## DESCRIPTION

The A8169-025 Series is a fixed frequency, constant current step-up DC/DC converter ideal for driving LEDs used in backlighting applications on cellular phones, PDAs and digital cameras etc. Output voltage of up to 23V can be derived, and from a 3.2V input six white LED's can be driven in series or alternatively, using a 2.5V input, a network of two parallel legs with three in each may be driven.

Luminance of the LED's is controlled by changing the duty cycle of a PWM signal applied to the EN pin. In addition, an internal MOSFET with an $R_{DS(ON)}$ of 0.8Ω is used. Allow profile and small board area solution can be achieved using a chip coil and an ultra small ceramic output capacitor (CL) of 0.22uF.

The A8169-025 is available in SOT-26 package.

## ORDERING INFORMATION

| Package Type | Part Number | |
|---|---|---|
| SOT-26 | E6 | A8169E6R-025 |
| | | A8169E6VR-025 |
| Note | R: Tape & Reel<br>V: Halogen free Package | |
| AiT provides all RoHS free products | | |

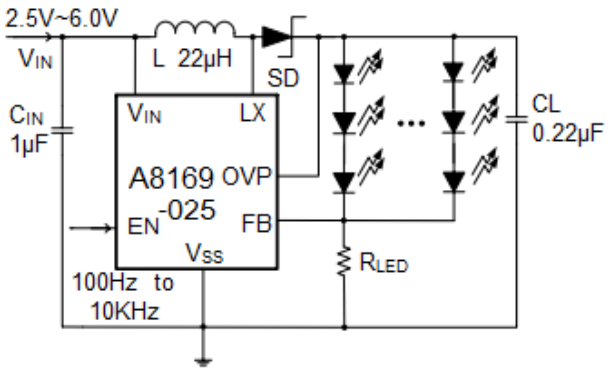
## FEATURES

- Input voltage range: 2.5V~6V
- Output voltage range: up to 23V externally set-up reference voltage 0.25V
- Oscillation frequency: 1.0MHz
- On resistance: 0.8Ω
- Efficiency: 88%(When driving 3 white LEDs in series $V_{IN}$=3.6V $I_{LED}$=20mA)
- Control: PWM control
- Stand-by Current: $I_{STB}$=1.0uA
- Load capacitor: 0.22uF ceramic
- Lx limit Current:1.0A
- Available in SOT-26 package

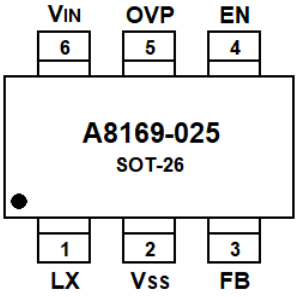
## APPLICATIONS

- For White LED Drivers
- Mobil phones, PHS
- PDAs , GPSs
- Digital still cameras

## TYPICAL APPLICATION



## PIN DESCRIPTION




Top View

| Pin # | Symbol | Function |
|---|---|---|
| 1 | LX | Switch |
| 2 | $V_{SS}$ | Ground |
| 3 | FB | Voltage Feedback |
| 4 | EN | Chip Enable |
| 5 | OVP | Over Voltage Protection |
| 6 | $V_{IN}$ | Power Supply |

## ABSOLUTE MAXIMUM RATINGS

| | |
|---|---|
| $V_{IN}$ Pin Voltage | Vss-0.3V ~ Vss+7V |
| LX Pin Voltage | Vss-0.3V ~ Vss+28V |
| FB Pin Voltage | Vss-0.3V ~ Vss+7V |
| EN Pin Voltage | Vss-0.3V ~ Vss+7V |
| OVP Pin Voltage | Vss-0.3V ~ Vss+28V |
| LX Pin Current | 1300mA |
| Power Dissipation | 250mW |
| Operating Temperature Range | -40℃ ~ + 85℃ |
| Storage Temperature Range | -55℃ ~ + 125℃ |
| Lead Temperature (Soldering, 10s) | 260℃ |

