



HIGH SIDE POWER SWITCHES

DESCRIPTION

The UTC **US94061** are high-side load switches incorporating a low on-resistance P-channel MOSFET which provides customers over 2A continuous current.

The UTC **US94061** is characterized by a fast turn on function. The UTC **US94061** keeps in a floating state when an active pull-down signals is on the enable input until a high level signal applies on the EN pin. Built-in level shift circuitry allows low voltage logic signals to switch to higher supply voltages, on the contrary, high level logic signals can control low level voltages.

The UTC **US94061**'s operating voltage varies from 1.8V ~ 5.5V which makes these devices suitable for 1-cell Lithium ion and 2- to 3-cell NiMH/NiCad/Alkaline powered systems as well as all 5V applications. The 2µA low operating current and low shutdown current(less than1µA) make the battery life longer.

The UTC **US94061** is generally suitable for applications, such as load switch in portable devices: cellular phones, PDAs, MP3 players, digital Cameras, portable instrumentation, battery switch-over circuits and level translators.

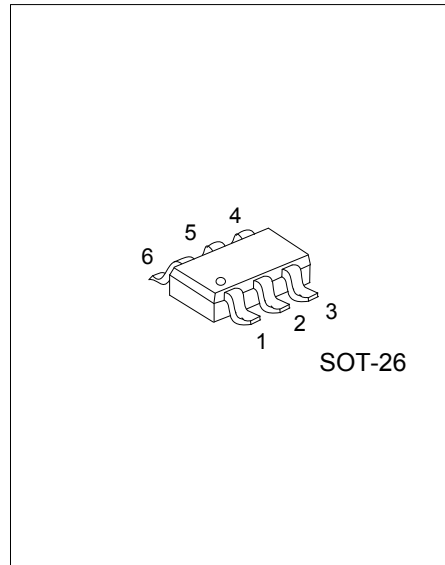
FEATURES

- * Operating voltage range:1.8V ~ 5.5V
- * Providing 2A continuous operating current
- * P-channel MOSFET's $R_{DS(ON)}$: 90mΩ typical
- * Built-in level shift for control logic
- * Quiescent current is as low as 2µA
- * Micro-power shutdown less than 1µA
- * Built-IN Level Shift Circuitry:
 - Controlled 1µs Turn-ON Rise-Time
 - Fast 60ns Turn-OFF Fall Time
- * Built-IN Fast-OFF Load Discharge Circuit

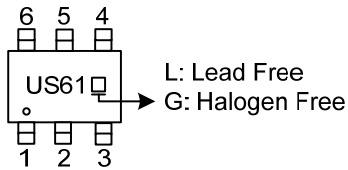
ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
US94061L-AG6-R	US94061G-AG6-R	SOT-26	Tape Reel

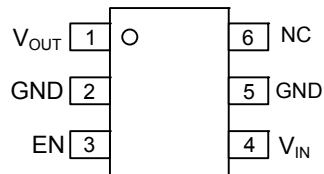
<p>US94061G-AG6-R</p> <ul style="list-style-type: none"> (1)Packing Type (2)Package Type (3)Green Package 	<ul style="list-style-type: none"> (1) R: Tape Reel (2) AG6: SOT-26 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING



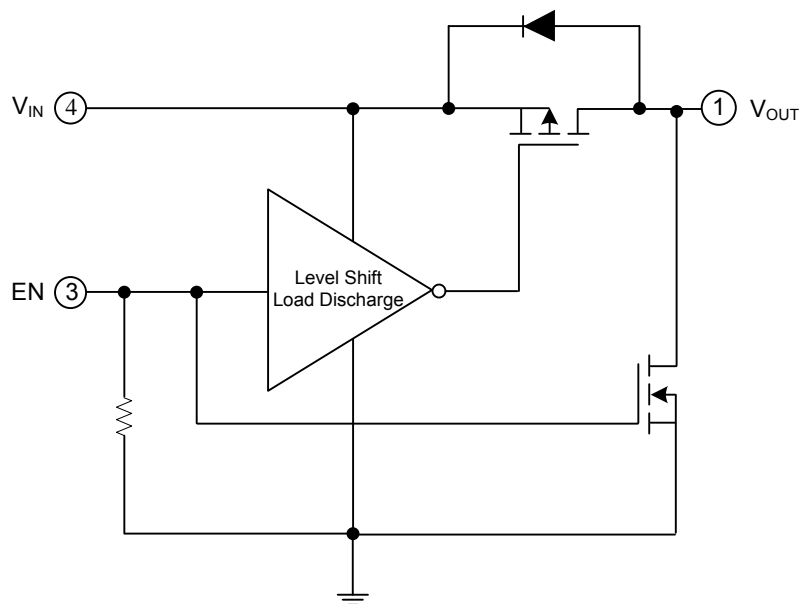
PIN CONFIGURATION



PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	V_{OUT}	Drain of P-channel MOSFET.
2, 5	GND	Ground connections. (Should both be connection to electrical ground).
3	EN	Enable (Input): Active-high CMOS compatible control input. Do not leave floating..
4	V_{IN}	Source of P-channel MOSFET.
6	NC	No connect

BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	+6	V
Enable Voltage	V_{EN}	+6	V
Continuous Drain Current (Note 3)	I_D	$T_A = 25^\circ\text{C}$	± 2
		$T_A = 85^\circ\text{C}$	± 1.4
Pulsed Drain Current (Note 5)	I_{DP}	± 6	A
Continuous Diode Current (Note 7)	I_S	-50	mA
Power Dissipation (Note 3) ($T_A = 85^\circ\text{C}$)	P_D	270	mW
Operating Ratings (Note 2)			
Input Voltage Range	V_{IN}	1.8~5.5	V
Junction Temperature	T_J	+150	$^\circ\text{C}$
Storage Temperature (Note 4)	T_{STG}	-55~+150	$^\circ\text{C}$

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 3)	θ_{JA}	240	$^\circ\text{C/W}$

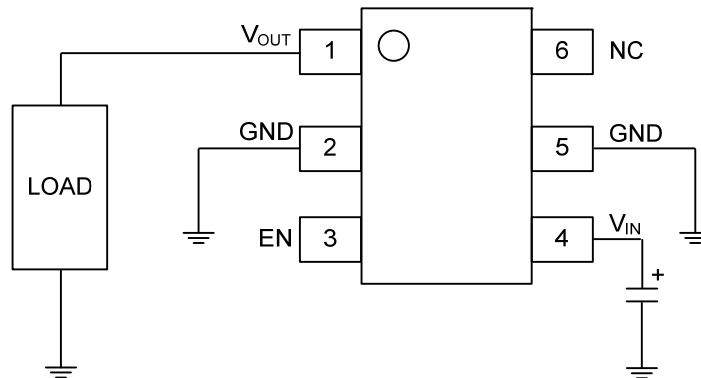
■ ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
STATIC						
EN Threshold Voltage	$V_{THD(EN)}$	$V_{IN} = 1.8\text{V} \sim 4.5\text{V}$, $I_D = -250\mu\text{A}$	0.5		1.2	V
EN Input Current (Quiescent Current)	$I_{Q(EN)}$	$V_{IN} = V_{EN} = 5.5\text{V}$		2	4	μA
OFF State Leakage Current	I_{LEAK}	$V_{EN} = \text{OPEN or } 0\text{V}$, $V_{IN} = +5.5\text{V}$			1	μA
P-Channel Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{IN} = 4.5\text{V}$, $I_D = -100\text{mA}$, $V_{EN} = 1.5\text{V}$		90	125	m Ω
		$V_{IN} = 3.6\text{V}$, $I_D = -100\text{mA}$, $V_{EN} = 1.5\text{V}$		95	135	
		$V_{IN} = 2.5\text{V}$, $I_D = -100\text{mA}$, $V_{EN} = 1.5\text{V}$		115	150	
		$V_{IN} = 1.8\text{V}$, $I_D = -100\text{mA}$, $V_{EN} = 1.5\text{V}$		165	200	
Turn-OFF Impedance	R_{SHDN}	$V_{IN} = 3.6\text{V}$, $V_{EN} = 0\text{V or OPEN}$		200	300	Ω
DYNAMIC (NOTE 6)						
Turn-ON Delay Time	$t_{D(ON)}$	$V_{IN} = 3.6\text{V}$, $I_D = -100\text{mA}$, $V_{EN} = 1.5\text{V}$		850	1500	ns
Turn-ON Rise Time	t_R	$V_{IN} = 3.6\text{V}$, $I_D = -100\text{mA}$, $V_{EN} = 1.5\text{V}$	0.5	1	5	μs
Turn-OFF Delay Time	$t_{D(OFF)}$	$V_{IN} = 3.6\text{V}$, $I_D = -100\text{mA}$, $V_{EN} = 1.5\text{V}$		100	150	ns
Turn-OFF Fall Time	t_F	$V_{IN} = 3.6\text{V}$, $I_D = -100\text{mA}$, $V_{EN} = 1.5\text{V}$		60	100	ns

Notes: 1. $T_A = 25^\circ\text{C}$ unless otherwise noted. Absolute maximum ratings indicate limits beyond which damage to the component may occur. Electrical specifications do not apply when operating the device outside of its operating ratings. The maximum allowable power dissipation is a function of the maximum junction temperature, $T_{J(\text{Max})}$, the junction-to-ambient thermal resistance, θ_{JA} , and the ambient temperature, T_A .

