Low Power Low Dropout Linear Regulator with Current Limiting

1 Description

The CN8803L is a high accuracy low dropout linear regulator with wide voltage input range, which provides 150mA output current. It features short circuit protection, over current protection and thermal shutdown.

CN8803L is available in SOT23-3/5, SOT89-3, DFN2X2-6 packages to meet the high density PCB layout and thermal performance requirements.

2 Features

- Low quiescent current: 5μA
- Output voltage range: 2.5V~5.6V (step 0.1V), 12V
- High accuracy: ±2%
- Dropout voltage: 900mV @VOUT=3.3V / IOUT=150mA
- Maximum output current: 150mA
- Input voltage range: maximum 36V
- Output short circuit protection
- Thermal shutdown
- Overcurrent protection

3 Applications

- Smart meters
- Switching power supply

4 Ordering information

Product Number	Package	Quantity/Tape
CN8803LXXXOGR	SOT89-3	1000/Tape
CN8803LXXXAOGR	SOT89-3	1000/Tape
CN8803LXXXDSR	DFN2X2-6	3000/Tape
CN8803LXXXTCR	SOT23-5	3000/Tape
CN8803LXXXATCR	SOT23-5	3000/Tape
CN8803LXXXTGR	SOT23-3	3000/Tape

5 Marking

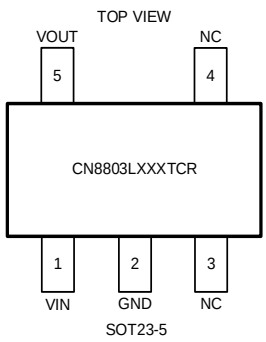
Product Number	Marking
CN8803LXXXOGR	03LXXX YYWW
CN8803LXXXAOGR	03LXXXA YYWW
CN8803LXXXDSR	TBD
CN8803LXXXTCR	TBD
CN8803LXXXATCR	TBD
CN8803LXXXTGR	TBD

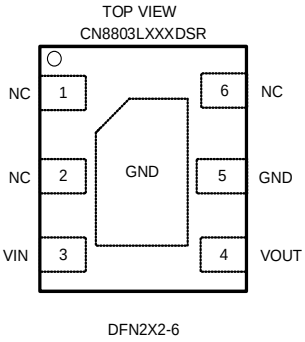
Note: XXX=Output voltage, YY/Y=Year, WW/W=Week.

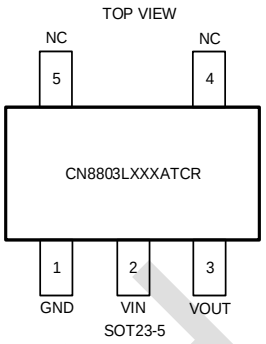
Green (RoHS & HF): CHIPNORTH defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your CHIPNORTH representative directly.

