



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

0755-83047638

ysbdt@szyoushang.cn

www.szyoushang.cn



企业微信二维码



企业QQ二维码

Description

The NK-ZXTR2005ZQ monolithically integrates a transistor, Zener diode and resistor to function as a high voltage linear regulator. The device regulates with a 5V 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 SOT89 package, minimizing PCB area and reducing number of components when compared with a multi-chip discrete solution.

Applications

Supply Voltage Regulation in:

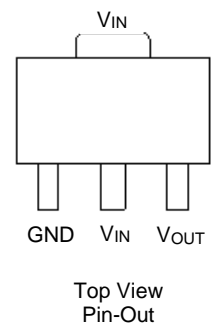
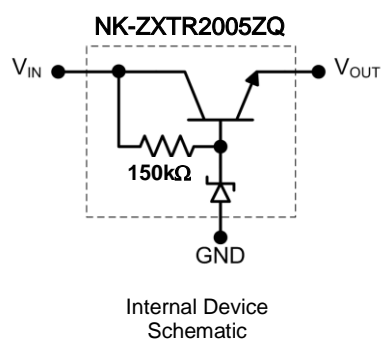
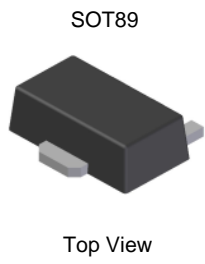
- Startup Switch in DC-DC Converters
- Networking
- Telecommunications
- Power-over-Ethernet (PoE)

Features

- Series Linear Regulator Using Emitter-Follower Stage
- Input Voltage = 10V to 100V (For Regulated Output Voltage)
- Output Voltage = 5V ± 10%
- 150kΩ Resistor to Limit Quiescent Current
- Fully Integrated Into a SOT89 Package

Mechanical Data

- Case: SOT89
- 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 [Ⓔ]
- Weight: 0.052 grams (Approximate)



Pin Name	Pin Function
V _{IN}	Input Supply
GND	Power Ground
V _{OUT}	Voltage Output

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

Characteristic	Symbol	Value	Unit
Input Voltage	V _{IN}	-0.3 to 100	V
Continuous Input & Output Current	I _{IN} , I _{OUT}	350	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} +5V or 11V	V

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

Characteristic	Symbol	Value	Unit
Continuous Output Current	I _{OUT}	38	mA
Pulsed Output Current	I _{OM}	740	mA
		150	

