

■ Description

The WD1117 is available in industrial temperature range low dropout three-terminal regulator. The WD1117 is optimized for low voltage where transient response and minimum input voltage are critical. It provides current limit and thermal shutdown. Its circuit includes a trimmed bandgap reference to assure output voltage accuracy to be within $\pm 1\%$. On-chip thermal shutdown provides protection against a combination of high current and ambient temperature that would create excessive junction temperature.

The WD1117 is available in 1.2V, 1.5V, 1.8V, 2.5V, 3.3V, 5.0V fixed output voltage versions and ADJ output voltage version. The fixed versions integrate the adjust resistors. It is also available in an adjustable version which can set the output voltage with two external resistors.

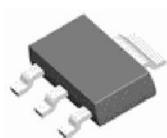
The WD1117 is available in the industry-standard SOT223, TO252-2 and SOT-89 packages.

■ Features and Benefits

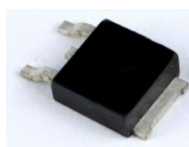
- Current Limit: 1.35A (Typ)
- Output Noise from 10Hz to 10KHz: 0.003% of V_{OUT}
- PSRR at $I_{OUT} = 300mA$ and $f = 120Hz$: 70dB
- Output Voltage Accuracy: $\pm 2\%$
- On-chip Thermal Shutdown
- Maximum Quiescent Current: $I_{QMAX} = 6mA$
- Compatible with Low ESR Ceramic Capacitor
- Operation Junction Temperature: $-40^{\circ}C$ to $+125^{\circ}C$

■ Applications

- USB Device
- Add-on Card
- DVD Player
- PC Motherboard



SOT223



TO252-2



SOT-89

Figure 1. Package Type of WD1117

Pin Configurations

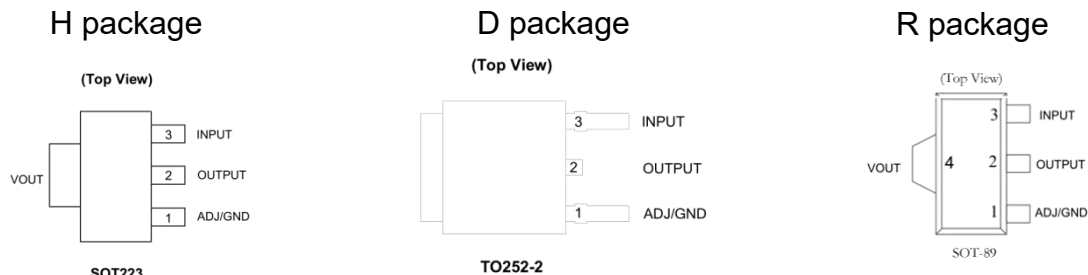


Figure 2. Pin Configuration of WD1117

Pin Description

Pin Number			Symbol	Function
H	D	R		
1	1	1	ADJ/GND	Adjust or Ground pin
2, 4	2	2, 4	Output	Output Voltage pin
3	3	3	Input	Input Voltage pin

