

GENERAL DESCRIPTION

The ACP2825 is a high-efficiency, DC-to-DC step-down switching regulators, capable of delivering up to 1.2A of output current. The device operates from an input voltage range of 2.5V to 6V and provides an output voltage from 0.6V to V_{IN} , making the ACP2825 ideal for low voltage power conversions. Running at a fixed frequency of 1.5MHz allows the use of small external components, such as ceramic input and output caps, as well as small inductors, while still providing low output ripples. This low noise output along with its excellent efficiency achieved by the internal synchronous rectifier, making ACP2825 an ideal green replacement for large power consuming linear regulators. Internal soft-start control circuitry reduces inrush current. Short-circuit and thermal-overload protection, input over voltage and input under voltage lockout protection improves design reliability.

The device is available in SOT25 package.

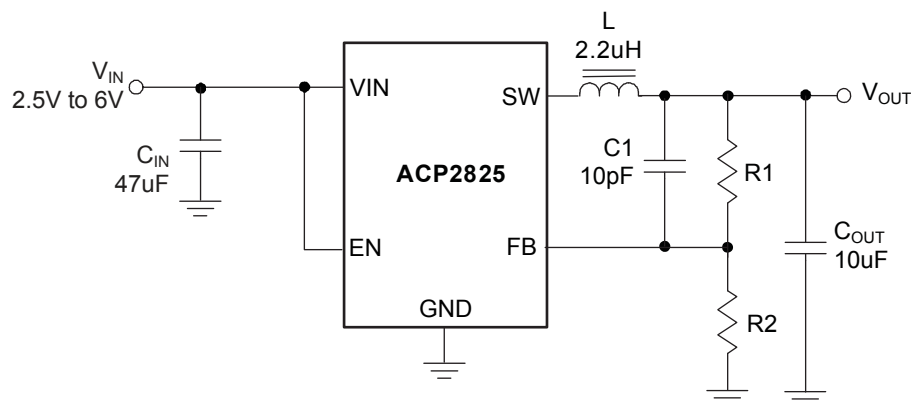
FEATURES

- Input Voltage Range: 2.5V to 6V
- Output Current: 1.2A
- Adjustable Output with 0.6V Reference Voltage
- Automatic PFM Mode at Light Load
- Low Dropout 100% Duty Operation
- 1.5MHz Programmable Frequency
- Maximum 65 μ A Quiescent Current
- Internal Soft Start Function
- Excellent Line and Load Transient Response
- Short Circuit Protection
- Input Over Voltage Protection
- Under Voltage Lockout Protection
- Thermal Shutdown Protection

APPLICATION

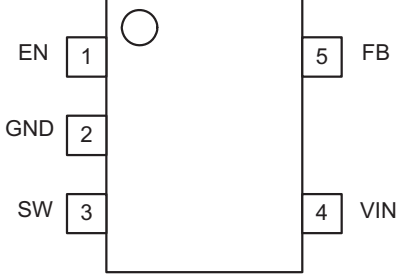
- 4G Wireless LAN
- Portable Instruments
- DSP Core Supplies
- Cellular Phones

APPLICATION CIRCUIT



Typical ACP2825 Application Circuit

▼ PIN CONFIGURATION

| Pin Configuration | Pin Description | | |
|---|-----------------|--------|------------------------------|
| | Pin# | Symbol | Function |
|  | 1 | EN | Enable Pin |
| | 2 | GND | Ground |
| | 3 | SW | Internal Power Switch Output |
| | 4 | VIN | Input Supply Pin |
| | 5 | FB | Feedback Voltage Pin |

▼ ORDERING INFORMATION

| Standard Part NO. | Package | Packing | Min. Quantity |
|-------------------|---------|-------------|---------------|
| ACP2825-BAA | SOT25 | Tape & Reel | 3000PCS |

▼ ABSOLUTE MAXIMUM RATINGS($T_A = +25^{\circ}\text{C}$)

| Parameter | Symbol | Rating | Unit |
|--------------------------------|---------------|------------------|-----------------------------|
| VIN, EN, SW, FB, Pins Voltage | | -0.3 to 7 | V |
| Enable Input Voltage | V_{EN} | -0.3 to V_{IN} | |
| Junction to Ambient | θ_{JA} | 110 | $^{\circ}\text{C}/\text{W}$ |
| Lead Temperature | T_L | 260 | $^{\circ}\text{C}$ |
| Storage Temperature | T_S | -65 to 150 | |
| Operating Junction Temperature | T_J | -40 to 150 | |
| Human Body Model | HBM | 2000 | V |
| Maximum Power Dissipation | PD | 600 | mW |

