

**ISDN POWER SUPPLY**

ADVANCE DATA

**APPLICATIONS**

- SWITCH MODE POWER SUPPLIES FOR ISDN APPLICATIONS
- SUITABLE AS A DC/DC CONVERTER IN TE, NT AND LT APPLICATIONS
- EXTRACTOR/FEEDER IN NT's
- EMERGENCY POWER EXTRACTOR IN TE
- ISOLATED AND NON-ISOLATED APPLICATIONS SUPPORTED
- COMPLIES WITH CCITT I.430 S BUS RECOMMENDATIONS

**FEATURES**

- LARGE INPUT VOLTAGE RANGE 24V-90V
- DEVICE SUPPLY VOLTAGE RANGE 5V-8V
- HIGH EFFICIENCY:  
>50% at P = 25mW  
>80% at P = 1.0W
- BURST MODE REGULATION AT LOW POWER, FOR EFFICIENCY IMPROVEMENT
- EXTERNAL MOS DRIVER FOR HIGH CURRENT/POWER APPLICATIONS
- FREE FREQUENCY OSCILLATOR (10KHz to 100kHz) WITH SYNCHRONIZATION POSSIBILITY
- OVERCURRENT DETECTION WITH FOLD-BACK LIMITATION
- INTEGRATED SOFT START
- UNDERVOLTAGE DETECTION
- POLARITY REVERSAL DETECTION AND SIGNALING
- PRIMARY "START UP" CURRENT LIMITATION

**DESCRIPTION**

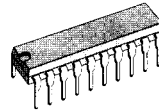
The ST5430 is a ISDN Switch Mode Power Supply specifically designed to be used in all the ISDN configurations:

-LT: U line powering from CO battery

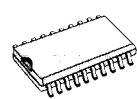
-NT:

- a) Power extractor from U line
- b) NT, U and S device powering at +5V
- c) S bus emergency powering at 40V

**MULTIPOWER BCD TECHNOLOGY**

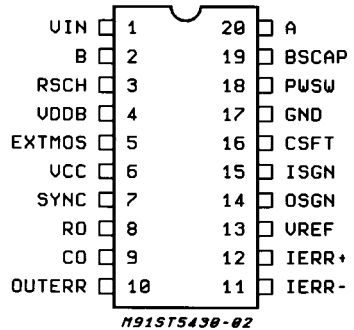


DIP20



SO20

**PIN CONNECTION** (Top view)



-TE:

- a) Emergency power extractor from S bus
- b) TE devices powering at +5V

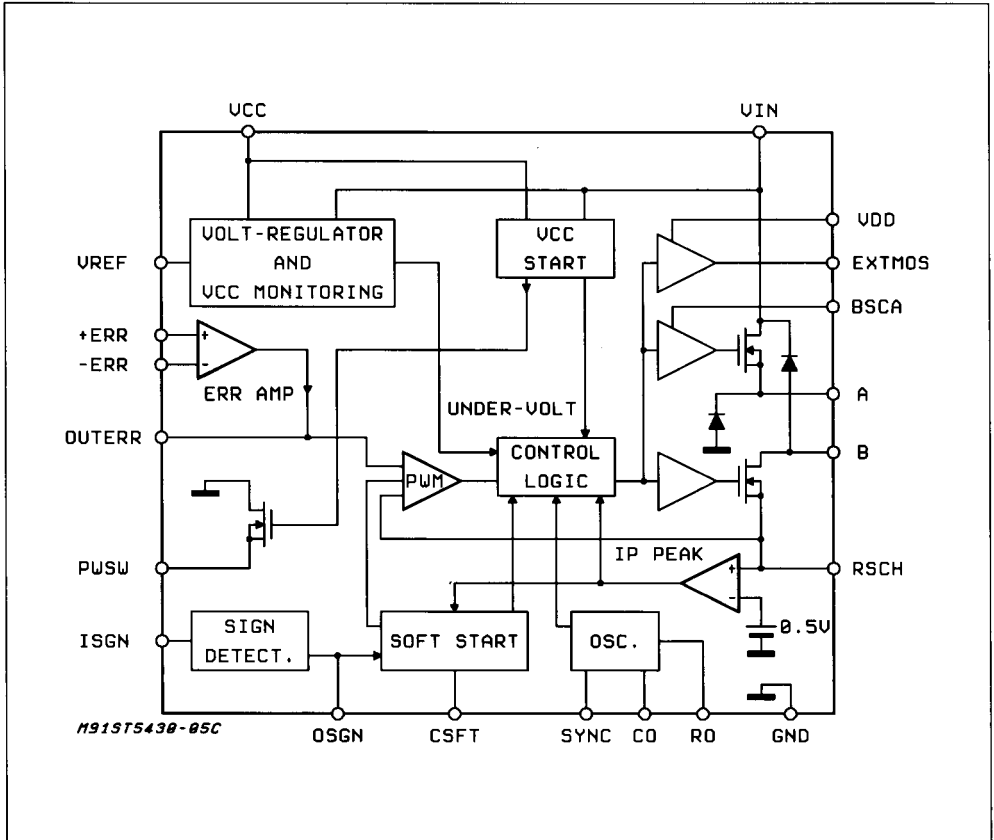
It performs the functions of Switch Mode Power Supply for flyback converter with current mode feedback.

