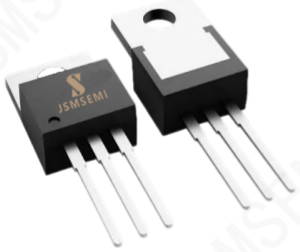
DESCRIPTION

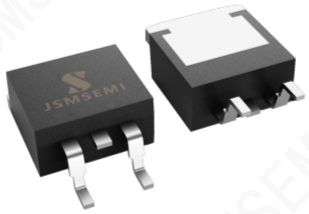
The LM317 is an adjustable 3-terminal positive voltage regulator,designed to supply 1A of output current with voltage adjustable from 1.3V ~ 37V.

FEATURES

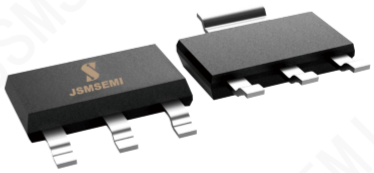
*Output voltage adjustable from 1.3V ~ 37V
*Output current in excess of 1A
*Internal short circuit protection.
*Internal over temperature protection.
*Output transistor safe area compensation



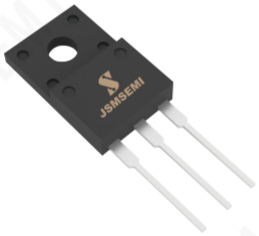
TO-220



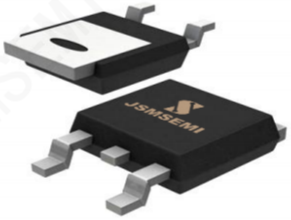
TO-263



SOT-223



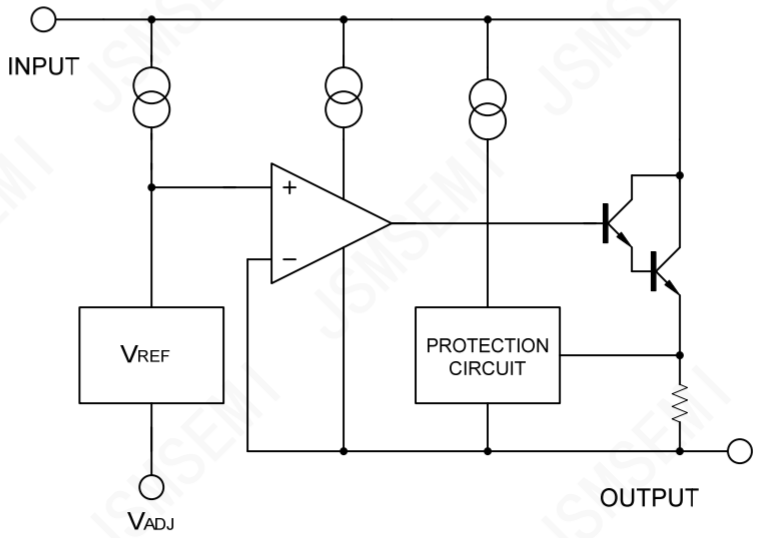
TO-220F



TO-252

TO-3

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS (Ta=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Input - Output Voltage Difference	V_{IN}-V_{OUT}	40	V
Power Dissipation	P_D	Internal limited	
Junction Temperature	T_J	+125	°C
Operating Temperature	T_{OPR}	-40 ~ +85	°C
Storage Temperature	T_{STG}	-40 ~ +150	°C

Note:1. Absolute maximum ratings are stress ratings only and functional device operation is not implied. The device could be damaged beyond Absolute maximum ratings.

