

General Description

The LTP43xHS series IC is a three terminal adjustable shunt regulator with guaranteed thermal stability throughout the entire operating range. These integrated circuits have steep conduction characteristics, low temperature coefficient, and low output impedance, making them ideal alternatives to Zener diodes in applications such as switching power supplies, chargers, and other adjustable regulators. The output voltage of these ICs can be set to any value between VREF (2.5V) and the maximum cathode voltage (36V). The precision benchmark of the LTP43xHS series provides two voltage tolerances: 0.4% and 0.8%.

The LTP431 is offered in SOT23. The LTP432 is offered in SOT23 and TO92-3L. The device is rated over -40°C to $+125^{\circ}\text{C}$ extended in industrial temperature range.

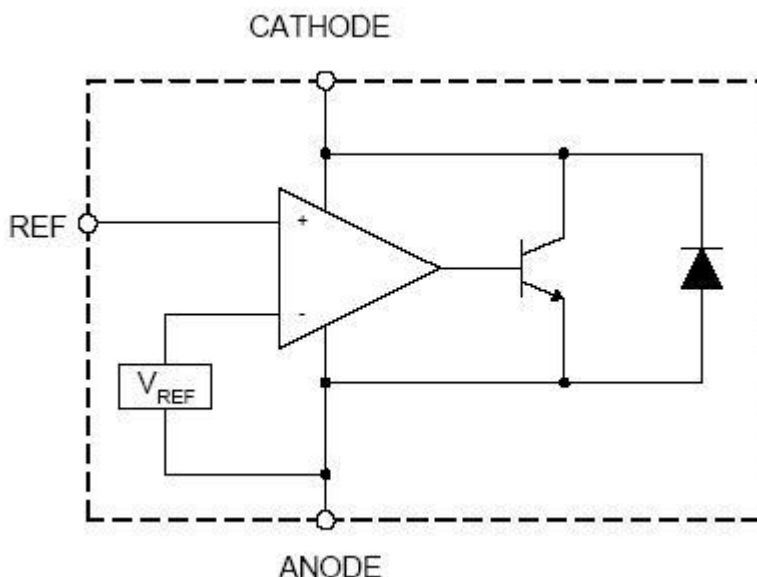
Features and Benefits

- Programmable Precise Output Voltage from 2.5V to 36V
- High Stability under Capacitive Load
- Low Temperature Deviation: 4.5mV Typical
- Low Equivalent Full-range Temperature Coefficient with 20PPM/ $^{\circ}\text{C}$ Typical
- Low Dynamic Output Resistance: 0.15Ω Typical
- Sink Current Capacity from 1mA to 100mA
- Low Output Noise
- Wide Operating Range of -40 to $+125^{\circ}\text{C}$
- Totally Lead-Free; RoHS Compliant
- Totally Lead-Free & Fully RoHS Compliant

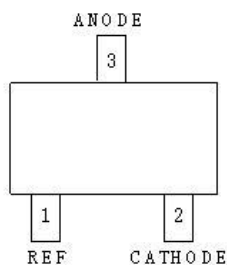
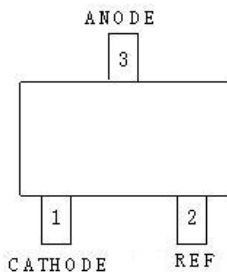
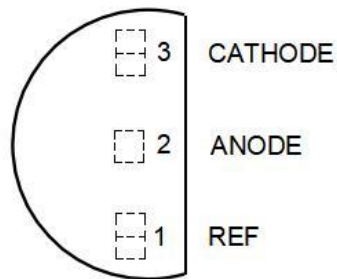
Applications

- Charger
- Voltage Adapter
- Switching Power Supply
- Graphic Card
- Precision Voltage Reference

