1A Low-Dropout Voltage Regulator

Features

- Low quiescent current : 0.4mA
- High output current : 1A
- Fixed output voltages : 1.8V, 2.5V,3.3V and 5.0V
- Line regulation: ±0.2% (Max.)
- Load regulation: ±0.4% (Max.)
- I_{OUT}=0A→1A,ΔV_{OUT}=60mV(V_{IN}=5.3V,V_{OUT}=3.3V)
- short-circuited survive with V_{IN}=18V
- Stable within -40℃~+125℃
- Stable with surface mount, electrolytic and ceramic capacitors
- V_{OUT}=1.25V, no external resistor is required
- Over-current protection
- Thermal shutdown protection
- Available packages：SOT223

Applications

- Battery-powered equipment
- Smoke detector and sensor
- Micro controller applications

Description

The OSU1117 is a low-dropout linear regulator with a 1.3V voltage drop at a load current of 1A.

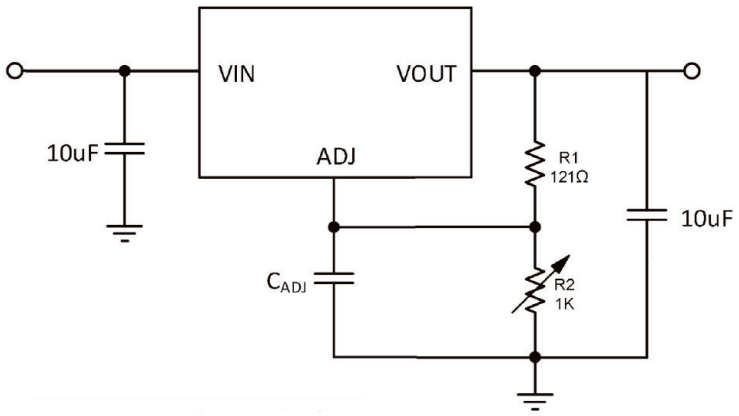
The OSU1117 offers an adjustable voltage version, allowing the output voltage to be set from 1.25V to 13.8V with just two external resistors. In addition, this device also offers four fixed voltages: 1.8V, 2.5V, 3.3V and 5V.

The OSU1117 features over-current protection and thermal shutdown protection. The circuit of this device includes a Zener fine-tuning bandgap reference to ensure that the output voltage accuracy is within ±1%.

Device Information

PART NUMBER	PACKAGE	BODY SIZE(NOM)
OSU1117	SOT223	6.50mm*7.00mm

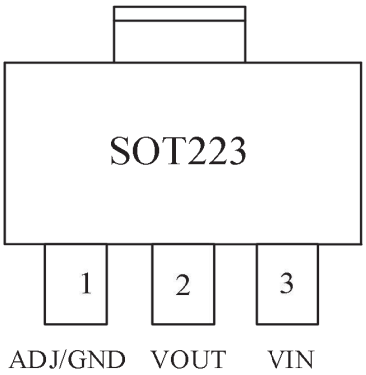
Typical Application



V_{OUT}= 1.25（1 + R2/R1）

C_{ADJ} is optional, however it will improve ripple rejection.

Pin Configuration and Functions



Pin functions

Name	SOT-223	Description
GND/ADJ	1	Ground/ Adjustable
VOUT	2	Output pin
VIN	3	Input pin

Absolute Maximum Ratings

Parameter	Description	Min	Max	Unit
Input voltage	VIN to GND		18	V
Maximum current		Internally limited		
Temperature	Junction temperature	150		℃
	Storage temperature	-65	150	℃
$R_{\theta JA}$	SOT223	61.6		℃/W

Note:

exceeding the range specified by the rated parameters will cause damage to the chip, and the working state of the chip beyond the range of rated parameters cannot be guaranteed. Exposure outside the rated parameter range will affect the reliability of the chip.

ESD Ratings

Parameter	Description	Range	Unit
V_{ESD}	Human body model(HBM)	±2	KV

Note:

JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.

