

## SINGLE OPERATIONAL AMPLIFIER AND VOLTAGE REFERENCE

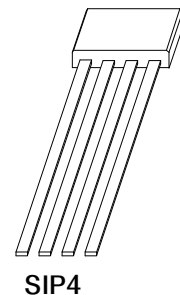
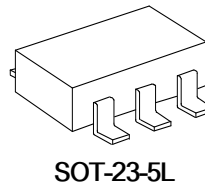
### GENERAL DESCRIPTION

The FP701, a 1-chip composed one op-amp (OPA) with a 1.25V precision voltage reference on non-inverting input and an open collector output, applied to offer space and low cost in many applications such as the secondary feedback control of power supply, AC/DC converter or adaptor.

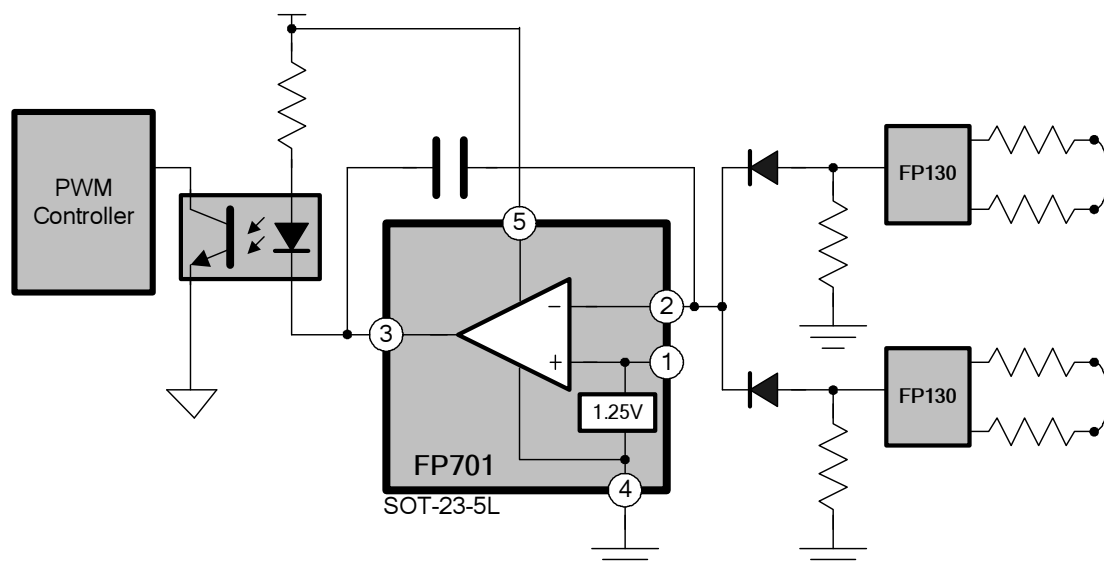
Using few external components, FP701, a high performance integrated IC, is designed for an OCP detector. The circuit diagram of the typical application example is as below.

### FEATURES

- Fixed reference voltage: 1.25V
- High precision over temperature: 1%
- Wide operating voltage from 3.0V~25V
- Open collector output
- Sink current up to 20mA
- Low input offset voltage: 1mV
- Package: SOT-23-5L & SIP-4L

