

Product Specification

XBLW LM350

40V, 3A, Adjustable Voltage Regulator

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Descriptions

The LM350 is an adjustable 3-terminal positive voltage regulator capable of supplying in excess of 3.0A over an output voltage range of 1.20 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 LM350 serves a wide variety of applications including local, on card regulation. This device can also be used to make a programmable output regulator, or by connecting a fixed resistor between the adjustment and output, the LM350 can be used as a precision current regulator.

The LM350 series are packaged in TO-220, TO-252, SOT-223 and TO-263.

Features

- Typical 1% Output Voltage Tolerance
- Output voltage adjustable from 1.20V ~37V
- Output current in excess of 3.0A
- Internal short circuit protection
- Internal over temperature protection
- Output transistor safe area compensation

Applications

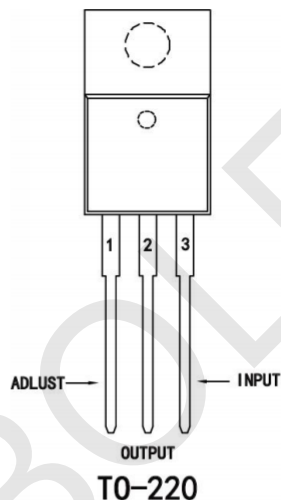
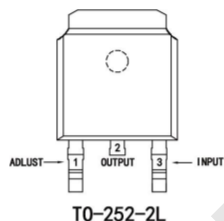
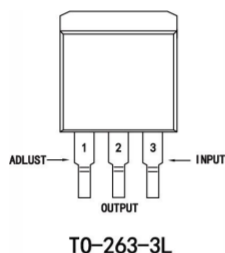
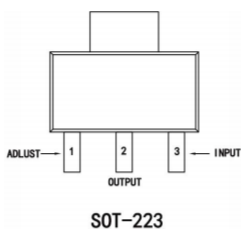
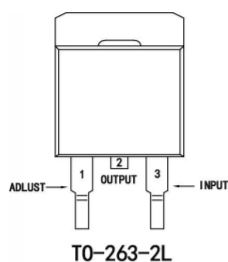
- Adjustable Power supplies
- Constant Current Regulators
- Battery Chargers
- Efficient linear adjuster
- Post regulator for switching power supply
- Desktop computers, RISC, and built-in processor power supplies



Ordering Information

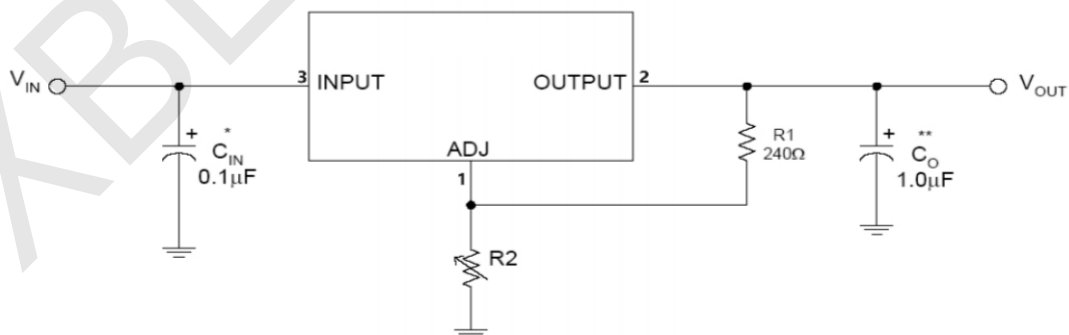
Product Model	Package Type	Marking	Packing	Packing Qty
XBLW LM350T	TO-220	LM350T	Tube	1000Pcs/Box
XBLW LM350MDTR	TO-252-2L	LM350M	Tape	2500Pcs/Reel
XBLW LM350CDTR	TO-263-2L	LM350C	Tape	800Pcs/Reel
XBLW LM350C3DTR	TO-263-3L	LM350C	Tape	800Pcs/Reel
XBLW LM350SDTR	SOT-223	LM350S	Tape	2500Pcs/Reel

Pin Description



NAME	PIN				I/O	DESCRIPTION
	TO-220	SOT-223	TO-263	TO-252		
AJD	1	1	1	1	-	Adjust pin
V _{IN}	3	3	3	3	I	Input voltage pin for the regulator
V _{OUT}	2,TAB	2,4	2,TAB	2,TAB	O	Output voltage pin for the regulator

Typical Application Circuit



* = C_{IN} is required if the regulator is located near power supply filter.

**= C_O is needed for stability and it improves transient response.

$$V_{OUT} = V_{REF} \times (1 + R2/R1) + I_{ADJ} \times R2$$

Since I_{ADJ} is controlled to less than 100μA, the error associated with this term is negligible in most applications.

