

芯伯乐®
X I N B O L E

Product Specification

XBLW LM337

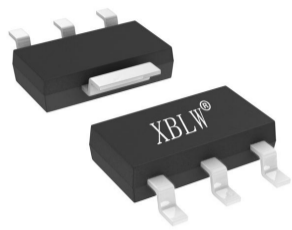
3-Terminal Adjustable Negative Regulators

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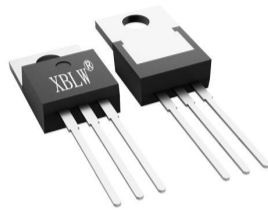


Descriptions

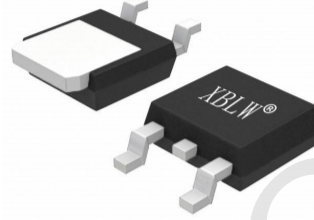
The LM337 is adjustable 3-terminal negative voltage regulators capable of supplying 1.5 A or more currents over an output voltage range of -1.25 V to -37 V . It requires only two external resistors to set the output voltage and one output capacitor for frequency compensation. The circuit design has been optimized for excellent regulation and low thermal transients. Further, the LM337 feature internal current limiting, thermal shutdown and safe-area compensation, making it virtually blowout-proof against overloads.



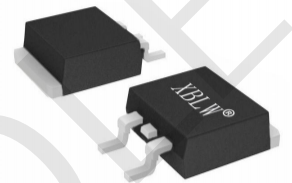
SOT-223



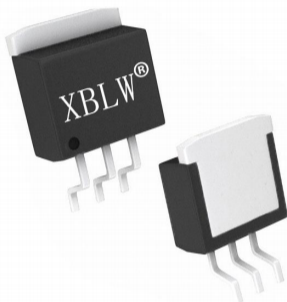
TO-220



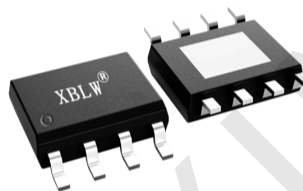
TO-252-2L



TO-263-2L



TO-263-3L



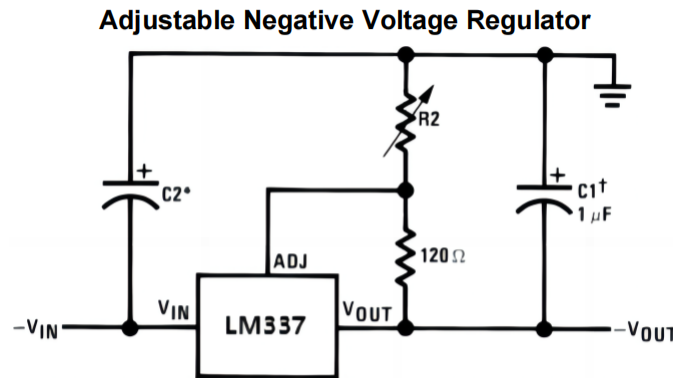
ESOP-8

Feature

- 1.5A Output Current
- Line Regulation 0.01%/V (Typical)
- Load Regulation 0.3% (Typical)
- 77-dB Ripple Rejection
- 50 ppm/°C Temperature Coefficient
- Thermal Overload Protection
- Internal Short-Circuit Current Limiting Protections

Applications

- Industrial Power Supplies
- Factory Automation Systems
- Building Automation Systems
- PLC System
- Instrumentation
- IGBT Drive Negative Gate Supplies
- Networking
- Set-Top Boxes



Full output current not available at high input-output voltages

$$-V_{OUT} = -1.25V \left(1 + \frac{R2}{120} \right) + (-I_{ADJ} \times R2)$$

†C1 = 1-μF solid tantalum or 10-μF aluminum electrolytic required for stability

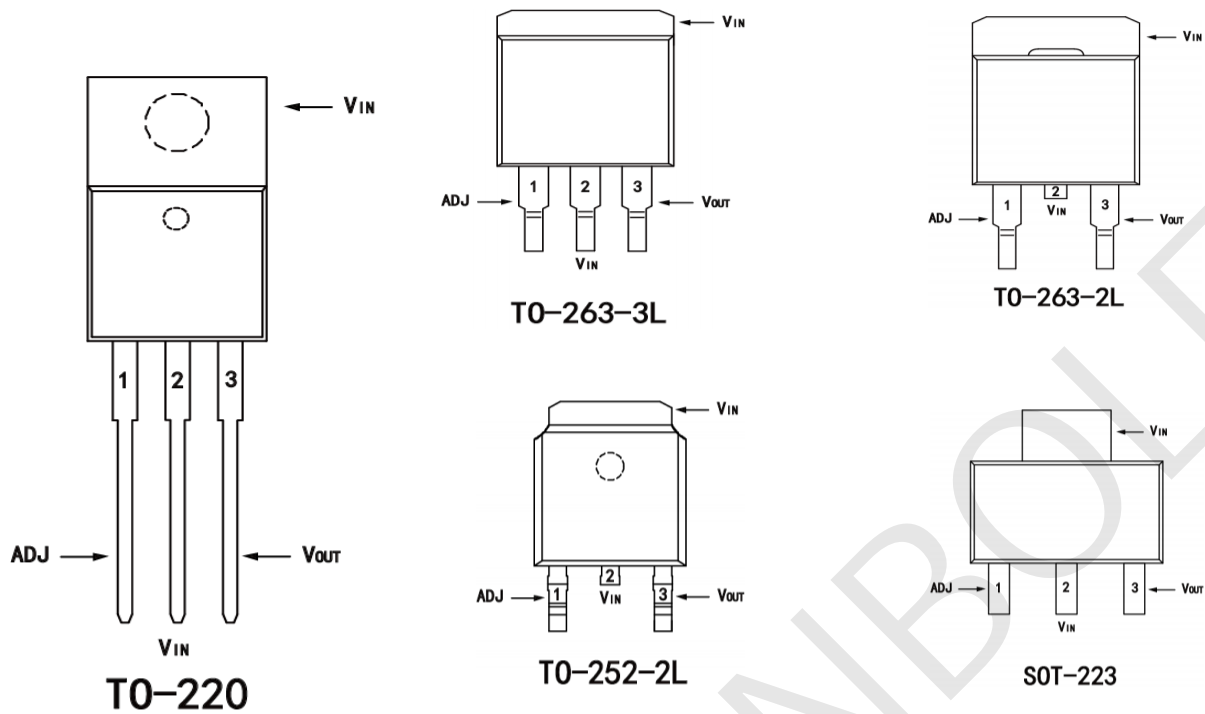
*C2 = 1-μF solid tantalum is required only if regulator is more than 4" from power-supply filter capacitor

