

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

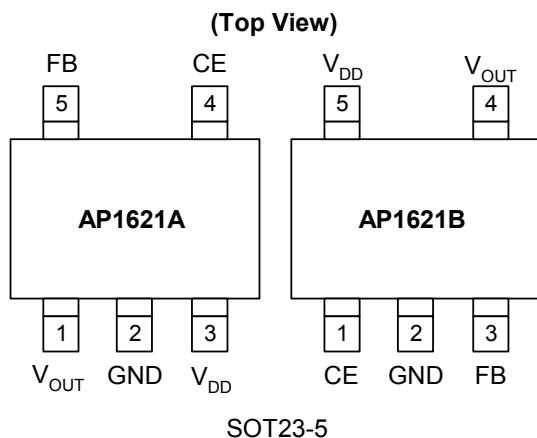
■ Features

- Input voltage range: 2.2V~7V (V_{OUT} type)
- Adjustable version ($\pm 2.5\%$)
- Oscillator frequency: 300KHz ($\pm 20\%$)
- High Efficiency: 92% (typ.)
- Stand-by capability: $I_{STB} = 2\mu A$. (Max.)
- 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 AP1621 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 300KHz switching frequency, the size of the external components can be reduced.

Control switches from PWM to PFM during light loads with the AP1621 (PWM/PFM switchable) and the series is highly efficient from light loads to large output currents.

During stand-by time (CE pin "LOW") ,current consumption is reduced to less than $2\mu A$.

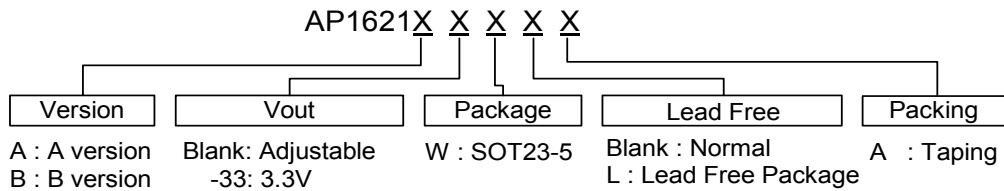
With U.V.L.O internal, the external MOSFET. Will be forcibly switched off if used below the stipulated voltage.

■ Pin Descriptions

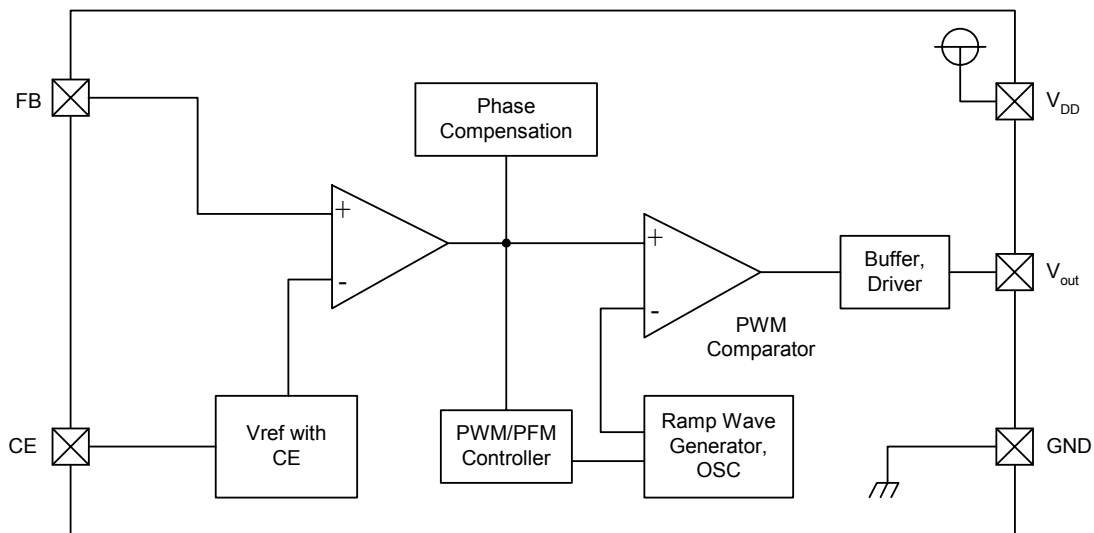
Pin No.		Pin Name	Function
A	B		
1	4	V_{OUT}	External PMOSFET Connection
2	2	GND	Ground
3	5	V_{DD}	Power Supply
4	1	CE	Chip Enable: H: Enable L: Disable
5	3	FB	Feedback pin

