



## UD24121

### LINEAR INTEGRATED CIRCUIT

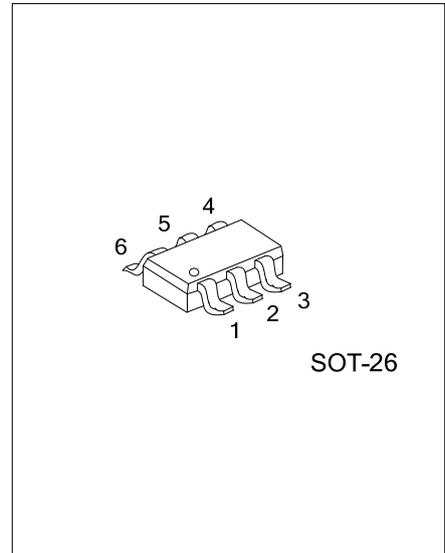
## 1.2A, 24V, 1.4MHz STEP-DOWN CONVERTER

### DESCRIPTION

The UTC **UD24121** is a monolithic step-down switching mode converter with a built-in power MOSFET. It regulates input voltages from 4.5V to 24V down to an output voltage as low as 0.81V, and supplies up to 1.2A of load current.

Current mode operation provides fast transient response and eases loop stabilization. Fault condition protection includes cycle-by-cycle current limiting and thermal shutdown.

The UTC **UD24121** requires a minimum number of readily available standard external components.



### APPLICATIONS

- \* Distributed Power Systems
- \* Battery Charger
- \* Pre-Regulator for Linear Regulators
- \* WLED Drivers

### FEATURES

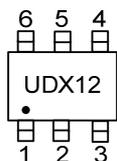
- \* 1.2A Peak Output Current
- \* 0.35Ω Internal Power MOSFET Switch
- \* Stable with Low ESR Output Ceramic Capacitors
- \* Up to 92% Efficiency
- \* 0.1μA Shutdown Mode
- \* Fixed 1.4MHz Frequency
- \* Thermal Shutdown
- \* Cycle-by-Cycle Over Current Protection
- \* Wide 4.5V to 24V Operating Input Range
- \* Output Adjustable from 0.81V to 15V

### ORDERING INFORMATION

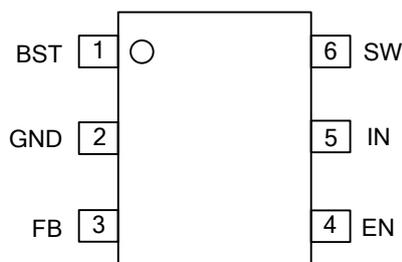
Ordering Number		Package	Packing
Lead Free	Halogen Free		
UD24121L-AG6-R	UD24121G-AG6-R	SOT-26	Tape Reel

UD24121G-AG6-R	(1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) AG6: SOT-26 (3) G: Halogen Free and Lead Free, L: Lead Free
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### MARKING