Functional Block Diagram

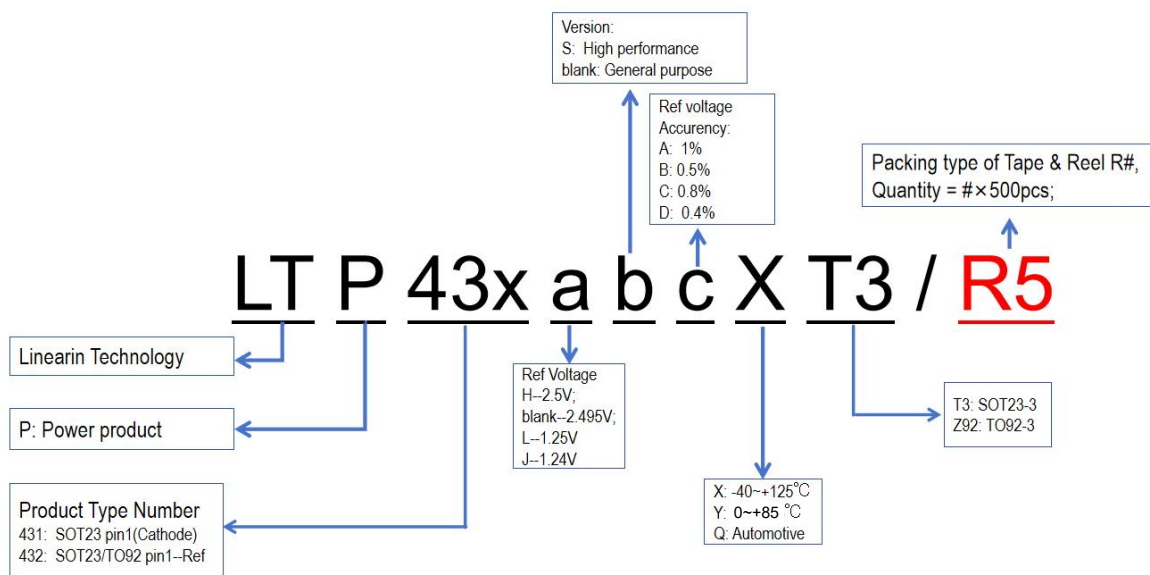


Pin Description(Top View)

SOT23
LTP432HSSOT23
LTP431HS

TO92-3L

Shunt reference naming rule



Ordering Information

Type Number	Package Name	Condition	Package Quantity	Eco Class	Marking Code
LTP431HSDXT3/R6	SOT23	0.4%	Tape and Reel, 3 000	Green (RoHS & no Sb/Br)	NpA
LTP431HSCXT3/R6	SOT23	0.8%	Tape and Reel, 3 000	Green (RoHS & no Sb/Br)	NpB
LTP432HSDXT3/R6	SOT23	0.4%	Tape and Reel, 3 000	Green (RoHS & no Sb/Br)	N1A
LTP432HSCXT3/R6	SOT23	0.8%	Tape and Reel, 3 000	Green (RoHS & no Sb/Br)	N1B
LTP432HSDZ92	TO92-3L	0.4%	Ammo, 2 000	Green (RoHS & no Sb/Br)	431AZA-G1
LTP432HSCZ92	TO92-3L	0.8%	Ammo, 2 000	Green (RoHS & no Sb/Br)	431BZA-G1

Table of Content

General Description1

Features and Benefits1

Application1

Functional Block Diagram1

Table of Content2

Pin Description (Top View)3

Shunt reference naming rule.....3

Ordering Information3

Limiting Value4

ESD Rating4

Electrical Characteristics.....5

Typical Performance Characteristics7

Tape and Reel Information10

Package Outlines11

Important Notice13

Limiting Value

In accordance with the Absolute Maximum Rating System (IEC 60134).

Parameter	Absolute Maximum Rating
Cathode Voltage, V_{KA}	40V
Cathode Current Range (Continuous), I_{KA}	-100 to 150 mA
Reference Input Current Range, I_{REF}	10mA
Power Dissipation, P_D	370 mW
Storage Temperature Range, T_{stg}	-65°C to +150°C
Junction Temperature, T_J	150°C

ESD Rating

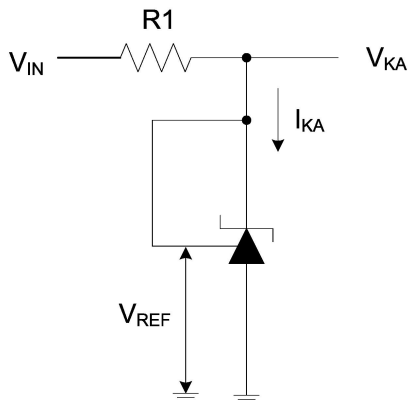
Parameter	Item	Value	Unit
Electrostatic Discharge Voltage	Human body model (HBM), per ANSI/ESDA/JEDEC JS-001	±2 000	V
	Charged device model (CDM), per ANSI/ESDA/JEDEC JS-002	±2 000	

