ACE517C

2A Low Consumption Linear Regulator

Description

ACE517C is a series of low power consumption, low dropout voltage regulator with a typical dropout voltage of 1.0V at 2A load current.

ACE517C can provide output value in the range of 1.1V~5.0V in 0.1V steps. It also can customized on command.

Other than every voltage version can be used as an adjustable voltage version, with which desired voltage can be achieved by setting the values of two external resistors of the application circuitry.

ACE517C has well load transient response and good temperature characteristic, And it uses trimming technique to guarantee output voltage accuracy within±2%.

ACE517C series is available in standard packages ofSOT-223 and TO-252

Features

- Low Power Consumption:2.0uA (Typ.)
- Maximum output current : 2A
- Maximum input voltage: 18V
- Line regulation: 0.2％ (Typical)
- Output Voltage Range:1.1V~5.0V (customized on command in 0.1V steps)
- Highly Accurate:±2%(±1% customized)
- Typical Dropout Voltage:850mV@1.5A (Vout=3.3V)
- Operation environment Temperature: -40 ~85℃

Applications

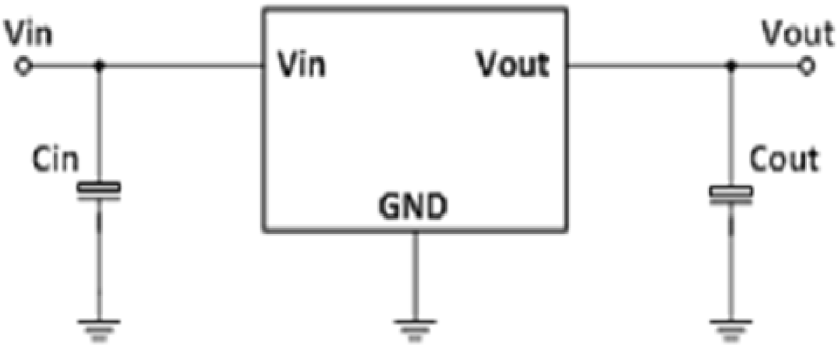
- Battery Charger
- Battery Powered equipment
- Post Regulators for Switching Supplies
- Reference Voltage Source Regulation after Switching Power

Absolute Maximum Rating

Parameter		Value
Max Input Voltage		20V
Operating Junction Temperature(Ta)		125℃
Ambient Temperature(Ta)		-40~85℃
Package Thermal Resistance	SOT-223	20℃/W
	TO-252	20℃/W
Storage Temperature(Ts)		- 40 to 150℃
Lead Temperature & Time		260℃,10S

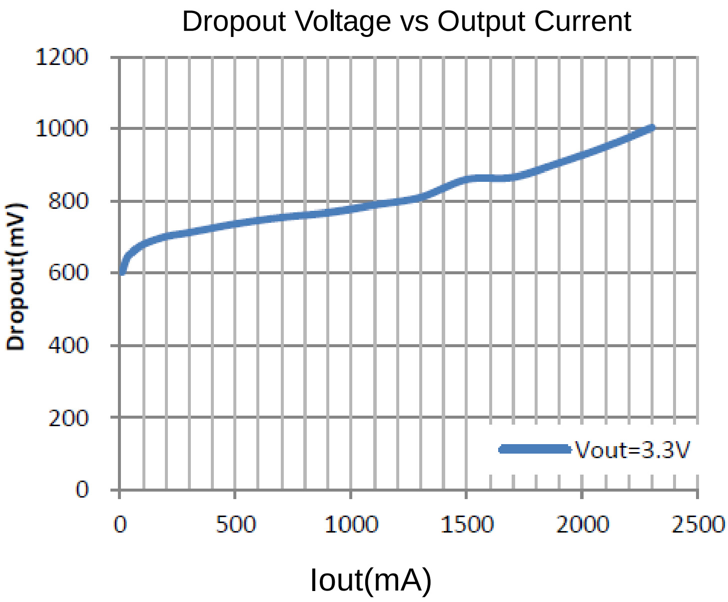
Note: Exceed these limits to damage to the device. Exposure to absolute maximum rating conditions may affect device reliability.

