



UD40201

Preliminary

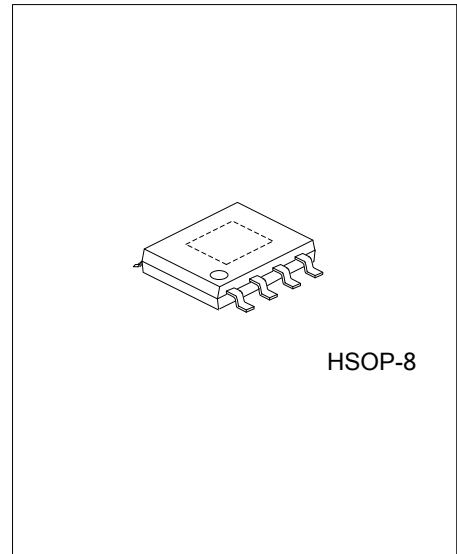
LINEAR INTEGRATED CIRCUIT

40V, 2A, 125KHZ ASYNCHRONOUS STEP-DOWN CONVERTER

DESCRIPTION

The UTC **UD40201** is a monolithic step-down switch mode converter with a built-in high-side power MOSFET. It achieves 2A continuous output current over a wide input supply range with excellent load and line regulation. 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 **UD40201** provides a very compact system solution.



FEATURES

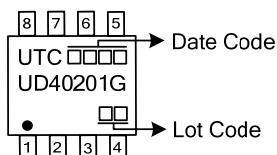
- * Wide Input Voltage from 9V~40V
- * Up to 2A Output Current
- * Adjustable Output Voltage up to 12V
- * High Efficiency Up to 90%
- * Internal Soft-Start
- * Auto Recovery after Faults
- * Output Cord Voltage Drop Compensation
- * Programmable Over Current Setting
- * Output Over-Voltage Protection
- * Over-Temperature Protection
- * RoHS Compliant

ORDERING INFORMATION

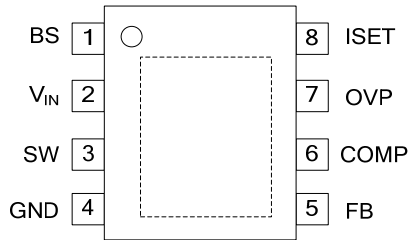
Ordering Number	Package	Packing
UD40201G-SH2-R	HSOP-8	Tape Reel

<p>UD40201G-SH2-R</p> <ul style="list-style-type: none"> (1) Packing Type (2) Package Type (3) Green Package 	<ul style="list-style-type: none"> (1) R: Tape Reel (2) SH2: HSOP-8 (3) G: Halogen Free and Lead Free
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MARKING



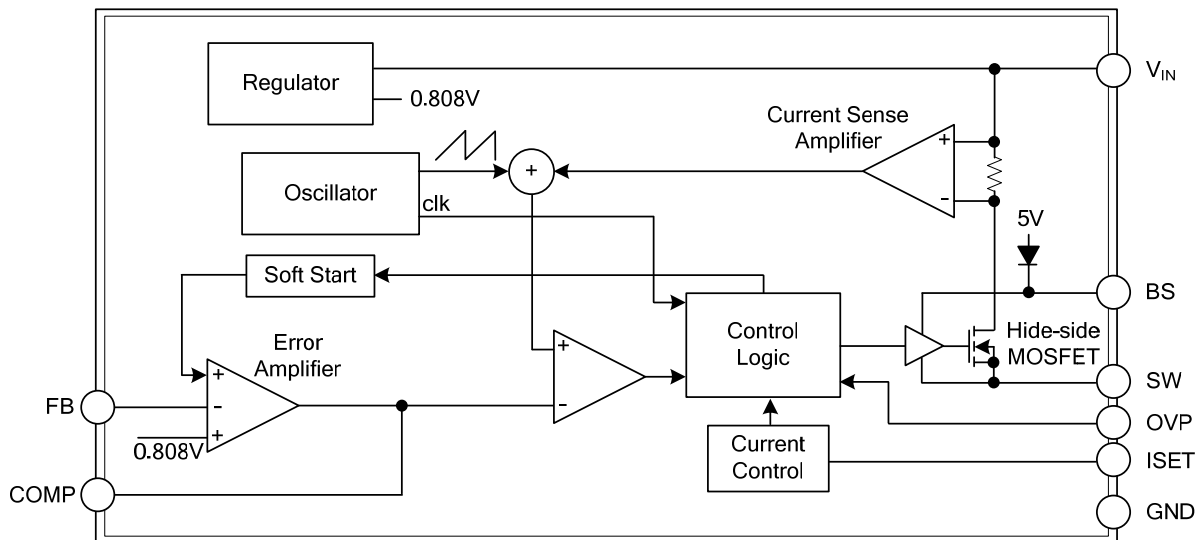
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	BS	High Side Gate Drive Boost Input. A 22nF or greater capacitor must be connected from this pin to SW. It can boost the gate drive to fully turn on the internal high side NMOS.
2	V _{IN}	Power Supply Input Pin. Drive 9V~40V voltage to this pin to power on this chip. Connecting a bypass capacitor ($\geq 22\mu\text{F} \times 2$) between VIN and GND to eliminate noise.
3	SW	Power Switching Output. It is the output pin that internal high side NMOS switching to supply power.
4	GND	Ground Pin.
5	FB	Voltage Feedback Input Pin. Connecting FB and VOUT with a resistive voltage divider. This IC senses feedback voltage via FB and regulate it at 0.808V.
6	COMP	Compensation Pin. This pin is used to compensate the regulation control loop. Connect a series RC network from COMP pin to GND.
7	OVP	OVP Input Pin. If the voltage at this pin is over 0.8V, the IC shuts down the high-side switching MOSFET.
8	ISET	Output Current Setting Pin. Connect a resistor between ISET and GND pin to set output current.

