



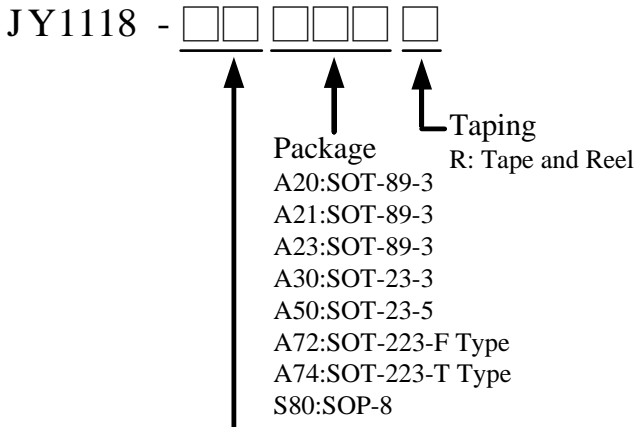
General Description

The JY1118 is an 1000mA fixed output voltage, low dropout and low noise linear regulator with high ripple rejection ratio and fast turn-on time.

It includes a reference voltage source, an error amplifier, driver transistors and an internal current limiter. The current limiter's holdback circuit operates as a short protection.

The JY1118 works well with low ESR ceramic capacitors, suitable for portable RF and wireless battery-powered applications with stringent space requirements and demanding performance. It also offers ultra low noise output and has low quiescent current.

Ordering Information



Output Voltage	Voltage Code
1.0	10
1.2	12
1.5	15
1.8	18
2.5	25
2.6	26
2.8	28
3.3	33
Adjustable	AD

Features

- Ultra-Low-Noise application
- Wide 2.5V to 7V Operating Range
- Quick Start-Up
- Eight Fixed Voltage Options Available
- Current Limiting Protection
- Thermal Shutdown Protection
- High Ripple Rejection 50dB@1kHz
- Standby Current Less Than 0.1µA
- Auto Discharge

Applications

- Battery-Powered Equipment
- Portable Instruments
- Slim DVDs
- Digital Camera
- WLAN Communication
- Hand-Held Instruments

Part name	Package	Quantity Per Reel
JY1118	SOT23-3	3000
	SOT89-3	3000
	SOT223	3000
	SOP-8	3000

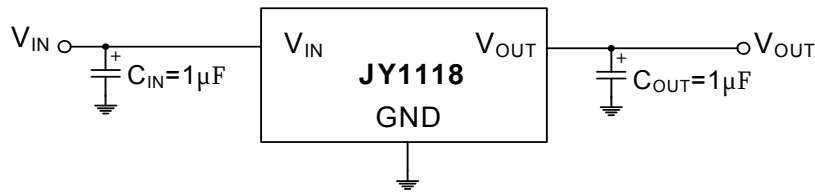
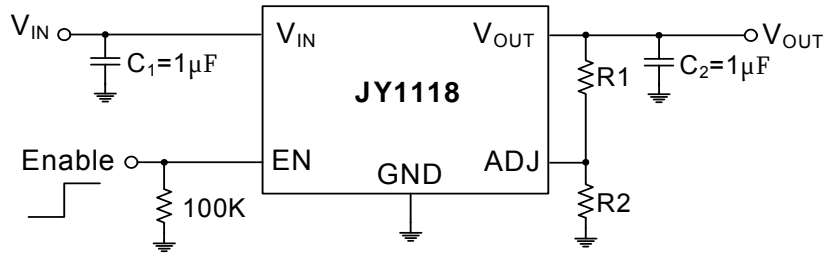


Figure 1. Fixed Voltage Version



$$V_{OUT} = 1.0 \times \left(1 + \frac{R_1}{R_2} \right) \text{Volts}$$

Figure 2. Adjustable Voltage Version

Absolute Maximum Ratings

Supply Voltage V_{IN}	8V
Power Dissipation, P_D @ $T_A=25^\circ\text{C}$	
SOT-89-3	570mW
SOT-223	1050mW
SOT-23-3 & SOT-23-5	400mW
SOP-8	625mW
Thermal Resistance, θ_{ja}	
SOT-89-3	175°C/W
SOT-223	95°C/W
SOT-23-3 & SOT-23-5	250°C/W
SOP-8	160°C/W
Lead Temperature	260 °C
Storage Temperature	-65°C to 150°C
ESD Susceptibility	
HBM (Human Body Mode)	2kV
MM (Machine Mode)	200V

Recommended Operating Conditions

Input Voltage V_{IN}	2.5V to 7V
EN Input Voltage	0V to 7V
Junction Temperature	-40°C to 125°C
Ambient Operating Temperature	-40°C to 85°C



Electrical Characteristics (Unless otherwise specified $V_{IN}=5V$, $T_A=25^{\circ}C$)

Parameters	Symbol	Condition	Min	Typ	Max	Units	
Operating Voltage Range	V_{IN}				7	V	
Shutdown Supply Current	I_{SBY}	$V_{EN} = GND, Shutdown$		0.01	1	μA	
Reference Voltage Tolerance	V_{REF}		0.98	1	1.02	V	
Supply Current Limit	I_{LIMIT}	$R_{LOAD} = 1\Omega$	800	1000		mA	
Quiescent Current	I_Q	$V_{EN} \geq 1.2V, I_{OUT} = 0mA$		90	150	μA	
Dropout Voltage (Note 3)	V_{DROP}	$I_{OUT} = 800mA$	$V_{OUT} = 1.0V$		1400	2000	mV
			$V_{OUT} = 1.2V$		1100	1800	
			$V_{OUT} = 1.5V$		850	1500	
			$V_{OUT} = 1.8V$		650	1200	
			$V_{OUT} = 2.5V$		450	800	
			$V_{OUT} = 2.8V$		400	600	
			$V_{OUT} = 3.3V$		300	500	
Line regulation	ΔV_{LINE}	$V_{IN} = (V_{OUT} + 1V)$ to 6V $I_{OUT} = 1mA$			6	mV/V	
Load Regulation	ΔV_{LOAD}	$1mA < I_{OUT} < 800mA$			55	mV	
Fast Discharge N-MOSFET Turn On Resistance	$R_{DISCHARGE}$	$V_{IN} = 4V, V_{EN} = 0V$		35		Ω	
Output Noise Voltage	eNO	10Hz to 100kHz $I_{OUT} = 200mA, C_{OUT} = 1\mu F$			100	μV_{RMS}	
Thermal Shutdown Temperature	T_{SD}			165		$^{\circ}C$	
Thermal Shutdown Temperature Hysteresis	ΔT_{SD}			30		$^{\circ}C$	
Output Voltage Accuracy	ΔV_{OUT}	$V_{OUT} < 1.5V, I_{OUT} = 1mA$	-2.5		+2.5	%	
		$V_{OUT} > 1.5V, I_{OUT} = 1mA$	-2		+2		
EN Threshold	Logic-Low V	V_{IL}	$V_{IN} = 2.5V$ to 7V, Shutdown		0.4	V	
	Logic-High V	V_{IH}	$V_{IN} = 2.5V$ to 6V, Start-Up	1.6			
Power Supply Rejection Rate	$f = 100Hz$	PSRR	$C_{OUT} = 1\mu F, I_{OUT} = 10mA$		-60	dB	
	$f = 10kHz$				-50		

Note 1: Stresses listed as the above "Absolute Maximum Ratings" may cause permanent damage to the device. These are for stress ratings. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may remain possibility to affect device reliability.

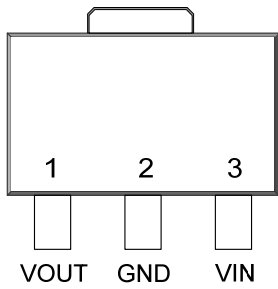
Note 2: $V_{IN(MIN)} = V_{OUT} + V_{DROPOUT}$

Note 3: The dropout voltage is defined as $(V_{IN} - V_{OUT})$ when V_{OUT} is 100mV below the target value of V_{OUT} .