Function Block

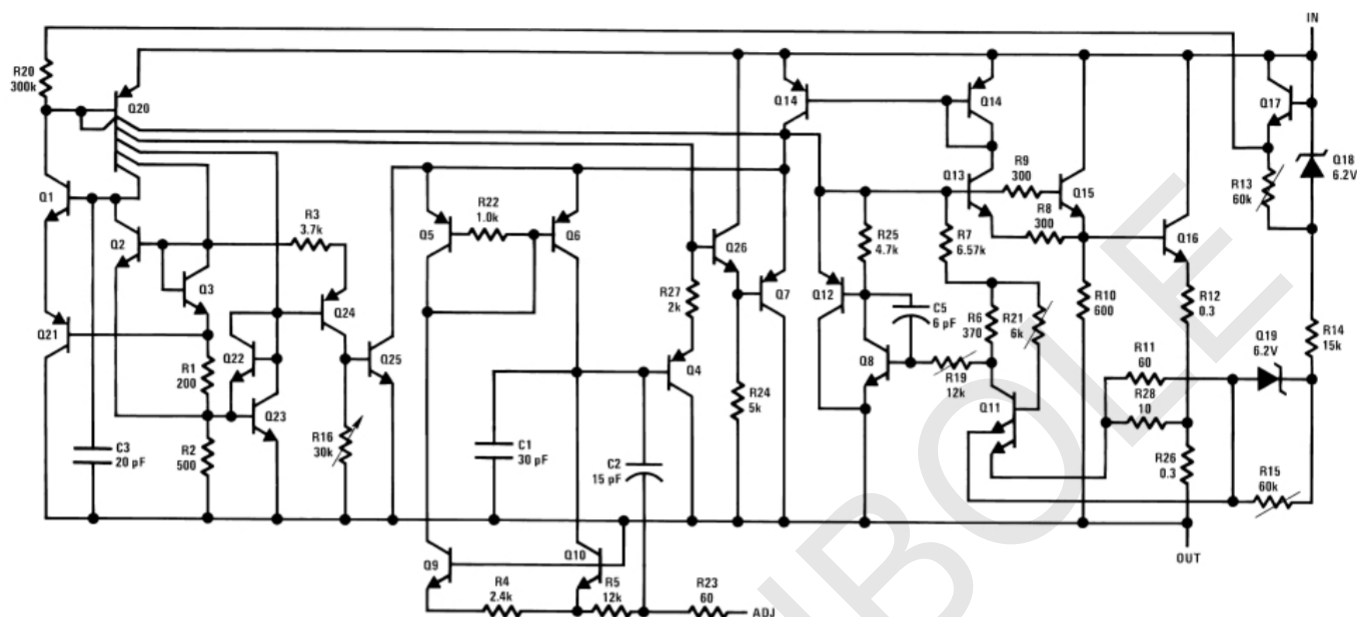


Figure 1 Function Block Diagram of LM350

Absolute Maximum Ratings (Ta=25°C)

Characteristic	Symbol	Min .	Max .	Unit
Input - Output Voltage Difference	Vin-Vout		40	V
Power Dissipation	Pd	Internal limited		
Maximum junction temperature	T _J		150	°C
Storage temperature	T _S	-40	150	°C
Lead temperature (soldering , 10sec)	T _{LEAD}		260	°C
ESD (human body model)	ESD		4000	V
Operating temperature	T _{oJ}	-40~ 125		°C

Recommended Operating Conditions(Ta=25°C)

Parameter Name	Min.	Max.	Unit
Input Voltage Range		37	V
Operating temperature	-40	125	°C

