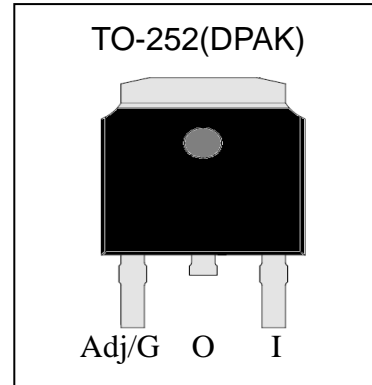


1A Low Dropout Positive Voltage Regulator

LM1117-XXXJ3



Features

- Adjustable or Fixed Output
- Output Current of 1A
- Low Dropout, 1.4V max at 1A Output Current
- Good Noise Rejection
- Output Current Limiting
- Built-in Thermal Shutdown
- Fast Transient Response
- Can operate using MLCCs in the capacitance range of 2μF to 10μF

Description

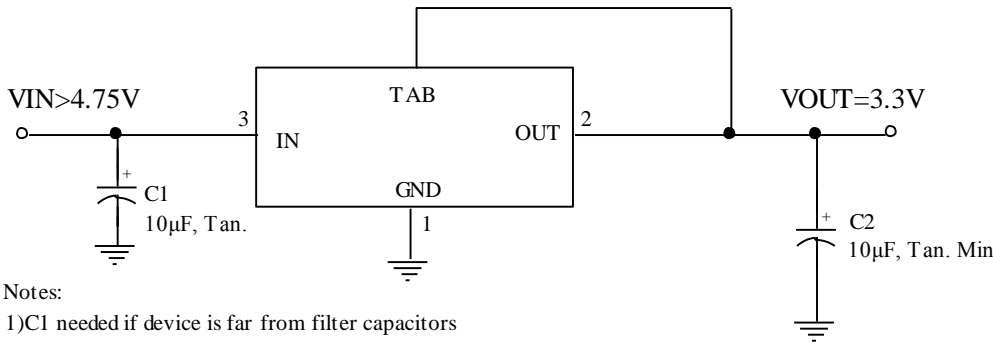
The LM1117 series of positive adjustable and fixed regulators are designed to provide 1A with high efficiency. All internal circuitry is designed to operate down to 1.4V input to output differential. The product is specifically designed to provide well-regulated supply for low-voltage IC application 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

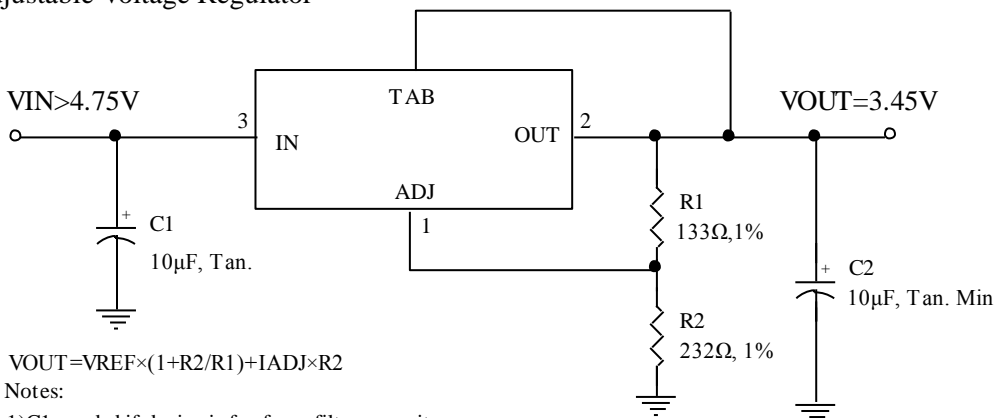
Fixed Voltage Regulator



Notes:

- 1)C1 needed if device is far from filter capacitors
- 2)C2 minimum value required for stability

Adjustable Voltage Regulator

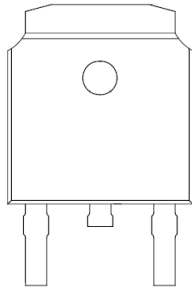


$$V_{OUT} = V_{REF} \times (1 + R2/R1) + I_{ADJ} \times R2$$

Notes:

- 1)C1 needed if device is far from filter capacitors
- 2)C2 minimum value required for stability

