AP1624

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（±15%）
- Stand-by Current: I_{STB} = 3μA（Typ.）
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

General Description

The AP1624 is a multi-functional step-up DC/DC controller. 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.

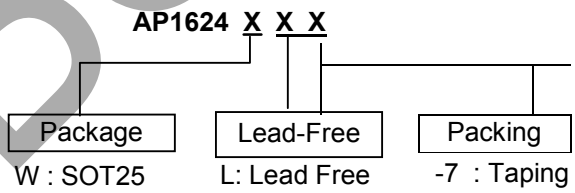
Control switches from PFM to PWM during light loads with the AP1624（PFM/PWM switchable）and the series is highly efficient from light loads to large output currents.

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

Applications

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

Ordering Information



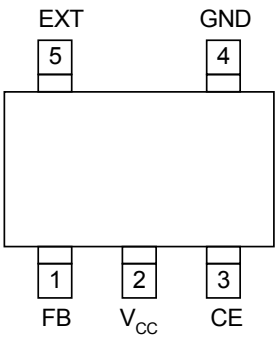
Note: 1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

Device	Package Code	Packaging (Note 4)	7" Tape and Reel	
			Quantity	Part Number Suffix
AP1624W	W	SOT25	3000/Tape & Reel	-7

Note: 4. Pad layout as shown on Diodes Inc. suggested pad layout document can be found at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Pin Assignments

(TOP VIEW)

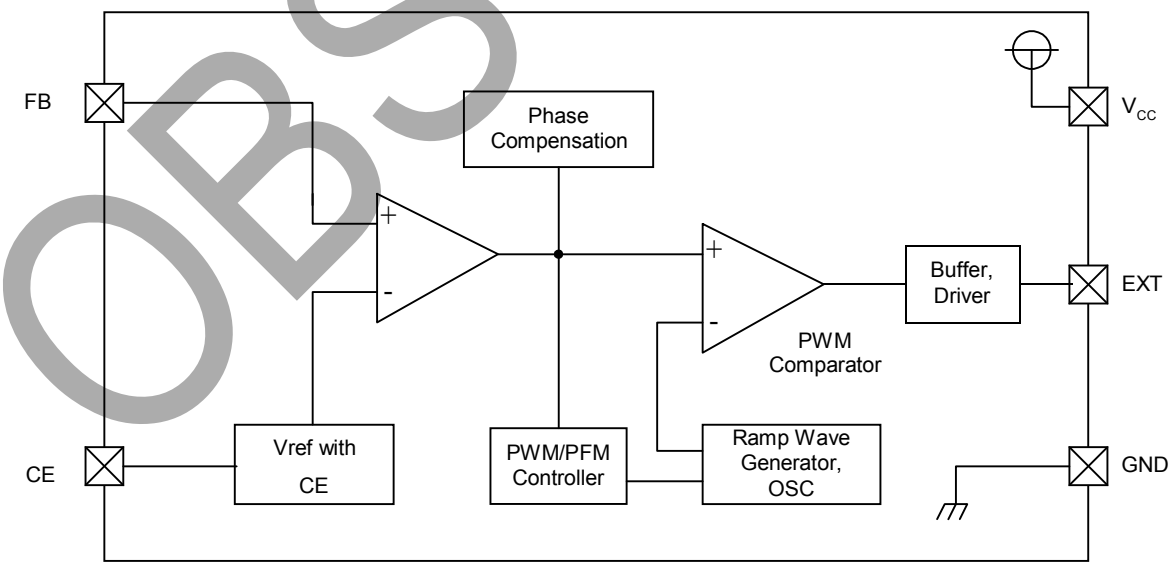


SOT25

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

Block Diagram



Absolute Maximum Ratings

$T_A = 25^oC$

Parameter	Symbol	Ratings	Units
V_{IN} Pin Voltage	V_{CC}	-0.3 ~ 6.5	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
Operating Junction Temperature	T_{OP}	-30 ~ +105	°C
Storage Temperature	T_{ST}	-40 ~ +125	°C

