研吉简介

研吉电子是以研发QC3.0,USB TYPE-C,USB TYPE-C PD充电器、移动电源，车充为主导的专业型方案公司，我们的技术团队均来自于在行业内从业多年，有资深经验的顶尖RD人员。更有像Didoes、Fairchild、STM、Semi-High、Hunteck、CT Micro、MagnaChip、LITEON、龙腾、东微、等原厂,都是我们的长期战略合作伙伴，可以第一时间拿到最新的技术及样品支持。

研吉可以为客户提供最专业的方案和PCBA，在市场竞争越来越加剧的现状下，为客户节省了研发费用，更直接缩短了研发周期，让客户以最高的效率去抢占市场份额。

产品特征

7 IN 1快充

- 24W 充电器支持
- Quick Charger（高通） 3.0 2.0
- PumpExpress（MTK）2.0 1.0
- FCP SFCP(华为海思)
- BC1.2 /Apple2.1A/2.4A
- Fairchild （美国仙童）/FAN602（PWM） &FAN6290(SR同步整流+Protocol 协议控制)

YANJI ELECTRONICS 研吉電子

Target specification

Description	Min	Type	Max	Units	Conditions
input					
Voltang	90		264	VAC	
Frequency	47	50/60	63	Hz	
No-Load input power(230Vac)	15	20	50	mW	
Output					
Output Voltage	3.6	5.0	12	V	
Output Current	2		3	A	
Output Power		24		W	
Output Ripple Voltage			100	mVp-p	Iout=3A @25℃,20MHzbandwidth
Common Mode Noise			2	Vp-p	30k-500kHz,Load with 5ohm Resistor
Output Over Current Protection	3.25		3.30		Hiccup,Auto Restart
Ambient Temperature			45	℃	
Efficlency					
Averang Efficiency (COC-Tie 2)	85		89	%	**Measured at end of output DC-Cable,115Vac＆230Vac @ 25℃**
EMI	**Pass EN55022 CIASS B with 6dB Margin**				

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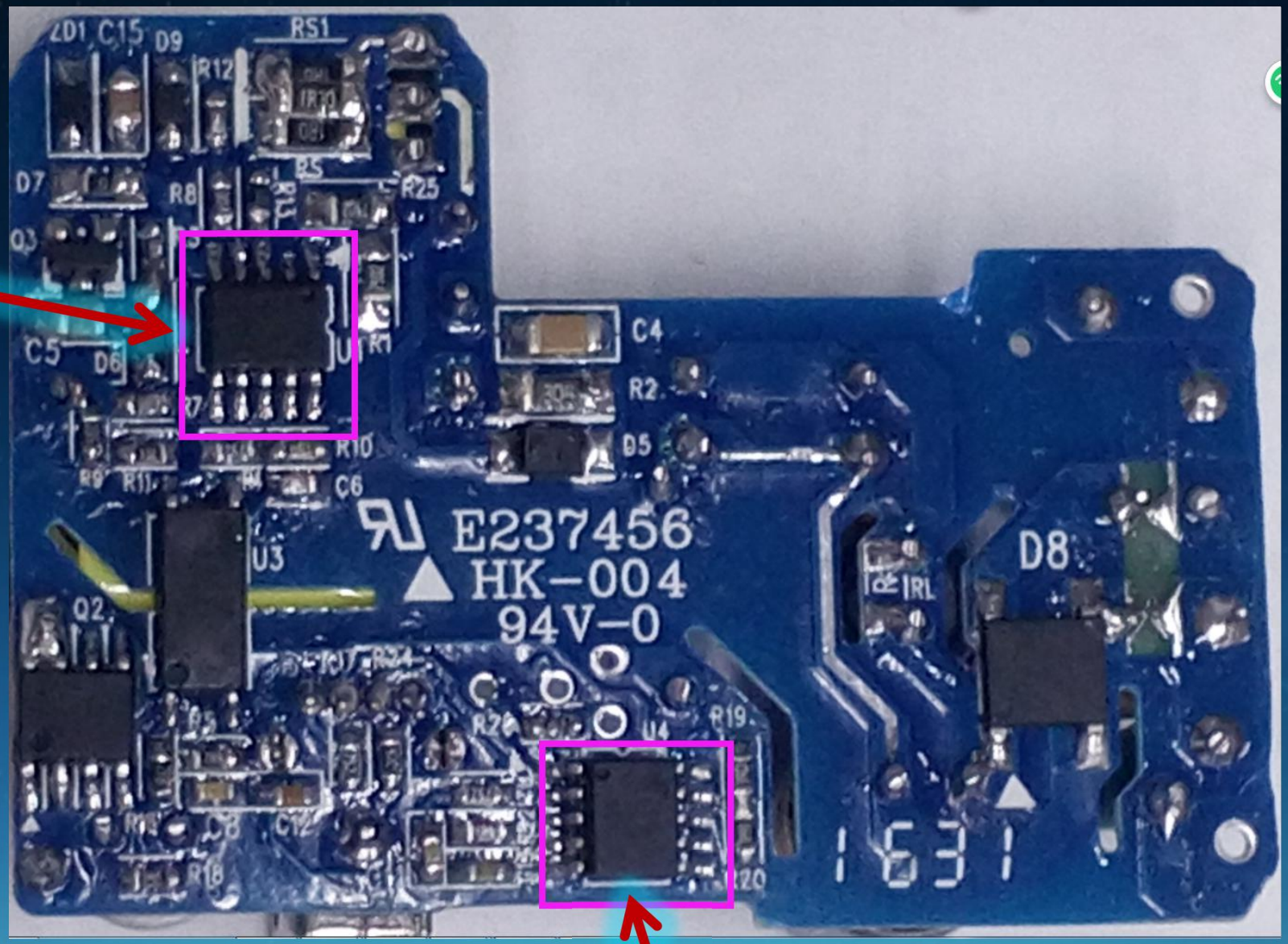
Key Performance