Package Information



1 2 3

TO-252

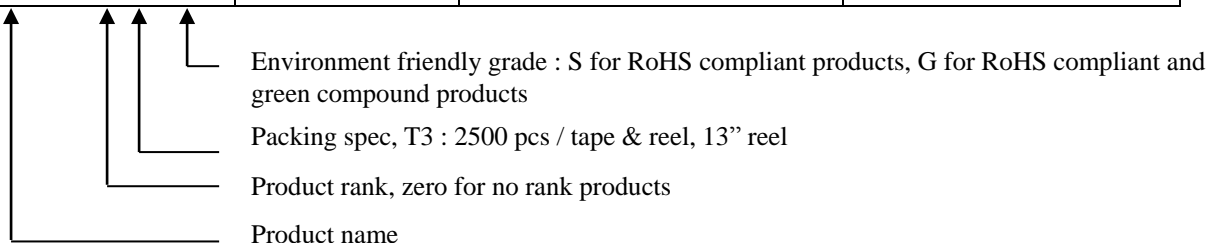
| Pin | Name |
|-----|---------|
| 1 | ADJ/GND |
| 2 | OUTPUT |
| 3 | INPUT |

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

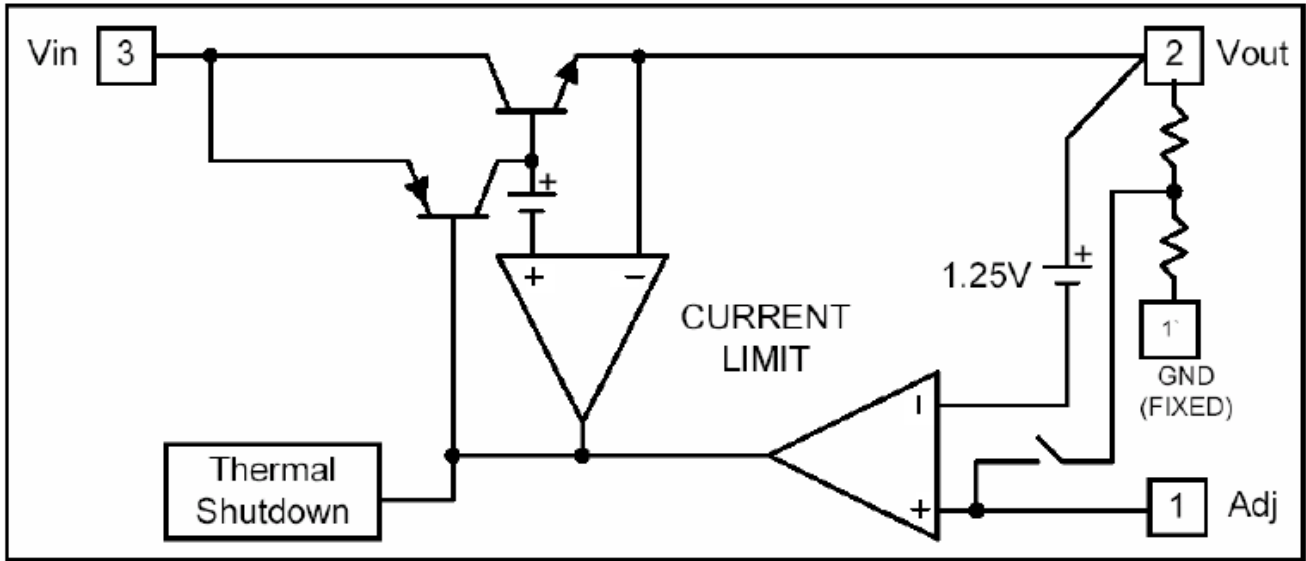
| Symbol | Parameter | Maximum | Units |
|-----------|--------------------------------------|------------|--------------------|
| P_D | Power Dissipation@ minimum footprint | 850 | mW |
| V_{IN} | Input Voltage | 20 | V |
| T_{OPR} | Operating Junction Temperature Range | -40 ~ +125 | $^{\circ}\text{C}$ |
| T_{STG} | Storage Temperature | -65 ~ +150 | $^{\circ}\text{C}$ |
| T_{MJ} | Maximum Junction Temperature | 150 | $^{\circ}\text{C}$ |

