DESCRIPTION

The A8240 is a CMOS based White/Blue LED driver with stand-alone capability. The driver is primarily designed for LED backlighting of LCD display powered by Li-ion battery With its high efficiency, low standby current and wide range of input supply voltage, the A8240 is suitable for applications such as portable device display and keypad backlighting.

A8240 has four LED channels.

The A8240 is available in MSOP8 package.

ORDERING INFORMATION

Package Type	Part Number	
MSOP8	MS8	A8240MS8R
		A8240MS8VR
Note	V: Halogen free Package R: Tape & Reel SPQ: 3,000pcs/Reel	
AiT provides all RoHS products Suffix " V " means Halogen free Package		

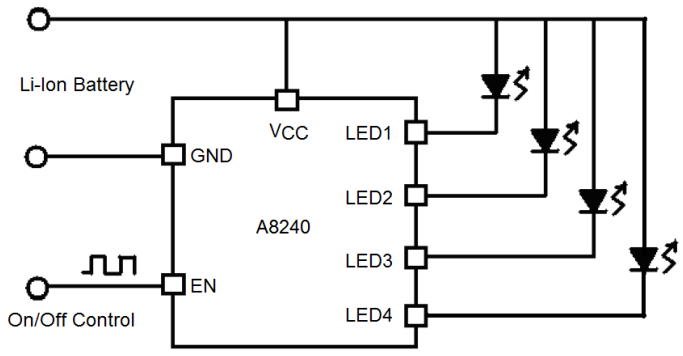
FEATURES

- No external component required
- PWM dimming control available
- Low noise and EMI
- LED sink current of 20mA
- Independent current sink circuit for each LED output
- Versatile supply voltage range
- Low standby current
- High accuracy current match on each channel
- Available in MSOP8 Package

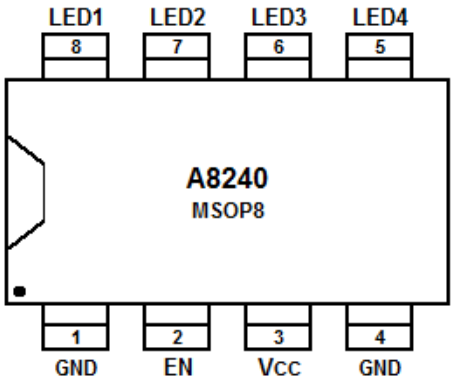
APPLICATION

- Small Size Color LCD Backlights Driver
- Mobile Phone, Portable DeviEN Keypad Backlights Driver

TYPICAL APPLICATION



PIN DESCRIPTION



Top View

Pin #	Symbol	Function
1,4	GND	Ground. In A8240, for good LED current match, it is recommended to tie the two GND pins together by external copper.
2	EN	Chip enable pin. High level activates the chip. Connect this pin to V_{CC} if not used, do not leave this pin floating.
3	V_{CC}	Power Supply
5,6,7,8	LED1-LEDn	RGB or WLED Cathode Connection Pin

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	-0.3V~7V
Voltage of LEDn, EN pin	-0.3V~7V
Maximum Junction Temperature	125°C
Operating Ambient Temperature Range	-40°C ~85°C
Storage Temperature Range	-40°C~150°C
Lead Temperature (Soldering, 10 sec)	260°C

Stress beyond above listed "Absolute Maximum Ratings" may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

RECOMMENDED OPERATING CONDITIONS

Parameter	MIN	MAX	Units
Supply Voltage Range	2.7	6	V
Output sink current on each channel		25	mA
Operating Temperature	-25	85	℃