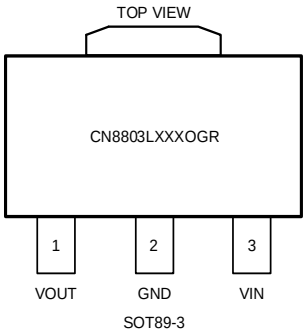
Moisture sensitivity level(MSL):3

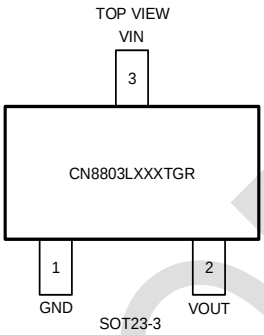
6 Pinout

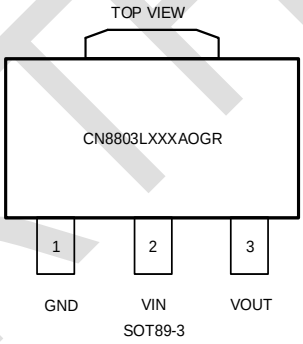




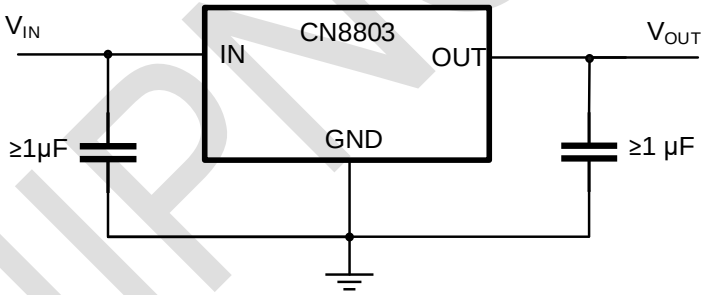






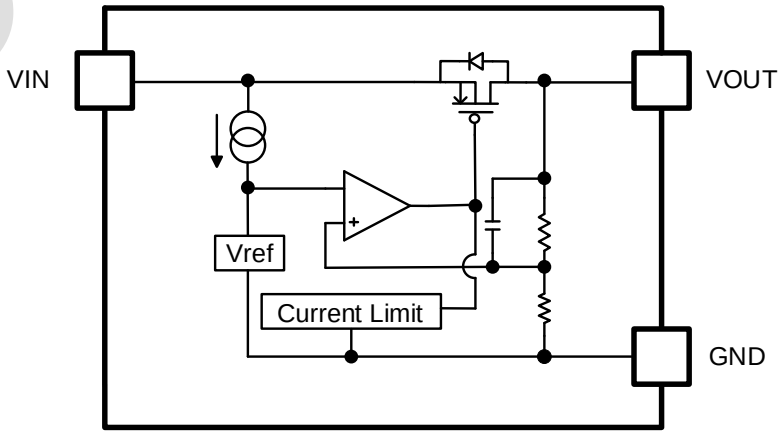


7 Typical Application



Note: General application circuits are recommended input capacitance C_{IN} ⩾ 1μF, near the chip input; output capacitance C_{OUT} ⩾ 1μF, near the chip output.

8 Block Diagram



9 Pin Descriptions

Pin No.							Descriptions
Pin Name	CN8803L XXXAOGR	CN8803L XXXOGR	CN8803L XXXDSR	CN8803L XXXTCR	CN8803L XXXATCR	CN8803L XXXTGR	
GND	1	2	5	2	1	1	Ground
VIN	2	3	3	1	2	3	Input
VOUT	3	1	4	5	3	2	Output
NC			1、2、6	3、4	4、5		No connect

10 Specifications

10.1 Absolute Maximum Ratings

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	-0.3 ~ 40	V
Output Voltage	V_{OUT}	-0.3 ~ 20	V
Storage Temperature Range	T_{STG}	-55 ~ 150	°C
Soldering Temperature	T_{LEAD}	260（Soldering 10s）	°C

10.2 ESD Ratings

Discharge mode	Standard	Value	Units
HBM	ANSI/ESDA/JEDEC JS-001-2024	±4000	V
CDM	ANSI/ESDA/JEDEC JS-002-2022	±2000	V

10.3 Recommended Operating Range

Parameter	Symbol	Min.	Max.	Units
Input Voltage	V_{IN}	V_{OUT}+1	36	V
Output Current	I_{OUT}		150	mA
Input Capacitor	C_{IN}	1		μF
Output Capacitor	C_{OUT}	1		μF
Operating Temperature	T_A	-40	105	°C

10.4 Thermal Information

Parameter	Package	Value	Unit
Junction to ambient thermal resistance($R_{\theta JA}$)	SOT23-3	220	°C/W
	SOT23-5	188	°C/W
	DFN2x2-6	140	°C/W
	SOT89-3（OGR）	100	°C/W
	SOT89-3（AOGR）	165	°C/W

(1) Thermal resistance is not a fixed constant; its value is influenced by the following factors: PCB heat dissipation capacity, number and thickness of copper layers, ambient temperature, airflow velocity, etc.