Functional Block Diagram

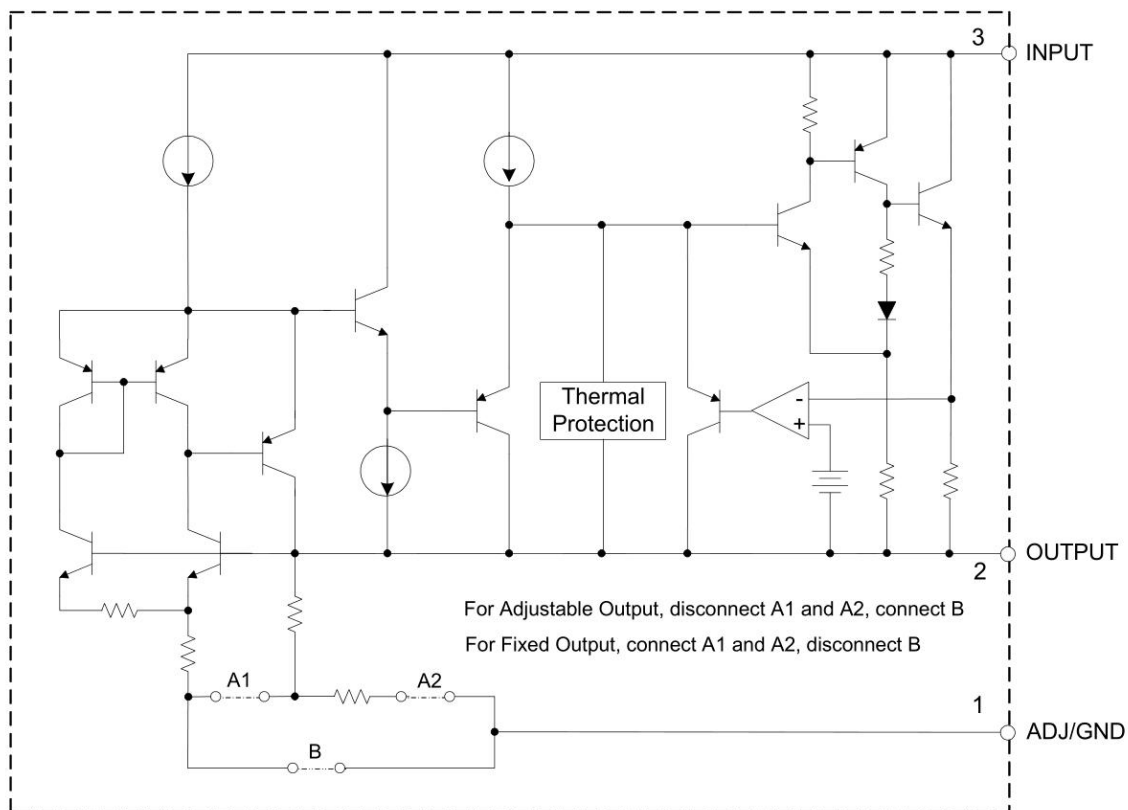
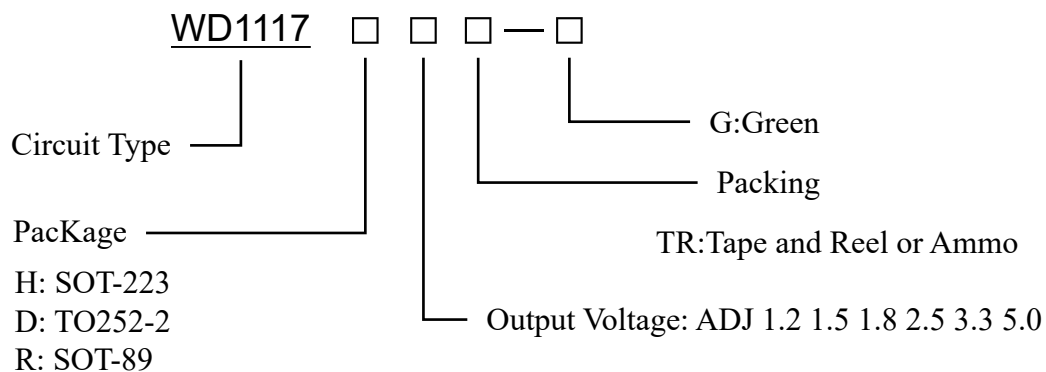


Figure 3. Functional Block Diagram of WD1117

■ Functional Block Diagram



Package	Temperature Range	Part Number	Marking ID	Packing Type
		Green	Green	
SOT-223	-40 to 125 °C	WD1117HADJTR-G	WD1117ADJ	Tape and Reel
		WD1117H1.2TR-G	WD1117 12	Tape and Reel
		WD1117H1.5TR-G	WD1117 15	Tape and Reel
		WD1117H1.8TR-G	WD1117 18	Tape and Reel
		WD1117H2.5TR-G	WD1117 25	Tape and Reel
		WD1117H3.3TR-G	WD1117 33	Tape and Reel
		WD1117H5.0TR-G	WD1117 50	Tape and Reel
TO252-2	-40 to 125 °C	WD1117DADJTR-G	WD1117ADJ	Tape and Reel
		WD1117D1.2TR-G	WD1117 12	Tape and Reel
		WD1117D1.5TR-G	WD1117 15	Tape and Reel
		WD1117D1.8TR-G	WD1117 18	Tape and Reel
		WD1117D2.5TR-G	WD1117 25	Tape and Reel
		WD1117D3.3TR-G	WD1117 33	Tape and Reel
		WD1117D5.0TR-G	WD1117 50	Tape and Reel
SOT-89	-40 to 125 °C	WD1117RADJTR-G	WD1117ADJ	Tape and Reel
		WD1117R1.2TR-G	WD1117 12	Tape and Reel
		WD1117R1.5TR-G	WD1117 15	Tape and Reel
		WD1117R1.8TR-G	WD1117 18	Tape and Reel
		WD1117R2.5TR-G	WD1117 25	Tape and Reel
		WD1117R3.3TR-G	WD1117 33	Tape and Reel
		WD1117R5.0TR-G	WD1117 50	Tape and Reel

Products with "G" suffix are available in green package. are RoHS compliant.

