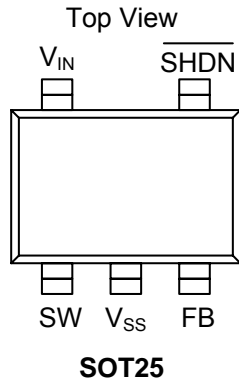


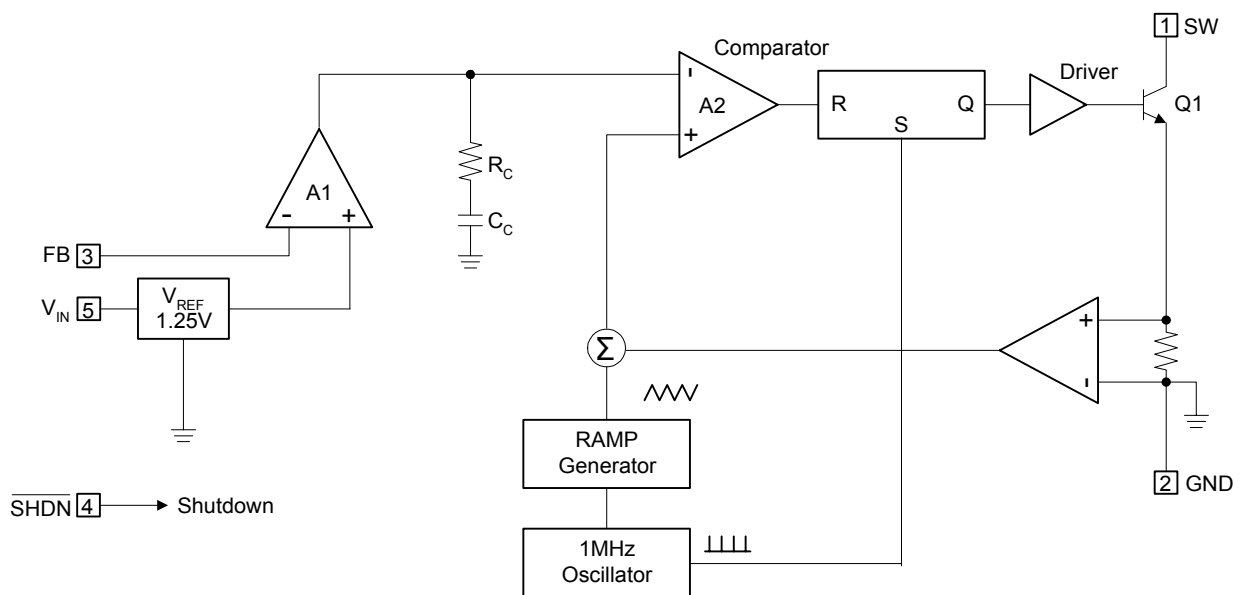
### Pin Assignments



### Pin Descriptions

Name	Description
SW	Switch Pin. Connect inductor/diode here. Minimize trace area at this pin to reduce EMI.
V <sub>SS</sub>	GND pin
FB	Feedback Pin. Reference voltage is 1.25V.
$\overline{\text{SHDN}}$	Shutdown Pin. Tie to 0.6V or higher to enable device; 0.5V or less to disable device.
V <sub>IN</sub>	Input Supply Pin. Must be locally bypassed.

### Block Diagram



## Absolute Maximum Ratings

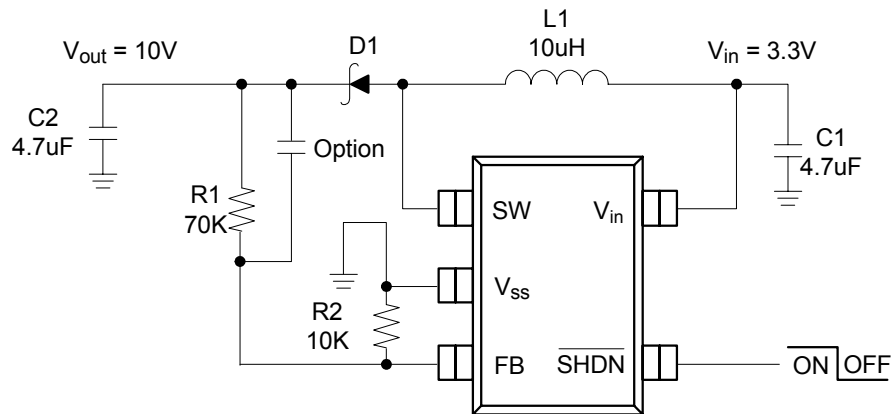
Symbol	Parameter	Rating	Unit
$V_{IN}$	$V_{IN}$ Pin Voltage	10	V
$V_{SW}$	SW Voltage	36	V
$V_{FB}$	Feedback Pin Voltage	10	V
$V_{SHDN}$	SHDN Pin Voltage	10	V
$T_J$	Maximum Junction Temperature	125	°C
$T_{LEAD}$	Lead Temperature (Soldering for 10s.)	300	°C
$T_{OPR}$	Operating Ambient Temperature Range	0 to +85	°C
$T_{STG}$	Storage Temperature Range	-40 to +125	°C