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING (Note 2)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Supply Voltage	V_{IN}	-0.3 ~ +42	V
SW Voltage	V_{SW}	-0.3 ~ 42	V
Boost Voltage	V_{BS}	-0.3 ~ ($V_{SW}+6$)	V
All Other Pins Voltage		-0.3 ~ +6	V
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-55 ~ +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
Input Supply Voltage	V_{IN}	9 ~ 40	V
Junction Temperature	T_J	-40 ~ +125	°C
Ambient Temperature	T_A	-40 ~ +85	°C

Note: If out of its operation conditions, the device is not guaranteed to function.

■ THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction To Ambient	θ_{JA}	105	°C/W
Junction to Case	θ_{JC}	50	°C/W

■ ELECTRICAL CHARACTERISTICS ($V_{IN}=12V$, $T_A=25^{\circ}C$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Current						
Quiescent Current (Non-switching)	I_Q	$V_{FB}=1V$		0.9	1.4	mA
Shutdown Supply Current (No loading)		$V_{OUT}=5V$		0.3		mA
Reference Voltage						
Feedback Voltage	V_{FB}	$9V \leq V_{IN} \leq 40V$	792	808	824	mV
Input UVLO						
UVLO Threshold		V_{IN} rising	8.0	8.5	8.9	V
Hysteresis		V_{IN} Falling		1.2		
OVP Threshold						
OVP Threshold Voltage	V_{OVP}	V_{OVP} Rising		0.8		V
Oscillator						
Switching Frequency	f_{SW}	$V_{FB}=0.808V$	90	125	160	kHz
Foldback Switching Frequency		$V_{FB}=0V$		30		kHz
Maximum Duty Cycle	D_{MAX}		80	86	91	%
Minimum On Time	$T_{ON(MIN)}$	$V_{FB}=0.7V$		200		ns
MOSFET						
High Side MOSFET On Resistance (Note)	$R_{DS(on)h}$	At $25^{\circ}C$		200		m Ω
Current Limit						
Current Limit (Note)	I_{LIM}			2.7		A
Error Amplifier						
Error Amplifier Transconductance (Note)	G_{EA}	$\Delta I_{COMP}=\pm 10\mu A$		650		$\mu A/V$
Error Amplifier Voltage Gain (Note)	A_{EA}			4000		V/V
Current Sense Transconductance (Note)	G_{CS}			5.25		A/V
Current Setting						
ISET Voltage				1		V
ISET to I_{OUT} Current Gain		I_{OUT}/I_{SET} , $R_{ISET}=19.6k\Omega$		25000		A/A
Current Controller DC Accuracy		$R_{ISET}=19.6k\Omega$, $V_{OUT}=3.5V$, Open-Loop DC Test	1175	1190	1205	mA
Thermal Shutdown						
Thermal Shutdown threshold (Note)				160		$^{\circ}C$

Note: Guaranteed by design.

■ TYPICAL APPLICATION CIRCUIT

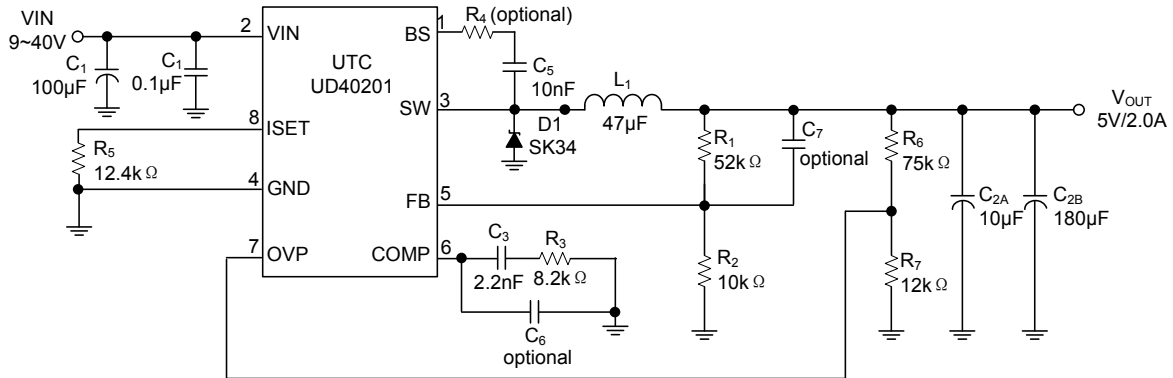


Table 1 Recommended Component Selection

V _{OUT} (V)	R1 (kΩ)	R2 (kΩ)	R3 (kΩ)	C3 (nF)	C6	L1 (µH)	C2A (µF)	C2B (µF)
5	52	10	8.2	2.2	NA	47	10uF 6.3V/Ceramic	180 6.3V/30mΩ
5	52	10	8.2	2.2	NA	47	10uF 6.3V/Ceramic	470 6.3V/30mΩ

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