ACE7540UI

40V, 0.6A, 2MHz, Synchronous, Step-Down Converter

Description

The ACE7540UI is a high-frequency, step-down, switching regulator with integrated high-side and low-side power MOSFET designed specifically for power meter applications. The ACE7540UI can provide up to 0.6A output current and current mode control for fast loop response.

The wide input range of 5V to 40V is suitable for various power meter step-down applications. Quiescent current of 10μA shutdown mode allows devices to be used for battery power supply applications. The ACE7540UI uses high duty cycle and low dropout mode under the condition of low input voltage of power meter.

The ACE7540UI achieves high power conversion efficiency in a wide load range by reducing switching frequency under light load conditions to reduce switching and gate drive losses.

Frequency folding prevents short circuit and inductance current from losing control during startup. Thermal shutdown provides reliable and fault-tolerant operation. The ACE7540UI is packaged in SOT23-6.

Features

- Operating Input Range: 5V to 40V
- Adjustable Output Range: 0.8V to 0.95·VIN
- Operating Quiescent Current: 150μA
- Fixed Switching Frequency: 2MHz
- 400mΩ/200mΩ Internal Power MOSFETs
- Optimized for Power Meter Applications
- Satisfies 0.1% Output Voltage Ripple Requirements in Power Meter Applications
- Low Dropout Mode
- Light-Load Mode
- >90% Efficiency
- Dedicated Internal Compensation
- Stable with Ceramic/Electrolytic Output Capacitors
- Internal Soft Start (SS)
- Precision Current Limit without Current Sensing Resistor
- Guaranteed Industrial Temperature Range Limits

Applications

- Power Meters Only

Absolute Maximum Ratings

Stresses beyond those listed under “Absolute Maximum Rating” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other condition beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Parameter		Rating	Unit
Supply voltage	V_{IN}	-0.3 to 42	V
Switch voltage	V_{SW}	-0.3 to (V_{IN} + 0.3)	V
BST to SW		-0.3 to 6.0	V
All other pins		-0.3 to 6.0	V
Continuous power dissipation (T_A = 25°C) (1)		0.6	W
Junction temperature		150	°C
Lead temperature		260	°C
Storage temperature		-65 to 150	°C
Package Thermal Resistance	θ_{JA}	170	°C/W
	θ_{Jc}	130	
ESD	Human Body Mode	1500	V
Latch up		300	mA

Note:

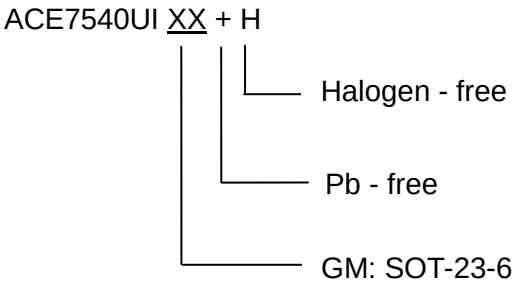
1. The maximum allowable power dissipation is a function of the maximum junction temperature T_J(MAX), the junction-to-ambient thermal resistance θ_{JA}, and the ambient temperature T_A. The maximum allowable continuous power dissipation at any ambient temperature is calculated by $P_D(MAX)=(T_J(MAX)-T_A)/\theta_{JA}$. Exceeding the maximum allowable power dissipation produces an excessive die temperature, and the regulator goes into thermal shutdown. Internal thermal shutdown circuitry protects the device from permanent damage.

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended Operating conditions are specified to ensure optimal performance to the datasheet specifications.

Parameter		Rating	Unit
Supply voltage	V_{IN}	5 to 40	V
Output voltage	V_{OUT}	Adjustable from 0.8	V
Operating junction temperature	T_J	-40 to 125	°C

Ordering information



Notes

ACE does not assume any responsibility for use as critical components in life support devices or systems without the express written approval of the president and general counsel of ACE Technology Co., LTD. As sued herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and shoes failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.