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Vinka Microelectronics

VK75XX-1 Datasheet

100mA Low Dropout LDO

Rev.1.1

1 General Description

VK75XX-1 is a low-dropout linear regulator that adopts CMOS technology. The maximum output current is 100mA and the maximum allowable input voltage is +36V. It has several fixed output voltages, ranging from 2.5V to 5.0V. COMS technology can ensure that it has the characteristics of low voltage drop and low quiescent current.

2 Key Features

- Low power consumption
- Low dropout voltage
- Lower temperature coefficient
- Maximum input voltage: +36V
- Typical static current: 2uA
- Maximum output current: 100mA
- Output voltage accuracy: ±2%
- Available Packages:
  SOT23-3, SOT89

3 Application Field

- Battery-powered equipment
- Communication equipment
- Audio/video equipment

4 Product Selection

Part No.	Output voltage	Packaging	Official seal
VK7525-1	2.5V	SOT23-3 SOT89	VK75XX-1 (Package as SOT23-3) VK75XX-1 (Package as SOT89)
VK7530-1	3.0V		
VK7533-1	3.3V		
VK7536-1	3.6V		
VK7544-1	4.4V		
VK7550-1	5.0V		

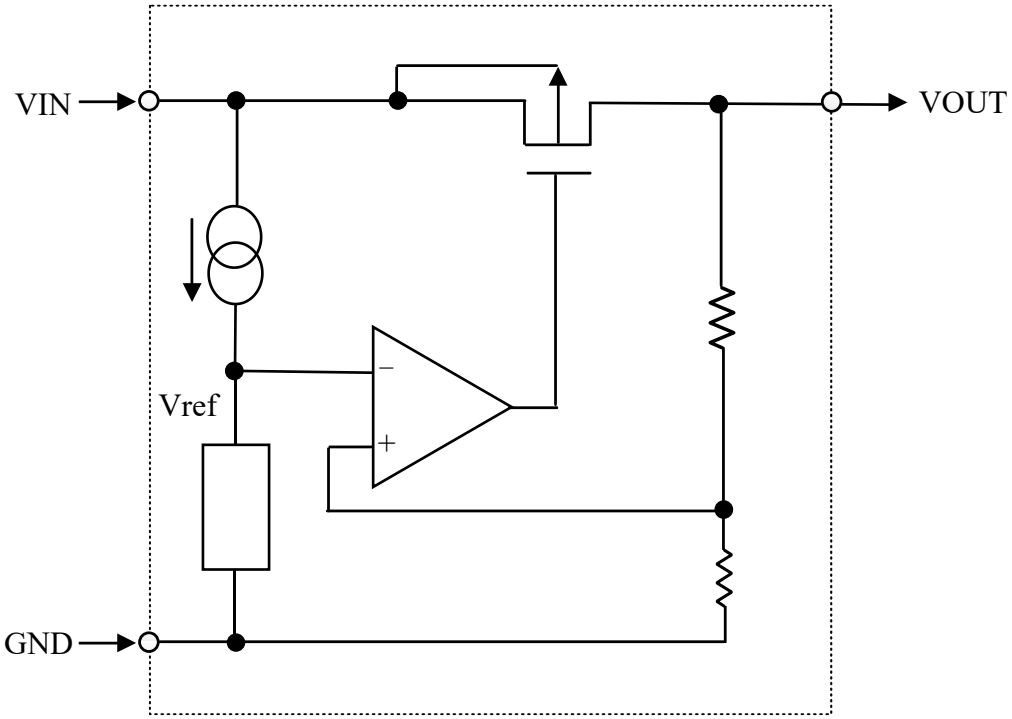
Note: "xx" represents the output voltage.