(2) The thermal resistance values listed in the datasheet are provided solely for customers to compare the thermal performance of different packages. Since the heat dissipation conditions of the PCB in actual customer applications differ from those of our test boards, the actual measured thermal resistance values may vary from the nominal values in the datasheet. Customers should conduct verification on their own system boards to ensure that the thermal design meets the requirements of the product application.

10.5 Electrical Characteristics

Test conditions: V_{IN}=V_{OUT}+2V, C_{IN}=1μF, C_{OUT}=1μF, T_A=25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input voltage range	V_{IN}	I_{OUT}=10mA	V_{OUT}+1V		36	V
Output voltage *1	V_{OUT}	V_{IN}=V_{OUT}+2V, I_{OUT}=1mA	V_{OUT} x0.98	V_{OUT}	V_{OUT} x1.02	V
Line regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	V_{IN}=V_{SET}+2V~36V I_{OUT}=1mA@V_{OUT}=3.3V		0.01	0.026	%/V
Load regulation	ΔV_{OUT}	V_{IN}=V_{OUT}+2V I_{OUT}=1~150mA@V_{OUT}=3.3V		15	28	mV
Quiescent current	I_Q	V_{IN}=7V, I_{OUT} =0mA		5	7.3	μA
Dropout voltage*2	V_{DROP}	I_{OUT}=150mA@V_{OUT}=3.3V		900	1250	mV
Max output current	I_{OUT_MAX}		150			mA
Current limit *3	I_{LIMIT}	V_{IN}=V_{OUT}+2V		270		mA
Thermal shutdown threshold	OTP			160		°C
Thermal shutdown threshold hysteresis	OTP_Hys			30		°C

Note*:

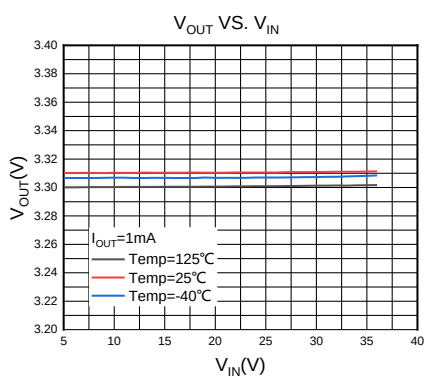
*1. $V_{OUT(S)}$: output voltage when V_{IN} = V_{OUT} + 2V, I_{OUT} = 1mA.

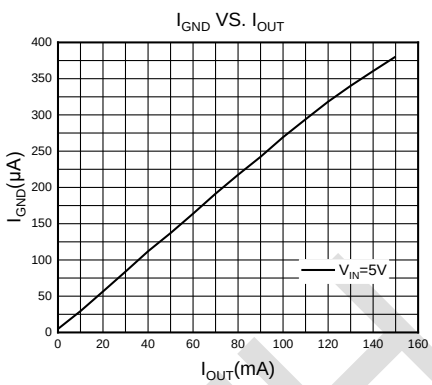
*2. V_{DROP}=V_{IN}-(V_{OUT_REG}*0.95), V_{OUT_REG} is the output voltage when V_{IN} = V_{OUT} + 2.0V and I_{OUT} = 100mA. V_{IN} is the input voltage, and when the input voltage is gradually reduced, the output voltage becomes 95% of V_{OUT_REG}.

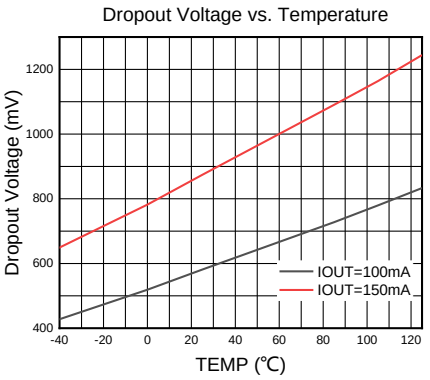
*3. I_{LIMIT}: Output current when V_{IN} = V_{OUT} + 2V and V_{OUT} = 0.95 x $V_{OUT(S)}$.

