

General Description

The LTP431L/LTP432L device is a three-terminal adjustable shunt regulator, with specified thermal stability over applicable industry and automotive temperature range. The output voltage can be set to any value between V_{ref} (Typical 1.25 V) and 18 V, with two external resistors. These devices have a typical output impedance of 0.05 Ω . These high performances make it very suitable for multiple applications, such as onboard regulation, adjustable power supplies, and switching power supplies. The LTP431L/LTP432L devices are offered in two grades, with initial tolerances (at 25 °C) of 0.5% and 1%, for the B and A grade, respectively. In addition, low output drift versus temperature ensures good stability over the entire temperature range.

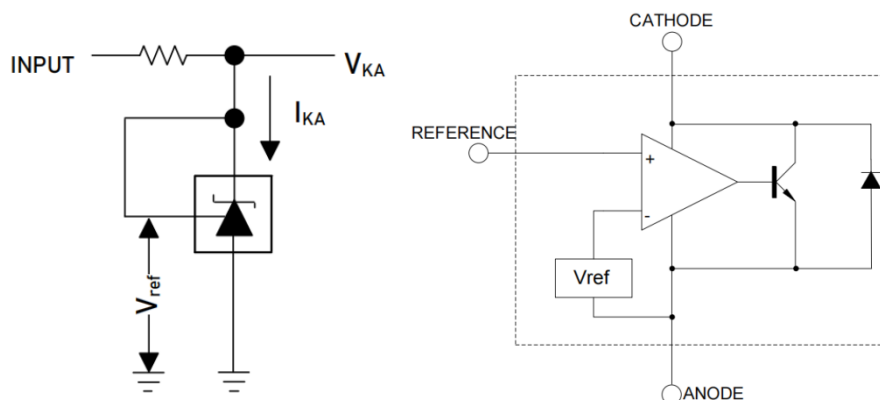
LTP431L/LTP432L is specified for the wide operating temperature range of 0 to +85 °C. and is offered in SOT23 package.

Features and Benefits

- Adjustable output voltage: V_{ref} to 18 V
- Reference Voltage tolerance at 25°C:
 - 0.5% (B Grade)
 - 1% (A Grade)
- 0.05 Ω Typical output impedance
- Sink-current capability: $I_{KA} = 0.1\sim 100$ mA
- Low output Noise

Applications

- Adjustable voltage and current referencing
- Secondary side regulation in flyback SMPSs
- Zener replacement
- Voltage replacement
- Comparator with integrated reference



Block Diagram

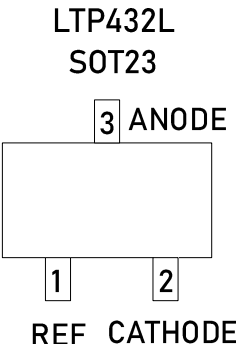
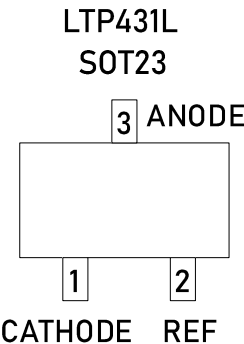
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Ordering Information

Part Number	Package Type	Initial Accuracy	Package Quantity	ECO Class	Mark Code
LTP431LAYT3/R6	SOT23	1%	Tape and Reel, 3 000	Green (RoHS & no Sb/Br)	LR1xx
LTP431LBYT3/R6	SOT23	0.5%	Tape and Reel, 3 000	Green (RoHS & no Sb/Br)	LR1xx
LTP432LAYT3/R6	SOT23	1%	Tape and Reel, 3 000	Green (RoHS & no Sb/Br)	LR2xx
LTP432LBYT3/R6	SOT23	0.5%	Tape and Reel, 3 000	Green (RoHS & no Sb/Br)	LR2xx

Pin Configuration (Top View)



PIN Name	Description
CATHODE	Shunt Current / Voltage Input
ANODE	Common Pin, normally connected to Ground
REF	Threshold relative to common Anode

Limiting Value

Parameter	Symbol	Absolute Maximum Rating
Cathode Voltage	V_{KA}	20 V
Continuous Cathode Current Range	I_{KA}	-100 to +100 mA
Reference Input Current Range	$I_{I(REF)}$	10 mA
Storage Temperature Range	T_{stg}	-65 °C to +150 °C