Item	Spec	Test Conditions	Test Data	Result
Output Voltage	5.0-5.4V	90-264Vac@0-3A	5.10-5.40	Pass
Ripple	<120mVp-p	90-264Vac@0-3A	115mV	Pass
Standby Power	<75mW	230Vac@0A	55mW	Pass
Dynamic	4.5-5.5V	90-264Vac@3.0-0.3A 10mS 0.5A/uS	4.80-5.44V	Pass
Common Mode Noise	<2Vp-p	90-264Vac@2A 30K-500kHZ	1.2Vp-p	Pass
ESD	18kV	230Vac@4A	20kV	Pass

YANJI ELECTRONICS 研吉电子

PHOTO-BOTTOM

PWM IC
FAN602MX



同步整流+多协议识别 IC：
FAN6290QH

YANJI ELECTRONICS 研吉电子

核心器件:FAIRCHILD –FAN602MX

FAIRCHILD

July 2015

FAN602
Offline Quasi-Resonant PWM Controller

Features

- High Efficiency Across Wide Input and Output Conditions in a Small Form Factor
  - Quasi Resonant (QR) Switching Operation with Programmable Frequency Range (Maximum Switching Frequency between 125 kHz and 250 kHz
  - Programmable Minimum Peak Current to Improve Light Load Efficiency
  - mWSaver® Technology for Ultra Low Standby Power Consumption (<20mW)
- Low EMI Emissions and Common Mode Noise
  - Use Inherent Frequency Modulation of Valley Switching at Low Line
  - Forced and Inherent Frequency Modulation of Valley Switching at High line
- Advanced User Configurable Protection Features
  - Built-In and User Configurable Over-Voltage Protection (OVP), and Over-Temperature Protection (OTP)
  - Fully Programmable Brown-In and Brown-Out Protection
- Two stage OVP and Adaptive Burst Mode Entry Level for Adaptive Charger Application
- Precise Constant Output Current Regulation with Programmable Line Compensation
- User Configurable Burst Mode Entry and Exit to Maximize Light Load Efficiency and Minimize Audible Noise
- Built-In High-Voltage Startup to Reduce External Components
- 10 Lead MLP QUAD 4mmx3mm

Description

The FAN602 is an advanced PWM controller aimed at achieving power density of ≥10W/in3 in universal input range AC/DC flyback isolated power supplies. It incorporates Quasi-Resonant (QR) control with proprietary Valley Switching with a limited frequency variation. QR switching provides high efficiency by reducing switching losses while Valley Switching with a limited frequency variation bounds the frequency band to overcome the inherent limitation of QR switching.