Output capacitors in the range of 1-μF to 1000-μF of aluminum or tantalum electrolytic are commonly used to provide improved output impedance and rejection of transients

Ordering Information

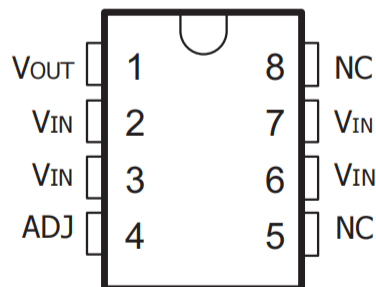
Product Model	Package Type	Marking	Packing	Packing Qty
XBLW LM337S	SOT-223	LM337S	Tape	2500Pcs/Reel
XBLW LM337T	TO-220	LM337T	Tube	1000Pcs/Box
XBLW LM337MDTR	TO-252-2L	LM337M	Tape	2500Pcs/Reel
XBLW LM337C2DTR	TO-263-2L	LM337C	Tape	500Pcs/Reel
XBLW LM337CDTR	TO-263-3L	LM337C	Tape	500Pcs/Reel
XBLW LM337EDTR	ESOP-8	LM337	Tape	2500Pcs/Reel

Pin Configuration and Functions



Pin Functions

PIN		TYPE	DESCRIPTION
NAME	NO.		
ADJUSTMENT	1	I	Adjustment pin for the output voltage. Connect two external resistors to adjust the output voltage.
INPUT	2	I	Input voltage. The input voltage and current will be designated V_I and I_I respectively.
OUTPUT	3	O	Output voltage. The output voltage and current will be designated V_O and I_O respectively.



Pin Functions

NAME	PIN NO.	I/O	DESCRIPTION
ADJ	4	—	Adjust pin
NC	5, 8	—	No connection
V_{IN}	2, 3, 6, 7	Input	Input voltage pin for the regulator
V_{OUT}	1	Output	Output voltage pin for the regulator

Absolute Maximum Ratings

	MIN	MAX	UNIT
Power dissipation	Internally Limited		
Input-output voltage differential	-0.3	40	V
Operating junction temperature	0	125	°C
Storage temperature, T _{stg}	-65	150	°C

Recommended Operating Conditions

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

	LM337	MIN	MAX	UNIT
Operating junction temperature		0	125	°C

Electrical Characteristics

PARAMETER	TEST CONDITIONS	LM337			UNIT	
		MIN	TYP	MAX		
Line regulation	T _J = 25°C, 3 V ≤ V _{IN} - V _{OUT} ≤ 40 V ⁽¹⁾ I _L = 10 mA		0.01	0.04	% / V	
Load regulation	T _J = 25°C, 10 mA ≤ I _{OUT} ≤ I _{MAX}		0.3%	1%		
Thermal regulation	T _J = 25°C, 10-ms Pulse		0.003	0.04	% / W	
Adjustment pin current			65	100	μA	
Adjustment pin current charge	10 mA ≤ I _L ≤ I _{MAX} 3 V ≤ V _{IN} - V _{OUT} ≤ 40 V, T _A = 25°C		2	5	μA	
Reference voltage	3 V ≤ V _{IN} - V _{OUT} ≤ 40 V, ⁽²⁾ 10 mA ≤ I _{OUT} ≤ I _{MAX} , P ≤ P _{MAX}	T _J = 25°C ⁽²⁾	-1.213	-1.25	-1.287	V
		-55°C ≤ T _J ≤ 150°C	-1.2	-1.25	-1.3	V
Line regulation	3 V ≤ V _{IN} - V _{OUT} ≤ 40 V, ⁽¹⁾		0.02	0.07	% / V	
Load regulation	10 mA ≤ I _{OUT} ≤ I _{MAX} , ⁽¹⁾		0.3%	1.5%		
Temperature stability	T _{MIN} ≤ T _J ≤ T _{MAX}		0.6%			
Minimum load current	V _{IN} - V _{OUT} ≤ 40 V		2.5	10	mA	
	V _{IN} - V _{OUT} ≤ 10 V		1.5	6	mA	
Current limit	V _{IN} - V _{OUT} ≤ 15 V	TO-220/TO263 /SOT223/TO-252 package	1.5	2.2	3.7	A
	V _{IN} - V _{OUT} = 40 V, T _J = 25°C	TO-220/TO263 /SOT223/TO-252 package	0.15	0.4		A
RMS output noise, % of V _{OUT}	T _J = 25°C, 10 Hz ≤ f ≤ 10 kHz		0.003%			
Ripple rejection ratio	V _{OUT} = -10 V, f = 120 Hz		60	77	dB	
	C _{ADJ} = 10 μF		66	77	dB	
Long term stability	T _J = 125°C 1000 Hours		0.3%	1%		

