



### Description

The JLR1117E is a low-dropout three-terminal regulator with 1.0A output current ability, and the dropout voltage is specified at typical 1.1V at 1.0A current load decreasing at lower load currents.

The JLR1117E is optimized for low voltage where transient response and minimum input voltage are critical. It provides current limit and thermal shutdown protection solutions. Its circuit includes a trimmed band gap reference to assure output voltage accuracy to be within ±1%. On-chip thermal shutdown provides protection against a combination of high current and ambient temperature that would create excessive junction temperature.

The JLR1117E is available in 1.2V, 1.5V, 1.8V, 2.5V, 3.3V, and 5.0V fixed-output voltage versions and ADJ output voltage version. The fixed versions integrate the adjust resistors.

The JLR1117E is available in the industry-standard SOT-223 , TO-252-2L package.

### Applications

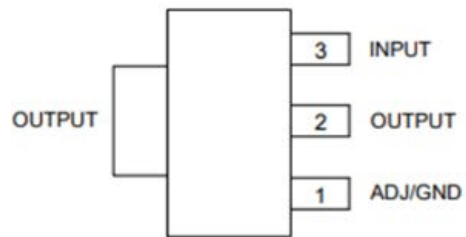
- TVs and LCD Monitors
- PC Peripherals: Notebooks, Motherboards
- STB

### Features and Benefits

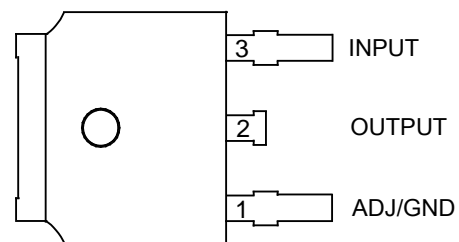
- Provides ADJ Version (VREF = 1.25V) and Fixed Voltage 1.2V, 1.5V, 1.8V, 2.5V, 3.3V, and 5.0V with Accuracy ±1%
- Current Limit: 1.3A (Typ.)
- Dropout Voltage: 1.1V (Typ.) @ IOUT = 1A
- Regulator Stable with Low ESR MLCC
- Excellent Line Regulation: 0.001%/V (Typ.) @ IOUT = 30mA
- Excellent Load Regulation: 0.2%/A @ IOUT = 1A
- Quiescent Current: 3.5mA
- Low Output Noise
- PSRR: 70dB
- OTSD Protection
- Operation Junction Temperature: -40°C to +125°C
- Totally Lead-Free & Fully RoHS Compliant

### Pin Assignment

Top View  
SOT-223



TO-252-2L



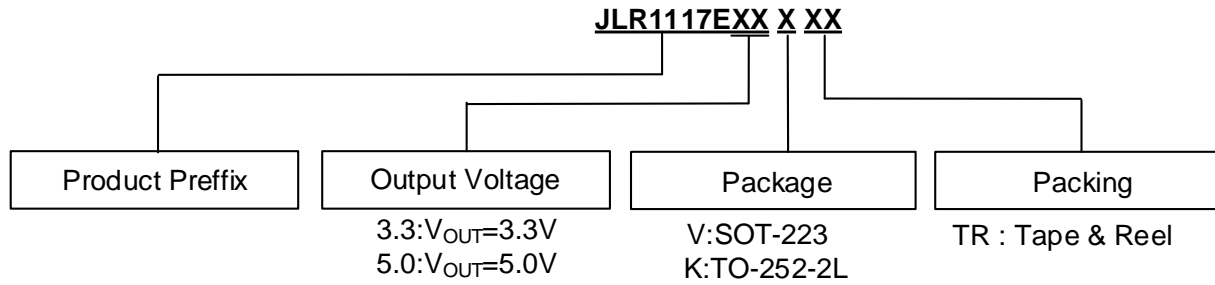


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JLR1117E Series

1.0A Low Drop-out Linear Regulators

## Ordering Information

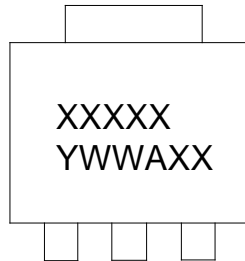


Product Name	Package	Marking	MSL	TJ (°C)	Media	Quantity (pcs)
JLR1117E3.3VTR	SOT-223	GH27G	3	-40 ~ 125	13" T&R	4000
JLR1117E5.0VTR	SOT-223	GH18H	3	-40 ~ 125	13" T&R	4000
JLR1117E3.3KTR	TO-252-2L	1117ED-3.3G1	3	-40 ~ 125	13" T&R	2500