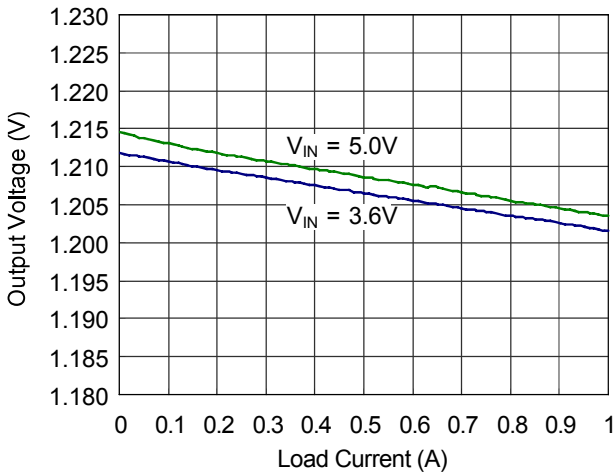
RECOMMENDED WORK CONDITIONS

| Parameter | Symbol | Rating | Unit |
|--------------------------------|----------|-----------|------|
| Input Voltage | V_{IN} | 2.5 to 6 | V |
| Operating Junction Temperature | T_J | -40 to 85 | °C |

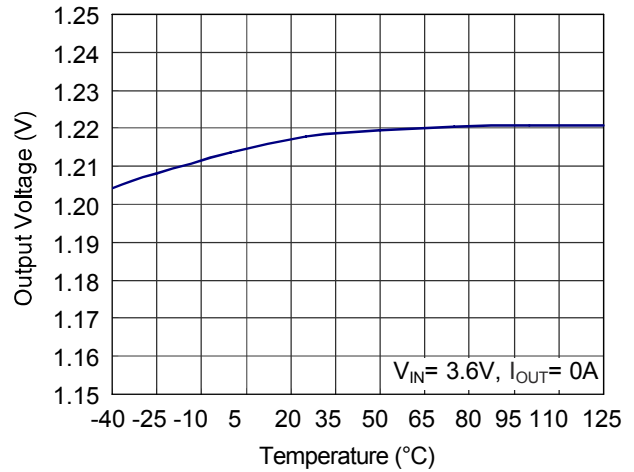
ELECTRICAL CHARACTERISTICS($T_A = +25^{\circ}\text{C}$)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|-----------------------------------|----------------|---|-------|------|-------|------|
| Feedback Voltage | V_{FB} | $V_{IN}=5\text{V}$ | 0.588 | 0.6 | 0.612 | V |
| Switching Frequency | f_s | | | 1.5 | | MHz |
| FB Pin Bias Current | I_{FB} | | | 0.1 | 1 | μA |
| Quiescent Current | I_Q | $V_{FB}=0.65\text{V}$, No Switching | | 40 | 65 | |
| Shutdown Current | I_{SHUT} | $V_{EN} = 0\text{V}$ | | 0.1 | 10 | |
| Line Regulation | | $V_{IN}=2.5\text{V to }6\text{V}$ | | 0.04 | 0.4 | %/V |
| Load Regulation | | $I_{OUT}=0.01\text{ to }1\text{A}$ | | 0.1 | 0.2 | %/A |
| PMOS RDS(ON) | $R_{PDS(ON)}$ | | | 250 | 300 | mΩ |
| NMOS RDS(ON) | $R_{NDS(ON)}$ | | | 100 | 150 | |
| Under Voltage Threshold Lockout | V_{UVLO} | | | 2.3 | | V |
| UVLO Hysteresis | V_{UVLO_HY} | | | 100 | | mV |
| Over Voltage Protection Threshold | V_{OVP} | | | 6.5 | | V |
| Peak Current Limit | I_{LIMIT} | $V_{FB}=0.75\text{V}$ | 1.5 | | | A |
| SW Leakage Current | $I_{L(SW)}$ | $V_{OUT}=V_{SW}=5\text{V}$, $V_{EN}=0\text{V}$ | | | 1 | μA |
| EN Leakage Current | $I_{L(EN)}$ | | | | 1 | |
| EN Input High Voltage | V_{EN_H} | | 1.2 | | | V |
| EN Input Low Voltage | V_{EN_L} | | | | 0.5 | |
| Thermal Shutdown Temperature | T_{SD} | | | 160 | | °C |

