



XTP2101

12V 500mA,

Ultra-Low I_Q , Low-Dropout LDO

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DESCRIPTION

The XTP2101 is a Low-Dropout (LDO) linear voltage regulator, and support 2.5V to 12V input voltage range with very-low quiescent (I_Q) . These features help modern appliances meet increasingly stringent energy requirements and help extend battery life in portable-power solutions.

Other features include short-circuit current limit and thermal shutdown protection, overload, and over-temperature conditions.

The XTP2101 is available in green SOT89-3, SOT23-5, SOT23-3 packages.

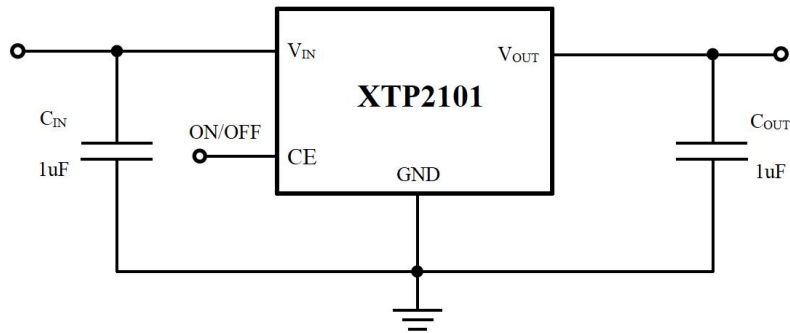
FEATURES

- Operating Input Voltage Range: 2.5V~12V
- Fixed Output Voltage: 1.2V, 1.8V, 2.5V, 2.8V, 3.3V, 3.6V, 4.0V, 5.0V
- Output Voltage Accuracy : $\pm 1.5\%$
- Low Quiescent Current: 3.1uA (TYP)
- PSRR: 65dB@1KHz
- Current Limiting Protection
- Thermal Shutdown Protection
- Operation Temperature: $-40^{\circ}\text{C}\sim+85^{\circ}\text{C}$
- Package: SOT89-3, SOT23-5, SOT23-3, SOT89-5

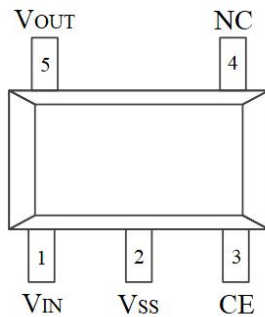
APPLICATIONS

- Home and building automation
- Portable Devices
- Portable power tools
- Smart door lock
- White goods