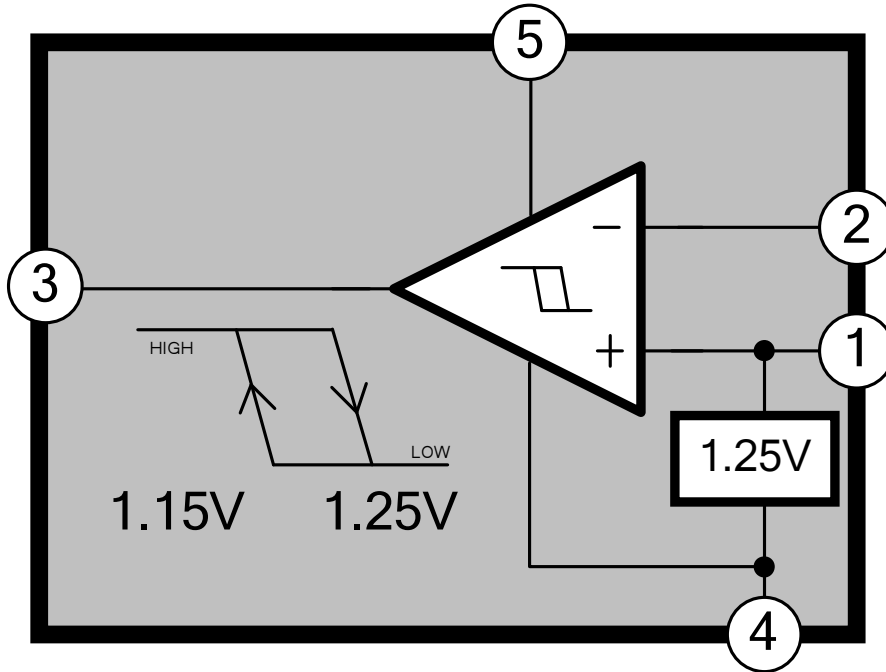


### TYPICAL APPLICATION CIRCUIT

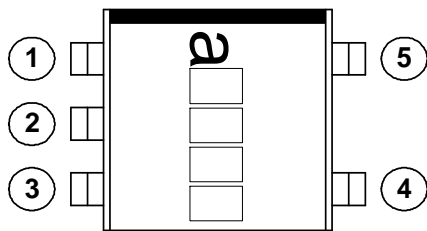


FUNCTIONAL BLOCK DIAGRAM

SOT-23-5L



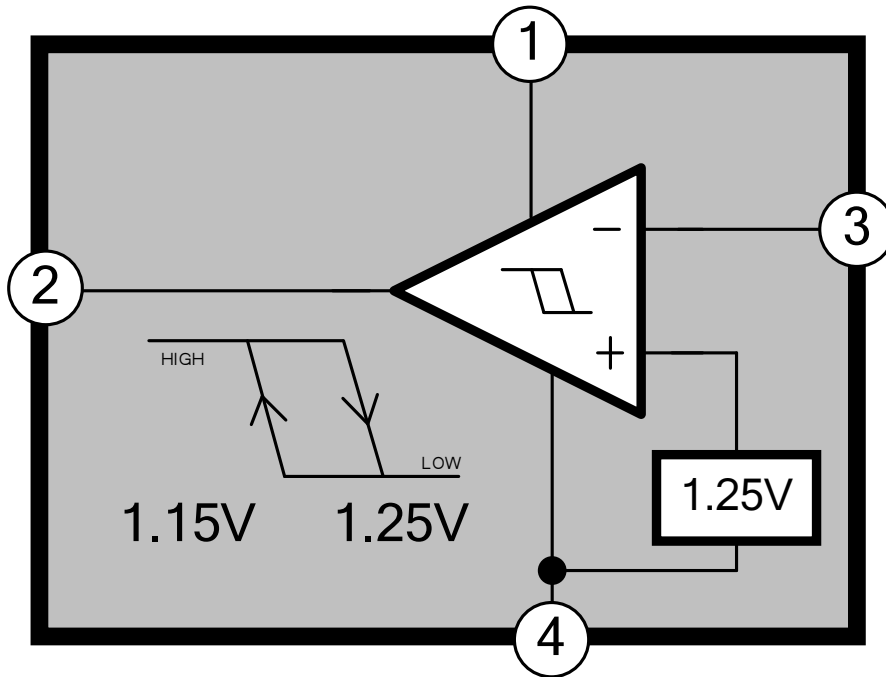
MARK VIEW



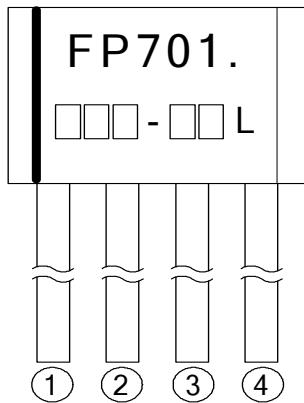
PIN DESCRIPTION

NAME	NO.	STATUS	DESCRIPTION
REF	1	O/I	1.25V Reference Output OPA Non-Inverting Input
IN-	2	I	OPA Inverting Input
OUT	3	O	OPA Open Collector Output
GND	4	P	IC Ground
VCC	5	P	IC Power Supply

SIP-4L



### MARK VIEW



### PIN DESCRIPTION

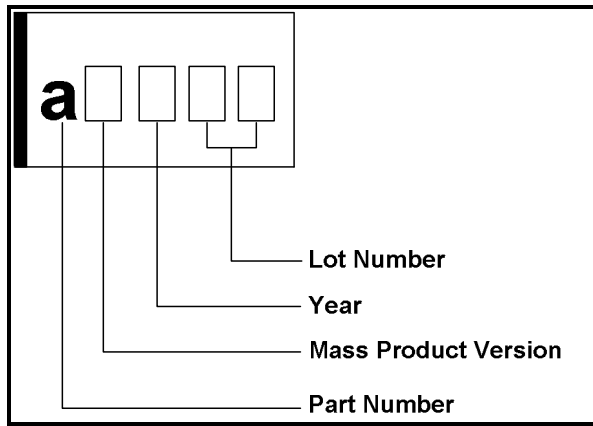
NAME	NO.	STATUS	DESCRIPTION
VCC	1	P	IC Power Supply
OUT	2	O	OPA Open Collector Output
IN-	3	I	OPA Inverting Input
GND	4	P	IC Ground

