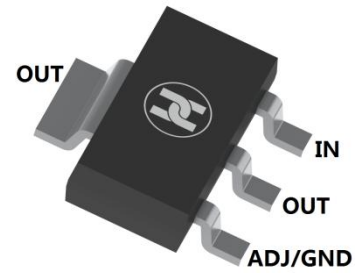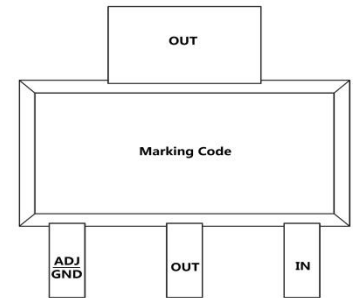# Hottech® Semiconductor

LOW DROP LINEAR VOLTAGE REGULATORS

FEATURES

- Low Dropout Voltage: 1.2V at 1A Output Current
- Three-Terminal Adjustable or Fixed :
  1.2V,1.5V,1.8V, 2.5V, 2.85V,3.0V,3.3V,3.6V,5V,ADJ
- Trimmed Current Limit
- On-Chip Thermal Shutdown
- Operation Junction Temperature: -25 ℃ to 125℃
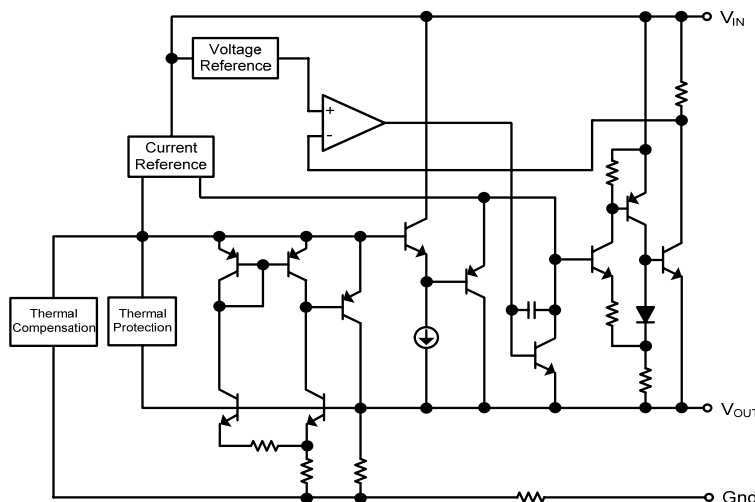- Surface Mount device

APPLICATIONS

- PC Motherboard
- LCD Monitor
- Graphic Card
- DVD-Video Player
- NIC/Switch
- Telecom Modem
- ADSL Modem
- Printer and other peripheral Equipment

MECHANICAL DATA

- Case: SOT-223
- Case Material: Molded Plastic. UL flammability
- Classification Rating: 94V-0
- Weight: 0.04 grams (approximate)

SOT-223

SCHEMATIC DIAGRAM

MARKING INFORMATION

Marking	1117-12	1117-15	1117-18	1117-25	1117-2J	1117-30	1117-33	1117-36	1117-50	1117-ADJ
V_O Voltage	1.2V	1.5V	1.8V	2.5V	2.85V	3.0V	3.3V	3.6V	5.0V	ADJ.

LOW DROP LINEAR VOLTAGE REGULATORS

ABOSLUTE MAXIMUM RATINGS(Ta=25℃ unless otherwise noted)

Symbol	Parameter	Maximum	Units
P_D	Power dissipation	Internally limited	W
V_{IN}	Input voltage	20	V
T_J	Operating junction temperature range	-40 to 125	^{o}C
T_{STG}	Storage temperature	-65 to 150	^{o}C
T_{LEAD}	Lead temperature (soldering, 10 sec)	300	^{o}C
V_{ESD}	Minimum ESD rating (HBM)	3	kV

DEVICE SELECTION GUIDE

Device	Output Voltage
1117ADJ	Adj
1117-1.2	1.2V
1117-1.5	1.5V
1117-1.8	1.8V
1117-2.5	2.5V
1117-2.85	2.85V
1117-3.0	3.0V
1117-3.3	3.3V
1117-3.5	3.5V
1117-5.0	5.0V

Other fixed versions are available V_{OUT} = 1.5V to 5.0V

Hottech®
Semiconductor

LOW DROP LINEAR VOLTAGE REGULATORS

ELECTRICAL CHARACTERISTICS

The electrical characteristics at I_{LOAD} = 0 mA and T_J = +25°C, unless otherwise specified.