THERMAL DAT

PARAMETER		SYMBOL	RATINGS	UNIT
Junction-to-Ambient	TO-252	θ_{JA}	112	℃/W
	TO-220/TO-220F		54	
	TO-263		64	
	SOT-223		165	
	TO-3		35	
Junction-to-Case	TO-252	θ_{JC}	12	℃/W
	TO-220/TO-220F		5	
	TO-263		5	
	SOT-223		23	
	TO-3		3	

ELECTRICAL CHARACTERISTICS

(V_{IN}-V_{OUT}=5V, I_{OUT}=10mA, Ta=25°C, unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Line Regulation	$\Delta V_{OUT}/V_{OUT}$	3V≦V_{IN}-V_{OUT}≦40V			0.01	0.04	%/V
Load Regulation	ΔV_{OUT}	10mA≦I_{OUT}≦1A	V_{OUT}≦5V		5	25	mV
			V_{OUT}≧5V		0.1	0.5	%
Adjustable Pin Current	I_{ADJ}				50	100	μA
Adjustable Pin Current Change	ΔI_{ADJ}	3V≦V_{IN}-V_{OUT}≦40V, 10mA≦I_{OUT}≦1A, P_D≦20W			0.2	5	μA
Reference Voltage	V_{REF}	3V≦V_{IN}-V_{OUT}≦40V, 10mA≦I_{OUT}≦1A, P_D≦20W		1.20	1.25	1.30	V
Temperature Stability		T_{MIN}≦T_J≦T_{MAX}			0.7		%/V_{OUT}
Minimum Load Current for Regulation	$I_{L(MIN)}$	V_{IN}-V_{OUT}=40V			3.5	10	mA
Maximum Output Current	$I_{O(MAX)}$	V_{IN}-V_{OUT}=40V, P_D≦20W		0.2	0.3		A
RMS Noise vs. %of V_{OUT}	eN	10Hz≦f≦10KHz			0.003		%/V_{OUT}
Ripple Rejection	RR	V_{OUT}=10V,f=120Hz	C_{ADJ}=0		65		dB
			C_{ADJ}=10μF	66	80		

Note: C_{ADJ} is connected between Adjust pin and Ground.

APPLICATION CIRCUITS

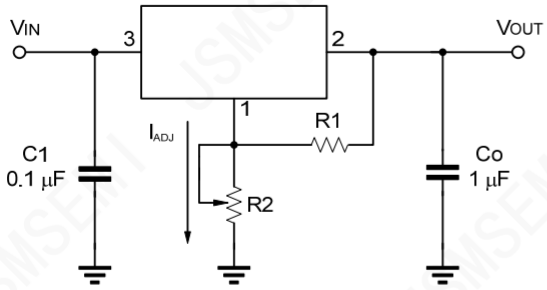


Fig.1 Programmable voltage regulator

V_{OUT}= 1.25V*(1+R2/R1)+I_{ADJ}*R2

C1 is required when regulator is located an appreciated distance from power supply. Co is needed to improve transient response.

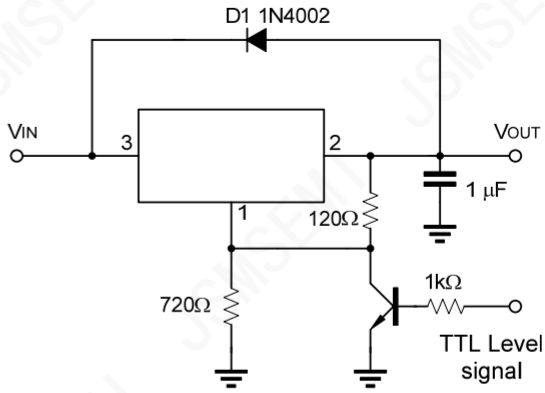


Fig.2 Regulator with On-off control

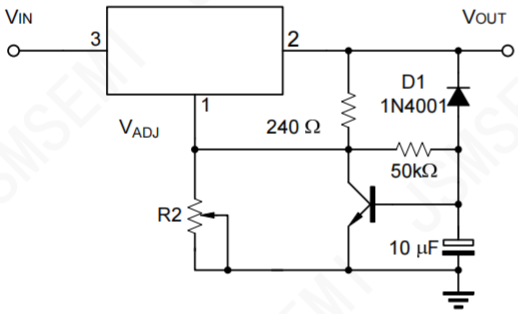
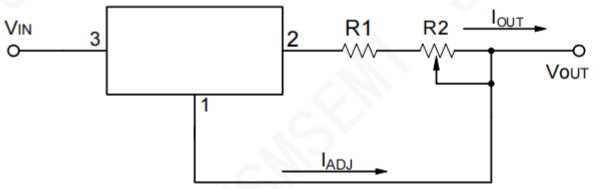


