

Product Specification

XBLW LM317M

500 mA Adjustable Voltage Regulator

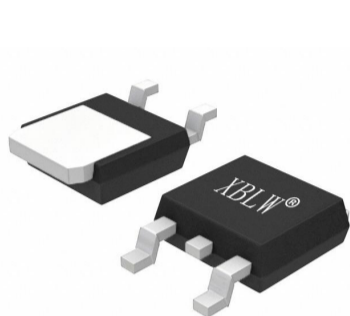
WEB | www.xinboleic.com



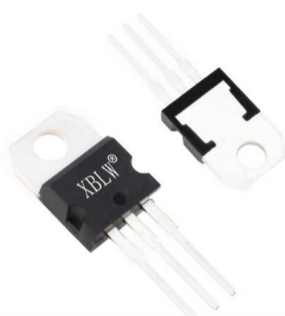
Descriptions

The LM317M is an adjustable three-terminal positive voltage regulator capable of supplying in excess of 500 mA over an output voltage range of 1.2 V to 37 V. This voltage regulator is exceptionally easy to use and requires only two external resistors to set the output voltage. Further, it employs internal current limiting, thermal shutdown and safe area compensation, making it essentially blow-out proof.

The LM317M serves a wide variety of applications including local, on-card regulation. This device also makes an especially simple adjustable switching regulator, a programmable output regulator, or by connecting a fixed resistor between the adjustment and output, the LM317M can be used as a precision current regulator.



TO-252-2L



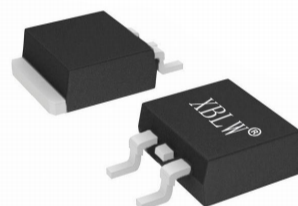
TO-220



SOT-223

Feature

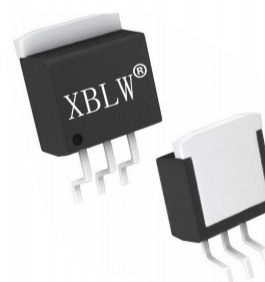
- Output Current in Excess of 500 mA
- Output Adjustable between 1.2 V and 37 V
- Internal Thermal Overload Protection
- Internal Short Circuit Current Limiting
- Output Transistor Safe-Area Compensation



TO-263-2L

Applications

- PC Motherboard
- LCD Monitor
- Graphic Card
- DVD Player
- Network Interface Card/Switch
- Telecom Equipment
- Printer and other Peripheral Equipment

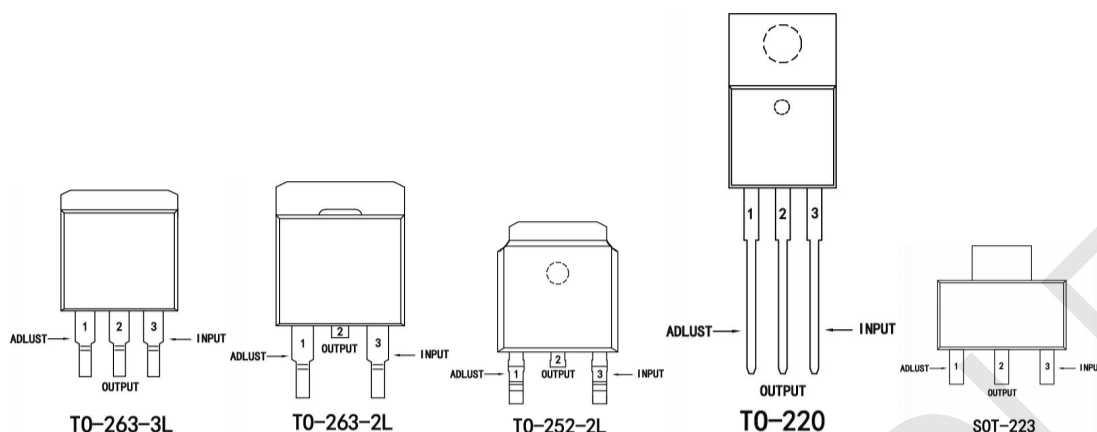


TO-263-3L

Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW LM317M	TO-220	LM317M	Tube	1000PCS/Box
XBLW LM317MCDTR	TO-263-2L	LM317M	Tape	800PCS/Reel
XBLW LM317MGDTR	TO-252-2L	LM317M	Tape	2500PCS/Reel
XBLW LM317MTDTR	SOT-223	LM317M	Tape	2500PCS/Reel
XBLW LM317MC3DTR	TO-263-3L	LM317M	Tape	2500PCS/Reel

