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

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Description

The NK-ZXTR2008P5 monolithically integrates a transistor, zener diode and resistor to function as a high-voltage linear regulator. The device regulates with an 8.2V nominal output at 15mA. It is designed for use in high-voltage applications where standard linear regulators cannot be used. This function is fully integrated into a PowerDI®5 package, minimizing PCB area and reducing number of components when compared with a multi-chip discrete solution.

Features

- Series Linear Regulator Using Emitter-Follower Stage
- Input Voltage = 12V to 100V (For regulated output voltage)
- Output Voltage = 8.2V ± 10%
- 150kΩ resistor to limit quiescent current
- Fully integrated into a PowerDI5 package

Applications

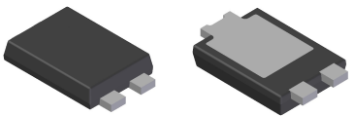
Supply voltage regulation in:

- Startup switch in DC-DC converters
- Networking
- Telecommunications
- Power over Ethernet (PoE)

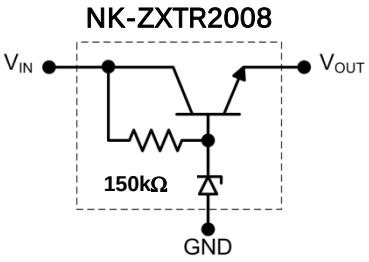
Mechanical Data

- Case: PowerDI5
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.100 grams (Approximate)

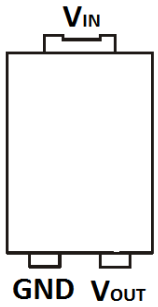
PowerDI5



Top View Bottom View



Internal Device Schematic



Top View Pin-Out

Pin Name	Pin Function
VIN	Input Supply
GND	Power Ground
VOUT	Voltage Output

Absolute Maximum Ratings (Voltage relative to GND, @T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Input Supply Voltage	V_{IN}	-0.3 to 100	V
Continuous Input & Output Current	I_{IN}, I_{OUT}	450	mA
Peak Pulsed Input & Output Current	I_{IM}, I_{OM}	2	A
Maximum Voltage applied to V_{OUT}	$V_{OUT(max)}$	Smaller of V_{IN}+8.2V or 14.5V	V

Maximum Current at V_{IN} = 48V (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Continuous Output Current	(Note 7)	I_{OUT}	45	mA
Pulsed Output Current	(Note 8)	I_{OM}	800	mA
	(Note 9)		160	

Thermal Characteristics

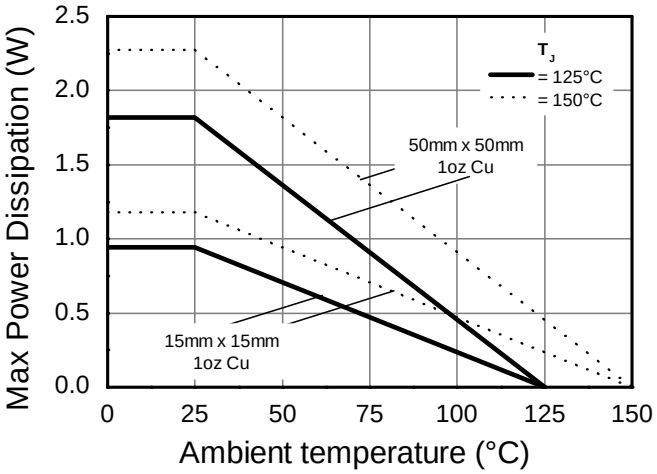
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	1.82	W
	(Note 6)		0.94	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	55	°C/W
	(Note 6)		107	
Thermal Resistance, Junction to Lead	(Note 10)	$R_{\theta JL}$	20	
Thermal Resistance, Junction to Case	(Note 10)	$R_{\theta JC}$	17.8	
Recommended Operating Junction Temperature Range		T_J	-40 to +125	°C
Maximum Operating Junction and Storage Temperature Range		T_J , T_{STG}	-65 to +150	