## Marking Information

Top View

SOT-223



First Line: Marking (see Ordering Information)

Second Line: Date Code

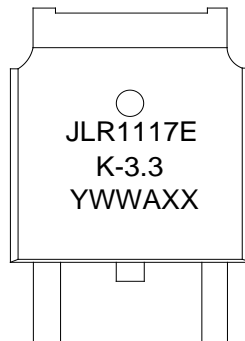
Y: Year

WW: Work Week of Molding

A: Code for Assembly & Test Site

XX: 7<sup>th</sup> & 8<sup>th</sup> Digits of Batch Number

TO-252-2L



First and second lines: Marking ID

(see Ordering Information)

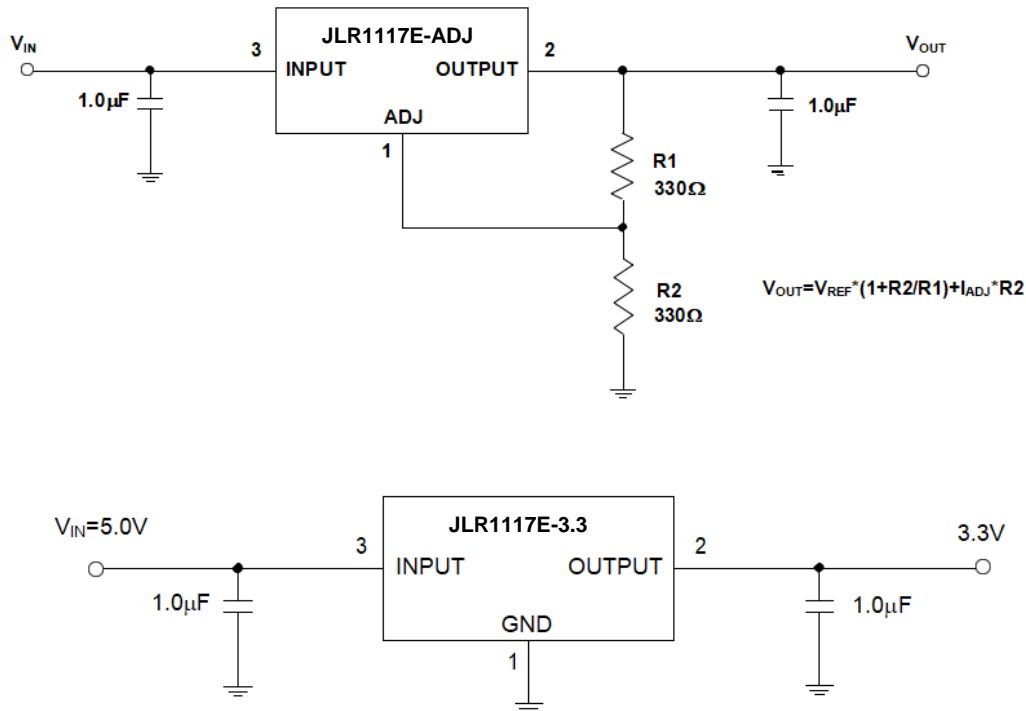
Third Line: Date Code

Y: Year

WW: Work Week of Molding

A: Code for Assembly & Test Site

XX: 7<sup>th</sup> & 8<sup>th</sup> Digits of Batch Number

**Typical Applications Circuit**

**Fig. 1: Application Circuits**

Notes: The JLR1117E is designed to work well with MLCC capacitors of low ESR. While input and output capacitors with values of  $\geq 1.0\mu\text{F}$  are recommended, ESR of the output capacitor must be  $< 1.5\Omega$ . Whenever a capacitor is populated near pin 2 (OUTPUT) of JLR1117E and in parallel to the output capacitor, its capacitance must be  $< 0.68\mu\text{F}$ . In the case that this capacitor is as small as  $0.1\mu\text{F}$ , it must be positioned  $\geq 5\text{mm}$  away from pin 2.