Parameter	Device	Test Conditions		Min	Typ	Max	Units
Reference voltage, (Note 1)	1117-ADJ	V_{IN} = 5V, I_{LOAD} = 10 mA		1.232	1.250	1.268	V
		1.5V ≤ V_{IN} - V_{OUT} ≤ 10V I_{LOAD} = 10 mA to 1A	*	1.225	1.250	1.275	
Output voltage (Note 1)	All fixed versions	V_{IN} = V_{OUT} +1.5V, Varied from nominal V_{OUT}		-1.5		+1.5	%
		1.5V ≤ V_{IN} - V_{OUT} ≤ 10V, I_{LOAD}= 0 mA to 1A,		-3		+3	
	V_{OUT} =1.2V	Varied from nominal V_{OUT}		-3		+3	
Accuracy of output voltage at wafer testing	All	V_{IN} = V_{OUT} +1.5V I_{LOAD} = 10 mA		-0.2	0	+0.2	%
Line regulation	All	I_{LOAD} = 10 mA, 1.5V ≤ V_{IN} - V_{OUT} ≤ 10V	*		0.04	0.20	%
Load regulation, (Note 1)	All	V_{IN} = V_{OUT} + 1.5V I_{LOAD} = 10 mA to 1A	*		0.2	0.40	
Minimum load current	1117-ADJ	V_{IN} = 5V, V_{ADJ} = 0V	*		2	7	mA
GND pin current	All fixed versions	V_{IN} = V_{OUT} +1.5V I_{LOAD}=10 mA to 1A	*		3.5	10	mA
ADJ pin current	1117-ADJ	1.5V ≤ V_{IN} - V_{OUT} ≤ 10V I_{LOAD}=10 mA	*		35	60	μA
Current limit	All	V_{IN} - V_{OUT} = 1.5V	*	1	1.5	2	A
Ripple rejection, (Note 2)	All	V_{IN} - V_{OUT} = 2.5 V I_{LOAD} = 1A		60			dB
Dropout voltage, (Note 1, 3)	All	I_{LOAD} = 1A	*		1.20	1.40	V
Temperature coefficient	All	V_{IN} - V_{OUT} = 1.5V, I_{LOAD} = 10 mA	*			0.015	%/°C

Notes:

    * denotes "apply over the full temperature range" – 40°C ≤ T_J ≤ 125°C

    1. Low duty pulse testing with Kelvin connections is required

    2. 120Hz input ripple (C_{ADJ} = 25μF for the Adj version)

    3. ΔV_{OUT}, ΔV_{REF} = 1%

LOW DROP LINEAR VOLTAGE REGULATORS

ELECTRICAL CHARACTERISTICS OF 1117/1.2

(Ta=25℃, refer to the test circuits, TJ=0 to 125°C, Co=10μF unless otherwise specified)

