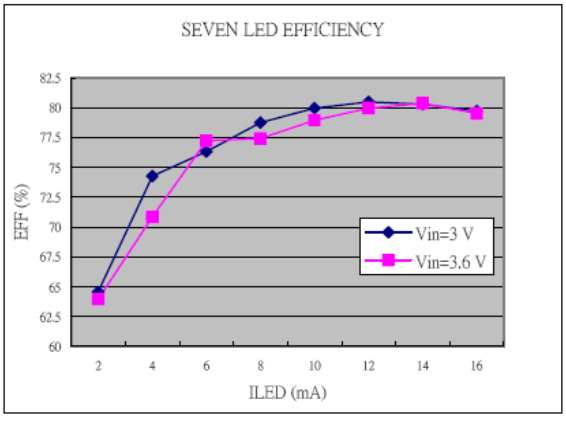
Li-Ion to Five White LEDs





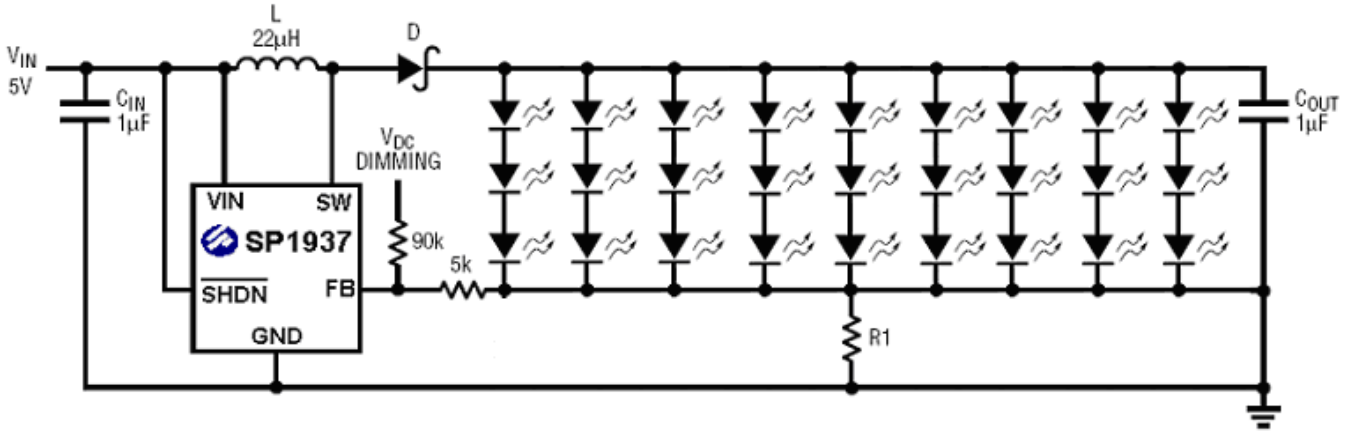
5V to Seven White LEDs



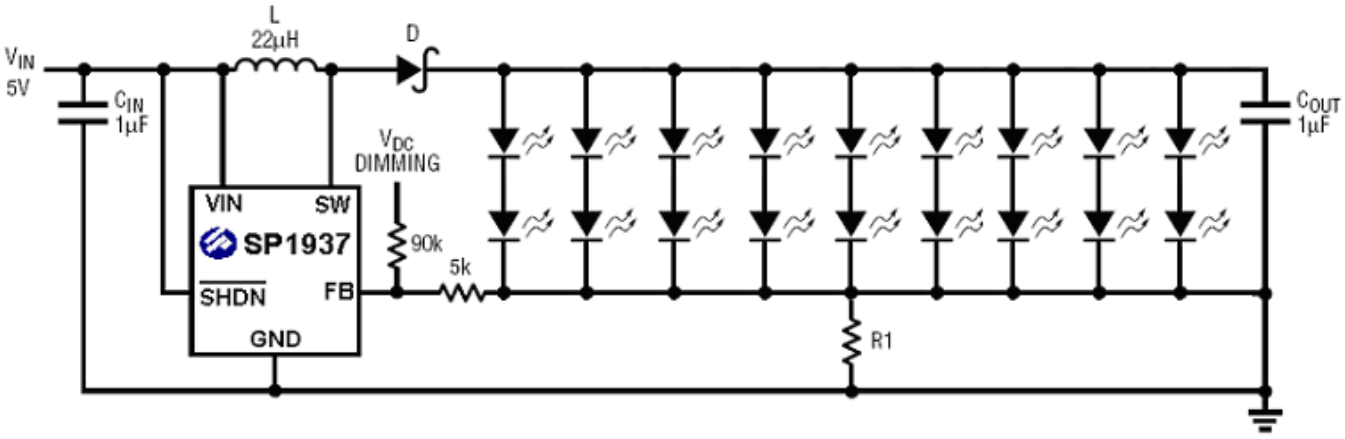


