

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

➤ **2 IN 1 PD+QC3.0快充全兼容**

➤ **45W PD充电器，单口输出同时支持 Quick Charge（高通） 3.0/ 20**

➤ **Fairchild（美国仙童）/FAN602（PWM）&FAN6240(SR同步整流）
+ PD Protocol 协议控制)**

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	20	V	
Output Current	2		3	A	
Output Power		45		W	
Output Ripple Voltage			100	mVp-p	Iout=3A @25°C,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	°C	
Efficiency					
Averang Efficiency (COC-Tie 2)	85		89	%	Measured at end of output DC-Cable,115Vac&230Vac @ 25°C
EMI	Pass EN55022 CIASS B with 6dB Margin				

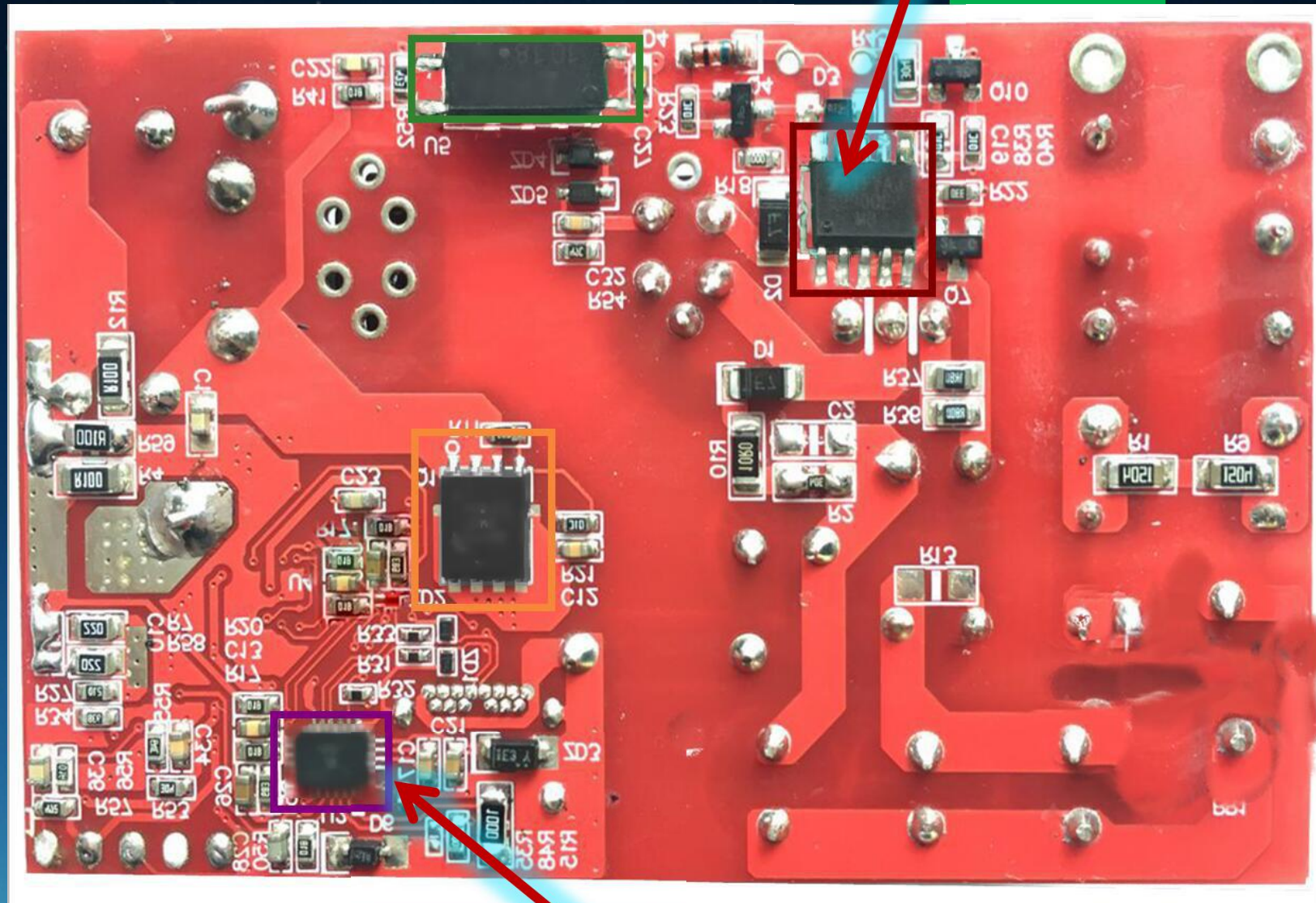
Key Performance

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	100mV	Pass
Standby Power	<75mW	230Vac@0A	50mW	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