Electrical Characteristics

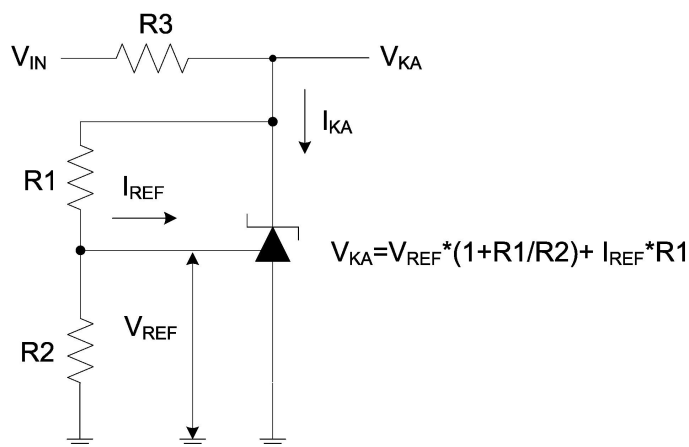
 $T_A = +25^\circ\text{C}$, unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{REF}	Reference Voltage	$\pm 0.4\%$, $V_{KA}=V_{REF}$, $I_{KA}=10\text{mA}$	2.49	2.5	2.51	V
		$\pm 0.8\%$, $V_{KA}=V_{REF}$, $I_{KA}=10\text{mA}$	2.48	2.5	2.52	
ΔV_{REF}	Deviation of Reference Voltage Over Full Temperature Range	$V_{KA}=V_{REF}$, $I_{KA}=10\text{mA}$, $T_A=0$ to $+70^\circ\text{C}$		4.5	8	mV
		$V_{KA}=V_{REF}$, $I_{KA}=10\text{mA}$, $T_A=-40$ to $+85^\circ\text{C}$		4.5	10	
		$V_{KA}=V_{REF}$, $I_{KA}=10\text{mA}$, $T_A=-40$ to $+125^\circ\text{C}$		4.5	16	
$\Delta V_{REF}/\Delta V_{KA}$	Ratio of Change in Reference Voltage to the Change in Cathode Voltage	$I_{KA}=10\text{mA}$, $\Delta V_{KA}=10\text{V}$ to V_{REF}		-1.0	-2.7	mV/V
		$I_{KA}=10\text{mA}$, $\Delta V_{KA}=36\text{V}$ to 10V		-0.5	-2.0	
I_{REF}	Reference Current	$I_{KA}=10\text{mA}$, $R1=10\text{k}\Omega$, $R2=\infty$		0.7	4	μA
ΔI_{REF}	Deviation of Reference Current Over Full Temperature Range	$I_{KA}=10\text{mA}$, $R1=10\text{k}\Omega$, $R2=\infty$, $T_A=-40$ to $+125^\circ\text{C}$		0.4	1.2	μA
$I_{KA}(\text{Min})$	Minimum Cathode Current for Regulation	$V_{KA}=V_{REF}$		0.4	1.0	mA
$I_{KA}(\text{Off})$	Off-state Cathode Current	$V_{KA}=36\text{V}$, $V_{REF}=0$		0.05	1.0	μA
Z_{KA}	Dynamic Impedance	$V_{KA}=V_{REF}$, $I_{KA}=1$ to 100mA , $f \leq 1.0\text{kHz}$		0.15	0.5	Ω
θ_{JC}	Thermal Resistance	SOT23		135		$^\circ\text{C}/\text{W}$

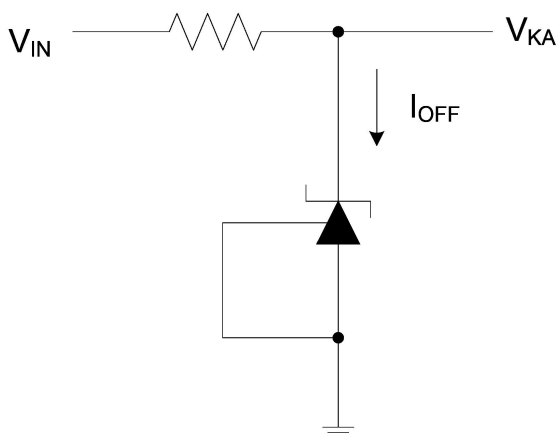
Electrical Characteristics (continued)



