



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

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企业微信二维码



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Description

The NK-AZ2185 series is low dropout positive voltage regulators with a maximum dropout of 1.5V at 3A of load current.

The device features low quiescent current, low adjustable current and improved load transient performance. This device built in band-gap reference circuit, on-chip thermal shutdown and current limit function.

The NK-AZ2185 is available in adjustable version. The adjustable version can set the output voltage with two external resistors.

The NK-AZ2185 series is available in standard packages of TO252(Standard).

Features

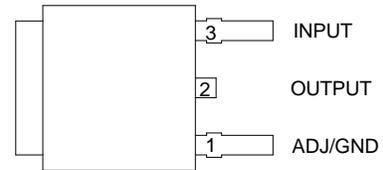
- Low Dropout Voltage: Typical 1.3V at 3A
- Current Limiting and Thermal Protection
- Output Current: 3A
- Current Limit: 4.5A
- Operating Junction Temperature: -40 to +125°C
- Line Regulation: 0.015%/V (Typ)
- Load Regulation: 0.1%/A (Typ)
- Adjust Pin Current: 6μA (Typ)
- Minimum Load Current: 0.3mA (Typ)
- Compatible with Low ESR Ceramic Capacitor

Applications

- High Efficiency Linear Regulators
- Battery Charger
- Digital Video/Camcorder
- Post Regulation for Switching Supplies
- Microprocessor Supply
- Mother Board Power Supplies
- DVD-video Player
- Telecom Equipment
- Set Top Boxes and Web Boxes Modules' Supply

Features

(Top View)

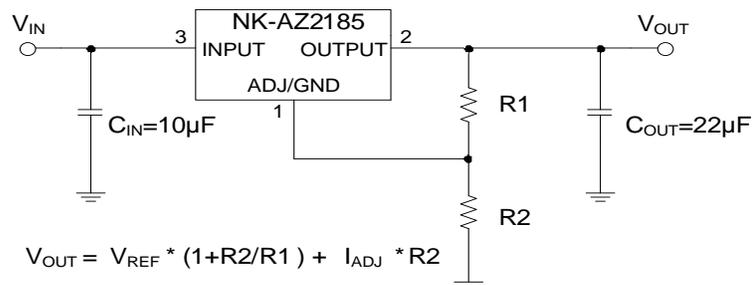


TO252 (Standard)

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Typical Applications Circuit (Note 4)