Electrical Characteristics

(At T_A=25°C, C_{IN}=10uF, C_{OUT}=10uF, unless otherwise noted)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_{REF}	Reference voltage (OSU1117-ADJ)	I_{OUT}=10mA， V_{IN} -V_{OUT}=2V		1.238	1.250	1.262	V
		10mA≤I_{OUT}≤1A， 1.4V≤V_{IN} -V_{OUT}≤10V		1.225	1.250	1.27	
V_{OUT}	Output voltage	OSU1117-1.8	I_{OUT}=10mA， V_{IN}= 3.8V	1.782	1.8	1.818	V
			0mA≤I_{OUT}≤ 1A，3.2V≤V_{IN} ≤ 10V	1.746	1.8	1.854	
		OSU1117-2.5	I_{OUT}=10mA， V_{IN}= 4.5V	2.475	2.5	2.525	V
			0mA≤I_{OUT}≤1A，3.9V≤V_{IN} ≤ 10V	2.45	2.5	2.55	
		OSU1117-3.3	I_{OUT}=10mA， V_{IN}= 5.3V	3.267	3.3	3.333	V
			0mA≤I_{OUT}≤1A，4.75V≤V_{IN} ≤10V	3.235	3.3	3.365	
		OSU1117-5.0	I_{OUT}=10mA， V_{IN}= 7V	4.95	5	5.05	V
			0mA≤I_{OUT}≤1A，6.5V≤V_{IN} ≤12V	4.9	5	5.1	
ΔV_{OUT}	Line regulation	OSU1117-ADJ，I_{OUT}=10mA，1.5V≤V_{IN} -V_{OUT}≤ 13.75V			±0.2		%
		OSU1117-1.8，I_{OUT}=1mA，3.2V≤V_{IN}≤ 10V			±0.2		%
		OSU1117-2.5，I_{OUT}=1mA，3.9V≤V_{IN}≤ 10V			±0.2		%
		OSU1117-3.3，I_{OUT}=1mA，5V≤V_{IN}≤ 18V			±0.2		%
		OSU1117-5.0，I_{OUT}=1mA，6.5V≤V_{IN}≤ 15V			±0.2		%
ΔV_{OUT}	Load regulation	OSU1117-ADJ, V_{IN}-V_{OUT}=3V， 10mA ≤I_{OUT}≤ 1A			±0.4		%
		OSU1117-1.8,V_{IN}=3.2V， 0mA≤I_{OUT}≤1A			±0.4		%
		OSU1117-2.5,V_{IN}=3.9V， 0mA≤I_{OUT}≤1A			±0.4		%
		OSU1117-3.3,V_{IN}=4.8V， 0mA≤I_{OUT}≤1A			±0.4		%
		OSU1117-5.0,V_{IN}=6.5V， 0mA≤I_{OUT}≤1A			±0.4		%
V_{DROP}	Dropout voltage	I_{OUT}=100mA			1.1		V
		I_{OUT}=500mA			1.15		V
		I_{OUT}=1A			1.3		V

Electrical Characteristics (continue)

(At T_A=25°C, C_{IN}=10uF, C_{OUT}=10uF, unless otherwise noted)

I_{LIMIT}	Current limit	V_{IN}-V_{OUT}=5V		1600		mA
$I_{LOAD(MIN)}$	Minimum load current	V_{IN}= 15V（OSU1117-ADJ）		2	10	mA
I_Q	Quiescent current	OSU1117-1.8,V_{IN}≤ 15V		400		uA
		OSU1117-2.5,V_{IN}≤ 15V		400		uA
		OSU1117-3.3,V_{IN}≤ 15V		400		uA
		OSU1117-5.0,V_{IN}≤ 15V		400		uA
PSRR		V_{IN}=6.3V，V_{OUT}=3.3V，I_{OUT}=10mA，f=1kHz		75		dB
I_{ADJ}	Adjustable pin current			40		uA
ΔI_{ADJ}	Adjust the current variation of the pins	10mA≤I_{OUT}≤800mA, 1.4V≤V_{IN}-V_{OUT}≤10V		1		uA
	RMS noise（%of V_{OUT}）	10Hz≤ f ≤10kHz		323		uVms