**Absolute Maximum Ratings <sup>\*1</sup>**

Symbol	Parameter	Rating	Unit
$V_{IN}$	Power Supply Voltage	16	V
$T_J$	Operating Junction Temperature Range	+150	°C
$T_{STG}$	Storage Temperature Range	-65 to +150	°C
$T_{LEAD}$	Lead Temperature (Soldering, 10sec)	+260	°C
$\Theta_{JA}$	Thermal Resistance (Junction to Ambient)	SOT-223	65
		TO-252-2L	—
—	ESD (Machine Model)	200	V
—	ESD (Human Body Model)	2000	V

Note \*1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. While these are stress ratings only, functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" are not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.



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**JLR1117E Series****1.0A Low Drop-out Linear Regulators****Recommended Operating Conditions**

Symbol	Parameter	Min.	Max.	Unit
V <sub>IN</sub>	Supply Voltage	–	13	V
T <sub>J</sub>	Operating Junction Temperature Range	-40	+125	°C

**Electrical Characteristics** (T<sub>A</sub> = 25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit	
V <sub>REF</sub>	Reference Voltage	V <sub>OUT</sub> + 1.5V ≤ V <sub>IN</sub> ≤ 12V, I <sub>OUT</sub> = 10mA	1.238	1.250	1.262	V	
			98% × V <sub>OUT</sub>	V <sub>OUT</sub>	102% × V <sub>OUT</sub>	V	
V <sub>OUT</sub>	Output Voltage (Fixed Versions)	For 1.2V, V <sub>OUT</sub> + 1.5V ≤ V <sub>IN</sub> ≤ 12V, I <sub>OUT</sub> = 10mA	98% × V <sub>OUT</sub>	V <sub>OUT</sub>	102% × V <sub>OUT</sub>	V	
			96% × V <sub>OUT</sub>	V <sub>OUT</sub>	104% × V <sub>OUT</sub>	V	
		For 1.5V to 5V, V <sub>OUT</sub> +1.5V ≤ V <sub>IN</sub> ≤ 12V, I <sub>OUT</sub> = 10mA	99% × V <sub>OUT</sub>	V <sub>OUT</sub>	101% × V <sub>OUT</sub>	V	
			98% × V <sub>OUT</sub>	V <sub>OUT</sub>	102% × V <sub>OUT</sub>	V	
V <sub>DROP</sub>	Dropout Voltage	I <sub>OUT</sub> = 1A	–	1.1	1.3	V	
I <sub>OUT(MAX)</sub>	Maximum Output Current	1.5V ≤ V <sub>IN</sub> -V <sub>OUT</sub>	1	1.3	–	A	
V <sub>RLOAD</sub>	Load Regulation	V <sub>IN</sub> = V <sub>OUT</sub> +1.5V 1mA ≤ I <sub>OUT</sub> ≤ 1A	–	0.2	0.6	%/A	
V <sub>RLINE</sub>	Line Regulation	1.5V ≤ V <sub>IN</sub> - V <sub>OUT</sub> ≤ 10V, I <sub>OUT</sub> = 30mA	–	0.001	±0.04	%/V	
I <sub>Q</sub>	Quiescent Current	For Fixed Voltage Version, I <sub>OUT</sub> = 0	–	3.5	6	mA	
–	Minimum Load Current	For ADJ Version, 1.5V ≤ V <sub>IN</sub> -V <sub>OUT</sub> ≤ 10V	–	2	5	mA	
I <sub>ADJ</sub>	Adjustable Pin Current	–	–	45	90	μA	
–	Adjustable Pin Current Change	1.5V ≤ V <sub>IN</sub> -V <sub>OUT</sub> ≤ 10V	–	0.2	5	μA	
PSRR	Power Supply Rejection Ratio	Ripple 1.0 Vp-p V <sub>IN</sub> = V <sub>OUT</sub> + 2V, I <sub>OUT</sub> = 100mA	–	–	70	–	dB
			–	–	70	–	
$\frac{\Delta V_{OUT}}{V_{OUT}} / \Delta T$	Output Voltage Temperature Coefficient	I <sub>OUT</sub> = 30mA	–	±30	–	–	
V <sub>NOISE</sub>	RMS Output Noise	10Hz ≤ f ≤ 100kHz, No Load	–	0.003	–	–	
T <sub>OTSD</sub>	Thermal Shutdown Temperature	–	–	+170	–	–	
T <sub>HYOTSD</sub>	Thermal Shutdown Hysteresis	–	–	+20	–	–	
θ <sub>JC</sub>	Thermal Resistance (Junction to Case)	SOT-223	–	40	–	–	
		TO-252-2L	–	–	–	–	



