GENERAL DESCRIPTION

The L1117 Series are positive and low drop-out three-terminal voltage regulators with 1A output current capability. These devices are designed for use in low voltage applications that offers lower dropout voltage and faster transient response.

These devices are fully protected against over current faults, over temperature operation, reversed input polarity, reversed lead insertion, transient voltage spike …etc.

On-Chips trimming the reference voltage to 2% and features the low dropout of maximum 1.45 volts.

The L1117 Series regulators offer fixed and adjustable voltage options available in the popular industry standard SOT-223, TO-220, TO-252 and TO-263 packages.

FEATURES

- Fixed 2.5V, 2.85V, 3.3V, 5V or adjustable output voltage
- Low dropout voltage: 1.2V typical at up to 1A
- Low ground current
- Fast transient response
- Current & thermal limiting
- Line regulation: 0.5% typical
- Load regulation: 0.5% typical
- SOT-223,TO-220,TO-252,TO-263 package

APPLICATIONS

- 2.85V active SCSI terminators
- 8-15V to 5V linear regulators
- 5V to 2.5V or 3.3V linear regulators
- Low voltage micro-controllers
- Battery Chargers
- Motherboard clock supplies
- Post regulator for switching supplies
- Micro-controllers

ABSOLUTE MAXIMUM RATINGS

Maximum Supply Voltage	15V*
Power Dissipation	Internally Limited
Thermal Resistance Junction to Case, θ_{JC}	16 °C/W
Thermal Resistance Junction to Ambient, θ_{JA}	
SOT-223	158 °C/W
TO-252	70 °C/W
TO-220	50 °C/W
TO-263	60 °C/W
Operating Junction Temperature Range	0 to 125 °C
Storage Temperature Range	-40 to 150 °C
Lead Temperature (Soldering, 10 Seconds)	260 °C

* When considering short circuits to ground, the maximum input-to-output differential voltage shall not be allowed greater than approximate 2~3V at values of supply voltage in excess of 10V, continuous short-circuits can exceed the power dissipation ratings and cause eventual destruction.

ELECTRICAL CHARACTERISTICS for ADJUSTABLE (Unless otherwise specified, T_A = 25°C)

Parameter	Symbol	Test Conditions	Typical	Limits
Reference Voltage (Adjustable version)	V_{REF}	V_{IN} = 5V, I_{OUT} = 10mA	1.25V	1.23V$_{Min}$ 1.27V$_{Max}$
Output Voltage (Fixed version)	V_O	V_{IN} = 5V, I_{OUT} = 10mA	V_O	0.98V$_{O(Min)}$ 1.02V$_{O(Max)}$
Dropout Voltage	V_D	ΔV_{REF} = 1%, I_{OUT} = 1A	1.2V	1.45V
Line Regulation	$REG_{(LINE)}$	$(V_{OUT} + 1.5V) \le V_{IN} \le 15V$, I_{OUT} = 10mA	0.5%	2%
Load Regulation	$REG_{(LOAD)}$	$(V_{IN} - V_{OUT})$ = 2V, 10mA ≤ I_{OUT} ≤ 1A	0.5%	2.5%
Minimum Load Current	I_O	1.5V ≤ $(V_{IN} - V_{OUT}) \le 5.75V$	10mA	
Adjust Pin Current	I_{ADJ}		55µA	100µA
Current Limit	I_{CL}	$V_{IN} - V_{OUT}$ = 2V	1.2A	1.1A (Min)
RMS Output Noise	V_N		0.003% of V_{OUT}	
Ripple Rejection Ratio	R_A	f = 120Hz, C_{ADJ} = 22µF for ADJ pin, V_{IN} = 5V, I_{OUT} = 1A	72dB	60dB (Min)

ELECTRICAL CHARACTERISTICS for L1117-2.5 (Unless otherwise specified, T_A = 25 °C)