Typical Application

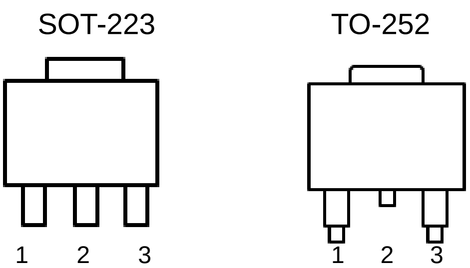


Note: Input capacitor (Cin=1uF) and Output capacitor (Cout=1uF) are recommended In all application circuit. ceramic capacitor is recommended.

ELECTRICAL CHARACTERISTICS



Packaging Type



SOT-223	SOT-252	Description
1	1	VSS/ADJ
2	2	V_{OUT}
3	3	V_{DD}

Recommended work conditions

Parameter	Value
Input Voltage Range	Max. 18V
Ambient Temperature	-40 ~ 85°C

Ordering information

ACE517C XX XX + H

- H: Halogen - free
- +: Pb - free
- XX (second): XM: SOT-223 / YM : SOT-252
- XX (first): Output Voltage :Ex：1.8V=18……5.0V=50

Electrical Characteristics

Test conditions: Cin=1uF, Cout=1uF, T_A=25℃, unless otherwise specified.

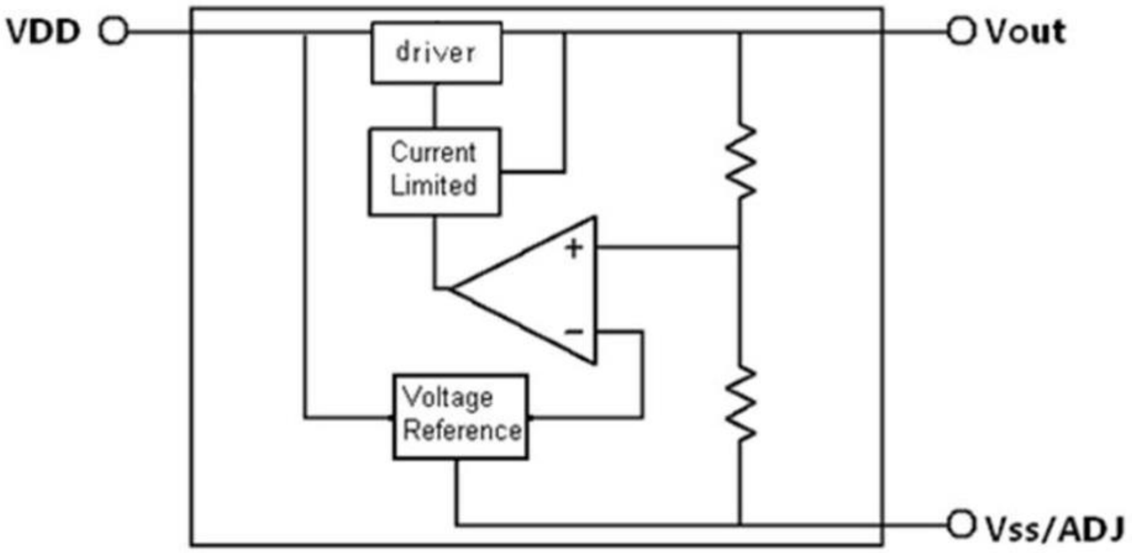
Parameter	Symbol	Conditions		Min	Typ	Mum	Unit
Input Voltage	Vin					18	V
Output Voltage	Vout			V_{OUT} *0.98		V_{OUT} *1.02	V
Maximum Output Current	Iout (Max.)	Vin-Vout=1.7V	Vout<1.5V	2			A
		Vin-Vout=1.4V	1.5V≦Vout<2.0V				
		Vin-Vout=1 V	Vout≧2.0V				
Input-Output Voltage Differential(note3)	Dropout Voltage	Iout≦1.5A	Vout<1.5V			1600	mV
			1.5V≦Vout<2.0V		1000	1300	
			Vout≧2.0V		800	950	
Line Regulation (note1)	△Vout / △Vin●Vout	Iout =10mA Set Vout+1V≦Vin≦18V			0.1	0.3	%/V
Line Regulation (note1,2)	△V_{OUT}	1mA≦Iout≦ 1.5A	Vout<1.5V		40	60	mV
			1.5V≦Vout<2.0V		20	40	
			Vout≧2.0V		10	30	
Quiescent Current	Iq	Vin= Set Vout+1V			2.0	5.0	uA
Output Voltage Temperature Coefficient	△Vout / △T●Vout	Iout =100mA			200		ppm/℃
Thermal Resistance junction to case	θ_{JC}	SOT-223			20		℃/W
		TO-252			12		

