UNISONIC TECHNOLOGIES CO., LTD

UD05151　　　　Preliminary　　　　*LINEAR INTEGRATED CIRCUIT*

1.5A, HIGH-EFFICIENCY 1.5MHz SYNCHRONOUS STEP-DOWN CONVERTER

SOT-25

■ DESCRIPTION

The UTC **UD05151** is a high-frequency, synchronous, rectified, step-down, switch-mode converter with internal power MOSFETs.

It offers a very compact solution to achieve a 1.5A continuous output current over from 3.0V to 5.5V input supply range, with excellent load and line regulation.

The UTC **UD05151** is ideally suited for portable electronic devices that are powered from 1-cell Li-ion battery or from other power sources such as cellular phones, PDAs, handheld devices, game console and related accessories.

The output voltage is adjustable from 0.6V to the input voltage. During shutdown, the input is disconnected from the output and the shutdown current is less than 1μA. Other key features include over-temperature and short circuit protection, and under-voltage lockout to prevent deep battery discharge.

The UTC **UD05151** at 1.5A maximum output current while consuming only 80μA of no-load quiescent current. Ultra-low $R_{DS(ON)}$ integrated MOSFET$_s$ and 100% duty cycle operation make the UTC **UD05151** an ideal choice for high-output voltage, high-current applications which require a low dropout threshold.

■ FEATURES

* Output Current : Up to 1.5A
* Output Voltage : 0.6V to V_{IN}
* Input Voltage : 3.0V to 5.5V
* Low-$R_{DS(ON)}$ Internal Power MOSFETs
* High-Efficiency Synchronous-Mode Operation, up to 90%
* 80uA (typ) No Load Quiescent Current
* Shutdown Current < 1μA
* 100% Duty Cycle Operation
* Fixed 1.5MHz Switching Frequency
* Internal Power-Save Mode for High Efficiency at Light Load
* Current Mode Operation
* Internal Soft-Start
* Current Limit Protection
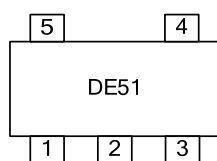* Over-temperature Protection
* Input Under Voltage Lockout (UVLO)
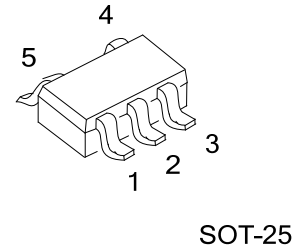
■ **ORDERING INFORMATION**

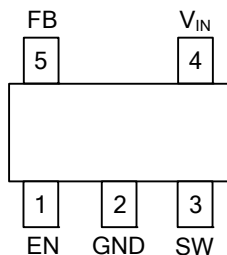| Ordering Number		Package	Packing
Lead Free	Halogen Free		
UD05151L-AF5-R	UD05151G-AF5-R	SOT-25	Tape Reel

UD05151G-AF5-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) AF5: SOT-25 (3) G: Halogen Free and Lead Free, L: Lead Free

■ **MARKING**

5		4
	DE51	
1	2	3

■ **PIN CONFIGURATION**

```
      FB              V_IN
      5                4

   1       2       3
   EN     GND      SW
```

■ **PIN DESCRIPTION**

PIN NO.	PIN NAME	DESCRIPTION
1	EN	Enable control. Pull high to turn on. Do not float
2	GND	Ground pin
3	SW	Inductor pin. Connect this pin to the switching node of inductor
4	V_{IN}	Input pin. Decouple this pin to GND pin with at least 1uF ceramic cap
5	FB	Output Feedback Pin. Connect this pin to the center point of the output resistor divider to program the output voltage: $V_{OUT}=0.6\times(1+R1/R2)$.