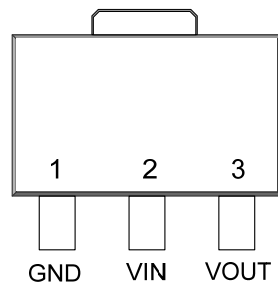


Pin Configurations

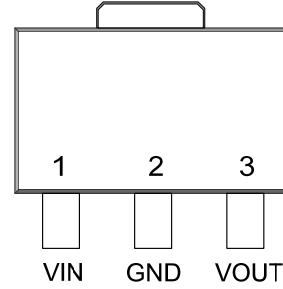
(Top View)



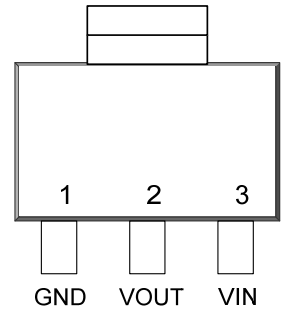
SOT-89-3 (A20)



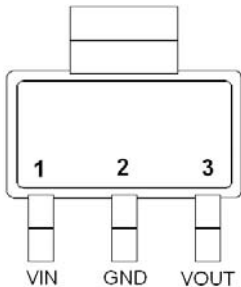
SOT-89-3 (A21)



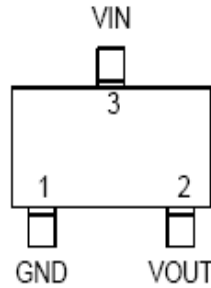
SOT-89-3 (A23)



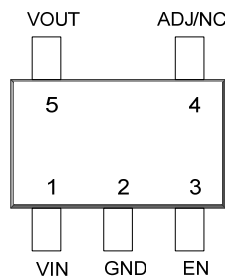
SOT-223 (F Type)



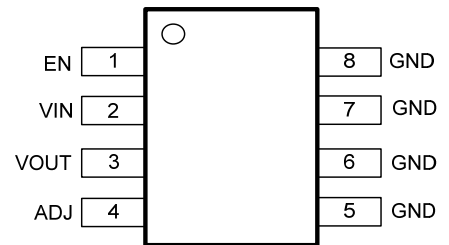
SOT-223 (T Type)



SOT-23-3



SOT-23-5



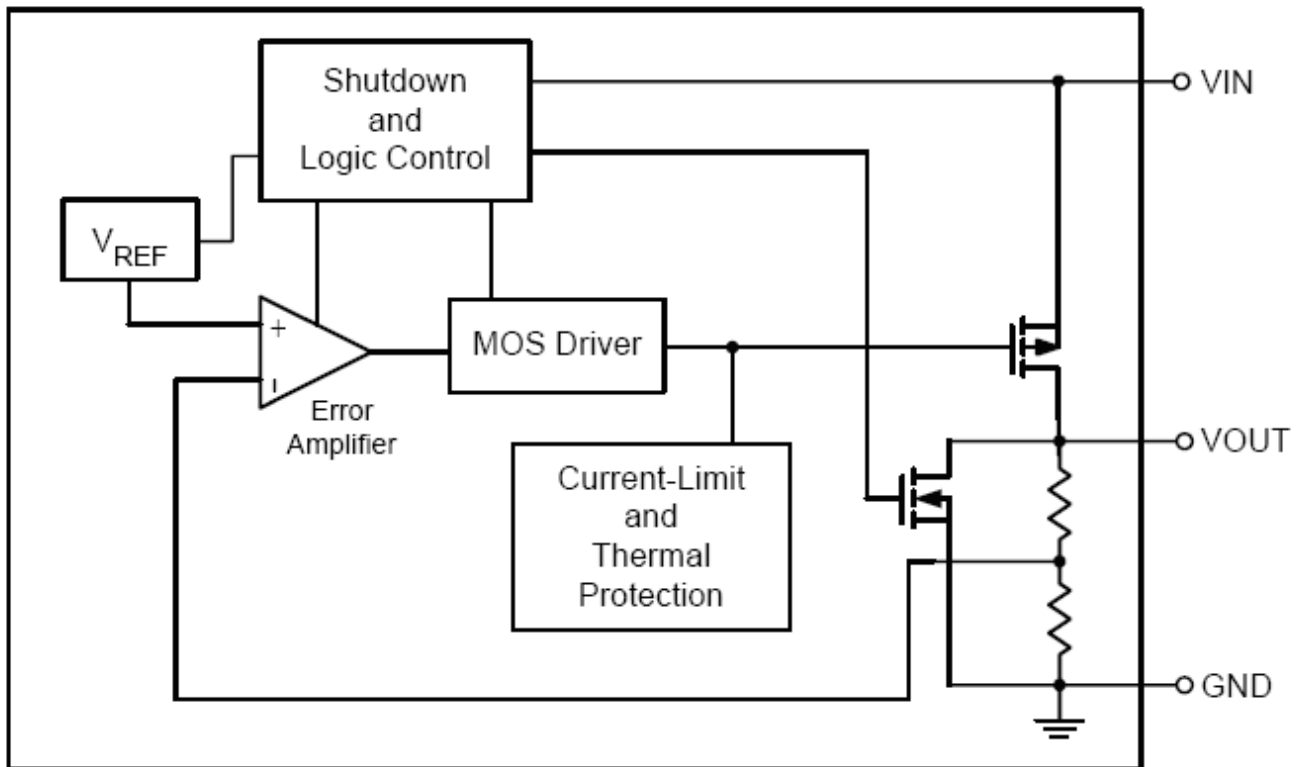
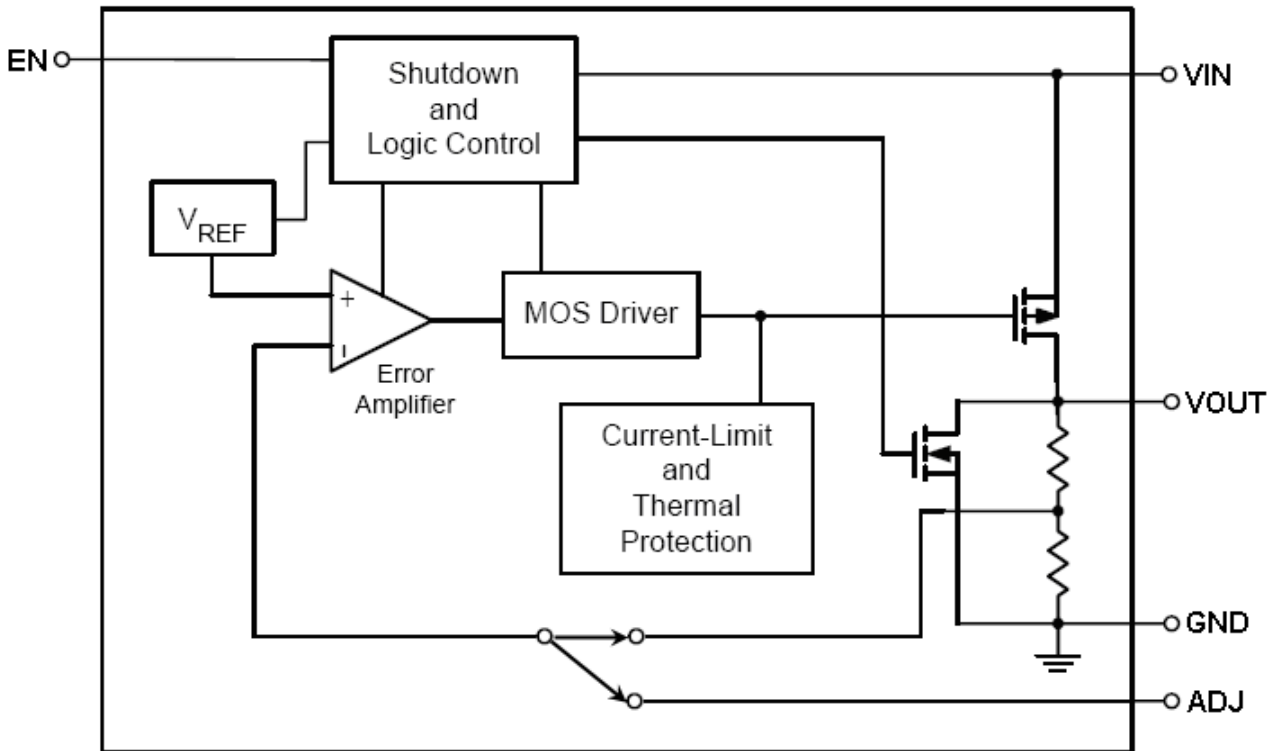
SOP-8

Pin Description

Pin Name	Pin Function
EN	Chip Enable (Active High). Note that this pin is high impedance. There should be a pull low 100kΩ resistor connected to GND when the control signal is floating.
GND	Ground
VOUT	Output Voltage
VIN	Input Voltage
ADJ	Adjust Output Voltage