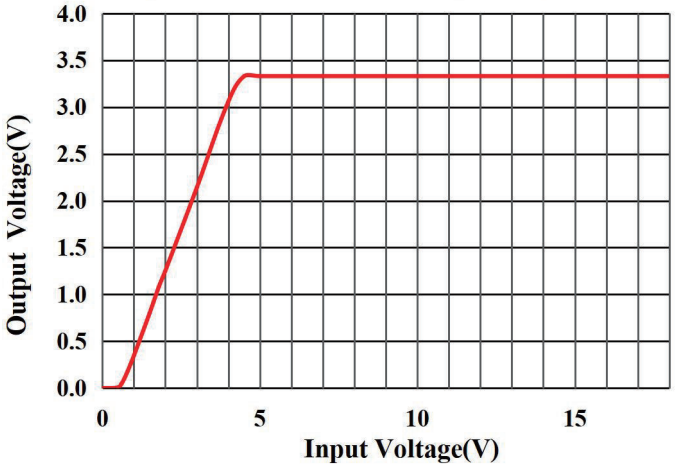
Note：

Dropout Voltage is the voltage difference between the input and the output at which the output voltage drops 2% below its nominal value.

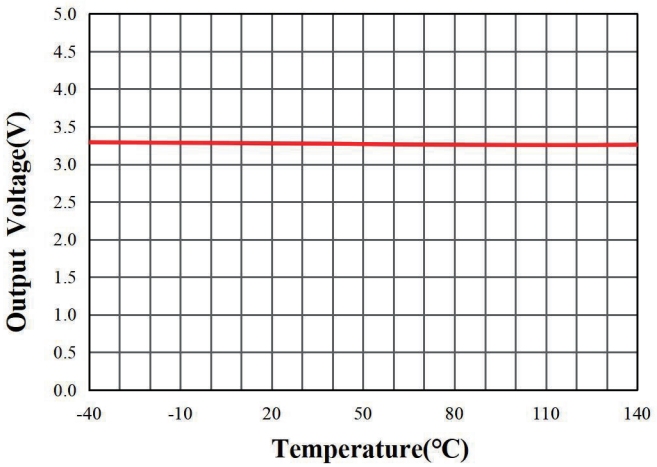
Typical Characteristics

(Test Condition: T_A = 25°C,C_{IN} = 10uF,V_{OUT}=3.3V,C_{OUT} = 10uF unless otherwise note)

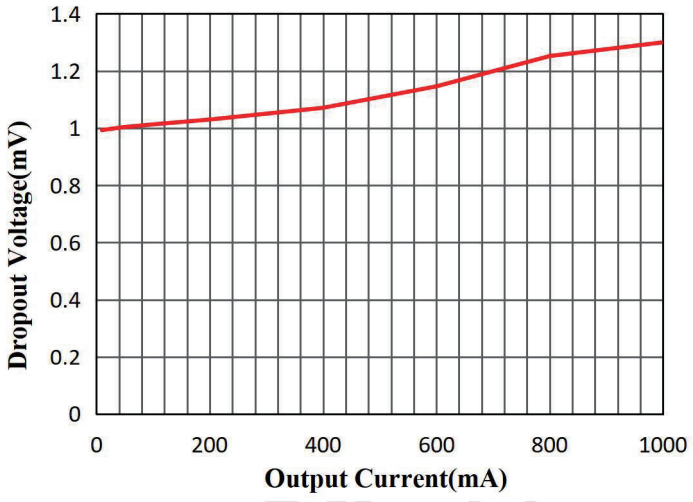
Output Voltage vs. Input Voltage (I_{OUT}= 1mA)



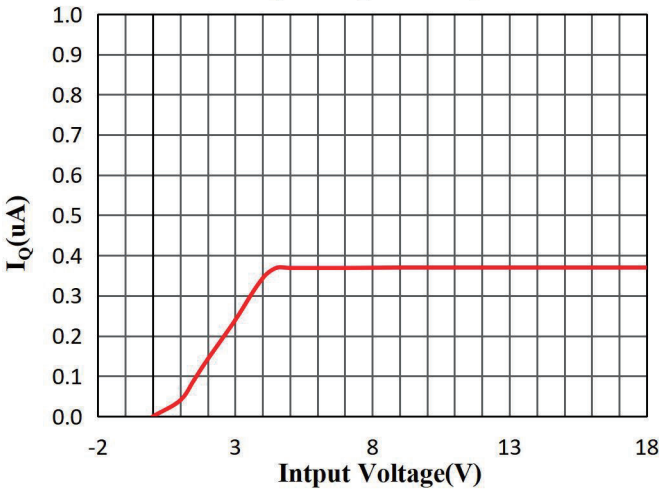
Output Voltage vs. Temperature (V_{IN}=5V, I_{OUT}= 1mA)



