

Bias supply DC-DC

KIT_6W_13V_P7_950V

Auxiliary supply solution featuring off-line
SMPS current mode controller IC with
950 V CoolMOS™ P7 SJ MOSFET

Description

KIT_6W_13V_P7_950V



Ordering code:
KIT_6W_13V_P7_950V

Board components

- › CoolSET™ 5th gen. Stand-alone controller (ICE5QSAG)
- › 950V CoolMOS™ P7 SJ MOSFET (IPU95R3K7P7)

Board specifications

- › Input voltage: $90V_{DC} - 440 V_{DC}$
- › Output voltage: $13V_{DC}$ (pri. + sec. side)
- › Output power max.: 6W (pri. + sec. side)

Technical Parameter

KIT_6W_13V_P7_950V

Summary

Quasi-resonant flyback using a Infineon's fifth generation controller.

-Snubberless operation to improve efficiency, 950V breakdown voltage allows operating off of higher input voltages.

Primary side regulated 18V and a secondary side unregulated 13V output.

In power supplies that are used for server, telecom, and industrial applications there is typically a small bias power supply in addition to the main power converter. This 6W bias board is designed to run in a system where it is continuously powered from the 400V_{DC} output of a boost power factor correction (PFC) converter and provides power to fans, gatedrivers, and controllers. This board uses the ICE5QSAG quasi-resonant (QR) flyback controller and the new 950V CoolMOS™ P7 (IPU95R3K7P7). This 950V breakdown voltage gives additional margin in the system to ensure the bias continues to run through surge events. This design was done as a snubberless flyback converter to further improve the efficiency over the entire load range.

Description

Value

Max. Efficiency [%]

85

Max. Efficiency [%] @ Output Current [A]

0.35

Max. Efficiency [%] @ Input Voltage [V]

400

Nom. Efficiency [%]

85

Efficiency @ 10% load [%]

50

Efficiency @ 50% load [%]

85

Efficiency @ 100% load [%]

85

Switching frequency min [kHz]

25

Switching frequency max [kHz]

60

Input Voltage Type

DC

Input Voltage min [V]

90

Input Voltage nom [V]

380

Input Voltage max [V]

440

ICE5QSAG

Description:

- › Infineon latest 5th generation quasi-resonant flyback PWM controller offers high performance and comprehensive suite of protection to increase system robustness.

Summary of Features:

- › Novel quasi-resonant switching scheme
- › Rapid and adjustable start-up with cascode configuration
- › 2 level selectable active burst mode level
- › Built-in digital soft-start
- › Cycle by cycle peak current limitation
- › Digital frequency reduction with decreasing load for higher efficiency
- › Adjustable line input over-voltage and brown IN/OUT protection
- › V_{CC} and CS pin short to ground protection
- › OLP, output short, output over-voltage, OTP with hysteresis and V_{CC} over/under voltage protection
- › Auto-restart for all protection features



Benefits:

- › High efficiency with latest CoolMOS™ P7 SJ MOSFET family and quasi-resonant switching scheme
- › Auto-restart recovery scheme to minimize interruption to system operation
- › Extensive protection coverage to increase system robustness
- › Rapid start-up performance with cascode configuration

Product features

KIT_6W_13V_P7_950V

IPU95R3K7P7

Description:

- › Designed to meet the growing consumer needs in the high voltage MOSFETs arena, the latest 950V CoolMOS™ P7 technology focuses on the low-power SMPS market.