Recommended Ratings

Parameter	Symbol	Min.	Max.	Unit
Cathode Voltage	V_{KA}	V_{REF}	18	V
Continuous Cathode Current Range	I_{KA}	0.1	100	mA
Operation Temperature	T_{OPR}	0	85	°C

Electrical Characteristics---LTP431L, LTP432L

Unless otherwise noted, $T_J = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Reference Voltage	V_{REF}	$V_{KA} = V_{REF}, I_{KA} = 10\text{ mA}$	0.5%	1.244	1.250	V
			1%	1.238	1.250	
Deviation of Reference Input Voltage	$V_{I(dev)}$	$V_{KA} = V_{REF}, I_{KA} = 10\text{ mA}$	0 to 85°C	3	15	mV
Ratio of change in Reference Voltage to the change in Cathode Voltage	$\Delta V_{REF} / \Delta V_{KA}$	$I_{KA} = 10\text{ mA}, \Delta V_{KA}: V_{REF}\text{ to }16\text{ V}$		-0.5	-1.5	mV/V
Reference Input Current	I_{REF}	$I_{KA} = 10\text{ mA}, R_1 = 10\text{ k}\Omega, R_2 = \infty$		0.15	0.4	μA
Deviation of Reference Input Current	$I_{I(dev)}$	$I_{KA} = 10\text{ mA}, R_1 = 10\text{ k}\Omega, R_2 = \infty, T_A = -20\sim 85^\circ\text{C}$		0.1	0.4	μA
Minimum Cathode Current for Regulation	I_{Zmin}	$V_{KA} = V_{REF}$		55	80	μA
Off-state Cathode Current	I_{OFF}	$V_{KA} = 18\text{ V}, V_{REF} = 0$		0.04	0.5	μA
		$V_{KA} = 6\text{ V}, V_{REF} = 0$		0.01	0.05	
Dynamic Impedance ⁽¹⁾	$ Z_{KA} $	$V_{KA} = V_{REF}, I_{KA} = 1\text{ to }100\text{ mA}; f \leq 1\text{ kHz}$		0.05	0.15	Ω

Note:(1) The Dynamic Impedance is defined by $|Z_{KA}| = \Delta V_{KA} / \Delta I_{KA}$

Typical Characteristics

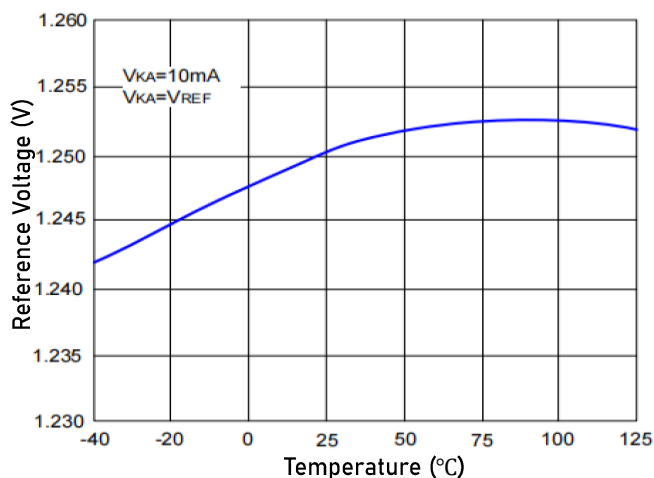
At $T_J = 25^\circ\text{C}$, unless otherwise noted.