Parameter	Symbol	Test Conditions	Typical	Limits
Output Voltage (Fixed version)	V_O	V_{IN} = 5V, I_{OUT} = 10mA	V_O	2.45V$_{(Min)}$ 2.55V$_{(Max)}$
Dropout Voltage	V_D	ΔV_O = 1%, I_{OUT} = 1A	1.2V	1.45V
Line Regulation	$REG_{(LINE)}$	$(V_{OUT} + 1.5V) \le V_{IN} \le 15V$, I_{OUT} = 10mA	0.5%	2.0%
Load Regulation	$REG_{(LOAD)}$	$(V_{IN} - V_{OUT})$ = 2V, 10mA ≤ I_{OUT} ≤ 1A	0.5%	2.0%
Minimum Load Current	I_O	1.5V ≤ $(V_{IN} - V_{OUT}) \le 5.75V$	10mA	
GND Pin Current	I_{GND}		55µA	100µA
Current Limit	I_{CL}	$V_{IN} - V_{OUT}$ = 2V	1.2A	1.1A (Min)
RMS Output Noise	V_N		0.003% of V_{OUT}	
Ripple Rejection Ratio	R_A	f = 120Hz, Co=22Uf, V_{IN} = 5V, I_{OUT} = 1A	72dB	60dB (Min)

ELECTRICAL CHARACTERISTICS for L1117-2.85 (Unless otherwise specified, T_A = 25 °C)

Parameter	Symbol	Test Conditions	Typical	Limits
Output Voltage (Fixed version)	V_O	V_{IN} = 5V, I_{OUT} = 10mA	V_O	2.793V$_{(Min)}$ 2.907V$_{(Max)}$
Dropout Voltage	V_D	$\triangle V_O$ = 1%, I_{OUT} = 1A	1.2V	1.45V
Line Regulation	$REG_{(LINE)}$	$(V_{OUT}$ + 1.5V) ≤ V_{IN} ≤ 8V, I_{OUT} = 10mA	0.5%	2.0%
Load Regulation	$REG_{(LOAD)}$	(V_{IN} -V_{OUT}) = 2V, 10mA ≤ I_{OUT} ≤ 1A	0.5%	2.0%
Minimum Load Current	I_O	1.5V ≤ (V_{IN} -V_{OUT}) ≤ 5.75V	10mA	
GND Pin Current	I_{GND}		55µA	100µA
Current Limit	I_{CL}	V_{IN} - V_{OUT} = 2V	1.2A	1.1A (Min)
RMS Output Noise	V_N		0.003% of V_{OUT}	
Ripple Rejection Ratio	R_A	f = 120Hz, Co=22Uf,V_{IN} = 5V, I_{OUT} = 1A	72dB	60dB (Min)

ELECTRICAL CHARACTERISTICS for L1117-3.3 (Unless otherwise specified, T_A = 25 °C)

Parameter	Symbol	Test Conditions	Typical	Limits
Output Voltage (Fixed version)	V_O	V_{IN} = 5V, I_{OUT} = 10mA	V_O	3.234V$_{(Min)}$ 3.367V$_{(Max)}$
Dropout Voltage	V_D	$\triangle V_O$ = 1%, I_{OUT} = 1A	1.2V	1.45V
Line Regulation	$REG_{(LINE)}$	(V_{OUT} + 1.5V) ≤ V_{IN} ≤ 15V, I_{OUT} = 10mA	0.5%	2.0%
Load Regulation	$REG_{(LOAD)}$	(V_{IN} -V_{OUT}) = 2V, 10mA ≤ I_{OUT} ≤ 1A	0.5%	2.0%
Minimum Load Current	I_O	1.5V ≤ (V_{IN} -V_{OUT}) ≤ 5.75V	10mA	
GND Pin Current	I_{GND}		55µA	100µA
Current Limit	I_{CL}	V_{IN} - V_{OUT} = 2V	1.2A	1.1A (Min)
RMS Output Noise	V_N		0.003% of V_{OUT}	
Ripple Rejection Ratio	R_A	f = 120Hz, Co=22Uf,V_{IN} = 5V, I_{OUT} = 1A	72dB	60dB (Min)