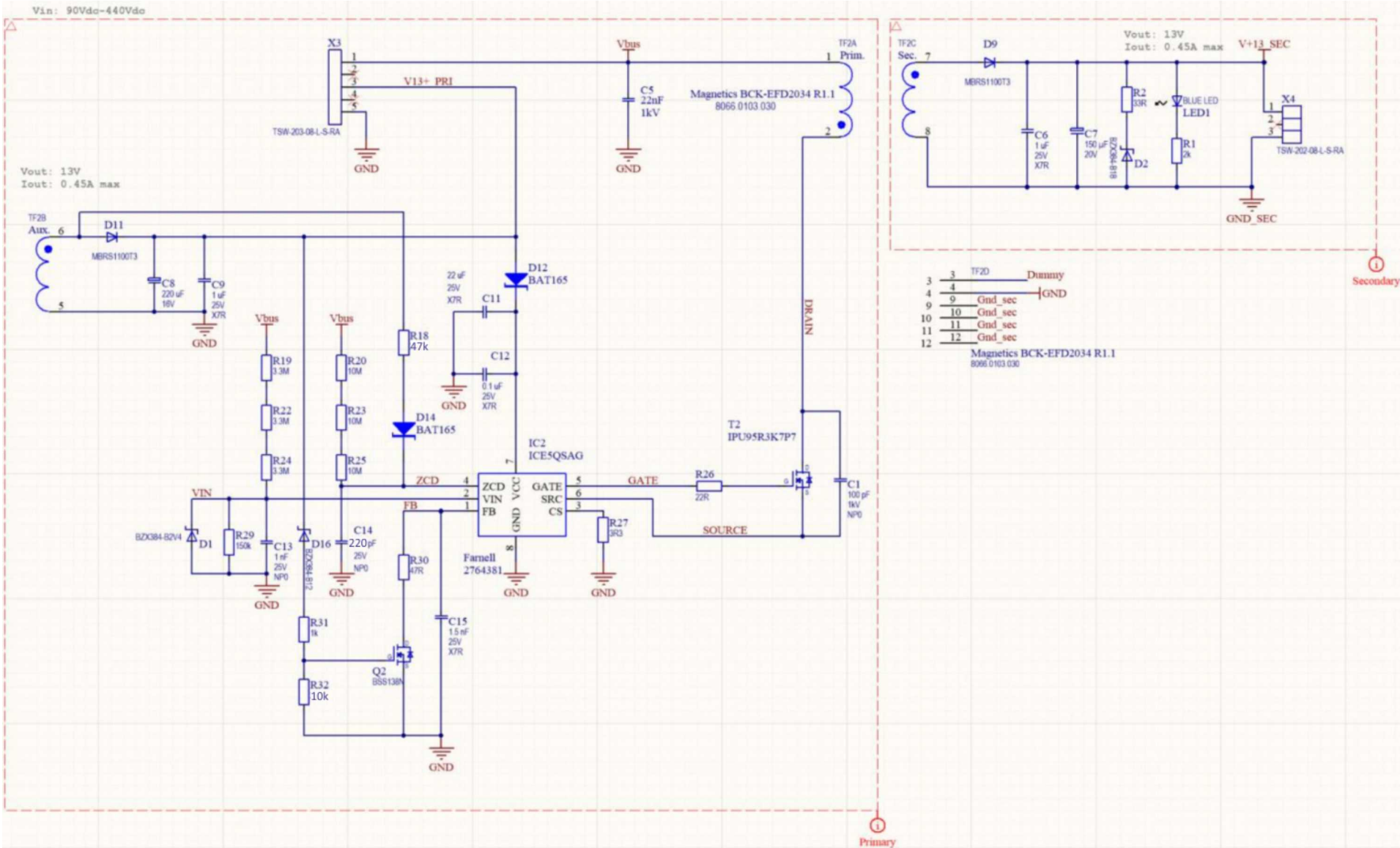
Summary of Features:

- › Offering 50V more blocking voltage than its predecessor 900V CoolMOS™ C3, the 950V CoolMOS™ P7 series delivers outstanding performance in terms of efficiency, thermal behavior and ease-of-use. As the all other P7 family members, the 950V CoolMOS™ P7 series comes with an integrated Zener diode ESD protection. The integrated diode considerably improves ESD robustness, thus reducing ESD-related yield loss and reaching exceptional ease-of-use levels. CoolMOS™ P7 is developed with best-in-class VGS(th) of 3V and a narrow tolerance of only $\pm 0.5V$, which makes it easy to drive and design-in.