Note1: Line Regulation and Load Regulation in Table1 are tested under constant junction temperature.

Note2: When load current varies between 0~2A and Vin-Vout ranges from 1V~18V at constant junction temperature, the parameter is satisfied the criterion in table.

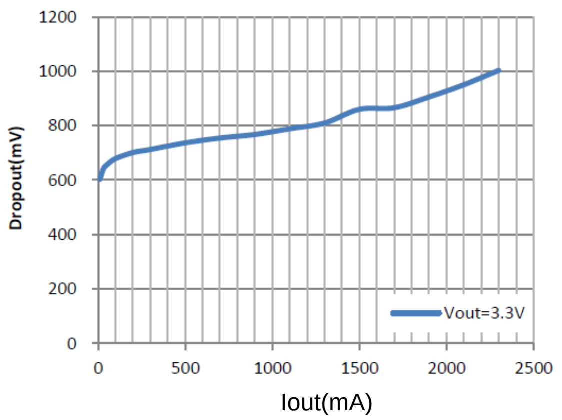
Note3: Dropout Voltage is the voltage difference between the input and output pin when the input voltage is minimum to maintain the lowest spec output voltage.

Block Diagram

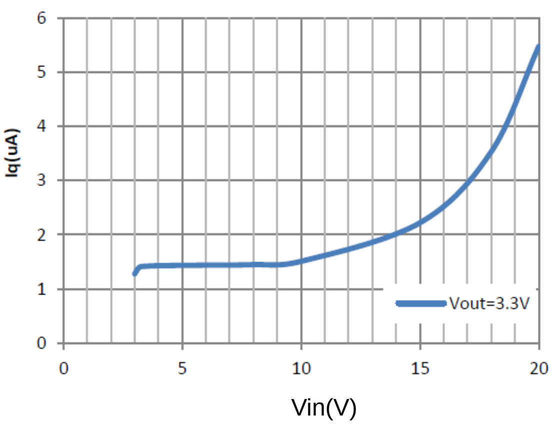


Typical Performance Characteristic

Dropout Voltage & Load Current

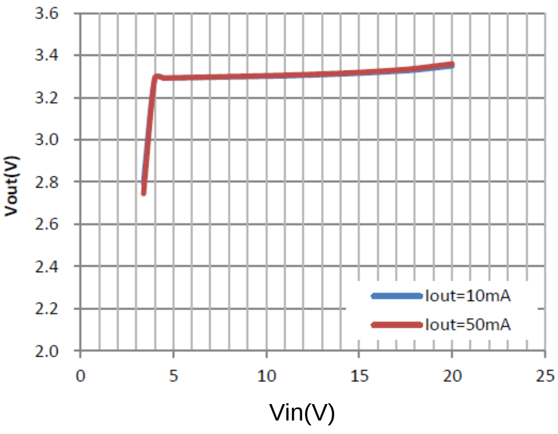


Iq vs. Vin Voltage

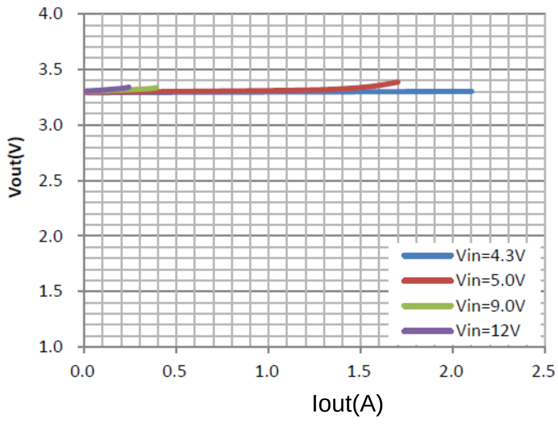


Typical Performance Characteristic

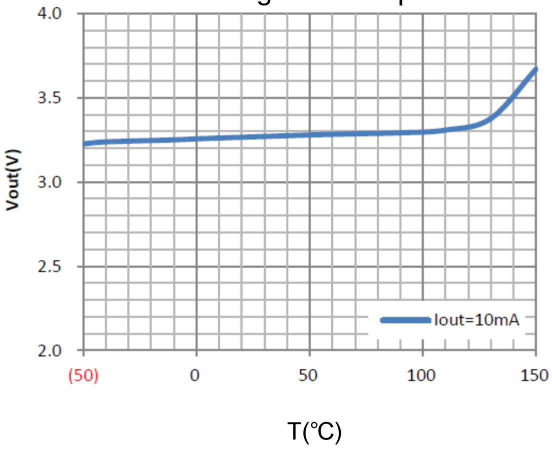
Line Regulation



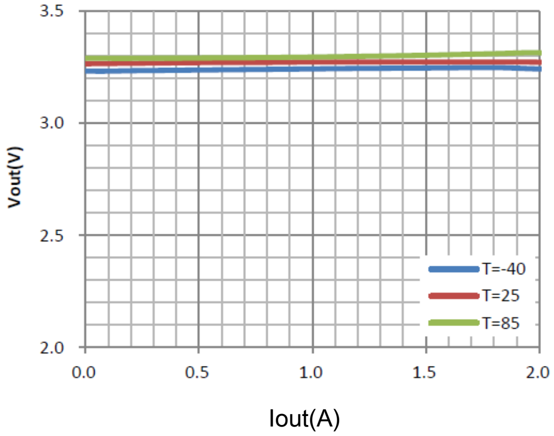
Load Regulation



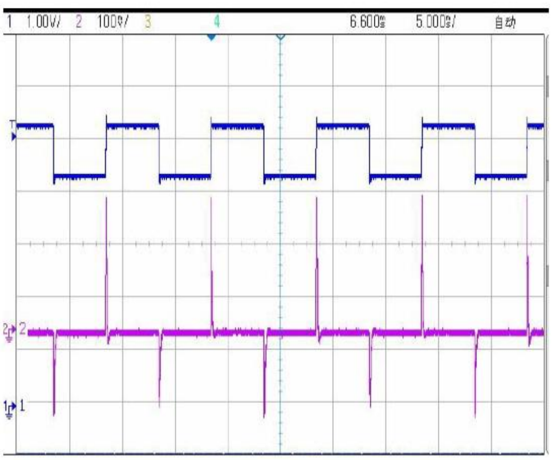
Vout Voltage vs. Temperature



