Fairchild Reference Design

The following reference design supports inclusion of FLS0116 in design of LED illumination. It should be used in conjunction with the FLS0116 datasheet as well as Fairchild's application notes and technical support team. Please visit Fairchild's website at http://www.fairchildsemi.com.

Application	Fairchild Device	Input Voltage Range	Rated Output Power	Output Voltage (Rated Current)
LED Bulb	FLS0116M	90-264V$_{AC}$	2.7W	28V/(97mA)

Key Features

- Built-in MOSFET (1A/550V)
- Digital implemented active PFC function
- Built in HV supplying circuit: Self biasing
- AOCP function with auto restart mode
- Cycle-by-cycle current limit
- Current sense pin open protection
- Low operating current: 0.85mA (typ.)
- Under-Voltage Lockout with 5V Hysteresis.
- Programmable Oscillation Frequency
- Programmable LED Current
- Analog Dimming Function
- Soft-Start Function
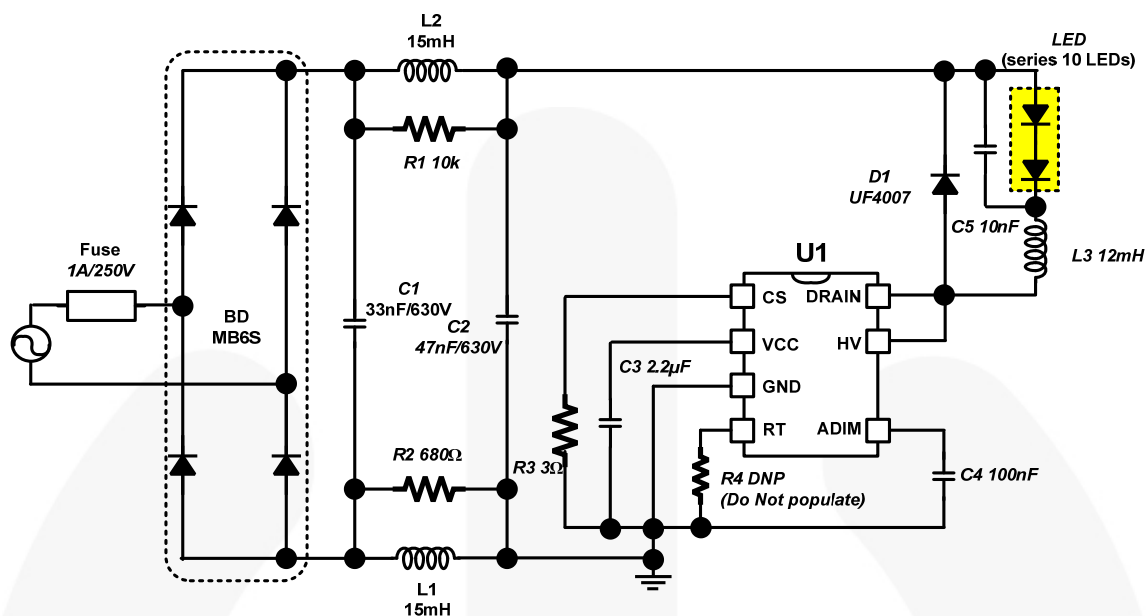- Precise Internal Reference: ±3%
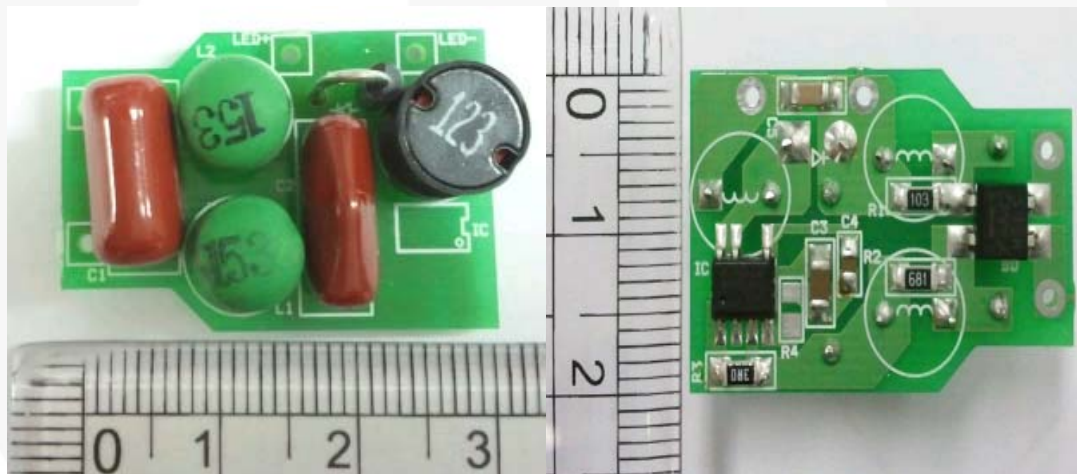
1. Schematics

