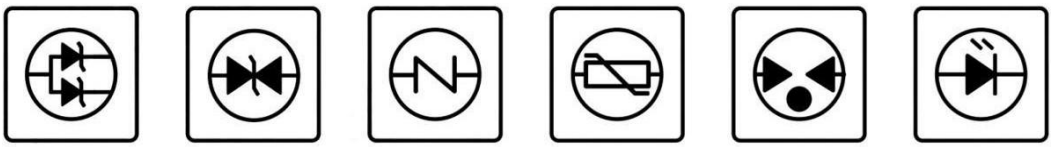
MSKSEMI 美森科
SEMICONDUCTOR



MS2188

Product specification

概述

MS2188 是一款具有低待机功耗、高效率的同步升压 DC-DC，待机电流仅 15uA。
MS2188 采用固定导通时间的 PFM 控制方式，在轻载时自动降低开关频率保持高的转换效率。
MS2188 外围仅需 3 个元件，即可实现将低输入的电池电压转换到所需要的工作电压。
MS2188 采用专利的控制技术，具有低待机功耗和轻载高效的特点。MS2188能够在保持输出电压升压稳压条件下实现输入电流仅 15uA，尤其适合对待机时间要求高的应用。
MS2188 采用 SOT23 和 SOT23-5 及 SOT89-3 封装。

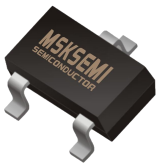
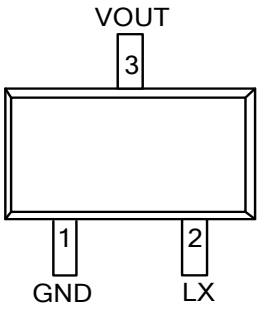
特点

- 低静态功耗：15uA
- 高效率：可高达 93%
- 最大工作频率：370KHz
- 输出电压：2.2V~5.0V（步进 0.1V）
- 启动电压：0.9V
- 低纹波、低噪声
- SOT-23、SOT-23-5、SOT-89-3 封装

应用领域

- 1~2 节干电池供电的电子设备
- 电子词典、数码相机、血压计、MP3、遥控玩具、无线耳机、无线鼠标键盘、医疗器械、防丢器、汽车防盗器、充电器、VCR、PDA 等手持电子设备

封装信息

SOT-23	PIN CONFIGURATION
	
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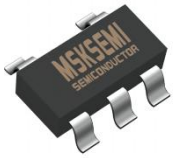	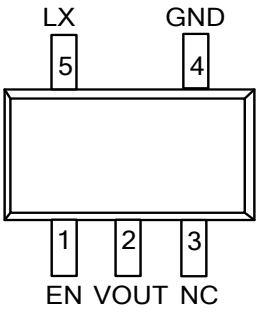
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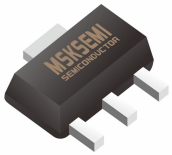
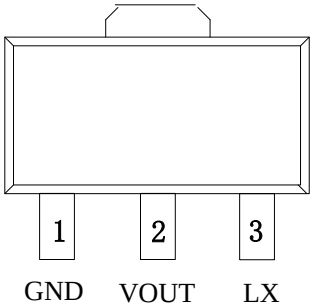
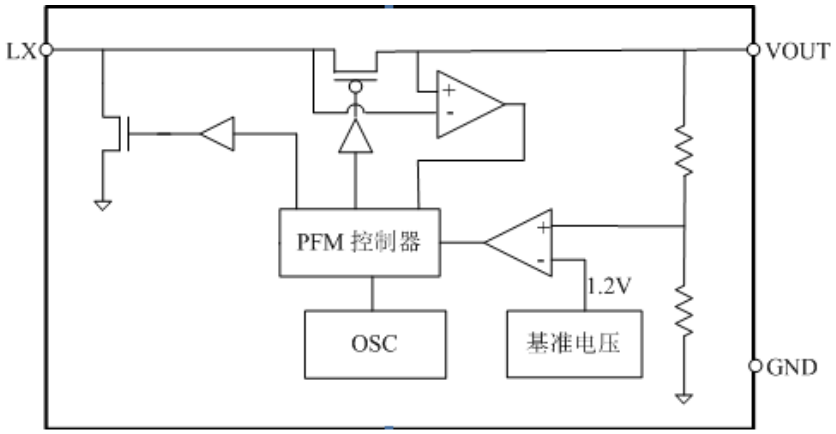
	