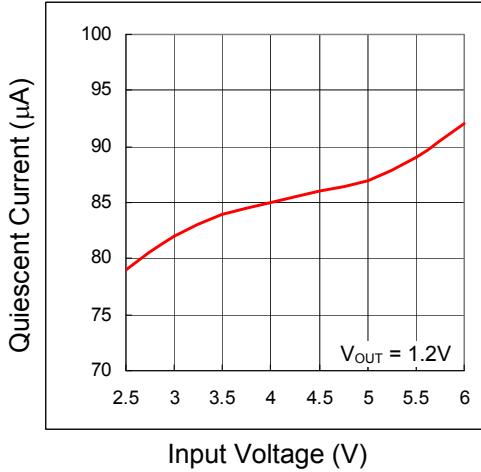
Function Block Diagram



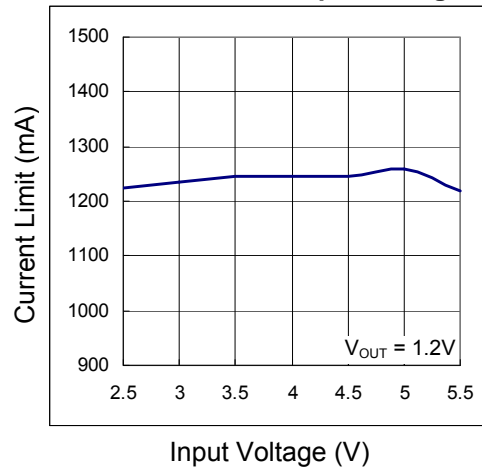


Typical Operating Characteristics

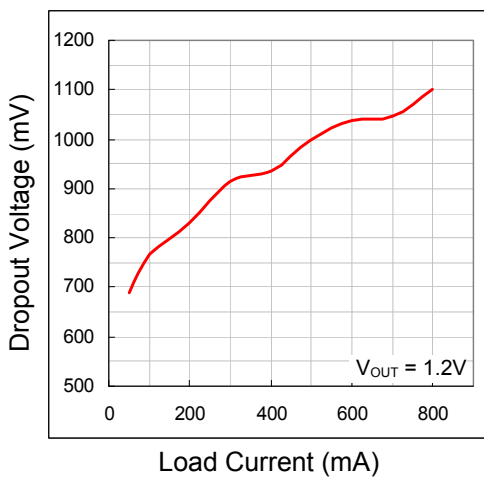
Quiescent Current vs. Input Voltage



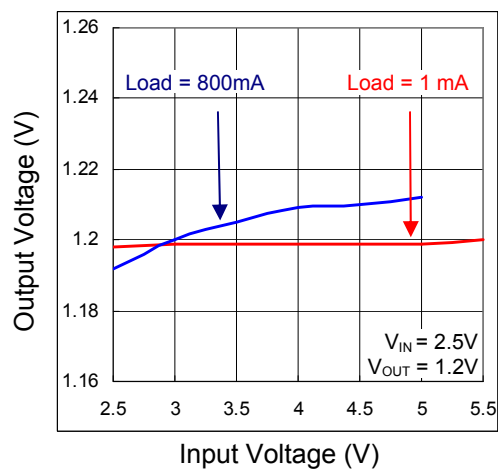
Current Limit vs. Input Voltage



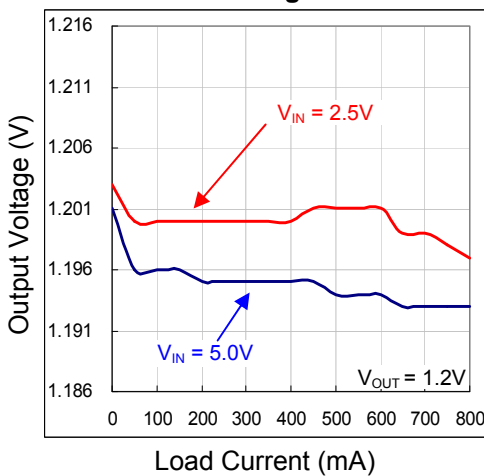
Dropout Voltage vs. Load Current



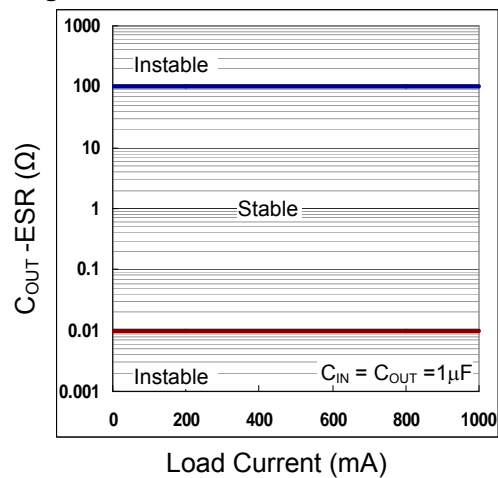
Line Regulation



Load Regulation

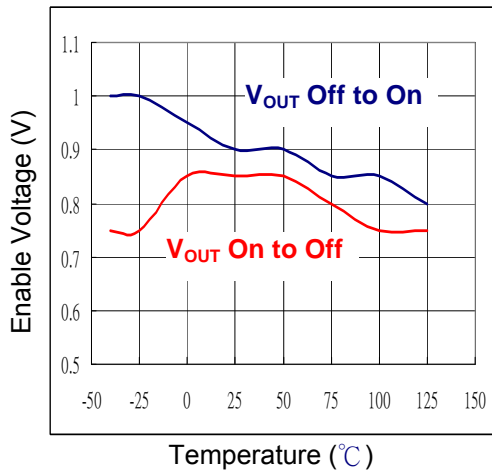


Region of Stable COUT ESR vs. Load Current

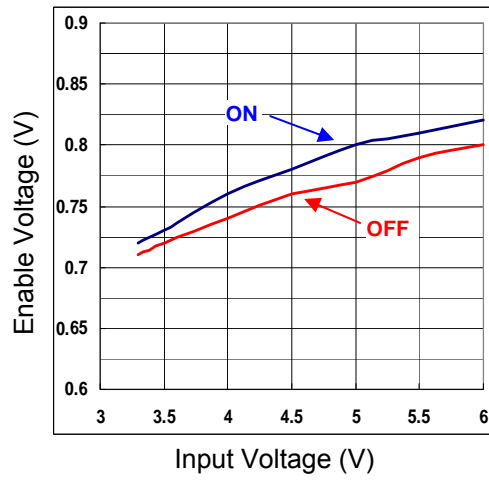




EN Threshold vs. Temperature

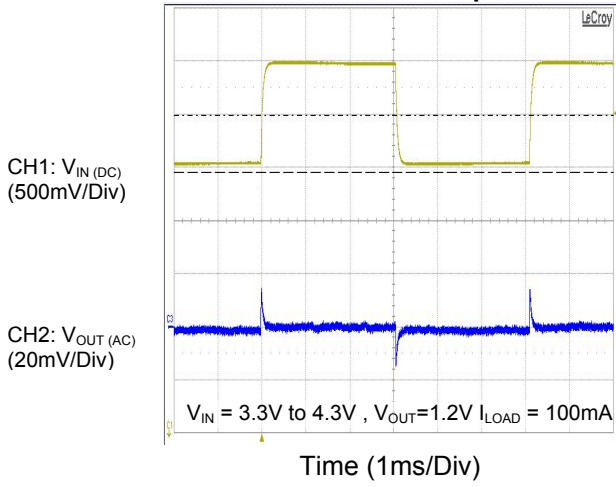


EN Threshold vs. Input Voltage

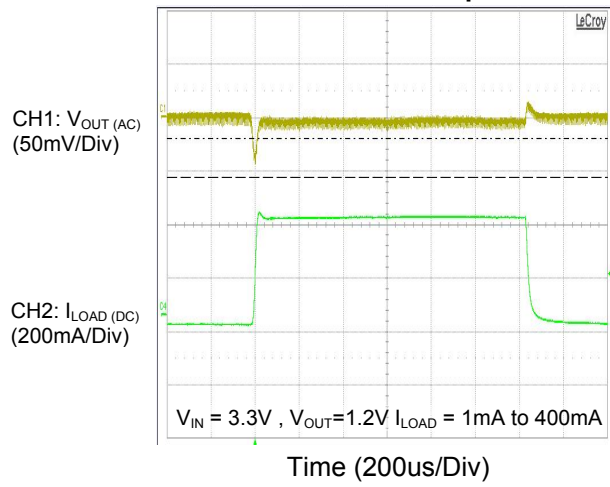




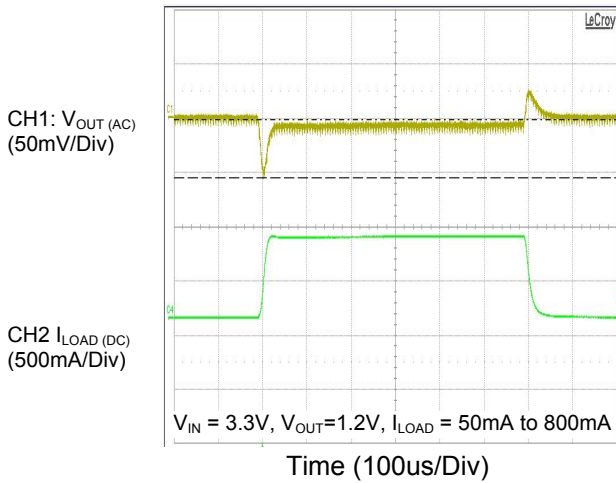
Line Transient Response



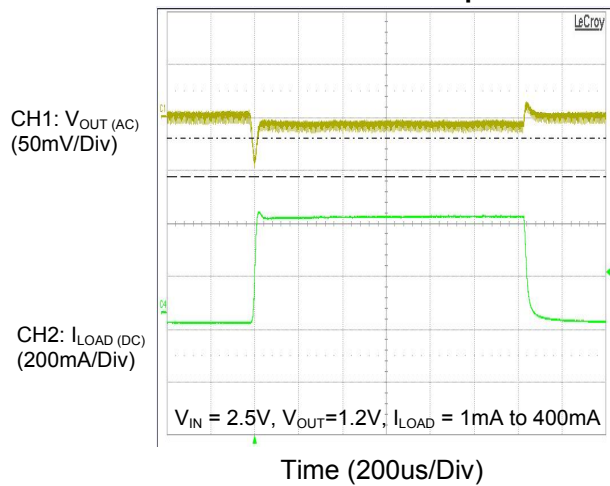
Load Transient Response



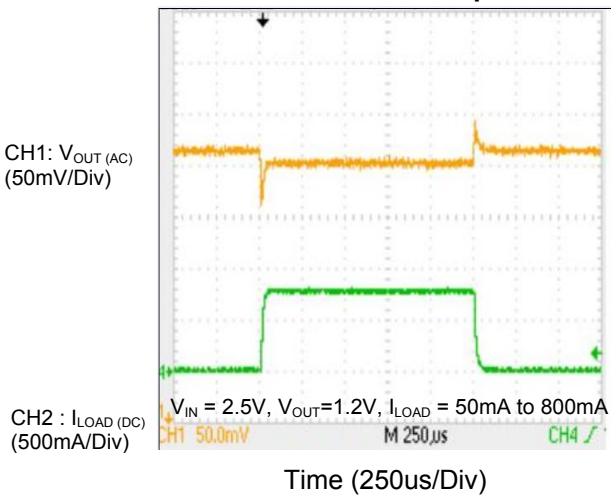
Load Transient Response



Load Transient Response



Load Transient Response





Application Information

Capacitor Selection and Regulator

Stability

Input Capacitor

An input capacitance of 1 μ F is required between the device input pin and ground directly (the amount of the capacitance may be increased without limit). The input capacitor **MUST** be located less than 1 cm from the device to assure input stability (see PCB Layout Section). A lower ESR capacitor allows the use of less capacitance, while higher ESR type (like aluminum electrolytic) requires more capacitance. Capacitor types (aluminum, ceramic and tantalum) can be mixed in parallel, but the total equivalent input capacitance/ESR must be defined as above for stable operation. There are no requirements for the ESR on the input capacitor, but tolerance and temperature coefficient must be considered when selecting the capacitor to ensure the capacitance is 1 μ F over the entire operating range.

Output Capacitor

The JY1118 is designed specifically to work with very small ceramic output capacitors. The minimum capacitance recommended (temperature characteristics of X7R, X5R, Z5U or Y5V) is within the 1 μ F to 10 μ F range with 5m Ω to 50m Ω ESR range ceramic capacitor between LDO output and GND for transient stability, but it may be increased without limit. Higher capacitance values help to improve transient response. The output capacitor's ESR is critical because it forms a zero to provide phase lead which is required for loop stability.

Enable Function

The JY1118 is shut down by pulling the EN pin low, and turned on by driving the input high. If the shutdown feature is not required, the EN pin should be tied to VIN to keep the regulator on at all times (the EN pin **MUST NOT** be left floating).

