

Pin Configuration

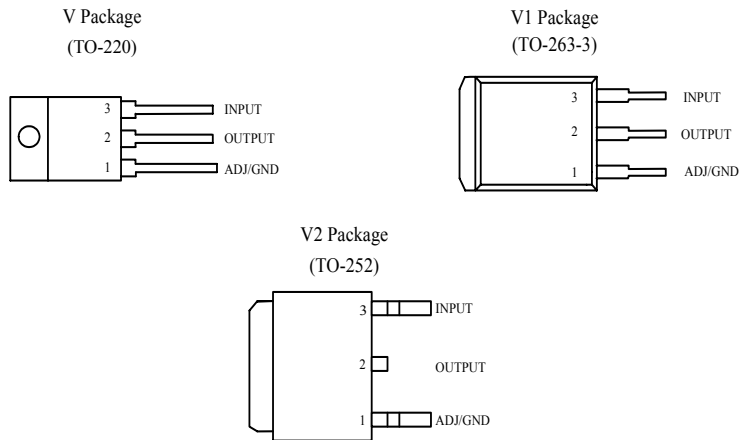


Figure 2. Pin Configuration of SP1086 (Top View)

Functional Block Diagram

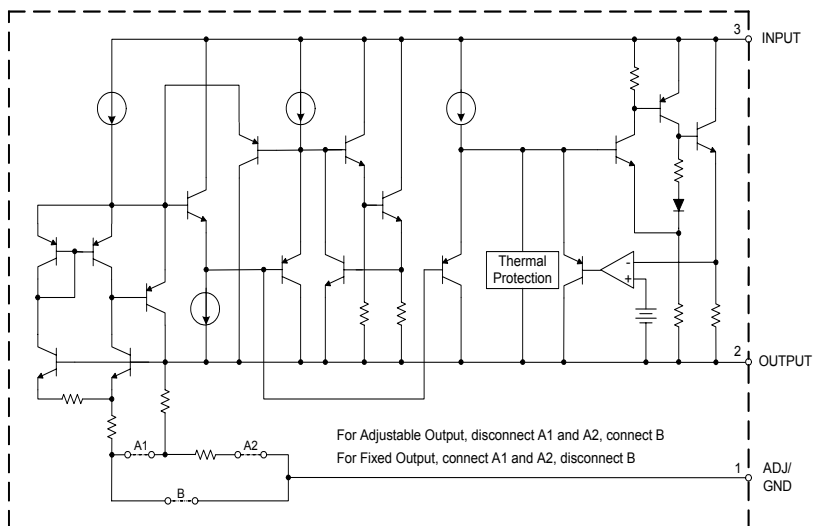


Figure 3. Functional Block Diagram of SP1086

Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Min	Max	Unit
Operating Junction Temperature Range	T_J		150	$^{\circ}\text{C}$
Storage Temperature Range	T_S	-65	150	$^{\circ}\text{C}$
Lead Temperature (Soldering, 10sec)	T_{LEAD}		300	$^{\circ}\text{C}$
ESD (Human Body Model)	ESD		2000	V

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.

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Input Voltage	V_{IN}		15	V
Operating Junction Temperature Range	T_J	0	125	$^{\circ}\text{C}$