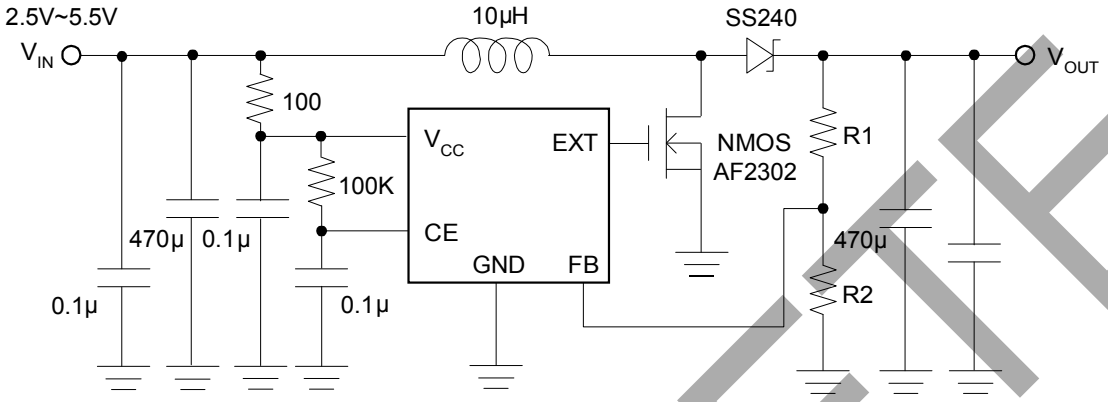
Electrical Characteristics

V_{IN} = 3.3V, V_{OUT} = 5V, Load = 300 mA $T_A = 25^oC$

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	Fosc		200	300	350	KHz
Maximum Duty Cycle	DC_{MAX}	No external components V_{CC} = 5V, V_{FB} = 0V	80	-	-	%
PFM Duty Cycle	DC_{PFM}	No load	15	25	35	%
CE "High" Voltage	V_{CEH}	Apply above 0.65Vcc (min.) to CE, Operating mode	0.65	-	-	*Vcc
CE "Low" Voltage	V_{CEL}	Apply under 0.2Vcc (min.) to CE, Standby mode	-	-	0.20	*Vcc
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	η		-	90	-	%

