

18SCT001-FW 1500V VOLTAGE MONITOR WITH LOW-PASS FILTER

18SCT001-FW - PRELIMINARY SPECIFICATION - REVISION Nov. 2021

Features

- Voltage Sensing up to 1500V
- Nominal Ratio = 0.000735
- High Accuracy: $\pm 5\%$ @ 25°C
- Great Linearity over voltage 0.35% (2.5ppm/V)
- Low Power Sensing: $5\mu\text{A}$ @ 400V
- Low-Pass EMI Filtering



TSSSP-8 Wide-body (4.4mm)

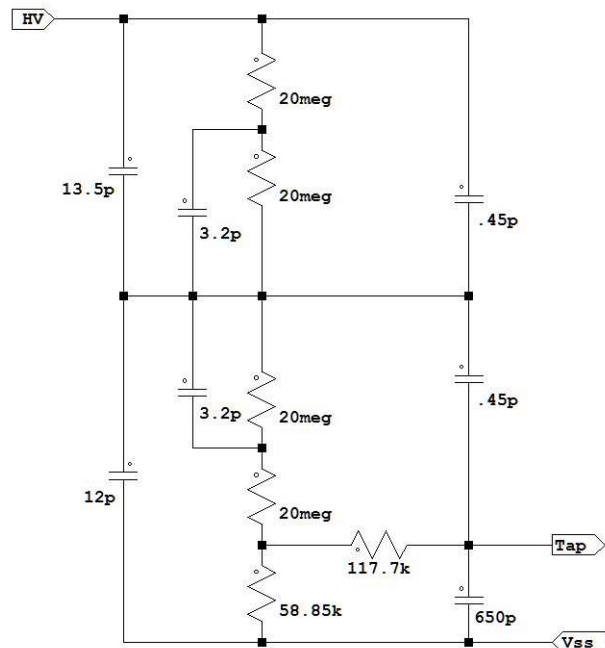
Applications

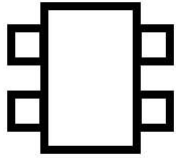
- Automotive (H)EV Powertrain and Inverters
- Medical Implant Defibrillators
- Industrial High Voltage Sensing

Description

The 18SCT001 is a voltage divider typically used to sense system voltage from 0V up to 1500V. For example, it can be used to monitor voltage generated from an embedded charge-pump. The chip has a built-in low-pass filter allowing the chip to filter voltage changes typical of voltage pumping frequencies while allowing accurate voltage measurements when the pump is turned-off. The voltage divider ratio is mask programmable in a wide range from $1.0\text{E-}5$ to 0.2000.

Equivalent circuit





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Absolute maximum rating

Input Voltage ($V_{HV} - V_{SS}$)	+/-1500 V
Output Voltage	-0.6/+20V
Operating temperature	-40 C to 100 C
Storage temperature	-65 C to 125 C

Recommended operating conditions

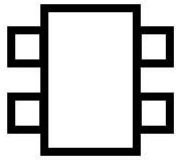
PARAMETER	MIN	MAX	UNIT
Operating voltage ($V_{HV} - V_{SS}$)	0	1500	V

DC Electrical characteristics at room temperature ($RT = 25C \pm 5C$)

PARAMETER	TEST CONDITIONS	TEMP	MIN	TYP	MAX	UNIT
R_{sense0} Divider Ratio	$V_{HV}=+100V$	RT	700	735	770	$\mu V/V$
R_{sense1} Divider Ratio	$V_{HV}=+500V$	RT	700	735	770	$\mu V/V$
R_{sense2} Divider Ratio	$V_{HV}=+1500V$	RT	700	735	770	$\mu V/V$
R_{TOT} Total Resistance	$V_{HV}=+500V$	RT	40.0	80.0	120.0	Meg Ω
R_{Sense} Sense Resistor	$V_{TAP}=1.00V$; $V_{HV}=0V$	RT	28.0	58.8	92.4	k Ω
$\Delta R/R$ Resistor Divider Linearity	$R@100V$; $R@1500V$ (3 seconds duration)	RT	-0.00	+0.35	+1.5	%
T_{C1} Resistance First Order Temperature Coefficient	T -40C to 85C	-		-4400		ppm/C
T_{C2} Resistance Second Order Temperature Coefficient	T -40C to 85C	-		+12.2		ppm/ C ²
C_{F1} Filter Capacitance	I=10nA	-		650		pF

AC Operating characteristics ($RT = 25C \pm 5C$)