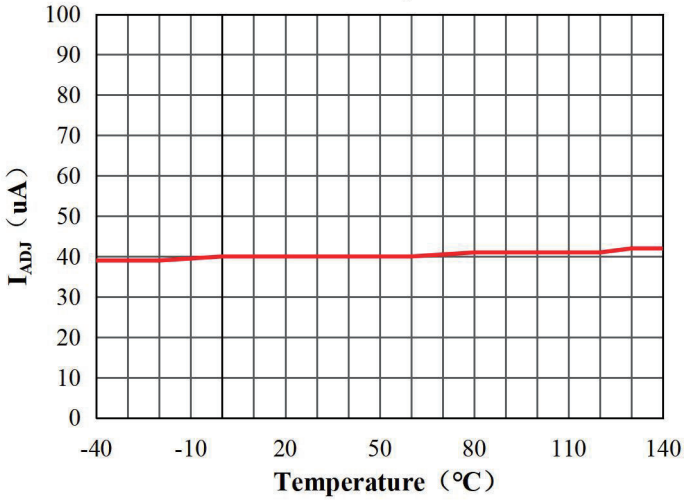
Dropout Voltage vs. Output Current



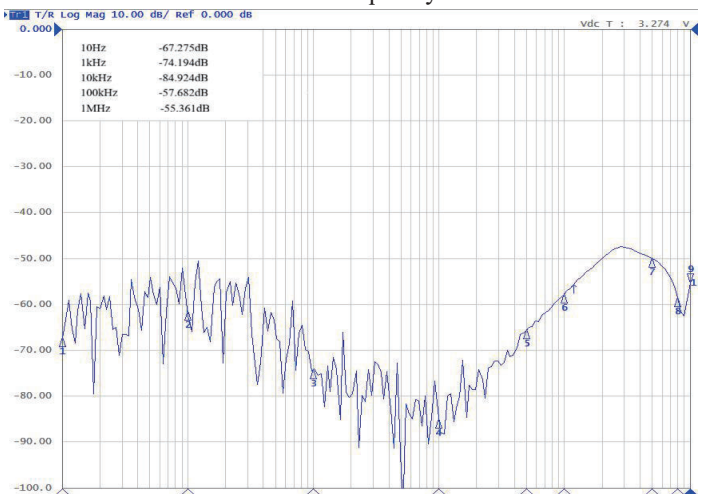
I_Q vs. Intput Voltage



I_{ADJ} vs. Temperature



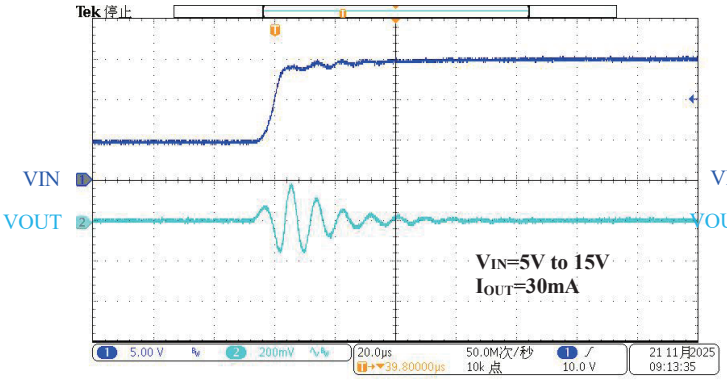
PSRR vs.frequency

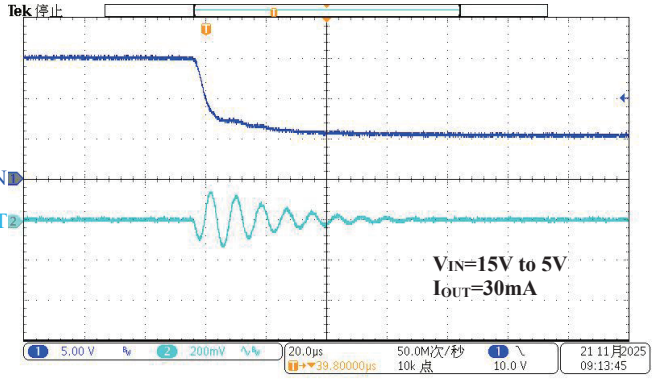


V_{IN}=6.3V,V_{OUT}=3.3V,I_{OUT}=10mA

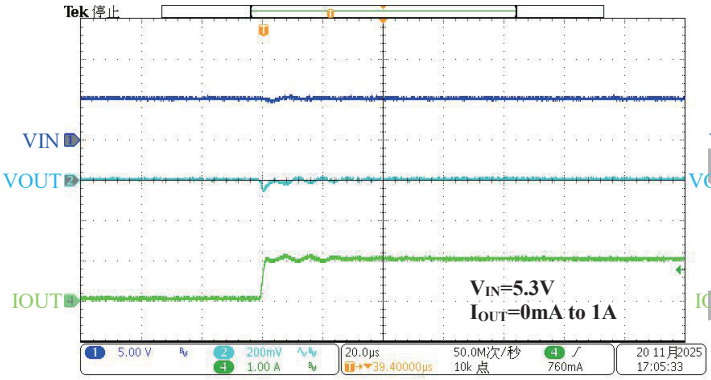
Typical Characteristics

(At T_A=25°C,C_{IN}=10uF,V_{OUT}=3.3V,C_{OUT}=10uF,unless otherwise noted)