PHOTO-BOTTOM

PWM IC
FAN602MX



同步整流+多协议
识别 IC: XXXX

核心器件:FAIRCHILD –FAN602MX

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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 $\geq 10\text{W/in}^3$ 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

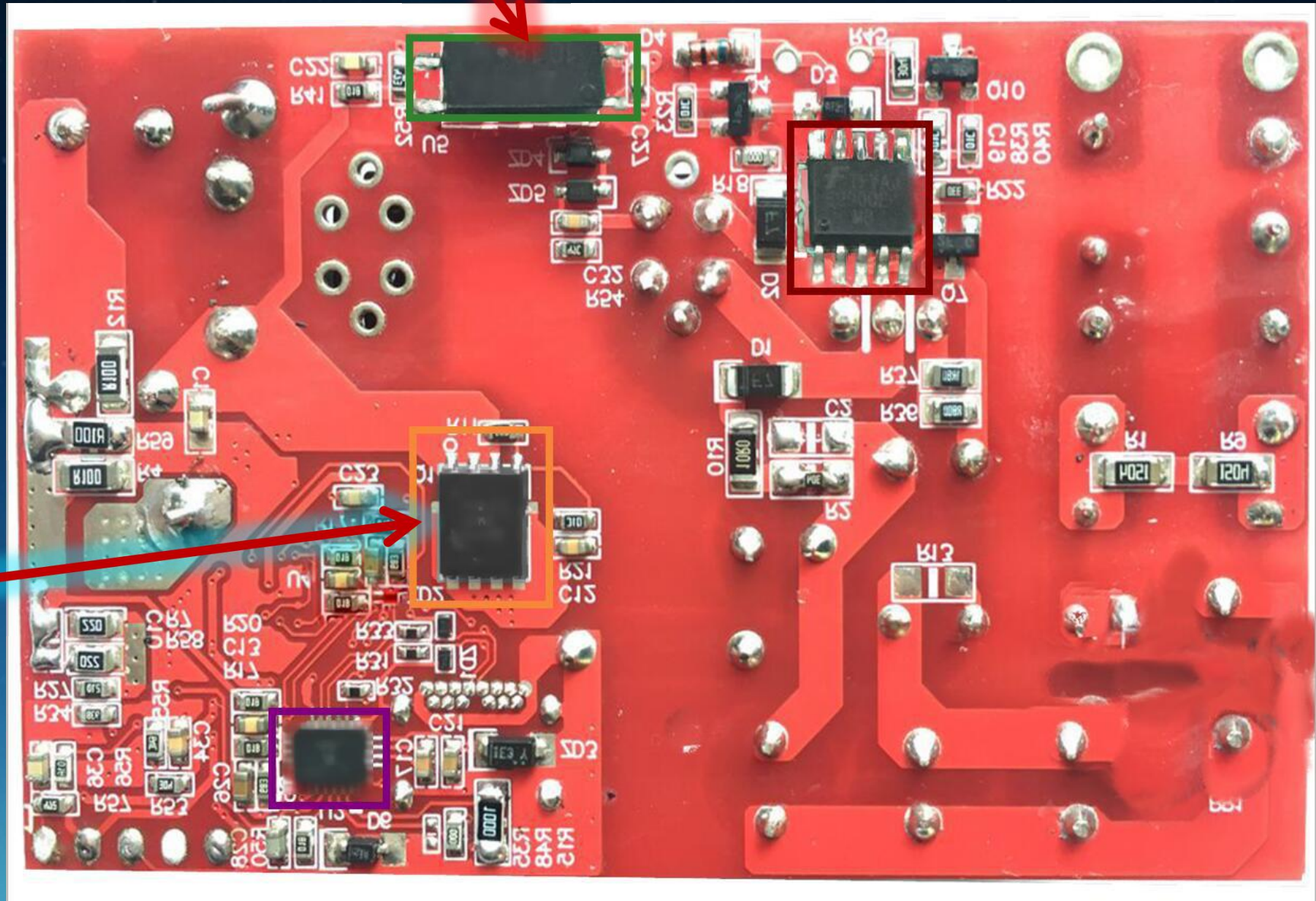
- Battery Charges for Smart Phones, Feature Phones, and Tablet PCs
- AC-DC Adapters for Portable Devices or Battery Chargers that Require CV/CC Control