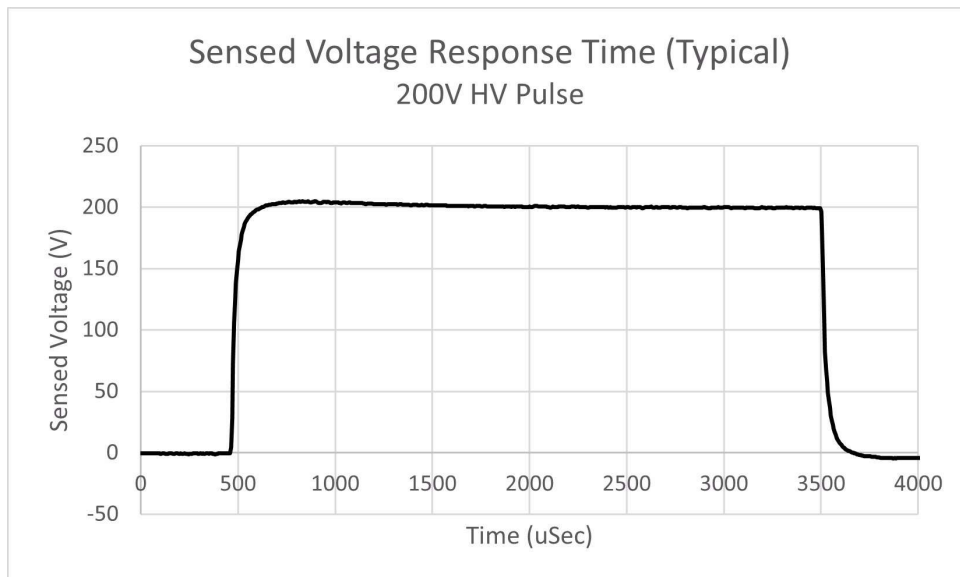
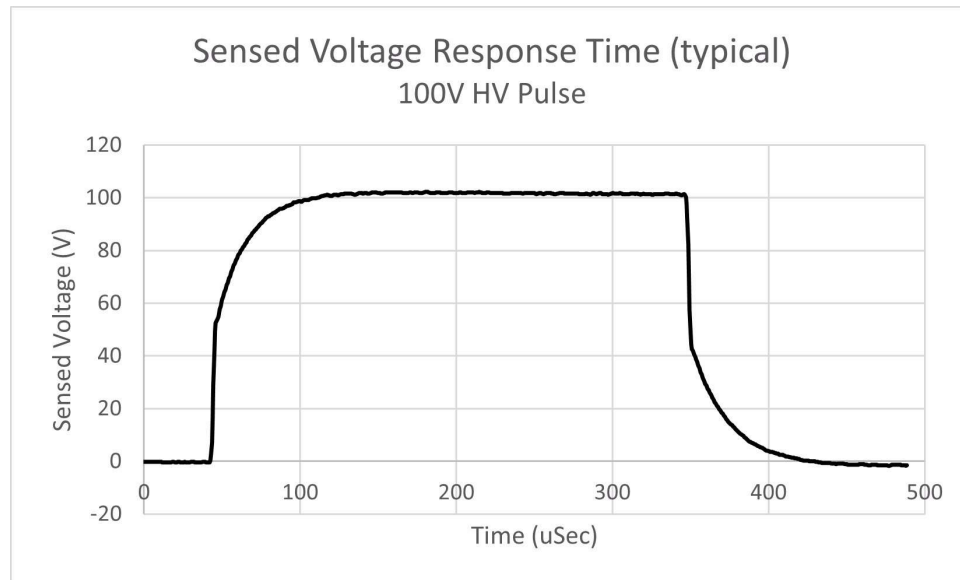
PARAMETER	TEST CONDITIONS	TEMP	MIN	TYP	MAX	UNIT
T_{SET} Filter Settling Time (95% of DC value)	$V_{HV}=0V \rightarrow 50V$	RT		250		μSec