Figure 1.   Schematic

Figure 2.   A Photograph of the evaluation board

2. Bill of Materials

Table 1.   BOM Table

Item No.	Part Reference	Part Number	Qty.	Description	Manufacturer
1	U1	FLS0116M	1	Controller	Fairchild Semiconductor
2	BD	MB6S	1	0.5A/600V, Bridge Diode	Fairchild Semiconductor
3	C1	MPE 630V333K	1	333/630V_{AC}, Film Capacitor	Sungho
4	C2	MPE 630V473K	1	473/630V_{AC}, Film Capacitor	Sungho
5	C3	C1206C225K3PACTU	1	225/25V SMD Capacitor 3216	Kemet
6	C4	C0805C104K3RACTU	1	104/25V SMD Capacitor 2012	Kemet
7	C5	C1206C103KDRACTU	1	103/630V SMD Capacitor 3216	Kemet
8	D1	UF4007	1	1A/1000V, Ultra-Fast Recovery	Fairchild Semiconductor
9	L1,L2	R06153KT00	2	15mH, Filter Inductor	Bosung
10	L3	RFB0810-123L	1	12mH, Inductor	Coil Craft
11	R1	RC1206JR-07103RL	1	10kΩ , SMD Resistor 3216	Yageo
12	R2	RC1206JR-07680RL	1	680Ω , SMD Resistor 3216	Yageo
13	R3	RC1206JR-073RL	1	3Ω , SMD Resistor 3216	Yageo
-	R4	-	0	Open	