ESD Ratings (Note 11)

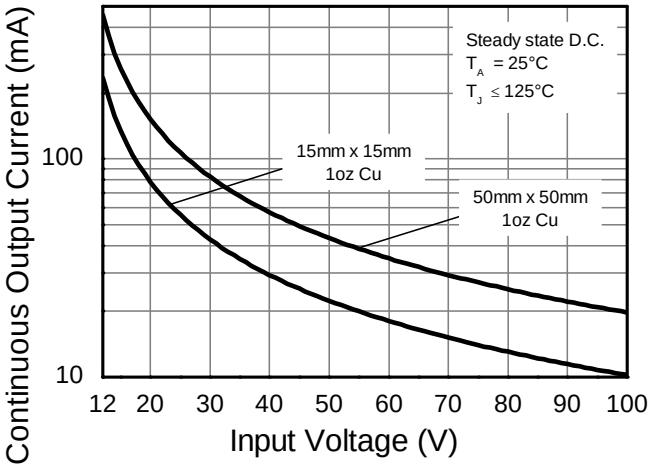
Characteristics	Symbols	Value	Unit	JEDEC Class
Electrostatic Discharge – Human Body Model	ESD HBM	4000	V	3A
Electrostatic Discharge – Machine Model	ESD MM	400	V	C

Notes:
5. For a device mounted with the exposed V_{IN} pad on 50mm x 50mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady-state.
6. Same as Note 5, except mounted on 15mm x 15mm 1oz copper.
7. Same as Note 5, while operating at V_{IN} = 48V. Refer to Safe Operating Area for other Input Voltages.
8. Same as Note 5, except measured with a single pulse width = 100µs and V_{IN} = 48V.
9. Same as Note 5, except measured with a single pulse width = 10ms and V_{IN} = 48V.
10. $R_{\theta JL}$ = Thermal resistance from junction to solder-point (on the exposed V_{IN} pad).
    $R_{\theta JC}$ = Thermal resistance from junction to the top of case.
11. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

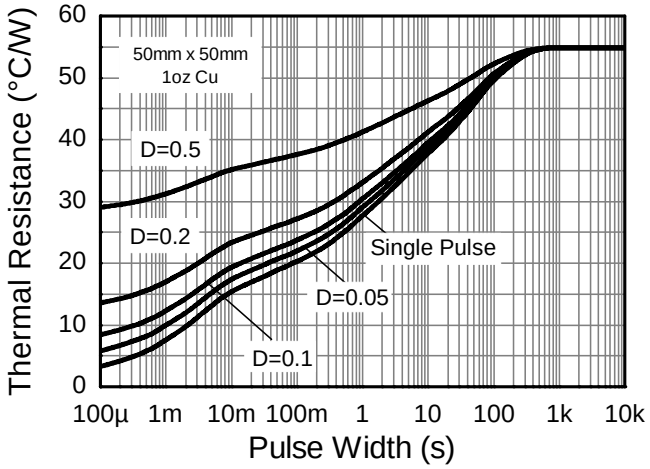
Thermal Characteristics and Derating Information