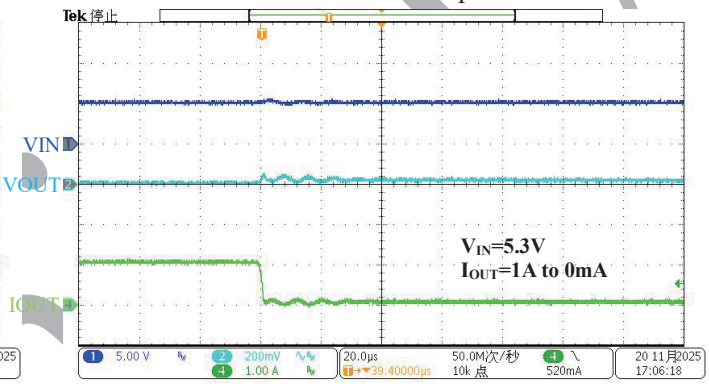




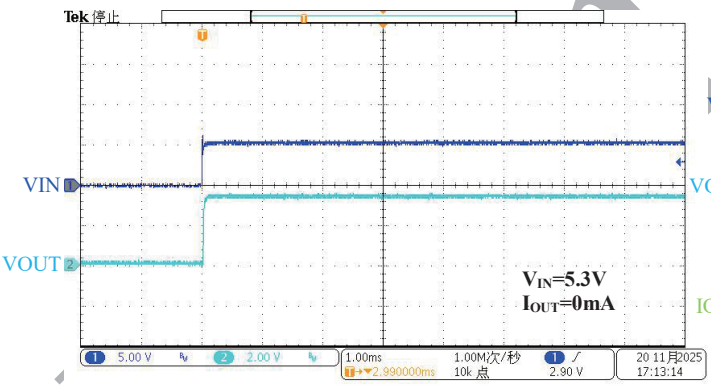
Line Transient Response



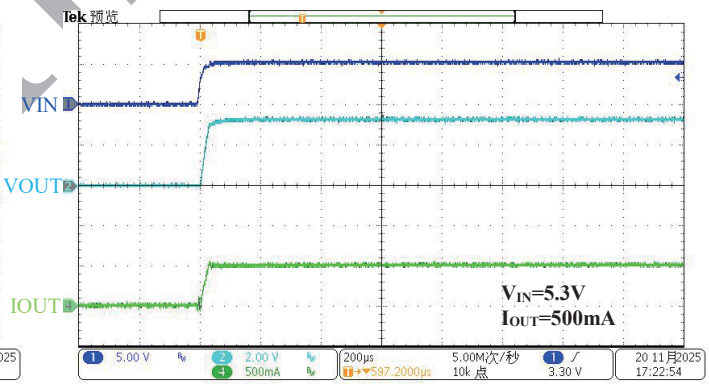
Line Transient Response



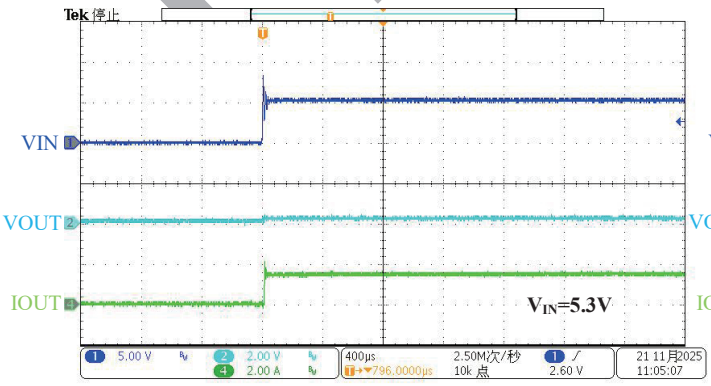
Load Transient Response



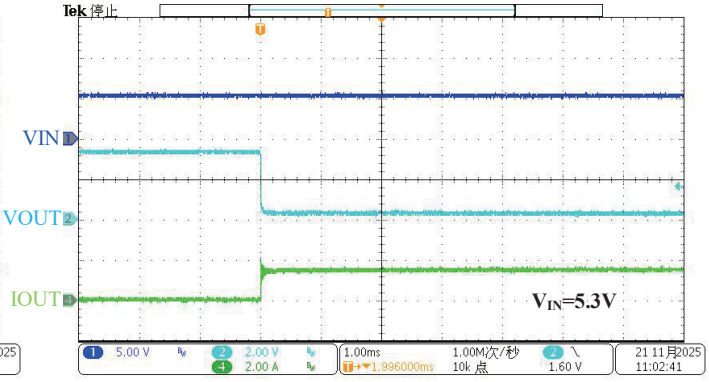
Load Transient Response



Start Up