Test Circuit 1 for $V_{KA}=V_{REF}$



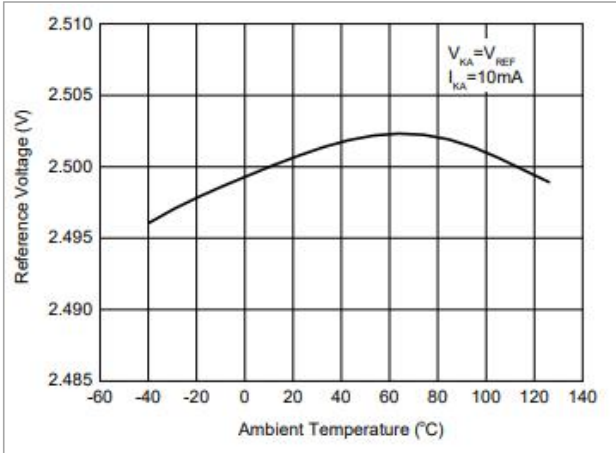
Test Circuit 2 for $V_{KA}>V_{REF}$



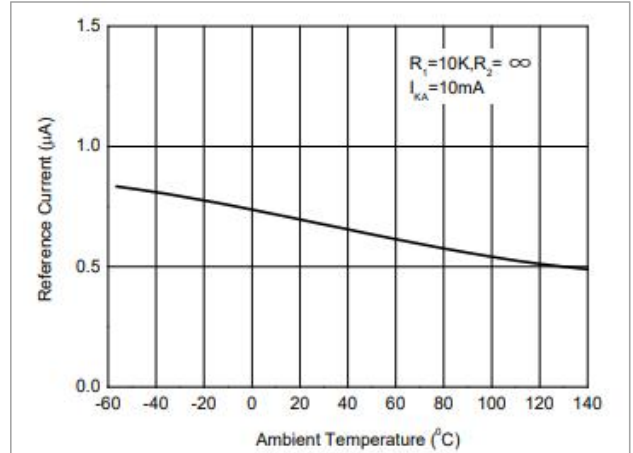
Test Circuit 3 for I_{OFF}

Typical Performance Characteristics

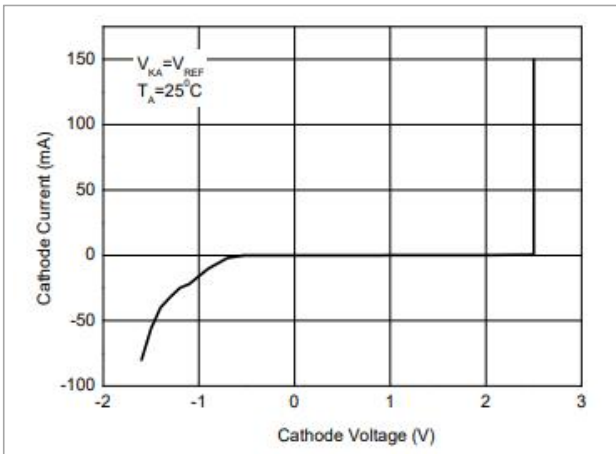
At $T_A = +25^\circ\text{C}$, unless otherwise noted.



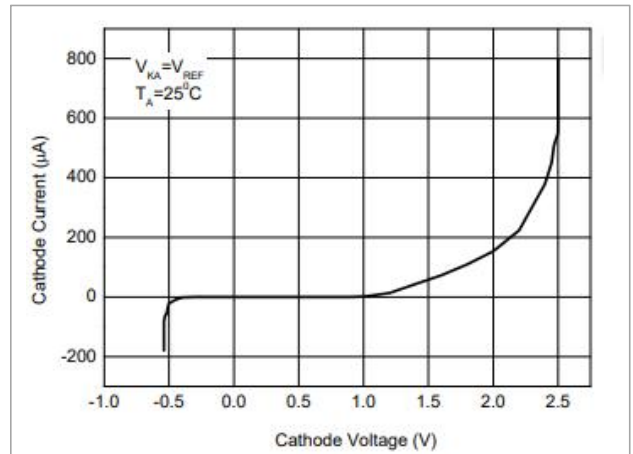
Reference Voltage vs. Ambient Temperature



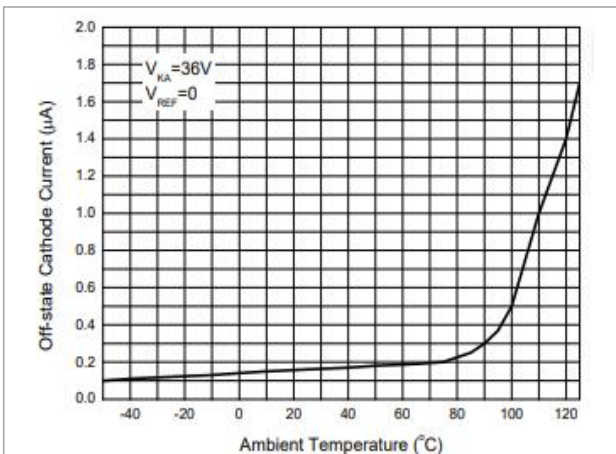
Reference Current vs. Ambient Temperature



