

0.7A Low Dropout Positive Voltage Regulator

LM1117N3 series

Features

- Adjustable or Fixed Output
- Output Current of 0.7A
- Low Dropout, 1.4V max at 0.5A Output Current
- Good Noise Rejection
- Output Current Limiting
- Built-in Thermal Shutdown
- Fast Transient Response
- Pb-free lead plating package
- Can operate using MLCCs in the capacitance range of 2μF to 10μF

Description

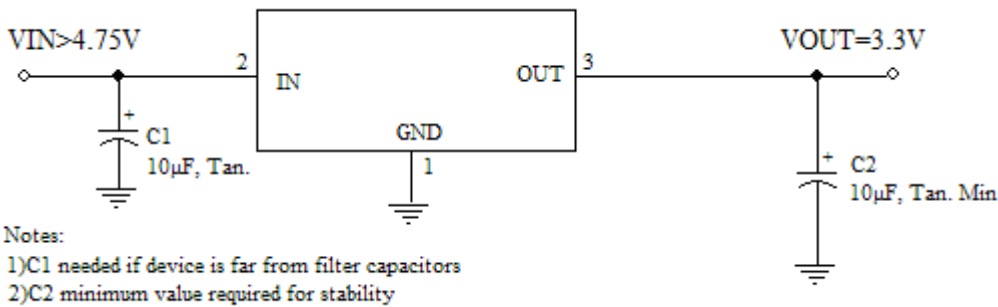
The LM1117 series of positive adjustable and fixed regulators are designed to provide 0.7A with high efficiency. All internal circuitry is designed to operate down to 1.4V input to output differential. The product is specifically designed to provide well-regulated supply for low-voltage IC application such as high-speed bus termination and low current 3.3V logic supply, and other applications such as VGA cards.

Applications

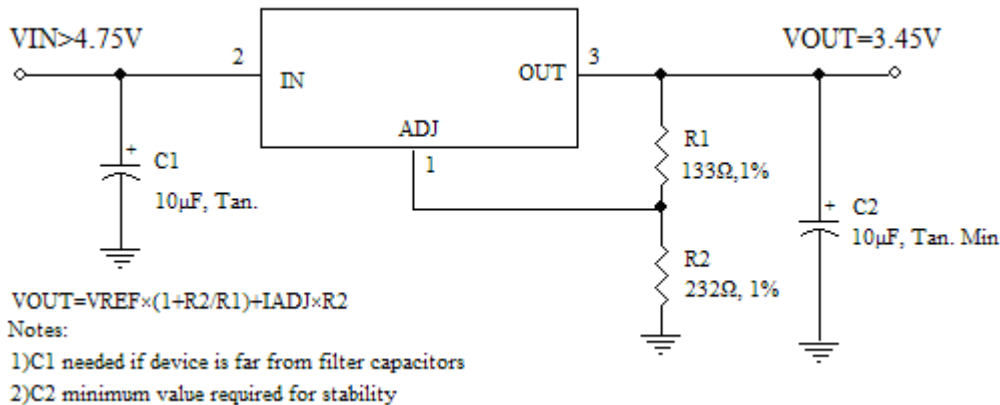
- High Efficiency Linear Regulators
- Post Regulators for Switching Supplies
- Adjustable Power Supply