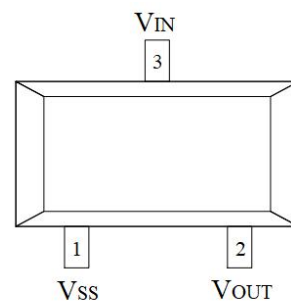
TYPICAL APPLICATION CIRCUIT



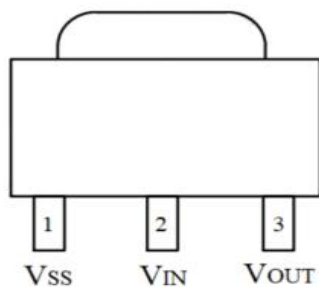
PIN CONFIGURATIONS



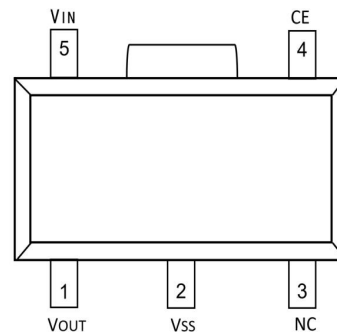
SOT23-5



SOT23-3



SOT89-3

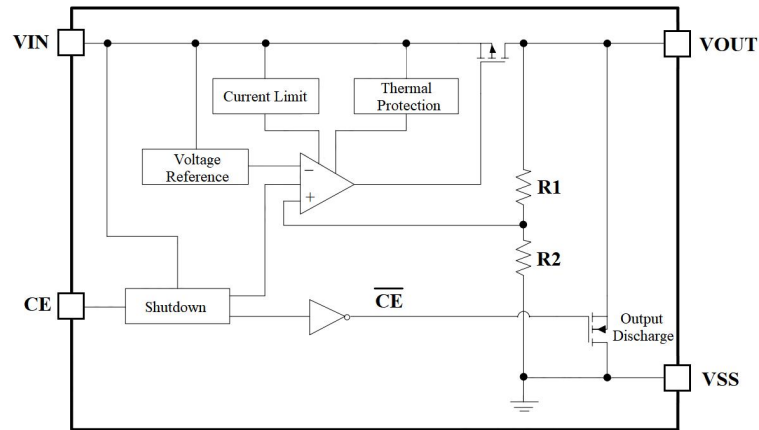


SOT89-5

Pin Description

SOT23-5	SOT23-3	SOT89-3	SOT89-5	NAME	DESCRIPTION
1	3	2	5	VIN	Input Voltage Supply
2	1	1	2	VSS	GND
3	-	-	4	CE	Enable PIN
4	-	-	3	NC	Not Connected
5	2	3	1	VOUT	Regulator Output

FUNCTION BLOCK DIAGRAM



ORDERING INFORMATION

Part Number	Package	Ordering Number	Part Number	Package	Ordering Number
XTP2101-1.2	SOT89-3	XTP2101-120ASACT	XTP2101-1.2	SOT23-5	XTP2101-120AS2CT
XTP2101-1.8	SOT89-3	XTP2101-180ASACT	XTP2101-1.8	SOT23-5	XTP2101-180AS2CT
XTP2101-2.5	SOT89-3	XTP2101-250ASACT	XTP2101-2.5	SOT23-5	XTP2101-250AS2CT
XTP2101-2.8	SOT89-3	XTP2101-280ASACT	XTP2101-2.8	SOT23-5	XTP2101-280AS2CT
XTP2101-3.3	SOT89-3	XTP2101-330ASACT	XTP2101-3.3	SOT23-5	XTP2101-330AS2CT
XTP2101-3.6	SOT89-3	XTP2101-360ASACT	XTP2101-3.6	SOT23-5	XTP2101-360AS2CT
XTP2101-4.0	SOT89-3	XTP2101-400ASACT	XTP2101-4.0	SOT23-5	XTP2101-400AS2CT
XTP2101-5.0	SOT89-3	XTP2101-500ASACT	XTP2101-5.0	SOT23-5	XTP2101-500AS2CT
XTP2101-1.2	SOT23-3	XTP2101-120AS1CT	XTP2101-1.2	SOT89-5	XTP2101-120ASCCT
XTP2101-1.8	SOT23-3	XTP2101-180AS1CT	XTP2101-1.8	SOT89-5	XTP2101-180ASCCT
XTP2101-2.5	SOT23-3	XTP2101-250AS1CT	XTP2101-2.5	SOT89-5	XTP2101-250ASCCT
XTP2101-2.8	SOT23-3	XTP2101-280AS1CT	XTP2101-2.8	SOT89-5	XTP2101-280ASCCT
XTP2101-3.3	SOT23-3	XTP2101-330AS1CT	XTP2101-3.3	SOT89-5	XTP2101-330ASCCT
XTP2101-3.6	SOT23-3	XTP2101-360AS1CT	XTP2101-3.6	SOT89-5	XTP2101-360ASCCT
XTP2101-4.0	SOT23-3	XTP2101-400AS1CT	XTP2101-4.0	SOT89-5	XTP2101-400ASCCT
XTP2101-5.0	SOT23-3	XTP2101-500AS1CT	XTP2101-5.0	SOT89-5	XTP2101-500ASCCT

PACKAGE/ORDERING INFORMATION

Package	Quantity/Reel	Operating Temperature Range
SOT89-3	3000	-40°C~85°C
SOT23-5	3000	-40°C~85°C
SOT23-3	3000	-40°C~85°C
SOT89-5	3000	-40°C~85°C

ABSOLUTE MAXIMUM RATINGS

Parameter		Min	Max	Unit
Power Supply Voltage	V _{IN}	-0.3	14	V
Output Current	I _{OUT}	0	0.6	A
CE Voltage	V _{CE}	-0.3	17	V
T _j	Maximum Junction Temperature	-40	125	°C
T _{OPR}	Operating Temperature Range	-40	85	°C
T _{stg}	Storage Temperature Range	-65	150	°C
T _L	Lead Temperature (Soldering 10 sec)		260	°C

Note: Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to any Absolute Maximum Rating condition for extended periods may affect device reliability and lifetime.

