

**SOT-25**

**Pin Definition:**

1. SW
2. Ground
3. FB
4. EN
5. Input

**General Description**

The TS1935B is a current mode step up converter intended for small, low power applications. The converter input voltage ranging from 2.6V to 5.5V. The Output voltage can be set up to 27V. The frequency is 1.2MHz allows the use of small external inductors and capacitors and provides fast transient response. Internal soft start results in small inrush current and extends battery life. Internal power MOSFET with very low RDS (ON) provides high efficiency. The TS1935B automatically transits from PWM to PFM during light load condition further increasing efficiency. The converter also provides protection functions such as under-voltage lockout, current limit and thermal shutdown.

**Features**

- 2.6V to 5.5 V operating input voltage range
- Adjustable output voltage range up to 27V
- 1.2MHz Fixed Switching Frequency
- Internal soft-start function
- Current limit and Thermal shutdown protection
- Under voltage Lockout
- $\leq 1\mu\text{A}$  Shutdown Current

**Application**

- White LED Current Source
- Digital Still Cameras
- Portable Electronics
- PDA's and Palm-Top Computers
- Local Boost Regulator

**Ordering Information**

Part No.	Package	Packing
TS1935BCX5 RFG	SOT-25	3Kpcs / 7" Reel

**Note:** "G" denotes for Halogen Free

**Absolute Maximum Rating**

Parameter	Symbol	Limit	Unit
Input Voltage	$V_{IN}$	GND - 0.3 to GND + 6.5	V
EN, $V_{FB}$ Voltage	$V_{EN}, V_{FB}$	GND - 0.3 to $V_{CC} + 0.3$	V
SW Voltage	$V_{SW}$	30	V
Ambient Temperature Range	$T_A$	-40 to +85	$^{\circ}\text{C}$
Junction Temperature Range	$T_J$	-40 to +125	$^{\circ}\text{C}$
Storage Temperature Range	$T_{STG}$	-40 to +150	$^{\circ}\text{C}$

**Note:** Stress above the listed absolute maximum rating may cause permanent damage to the device

**Thermal Information**

Parameter	Symbol	Maximum	Unit
Thermal Resistance* (Junction to Case)	$\Theta_{JC}$	110	$^{\circ}\text{C}/\text{W}$
Thermal Resistance* (Junction to Ambient)	$\Theta_{JA}$	250	$^{\circ}\text{C}/\text{W}$
Internal Power Dissipation	$P_D$	$(T_J - T_A) / \Theta_{JA}$	mW
Maximum Junction Temperature	$T_J$	150	$^{\circ}\text{C}$
Lead Solder Temperature (260 $^{\circ}\text{C}$ )		5	S

**Note:**  $\Theta_{JA}$  is measured with the PCB copper area of approximately 1 in<sup>2</sup>(Multi-layer).

**Electrical Specifications** ( $T_a = 25^\circ\text{C}$ ,  $V_{IN}=5\text{V}$ ,  $EN=V_{IN}$ ,  $I_L=0\text{A}$  unless otherwise noted)

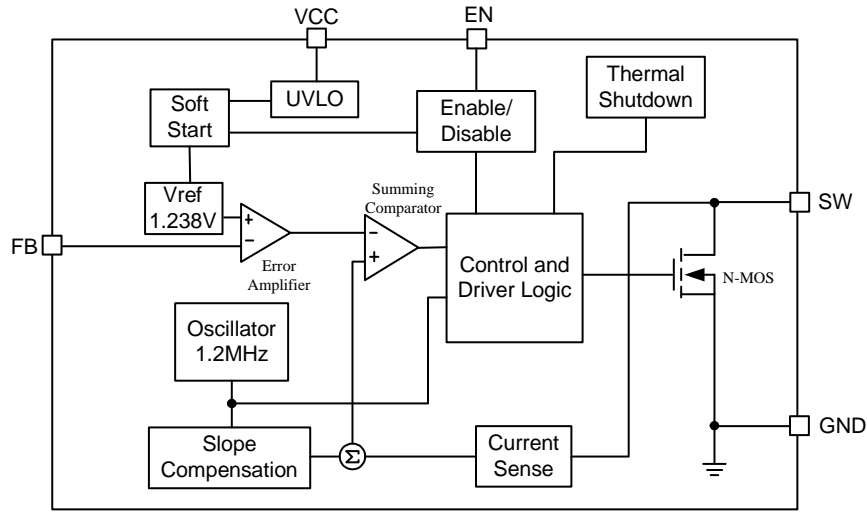
Characteristics	Symbol	Conditions	Min	Typ	Max	Units
Input Voltage range	$V_{CC}$		2.6	--	5.5	V
Under Voltage Lockout	UVLO	Rising	--	2.35	2.60	V
UVLO Hysteresis			--	-130	--	mV
Step-Up Voltage Adjust Range	$V_{OUT}$		3	--	27	V
Operating quiescent current	$I_{CCQ}$	$I_{OUT}=0\text{mA}$ , $V_{FB}=1.5\text{V}$	--	150	250	$\mu\text{A}$
Shutdown current	$I_{SD}$	$V_{EN}=0\text{V}$	--	0.1	1	$\mu\text{A}$
Feedback Voltage	$V_{FB}$		1.213	1.238	1.263	V
FB Input Leakage Current	$I_{FB-LKG}$	$V_{FB}=1.3\text{V}$	-100	0.01	+100	nA
Line Regulation		$V_{IN}=2.5$ to $5.5\text{V}$ $I_{OUT}=20\text{mA}$	--	0.2	--	%
Load Regulation		$V_{IN}=5\text{V}$ $I_{OUT}=1\text{mA}$ to $400\text{mA}$	-	0.2	--	%
Switching frequency	$F_{OSC}$		900	1200	1500	KHz
Maximum Duty	$D_{MAX}$		82	87	-	%
N-channel MOSFET current limit	$I_{LIM}$	Duty=50%	--	1.9	--	A
MOSFET on-resistance (Note 1)	$R_{DS(on)}$	$V_{CC}=3\text{V}$ , $I_{SW}=1\text{A}$ $V_{CC}=5\text{V}$ , $I_{SW}=1\text{A}$	--	650 500	- --	m $\Omega$
SW Leakage Current	$I_{SWL}$	$V_{LX}=27\text{V}$ , $V_{FB}=1.5\text{V}$	--	--	1	$\mu\text{A}$
EN high-level input voltage	$V_{IH}$		1.0	--	--	V
EN low-level input voltage	$V_{IL}$		--	--	0.4	V
EN Hysteresis	hys		--	200	-	mV
EN input leakage current	$I_{EN-LKG}$	$V_{EN}=\text{GND}$ or $V_{CC}$	--	0.01	0.1	$\mu\text{A}$
Thermal Shutdown	$T_{DS}$		--	150	--	$^\circ\text{C}$
Thermal Shutdown Hysteresis	$T_{SH}$		--	35	--	