Figure 1. Reference Voltage vs Temperature

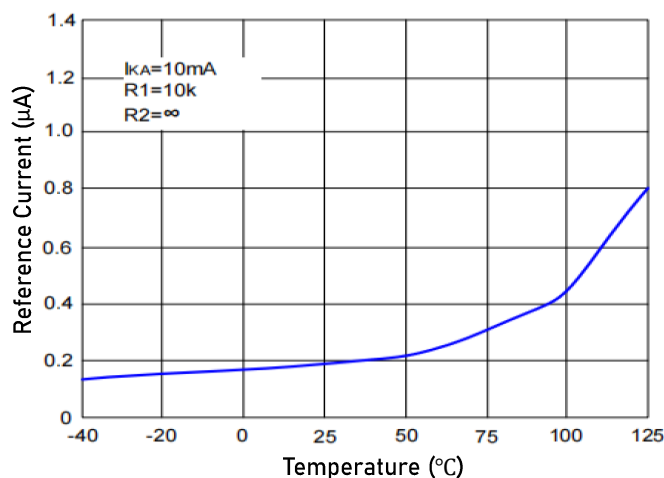


Figure 2. Reference Current vs Temperature

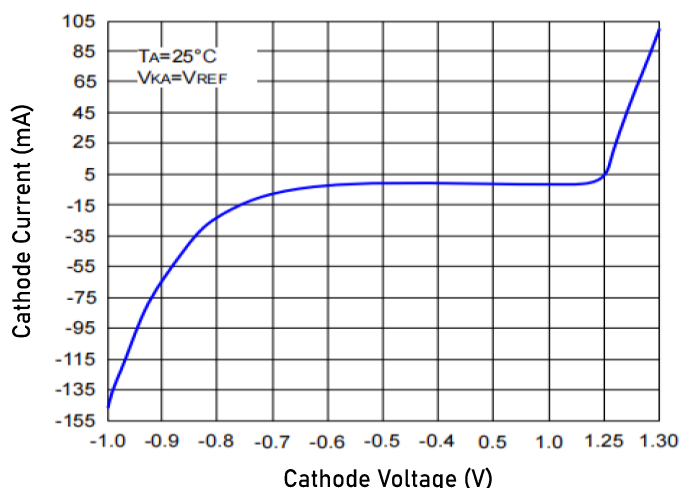


Figure 3. Cathode Current vs Cathode Voltage

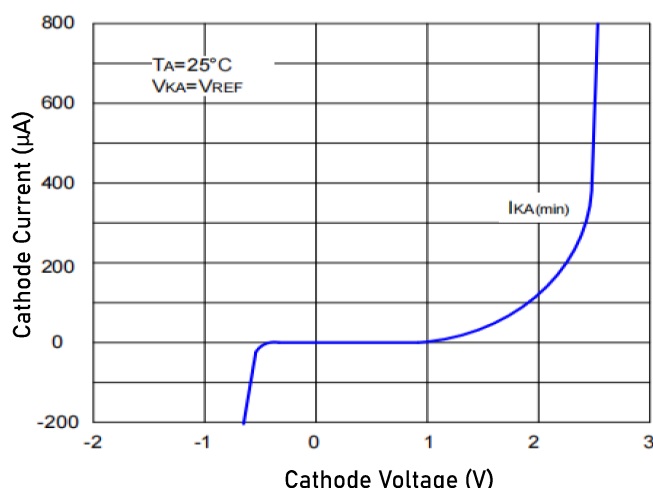


Figure 4. Cathode Current vs Cathode