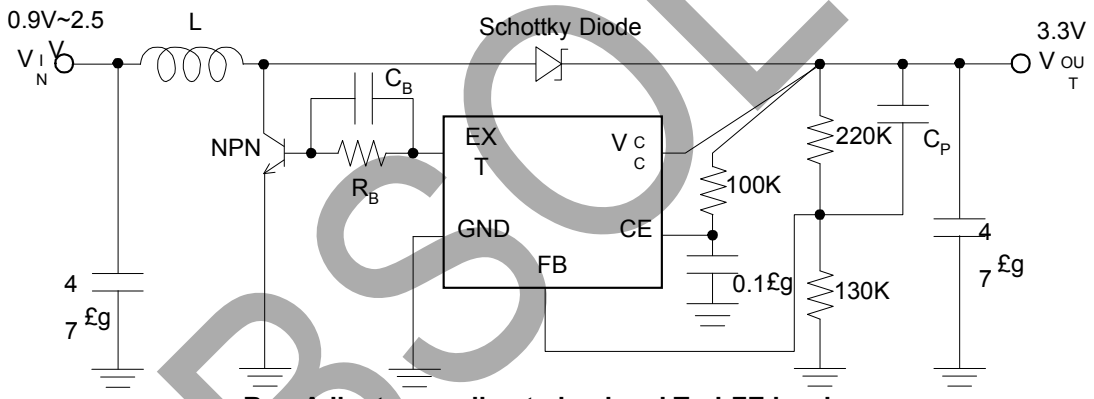
Typical Application Circuit

(1) Normal Circuit



$$V_{OUT} = 1.23 \times (1+\frac{R1}{R2}),\ R2 = 10K \sim 20K$$

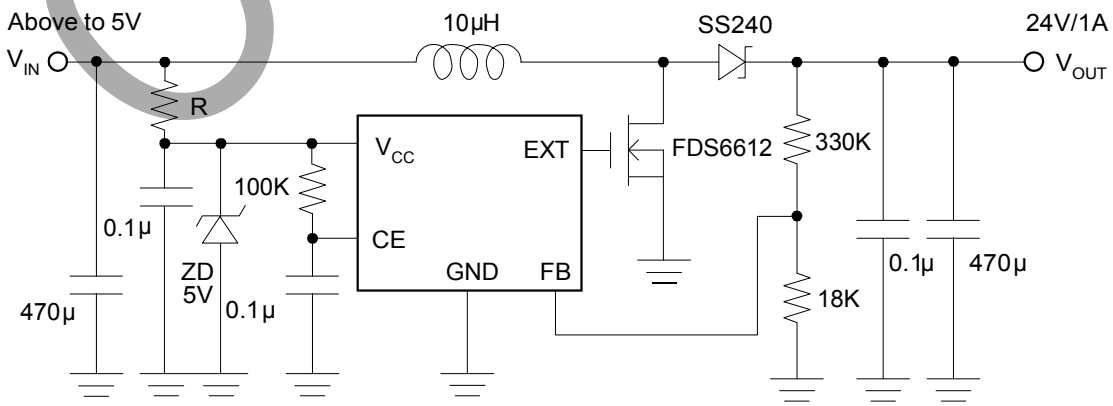
(2) LV Circuit



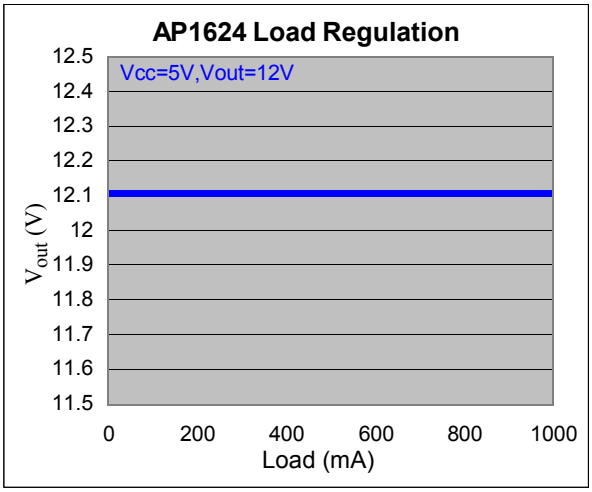
R_B = Adjust according to load and Tr. hFE levels

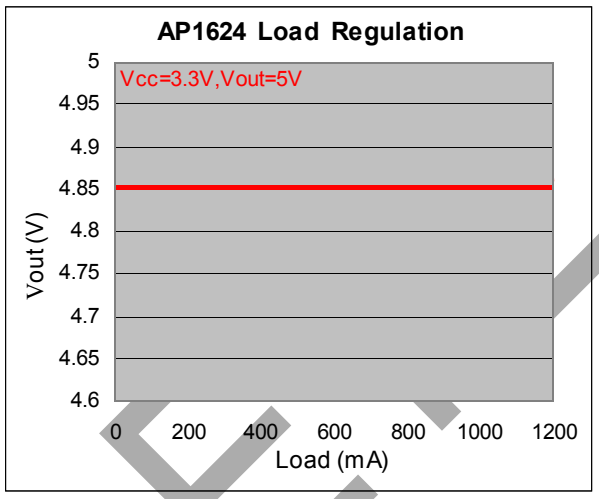
$C_B \le 1 / (2\pi \times R_B \times F_{OSC} \times 0.7)$