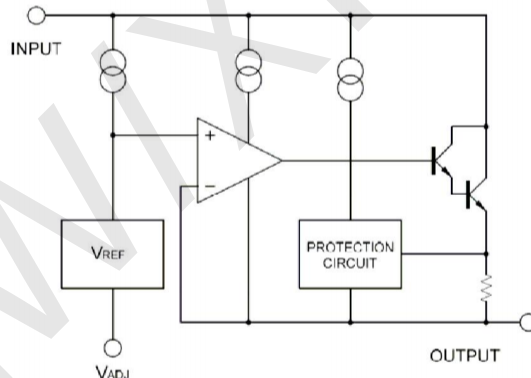
Pin Configuration (Top View)



Pin Functions

PIN		I/O	DESCRIPTION
NAME	NO.		
ADJUST	1	I	Output voltage adjustment pin. Connect to a resistor divider to set V_o
INPUT	3	I	Supply input pin
OUTPUT	2	O	Voltage output pin

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS ($T_a=25^{\circ}\text{C}$) *

Characteristic	Symbol	Min.	Max.	Unit
Input - Output Voltage Difference	$V_{in}-V_{out}$		40	V
Power Dissipation	P_d	Internal limited		
Maximum junction temperature	T_J		150	$^{\circ}\text{C}$
Storage temperature	T_s	-40	150	$^{\circ}\text{C}$
Lead temperature (soldering, 10sec)	T_{LEAD}		260	$^{\circ}\text{C}$
ESD (human body model)	ESD		4000	V

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

Recommended Operating Conditions

over operating free-air temperature range (unless otherwise noted)

		MIN	MAX	UNIT
Operating Temperature Range	LM317M	-20	125	°C

ELECTRICAL CHARACTERISTICS

($V_{IN}-V_{OUT}=5V$, $I_{OUT}=10mA$, $T_a=25^{\circ}C$, unless otherwise specified.) *

Characteristics	Test conditions	Symbol	Min.	Typ.	Max.	Unit
Reference voltage	$10mA \leq I_{OUT} \leq 500mA$	VREF	1.20	1.25	1.30	V
	$3V \leq (V_{IN} - V_{OUT}) \leq 37V$					
	$PD \leq 20W$					
Line regulation	$3V \leq V_{IN}-V_{OUT} \leq 37V$	SV		0.01	0.04	%/V
Load regulation	$0mA \leq I_{OUT} \leq 500mA$	Si		0.2	0.4	%
Adjust pin current		Iadj		50	100	μA
Adjust pin current change	$3V \leq V_{IN}-V_{OUT} \leq 37V$, $10mA \leq I_{OUT} \leq 500mA$, $PD \leq 20W$	Iadj		0.2	5.0	μA
Minimum load current	$V_{IN}-V_{OUT}=37V$	ILmin		3.5	10.0	mA
Ripple rejection	$f=120Hz$, $C_{OUT}=1\mu F$ tantalum,	RR	60	75		dB
	$(V_{IN} - V_{OUT})=3V$,					
	$I_{OUT}=500mA$					
Temperature stability	$T_{MIN} T_J T_{MAX}$			0.7		%
RMS output noise (% of V_{OUT})	$T_a=25^{\circ}C$, $10Hz \leq f \leq 10kHz$	en		0.003		%
Thermal resistance, Junction to case	SOT223	θ_{JC}		23		$^{\circ}C/W$
	TO252			12		
	TO220			5		
	TO263			5		
Thermal resistance, Junction to Ambient	SOT223	θ_{JA}		165		$^{\circ}C/W$
	TO252			112		
	TO220			54		
	TO263			64		
Thermal shutdown hysteresis		Thys		25		$^{\circ}C/W$

*: Maximum Power Dissipation is Package Type and Case Temperature dependent.

