

Low Power Linear Regulators with Current Limit Function

1 Description

The CN85LXXX is a low power high PSRR linear regulator with current limiting function that provides 300mA output current. With short circuit protection and thermal protection. It is available in SOT89-3, DFN2X2-6, SOT23-5, SOT23-3 packages.

2 Features

- Ultra-low quiescent current: 2.5μA
- High accuracy: ±2%
- Low dropout voltage: 80mV @ $I_{OUT} = 100mA$, $V_{OUT} = 5V$
- Maximum output current: 300mA
- Input voltage range: Max 20V
- Enabling control
- Output short circuit protection
- Thermal shutdown

3 Applications

- Cell phone
- Battery powered equipment
- Wireless telephone, wireless communication equipment
- Camera Recorder
- Portable audio-visual equipment
- Palmtop computer

4 Ordering information

Product Number	Package	Quantity/Tape
CN85LXXXDSR	DFN2x2-6	4000/Type
CN85LXXXTCR	SOT23-5	3000/Type
CN85LXXXTGR	SOT23-3	3000/Type
CN85LXXXOGR	SOT89-3	1000/Type
CN85LXXXAOG	SOT89-3	1000/Type

Product Number	output voltage
CN85L018	VOUT=1.8V
CN85L028	VOUT=2.8V
CN85L030	VOUT=3.0V
CN85L033	VOUT=3.3V
CN85L036	VOUT=3.6V
CN85L040	VOUT=4.0V
CN85L050	VOUT=5.0V

