Ultra Fast High PSRR Low Noise CMOS Voltage Regulator

■ INTRODUCTION

The AF6221 seriesare a group of positivevoltageregulators manufactured by CMOS technologies with high ripple rejection,ultra low noise, low power consumption and low dropout voltage, which can prolong battery life in portable electronics. The AF6221 series work with low-ESR ceramic capacitors, reducing the amount of board space necessary for power applications. The AF6221 series consume less than 0.01μA in shutdown mode and have fast turn-on time less than 50μS.The series are very suitable for the battery-powered equipments, such as RF applicationsand other systems requiring a quiet voltage source.

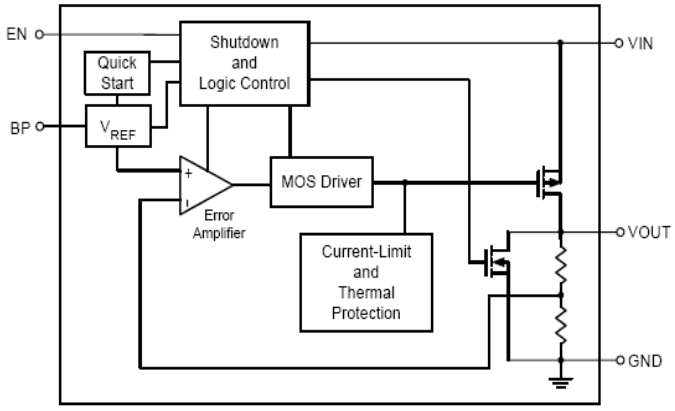
■ FEATURES

- High PSRR:70dB@100Hz
- Low Dropout Voltage：170mV@200mA
- Low Quiescent Current：25μA
- Excellent Line and Load Transient Response
- Operating Voltage Range：2.5V～5.5V
- Output Voltage Range：1.5V ~ 3.3V
- High Accuracy：±2％（Typ.）
- Built-in Current Limiter, Short-Circuit Protection
- TTL- Logic-Controlled Shutdown Input

■ APPLICATIONS

- Cellular and Smart Phones
- Laptop, Palmtops and PDA
- Digital Still and Video Cameras
- MP3,MP4 Player
- Radio control systems
- Battery-Powered Equipment

■ BLOCK DIAGRAM



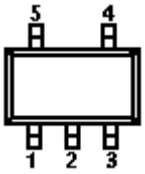
■ ORDER INFORMATION

AF6221-①②③

DESIGNATOR	SYMBOL	DESCRIPTION
①②	**Integer**	**Output Voltage e.g.1.8V=①:1, ②:8**
③	**Package:SOT23-5 ： C**	

■ PIN CONFIGURATION

SOT23-5

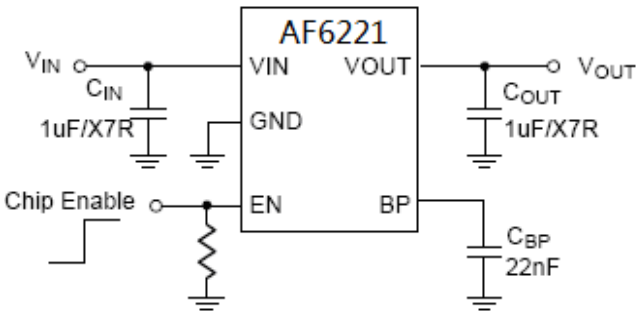


PIN NUMBER	SYMBOL	FUNCTION
1	V_{IN}	Power Input Pin
2	V_{SS}	Ground
3	CE	Chip Enable Pin
4	BYPASS	Optional bypass capacitor for noise reduction
5	V_{OUT}	Output Pin

■ Marking information

MARKING	
	Package
VOLTAGE(V)	SOT23-5
1.5	DS=JHT
1.8	DC=E2H
2.5	DH=M6C
2.8	DJ=G6U
3.0	DK=C0Z
3.3	DE=A1D

■ TYPICAL APPLICATION



ABSOLUTE MAXIMUM RATINGS(1)

(Unless otherwise specified, T_A=25°C)