Fig.3 Soft Start Application



$I_{O(MAX)}=(\frac{V_{REF}}{R1})+I_{ADJ}=\frac{1.25V}{R1}$

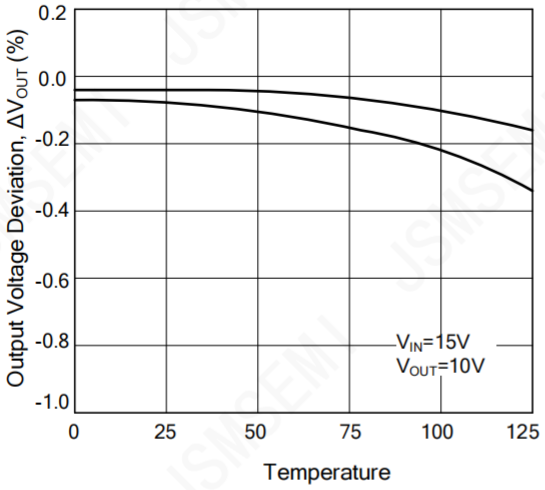
$I_{O(MIN)}=(\frac{V_{REF}}{R1+R2})+I_{ADJ}=\frac{1.25V}{R1+R2}$

$5mA<I_{OUT}<100mA$

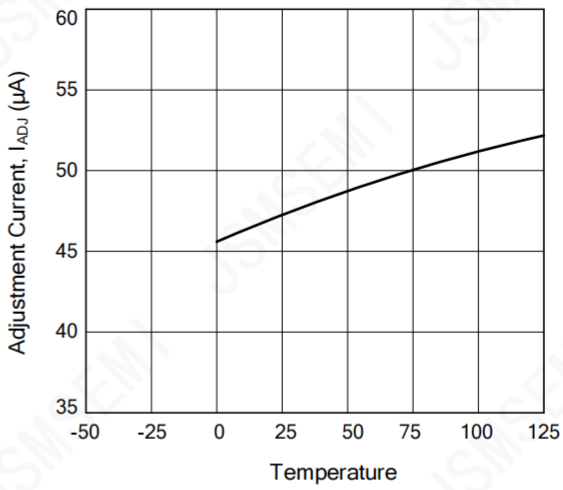
Fig.4 Constant Current Application

TYPICAL CHARACTERISTICS