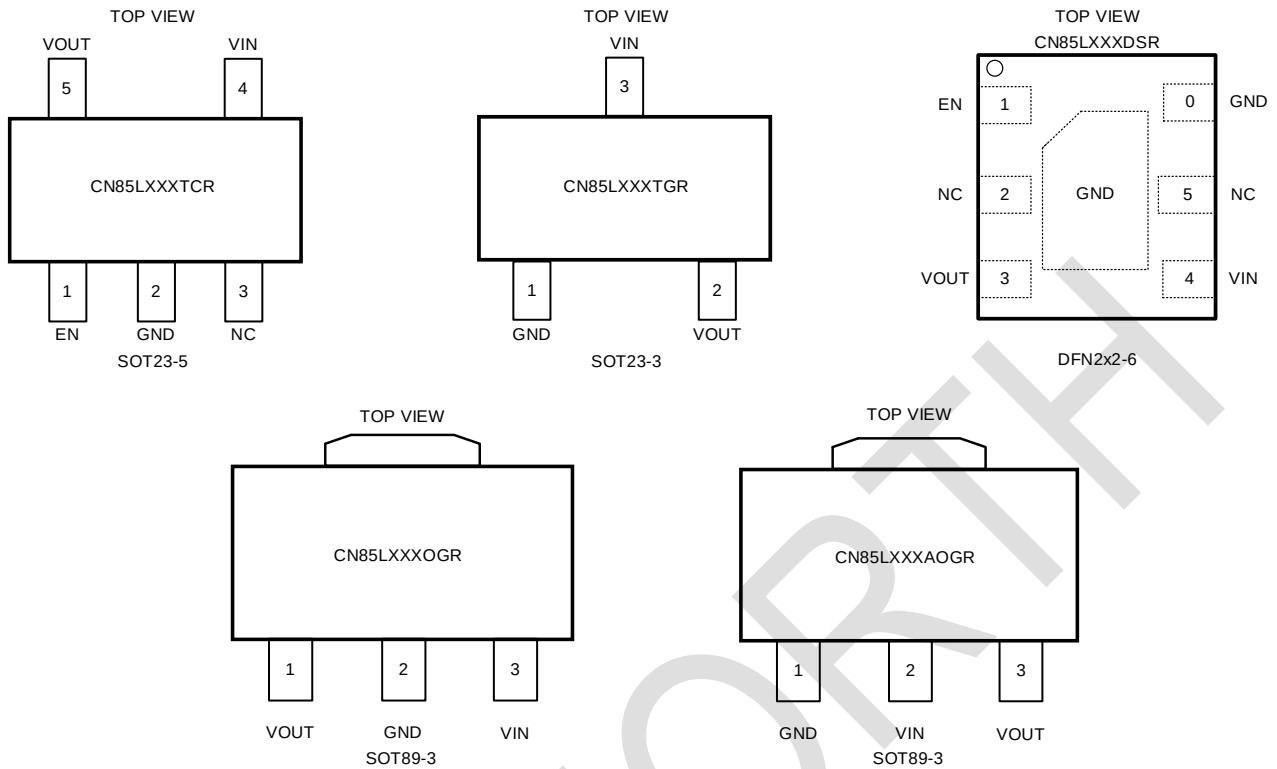
5 Marking

Product Number	Marking*
CN85LXXXDSR	CN85XX YYWW
CN85LXXXTCR	85LXXX YYWW
CN85LXXXTGR	85XXXT YYWW
CN85LXXXOGR	CN85LXXX YYWW
CN85LXXXAOG	CN85LXXXA YYWW

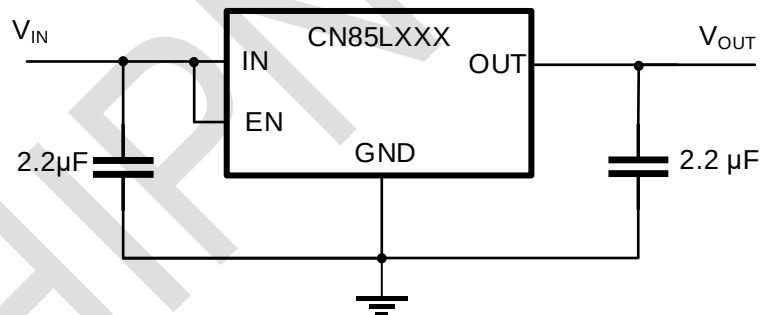
Note: YY=Year WW=Week.

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

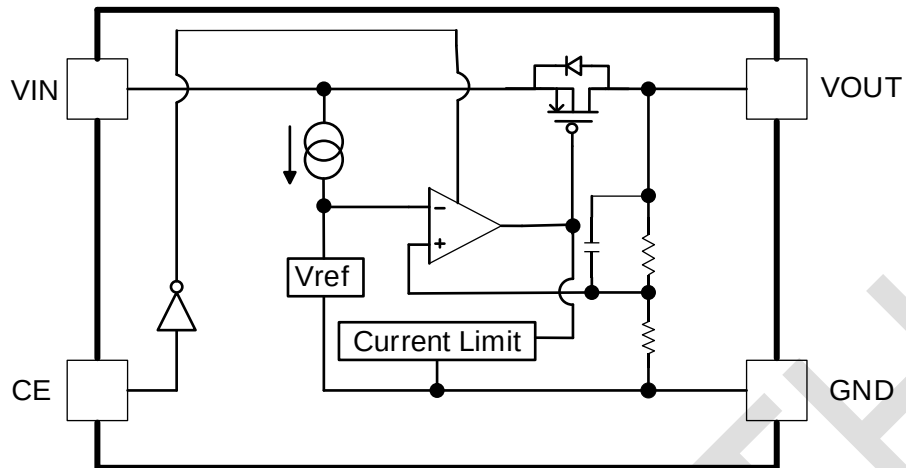


7 Typical Application



Note: General application circuits are recommended input capacitance $C_{IN} = 2.2\mu F$, near the chip input; output capacitance $C_{OUT} = 2.2\mu F$, near the chip output.

8 Block Diagram



9 Pin Descriptions

Pin Name	Pin No.					Descriptions
	CN85LXXX AOG	CN85LXXX OGR	CN85LXXX TGR	CN85LXXX DSR	CN85LXXX TCR	
GND	1	2	1	6	2	GND
VIN	2	3	3	4	4	Input
VOUT	3	1	2	3	5	Output
EN				1	1	Enable
NC				2、5	3	No Connect

10 Specifications

10.1 Absolute Maximum Ratings

Parameter	Symbol	Value	Units
Maximum Input Voltage	V_{IN}	-0.3 ~ 22	V
Maximum output Voltage	V_{OUT}	-0.3 ~ $V_{IN}-0.3$	V
EN enable voltage	V_{EN}	-0.3 ~ 14	V
Storage temperature range	T_{STG}	-55 ~ 150	°C
Soldering temperature	T_{LEAD}	260 (Soldering, 10s)	°C

(1) Stresses exceeding the values listed under Absolute Maximum Ratings may cause permanent damage to the device. These listed values are stress ratings only and do not imply that the device will operate properly under these conditions or any other conditions other than the recommended operating conditions. Prolonged operation at maximum absolute rating conditions can affect device reliability.