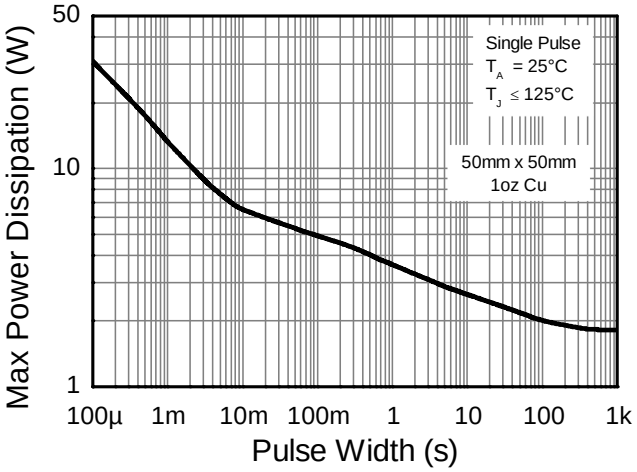
Derating Curve



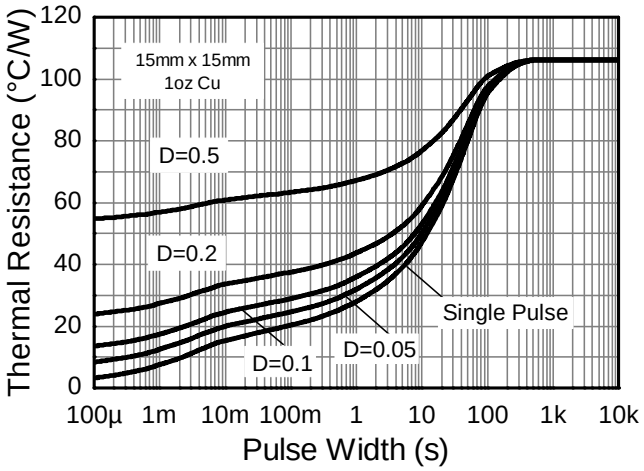
Safe Operating Area



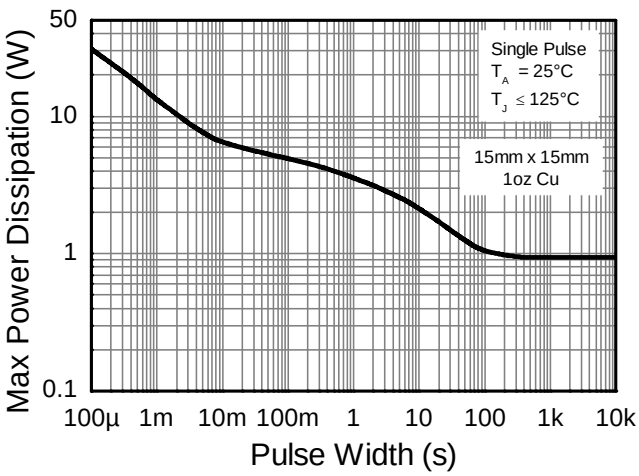
Transient Thermal Impedance



Pulse Power Dissipation



Transient Thermal Impedance



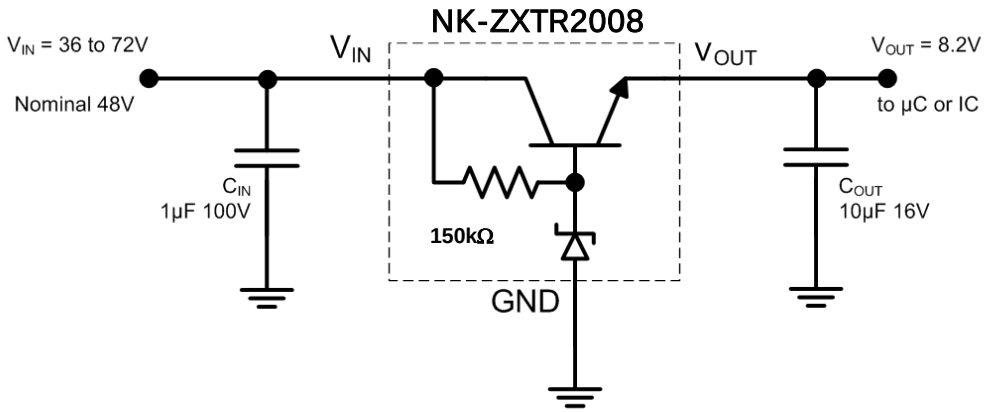
Pulse Power Dissipation

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Output Voltage (Note 12)	V_{OUT}	7.38	8.2	9.02	V	V_{IN} = 48V, I_{OUT} = 15mA
Line Regulation (Notes 12 & 13)	ΔV_{OUT}	—	10	300	mV	V_{IN} = 12 to 100V, I_{OUT} = 15mA
Temperature Coefficient	$\Delta V_{OUT}/\Delta T$	—	10	—	mV/°C	T_J = -40°C to +125°C V_{IN} = 48V, I_{OUT} = 15mA
Load Regulation (Notes 12 & 14)	ΔV_{OUT}	—	-180 -250	-400 -500	mV	I_{OUT} = 0.1 to 30mA, V_{IN} = 48V I_{OUT} = 0.1 to 100mA, V_{IN} = 48V
Minimum Value of Input Voltage Required to Maintain Line Regulation	$V_{IN(MIN)}$	12	—	—	V	—
Quiescent Current	I_Q	—	275 650	500 900	µA	V_{IN} = 48V, I_{OUT} = 10µA V_{IN} = 100V, I_{OUT} = 10µA
Power Supply Rejection Ratio	$\Delta V_{IN}/\Delta V_{OUT}$	—	38	—	dB	C_{OUT} = 100nF, I_{OUT} = 15mA, V_{OUT} = 8.2V, V_{IN}=12 to 100V, f=100Hz