FAN602 — Offline Quasi-Resonant PWM Controller



PHOTO-BOTTOM

光耦:
CT-CT019



SR MOS:HUNTECH
HGN077N10SL

核心器件



HGN077N10SL

P-1

Feature

- ◇ Optimized for high speed switching, Logic level
- ◇ Enhanced Body diode dv/dt capability
- ◇ Enhanced Avalanche Ruggedness
- ◇ 100% UIS Tested, 100% Rg Tested
- ◇ Lead Free, Halogen Free

Application

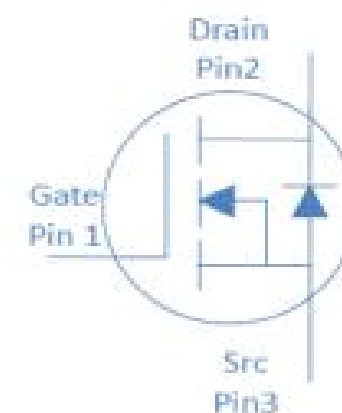
- ◇ DC-DC Conversion
- ◇ Hard Switching and High Speed Circuit
- ◇ Power Tools
- ◇ UPS
- ◇ SSR

100V N-Ch Power MOSFET

VDS		100	V
RDS(on).typ	VGS=10V	6.4	mΩ
Rds(on).typ	VGS=4.5V	7.8	mΩ
ID (Sillicon Limited)		86	A
ID (Package Limited)		60	A