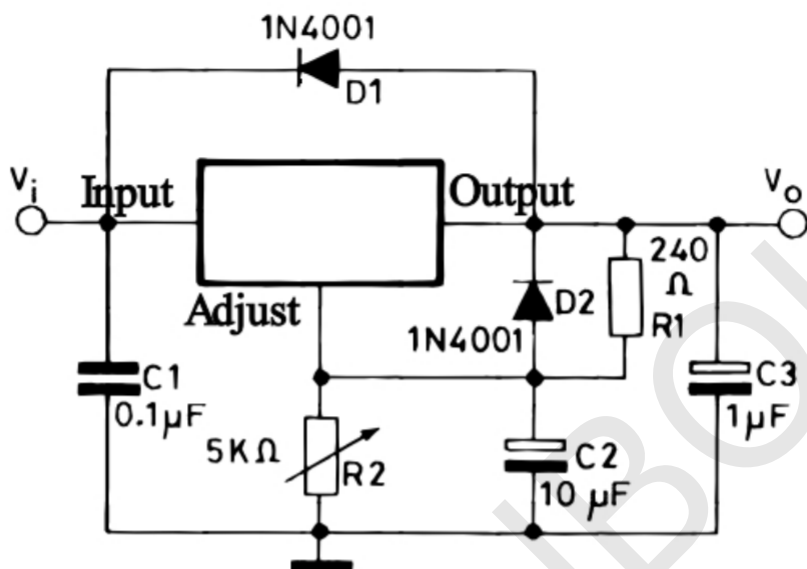
Electrical Characteristics

(VIN-VOUT = 5V, IOUT = 10 mA, Ta = 25°C, unless otherwise specified.) *

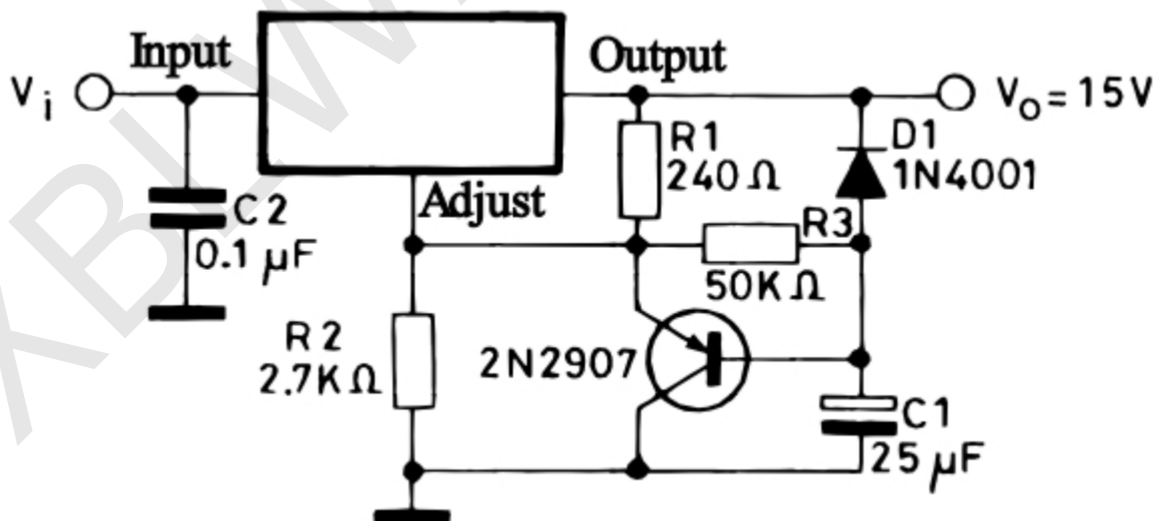
Characteristics	Test conditions	Symbol	Min.	Typ.	Max.	Unit
Reference voltage	10 mA ≤ IOUT ≤ 1.5 A 3 V ≤ (VIN-VOUT) ≤ 37V PD ≤ 20W	VREF	1.20	1.25	1.30	V
Line regulation	3 V ≤ VIN-VOUT ≤ 37V	SV		0.01	0.04	% / V
Load regulation	0 mA ≤ IOUT ≤ 1.5 A	Si		0.2	0.4	%
Adjust pin current		Iadj		50	100	μA
Adjust pin current change	3 V ≤ VIN-VOUT ≤ 37V, 10 mA ≤ IOUT ≤ 1.5 A, PD ≤ 20W	Δ Iadj		0.2	5.0	μA
Minimum load current	VIN-VOUT=37V	ILmin		3.5	10.0	mA
Ripple rejection	f=120Hz, COUT=1μF tantalum, (VIN-VOUT)=3V, IOUT=1.5A	RR	60	75		dB
Temperature stability	TMIN ≤ TJ ≤ TMAX			0.7		%
RMS output noise (% of VOUT)	Ta=25°C, 10Hz ≤ f ≤ 10kHz	en		0.003		%
Thermal resistance, Junction to case	SOT-223 TO-252 TO-220 TO-263	θJC		23 12 5 5		°C / W
Thermal resistance, Junction to Ambient	SOT-223 TO-252 TO-220 TO-263	θJA		165 112 54 65		°C / W
Thermal shutdown hysteresis		Thys		25		°C

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

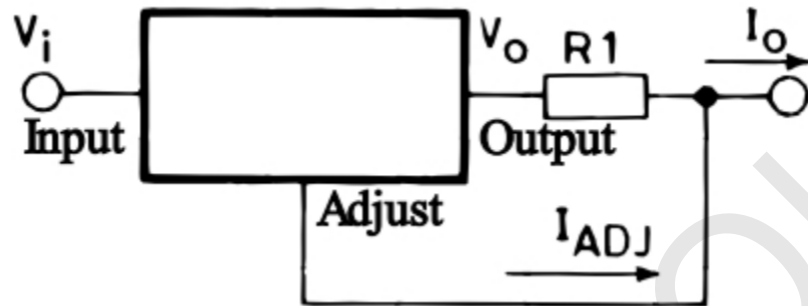
Application Information



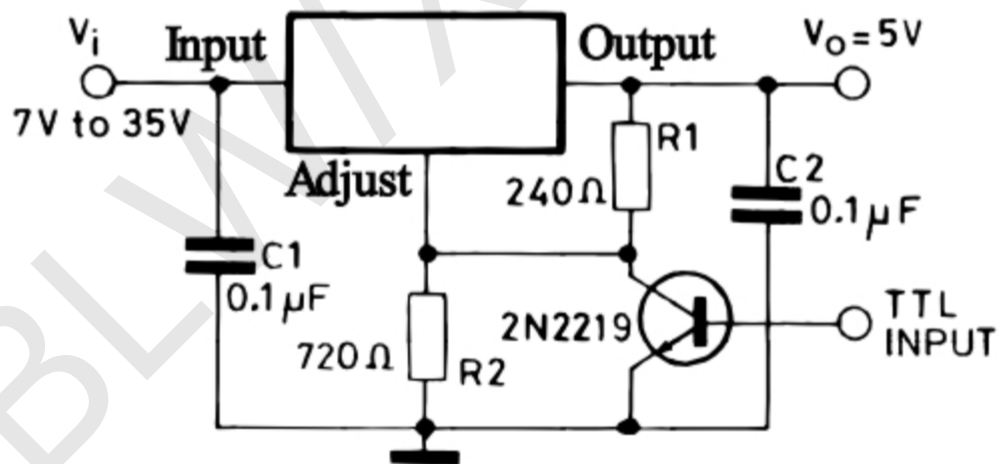
Voltage regulator with protection diodes



