优尚

YOUSHANG SEMICONDUCTOR

设计研发新型功率器件

各类小信号开关

中低压及高压大电流等场效应管

企业微信二维码   企业QQ二维码

Description

The NK-AP2213 is a 500mA output current fixed voltage regulator which provides low noise, very low dropout voltage (typically 350mV at
500mA), very low standby current (1μA maximum), and excellent power supply ripple rejection (PSRR 75dB at 100Hz). This device is used in battery-powered applications, such as handsets and PDAs; and in noise sensitive applications, such as RF electronics.
The NK-AP2213 features individual logic compatible enable/ shutdown
control inputs, a low power shutdown mode for extended battery life, over-current protection, over-temperature protection, and reversed current protection.
The NK-AP2213 has 2.5V, 3.0V, and 3.3V versions.

The AP2213 is available in the TO-252-2 (3), SOIC-8, and SOT-223 packages.

Pin Assignments

(Top View)

3	VOUT
2	GND
1	VIN

TO-252-2 (3)

(Top View)

3	VIN
2	VOUT
1	GND

SOT-223

(Top View)

EN	1		8	GND
VIN	2		7	GND
VOUT	3		6	GND
BYP	4		5	GND

SOIC-8

Features

- Up to 500mA Output Current
- Low Standby Current
- Low Dropout Voltage: V_{DROP} = 350mV at 500mA
- High Output Accuracy: ±1%
- Good Ripple Rejection Ability: 75dB at 100Hz and I_{OUT} = 100μA
- Tight Load and Line Regulation
- Low Temperature Coefficient
- Over Current Protection
- Thermal Protection
- Reversed Current Protection
- Logic-Controlled Enable
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminals: Finish—Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 ⓔ3
- Weight:
  - TO252-2 (3): 0.312 grams (Approximate)
  - SOT-223: 0.116 grams (Approximate)
  - SOIC-8: 0.077 grams (Approximate)
- Lead-Free Packages: TO-252-2 (3), SOT-223, SOIC-8
  - **Totally Lead-Free; RoHS Compliant (Notes 1 & 2)**
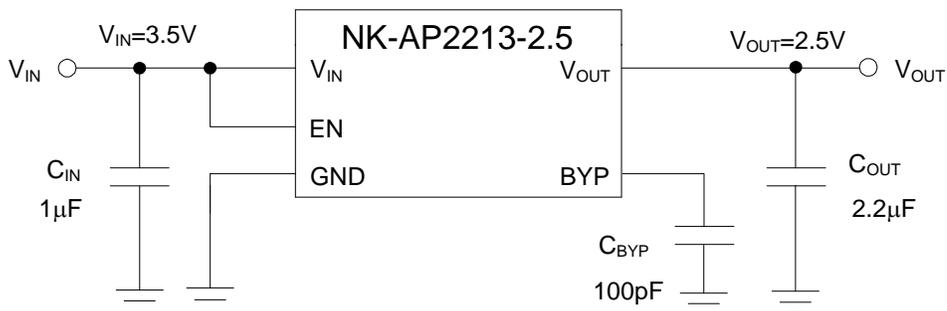- Lead-Free Packages, Available in "Green" Molding Compound: TO-252-2 (3), SOT-223, SOIC-8
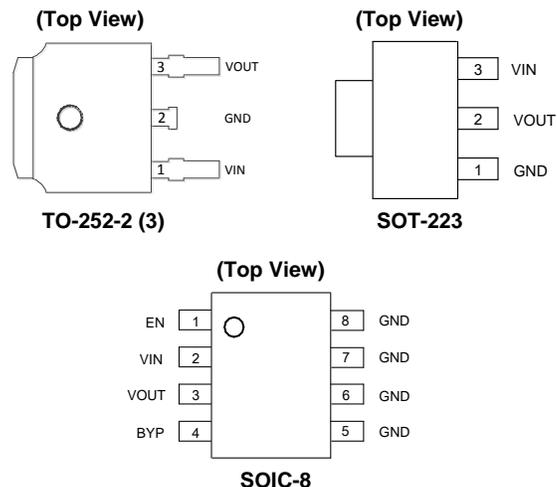
Applications

- Laptop, Notebook, and Palmtop Computer
- CD-ROM, CD-R/RW, DVD Driver
- Portable Electronic
- PC Peripheral

Typical Applications Circuit (Note 4)

Notes: 4. Dropout voltage is 350mV when T_A = +25°C. In order to obtain a normal output voltage, V_{OUT}+0.35V is the minimum input voltage which will result in a low PSRR, imposing a bad influence on system. Therefore, the recommended input voltage is V_{OUT}+1V to 18V. For NK-AP2213-2.5 version, its input voltage can be set from 3.5V(V_{OUT}+1V) to 18V.

Pin Descriptions

Pin Number			Pin Name	Function
TO-252-2 (3)	SOIC-8	SOT-223		
3	3	2	VOUT	Regulated output voltage
2	5, 6, 7, 8	1	GND	Ground
1	2	3	VIN	Input Voltage
—	1	—	EN	Enable input: CMOS or TTL compatible input. Logic high = enable, logic low = shutdown
—	4	—	BYP	Bypass capacitor for low noise operation

Functional Block Diagram
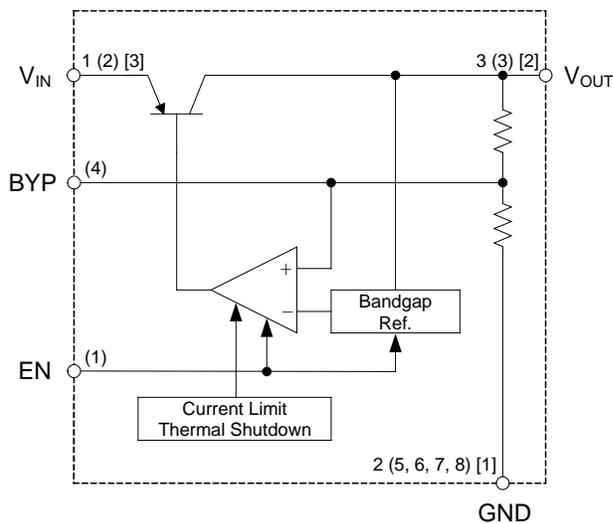
A (B) [C]
A for TO-252-2 (3)
B for SOIC-8
C for SOT-223