APPLICATION CIRCUIT

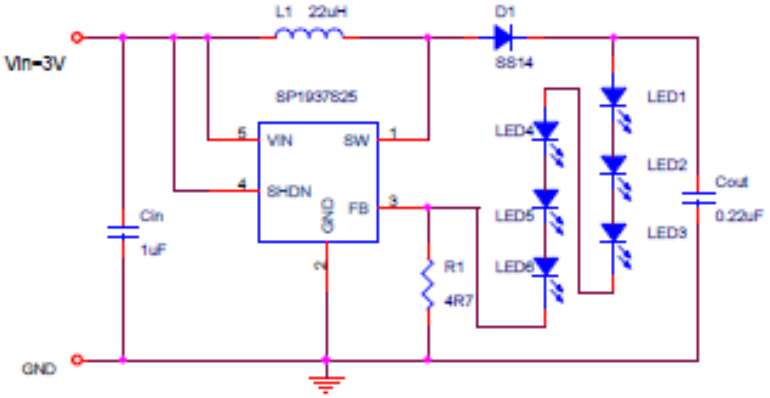
Three Series / Nine Parallel For 8" LCD Panel



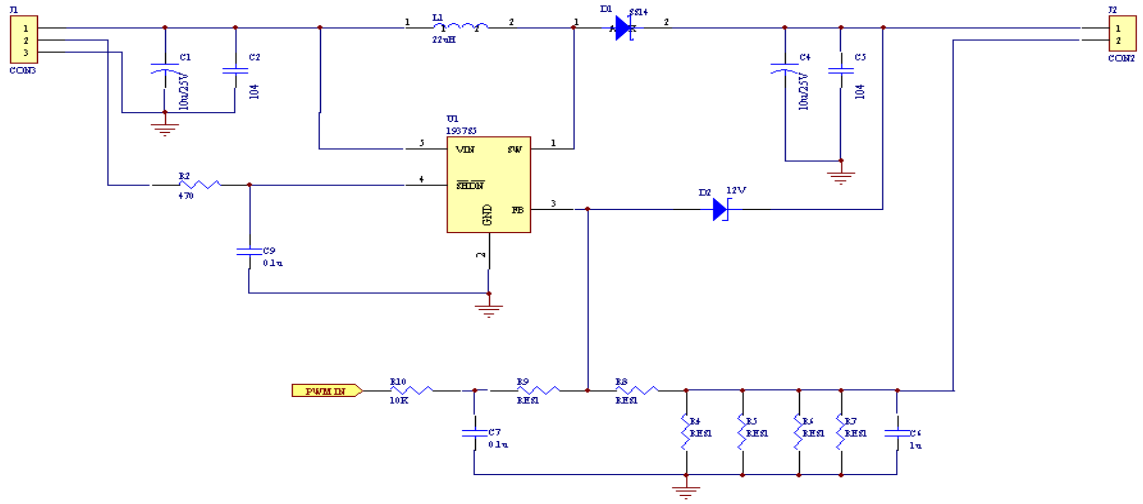
Two Series / Nine Parallel For 7" LCD Panel