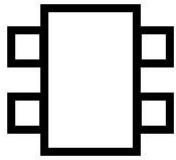


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TYPICAL CHARACTERISTICS

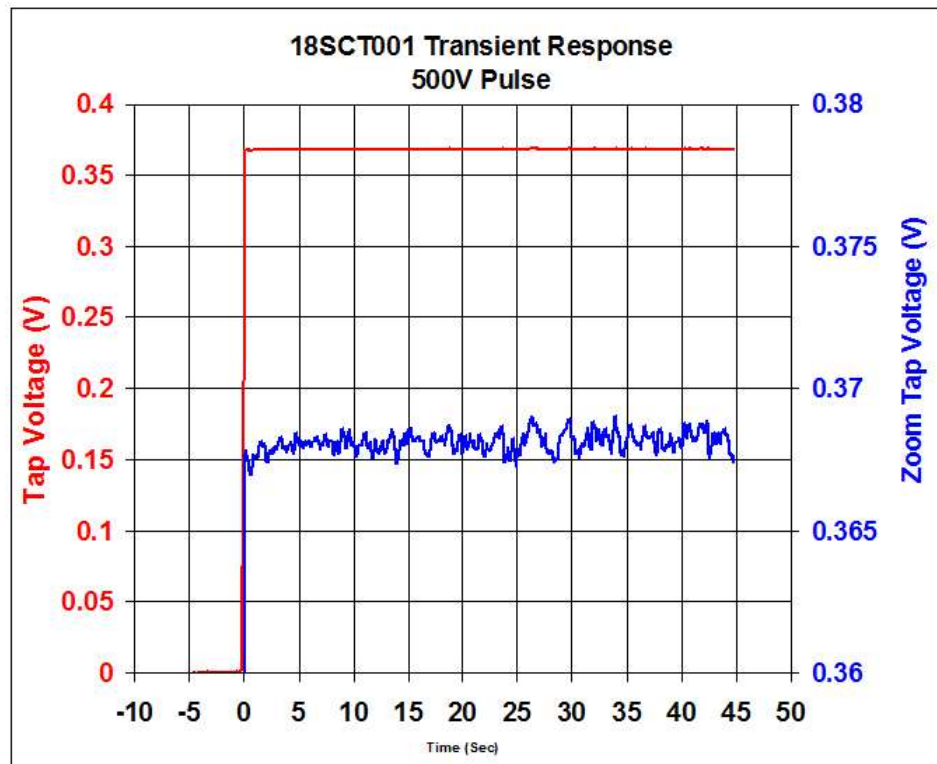


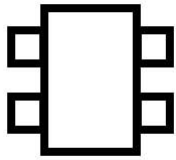


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TYPICAL CHARACTERISTICS (Cont)

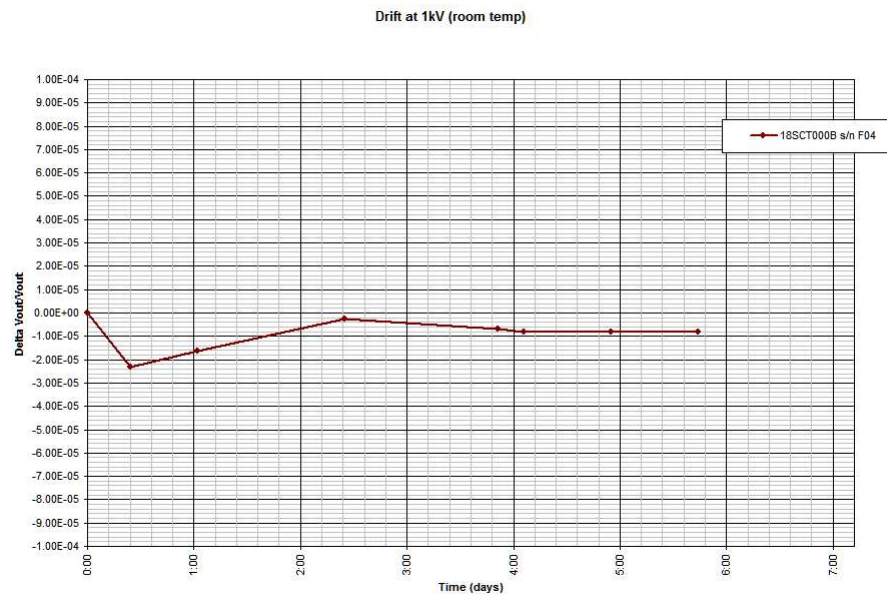
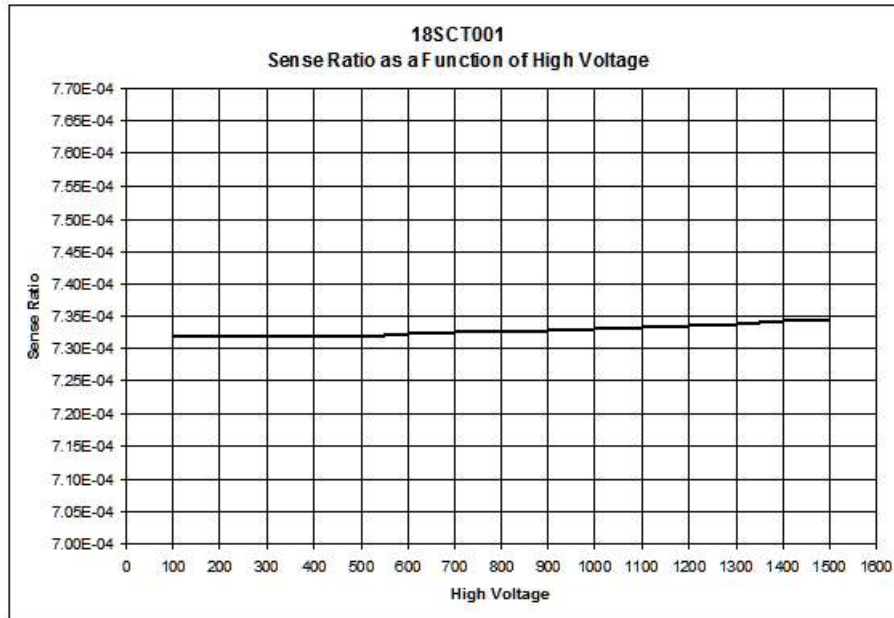