- (1) Regulation is measured at constant junction temperature, using pulse testing with a low duty cycle. Changes in output voltage due to heating effects are covered under the specification for thermal regulation. Load regulation is measured on the output pin at a point 1/8 in. below the base of the TO packages.
- (2) Selected devices with tightened tolerance reference voltage available.

Typical Characteristics

(NDE Package)

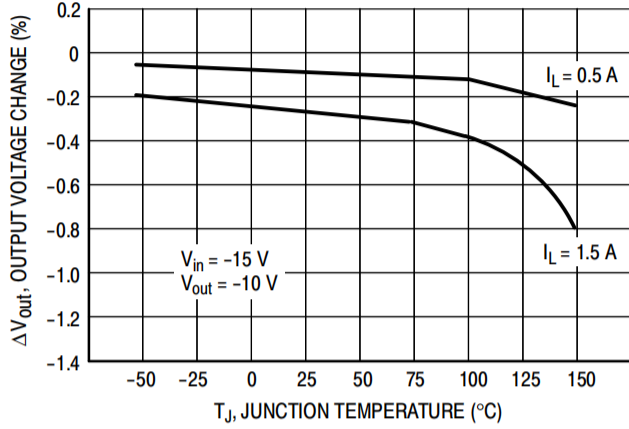


Figure 1. Load Regulation

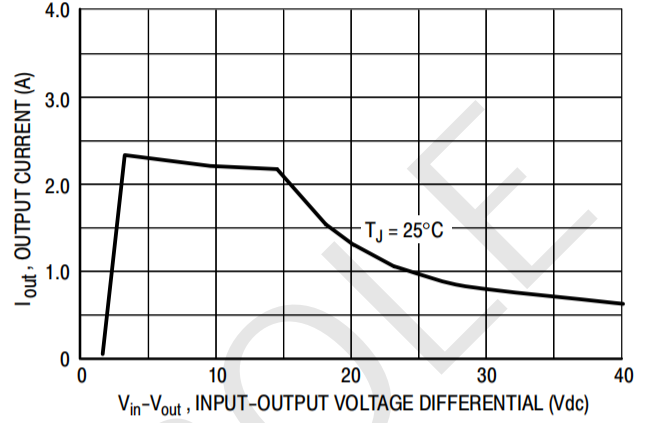


Figure 2. Current Limit

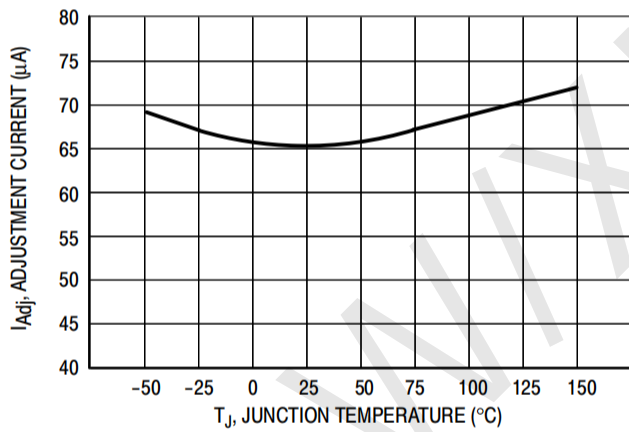


Figure 3. Adjustment Pin Current

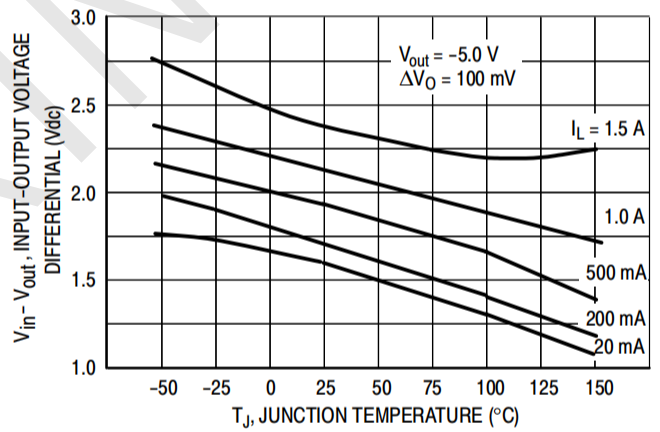


Figure 4. Dropout Voltage

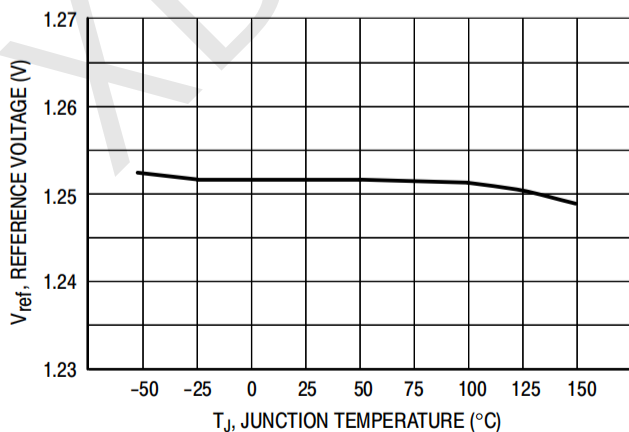


Figure 5. Temperature Stability

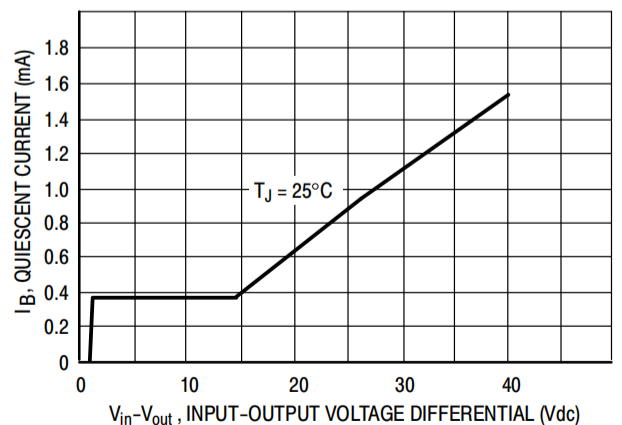


Figure 6. Minimum Operating Current

Typical Characteristics (continued)

(NDE Package)