Part Number	package	Marking
HGN077N10SL	DFN5X6	GN077N10SL

DFN5x6





**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.



PHOTO -TOP

桥堆：
GBP410

Type C母座：金
晟科技

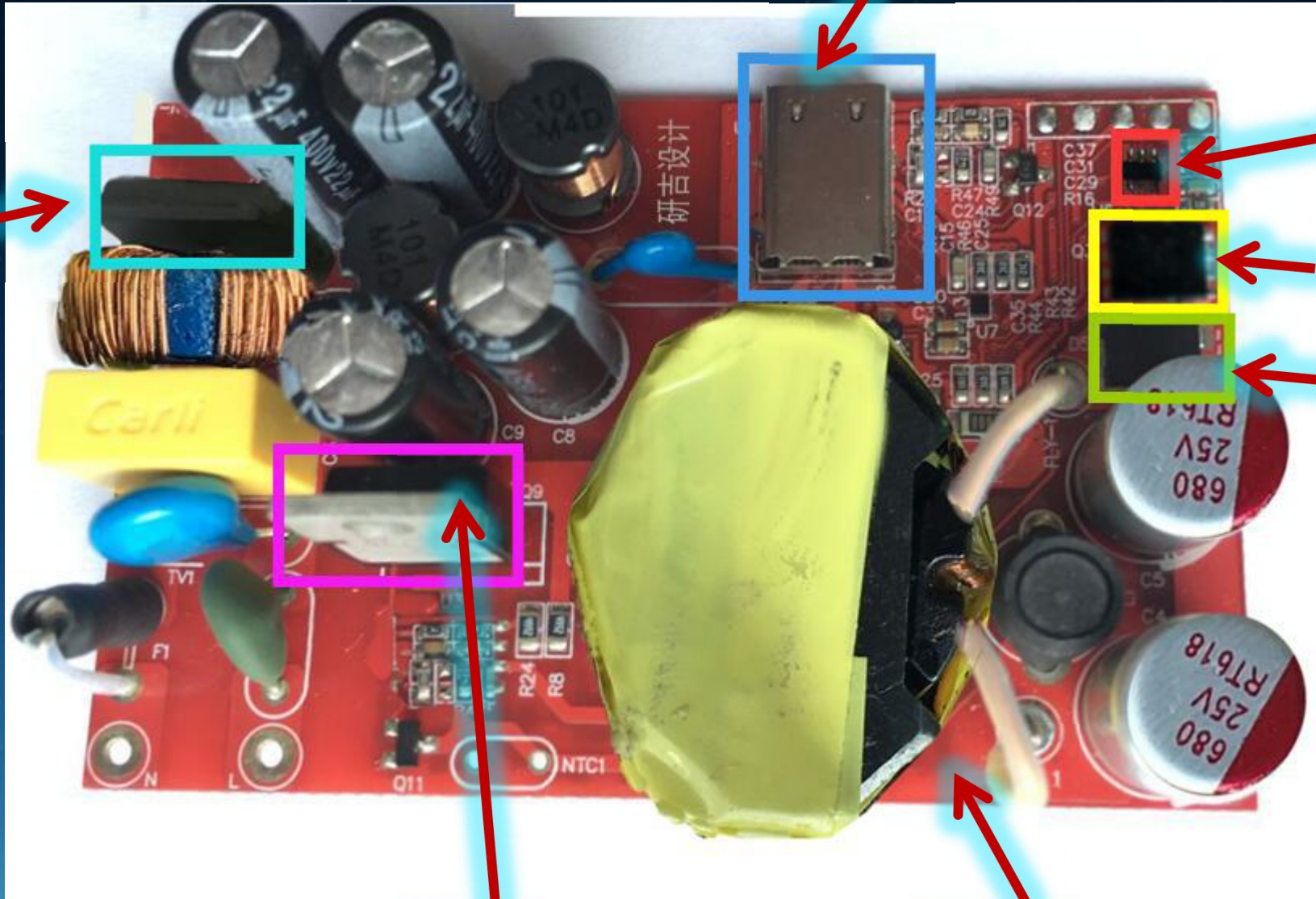
SR同步整流：
FAN6240

Load MOS：
FDMS6681Z

肖特基：
SBRT20U100slp

高压MOS：LONTEN
LSH07N60

PCB制造商：
卓荣电子



核心器件介绍----- Fairchild SR FAN6240



FAN6240 Secondary-Side Synchronous Rectifier Controller for Flyback Converters

Features

- Works in Discontinuous Conduction Mode (DCM).
- Adaptive Turn-off Trigger Blanking Time for easier use
- Turn-on Trigger Blanking Time (Minimum-OFF Time) for Improved Noise Immunity
- Supports High-Frequency Applications up to 200 kHz
- Minimum Turn-on Delay (20 ns)
- Adaptive Turn-off Threshold Control for Minimized SR MOSFET Body Diode Conduction (Dead-Time is independent of SR MOSFET)
- Wide Voltage Range for LDO Input up to 30 V
- Small Footprint: SOT-23 6 Pin Package

Description

The FAN6240M6X is a secondary-side synchronous rectifier (SR) controller for an isolated flyback converter operating in Discontinuous Conduction Mode (DCM). The adaptive dead-time control algorithm minimizes the body diode conduction of SR MOSFET while guaranteeing stable and robust SR operation against noise and disturbance caused by the circuit parasitic. 30 V rated input voltage LDO and Low VDD Under-Voltage Lockout (UVLO) voltage allow FAN6240M6X to be used for wide ranges of switched mode power supply output voltage without additional circuit.

Applications

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

FAN6240 — Secondary-Side Synchronous Rectifier Controller for Flybac

核心器件介绍----- Lonten LSH07N60



西安龙腾新能源科技发展有限公司是一家致力于新型功率半导体器件产品的研发及销售于一体的高新技术企业。公司由一批在电力电子、半导体等相关行业的资深人士创立，管理团队由具备国际化视野及上市公司管理背景的专业化人员组成。公司视技术创新为企业发展的核心竞争力，建有国内一流水准的研发中心及应用测试实验室。公司已通过ISO9001:2008质量体系认证，在功率半导体器件设计及应用领域已申请52项专利。

西安龙腾为开关电源、逆变器等电能变换产品的应用领域提供600V-900V超级结MOSFET系列产品、中低压Trench和SGT技术MOSFET系列产品、600V-1200V 单管IGBT系列产品、1200V-1700V IGBT模块、快速二极管等系列产品。西安龙腾功率半导体产品采用优化的设计、先进的工艺和可靠的封装，具有低功耗和高可靠性，尤其适用于对功率密度和能效要求较高的产品，产品已在TV板卡电源、充电器、适配器、计算机及服务器电源、LED驱动电源和工业电源等多个领域得到广泛应用。

公司的长期发展目标是成为全球功率半导体器件重要供应商。

Voltage level	part Number	VDS (V)	VDS (V)	PD (w) 25°C	Rds(on)(Ω) (VGS=10v)		Qg(nc) (vGS=10V)	VGS (V)	VGS(th) (v)	Packag e
					TYP.	Max.	TYP.			
	LSH07N 60	600	7	83	0.51	0.57	19	30	3.5	TO-251