■ Absolute Maximum Ratings (Ta= 25°C)

Parameter	Symbol	Value		Unit
Power Supply Voltage	V_{CC}	18		V
Thermal Resistance (Without Heatsink)	θ_{JA}	SOT-223	125	° C/W
		TO252-2	100	
		SOT-89	131	
Thermal Resistance (Junction to Case)	θ_{JC}	SOT-223	15	° C/W
		TO252-2	10	
		SOT-89	56	
Operating Junction Temperature	T_J	150		° C
Thermal Shutdown	T_{sd}	160		° C
Thermal Shutdown Hysteresis	T_{hys}	16		° C
Lead Temperature (Soldering, 10s)	T_{LEAD}	260		° C
Storage Temperature Range	T_{STG}	-65 to +150		° C

Note 1: Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “Recommended Operating Conditions” is not implied. Exposure to “Absolute Maximum Ratings” for extended periods may affect device reliability.

Note 2: Chip is soldered to 100mm 2 (10mm*10mm) copper (top side solder mask) on 2oz.2 layers FR-4 PCB with 8*0.5mm vias.

■ Recommended Operating Conditions (TA=25°C)

Parameter	Symbol	Min	Max	Unit
Power Supply Voltage	V_{CC}		15	V
Operating Temperature	T_A	-40	125	° C

■ Electrical Characteristics

$V_{IN} = V_{OUT} + 2V$, $I_{OUT} = 10mA$, $T_A = 25^{\circ}C$, unless otherwise specified.

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
Quiescent Current	I_Q	$I_{OUT} = 0$, FIX version			4	6	mA
Adjust Pin Current	I_{adj}	ADJ version			60	120	uA
Adjust Pin Current Change	ΔI_{adj}	$1.5V \leq V_{IN} - V_{OUT} \leq 10V$ ADJ version			0.2	5	uA
Minimum Load Current	I_{min}	$1.5V \leq V_{IN} - V_{OUT} \leq 10V$ ADJ version			1.7	5	uA
Output Voltage	V_{OUT}	$1.5V \leq V_{IN} - V_{OUT} \leq 10V$	ADJ	1.225	1.250	1.275	V
			1.2	1.176	1.2	1.224	V
			1.5	1.470	1.5	1.530	V
			1.8	1.764	1.8	1.836	V
			2.5	2.450	2.5	2.550	V
			3.3	3.234	3.3	3.366	V
			5.0	4.900	5.0	5.100	V
Output Voltage	V_{OUT}	$1.5V \leq V_{IN} - V_{OUT} \leq 10V$ -40° C to +125° C	ADJ	1.213	1.250	1.288	V
			1.2	1.164	1.2	1.236	V
			1.5	1.455	1.5	1.545	V
			1.8	1.746	1.8	1.854	V
			2.5	2.425	2.5	2.575	V
			3.3	3.201	3.3	3.399	V
			5.0	4.850	5.0	5.150	V

■ Electrical Characteristics (Continued)

$V_{IN} = V_{OUT} + 2V$, $I_{OUT} = 10mA$, $T_A = 25^\circ C$, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Line Regulation	V_{RLINE}	$1.5V \leq V_{IN} - V_{OUT} \leq 10V$	ADJ	0.001	0.1	%
			FIX	0.5	6	mV
Line Regulation	V_{RLINE}	$1.5V \leq V_{IN} - V_{OUT} \leq 10V$ $-40^\circ C$ to $+125^\circ C$	ADJ		0.2	%
			FIX		10	mV
Load Regulation	V_{RLOAD}	$V_{IN} - V_{OUT} = 2V$ $1.0mA \leq I_{OUT} \leq 1A$	ADJ	0.4	1.0	%
			FIX	2	15	mV
Dropout Voltage	V_{DROP}	$\Delta V_{OUT} = 1\%$, $I_{OUT} = 0.8A$	SOT223	1.2	1.3	V
			TO252-2	1.3	1.4	V
Current Limit	I_{LIMIT}	—		1.35		A
Output Noise Voltage	N_O	$10Hz \leq f \leq 10kHz$		0.003		%
Ripple Rejection	PSRR	$f = 120Hz$, $C_{OUT} = 22\mu F$ $(V_{IN} - V_{OUT}) = 3V$, $I_{OUT} = 300mA$		70		dB
Temperature Stability	$\Delta V_{OUT} / V_{OUT}$			0.5		%