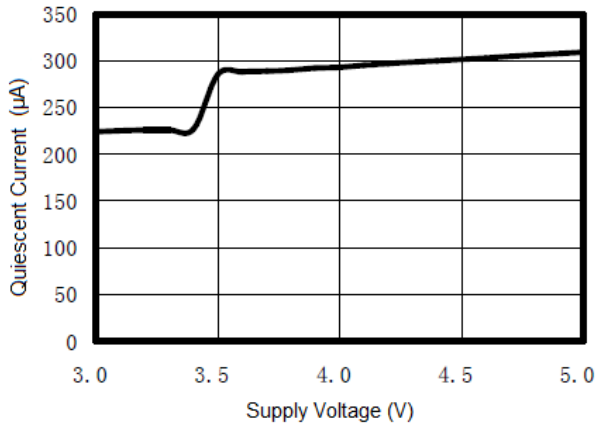
ELECTRICAL CHARACTERISTICS

V_{CC}=3.7V, T_A=25°C, No Load, Input: V_{EN}=3.7V, unless otherwise noted

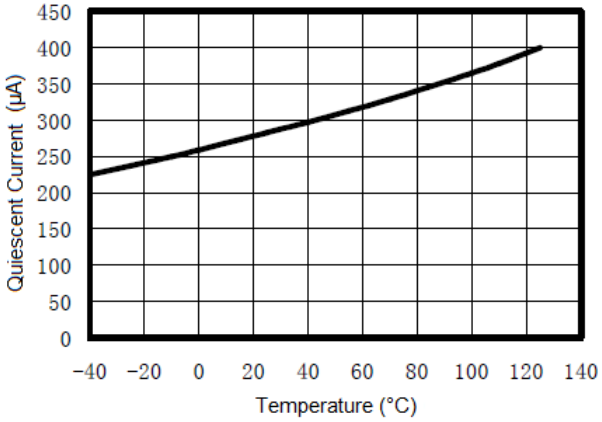
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
EN Pin "Low" Logic	V_{IL}				0.4	V
EN Pin "High" Logic	V_{IH}		1.7			V
EN Pin "Low" Input Current	I_{IL}		-1			μA
EN Pin "High" Input Current	I_{IH}				1	μA
LEDn Dropout Voltage	V_{LEDL}			100		mV
LEDn Sink Current	I_{LED}		18	20	22	mA
LEDn Sink Current Deviation	ΔI_{LEDn}				+/-3	%
Quiescent Current	I_Q			250	400	μA
Standby Supply Current	I_{STBY}	V_{EN}="0"		0.5		μA

TYPICAL PERFORMANCE CHARACTERISTICS

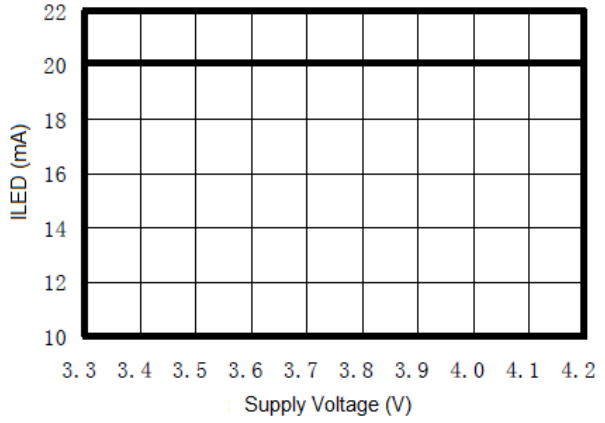
1. Quiescent Current vs. Supply Current, T_A=25°C



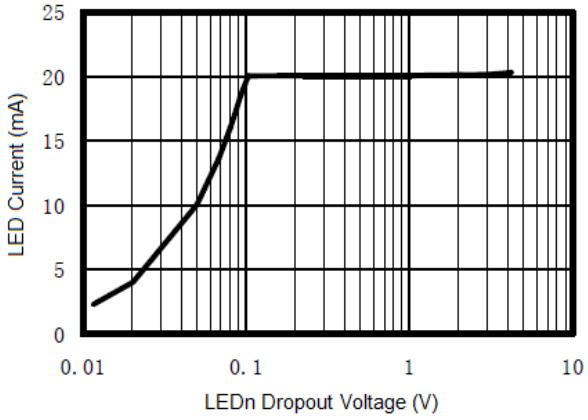
2. Quiescent Current vs. Temperature, V_{CC}=3.7V