Schematic

KIT_6W_13V_P7_950V



Transformer

KIT_6W_13V_P7_950V

AVV. Wind.	CONDUTTORE Wire	Nr. SPIRE Nr. of turns	R P t g z	PIN DI USCITA Pin output	SPIRE STRATO Turns per layer	Nr. STRATI Nr. of layers	NOTE Remarks
N1	Filo rame Ø0,15 Rif.4	0 65	+	2 3	56	2	ESEGUIRE 1 GIRO DI SPONDA H=3MM RIF.9 LATO 7-12 Execute 1 turn of tape h=3mm ref.9 side 7-12
ISOLAMENTO: 2 GIRI DI NASTRO ADESIVO POLIESTERE RIF. 7 Insulation: turns of polyester adhesive tape Ref.							
N2	TEX-E050 Rif.5	0 10	+	7 8	10	1	ATTRAVERSAMENTO A 90° SU NASTRO LATERALMENTE Perpendicular crossing on tape
ISOLAMENTO: 2 GIRI DI NASTRO ADESIVO POLIESTERE RIF. 7 Insulation: turns of polyester adhesive tape Ref.							
N3	Filo rame Ø0,50 Rif.6	0 10	+	6 5	10	1	LASCIARE 3MM LATO 7-12 ATTRAVERSAMENTO A 90° SU NASTRO LATERALMENTE Leave 3mm side 7-12. Perpendicular crossing on tape
ISOLAMENTO: 2 GIRI DI NASTRO ADESIVO POLIESTERE RIF. 7 Insulation: turns of polyester adhesive tape Ref.							
N4	Filo rame Ø0,15 Rif.4	0 65	+	3 1	46	2	ESEGUIRE 1 GIRO DI SPONDA H=3MM RIF.9 LATO 7-12 E 1 GIRO DI SPONDA H=1MM RIF.8 LATO 1-6 Execute 1 turn of tape H=3mm ref.9 side 7-12 and 1 turn of tape H=1mm ref.8 side 1-6
ISOLAMENTO: 2 GIRI DI NASTRO ADESIVO POLIESTERE RIF. 7 Insulation: turns of polyester adhesive tape Ref.							
POSIZIONAMENTO ROCCHETTO Positioning of the coilformer				PIEDINATURA (VISTA DAL BASSO) Pin-out (bottom view)			
SCHEMA ELETTRICO Electrical diagram							

MONTAGGIO – Assembling				
APPLICARE NR.2 PIASTRINI ISOLANTI RIF.11 Apply nr.2 spacers ref.11				
ASSIEMARE I SEMINUCLEI MEDIANTE 2 GIRI DI NASTRO RIF.10 Fix the halfcores with 2 turns of tape ref.10				
BLOCCARE NUCLEO/NUCLEO E ROCCHETTO/NUCLEO MEDIANTE RIF.15+16 Fix core/core and coil/core with ref.15+16				
TAGLIARE PIN 3 DOPO LA SALDATURA cut pin 3 after soldering				
2011/65/UE (RoHS-2) Compliant				
DIMENSIONI IN MILLIMETRI Dimensions in millimeters				

COLLAUDO ELETTRICO – Electrical checking				
TIPO DI PROVA – Test	CONDIZIONI DI PROVA – Test Conditions	LIMITI – Limits		
INDUTTANZA Inductance	2-1 @ 10 kHz – 100 mV	4.25 ÷ 5.75 mH		
RAPPORTO SPIRE Turns ratio	TRA TUTTI GLI AVV. @ 10kHz – 100mV Between all windings	< 1 SPIRA Turn		
RIGIDITÀ DIELETTRICA Dielectric strength	2+1+6+5/7+8 @ 4200 V – 50 Hz – 2 sec.	SUPERARE LA PROVA pass the test		
RIGIDITÀ DIELETTRICA Dielectric strength	2+1/6+5 @ 300 V – 50 Hz – 2 sec.	SUPERARE LA PROVA pass the test		
INDUTTANZA DISPERSA Leakage inductance	2-1 @ 10 kHz – 100 mV – 5+6+7+8 c.c.	< 40 µH		