FAN602 features mWSaver® burst mode operation with extremely low operating current (300 µA) and significantly reduces standby power consumption to meet the most stringent efficiency regulations such as Energy Star's 5-Star Level and CoC Tier II specifications.

FAN602 includes several user configurable features aimed at optimizing efficiency, EMI and protections. FAN602 has a programmable switching frequency range that provides flexibility in choosing noise rejection in targeted frequency zones. It incorporates user-configurable minimum peak current, which allows controlling the burst mode entry/exit power level, thereby enhancing light load efficiency and eliminating audible noise. It also includes several rich programmable protection features such as over-voltage protection (OVP), precise constant output current regulation (CC) and over-temperature protection (OTP) through external thermistor.

FAN602 is available in 10 Lead MLP QUAD package 4mmX3mm.

Applications

- Battery Charges for Smart Phones, Feature Phones, and Tablet PCs
- AC-DC Adapters for Portable Devices or Battery Chargers that Require CV/CC Control

YANJI ELECTRONICS 嵘吉電子

核心器件: FAIRCHILD –FAN6290QH

PRELIMINARY DATASHEET

FAIRCHILD SEMICONDUCTOR

November 2015

FAN6290Q
Compact Secondary-Side Adaptive Charging Controller Synchronous Rectifier Control and Cable Fault Protection

Features

- FAN6290Q : Compatible with Quick Charge 3.0 (QC3.0)
- Internal Synchronous Rectifier Control Circuit
- Secondary-Side Constant Voltage (CV) and Constant Current (CC) Regulation with Two Operational Amplifiers of Open-Drain Type for Dual-Loop CV/CC Control
- Small Current Sensing Resistor (30mΩ) for High Efficiency
- Built-in Adaptive Secondary-Side Output Over-Voltage Protection
- Built-in output capacitor bleeding function for fast discharging during change of output mode
- Output Under-Voltage Protection for Output Soft-short Condition
- Cable Fault Protection
- Built-in Cable-Drop Compensation

Applications

- Battery Chargers for Smart Phones, Feature Phones, and Tablet PCs
- AC-DC Adapters for Portable Devices that Require CV/CC Control

Description

FAN6290Q is a highly integrated, secondary-side power adaptor controller compatible with the Quick Charge 3.0 (QC3.0) protocol. FAN6290Q internally adopts synchronous rectifier control for less BOM counts as well as easy design.

It is designed for use in applications that require constant voltage (CV) and constant current (CC) regulation. The controller consists of two operational amplifiers for voltage- and current-loop regulation with adjustable references. The outputs of the CV and CC amplifiers are tied together in open-drain configuration.

FAN6290Q enables adaptor output voltage adjustment when Quick Charge 3.0 protocol is acknowledged. According to request from a battery charger of a power device, output voltage is adjusted up to 12 V. When a power device that implements non-compliant protocols is attached, it just maintains the default output, 5 V, for safety of the power device.

