

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

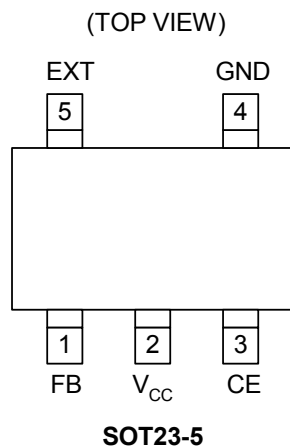
■ Features

- Input Voltage Range: 0.9~6V
- PWM/PFM Switching Control
- High Efficiency: 90%
- Oscillator Frequency: 300kHz ($\pm 15\%$)
- Stand-by Current: $I_{STB}=3\mu A$. (Typ.)
- **Pb-Free** 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 AP1624 is multi-functional step-up DC/DC controllers. Large output current is possible using an externally connected N channel MOSFET, coil, and diode.

Output voltage (V_{OUT}) is programmable with 1.23V of standard voltage supply internal, and using externally connected components, output voltage (FB) can be set up at will.

With a 300KHz switching frequency, the size of the external components can be reduced. Control switches from PFM to PWM during light loads with the AP1624 (PFM/PWM switchable) and the series is highly efficient from light loads to large output currents.

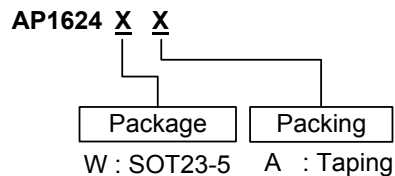
During stand-by time (CE pin "Low"), current consumption is reduced to 3 μA .

■ Pin Descriptions

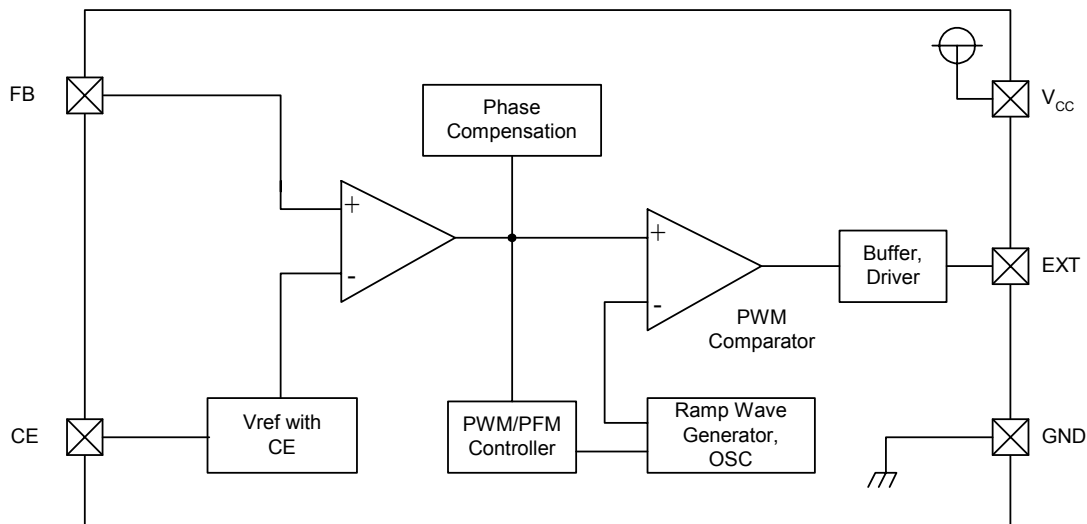
Pin No.	Pin Name	Function
1	FB	Feedback pin
2	V_{CC}	IC Power Supply pin
3	CE	Chip Enable: H: Enable L: Disable
4	GND	GND pin
5	EXT	External N-MOSFET Connection

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Ordering Information



Block Diagrams



Absolute Maximum Ratings

Ta=25°C

Parameter	Symbol	Ratings	Units
V _{IN} Pin Voltage	V _{CC}	-0.3 ~ 7	V
FB Pin Voltage	V _{FB}	-0.3 ~ V _{CC} +0.3	V
CE Pin Voltage	V _{CE}	-0.3 ~ V _{CC} +0.3	V
EXT Pin Voltage	V _{EXT}	-0.3 ~ V _{CC} +0.3	V
EXT Pin Current	I _{EXT}	±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