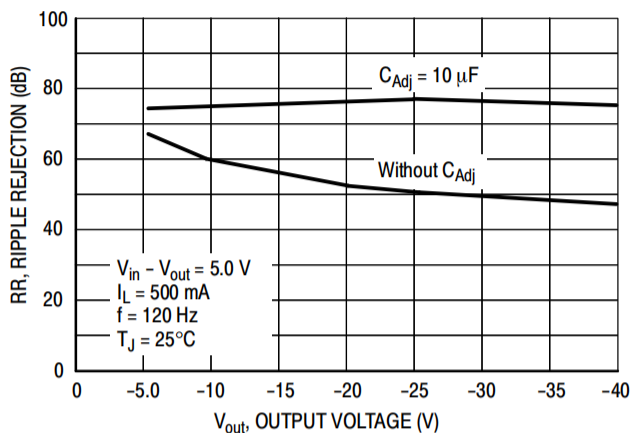


Figure 7. Ripple Rejection versus Output Voltage

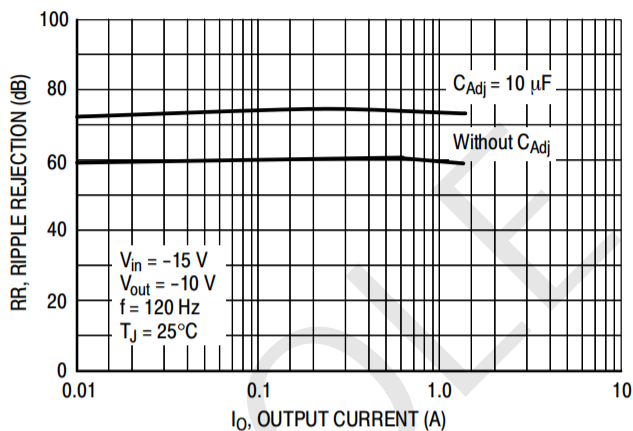


Figure 8. Ripple Rejection versus Output Current

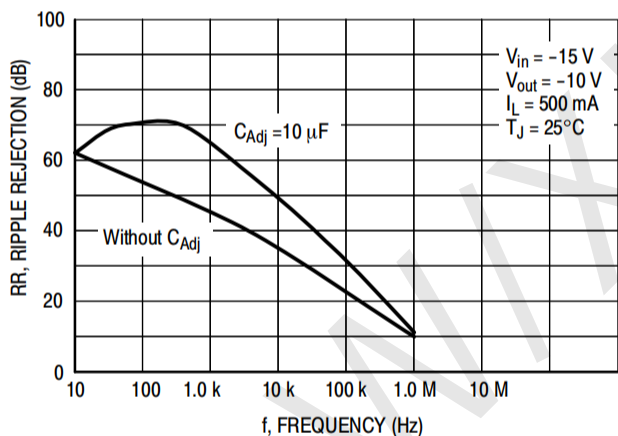


Figure 9. Ripple Rejection versus Frequency