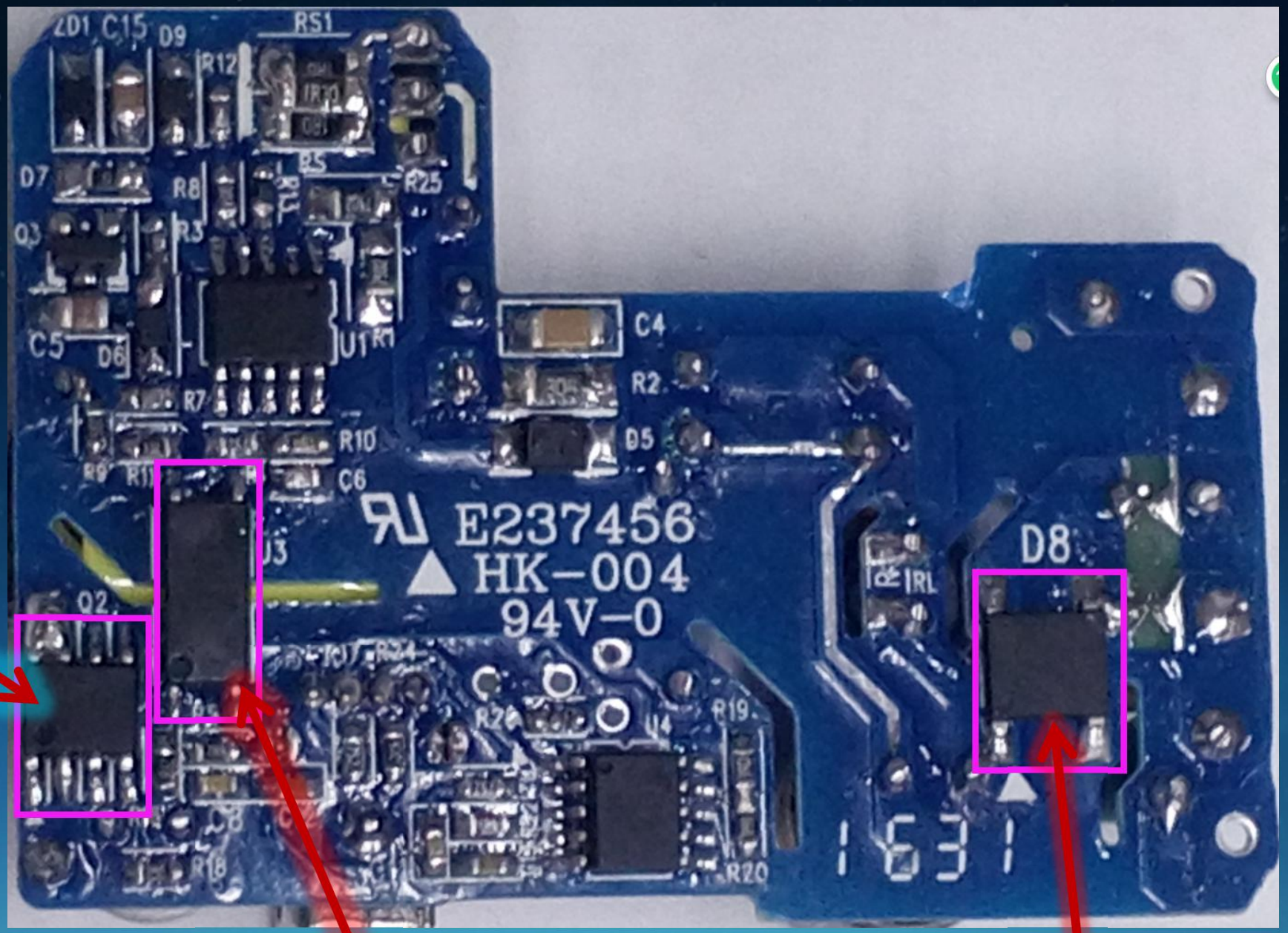
FAN6290Q incorporates an adaptive output over voltage and under voltage protections to improve system reliability.

Cable fault function can protect USB fault condition as monitoring fault status on D+ and D- lines. A power device also can send fault conditions through assigned codes. After fault conditions are acknowledged, system is shut-down with Auto-restart mode or Latch mode. This shut-down mode can be selected according to a primary controller.

FAN6290Q – Compact Secondary-Side Adaptive Charging Controller

YANJI ELECTRONICS 研吉电子

PHOTO-BOTTOM



SR MOS:HUNTECH
HGS090N06SL

光耦：
CT ： CT1019

整流桥：
BDC ABS20M

YANJI ELECTRONICS 研吉电子

核心器件

Hunteck

HGS090N06SL　P-1

60V N-Ch Power MOSFET

Feature

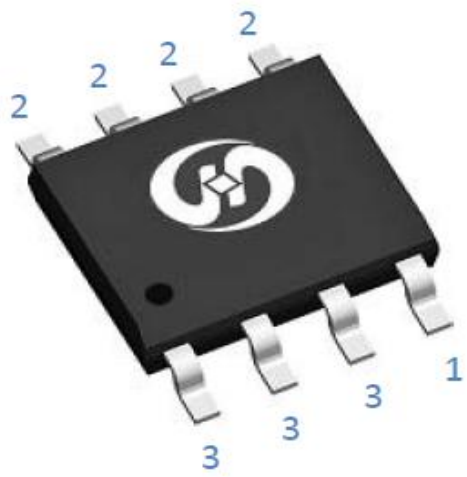
- ◇ High Speed Power Switching,Logic level
- ◇ Enhanced Body diode dv/dt capability
- ◇ Enhanced Avalanche Ruggedness
- ◇ 100% UIS Tested, 100% Rg Tested
- ◇ Lead Free, Halogen Free