Stresses above may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

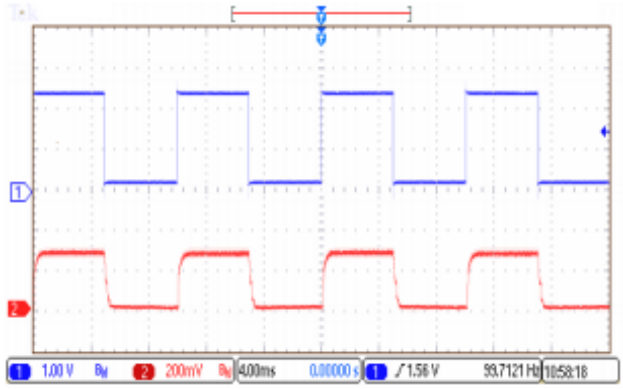
## ELECTRICAL CHARACTERISTICS

$T_A$=25°C, unless otherwise noted

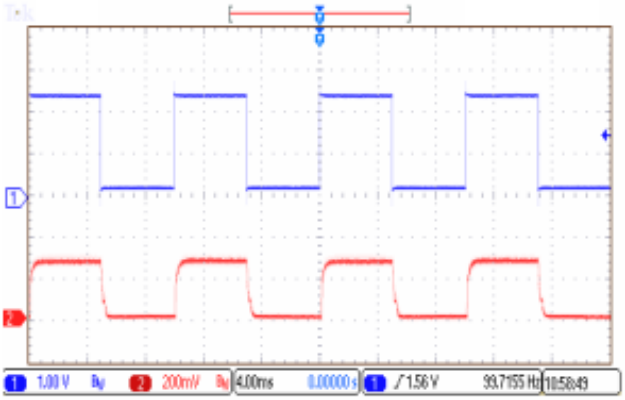
| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit | Circuits |
|---|---|---|---|---|---|---|---|
| FB Control Voltage | $V_{FB}$ | | 0.235 | 0.25 | 0.265 | V | 1 |
| Output Voltage Range | $V_{OUT}$ | | $V_{IN}$ | - | 23 | V | |
| Lx Operating Voltage Range | $V_{LX}$ | | - | - | 23 | V | |
| Operating Voltage Range | $V_{IN}$ | | 2.5 | - | 6 | V | |
| Stand-by Current | $I_{STB}$ | $V_{EN}$=0V, $V_{LX}$=5V | - | 1 | - | uA | 3 |
| Supply Current 1 | $I_{DD1}$ | | - | 550 | - | uA | 2 |
| Supply Current 2 | $I_{DD2}$ | $V_{IN}$=$V_{LX}$, $V_{FB}$=0.4V | - | 400 | - | uA | 3 |
| Oscillation Frequency | $F_{OSC}$ | | 0.8 | 1.0 | 1.2 | MHz | 2 |
| Maximum Duty Cycle | MAXDY | $V_{CONT}$=0.4V | 86 | 92 | 98 | % | 2 |
| Efficiency | EFFI | $V_{IN}$=3.6V; $R_{LED}$=12.5Ω | - | 88 | - | % | 1 |
| Current Limit | $I_{LIM}$ | $V_{IN}$=3.6 | - | 1.0 | - | A | 4 |
| LX Overvoltage Limit | LXOVL | | 23 | 25 | 27 | V | 2 |
| LX On Resistance | | $V_{IN}$=3.6V, $V_{LX}$=0.4V | - | 0.8 | - | Ω | 2 |
| LX Leak Current | $I_{LXL}$ | | - | 0 | 1 | uA | 3 |
| EN “H” Voltage | $V_{ENH}$ | | 1.4 | - | - | V | 2 |
| EN “L” Voltage | $V_{ENL}$ | | - | - | 0.5 | V | 2 |
| EN “H” Current | $I_{ENH}$ | $V_{IN}$=$V_{LX}$, $V_{FB}$=0.4V | - | 1 | - | uA | 3 |
| EN “L” Current | $I_{ENL}$ | $V_{IN}$ =$V_{LX}$, $V_{FB}$=0.4V | - | 1 | - | uA | 3 |
| FB “H” Current | $I_{FBH}$ | $V_{IN}$ = $V_{LX}$, $V_{FB}$=0.4V | - | - | 0.1 | uA | 3 |
| FB “L” Current | $I_{FBL}$ | $V_{IN}$ = $V_{LX}$, $V_{FB}$=0.4V | - | - | -0.1 | uA | 3 |