Absolute Maximum Ratings (Note 5)

Symbol	Parameter	Rating		Unit
V_{IN}	Supply Input Voltage	20		V
V_{EN}	Enable Input Voltage	20		V
P_D	Power Dissipation	Internally Limited (Thermal Protection)		W
T_{LEAD}	Lead Temperature (Soldering, 10s)	+260		°C
T_J	Junction Temperature	+150		°C
T_{STG}	Storage Temperature	-65 to +150		°C
ESD	ESD (Machine Model)	300		V
	ESD (Human Body Model)	6000		
	ESD (Charge Device Model)	2000		
θ_{JA}	Thermal Resistance (No Heatsink)	TO-252-2 (3)	90	°C/W
		SOIC-8	160	
		SOT-223	108	

Notes:　　5. Stresses greater than those listed under "*Absolute Maximum Ratings*" can cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "*Recommended Operating Conditions*" is not implied. Exposure to "*Absolute Maximum Ratings*" for extended periods can affect device reliability.

Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V_{IN}	Supply Input Voltage	2.5	18	V
V_{EN}	Enable Input Voltage	0	18	V
T_J	Operating Junction Temperature	-40	+125	°C

NK-AP2213-2.5 Electrical Characteristics (@V_{IN} = 3.5V, I_{OUT} = 100µA, C_{IN} = 1.0µF, C_{OUT} = 2.2µF, V_{EN} ≥ 2.0V, T_J = +25°C, **Bold** typeface applies over -40°C ≤ T_J ≤ +125°C (Note 6), unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$\Delta V_{OUT}/V_{OUT}$	Output Voltage Accuracy	Variation from Specified V_{OUT}	-1	—	1	%
			-2	—	**2**	
$\Delta V_{OUT}/\Delta T$	Output Voltage Temperature Coefficient (Note 7)	—	—	**120**	—	µV/°C
$(\Delta V_{OUT}/V_{OUT})/\Delta T$			—	**48**	—	ppm/°C
V_{RLINE}	Line Regulation	V_{IN} = 3.5V to 13.2V	—	1.5	4.5	mV
			—	—	**12**	
V_{RLOAD}	Load Regulation (Note 8)	I_{OUT} = 0.1mA to 500mA	—	1	7	mV
			—	—	**17**	
V_{DROP}	Dropout Voltage (Note 9)	I_{OUT} = 100µA	—	15	50	mV
			—	—	**70**	
		I_{OUT} = 50mA	—	110	150	
			—	—	**230**	
		I_{OUT} = 100mA	—	140	250	
			—	—	**300**	
		I_{OUT} = 150mA	—	165	275	
			—	—	**350**	
		I_{OUT} = 300mA	—	250	400	
			—	—	**500**	
		I_{OUT} = 500mA	—	350	600	
			—	—	**700**	
I_{STD}	Standby Current	V_{EN} ≤ 0.4V (Shutdown)	—	0.01	1	µA
		V_{EN} ≤ 0.18V (Shutdown)	—	—	**5**	
I_{GND}	Ground Pin Current (Note 10)	V_{EN} ≥ 2.0V, I_{OUT} = 100µA	—	100	150	µA
			—	—	**180**	
		V_{EN} ≥ 2.0V, I_{OUT} = 50mA	—	350	600	
			—	—	**800**	
		V_{EN} ≥ 2.0V, I_{OUT} = 150mA	—	1.3	1.9	mA
			—	—	**2.5**	
		V_{EN} ≥ 2.0V, I_{OUT} = 300mA	—	4	10	
			—	—	**15**	
		V_{EN} ≥ 2.0V, I_{OUT} = 500mA	—	11	20	
			—	—	**28**	

NK-AP2213-2.5 Electrical Characteristics (cont.) (@V_{IN} = 3.5V, I_{OUT} = 100µA, C_{IN} = 1.0µF, C_{OUT} = 2.2µF, V_{EN} ≥ 2.0V, T_J = +25°C, **Bold** typeface applies over -40°C ≤ T_J ≤ +125°C (Note 6), unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
PSRR	Ripple Rejection	f = 100Hz, I_{OUT} = 100µA	—	75	—	dB
I_{LIMIT}	Current Limit	V_{OUT} = 0V	—	**700**	1000	mA
e_{no}	Output Noise	I_{OUT} = 50mA, C_{OUT} = 2.2µF, 100pF from BYP to GND	—	260	—	$nV/\sqrt{Hz}$
V_{IL}	Enable Input Logic-Low Voltage	Regulator Shutdown	—	—	0.4	V
			—	—	**0.18**	
V_{IH}	Enable Input Logic-High Voltage	Regulator Enabled	**2.0**	—	—	V
I_{IL}	Enable Input Logic-Low Current	V_{IL} ≤ 0.4V	—	0.01	1	µA
		V_{IL} ≤ 0.18V	—	—	**2**	
I_{IH}	Enable Input Logic-High Current	V_{IH} ≥ 2.0V	—	5	20	µA
		V_{IH} ≥ 2.0V	—	—	**25**	
θ_{JC}	Thermal Resistance	TO-252-2 (3)	—	20	—	°C/W
		SOIC-8	—	45	—	
		SOT-223	—	31	—	

Notes: 6. Specifications in bold type are limited to -40°C ≤ T_J ≤ +125°C. Limits over temperature are guaranteed by design, but not tested in production.
7. Output voltage temperature coefficient is defined as the worst case voltage change divided by the total temperature range.
8. Regulation is measured at constant junction temperature using low duty cycle pulse testing. Parts are tested for load regulation in the load range from 0.1mA to 500mA. Changes in output voltage due to heating effects are covered by the thermal regulation specification.
9. Dropout voltage is defined as the input to output differential at which the output voltage drops 1% (T_J = +25°C) or 2% (-40°C ≤ T_J ≤ +125°C) below its nominal value measured at 1V differential.
10. Ground pin current is the regulator quiescent current plus pass transistor base current. The total current drawn from the supply is the sum of the load current plus the ground pin current.