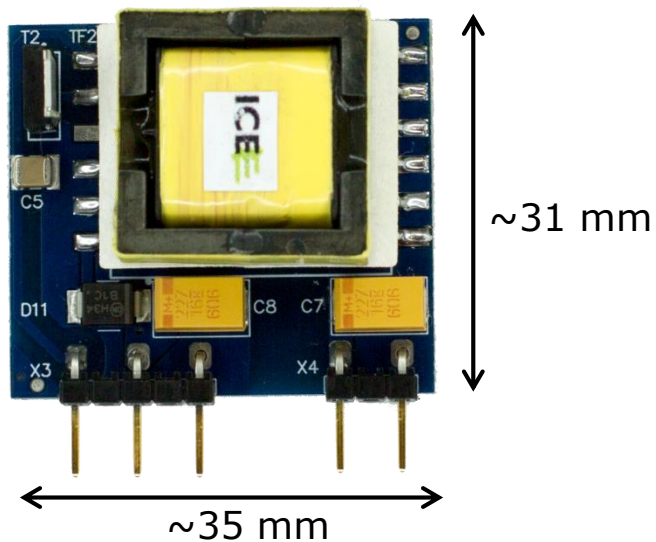
	01	30.06.17		EMISIONE – Release	C. Piccini	D. Di Giorgio	
	REV	DATA APPR	RIF. MOD.	DESCRIZIONE MODIFICA	REDAZIONE	VERIFICA E APPROVAZIONE	
	Rev	Appr. Date	Ref. Mod.	Description of modification	Editing	Check and approval	
	DESCRIZIONE-Description Transformer EFD20 SMD (6W_BIAS_V2)						
	DOCUMENTO-Document CODICE-Part Number REV.-Revision DATA EMISIONE-Release date PAG.-Page						
Mod. AQ 05.09		P.F.		8066.0103.030	01	30.06.17	1/1

Base board KIT_6W_13V_P7_950V



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Technical Material

- > Application Notes
- > Simulation Models
- > Datasheets
- > PCB Design Data

> www.infineon.com/kit-6w-13v-p7-950

Evaluation Boards

- > Evaluation Boards
- > Demoboards
- > Reference Designs

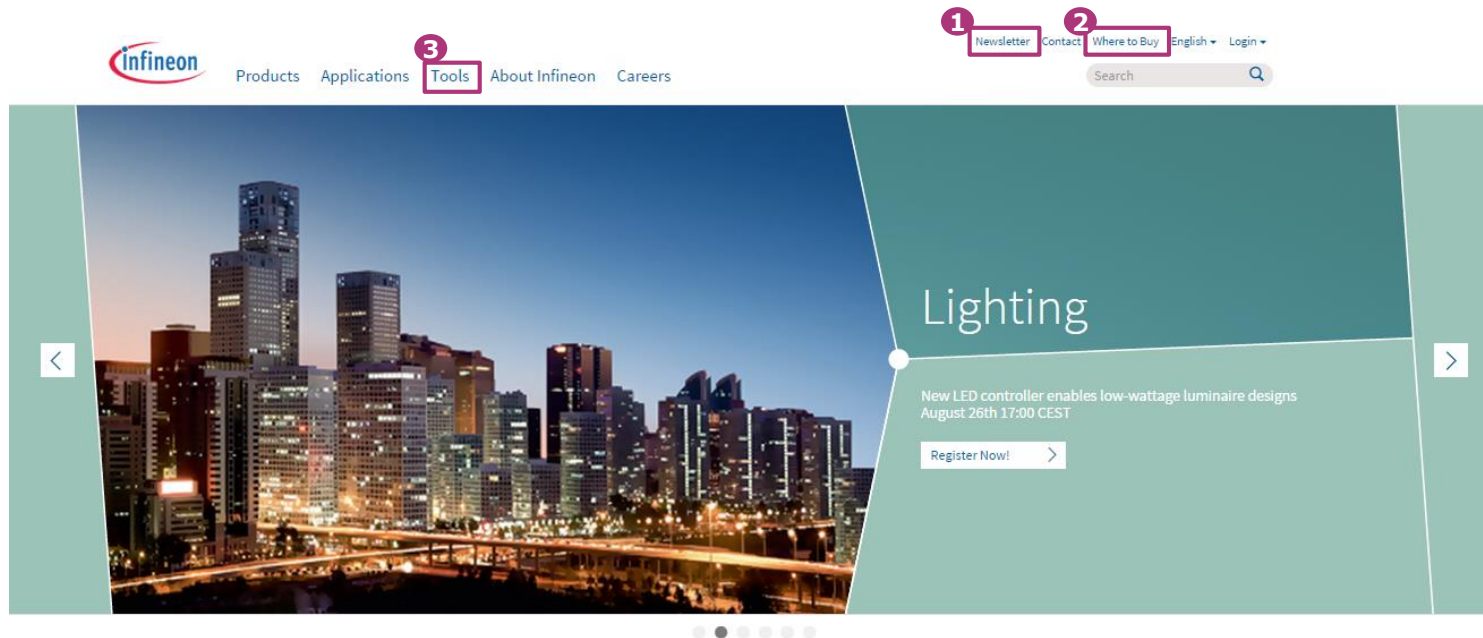
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