

Small Package, High Performance, Asynchronous Boost For 10 WLED Driver **HM5666A**

General Description:

The **HM5666A** is a high frequency, asynchronous boost converter. The internal MOSFET can support up to 10 White LEDs for backlighting and OLED power application, and the internal soft start function can reduce the inrush current. The device operates with 1-MHz fixed switching frequency to allow small external components and to simplify possible EMI problems. Moreover, the IC comes with 46V over voltage protection to allow inexpensive and small-output capacitors with lower voltage ratings. The LED current is initially set with the external sense resistor R_s .

Features:

- VIN Operating Range : 2.5V to 5.5V
- Internal Power N-MOSFET Switch
- Wide Range for PWM Dimming (100Hz to 200kHz)
- 1MHz Switching Frequency
- Minimize the External Component Counts
- Internal Soft Start
- Internal Compensation
- Under Voltage Protection
- Over Voltage Protection
- Over Temperature Protection

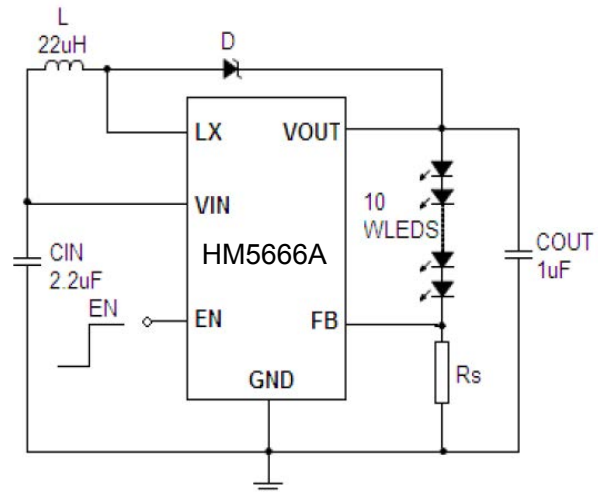
Applications:

- Cellular Phones
- Digital still cameras
- PDAs and Smart Phones and MP3 and OLED.
- Probable Instruments

R_s Resistor Value Selection:

| TYP. (Ω) | I_{LED} (mA) |
|-------------------|----------------|
| 10 | 20 |

Typical Application:



$$I_{LED} = 20\text{mA}, \quad R_s = 10\Omega$$

HM5666A

Selection Guide:

Pin Configuration& Marking Information:

HM 56 66 A X X

Environment mark

e.g.:G-Lead free

Package:

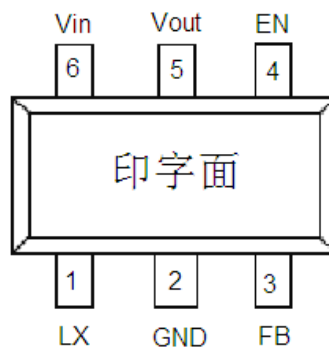
e.g.: **MR-SOT23-6**

Version

Product Type

Product Series

H&M Semi



SOT23-6

Pin information:

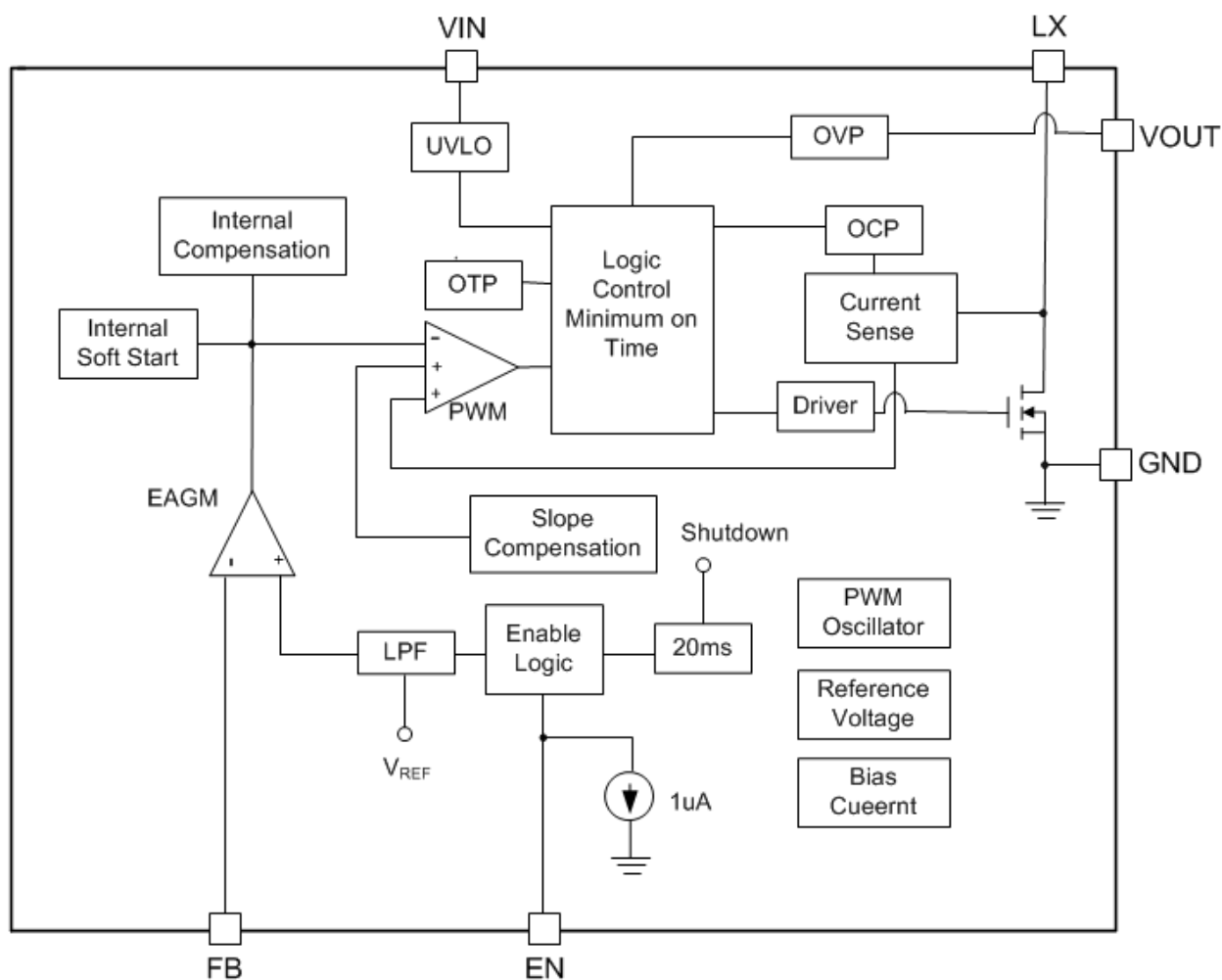
| Pin Number | Name | Function |
|------------|------|-------------|
| 1 | LX | Switch |
| 2 | GND | Ground |
| 3 | FB | Feedback |
| 4 | EN | Chip Enable |
| 5 | VOU | Output |
| 6 | VIN | Input |

Absolute Maximum Ratings:

HM5666A

| Parameter | Symbol | Ratings | Units |
|--------------------------------------|-----------|-------------|-------|
| Input Voltage | V_{IN} | -0.3V~6V | V |
| LX Pin Voltage | LX | -0.3V~6V | V |
| FB Pin Voltage | FB | -0.3V~6V | V |
| Operating Temperature Range | T_{OPR} | -40°C~85°C | °C |
| Storage Temperature Range | T_{STG} | -65°C~125°C | °C |
| Lead Temperature (Soldering, 10 sec) | T_L | 260°C | °C |
| Internal Power Dissipation (SOT23-6) | P_D | 400 | mW |

Function Block Diagram:



HM5666A

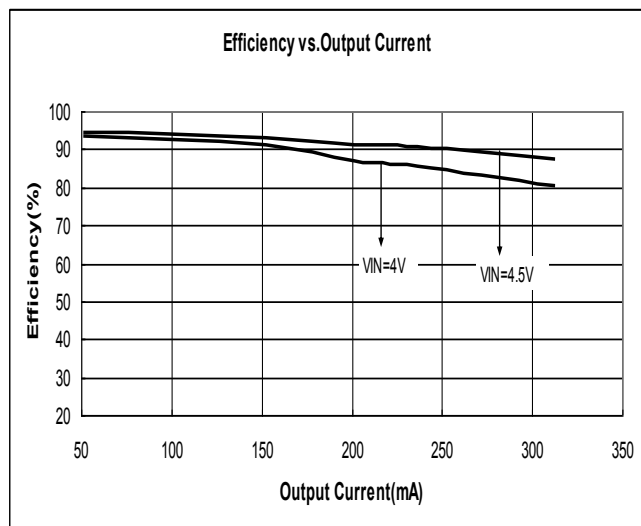
Electrical Characteristic

T=25°C, $V_{IN}=V_{EN}=3.7V$, L=22uH, $C_{in}=2.2\mu F$, $C_{out}=1\mu F$, unless otherwise noted.