Ordering Information

| Device | Output Voltage | Package | Shipping |
|---------------------|----------------|--|------------------------|
| LM1117-ADJJ3-0-T3-G | Adjustable | TO-252 (Pb-free lead plating and halogen-free package) | 2500 pcs / Tape & Reel |
| LM1117-1.5J3-0-T3-G | 1.5V | | |
| LM1117-1.8J3-0-T3-G | 1.8V | | |
| LM1117-2.5J3-0-T3-G | 2.5V | | |
| LM1117-3.3J3-0-T3-G | 3.3V | | |
| LM1117-5.0J3-0-T3-G | 5.0V | | |



Block Diagram



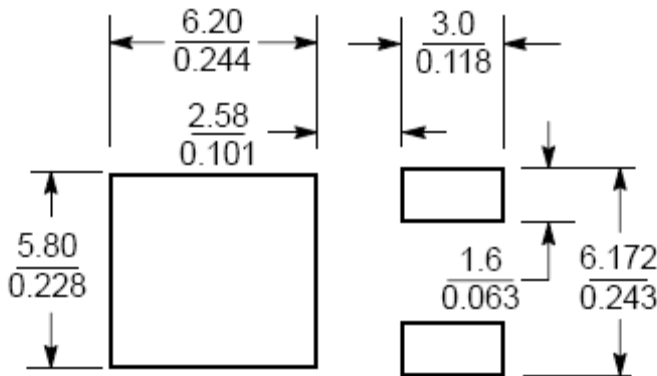
Electrical Characteristics @ $I_o=10mA, T_J=25^\circ C$, unless otherwise specified

| 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 | $V_{IN}=3.3V, V_{adj}=0, 10mA \leq I_o \leq 1A$ | - | - | 1 | % |
| | LM1117-1.5 | $V_{IN}=3.0V, 0mA \leq I_o \leq 1A$ | - | 12 | 15 | mV |
| | LM1117-1.8 | $V_{IN}=3.3V, 0mA \leq I_o \leq 1A$ | - | 15 | 18 | mV |
| | LM1117-2.5 | $V_{IN}=4.0V, 0mA \leq I_o \leq 1A$ | - | 20 | 25 | mV |
| | LM1117-3.3 | $V_{IN}=5.0V, 0mA \leq I_o \leq 1A$ | - | 26 | 33 | mV |
| | LM1117-5.0 | $V_{IN}=8.0V, 0mA \leq I_o \leq 1A$ | - | 40 | 50 | mV |
| Dropout Voltage ($V_{IN}-V_{OUT}$) | All version | $I_o=1A (\Delta V_{OUT}=1\% V_{OUT})$ | - | 1.3 | 1.4 | V |
| Current Limit | All version | $V_{IN}-V_{OUT}=5V$ | 1.1 | - | - | A |
| Minimum Load Current | Adj version | $V_{IN}=5V$ | - | 2 | 7 | 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 | $T_A=25^\circ C, 30ms$ pulse | - | 0.008 | 0.04 | %/W |

| | | | | | | |
|--|-------------|---|----|-----|---|-----------------------------|
| Ripple Rejection | All version | $f=120\text{Hz}$, $V_{IN}=V_{OUT}+3\text{V}$, $I_O=1\text{A}$, $C_{OUT}=25\mu\text{F}$ tantalum | 60 | 70 | - | dB |
| Temperature Stability | All version | $I_O=10\text{mA}$ | - | 0.5 | - | % |
| Thermal Resistance, Junction to Ambient (No heat sink, no air flow) | All version | | - | 117 | - | $^{\circ}\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Case | All version | Control Circuitry/ Power transistor | - | 15 | - | $^{\circ}\text{C}/\text{W}$ |

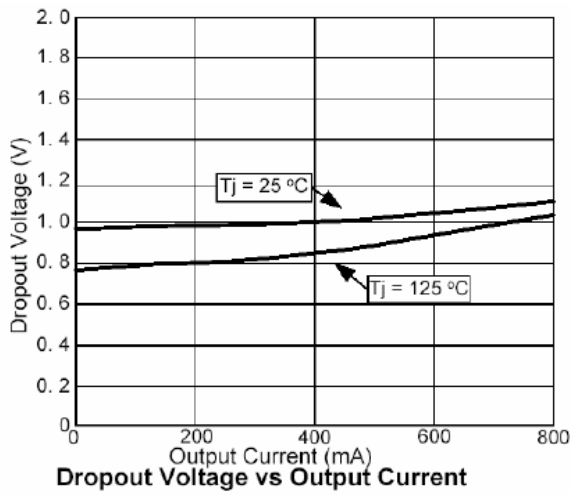
Note : 1. See thermal regulation specifications for changes in output voltage due to heating effects. Line and load regulation are measured at a constant junction temperature by low duty cycle pulse testing. Load regulation is measured at the output lead 1/18" from the package.
 2. Line and load regulation are guaranteed up to the maximum power dissipation of 6.7W. Power dissipation is determined by the difference in input and output and the output current. Guaranteed maximum power dissipation will not be available over the full input/output range.