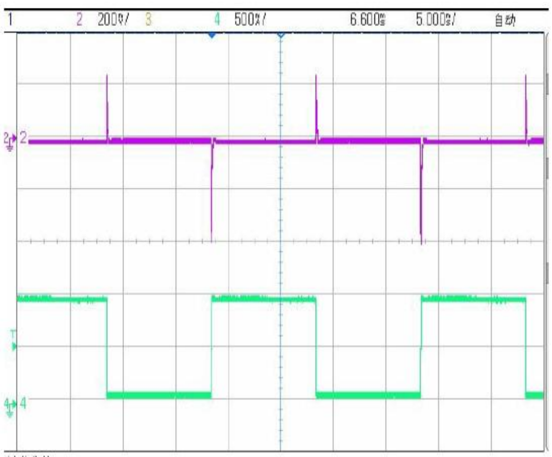
Vout Voltage vs. Iout Current



Line Transient Response
Iout=10 mA , Vin4.3V to 5.3V



Load Transient Response
Vin=5V,Iout=0.1A to 1A



DETAILED DESCRIPTION

ACE517C is a series of low dropout voltage and low power consumption regulator. Its application circuitry requires minimum number of external components. Both fixed voltage and adjustable voltage application circuits need input and output capacitors to assure output voltage stability. Any desired output voltage from fixed voltage to 18V can be achieved by assigning proper values to two external resistors in its application circuitry (as shown in Fig.3, as R1, R2 are the two external resistors.).

ACE517C uses trimming technique to assure the accuracy of output value within ±2%, at the same time, temperature compensation is elaborately considered in this chip, which makes ACE517C's temperature coefficient within 100ppm/℃

TYPICAL APPLICATION