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JLR1117E Series

1.0A Low Drop-out Linear Regulators

## Performance Characteristics

Fig. 2: Line Regulation vs. Junction Temperature

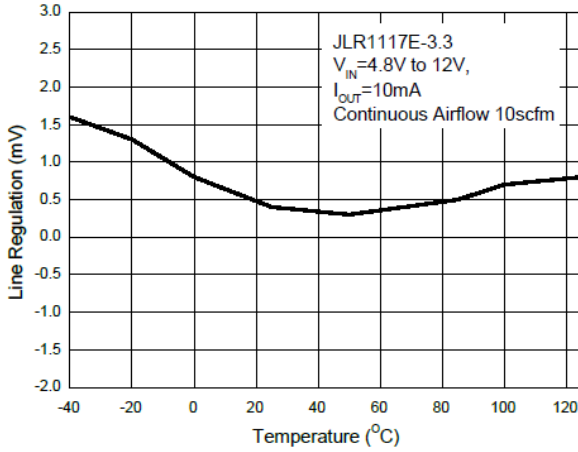


Fig. 3: Line Regulation vs. Junction Temperature  $\infty$

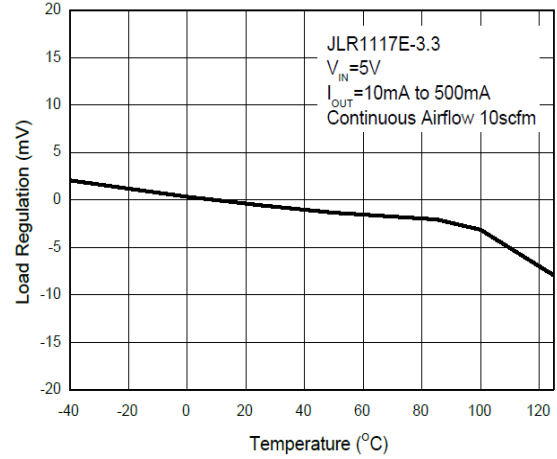


Fig. 4: Reference Voltage vs. Junction Temperature

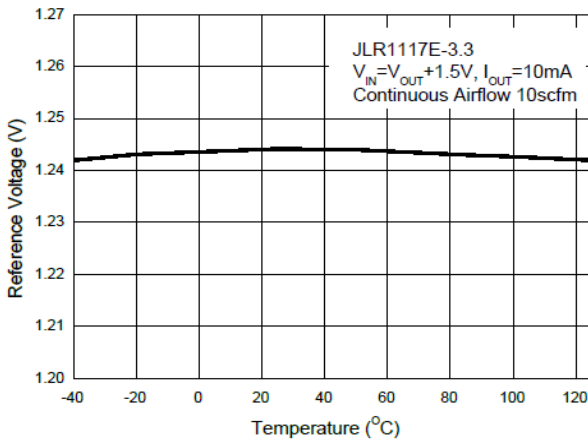


Fig. 5: Output Voltage vs. Junction Temperature

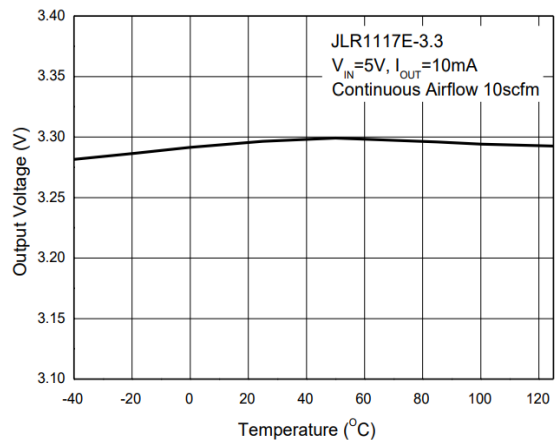


Fig. 6: Minimum Load Current vs. Junction Temperature

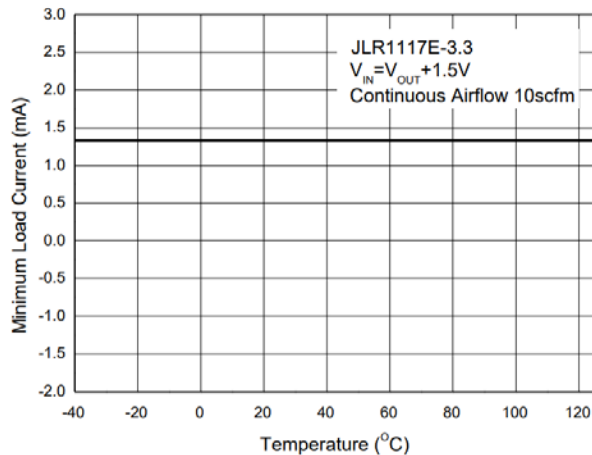
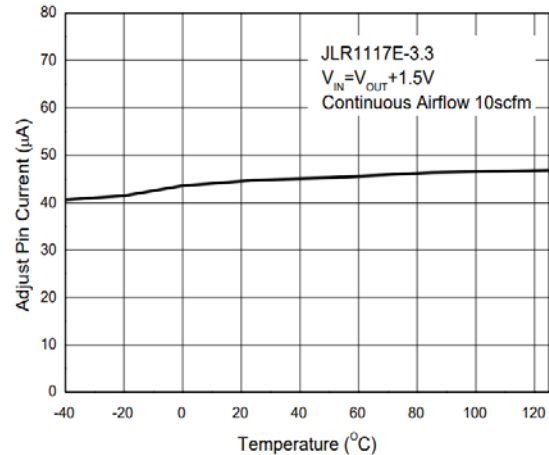


Fig. 7: Adjust Pin Current vs. Junction Temperature





Performance Characteristics (continued)