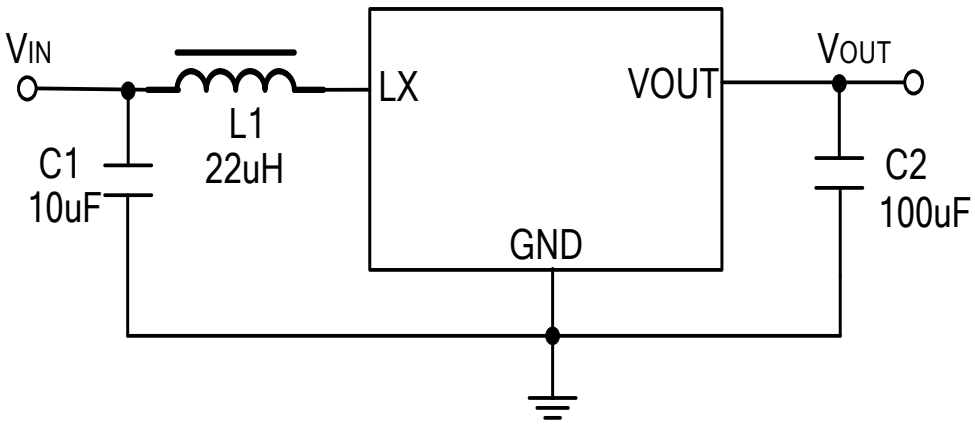
管脚描述

管脚			管脚名	描述
SOT23	SOT-23-5	SOT-89-3		
1	4	1	GND	接地
2	5	3	LX	开关脚，接电感
3	2	2	VOUT	输出端
-	1	-	EN	芯片使能控制
-	3	-	NC	悬空

结构框图



典型应用电路图



订货信息

型号	输出电压	封装形式	最小包装
MS2188A22XG	2.2V	SOT-23	3000PCS
MS2188A25XG	2.5V	SOT-23	3000PCS
MS2188A28XG	2.8V	SOT-23	3000PCS
MS2188A30XG	3.0V	SOT-23	3000PCS
MS2188A33XG	3.3V	SOT-23	3000PCS
MS2188A36XG	3.6V	SOT-23	3000PCS
MS2188A40XG	4.0V	SOT-23	3000PCS
MS2188A50XG	5.0V	SOT-23	3000PCS

型号	输出电压	封装形式	最小包装
MS2188C22M5G	2.2V	SOT-23-5	3000PCS
MS2188C25M5G	2.5V	SOT-23-5	3000PCS
MS2188C28M5G	2.8V	SOT-23-5	3000PCS
MS2188C30M5G	3.0V	SOT-23-5	3000PCS
MS2188C33M5G	3.3V	SOT-23-5	3000PCS
MS2188C36M5G	3.6V	SOT-23-5	3000PCS
MS2188C40M5G	4.0V	SOT-23-5	3000PCS
MS2188C50M5G	5.0V	SOT-23-5	3000PCS

型号	输出电压	封装形式	最小包装
MS2188A22PG	2.2V	SOT-89-3	1000PCS
MS2188A25PG	2.5V	SOT-89-3	1000PCS
MS2188A28PG	2.8V	SOT-89-3	1000PCS
MS2188A30PG	3.0V	SOT-89-3	1000PCS
MS2188A33PG	3.3V	SOT-89-3	1000PCS
MS2188A36PG	3.6V	SOT-89-3	1000PCS
MS2188A40PG	4.0V	SOT-89-3	1000PCS
MS2188A50PG	5.0V	SOT-89-3	1000PCS

MARKING

MS2188A22XG	MS2188A25XG	MS2188A28XG	MS2188A30XG
C22 *	C25 *	C28 *	C30 *
MS2188A33XG	**MS2188A36XG**	**MS2188A40XG**	**MS2188A50XG**
C33 *	C36 *	C40 *	C50 *

MS2188C22M5G	MS2188C25M5G	MS2188C28M5G	MS2188C30M5G
C22 *	C25 *	C28 *	C30 *
MS2188C33M5G	**MS2188C36M5G**	**MS2188C40M5G**	**MS2188C50M5G**
C33 *	C36 *	C40 *	C50 *