Thermal Characteristics

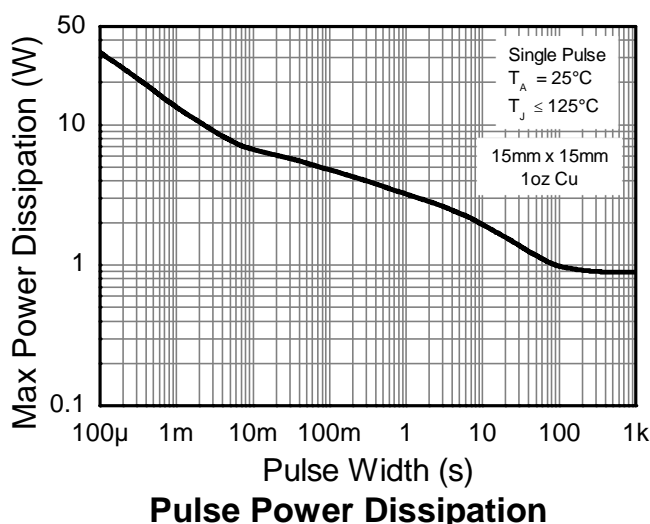
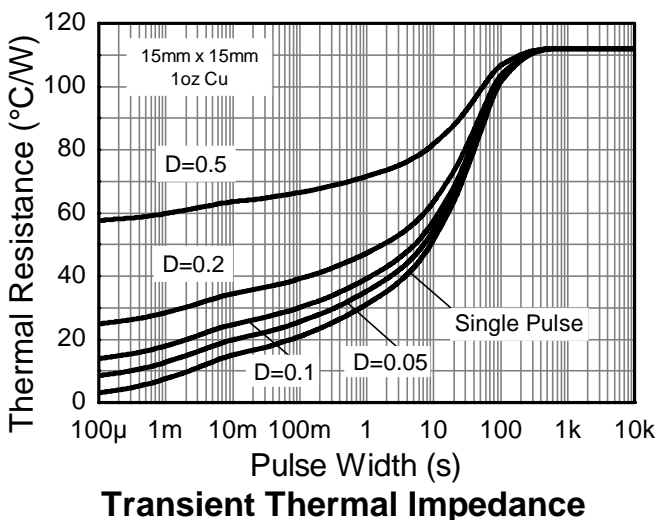
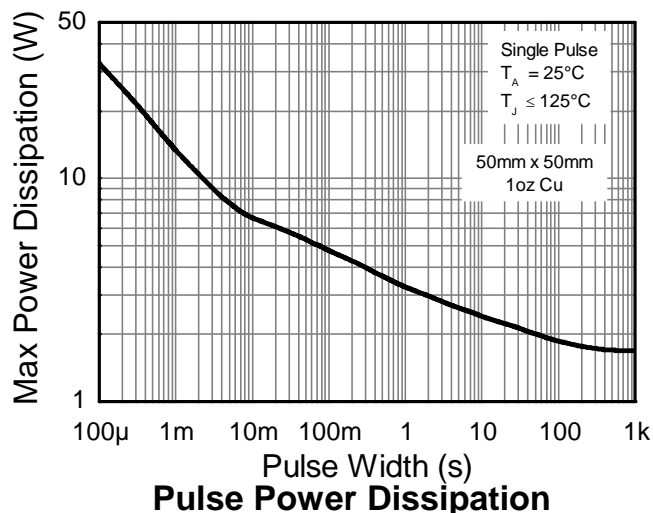
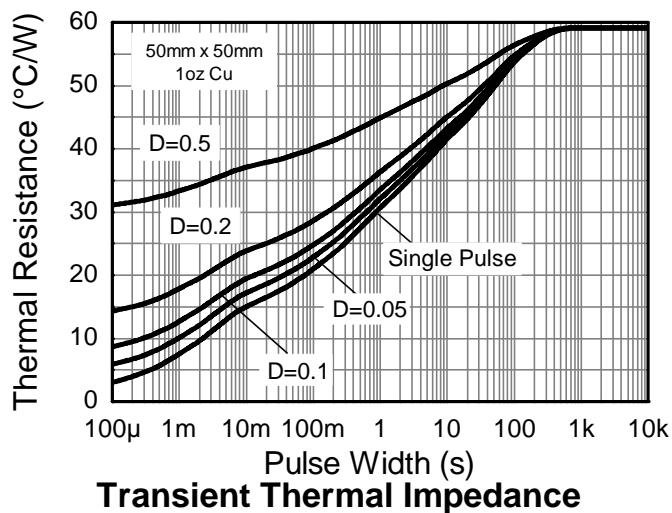
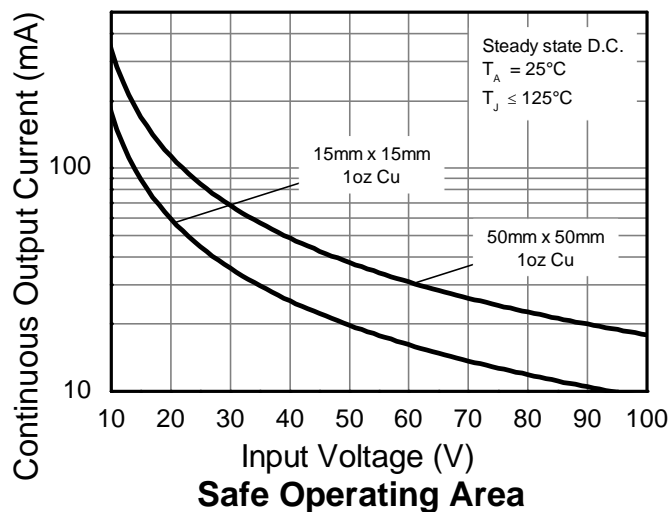
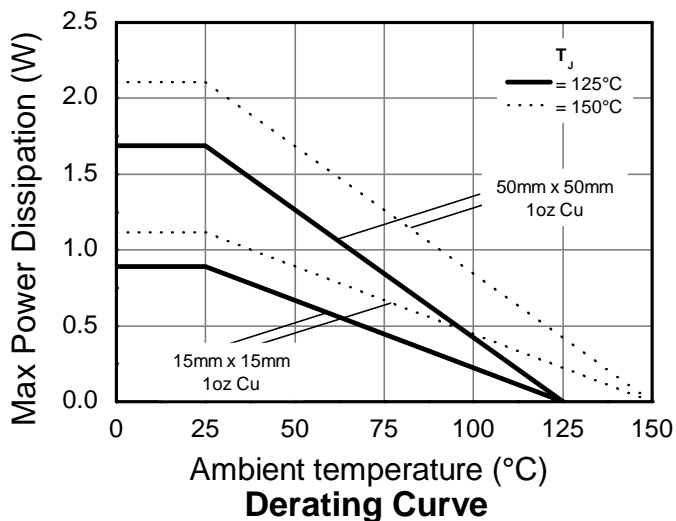
Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	1.7	W
		0.89	
Thermal Resistance, Junction to Ambient	R _{θJA}	59	°C/W
		112	
Thermal Resistance, Junction to Lead	R _{θJL}	20	
Thermal Resistance, Junction to Case	R _{θJC}	15.7	
Recommended Operating Junction Temperature Range	T _J	-40 to +125	°C
Maximum Operating Junction and Storage Temperature Range	T _J , T _{STG}	-65 to +150	°C