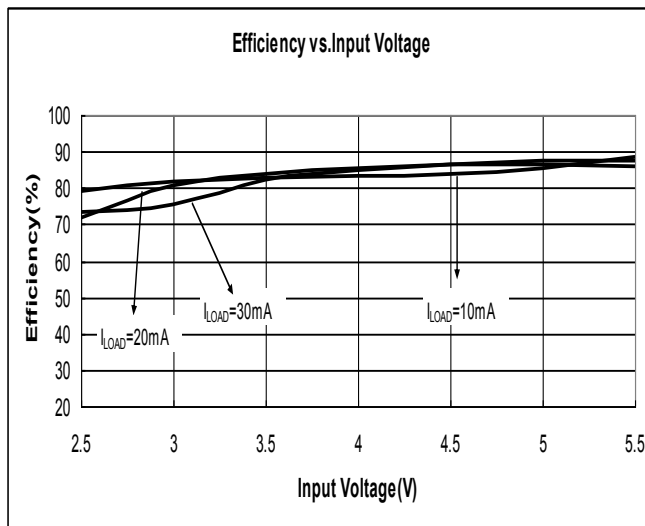
| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---------------------------|--------------------|--------------------------------------|------|-----|------|----------|
| Input Voltage Range | V_{IN} | | 2.5 | 3.7 | 5.5 | V |
| Under Voltage Lock Out | V_{UVLO} | | 2 | 2.2 | 2.45 | V |
| UVLO Hysteresis | | | | 0.1 | | V |
| Supply Current | I_{SS} | No external Component | | 0.8 | 1.5 | mA |
| Shutdown Current | I_{SHDN} | No external Component $V_{EN}=0V$ | 1 | 3 | 5 | uA |
| Oscillator Frequency | F_{OSC} | | 0.85 | 1.1 | 1.5 | MHz |
| Maximum Duty Cycle | | | 90 | 92 | | % |
| Feedback Voltage | V_{FB} | | 190 | 200 | 210 | mV |
| On Resistance | $R_{DS(ON)}$ | | | 0.7 | 1.2 | Ω |
| EN Threshold | Logic-High Voltage | V_{IH} | 1.6 | | | V |
| | Logic-Low Voltage | V_{IL} | | | 0.9 | V |
| Over-Voltage Threshold | V_{OCP} | | 42 | 46 | 50 | V |
| Over-Current Threshold | I_{OCP} | | 1 | 1.2 | | A |
| Efficiency | η | $I_{LED}=20mA$ | | 85 | | % |
| Over Temperature Shutdown | OTS | | | 150 | | °C |

Typical Operating Characteristics

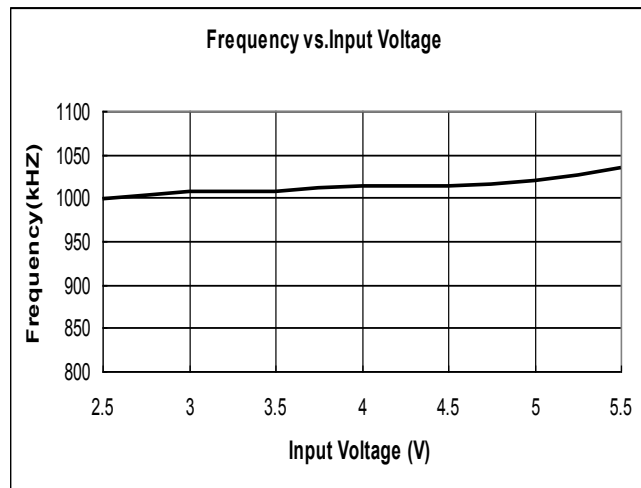
1. Efficiency vs. Output Current (3 White LEDs)