MS2188A22PG	MS2188A25PG	MS2188A28PG	MS2188A30PG
C22A	C25A	C28A	C30A
MS2188A33PG	**MS2188A36PG**	**MS2188A40PG**	**MS2188A50PG**
C33A	C36A	C40A	C50A

备注：*代表工厂内部订单

极限参数（注 1）

符 号	描述	参数范围	单位
V_{MAX}	LX,VOUT 脚最大电压	5	V
P_{SOT}	SOT23 封装最大功耗	0.2	W
T_A	工作温度范围	-20~85	°C
T_{STG}	存储温度范围	-40~120	°C
T_{SD}	焊接温度范围（时间小于30 秒	260	°C
V_{ESD}	静电耐压值（人体模型）	2000	V

注 1：极限参数是指超过上表中规定的工作范围可能会导致器件损坏。而工作在以上极限条件下可能会影响器 件的可靠性。

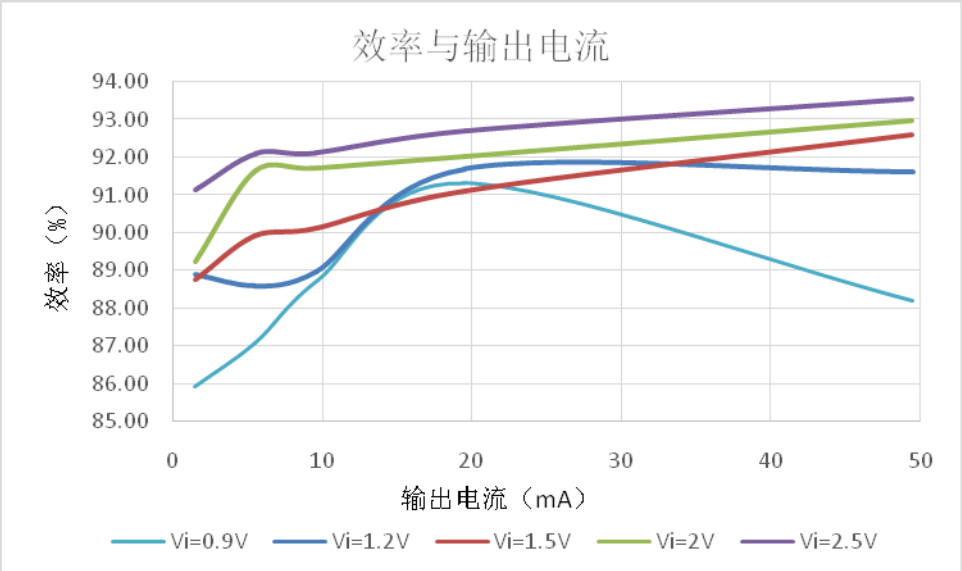
电气参数

除非特别说明，V_{OUT} =3.3V，T_A =25°C

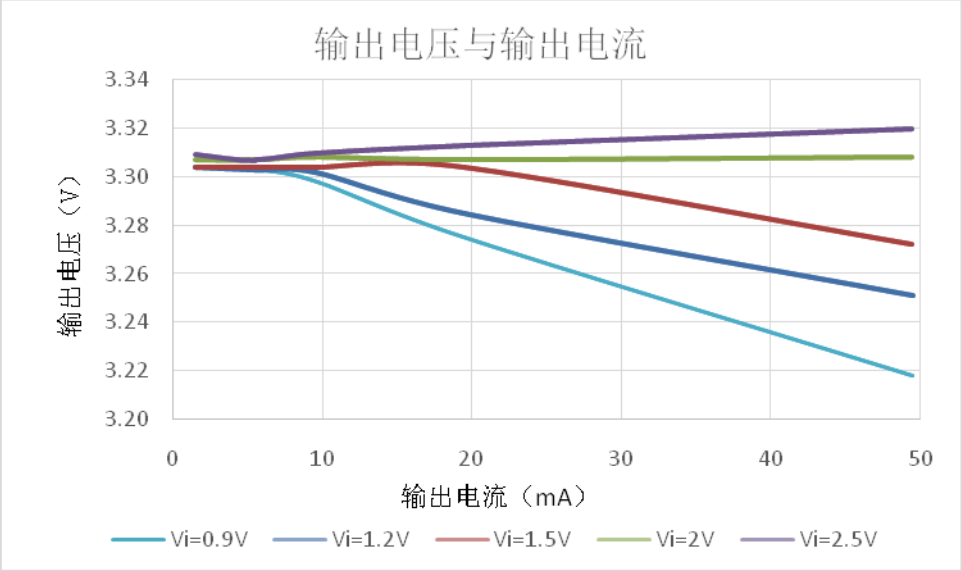
电气参数	符号	测试条件	最小值	典型值	最大值	单位
输出电压精度	△ VOUT		-2.5		2.5	%
启动电压	VSTART	ILOAD=1mA, VIN:0→2V		0.9		V
保持电压	VHOLD	ILOAD=1mA, VIN:2→0V	0.6			V
转换效率	η			93		%
无负载下输入电流	IIN	VIN=1.5V, VOUT=3.3V		15		uA
静态电流	IS	VOUT=VOUT_TAR+0.5V		6		uA
最大占空比	DUTY			80		%
最高开关频率	Fmax			370		KHz

