WDJ16XX
LOW DROPOUT LINEAR REGULATOR

GENERAL DESCRIPTION

WDJ16XX series are a set of Low Dropout Linear Regulator ICs implemented in CMOS technology.They can withstand voltage 30V. And they are available with low voltage drop and low quiescent current,widely used in audio, video and communication appliances.

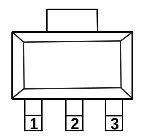
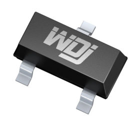
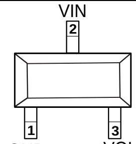
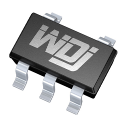
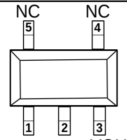
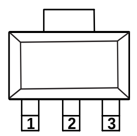
FEATURES

- Low Power Consumption
- Low Voltage Drop
- Low Temperature Coefficient
- Withstanding Voltage 30V
- Quiescent Current 1.5μA
- Output Voltage Accuracy: tolerance ±2%
- High output current: 150mA

TYPICAL APPLICATIONS

- Battery-powered Equipments
- Communication Equipments
- Audio/Video Equipments

PIN CONFIGURATION

SOT-89		SOT-23	
			
SOT23-5		**SOT-89(L)**	
			

ORDERING INFORMATION

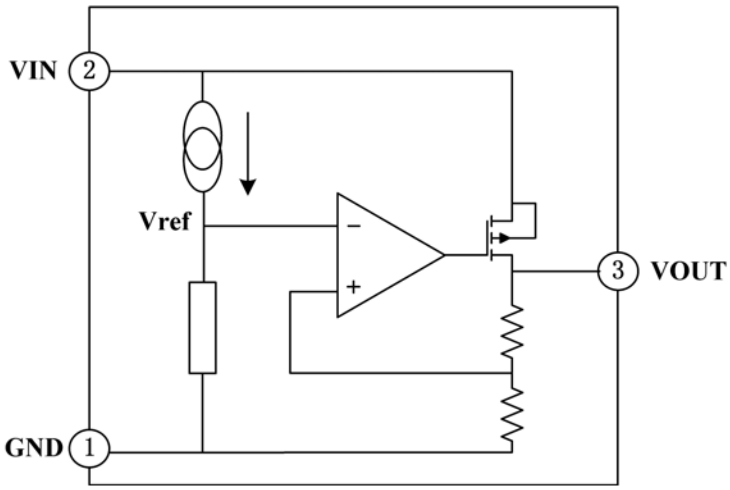
WDJ16 XX XXX

- WDJ16 — Product Name
- XX — Output Voltage
  - 25=2.5V 28=2.8V
  - 30=3.0V 33=3.3V
  - 36=3.6V 40=4.0V
  - 44=4.4V 50=5.0V
- XXX — Package
  - PR : SOT-89
  - PRL : SOT-89
  - M3R : SOT-23
  - M5R : SOT23-5

PIN DESCRIPTION

PIN No.			Name	Functions Description
SOT23-5	SOT-89 SOT-23	SOT-89 (L)		
1	1	2	GND	ground
2	2	3	V_{IN}	input
3	3	1	V_{OUT}	output
4			NC	No Connect
5			NC	No Connect

FUNCTIONAL BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Description	Symbol	Value range	Unit
Limit Power Voltage	V_{IN}	－0.3～+33	V
Storage Temperature Range	T_{STG}	－50～＋125	℃
Operating Free-air Temperature Range	T_A	－40～＋85	℃

Note : Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

HEAT DISSIPATION

Description	Symbol	Package	Value range	Unit
Thermal resistance	θ_{JA}	SOT-89	200	℃/W
		SOT23-5	500	℃/W
		SOT-23	500	℃/W
Power dissipation	P_D	SOT-89	500	mW
		SOT23-5	200	mW
		SOT-23	200	mW

ELECTRICAL CHARACTERISTICS (unless otherwise noted T_A =＋25°C)