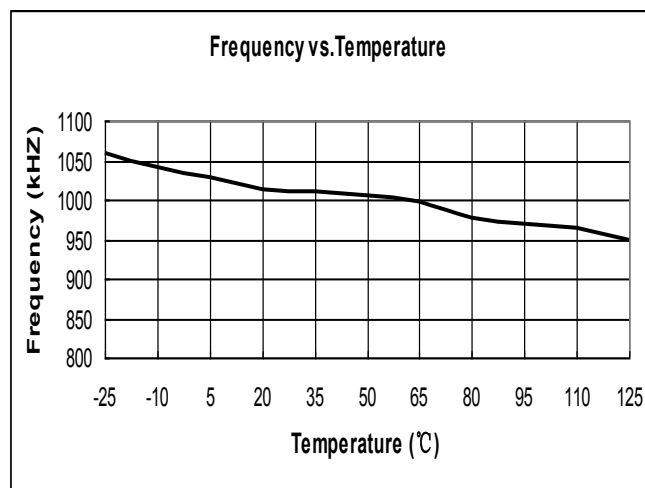
2. Efficiency vs. Input Voltage (10 White LEDs)



3. Frequency vs. Input Voltage (ILED=20mA)

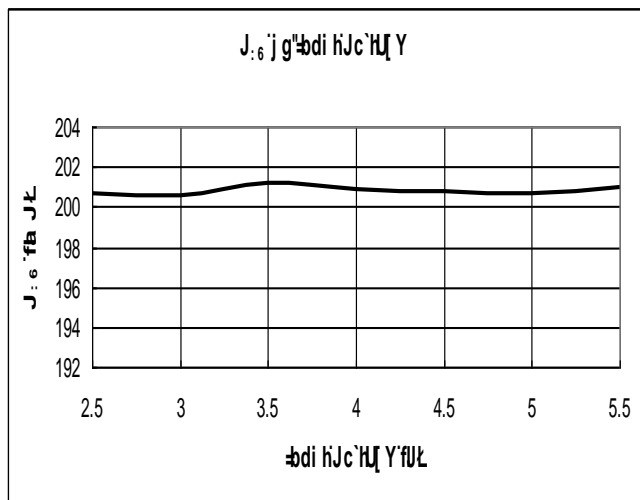


4. Frequency vs. Temperature (VIN=3.7V, ILED=20mA)

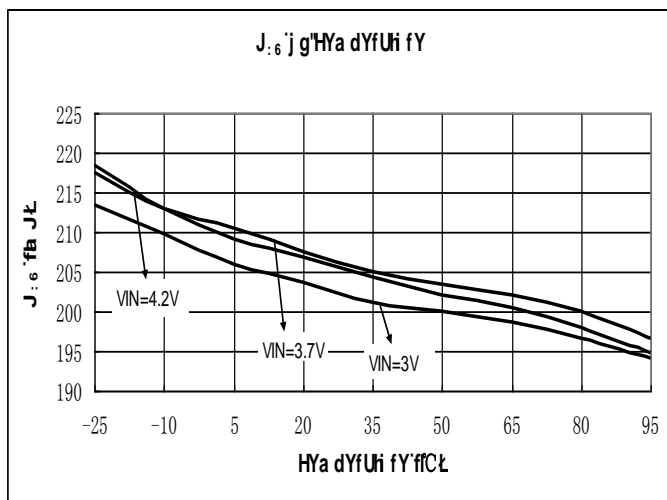


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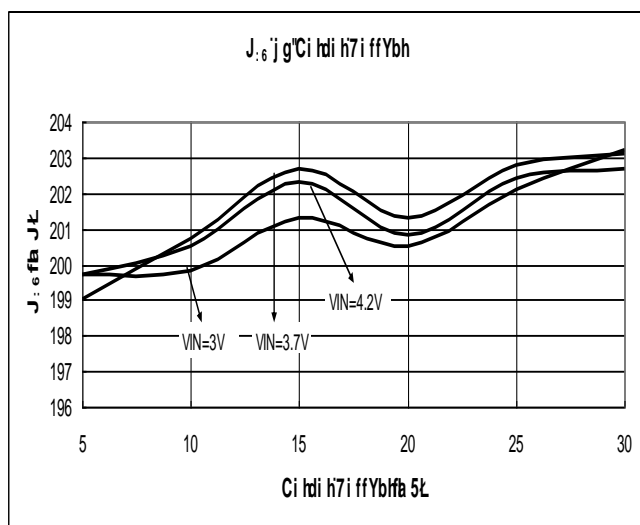
5. V_{FB} vs. Input Voltage (10 White LEDs, $I_{LED}=20mA$)