Electrical Characteristics

Typicals and limits appearing in normal type apply for $T_J = 25^\circ\text{C}$. Limits appearing in **Boldface** type apply over the entire junction temperature range for operation, 0°C to 125°C . ($P_D \leq$ maximum power dissipation, see Note 2.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reference Voltage	V_{REF}	SP1086-ADJ, $I_{\text{OUT}} = 10\text{mA}$, $V_{\text{IN}} - V_{\text{OUT}} = 2\text{V}$, $T_J = 25^\circ\text{C}$, $10\text{mA} \leq I_{\text{OUT}} \leq 1.5\text{A}$, $1.4\text{V} \leq V_{\text{IN}} - V_{\text{OUT}} \leq 6\text{V}$	1.238 1.225	1.250 1.250	1.262 1.270	V
Output Voltage	V_{OUT}	SP1086-1.5, $I_{\text{OUT}} = 10\text{mA}$, $V_{\text{IN}} = 3.5\text{V}$, $T_J = 25^\circ\text{C}$, $10\text{mA} \leq I_{\text{OUT}} \leq 1.5\text{A}$, $3\text{V} \leq V_{\text{IN}} \leq 10\text{V}$	1.485 1.47	1.5 1.5	1.515 1.53	V
		SP1086-1.8, $I_{\text{OUT}} = 10\text{mA}$, $V_{\text{IN}} = 3.8\text{V}$, $T_J = 25^\circ\text{C}$, $10\text{mA} \leq I_{\text{OUT}} \leq 1.5\text{A}$, $3.2\text{V} \leq V_{\text{IN}} \leq 10\text{V}$	1.782 1.746	1.8 1.8	1.818 1.854	V
		SP1086-2.5, $I_{\text{OUT}} = 10\text{mA}$, $V_{\text{IN}} = 4.5\text{V}$, $T_J = 25^\circ\text{C}$, $10\text{mA} \leq I_{\text{OUT}} \leq 1.5\text{A}$, $3.9\text{V} \leq V_{\text{IN}} \leq 10\text{V}$	2.475 2.45	2.5 2.5	2.525 2.55	V
		SP1086-3.0, $I_{\text{OUT}} = 10\text{mA}$, $V_{\text{IN}} = 4.5\text{V}$, $T_J = 25^\circ\text{C}$, $10\text{mA} \leq I_{\text{OUT}} \leq 1.5\text{A}$, $4.9\text{V} \leq V_{\text{IN}} \leq 10\text{V}$	2.97 2.94	3.0 3.0	3.03 3.06	V
		SP1086-3.3, $I_{\text{OUT}} = 10\text{mA}$, $V_{\text{IN}} = 5\text{V}$, $T_J = 25^\circ\text{C}$, $10\text{mA} \leq I_{\text{OUT}} \leq 1.5\text{A}$, $4.75\text{V} \leq V_{\text{IN}} \leq 10\text{V}$	3.267 3.235	3.3 3.3	3.333 3.365	V
		SP1086-5.0, $I_{\text{OUT}} = 10\text{mA}$, $V_{\text{IN}} = 7\text{V}$, $T_J = 25^\circ\text{C}$, $10\text{mA} \leq I_{\text{OUT}} \leq 1.5\text{A}$, $6.5\text{V} \leq V_{\text{IN}} \leq 10\text{V}$	4.95 4.9	5 5	5.05 5.1	V
Line Regulation	ΔV_{OUT}	SP1086-ADJ, $I_{\text{OUT}} = 10\text{mA}$, $1.5\text{V} \leq V_{\text{IN}} - V_{\text{OUT}} \leq 10\text{V}$		0.015 0.035	0.2 0.2	%
		SP1086-1.5, $I_{\text{OUT}} = 10\text{mA}$, $1.5\text{V} \leq V_{\text{IN}} - V_{\text{OUT}} \leq 10\text{V}$		0.3 0.6	6 6	mV
		SP1086-1.8, $I_{\text{OUT}} = 10\text{mA}$, $1.5\text{V} \leq V_{\text{IN}} - V_{\text{OUT}} \leq 10\text{V}$		0.3 0.6	6 6	mV
		SP1086-2.5, $I_{\text{OUT}} = 10\text{mA}$, $1.5\text{V} \leq V_{\text{IN}} - V_{\text{OUT}} \leq 10\text{V}$		0.3 0.6	6 6	mV
		SP1086-3.0, $I_{\text{OUT}} = 10\text{mA}$, $1.5\text{V} \leq V_{\text{IN}} - V_{\text{OUT}} \leq 10\text{V}$		0.3 0.6	6 6	mV
		SP1086-3.3, $I_{\text{OUT}} = 10\text{mA}$, $1.5\text{V} \leq V_{\text{IN}} - V_{\text{OUT}} \leq 10\text{V}$		0.5 1	10 10	mV
		SP1086-5.0, $I_{\text{OUT}} = 10\text{mA}$, $1.5\text{V} \leq V_{\text{IN}} - V_{\text{OUT}} \leq 10\text{V}$		0.5 1	10 10	mV