Typical Application Data

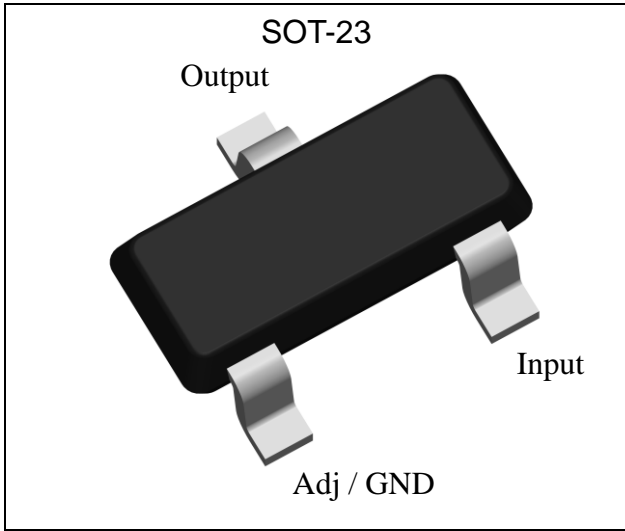
Fixed Voltage Regulator



Adjustable Voltage Regulator



Package Information



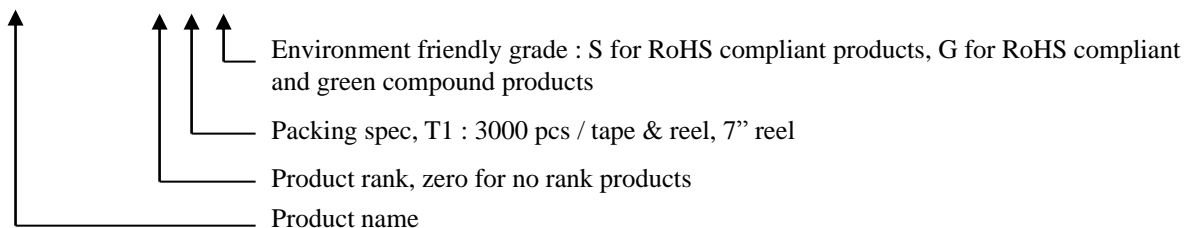
Absolute Maximum Ratings($T_A=25^{\circ}C$)

| Symbol | Parameter | Maximum | Units |
|-----------------|---|------------|---------------|
| P_D | Power Dissipation | 1 (Note) | W |
| V_{IN} | Input Voltage | 20 | V |
| $R_{\theta JA}$ | Thermal resistance, Junction to Ambient | 100 (Note) | $^{\circ}C/W$ |
| T_{OPR} | Operating Junction Temperature Range | -40 ~ +125 | $^{\circ}C$ |
| T_{STG} | Storage Temperature | -65 ~ +150 | $^{\circ}C$ |
| T_{MJ} | Maximum Junction Temperature | 150 | $^{\circ}C$ |

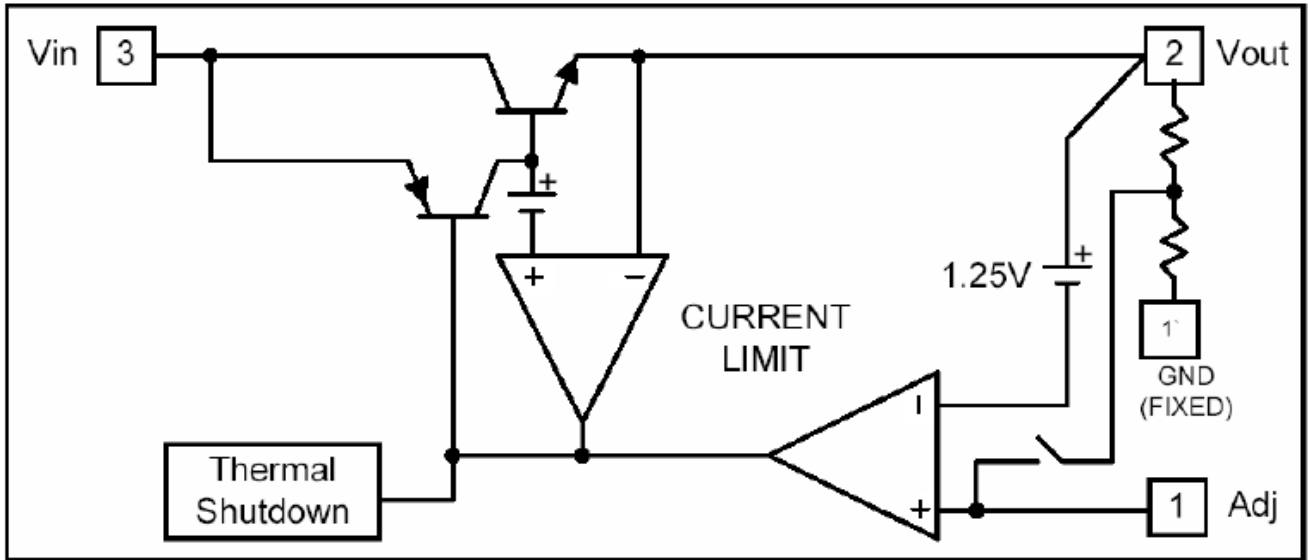
Note : Surface mounted on 1 in² copper pad of FR-4 board, $t \leq 5s$; 120 $^{\circ}C/W$ at steady state; 417 $^{\circ}C/W$ when mounted on minimum copper pad.