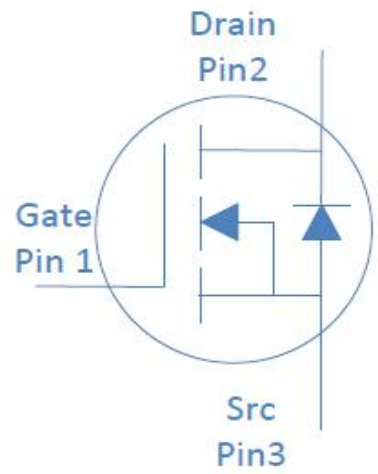
V_{DS}		60	V
$R_{DS(on),typ}$	V_{GS}=10V	7.5	mΩ
$R_{DS(on),typ}$	V_{GS}=4.5V	10.2	mΩ
I_D		14	A

Application

- ◇ Synchronous Rectification in SMPS
- ◇ Hard Switching and High Speed Circuit
- ◇ DC/DC in Telecoms and Inductrial

SOIC-8





Part Number	Package	Marking
HGS090N06SL	SOIC-8	GS090N06SL

YANJI ELECTRONICS 嘉合電子

核心器件

CT1010, CT1011, CT1012, CT1013
CT1014, CT1017, CT1018, CT1019
DC Input 4-Pin Long Mini-Flat Phototransistor Optocoupler

Features

- High isolation 5000 VRMS
- CTR flexibility available see order information
- Extra low coupling capacitance
- DC input with transistor output
- Temperature range - 55 °C to 110 °C
- Regulatory Approvals
  - UL - UL1577 (E364000)
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC – GB4943.1, GB8898
  - IEC60065, IEC60950
- Creepage distance > 8 mm
- Green Package

Applications

- Switch mode power supplies
- Computer peripheral interface
- Microprocessor system interface

Description

The CT1010, CT1011, CT1012, CT1013, CT1014, CT1017, CT1018, CT1019 series consists of a photo transistor optically coupled to a gallium arsenide Infrared-emitting diode in a 4-lead SOP Package.

YANJI ELECTRONICS 晶吉电子

核心器件

LITE-ON SEMICONDUCTOR

ABS20M

GLASS PASSIVATED SURFACE MOUNT BRIDGE RECTIFIER

REVERSE VOLTAGE – 1000 Volts
FORWARD CURRENT – 2 Amperes

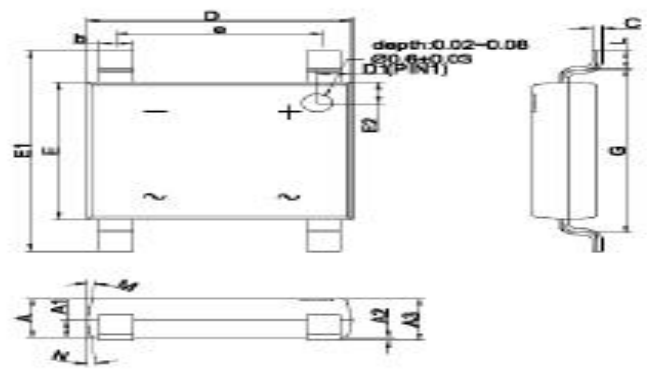
FEATURES

- Ideal for printed circuit board
- Reliable low cost construction utilizing molded plastic technique

MECHANICAL DATA

- Case Material: "Green" molding compound, UL flammability classification 94V-0,(No Br. Sb. Cl.) "Halogen-free"
- UL recognized file # E364304
- Polarity indicator: As marked on the body
- Weight: 98 mg (Approximate)
- Marking Code: ABS20M

ABS



ABS		
DIM	MIN	MAX
A	1.20	1.30
A1	0.43	0.63
A2	0.00	0.10
A3	1.20	1.40
b	0.50	0.80
C	0.10	0.30
D	4.85	5.25
D1	0.45	0.85
e	4.00 TYP.	
E	4.25	4.65
E1	6.40	6.80
E2	0.45	0.85
G	5.20	5.60
L	0.40	0.80
M	7° TYP.	
N	7° TYP.	
All dimension in millimeter		

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Ratings at 25°C ambient temperature unless otherwise specified.