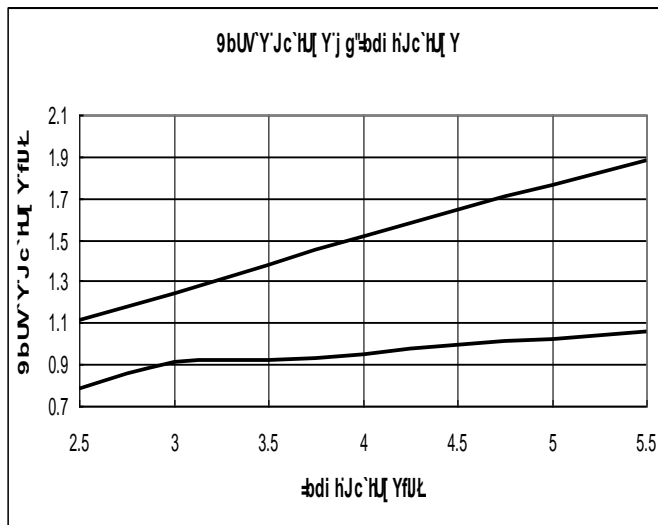
6. V_{FB} vs. Temperature ($I_{LED}=20mA$)



7. V_{FB} vs. Output Current (10 White LEDs)

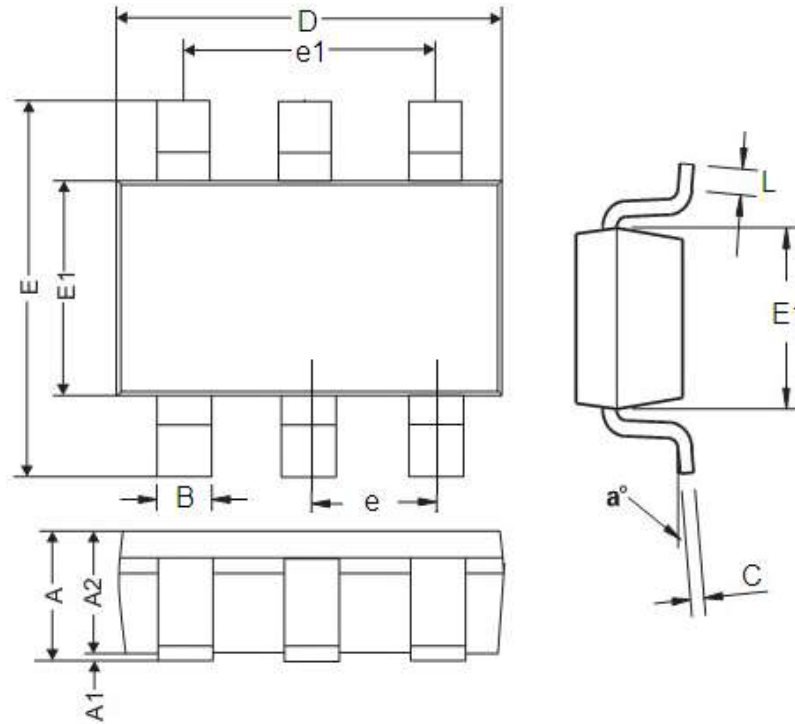


8. Enable Voltage vs. Input Voltage (10 White LEDs)



Package Information

• SOT-23-6



| DIM | Millimeters | | Inches | |
|-----|-------------|------|-----------|--------|
| | Min | Max | Min | Max |
| A | 0.9 | 1.45 | 0.0354 | 0.0570 |
| A1 | 0 | 0.15 | 0 | 0.0059 |
| A2 | 0.9 | 1.3 | 0.0354 | 0.0511 |
| B | 0.2 | 0.5 | 0.0078 | 0.0196 |
| C | 0.09 | 0.26 | 0.0035 | 0.0102 |
| D | 2.7 | 3.10 | 0.1062 | 0.1220 |
| E | 2.2 | 3.2 | 0.0866 | 0.1181 |
| E1 | 1.30 | 1.80 | 0.0511 | 0.0708 |
| e | 0.95REF | | 0.0374REF | |
| e1 | 1.90REF | | 0.0748REF | |
| L | 0.10 | 0.60 | 0.0039 | 0.0236 |
| a° | 0° | 30° | 0° | 30° |