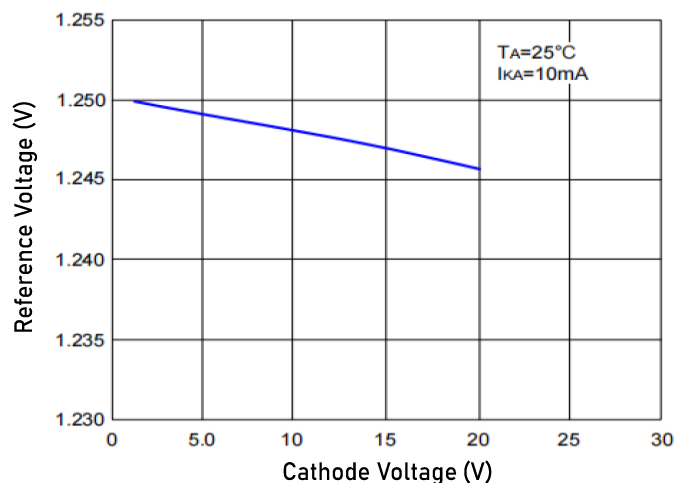


Figure 5. Reference Voltage vs Cathode Voltage

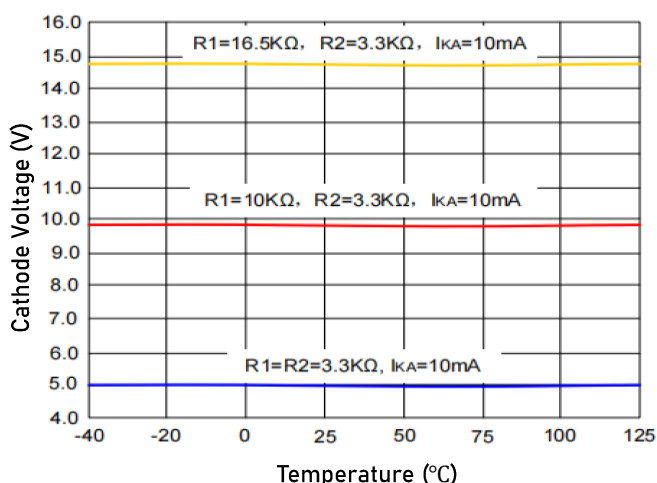


Figure 6. Cathode Voltage vs Temperature

Typical Characteristics (Cont.)

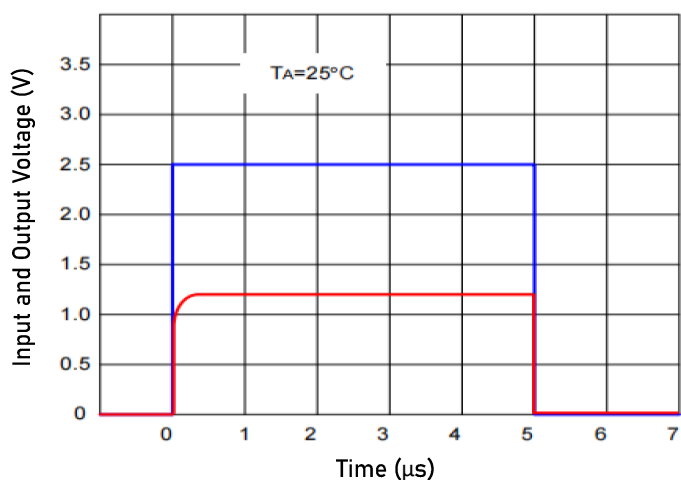
At $T_J = 25^\circ\text{C}$, unless otherwise noted.