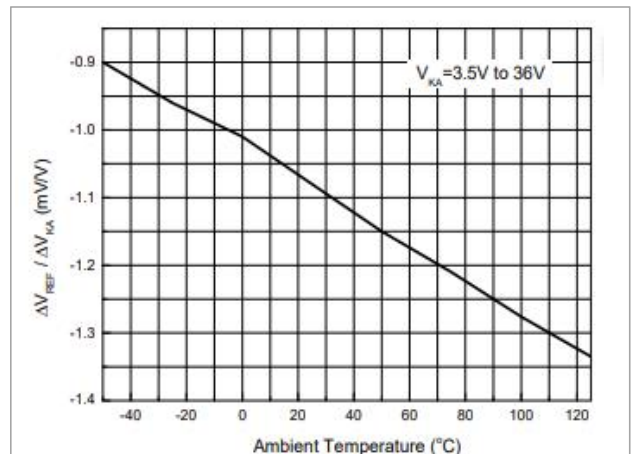
Cathode Current vs. Cathode Voltage



Cathode Current vs. Cathode Voltage



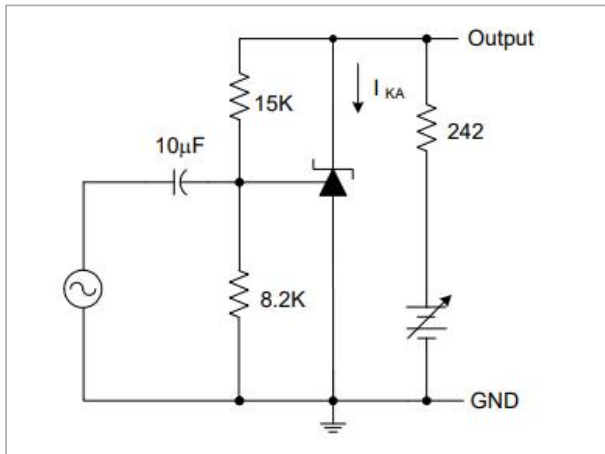
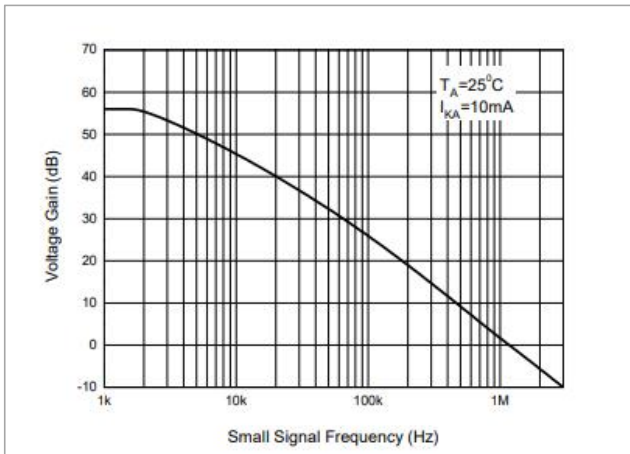
Off-state Cathode Current vs. Ambient Temperature



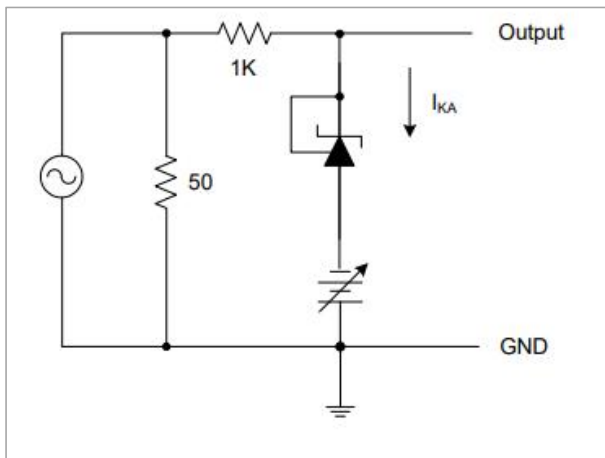
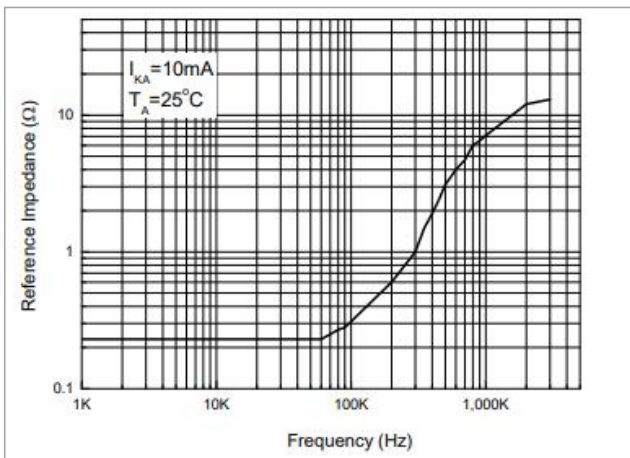
Ratio of Delta Reference Voltage to the Ratio of Delta Cathode Voltage