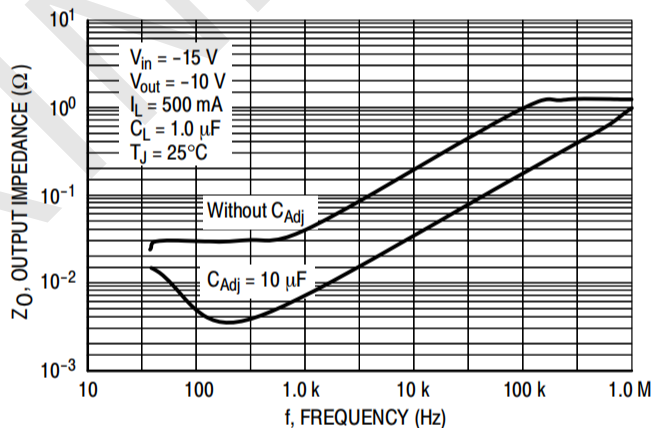


Figure 10. Output Impedance

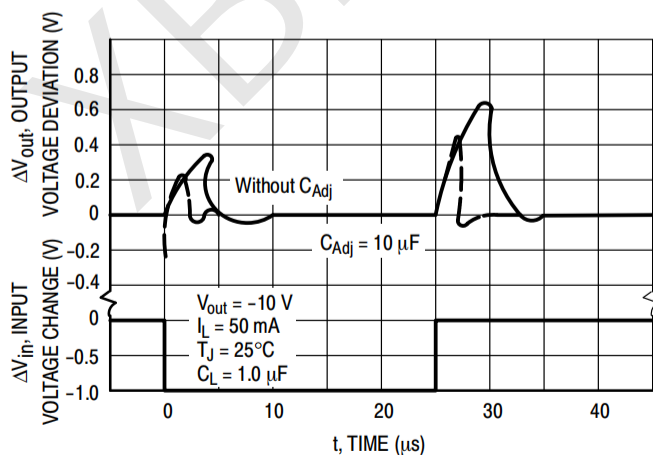


Figure 11. Line Transient Response

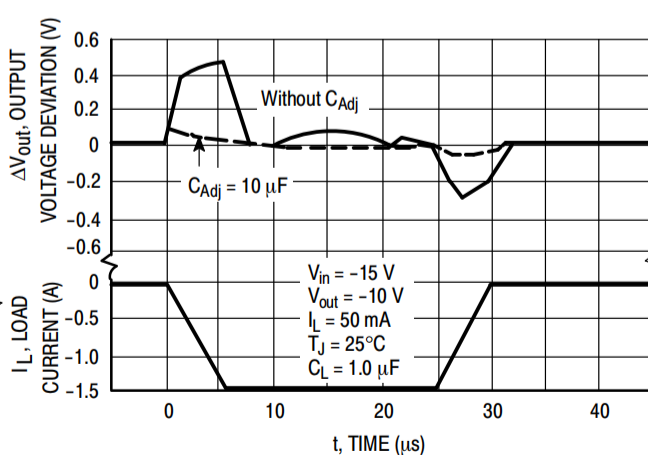
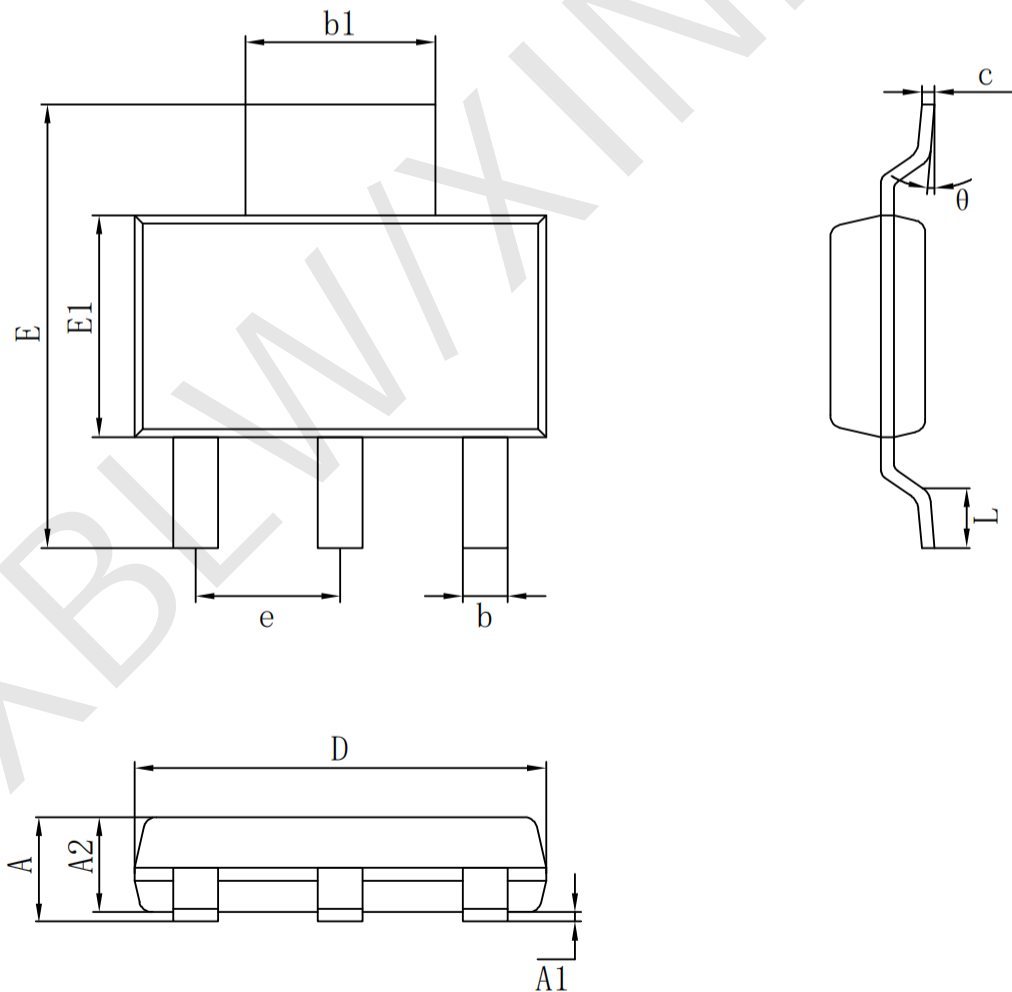