## ORDER INFORMATION

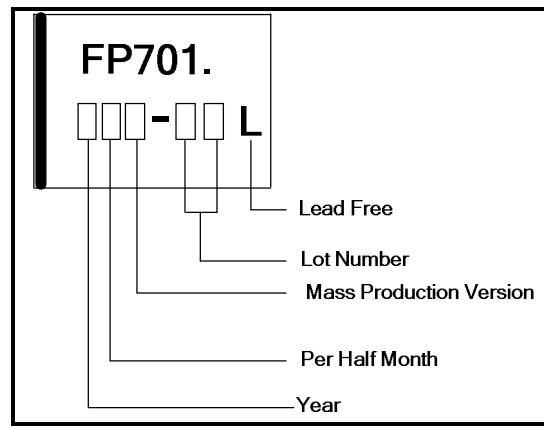
Part Number	Op. Temperature	Package	Description
FP701K-LF	-20°C ~ 85°C	SOT-23-5L	
FP701KR-LF		SOT-23-5L	Tape & Reel
FP701H-LF		SIP4	BAG

## IC DATE CODE DISTINGUISH

SOT23-5L



SIP-4L




### For example:

- 1 – Year 2001
- 2 – Year 2002
- 3 – Year 2003 ----- And so on

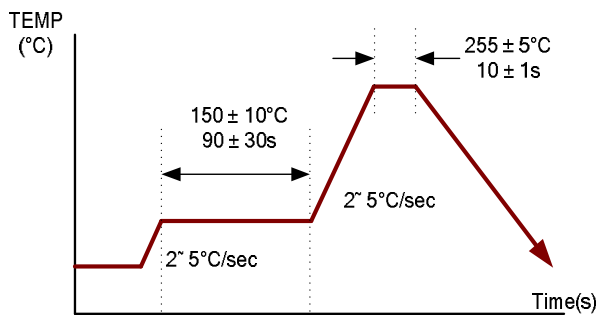
Lot Number is the last two numbers

### For example:

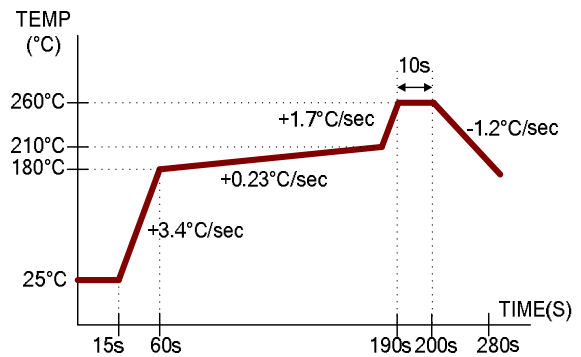
A3311C<sup>62</sup>  
 Lot Number

## ABSOLUTE MAXIMUM RATINGS

Supply Voltage ( $V_{CC}$ ) .....	+25V
IN- Input Voltage .....	-0.3V~+VCC
Output Voltage .....	+25V
Output Sink Current .....	+30mA
Maximum Junction Temperature.....	+150°C
Thermal Resistance Junction to Ambient ( $\theta_{ja}$ )	
SOT-23-5L .....	400°C/W
SIP-4L.....	150°C/W
Power Dissipation ( $P_D$ )	
SOT-23-5L .....	250mW
SIP-4L.....	700mW
Operating Temperature Range .....	-20°C ~ 85°C
Storage Temperature Range .....	-65°C ~ +150°C
Lead Temperature (soldering, 10 sec) .....	+260°C



Wave Soldering Temperature vs. Second Curve



IR Re-flow Temperature vs. Second Curve

**Note:**

- Suggest IR Reflow Soldering Profile Condition.**

## DC ELECTRICAL CHARACTERISTICS (Ta=25°C, VCC=12V, unless otherwise noted)

### Operating Amplifier

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage	V <sub>io</sub>	T <sub>amb</sub> =25°C		1	3	mV
		T <sub>min</sub> ≤ T <sub>amb</sub> ≤ T <sub>max</sub>			5	
Input Offset Voltage Drift	DV <sub>io</sub>			7		μV/°C
IN- Input Bias Current	I <sub>ib</sub>	T <sub>amb</sub> =25°C		-80	-250	nA
		T <sub>min</sub> ≤ T <sub>amb</sub> ≤ T <sub>max</sub>			-500	
Large Signal Voltage Gain	A <sub>vd</sub>			50		V/mV
Output Sink Current	I <sub>SINK</sub>	V <sub>IN</sub> =2V, V <sub>OUT</sub> =1.2V		30		mA
Low Level Output Voltage	V <sub>OL</sub>	V <sub>IN</sub> =2V, I <sub>SINK</sub> =20mA		0.9	1	V
Output Leakage Current	I <sub>LEAK</sub>	V <sub>OUT</sub> =25V, V <sub>IN</sub> =0.5V		0.1	1	uA
Output Switch Hysteris	HYS.			100		mV