ELECTRICAL CHARACTERISTICS for L1117-5(Unless otherwise specified, T_A = 25 °C)

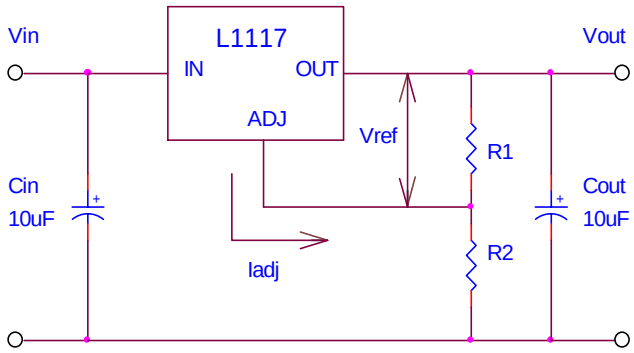
Parameter	Symbol	Test Conditions	Typical	Limits
Output Voltage (Fixed version)	V_O	V_{IN} = 8V, I_{OUT} = 10mA	V_O	4.90V(Min) 5.10V(Max)
Dropout Voltage	V_D	$\triangle V_O$ = 1%, I_{OUT} = 1A	1.2V	1.45V
Line Regulation	$REG_{(LINE)}$	$(V_{OUT} + 1.5V) \leq V_{IN} \leq 15V$, I_{OUT} = 10mA	0.5%	1.0%
Load Regulation	$REG_{(LOAD)}$	$(V_{IN} - V_{OUT})$ = 2V, 10mA ≤ I_{OUT} ≤ 1A	0.5%	1.0%
Minimum Load Current	I_O	1.5V ≤ $(V_{IN} - V_{OUT}) \leq 5.75V$	10mA	
GND Pin Current	I_{GND}		55µA	100µA
Current Limit	I_{CL}	$V_{IN} - V_{OUT}$ = 2V	1.2A	1.1A (Min)
RMS Output Noise	V_N		0.003% of V_{OUT}	
Ripple Rejection Ratio	R_A	f = 120Hz, Co=22uf, V_{IN} = 8V, I_{OUT} = 1A	72dB	60dB (Min)

DEVICE SELECTION GUIDE

Device	L1117L	L1117D	L1117L-2.5	L1117L-2.85	L1117L-3.3	L1117D-3.3	L1117L-5
Voltage Version	ADJ	ADJ	2.5	2.85	3.3	3.3	5
Package	SOT-223	TO-252	SOT-223	SOT-223	SOT-223	TO-252	SOT-223
Marking	L1117L	L1117D	L1117L-2.5	L1117L-2.85	L1117L-3.3	L1117D-3.3	L1117L-5

Device	L1117D-5	L1117T	L1117T-3.3	L1117T-5	L1117S-5
Voltage Version	5	ADJ	3.3	5	5
Package	TO-252	TO-220	TO-220	TO-220	TO-263
Marking	L1117D-5	L1117T	L1117T-3.3	L1117T-5	L1117S-5