To assure proper operation, the signal source used to drive the EN pin must be able to swing above and below the specified turn-on/off voltage thresholds listed in the "Electrical Characteristics" under V_{IH} and V_{IL}. The ON/OFF signal may come from either CMOS output, or an open-collector output with pull-up resistor to the device input voltage or another logic supply. The high-level voltage may exceed the device input voltage, but must remain within the absolute maximum ratings for the EN pin.

Operating Region and Power Dissipation

Since the JY1118 is a linear regulator, its power dissipation is always given by $P = I_{OUT} (V_{IN} - V_{OUT})$. For SOP-8 package the maximum power dissipation is given by: $P_{D(MAX)} = (T_J - T_A) / \theta_{JA} = (125^\circ\text{C} - 25^\circ\text{C}) / 160^\circ\text{C} / \text{W} = 625\text{mW}$ Where $(T_J - T_A)$ is the temperature difference the JY1118 die and the ambient air, θ_{JA} is the thermal resistance of the chosen package to the ambient air. For surface mount device, heat sinking is accomplished by using the heat spreading capabilities of the PC board and its copper traces. In the case of a SOP-8 package, the thermal resistance is typically 160 $^\circ\text{C} / \text{Watt}$. Figure 1 is the maximum power dissipation information of SOT-223, SOT-23-5 and SOP-8. The die attachment area of the iD9307 lead frame is connected to GND pin. Therefore, the GND pin of JY1118 can dissipate the heat from the die very effectively. To improve the maximum power providing capability, connect the GND pin to ground using a large ground plane near the GND pin.

Adjustable Operation

The adjustable version of the JY1118 has an output voltage ranging from 1.0V to 5.0V. The output voltage of the JY1118 adjustable regulator is programmed using an external resistor divider as shown in Figure 2. The output voltage can be calculated using:

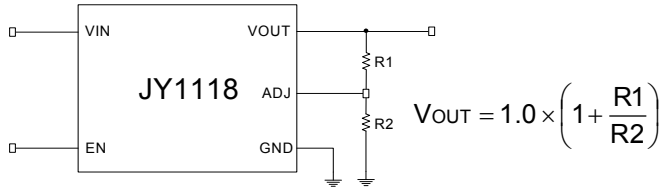


Figure 2. Output Voltage setting equation

$V_{REF} = 1.0V$ TYP. (the internal reference voltage)

R2 can be chosen in the range of ~320 kΩ and the reference table can be found in table 1 below.

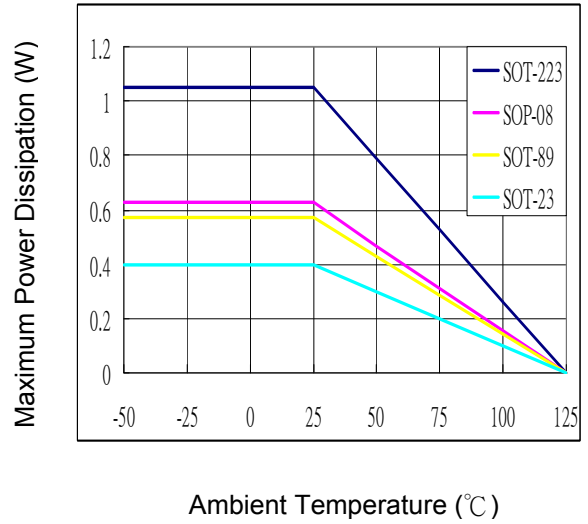
Table 1: Typical Output Voltage Setting Value

V _{out}	R1	R2
1.2 V	60 kΩ	300 kΩ
1.8 V	240 kΩ	300 kΩ
2.8 V	540 kΩ	300 kΩ
3.3 V	506 kΩ	220 kΩ
5.0V	1.2 MΩ	300 kΩ

Where:

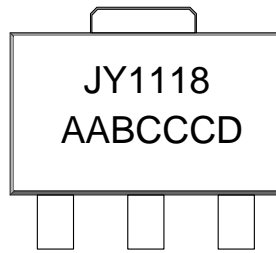
$V_{REF} = 1.0V$ typ. (the internal reference voltage)

Figure 1: Maximum Power Dissipation





Marking Information



SOT-89-3

AA: output voltage

B: package (E,F,G)