典型特性曲线

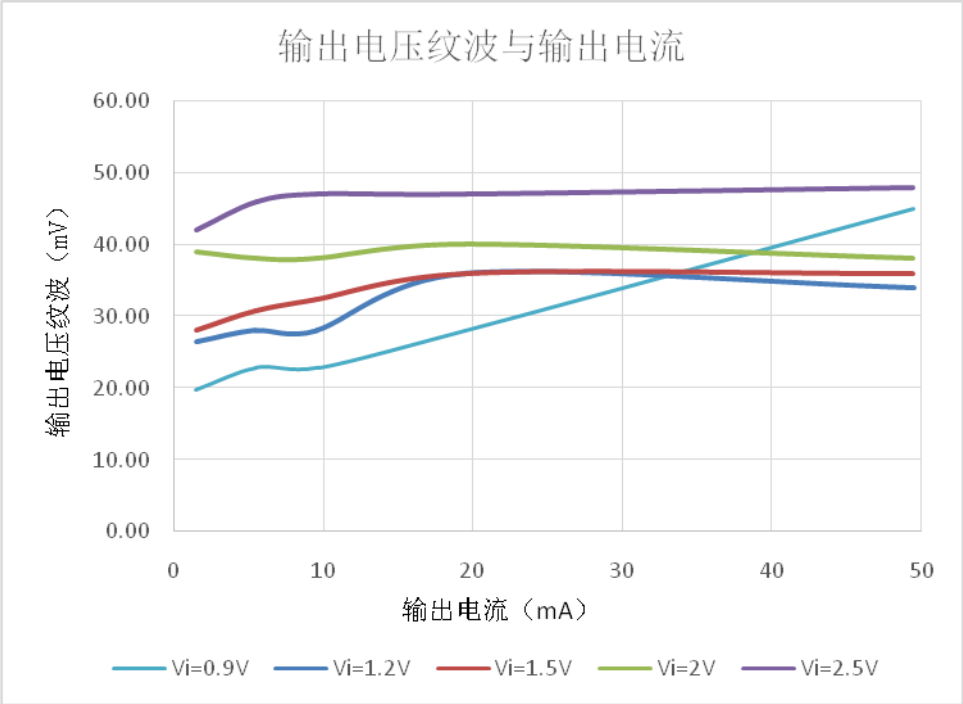
（测试条件：VO=3.3V, L=22uH, CI=10uF, CO=100uF）