Parameter	Device	Test Conditions		Min	Typ	Max	Units
Reference voltage, (Note 1)	1117-1.2	V_{IN} = 3.2V, I_{LOAD} = 10 mA		1.188	1.2	1.212	V
		1.5V ≤ V_{IN} - V_{OUT} ≤ 10V I_{LOAD} = 10 mA to 1A		1.176	1.2	1.224	
Output voltage (Note 1)	1117-1.2	V_{IN} = V_{OUT} +1.5V, Varied from nominal V_{OUT}		-1.5		+1.5	%
		1.5V ≤ V_{IN} - V_{OUT} ≤ 10V, I_{LOAD}= 0 mA to 1A,		-3		+3	
	V_{OUT} =1.2V	Varied from nominal V_{OUT}		-3		+3	
Accuracy of output voltage at wafer testing	1117-1.2	V_{IN} = V_{OUT} +1.5V I_{LOAD} = 10 mA		-0.2	0	+0.2	%
Line regulation	1117-1.2	I_{LOAD} = 10 mA, 1.5V ≤ V_{IN} - V_{OUT} ≤ 10V	*		0.04	0.20	%
Load regulation, (Note 1)	1117-1.2	V_{IN} = V_{OUT} + 1.5V I_{LOAD} = 10 mA to 1A	*		0.2	0.40	
Minimum load current	1117-1.2	V_{IN} = 5V, V_{ADJ} = 0V	*		2	7	mA
GND pin current	1117-1.2	V_{IN} = V_{OUT} +1.5V I_{LOAD}=10 mA to 1A	*		3.5	10	mA
ADJ pin current	1117-1.2	1.5V ≤ V_{IN} - V_{OUT} ≤ 10V I_{LOAD}=10 mA	*		35	60	μA
Current limit	1117-1.2	V_{IN} - V_{OUT} = 1.5V	*	1	1.5	2	A
Ripple rejection, (Note 2)	1117-1.2	V_{IN} - V_{OUT} = 2.5 V I_{LOAD} = 1A		60			dB
Dropout voltage, (Note 1, 3)	1117-1.2	I_{LOAD} = 1A	*		1.20	1.40	V
Temperature coefficient	1117-1.2	V_{IN} - V_{OUT} = 1.5V, I_{LOAD} = 10 mA	*			0.015	%/^{o}C

Parameter	Device	Test Conditions		Min	Typ	Max	Units
Reference voltage, (Note 1)	1117-1.8	V_{IN} = 3.8V, I_{LOAD} = 10 mA		1.780	1.8	1.820	V
		1.5V ≤ V_{IN} - V_{OUT} ≤ 10V I_{LOAD} = 10 mA to 1A		1.760	1.8	1.840	
Output voltage (Note 1)	1117-1.8	V_{IN} = V_{OUT} +1.5V, Varied from nominal V_{OUT}		-1.5		+1.5	%
		1.5V ≤ V_{IN} - V_{OUT} ≤ 10V, I_{LOAD}= 0 mA to 1A,		-3		+3	
	V_{OUT} =1.2V	Varied from nominal V_{OUT}		-3		+3	
Accuracy of output voltage at wafer testing	1117-1.8	V_{IN} = V_{OUT} +1.5V I_{LOAD} = 10 mA		-0.2	0	+0.2	%
Line regulation	1117-1.8	I_{LOAD} = 10 mA, 1.5V ≤ V_{IN} - V_{OUT} ≤ 10V	*		0.04	0.20	%
Load regulation, (Note 1)	1117-1.8	V_{IN} = V_{OUT} + 1.5V I_{LOAD} = 10 mA to 1A	*		0.2	0.40	
Minimum load current	1117-1.8	V_{IN} = 5V, V_{ADJ} = 0V	*		2	7	mA
GND pin current	1117-1.8	V_{IN} = V_{OUT} +1.5V I_{LOAD}=10 mA to 1A	*		3.5	10	mA
ADJ pin current	1117-1.8	1.5V ≤ V_{IN} - V_{OUT} ≤ 10V I_{LOAD}=10 mA	*		35	60	μA
Current limit	1117-1.8	V_{IN} - V_{OUT} = 1.5V	*	1	1.5	2	A
Ripple rejection, (Note 2)	1117-1.8	V_{IN} - V_{OUT} = 2.5 V I_{LOAD} = 1A		60			dB
Dropout voltage, (Note 1, 3)	1117-1.8	I_{LOAD} = 1A	*		1.20	1.40	V
Temperature coefficient	1117-1.8	V_{IN} - V_{OUT} = 1.5V, I_{LOAD} = 10 mA	*			0.015	%/^{o}C