Electrical Characteristics (Continued)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Load Regulation	ΔV_{OUT}	SP1086-ADJ, $10\text{mA} \leq I_{OUT} \leq 1.5\text{A}$, $V_{IN} - V_{OUT} = 2\text{V}$		0.1 0.2	0.3 0.4	%
		SP1086-1.5, $10\text{mA} \leq I_{OUT} \leq 1.5\text{A}$, $V_{IN} - V_{OUT} = 2\text{V}$		3 6	12 20	mV
		SP1086-1.8, $10\text{mA} \leq I_{OUT} \leq 1.5\text{A}$, $V_{IN} - V_{OUT} = 2\text{V}$		3 6	12 20	mV
		SP1086-2.5, $10\text{mA} \leq I_{OUT} \leq 1.5\text{A}$, $V_{IN} - V_{OUT} = 2\text{V}$		3 6	12 20	mV
		SP1086-3.0, $10\text{mA} \leq I_{OUT} \leq 1.5\text{A}$, $V_{IN} - V_{OUT} = 2\text{V}$		3 7	15 20	mV
		SP1086-3.3, $10\text{mA} \leq I_{OUT} \leq 1.5\text{A}$, $V_{IN} - V_{OUT} = 2\text{V}$		3 7	15 20	mV
		SP1086-5.0, $10\text{mA} \leq I_{OUT} \leq 1.5\text{A}$, $V_{IN} - V_{OUT} = 2\text{V}$		5 10	20 35	mV
Dropout Voltage		$I_O = 1.5\text{A}$, $\Delta V_{REF} = 1\%$		1.3	1.5	V
Current Limit	I_{LIMIT}	$V_{IN} - V_{OUT} = 2\text{V}$,	1.5	2.3		A
Minimum Load Current		$1.4\text{V} \leq V_{IN} - V_{OUT} \leq 10\text{V}$ (For ADJ)		2	5	mA
Quiescent Current		$V_{IN} = V_{OUT} + 1.3\text{V}$		5	10	mA
Ripple Rejection		$f_{RIPPLE} = 120\text{Hz}$, $C_{OUT} = 25\mu\text{F}$ Tantalum, $I_{OUT} = 1.5\text{A}$, $V_{IN} - V_{OUT} = 3\text{V}$	60	75		dB
Adjust Pin Current				60	120	μA
Adjust Pin Current Change		$10\text{mA} \leq I_{OUT} \leq 1.5\text{A}$, $1.4\text{V} \leq V_{IN} - V_{OUT} \leq 10\text{V}$		0.2	5	μA
Temperature Stability				0.5		%
RMS Noise (% of V_{OUT})		$T_A = 25^\circ\text{C}$, $10\text{Hz} \leq f \leq 10\text{kHz}$		0.003		%
Thermal Shutdown		Junction Temperature		165		$^\circ\text{C}$
Thermal Shutdown Hysteresis				30		$^\circ\text{C}$
Thermal Resistance Junction-to-Case	θ_{JC}	TO - 252 TO - 263 TO - 220		4 4 4		$^\circ\text{C/W}$

Note 2: Maximum power dissipation see Figure 5.