NK-AP2213-3.0 Electrical Characteristics (@V_{IN} = 4V, I_{OUT} = 100µA, C_{IN} = 1.0µF, C_{OUT} = 2.2µF, V_{EN} ≥ 2.0V, T_J = +25°C, **Bold** typeface applies over -40°C ≤ T_J ≤ +125°C (Note 6), unless otherwise specified.)

| Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$\Delta V_{OUT}/V_{OUT}$	Output Voltage Accuracy	Variation from Specified V_{OUT}	-1	—	1	%
			-2	—	**2**	
$\Delta V_{OUT}/\Delta T$	Output Voltage Temperature Coefficient (Note 7)	—	—	**120**	—	µV/°C
$(\Delta V_{OUT}/V_{OUT})/\Delta T$			—	**40**	—	ppm/°C
V_{RLINE}	Line Regulation	V_{IN} = 4V to 13.2V	—	1.5	4.5	mV
			—	—	**12**	
V_{RLOAD}	Load Regulation (Note 8)	I_{OUT} = 0.1mA to 500mA	—	1	8	mV
			—	—	**17**	
V_{DROP}	Dropout Voltage (Note 9)	I_{OUT} = 100µA	—	15	50	mV
			—	—	**70**	
		I_{OUT} = 50mA	—	110	150	
			—	—	**230**	
		I_{OUT} = 100mA	—	140	250	
			—	—	**300**	
		I_{OUT} = 150mA	—	165	275	
			—	—	**350**	
		I_{OUT} = 300mA	—	250	400	
			—	—	**500**	
		I_{OUT} = 500mA	—	350	600	
			—	—	**700**	
I_{STD}	Standby Current	V_{EN} ≤ 0.4V (Shutdown)	—	0.01	1	µA
		V_{EN} ≤ 0.18V (Shutdown)	—	—	**5**	
I_{GND}	Ground Pin Current (Note 10)	V_{EN} ≥ 2.0V, I_{OUT} = 100µA	—	100	150	µA
			—	—	**180**	
		V_{EN} ≥ 2.0V, I_{OUT} = 50mA	—	350	600	
			—	—	**800**	
		V_{EN} ≥ 2.0V, I_{OUT} = 150mA	—	1.3	1.9	mA
			—	—	**2.5**	
		V_{EN} ≥ 2.0V, I_{OUT} = 300mA	—	4	10	
			—	—	**15**	
		V_{EN} ≥ 2.0V, I_{OUT} = 500mA	—	11	20	
			—	—	**28**	

NK-AP2213-3.0 Electrical Characteristics (cont.) (@V_{IN} = 4V, I_{OUT} = 100μA, C_{IN} = 1.0μF, C_{OUT} = 2.2μF, V_{EN} ≥ 2.0V, T_J = +25°C, **Bold** typeface applies over -40°C ≤ T_J ≤ +125°C (Note 6), unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
PSRR	Ripple Rejection	f = 100Hz, I_{OUT} = 100μA	—	75	—	dB
I_{LIMIT}	Current Limit	V_{OUT} = 0V	—	**700**	1000	mA
e_{no}	Output Noise	I_{OUT} = 50mA, C_{OUT} = 2.2μF, 100pF from BYP to GND	—	260	—	$nV/\sqrt{Hz}$
V_{IL}	Enable Input Logic-Low Voltage	Regulator Shutdown	—	—	0.4	V
			—	—	**0.18**	
V_{IH}	Enable Input Logic-High Voltage	Regulator Enabled	**2.0**	—	—	V
I_{IL}	Enable Input Logic-Low Current	V_{IL} ≤ 0.4V	—	0.01	1	μA
		V_{IL} ≤ 0.18V	—	—	**2**	
I_{IH}	Enable Input Logic-High Current	V_{IH} ≥ 2.0V	—	5	20	μA
		V_{IH} ≥ 2.0V	—	—	**25**	
θ_{JC}	Thermal Resistance	TO-252-2 (3)	—	20	—	°C/W
		SOIC-8	—	45	—	
		SOT-223	—	31	—	

Notes: 6. Specifications in bold type are limited to -40°C ≤ T_J ≤ +125°C. Limits over temperature are guaranteed by design, but not tested in production.
7. Output voltage temperature coefficient is defined as the worst case voltage change divided by the total temperature range.
8. Regulation is measured at constant junction temperature using low duty cycle pulse testing. Parts are tested for load regulation in the load range from 0.1mA to 500mA. Changes in output voltage due to heating effects are covered by the thermal regulation specification.
9. Dropout voltage is defined as the input to output differential at which the output voltage drops 1% (T_J = +25°C) or 2% (-40°C ≤ T_J ≤ +125°C) below its nominal value measured at 1V differential.
10. Ground pin current is the regulator quiescent current plus pass transistor base current. The total current drawn from the supply is the sum of the load current plus the ground pin current.