PARAMETER	SYMBOL	RATINGS	UNITS
Input Voltage(2)	V_{IN}	-0.3~6.5	V
Output Voltage(2)	V_{OUT}	-0.3~V_{IN}+0.3	V
Output Current	I_{OUT}	500	mA
Power Dissipation	P_D	0.4	W
Operating free air temperature range	T_A	-40~85	°C
Operating Junction Temperature Range(3)	T_j	-40~125	°C
Storage Temperature	T_{stg}	-40~125	°C
Lead Temperature(Soldering, 10 sec)	T_{solder}	260	°C

(1) Stresses beyond those listed under *absolute maximum ratings may* cause permanent damage to the device. These are stress ratingsonly, and functional operation of the device at these or any other conditions beyond those indicated under *recommended operatingconditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods my affect device reliability.

(2)All voltages are with respect to network ground terminal.

(3)This IC includes overtemperature protection that is intended toprotect the device during momentary overload. Junction temperature willexceed 125°C when overtemperature protection is active. Continuousoperation above the specified maximum operating junction temperaturemay impair device reliability.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	MIN.	NOM.	MAX.	UNITS
Supply voltage at V_{IN}	2.5		5.5	V
Operating junction temperature range, T_j	0		125	°C
Operating free air temperature range, T_A	0		85	°C

■ ELECTRICAL CHARACTERISTICS

AF6221 Series (V_{IN}=V_{OUT}+1V, C_{IN}=C_{OUT}=1μF, T_A=25℃,unless otherwise specified)

PARAMETER		SYMBOL	CONDITIONS	MIN.	TYP.(4)	MAX.	UNITS
Output Voltage		V_{OUT}(E)(5)	I_{OUT}=1mA	V_{OUT}(6) *0.98	V_{OUT}(6)	V_{OUT}(6) *1.02	V
Supply Current		I_{SS}	VEN ≥ 1.2V, IOUT = 0mA		25		μA
Standby Current		I_{STBY}	VEN = GND		0.01	1	μA
Output Current		I_{OUT}	RLOAD = 1Ω		400	500	mA
Dropout Voltage		V_{DOP}(7)	IOUT = 200mA, VOUT > 2.8V		170	200	mV
			IOUT = 300mA, VOUT > 2.8V		220	300	mV
Load Regulation		ΔV_{OUT}	1mA < IOUT < 300mA			0.6	%
Line Regulation		$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta V_{IN}}$	VIN = (VOUT + 1V) ~5.5V,IOUT = 1mA			0.3	%
Input Voltage		V_{IN}	—	2.5		6.5	V
Power Supply Rejection Rate	100Hz	PSRR	COUT = 1μF, IOUT = 10mA		−70		dB
	10kHz				-50		
CE "High" Voltage		V_{CE}"H"	VIN = 3V ~ 5.5V,ON	1.2			V
CE "Low" Voltage		V_{CE}"L"	VIN = 3V~5.5V, OFF			0.4	V
Thermal Shutdown		TSD			165		° C
Thermal Shutdown Deviation		ΔTSD			30		° C

(4) Typical numbers are at 25°C and represent the mostlikely norm.

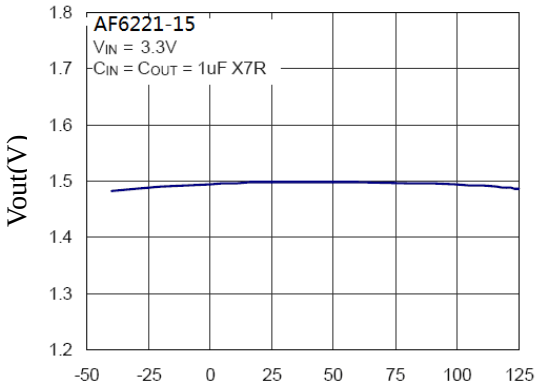
(5)V_{OUT}(E) : Effective Output Voltage (Ie. The output voltage when V_{IN}= (V_{OUT} +1.0V) andmaintain acertain I_{OUT} Value).