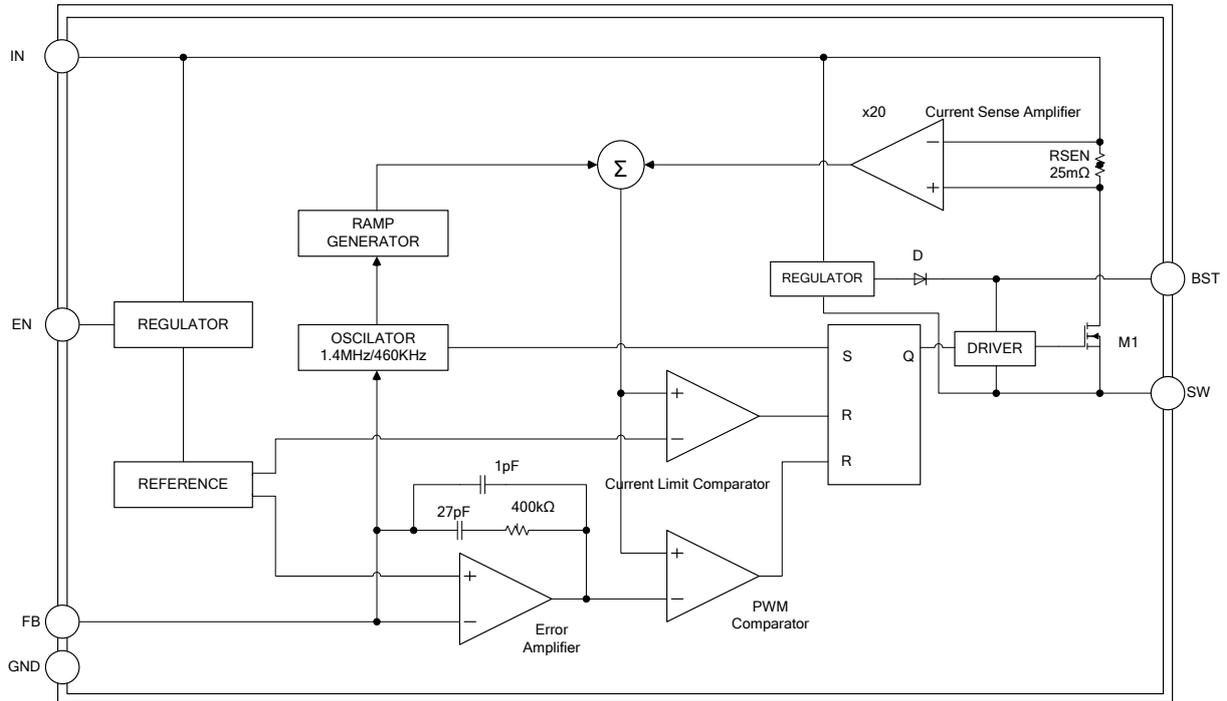
### PIN CONFIGURATION



### PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	BST	High-Side Gate Drive Boost Input. BS supplies the drive for the high-side N-Channel MOSFET switch. Connect a 0.01 $\mu$ F or greater capacitor from SW to BST to power the high side switch.
2	GND	Ground.
3	FB	Feedback. An external resistor divider from the output to GND, tapped to the FB pin sets the output voltage. To prevent current limit run away during a short circuit fault condition, the frequency foldback comparator lowers the oscillator frequency when the FB voltage is below 250mV.
4	EN	On/Off Control Input. Pull EN above 1.2V to turn the device on. For automatic enable, connect a 100k $\Omega$ resistor between this pin and Vin pin.
5	V <sub>IN</sub>	Supply Voltage. The <b>UD24121</b> operates from a +4.5V to +24V unregulated input. C1 is needed to prevent large voltage spikes from appearing at the input.
6	SW	Power Switching Output. SW is the switching node that supplies power to the output. Connect the output LC filter from SW to the output load. Note that a capacitor is required from SW to BS to power the high-side switch.

## ■ BLOCK DIAGRAM



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■ ABSOLUTE MAXIMUM RATING ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
V <sub>CC</sub> Pin Voltage	V <sub>IN</sub>	26	V
SW Pin Voltage	V <sub>SW</sub>	27	V
BOOST Trap Voltage	V <sub>BST</sub>	V <sub>SW</sub> +6V	V
All Other Pins Voltage		-0.3V ~ +6V	V
Power Dissipation	P <sub>D</sub>	568	mW
Junction Temperature Range	T <sub>J</sub>	+150	°C
Storage Temperature Range	T <sub>STG</sub>	-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.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT
Input Supply Voltage	V <sub>IN</sub>	4.5 ~ 24	V
Output Voltage	V <sub>OUT</sub>	0.81 ~ 15	V
Ambient Temperature	T <sub>A</sub>	-40 ~ +125	°C
input current into the EN pin		300	μA

Note: The device is not guaranteed to function outside of its operating conditions.

■ THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction To Ambient	θ <sub>JA</sub>	220	°C/W
Junction to Case	θ <sub>JC</sub>	110	°C/W

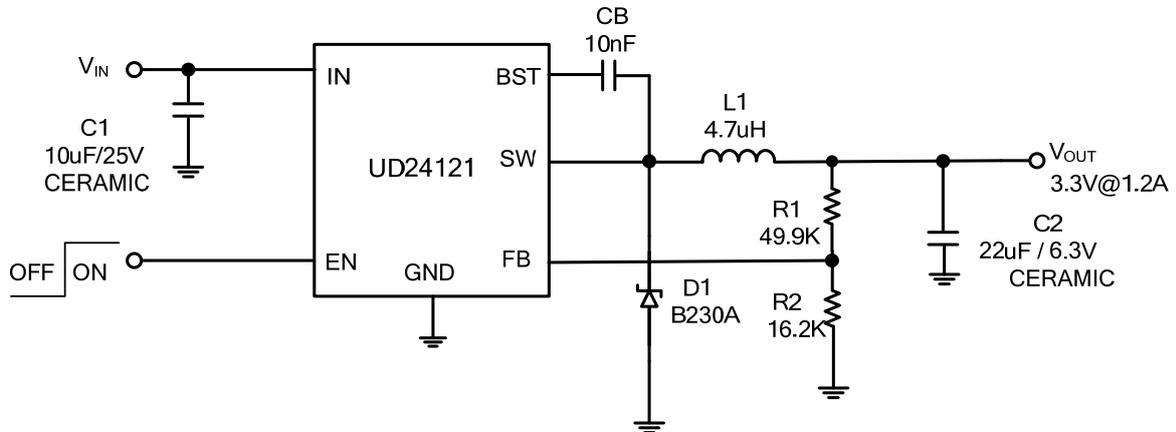
■ ELECTRICAL CHARACTERISTICS

(V<sub>IN</sub> = 12V, T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Quiescent Current	I <sub>Q</sub>	V <sub>EN</sub> =2V, V <sub>FB</sub> =1V		0.8		mA
Shutdown Current	I <sub>SHDN</sub>	V <sub>EN</sub> =0V.		1	3	μA
Switch-On Resistance (Note 6)	R <sub>DS-ON</sub>			0.35		Ω
Switch Leakage Current	I <sub>SWLKG</sub>	V <sub>EN</sub> =0V, V <sub>SW</sub> =0V			10	μA
Current Limit (Note 6)	I <sub>LIMIT</sub>			1.8		A
Oscillation frequency	F <sub>SW</sub>			1.4		MHz
Fold-Back Frequency	F <sub>SB</sub>	V <sub>FB</sub> =0V		460		KHz
Max Duty Cycle	D <sub>MAX</sub>	V <sub>FB</sub> =0.6V		87		%
Minimum On Time (Note 6)	T <sub>ON MIN</sub>			100		nS
Feedback Voltage	V <sub>FB</sub>	4.5V ≤ V <sub>IN</sub> ≤ 18V	0.790	0.810	0.830	mV
EN Input High Voltage	V <sub>EN H</sub>	V <sub>EN</sub> Rising	1.2			V
EN Input Low Voltage					0.4	mV
EN input current		V <sub>EN</sub> =2V		2.1		μA
		V <sub>EN</sub> =0V		0.1		
V <sub>IN</sub> UVLO Threshold-Rising	V <sub>UVLO(Vth)</sub>	V <sub>IN</sub> Rising		2.8		V
V <sub>IN</sub> UVLO Threshold Hysteresis				150		mV
Thermal Shutdown (Note 6)	T <sub>SD</sub>			150		°C
Thermal Hysteresis (Note 6)				25		°C

Note: Guaranteed by design.

### ■ TYPICAL APPLICATION CIRCUIT



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