Note 1: Guaranteed by design

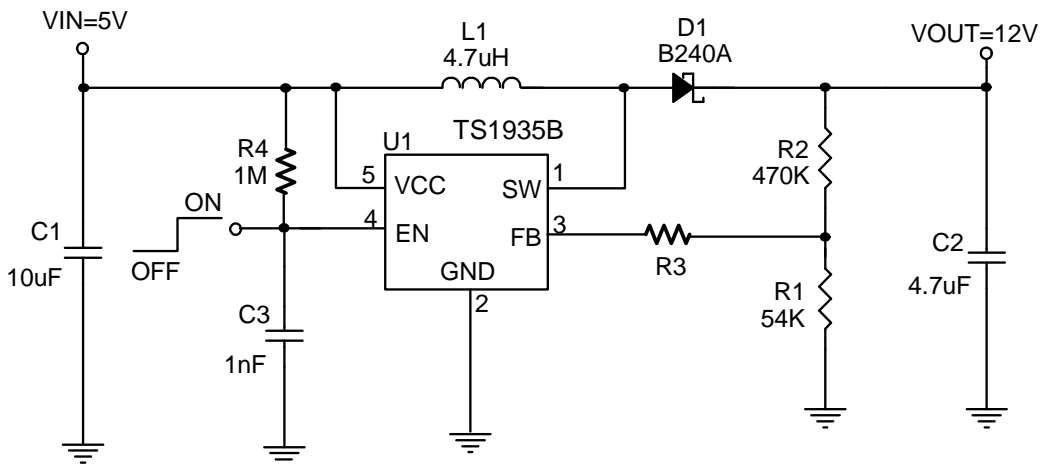
**Pin Description**

Pin Number	Pin Name	Description
1	SW	Power Switch Output. SW is the drain of the internal MOSFET switch. Connect the power inductor and output rectifier to SW. SW can swing between GND and 27V.
2	GND	Ground. Tie directly to ground plan.
3	FB	Feedback Input. FB voltage is 1.238V. Connect a resistor divider to FB.
4	EN	Regulator On/Off Control Input. A high input at EN turns on the converter, and a low input turns it off. When not used, connect EN to the input source for automatic startup. The EN pin cannot be left floating.
5	VCC	Input Supply Pin. Must be locally bypassed.

**Block Diagram**



**Application Circuit**



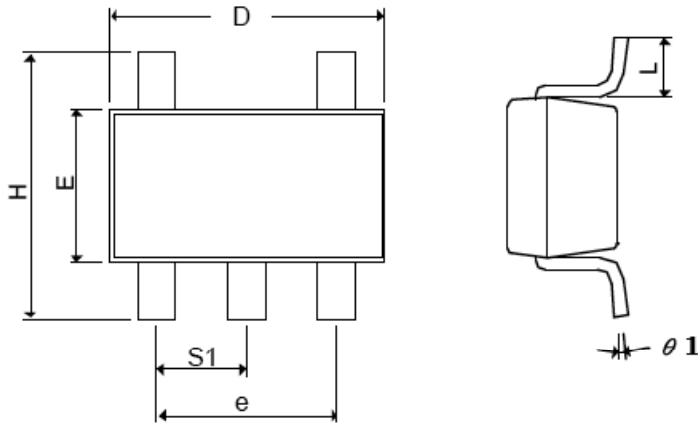
$$V_{OUT} = 1.238V \times \left(1 + \frac{R2}{R1}\right)$$

R2 Suggest 390K~820K

VIN	VOUT	R3
2.6~3.6V	5V	120KΩ
2.6~5.3V	7V	82KΩ
2.6~5.5V	7.5~27V	0Ω

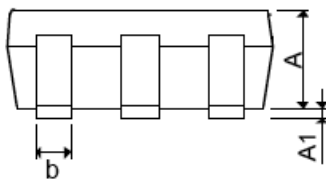


**SOT-25 Mechanical Drawing**



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX.
A+A1	0.09	1.25	0.0354	0.0492
B	0.30	0.50	0.0118	0.0197
C	0.09	0.25	0.0035	0.0098
D	2.70	3.10	0.1063	0.1220
E	1.40	1.80	0.0551	0.0709
E	1.90 BSC		0.0748 BSC	
H	2.40	3.00	0.09449	0.1181
L	0.35 BSC		0.0138 BSC	
Ø1	0°	10°	0°	10°
S1	0.95 BSC		0.0374 BSC	

**Front View**



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