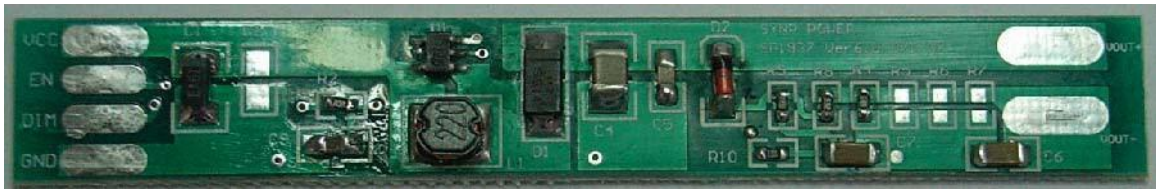


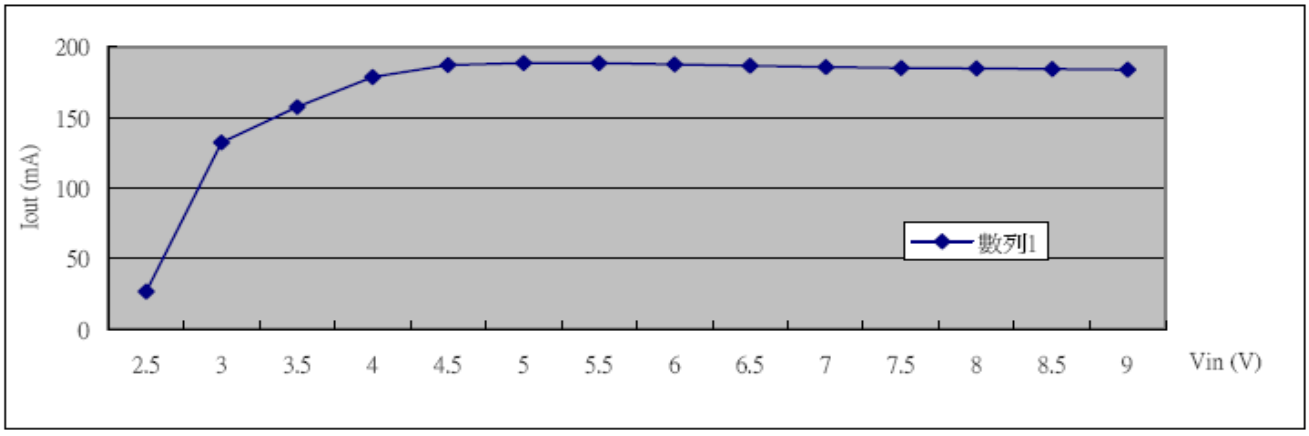
3V with Six White LEDs

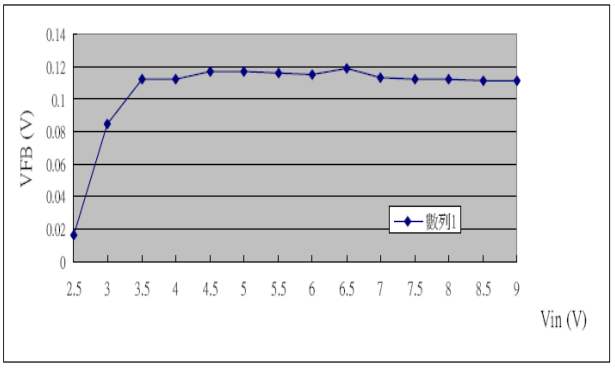


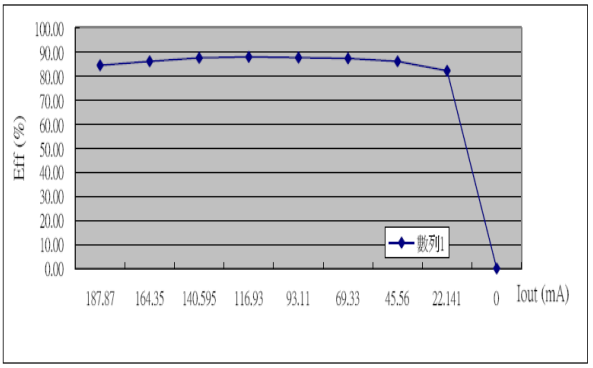
TYPICAL PERFORMERCE CHARACTERISTICS(For LCD Panel)











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