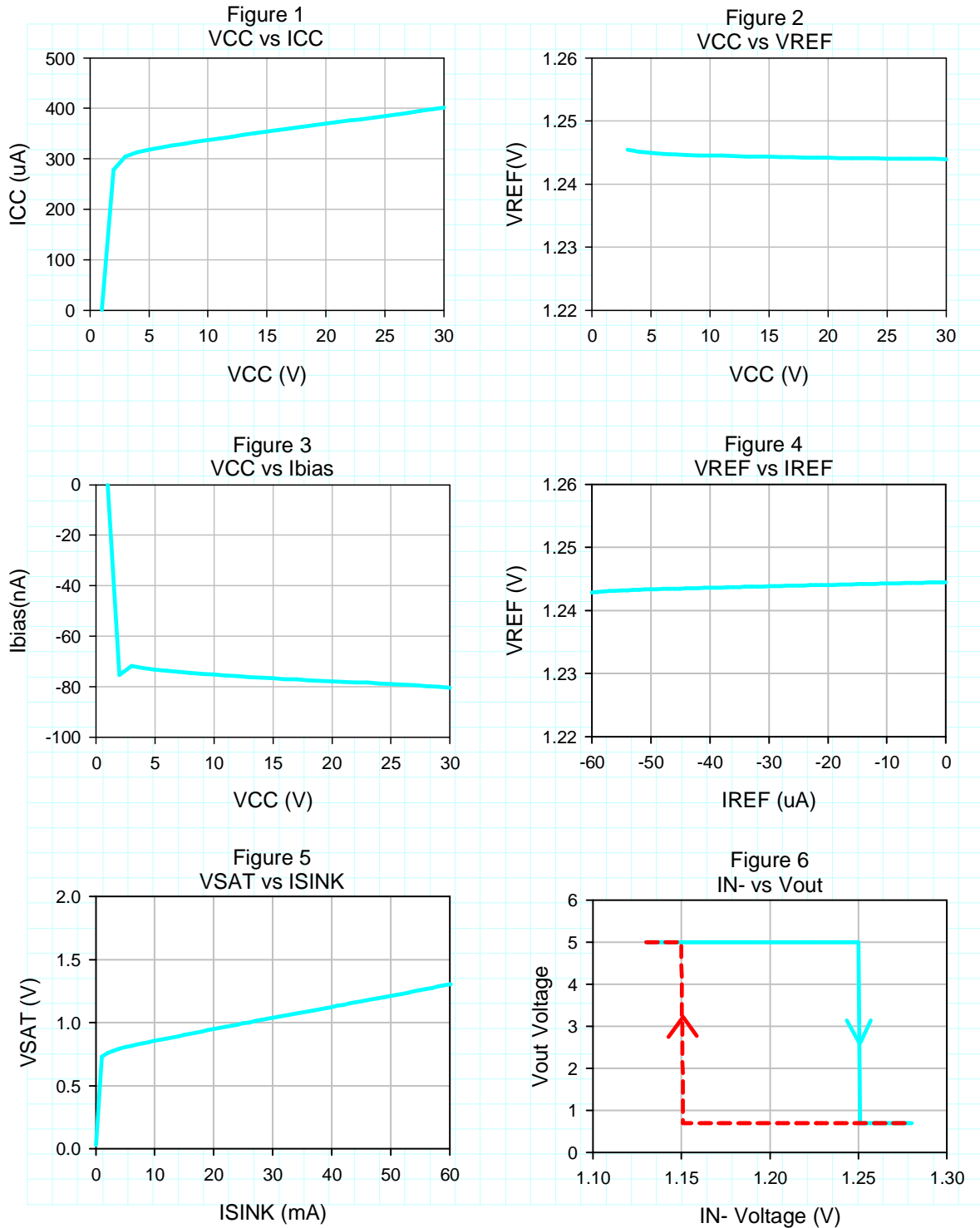
### Voltage Reference

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Reference Voltage	V <sub>ref</sub>	T <sub>amb</sub> =25°C	1.237	1.25	1.263	V
		T <sub>min</sub> ≤ T <sub>amb</sub> ≤ T <sub>max</sub>	1.225		1.275	
Reference Voltage Deviation Over Temperature Range	ΔV <sub>ref</sub>	T <sub>min</sub> ≤ T <sub>amb</sub> ≤ T <sub>max</sub>		10		mV
Line Regulation		3.0V ≤ V <sub>CC</sub> ≤ 25V		1	3	mV
Load Regulation		I <sub>ref</sub> = 0uA to 40uA		3	5	mV

