

DESIGN FOR APPLICATION BASED ON Q2403

POWER SUPPLY 5V/32V

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001	21/11/01	OFFICIAL VERSION	B LEBOT
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	Name / Nom	Function / Fonction	Date/ Date	Signature/ Signature
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1 INTRODUCTION

1.1 Goal of the document

The goal of this document is to propose a design around the **Q2403** modules .

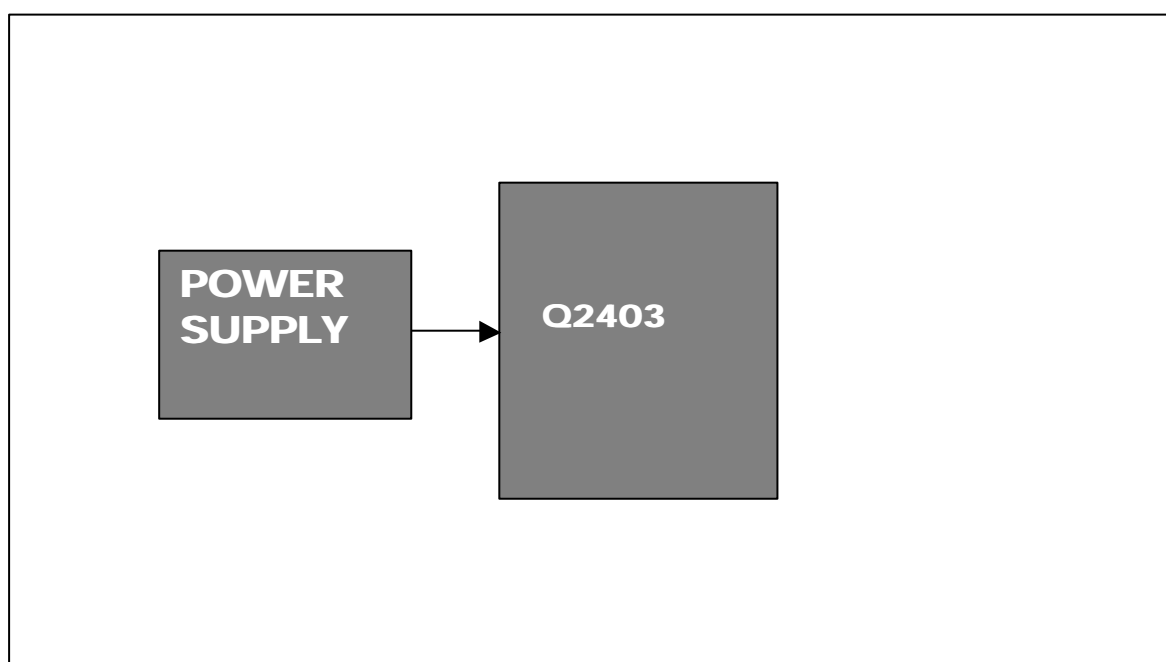
NOTES:

All schematics proposed in this document have been applied in a modem and have EMC tests in accordance with the following standards:

ETSI EN 301 489-7 edition 2000
ETSI EN 301 489-1 edition 2000
EN 55022 Class B (emission)
EN 61000-4-2.
EN 61000-4-3.
EN 61000-4-4.
EN 61000-4-5.
EN 61000-4-6.
EN 61000-4-8.
EN 61000-4-11.
ISO 7637-1 et ISO 7637-2
CLIMATIC TEST OPERATING -20°C; +55°C
CLIMATIC TEST STORAGE -30°C; +85°C

2 MODULE INTERFACES

2.1 Block diagram



2.2 Interface description

- POWER SUPPLY: A standard 5V to 32V power is required to supply this design (battery car ie).

3 POWER SUPPLY

3.1 5V/32V POWER SUPPLY

Power Supply is one of the key issue in the design of a GSM terminal.
The purpose is to characterise a reference 5 to 32V power supply to feed Q2403 module .