Slow turn-on 15 V regulator

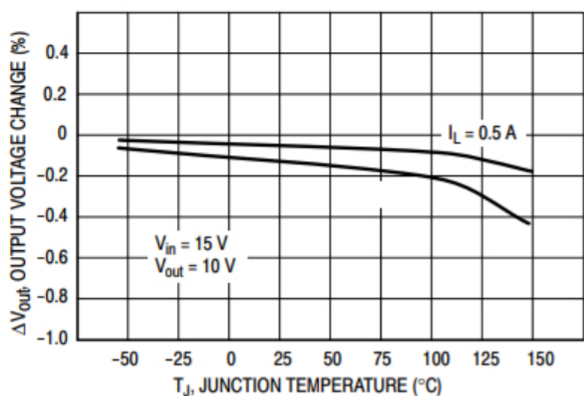


Current regulator

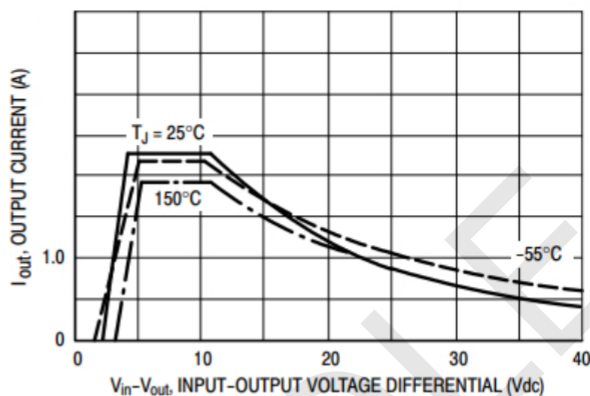


5 V electronic shut-down regulator

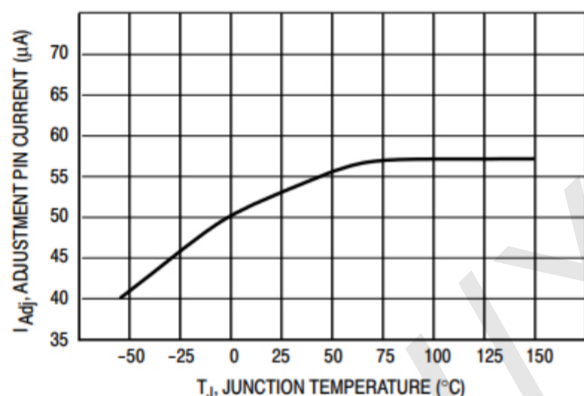
Characteristics Curves



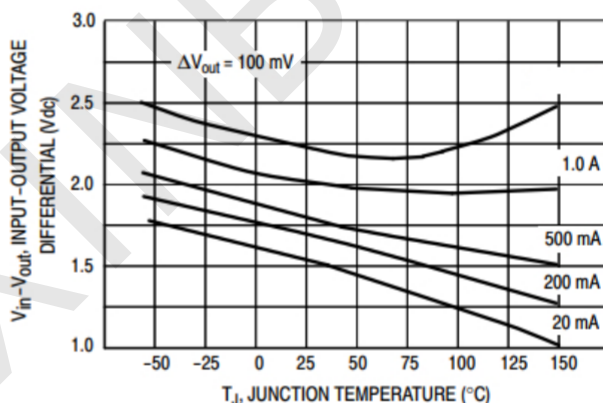
Load Regulation



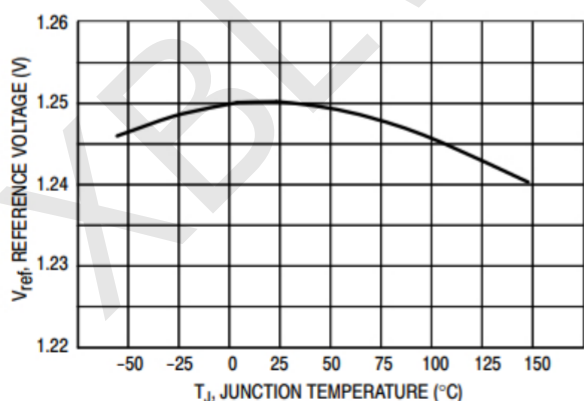
Current Limit



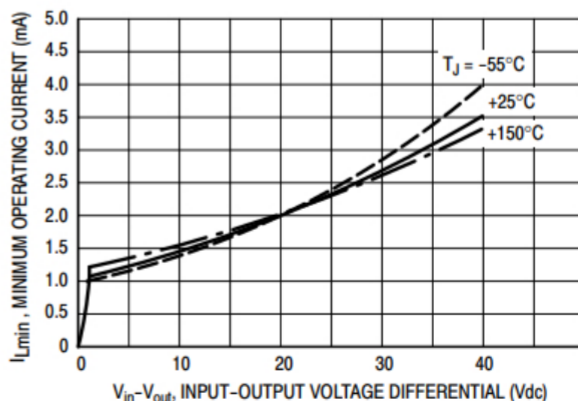