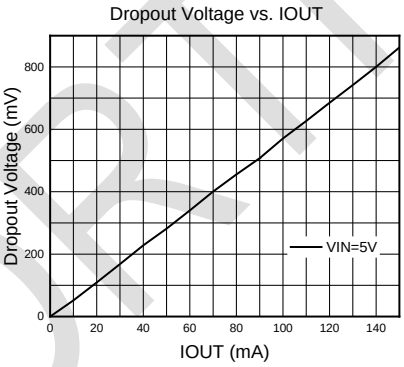
10.6 Characteristics Curve

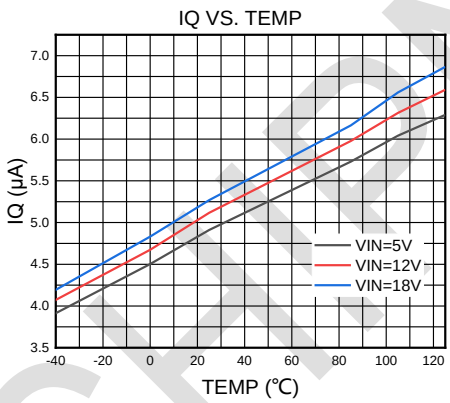
Test conditions: V_{IN}=V_{OUT}+1V, C_{IN}=1μF, C_{OUT}=1μF, T_A=25°C, unless otherwise specified.

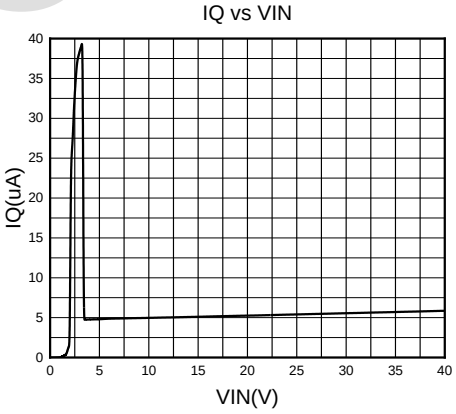












10.7 Operating waveforms

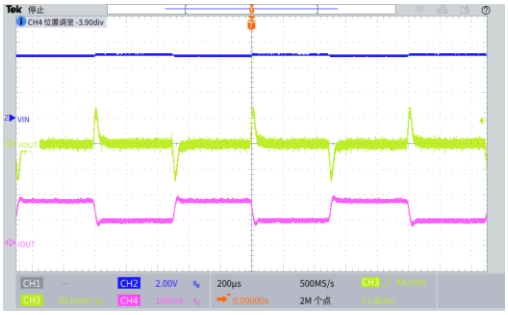


Figure1 Load Transient
(VIN=5V, IOUT=75mA-150mA-75mA)

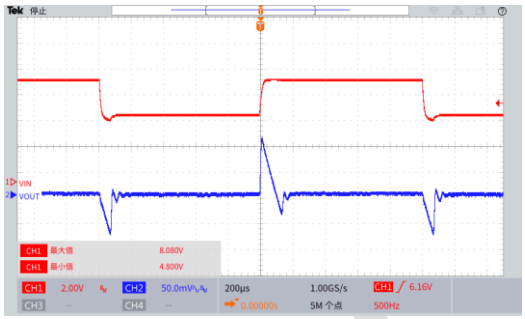


Figure 2 Line Transient
(VIN=from 8V to 5V to 8V IOUT=0mA)

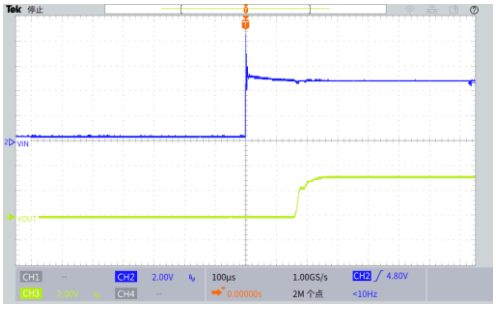


Figure 3 Power-up (fast)
(VIN=5V IOUT=0mA)