AP1624

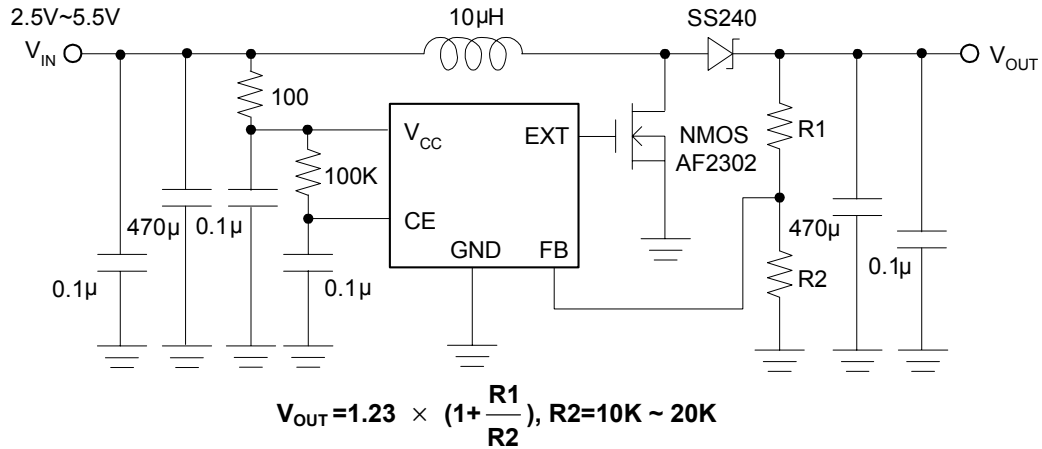
 $(V_{IN}=3.3V, V_{OUT}=5V, Load=300mA)$ $T_a=25^{\circ}C$

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
FB Voltage	V_{FB}		1.205	1.23	1.255	V
Maximum Input Voltage	V_{CC}		6	-	-	V
Supply Current 1	I_{CC1}	No external components, $CE=V_{IN}, V_{FB}=1.5V$	-	50	100	μA
Supply Current 2	I_{CC2}	No external components, $CE=V_{IN}, V_{FB}=0V$	-	100	200	μA
Stand-by Current	I_{STB}	No external components, $CE=0V, V_{FB}=0.5V$	-	3	-	μA
Oscillator Frequency	F_{OSC}		255	300	345	kHz
Maximum Duty Ratio	MAXDTY	No external components $V_{CC}=5V, V_{FB}=0V$	80	-	-	%
PFM Duty Ratio	PFMDTY	No load	15	25	35	%
CE "High" Voltage	V_{CEH}	Apply above 0.65V _{CC} (min.) to CE, Operating mode	0.65	-	-	*V _{CC}
CE "Low" Voltage	V_{CEL}	Apply under 0.2V _{CC} (min.) to CE, Standby mode	-	-	0.20	*V _{CC}
EXT Source Current	I_{SOURCE}	$V_{CE}=V_{IN}, V_{FB}=0V, V_{EXT}=V_{CC}-0.4V$	-	40	-	mA
EXT Sink Current	I_{SINK}	$V_{CE}=V_{IN}, V_{FB}=2V, V_{EXT}=0.4V$	-	70	-	mA
Efficiency	EFFI		-	90	-	%

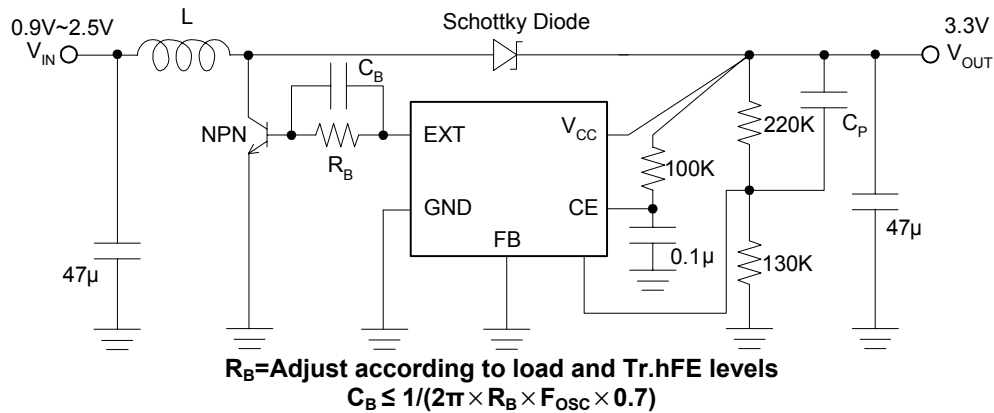
PWM/PFM Dual Mode Step-up DC/DC Controller