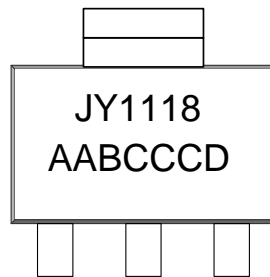
E: A20

F: A21

G: A23

CCC: Wafer's Lot No

D: Internal Code



SOT-223

AA: output voltage

B: package (F,T)

F: A72

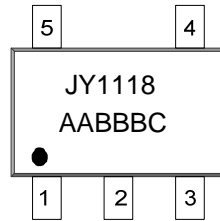
T: A74

CCC: Wafer's Lot No

D: Internal Code

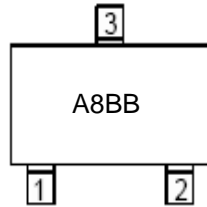


Marking Information



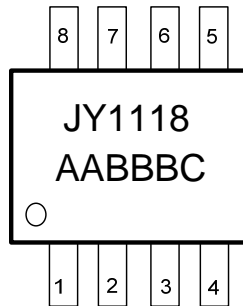
SOT-23-5

AA: output voltage
BBB: Wafer's Lot No
C: Internal Code



A8: indicate JY1118
BB: output voltage

SOT-23-3



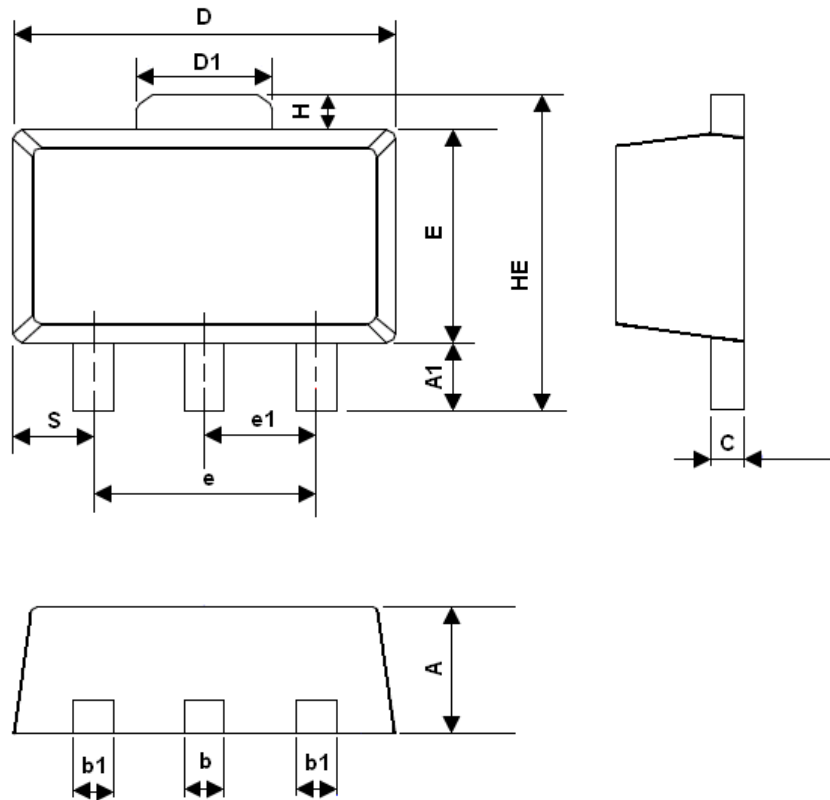
SOP-8

AA: output voltage
BBB: Wafer's Lot No
C: Internal Code



Packaging

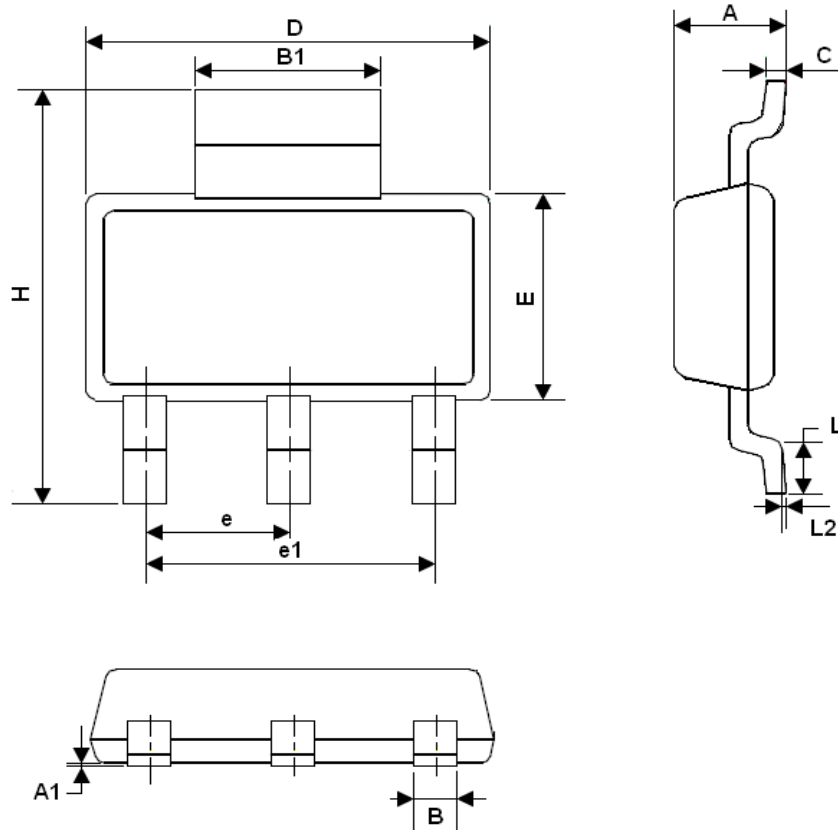
SOT-89-3



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.40	1.50	1.60	0.055	0.059	0.063
A1	0.80	1.04-	---	0.031	0.041	---
b	0.36	0.42	0.48	0.014	0.016	0.018
b1	0.41	0.47	0.53	0.016	0.18	0.020
C	0.38	0.40	0.43	0.014	0.015	0.017
D	4.40	4.50	4.600	0.173	0.177	0.181
D1	1.40	1.60	1.75	0.055	0.062	0.069
HE	---	---	4.25	---	---	0.167
E	2.40	2.50	2.60	0.094	0.098	0.102
e	2.90	3.00	3.10	0.114	0.118	0.122
H	0.35	0.40	0.45	0.014	0.016	0.018
S	0.65	0.75	0.85	0.026	0.030	0.034
e1	1.40	1.50	1.60	0.054	0.059	0.063



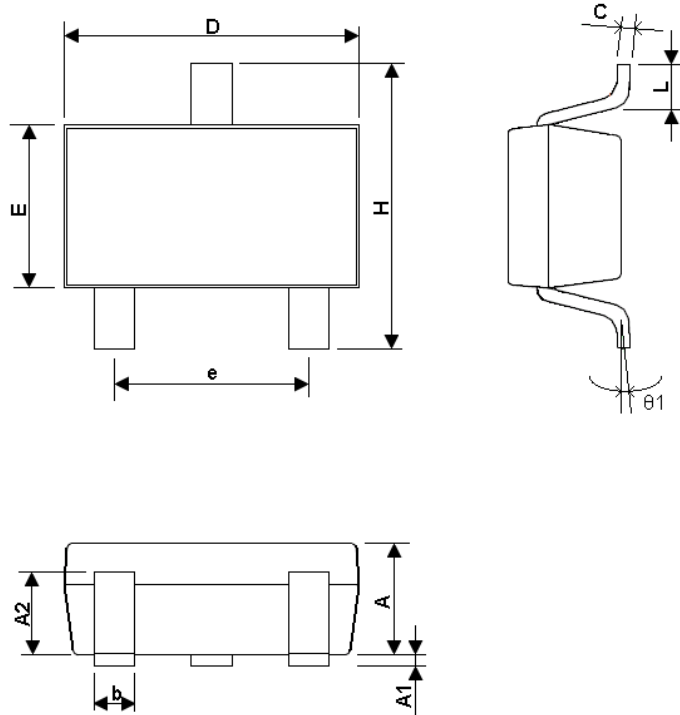
SOT-223



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.55	---	1.60	0.061	---	0.071
A1	0.02	---	0.10	0.0008	---	0.004
B	0.60	---	0.8	0.024	---	0.031
B1	2.90	---	3.10	0.114	---	0.122
C	0.24	---	0.32	0.009	---	0.013
D	6.30	---	6.80	0.248	---	0.268
E	3.30	---	3.70	0.13	---	0.146
e	2.30 BSC			0.090 BSC		
e1	4.60 BSC			0.181 BSC		
H	6.70		7.30	0.264		0.287
L	0.90 MIN			0.036 MIN		
L2	0.06 BSC			0.0024 BSC		