APPLICATION CIRCUIT

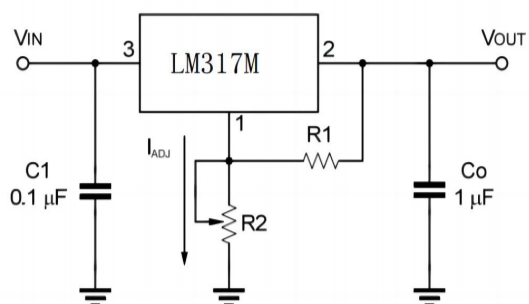


Fig.1 Programmable voltage regulator

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

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

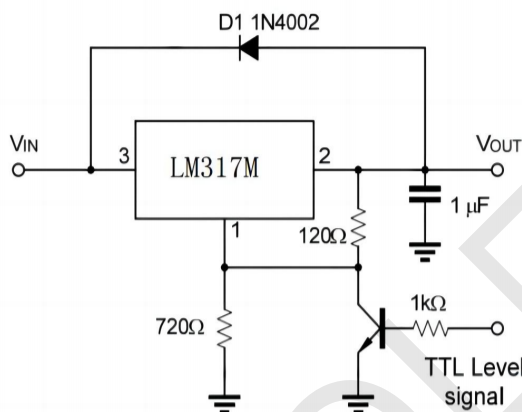


Fig.2 Regulator with On-off control

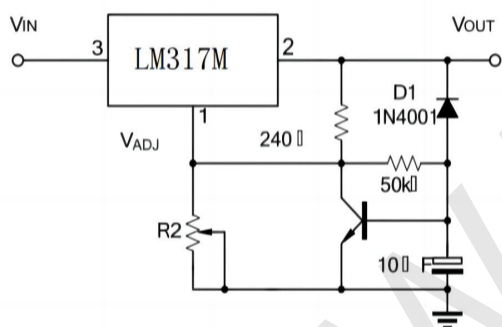
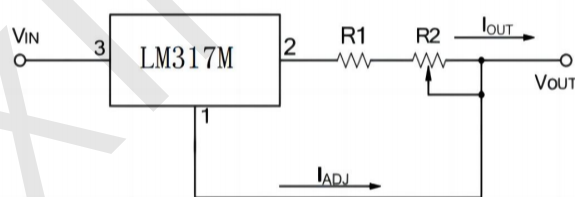


Fig.3 Soft Start Application



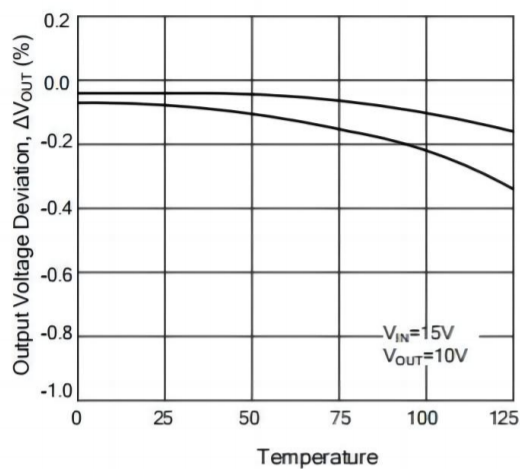
$$I_{O(MAX)} = \left(\frac{V_{REF}}{R1} \right) + I_{ADJ} = \frac{1.25V}{R1}$$