■ Typical Application Circuit

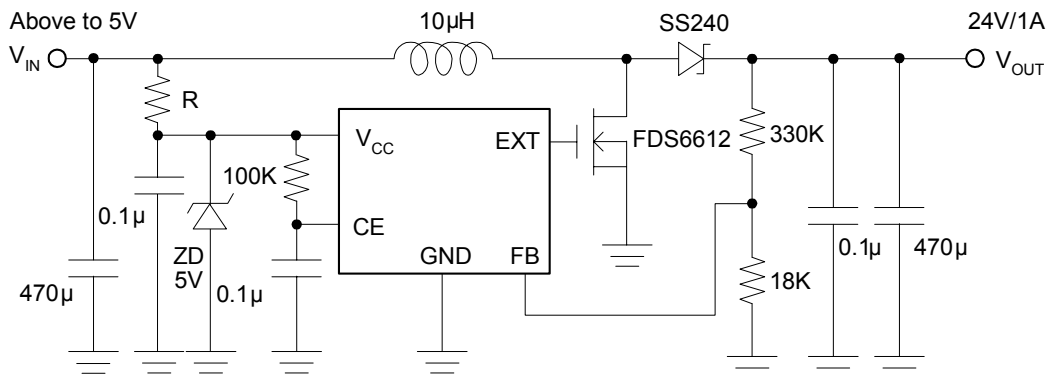
(1) Normal Circuit



(2) LV Circuit

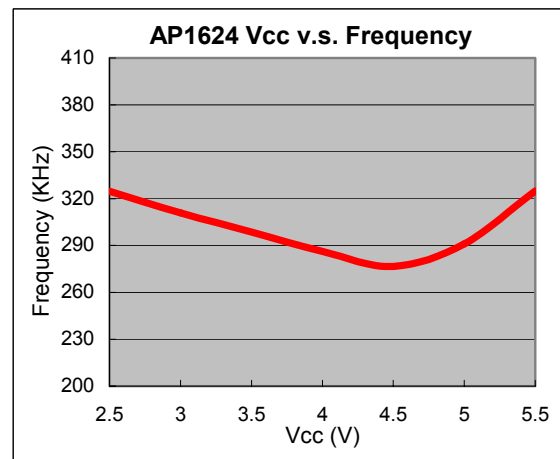
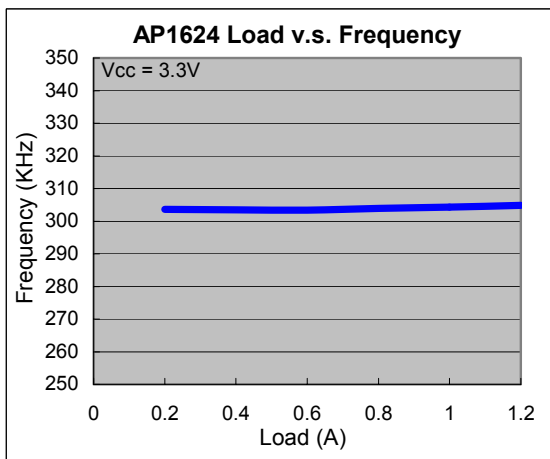
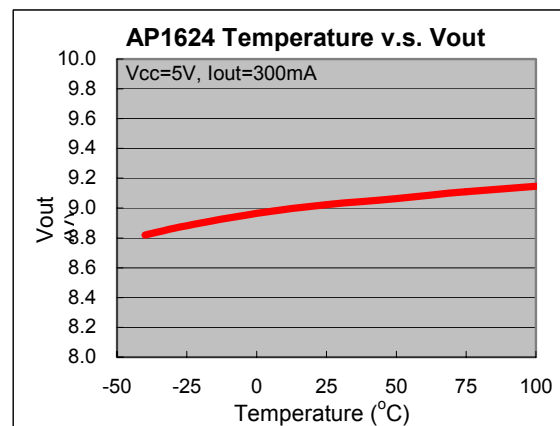
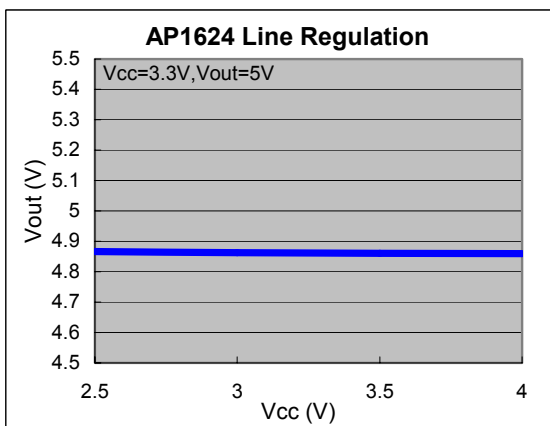
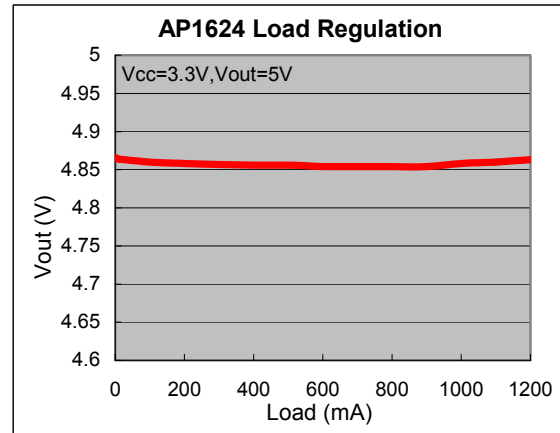
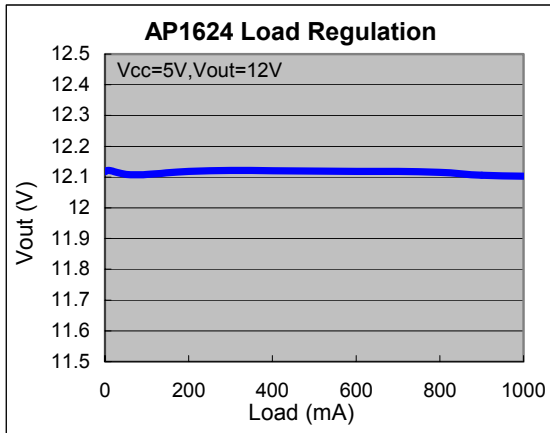