转换效率与输出电流特性曲线



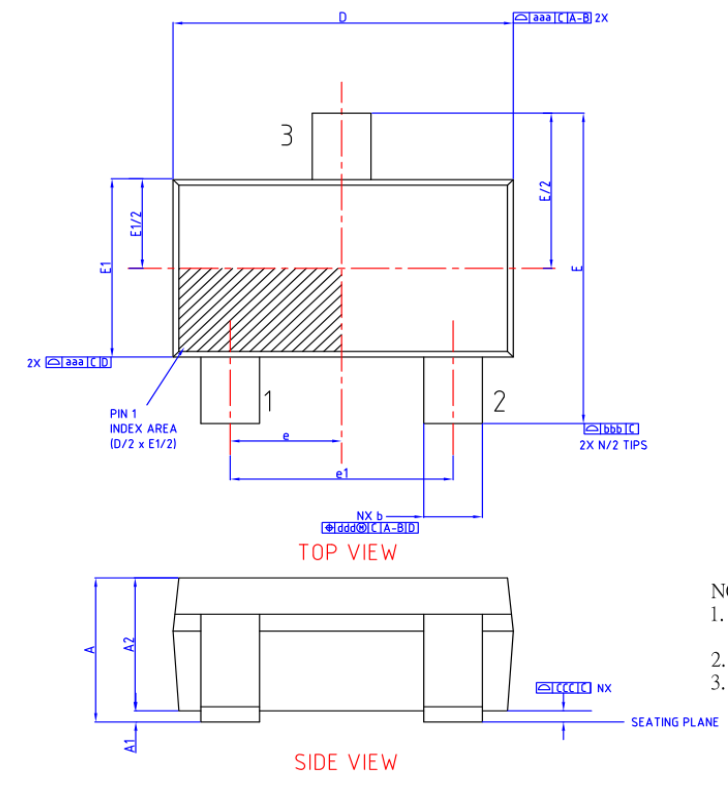
输出电压与输出电流特性曲线

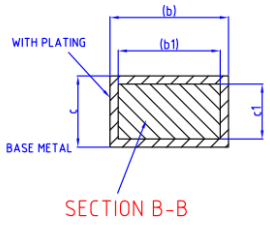


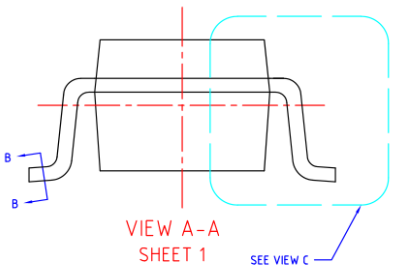
输出电压纹波与输出电流特性曲线

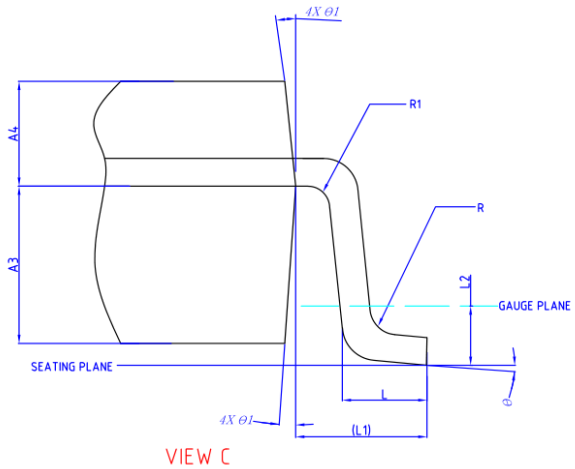
封装信息

SOT23







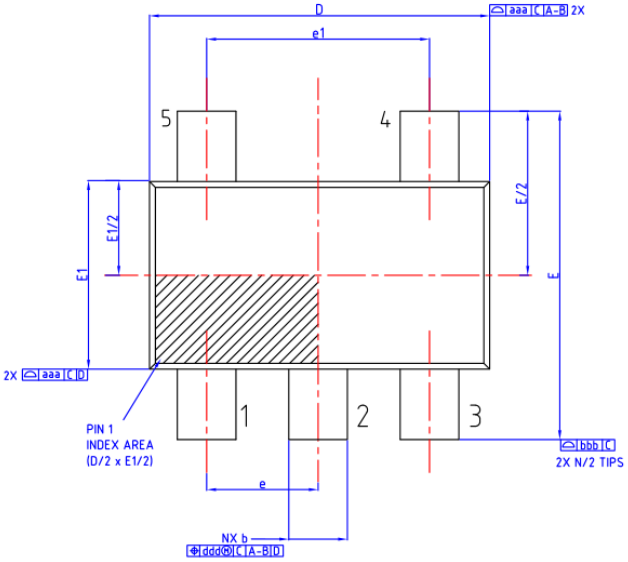


DIMENSION IN MM(SOT23,3L)			
SYMBOL	MIN	NOM	MAX
A	0.95	1.30	1.40
A1	0.050	0.100	0.150
A2	0.90	1.20	1.25
A3		0.783BSC	
A4		0.417BSC	
b	0.30	0.35	0.50
b1	0.30	0.40	0.45
c	0.08	0.152	0.220
c1	0.08	0.13	0.20
D	2.80	2.90	3.00
e		0.95BSC	
e1		1.90BSC	
E	2.60	2.80	3.00
E1	1.50	1.60	1.70
L	0.30	0.45	0.60
L1		0.60REF	
L2		0.25BSC	
θ	0°	4°	8°
θ1	5°	10°	15°