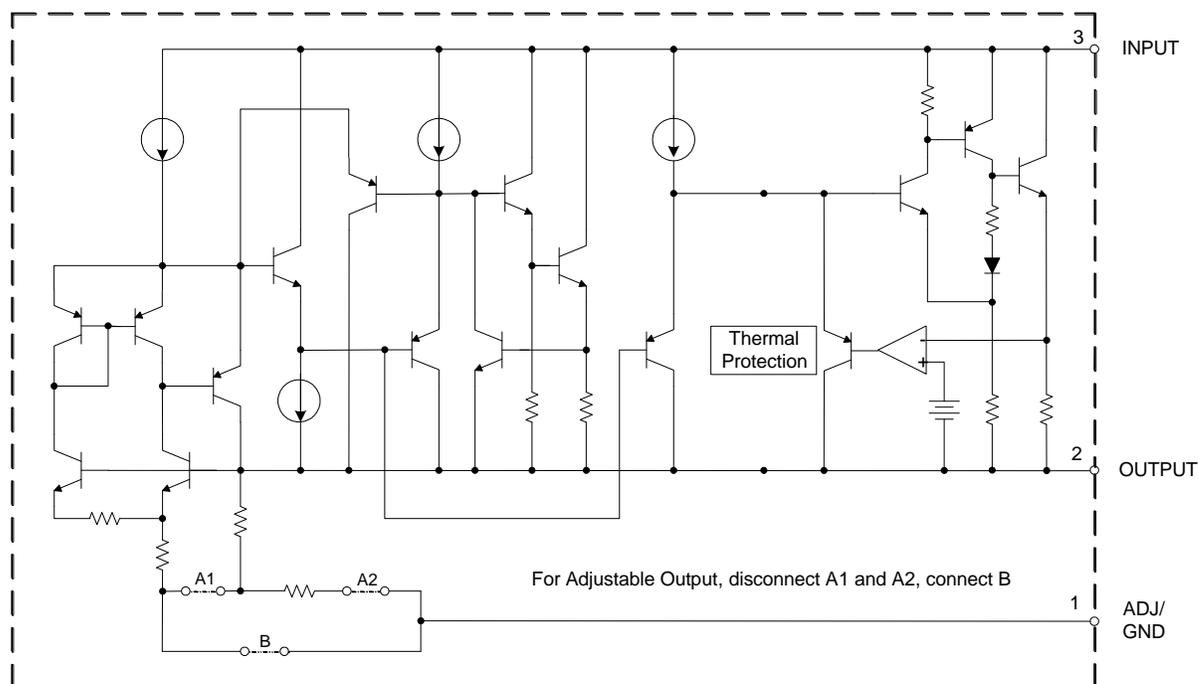


Note 4: The NK-AZ2185 is compatible with low ESR ceramic capacitor.
 The ESR of the output capacitors must be less than 0.4Ω.
 A minimum of 10µF output capacitor is required.

Pin Descriptions

Pin Number	Pin Name	Function
1	ADJ/GND	Adjust pin/Ground
2	OUTPUT	Output voltage
3	INPUT	Input voltage

Functional Block Diagram



Absolute Maximum Ratings (Note 5)

Symbol	Parameter	Rating	Unit
V_{IN}	Input Voltage	18	V
T_J	Operating Junction Temperature	+150	°C
T_{STG}	Storage Temperature Range	-65 to +150	°C
T_{LEAD}	Lead Temperature (Soldering, 10sec)	+260	°C
θ_{JA}	Thermal Resistance (Junction to Ambient)	75	°C/W
—	ESD (Human Body Model)	5000	V
—	ESD (Charge Device Model)	2000	V

Note 5: Stresses greater than those listed under “Absolute Maximum Ratings” may 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 may affect device reliability.

Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V_{IN}	Input Voltage	—	12	V
T_J	Operating Junction Temperature	-40	+125	°C

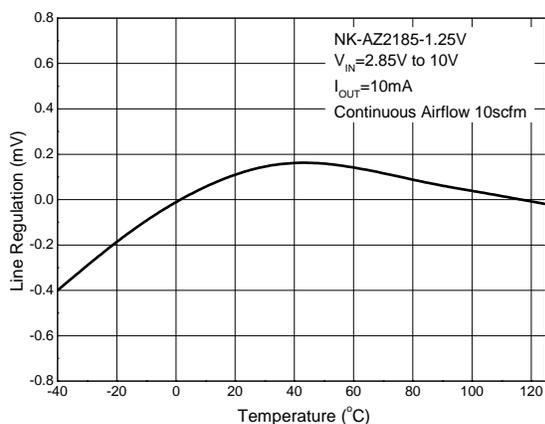
Electrical Characteristics (Typicals and limits appearing in normal type apply for $T_J = +25^\circ\text{C}$. Limits appearing in **Boldface** type apply over the entire operating junction temperature range -40 to $+125^\circ\text{C}$.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{REF}	Reference Voltage	$I_{OUT} = 10\text{mA}$, $V_{IN}-V_{OUT} = 3\text{V}$, $T_J = +25^\circ\text{C}$, $10\text{mA} \leq I_{OUT} \leq 3\text{A}$, $1.5\text{V} \leq V_{IN}-V_{OUT} \leq 5\text{V}$	1.238 1.225	1.250 1.250	1.262 1.275	V