(3) HV Circuit



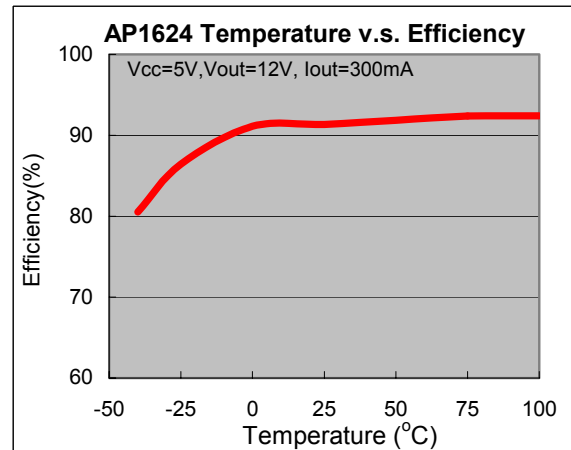
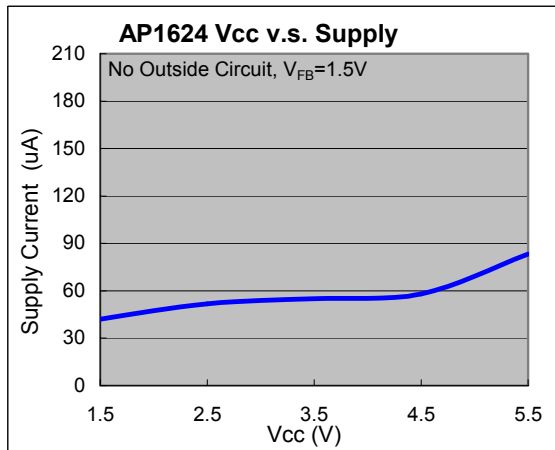
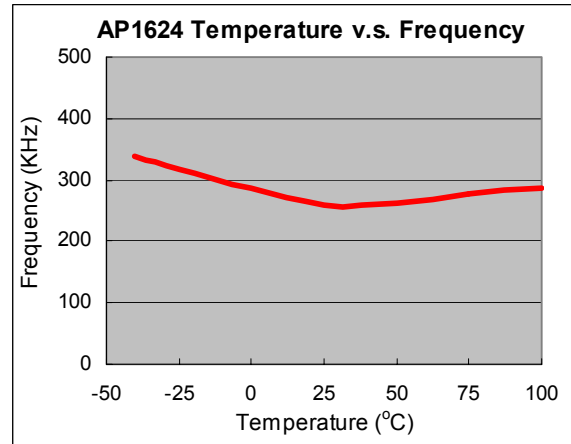
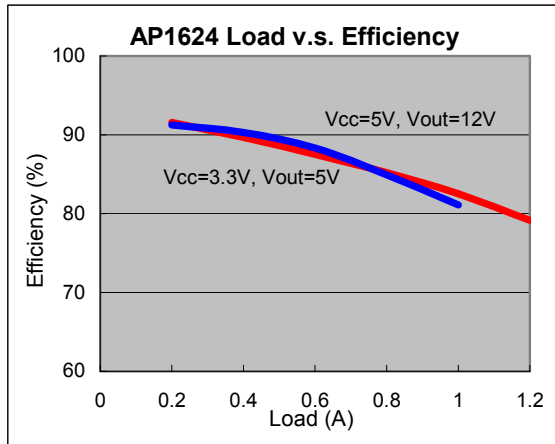
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■ Typical Performance Characteristics