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

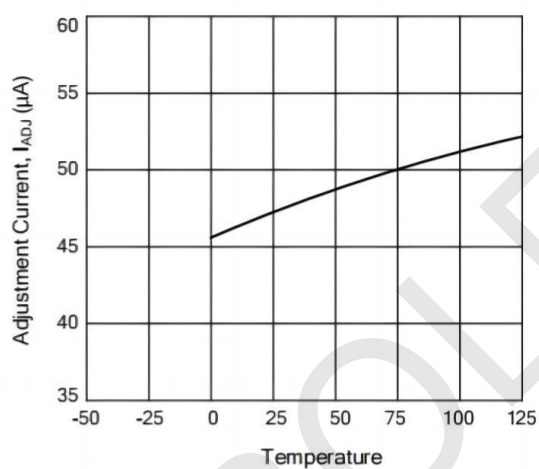
Fig.4 Constant Current Application

CHARACTERISTICS CURVES

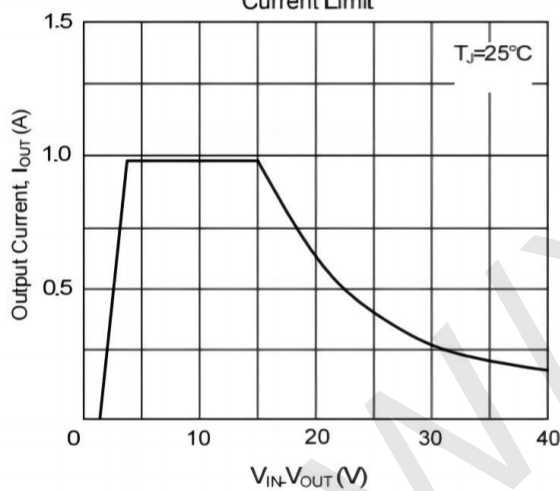
Load Regulation vs. temperature



Adjustment Current vs. Temperature



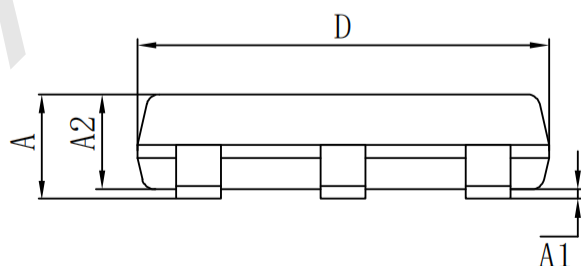
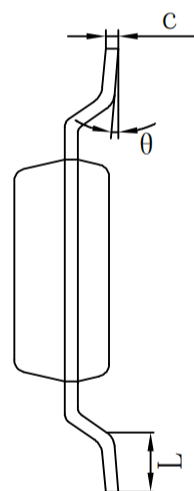
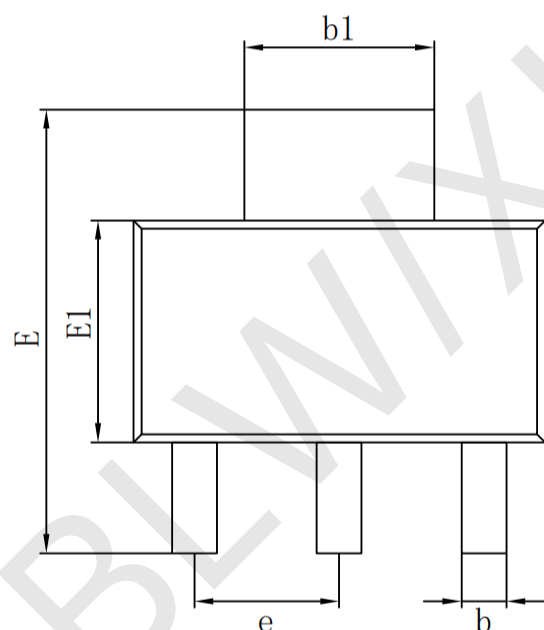
Current Limit



