



## LC1126

Preliminary

LINEAR INTEGRATED CIRCUIT

### ULTRA LOW OUTPUT VOLTAGE LINEAR N-FET CONTROLLER

#### DESCRIPTION

The UTC **LC1126** is an ultra low output voltage linear N-FET controller designed to provide well supply voltage for front-side-bus termination on motherboards and NB applications. The UTC **LC1126** integrates many functions. A Power-On-Reset (POR) circuit monitors supply voltages to prevent wrong operations. A POK indicates the output status with time delay which is set internally. It can control other converter for power sequence. It can available for SC-59-6 package.

The UTC **LC1126** can be enabled by other power system. A 0.5V reference voltage with 2% accuracy providing tight regulation of the output voltage, enable control, open drain power good signal, under-voltage protection and soft start.

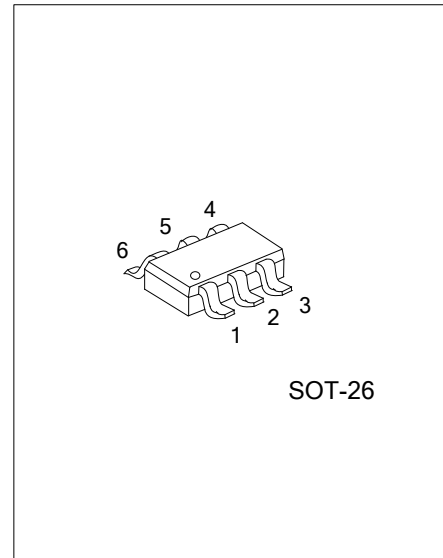
#### FEATURES

- \* MLCC and POSCAP Stable
- \* 0.5V±2% Reference Voltage
- \* Internal soft-start
- \* Enable control
- \* Fast transient response
- \* Under-Voltage short circuit protection
- \* Power OK output with a delay time
- \* Adjustable output voltage down to 0.5V
- \* Drive N-Channel MOSFETs

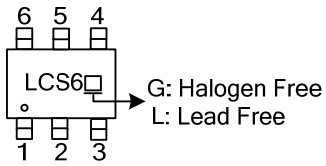
#### ORDERING INFORMATION

Ordering Number		Package Packing	
Lead Free	Halogen Free	SOT-26	Tape Reel
LC1126L-AG6-R	LC1126G-AG6-R		

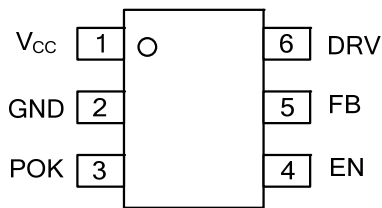
<p>LC1126L-AG6-R</p> <p>(1)Packing Type (2)Package Type (3)Halogen Free</p>	<p>(1) R: Tape Reel (2) AG6: SOT-26 (3) L: Lead Free, G: Halogen Free</p>
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■ MARKING INFORMATION



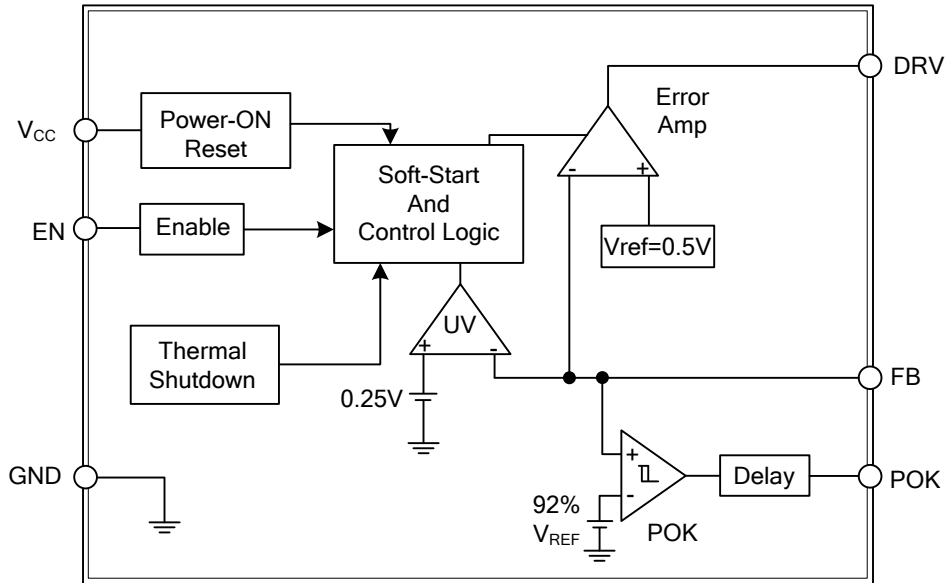
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	V <sub>CC</sub>	Input Voltage
2	GND	Ground
3	POK	Power ok Output Pin
4	EN	H: Normal Operation, L: Shutdown
5	FB	Feedback Pin
6	DRV	Gate Drive to N-FET