NK-AP2213-3.3 Electrical Characteristics (@V$_{IN}$ = 4.3V, I$_{OUT}$ = 100μA, C$_{IN}$ = 1.0μF, C$_{OUT}$ = 2.2μF, V$_{EN}$ ≥ 2.0V, T$_J$ = +25°C, **Bold** typeface applies over -40°C ≤ T$_J$ ≤ +125°C (Note 6), unless otherwise specified.)

| Symbol	Parameter	Conditions	Min	Typ	Max	Unit
ΔV$_{OUT}$/V$_{OUT}$	Output Voltage Accuracy	Variation from Specified V$_{OUT}$	-1	—	1	%
			-2	—	**2**	
ΔV$_{OUT}$/ΔT	Output Voltage Temperature Coefficient (Note 7)	—	—	**120**	—	μV/°C
(ΔV$_{OUT}$/V$_{OUT}$)/ΔT		—	—	**36.3**	—	ppm/°C
V$_{RLINE}$	Line Regulation	V$_{IN}$ = 4.3V to 13.2V	—	1.5	4.5	mV
			—	—	**12**	
V$_{RLOAD}$	Load Regulation (Note 8)	I$_{OUT}$ = 0.1mA to 500mA	—	1	9	mV
			—	—	**18**	
V$_{DROP}$	Dropout Voltage (Note 9)	I$_{OUT}$ = 100μA	—	15	50	mV
			—	—	**70**	
		I$_{OUT}$ = 50mA	—	110	150	
			—	—	**230**	
		I$_{OUT}$ = 100mA	—	140	250	
			—	—	**300**	
		I$_{OUT}$ = 150mA	—	165	275	
			—	—	**350**	
		I$_{OUT}$ = 300mA	—	250	400	
			—	–	**500**	
		I$_{OUT}$ = 500mA	—	350	600	
			—	—	**700**	
I$_{STD}$	Standby Current	V$_{EN}$ ≤ 0.4V (Shutdown)	—	0.01	1	μA
		V$_{EN}$ ≤ 0.18V (Shutdown)	—	—	**5**	
I$_{GND}$	Ground Pin Current (Note 10)	V$_{EN}$ ≥ 2.0V, I$_{OUT}$ = 100μA	—	100	150	μA
			—	—	**180**	
		V$_{EN}$ ≥ 2.0V, I$_{OUT}$ = 50mA	—	350	600	
			—	—	**800**	
		V$_{EN}$ ≥ 2.0V, I$_{OUT}$ = 150mA	—	1.3	1.9	mA
			—	—	**2.5**	
		V$_{EN}$ ≥ 2.0V, I$_{OUT}$ = 300mA	—	4	10	
			—	—	**15**	
		V$_{EN}$ ≥ 2.0V, I$_{OUT}$ = 500mA	—	11	20	
			—	—	**28**	

NK-AP2213-3.3 Electrical Characteristics (cont.) (@V_{IN} = 4.3V, I_{OUT} = 100µA, C_{IN} = 1.0µF, C_{OUT} = 2.2µF, V_{EN} ≥ 2.0V, T_J = +25°C, **Bold** typeface applies over -40°C ≤ T_J ≤ +125°C (Note 6), unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
PSRR	Ripple Rejection	f = 100Hz, I_{OUT} = 100µA	—	75	—	dB
I_{LIMIT}	Current Limit	V_{OUT} = 0V	—	**700**	1000	mA
e_{no}	Output Noise	I_{OUT} = 50mA, C_{OUT} = 2.2µF, 100pF from BYP to GND	—	260	—	$nV/\sqrt{Hz}$
V_{IL}	Enable Input Logic-Low Voltage	Regulator Shutdown	—	—	0.4	V
			—	—	**0.18**	
V_{IH}	Enable Input Logic-High Voltage	Regulator Enabled	**2.0**	—	—	V
I_{IL}	Enable Input Logic-Low Current	V_{IL} ≤ 0.4V	—	0.01	1	µA
		V_{IL} ≤ 0.18V	—	—	**2**	
I_{IH}	Enable Input Logic-High Current	V_{IH} ≥ 2.0V	—	5	20	µA
		V_{IH} ≥ 2.0V	—	—	**25**	
θ_{JC}	Thermal Resistance	TO-252-2 (3)	—	20	—	°C/W
		SOIC-8	—	45	—	
		SOT-223	—	31	—	

Notes: 6. Specifications in bold type are limited to -40°C ≤ T_J ≤ +125°C. Limits over temperature are guaranteed by design, but not tested in production.
7. Output voltage temperature coefficient is defined as the worst case voltage change divided by the total temperature range.
8. Regulation is measured at constant junction temperature using low duty cycle pulse testing. Parts are tested for load regulation in the load range from 0.1mA to 500mA. Changes in output voltage due to heating effects are covered by the thermal regulation specification.
9. Dropout voltage is defined as the input to output differential at which the output voltage drops 1% (T_J = +25°C) or 2% (-40°C ≤ T_J ≤ +125°C) below its nominal value measured at 1V differential.
10. Ground pin current is the regulator quiescent current plus pass transistor base current. The total current drawn from the supply is the sum of the load current plus the ground pin current.