ESD Ratings (Note 11)

Characteristics	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge – Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge – Machine Model	ESD MM	400	V	C

- Notes:
- 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.
 - Same as note 5, except mounted on 15mm x 15mm 1oz copper.
 - Same as note 5, whilst operating at V_{IN} = 48V. Refer to Safe Operating Area for other Input Voltages.
 - Same as note 5, except measured with a single pulse width = 100μs and V_{IN} = 48V.
 - Same as note 5, except measured with a single pulse width = 10ms and V_{IN} = 48V.
 - R_{θJL} = Thermal resistance from junction to solder-point (on the exposed V_{IN} pad). R_{θJC} = Thermal resistance from junction to the top of case.
 - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

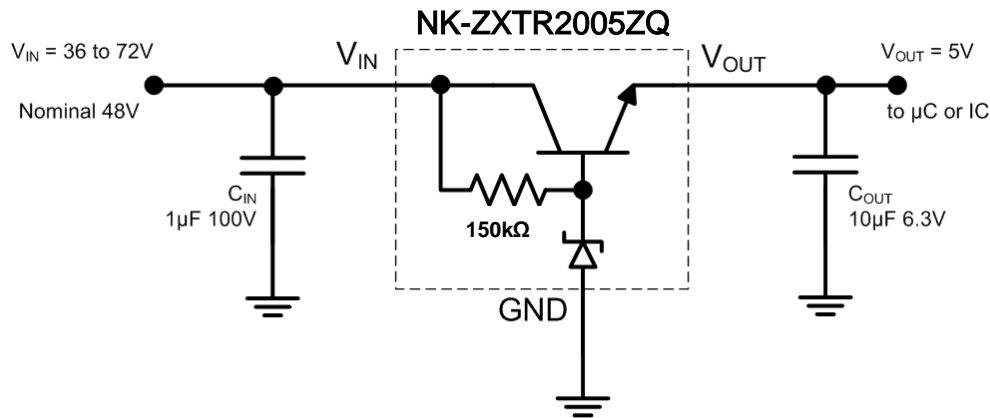


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Output Voltage (Note 12)	V _{OUT}	4.5	5.0	5.5	V	V _{IN} = 48V, I _{OUT} = 15mA
Line Regulation (Notes 12 & 13)	ΔV _{OUT}	—	195	300	mV	V _{IN} = 10V to 72V, I _{OUT} = 15mA
Temperature Coefficient	ΔV _{OUT} /ΔT	—	7.0	—	mV/°C	T _J = -40°C to +125°C V _{IN} = 48V, I _{OUT} = 15mA
Load Regulation (Notes 12 & 14)	ΔV _{OUT}	—	-185 -205	-350 -400	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)}	10	—	—	V	—
Quiescent Current	I _Q	—	260 550	500 900	μA	V _{IN} = 48V, I _{OUT} = 10μA V _{IN} = 100V, I _{OUT} = 10μA
Power Supply Rejection Ratio	ΔV _{IN} /ΔV _{OUT}	—	45	—	dB	C _{OUT} = 100nF, I _{OUT} = 15mA, V _{OUT} = 5V, V _{IN} = 10V to 100V, f = 100Hz

- Notes:
12. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.
 13. Line regulation ΔV_{OUT} = V_{OUT}(@ V_{IN} = 72V) – V_{OUT}(@ V_{IN} = 10V)
 14. Load regulation ΔV_{OUT} = V_{OUT}(@ I_{OUT} = 30mA) – V_{OUT}(@ I_{OUT} = 0.1mA)
ΔV_{OUT} = V_{OUT}(@ I_{OUT} = 100mA) – V_{OUT}(@ I_{OUT} = 0.1mA)

Typical Application Circuit

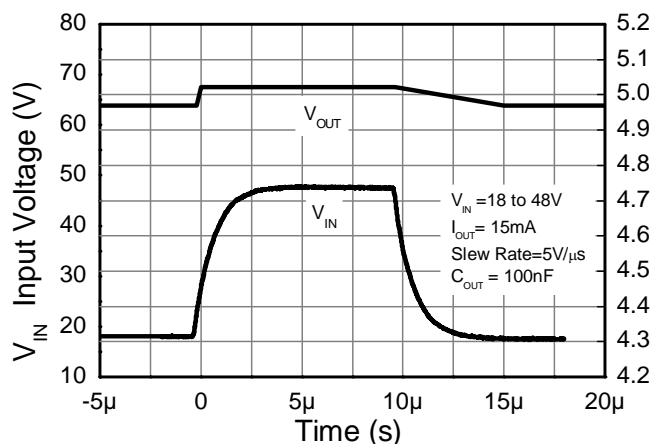


Example of a 5V regulated supply from a nominal 48V for powering a Controller IC.

