General Description

The EC49315 is a low noise 500mA fixed /adjustable output voltage, with high ripple rejection ratio and fast transient response. It includes a precise reference voltage, an error amplifier, driver transistors, a compensation network and a low ON-resistance power MOSFET. It also integrates many protection circuitries, such as current limiters and an over temperature protection module. The EC49315 works well with low ESR ceramic capacitors, suitable for battery-powered applications with stringent space requirements and demanding performance. It also offers low quiescent current.

Features

◆Wide 2.5V to 6V Operating Range
◆Current Limiting Protection
◆Thermal Shutdown Protection
◆Low Dropout : 225mV @ 300mA; VOUT = 3.3V
◆High Ripple Rejection 65dB@10Hz
◆Standby Current Less Than 0.1 μ A

Applications

◆Battery-Powered Equipment
◆Portable Instruments
◆Digital Camera
◆WLAN Communication
◆Hand-Held Instruments

Ordering/Marking Information

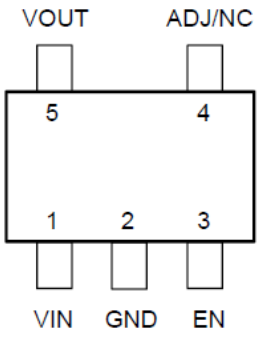
EC49315 XX XX X

- XX (1.05V=05, 1.1V=11, 3.3V=33, ADJ=AJ)
- XX (B2：SOT23-5L, F9：uDFN 1×1, T2：TSOT23-5L)
- X (R：Tape & reel)

Part No	Package	Marking	Information
EC49315XXB2R	SOT23-5L	XXYW	XX：Voltage Code 1.05V=05；1.1V=11；3.3V=33 Y：2017=7；2018=8；2019=9 W： A~Z=1~26 weeks a~z=27~52 weeks
		XXYW	XX：Voltage Code 1.05V=05；1.1V=11；3.3V=33 Y：2017=H、2018=I… W：A~Z=1~26 weeks a~z=27~52 weeks
EC49315XXF9R	Udfn1x1 4L	VV YW	Y：2017=H、2018=I… W：A~Z=1~26 weeks a~z=27~52 weeks
EC49315XXT2R	TSOT23-5L		

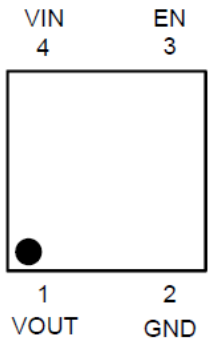
Pin Configurations

(Top View)



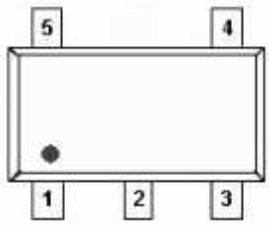
SOT23-5

(Top View)



uDFN-4L

(Top View)



TSOT23-5L

Pin Description

Name	Description
EN	Chip Enable (Active High). Note that this pin is high impedance. There should be a pull low 100kΩ resistor connected to GND when the control signal is floating.
GND	Ground
VOUT	Output Voltage
VIN	Input Voltage
ADJ	Feedback pin voltage is set to be 0.8V, Output voltage can be programmed by a resistor divider.
NC	No Internal Connection (Floating or Connecting to GND).

Typical Application Circuit

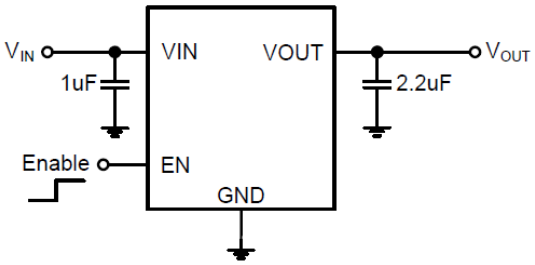
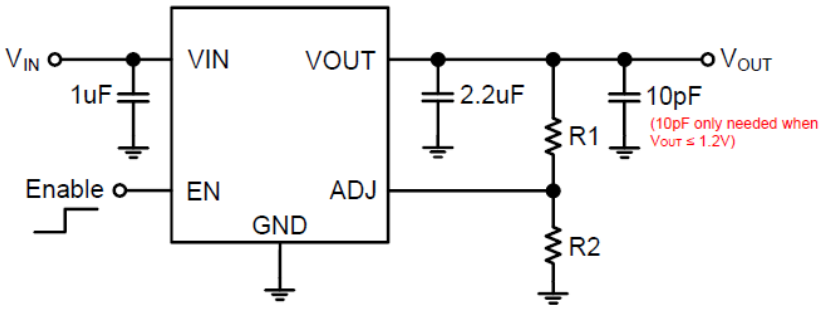