Caution: The absolute maximum ratings are rated values exceeding which the product could suffer physical damage. These values must therefore not be exceeded under any conditions.

## Electrical Characteristics ( $T_a = 25^\circ\text{C}$ , $V_{IN} = 5\text{V}$ , $V_{SHDN} = 5\text{V}$ , unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{IN}$	Minimum Operation Voltage	-	2.5	-	-	V
$V_{IN}$	Maximum Operation Voltage	-	-	-	10	V
$V_{FB}$	Feedback Pin Voltage	-	1.225	1.25	1.275	V
$I_{FB}$	Feedback Pin Bias Current	-	10	45	100	nA
$I_{IN}$	Supply Current	Operation Current	-	2	3	mA
		$V_{SHDN} = 0\text{V}$	-	0.1	1.0	$\mu\text{A}$
$F_{SW}$	Switching Frequency		0.75	1.0	1.25	MHz
Duty	PWM Maximum Duty Cycle		85	90	-	%
$I_{SW}$	Switch Current		280	320	360	mA
$V_{SAT}$	Switch $V_{SAT}$	$I_{SW} = 250\text{mA}$	-	350	-	mV
	Switch Leakage Current	$V_{SW} = 5\text{V}$	-	0.1	5	$\mu\text{A}$
$V_{SHDN}$	SHDN Pin Voltage High	Enable	0.6	-	-	V
$V_{SHDN}$	SHDN Pin Voltage Low	Disable	-	-	0.5	V
$I_{SHDN}$	SHDN Pin Bios Current		-	10	-	$\mu\text{A}$

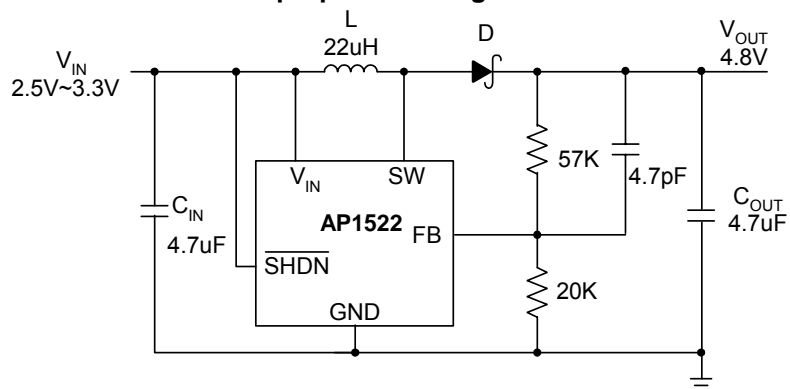
### Typical Application Circuit



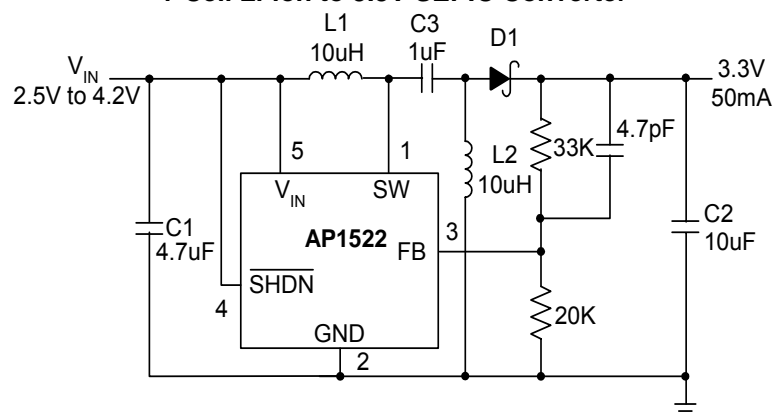
$$V_{OUT} = V_{FB} \left( 1 + \frac{R1}{R2} \right)$$