ABSOLUTE RATINGS

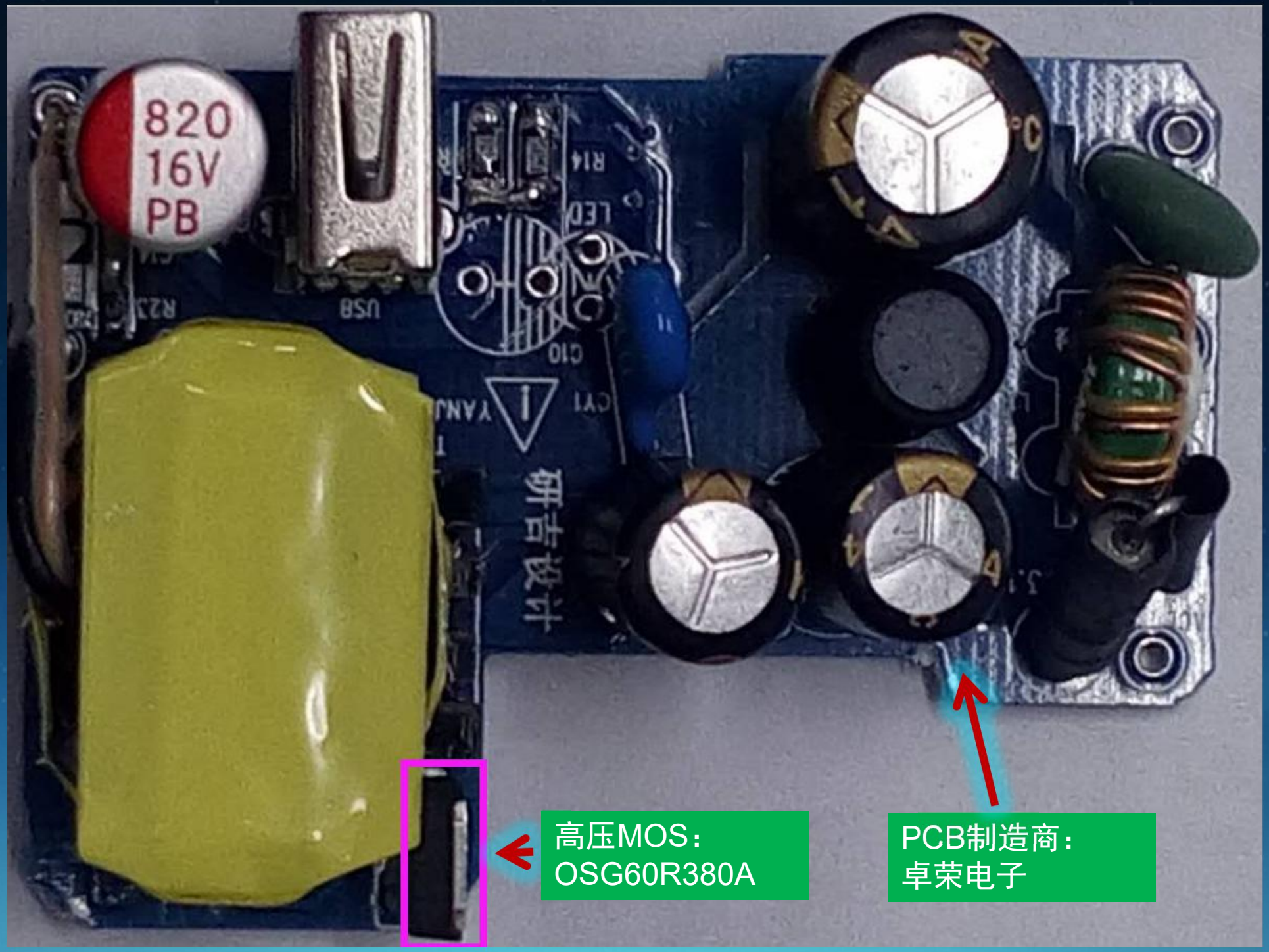
PARAMETER		SYMBOL	VALUE	UNIT
Maximum repetitive peak reverse voltage		V_{RRM}	1000	V
Maximum DC blocking voltage		V_{DC}	1000	V
Average rectified output current per device		$I_{(AV)}$	2	A
Peak forward surge current 8.3ms single half sine-wave superimposed on rated load	@ T_A=25°C @ T_A=125°C (Note 1)	I_{FSM}	55 44	A
Peak forward surge current 1ms single half sine-wave superimposed on rated load	@ T_A=25°C @ T_A=125°C (Note 1)	I_{FSM}	110 88	A
I^2t rating for fusing (t = 8.3ms)		I^2t	10.37	A^2S
Operating and storage temperature range		T_J ,T_{STG}	-55 to +150	°C

