



# NXP voltage references TL431 and TLVH431 families

## Adjustable precision voltage references for power management and more

As part of NXP's proven portfolio of precision shunt regulators, these adjustable voltage references are an ideal choice for power management and other applications. They use a reference voltage of 1.24 V (TLVH431) or 2.495 V (TL431), are housed in SOT23 and SOT753 packages, and are available in several versions, so it's easy to find the right part for your design.

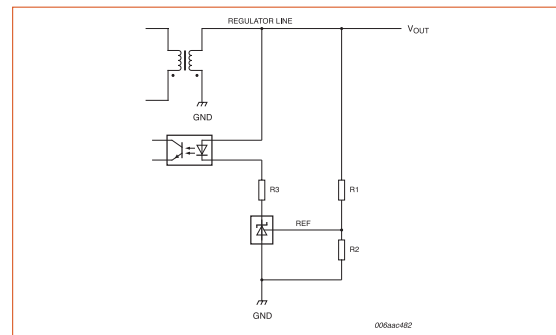
### Key features

- ▶ Simple solution to achieve a stabilized voltage
- ▶ Enables regulated voltage down to 1.24 V (TLVH431)
- ▶  $V_{max}$  up to 36 V (TL431)
- ▶ Available with voltage accuracy down to 0.5%
- ▶ Low  $I_{kmin}$  value of 55  $\mu A$  (typ) for improved energy efficiency (TLVH431)
- ▶ Full temperature range from -40 to 125 °C
- ▶ Very low temperature drift: 4 mV for TLVH431
- ▶ High quality level according to AEC-Q100 (grade1)

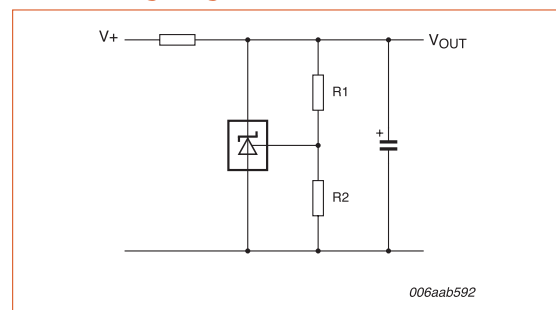
### Key applications

- ▶ Power adaptor
- ▶ LCD TV
- ▶ Printer
- ▶ Computing
- ▶ Shunt regulator
- ▶ Precision voltage reference
- ▶ Isolated feedback loop for SMPS

### Isolated feedback loop for SMPS



### Shunt voltage regulator



## Adjustable shunt voltage regulator TL431 with $V_{ref} = 2.495\text{ V}$

Package				SOT23		
Size (mm)				2.9 x 1.3 x 1.0		
P <sub>tot</sub> (mW)				580		
Pinning configuration				Normal pinning*	Mirrored pinning*	
V <sub>KA</sub> (V)	I <sub>K</sub> (mA)	V <sub>ref</sub>	T <sub>amb</sub> (°C)			
36	100	2.495	2%	0 to 70	TL431CDBZR <sup>(1)</sup>	
				-40 to 85	TL431IDBZR <sup>(1)</sup>	
				-40 to 125	TL431QDBZR <sup>(1)</sup>	
					TL431FDT <sup>(2)</sup>	TL431MFDT <sup>(2)</sup>
				TL431SDT <sup>(3)</sup>	TL431MSDT <sup>(3)</sup>	
				1%	0 to 70	TL431ACDBZR <sup>(1)</sup>
			-40 to 85		TL431AIDBZR <sup>(1)</sup>	
			-40 to 125		TL431AQDBZR <sup>(1)</sup>	
					TL431AFDT <sup>(2)</sup>	TL431AMFDT <sup>(2)</sup>
			TL431ASDT <sup>(3)</sup>		TL431AMSDT <sup>(3)</sup>	
			0.5%		0 to 70	TL431BCDBZR <sup>(1)</sup>
				-40 to 85	TL431BIDBZR <sup>(1)</sup>	
-40 to 125	TL431BQDBZR <sup>(1)</sup>					
	TL431BFDT <sup>(2)</sup>	TL431BMFDT <sup>(2)</sup>				
TL431BSDT <sup>(3)</sup>	TL431BMSDT <sup>(3)</sup>					

<sup>(1)</sup> Offers enhanced stability area and very low load capacity requirement

<sup>(2)</sup> Offers higher ElectroMagnetic Interference (EMI) ruggedness, e.g. for Switch Mode Power Supply

<sup>(3)</sup> Is designed for standard requirements and linear applications

### \* Normal pinning vs. mirrored pinning for TL431

	Pin	Symbol	Description	Simplified outline	Grafic symbol
Normal pinning	1	k	cathode		REF a — >— k
	2	REF	reference		
	3	a	anode		
Mirrored pinning	1	REF	reference		REF a — >— k
	2	k	cathode		
	3	a	anode		

## Adjustable shunt voltage regulator TLVH431 with $V_{ref} = 1.24\text{ V}$

types in **bold** represent new products

Package				SOT23		SOT753	
Size (mm)				2.9 x 1.3 x 1.0		2.9 x 1.5 x 1.0	
P <sub>tot</sub> (mW)				480		450	
Pinning configuration				Normal pinning*	Mirrored pinning*		
V <sub>KA</sub> (V)	I <sub>K</sub> (mA)	V <sub>ref</sub>	T <sub>amb</sub> (°C)				
20	80	1.24	1.5%	0 to 70	<b>TLVH431CDBZR</b>		
				-40 to 85	<b>TLVH431IDBZR</b>		
				-40 to 125	<b>TLVH431QDBZR</b>	TLVH431MQDBZR	TLVH431QDBVR
					<b>TLVH431ACDBZR</b>		
				1%	0 to 70	<b>TLVH431AIDBZR</b>	
					-40 to 85	<b>TLVH431AQDBZR</b>	TLVH431AMQDBZR
			-40 to 125		<b>TLVH431DQDBZR</b>	TLVH431DMQDBZR	TLVH431DQDBVR
			0.75%		0 to 70	<b>TLVH431QDBZR</b>	
					-40 to 125	<b>TLVH431DQDBZR</b>	

### \* Normal pinning vs. mirrored pinning for TLVH431

	Pin	Symbol	Description	Simplified outline	Grafic symbol
SOT23 Normal pinning	1	REF	reference		REF a — >— k
	2	k	cathode		
	3	a	anode		
SOT23 Mirrored pinning	1	k	cathode		REF a — >— k
	2	REF	reference		
	3	a	anode		
SOT753 Pinning	1	NC	no internal connection		REF a — >— k
	2	NC	no internal connection		
	3	k	cathode		
	4	REF	reference		
	5	a	anode		

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