Package Information

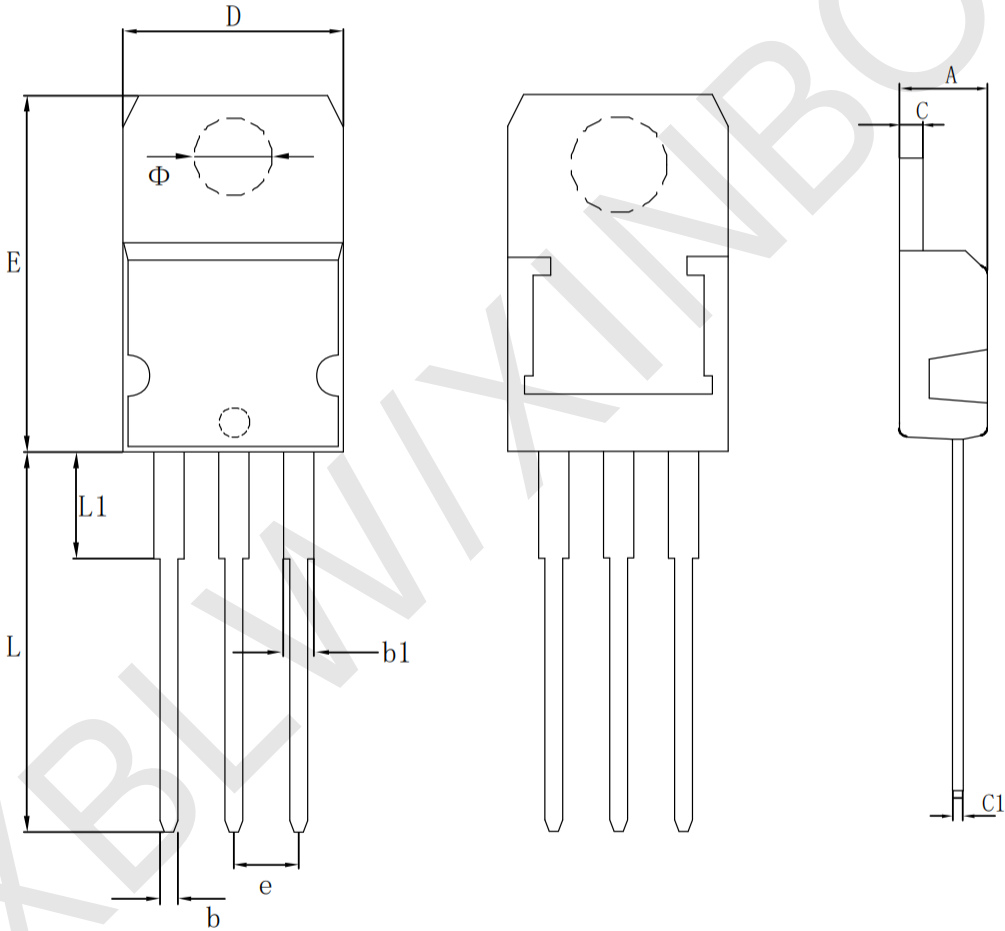
· SOT-223

Size Symbol	Dimensions In Millimeters		Size Symbol	Dimensions In Inches	
	Min (mm)	Max (mm)		Min (in)	Max (in)
A		1.800	A		0.071
A1	0.020	0.100	A1	0.001	0.004
A2	1.500	1.700	A2	0.059	0.067
b	0.660	0.840	b	0.026	0.033
b1	2.900	3.100	b1	0.114	0.122
c	0.230	0.350	c	0.009	0.014
D	6.300	6.700	D	0.248	0.264
E	6.700	7.300	E	0.264	0.287
E1	3.300	3.700	E1	0.130	0.146
e	2.300 (BSC)		e	0.091 (BSC)	
L	0.750		L	0.030	
θ	0°	10°	θ	0°	10°