WDJ1625 +2.5V

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$	2.45	2.50	2.55	V
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	100	150	—	mA
Load Regulation	$\triangle V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA \le I_{OUT} \le 50mA$	—	25	60	mV
Voltage Drop	V_{DIF}	$I_{OUT}=1mA$, $\triangle V_{OUT}=2\%$	—	30	100	mV
Quiescent Current	I_{SS}	No Load	—	1.5	3.0	μA
Line Regulation	$\triangle V_{OUT}/ V_{OUT}* \triangle V_{IN}$	$V_{OUT}+1.0V \le V_{IN} \le 30V$, $I_{OUT}=1mA$	—	—	0.2	%/V
Input Voltage	V_{IN}	—	—	—	30	V
Temperature Coefficient	$\triangle V_{OUT}/ \triangle T_A*V_{OUT}$	$V_{OUT}+2.0V$, $I_{OUT}=10mA$, $-40°C \le T_A \le 85°C$	—	100	—	ppm/°C

Note : Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT} +2V with a fixed load.

WDJ1628 +2.8V

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$	2.744	2.80	2.856	V
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	100	150	—	mA
Load Regulation	$\triangle V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA \le I_{OUT} \le 50mA$	—	25	60	mV
Voltage Drop	V_{DIF}	$I_{OUT}=1mA$, $\triangle V_{OUT}=2\%$	—	30	100	mV
Quiescent Current	I_{SS}	No Load	—	1.5	3.0	μA
Line Regulation	$\triangle V_{OUT}/ V_{OUT}* \triangle V_{IN}$	$V_{OUT}+1.0V \le V_{IN} \le 30V$, $I_{OUT}=1mA$	—	—	0.2	%/V
Input Voltage	V_{IN}	—	—	—	30	V
Temperature Coefficient	$\triangle V_{OUT}/ \triangle T_A*V_{OUT}$	$V_{OUT}+2.0V$, $I_{OUT}=10mA$, $-40°C \le T_A \le 85°C$	—	100	—	ppm/°C

Note : Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT} +2V with a fixed load.

WDJ1630 +3.0V

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$	2.94	3.00	3.06	V
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	100	150	—	mA
Load Regulation	$\triangle V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA \leqslant I_{OUT} \leqslant 50mA$	—	25	60	mV
Voltage Drop	V_{DIF}	$I_{OUT}=1mA$, $\triangle V_{OUT}=2\%$	—	30	100	mV
Quiescent Current	I_{SS}	No Load	—	1.5	3.0	µA
Line Regulation	$\triangle V_{OUT}/ V_{OUT}* \triangle V_{IN}$	$V_{OUT}+1.0V \leqslant V_{IN} \leqslant 30V$, $I_{OUT}=1mA$	—	—	0.2	%/V
Input Voltage	V_{IN}	—	—	—	30	V
Temperature Coefficient	$\triangle V_{OUT}/ \triangle T_A*V_{OUT}$	$V_{IN}= V_{OUT}+2.0V$, $I_{OUT}=10mA$, $-40℃ \leqslant T_A \leqslant 85℃$	—	100	—	ppm/℃

Note : Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT} +2V with a fixed load.

WDJ1633 +3.3V

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$	3.234	3.30	3.366	V
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	100	100	—	mA
Load Regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+2.0V$ $1mA \leqslant I_{OUT} \leqslant 50mA$	—	25	60	mV
Voltage Drop	V_{DIF}	$I_{OUT}=1mA$, $\triangle V_{OUT}=2\%$	—	25	55	mV
Quiescent Current	I_{SS}	No Load	—	1.5	3.0	µA
Line Regulation	$\triangle V_{OUT}/ V_{OUT}* \triangle V_{IN}$	$V_{OUT}+1.0V \leqslant V_{IN} \leqslant 30V$, $I_{OUT}=1mA$	—	—	0.2	%/V
Input Voltage	V_{IN}	—	—	—	30	V
Temperature Coefficient	$\triangle V_{OUT}/ \triangle T_A*V_{OUT}$	$V_{IN}= V_{OUT}+2.0V$, $I_{OUT}=10mA$, $-40℃ \leqslant T_A \leqslant 85℃$	—	100	—	ppm/℃

Note : Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT} +2V with a fixed load.