Ordering Information

| Device | Output Voltage | Package | Shipping |
|----------------------|----------------|---|-----------------------|
| LM1117-ADJN3-0-T1-G | Adjustable | SOT-23 (pb-free lead plating and halogen-free package) | 3000 pcs/ tape & reel |
| LM1117-1.5N3 -0-T1-G | 1.5V | | |
| LM1117-1.8N3 -0-T1-G | 1.8V | | |
| LM1117-2.5N3 -0-T1-G | 2.5V | | |
| LM1117-3.3N3 -0-T1-G | 3.3V | | |
| LM1117-5.0N3 -0-T1-G | 5.0V | | |



Block Diagram



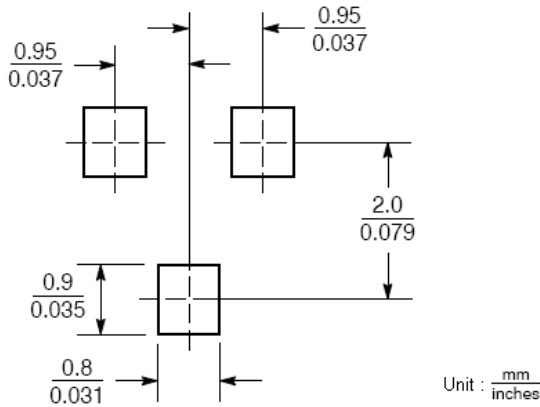
Electrical Characteristics @ $I_o=10mA, T_J=25^\circ C$, unless otherwise specified

| Parameter | Device | Test Conditions | Min | Typ | Max | Units |
|---|---------------|---|-------|-------|-------|---------|
| Reference voltage | Adj version | $V_{IN}-V_{OUT}=1.5V$ | 1.225 | 1.250 | 1.275 | V |
| Output Voltage | LM1117-1.5 | $3.0V \leq V_{IN} \leq 12V$ | 1.470 | 1.500 | 1.530 | V |
| | LM1117-1.8 | $3.3V \leq V_{IN} \leq 12V$ | 1.764 | 1.800 | 1.836 | V |
| | LM1117-2.5 | $4.0V \leq V_{IN} \leq 12V$ | 2.450 | 2.500 | 2.550 | V |
| | LM1117-3.3 | $4.8V \leq V_{IN} \leq 12V$ | 3.235 | 3.300 | 3.365 | V |
| | LM1117-5.0 | $6.5V \leq V_{IN} \leq 12V$ | 4.900 | 5.000 | 5.100 | V |
| Line Regulation | All version | $V_{OUT}+1.5V \leq V_{IN} \leq 12V$ | - | - | 0.2 | % |
| Load Regulation (Note 1, 2) | LM1117-ADJ | $V_{IN}=3.3V, V_{adj}=0, 10mA \leq I_o \leq 0.5A$ | - | - | 1 | % |
| | LM1117-1.5 | $V_{IN}=3.0V, 0mA \leq I_o \leq 0.5A$ | - | 12 | 15 | mV |
| | LM1117-1.8 | $V_{IN}=3.3V, 0mA \leq I_o \leq 0.5A$ | - | 15 | 18 | mV |
| | LM1117-2.5 | $V_{IN}=4.0V, 0mA \leq I_o \leq 0.5A$ | - | 20 | 25 | mV |
| | LM1117-3.3 | $V_{IN}=5.0V, 0mA \leq I_o \leq 0.5A$ | - | 26 | 33 | mV |
| | LM1117-5.0 | $V_{IN}=8.0V, 0mA \leq I_o \leq 0.5A$ | - | 40 | 50 | mV |
| Dropout Voltage ($V_{IN}-V_{OUT}$) | All version | $I_o=0.5A (\Delta V_{OUT}=1\% V_{OUT})$ | - | 1.3 | 1.4 | V |
| Current Limit | All version | $V_{IN}-V_{OUT}=5V$ | 0.7 | - | - | A |
| Minimum Load Current | Adj version | $V_{IN}=5V$ | - | 5 | 10 | mA |
| Adjust Pin Current | Adj version | $V_{IN}=12V, I_o=10mA$ | - | 50 | 100 | μA |
| Quiescent Current | Fixed version | $V_{IN}=12V, I_o=0mA$ | - | - | 12 | mA |