TYPICAL APPLICATION

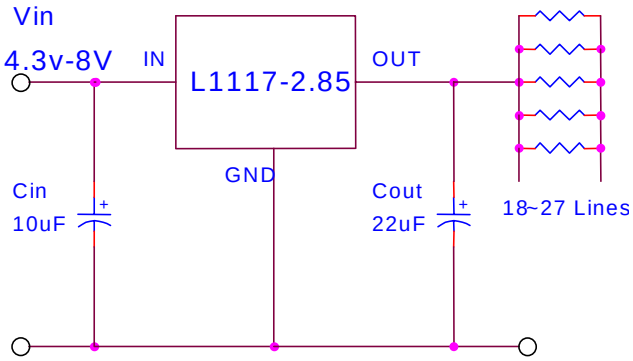


Vo = Vref (1+R2/R1) + Iadj x R2

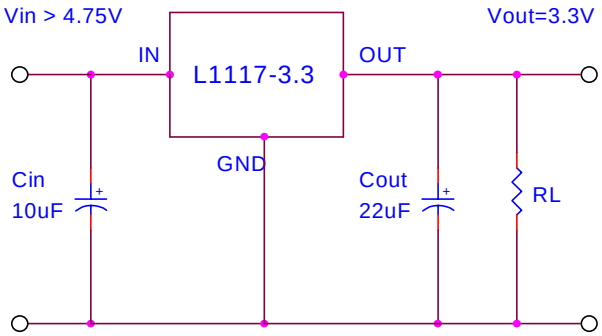
1. Cin needed if device is far from from filter capacitors.