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sub>CC</sub>	-0.3~7	V
DRV to GND		-0.3~V <sub>CC</sub> +0.3 V	
Power Dissipation	P <sub>D</sub>	0.4	W
Junction Temperature	T <sub>J</sub> -40~	+125	°C
Operating Temperature	T <sub>OPR</sub>	-40~+85	°C
Storage Temperature	T <sub>STG</sub>	-65~+150	°C

Note: 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.

■ ELECTRICAL CHARACTERISTICS

(V<sub>IN</sub>=1.5V, V<sub>SHDN</sub>=V<sub>IN</sub>, T<sub>A</sub>=25°C, C<sub>IN</sub>=C<sub>OUT</sub>=1μF, unless otherwise noted.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage Range	V <sub>CC</sub>		4.5		5.5	V
Input Voltage UVLO Threshold	V <sub>UVLO</sub>	V <sub>CC</sub> Rising		3.75		V
Input Voltage UVLO Hysteresis	V <sub>HYST</sub>	V <sub>CC</sub> Falling		0.25		V
Supply Current	I <sub>CC</sub>	EN=V <sub>CC</sub>		0.4	0.8	mA
Shutdown Current	I <sub>SD</sub>	EN=0V	-1		1	μA
Feedback Voltage	V <sub>FB</sub>		0.49	0.5	0.51	V
Feedback Pin Input Current	I <sub>FB</sub>	V <sub>F</sub> B=0.5V	-100		100	nA
Soft Start Time	T <sub>SS</sub>			1		ms
EN Pin Logic High Threshold Voltage	V <sub>ENH</sub>	Enable	1.3			V
	V <sub>ENL</sub>	Disable			0.5	V
EN Pin Input Current	I <sub>EN</sub>	I <sub>OUT</sub> =0mA, V <sub>IN</sub> =5V -1			+1	μA
Output Voltage UVLO Threshold	V <sub>TH(UV)</sub>	V <sub>FB</sub> Falling	0.2	0.25	0.3	V
Ton Duty	T <sub>ON</sub>	V <sub>FB</sub> <0.25V		30		%
DRV Output Current	I <sub>DRV(SRC)</sub>	Sourcing, V <sub>FB</sub> =0.48V		20		mA
	I <sub>DRV(SINK)</sub>	Sinking, V <sub>FB</sub> =0.52V		20		mA
DRV Pin Output Voltage	V <sub>DRV</sub>	V <sub>FB</sub> =0.48V, V <sub>CC</sub> =5V, No Load	4.9		5.0	V
POK Threshold Voltage for Power OK	V <sub>POK</sub>	V <sub>FB</sub> Rising	90%	93%	96%	V <sub>FB</sub>
POK Threshold Voltage for Power Not OK	V <sub>PNOK</sub>	V <sub>FB</sub> Falling	82%	85%	88%	V <sub>FB</sub>
POK Low Voltage		POK Sinks 1mA		50	100	mV
POK Delay Time	T <sub>DELAY</sub>		0.8	2	10	ms
Thermal Shutdown Temperature	T <sub>SD</sub>			150		°C
Thermal Shutdown Hysteresis				50		°C

■ FUNCTION DESCRIPTIONS

**Power-On-Reset**

A Power-On-Reset (POR) circuit monitors the VCC pin voltage (VCC) for power-on-reset function to prevent wrong operation. The built-in POR circuit keeps the output shutting off until internal circuit is operating properly..