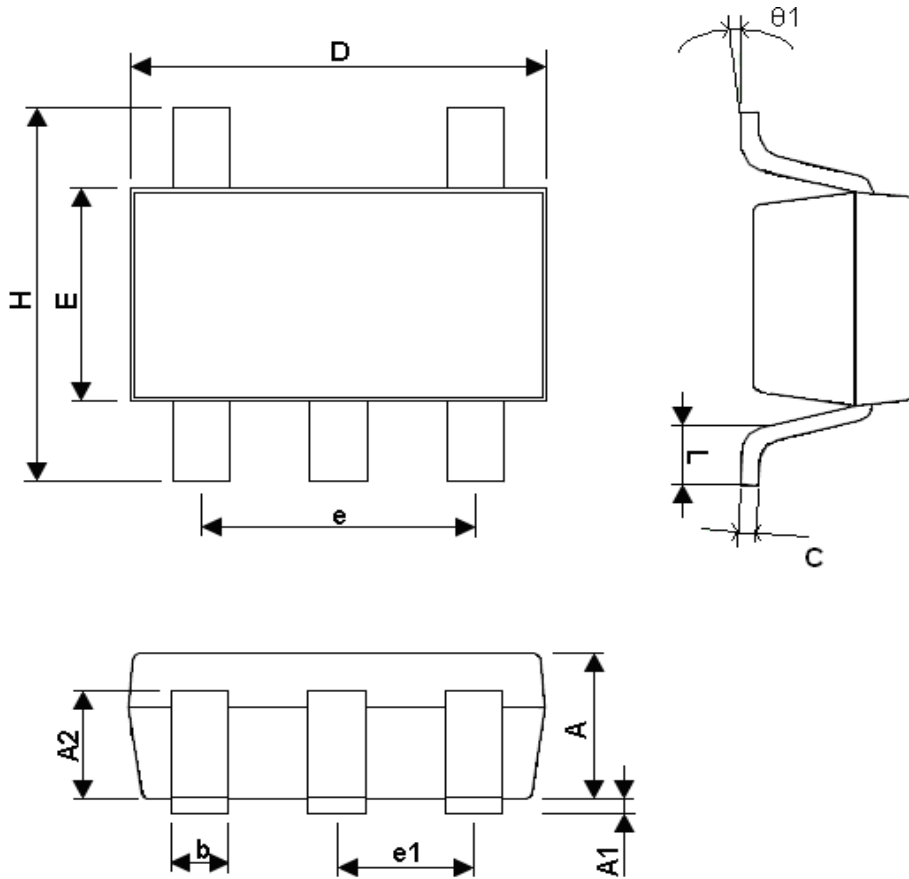
SOT-23-3



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.00	1.10	1.30	0.039	0.043	0.051
A1	0.00	---	0.10	0.000	---	0.004
A2	0.70	0.80	0.90	0.027	0.031	0.035
b	0.35	0.40	0.50	0.013	0.016	0.020
C	0.10	0.15	0.25	0.004	0.006	0.001
D	2.70	2.90	3.10	0.106	0.114	0.122
E	1.40	1.60	1.80	0.055	0.063	0.071
e	---	1.90(TYP)	---	---	0.075	---
H	2.60	2.80	3.00	0.102	0.110	0.118
L	0.370	---	---	0.015	---	---
Θ1	1°	5°	9°	1°	5°	9°



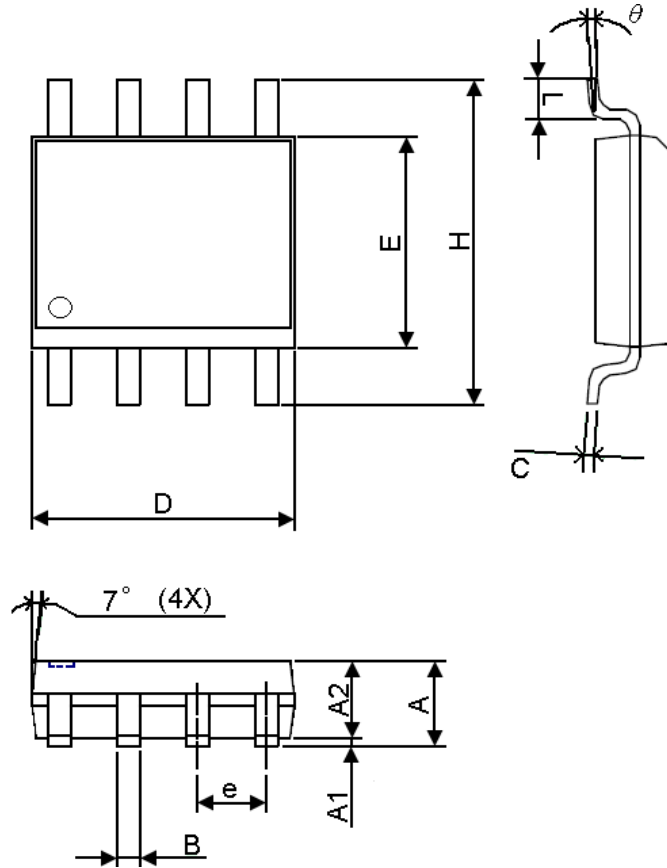
SOT-23-5



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.00	1.10	1.30	0.039	0.043	0.051
A1	0.00	---	0.10	0.000	---	0.004
A2	0.70	0.80	0.90	0.027	0.031	0.035
b	0.35	0.40	0.50	0.013	0.016	0.020
C	0.10	0.15	0.25	0.004	0.006	0.001
D	2.70	2.90	3.10	0.106	0.114	0.122
E	1.50	1.60	1.80	0.059	0.063	0.071
e	---	1.90(TYP)	---	---	0.075	---
H	2.60	2.80	3.00	0.102	0.110	0.118
L	0.370	---	---	0.015	---	---
θ1	1°	5°	9°	1°	5°	9°
e1	---	0.95(TYP)	---	---	0.037	---



SOP-8

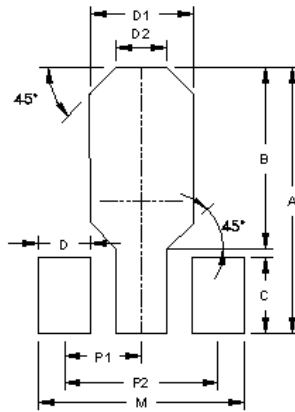


SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.35	1.60	1.75	0.053	0.063	0.069
A1	0.10	---	0.25	0.004	---	0.010
A2	---	1.45	---	---	0.057	---
B	0.33	---	0.51	0.013	---	0.020
C	0.19	---	0.25	0.007	---	0.010
D	4.80	---	5.00	0.189	---	0.197
E	3.80	---	4.00	0.150	---	0.157
e	---	1.27	---	---	0.050	---
H	5.80	---	6.20	0.228	---	0.244
L	0.40	---	1.27	0.016	---	0.050
y	---	---	0.10	---	---	0.004
θ	0°	---	8°	0°	---	8°



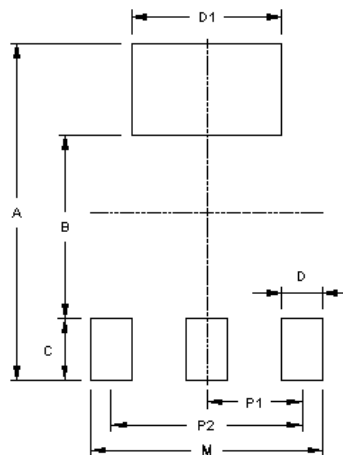
Footprints

SOT-89-3



Package	Number of Pin	Footprint Dimension (mm)										Tolerance
		P1	P2	A	B	B1	C	D	D1	D2	M	
SOT-89-3	3	1.50	3.00	5.10	3.40	--	1.50	1.00	2.20	1.00	4.00	±0.10