LOW DROP LINEAR VOLTAGE REGULATORS

ELECTRICAL CHARACTERISTICS OF 1117/2.5

(T_a=25℃, refer to the test circuits, T_J=0 to 125°C, C_o=10μF unless otherwise specified)

Parameter	Device	Test Conditions		Min	Typ	Max	Units
Reference voltage, (Note 1)	1117-2.5	V_{IN} = 4.5V, I_{LOAD} = 10 mA		2.475	2.5	2.525	V
		1.5V ≤ V_{IN} - V_{OUT} ≤ 10V I_{LOAD} = 10 mA to 1A		2.450	2.5	2.550	
Output voltage (Note 1)	1117-2.5	V_{IN} = V_{OUT} +1.5V, Varied from nominal V_{OUT}		-1.5		+1.5	%
		1.5V ≤ V_{IN} - V_{OUT} ≤ 10V, I_{LOAD}= 0 mA to 1A,		-3		+3	
	V_{OUT} =1.2V	Varied from nominal V_{OUT}		-3		+3	
Accuracy of output voltage at wafer testing	1117-2.5	V_{IN} = V_{OUT} +1.5V I_{LOAD} = 10 mA		-0.2	0	+0.2	%
Line regulation	1117-2.5	I_{LOAD} = 10 mA, 1.5V ≤ V_{IN} - V_{OUT} ≤ 10V	*		0.04	0.20	%
Load regulation, (Note 1)	1117-2.5	V_{IN} = V_{OUT} + 1.5V I_{LOAD} = 10 mA to 1A	*		0.2	0.40	
Minimum load current	1117-2.5	V_{IN} = 5V, V_{ADJ} = 0V	*		2	7	mA
GND pin current	1117-2.5	V_{IN} = V_{OUT} +1.5V I_{LOAD}=10 mA to 1A	*		3.5	10	mA
ADJ pin current	1117-2.5	1.5V ≤ V_{IN} - V_{OUT} ≤ 10V I_{LOAD}=10 mA	*		35	60	μA
Current limit	1117-2.5	V_{IN} - V_{OUT} = 1.5V	*	1	1.5	2	A
Ripple rejection, (Note 2)	1117-2.5	V_{IN} - V_{OUT} = 2.5 V I_{LOAD} = 1A		60			dB
Dropout voltage, (Note 1, 3)	1117-2.5	I_{LOAD} = 1A	*		1.20	1.40	V
Temperature coefficient	1117-2.5	V_{IN} - V_{OUT} = 1.5V, I_{LOAD} = 10 mA	*			0.015	%/^{o}C