ESD,ELECTROSTATIC DISCHARGE PROTECTION

Symbol	Parameter	Condition	Minimum Level	Unit
HBM	Human Body Model ESD	ANSI/ESDA/JEDEC JS-001 ⁽¹⁾	4000	V
CDM	Charged Device Model ESD	ANSI/ESDA/JEDEC JS-002 ⁽²⁾	1000	V

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.

(2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

RECOMMENDED OPERATING CONDITIONS

(Unless otherwise noted, T_A=25°C)

Parameter		Min	Max	Unit
Power Supply	V _{IN}	2.5	12	V
Output Current (continuously)	I _{OUT}	0	0.5	A

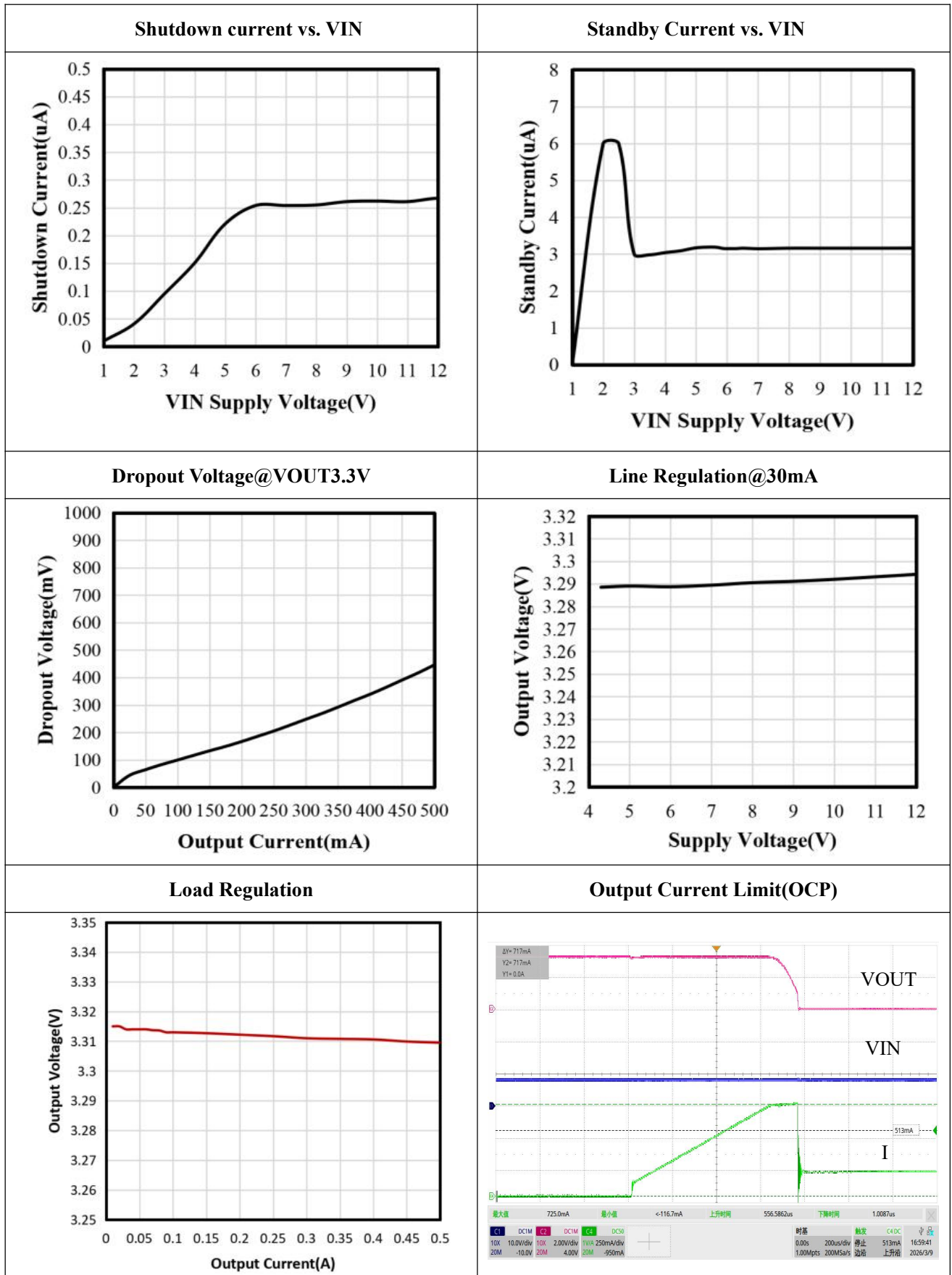
ELECTRICAL CHARACTERISTICS

 $V_{IN}=V_{OUT}+1V$ ($V_{OUT}>2V$), $V_{IN}=V_{OUT}+1.5V$ ($V_{OUT}\leq 2V$), $V_{CE}=V_{IN}$, $T_A=25^{\circ}C$

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{IN}	Operating Supply Voltage		2.5		12	V
I_{OUT}	Output Current	$V_{IN}=V_{OUT}+1V$		500		mA
ΔV_{OUT}	Load Regulation	$V_{IN}=V_{OUT}+1V$, $1mA\leq I_{OUT}\leq 100mA$		5	20	mV
V_{DIF}	Dropout Voltage	$V_{OUT}\geq 3V$, $I_{OUT}=100mA$		100		mV
I_Q	Quiescent Current	$V_{IN}=V_{OUT}+1V$		3.1	4.8	uA
I_{CEL}	Shutdown Current	$V_{CE}=0V$		0.2	0.25	uA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} * V_{OUT}}$	Line Regulation	$I_{OUT}=30mA$, $V_{OUT}+1V\leq V_{IN}\leq 15V$		0.03		%V
I_{LIM}	Output Current Limit			700		mA
V_{CEH}	CE Logic High		1.5			V
V_{CEL}	CE Logic Low				0.25	V
R_{DIS}	Output Discharge Resistance	$V_{CE}<0.25V$		500		Ω
PSRR	Power Supply Rejection Ratio	@1KHz		65		dB
T_{SHDN}	Thermal Shutdown Temperature			155		$^{\circ}C$
$T_{SHDNHYS}$	Thermal Shutdown Hysteresis			30		$^{\circ}C$

Typical Performance Characteristics

($T_A = 25^\circ\text{C}$, $V_{IN}=4.3\text{V}$, $V_{OUT} = 3.3\text{V}$, $C_{OUT} = 1\mu\text{F}$, $C_{IN} = 1\mu\text{F}$, unless otherwise noted)