Adjustment Pin Current



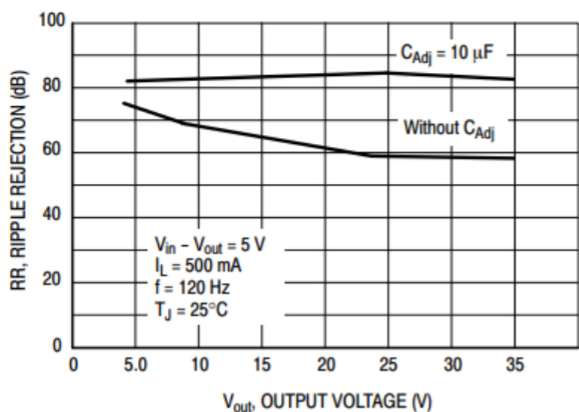
Dropout Voltage



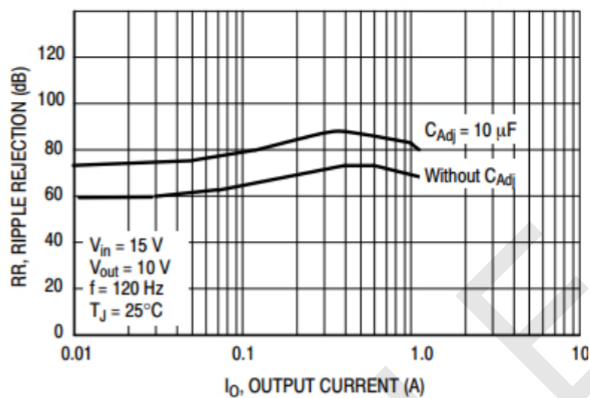
Temperature Stability



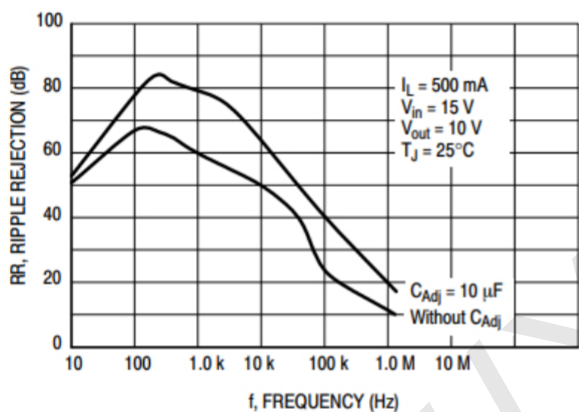
Minimum Operating Current



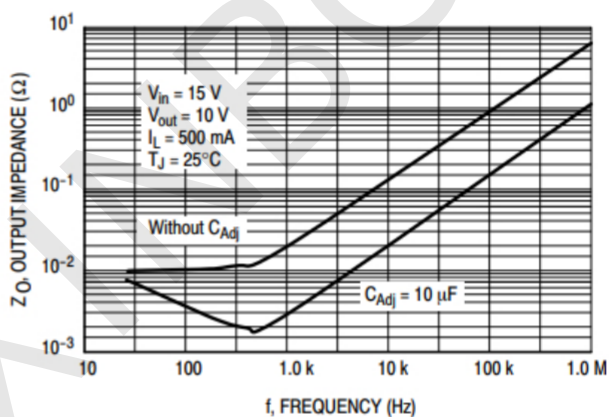
Ripple Rejection versus Output Voltage



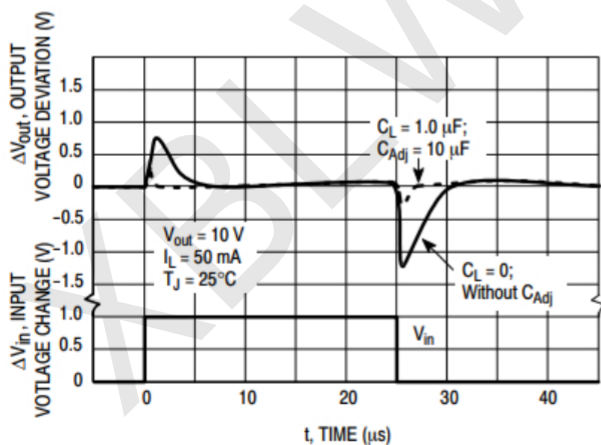
Ripple Rejection versus Output Current