2. Cout required for stability.

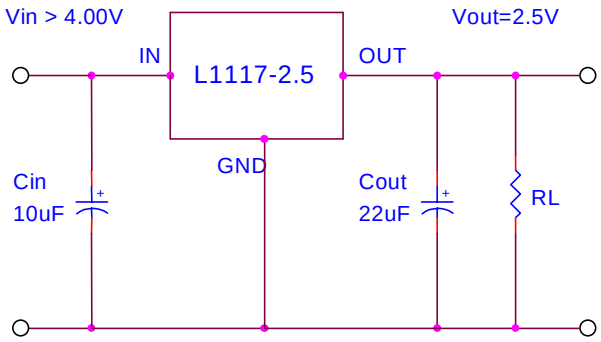
- Basic Adjustable Regulator Circuit -



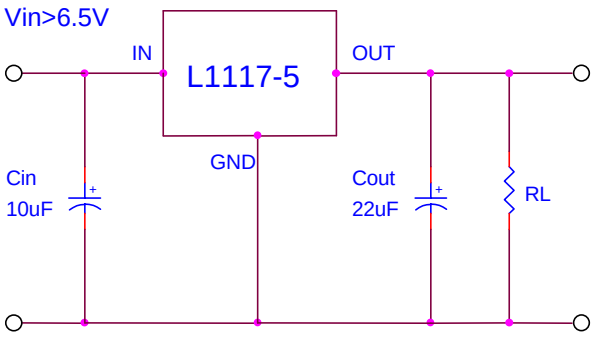
- Active SCSI Bus Terminators -



Basic Fixed Output Regulator Circuit

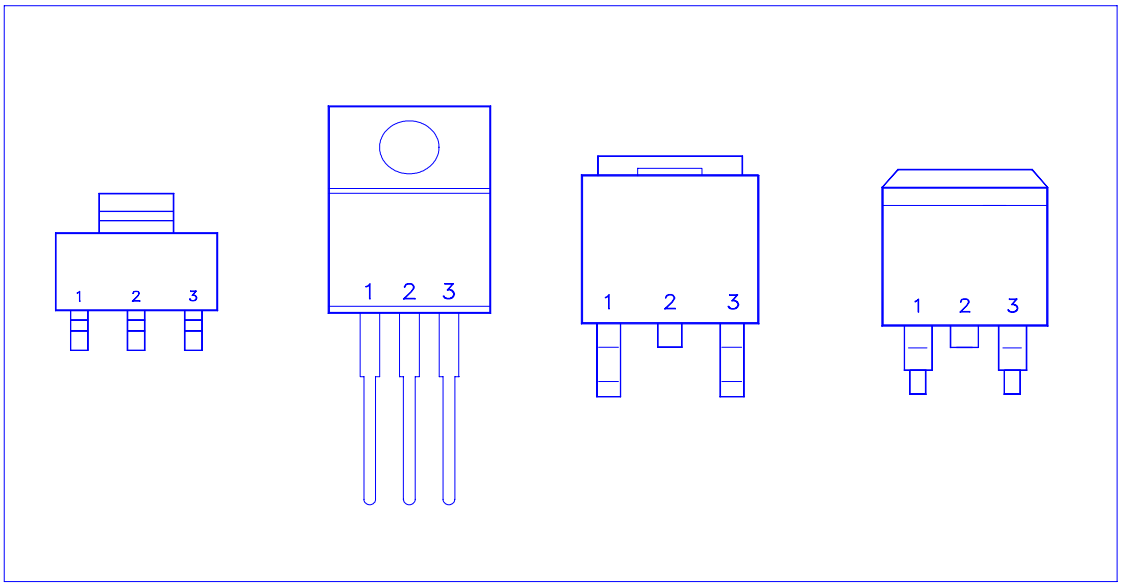


Basic Fixed Output Regulator Circuit



Basic Fixed Output Regulator Circuit

PIN CONFIGURATIONS