V_{RLOAD}	Load Regulation	$10\text{mA} \leq I_{OUT} \leq 3\text{A}$, $V_{IN}-V_{OUT} = 3\text{V}$	—	0.1 0.2	0.4 0.5	%/A
V_{RLINE}	Line Regulation	$I_{OUT} = 10\text{mA}$, $2.85\text{V} \leq V_{IN} \leq 10\text{V}$	—	0.015 0.035	0.2 0.2	%/V
V_{DROP}	Dropout Voltage	$I_{OUT} = 3\text{A}$, ΔV_{REF} , $\Delta V_{OUT} = 1\%$	—	1.3	1.5	V
I_{LIMIT} (Note 6)	Current Limit	$V_{IN}-V_{OUT} = 3\text{V}$	3.2	4.5	4.95	A
I_{LOAD}	Minimum Load Current	$V_{IN} = 10\text{V}$	—	0.3	1	mA
I_{ADJ}	Adjust Pin Current	$V_{IN} = 4.25\text{V}$, $I_{OUT} = 10\text{mA}$	—	6	10	μA
ΔI_{ADJ}	Adjust Pin Current Change	$10\text{mA} \leq I_{OUT} \leq 3\text{A}$, $1.5\text{V} \leq V_{IN}-V_{OUT} \leq 6\text{V}$	—	0.3	2	μA
PSRR	Ripple Rejection	$f_{RIPPLE} = 120\text{Hz}$, $C_{OUT} = 22\mu\text{F}$, $I_{OUT} = 3\text{A}$, $V_{IN}-V_{OUT} = 3\text{V}$	—	50	—	dB
—	Long Term Stability	$T_A = +125^\circ\text{C}$, 1000Hrs	—	0.5	—	%
—	Temperature Stability	$I_{OUT} = 10\text{mA}$, $V_{IN}-V_{OUT} = 1.5\text{V}$	—	50	—	PPM%
—	RMS Noise (% of V_{OUT})	$T_A = +125^\circ\text{C}$, $10\text{Hz} \leq f \leq 10\text{kHz}$	—	0.003	—	%
—	OTSD	—	—	+150	—	$^\circ\text{C}$
—	OTSD Hysteresis	—	—	+20	—	$^\circ\text{C}$
θ_{JC}	Thermal Resistance (Junction to Case)	—	—	10	—	$^\circ\text{C/W}$