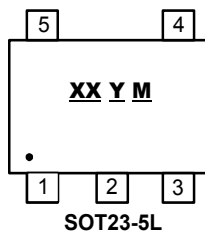


PWM/PFM Dual Mode Step-up DC/DC Controller

■ Typical Performance Characteristics (Continued)



■ Marking Information



XX : Identification code
(See Appendix)
Y : Year: 0-9
M : Month: A~L

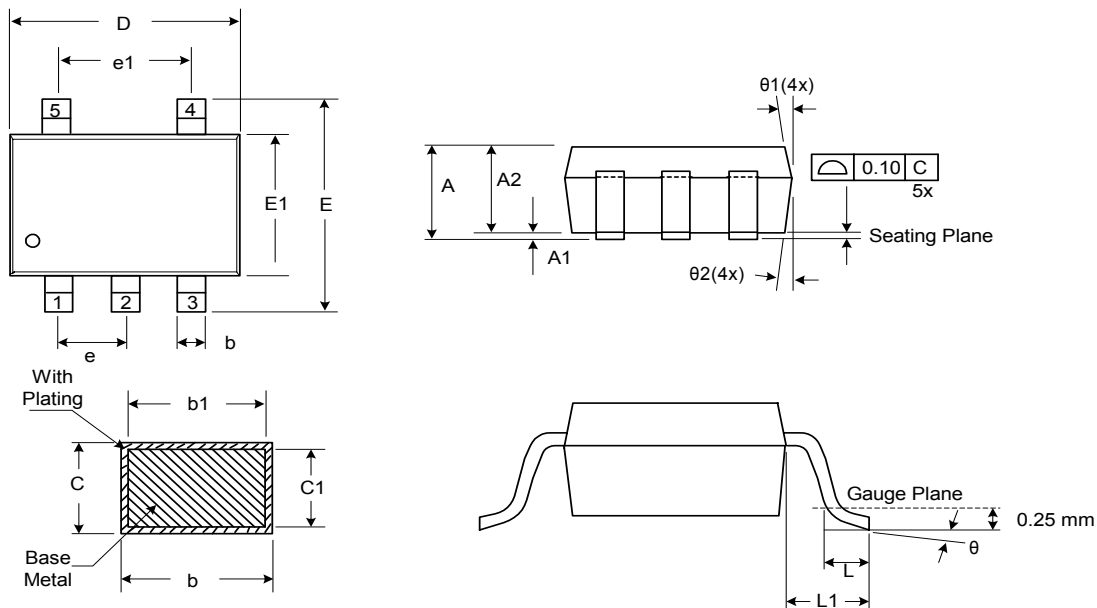
Appendix

Part Number	Package	Identification Code
AP1624	SOT23-5	EQ

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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°
$\theta 1$	3°	5°	7°	3°	5°	7°
$\theta 2$	6°	8°	10°	6°	8°	10°