



USR1021

Preliminary

LINEAR INTEGRATED CIRCUIT

3A SYNCHRONOUS BUCK REGULATOR

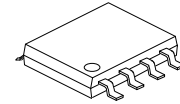
■ DESCRIPTION

The UTC **USR1021** is a high efficiency, 3A synchronous buck regulator. The UTC **USR1021** works from a 6V to 18V input voltage range, and provides up to 3A of continuous output current with an output voltage adjustable down to 0.8V.

The UTC **USR1021** comes in an SOP-8 packages and is rated over a -40°C~+85°C ambient temperature range.

■ FEATURES

- * 6V~18V operating input voltage range
- * High efficiency
- * Internal soft start
- * 1.5% initial output accuracy
- * Output voltage adjustable to 0.8V
- * 3A continuous output current
- * Cycle-by-cycle current limit
- * 500kHz PWM operation
- * Thermal shutdown
- * Short-circuit protection



SOP-8

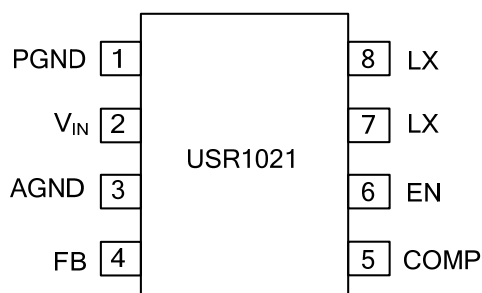
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
USR1021L-S08-R	USR1021G-S08-R	SOP-8	Tape Reel
USR1021L-S08-T	USR1021G-S08-T	SOP-8	Tube

Note: xx: Output Voltage, refer to Marking Information.

USR1021L-S08-R	(1)Packing Type (2)Package Type (3)Halogen Free	(1) R: Tape Reel, T: Tube (2) S08: SOP-8 (3) L: Lead Free, G: Halogen Free
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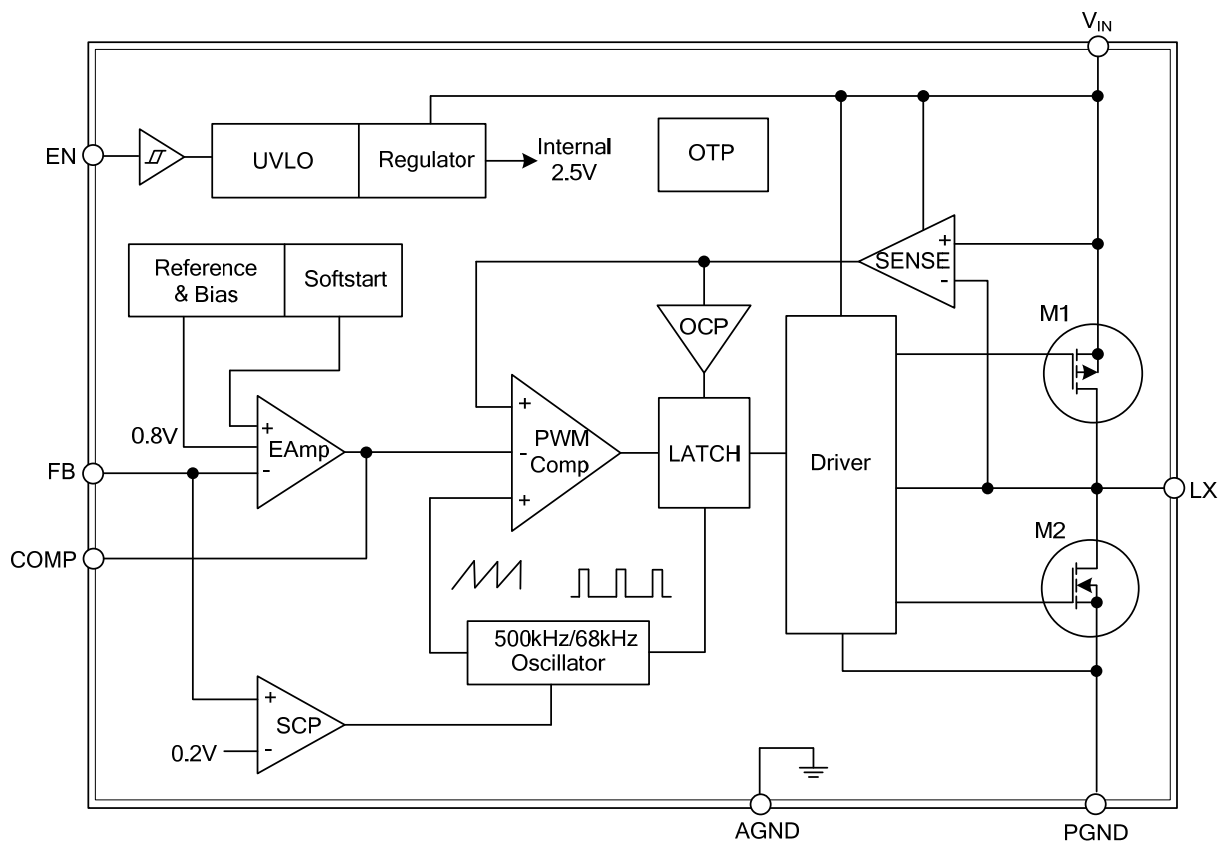
PIN CONFIGURATION



PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	PGND	Power ground
2	V _{IN}	Supply voltage input
3	AGND	Reference connectio for controller section
4	FB	Feedback voltage
5	COMP	Compensation pin
6	EN	Enable pin
7, 8	LX	Switch pin

BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{IN}	18	V
LX to AGND		$-0.7 \sim V_{IN} + 0.3$	V
EN to AGND		$-0.3 \sim V_{IN} + 0.3$	V
FB to AGND		$-0.3 \sim 6.0$	V
COMP to AGND		$-0.3 \sim 6.0$	V
PGND to AGND		$-0.3 \sim +0.3$	V
Junction Temperature	T_J	+150	°C
Storage Temperature	T_{STG}	$-65 \sim +150$	°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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient (Note 2)	θ_{JA}	87	°C/W

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{IN}	6~18	V
Output Voltage Range		$0.8 \sim V_{IN}$	V
Ambient Temperature	T_A	$-40 \sim +85$	°C

■ ELECTRICAL CHARACTERISTICS

($T_A = 25^\circ\text{C}$, $V_{IN} = V_{EN} = 12\text{V}$, $V_{OUT} = 3.3\text{V}$, unless otherwise specified) (Note 3)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{IN}		6		18	V
Supply Current (Quiescent)	I_{IN}	$I_{OUT} = 0$, $V_{FB} = 1.2\text{V}$, $V_{EN} > 2\text{V}$		3.5	5	mA
Shutdown Supply Current	I_{OFF}	$V_{EN} = 0\text{V}$		1	10	μA
Feedback Voltage	V_{FB}	$T_A = 25^\circ\text{C}$	0.788	0.8	0.812	V
Load Regulation				0.5		%
Line Regulation				1		%
Feedback Voltage Input Current	I_{FB}				200	nA
EN Input Threshold	V_{EN}	Off Threshold			0.6	V
		On Threshold	2			V
SS Time		$C_{SS} = 16\text{nF}$		2		ms

MODULATOR

Frequency	f_O		400	500	600	kHz
Maximum Duty Cycle	D_{MAX}		85			%
Controllable Minimum On Time	T_{MIN}				150	ns
Current Sense Transconductance				7		A/V
Error Amplifier Transconductance				180		μA/V

PROTECTION

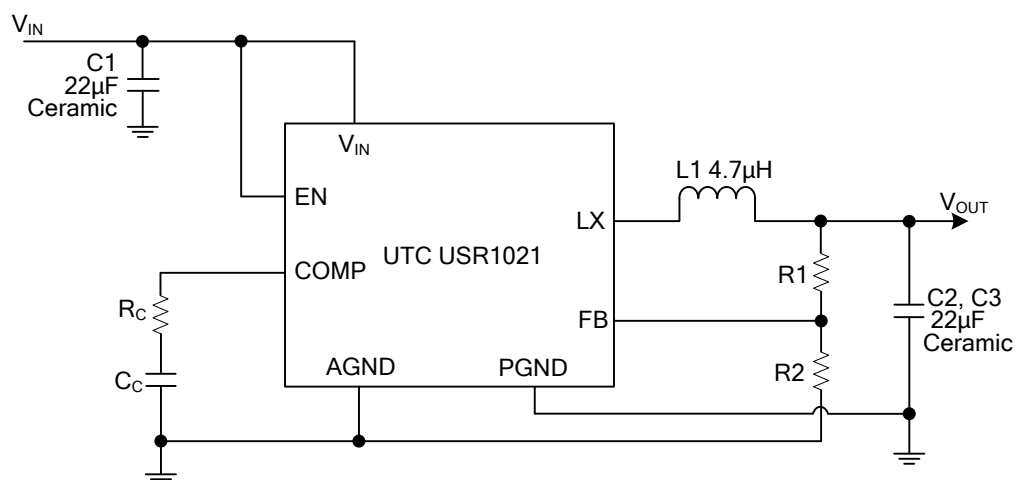
Current Limit	I_{LIMIT}		3.5	4.5		A
Over-Temperature Shutdown Limit		T_J Rising		150		°C
		T_J Falling		100		°C

Notes: 1. Devices are inherently ESD sensitive, handling precautions are required. Human body model rating: 1.5 kΩ in series with 100pF.

2. The value of θ_{JA} is measured with the device mounted on a 1-in² FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$. The value in any given application depends on the user's specific board design.

3. Specification in BOLD indicate an ambient temperature range of $-40^\circ\text{C} \sim +85^\circ\text{C}$. These specifications are guaranteed by design.

■ TYPICAL APPLICATION CIRCUIT



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