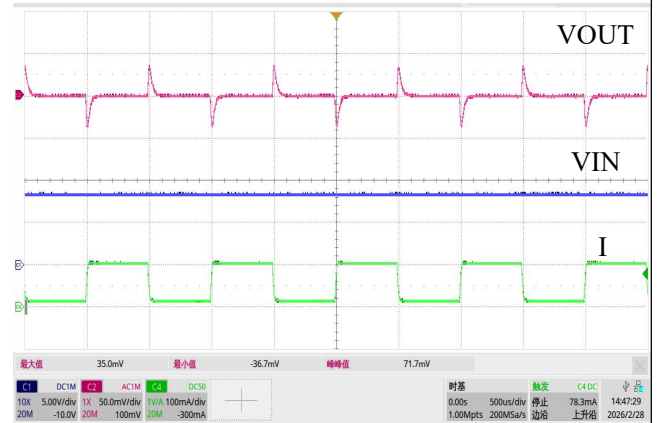
Load Transient Response

VIN=4.3V, VOUT=3.3V, ILoad:10mA-100mA



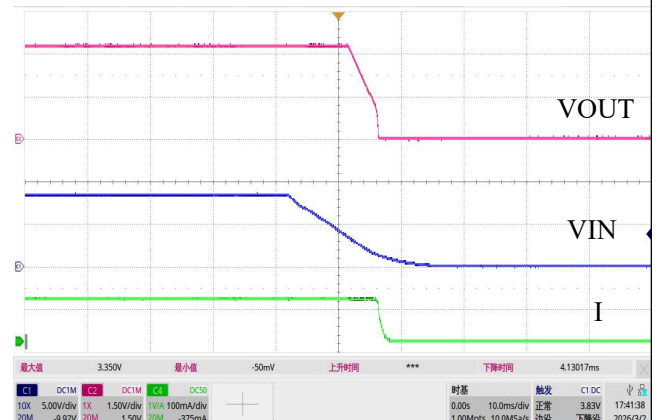
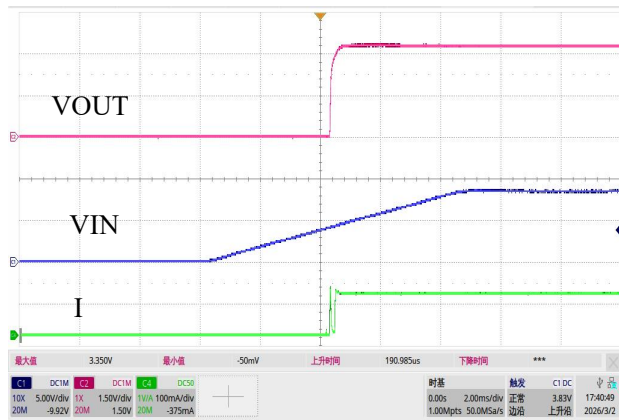
Load Transient Response