Figure 7. Pulse Response

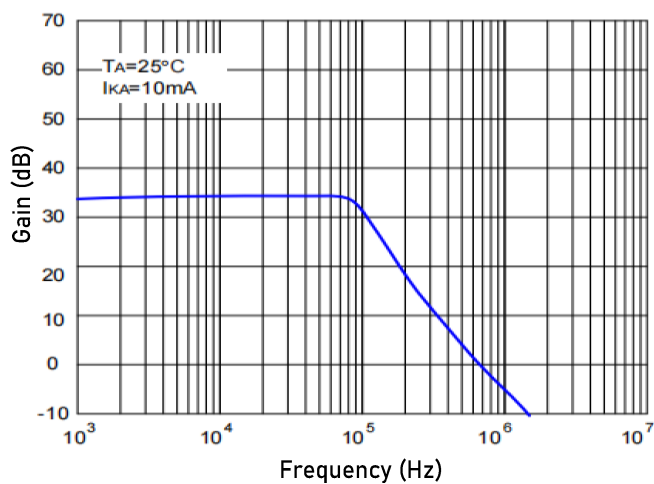


Figure 8. Gain vs Frequency

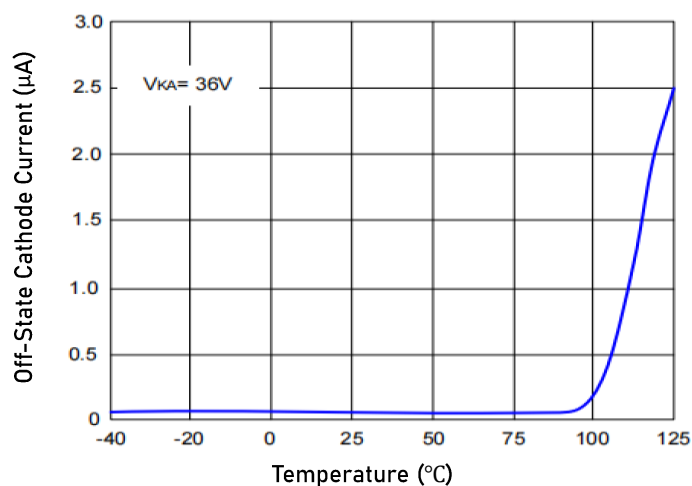


Figure 9. Off-State Cathode Current vs Temperature

Application Notes

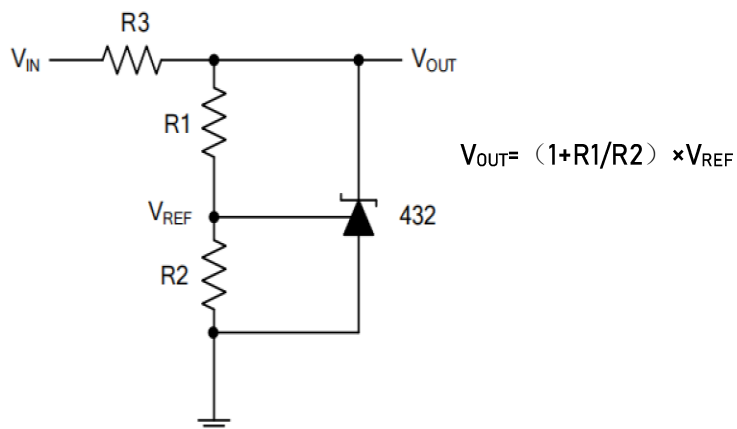


Figure 10 Shunt Regulator

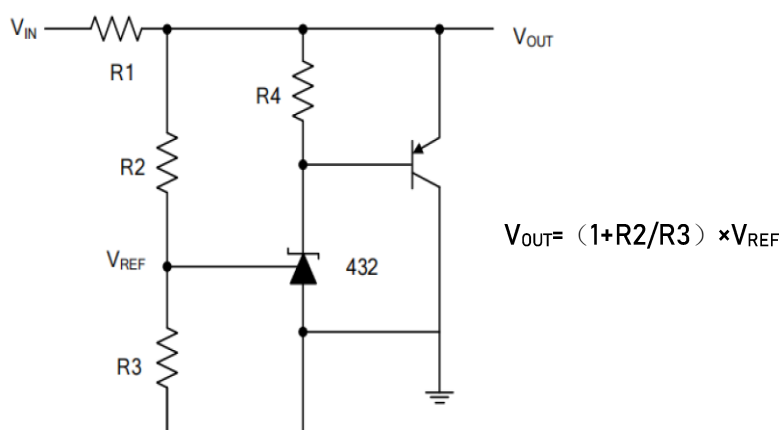


Figure 11 High Current Shunt Regulator

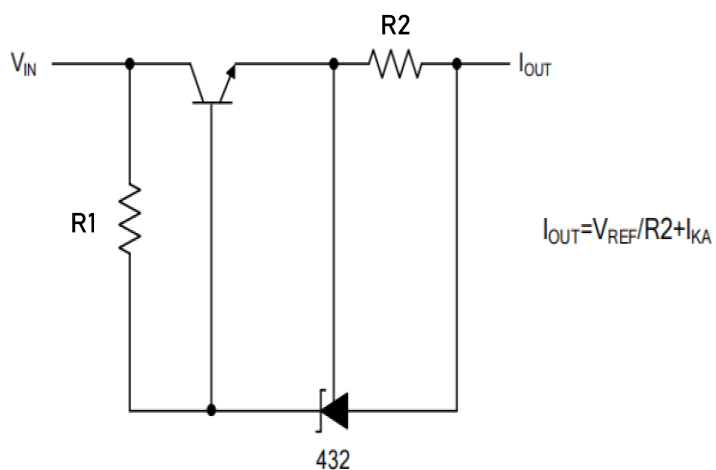


Figure 12 Current Source or Current Limit

Application Notes (Cont.)

