

PWM/PFM DUAL MODE STEP-DOWN DC/DC CONVERTER

Features

- Input voltage range: 2.2V~5.5V (V_{OUT} type)
- Oscillator frequency: 600KHz (Typ.)
- Internal reference: 1.0V (Typ.)
- High efficiency: 93% (Typ.)
- Stand-by capability: I_{STB}=2µA. (Typ.)
- Soft-start time set-up externally type possible
- Current limit and thermal shutdown protection
- Lead Free Package: SOT25
- SOT25: Available in "Green" Molding Compound
 (No Br, Sb)
- Lead Free Finish/ RoHS Compliant (Note 1)

General Description

The AP1604A series are multi-functional step-down DC/DC converters with built-in speed, low ON resistance drivers. It is capable to deliver more than 800mA output current with external coil, diode and capacitor.

Output voltage is set-up by the external resistors. (±2.5% accuracy). The 600KHz AP1604A that can work out with small value external components comes out more compact board.

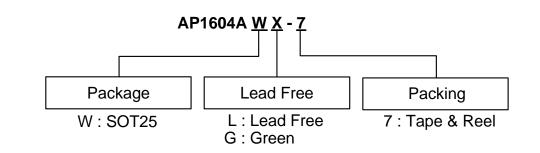
The device switches to and works under PFM mode with light loads. It keeps at high efficiency for both light loads and large output current.

AP1604A can be soft-start with a proper capacitor connected between CE/SS pin and ground. The stand-by current is less than 2uA when CE/SS pin is at "LOW" status. The device is forced to switch off as the voltage at that pin is lower than the stipulated voltage.

Applications

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

Ordering Information



	Device	Package	Packaging (Note 2)	7" Tape and Reel		
	Device	Code		Quantity	Part Number Suffix	
PD	AP1604AWL-7	W	SOT25	3000/Tape & Reel	-7	
P),	AP1604AWG-7	W	SOT25	3000/Tape & Reel	-7	

Notes: 1. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at

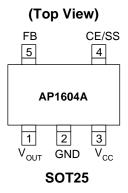
http://www.diodes.com/products/lead_free.html.

2. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at http://www.diodes.com/datasheets/ap02001.pdf.



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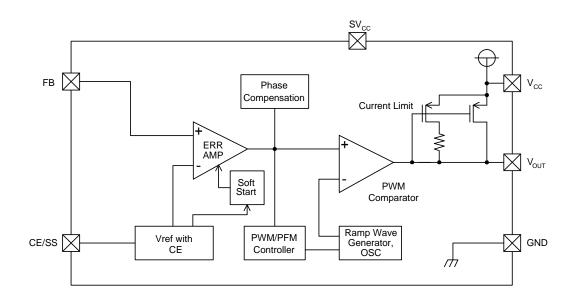
Pin Assignment



Pin Description

Pin Name	Description	
V _{OUT}	Output Voltage	
GND	Ground	
V _{cc}	Input Supply	
CE/SS	Chip Enable / Soft Start	
FB	Feedback pin	

Block Diagram





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Absolute Maximum Ratings (T_A=25°C)

Symbol	Parameter	Ratings	Units
V _{cc} /SV _{cc}	V _{IN} Pin Voltage	-0.3 ~ 6.5	V
V _{OUT}	V _{OUT} Pin Voltage	-0.3 ~ V _{IN} +0.3	V
V _{FB}	FB Pin Voltage	-0.3 ~ V _{IN} +0.3	V
V _{CE/SS}	CE/SS Pin Voltage	-0.3 ~ V _{IN} +0.3	V
PD	Continuous Total Power Dissipation	Internal limited	
T _{OP}	Operating Ambient Temperature	-25 ~ +80	°C
T _{ST}	Storage Temperature Range	-40 ~ +125	°C