■ Typical Applications Circuit

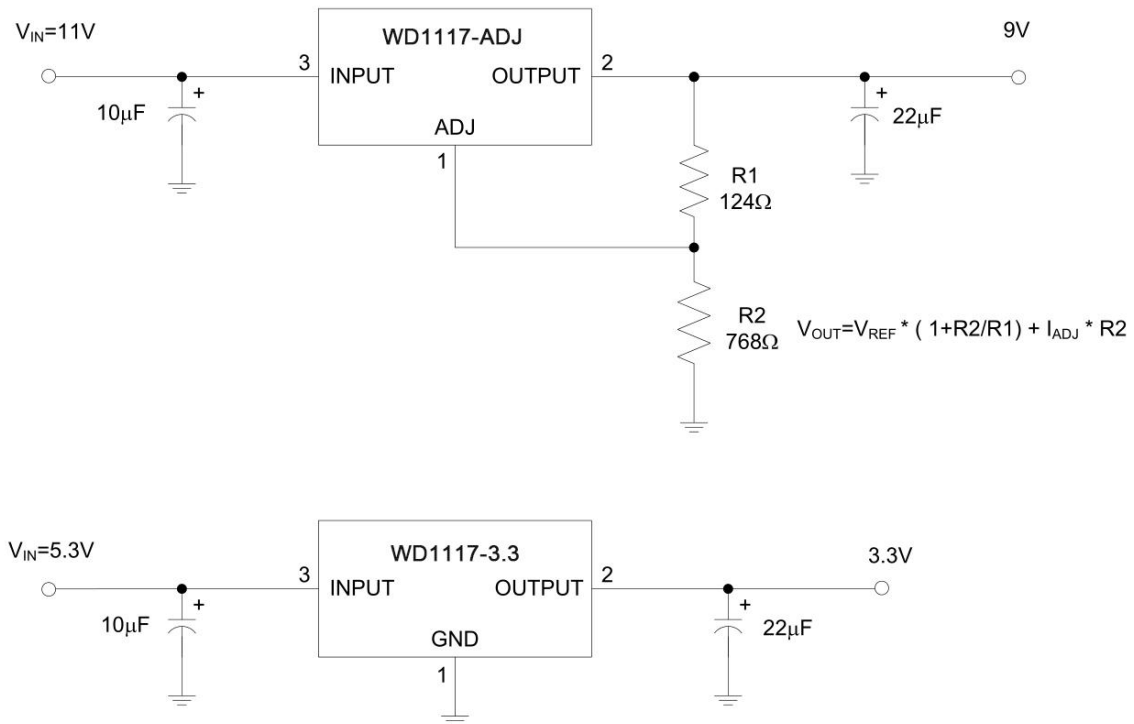
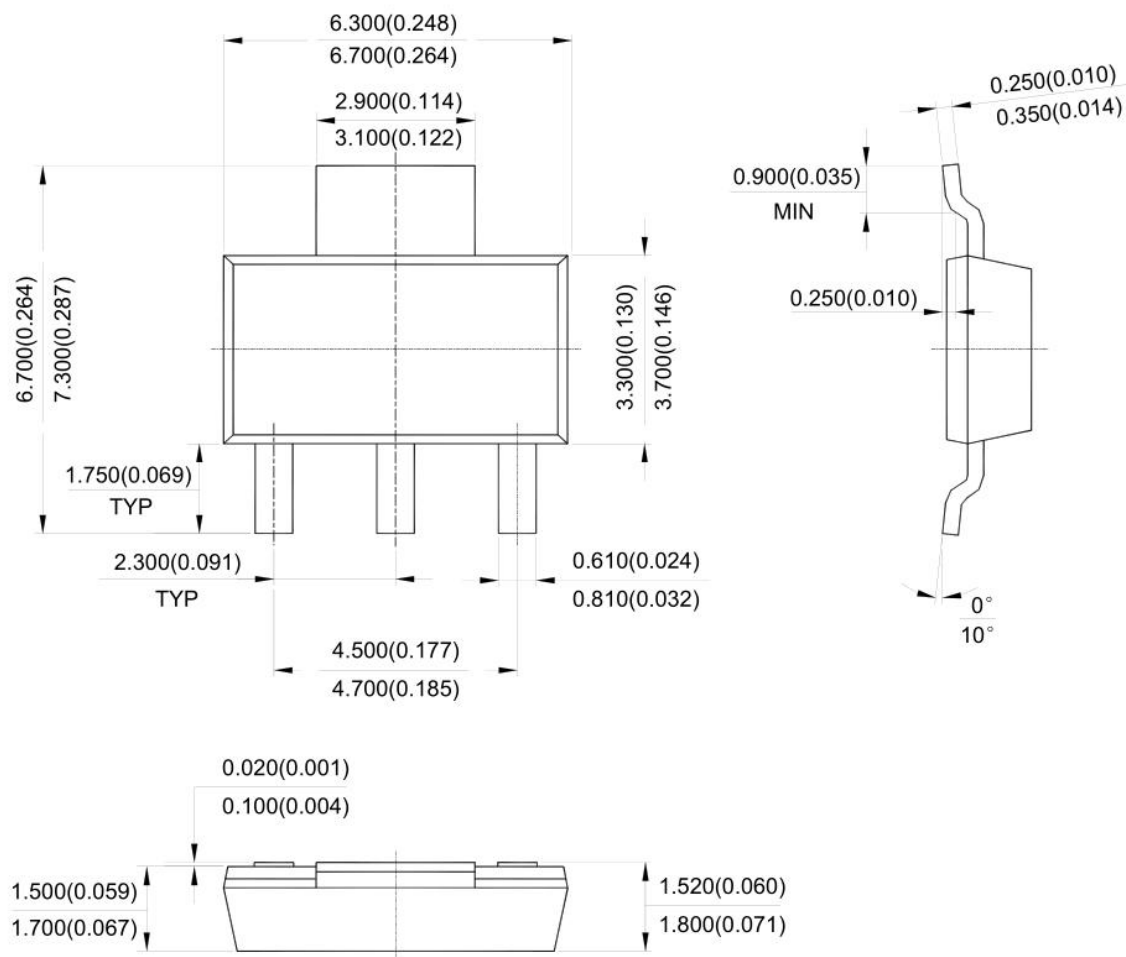