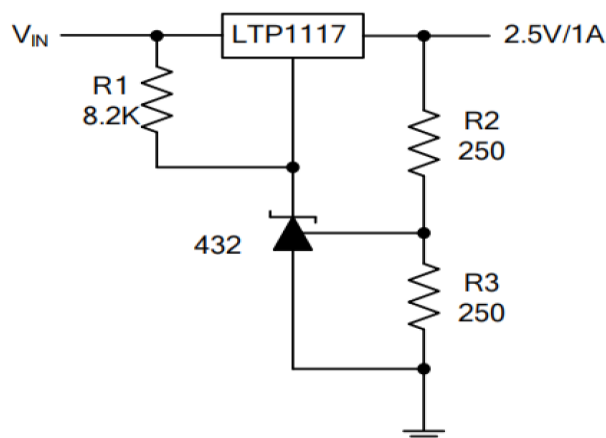


Figure 13 Precision 2.5V/1A Regulator

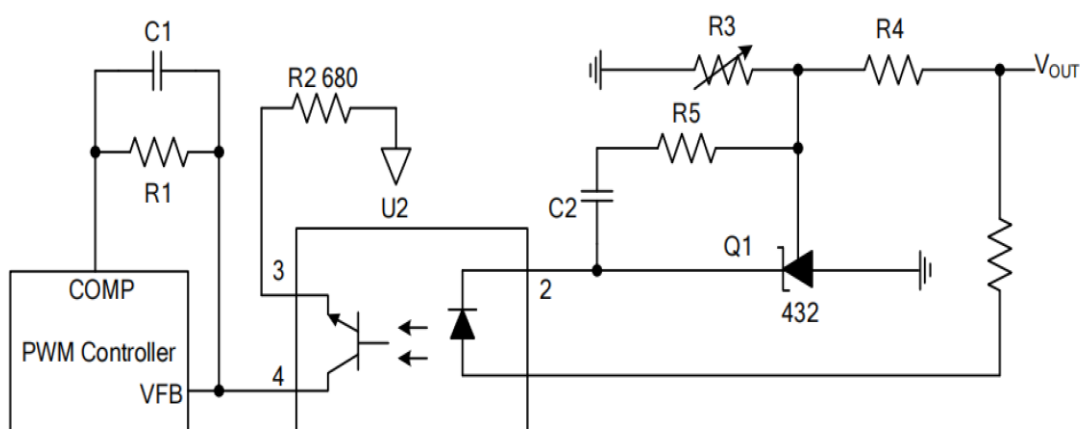
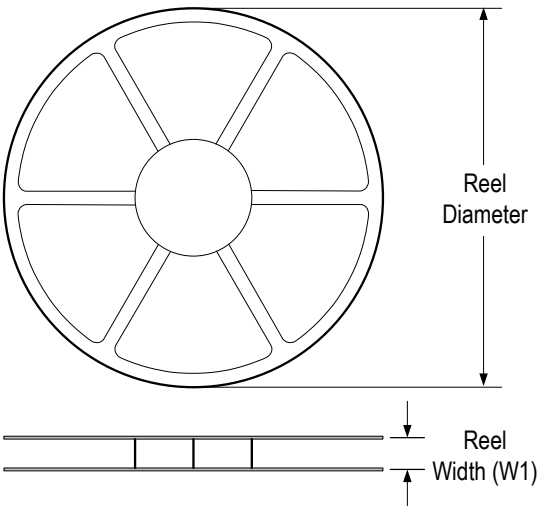


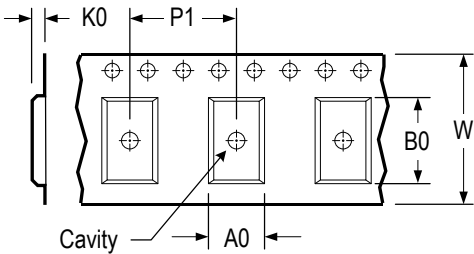
Figure 14 PWM Converter with Reference Voltage