The ST5430 is realized with BCD technology featuring, 5V CMOS, 40V Bipolar and 100V DMOS, for high efficiency design both in size and in power consumption.

## PIN FUNCTIONS

No.	Name	Description
1	Vin	Input Voltage (24V to 90V)
2	B	Negative Side of Primary Transformer Winding
3	RSCH	Primary Current Sense Resistor
4	VDD	External Mos Buffer Supply Voltage
5	EXTMOS	External Mos Gate Drive
6	Vcc	Supply Voltage
7	SYNC	Input Synchronization
8	Ro	Oscillator Resistor
9	Co	Oscillator Capacitor
10	OUTERR	Output of Error Amplifier
11	IERR-	Negative Input of Error Amplifier
12	IERR+	Positive Input of Error Amplifier
13	Vref	Voltage Reference Output
14	OSGN	Output Sign of V <sub>IN</sub>
15	ISGN	Input for Sign Detection of V <sub>IN</sub>
16	CSFT	Soft Start Capacitor
17	GND	Ground
18	PWSW	Power on Switch
19	BSCA	Bootstrap Capacitor
20	A	Positive Side at Primary Transformer Winding

## BLOCK DIAGRAM



## ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CC}, V_{DD}$	Supply Voltage	8	V
$V_{IN}$	Input Voltage	90	V
$I_{O\ rms}$	Output Current (Pins A & B)	0.5	A
$T_{STG}$	Storage Temperature	-65 to +125	°C
$T_{OP}$	Operating Temperature	-40 to +85	°C
$T_J$	Junction Temperature	125	°C

**ELECTRICAL CHARACTERISTICS** (unless otherwise specified,  $V_{CC} = 5V$ ,  $V_{IN} = 24V$ ,  $T_{amb} = 25^{\circ}C$ )

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{REF1}$	Voltage Reference			1.2		V
$Z_{REF}$	Output Impedance			13		$\Omega$
$V_{CCRJ}$	$V_{CC}$ Rejection	$V_{CCAC} = 0.1V_{rms}$ $f = 1KHz$	45			dB
$I_{OREF}$	Max Out Current	$V_{CC} = 5V$	-10		+10	$\mu A$
$V_{no}$	Noise Voltage			100		nV/ $\sqrt{Hz}$
$V_{CCmin}$	Supply Voltage	@ $V_{REF} = 0.9 \cdot V_{REF1}$	3			V

**OSCILLATOR**

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$F_{max}$	Maximum Frequency				100	kHz
$A_{CCF}$	Accuracy	$\Delta f / f$ $f=20kHz$ $V_{CC}=5V$	-5		+5	%
$V_{CCREJ}$	Freq. Stability vs $V_{CC}$	$4.5V < V_{CC} < 5.5V$		0.4		% / V
$V_{RO}$	Out RO Voltage			1.2		V
$I_{SYNC}$	INPUT SYNCHRO CURRENT	$V_{SYNC} = 0V$			1	$\mu A$
$I_{CO+}$	Capacitor charge current with $R_O = 62k\Omega$	$V_{CC} = 5V$		18		$\mu A$
$I_{CO-}$		$V_{CC} = 5V$		-18		$\mu A$

**ERROR AMPLIFIER**

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$I_{BIAS}$	IN Bias Current	$V_{CC} = 5V$		15	30	nA
$V_{IO}$	IN Offset Voltage			5		mV
$I_{IO}$	IN Offset Current			2	20	nA
$G_{wr}$	Gain Band Product	$C_{LOAD}=12pF$ $R_{LOAD}=10M\Omega$		300		kHz
$O_{VG}$	Open Loop Voltage Gain			100		dB
$I_{OERR+}$	Output Positive Current	$V_{CC} = 5V$ $V_{OUT}=1V$	0.5			mA
$I_{OERR-}$	Output Negative Current 1	$V_{CC} = 5V$ $V_{OUT}=0.5V$	-5			$\mu A$
$I_{OERR-}$	Output Negative Current 2	$V_{CC} = 5V$ $V_{OUT}=1.5V$			-0.5	mA
$C_{CMR}$	Commun Mode Rejection	$V_{INCM}=0.1V_{rms}$	-65			dB
$SVR$	Supply Voltage Ratio Rejection	$V_{CCAC}=0.1V_{rms}$ $f=1kHz$	-65			dB
$SB$	Slew Rate			0.14		V / $\mu s$
$I_{CMV}$	Input Common Mode Voltage		0		3	V
$O_{SV}$	Output Swing Voltage		0.1		3	V
$V_n$	Input Equiv. Noise Voltage	$f=1kHz$ , $R_S=10\Omega$		40		nV/ $\sqrt{Hz}$