Typical Performance Characteristics

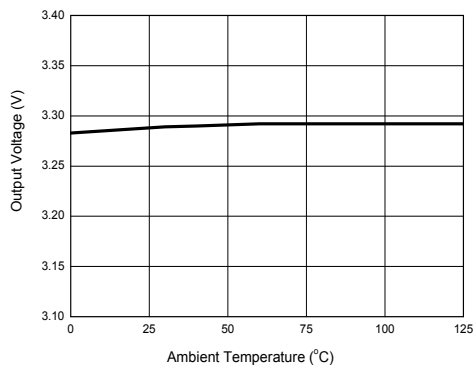


Figure 4. Output Voltage vs. Temperature

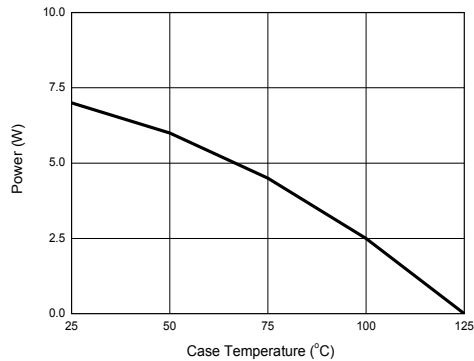


Figure 5. Maximum Power Dissipation

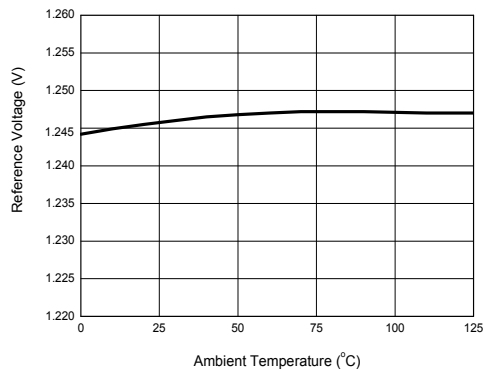


Figure 6. Reference Voltage vs. Temperature

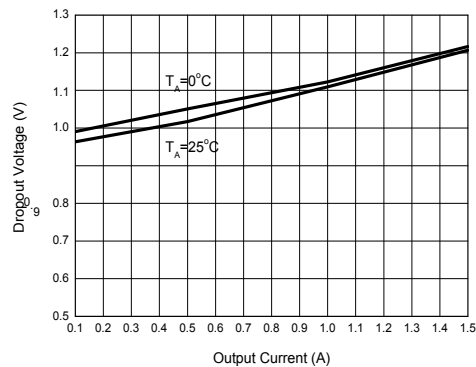


Figure 7. Dropout Voltage vs. Output Current

Typical Performance Characteristics (Continued)