Recommended soldering footprint

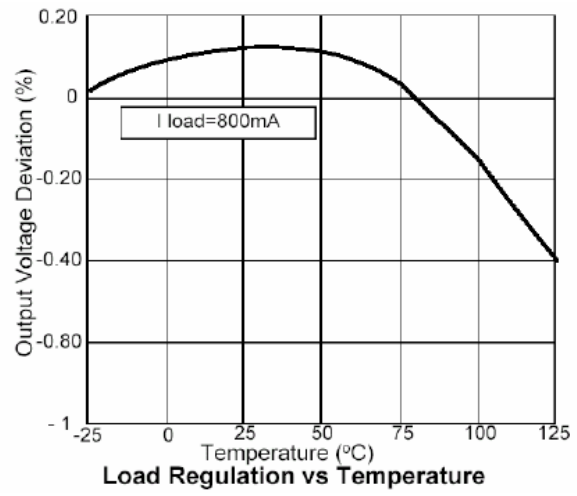


Unit ($\frac{\text{mm}}{\text{inch}}$)

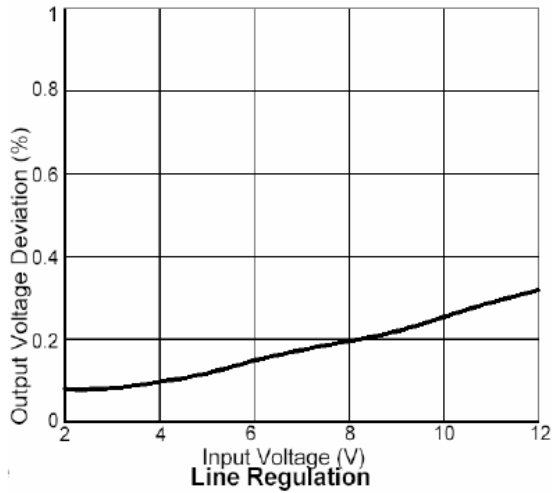
Typical Characteristics



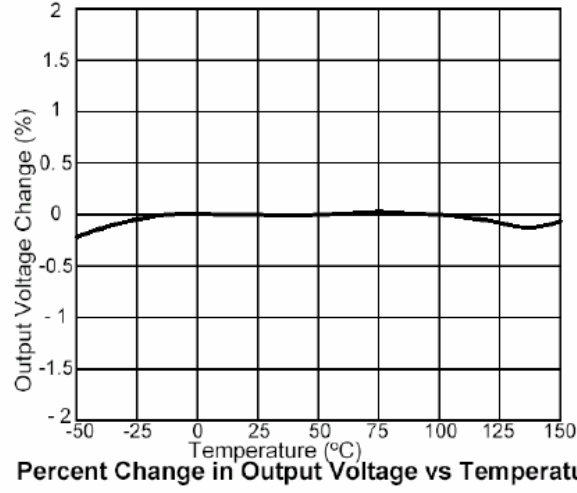
Dropout Voltage vs Output Current