WDJ1636 +3.6V

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	V_{IN}=V_{OUT}+2.0V ，I_{OUT}=10mA	3.528	3.60	3.672	V
Output Current	I_{OUT}	V_{IN}=V_{OUT}+2.0V	100	150	—	mA
Load Regulation	△V_{OUT}	V_{IN}=V_{OUT}+2.0V 1mA≤I_{OUT}≤50mA	—	25	60	mV
Voltage Drop	V_{DIF}	I_{OUT}=1mA，△V_{OUT}=2%	—	25	55	mV
Quiescent Current	I_{SS}	No Load	—	1.5	3.0	μA
Line Regulation	△V_{OUT}/ V_{OUT}*△V_{IN}	V_{OUT}+1.0V≤V_{IN}≤30V，I_{OUT}=1mA	—	—	0.2	%/V
Input Voltage	V_{IN}	—	—	—	30	V
Temperature Coefficient	△V_{OUT}/△T_A*V_{OUT}	V_{IN}= V_{OUT}+2.0V，I_{OUT}=10mA，-40℃≤T_A≤85℃	—	100	—	ppm/℃

Note : Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT} +2V with a fixed load.

WDJ1640 +4.0V

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	V_{IN}=V_{OUT}+2.0V，I_{OUT}=10mA	3.92	4.0	4.08	V
Output Current	I_{OUT}	V_{IN}=V_{OUT}+2.0V	100	150	—	mA
Load Regulation	△V_{OUT}	V_{IN}=V_{OUT}+2.0V 1mA≤I_{OUT}≤50mA	—	25	60	mV
Voltage Drop	V_{DIF}	I_{OUT}=1mA，△V_{OUT}=2%	—	25	55	mV
Quiescent Current	I_{SS}	No Load	—	1.5	3.0	μA
Line Regulation	△V_{OUT}/ V_{OUT}*△V_{IN}	V_{OUT}+1.0V≤V_{IN}≤30V，I_{OUT}=1mA	—	—	0.2	%/V
Input Voltage	V_{IN}	—	—	—	30	V
Temperature Coefficient	△V_{OUT}/△T_A*V_{OUT}	V_{IN}= V_{OUT}+2.0V，I_{OUT}=10mA，-40℃≤T_A≤85℃	—	100	—	ppm/℃

Note : Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT} +2V with a fixed load.

WDJ1644 +4.4V

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	V_{IN}=V_{OUT}+2.0V ，I_{OUT}=10mA	4.312	4.4	4.488	V
Output Current	I_{OUT}	V_{IN}=V_{OUT}+2.0V	100	150	—	mA
Load Regulation	△V_{OUT}	V_{IN}=V_{OUT}+2.0V 1mA≤I_{OUT}≤50mA	—	25	60	mV
Voltage Drop	V_{DIF}	I_{OUT}=1mA，△V_{OUT}=2%	—	25	55	mV
Quiescent Current	I_{SS}	No Load	—	1.5	3.0	μA
Line Regulation	△V_{OUT}/ V_{OUT}* △V_{IN}	V_{OUT}+1.0V≤V_{IN}≤30V，I_{OUT}=1mA	—	—	0.2	%/V
Input Voltage	V_{IN}	—	—	—	30	V
Temperature Coefficient	△V_{OUT}/ △T_A*V_{OUT}	V_{IN}= V_{OUT}+2.0V，I_{OUT}=10mA，-40℃≤T_A≤85℃	—	100	—	ppm/℃

Note : Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT} +2V with a fixed load.