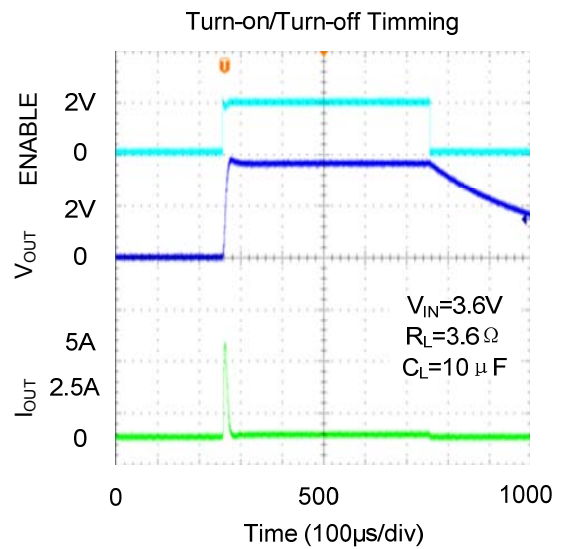
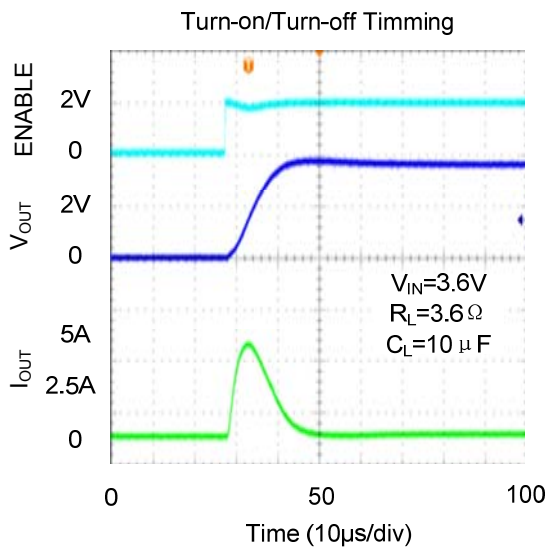
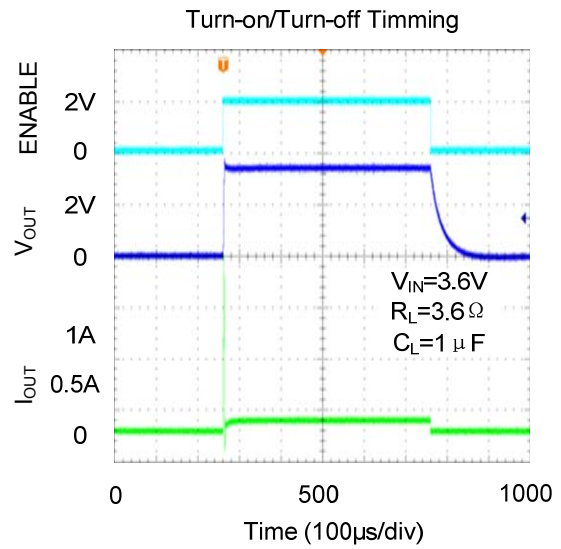
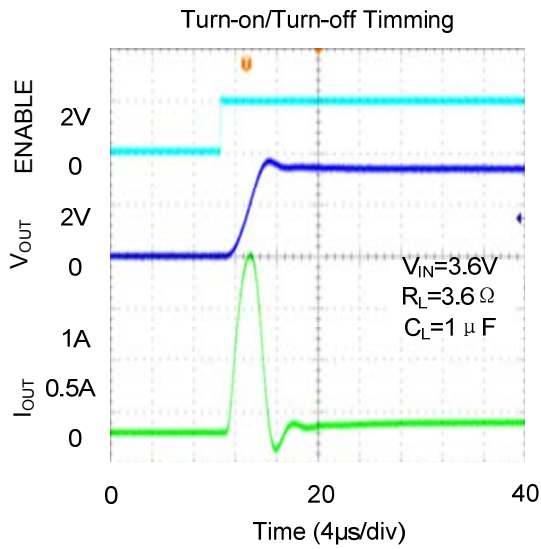
- This device is not guaranteed to operate beyond its specified operating rating.
- Mounted on 1 square-inch pad of 2 oz. copper.
- IC devices are inherently ESD sensitive. Handling precautions required.
- Pulse width < 300 μs with <2% duty cycle.
- Dynamic specifications are guaranteed by design.
- Body diode current conduction is not recommended.

■ TYPICAL APPLICATION CIRCUIT



Load Switch Application with Capacitive Load Discharge

■ TYPICAL CHARACTERISTICS



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