Figure1. Fixed Operation



$$V_{OUT} = V_{ADJ} \times \left(1 + \frac{R_1}{R_2}\right) Volts$$

Figure2. Adjustable Operation

Absolute Maximum Ratings (Note 1)

- ◆Supply Voltage VIN 8V
- ◆ Power Dissipation, PD @ TA=25°C
  - SOT23-5 400mW
  - uDFN-4L 400mW
- ◆ Thermal Resistance, θ_{JA}
  - SOT23-5 250°C/W
  - uDFN-4L 250°C/W
- ◆ Lead Temperature 260°C
- ◆ Storage Temperature -65°C to 150°C
- ◆ ESD Susceptibility
  - HBM (Human Body Mode) 2kV
  - MM (Machine Mode) 200V

Recommended Operating Conditions

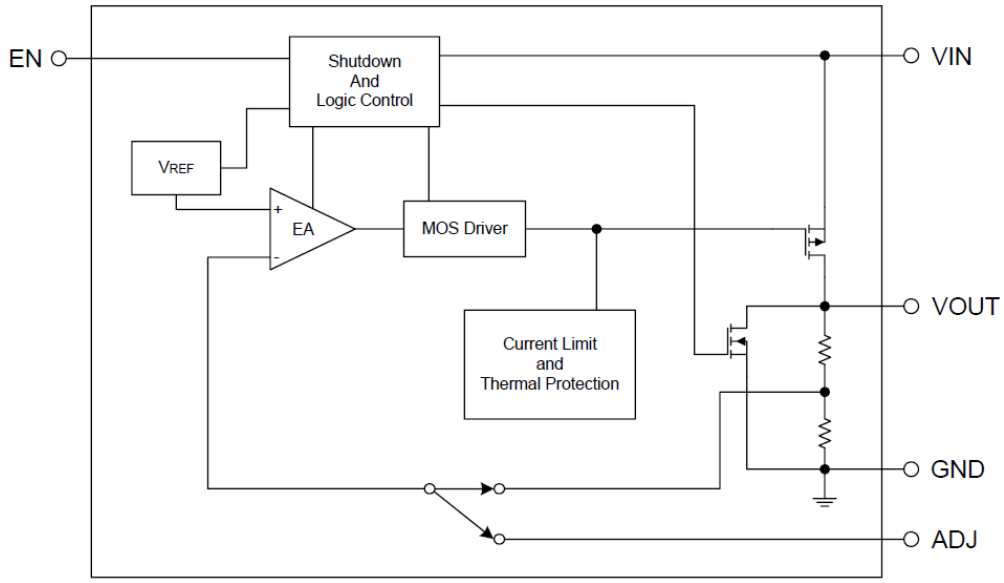
- ◆ Input Voltage V_{IN} 2.5V to 6V
- ◆ EN Input Voltage 0V to 6V
- ◆ Junction Temperature -40°C to 125°C
- ◆ Ambient Operating Temperature -40°C to 85°C

Electrical Characteristics (Unless otherwise specified. V_{IN}=5V， T_A = 25°C)

Parameters		Symbol	Condition		Min	Typ	Max	Units
Operating Voltage Range		VIN			2.5		6.0	V
Shutdown Supply Current		ISBY	VEN = GND, Shutdown			0.1	1	μA
Supply Current Limit		ILIMIT	RLOAD = 1Ω			900		mA
Quiescent Current		IQ	VADJ = 1V			35		μA
Dropout Voltage		VDrop	VOUT=3.3V	IOUT = 300mA		225		mV
				IOUT = 500mA		370		mV
Line regulation		ΔVLINE	VIN = (VOUT +1V) to 6V, IOUT = 1mA			0.075		%/V
Load Regulation		ΔVLOAD	(Vin=Vout+1V)1mA < IOUT < 500mA			10		mV
Fixed Output Voltage Accuracy		ΔVOUT	IOUT =1mA		-2		+2	%
Feedback Voltage		VADJ			0.775	0.8	0.825	V
EN Threshold	Logic-Low V	VIL	VIN = 2.5V to 6V, Shutdown				0.5	V
	Logic-High V	VIH	VIN = 2.5V to 6V, Start-Up		1.5			
Power Supply Rejection Rate	f = 10Hz	PSRR	COUT = 2.2 F, IOUT = 10mA			65		dB
Thermal Shutdown Temperature		TSD				150		°C
Thermal Shutdown Temperature Hysteresis		ΔTSD				30		°C

