

## PWM/PFM Dual Mode Step-down DC/DC Controller

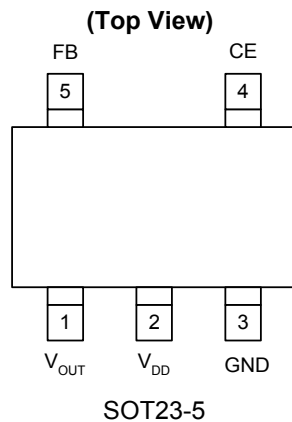
### ■ Features

- Input voltage range: 2.2V~8V ( $V_{OUT}$  type)
- Adjustable version ( $\pm 2.5\%$ )
- Oscillator frequency: 270KHz ( $\pm 15\%$ )
- High Efficiency: 92% (typ.)
- Stand-by capability:  $I_{STB} = 3\mu A$ . (max.)
- Soft-start time set-up externally type possible
- Output voltage type possible (FB)
- Package: SOT23-5

### ■ Applications

- Electronic Information Organizers
- Palmtops
- Cellular and portable phones
- Portable Audio Systems
- Various Multi-function Power Supplies

### ■ Pin Assignment



### ■ General Descriptions

The AP1625 series are multi-functional step-down DC/DC converters with built-in speed, low ON resistance drivers. A more than 1A output current is possible using an externally connected transistor, coil, diode and capacitor.

Output voltage is set-up by external resistor. ( $\pm 2.5\%$  accuracy).

With a 270KHz switching frequency, the size of the external components can be reduced.

Control switches from PWM to PFM during light loads with the AP1625 (PWM/PFM switchable) and the series is highly efficient from light loads to large output currents.

In relation to soft-start time external capacitor regulated types.

During stand-by time (CE pin "LOW"), current consumption is reduced to less than  $0.5\mu A$ .

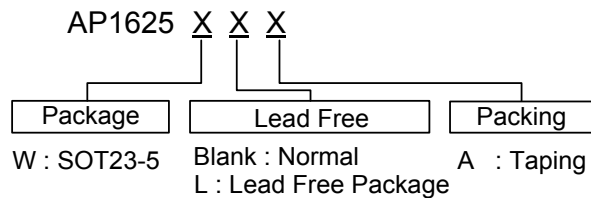
With U.V.L.O internal, the external MOSFET. Will be forcibly switched off if used below the stipulated voltage.

### ■ Pin Descriptions

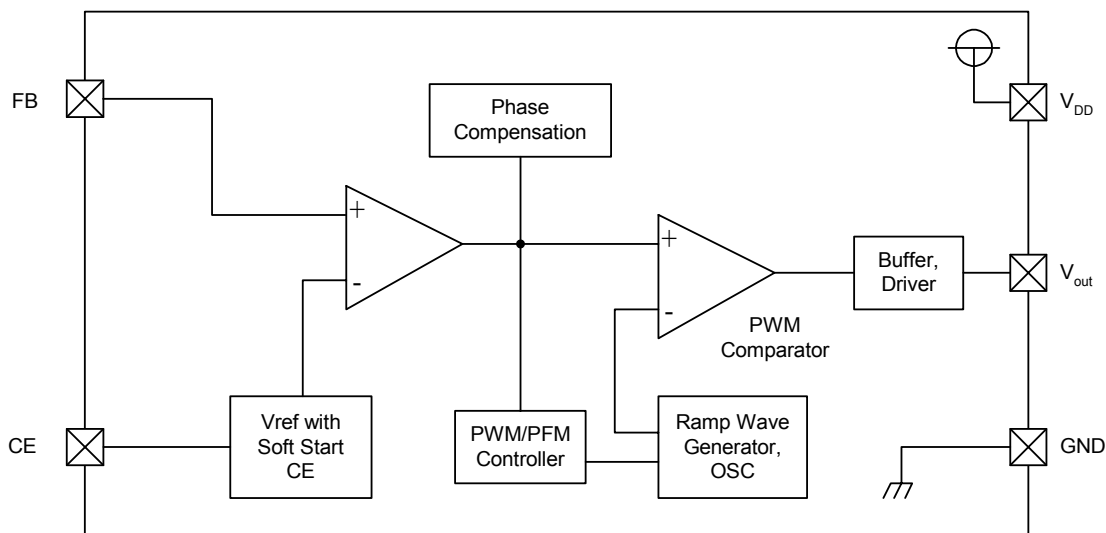
Pin No.	Pin Name	Function
1	$V_{OUT}$	External PMOSFET Connection
2	$V_{DD}$	Power Supply
3	GND	Ground
4	CE	Chip Enable Soft-start capacitor connection
5	FB	Feedback pin