3. Performance

Efficiency
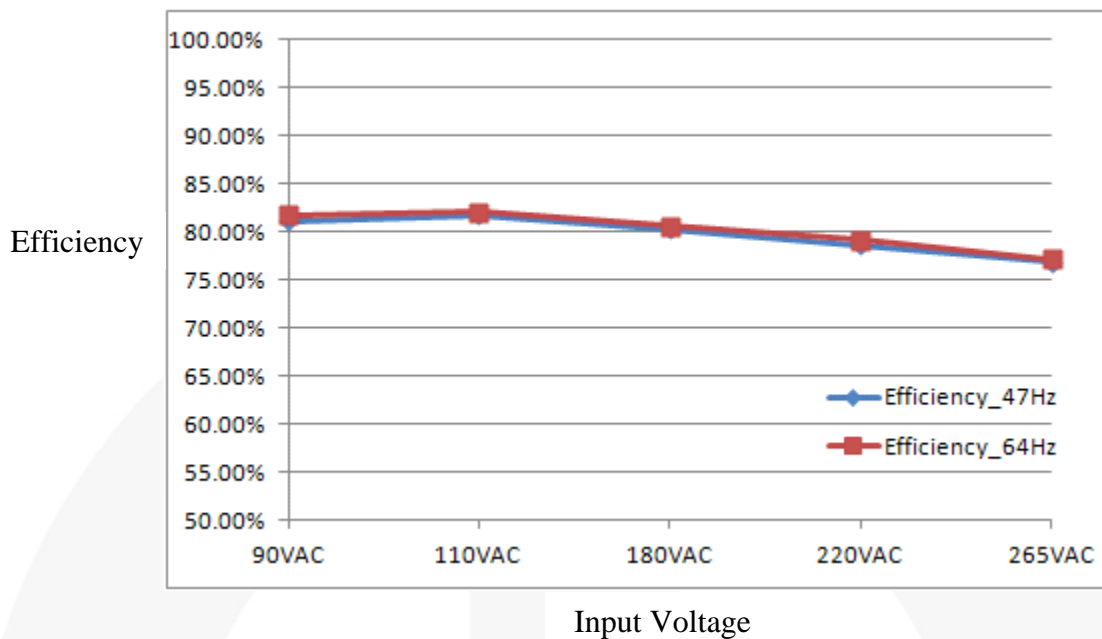
Input Voltage

Figure 3. Efficiency Curve

Table 2.   Efficiency test result

Input Voltage (V$_{AC}$)	Frequency (Hz)	Efficiency (%)
90V$_{AC}$	47Hz	81.12
	64Hz	81.73
110V$_{AC}$	47Hz	81.72
	64Hz	82.08
180V$_{AC}$	47Hz	80.26
	64Hz	82.57
220V$_{AC}$	47Hz	78.64
	64Hz	79.12
265V$_{AC}$	47Hz	76.84
	64Hz	77.14
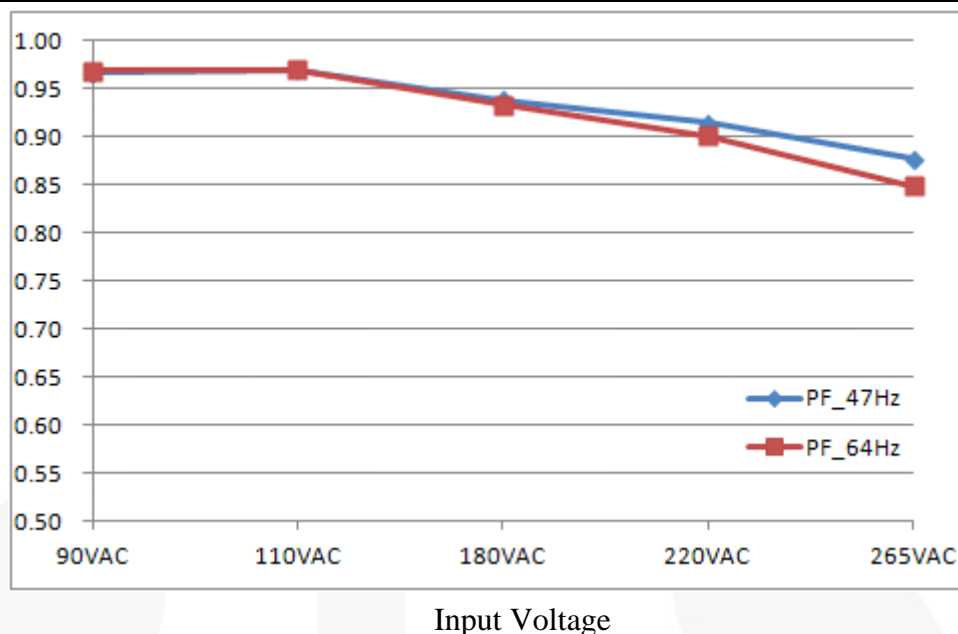
Input Voltage

Figure 4. Power Factor Performance

Table 3. PF Test Result

Input Voltage		Power Factor
90V$_{AC}$	47Hz	0.97
	64Hz	0.97
110V$_{AC}$	47Hz	0.97
	64Hz	0.97
180V$_{AC}$	47Hz	0.94
	64Hz	0.94
220V$_{AC}$	47Hz	0.91
	64Hz	0.90
265V$_{AC}$	47Hz	0.88
	64Hz	0.85

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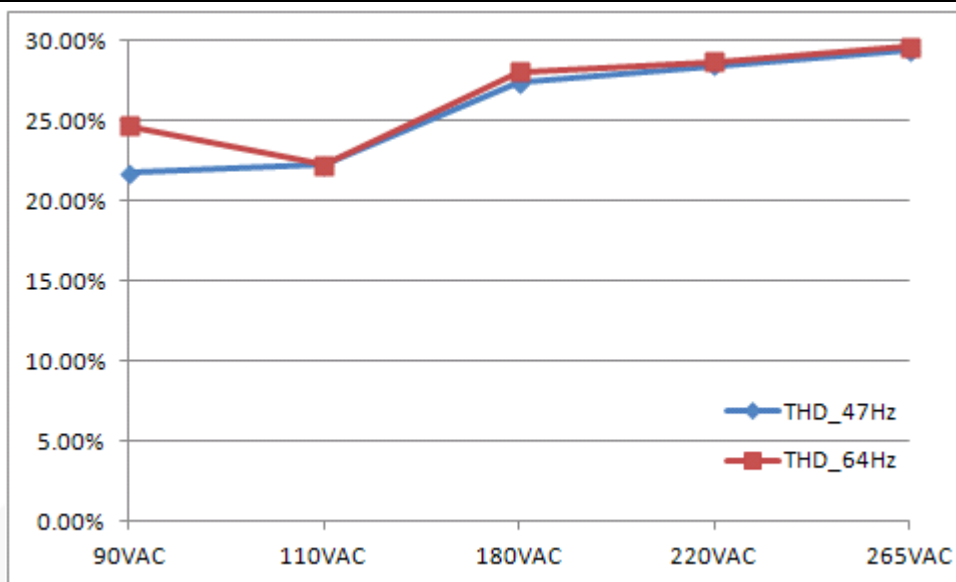
Input Voltage

Figure 5.   THD Performance

Table 4.   THD Test Result

Input Voltage (V_{AC})	Frequency (Hz)	THD (%)
90V_{AC}	47Hz	21.74
	64Hz	24.70
110V_{AC}	47Hz	22.24
	64Hz	22.23
180V_{AC}	47Hz	27.38
	64Hz	28.09
220V_{AC}	47Hz	28.46
	64Hz	28.72
265V_{AC}	47Hz	29.37
	64Hz	29.64

4. Related Resources

Datasheet link FLS0116

http://www.fairchildsemi.com/referencedesign/

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