### Total Supply Current

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
IC Supply Current	I <sub>CC</sub>	V <sub>CC</sub> =25V		0.4		mA

**TYPICAL CHARACTERISTICS** ( $T_a=25^{\circ}\text{C}$ ,  $V_{CC}=12\text{V}$ , unless otherwise noted)



TYPICAL CHARACTERISTICS (Ta=25°C, V<sub>CC</sub>=12V, R<sub>out</sub>=2K)

### IN- to Vout Delay Time

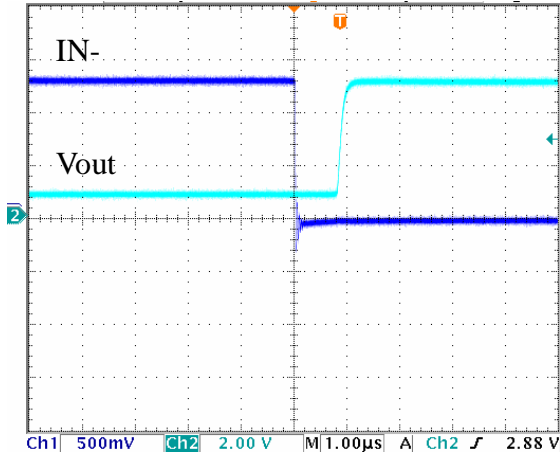


Figure 7

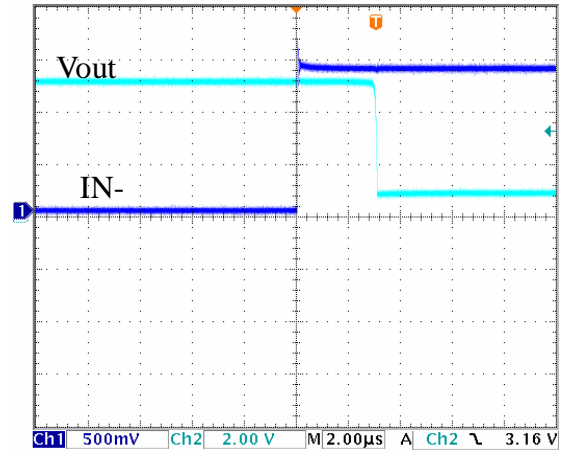


Figure 8

## APPLICATION NOTE

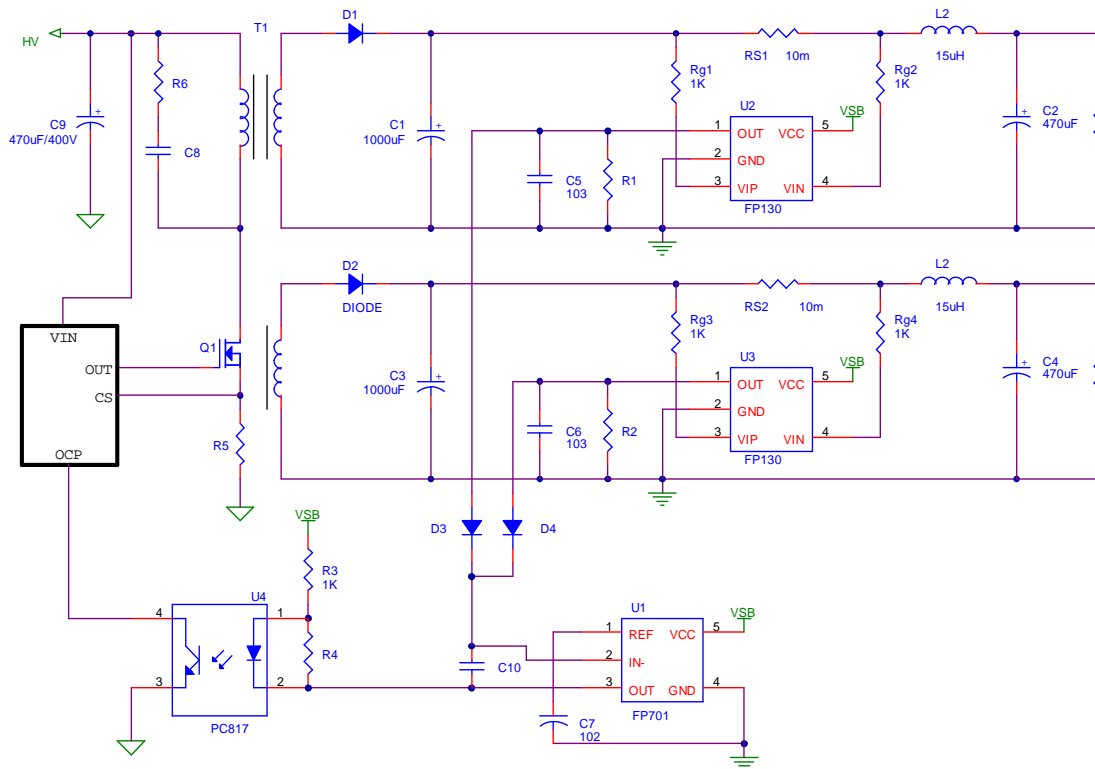
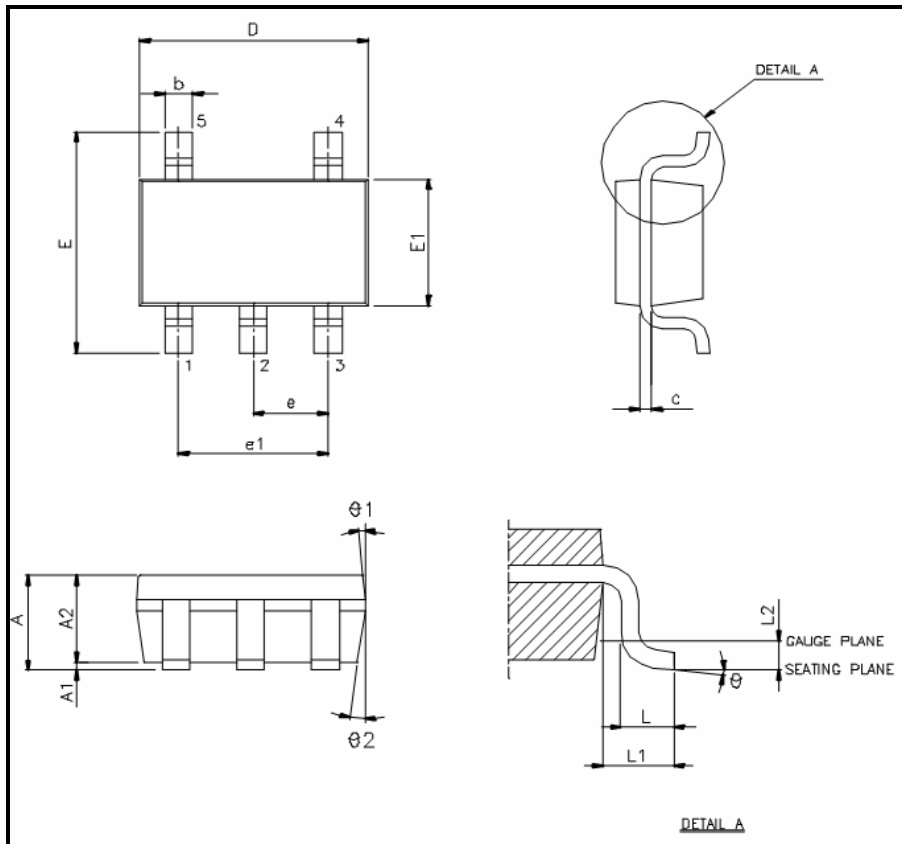


Figure 9. FP701 Over Current Protection Circuits with FP130x2 (Dual Output SPS)