## TYPICAL PERFORMANCE CHARACTERISTICS

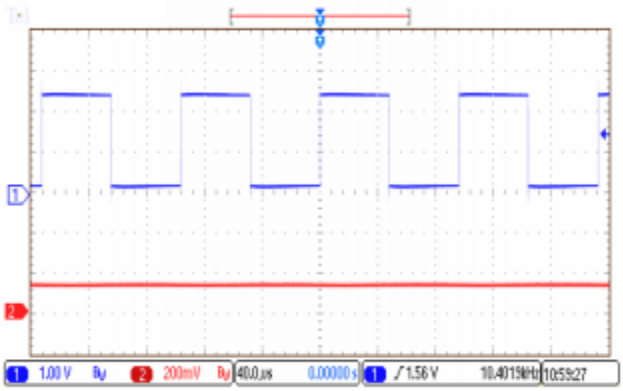
1. CH1=EN, CH2=FB
   100Hz, 4 series LED, $I_{LED}$=20mA



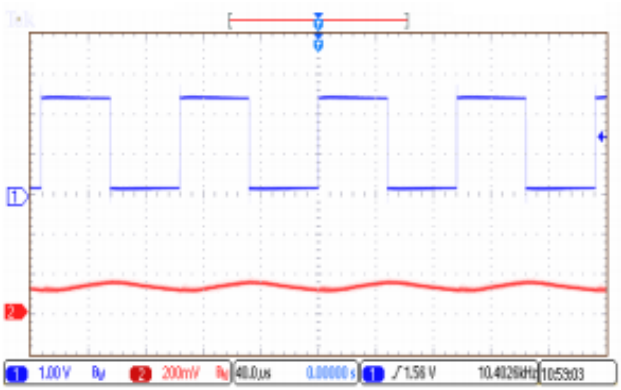
2. 100Hz, 6 series LED, $I_{LED}$=20mA



3. 10kHz, 4 series LED, $I_{LED}$=20mA

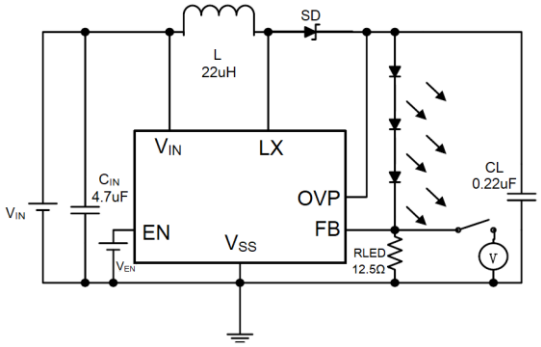


4. 10kHz, 6 series LED, $I_{LED}$=20mA

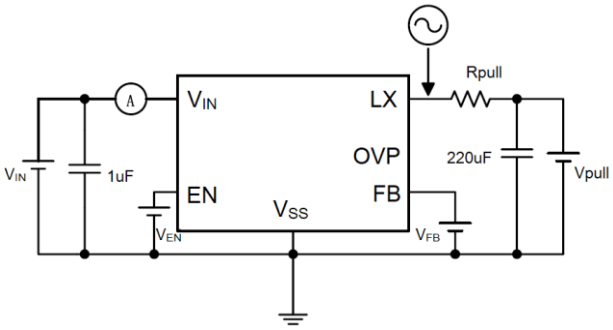