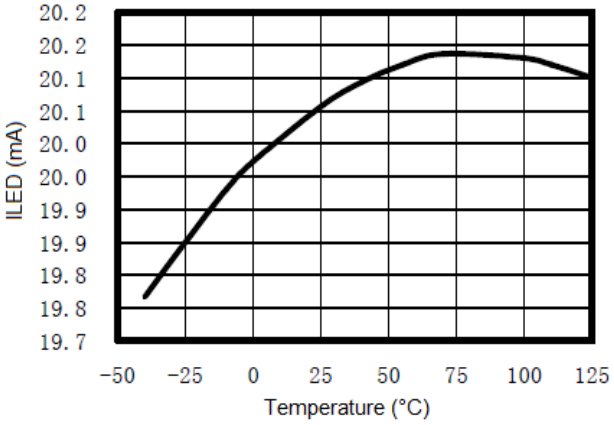
3. I_{LED} vs. Supply Voltage, V_{CC}=3.7V, V_{LEDn}=3.2V



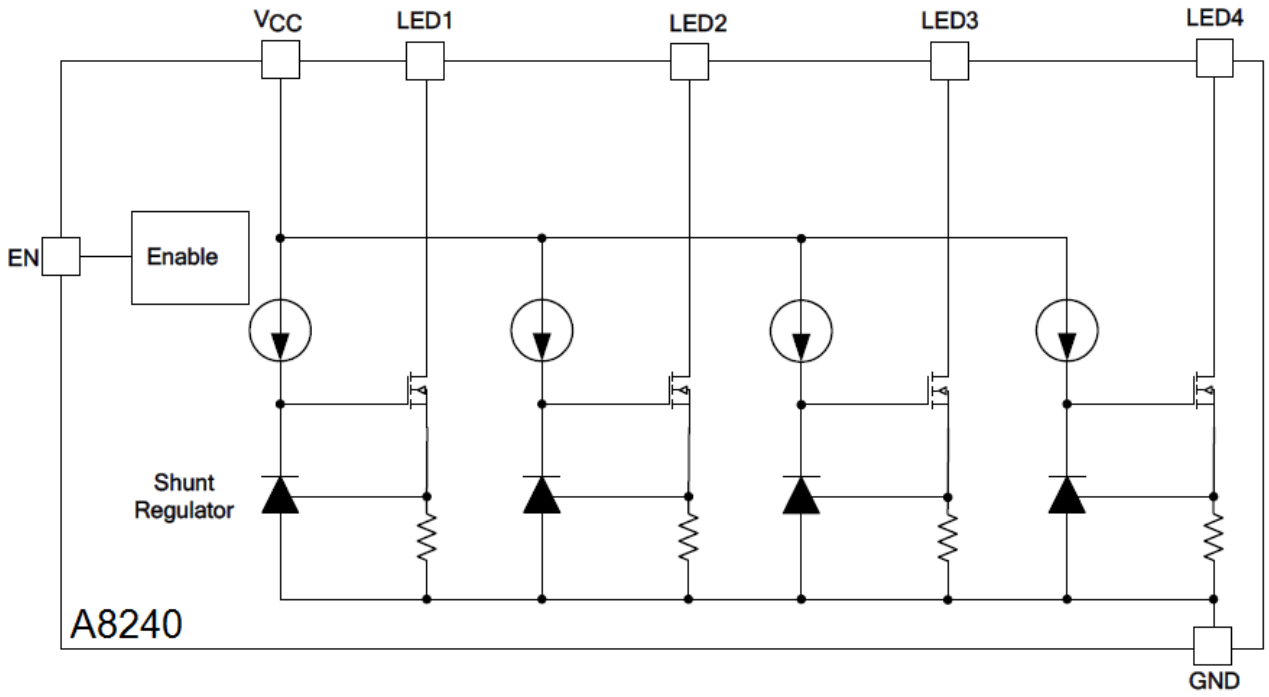
4. I_{LED} vs. L_{EDn} Dropout Voltage, V_{CC}=3.7V