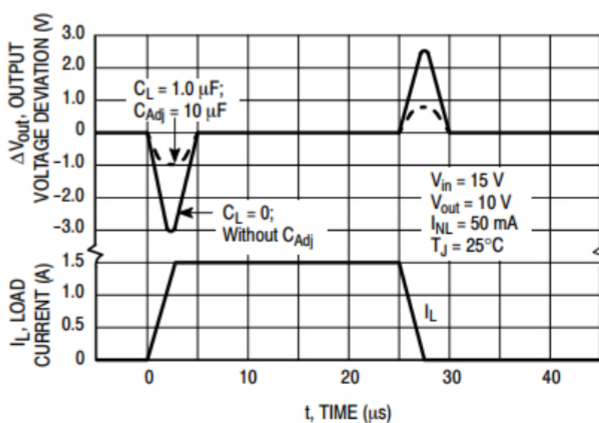
Ripple Rejection versus Frequency



Output Impedance



Line Transient Response

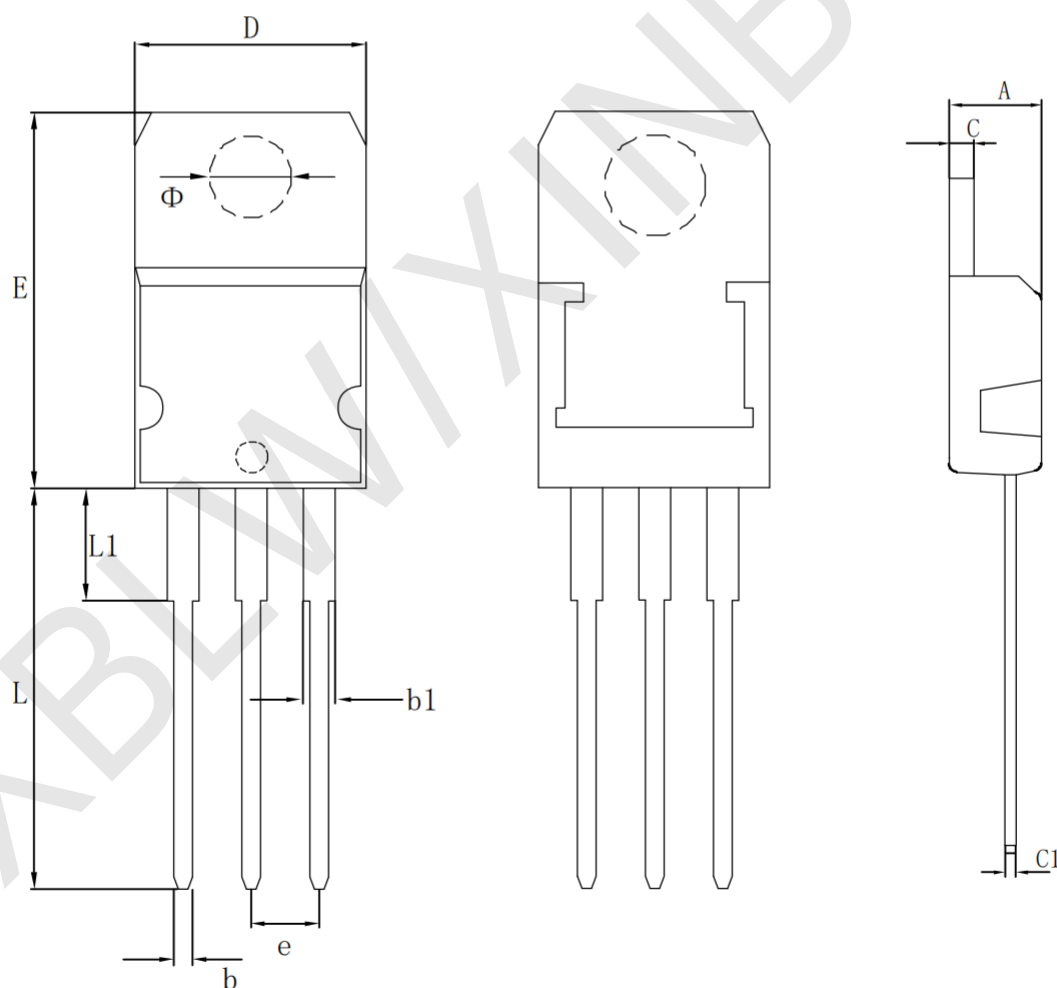


Load Transient Response

Package Information

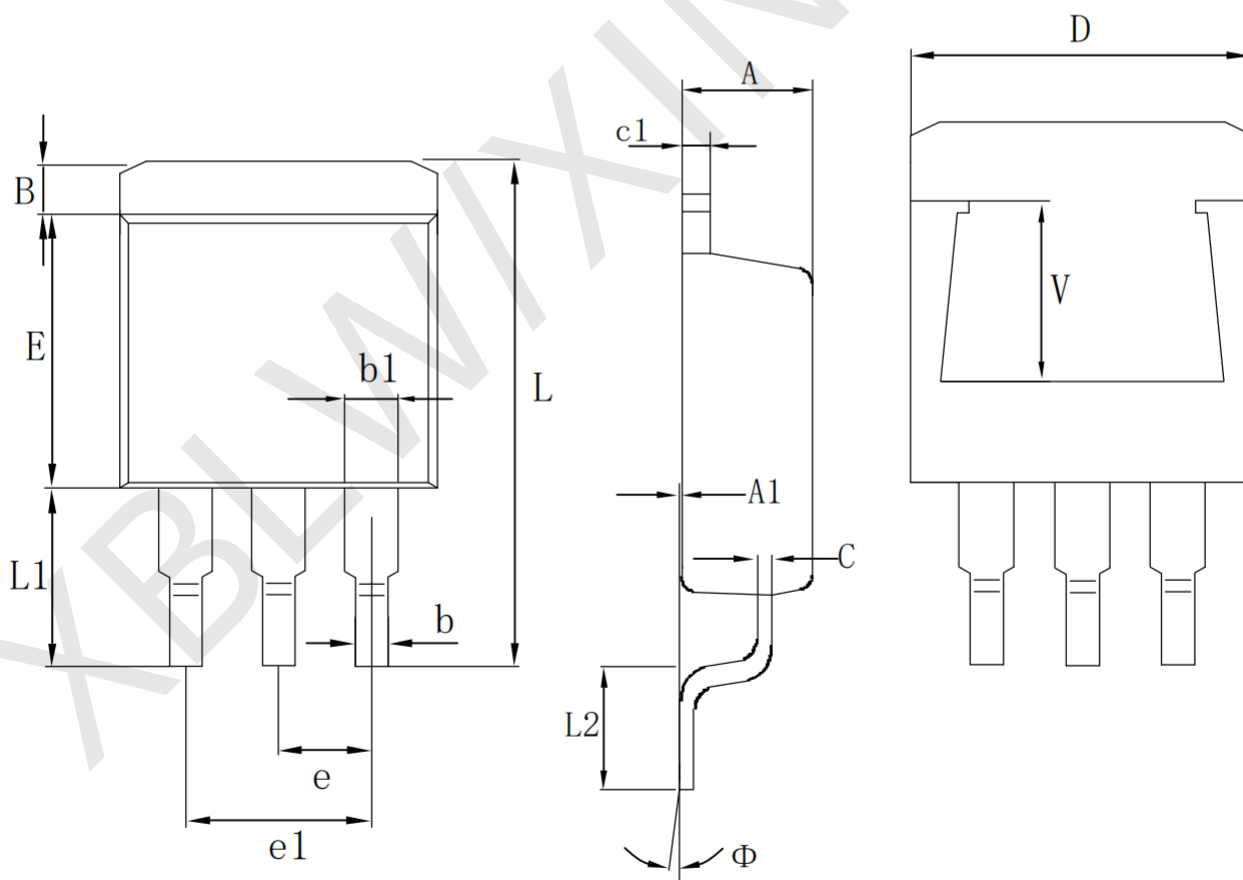
· T0-220

Symbol \ Size	Dimensions In Millimeters		Symbol \ Size	Dimensions In Inches	
	Min (mm)	Max (mm)		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