VIN=8.4V, VOUT=3.3V, ILoad:10mA-100mA



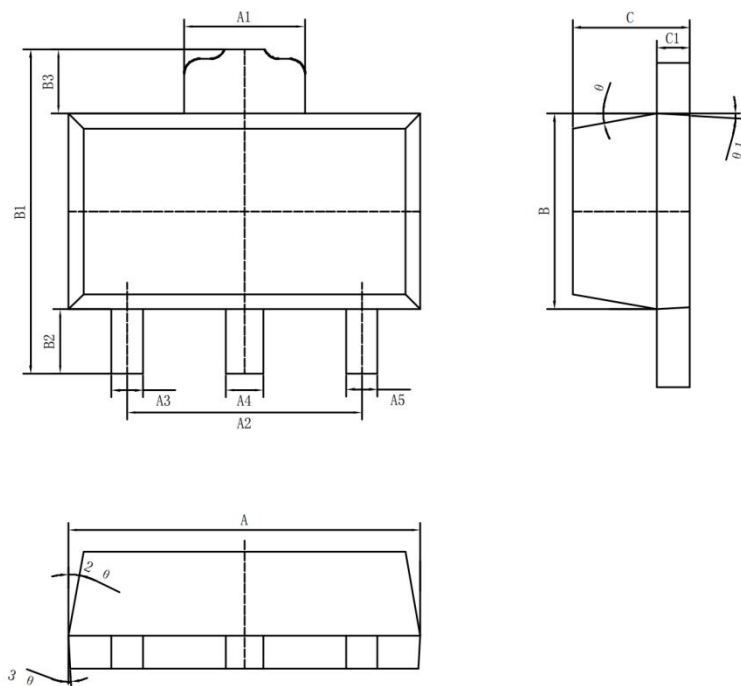
Power ON & Down

VIN=8.4V, VOUT=3.3V, @1V/mS IOU=100mA

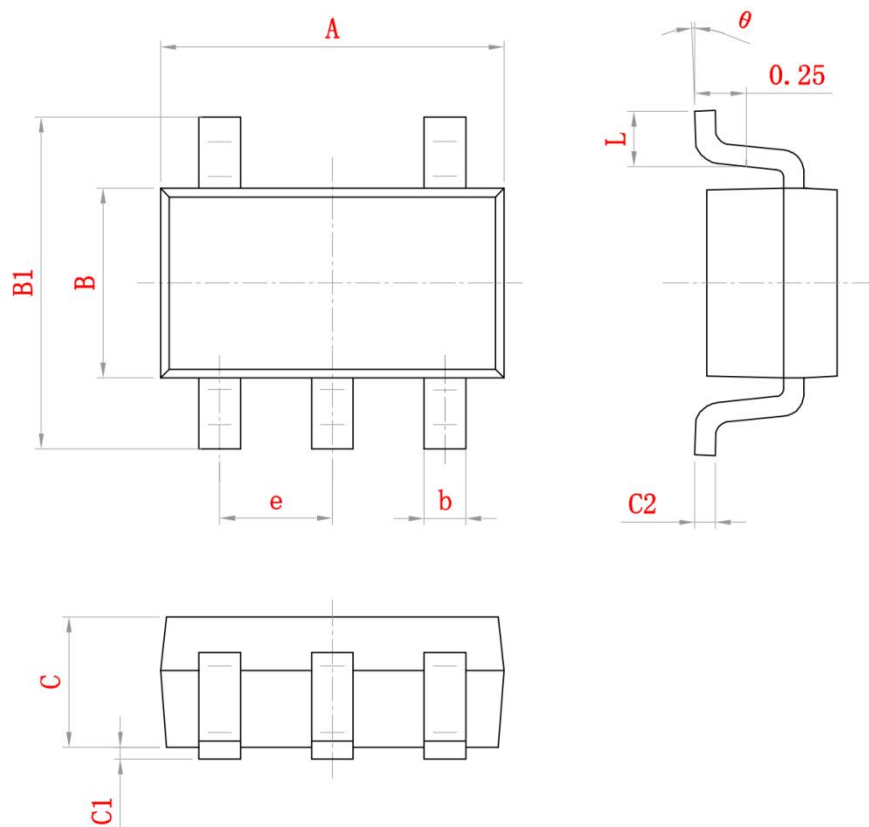


PACKAGE OUTLINE DIMENSIONS

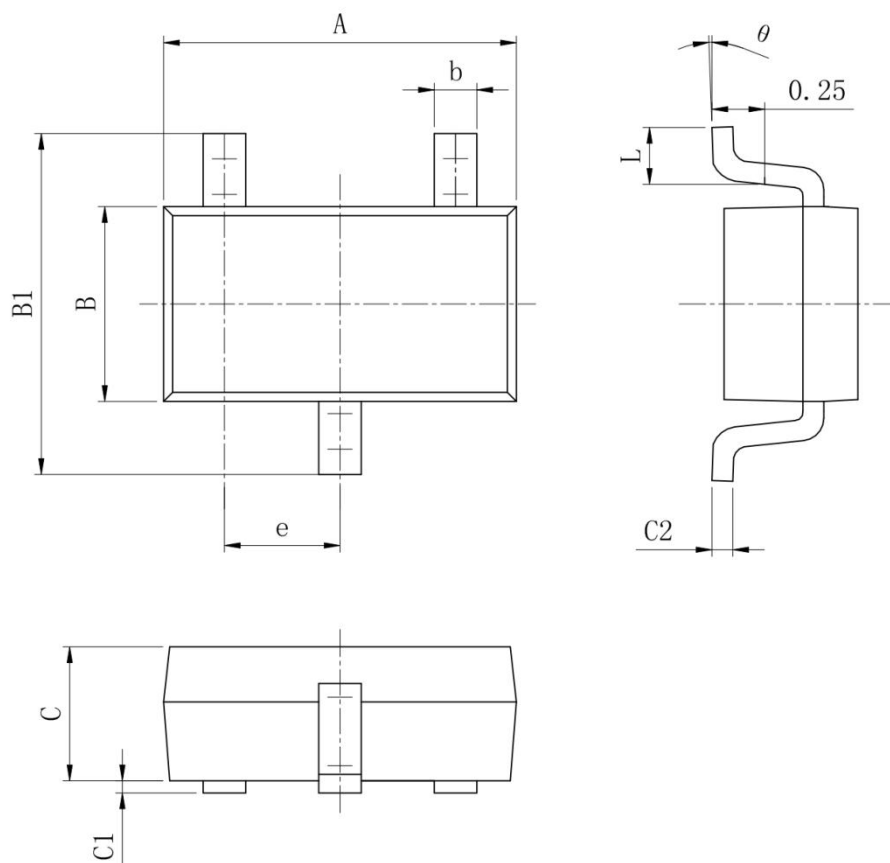
SOT89-3



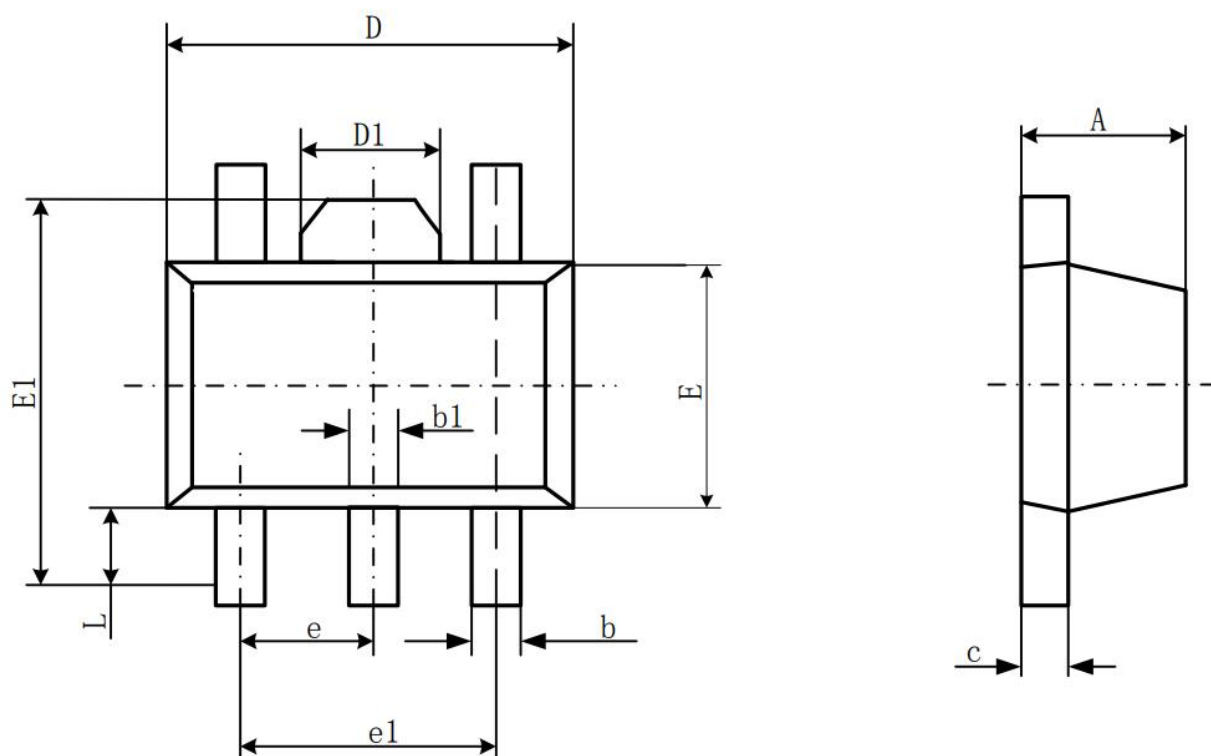
SYMBOL	DIMENSIONS IN MILLIMETERS	
	MIN	MAX
A	4.40	4.60
A1	1.65	1.75
A2	2.95	3.05
A3	0.35	0.45
A4	0.43	0.53
A5	0.35	0.45
B	2.40	2.60
B1	4.05	4.25
B2	0.82	0.83
B3	0.82	0.83