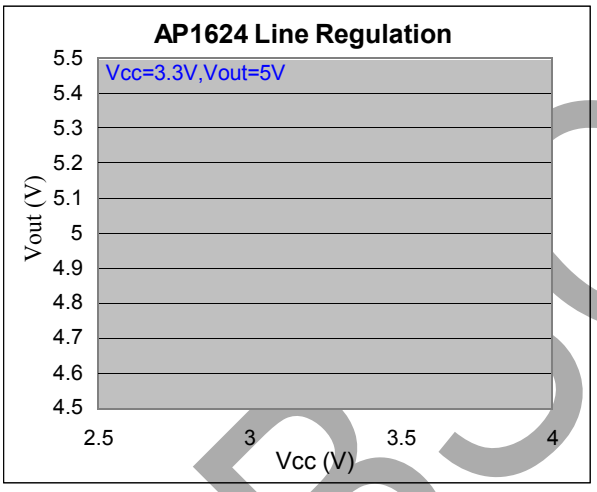
(3) HV Circuit

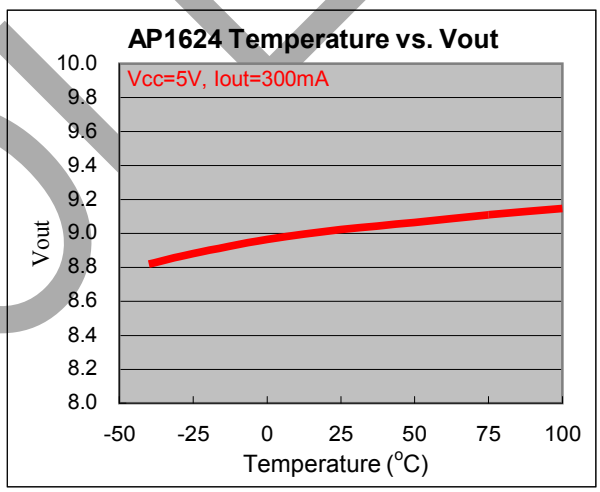


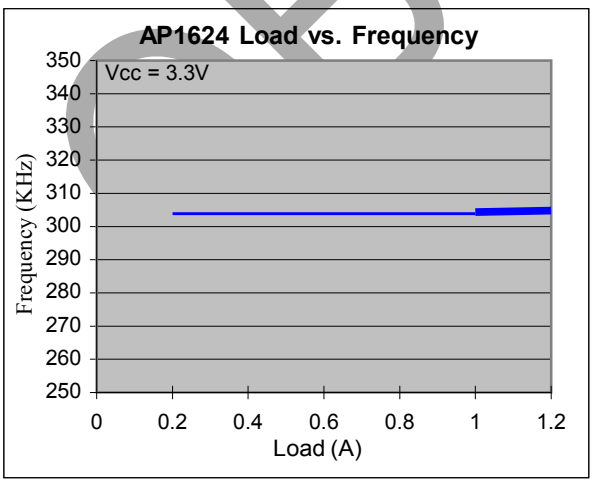
Typical Performance Characteristics

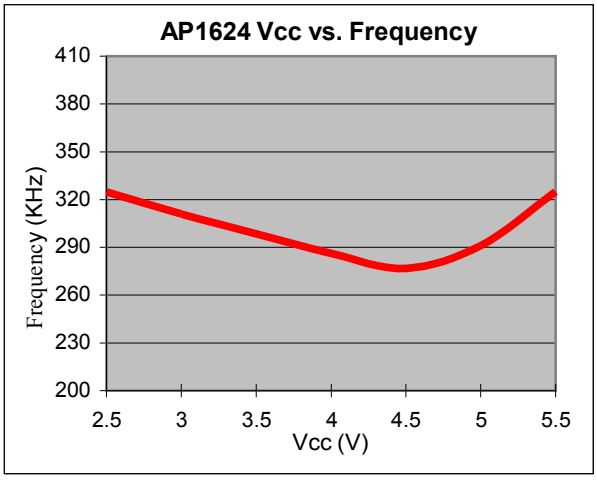




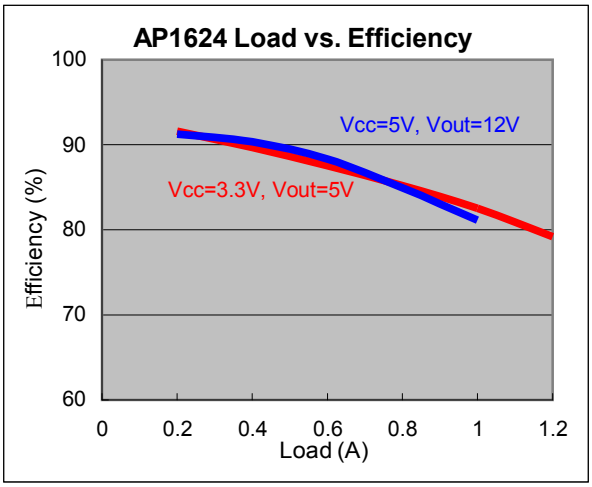


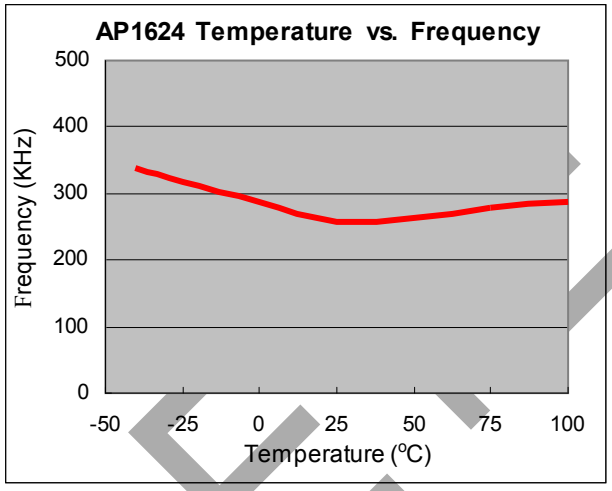


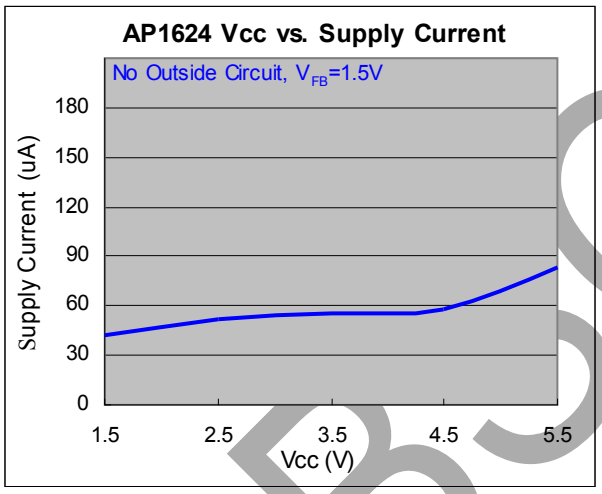


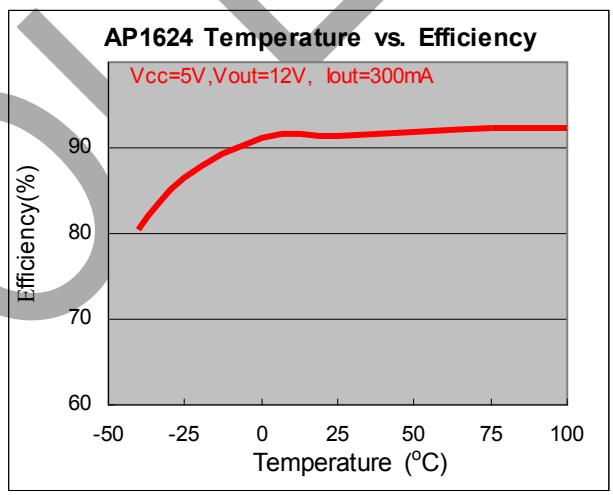