SOT-223

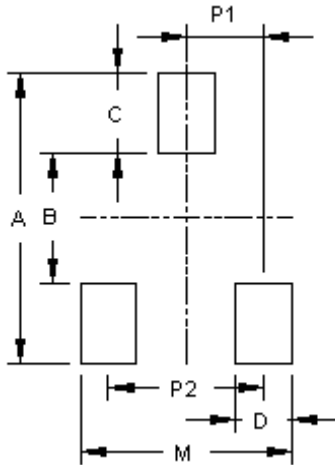


Package	Number of Pin	Footprint Dimension (mm)								Tolerance
		P1	P2	A	B	C	D	D1	M	
SOT-223	4	2.30	4.60	8.00	4.60	1.60	1.00	3.30	5.60	±0.10



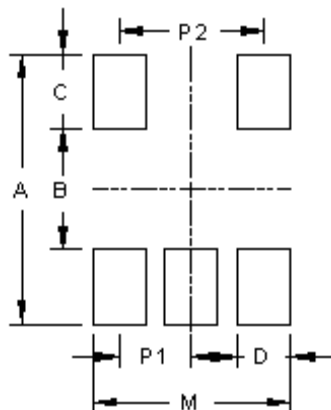
Footprints

SOT-23-3



Package	Number of PIN	Footprint Dimension (mm)							Tolerance
		P1	P2	A	B	C	D	M	
SOT-23-3	3	0.95	1.90	3.60	1.60	1.00	0.80	2.70	±0.10

SOT-23-5

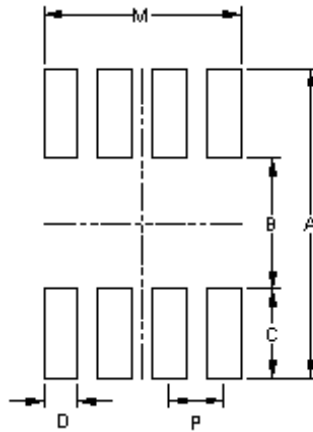


Package	Number of Pin	Footprint Dimension (mm)							Tolerance
		P1	P2	A	B	C	D	M	
SOT-23-5	5	0.95	1.90	3.60	1.60	1.00	0.70	2.60	±0.10



Footprints

SOP-8

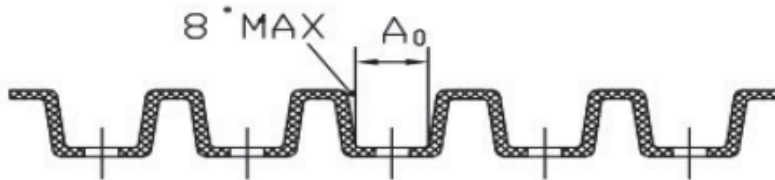
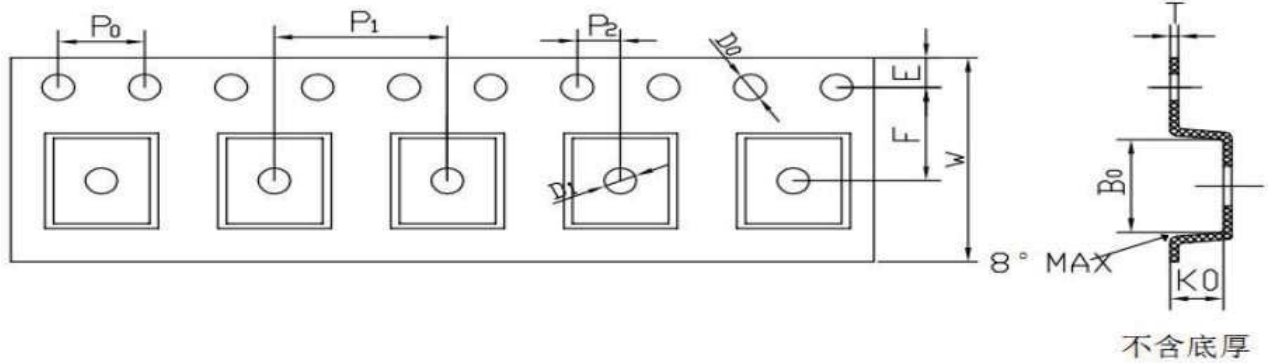


Package	Number of Pin	Footprint Dimension (mm)								Tolerance
		P	A	B	C	D	Sx	Sy	M	
SOP-8	8	1.27	6.80	4.20	1.30	0.70	--	--	4.51	±0.10



Carrier Dimensions

SOT89-3

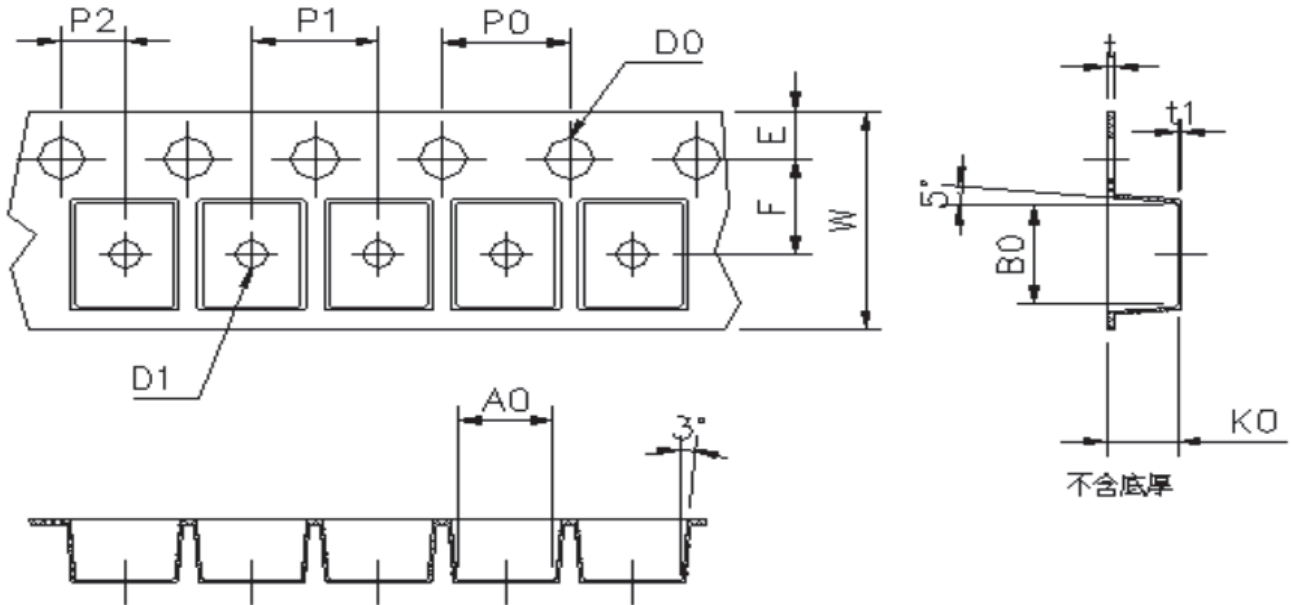


Symbol	Spec	Symbol	Spec
W	12.00 ± 0.10	A₀	4.90 ± 0.10
E	1.75 ± 0.10	B₀	4.50 ± 0.10
F	5.50 ± 0.05	K₀	1.85 ± 0.10
D₀	$1.50 (+0.10, -0)$		
D₁	$1.50 (+0.10, -0)$		
P₀	4.00 ± 0.10		
P₁	8.00 ± 0.10		
P₂	2.00 ± 0.05		
t	$0.25-0.28$		
t₁	0.05以上		



Carrier Dimensions

SOT223

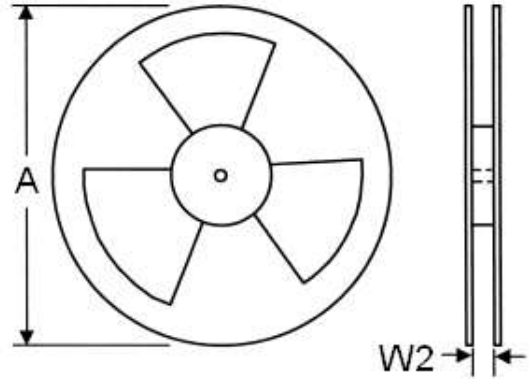
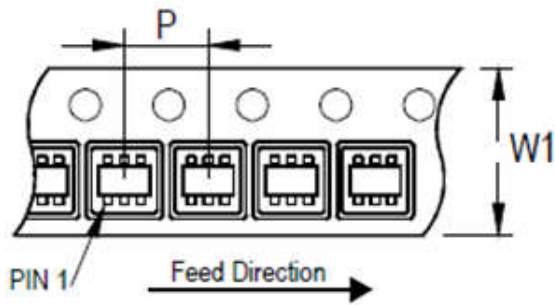