Note 1: Stresses listed as the above “Absolute Maximum Ratings” may cause permanent damage to the device. These are for stress ratings. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may remain possibility to affect device reliability.
Note 2: VIN(MIN) = VOUT+VDROP
Note 3: The dropout voltage is defined as (VIN-VOUT) when VOUT is 100mV below the target value of VOUT.
Note 4: The maximum output current is defined as (VIN-VOUT) x IOUT < Power dissipation value.

Function Block Diagram



Application Information

Input Capacitor

An input capacitance of 1μF is required between the device input pin and ground directly (the amount of the capacitance may be increased without limit). The input capacitor MUST be located less than 1cm from the device to assure input stability. A lower ESR capacitor allows the use of less capacitance, while higher ESR type (like aluminum electrolytic) requires more capacitance. Capacitor types (aluminum, ceramic and tantalum) can be mixed in parallel, but the total equivalent input capacitance/ESR must be defined as above for stable operation. There are no requirements for the ESR on the input capacitor, but tolerance and temperature coefficient must be considered when selecting the capacitor to ensure the capacitance is 1μF over the entire operating range.

Output Capacitor

The EC49315 is designed specifically to work with very small ceramic output capacitors. The minimum capacitance recommended(temperature characteristics of X7R, X5R, Z5U or Y5V) is within the 1μF to 10mf range with 5mΩ to 50mΩ ESR range ceramic capacitor between LDO output and GND for transient stability, but it may be increased without limit. Higher capacitance values help to improve transient response. The output capacitor's ESR is critical because it forms a zero to provide phase lead which is required for loop stability.

Enable Function

The EC49315 is shut down by pulling the EN pin low, and turned on by driving the input high. If the shutdown feature is not required, the EN pin should be tied to VIN to keep the regulator on at all times (the EN pin MUST NOT be left floating). To assure proper operation, the signal source used to drive the EN pin must be able to swing above and below the specified turn-on/off voltage thresholds listed in the “Electrical Characteristics” under VIH and VIL. The ON/OFF signal may come from either CMOS output, or an open-collector output with pull up resistor to the device input voltage or another logic supply. The high-level voltage may exceed the device input voltage, but must remain within the absolute maximum ratings for the EN pin.

Thermal Considerations

For continuous operation, do not exceed the maximum operation junction temperature 125° C. The maximum power dissipation depends on the thermal resistance of IC package, PCB layout, the rate of surroundings airflow and temperature difference between junctions to ambient. The maximum power dissipation can be calculated by following formula:

$$P_{D(MAX)} = \frac{(T_{J(MAX)} - T_A)}{\theta_{JA}}$$

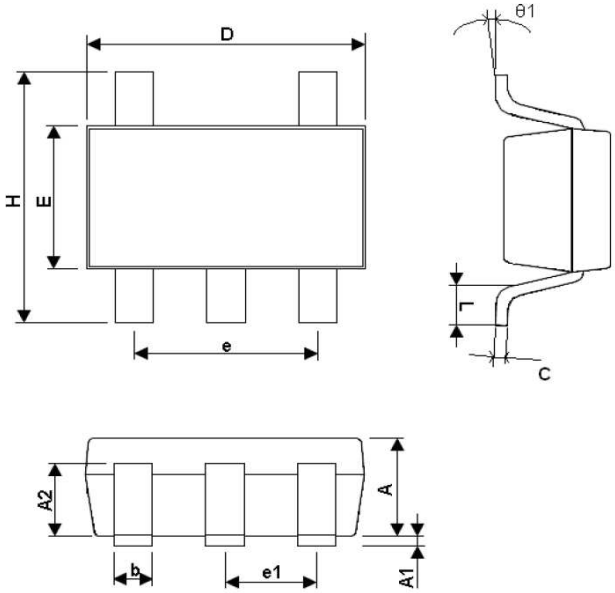
Where TJ(MAX) is the maximum operation junction temperature 125° C, TA is the ambient temperature and theθJA is the junction to ambient thermal resistance. For recommended operating conditions specification of EC49315 where TJ(MAX) is the maximum junction temperature of the die (125° C) and TA is the maximum ambient temperature. The junction to ambient thermal resistance θJA is layout dependent.