Notes: 12. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%
13. Line regulation $\Delta V_{OUT} = V_{OUT}(@\ V_{IN} = 72V) - V_{OUT}(@\ V_{IN} = 15V)$
14. Load regulation $\Delta V_{OUT} = V_{OUT}(@\ I_{OUT} = 30mA) - V_{OUT}(@\ I_{OUT} = 0.1mA)$
$\Delta V_{OUT} = V_{OUT}(@\ I_{OUT} = 100mA) - V_{OUT}(@\ I_{OUT} = 0.1mA)$

Typical Application Circuit

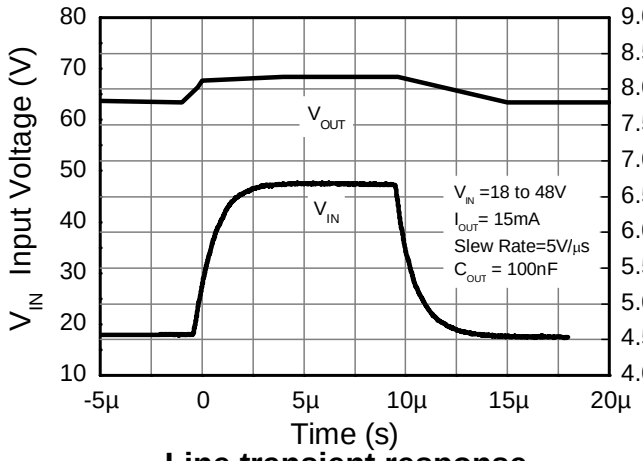


Example of an 8.2V regulated supply from a nominal 48V for powering a Controller IC.

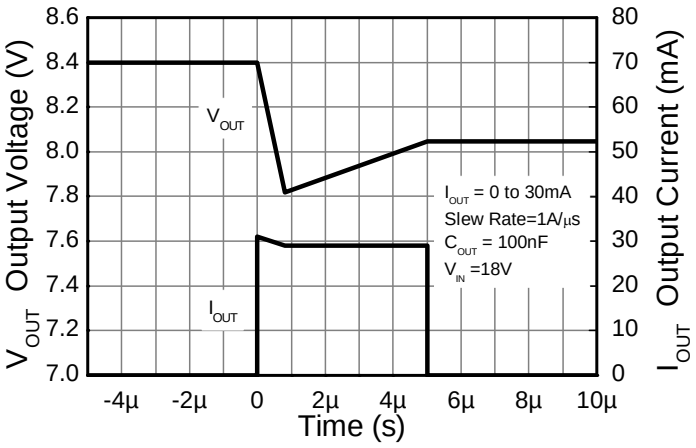
Pin Functions

Pin Name	Pin Function	Notes
VIN	Input Supply	Input voltage can vary from -0.3V to 100V with respect to GND; for VOUT regulated then 12V ≤ VIN ≤ 100V. It is recommended to connect a 1µF capacitor to GND.
GND	Power Ground	This pin should be tied to the system ground.
VOUT	Voltage Output	Outputs a regulated 8V when 12V ≤ VIN ≤ 100V. When VIN < 12V, then VOUT maximum = VIN – 1.5V. The pin can be pulled high to a maximum of +14V with respect to GND, or +8V with respect to VIN, whichever is lower. It is recommended to connect a 10µF capacitor to GND and a minimum of 10µA to be drawn from VOUT to maintain regulation.