核心器件介绍----- 平伟桥堆 GBP406

GBP4005 THRU GBP410

SINGLE PHASE 4.0AMPS.GLASS PASSIVATED BRIDGE RECTIFIERS

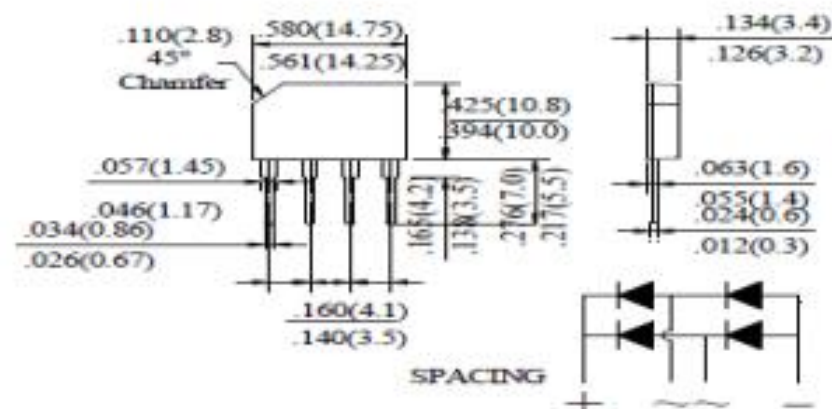
FEATURE

- . Ideal for printed circuit board
- . Glass passivated chip junctions
- . High case dielectric strength
- . Low leakage
- . Low forward voltage
- . High surge current capability
- . High temperature soldering guaranteed:
260°C/10seconds/.375"(.9.5mm) lead lengths.

MECHANICAL DATA

- . Case: Molded plastic body
- . Epoxy: UL 94V-0 rate flame retardant
- . Terminals: Pure tin plated, Lead free. Leads solderable per MIL-STD-750, Method 2026.
- . Polarity: Symbols molded or marked on body
- . Mounting position: Any

GBP



Dimensions in inches and (millimeters)

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Ratings at 25°C ambient temperature unless otherwise specified.
Single phase, half wave, 60Hz.resistive or inductive load.
For capacitive load, derate current by 20%

Type Number	SYM BOL	GBP 4005	GBP 401	GBP 402	GBP 404	GBP 406	GBP 408	GBP 410	units
Maximum Reurrent peak Reverse Voltage	VRRM	50	100	200	400	600	800	1000	V
Maximum RMS Voltage	VRMS	35	70	140	280	420	560	700	V
Maximum DC blocking Voltage	VDC	50	100	200	400	600	800	1000	V
Maximum Average Forward rectified Output Currecnt at Tc=100°C	IF(AV)	4.0							A
Peak Forward Surge Current 8.3ms single half sine-wave superimposed on rate load(JEDEC method)	IFSM	120							A
Maximum Forward Voltage Dropper dlement at 4.0A DC	VF	1.1							V