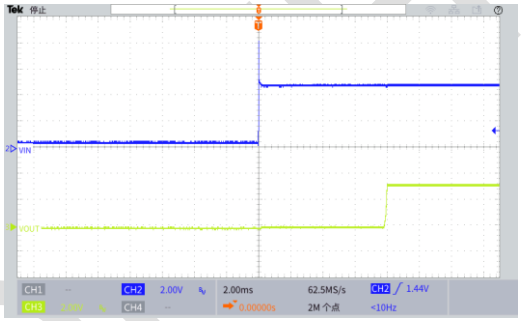
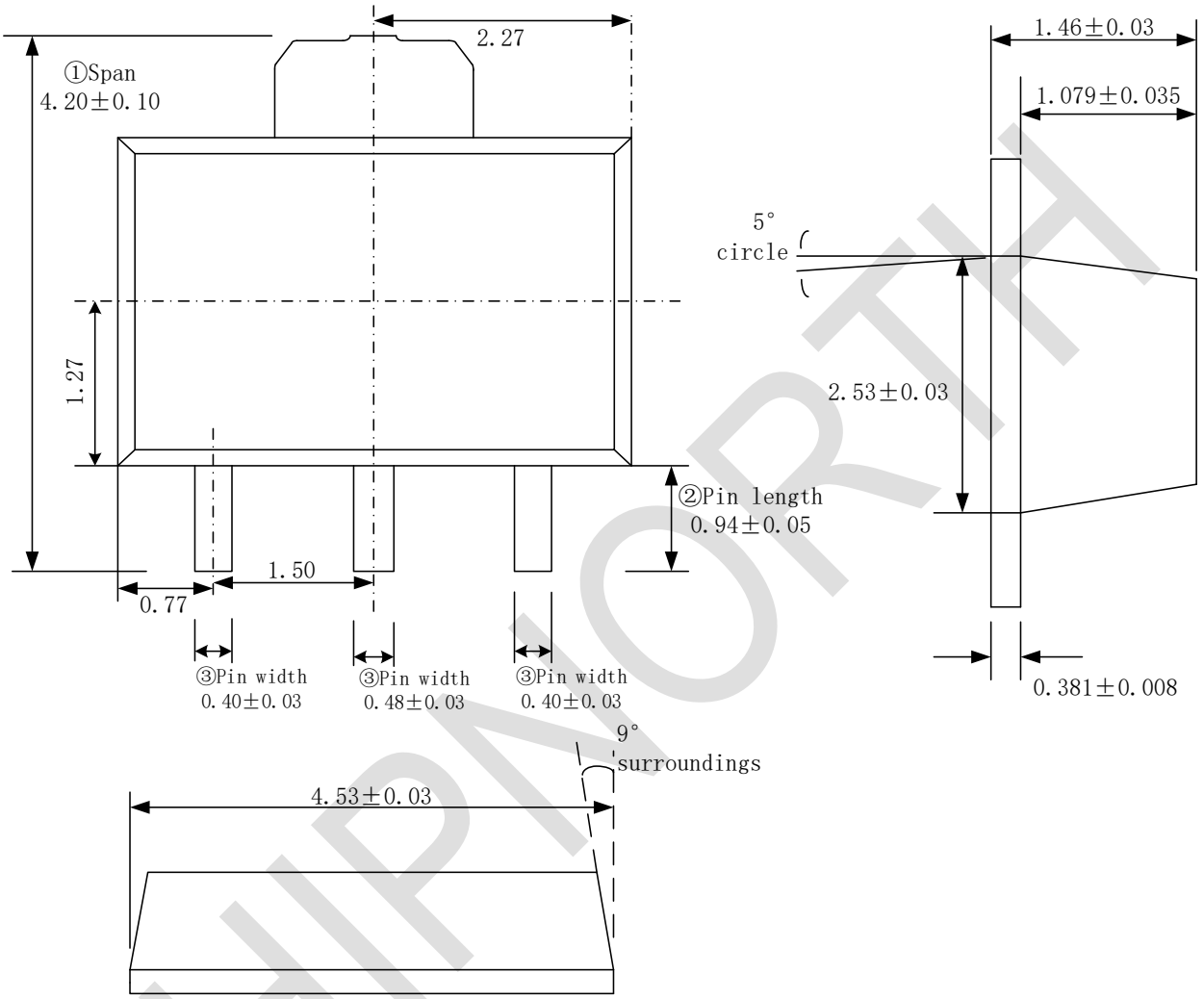