STATIC ELECTRICAL CHARACTERISTICS

PARAMETER	TEST CONDITION		SYMBOL	MAX.	UNIT
Forward voltage (Note1)	I_F = 1A	T_A = 25°C	V_F	0.95	V
Leakage current	V_R = 1000V	T_A = 25°C T_A = 125°C (Note1)	I_R	10 100	uA
Typical junction capacitance (Note 2)			C_J	12.34	pF

YANJI ELECTRONICS 研吉電子

PHOTO -TOP



YANJI ELECTRONICS 研吉电子

核心器件介绍

- 高压MOS来自于东微半导体主推规格OSG60R380A

产品介绍

东微半导体 ORIENTAL SEMICONDUCTOR

为适应电源系统高效率小型化的需求，东微半导体推出了新型的GreenMOS™系列高压MOSFET及SFGMOS™系列中低压高速MOSFET产品。采用独特专利器件结构和制造工艺，GreenMOS™和SFGMOS™产品具有比常规MOSFET更快的开关速度及更柔和的开关曲线，在获得极低的动态损耗的同时最大限度抑制了开关震荡。不仅可以大大提高系统效率、降低发热量，同时简化了系统EMI设计。GreenMOS™系列产品覆盖600-800V全系列，最大提供高达80A静态电流的规格，最高工作频率达到2MHz，可以满足各种电源系统的需求。SFGMOS™系列产品提供60-200V耐压，内阻低至2.5mΩ。基于其高效率低温升的特点，东微半导体的功率器件产品特别适用于快速充电器、LED电源、通讯、服务器电源、电动车充电桩、电机驱动等系统。

Product Name	Package	Vdss(V)	Id(A)	Rdson_typ(Ω)	Rdson_max(Ω)
OSG60R380A	TO251	600	11	0.33	0.38

YANJI ELECTRONICS 研吉电子

核心器件介绍

- PCB是世界标准生产厂家：卓荣电子，特别提供
- 卓荣电子，專業生產各種高精密單雙多層pcb，特別在電源，汽車及背光源有著特別的經驗技術，以先進的設備，多年的經驗在行業內得到優良的口碑