Performance Characteristics
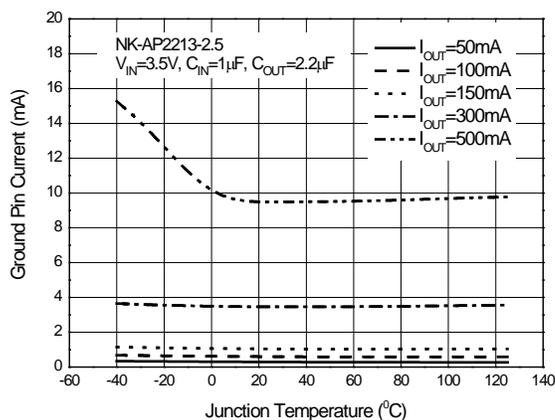
Output Voltage vs. Junction Temperature
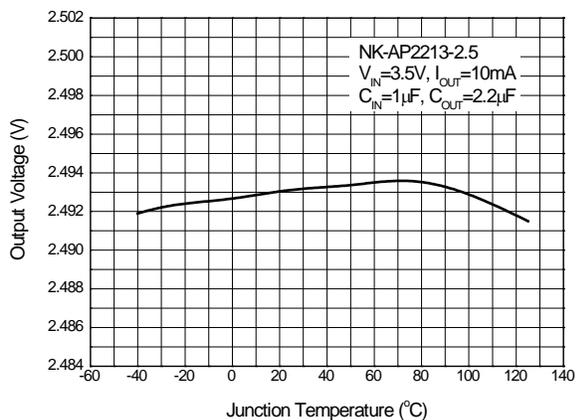
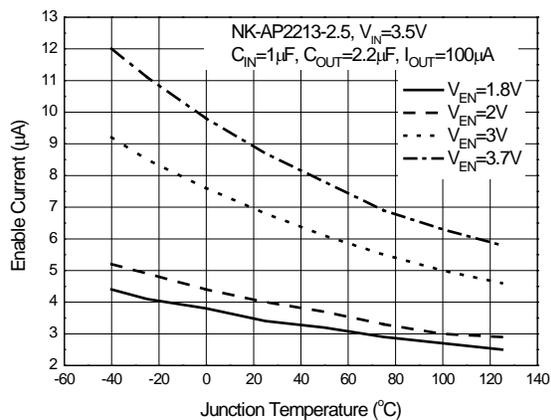### Dropout Voltage vs. Junction Temperature
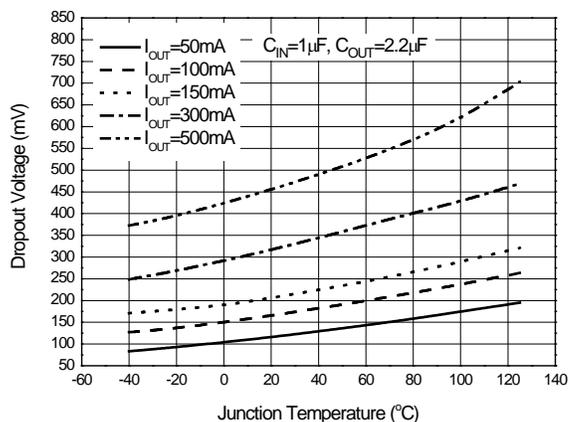
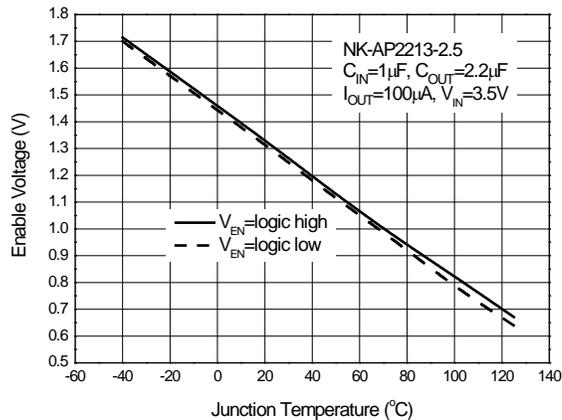### Ground Pin Current vs. Output Current
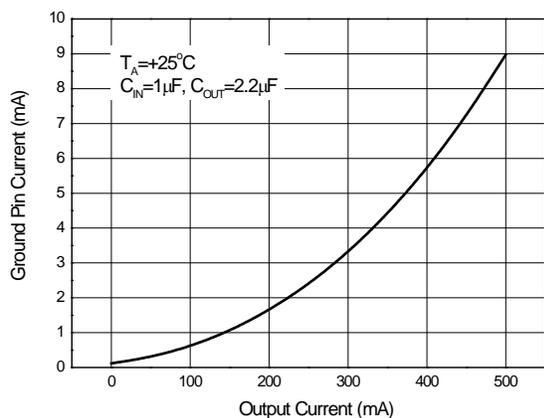
Ground Pin Current vs. Junction Temperature

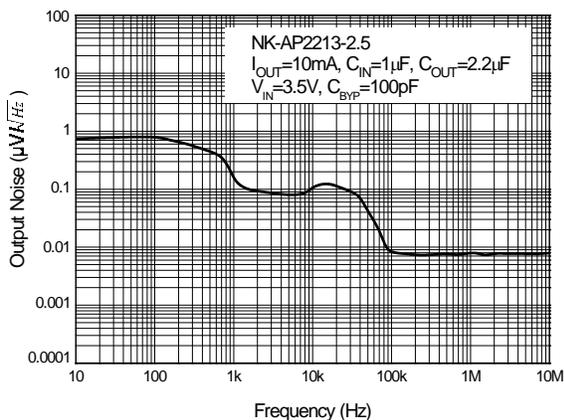### Enable Current vs. Junction Temperature
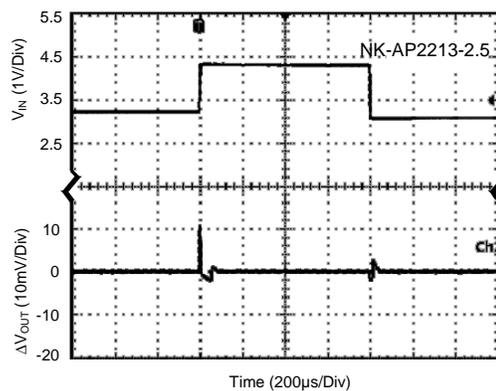

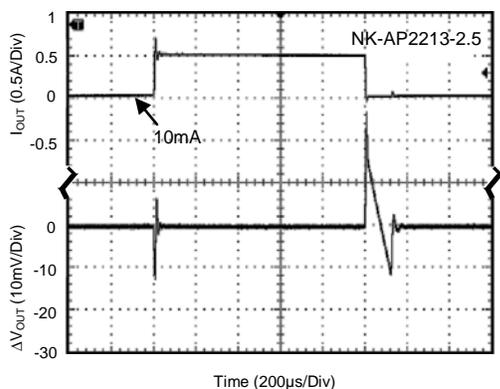### Enable Voltage vs. Junction Temperature

Performance Characteristics (cont.)