Fig. 8: Drop-out Voltage vs. Output Current

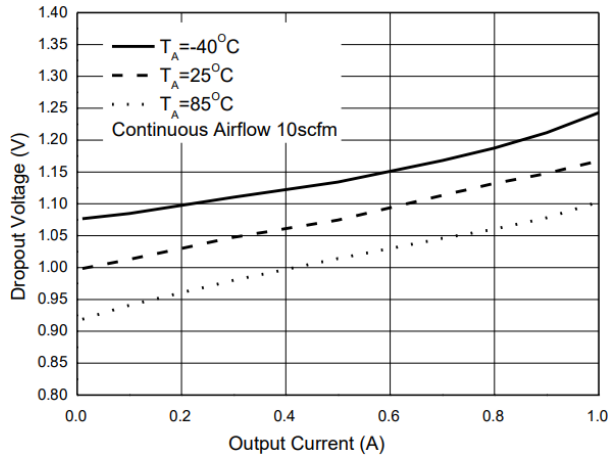


Fig. 9: Drop-out Voltage vs. Junction Temperature

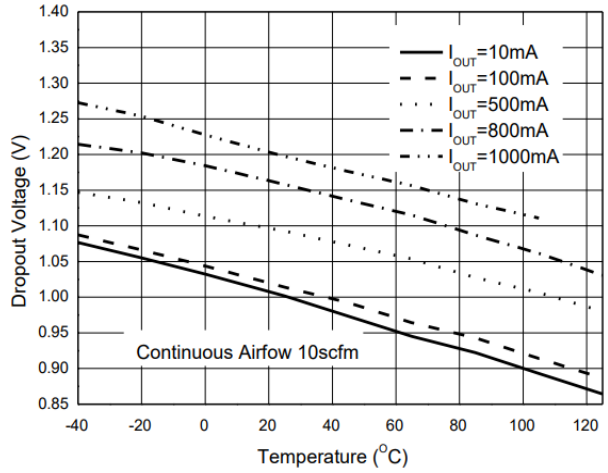


Fig. 10: Output Voltage vs. Output Current

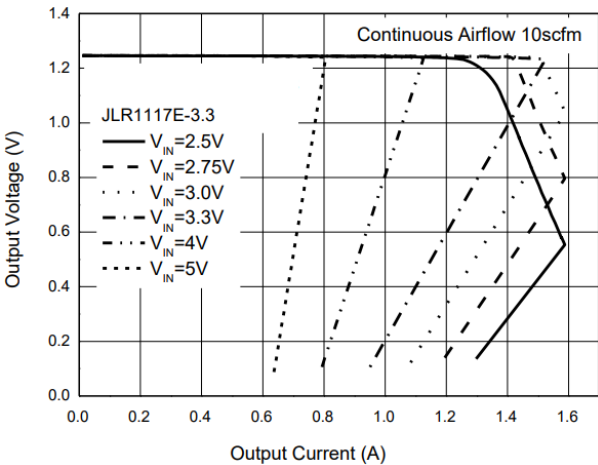


Fig. 11: PSRR vs. Frequency

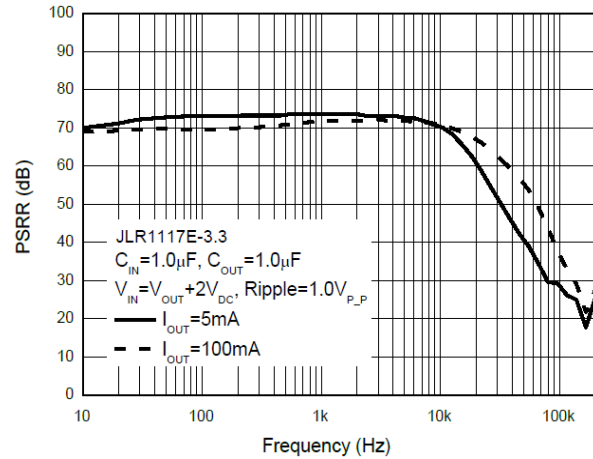


Fig. 12: Current Limit vs. Temperature

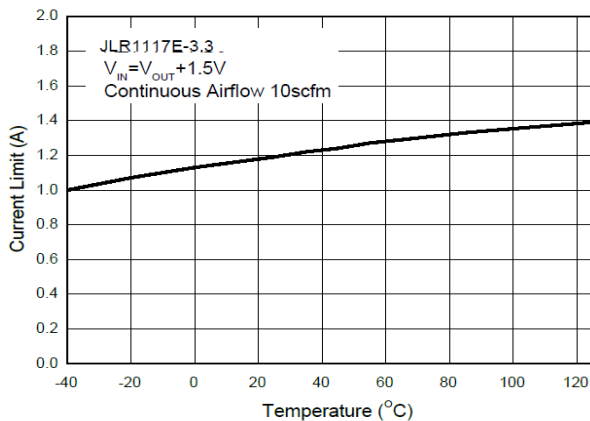
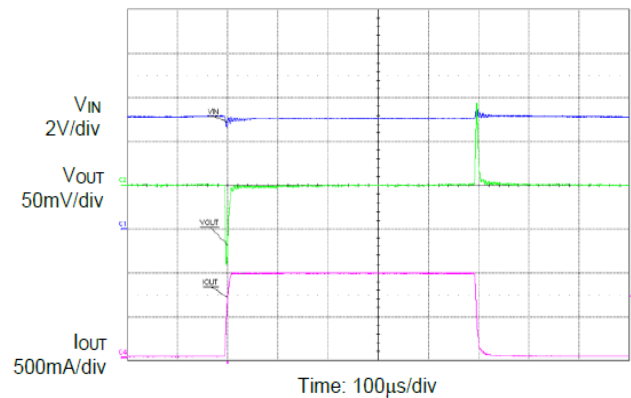


Fig. 13: Load Transient Response (JLR1117E-3.3,  $V_{IN} = 5\text{V}$ ,  $V_{OUT} = 3.3\text{V}$ ,  $C_{IN} = 1.0\mu\text{F}$ ,  $C_{OUT} = 1.0\mu\text{F}$ )