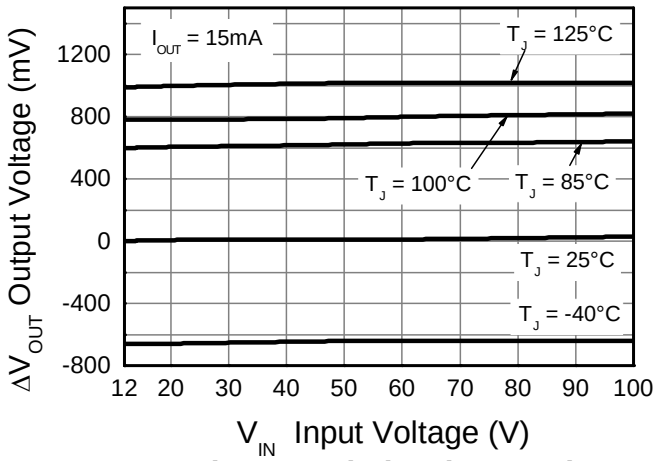
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



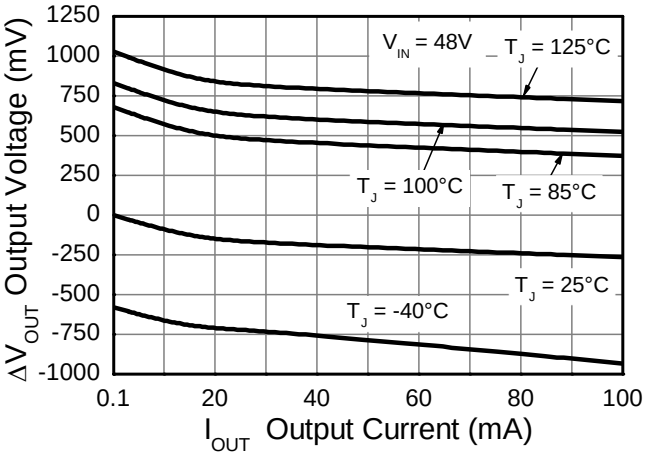
Line transient response



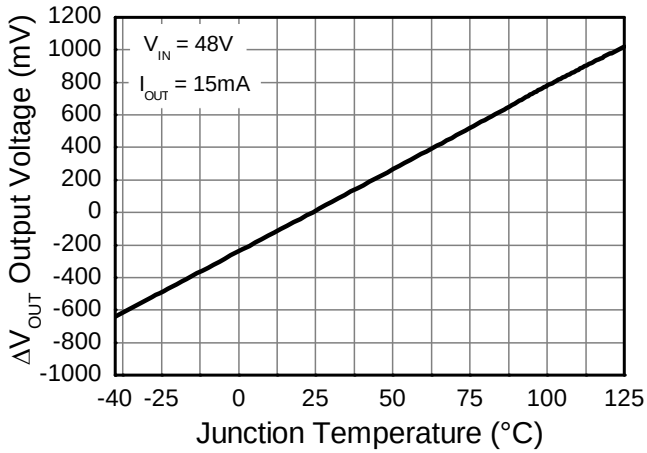
Load transient response



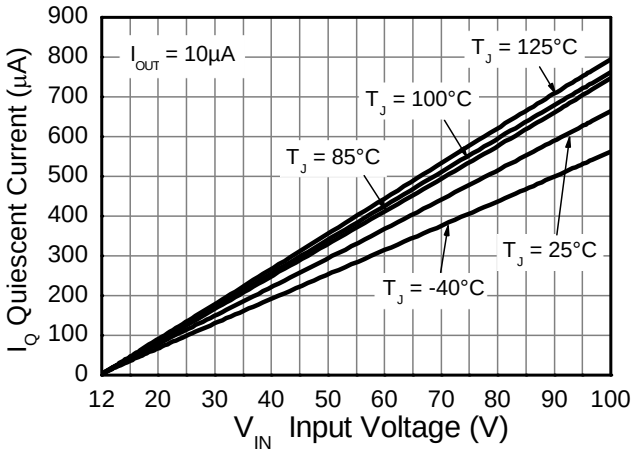
Line Regulation (Note 15)