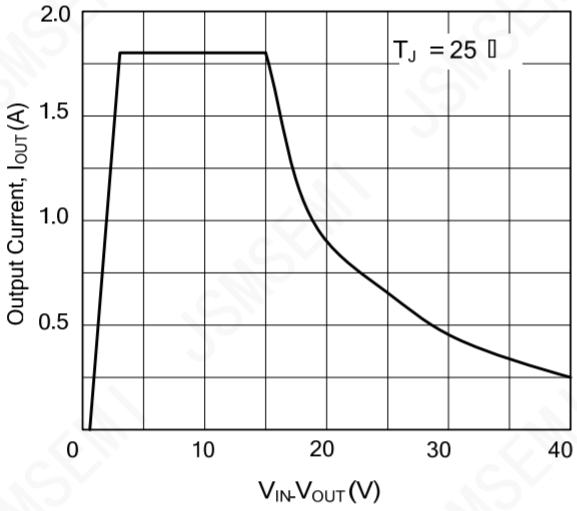
Load Regulation vs. temperature



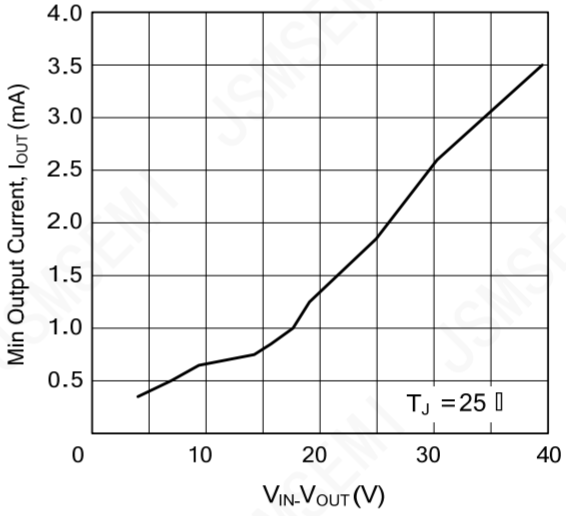
Adjustment Current vs. Temperature



Current Limit

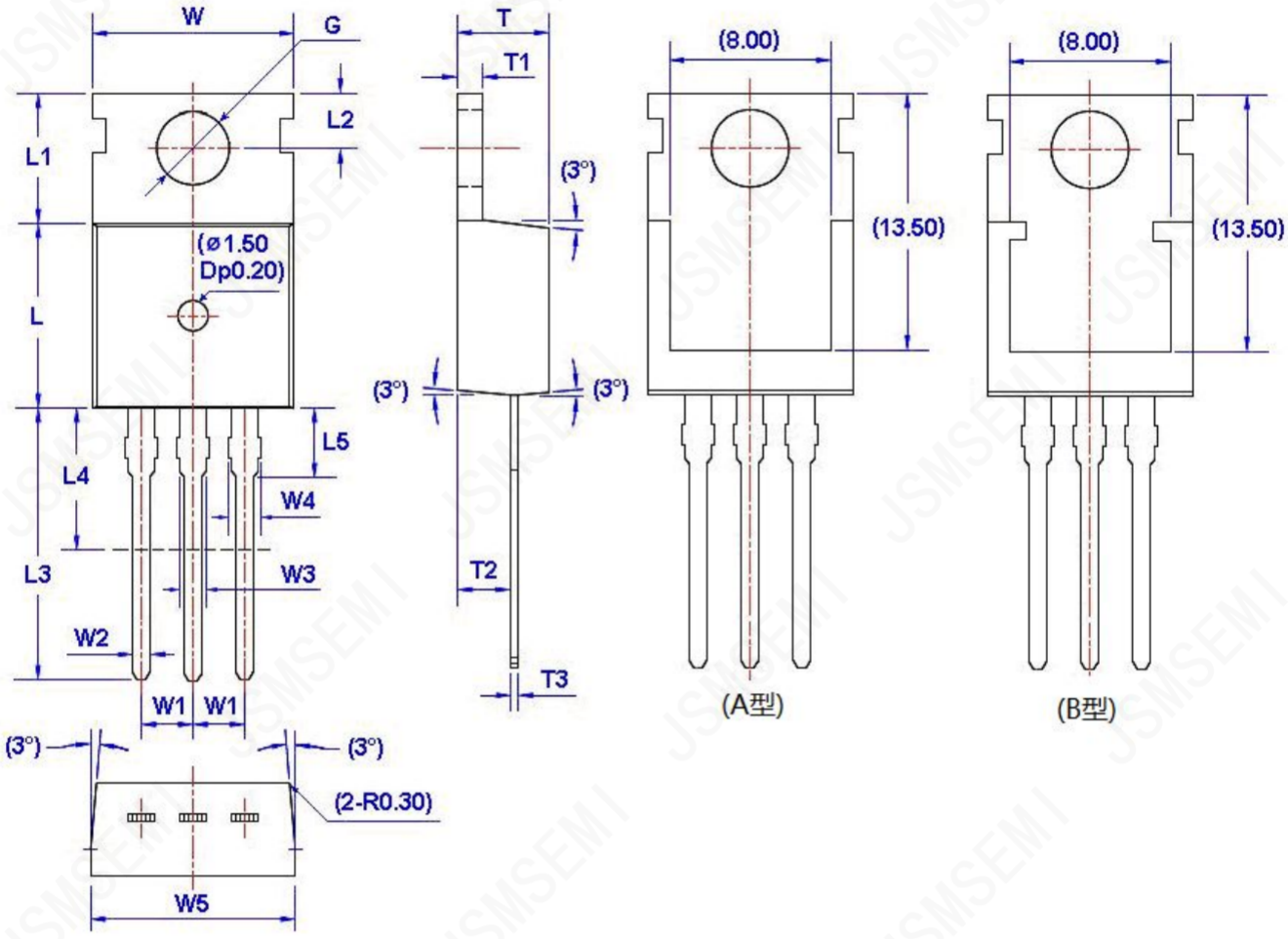


Minimum Operating Current



PACKAGE INFORMATION

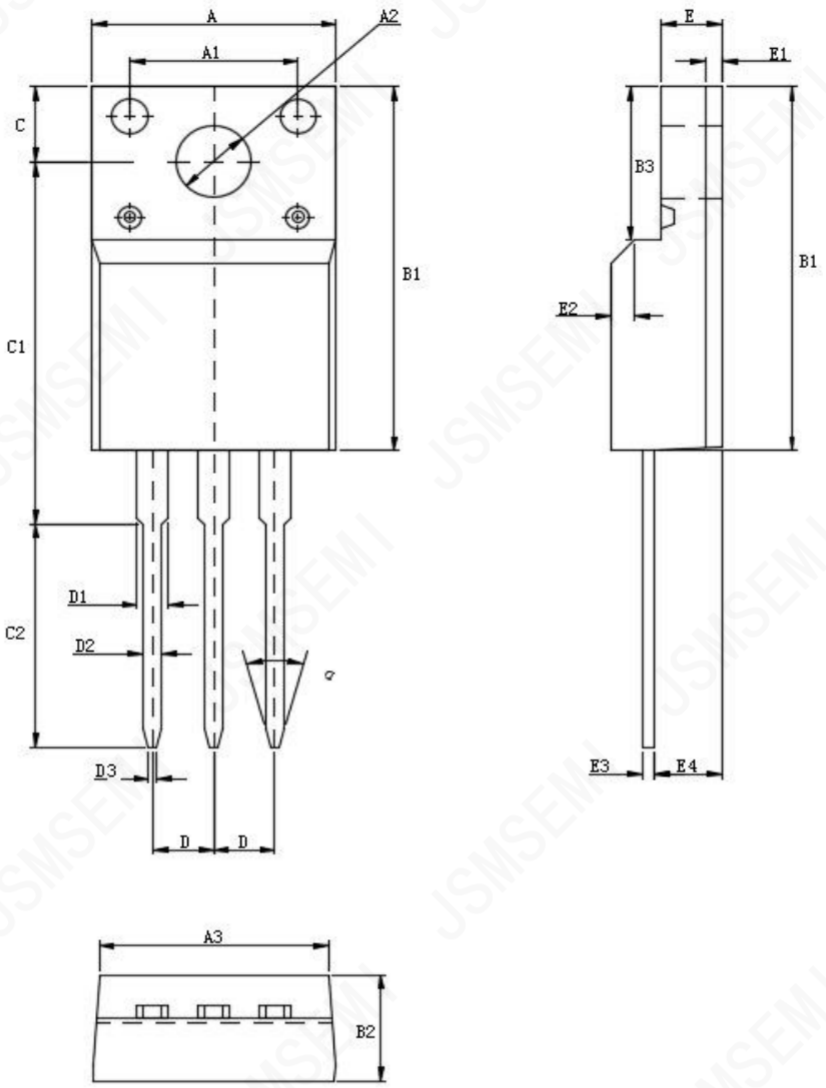
TO-220



Unit: mm

Symbol	Size		Symbol	Size		Symbol	Size		Symbol	Size	
	Min	Max		Min	Max		Min	Max		Min	Max
W	9.66	10.28	W5	9.80	10.20	L4**	6.20	6.60	T3	0.45	0.60
W1	2.54（TYP）		L	9.00	9.40	L5	2.79	3.30	G(Φ)	3.50	3.70
W2	0.70	0.95	L1	6.40	6.80	T	4.30	4.70			
W3	1.17	1.37	L2	2.70	2.90	T1	1.15	1.40			
W4*	1.32	1.72	L3	12.70	14.27	T2	2.20	2.60			