核心器件介绍

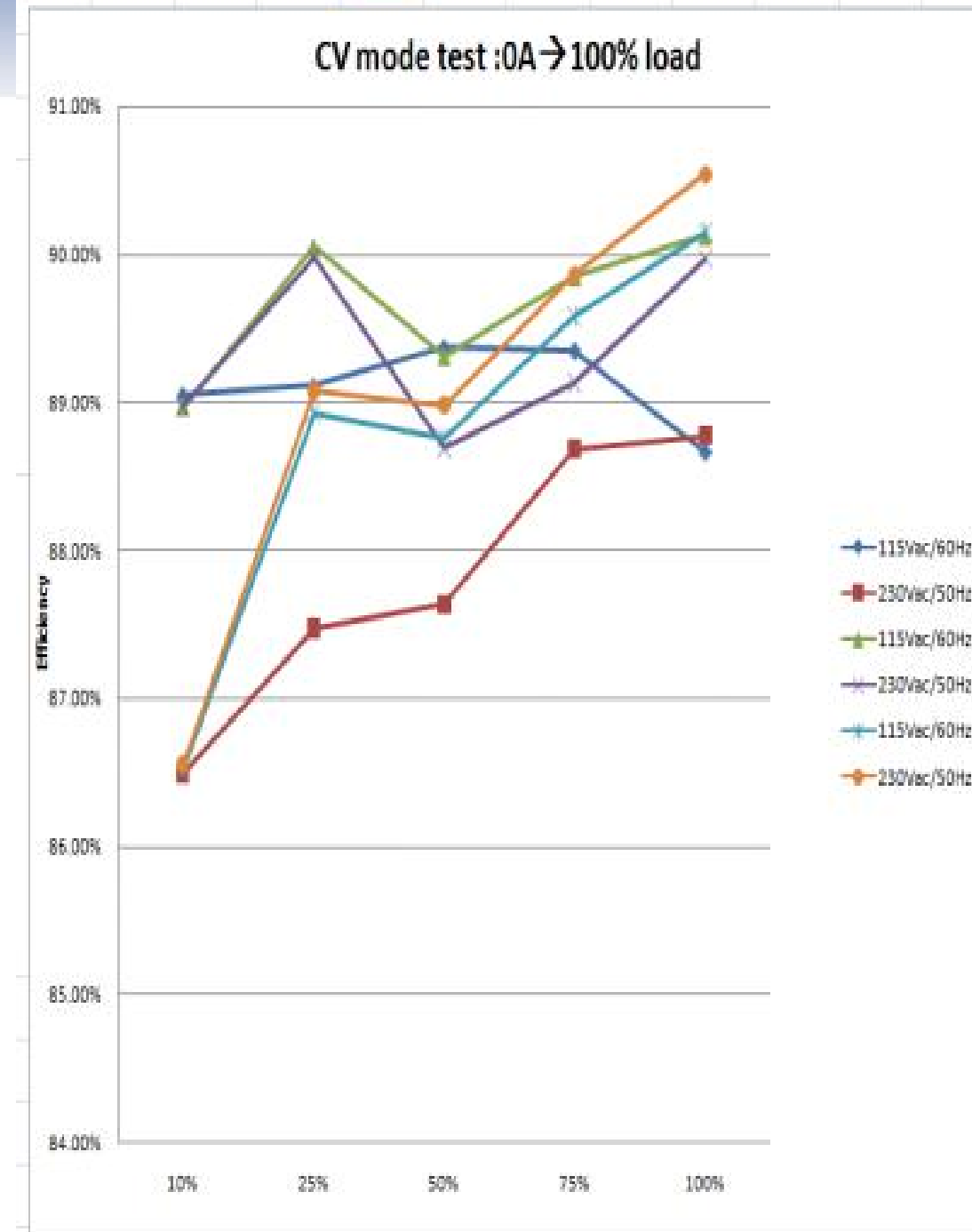
- ◆PCB是世界标准生产厂家：卓荣电子，特别提供
- ◆卓荣电子，专业生产各种高精密单多口PCB, 特别在电源，汽车及背光源有着特别的经验技术。以先进的设备和多年的经验在行业内得到优良的口碑。

效率参数

5V Mode								
mode	vin	10%	25%	50%	75%	100%	Avg	specificat ion
5v/2.0A	90vac/60hz	87.80%	88.90%	88.60%	88.40%	88.30%	88.55%	Meet c.o.c tier 2:115vac/ 230Vac Average eff.>80.5 9% 10%eff.> 71.28%
	115vac/60hz	89.05%	89.11%	89.37%	89.35%	88.67%	89.13%	
	230vac/50hz	86.49%	87.47%	87.63%	88.68%	88.77%	88.14%	
	264vac/50hz	85.51%	86.29%	86.73%	87.33%	87.83%	87.05%	

12v mode								
mode	vin	10%	25%	50%	75%	100%	Avg	specificati on
12v/3.0A	90Vac/60Hz	88.53%	89.37%	88.64%	89.35%	89.57%	89.23%	Meet C.O.C tier2:115 Vac/230V ac Average eff.>86.5 2% 10%eff.> 75.96%
	115Vac/60Hz	88.97%	90.05%	89.31%	89.85%	90.13%	89.84%	
	230Vac/50Hz	88.97%	89.98%	88.69%	89.13%	89.97%	89.44%	
	264Vac/50Hz	88.53%	88.13%	87.96%	90.25%	89.33%	88.92%	

20V Mode								
mode	vin	10%	25%	50%	75%	100%	Avg	specifica tion
20V/2.25A	90vAC/60Hz	86.58%	88.80%	88.50%	89.08%	90.51%	89.22%	Meet C.O.C tier2:115 Vac/230 Vac Average eff.>86.5 2% 10%eff.>
	115Vzc/60Hz	86.52%	88.93%	88.76%	89.58%	90.15%	89.36%	
	230Vac/50Hz	86.55%	89.08%	88.98%	89.86%	90.54%	89.62%	
	264Vac/50Hz	86.09%	88.49%	88.73%	89.03%	89.65%	88.98%	



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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