Output Noise vs. Frequency

NK-AP2213-2.5
I_{OUT}=10mA, C_{IN}=1µF, C_{OUT}=2.2µF
V_{IN}=3.5V, C_{BYP}=100pF

Output Noise ($µV/\sqrt{Hz}$)
Frequency (Hz)

Line Transient
(Conditions: V_{IN}=3.4V to 4.4V, V_{EN}=2V, I_{OUT}=100µA
C_{BYP}=100pF, C_{OUT}=2.2µF)

NK-AP2213-2.5

V_{IN} (1V/Div)
ΔV_{OUT} (10mV/Div)
Ch2
Time (200µs/Div)

Load Transient
(Conditions: V_{IN}=3.5V, C_{BYP}=100pF, V_{EN}=2V,
I_{OUT}=10mA to 500mA, C_{IN}=1.0µF, C_{OUT}=2.2µF)

NK-AP2213-2.5

I_{OUT} (0.5A/Div)
10mA
ΔV_{OUT} (10mV/Div)
Time (200µs/Div)

V_{EN} vs. V_{OUT}
(Conditions: V_{EN}=0V to 2V, V_{IN}=3.5V, I_{OUT}=30mA,
C_{BYP}=open, C_{IN}=1.0µF, C_{OUT}=2.2µF)

NK-AP2213-2.5

V_{EN} (1V/Div)
V_{OUT} (1V/Div)
Time (40µs/Div)

PSRR vs. Frequency

NK-AP2213-2.5
V_{IN}=3.5V, V_{RIPPLE}=1V_{PP}
I_{OUT}=10mA, C_{OUT}=2.2µF

PSRR (dB)
Frequency (Hz)

Power Dissipation vs. Ambient Temperature
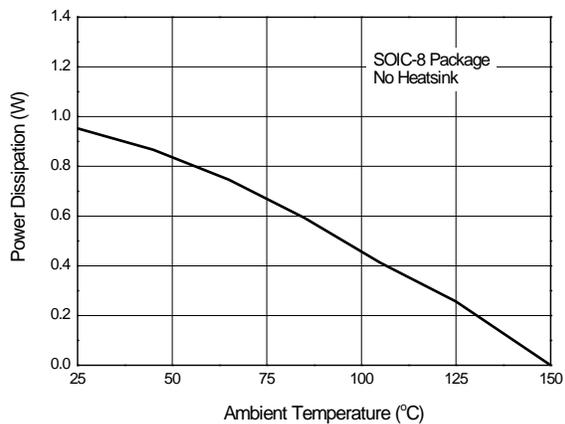
TO-252-2(3) Package
No Heatsink

Power Dissipation (W)
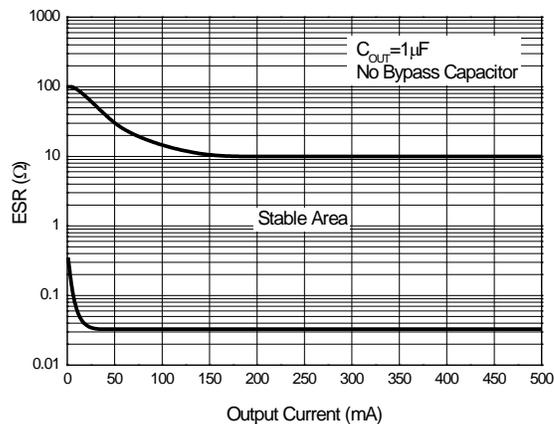Ambient Temperature (°C)
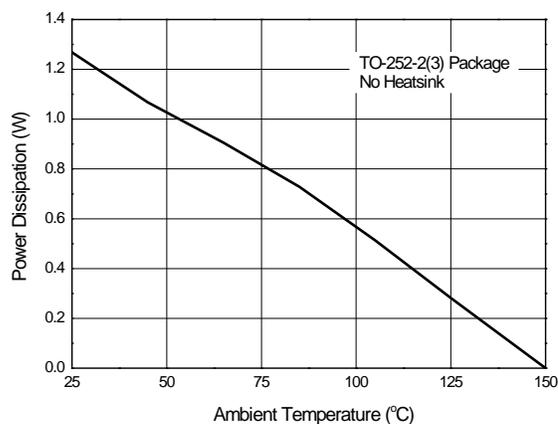
Performance Characteristics (cont.)

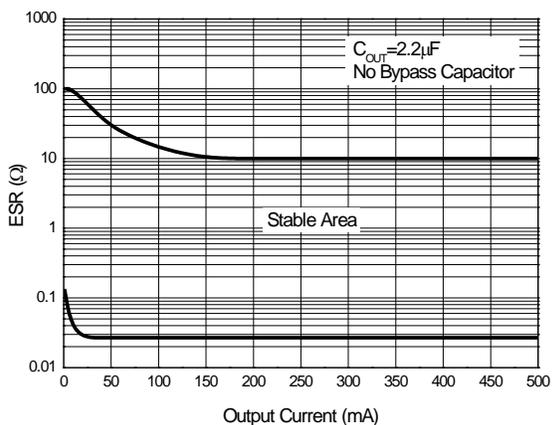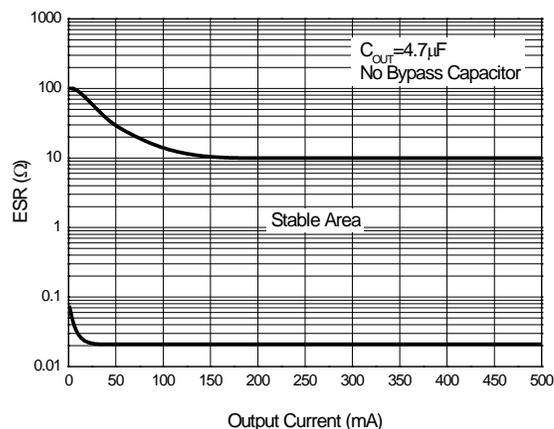### Power Dissipation vs. Ambient Temperature

ESR vs. Output Current

ESR vs. Output Current

ESR vs. Output Current

Application Information

Input Capacitor

A 1μF minimum capacitor is recommended to be placed between V_{IN} and GND.

Output Capacitor

An output capacitor is required to prevent oscillation. A 1μF minimum is recommended when C_{BYP} is unused. A 2.2μF minimum is recommended when C_{BYP} is 100pF. The output capacitor may be increased to improve transient response.