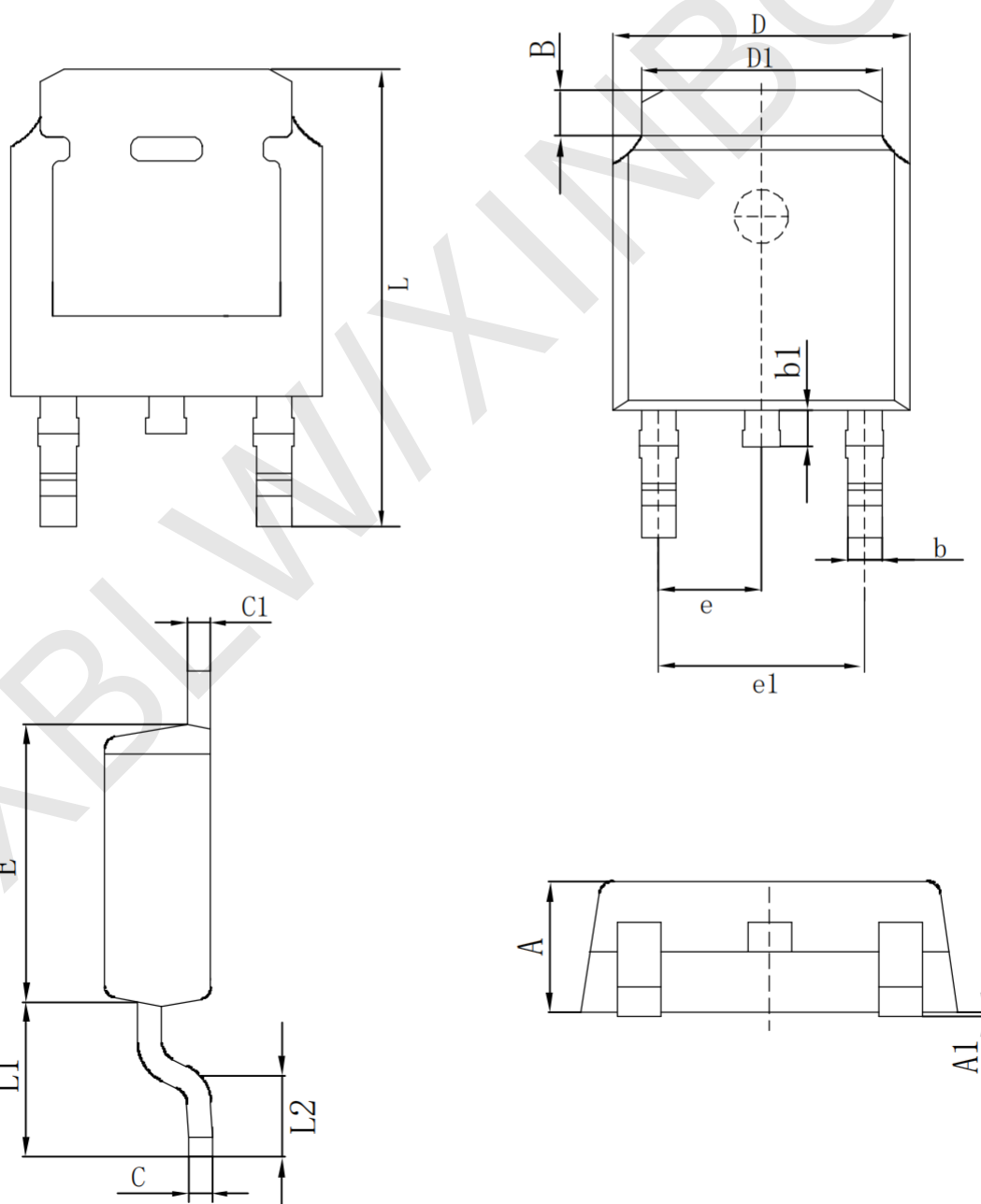
· T0-263-3L

Symbol	Dimensions In Millimeters		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°