Figure 4 Power-up (fast)
(VIN=5V IOUT=150mA)

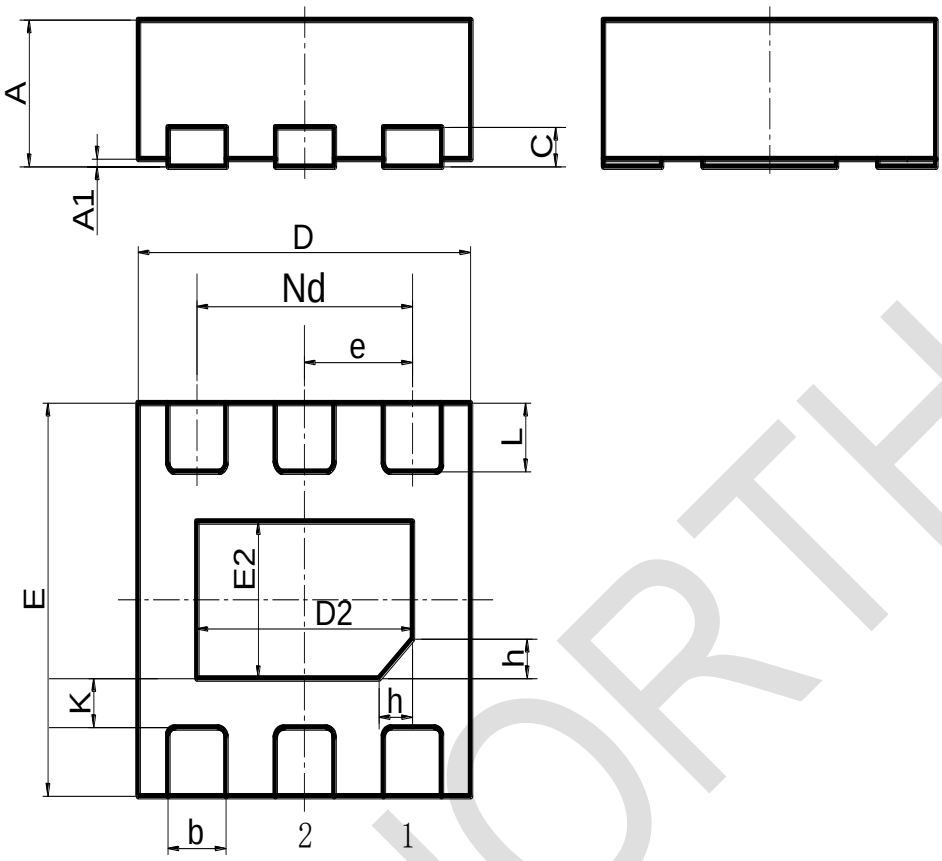
11 Package Information

SOT89-3

Unit：mm

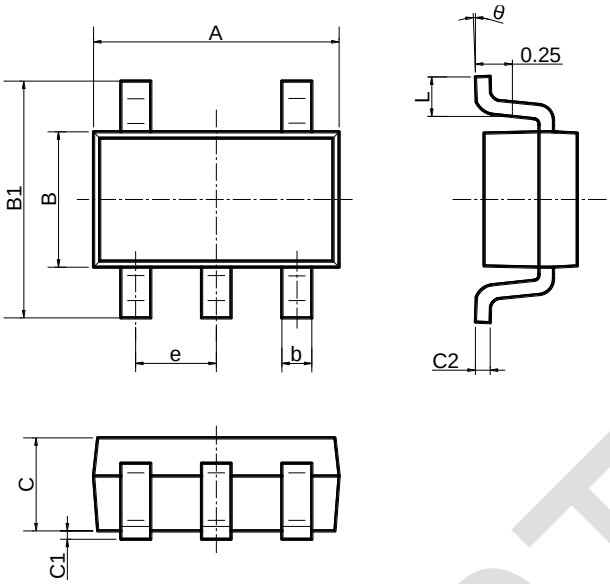


DFN2X2-6



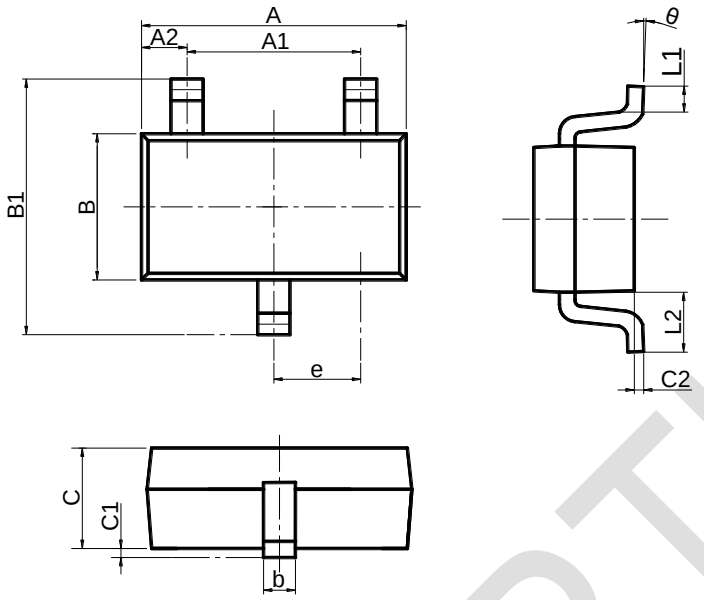
Dimension / Symbol	Min (mm)	Nom (mm)	Max (mm)	Dimension / Symbol	Min (mm)	Nom (mm)	Max (mm)
A	0.70	0.75	0.80	E2	0.75	0.80	0.85
A1	0.00	0.02	0.05	e	0.650BSC		
b	0.30	0.35	0.40	Nd	1.300BSC		
c	0.18	0.20	0.25	K	0.20	-	-
D	1.95	2.00	2.05	L	0.28	0.33	0.38
E	1.95	2.00	2.05	H	0.15	0.20	0.25
D2	1.25	1.30	1.35				

SOT23-5



Dimension / Symbol	Min (mm)	Nom (mm)	Dimension / Symbol	Min (mm)	Nom (mm)
A	2.82	3.02	C	1.05	1.15
e	0.95(BSC)		C1	0.03	0.15
b	0.28	0.45	C2	0.12	0.23
B	1.50	1.70	L	0.35	0.55
B1	2.75	3.05	θ	0°	8°

SOT23-3



Dimension / Symbol	Min (mm)	Nom (mm)	Max (mm)
A	2.70	2.90	3.10
A1	1.70	1.90	2.10
A2	-	-	0.6
e	0.85	0.95	1.05
b	0.30	0.40	0.50
B	1.50	1.60	1.80
B1	2.60	2.80	3.00
C	1.00	1.10	1.20
C1	-	-	0.10
C2	0.02	-	0.08
L1	0.20	-	0.55
L2	-	0.60	-
θ	0°	-	15°

12 Important Statement

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