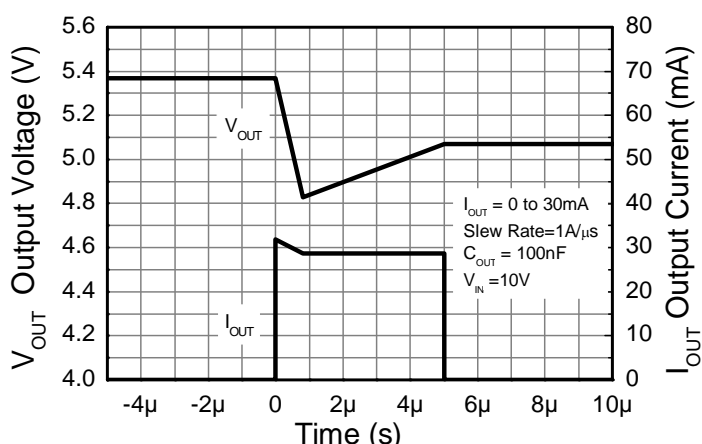
Pin Functions

Pin Name	Pin Function	Notes
V _{IN}	Input Supply	Input voltage can vary from -0.3V to 100V with respect to GND; for V _{OUT} regulated then 10V ≤ V _{IN} ≤ 100V. It is recommended to connect a 1μF capacitor to GND.
GND	Power Ground	This pin should be tied to the system ground.
V _{OUT}	Voltage Output	Outputs a regulated 5V when 10V ≤ V _{IN} ≤ 100V. When V _{IN} < 10V, then V _{OUT} maximum = V _{IN} – 1.5V. This pin can be pulled high to a maximum of +11V with respect to GND, or +5V with respect to V _{IN} , whichever is lower. It is recommended to connect a 10μF capacitor to GND and a minimum of 10μA to be drawn from V _{OUT} to maintain regulation.

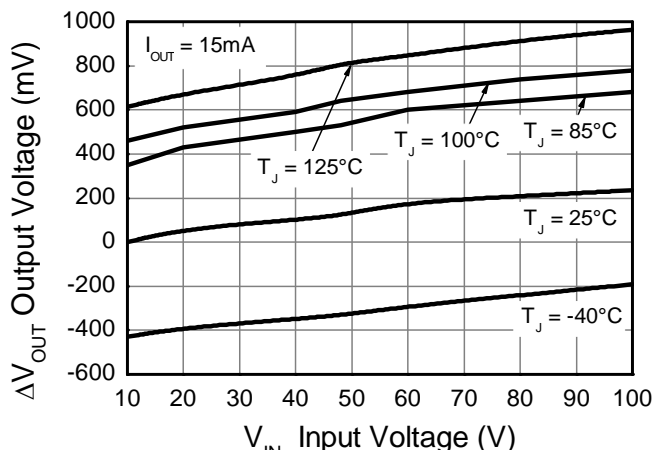
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