(2) All voltage values are based on the ground terminal.

10.2 ESD Ratings

Discharge mode	Standardize	Value	Units
HBM	ESDA/JEDEC JS-001-2017	±4000	V
CDM	ESDA/JEDEC JS-002-2018	±2000	V

10.3 Recommended Operating Range

Parameter	Symbol	Min.	Max.	Units
Input Voltage Range	V_{IN}	$V_{OUT}+1$	20	V
Ambient temperature	T_A	-40	105	°C

10.4 Thermal Information

Parameter	Package	Value	Units
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	100	°C/W

10.5 Electrical Characteristics

Test conditions: $V_{IN}=V_{OUT}+1V$, $C_{IN}=2.2\mu F$, $C_{OUT}=2.2\mu F$, $T_A=25^{\circ}C$, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Input Voltage Range	V_{IN}	$I_{OUT}=10mA$	$V_{OUT}+0.1V$		20	V
Output voltage *1	V_{OUT}	$V_{IN}=V_{OUT}+2V$, $I_{OUT}=1mA$	$V_{OUT} \times 0.98$	V_{OUT}	$V_{OUT} \times 1.02$	V
Output Voltage Accuracy	$V_{OUT}\%$	$V_{IN}=V_{OUT}+2V$, $I_{OUT}=10mA$	98%		102%	
Linear rate of adjustment	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$V_{IN}=V_{SET}+1V \sim 20V$ $I_{OUT}=1mA @ V_{OUT}=5V$			0.01	%/V
Load Adjustment Ratio	ΔV_{OUT}	$V_{IN}=V_{SET}+1V$ $I_{OUT}=0 \sim 300mA @ V_{OUT}=5V$		28	45	mV
Quiescent current	I_Q	$V_{IN}=12V$, $I_{OUT}=0mA$	1	2.5	4.2	μA
Dropout voltage *2	V_{DROP}	$I_{OUT}=100mA @ V_{OUT}=5V$	35	80	125	mV
Maximum Output Current	I_{OUT_MAX}			300		mA
Current Limit *3	I_{LIMIT}	$V_{IN}=V_{OUT}+1.0V$	0.3		1	A
OTP threshold				160		$^{\circ}C$
OTP hystereis				30		$^{\circ}C$
PSRR		100Hz		60		dB

Note*:

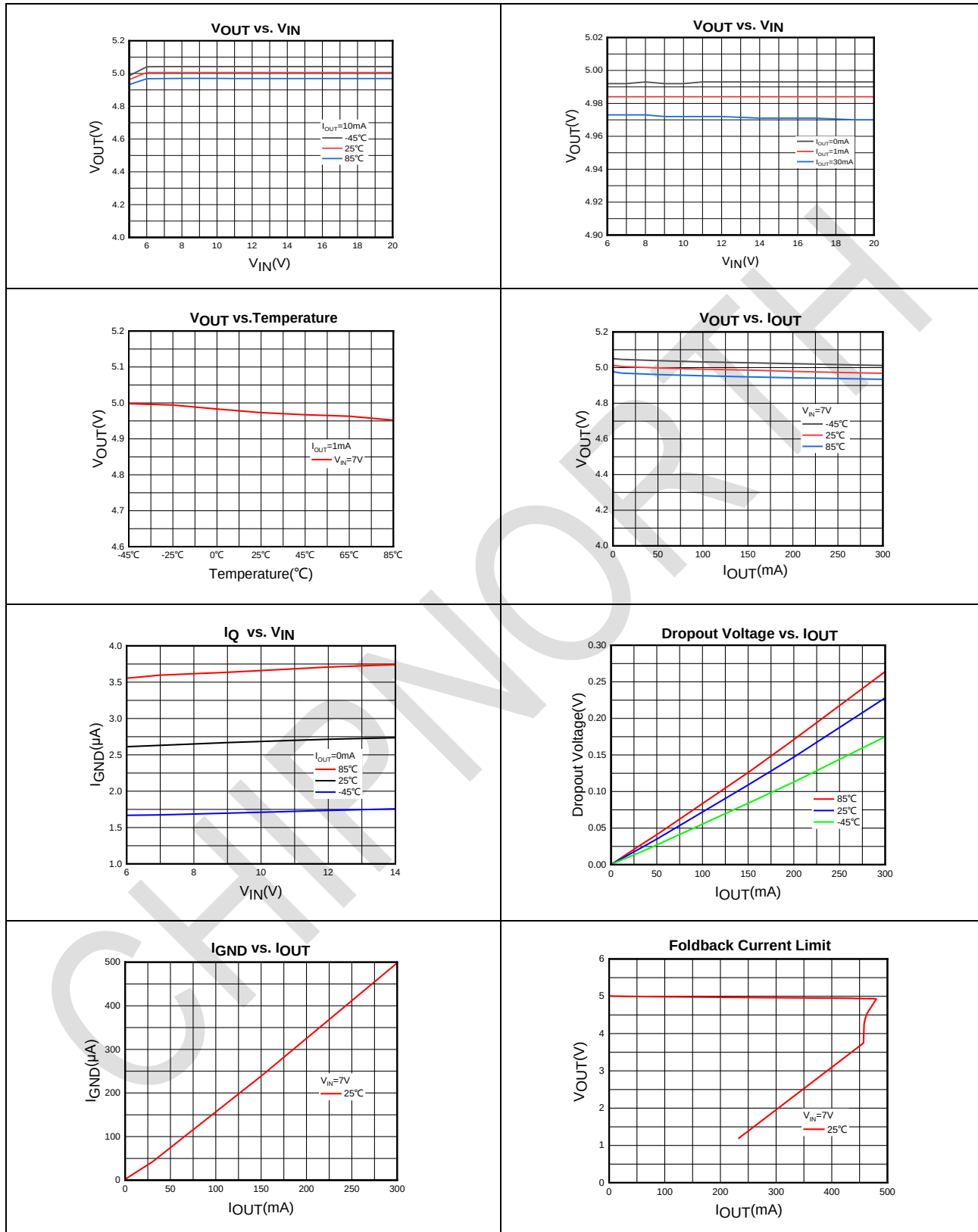
*1. $V_{OUT(S)}$: output voltage when $V_{IN} = V_{OUT} + 1V$, $I_{OUT} = 1mA$.

*2. $V_{DROP}=V_{IN}-(V_{OUT_REG} \times 0.98)$, V_{OUT_REG} is the output voltage when $V_{IN} = V_{OUT} + 1.0V$ and $I_{OUT} = 100mA$. V_{IN} is the input voltage, and when the input voltage is gradually reduced, the output voltage becomes 98% of V_{OUT_REG} .

*3. I_{LIMIT} : Output current when $V_{IN} = V_{OUT} + 1V$ and $V_{OUT} = 0.95 \times V_{OUT(S)}$.

10.6 Characteristics Curve (CN85L050OGR)

Test conditions: $V_{IN}=V_{OUT}+1V$, $C_{IN}=2.2\mu F$, $C_{OUT}=2.2\mu F$, $T_A=25^\circ C$, unless otherwise specified.



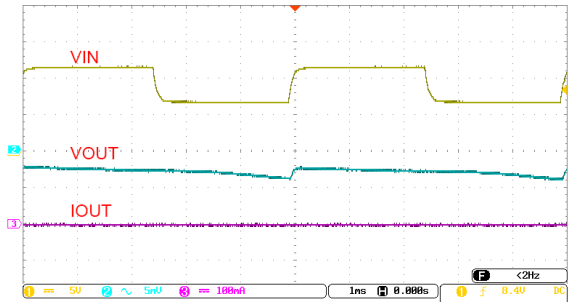


Figure 1 Line Transient
(VIN=from 6V to 12V to VOUT+1V IOUT=0mA)