**Internal Soft-Start**

An internal soft-start provides an internal soft-start circuitry to control rise rate of the output voltage and limit the current surge during start-up. The typical soft-start interval is about 1ms.

**Output Voltage Regulation**

An error amplifier working with a temperature compensated 0.5V reference and an output NMOS regulates output to the preset voltage. The error amplifier designed with high bandwidth and DC gain provides very fast transient response and less load regulation.

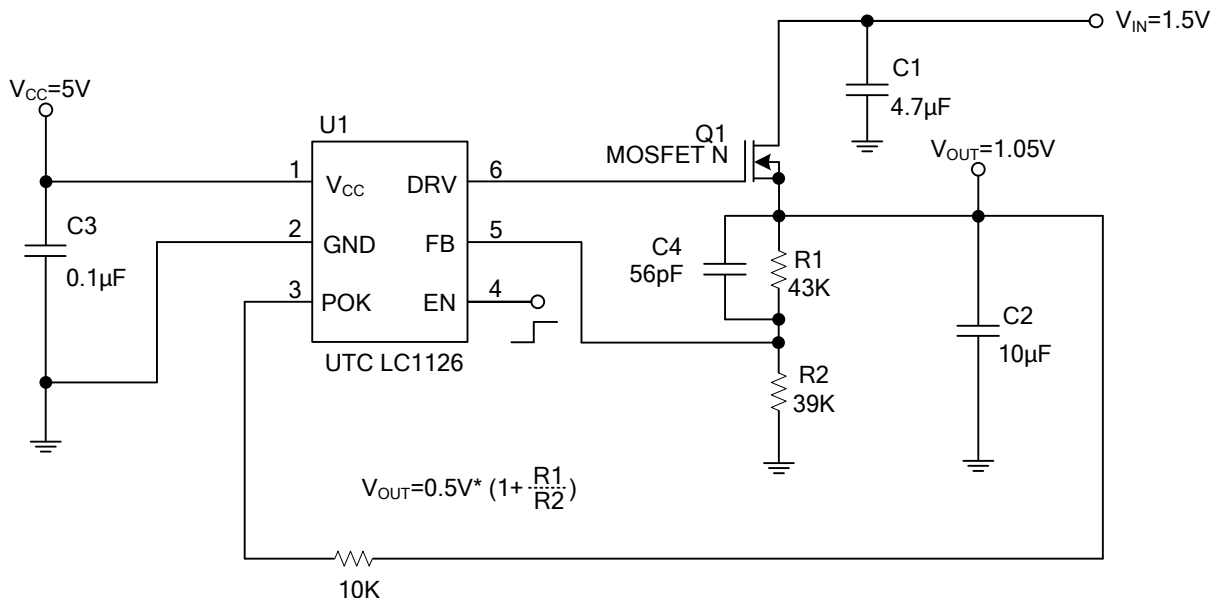
**Under-Voltage Protection (UVP)**

UTC LC1126 monitors the voltage on FB pin after soft-start process is finished. Therefore the UVP is disabling during soft-start. When the voltage on FB pin falls below the under-voltage threshold, the UVP circuit shuts off the output immediately. After a while (~70% Duty), UTC LC1126 starts a new soft-start to regulate output.

**Thermal Shutdown**

A thermal shutdown circuit limits the junction temperature of UTC LC1126. When the junction temperature exceeds +150°C, a thermal sensor turns off the output NMOS, allowing the device to cool down. The regulator regulates the output again through initiation of new soft-start cycle after the junction temperature cools by 50°C, resulting in a pulsed output during continuous thermal overload conditions.

■ TYPICAL APPLICATION CIRCUIT



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