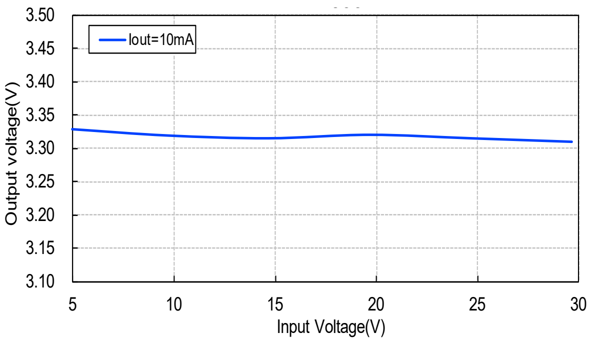
WDJ1650 +5.0V

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	V_{IN}=V_{OUT}+2.0V ，I_{OUT}=10mA	4.9	5.0	5.1	V
Output Current	I_{OUT}	V_{IN}=V_{OUT}+2.0V	100	150	—	mA
Load Regulation	△V_{OUT}	V_{IN}=V_{OUT}+2.0V 1mA≤I_{OUT}≤70mA	—	25	60	mV
Voltage Drop	V_{DIF}	I_{OUT}=1mA，△V_{OUT}=2%	—	25	55	mV
Quiescent Current	I_{SS}	No Load	—	1.5	3.0	μA
Line Regulation	△V_{OUT}/ V_{OUT}* △V_{IN}	V_{OUT}+1.0 V≤V_{IN}≤30V，I_{OUT}=1mA	—	—	0.2	%/V
Input Voltage	V_{IN}	—	—	—	30	V
Temperature Coefficient	△V_{OUT}/ △T_A*V_{OUT}	V_{IN}= V_{OUT}+2.0V，I_{OUT}=10mA，-40℃≤T_A≤85℃	—	100	—	ppm/℃

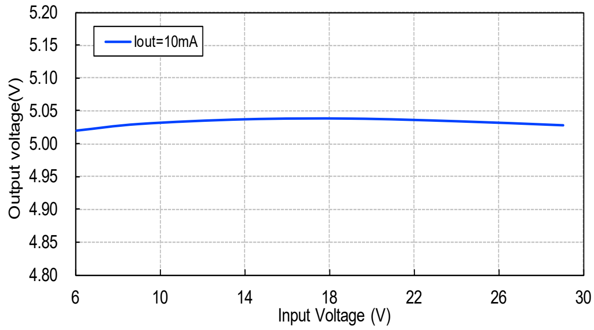
Note : Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT} +2V with a fixed load.

TYPICAL PERFORMANCE CHARACTERISTICS

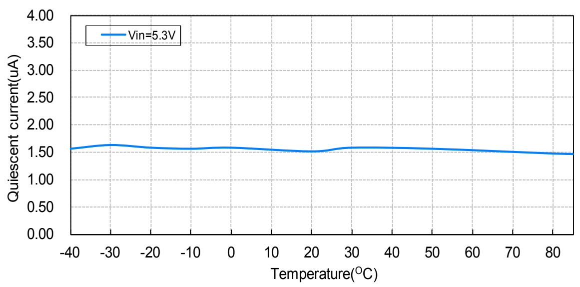
Test Condition: $V_{IN}=V_{OUT}+2V$, $I_{OUT}=10mA$, $T_J=25°C$, unless otherwise noted



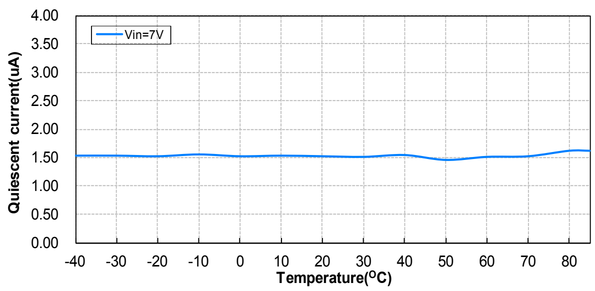
Output Voltage vs Input Voltage: 3.3V



Output Voltage vs Input Voltage: 5.0V



Quiescent Current vs Temperature: 3.3V (I_{OUT}=0mA)