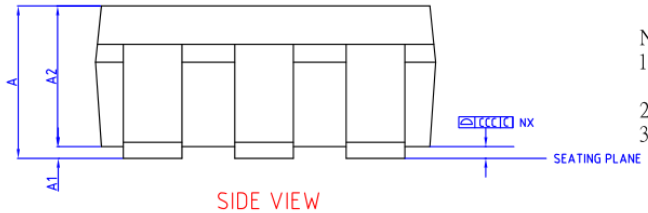
SYMBOL	TOLERANCES OF FORM AND POSITION
aaa	0.15
bbb	0.20
ccc	0.10
ddd	0.20

NOTE:
1. Body dimension not include mold flash or protrusion
   Mold flash or protrusion shall not exceed 0.15mm per side.
2. Falls within JEDEC MO-178 variation AB
3. Basic common dimension sheet plating thickness for pre-plating
   For Tin plating product ,Tin plating thickness is 0.01mm – 0.018mm

SOT-23-5



TOP VIEW

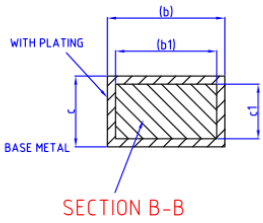


SIDE VIEW

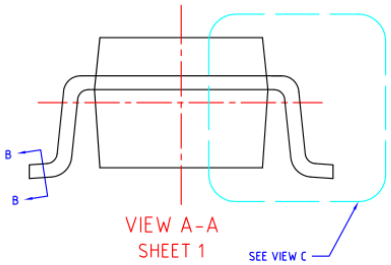
DIMENSION IN MM(SOT23,5L)			
SYMBOL	MIN	NOM	MAX
A	0.95	1.30	1.40
A1	0.050	0.100	0.150
A2	0.90	1.20	1.25
A3		0.783BSC	
A4		0.417BSC	
b	0.30	0.35	0.50
b1	0.30	0.40	0.45
c	0.08	0.152	0.220
c1	0.08	0.13	0.20
D	2.80	2.90	3.00
e		0.95BSC	
e1		1.90BSC	
E	2.60	2.80	3.00
E1	1.50	1.60	1.70
L	0.30	0.45	0.60
L1		0.60REF	
L2		0.25BSC	
θ	0°	4°	8°
θ1	5°	10°	15°

SYMBOL	TOLERANCES OF FORM AND POSITION
aaa	0.15
bbb	0.20
ccc	0.10
ddd	0.20

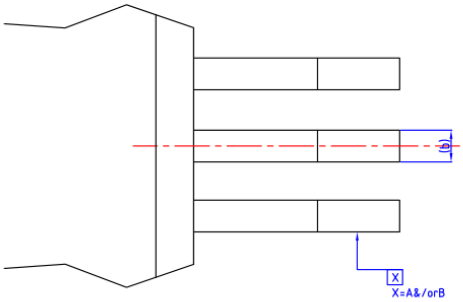
NOTE:
1. Body dimension not include mold flash or protrusion
   Mold flash or protrusion shall not exceed 0.15mm per side.
2. Falls within JEDEC MO-178 variation AB
3. Basic common dimension sheet plating thickness for pre-plating
   For Tin plating product ,Tin plating thickness is 0.01mm – 0.018mm