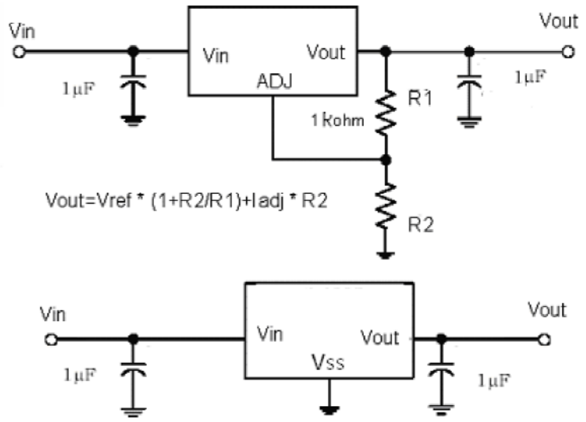
ACE517C has fixed voltage and adjustable voltage application mode, Fig.4 shows their typical application circuitry.

A 1uF ceramic capacitor connected between input and GND as bypass capacitor and a 1uF ceramic capacitor between output and GND are recommended for all application.

Using a bypass capacitor (C_{Adj}) between the adjust terminal and ground can improve ripple rejection. The bypass capacitor prevents ripple from being amplified in case the output voltage is increased. The impedance of C_{Adj} should be less than the resistance of R_1 to prevent ripple from being amplified at any frequency. As R1 is normally in the range of 1KΩ~10KΩ, the value of C_{Adj} should satisfy the following condition:

$1/(2\pi * Frequency_{Ripple} * C_{adj}) < R1$

A 0.1μF ceramic capacitor is recommended.



EXPLANATION

The output voltage of adjustable application satisfies this followed equation:

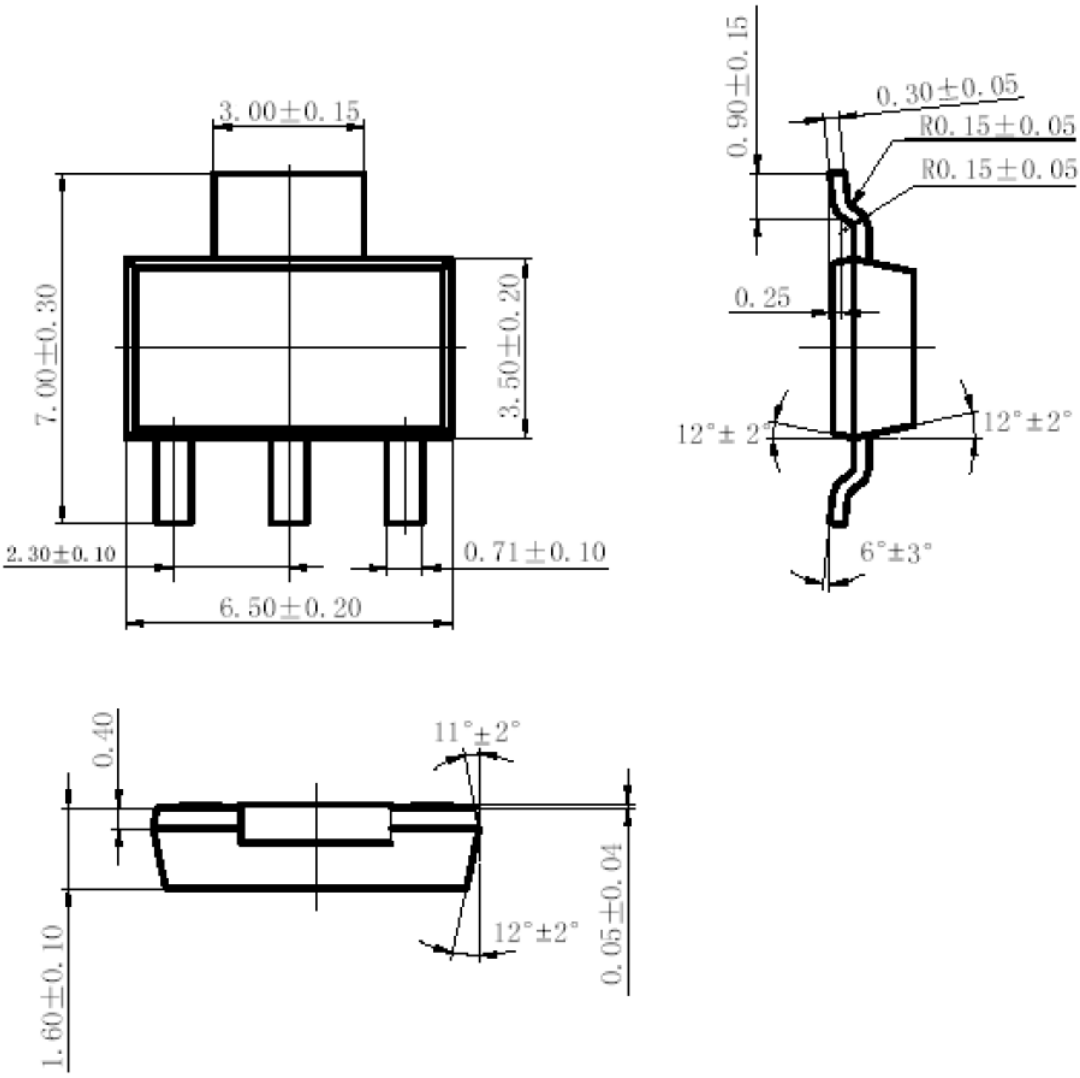
$V_{out}=V_{Ref}\times (1+R_2/R_1)+I_{Adj}\times R_2$.

The second term $I_{Adj}\times R_2$ can be ignored since the adjustable pin current I_{Adj} (~ 2μA) is much less than the current through R_1 (~1mA).

The value of R_1 is preferred in the range of 1KΩ～10KΩ and the value of V_{Ref} is the output voltage of typical fixed voltage application circuit.