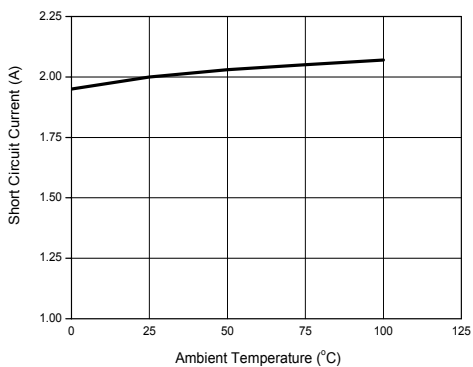


Figure 8. Short Circuit Current vs. Temperature

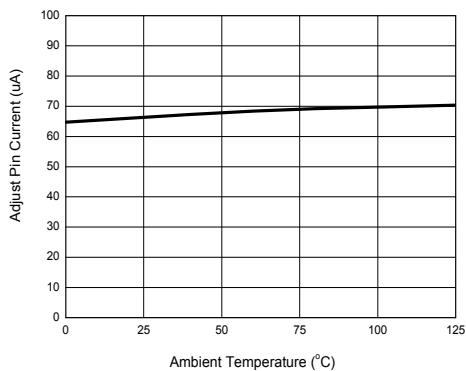


Figure 9. Adjust Pin Current vs. Temperature

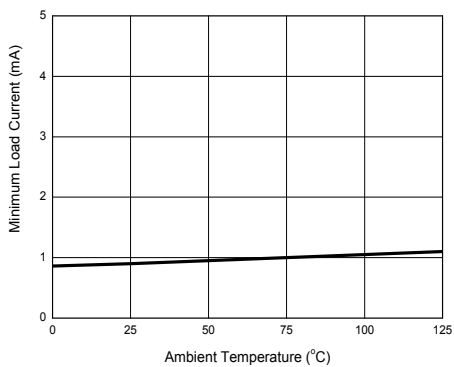


Figure 10. Minimum Load Current vs. Temperature

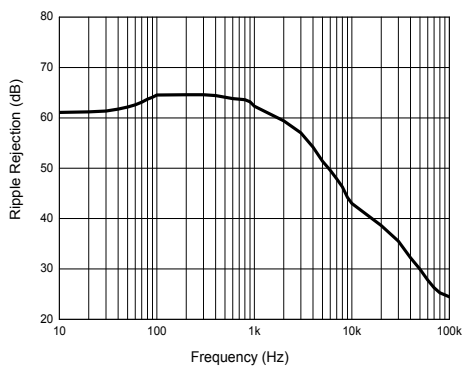
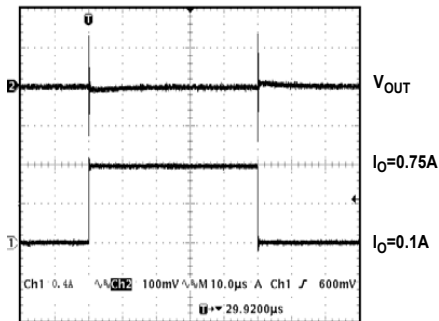


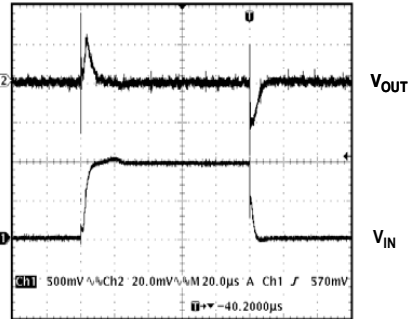
Figure 11. Ripple Rejection vs. Frequency

Typical Performance Characteristics (Continued)



SP1086V Load transient response

$V_{IN}=4.8V$, $V_{OUT}=3.3V$, $I_O=0.1A$ to $0.75A$, $C_{IN}=C_{OUT}=10\mu$ (tan)



SP1086V Line transient response

$V_{IN}=4.8V$, $V_{OUT}=3.3V$, $I_O=0.1A$, $C_{IN}=1\mu$ (tan), $C_{OUT}=10\mu$ (tan)