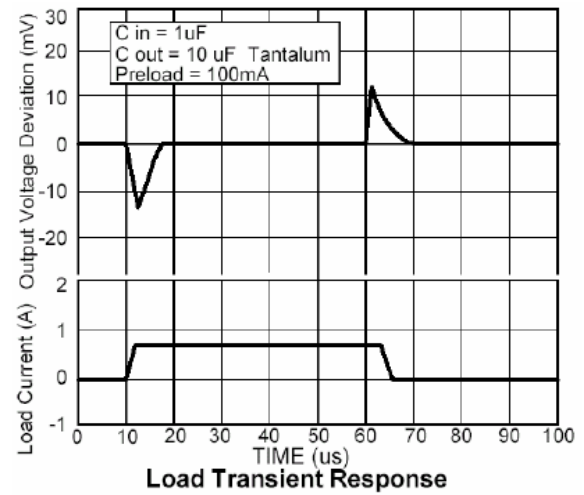
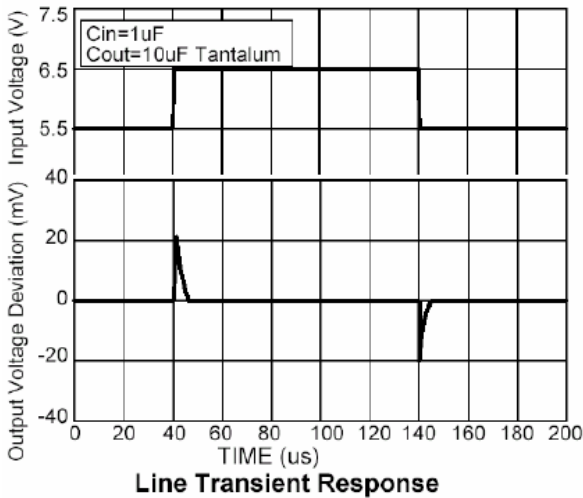
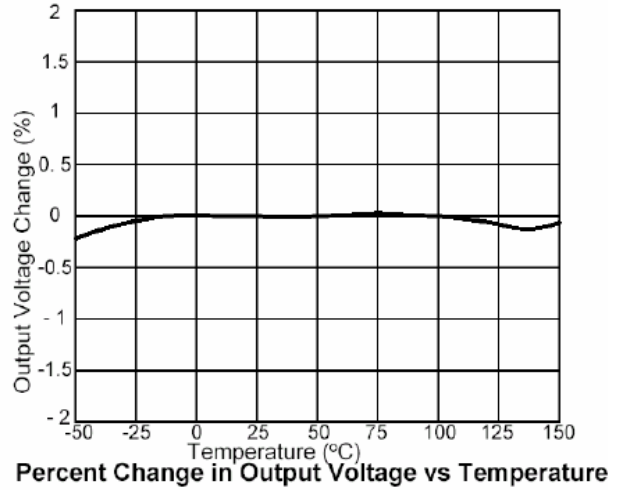
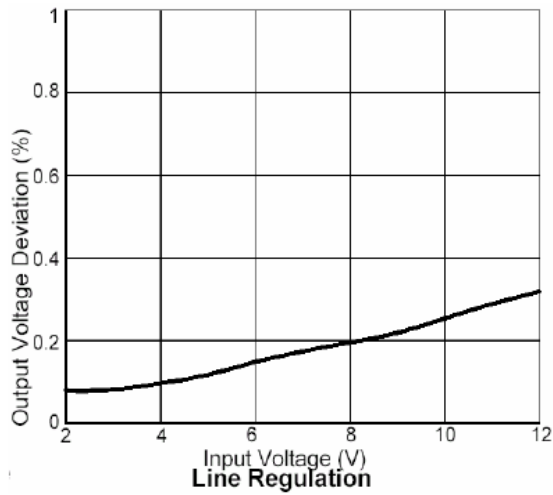
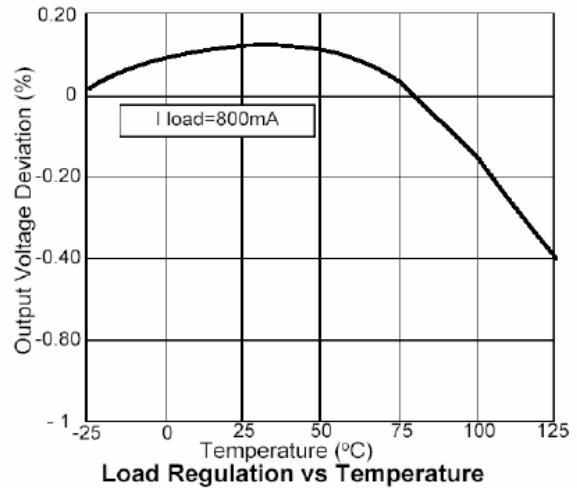
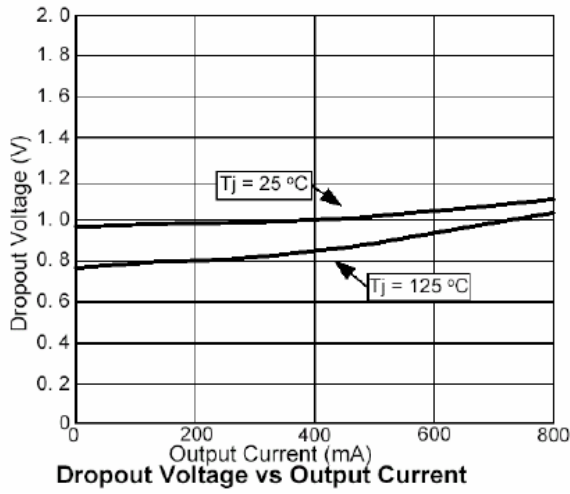
| | | | | | | |
|-----------------------|-------------|---|----|-------|------|-----|
| Thermal Regulation | All version | $T_A=25^{\circ}\text{C}$, 30ms pulse | - | 0.008 | 0.04 | %/W |
| Ripple Rejection | All version | $f=120\text{Hz}$, $V_{IN}=V_{OUT}+3\text{V}$, $I_O=0.7\text{A}$, $C_{OUT}=25\mu\text{F}$ tantalum | 60 | 70 | - | dB |
| Temperature Stability | All version | $I_O=10\text{mA}$ | - | 0.5 | - | % |