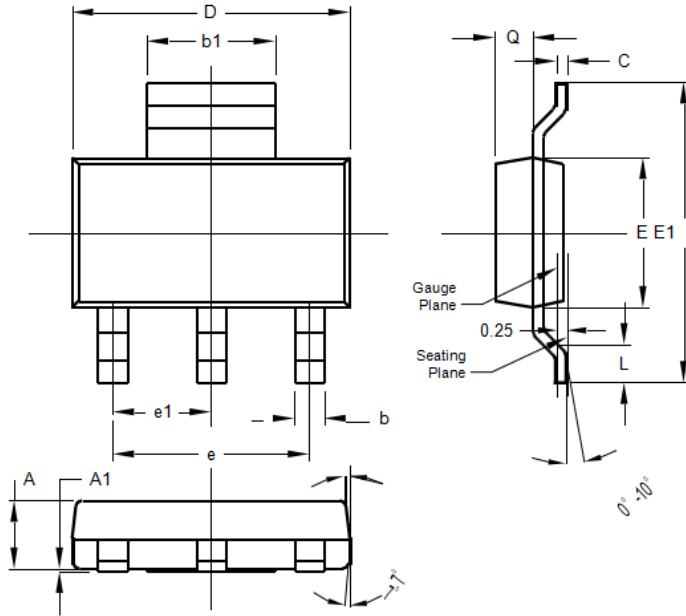
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1.0A Low Drop-out Linear Regulators