(6)V_{OUT}: Specified Output Voltage.

(7)V_{DO} : The Difference Of Output Voltage And Input Voltage When Input Voltage Is Decreased Gradually Till Output Voltage Equals To 98% Of V_{OUT} (E).

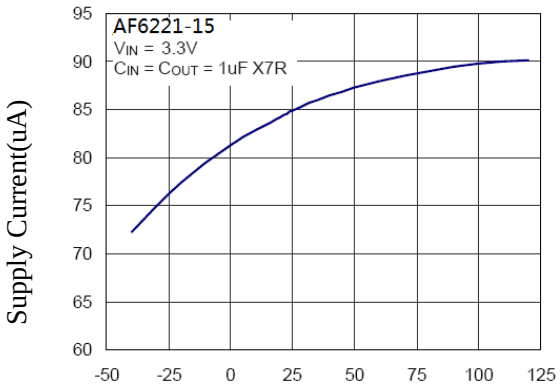
■ TYPICAL PERFORMANCE CHARACTERISTICS

Output Voltage vs.Temperature



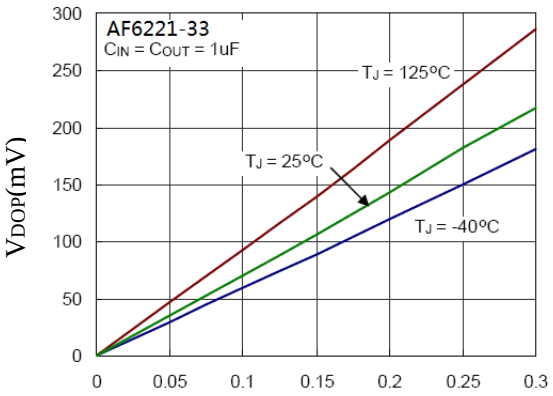
Temperature(℃)

Supply Current vs.Temperature



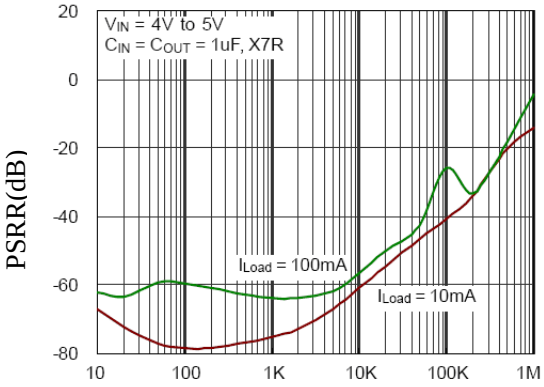
Temperature(℃)

Dropout Voltage vs.Load Current



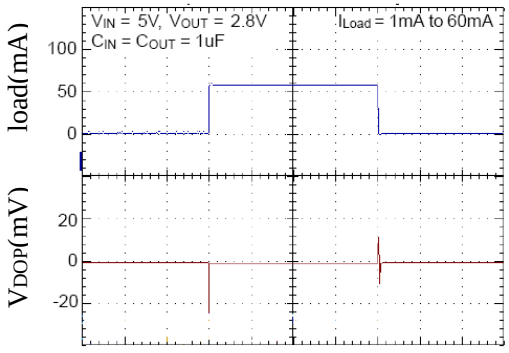
Load Current(A)

PSRR vs.Frequency



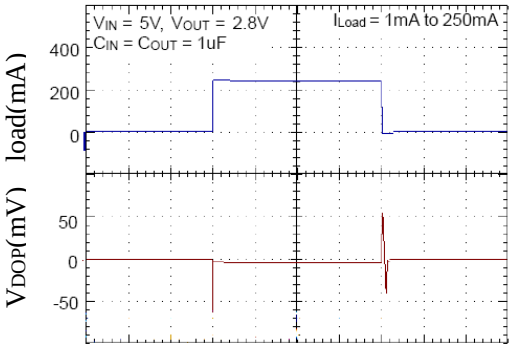
Frequency(Hz)