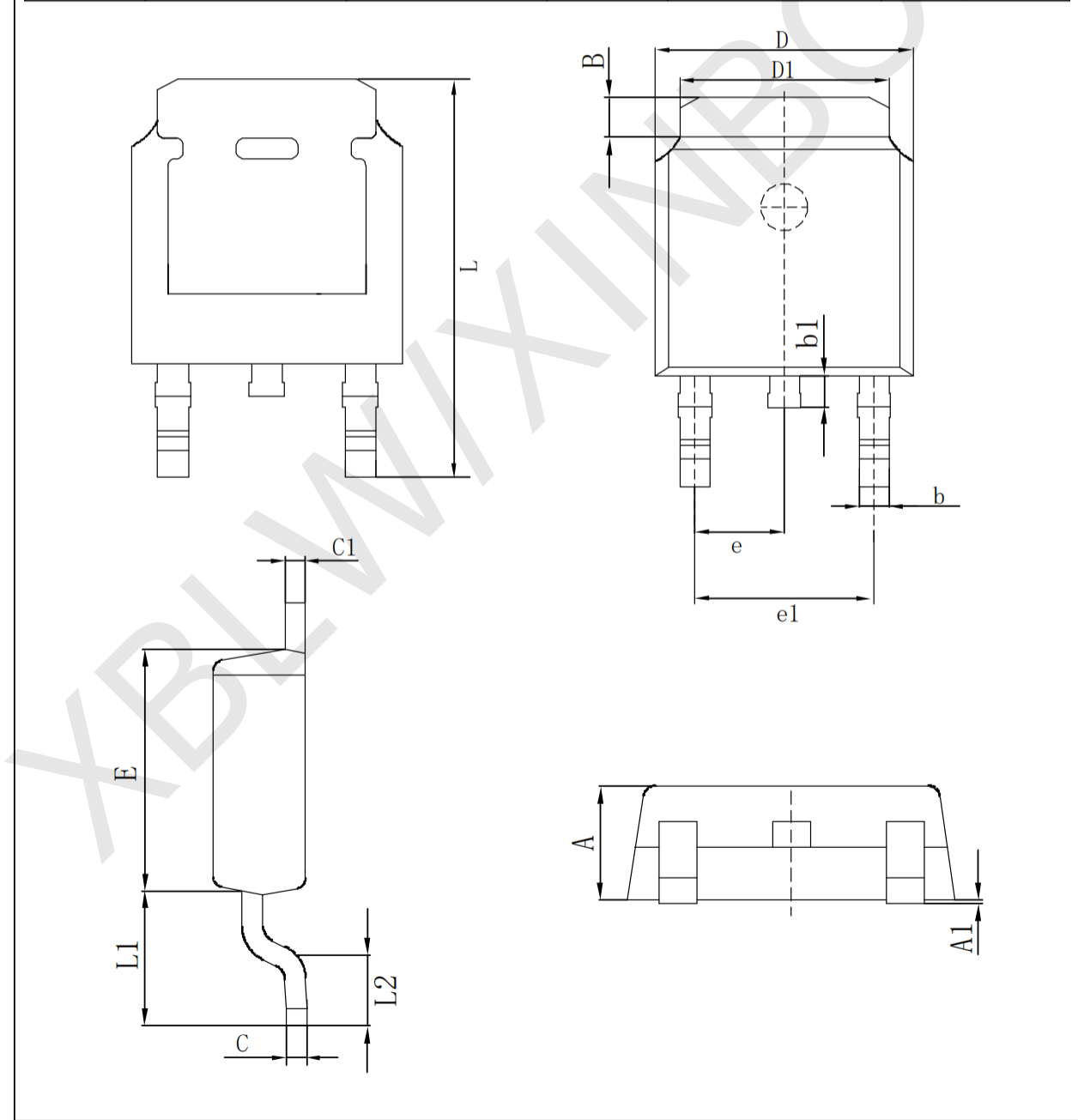
· T0-220

Size		Dimensions In Millimeters		Size		Dimensions In Inches	
Symbol		Min (mm)	Max (mm)	Symbol		Min (in)	Max (in)
A		4.150	4.250	A		0.163	0.167
C		0.985	1.015	C		0.039	0.040
C1		0.365	0.395	C1		0.014	0.016
D		10.03	10.10	D		0.395	0.398
E		15.02	15.75	E		0.591	0.620
Φ		3.700	3.900	Φ		0.146	0.154
e		2.540 (TYP)		e		0.100 (TYP)	
b		0.770	0.830	b		0.030	0.033
b1		1.230	1.290	b1		0.048	0.051
L		13.00	14.00	L		0.512	0.551
L1		3.500	3.900	L1		0.138	0.154