5 Ordering Information

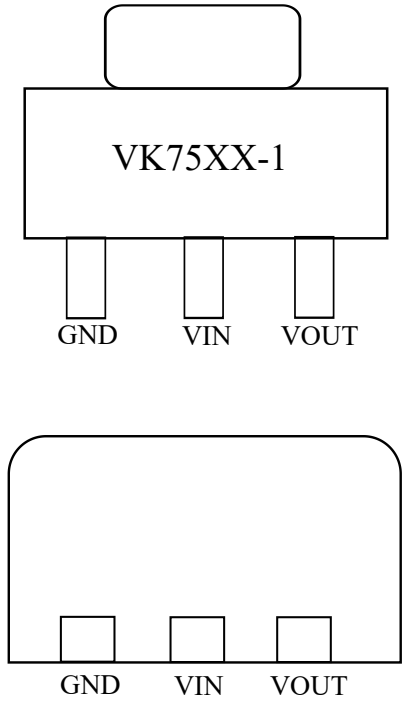
Part No.	Packaging	Tube Qty	Tray(reel)Qty	Box Qty	Total Qty	Notes
VK7525-1	SOT23-3	—	3000/reel	9000/box	108000 PCS	
	SOT89	—	1000/reel	3000/box	36000 PCS	
VK7530-1	SOT23-3	—	3000/reel	9000/box	108000 PCS	
	SOT89	—	1000/reel	3000/box	36000 PCS	
VK7533-1	SOT23-3	—	3000/reel	9000/box	108000 PCS	
	SOT89	—	1000/reel	3000/box	36000 PCS	
VK7536-1	SOT23-3	—	3000/reel	9000/box	108000 PCS	
	SOT89	—	1000/reel	3000/box	36000 PCS	
VK7544-1	SOT23-3	—	3000/reel	9000/box	108000 PCS	
	SOT89	—	1000/reel	3000/box	36000 PCS	
VK7550-1	SOT23-3	—	3000/reel	9000/box	108000 PCS	
	SOT89	—	1000/reel	3000/box	36000 PCS	

6 Functional Description

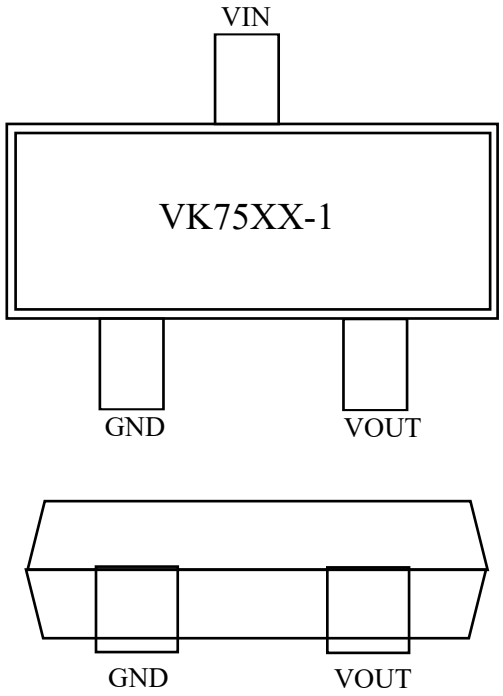
6.1 Block Diagram



7 Package Pinout Information(SOT-89 / SOT23-3)



SOT-89



SOT23-3

For more information: 11-12 page

7.1 VK75XX-1/SOT-89/SOT23-3 Pin Description

No.	Name	Function
1	GND	Negative power supply
2	VIN	Input pin
3	VOUT	Output pin

8 Limit Parameters

Power supply voltage ---------- -0.3V ~+36V
Storage temperature range ---------- -45℃~+140℃
Working environment temperature ---------- -40℃~+85℃

Note: Here, only the rated power is emphasized. Exceeding the range specified by the limit parameters will cause damage to the chip. It is impossible to predict the working state of the chip outside the above-mentioned marked range. Moreover, if it operates for a long time under conditions outside the marked range, it may affect the reliability of the chip.
*When choosing the input voltage and output current, be sure that the power consumption does not exceed the PD value.

8.1 Thermal Information

Symbol	Parameter	Packaging	Max.	Unit
θJA	Thermal resistance (connection with the environment) (assuming no environmental airflow and no heat sink)	SOT23-3	500	℃/W
		SOT89	200	℃/W
PD	Power consumption	SOT23-3	0.2	W
		SOT89	0.5	W

Note: The PD value was measured at Ta=25℃.

8.2 Electrical Characteristics

Note 1: Avoid the internal power consumption (PD) of the IC exceeding the maximum power consumption value allowed by the package.
The calculation method of PD: PD=(VIN-VOUT)×IOUT
For example, in the SOT89 package, when VIN=12V and IOUT=100mA, PD=(12-5)× 100mA=0.7W. Exceeding the specification of 0.5W May damage the IC.
For PD values of different packages, please refer to the "Thermal Energy Information" column.