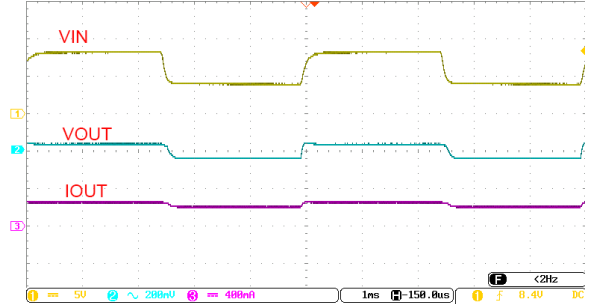


Figure 2 Line Transient
(VIN=from 6V to 12V to VOUT+1V IOUT=300mA)

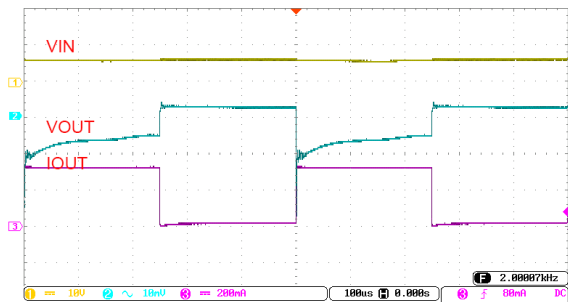


Figure 3 Load Transient
(VIN=7V, IOUT=0mA-300mA-0mA)

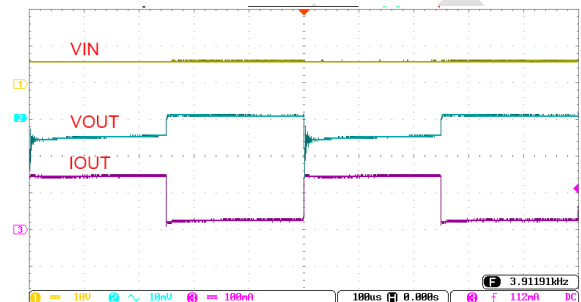
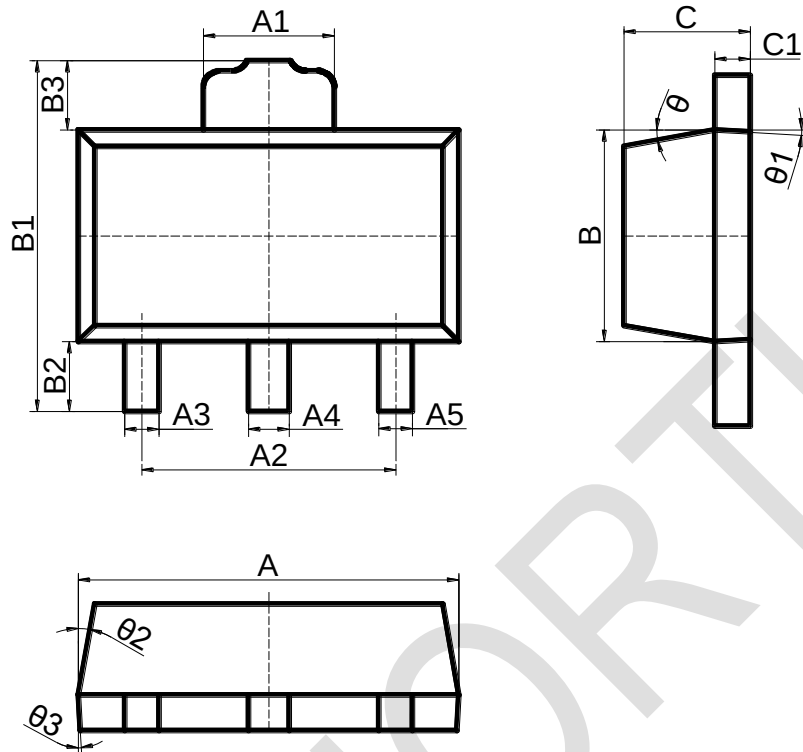


Figure 4 Load Transient
(VIN=7V, IOUT=1mA-150mA-1mA)