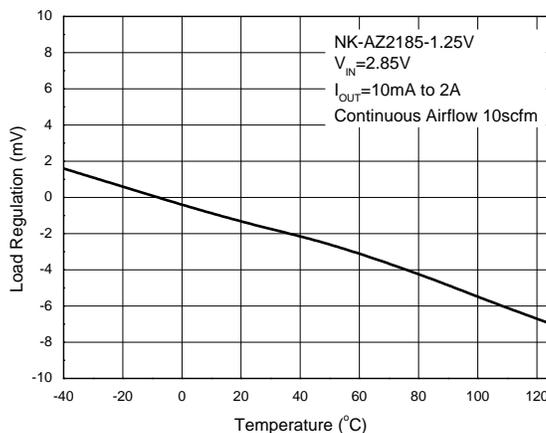
Note 6: Make the V_{OUT} down to about 98% of the test values, I_{OUT} value is set to I_{LIMIT} at this time.

Performance Characteristics

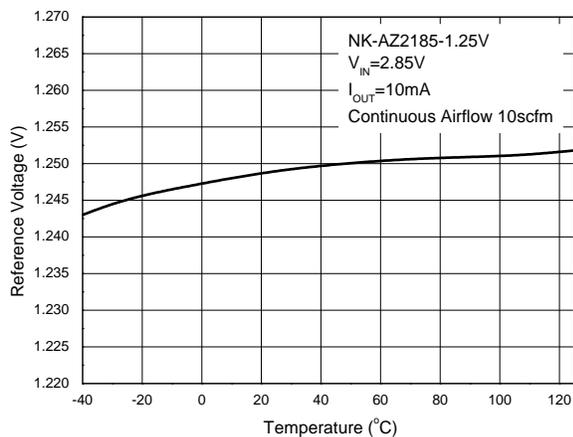
Line Regulation vs. Temperature



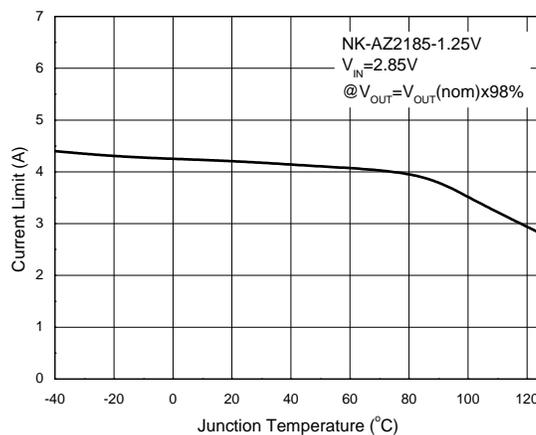
Load Regulation vs. Temperature



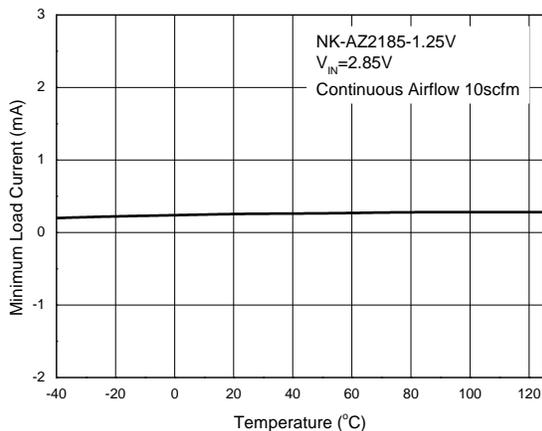
Reference Voltage vs. Temperature



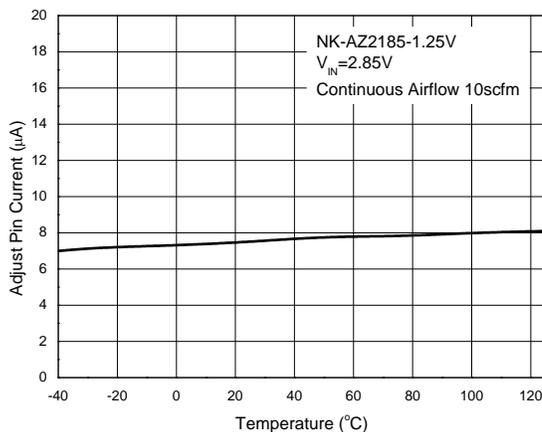
Current Limit vs. Temperature



Minimum Load Current vs. Temperature

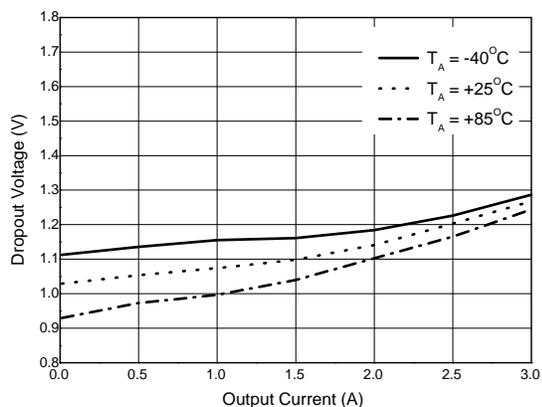


Adjust Pin Current vs. Temperature

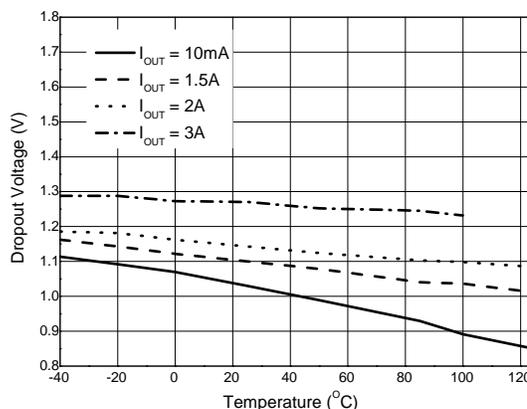


Performance Characteristics (Cont.)