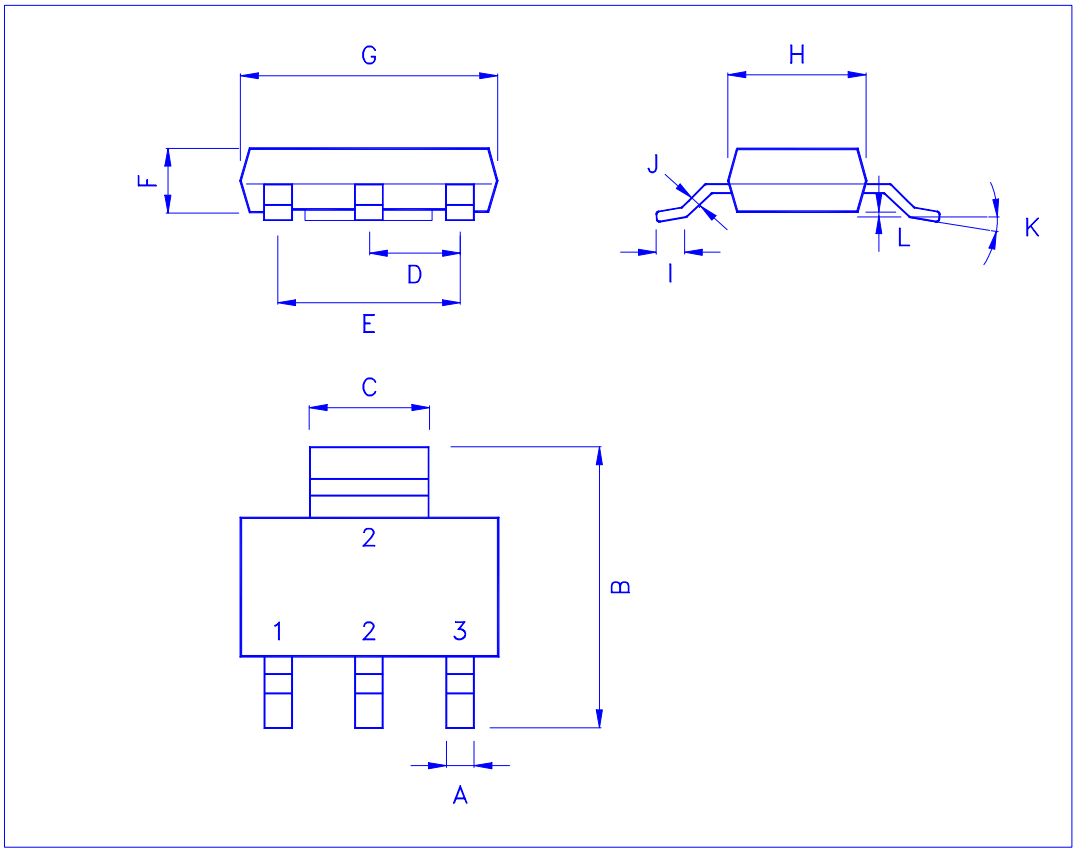


Pin #	Function
1	Adjust/Ground
2	Output
3	Input

Note: TAB is Output Pin

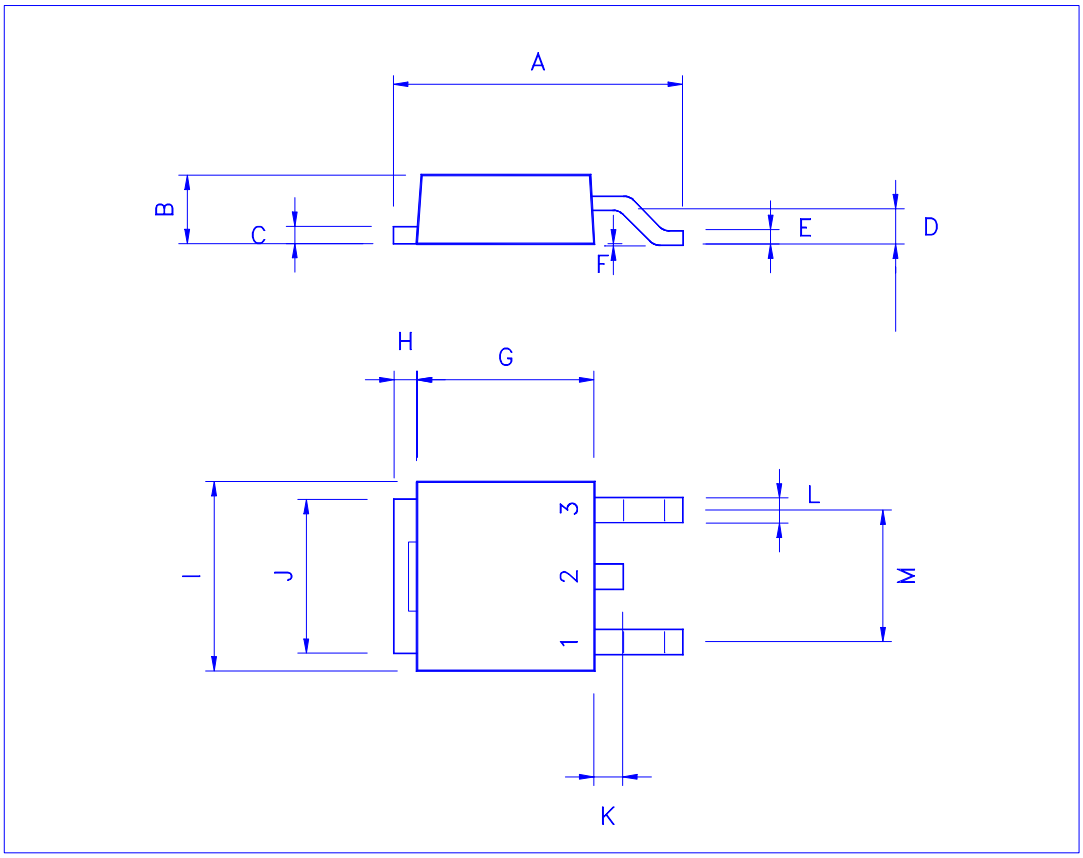
SOT-223 MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	0.67	0.7	0.73	H	3.3	3.5	3.7
B	6.7	7	7.3	I	0.63	0.65	0.67
C	2.9	3	3.1	J		0.32	0.4
D	2.27	2.3	2.33	K	0°		10°
E	4.57	4.6	4.63	L	0.03		0.1
F	1.5	1.6	1.7	M			
G	6.3	6.5	6.7	N			