## PACKAGE OUTLINE

SOT-23-5L



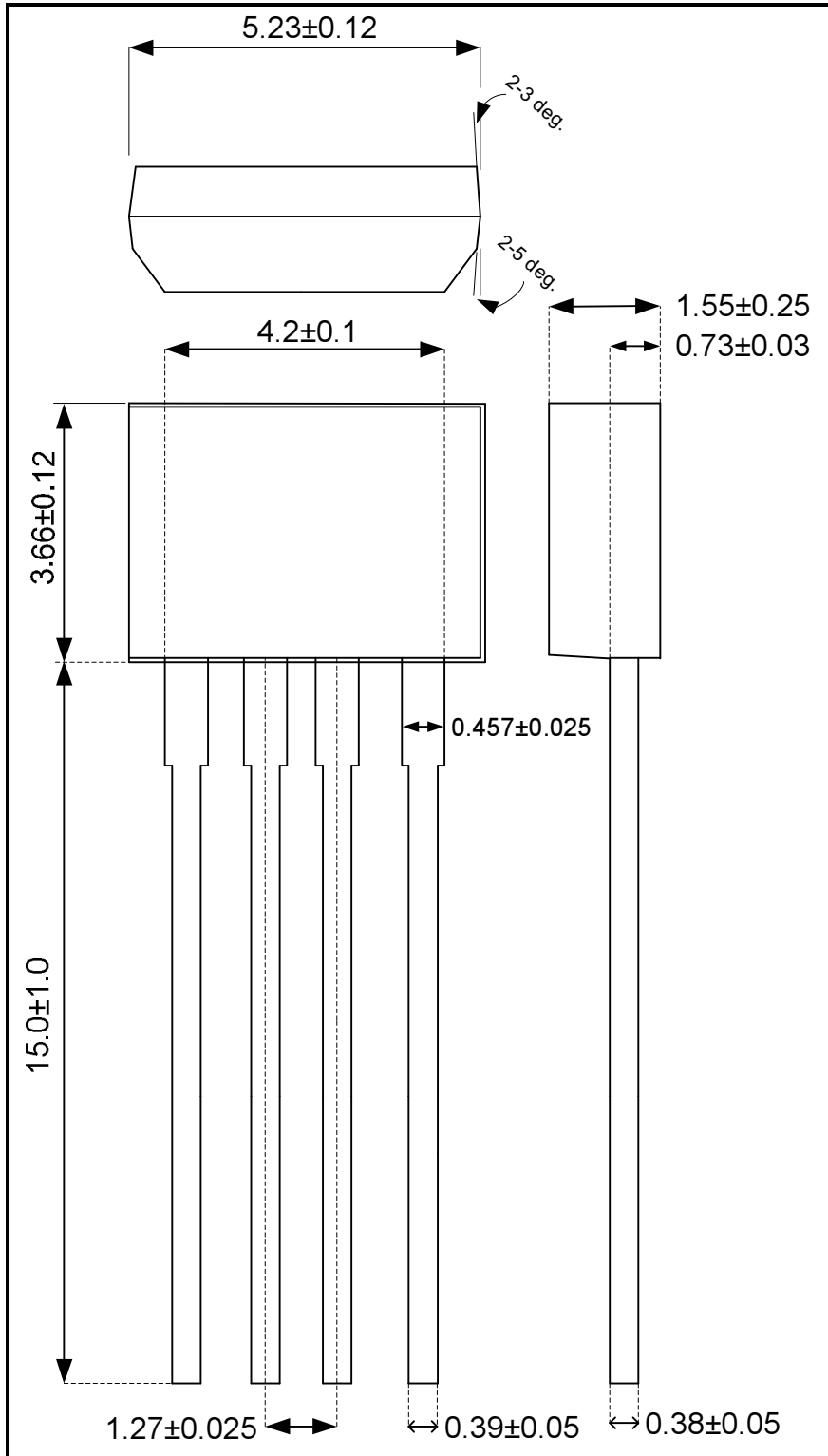
SYMBOLS	MIN	MAX
A	1.05	1.35
A1	0.05	0.15
A2	1.00	1.20
b	0.25	0.50
c	0.08	0.20
D	2.70	3.00
E	2.60	3.00
E1	1.50	1.70
e	0.95 BSC.	
e1	1.90 BSC.	
L	0.30	0.55
L1	0.60 REF.	
L2	0.25 BSC.	
theta°	0	10