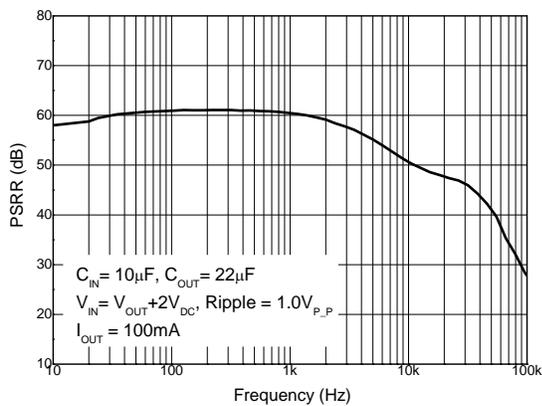
Dropout Voltage vs. Output Current



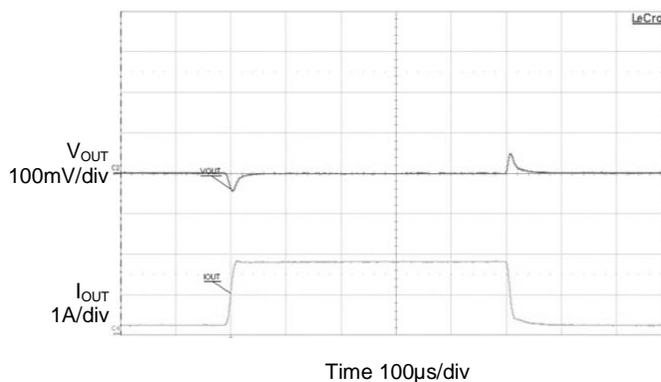
Dropout Voltage vs. Temperature



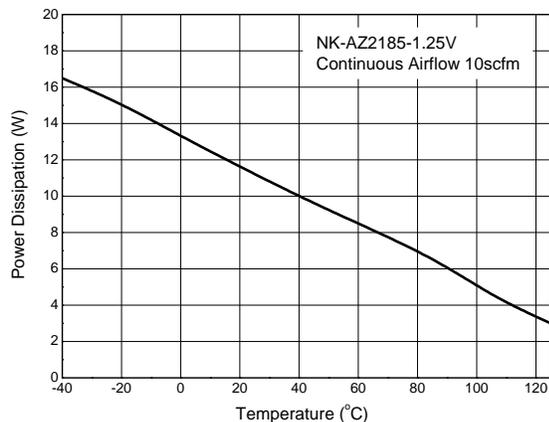
PSRR vs. Frequency



Load Transient Response

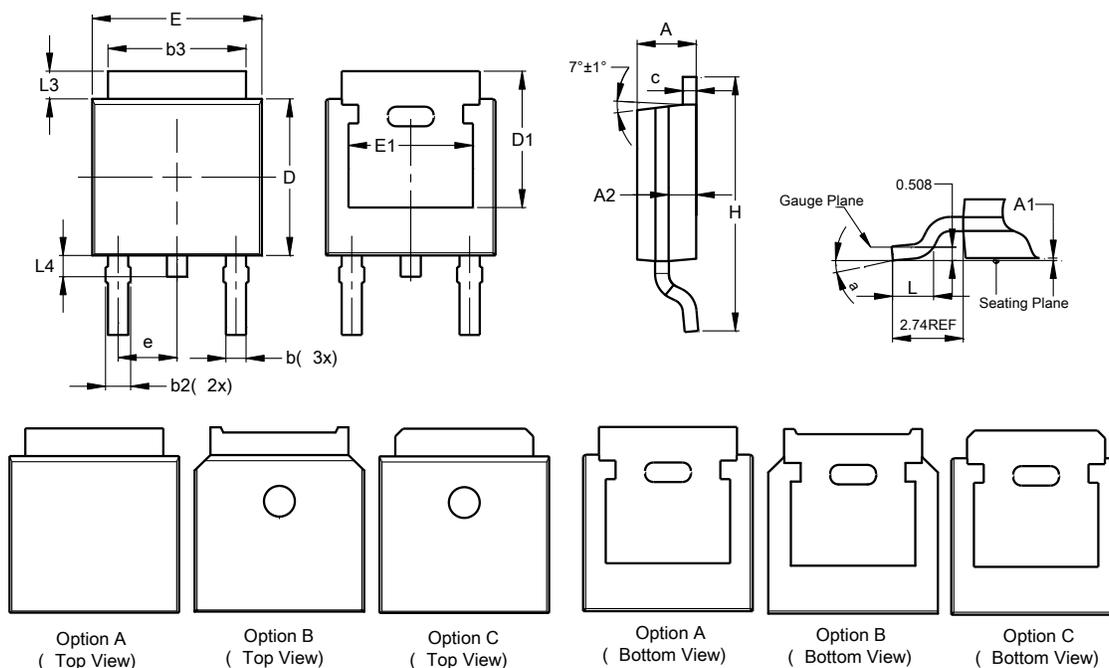


Power Dissipation vs. Temperature



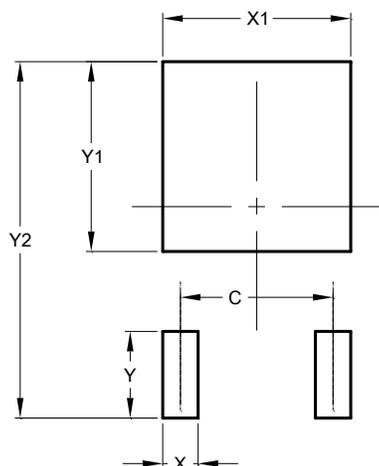
Package Outline Dimensions

(1) Package Type: TO252 (Standard)



Suggested Pad Layout

(1) Package Type: TO252 (Standard)



Dimensions	Value (in mm)
C	4.572
X	1.060
X1	5.632
Y	2.600
Y1	5.700
Y2	10.700