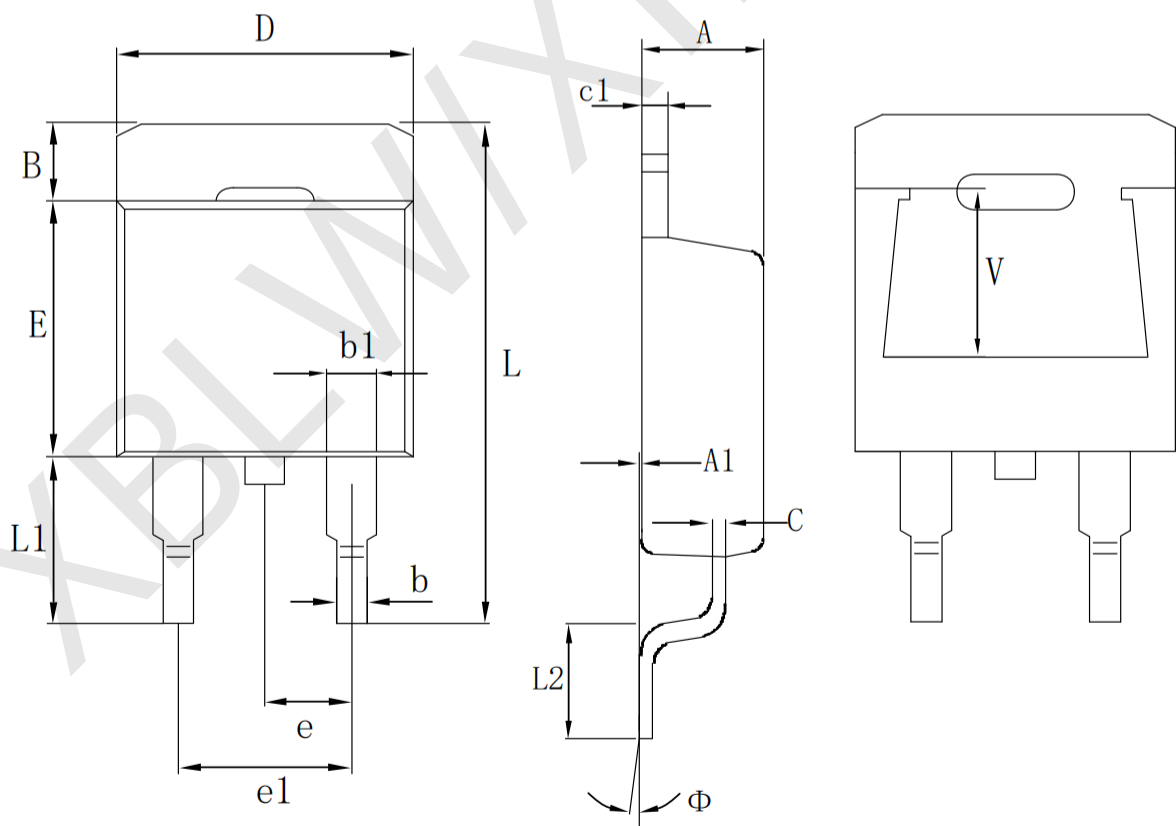
· T0-252-2L

Size Symbol	Dimensions In Millimeters		Size Symbol	Dimensions In Inches	
	Min (mm)	Max (mm)		Min (mm)	Max (mm)
A	2.200	2.400	A	0.087	0.094
A1	0.000	0.127	A1	0.000	0.005
B	1.350	1.650	B	0.053	0.065
b	0.500	0.700	b	0.020	0.028
b1	0.700	0.900	b1	0.028	0.035
c	0.430	0.580	c	0.017	0.023
c1	0.430	0.580	c1	0.017	0.023
D	6.350	6.500	D	0.250	0.262
D1	5.200	5.400	D1	0.205	0.213
E	5.400	5.700	E	0.213	0.224
e	2.300 (TYP)		e	0.091 (TYP)	
e1	4.500	4.700	e1	0.177	0.185
L	9.500	9.900	L	0.374	0.390
L1	2.550	2.900	L1	0.100	0.114
L2	1.400	1.780	L2	0.055	0.070