TO-220F

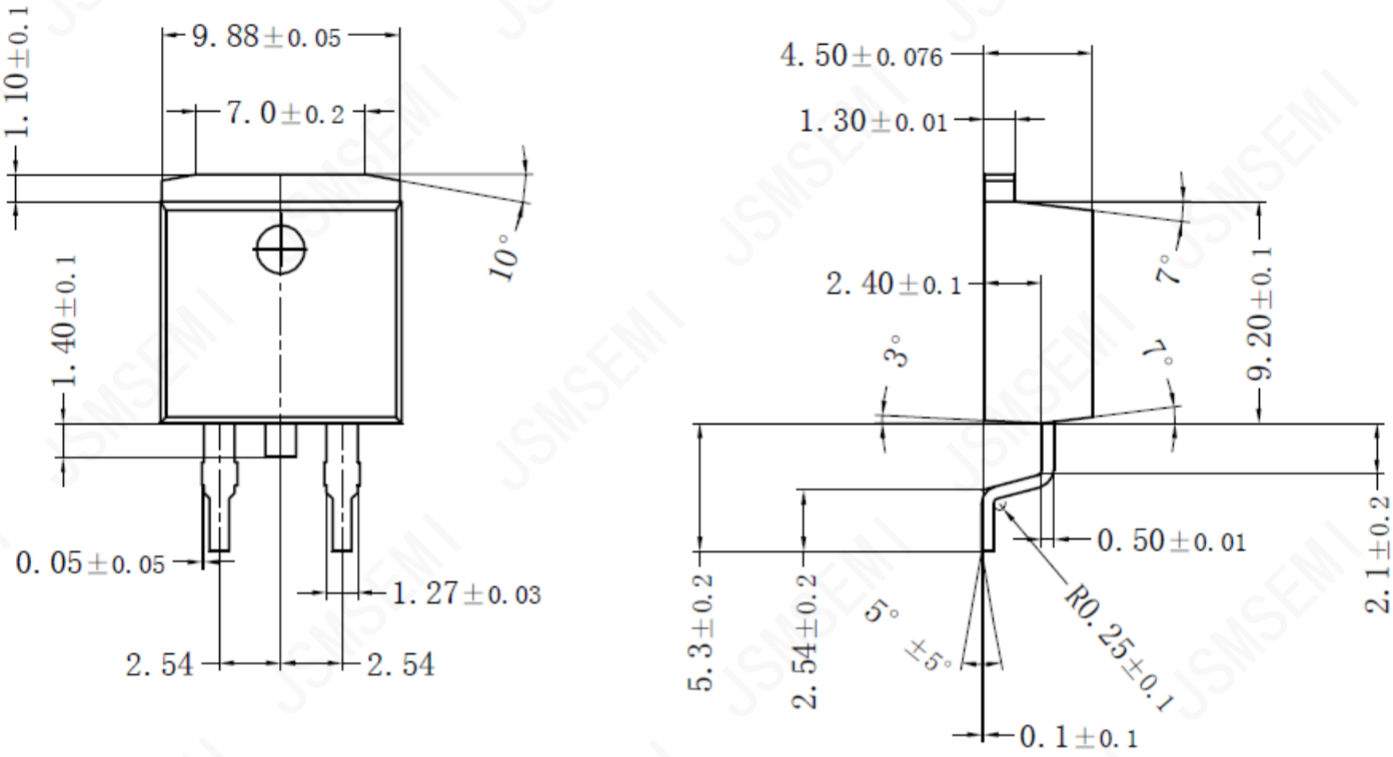


UNIT：mm

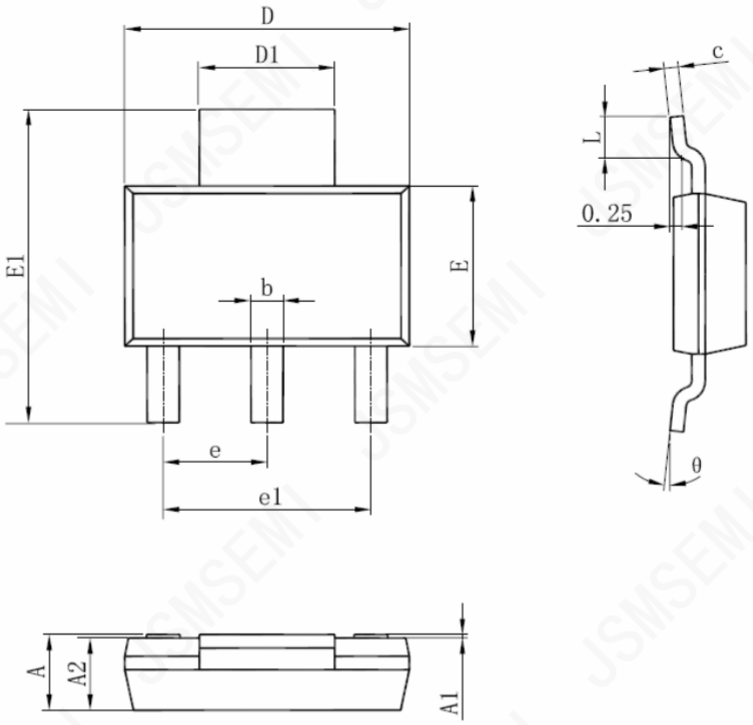
SYMBOL	min	nom	max	SYMBOL	min	nom	max
A	9.80		10.60	D		2.54	
A1		7.00		D1	1.15		1.55
A2	2.90		3.40	D2	0.60		1.00
A3	9.10		9.90	D3	0.20		0.50
B1	15.40		16.40	E	2.24		2.84
B2	4.35		4.95	E1		0.70	
B3	6.00		7.40	E2		1.0×45°	
C	3.00		3.70	E3	0.35		0.65
C1	15.00		17.00	E4	2.30		3.30
C2	8.80		10.80	α（度）		30°	