Figure 4. Typical Application of the WD1117

■ Package Outline Dimensions

SOT-223

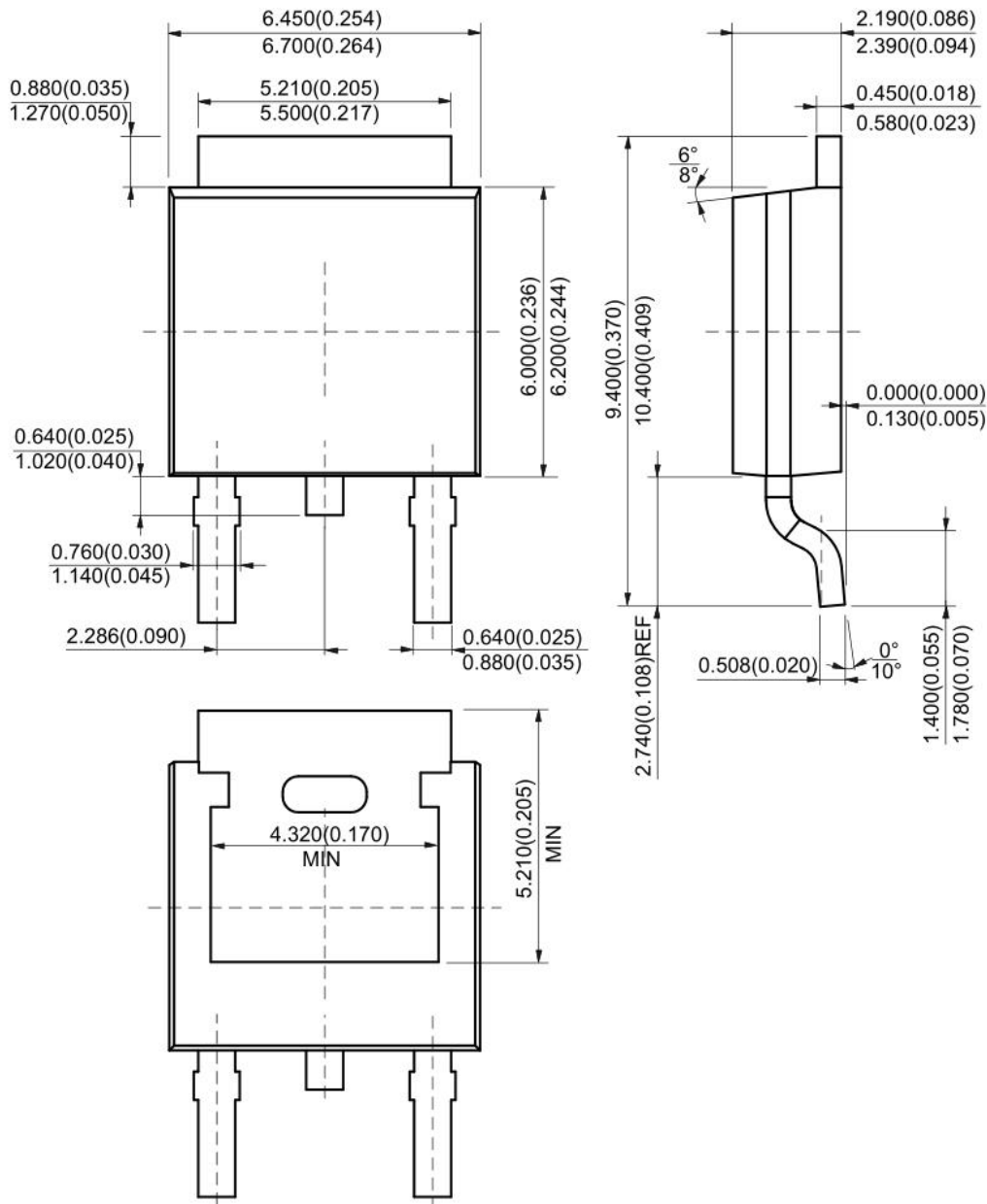
Unit: mm(inch)