Figure 12. Load Transient Response

Figure 13. Line Transient Response

Typical Application

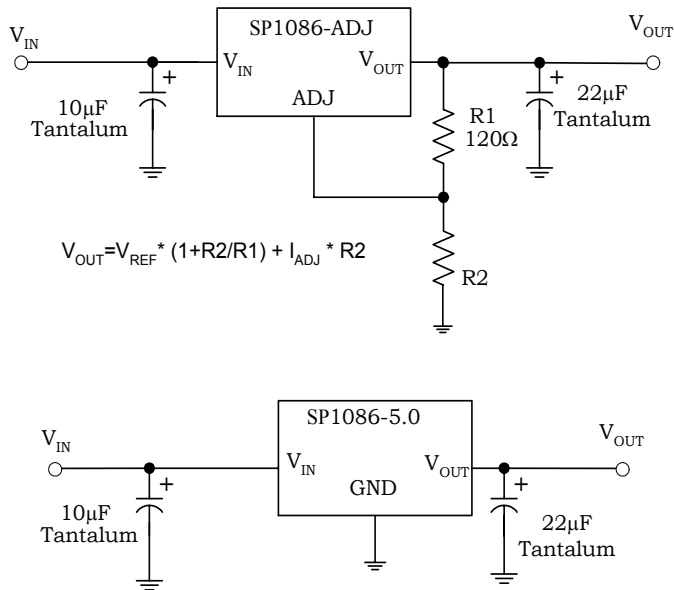
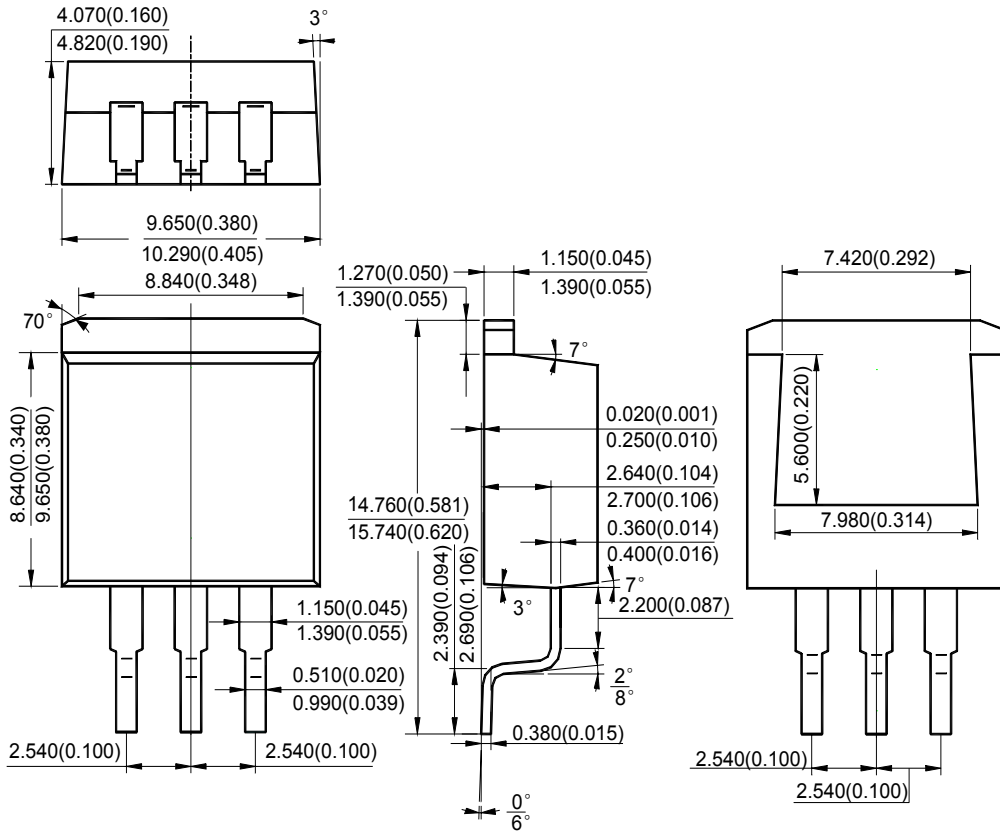


Figure 14. Typical Applications of SP1086

Mechanical Dimensions

TO-263-3

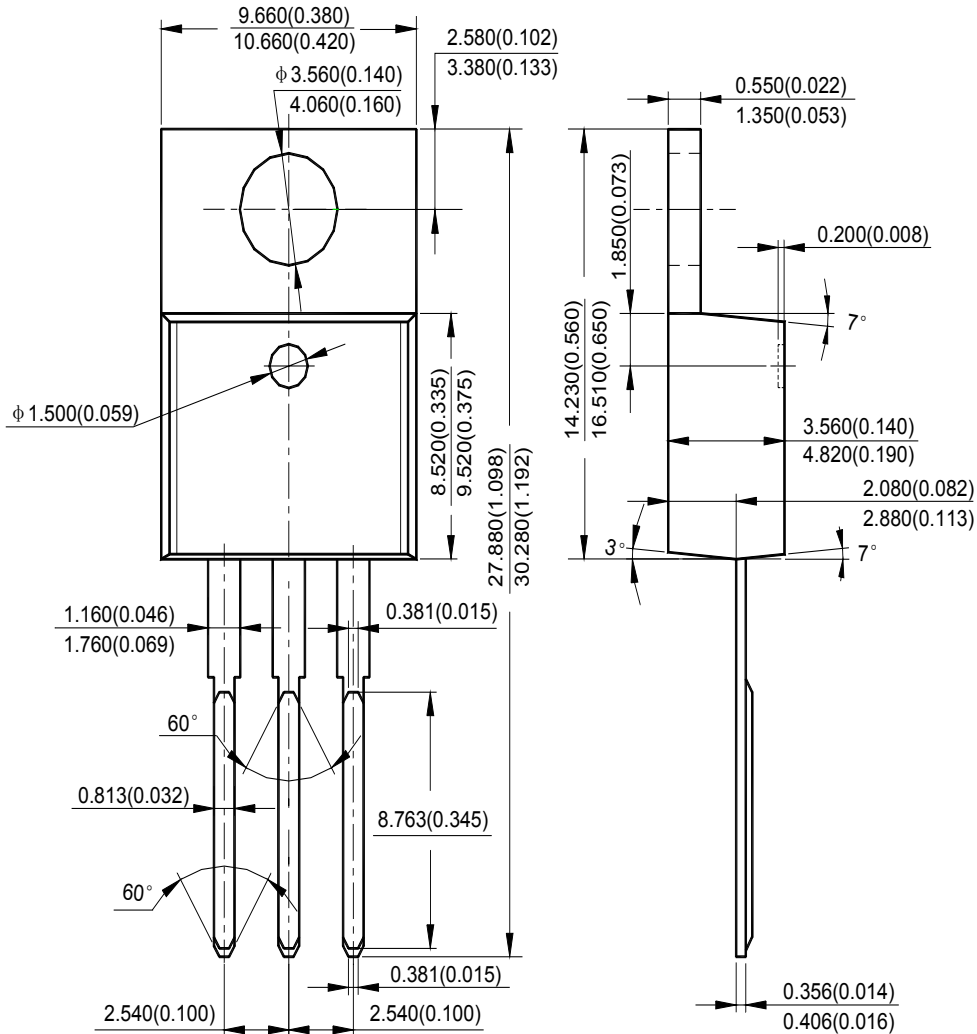
Unit: mm(inch)