$$1K \leq R2 \leq 50K$$

### Step Up DC-DC Regulator

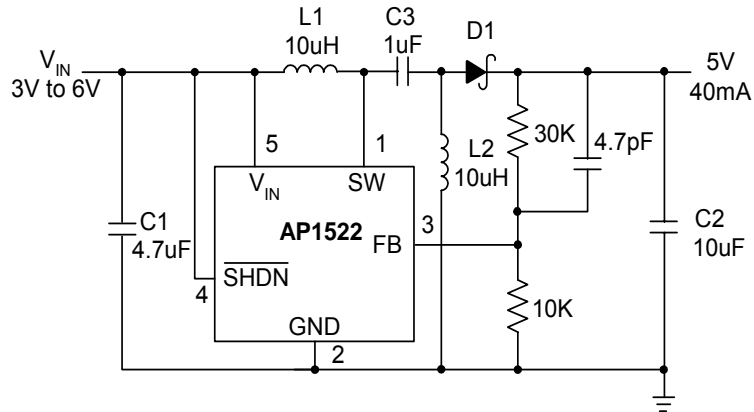


### 1-Cell Li-Ion to 3.3V SEPIC Converter

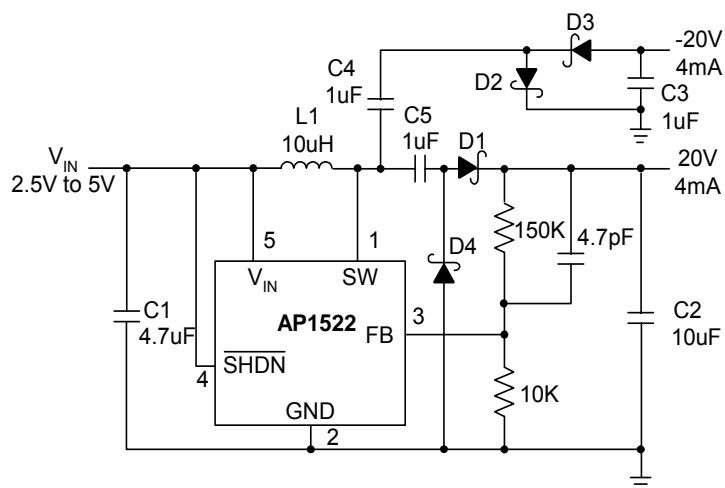


**Typical Application Circuit (Continued)**

**4-Cell to 5V SEPIC Converter**



**±20V Dual Output Converter with Output Disconnect**



### Applications Information

#### Inductor Selection

A 10 $\mu$ H inductor is recommended for most AP1522 applications. Although small size and high efficiency are major concerns, the inductor should have low core losses at 1MHz and low DCR (copper wire resistance).

#### Capacitor Selection

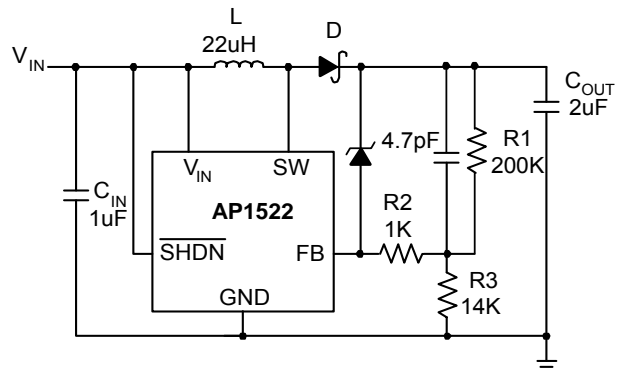
The small size of ceramic capacitors makes them ideal for AP1522 applications. X5R and X7R types are recommended because they retain their capacitance over wider voltage and temperature ranges than other types such as Y5V or Z5U. A 4.7 $\mu$ F input capacitor and a 4.7 $\mu$ F output capacitor are sufficient for most AP1522 applications.

#### Diode Selection

Schottky diodes, with their low forward voltage drop and fast reverse recovery, are the ideal choices for AP1522 applications. The forward voltage drop of a Schottky diode represents the conduction losses in the diode, while the diode capacitance ( $C_T$  or  $C_D$ ) represents the switching losses. For diode selection, both forward voltage drop and diode capacitance need to be considered. Schottky diodes with higher current ratings usually have lower forward voltage drop and larger diode capacitance, which can cause significant switching losses at the 1MHz switching frequency of the AP1522. A Schottky diode rated at 100mA to 200mA is sufficient for most AP1522 applications.

#### Open-Circuit Protection

In the cases of output open circuit, when the R1 are disconnected from the circuit, the feedback voltage will be zero. The AP1522 will then switch at a high duty cycle resulting in a high output voltage, which may cause the SW pin voltage to exceed its maximum 36V rating. A Zener diode can be used at the output to limit the voltage on the SW pin (**Figure 1**). The Zener voltage should be larger than the maximum forward voltage of the  $V_{OUT}$ . The current rating of the Zener should be larger than 0.1mA.