Start Up

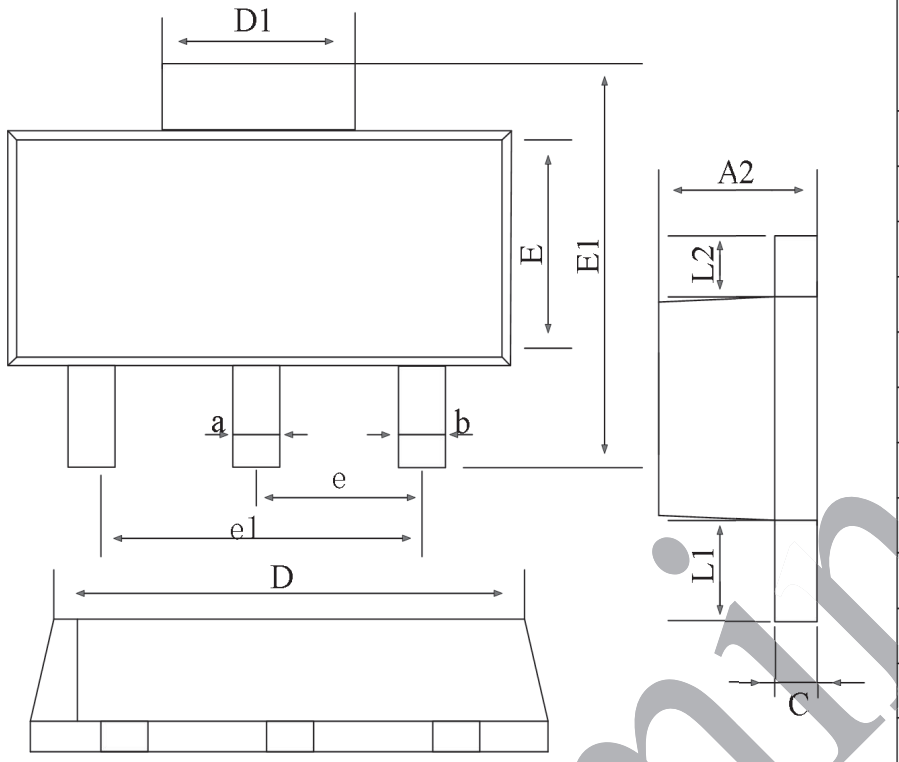


Short

Short

Package Outline

SOT223



REF.	Millimeter	
	Min.	Max.
A2	1.5	1.8
a	0.66	0.84
b	0.66	0.84
c	0.23	0.35
D	6.30	6.70
D1	2.90	3.10
E	3.30	3.70
E1	6.70	7.30
e	2.20	2.30
e1	4.40	4.60
L1	0.80	1.00
L2	0.65	0.75

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