Note : 1. See thermal regulation specifications for changes in output voltage due to heating effects. Line and load regulation are measured at a constant junction temperature by low duty cycle pulse testing.
 2. Line and load regulation are guaranteed up to the maximum power dissipation of 1W when device is mounted on FR-4 board and the pulse width is less than 5s. Power dissipation is determined by the difference in input and output voltage and the output current. Guaranteed maximum power dissipation will not be available over the full input/output range.

Recommended soldering footprint



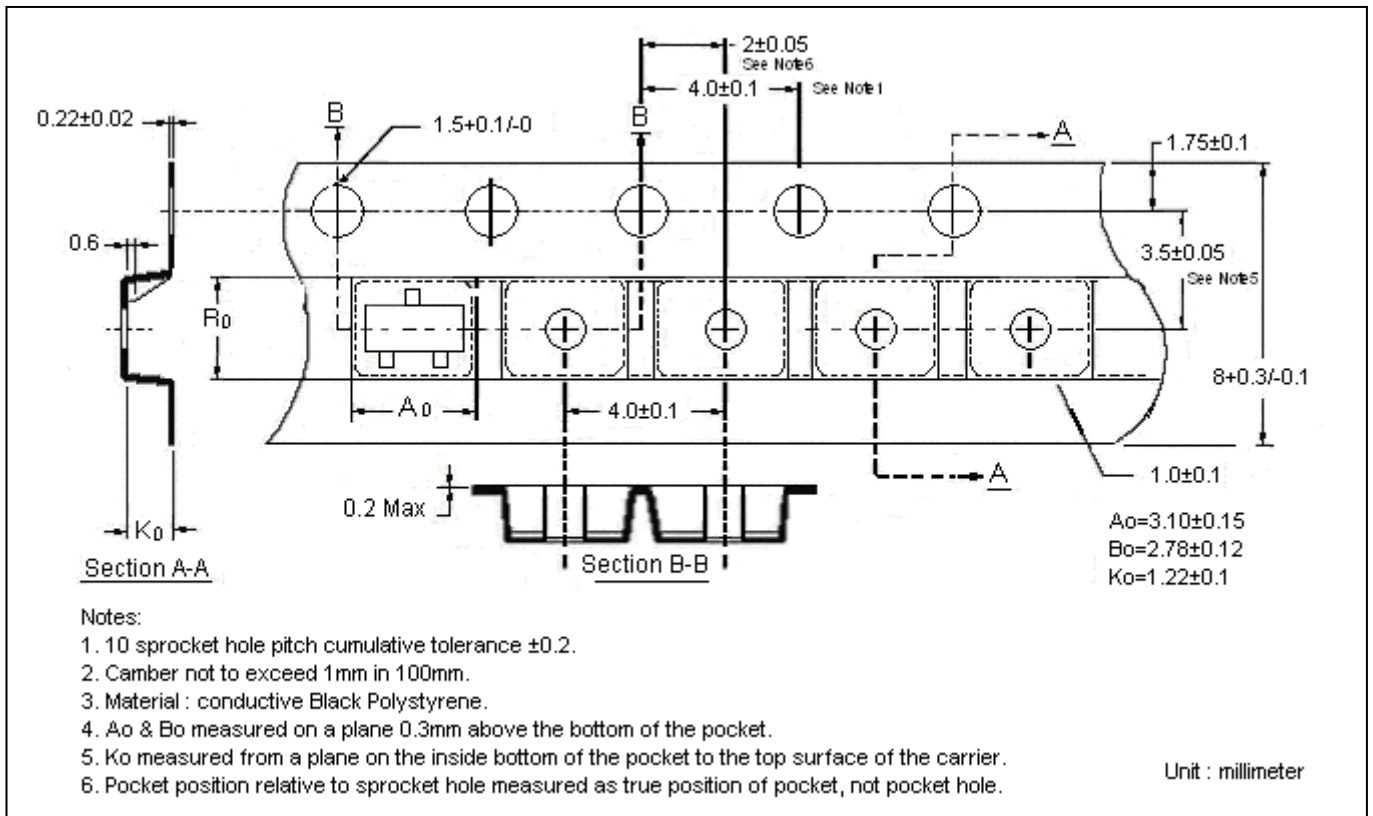
Typical Characteristics



Reel Dimension



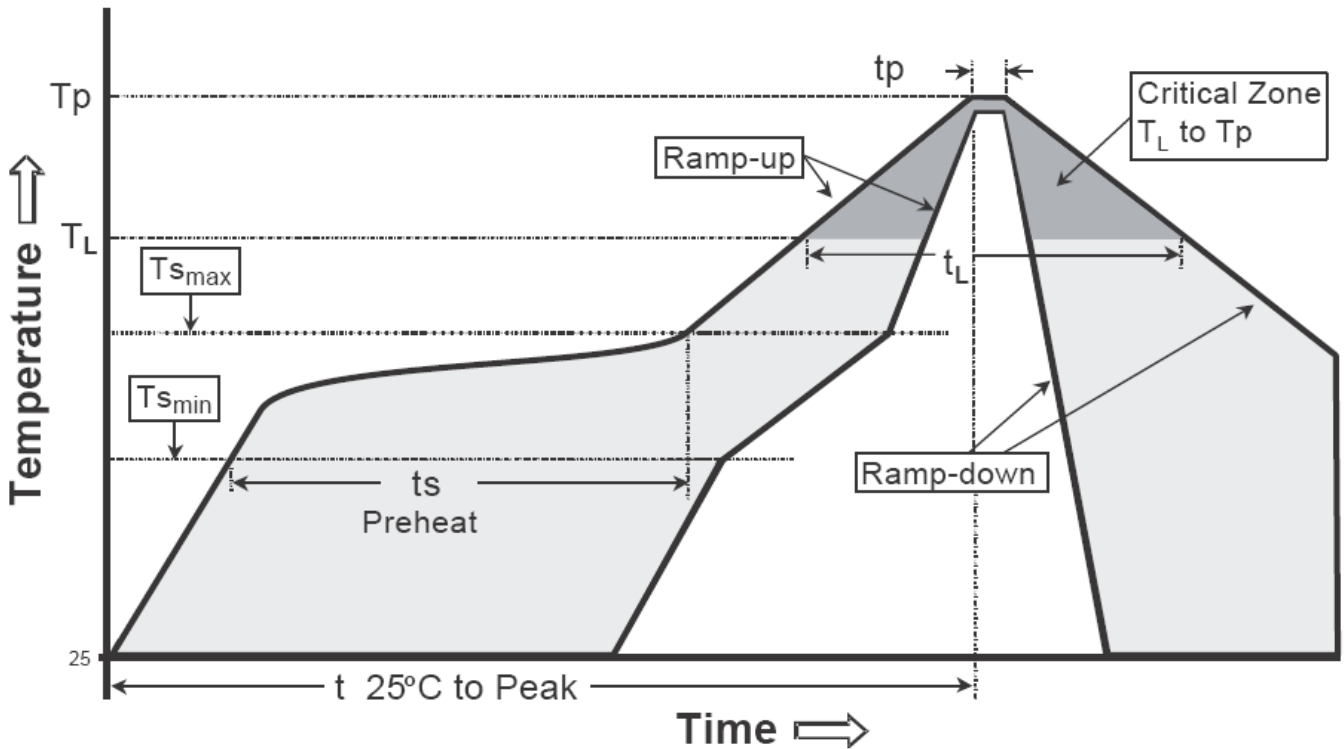
Carrier Tape Dimension



Recommended wave soldering condition

| | | |
|-----------------|------------------|-----------------|
| Product | Peak Temperature | Soldering Time |
| Pb-free devices | 260 +0/-5 °C | 5 +1/-1 seconds |