Load Regulation (Note 16)



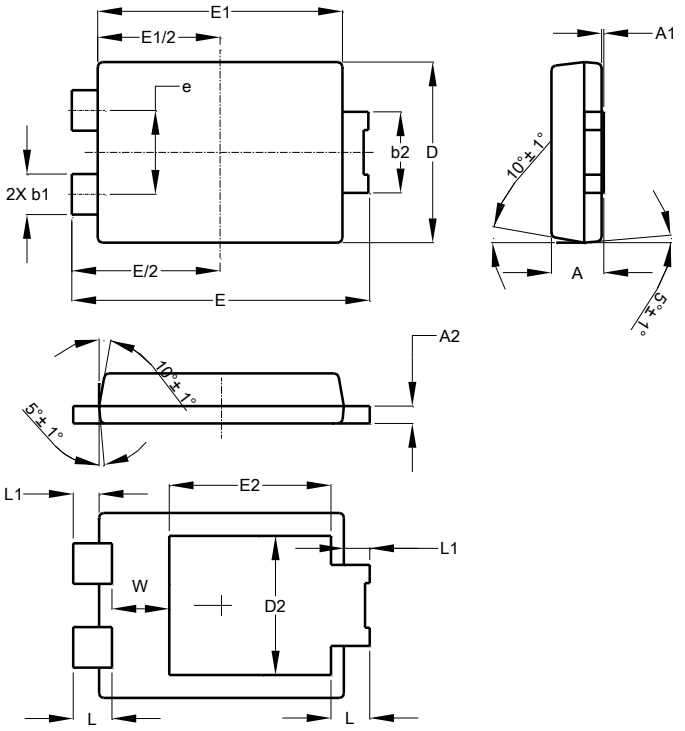
Temperature Coefficient (Note 17)



Quiescent Current

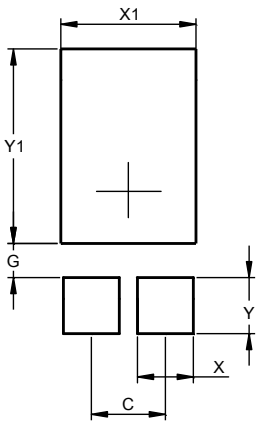
Notes: 15. Line regulation $\Delta V_{OUT} = V_{OUT} – V_{OUT}$(@ V_{IN} = 15V, I_{OUT} = 15mA, T_J = +25°C)
16. Load regulation $\Delta V_{OUT} = V_{OUT} – V_{OUT}$(@ V_{IN} = 48V, I_{OUT} = 0.1mA, T_J = +25°C)
17. Temperature Coefficient $\Delta V_{OUT} = V_{OUT} – V_{OUT}$(@ V_{IN} = 48V, I_{OUT} = 15mA, T_J = +25°C)

Package Outline Dimensions



PowerDI5			
Dim	**Min**	**Max**	**Typ**
A	1.05	1.15	1.10
A1	0.00	0.05	--
A2	0.33	0.43	0.381
b1	0.80	0.99	0.89
b2	1.70	1.88	1.78
D	3.90	4.05	3.966
D2	--	--	3.054
E	6.40	6.60	6.504
e	--	--	1.84
E1	5.30	5.45	5.37
E2	--	--	3.549
L	0.75	0.95	0.85
L1	0.50	0.65	0.57
W	1.10	1.41	1.255
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
C	1.840
G	0.852
X	1.390
X1	3.360
Y	1.400
Y1	4.860