■ Package Outline Dimensions(Continued)

TO252-2

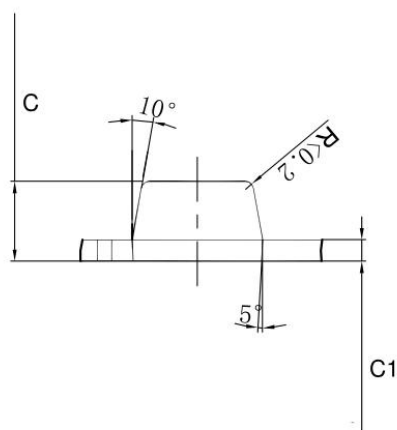
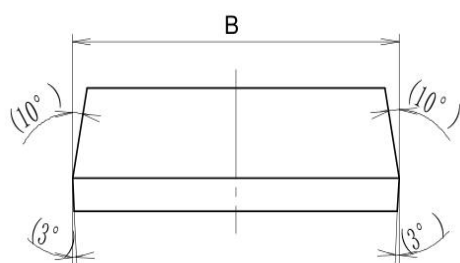
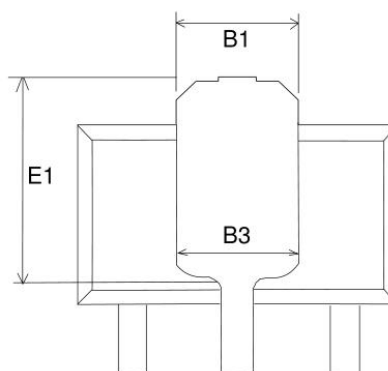
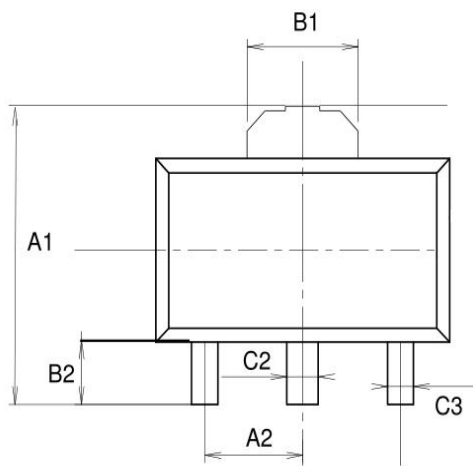
Unit: mm(inch)



■ Package Outline Dimensions(Continued)

SOT-89

Unit: mm



SYMBOL	MIN	MID	MAX
A	2.35	2.45	2.55
A1	4.135	4.235	4.335
A2	1.45	1.50	1.55
B	4.40	4.50	4.60
B1		1.55 REF	
B2	0.95	1.00	1.05
B3		1.63 REF	
C	1.45	1.50	1.55
C1	0.39	0.40	0.41
C2	0.4	0.48	0.55
C3	0.35	0.4	0.45
E1	2.65	2.75	2.85