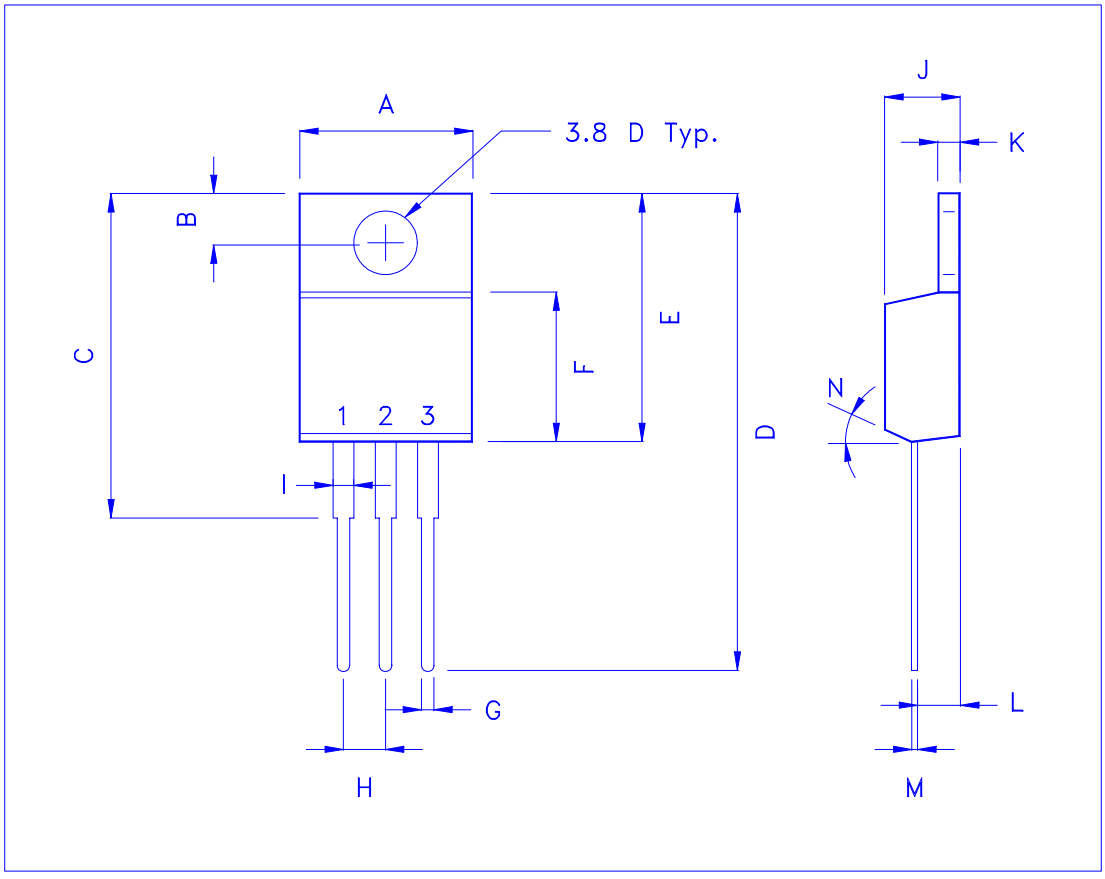
TO-252 (DPAK) MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	9.35		10.1	H		0.8	
B	2.2		2.4	I	6.4		6.6
C	0.48		0.6	J	5.2		5.4
D	0.89		1.5	K	0.6		1
E	0.45		0.6	L	0.64		0.9
F	0.03		0.23	M	4.4		4.6
G	6		6.2	N			



TO-220 (3-Lead) MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	9.78	10.16	10.54	H	2.4	2.54	2.68
B	2.61	2.74	2.87	I	1.19	1.27	1.35
C		20		J	4.4	4.6	4.8
D	28.5	28.9	29.3	K	1.14	1.27	1.4
E	14.6	15.0	15.4	L	2.3	2.6	2.9
F	8.4	8.8	9.2	M	0.26	0.46	0.66
G	0.72	0.8	0.88	N		7°	



TO-263 (D^2PAK) MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	14.5	15	15.8	H	1.0	1.5	1.8
B	4.2		4.7	I	9.8		10.3
C	1.20		1.35	J		6.5	
D		2.8		K		1.5	
E	0.3	0.4	0.5	L	0.7		1.4
F	-0.102		0.203	M	4.83	5.08	5.33
G	8.5	9	9.5	N			