## TEST CIRCUIT

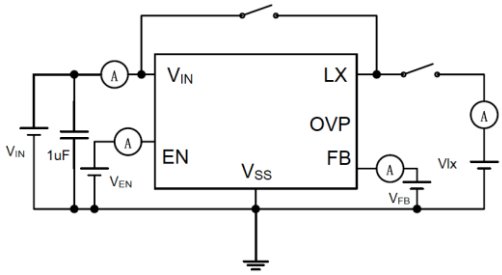
1. Circuit 1



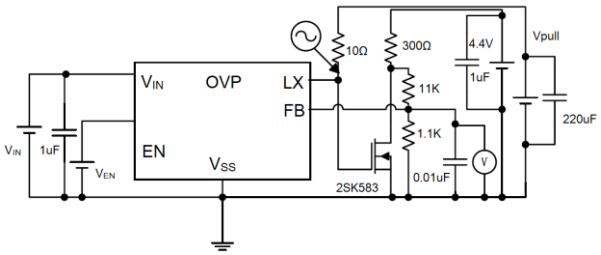

2. Circuit 2



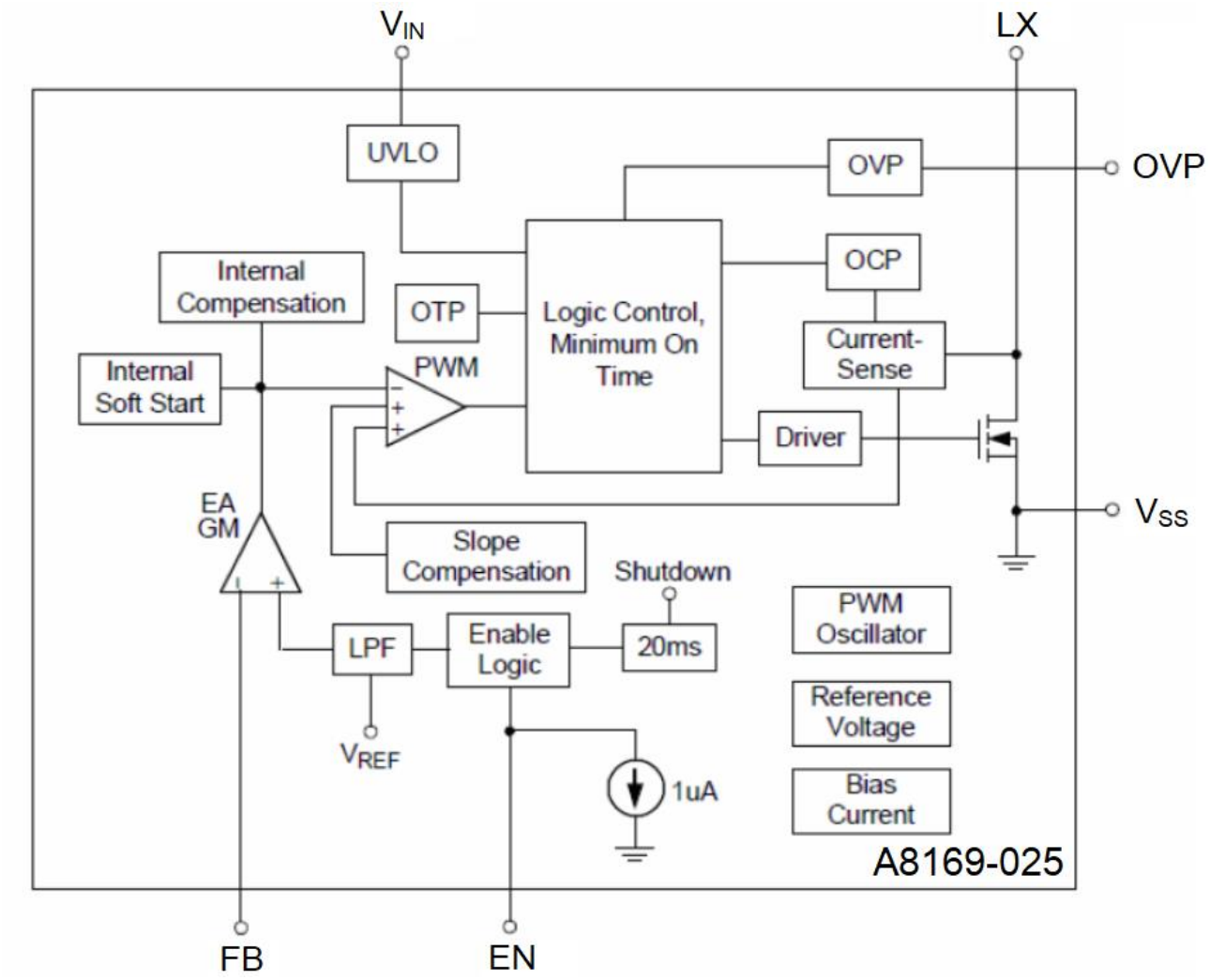

3. Circuit 3




4. Circuit 4

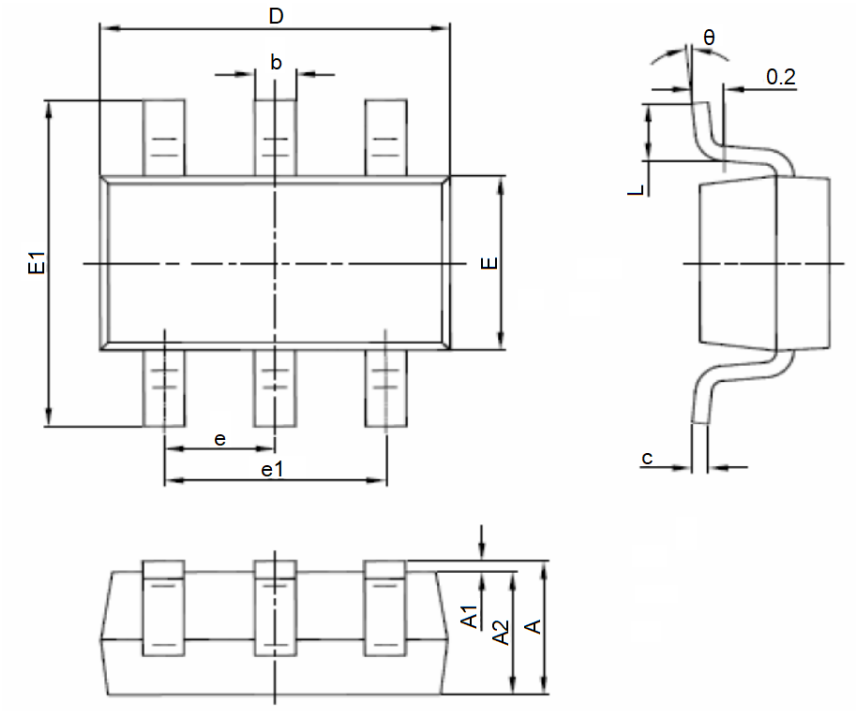


## BLOCK DIAGRAM



## PACKAGING INFORMATION

Dimension in SOT-26 Package (Unit: mm)




| Symbol | Millimeters | | Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.820 | 3.020 | 0.111 | 0.119 |
| E | 1.500 | 1.700 | 0.059 | 0.067 |
| E1 | 2.650 | 2.950 | 0.104 | 0.116 |
| e | 0.950 BSC | | 0.037 BSC | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.300 | 0.600 | 0.012 | 0.024 |
| θ | 0° | 8° | 0° | 8° |

## IMPORTANT NOTICE

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