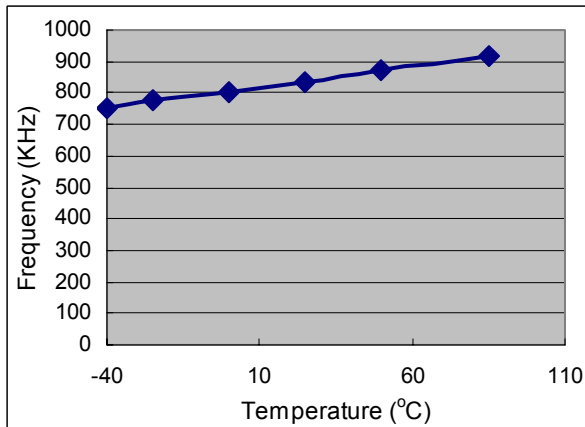


**Figure 1.** With Open-Circuit Protection

## Typical Performance Characteristics

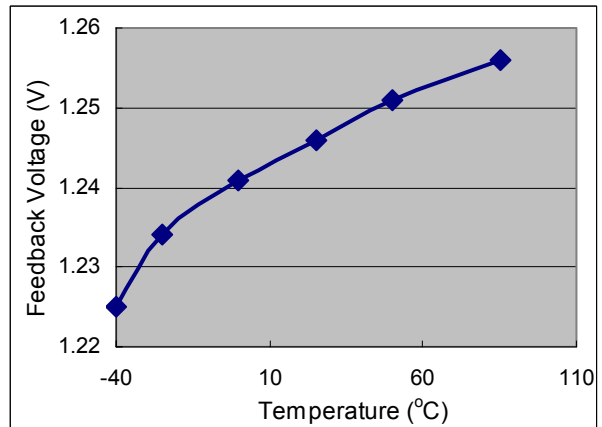
**Frequency vs. Temperature**

$V_{in} = 5V$ ;  $V_{out} = 15V$



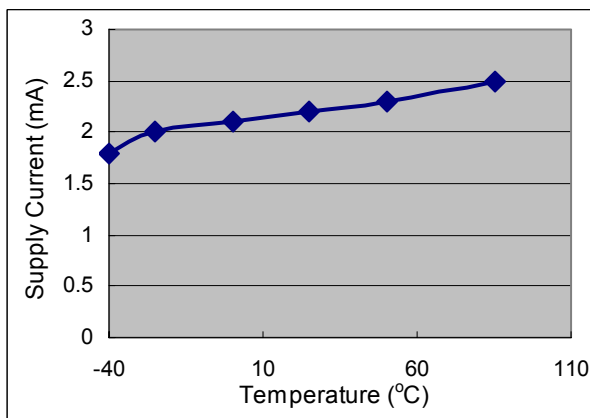
**Feedback Voltage vs. Temperature**

$V_{in} = 5V$ ;  $V_{out} = 15V$



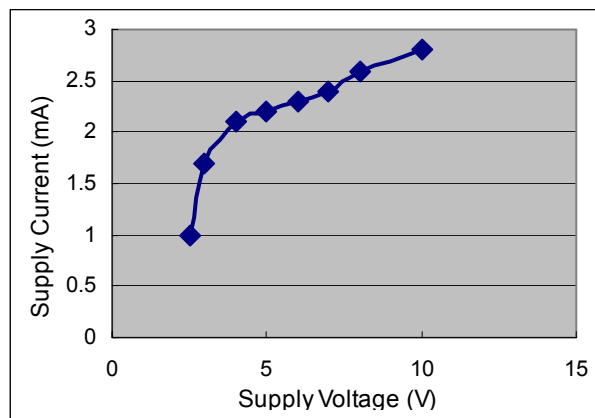
**Supply Current vs. Temperature**

$V_{in} = 5V$ ;  $V_{out} = 15V$ ;  $I_{out} = 0A$



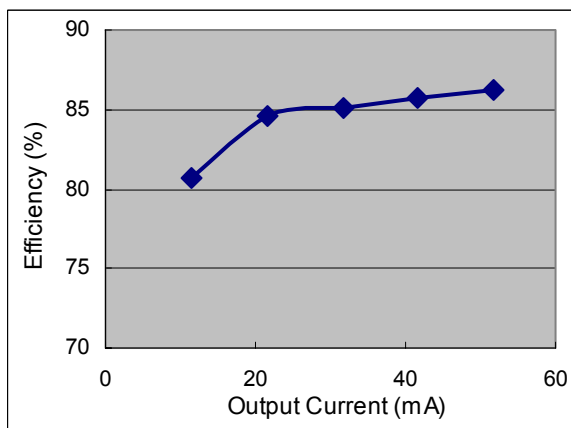
**Supply Current vs. Supply Voltage**

$V_{out} = 15V$ ;  $I_{out} = 0A$



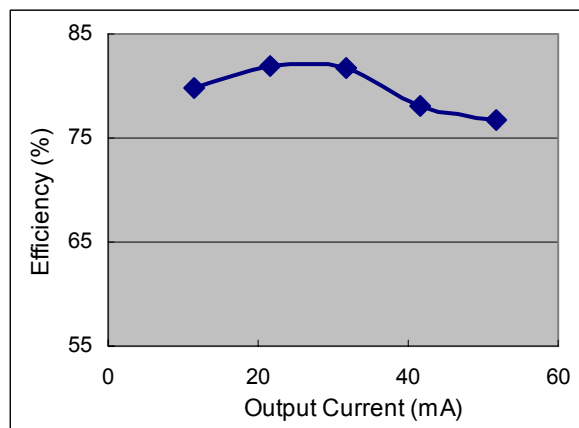