## SUPPLY

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I <sub>VCC</sub>	V <sub>CC</sub> Current	f = 20kHz		0.8	2	mA
I <sub>VCCF</sub>	V <sub>CC</sub> Dynamic Current	f = 100kHz			4	mA
I <sub>VIN</sub>	Input V <sub>IN</sub> DC Current	V <sub>IN</sub> = 100V; V <sub>CC</sub> = 5.0V f = 20kHz		0.35		mA

## OUTPUT DMOS CIRCUIT

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
R <sub>onA</sub>	A Output on Resistance	V <sub>CC</sub> = 5V		2.2	4	Ω
I <sub>AMax</sub>	A Output Current	V <sub>CC</sub> = 5V	250			mA
t <sub>DHL</sub>	Delay Out A / Osc			550		ns
t <sub>DLH</sub>				400		ns
R <sub>onB</sub>	B Output on Resistance	V <sub>CC</sub> = 5V		2.2	4	Ω
I <sub>Bmax</sub>	B Output Current	V <sub>CC</sub> = 5V			-250	mA
t <sub>DHL</sub>	Delay Out B / Osc			450		ns
t <sub>DLH</sub>					400	
I <sub>outB+</sub>	External Mos Output Buffer current	V <sub>CC</sub> = 5V	10	20		mA
I <sub>outB-</sub>		V <sub>DD</sub> = 5V			-40	-20

## POWER ON CIRCUIT

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V <sub>INmin</sub>	Min. Input Voltage	V <sub>CC</sub> = 5V		22	24	V
R <sub>ONpw</sub>	Power Switch R <sub>ON</sub>			2.2		Ω
V <sub>CCDET</sub>	V <sub>CC</sub> Detection		4.5		7	V
I <sub>VCCST</sub>	Start V <sub>CC</sub> Current		2.5	3.5		mA
I <sub>BST</sub>	Bootstrap Current	f = 15KHz f = 20KHz		0.25		mA

SIGN OF V<sub>IN</sub> DETECTION

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I <sub>OH</sub>	Output	V <sub>14</sub> = 1V, V <sub>15</sub> = 0.5V		-12	-5	μA
V <sub>OL</sub>		V <sub>CC</sub> = 5V, I <sub>14</sub> = 0.5mA		0.4	0.5	V
V <sub>TH</sub>	Input	Threshold Voltage	1	1.4	2	V
INLO		V <sub>CC</sub> = 5V	1	2.2	5	μA

## SOFT START CAPACITOR

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I <sub>STC</sub>	Charge Current		7	9	11	μA

## PEAK PRIMARY CURRENT DETECTOR

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V <sub>THIP</sub>	Threshold Voltage			0.55		V

Figure 1: Application with internal DMOS

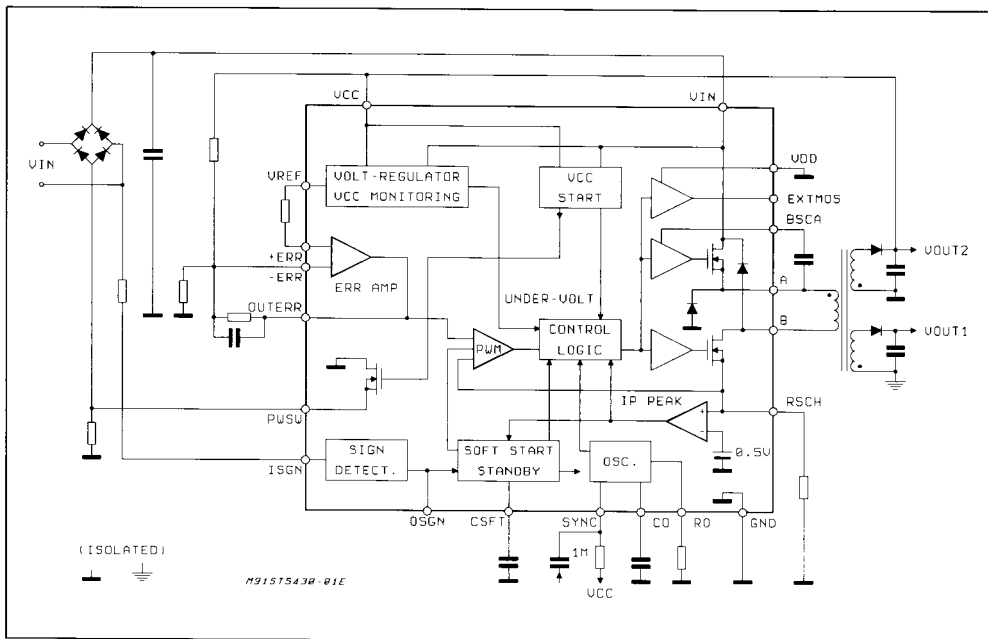


Figure 2: Application with external MOS