Mechanical Dimensions (Continued)

TO-220

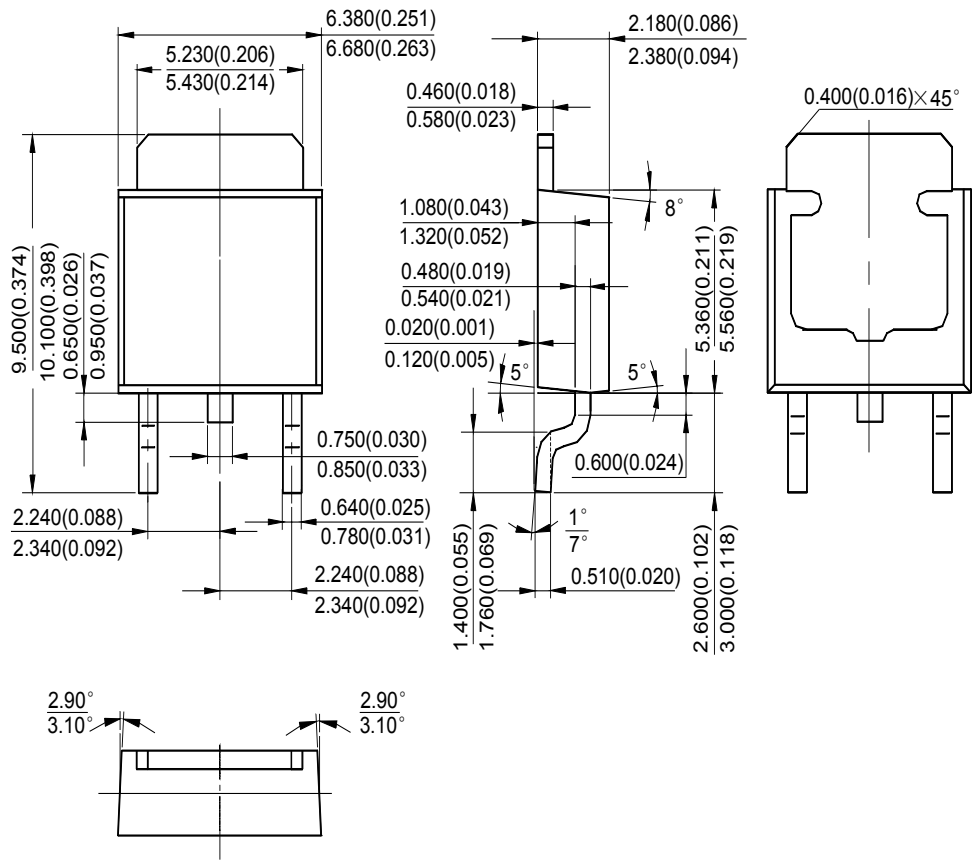
Unit: mm(inch)