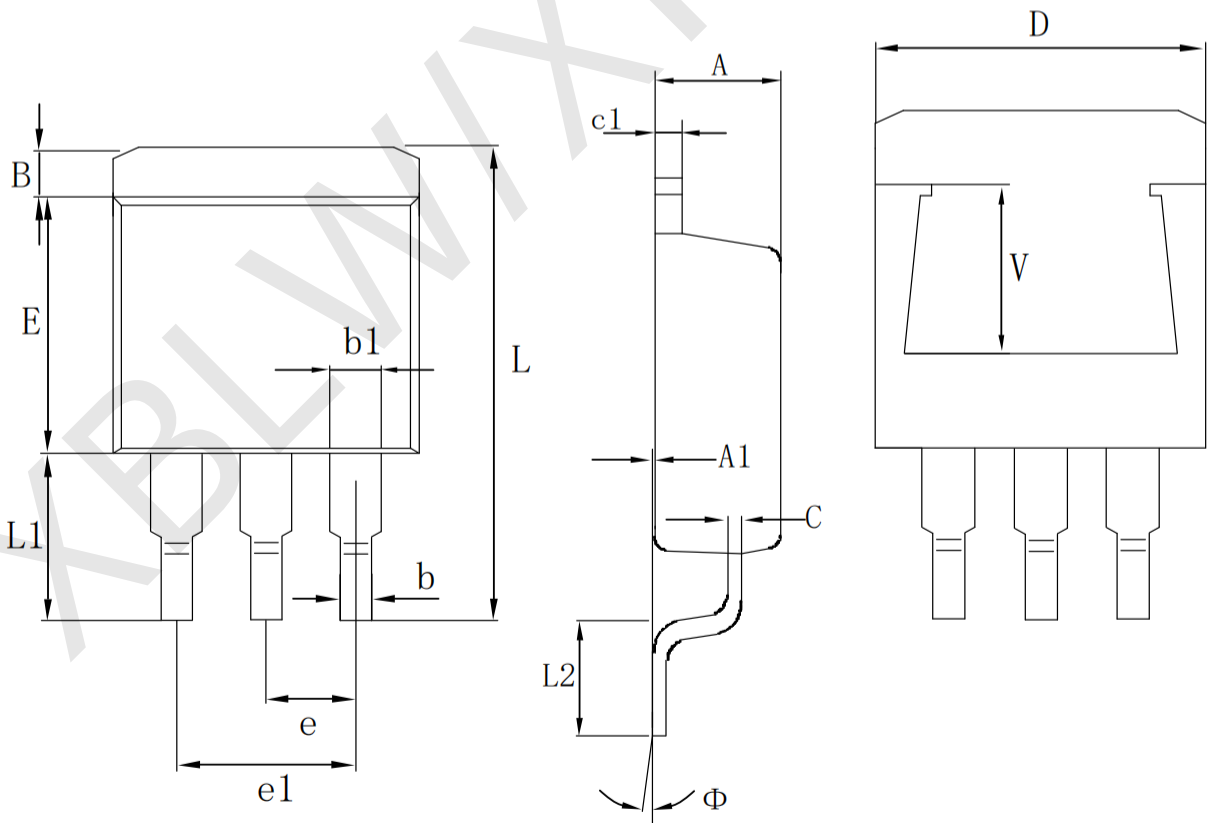
· T0-263-2L

Symbol	Size	Dimensions In Millimeters		Symbol	Size	Dimensions In Inches	
		Min (mm)	Max (mm)			Min (in)	Max (in)
A		4.470	4.670	A		0.176	0.184
A1		0.000	0.150	A1		0.000	0.006
B		1.120	1.420	B		0.044	0.056
b		0.710	0.910	b		0.028	0.036
b1		1.170	1.370	b1		0.046	0.054
c		0.310	0.530	c		0.012	0.021
c1		1.170	1.370	c1		0.046	0.054
D		10.01	10.31	D		0.394	0.406
E		8.700	9.400	E		0.343	0.370
e		2.540 (TYP)		e		0.100 (TYP)	
e1		4.980	5.180	e1		0.196	0.204
L		14.94	15.50	L		0.588	0.610
L1		4.950	5.450	L1		0.195	0.215
L2		2.340	2.740	L2		0.092	0.860
V		5.600 (REF)		V		0.220 (REF)	
Φ		0°	8°	Φ		0°	8°



• T0-263-3L

Size Symbol	Dimensions In Millimeters		Size Symbol	Dimensions In Inches	
	Min(mm)	Max(mm)		Min(in)	Max(in)
A	4.470	4.670	A	0.176	0.184
A1	0.000	0.150	A1	0.000	0.006
B	1.120	1.420	B	0.044	0.056
b	0.710	0.910	b	0.028	0.036
b1	1.170	1.370	b1	0.046	0.054
c	0.310	0.530	c	0.012	0.021
c1	1.170	1.370	c1	0.046	0.054
D	10.01	10.31	D	0.394	0.406
E	8.700	9.400	E	0.343	0.370
e	2.540 (TYP)		e	0.100 (TYP)	
e1	4.980	5.180	e1	0.196	0.204
L	14.94	15.50	L	0.588	0.610
L1	4.950	5.450	L1	0.195	0.215
L2	2.340	2.740	L2	0.092	0.860
V	5.600 (REF)		V	0.220 (REF)	
Φ	0°	8°	Φ	0°	8°



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