Symbol	Spec	Symbol	Spec
W	12.00±0.10	A₀	7.00±0.10
E	1.75±0.10	B₀	7.27±0.10
F	5.50±0.10	K₀	1.85±0.10
D₀	1.50 (+0.10; -0)	10*p₀	40.00±0.20
D₁	1.50 (+0.10; -0)		
P₀	4.00±0.10		
P₁	8.00±0.10		
P₂	2.00±0.10		
t	0.25-0.28		
t₁	0.05以上		



Carrier Dimensions

SOT23-5



Tape Size (W1) mm	Pocket Pitch (P) mm	Reel Size (A)		Reel Width (W2) mm	Empty Cavity Length mm	Units per Reel
		in	mm			
8	4	7	180	8.4	300~1000	3,000

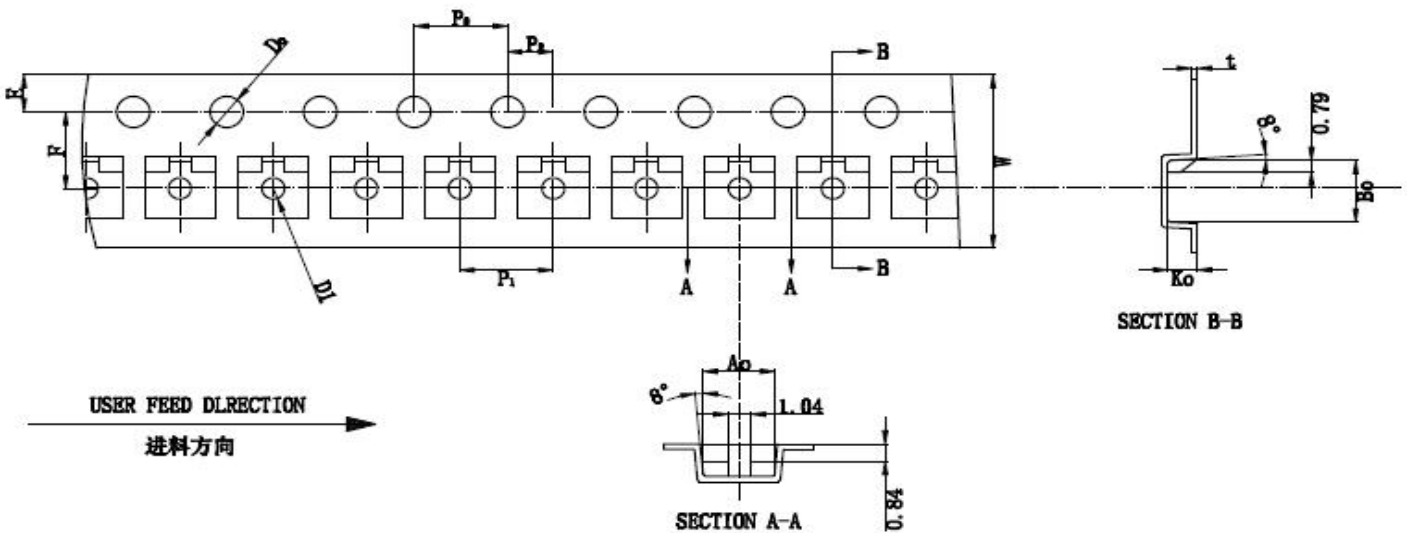


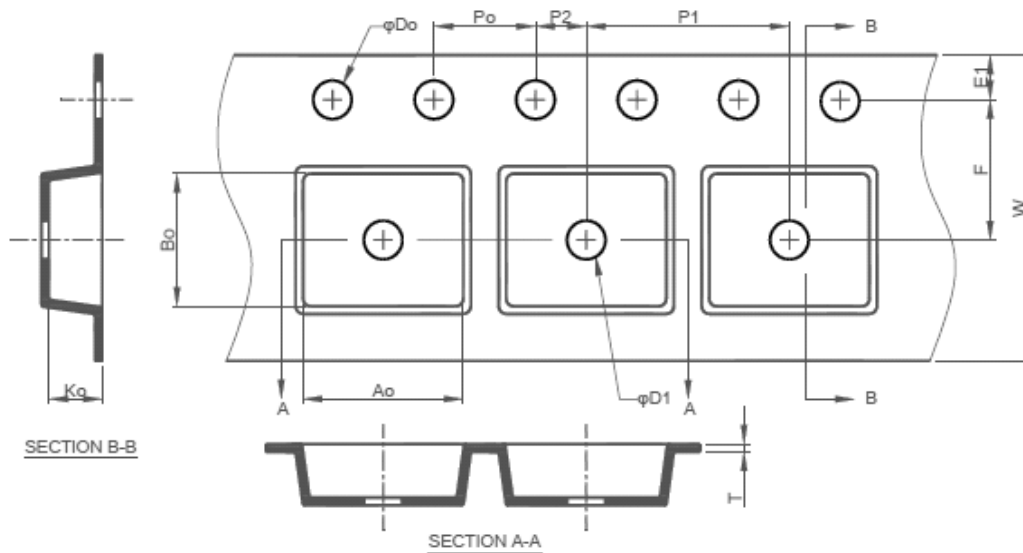
Carrier Dimensions

SOT23-3

PKG TYPE	W	P	E	F	D	D1	Po	Po10	P2
SOT-23	8.00	4.00	1.75	3.50	1.50	1.00	4.00	40.00	2.00
Tolerance	+0.3/-0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.2	±0.05

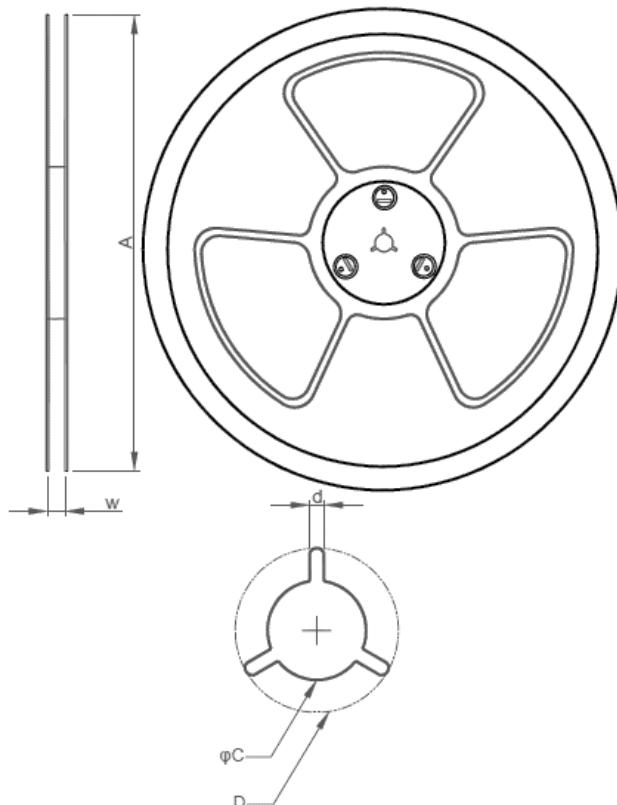
A0	B0	K0	T
3.15	2.77	1.22	0.20
±0.1	±0.1	±0.1	±0.02



Carrier Dimensions
SOP-8


- Note: 1. Refer to EIA-481-B
 2. 10 sprocket hole pitch cumulative tolerance ± 0.2
 3. Material: conductive polystyrene
 4. A_0 and B_0 measured on a plane 0.3mm above the bottom of the pocket
 5. K_0 measured from a plane on the inside bottom of the pocket to the top surface of the carrier

SYMBOL	A0	B0	K0	T	D0	D1
SPEC	6.400±0.100	5.350±0.100	2.000±0.100	0.250±0.020	1.550±0.050	1.550±0.100
SYMBOL	P0	P1	P2	E1	F	W
SPEC	4.000±0.100	8.000±0.100	2.000±0.050	1.750±0.100	5.500±0.050	12.000±0.30



Package Type	A	W	C	d	D
TO-252-3L	330±2	16.4 ^{+2.0} _{-0.0}	13.0 ^{+0.5} _{-0.2}	1.5 MIN.	20.2 MIN.
SOP-8 SOT-223	330±2	12.4 ^{+2.0} _{-0.0}	13.0 ^{+0.5} _{-0.2}	1.5 MIN.	20.2 MIN.
SOT-89-3L	178±2	12.4 ^{+2.0} _{-0.0}	13.0 ^{+0.5} _{-0.2}	1.5 MIN.	20.2 MIN.

Note: Refer to EIA-481-B