VK7525-1,+2.5V Output Ta=25℃

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{IN}	Input voltage	—	—	—	36(Note1)	V
V_{OUT}	Output voltage	$V_{IN}=V_{OUT}+2V$ $I_{OUT}=10mA$	2.450	2.500	2.550	V
I_{OUT}	Output current	$V_{IN}=V_{OUT}+2V$	70	100	—	mA
ΔV_{OUT}	Load regulation rate	$V_{IN}=V_{OUT}+2V$ $1mA \leqslant I_{OUT} \leqslant 50mA$	—	25	60	mV
V_{DIF}	Dropout Voltage	I_{OUT} =1mA, ΔVo =2%	—	2	4	mV
I_{SS}	Static current	No load	—	2	3.0	uA
$\frac{\Delta VOUT}{\Delta VIN \times VOUT}$	Input voltage regulation rate	$Vo+1V \leqslant V_{IN} \leqslant 36V$ I_{OUT} =1mA	—	—	0.2	%/V
$\frac{\Delta VOUT}{\Delta Ta \times VOUT}$	Temperature coefficient	I_{OUT} =10mA -40℃<Ta<85℃	—	100	—	ppm/℃

Note: Under the condition of VIN=VOUT+2V and a fixed load, the output voltage drops by 2%. At this time, the input voltage minus the output voltage is the Dropout voltage.

VK7530-1,+3.0V Output Ta=25℃

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{IN}	Input voltage	—	—	—	36(Note1)	V
V_{OUT}	Output voltage	$V_{IN}=V_{OUT}+2V$ $I_{OUT}=10mA$	2.940	3.000	3.060	V
I_{OUT}	Output current	$V_{IN}=V_{OUT}+2V$	70	100	—	mA
ΔV_{OUT}	Load regulation rate	$V_{IN}=V_{OUT}+2V$ $1mA \leqslant I_{OUT} \leqslant 50mA$	—	25	60	mV
V_{DIF}	Dropout Voltage	I_{OUT} =1mA, ΔVo =2%	—	2	4	mV
I_{SS}	Static current	No load	—	2.0	3.0	uA
$\frac{\Delta VOUT}{\Delta VIN \times VOUT}$	Input voltage regulation rate	$Vo+1V \leqslant V_{IN} \leqslant 36V$ I_{OUT} =1mA	—	—	0.2	%/V
$\frac{\Delta VOUT}{\Delta Ta \times VOUT}$	Temperature coefficient	I_{OUT} =10mA -40℃<Ta<85℃	—	100	—	ppm/℃

Note: Under the condition of VIN=VOUT+2V and a fixed load, the output voltage drops by 2%. At this time, the input voltage minus the output voltage is the Dropout voltage.

VK7533-1，+3.3V Output Ta=25℃

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{IN}	Input voltage	—	—	—	36(Note1)	V
V_{OUT}	Output voltage	$V_{IN}=V_{OUT}+2V$ $I_{OUT}=10mA$	3.234	3.300	3.366	V
I_{OUT}	Output current	$V_{IN}=V_{OUT}+2V$	70	100	—	mA
ΔV_{OUT}	Load regulation rate	$V_{IN}=V_{OUT}+2V$ $1mA \leqslant I_{OUT} \leqslant 50mA$	—	25	60	mV
V_{DIF}	Dropout Voltage	I_{OUT} =1mA, ΔVo =2%	—	2	4	mV
I_{SS}	Static current	No load	—	2.0	3.0	uA
$\frac{\Delta VOUT}{\Delta VIN \times VOUT}$	Input voltage regulation rate	$Vo+1V \leqslant V_{IN} \leqslant 36V$ I_{OUT} =1mA	—	—	0.2	%/V
$\frac{\Delta VOUT}{\Delta Ta \times VOUT}$	Temperature coefficient	I_{OUT} =10mA -40℃<Ta<85℃	—	100	—	ppm/℃

Note: Under the condition of VIN=VOUT+2V and a fixed load, the output voltage drops by 2%. At this time, the input voltage minus the output voltage is the Dropout voltage.