Tape and Reel Information

REEL DIMENSIONS

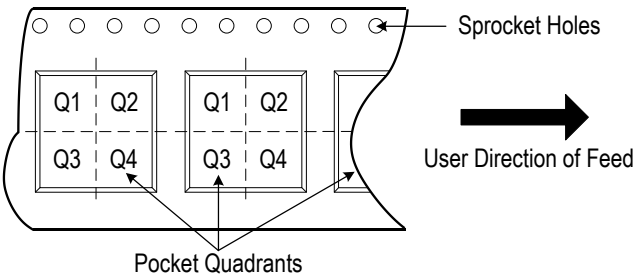


TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE

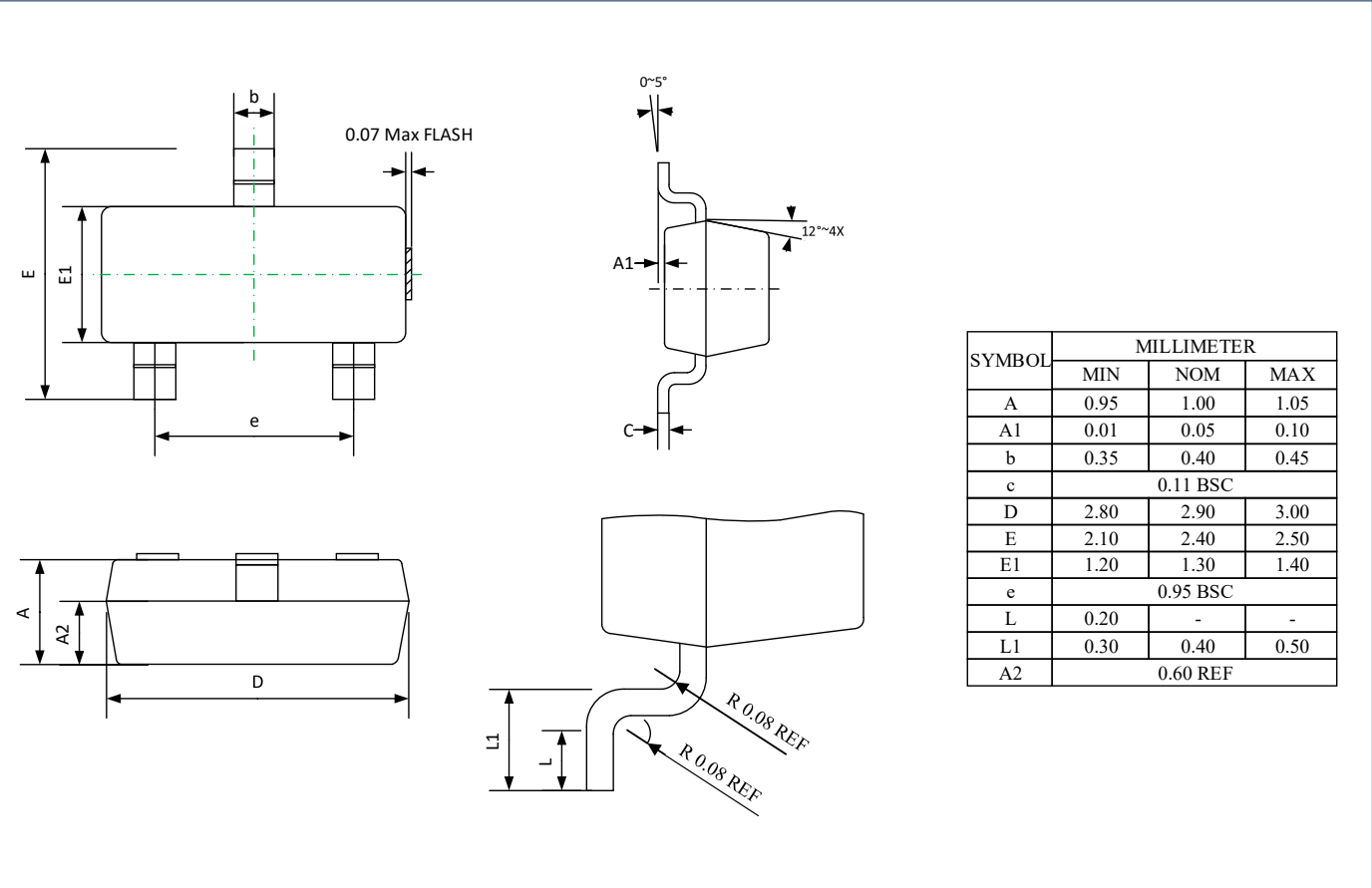


* All dimensions are nominal

Device	Package Type	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin 1 Quadrant
LTP431LAYT3/R6	SOT23	3	3 000	178	9.5	3.2	3.2	1.4	4.0	8.0	Q3
LTP431LBYT3/R6	SOT23	3	3 000	178	9.5	3.2	3.2	1.4	4.0	8.0	Q3
LTP432LAYT3/R6	SOT23	3	3 000	178	9.5	3.2	3.2	1.4	4.0	8.0	Q3
LTP432LBYT3/R6	SOT23	3	3 000	178	9.5	3.2	3.2	1.4	4.0	8.0	Q3

Package Outlines

DIMENSIONS, SOT23



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, intelligent industrial & smart factory (industry 4.0), and automotives. 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.

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