5. I_{LED} vs. Temperature, V_{CC}=3.7V



BLOCK DIAGRAM



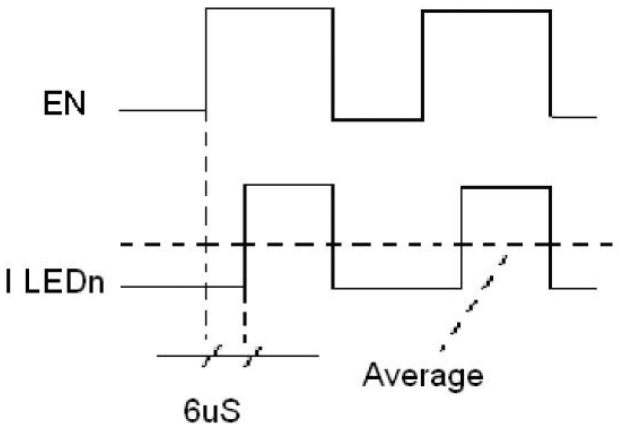
DETAILED INFORMATION

A8240 works with a wide range of supply voltage, from 2.7V to 6V. The forward voltage of commercial white/blue LED is in the range of 2.9V to 3.5V at a current level of 20mA. Proper selection of the LED to match the supply voltage can fully utilize the Li-ion battery. For example, there is 1% ~ 3 % power left in the Li-ion battery when its voltage reaches 3.275V. So a LED with a forward voltage value of 3.2V can use up to 99% of the battery power under normal working condition. When the voltage of the battery drops below 3.2V, the current through the LED (hence the brightness) starts to decrease.

Due to its uniquely designed current regulator, A8240 offer low output dropout and provide superior efficiency performance over standard Inductive boost type and capacitive charge pump type LED driver.

The EN pin controls the on/off state of the device. A high level state turns on the device and a low level turns off the device, results in the low off state current. This pin needs to be terminated since a floating level of the EN pin will cause the instability of the device.

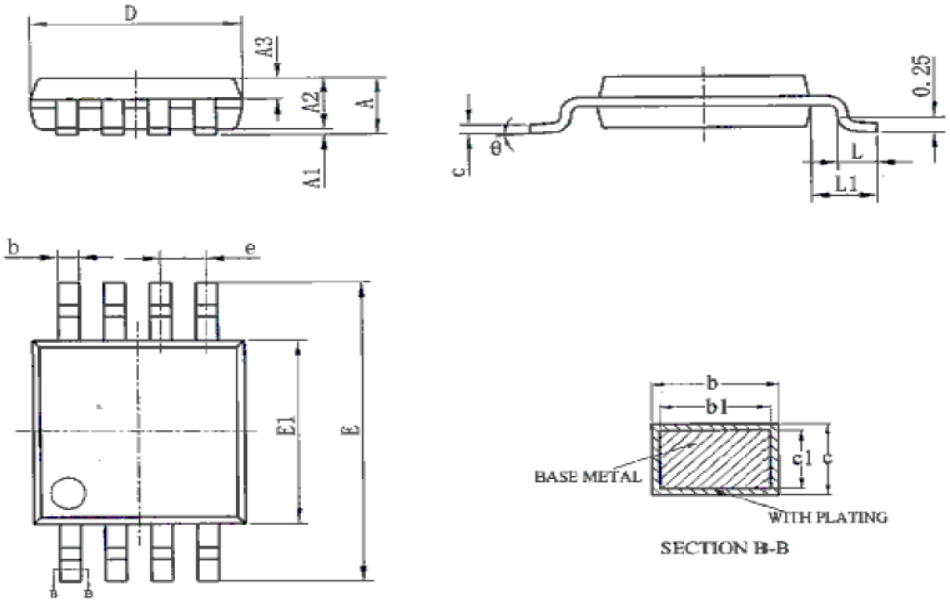
The sink current has a constant value of 20mA. The brightness of the LED can be adjusted by controlling the duty cycle of the A8240's LEDn output. This can be accomplished by applying a PWM signal to the EN pin. In A8240, the internal power on sequence presents a delay time of 6us from EN pin to LEDn pin. Hence, In order to normally modulate the output of LEDn in every cycle, the width of dimming signal applied EN pin have to be no less than 6us. For example, when a dimming signal of 20KHz is applied, the minimum range of dimming is about 12%, that is, the average output current on each channel is 2.4mA.



Dimming Control Waveform

PACKAGE INFORMATION

Dimension in MSOP8 (Unit: mm)



Symbol	Min	Max
A	-	1.100
A1	0.050	0.150
A2	0.750	0.950
A3	0.300	0.400
b	0.290	0.380
b1	0.280	0.330
c	0.150	0.200
c1	0.140	0.160
D	2.900	3.100
E	4.700	5.100
E1	2.900	3.100
e	0.650(BSC)	
L	0.400	0.700
L1	0.950(BSC)	
θ	0°	8°

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