**Efficiency vs. Output Current**

$V_{in} = 5V$ ;  $V_{out} = 15V$



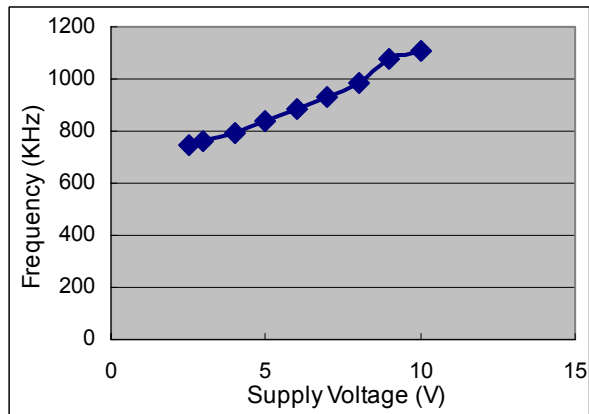
**Efficiency vs. Output Current**

$V_{in} = 3.3V$ ;  $V_{out} = 15V$



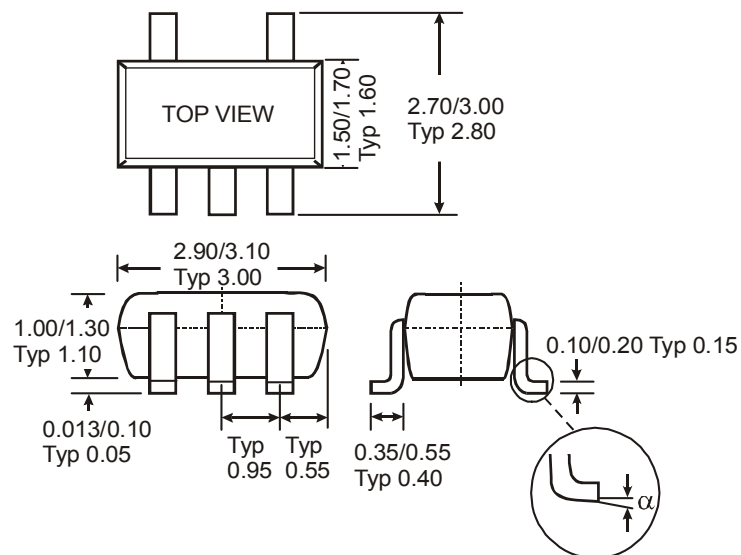
## Typical Performance Characteristics (Continued)

Frequency vs. Supply Voltage  
 $V_{out} = 15V$



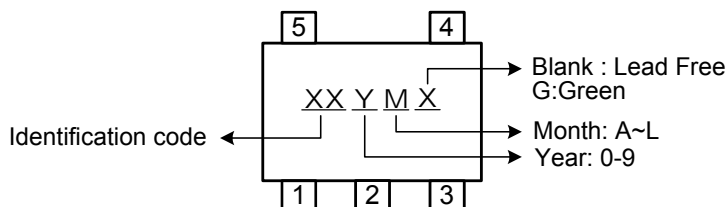
## Package Diagrams (All Dimensions in mm)

### (1) SOT25



### Marking Information

#### (1) SOT25



Device	Package (Note 4)	Identification Code
AP1522W	SOT25	FA

Note: 4. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

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