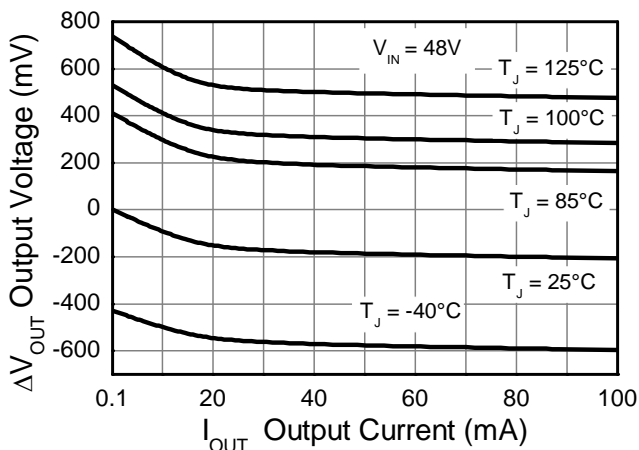
Line transient response



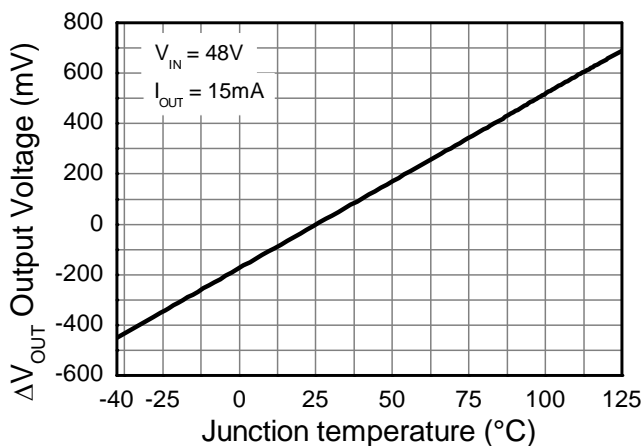
Load transient response



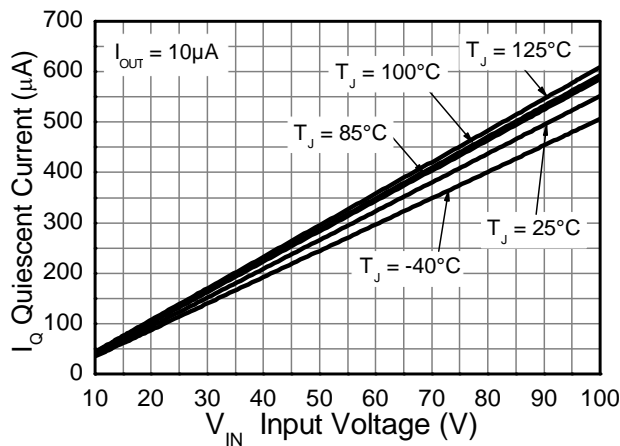
Line Regulation (Note 15)



Load Regulation (Note 16)



Temperature Coefficient (Note 17)

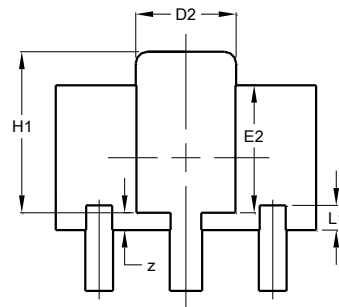
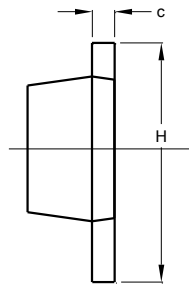
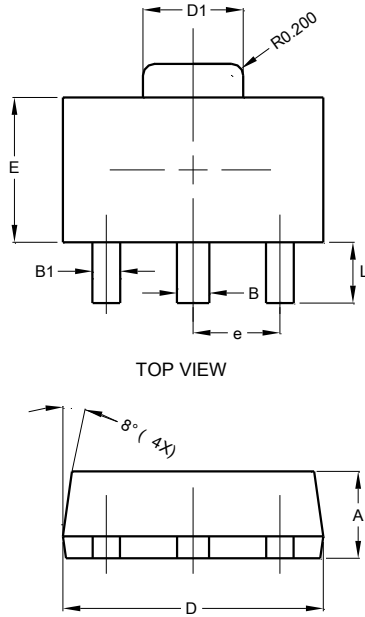


Quiescent Current

Notes: 15. Line regulation $\Delta V_{OUT} = V_{OUT} - V_{OUT}$ (@ $V_{IN} = 10\text{V}$, $I_{OUT} = 15\text{mA}$, $T_J = +25^\circ\text{C}$)
 16. Load regulation $\Delta V_{OUT} = V_{OUT} - V_{OUT}$ (@ $V_{IN} = 48\text{V}$, $I_{OUT} = 0.1\text{mA}$, $T_J = +25^\circ\text{C}$)
 17. Temperature Coefficient $\Delta V_{OUT} = V_{OUT} - V_{OUT}$ (@ $V_{IN} = 48\text{V}$, $I_{OUT} = 15\text{mA}$, $T_J = +25^\circ\text{C}$)

Package Outline Dimensions

SOT89

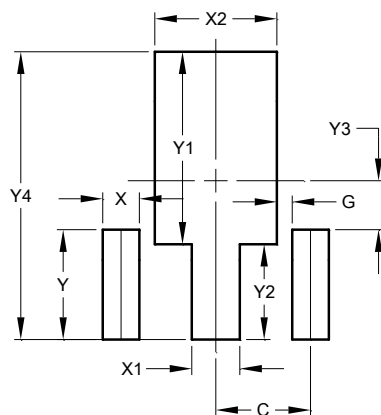


BOTTOM VIEW

SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in mm			

Suggested Pad Layout

SOT89



Dimensions	Value (in mm)
C	1.500
G	0.244
X	0.580
X1	0.760
X2	1.933
Y	1.730
Y1	3.030
Y2	1.500
Y3	0.770
Y4	4.530