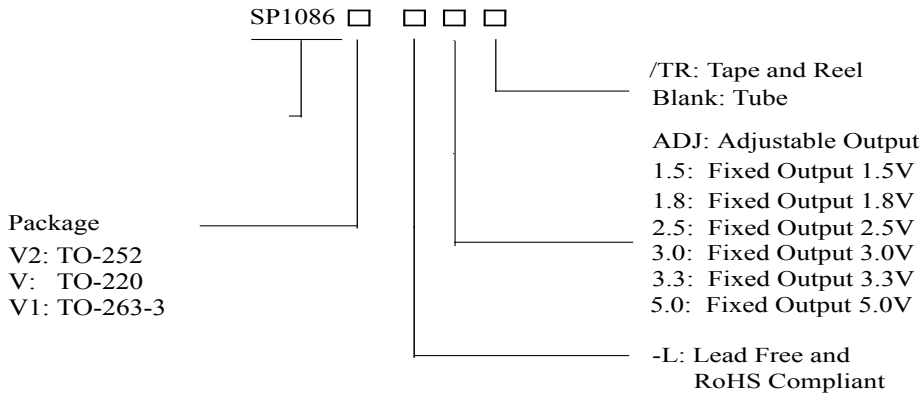


Mechanical Dimensions (Continued)

TO-252

Unit: mm(inch)





Part Number	Voltage Range	Temperature Range	Package	Pin Count	Pack Qty
SP1086V2-L/TR	Adj	0°C to +125°C	TO-252	3	2,500/TR
SP1086V2-L-1-5/TR	1.5V	0°C to +125°C	TO-252	3	2,500/TR
SP1086V2-L-1-8/TR	1.8V	0°C to +125°C	TO-252	3	2,500/TR
SP1086V2-L-2-5/TR	2.5V	0°C to +125°C	TO-252	3	2,500/TR
SP1086V2-L-3-0/TR	3V	0°C to +125°C	TO-252	3	2,500/TR
SP1086V2-L-3-3/TR	3.3V	0°C to +125°C	TO-252	3	2,500/TR
SP1086V2-L-5-0/TR	5V	0°C to +125°C	TO-252	3	2,500/TR
SP1086V1-L/TR	Adj	0°C to +125°C	TO-263	3	800/TR
SP1086V1-L-1-5/TR	1.5V	0°C to +125°C	TO-263	3	800/TR
SP1086V1-L-1-8/TR	1.8V	0°C to +125°C	TO-263	3	800/TR
SP1086V1-L-2-5/TR	2.5V	0°C to +125°C	TO-263	3	800/TR
SP1086V1-L-3-0/TR	3V	0°C to +125°C	TO-263	3	800/TR
SP1086V1-L-3-3/TR	3.3V	0°C to +125°C	TO-263	3	800/TR
SP1086V1-L-5-0/TR	5V	0°C to +125°C	TO-263	3	800/TR
SP1086V-L	Adj	0°C to +125°C	TO-220	3	50/TUBE
SP1086V-L-1-5	1.5V	0°C to +125°C	TO-220	3	50/TUBE
SP1086V-L-1-8	1.8V	0°C to +125°C	TO-220	3	50/TUBE
SP1086V-L-2-5	2.5V	0°C to +125°C	TO-220	3	50/TUBE
SP1086V-L-3-0	3V	0°C to +125°C	TO-220	3	50/TUBE
SP1086V-L-3-3	3.3V	0°C to +125°C	TO-220	3	50/TUBE
SP1086V-L-5-0	5V	0°C to +125°C	TO-220	3	50/TUBE



Sipex Corporation

Headquarters and
Sales Office
233 South Hillview Drive
Milpitas, CA 95035
TEL: (408) 934-7500
FAX: (408) 935-7600

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