Adjustable Operation

The adjustable version of the EC49315 has an output voltage ranging from 0.9V to 5V. The output voltage of the EC49315 adjustable regulator is programmed using an external resistor divider as shown in Figure2. R2 resistor must less than 100KΩ for good stability. To enable default output voltage (pre-set), connect ADJ pin to ground. There is no external component needed to decide voltage.

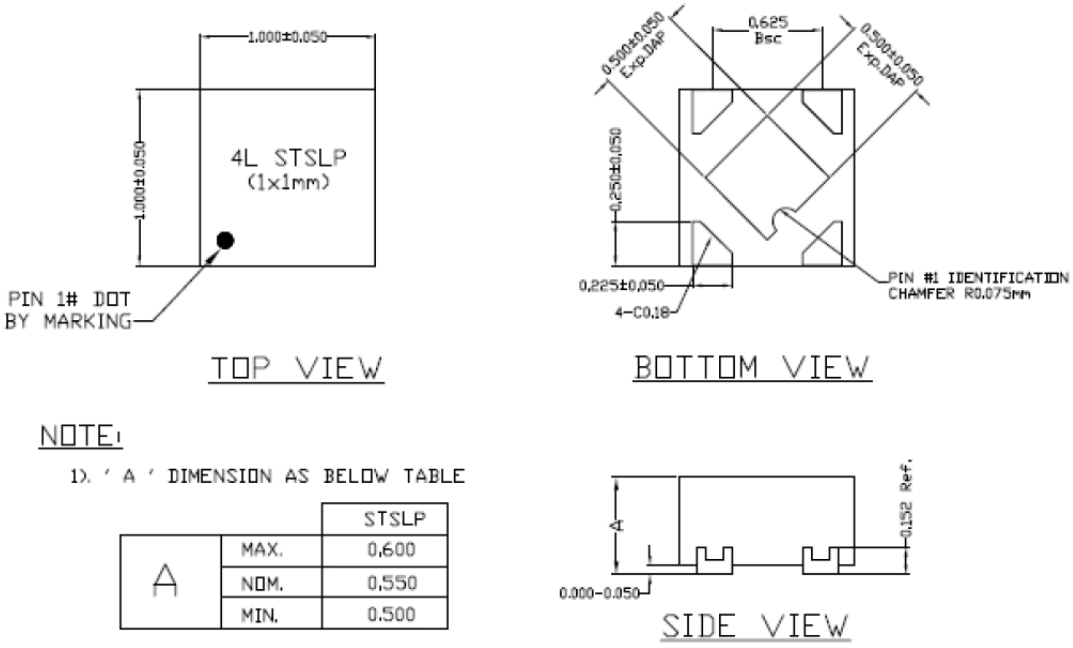
Package Information

SOT23-5

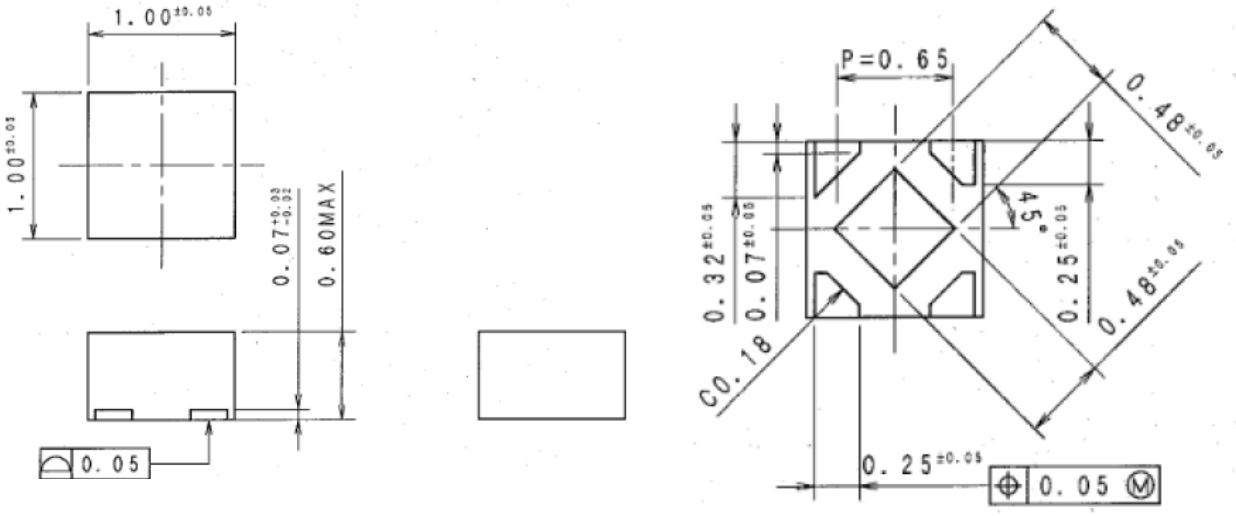


SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.00	1.10	1.30	0.039	0.043	0.051
A1	0.00	---	0.10	0.000	---	0.004
A2	0.70	0.80	0.90	0.027	0.031	0.035
b	0.35	0.40	0.50	0.013	0.016	0.020
C	0.10	0.15	0.25	0.004	0.006	0.001
D	2.70	2.90	3.10	0.106	0.114	0.122
E	1.50	1.60	1.80	0.059	0.063	0.071
e	---	1.90(TYP)	---	---	0.075	---
H	2.60	2.80	3.00	0.102	0.110	0.118
L	0.370	---	---	0.015	---	---
Θ1	1°	5°	9°	1°	5°	9°
e1	---	0.95(TYP)	---	---	0.037	---