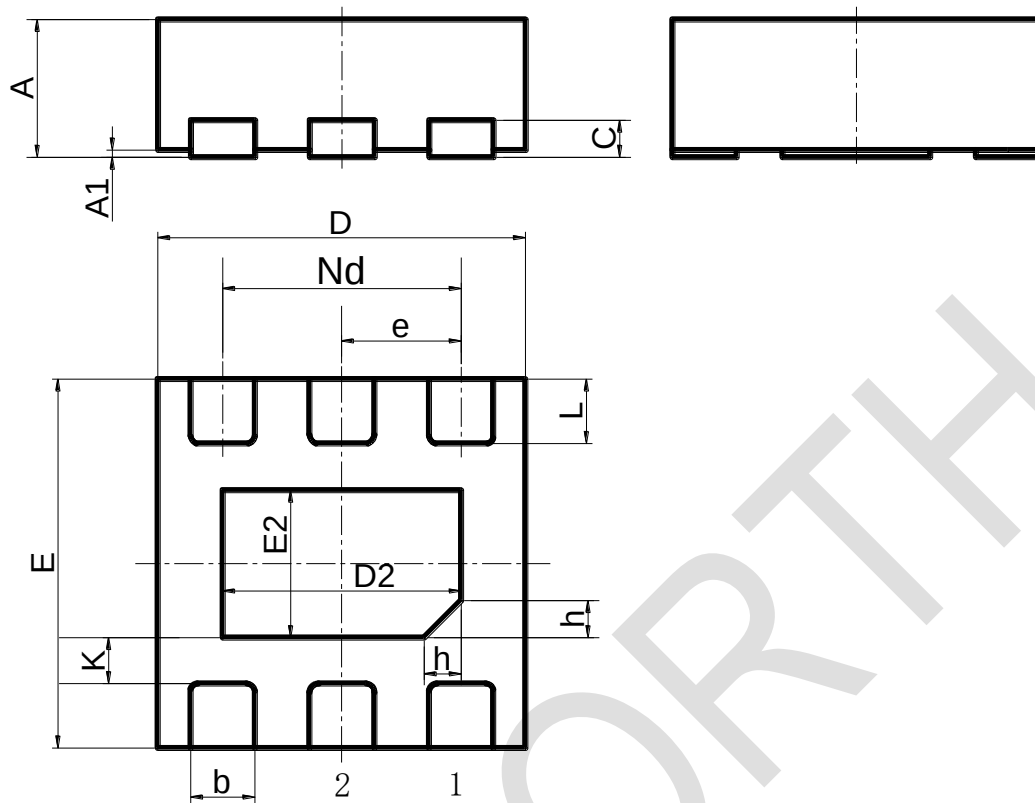
11 Package Information

SOT89-3



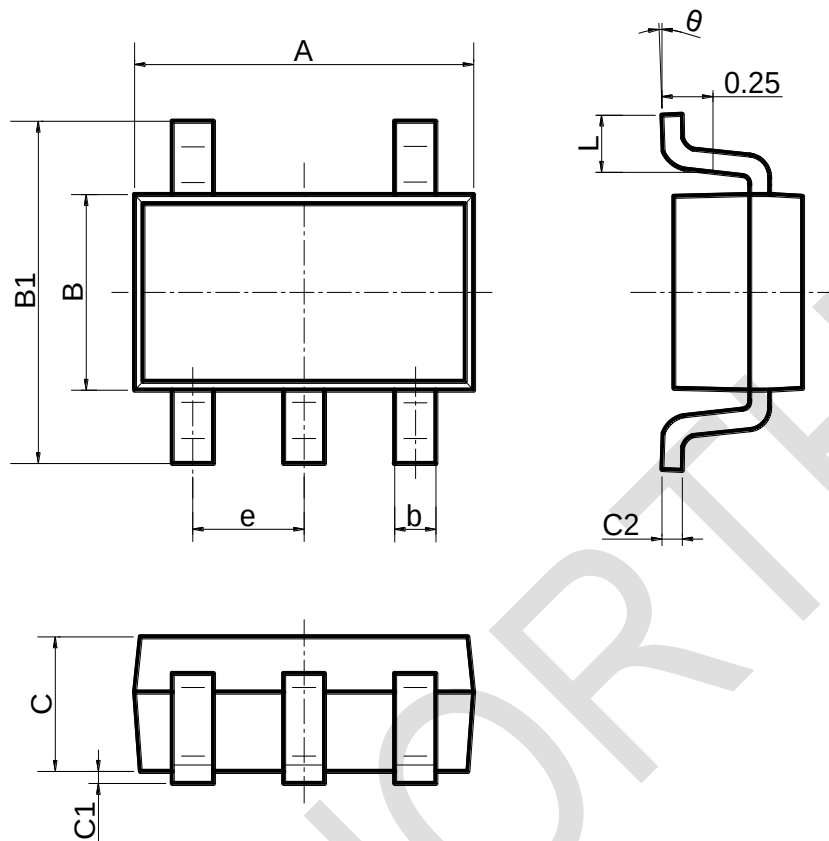
Dimension Symbol	Min (mm)	Nom (mm)	Max (mm)
A	4.4	4.5	4.6
A1	1.4	1.6	1.8
A2	2.8	3.0	3.2
A4	0.37	0.47	0.57
A5	0.22	0.42	0.62
B	2.4	2.5	2.6
B1	-	-	4.25
B2	0.8	-	-
C	1.4	1.5	1.6
C1	0.3	0.4	0.5