Typical Performance Characteristics (continued)

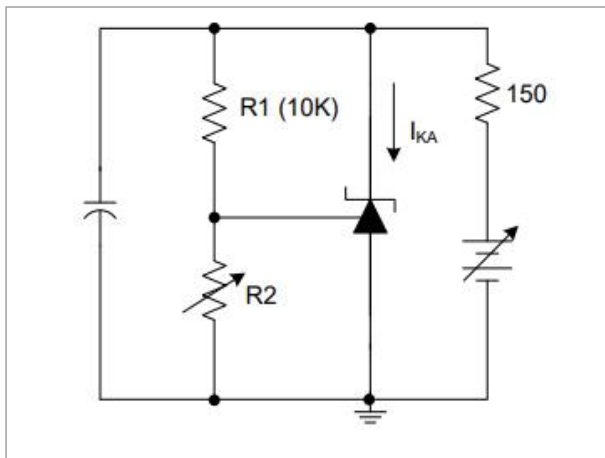
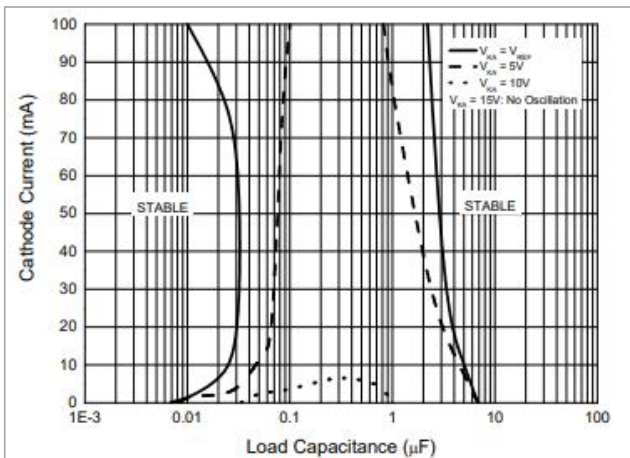
At $T_A = +25^\circ\text{C}$, unless otherwise noted.