Load-Transient Response



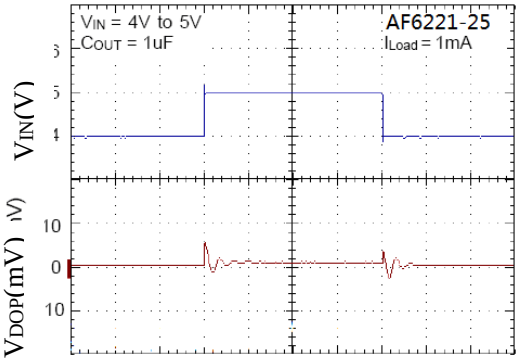
Time(500us/Div)

Load-Transient Response



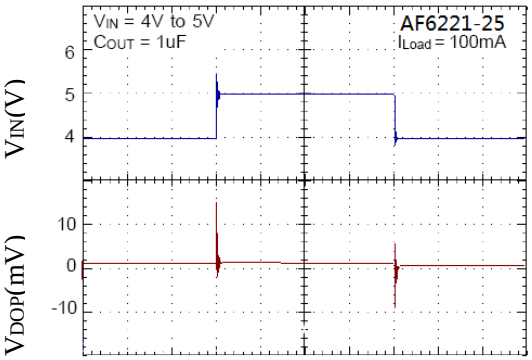
Time(500us/Div)

Line-Transient Response



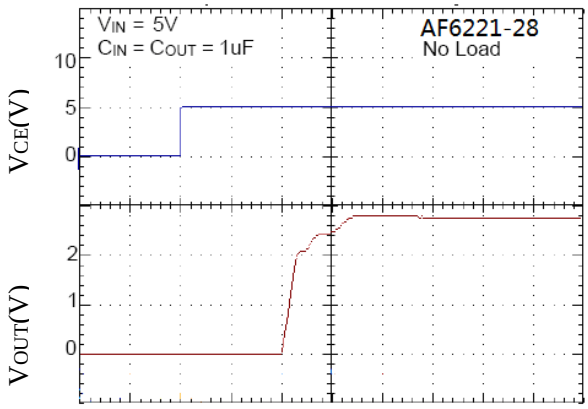
Time(50us/Div)

Line-Transient Response



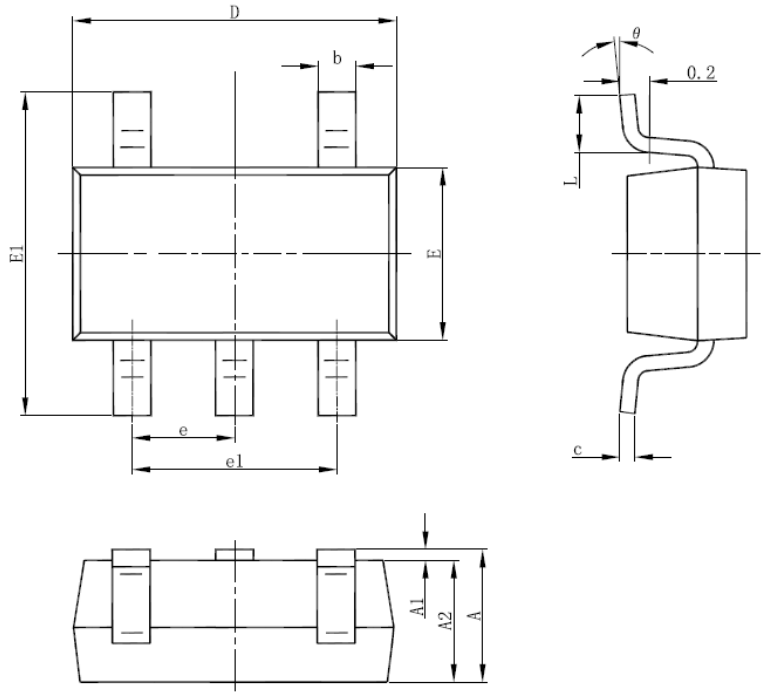
Time(100us/Div)

Start UP



Time(10us/Div)

● **SOT-23-5 PACKAGE OUTLINE DIMENSIONS**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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