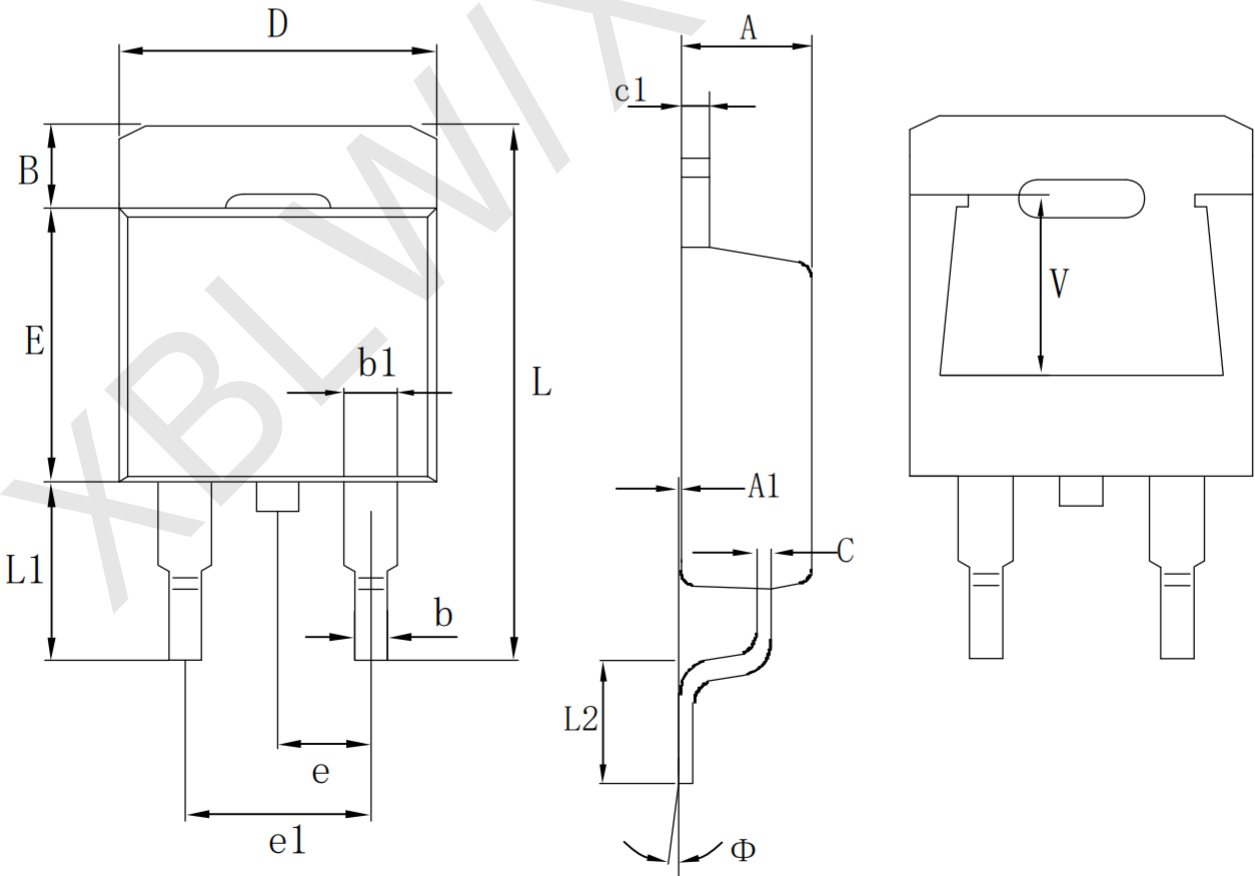
· T0-252-2L

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



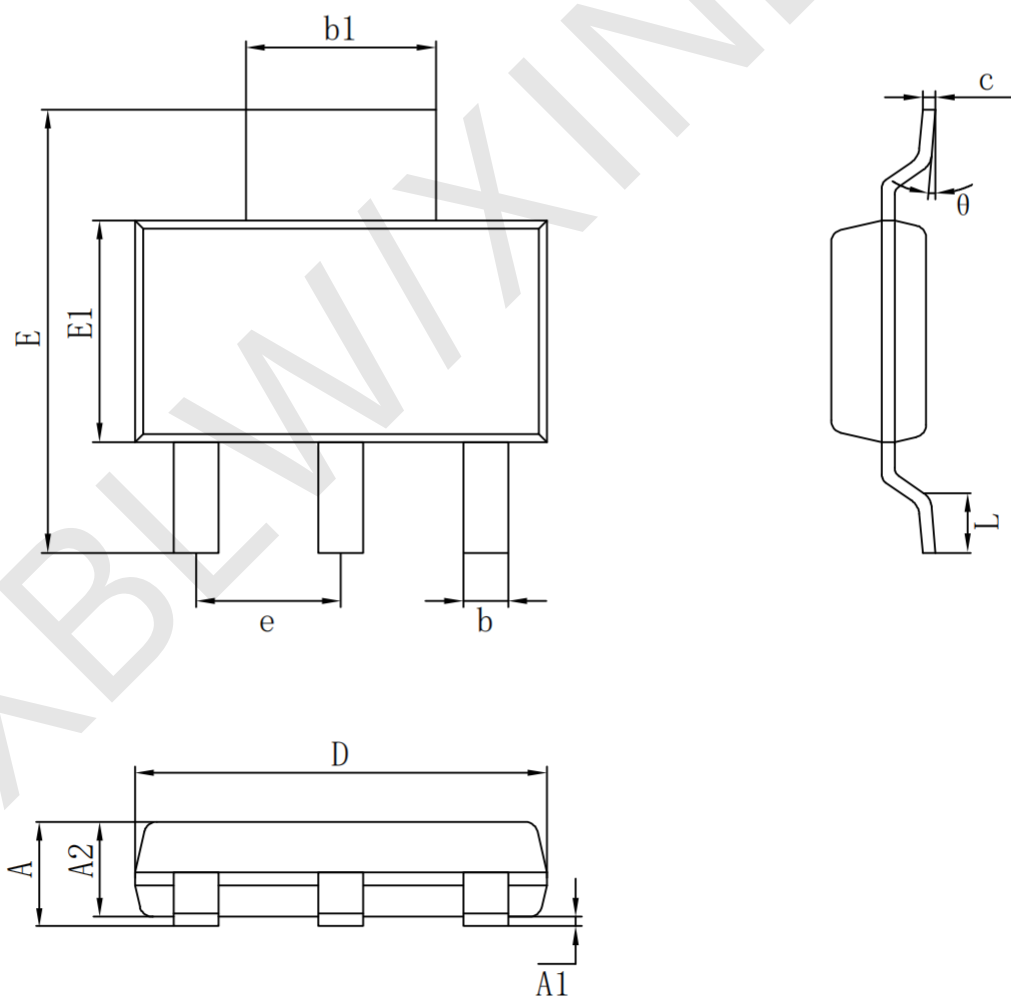
T0-263-2L

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°



· 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°



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