## PWM/PFM Dual Mode Step-down DC/DC Controller

### Ordering Information



### Block Diagrams



### Absolute Maximum Ratings

Ta=25°C

Parameter	Symbol	Rating	Unit
V <sub>IN</sub> Pin Voltage	V <sub>DD</sub>	-0.3 ~ 8.5	V
V <sub>OUT</sub> Pin Voltage	V <sub>OUT</sub>	-0.3 ~ V <sub>IN</sub> +0.3	V
FB Pin Voltage	V <sub>FB</sub>	-0.3 ~ V <sub>IN</sub> +0.3	V
CE Pin Voltage	V <sub>CE</sub>	-0.3 ~ V <sub>IN</sub> +0.3	V
V <sub>OUT</sub> Pin Current	I <sub>OUT</sub>	±100	mA
Continuous Total Power Dissipation	P <sub>d</sub>	250	mW
Operating Ambient Temperature	T <sub>opr</sub>	-30 ~ +80	°C
Storage Temperature	T <sub>stg</sub>	-40 ~ +125	°C



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### ■ Electrical Characteristics

AP1625 (V<sub>OUT</sub>=3.3V, F<sub>OSC</sub>=270KHz) Ta=25°C

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
FB	V <sub>FB</sub>		1.17	1.2	1.23	V
Maximum Input Voltage	V <sub>IN</sub>		8			V
UVLO Voltage ( min. operating voltage )	V <sub>UVLO</sub>	Same as I <sub>DD</sub> , voltage required to maintain H at V <sub>OUT</sub>			2.2	V
Supply Current	I <sub>DD</sub>	No external components, CE=V <sub>IN</sub> , V <sub>OUT</sub> =0V		40	110	μA
Stand-by Current	I <sub>STB</sub>	No external components, CE=V <sub>IN</sub> , V <sub>OUT</sub> =0V			2	μA
Oscillator Frequency	F <sub>OSC</sub>	Measuring of EXT/waveform, V <sub>IN</sub> =output voltage+0.3V	230	270	310	KHz
Maximum Duty Ratio	MAXDTY		100			%
PFM Duty Ratio	PFMDTY	NO load (AP1625 only)	15	25	35	%
CE"High" Voltage	V <sub>CEH</sub>	NO external components, V <sub>FB</sub> =0V, apply 0.65V (min.) to CE, determine V <sub>OUT</sub> "Low"	0.5			V <sub>CC</sub>
CE"Low" Voltage	V <sub>CEL</sub>	Same as V <sub>CEH</sub> , determine EXT"High"			0.20	V
Efficiency	EFFI			92		%
Soft-Start Time	T <sub>SS</sub>	Use a 33 nF Capacitor	5	15		msec

Measuring conditions: Unless otherwise specified, connect external components. V<sub>IN</sub>=5.0V, L<sub>OUT</sub>=220mA  
Series Amendment:

AP1625

External Components: C<sub>SS</sub> = 0.033μF, R<sub>SS</sub> = 470kΩ

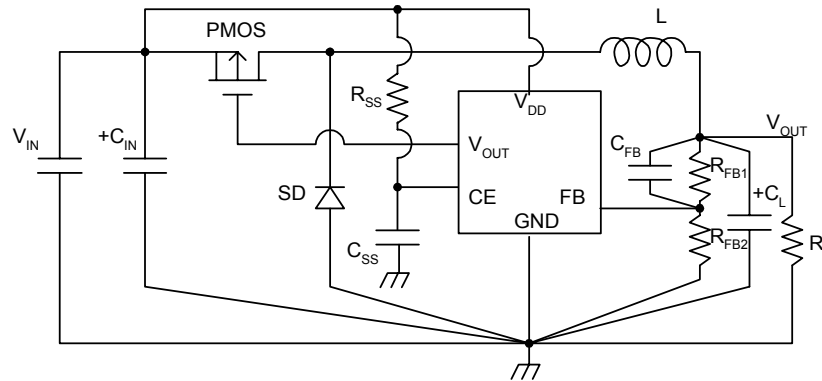
The Following Parameter Applies:

Soft Start Time ( T<sub>SS</sub> ) : Connect R<sub>SS</sub>, C<sub>SS</sub>. CE, 0V → 3.0V ( When V<sub>IN</sub> < 3.0V, V<sub>IN</sub> = 3.0V )

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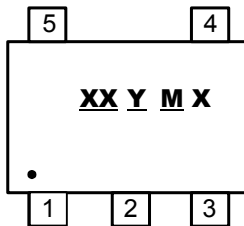
### ■ Typical Application Circuit

AP1625



### ■ Marking Information

SOT23-5L



SOT23-5L

**XX** : Identification code  
(See Appendix)  
**Y** : Year: 0-9  
**M** : Month: A~L  
**X** : Blank: normal  
**L** : Lead Free Package

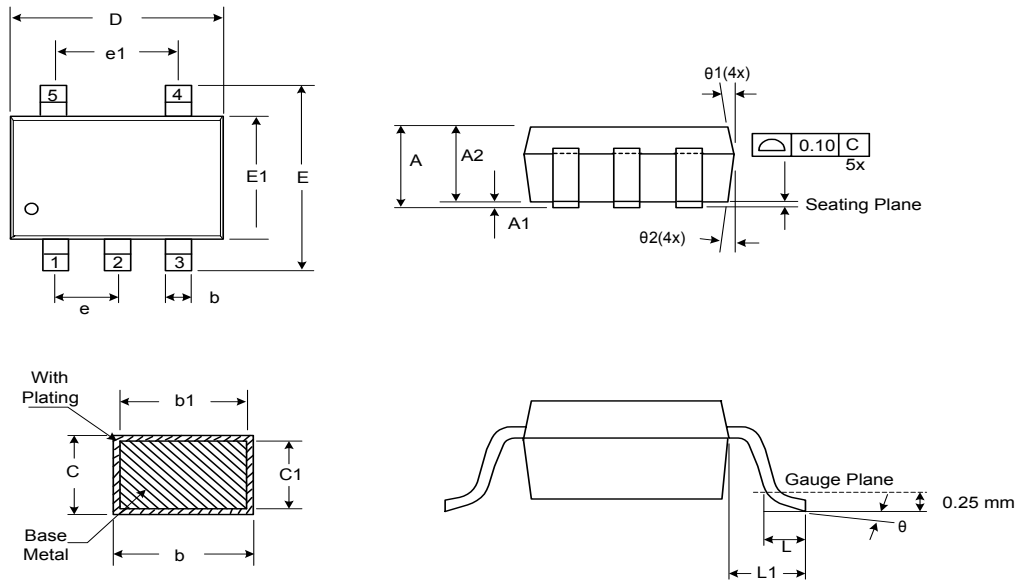
#### Appendix

Part Number	Package	Identification Code
AP1625	SOT23-5	EW

## PWM/PFM Dual Mode Step-down DC/DC Controller

### ■ Package Information

Package Type: SOT23-5L



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.05	1.20	1.35	0.041	0.047	0.053
A1	0.05	0.10	0.15	0.002	0.004	0.006
A2	1.00	1.10	1.20	0.039	0.043	0.047
b	0.25	-	0.55	0.010	-	0.022
b1	0.25	0.40	0.45	0.010	0.016	0.018
c	0.08	-	0.20	0.003	-	0.008
c1	0.08	0.11	0.15	0.003	0.004	0.006
D	2.70	2.85	3.00	0.106	0.112	0.118
E	2.60	2.80	3.00	0.102	0.110	0.118
E1	1.50	1.60	1.70	0.059	0.063	0.067
L	0.35	0.45	0.55	0.014	0.018	0.022
L1	0.60 Ref.			0.024 Ref.		
e	0.95 Bsc.			0.037 Bsc.		
e1	1.90 Bsc.			0.075 Bsc.		
θ	0°	5°	10°	0°	5°	10°
θ1	3°	5°	7°	3°	5°	7°
θ2	6°	8°	10°	6°	8°	10°