Quiescent Current vs Temperature: 5.0V (I_{OUT}=0mA)

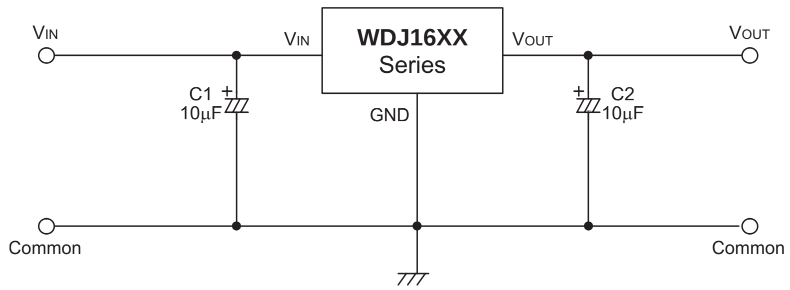
FUNCTIONAL DESCRIPTION

WDJ16XX series are linear voltage regulator ICs withstanding 30V voltage. The series IC consists of a voltage reference, an error amplifier, a current limiter and a phase compensation circuit plus a driver transistor. The output stabilization capacitor is also compatible with low ESR ceramic capacitors.

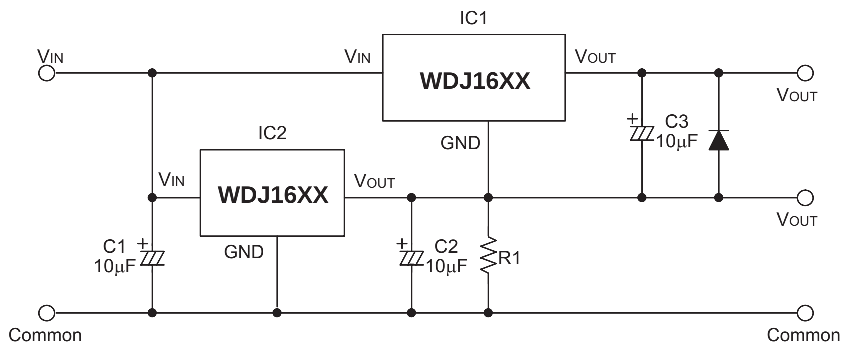
The over current protection circuit and the over voltage protection circuit are built-in. The protection circuit will operate when the output current or input voltage reaches limit level.