DFN2x2-6



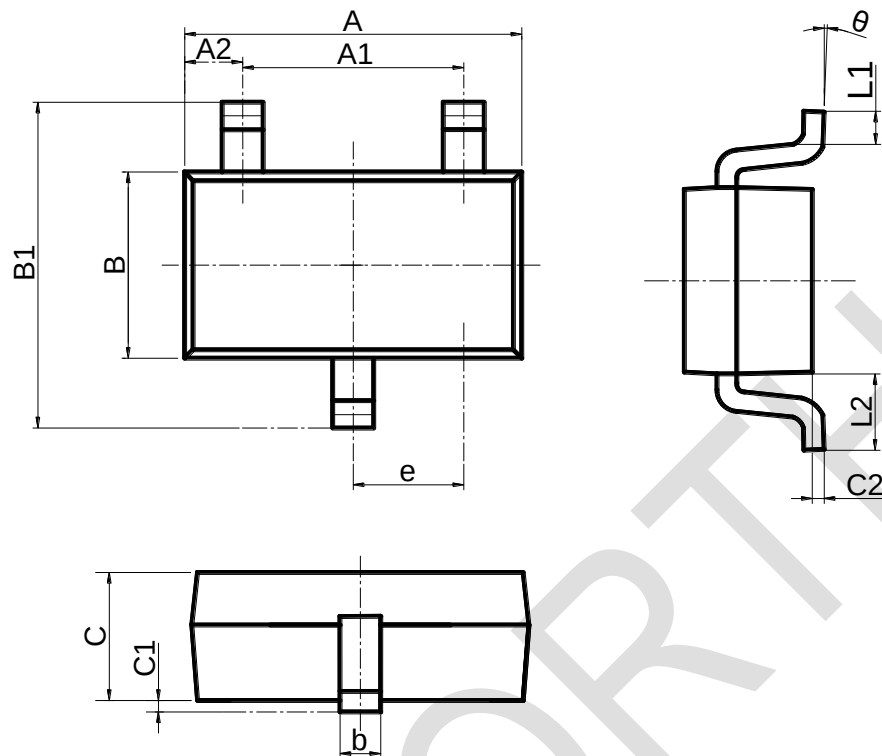
Dimension Symbol	Min (mm)	Nom (mm)	Max (mm)	Dimension Symbol	Min (mm)	Nom (mm)	Max (mm)
A	0.70	0.75	0.80	E2	0.75	0.80	0.85
A1	0.00	0.02	0.05	e	0.650(BSC)		
b	0.30	0.35	0.40	Nd	1.300(BSC)		
c	0.18	0.20	0.25	K	0.20	-	-
D	1.95	2.00	2.05	L	0.28	0.33	0.38
E	1.95	2.00	2.05	h	0.15	0.20	0.25

SOT23-5



Dimension Symbol	Min (mm)	Max (mm)	Dimension Symbol	Min (mm)	Max (mm)
A	2.82	3.02mm	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°

SOT23-3L



Dimension Symbol	Min (mm)	Max (mm)	Min (inch)	Max (inch)
A	2.820	3.020	0.111	0.119
A1	1.800	2.000	0.071	0.079
B	1.500	1.700	0.059	0.067
B1	2.650	2.950	0.104	0.116
b	0.300	0.500	0.012	0.020
e	0.950(BSC)		0.037(BSC)	
C	1.050	1.250	0.041	0.049
C1	0.000	0.100	0.000	0.004
C2	0.100	0.200	0.004	0.008
L1	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

12 Important Statement

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