VK7536-1，+3.6V Output Ta=25℃

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{IN}	Input voltage	—	—	—	36(Note1)	V
V_{OUT}	Output voltage	$V_{IN}=V_{OUT}+2V$ $I_{OUT}=10mA$	3.528	3.600	3.672	V
I_{OUT}	Output current	$V_{IN}=V_{OUT}+2V$	70	100	—	mA
ΔV_{OUT}	Load regulation rate	$V_{IN}=V_{OUT}+2V$ $1mA \leqslant I_{OUT} \leqslant 50mA$	—	25	60	mV
V_{DIF}	Dropout Voltage	I_{OUT} =1mA, ΔVo =2%	—	2	4	mV
I_{SS}	Static current	No load	—	2.0	3.0	uA
$\frac{\Delta VOUT}{\Delta VIN \times VOUT}$	Input voltage regulation rate	$Vo+1V \leqslant V_{IN} \leqslant 36V$ I_{OUT} =1mA	—	—	0.2	%/V
$\frac{\Delta VOUT}{\Delta Ta \times VOUT}$	Temperature coefficient	I_{OUT} =10mA -40℃<Ta<85℃	—	100	—	ppm/℃

Note: Under the condition of VIN=VOUT+2V and a fixed load, the output voltage drops by 2%. At this time, the input voltage minus the output voltage is the Dropout voltage.

VK7544-1，+4.4V Output Ta=25℃

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{IN}	Input voltage	—	—	—	36(Note1)	V
V_{OUT}	Output voltage	$V_{IN}=V_{OUT}+2V$ $I_{OUT}=10mA$	4.312	4.400	4.488	V
I_{OUT}	Output current	$V_{IN}=V_{OUT}+2V$	70	100	—	mA
ΔV_{OUT}	Load regulation rate	$V_{IN}=V_{OUT}+2V$ $1mA \leqslant I_{OUT} \leqslant 50mA$	—	25	60	mV
V_{DIF}	Dropout Voltage	I_{OUT} =1mA, ΔVo =2%	—	2	4	mV
I_{SS}	Static current	No load	—	2.0	3.0	uA
$\frac{\Delta VOUT}{\Delta VIN \times VOUT}$	Input voltage regulation rate	$Vo+1V \leqslant V_{IN} \leqslant 36V$ I_{OUT} =1mA	—	—	0.2	%/V
$\frac{\Delta VOUT}{\Delta Ta \times VOUT}$	Temperature coefficient	I_{OUT} =10mA -40℃<Ta<85℃	—	100	—	ppm/℃

Note: Under the condition of VIN=VOUT+2V and a fixed load, the output voltage drops by 2%. At this time, the input voltage minus the output voltage is the Dropout voltage.

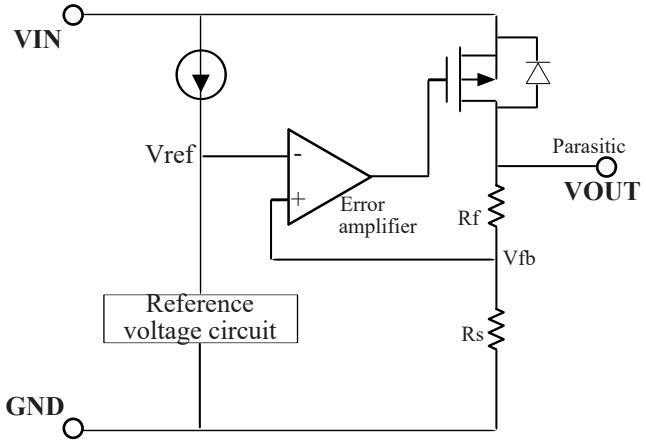
VK7550-1，+5.0V Output Ta=25℃

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{IN}	Input voltage	—	—	—	36(Note1)	V
V_{OUT}	Output voltage	$V_{IN}=V_{OUT}+2V$ $I_{OUT}=10mA$	4.900	5.000	5.100	V
I_{OUT}	Output current	$V_{IN}=V_{OUT}+2V$	100	100	—	mA
ΔV_{OUT}	Load regulation rate	$V_{IN}=V_{OUT}+2V$ $1mA \leqslant I_{OUT} \leqslant 50mA$	—	25	60	mV
V_{DIF}	Dropout Voltage	I_{OUT} =1mA, ΔVo =2%	—	2	4	mV
I_{SS}	Static current	No load	—	2.0	3.0	uA
$\frac{\Delta VOUT}{\Delta VIN \times VOUT}$	Input voltage regulation rate	$Vo+1V \leqslant V_{IN} \leqslant 36V$ I_{OUT} =1mA	—	—	0.2	%/V
$\frac{\Delta VOUT}{\Delta Ta \times VOUT}$	Temperature coefficient	I_{OUT} =10mA -40℃<Ta<85℃	—	100	—	ppm/℃

Note: Under the condition of VIN=VOUT+2V and a fixed load, the output voltage drops by 2%. At this time, the input voltage minus the output voltage is the Dropout voltage.