效率参数

Efficiency Test

- Measurement point : Board End

CoC Tier2: 69.73% at 10% load; 79.00% at Avg. Eff @$5V_O$

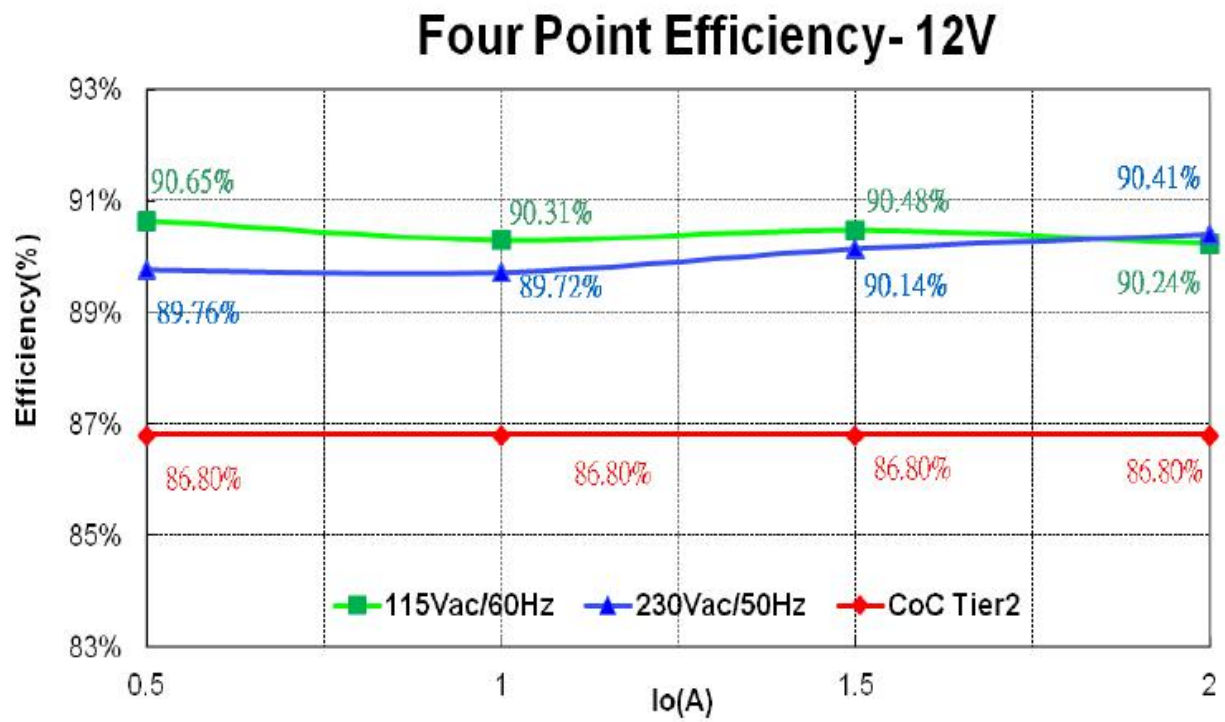
Vo=5V						
	10%	25%	50%	75%	100%	Avg
85Vac	91.49	90.15	89.52	89.02	88.52	89.30
115Vac	91.40	90.28	89.91	89.83	89.53	89.89
230Vac	87.70	86.88	86.94	88.01	88.26	87.52
264Vac	85.92	85.38	85.43	86.86	87.36	86.26

CoCTier2: 75.00% at 10% load; 85.45% at Avg. Eff @$9V_O$

Vo=9V						
	10%	25%	50%	75%	100%	Avg
85Vac	91.30	90.31	89.71	89.69	89.04	89.69
115Vac	91.59	90.89	90.31	90.50	90.36	90.51
230Vac	89.54	88.73	89.19	89.58	89.91	89.35
264Vac	88.42	88.09	88.24	88.68	89.14	88.54

CoC Tier2: 76.20% at 10% load; 86.80% at Avg. Eff @$12V_O$

Vo=12V						
	10%	25%	50%	75%	100%	Avg
85Vac	89.42	89.71	89.51	89.74	88.58	89.38
115Vac	90.04	90.65	90.31	90.48	90.24	90.42
230Vac	88.90	89.76	89.72	90.14	90.41	90.01
264Vac	88.04	88.99	89.01	89.48	90.08	89.39



✓ **Coc-tier2 requests 86.8% at 12V output**

✓ **The EVB can meet it with over than 3% margin.**

输出纹波参数

Output Ripple & Noise

- Measurement point : Board End

	Vo=5V	Vo=9V	Vo=12V
Input Voltage	Max. ripple (mV)	Max. ripple(mV)	Max. ripple(mV)
85Vac	93	93	105
115Vac	106	98	103
230Vac	116	103	113
264Vac	116	111	114

- Max ripple is measured in the burst mode, excepting 12V at 85Vac.
- The max ripple of 12V at 85Vac is measured at full load condition.
- Target spec of output ripple is under 150mV.

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