Figure 12. Load Transient Response

Package Information

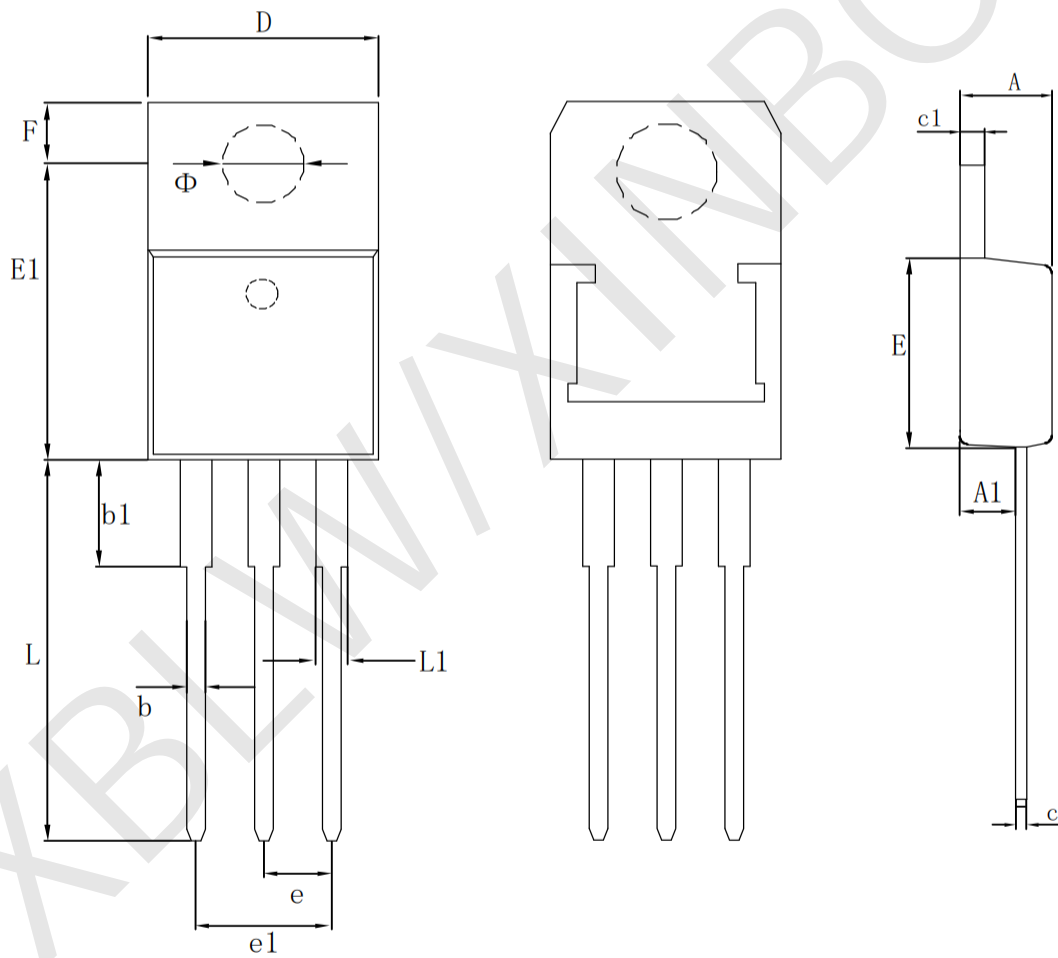
· SOT-223

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°



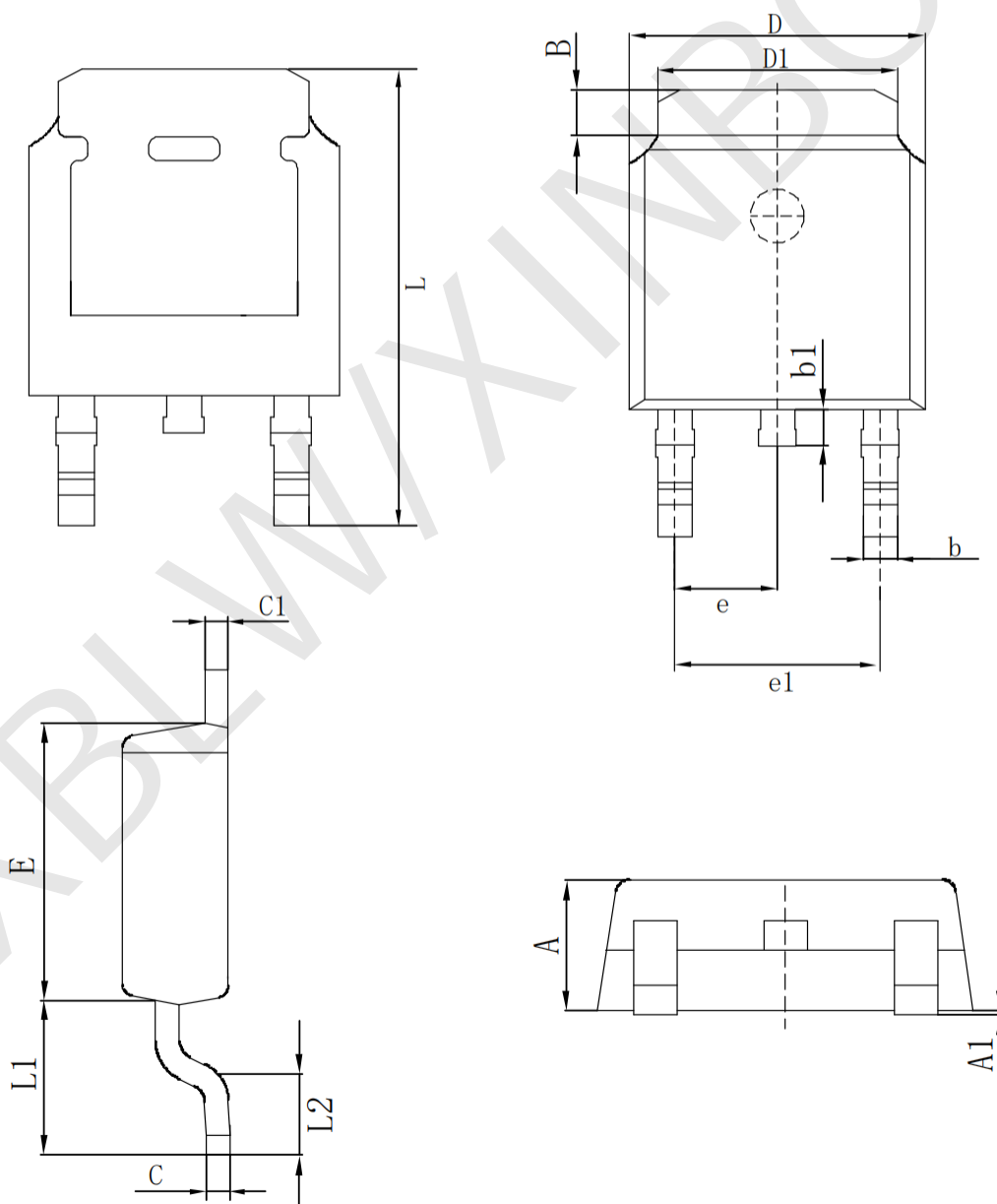
· T0-220

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	2.520	2.820	A1	0.099	0.111
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	8.500	8.900	E	0.335	0.350
E1	12.06	12.46	E1	0.475	0.491
e	2.540 (TYP)		e	0.100 (TYP)	
e1	4.980	5.180	e1	0.196	0.204
F	2.590	2.890	F	0.102	0.114
L	13.40	13.80	L	0.528	0.543
L1	3.560	3.960	L1	0.140	0.156
Φ	3.735	3.935	Φ	0.147	0.155