Noise Bypass Capacitor

A bypass capacitor is connected to the internal voltage reference. A small capacitor connected from BYP to GND makes this reference quiet, resulting in a significant reduction in output noise, but the ESR stable area will be narrowed. In order to keep the output stability, it is recommended to use the bypass capacitor no more than 100pF.

The start-up speed of the NK-AP2213 is inversely proportional to the value of the reference bypass capacitor. In some cases, if output noise is not a major concern and rapid turn-on is necessary, omit C_{BYP} and leave BYP open.

Power Dissipation

Thermal shutdown may take place if the maximum power dissipation is exceeded in application. Under all possible operating conditions, the junction temperature must be within the range specified under absolute maximum ratings to avoid thermal shutdown.

To determine if the power dissipated in the regulator reaches the maximum power dissipation (see Figure Power Dissipation vs. Ambient Temperature (SOIC-8 Package), ESR vs. Output Current (C_{OUT} = 1μF)), use:

$T_J = P_D*\theta_{JA} + T_A$

$P_D = (V_{IN}-V_{OUT})*I_{OUT}+V_{IN}*I_{GND}$

Where: $T_J \leq T_{J(max)}$, $T_{J(max)}$ is absolute maximum ratings for the junction temperature; $V_{IN}*I_{GND}$ can be ignored due to its small value.

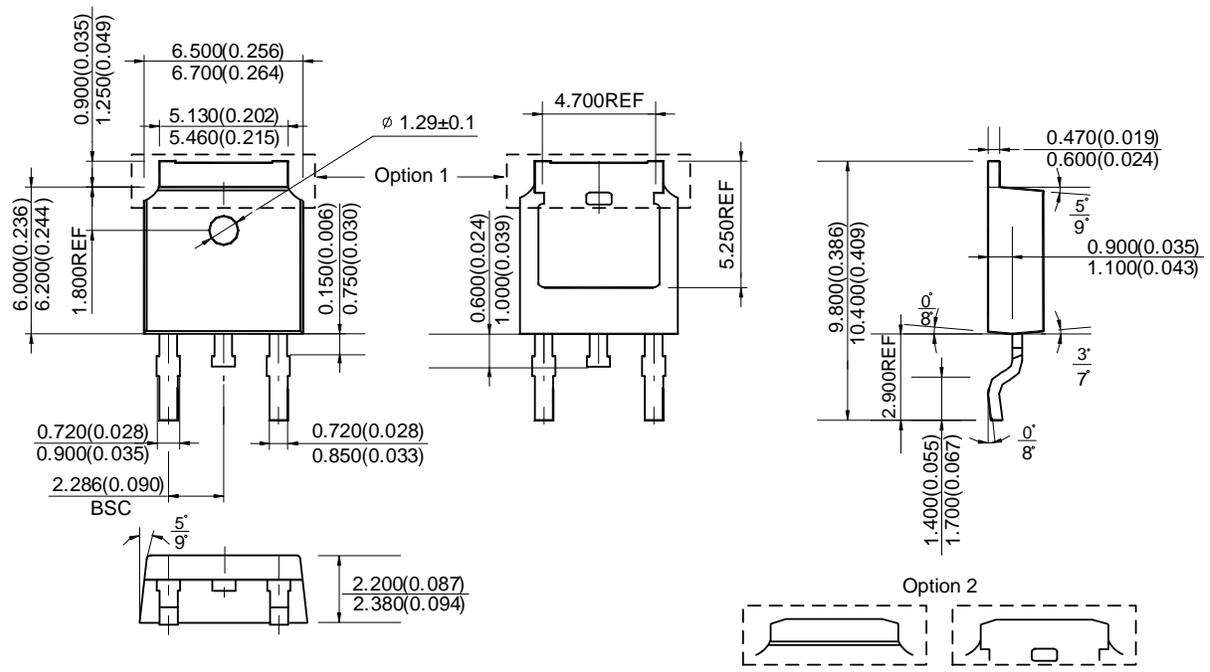$T_{J(max)}$ is +150°C, θ_{JA} is 90°C/W for TO-252-2 (3) package and 160°C/W for SOIC-8 package.

Example: For 2.5V version packaged in SOIC-8, I_{OUT} = 500mA, T_A = +50°C, $V_{IN(Max)}$ is:

(150°C-50°C)/(0.5A*160°C/W)+2.5V=3.75V

Therefore, for good performance, please make sure that the input voltage is less than 3.75V without heatsink when T_A = +50°C.
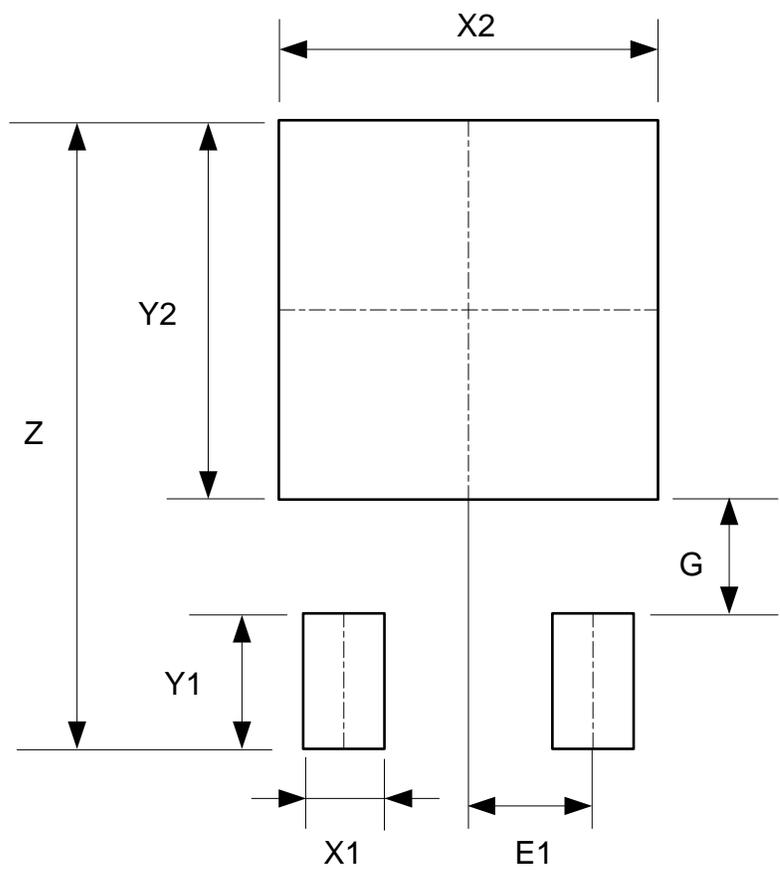
Package Outline Dimensions (All dimensions in mm(inch).)