■ **BLOCK DIAGRAM**
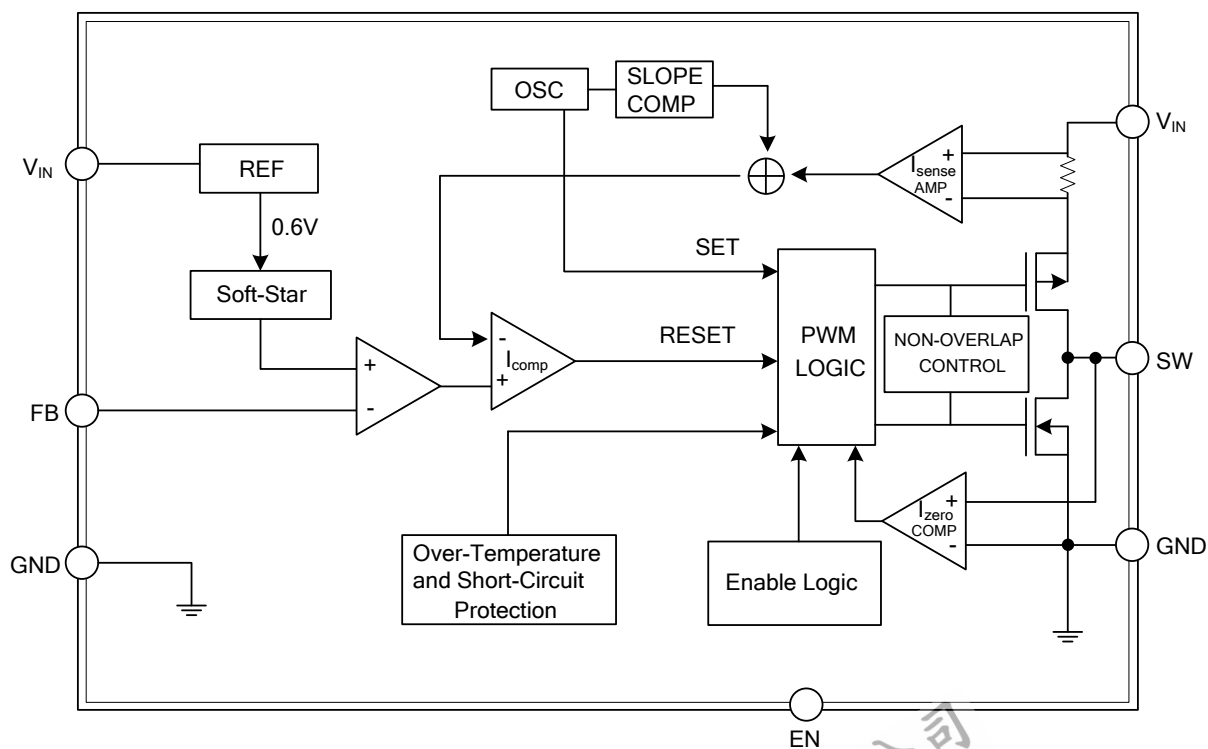
■ **ABSOLUTE MAXIMUM RATING** (T_A= 25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Input Voltage	V_{IN}	6.0	V
SW Pin Voltage	V_{SW}	V_{IN}+0.3	V
FB Pin Voltage	V_{FB}	V_{IN}+0.3	V
EN Pin Voltage	V_{EN}	6.0	V
Power Dissipation	P_D	0.38	W
Maximum Junction Temperature Range	T_J	+125	°C
Storage Temperature Range	T_{STG}	-65 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
    2. Stresses exceed those ratings may damage the device.

■ **RECOMMENDED OPERATING CONDITIONS**

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Input Voltage	V_{IN}	3.0 ~ 5.5	V
Output Voltage	V_{OUT}	0.6 ~ V_{IN}	V
Operating Junction Temperature Range	T_J	-40 ~ +125	°C
Operating Ambient Temperature Range	T_A	-40 ~ +85	°C

■ **THERMAL CHARACTERISTICS**

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	170	°C/W
Junction to Case	θ_{JC}	130	°C/W

■ **ELECTRICAL CHARACTERISTICS**

(V_{IN}=5.0V, T_A=25°C, V_{OUT} = 2.5V, C_{IN} = 33uF, C_{OUT} = 10uF, L = 2.2uH unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage Range	V_{IN}		3		5.5	V
Quiescent Current	I_Q	V_{EN} = 2V, V_{FB} = 1.0V, No Load		80		uA
Shutdown Current	I_{SHDN}	V_{EN} = 0V.		0.1	1	µA
HS Switch-On Resistance (Note 1, 2)	HS_{RDS-ON}	I_{SW} = 0.2A		200		mΩ
LS Switch-On Resistance (Note 1, 2)	LS_{RDS-ON}	I_{SW} = 0.2A		150		mΩ
HS Switch Current Limit (Note 1, 2)	$I_{LIMIT(HS)}$		1.8			A
Oscillation frequency	F_{SW}	Iout = 200mA		1.5		MHz
Feedback Voltage	V_{FB}	T_A = 25°C	0.588	0.6	0.612	V
Feedback Current	I_{FB}	V_{OUT} = V_{IN}		50		nA
EN Rising Threshold	V_{EN_RISING}		1.5			V
EN Falling Threshold	$V_{EN\_FALLING}$				0.4	V
VIN UVLO Threshold-Rising	V_{UVLO-H}	V_{IN} Rising		1.8		V
VIN UVLO Threshold Hysteresis	$V_{UVLO-HYS}$			0.1		V
Min ON Time				50		nS
Soft-Start Period (Note 1, 2)	T_{SS}	From enable to output regulation		1.5		mS
Thermal Shutdown (Note 1)	T_{SD}			160		°C

Notes: 1. Guaranteed by design.
    2. Not tested in production and guaranteed by over-temperature correlation.

■ TYPICAL APPLICATION CIRCUIT

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