9 Function Description

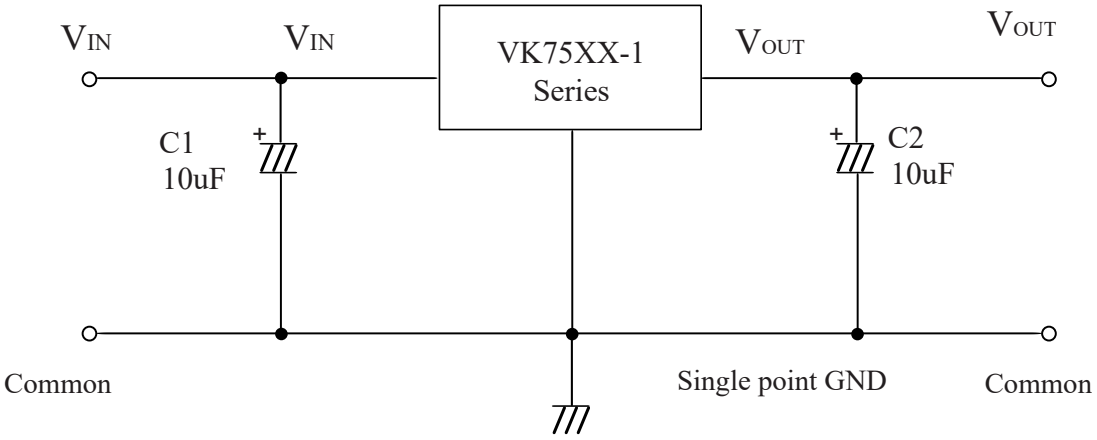
The error amplifier compares the input voltage Vfb of the voltage divider resistor composed of the feedback resistors Rs and Rf with the reference voltage Vref. The necessary gate voltage is provided to the output transistor through this error amplifier, so that the output voltage remains constant without being affected by the input voltage or temperature changes.



Usage Precautions：

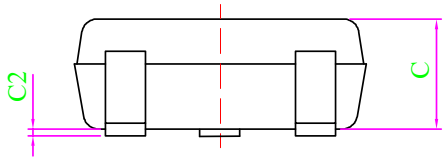
1. The circuit internally employs a phase compensation circuit and uses the ESR of the output capacitor for compensation. Therefore, the output to ground must be connected to a capacitor larger than 2.2uF.
2. It is recommended that 10uF polarized capacitors be used for input and output during application, and the capacitors be placed as close as possible to the VI N and VOUT pins of the LDO.
3. Pay attention to the usage conditions of input and output voltages and load currents to avoid the internal power consumption PD of the IC exceeding the maximum power consumption value allowed by the package.