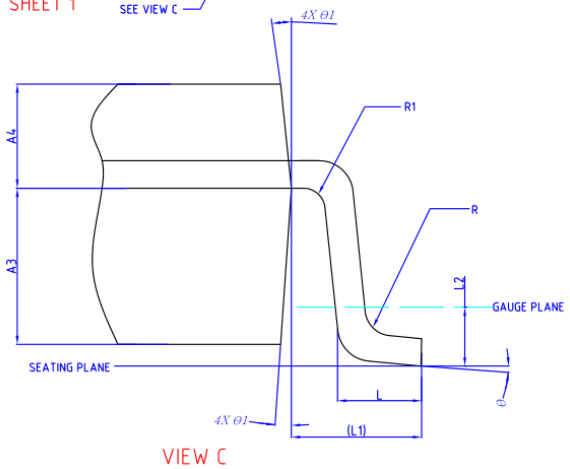
SECTION B-B



VIEW A-A
SHEET 1

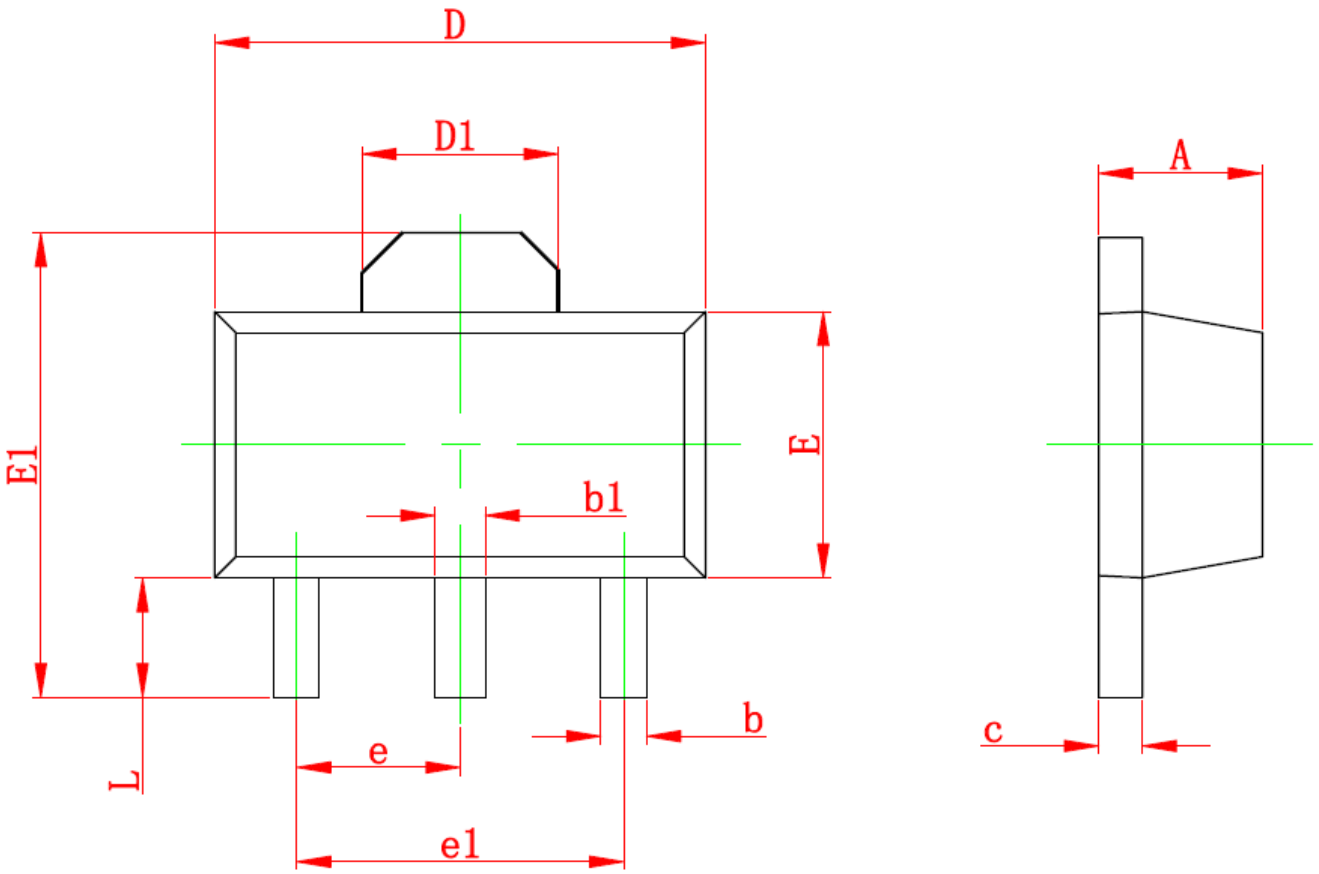


ODD LEAD SIDES
TOPVIEW



VIEW C

SOT-89-3



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	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

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