Electrical Characteristics

$V_{IN} = 5V, V_{OUT} = 2V, Load = 300mA, TA = 25^{\circ}C$	TA = 25°C
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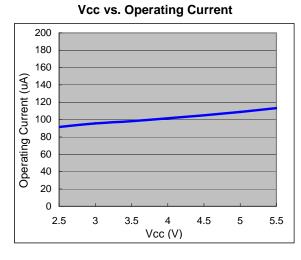
Sym.	Parameter	Conditions	Min	Тур.	Max	Units
V _{FB}	FB		0.975	1.0	1.025	V
V _{IN}	Input Voltage		2.2	-	5.5	V
	Line Regulation	V _{IN} = 2.2 ~ 5.5V, Load = 10mA	-	-	0.12	%
	Load Regulation	I _{OUT} = 10 ~ 800mA	-	-	1.2	%
V _{UVLO}	UVLO Voltage (min. operating voltage)	V_{CC} , voltage required to maintain H at V_{OUT}	-	-	2	V
I _{CC}	Operating Current	$CE/SS = V_{IN}$, No Load	-	100	150	μA
I _{CCQ}	Supply Current	No external components, CE/SS = V_{IN} , V_{FB} = 1.2V	-	90	120	μA
I _{STB}	Stand-by Current	No external components, CE/SS = 0V, V _{FB} = 0V	-	2	-	μA
I _{CL}	Current Limit	peak current V _{IN} = 5V, V _{OUT} = 2V	800	1000	1200	mA
Fosc	Oscillator Frequency	Load = 300mA, $V_{IN} = 5V$, $V_{OUT} = 2V$	500	600	700	kHz
MAXDTY	Maximum Duty Ratio		85	90	-	%
PFMDTY	PFM Duty Ratio	No load	15	25	35	%
V _{CEH}	CE/SS "High" Voltage	Apply 1.4V (min.) to CE/SS, determine V _{OUT} "High"	1.4	-	-	V
V _{CEL}	CE/SS "Low" Voltage	Same as V _{CEH} , determine V _{OUT} /"Low"	-	-	0.6	V
EFFI	Efficiency	$V_{CC} = 5V, V_{OUT} = 3.3V, Load = 300mA$	-	93	-	%
Rdson	Rdson Condition	$I_{OUT} = 300 \text{mA}, V_{IN} = 5 \text{V}, V_{OUT} = 2 \text{V}$	-	350	450	mΩ



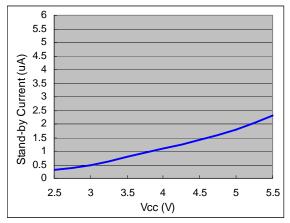
AP1604A PWM/PFM DUAL MODE STEP-DOWN DC/DC

CONVERTER

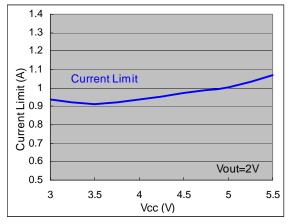
Typical Performance Characteristics

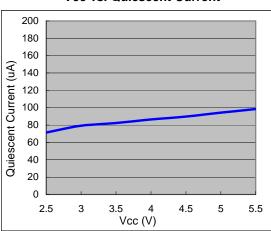


Vcc vs. Stand-by Current

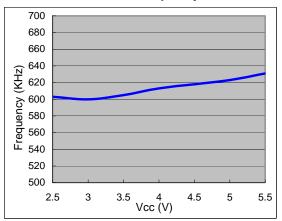




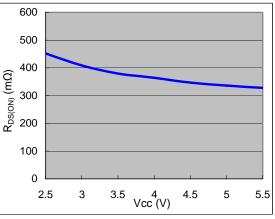




Vcc vs. Frequency







AP1604A Rev. 2

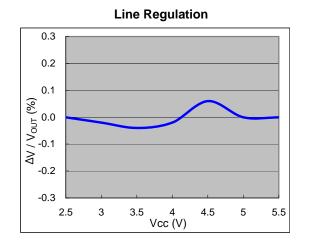
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Vcc vs. Quiescent Current



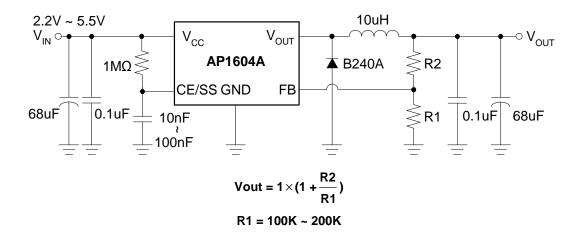
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Typical Performance Characteristics (Continued)





Typical Application Circuit

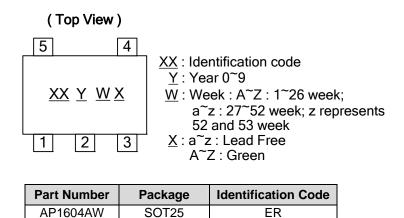




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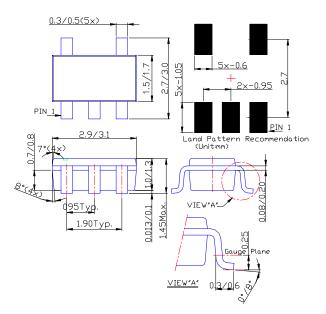
Marking Information

(1) SOT25



Package Information	ON (All Dimensions in mm)

(1) Package Type: SOT25







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