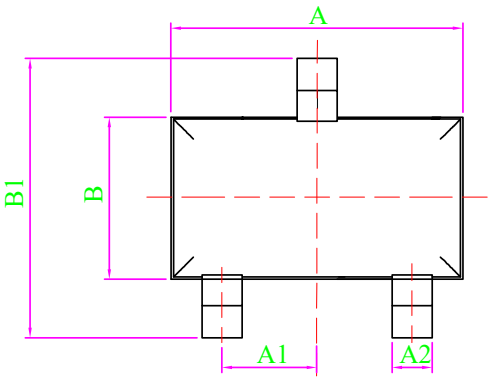
10 Application Circuits

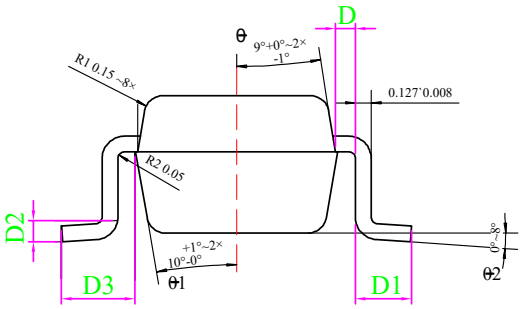


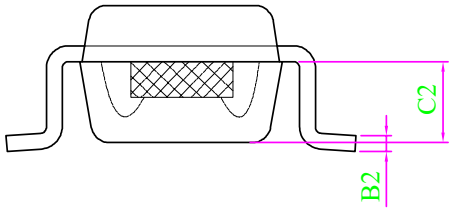
11 Package Information

11.1 SOT23-3 Package size



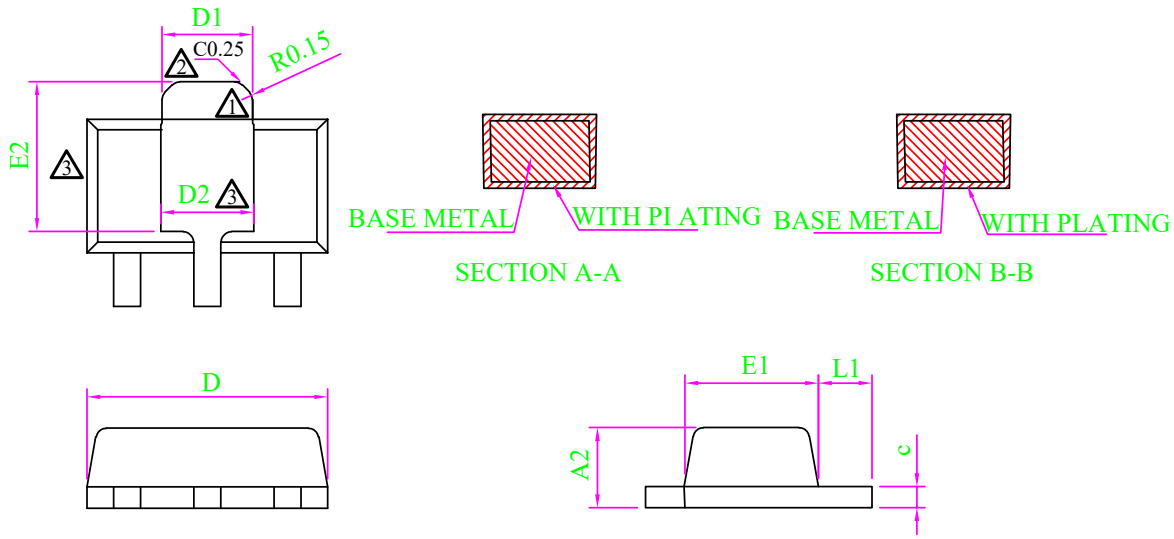






COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER			
SYMBOL	MIN	MID	MAX
A	2.82	2.92	3.02
A1	0.90	0.95	1.00
A3	0.30	0.35	0.40
B	1.52	1.62	1.72
B1	2.80	2.90	3.00
B2	0.12	0.128	0.135
C	1.05	1.10	1.15
C1	0.03	0.08	0.13
C2	0.60	0.65	0.70
D	0.03	0.08	0.13
D1	0.40	0.45	0.50
D2	0.25TYP		
D3	0.60	0.65	0.70

11.2 SOT-89 Package size



	SYMBOL	MILLIMETER		
		MIN	NOM	MAX
	A2	1.40	1.50	1.60
4	b	0.38	-	0.46
	b1	0.37	0.40	0.43
4	c	0.38	-	0.42
4	c1	0.37	0.38	0.39
	a	0.46	-	0.56
	a1	0.45	0.48	0.51
4	D	4.40	4.50	4.60
5	D1	1.62	-	1.83
5	E	3.95	-	4.25
4	E1	2.40	2.50	2.60
	e	1.50BSC		
5	L1	0.89	-	1.20

L/F Size (mil) \ Size(mm)	5 D2	3 E2
66.9*63	1.75REF	2.84REF

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13 Revision History

No.	Version	Date	Modify the content	Check
1	1.0	2020-08-10	initial release	YES
2	1.1	2025-11-07	Change Description	YES

[1] Please refer to the latest version of this document before starting or finalizing any design.

[2] Since the release of this document, the status or availability of this product may have changed. For the most up-to-date information, please visit: https://www.szvinka.com/