Small Signal Voltage Gain vs. Frequency



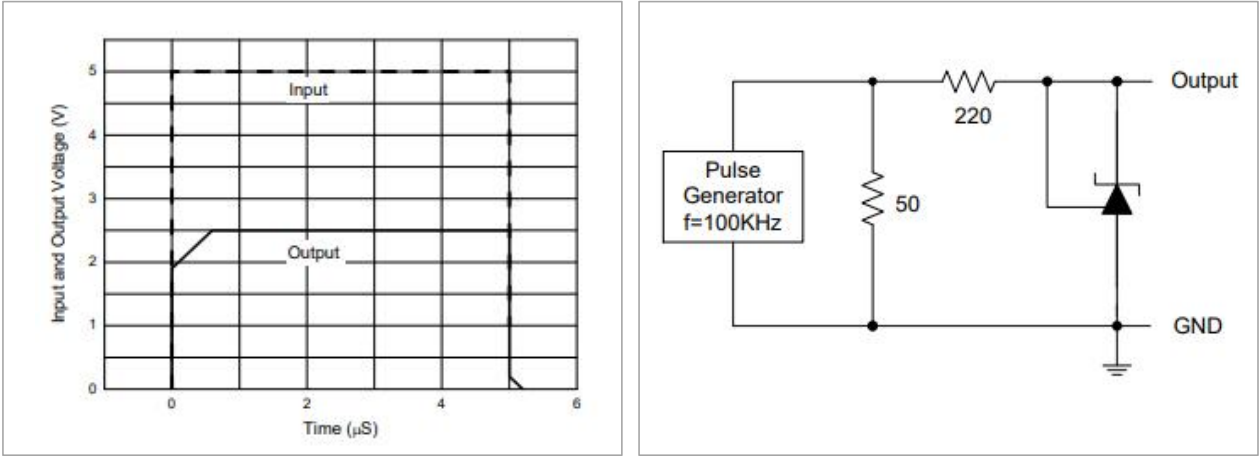
Reference Impedance vs. Frequency



Stability Boundary Conditions vs. Load Capacitance

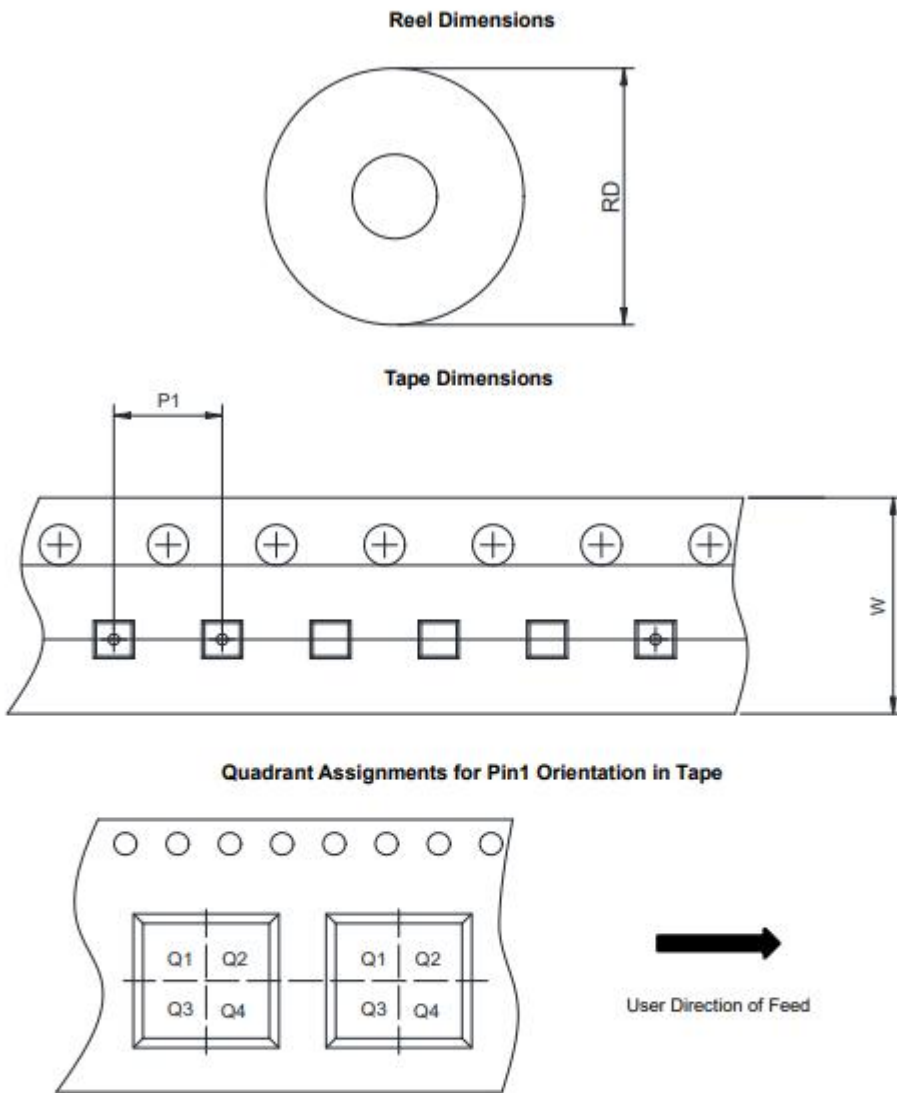
Typical Performance Characteristics (continued)

At $T_A = +25^{\circ}\text{C}$, unless otherwise noted.