TO-263

Unit: mm

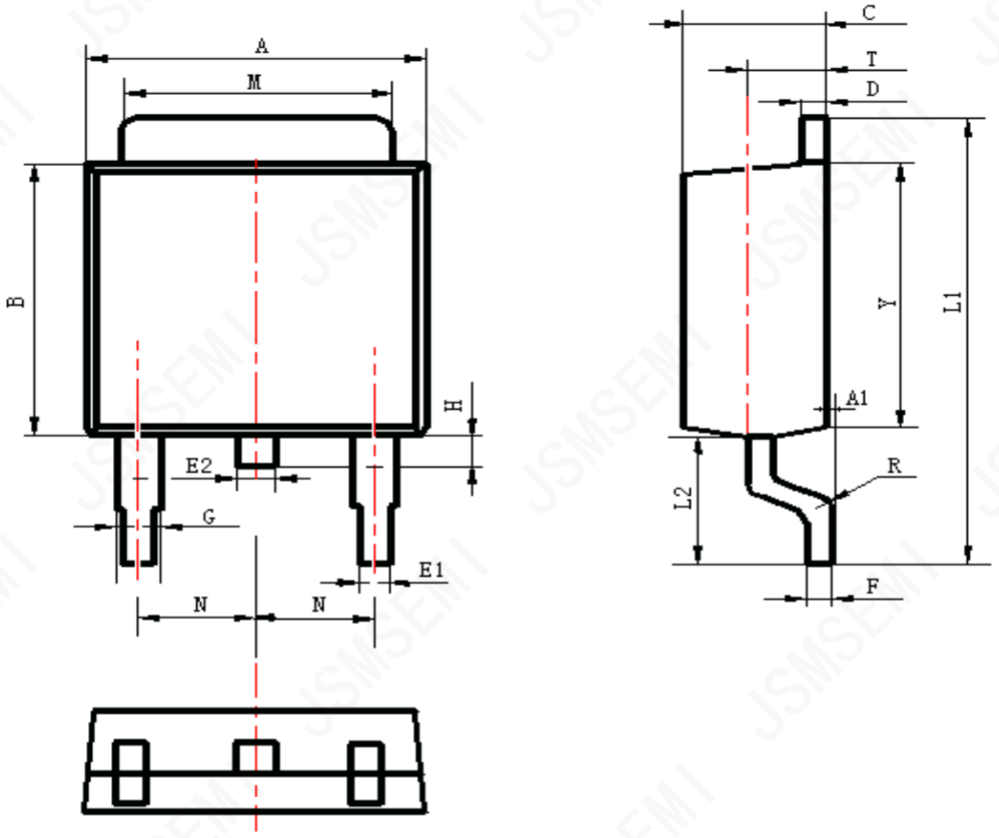


SOT-223



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.520	1.800	0.060	0.071
A1	0.000	0.100	0.000	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.820	0.026	0.032
c	0.250	0.350	0.010	0.014
D	6.200	6.400	0.244	0.252
D1	2.900	3.100	0.114	0.122
E	3.300	3.700	0.130	0.146
E1	6.830	7.070	0.269	0.278
e	2.300(BSC)		0.091(BSC)	
e1	4.500	4.700	0.177	0.185
L	0.900	1.150	0.035	0.045
θ	0°	10°	0°	10°

TO-252



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	6.30	6.90	0.248	0.272
A1	0.00	0.16	0.000	0.006