C	1.40	1.60
C1	0.35	0.45
θ	6° TYP4	
θ1	3° TYP4	
θ2	6° TYP4	
θ3	3° TYP4	



SYMBOL	DIMENSIONS IN MILLIMETERS	
	MIN	MAX
A	2.82	3.02
e	0.95 BSC	
b	0.28	0.45
B	1.50	1.70
B1	2.60	3.00
C	1.05	1.15
C1	0.03	0.15
C2	0.12	0.23
L	0.35	0.55
θ	0	8°



SYMBOL	DIMENSIONS IN MILLIMETERS	
	MIN	MAX
A	2.82	3.02
e	0.95 BSC	
b	0.28	0.45
B	1.50	1.70
B1	2.60	3.00
C	1.05	1.15
C1	0.03	0.15
C2	0.12	0.23
L	0.35	0.55
θ	0	8°



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.360	0.560	0.014	0.022
c	0.350	0.400	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.400	1.800	0.055	0.071
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500TYP		0.060TYP	
e1	2.900	3.100	0.114	0.122
L	0.900	1.100	0.035	0.043

REVISION HISTORY

Number	Description
Rev 1.0	XTP2101 datasheet release
Rev 1.1	Update ELECTRICAL CHARACTERISTICS
Rev 1.2	Update ELECTRICAL CHARACTERISTICS
Rev 1.3	Add curve waveforms and adjust layout
Rev 1.4	Add SOT89-5 package type