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Ordering Information



Block Diagrams



Absolute Maximum Ratings

Ta=25°C

Parameter	Symbol	Rating	Unit
V _{IN} Pin Voltage	V _{DD}	-0.3 ~ 8	V
V _{OUT} Pin Voltage	V _{OUT}	-0.3 ~ V _{IN} +0.3	V
FB Pin Voltage	V _{FB}	-0.3 ~ V _{IN} +0.3	V
CE Pin Voltage	V _{CE}	-0.3 ~ V _{IN} +0.3	V
V _{OUT} Pin Current	V _{OUT}	±100	mA
Continuous Total Power Dissipation	P _d	250	mW
Operating Ambient Temperature	T _{opr}	-30 ~ +80	°C
Storage Temperature	T _{stg}	-40 ~ +125	°C



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■ Electrical Characteristics

AP1621 (V_{OUT}=3.3V, F_{OSC}=300kHz) Ta=25°C

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
FB Voltage	V _{FB}		1.1625	1.2	1.2375	V
Output Voltage	V _{OUT}	AP1621-33 only	3.2	3.3	3.4	V
Maximum Input Voltage	V _{IN}		7	-	-	V
UVLO Voltage (Min. Operating Voltage)	V _{UVLO}	Same as I _{DD} , voltage required to maintain H at V _{OUT}	-	-	2.2	V
Supply Current	I _{DD}	No external components, CE=V _{IN} , V _{OUT} =0V	-	35	102	μA
Stand-by Current	I _{STB}	No external components, CE=V _{IN} , V _{OUT} =0V	-	-	2	μA
Oscillator Frequency	F _{OSC}	Measuring of EXT/waveform, V _{IN} =output voltage+0.3V	240	300	360	KHz
Maximum Duty Ratio	MAXDTY		100	-	-	%
PFM Duty Ratio	PFMDTY	No load (AP1621 only)	15	25	35	%
CE "High" Voltage	V _{CEH}	No external components, V _{FB} =0V, apply 0.65V (min.) to CE, determine V _{OUT} "Low"	0.65	-	-	*V _{CC}
CE "Low" Voltage	V _{CEL}	Same as V _{CEH} , determine EXT/"High"	-	-	0.20	*V _{CC}
Efficiency	EFFI		-	92	-	%

Measuring conditions: Unless otherwise specified, connect external components. V_{IN}=5.0V, I_{OUT}=220mA
Series Amendment:

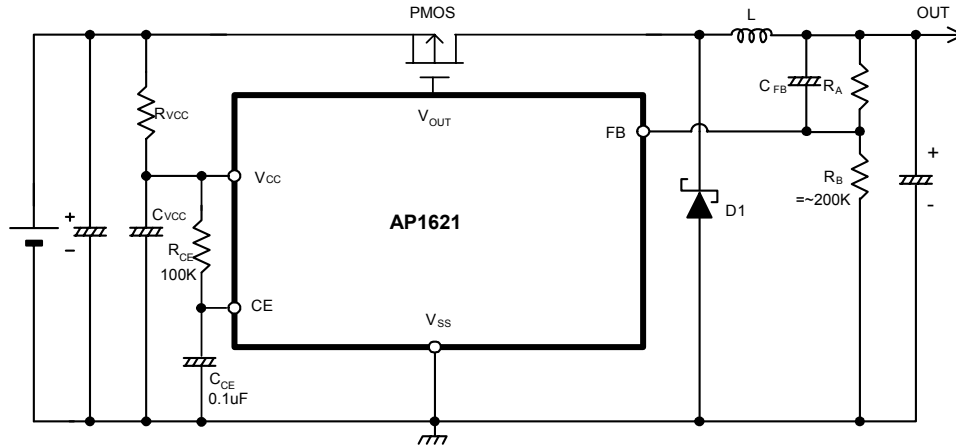
AP1621

External Components: C_{CE} = 0.1μF, R_{CE} = 100kΩ

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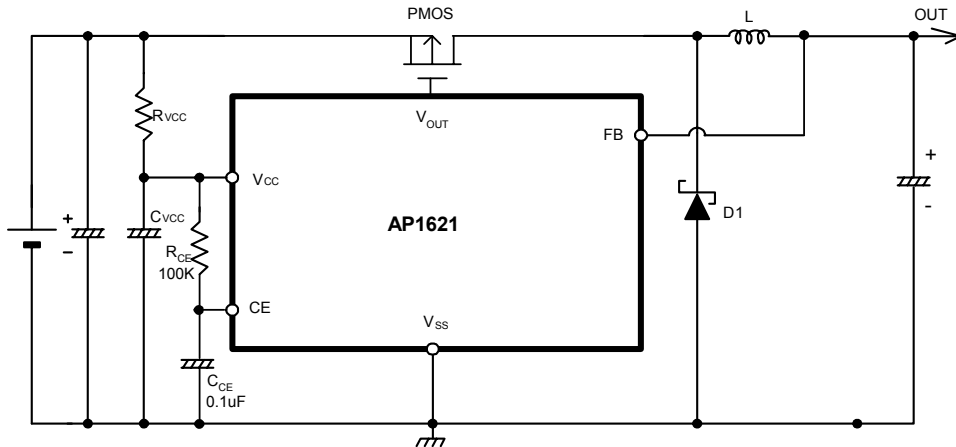
■ Typical Application Circuit

(1) AP1621-Adj

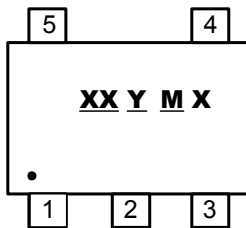


$$V_o = V_{ref} \times \left(1 + \frac{R_A}{R_B}\right)$$

(2) AP1621-33 Only



■ Marking Information



SOT23-5L

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

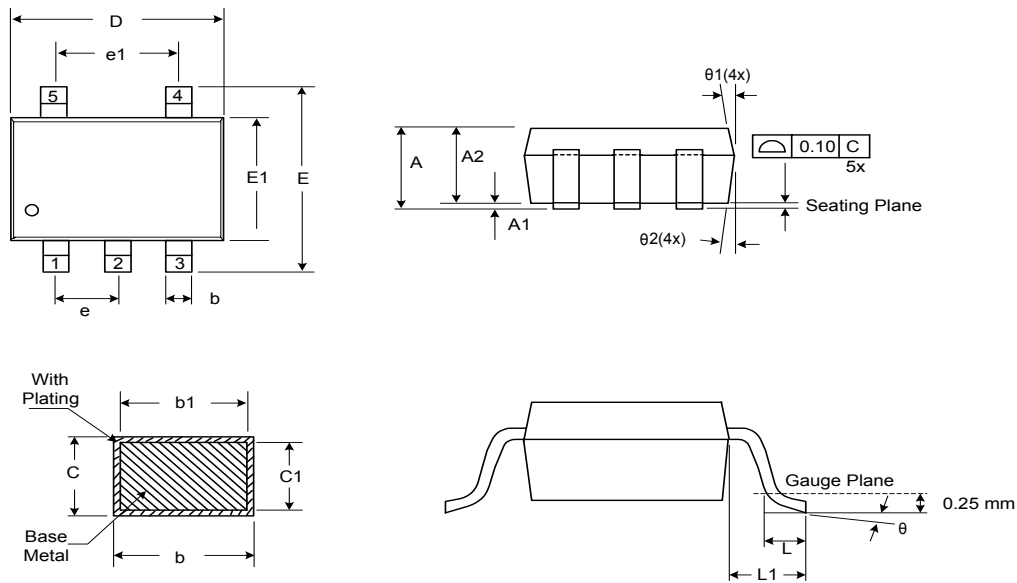
Appendix

Output version	Part Number	
	AP1621A	AP1621B
ADJ	EX	EU
3.3V	EZ	ET

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■ 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°