Pulse Response of Input and Output Voltage

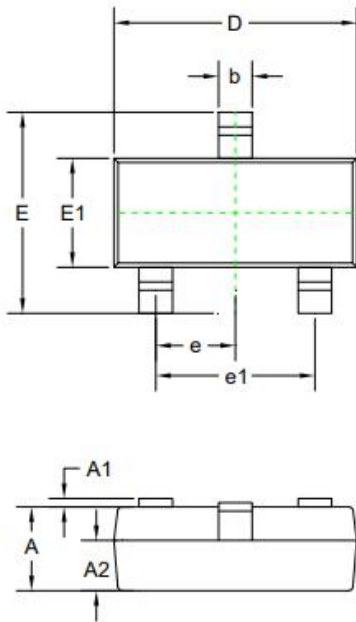
Tape and Reel Information



Project		SOT23
RD	Reel Dimension	7inch
W	Overall Width of the Carrier Tape	8mm
P1	Pitch between Successive Cavity Centers	4mm
Pin1	Pin1 Quadrant	Q3

Package Outlines

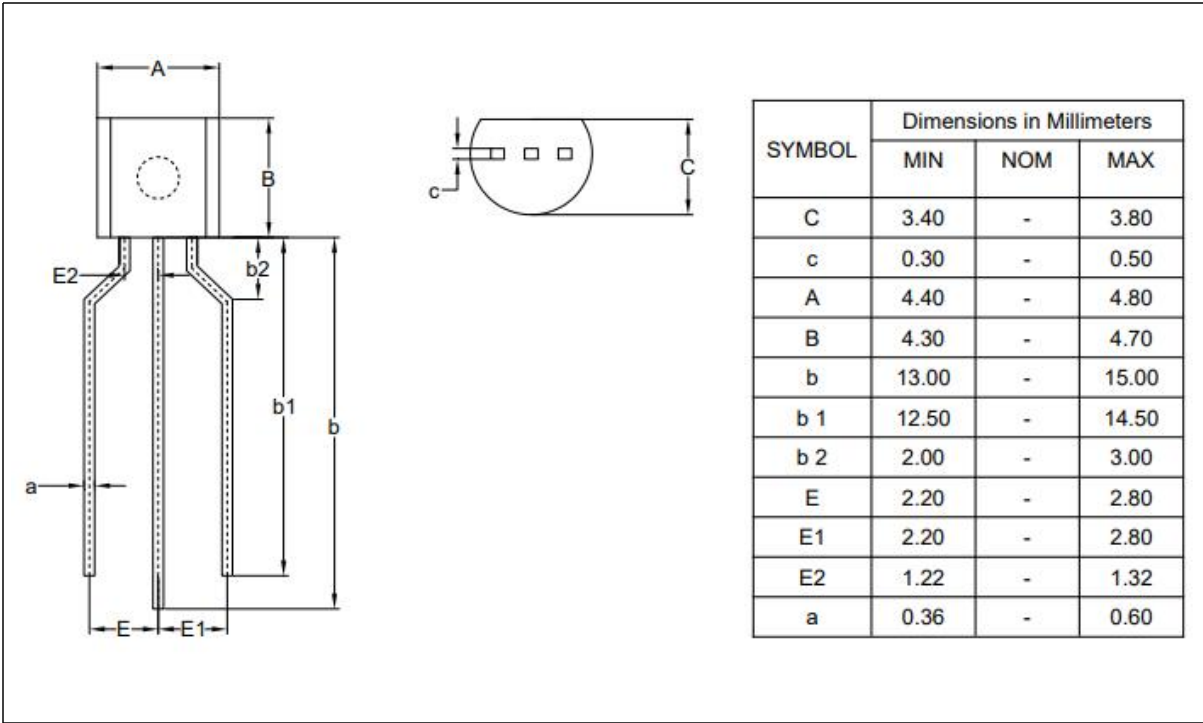
DIMENSIONS, SOT23



SYMBOL	Dimensions in Millimeters		
	MIN	NOM	MAX
A	0.90	-	1.10
A1	0.00	-	0.10
A2	0.60REF		
b	0.30	-	0.55
c	0.08	-	0.15
D	2.80	-	3.00
E	2.25	-	2.55
E1	1.20	-	1.40
e	0.95BSC		
e1	1.90BSC		
L	0.55REF		
L1	0.20	-	0.50
θ	0°	-	8°

Package Outlines (continued)

DIMENSIONS, T092-3L



Important Notice

Linearin is a global fabless semiconductor company specializing in advanced high-performance high-quality analog/mixed-signal IC products and sensor solutions. The company is devoted to the innovation of high performance, analog-intensive sensor front-end products and modular sensor solutions, applied in multi-market of medical & wearable devices, smart home, sensing of IoT, and intelligent industrial & smart factory (industrie 4.0). Linearin's product families include widely-used standard catalog products, solution-based application specific standard products (ASSPs) and sensor modules that help customers achieve faster time-to-market products. Go to <http://www.linearin.com> for a complete list of Linearin product families.

For additional product information, or full datasheet, please contact with the Linearin's Sales Department or Representatives.