B	5.70	6.30	0.224	0.248
C	2.10	2.50	0.083	0.098
D	0.30	0.70	0.012	0.028
E1	0.60	0.90	0.024	0.035
E2	0.70	1.00	0.028	0.039
F	0.30	0.60	0.012	0.024
G	0.70	1.20	0.028	0.047
L1	9.60	10.50	0.378	0.413
L2	2.70	3.10	0.106	0.122
H	0.40	1.00	0.016	0.039
M	5.10	5.50	0.201	0.217
N	2.09	2.49	0.082	0.098
R	0.30		0.012	
T	1.40	1.60	0.055	0.063
Y	5.10	6.30	0.201	0.248

TO-3

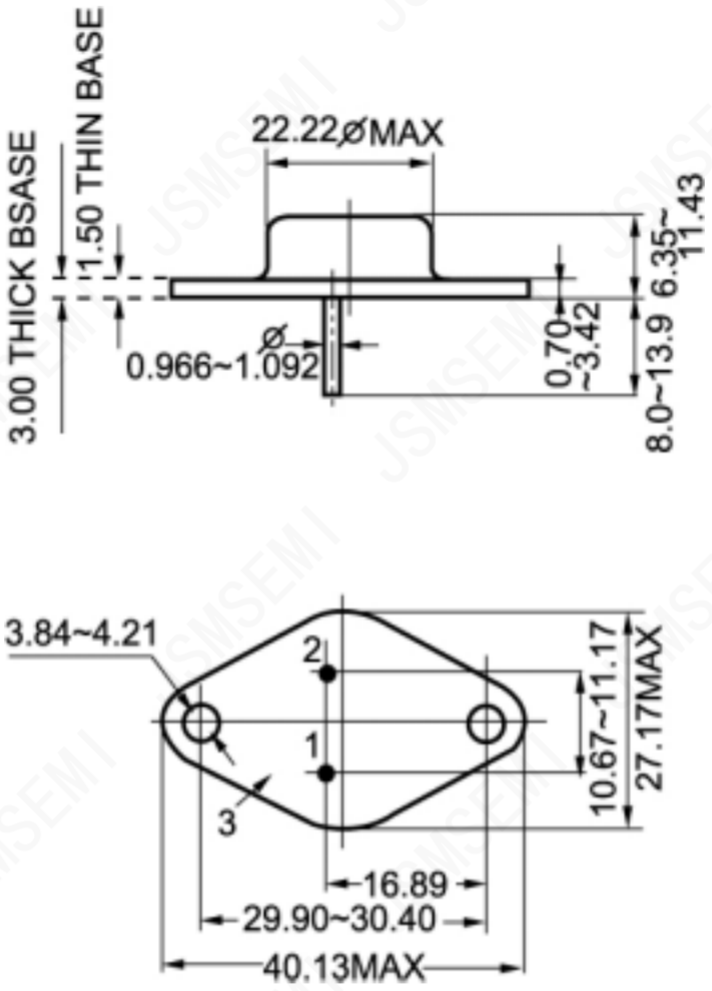


Fig.2 outline dimensions (unindicated tolerance:±0.1mm)

Revision History

Rev.	Change	Date
V1.0	Initial version	6/27/2021

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