Advantages of such kind of power supply:

- Small size(based on LTC 1735:switch regulator)
- Low POWER DISSIPATION
- Low consumption
- High autonomy
- Input protection (to minimise reverse and over voltages)
- Minimal radio perturbation (ripple)

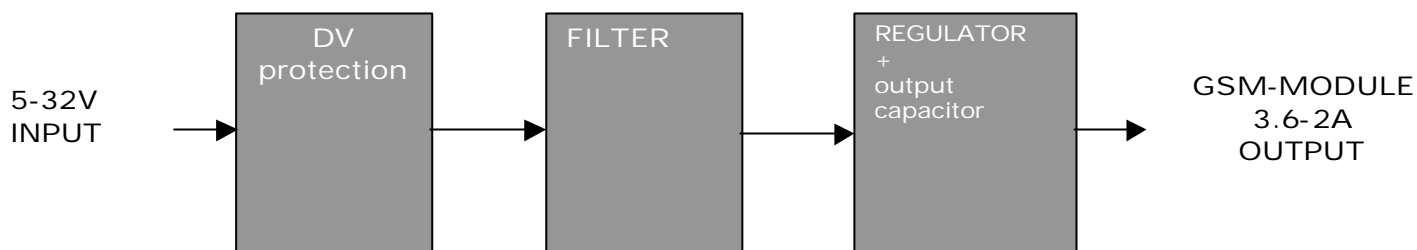
3.1.1 Input features

	MIN	NOM	MAX	UNITES
Input voltage DC	5	13.2	32	V
Input current	1			A
Ripple voltage :F<200Khz			100	mV
Ripple voltage :F>200Khz			15	mV

3.1.2 Output features

	SPECIFICATION				
	MIN	NOM	MAX	RESULT	UNITES
Output current @ PCL5-TX			2	1.6	A
Output voltage DC		3.7		3.72@5V	V
Ripple voltage			300	240@5V	mV

3.2 BLOCK DIAGRAM



dV protection:

- protection against reverse voltage (D2)
- protection against over-voltage or transient-voltage(D1)

Filter:

This filter is to minimise noise coming from outside .

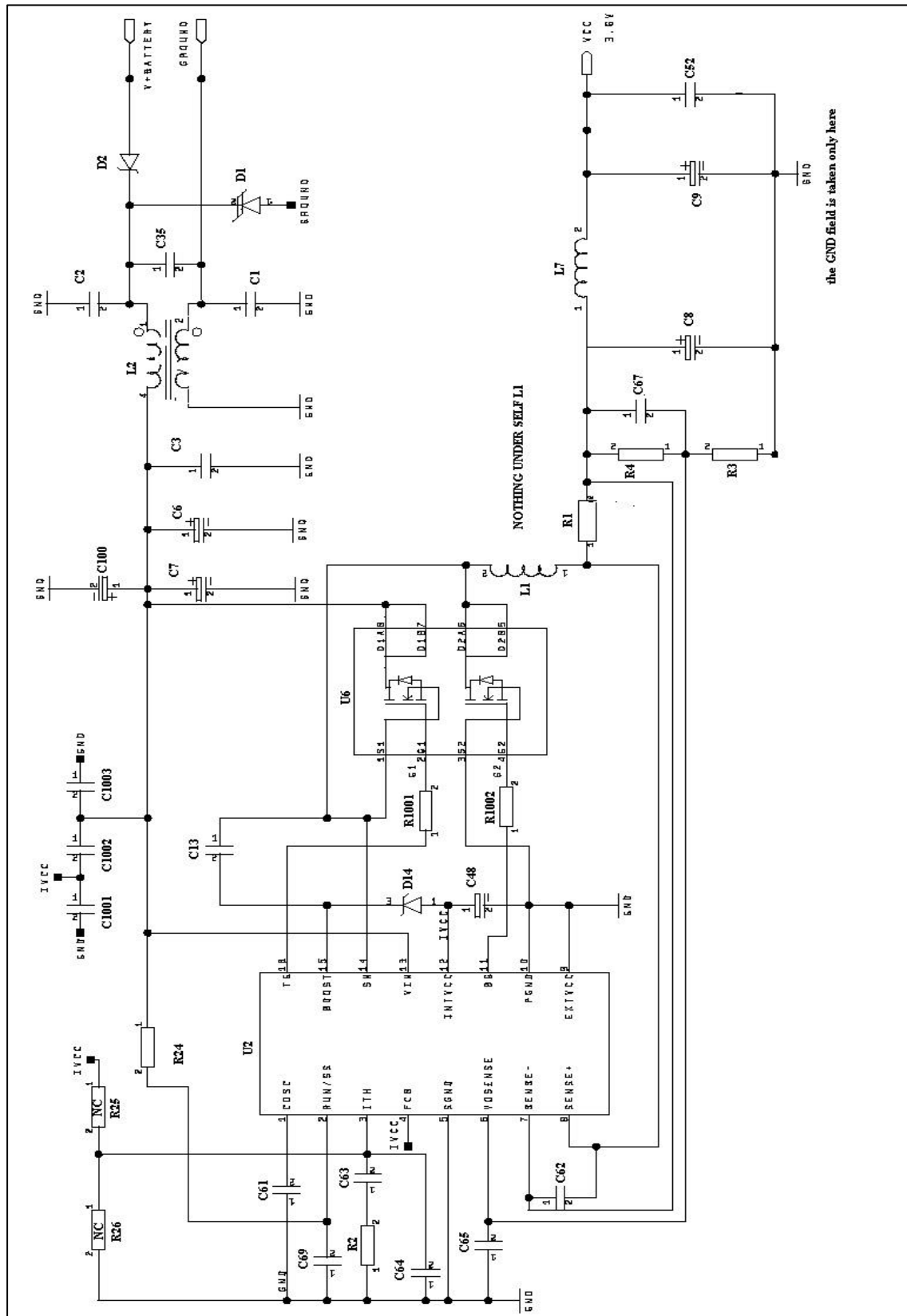
Regulator:

A switching regulator (tuned to 500kHz) is used.

Switching regulator added to a PMOS output minimise dissipation.

Output capacitor have to be adjust to obtain the best result possible on VBATT module (see hardware specification).

3.3 5V-32V power supply schematic

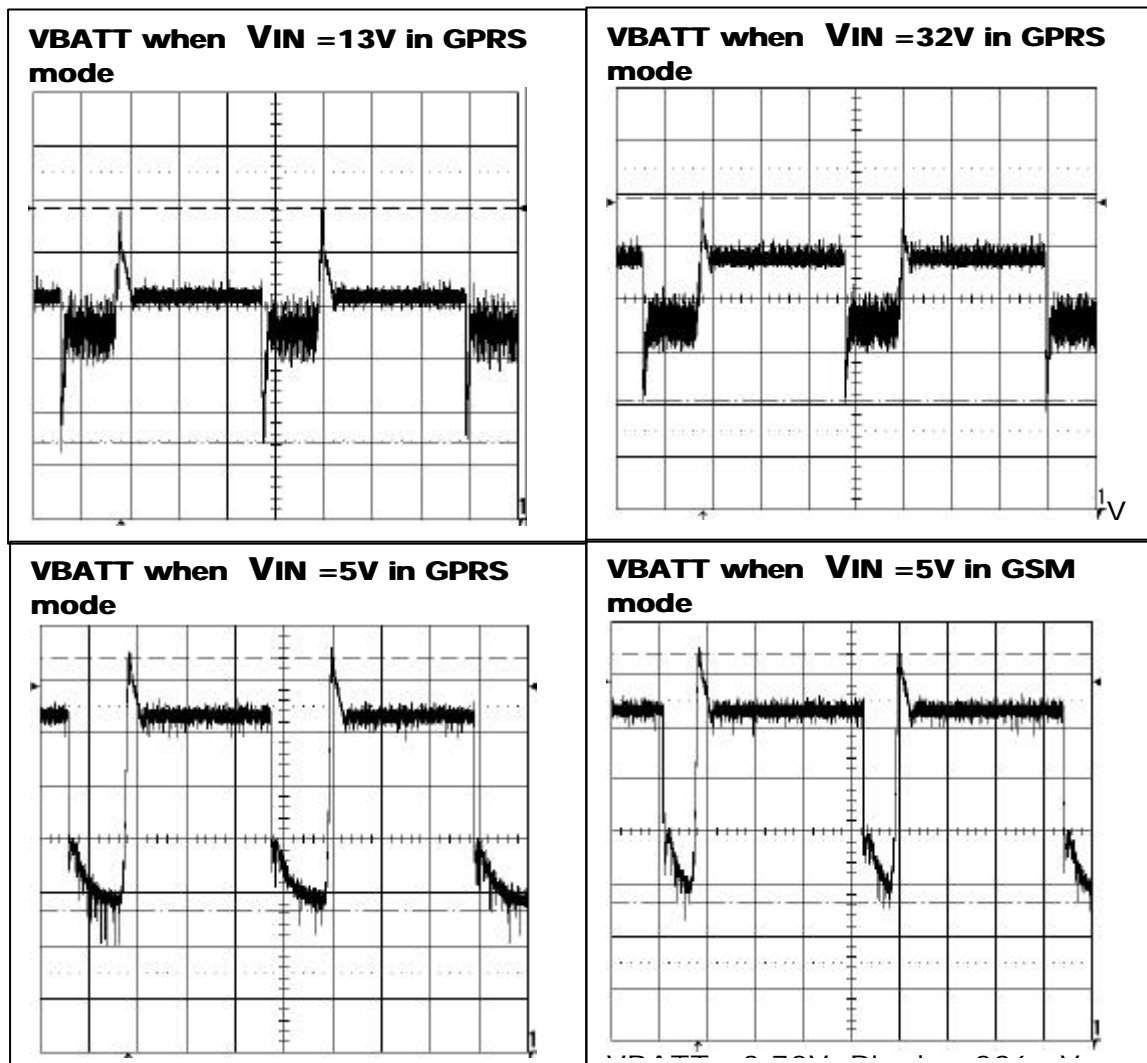


3.4 Tests with 5V-32V power supply in GPRS mode SIMULATED

GPRS mode			
*VIN (V)	5	13	32
**VBATT (V)	3.72	3.75	3.767
RIPPLE (mV)	240	219	191

*VIN = input application voltage

**VBATT = input power supply of the module.



3.5 Bill of material

REFDES	DEVICE	PACKAGE	VALUE	SUPPLIER
D1	SMT15T33A	D0214-AB		ST
D2	STPS340U	D0214-AA	40V	ST
D14	BAS40	SOT23	40V	GC
C35	C0603	C0603	4.7NF/50V	GC
C1,C2,C3,C1001, C1002,C1003, C69,C13,C52	C0805	C0805	100NF/50V	GC
C6 ,C7	NC			
C100	50CV47AX	63X77	47UF	SANYO
C61	C0603	C0603	22PF	GC
C63	C0603	C0603	470PF	GC
C64,C67	C0603	C0603	220PF	GC
C65	C0603	C0603	100PF	GC
C62	C0603	C0603	1NF	GC
C48	TANTALE_A	CASEA_AVX	4.7UF	GC
C8,C9	To be adjusted			
R24	R0603	R0603	680K	GC
R25	NC(for future purpose)			
R26	NC(for future purpose)			
R2	R0603	R0603	30K	GC
R1001,R1002	R0603	R0603	10	GC
R1	WSL1206.02 1%	R1206	0.02 OHM 1%	Vishay
R3	R0603	R0603	33K 1%	GC
R4	R0603	R0603	120K 1%	GC
L1	L_SLF101	45SLF10145	10UH	TDK
L7	WE_PD2S	WE_PD2S	1UH	WURTZ
L2	ZJYS51R52P	ZJYS51R52PT	3UH	TDK
U6	STD4SNF60L	SO8		ST
U2	LTC1735CS	SO16NB		Linear Technol

**NC=NOT
CONNECTED**

**GC=GENERIC
COMPONENTS**

C8 and C9 have to be adjusted to obtain a proper VBATT in Input .

4 MMI layout restrictions

To avoid any EMI/RFI problem, do not place any electrical function around the antenna connection on module or too close to the antenna.

Especially for Low frequency devices: DC/DC converter, microprocessors, memories..

RF lines or cables shall be as short as possible to minimize losses and must have a characteristic impedance of 50 Ohms until $F \geq 2$ GHz.

A micro strip line, as above, or a strip line can be used.

4.1 Power supply connection

Since the maximum peak current is around 2 A, to avoid voltage loss between the external power supply and the module power supply, WAVECOM strongly recommends a large width for the layout of this signal.

A total impedance line $\leq 10 \text{ m}\Omega$ @ 217 Hz shall be routed, including through holes.

4.2 Ground connection

The ground connection on module is assumed by mechanical fixing points, and not 60pts connector. All of these 4 points shall be connected together to assume the module ground. An extra ground plane is recommended on application board just behind module.