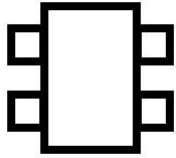


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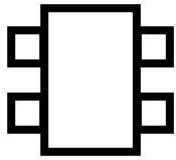
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SPICE PARAMETERS

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*****
* TSSOP-8 version of 18SCT001 *
* SimpleChips Technology Inc   *
* November 28th, 2021         *
*                               *
*                               *
.subckt tssop8-18sct001 HV Tap Vss
*
* SR varies the performance between:
* SR=-1 = SLOW meaning: High Resistances + High Capacitance
* SR=0  = Nominal meaning: Nominal Resistances + Nominal Capacitance
* SR=+1 = FAST meaning: Low Resistances + Low Capacitance
*
.param SR=0
*
R1 N001 N002 {20meg*(1-0.5*SR)}
R2 N002 N003 {20meg*(1-0.5*SR)}
R3 N004 Vss {0.5*117.7k*(1-0.5*SR)}
R4 N004 Tap {117.7k*(1-0.5*SR)}
C1 Tap Vss {770p*(1-0.10*SR)}
C2 N002 Tap .45p
C3 HV N002 .45p
C4 HV N002 13.5p
C5 N002 Vss 12p
R5 HV N001 {20meg*(1-0.5*SR)}
R6 N003 N004 {20meg*(1-0.5*SR)}
C6 N001 N002 3.2p
C7 N002 N003 3.2p

.ends tssop8-18sct001
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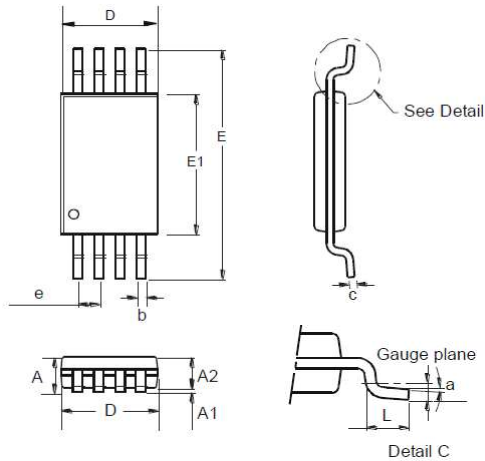


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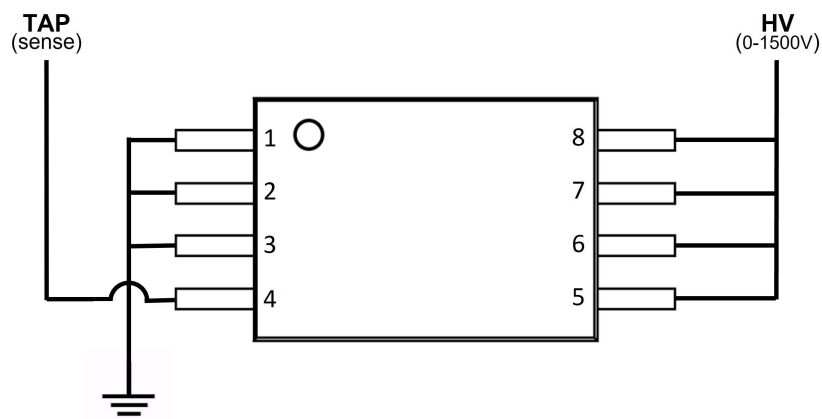
DIMENSIONS

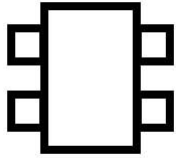
TSSOP-8 Wide-Body (4.4mm)



ALL Dimensions in mm			
Dim	Min	Max	Typ
a	0.09	-	-
A	-	1.20	-
A1	0.05	0.15	0.925
A2	0.825	1.025	-
b	0.19	0.30	-
c	0.09	0.20	-
D	2.90	3.10	3.025
e	-	-	0.65
E	-	-	6.40
E1	4.3	4.50	4.425
L	0.45	0.75	0.6

Recommended connections





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Product Identification Codes:

PART NO. **18SCT001** - **XX** - **XX**

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Device **Package** **Media**

Type

Device: 18SCT001

Package: FW = TSSOP-8 Wide Body

Media Type: B = Bulk Samples
 T = Tubes
 TR = Tape & Reel