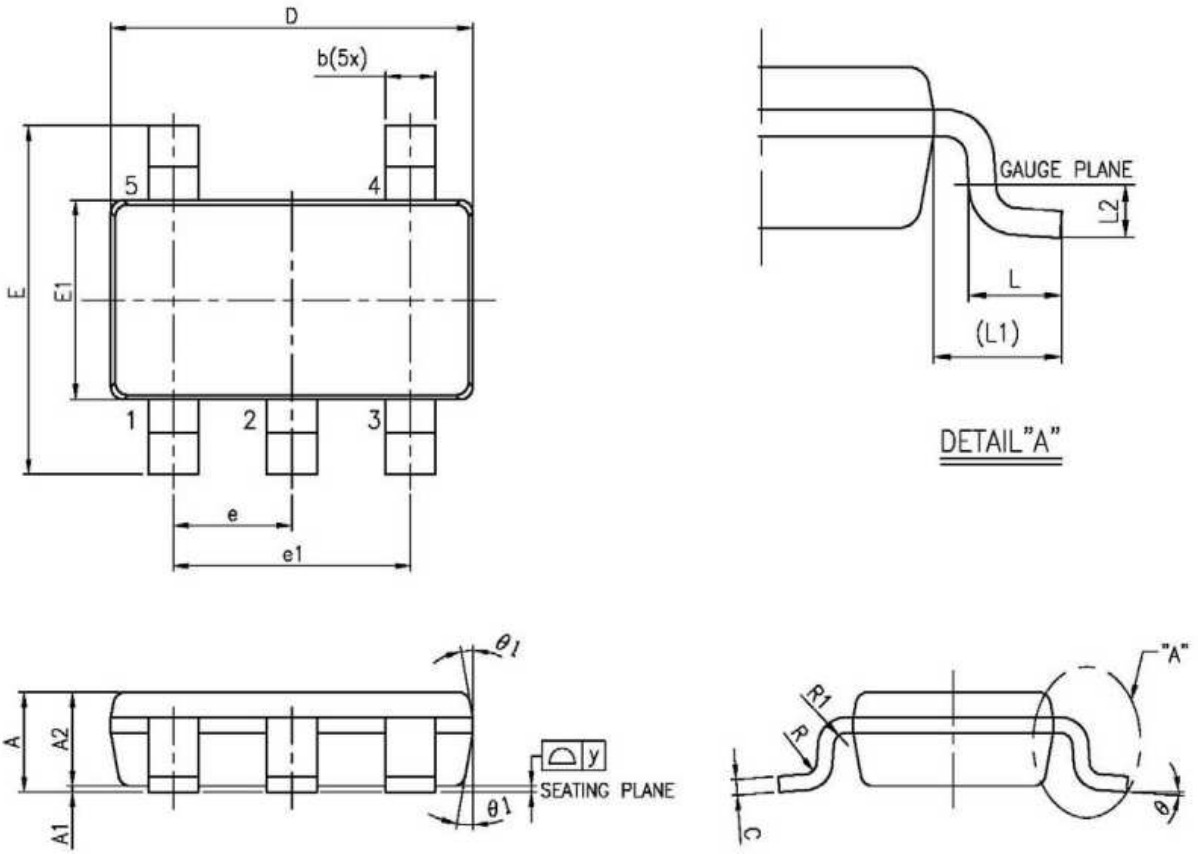
uDFN(1x1) TypeA



uDFN(1x1) TypeB



TSOT23-5L



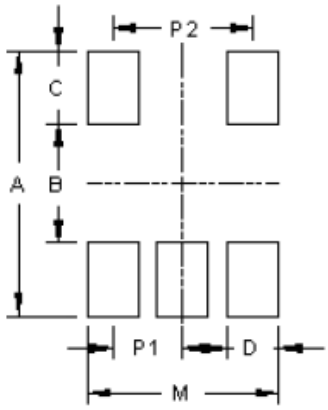
NOTE :

1. All dimensions are in millimeters.
2. Dimension D does not include mold flash, protrusion or gate burrs. Mold flash protrusions or gate burrs shall not exceed 0.15mm per end. Dimension E1 does not include interlead flash or protrusion. Interlead flash or protrusion shall not exceed 0.15mm per side.
3. The package top may be smaller then the package bottom. Dimensions D and E1 are determined at outermost extremes of the plastic body exclusive of mold flash, Tie bar burrs, Gate burrs and interlead flash, but including any mismatch between the top and bottom of the plastic body.
4. Dimension “b” does not include dambar protrusion. Allowable dambar protrusion shall be 0.08mm total in excess of the “b” dimension at maximum material condition. The