Parameter	Device	Test Conditions		Min	Typ	Max	Units
Reference voltage, (Note 1)	1117-3.3	V_{IN} = 5.3V, I_{LOAD} = 10 mA		3.267	3.3	3.333	V
		1.5V ≤ V_{IN} - V_{OUT} ≤ 10V I_{LOAD} = 10 mA to 1A		3.160	3.3	3.440	
Output voltage (Note 1)	1117-3.3	V_{IN} = V_{OUT} +1.5V, Varied from nominal V_{OUT}		-1.5		+1.5	%
		1.5V ≤ V_{IN} - V_{OUT} ≤ 10V, I_{LOAD}= 0 mA to 1A,		-3		+3	
	V_{OUT} =1.2V	Varied from nominal V_{OUT}		-3		+3	
Accuracy of output voltage at wafer testing	1117-3.3	V_{IN} = V_{OUT} +1.5V I_{LOAD} = 10 mA		-0.2	0	+0.2	%
Line regulation	1117-3.3	I_{LOAD} = 10 mA, 1.5V ≤ V_{IN} - V_{OUT} ≤ 10V	*		0.04	0.20	%
Load regulation, (Note 1)	1117-3.3	V_{IN} = V_{OUT} + 1.5V I_{LOAD} = 10 mA to 1A	*		0.2	0.40	
Minimum load current	1117-3.3	V_{IN} = 5V, V_{ADJ} = 0V	*		2	7	mA
GND pin current	1117-3.3	V_{IN} = V_{OUT} +1.5V I_{LOAD}=10 mA to 1A	*		3.5	10	mA
ADJ pin current	1117-3.3	1.5V ≤ V_{IN} - V_{OUT} ≤ 10V I_{LOAD}=10 mA	*		35	60	μA
Current limit	1117-3.3	V_{IN} - V_{OUT} = 1.5V	*	1	1.5	2	A
Ripple rejection, (Note 2)	1117-3.3	V_{IN} - V_{OUT} = 2.5 V I_{LOAD} = 1A		60			dB
Dropout voltage, (Note 1, 3)	1117-3.3	I_{LOAD} = 1A	*		1.20	1.40	V
Temperature coefficient	1117-3.3	V_{IN} - V_{OUT} = 1.5V, I_{LOAD} = 10 mA	*			0.015	%/^{o}C