## Package Outline Dimensions

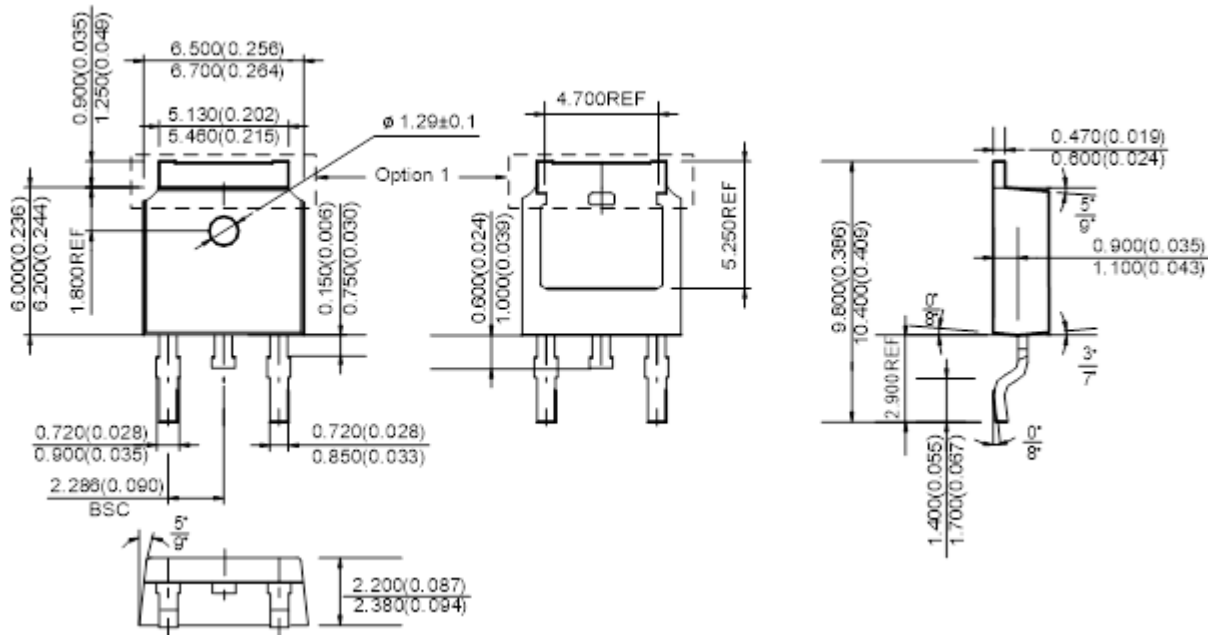
Package Type: SOT-223



SOT-223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89

All Dimensions in mm

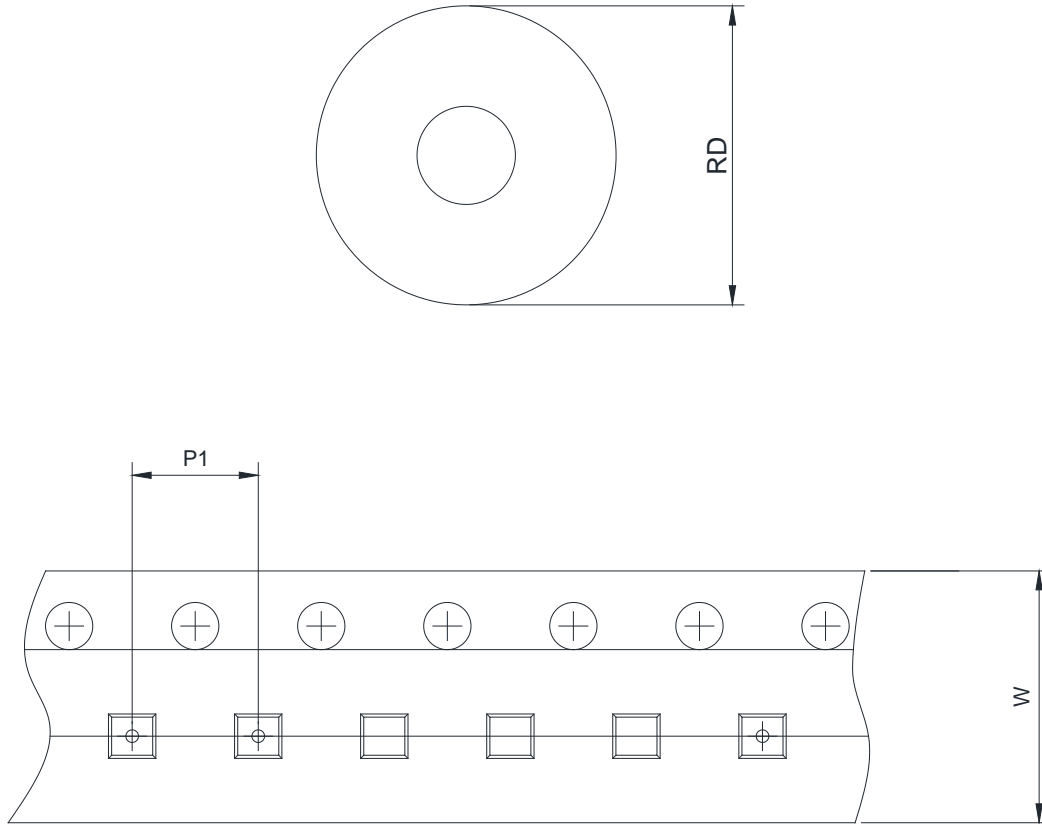
Package Type: TO-252-2L



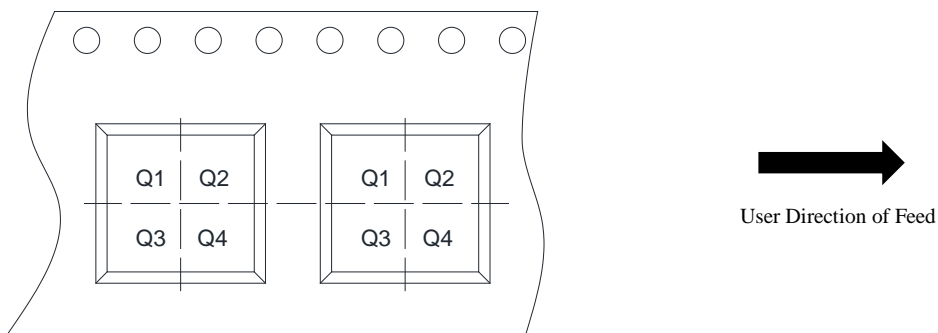


## Tape and Reel Information

### Reel Dimensions



### Quadrant Assignments for Pin1 Orientation in Tape








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1.0A Low Drop-out Linear Regulators

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