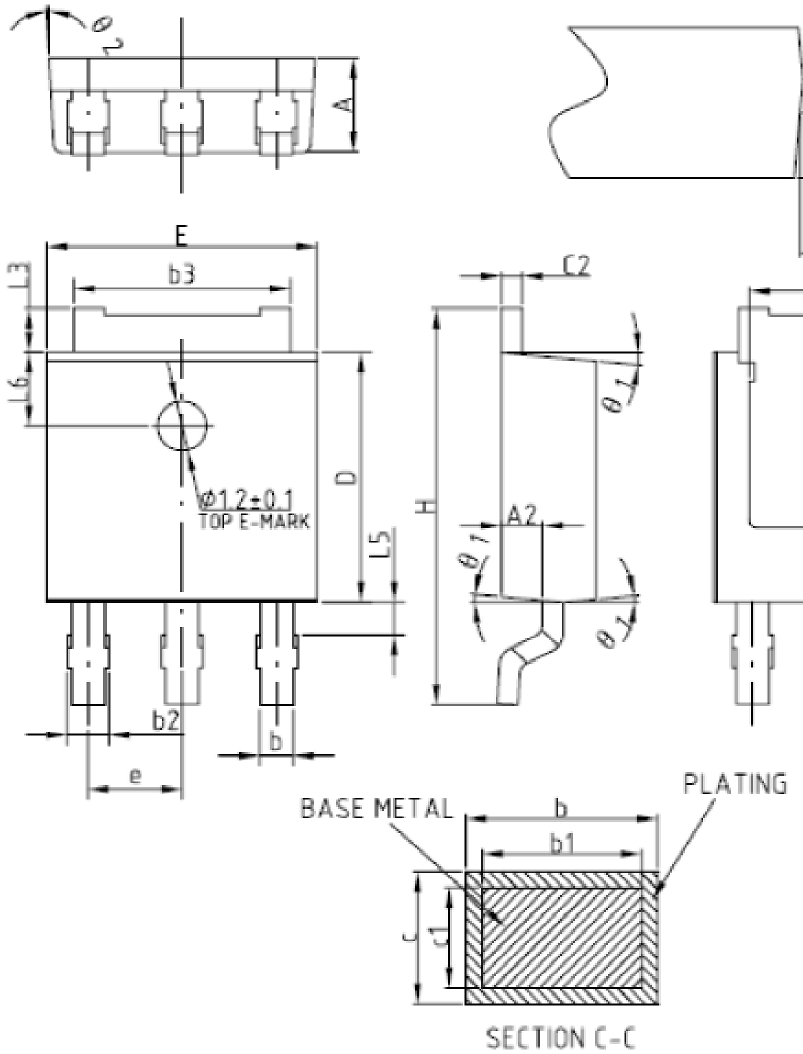
Packing Information

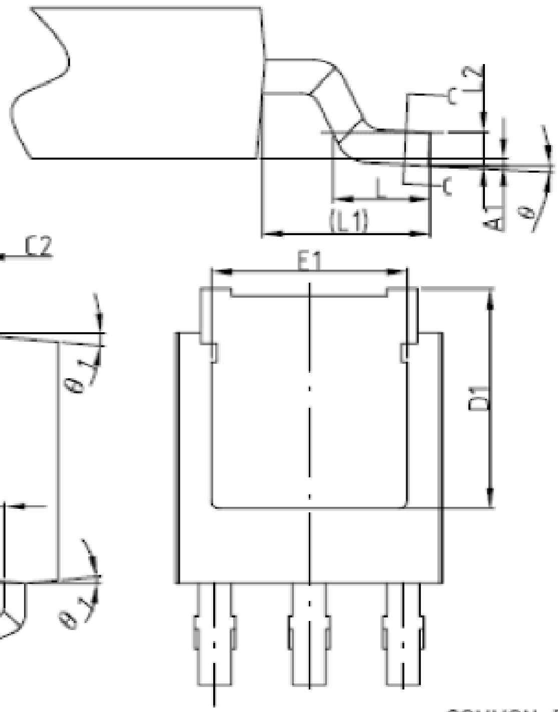
SOT-223



Packing Information

SOT-252





COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0	–	0.10
A2	0.90	1.00	1.10
b	0.77	–	0.89
b1	0.76	0.81	0.86
b2	0.77	–	1.10
b3	5.23	5.33	5.43
c	0.47	–	0.60
c1	0.46	0.51	0.56
c2	0.47	–	0.60
D	6.00	6.10	6.20
D1	5.25	–	–
E	6.50	6.60	6.70
E1	4.70	–	–
e	2.28BSC		
H	9.80	10.10	10.40
L	1.40	1.50	1.70
L1	2.90REF		
L2	0.51BSC		
L3	0.90	–	1.25
⚠3 L5	0.90	–	1.50
⚠2 L6	1.80REF		
θ	0°	–	8°
θ1	3°	5°	7°
θ2	1°	3°	5°

Notes

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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