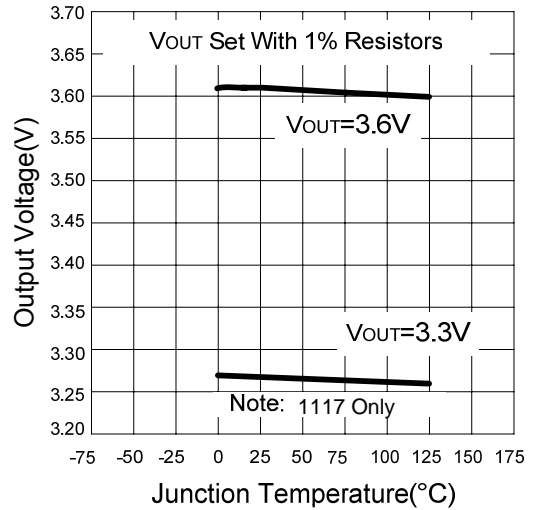# LOW DROP LINEAR VOLTAGE REGULATORS

Typical Characteristics

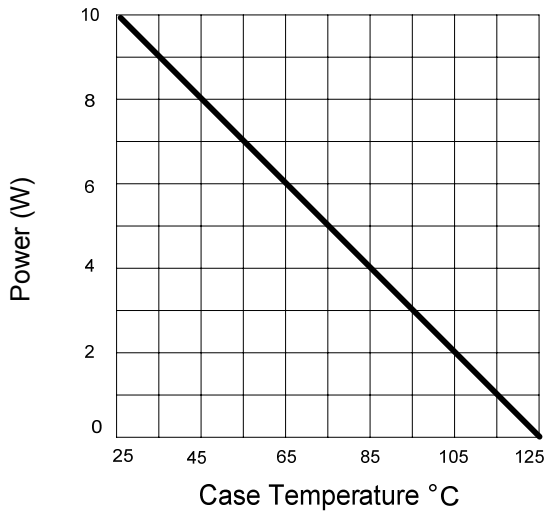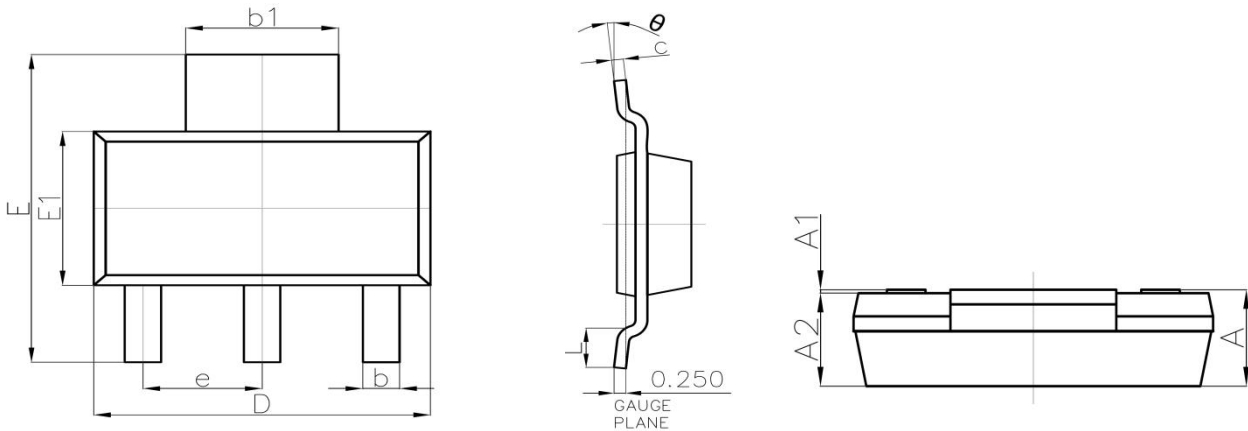Reference Voltge vs. Temperature
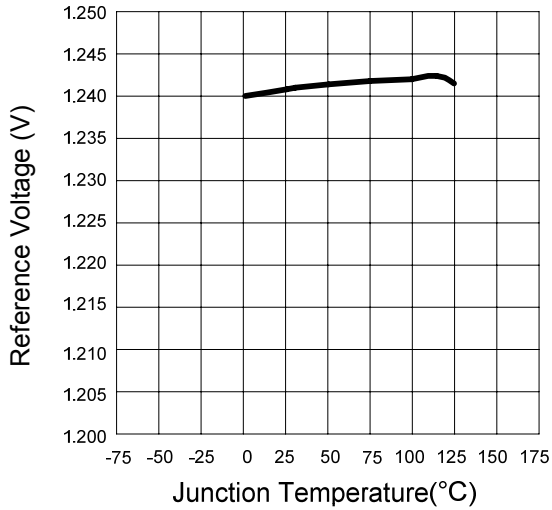
Output Voltage vs. Temperautre

Maximum Power Dissipation

LOW DROP LINEAR VOLTAGE REGULATORS

SOT-223 Package Outline Dimensions

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	——	1.800	------	0.071
A1	0.020	0.100	0.001	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.840	0.026	0.033
b1	2.900	3.100	0.114	0.122
c	0.230	0.350	0.009	0.014
D	6.300	6.700	0.248	0.264
E	6.700	7.300	0.264	0.287
E1	3.300	3.700	0.130	0.146
e	2.300(BSC)		0.091(BSC)	
L	0.750	------	0.030	------
θ	0°	10°	0°	10°

SOT-223 Suggested Pad Layout
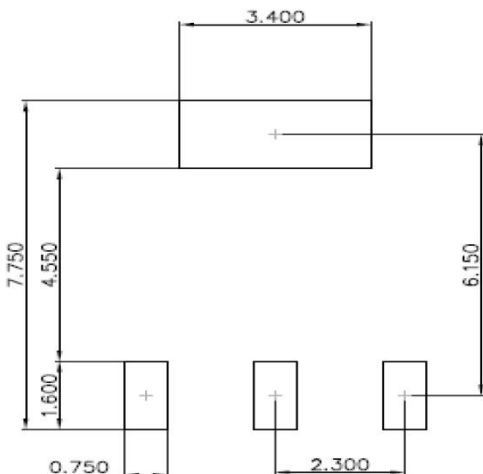
Note:

1.Controlling dimension: in millimeters

2.General tolerance: ±0.05mm

3.The pad layout is for reference purposes only

LOW DROP LINEAR VOLTAGE REGULATORS

SOT-223 Tape and Reel

SOT-223 Embossed Carrier Tape
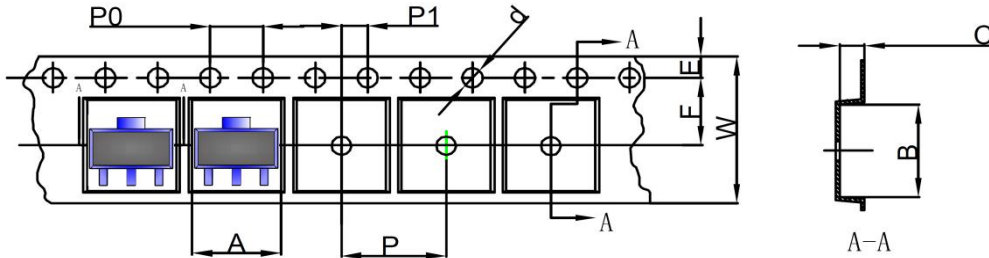
	DIMENSIONS ARE IN MILLIMETER									
TYPE	A	B	C	d	E	F	P0	P	P1	W
SOT-223	6.765	7.335	1.88	Ø1.50	1.75	5.50	4.00	4.00	2.00	12.00
TOLERANCE	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1

SOT-223 Tape Leader and Trailer
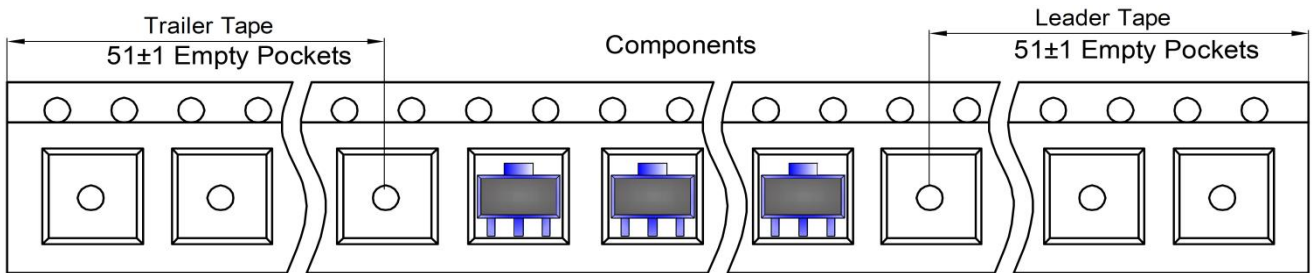
SOT-223 Reel
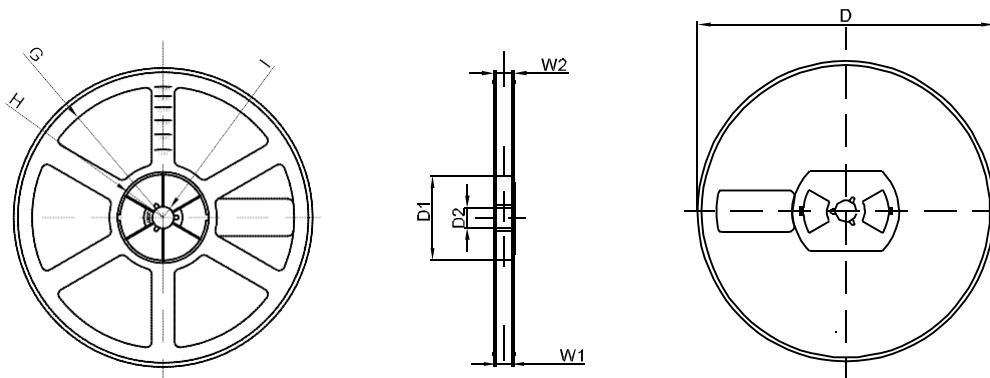
	DIMENSIONS ARE IN MILLIMETER							
REEL OPTION	D	D1	D2	G	H	I	W1	W2
13" DIA	Ø330.00	100.00	13.00	R151.00	R56.00	R6.50	12.40	17.60
TOLERANCE	±2	±1	±1	±1	±1	±1	±1	±1