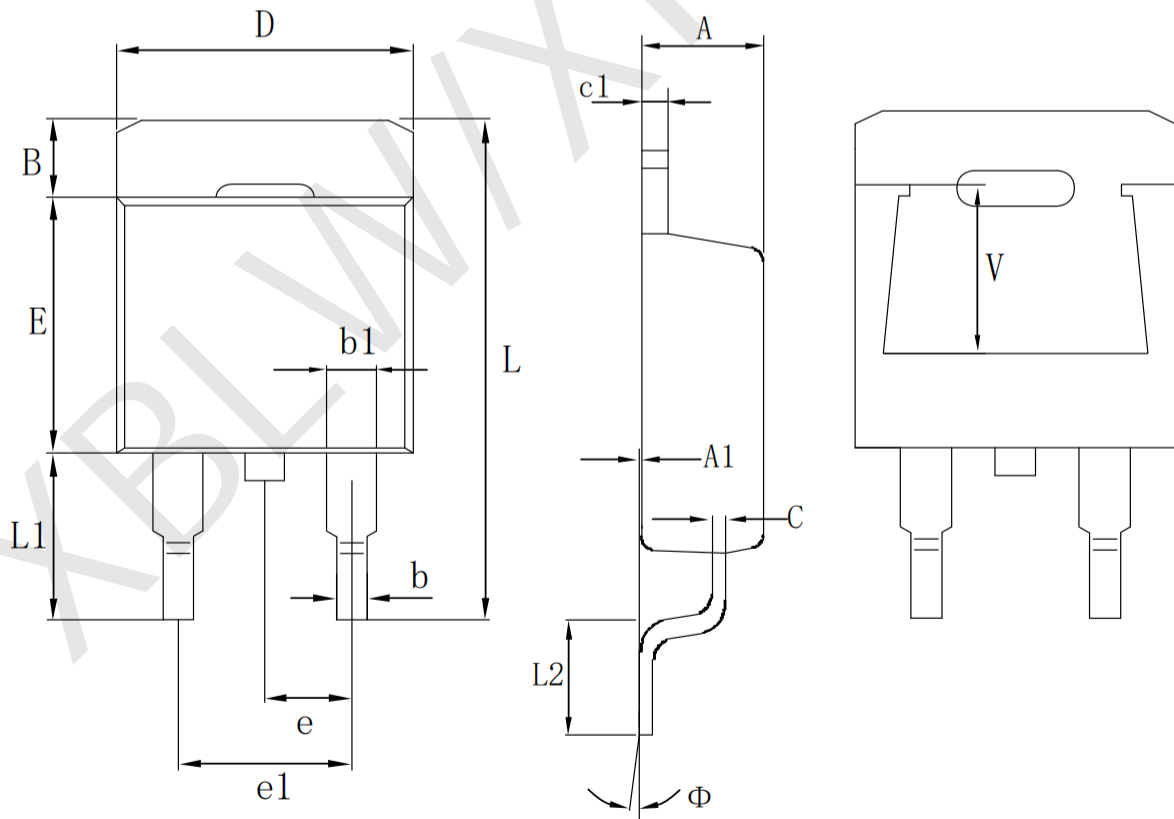
· T0-252-2L

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



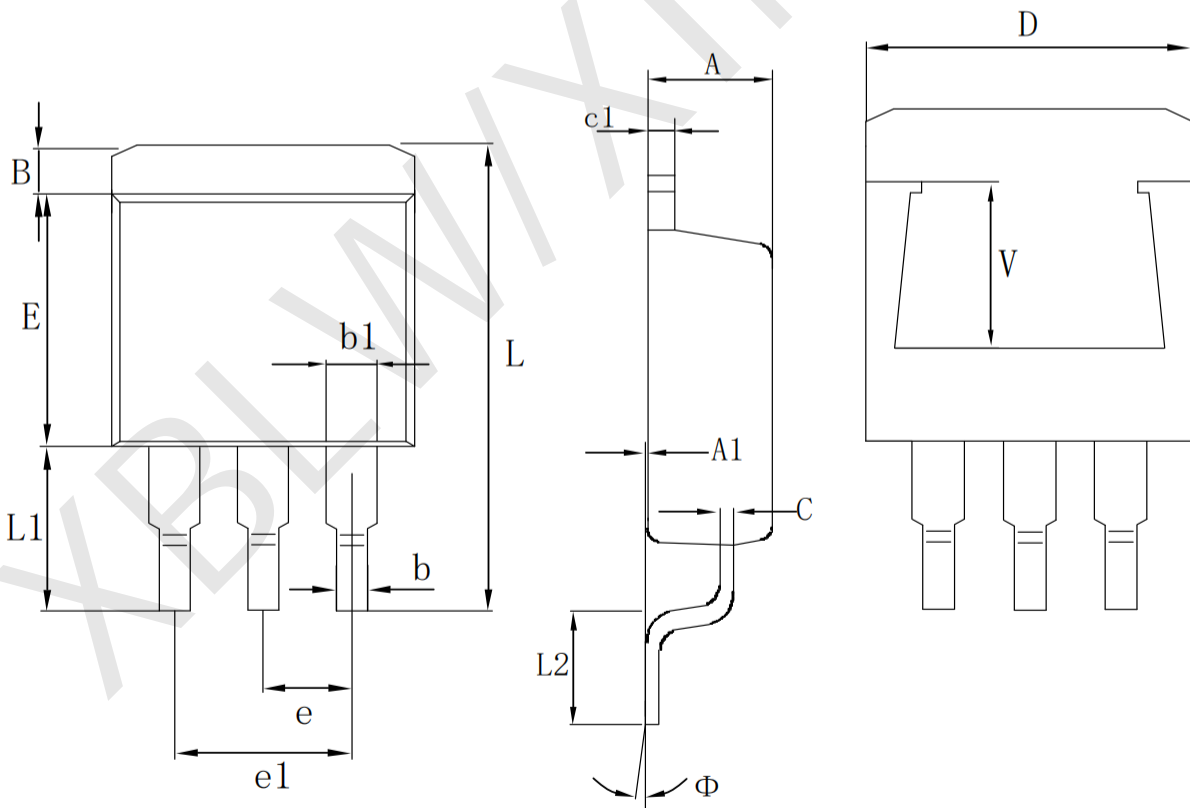
· T0-263-2L

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°



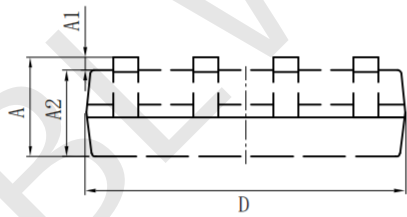
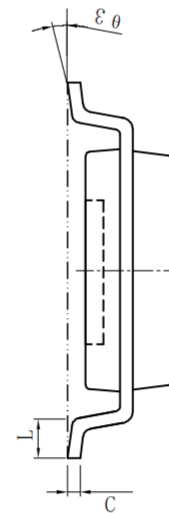
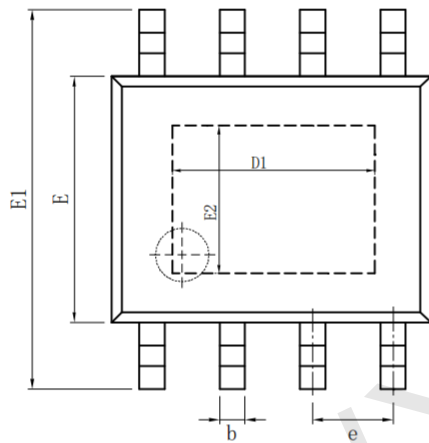
· T0-263-3L

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°



· ESOP-8

Size		Dimensions In Millimeters		Size		Dimensions In Inches	
Symbol		Min (mm)	Max (mm)	Symbol		Min (in)	Max (in)
A		1.350	1.750	A		0.053	0.069
A1		0.050	0.150	A1		0.004	0.010
A2		1.350	1.550	A2		0.053	0.061
b		0.330	0.510	b		0.013	0.020
c		0.170	0.250	c		0.007	0.010
D		4.700	5.100	D		0.185	0.201
D1		3.202	3.402	D1		0.126	0.134
E		3.800	4.000	E		0.150	0.157
E1		5.800	6.200	E1		0.228	0.244
E2		2.313	2.513	E2		0.091	0.099
e		1.270 (BSC)		e		0.050 (BSC)	
L		0.400	1.270	L		0.016	0.050
θ		0°	8°	θ		0°	8°



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