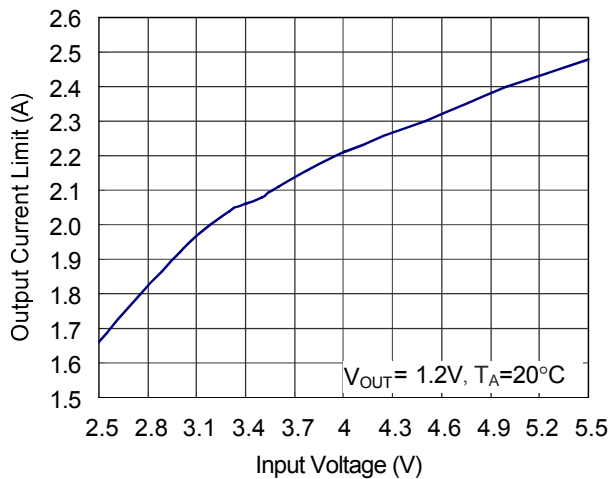
PERFORMANCE CHARACTERISTIC



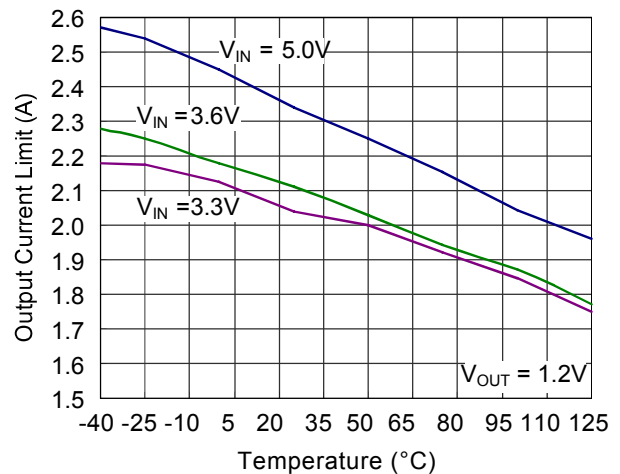
Output Voltage vs. Load Current



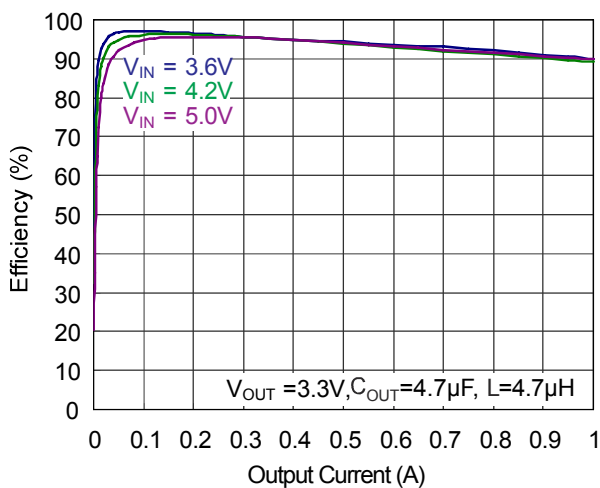
Output Voltage vs. Temperature



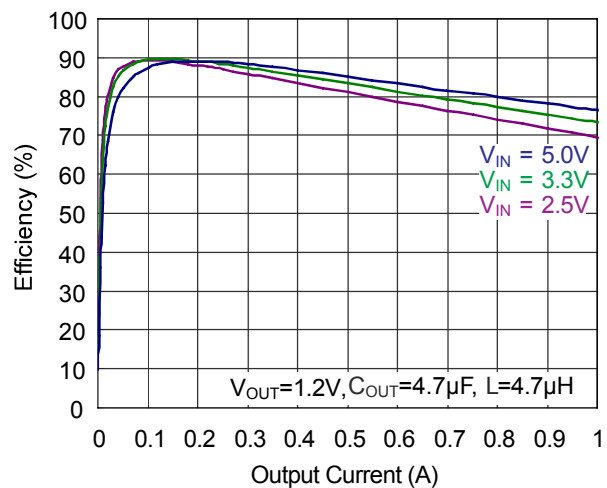
Output Current Limit vs. Input Voltage



Output Current Limit vs. Temperature

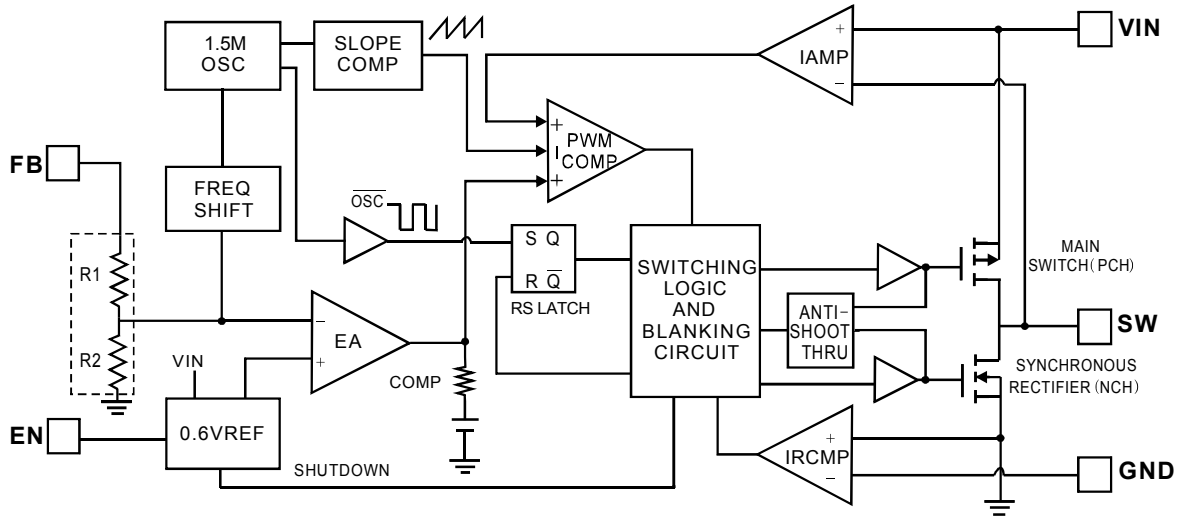


Efficiency vs. Output Current



Efficiency vs. Output Current

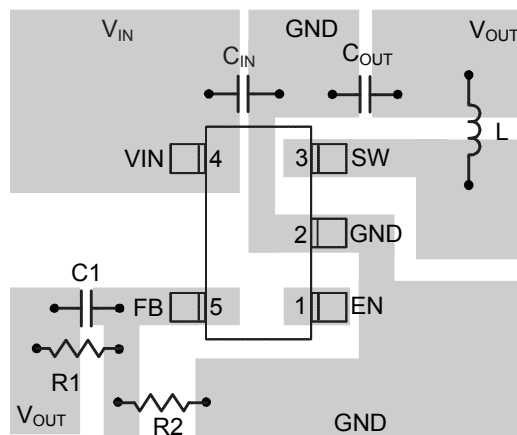
FUNCTION BLOCK



Functional Block Diagram

LAYOUT CONSIDERATION

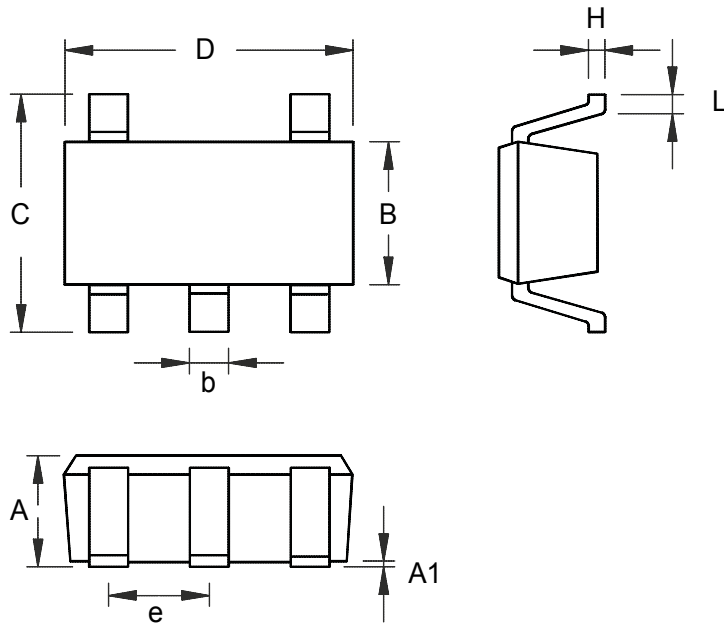
As with all switching regulators, careful attention must be paid to the PCB board layout and component placement. To maximize efficiency, switch rise and fall times are made as short as possible. To prevent electromagnetic interference(EMI) problems, proper layout of the high frequency switching path is essential. The voltage signal of the SW pin has sharp rise and fall edges. Minimize the length and area of all traces connected to the SW pin and always use a ground plane under the switching regulator to minimize inter-plane coupling. In addition, the ground connection for the feedback resistor R2 should be tied directly to the GND pin and not shared with any other component, ensuring a clean, noise-free connection. Please refer to next figure:



PCB Layout Guide

PACKAGE INFORMATION

- SOT25



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 0.889 | 1.295 | 0.035 | 0.051 |
| A1 | 0.000 | 0.152 | 0.000 | 0.006 |
| B | 1.397 | 1.803 | 0.055 | 0.071 |
| b | 0.356 | 0.559 | 0.014 | 0.022 |
| C | 2.591 | 2.997 | 0.102 | 0.118 |
| D | 2.692 | 3.099 | 0.106 | 0.122 |
| e | 0.838 | 1.041 | 0.033 | 0.041 |
| H | 0.080 | 0.254 | 0.003 | 0.010 |
| L | 0.300 | 0.610 | 0.012 | 0.024 |