(1) Package Type: TO-252-2 (3)

Package Outline Dimensions (All dimensions in mm(inch).) (continued)

(2) Package Type: SOIC-8

Note: Eject hole , oriented hole and mold mark is optional .

Package Outline Dimensions (All dimensions in mm(inch).) (continued)

(3)   Package Type: SOT-223

Suggested Pad Layout

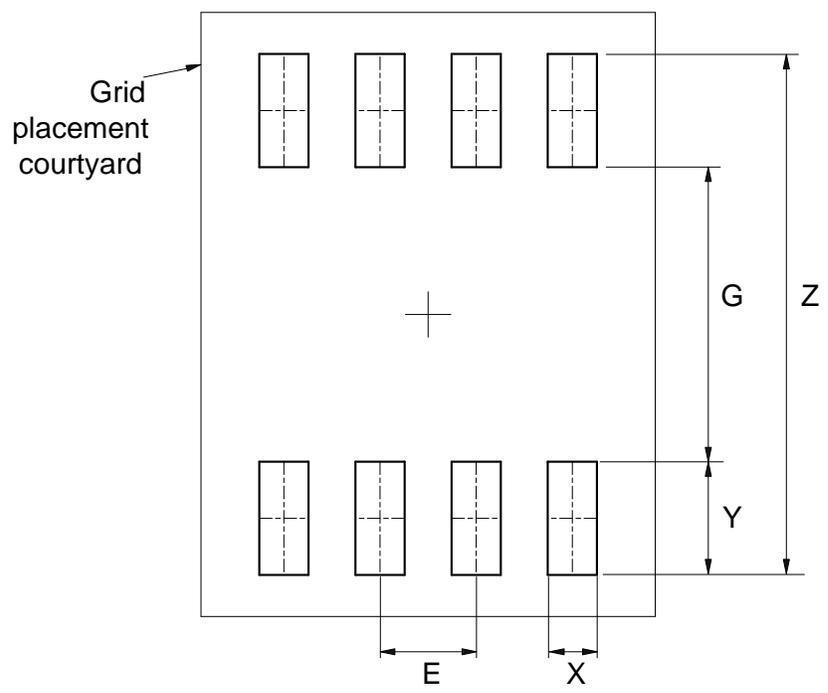**(1)   Package Type: TO-252-2 (3)**

Dimensions	Z (mm)/(inch)	X1 (mm)/(inch)	X2=Y2 (mm)/(inch)	Y1 (mm)/(inch)	G (mm)/(inch)	E1 (mm)/(inch)
Value	11.600/0.457	1.500/0.059	7.000/0.276	2.500/0.098	2.100/0.083	2.300/0.091

Suggested Pad Layout (continued)

(2) Package Type: SOIC-8

Dimensions	Z (mm)/(inch)	G (mm)/(inch)	X (mm)/(inch)	Y (mm)/(inch)	E (mm)/(inch)
Value	6.900/0.272	3.900/0.154	0.650/0.026	1.500/0.059	1.270/0.050

Suggested Pad Layout (continued)

(3)   Package Type: SOT-223

Grid placement courtyard
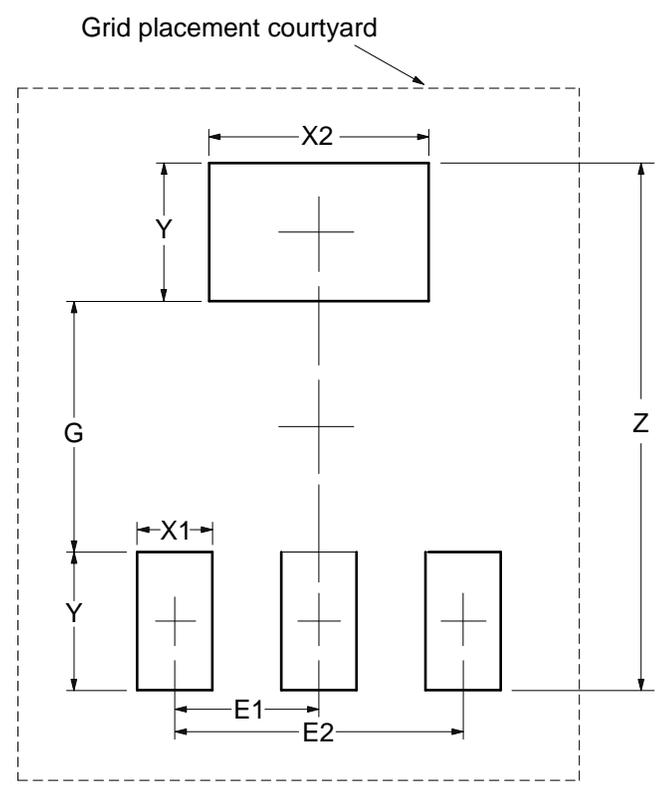
Dimensions	Z (mm)/(inch)	G (mm)/(inch)	X1 (mm)/(inch)	X2 (mm)/(inch)	Y (mm)/(inch)	E1 (mm)/(inch)	E2 (mm)/(inch)
Value	8.400/0.331	4.000/0.157	1.200/0.047	3.500/0.138	2.200/0.087	2.300/0.091	4.600/0.181