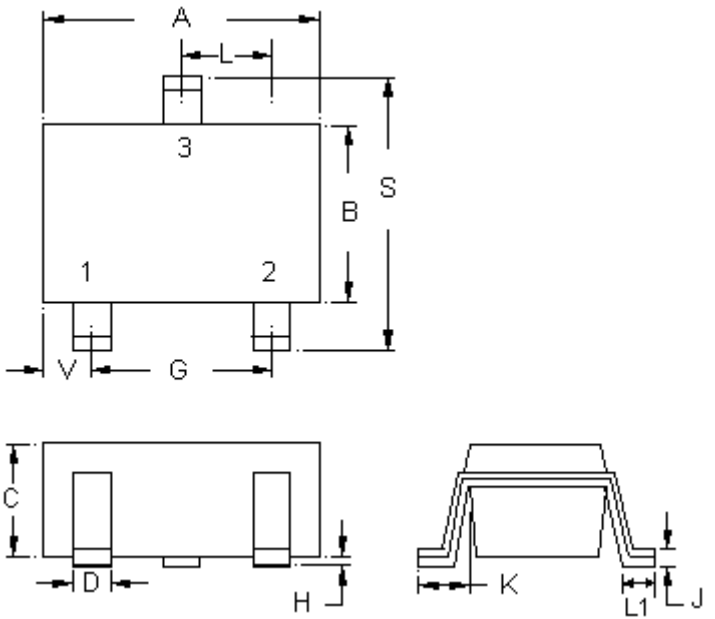
Recommended temperature profile for IR reflow



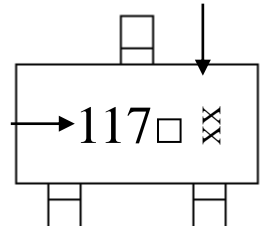
| Profile feature | Sn-Pb eutectic Assembly | Pb-free Assembly |
|---|-------------------------|------------------|
| Average ramp-up rate (T _{smax} to T _p) | 3°C/second max. | 3°C/second max. |
| Preheat | | |
| -Temperature Min(T _{s min}) | 100°C | 150°C |
| -Temperature Max(T _{s max}) | 150°C | 200°C |
| -Time(t _{s min} to t _{s max}) | 60-120 seconds | 60-180 seconds |
| Time maintained above: | | |
| -Temperature (T _L) | 183°C | 217°C |
| - Time (t _L) | 60-150 seconds | 60-150 seconds |
| Peak Temperature(T _P) | 240 +0/-5 °C | 260 +0/-5 °C |
| Time within 5°C of actual peak temperature(tp) | 10-30 seconds | 20-40 seconds |
| Ramp down rate | 6°C/second max. | 6°C/second max. |
| Time 25 °C to peak temperature | 6 minutes max. | 8 minutes max. |

Note : All temperatures refer to topside of the package, measured on the package body surface.

SOT-23 Dimension



Marking:



□ : A→Adj XX : year (bottom)+month
 0→1.5V year code : the last digit of
 1→1.8V christian year
 2→2.5V month code : 1~9 for Jan
 3→3.3V thru Sep, A~C for Oct thru
 5→5.0V Dec

Style : Pin 1.Adj/GND 2.Input 3.Output

3-Lead SOT-23 Plastic
 Surface Mounted Package
 CYStek Package Code: N3

*:Typical

| DIM | Inches | | Millimeters | | DIM | Inches | | Millimeters | |
|-----|--------|--------|-------------|------|-----|--------|--------|-------------|------|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | 0.1102 | 0.1204 | 2.80 | 3.04 | J | 0.0032 | 0.0079 | 0.08 | 0.20 |
| B | 0.0472 | 0.0669 | 1.20 | 1.70 | K | 0.0118 | 0.0266 | 0.30 | 0.67 |
| C | 0.0335 | 0.0512 | 0.89 | 1.30 | L | 0.0335 | 0.0453 | 0.85 | 1.15 |
| D | 0.0118 | 0.0197 | 0.30 | 0.50 | S | 0.0830 | 0.1161 | 2.10 | 2.95 |
| G | 0.0669 | 0.0910 | 1.70 | 2.30 | V | 0.0098 | 0.0256 | 0.25 | 0.65 |
| H | 0.0000 | 0.0040 | 0.00 | 0.10 | L1 | 0.0118 | 0.0197 | 0.30 | 0.50 |

Notes : 1.Controlling dimension : millimeters.
 2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
 3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

Material :

- Lead : Pure tin plated.
- Mold Compound : Epoxy resin family, flammability solid burning class:UL94V-0.

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