dambar cannot be located on the lower radius of the foot. Minimum space between protrusion and an adjacent lead shall not be less than 0.07mm

SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	0.75	----------	0.90
A1	0.00	----------	0.10
A2	0.70	0.75	0.80
B	0.30	----------	0.50
c	0.08	----------	0.20
D	2.80	2.90	3.00
E	2.60	2.80	3.00
E1	1.50	1.60	1.70
e		0.95 BSC	
e1		1.90 BSC	
L	0.30	0.45	0.60
L1		0.60 REF	
L2		0.25 BSC	
R	0.10	----------	----------
R1	0.10	----------	0.25
θ	0°	4°	8°
θ1	4°	10°	12°
y	----------	----------	0.10

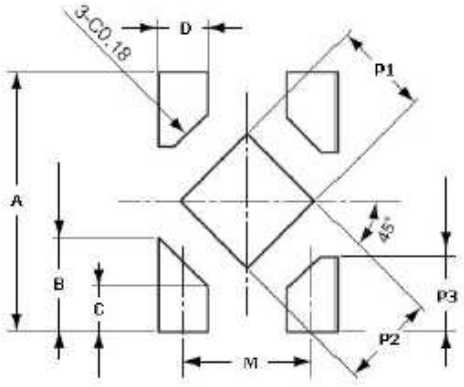
Footprints

SOT23-5



Package	Number of PIN	Footprint Dimension (mm)							Tolerance
		P1	P2	A	B	C	D	M	
(T)SOT-23-5	5	0.95	1.90	3.60	1.60	1.00	0.70	2.60	±0.10

uDFN(1x1)



Package	Number of	Footprint Dimension (mm)								Tolerance
	PIN	P1	P2	P3	A	B	C	D	M	
UDFN-4L	4	0.48	0.48	0.4	1.3	0.47	0.22	0.25	0.65	±0.10