Typical Performance Characteristics (Continued)

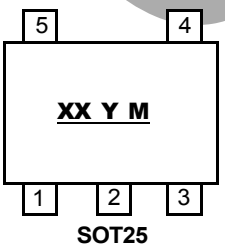








Marking Information

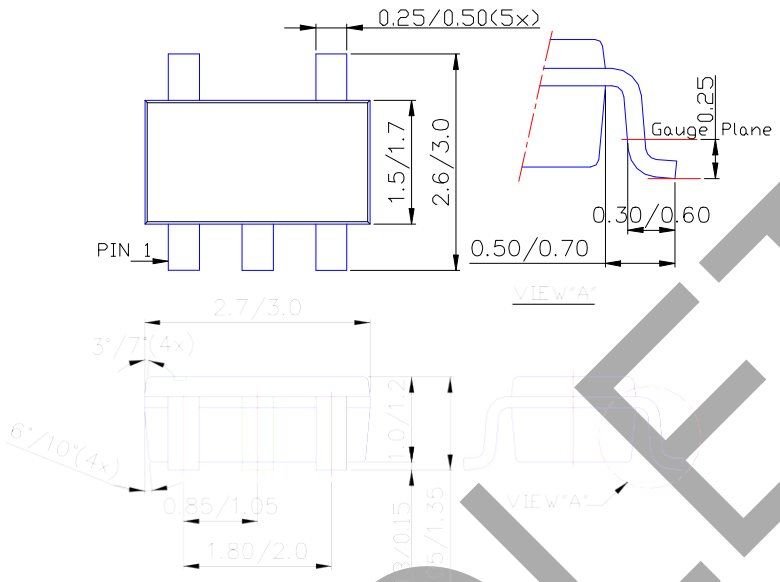


XX : Identification code
Y : Year: 0-9
M : Month: A~L

Part Number	Package	Identification Code
AP1624	SOT25	EQ

Package Information (unit: mm)

Package Type: SOT25



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