APPLICATION CIRCUIT

Basic Circuit

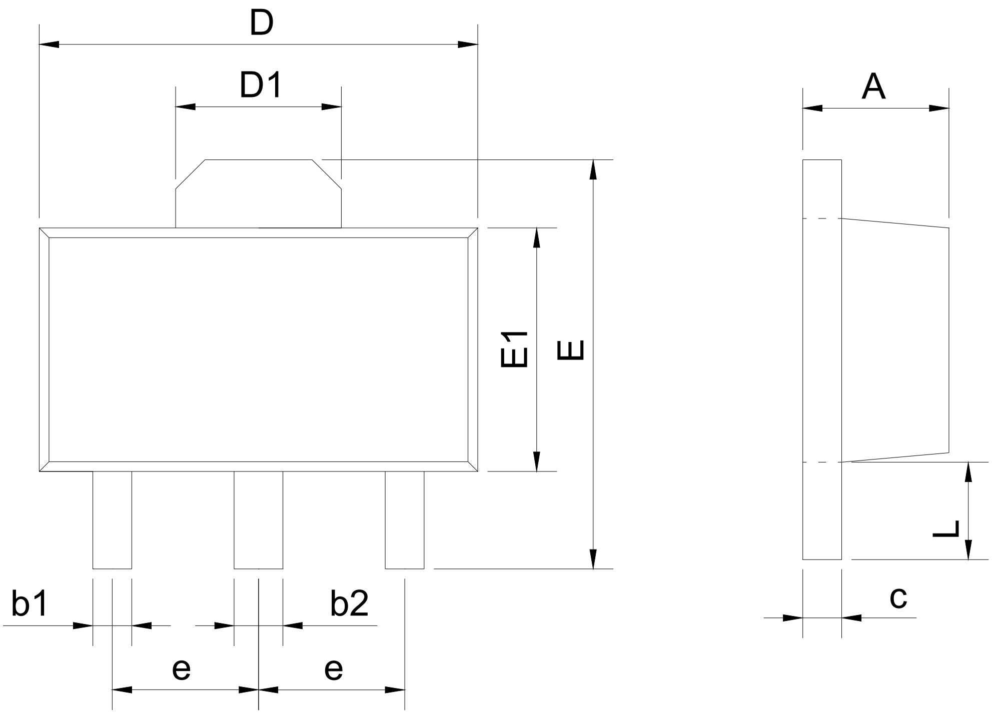


Dual Supply



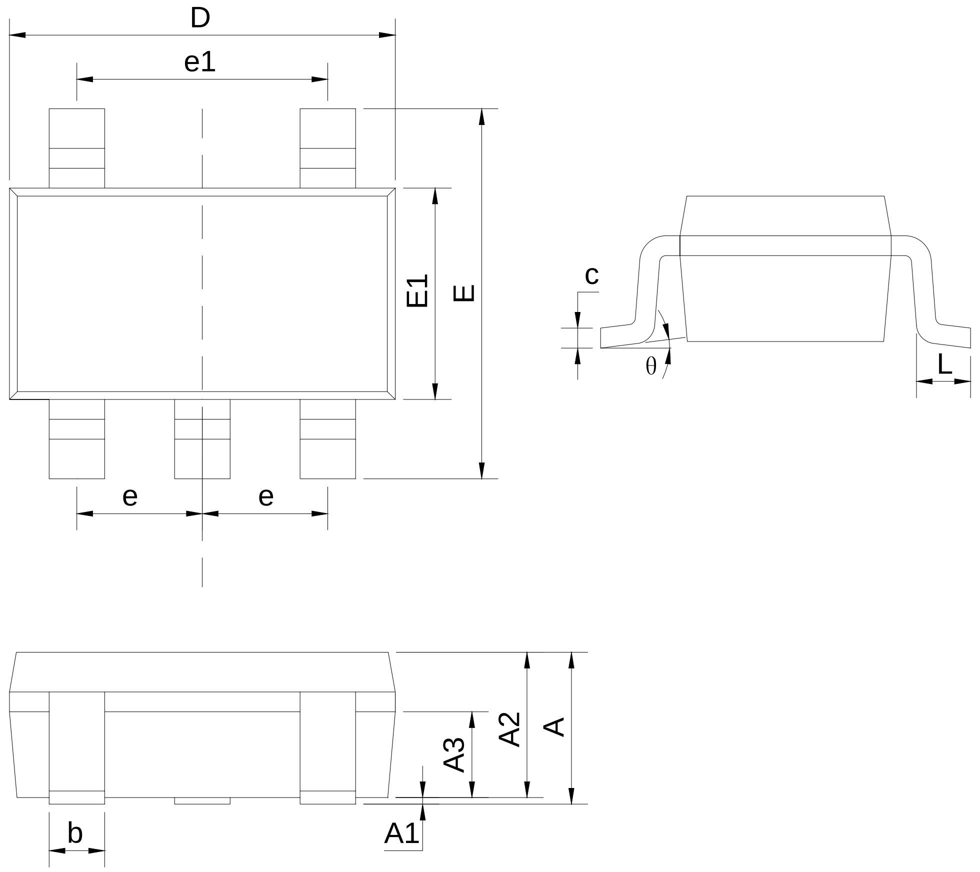
PACKAGE INFORMATION

SOT-89



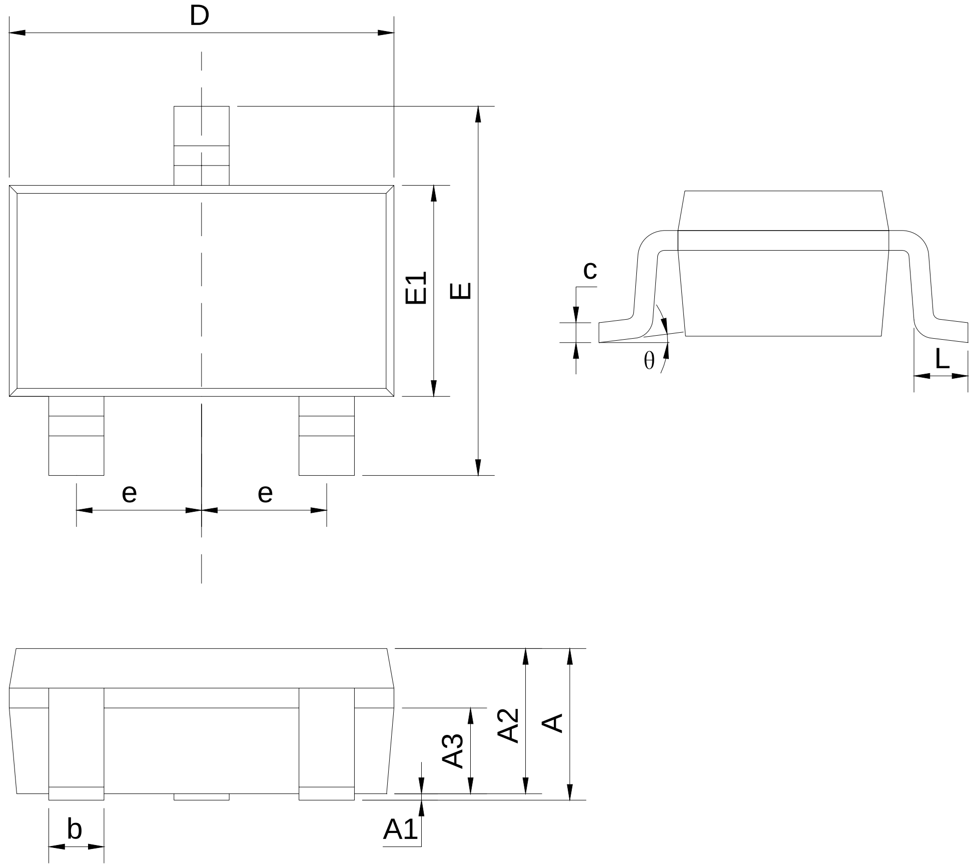
SYMBOL	mm	
	min	max
A	1.40	1.60
b1	0.35	0.50
b2	0.45	0.60
c	0.36	0.46
D	4.30	4.70
D1	1.40	1.80
E	4.00	4.40
E1	2.30	2.70
e	1.50BSC	
L	0.80	1.20

SOT23-5



SYMBOL	mm	
	min	max
A		1.35
A1	0.04	0.15
A2	1.00	1.20
A3	0.55	0.75
b	0.38	0.48
c	0.10	0.25
D	2.72	3.12
E	2.60	3.00
E1	1.40	1.80
e	0.95BSC	
e1	1.90BSC	
L	0.30	0.60
θ	0	8^{o}

SOT-23



SYMBOL	mm	
	min	max
A		1.35
A1	0.90	0.12
A2	0.85	1.05
A3	0.55	0.75
b	0.38	0.48
c	0.10	0.25
D	2.80	3.00
E	2.35	2.45
E1	1.20	1.40
e	0.95BSC	
L	0.30	0.60
θ	0	8°

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