UNIT:mm

### NOTE:

1. JEDEC OUTLINE:MO-178 AA °

SIP-4L

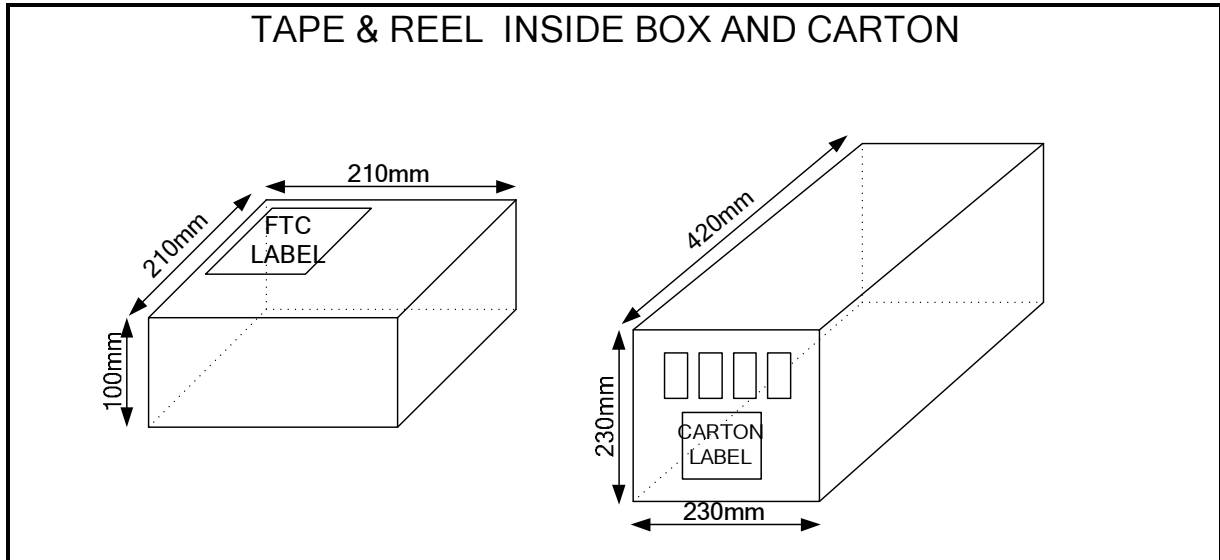


UNIT:mm

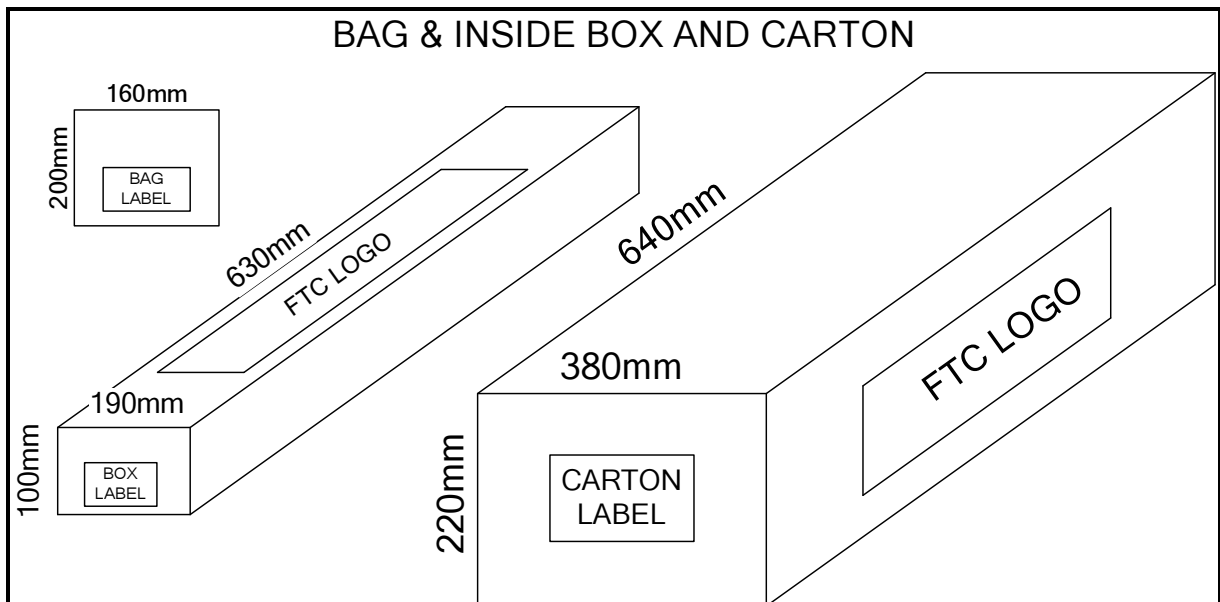
**PACKING SPECIFICATIONS**

**BOX & CARTON DIMENSION**

**SOT-23-5L**



**SIP-4L**



## PACKING QUANTITY SPECIFICATIONS

SOT-23-5L	SIP-4L
2500 EA / REEL	1000 EA / BAG
4 REELS / INSIDE BOX	25 BAGS / INSIDE BOX
4 INSIDE BOXES / CARTON	4 INSIDE BOXES / CARTON

## LABEL SPECIFICATIONS

### REEL & BAG

Feeling Technology Corp Product:FP701KR-LF Lot NO: XXXXXXXXX D/C: axxxx Q`ty: 2500 <div style="border: 1px solid black; padding: 2px; display: inline-block;">無鉛 Lead Free</div>	Feeling Technology Corp Product:FP701H-LF Lot NO: XXXXXXXXX D/C: XXx-XXL Q`ty: 1000 <div style="border: 1px solid black; padding: 2px; display: inline-block;">無鉛 Lead Free</div>
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### CARTON

Feeling Technology Corp Product Type: FP701KR-LF Lot No: XXXXXXXXX Date Code: axxxx Package Type:SOT-23-5L Marking Type:Laser Total Q`ty: 40K <div style="border: 1px solid black; padding: 2px; display: inline-block;">無鉛 Lead Free</div>	Feeling Technology Corp Product Type: FP701H-LF Lot No: XXXXXXXXX Date Code: XXx-XXL Package Type:SIP-4L Marking Type:Laser Total Q`ty: 100K <div style="border: 1px solid black; padding: 2px; display: inline-block;">無鉛 Lead Free</div>
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## CARRIER TAPE AND REEL DIMENSIONS

### SOT-23-5L