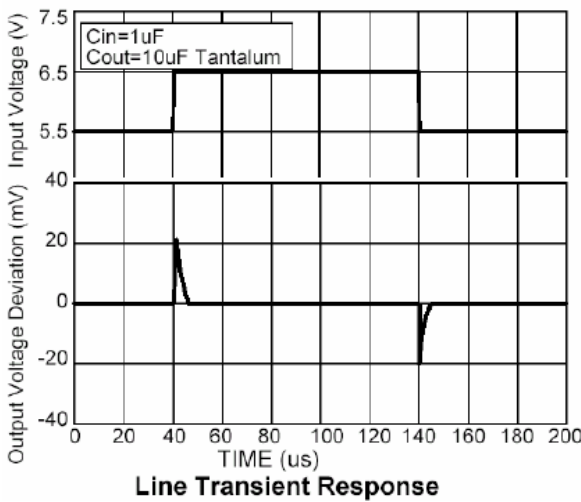
Load Regulation vs Temperature



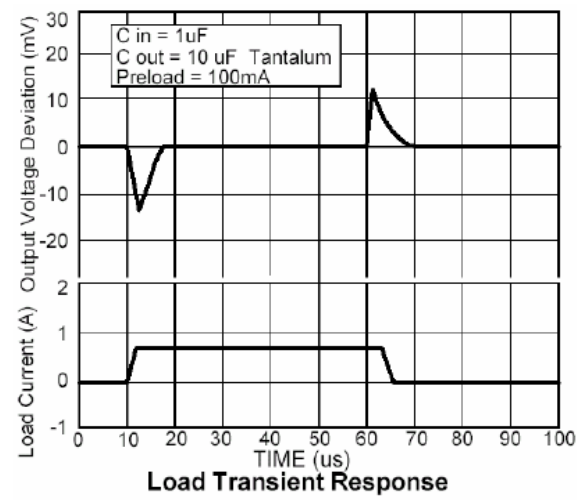
Line Regulation



Percent Change in Output Voltage vs Temperature

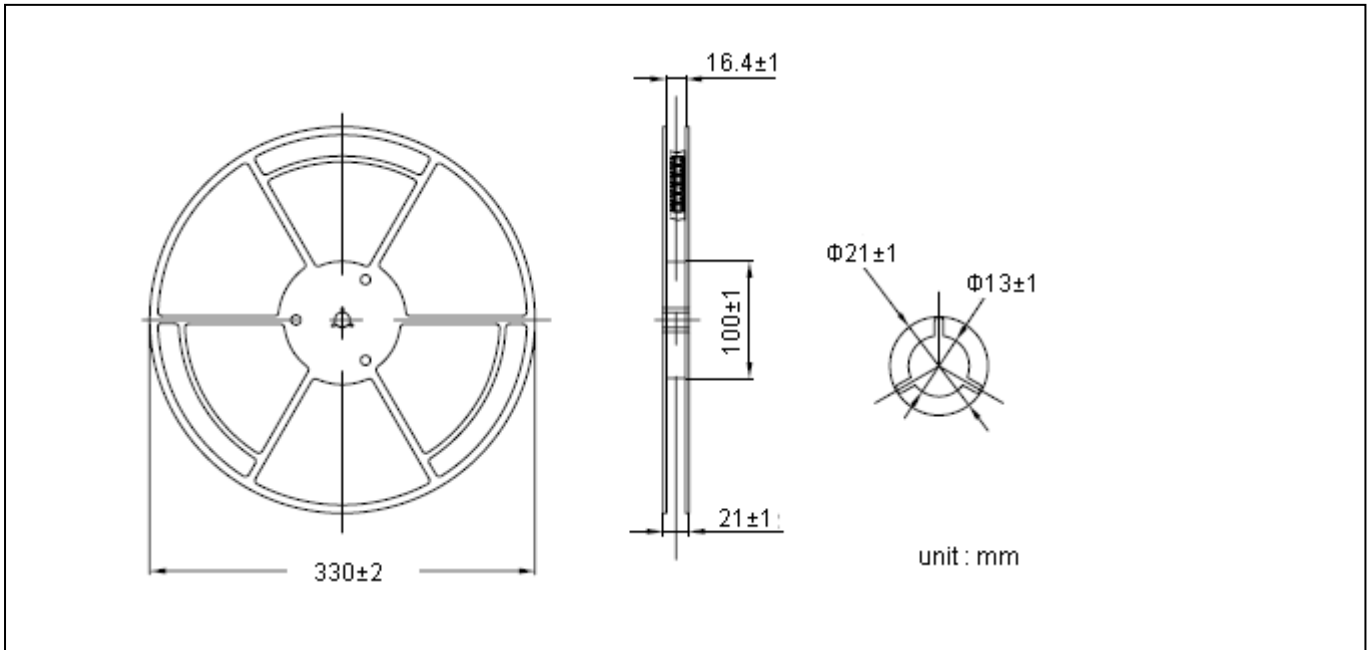


Line Transient Response

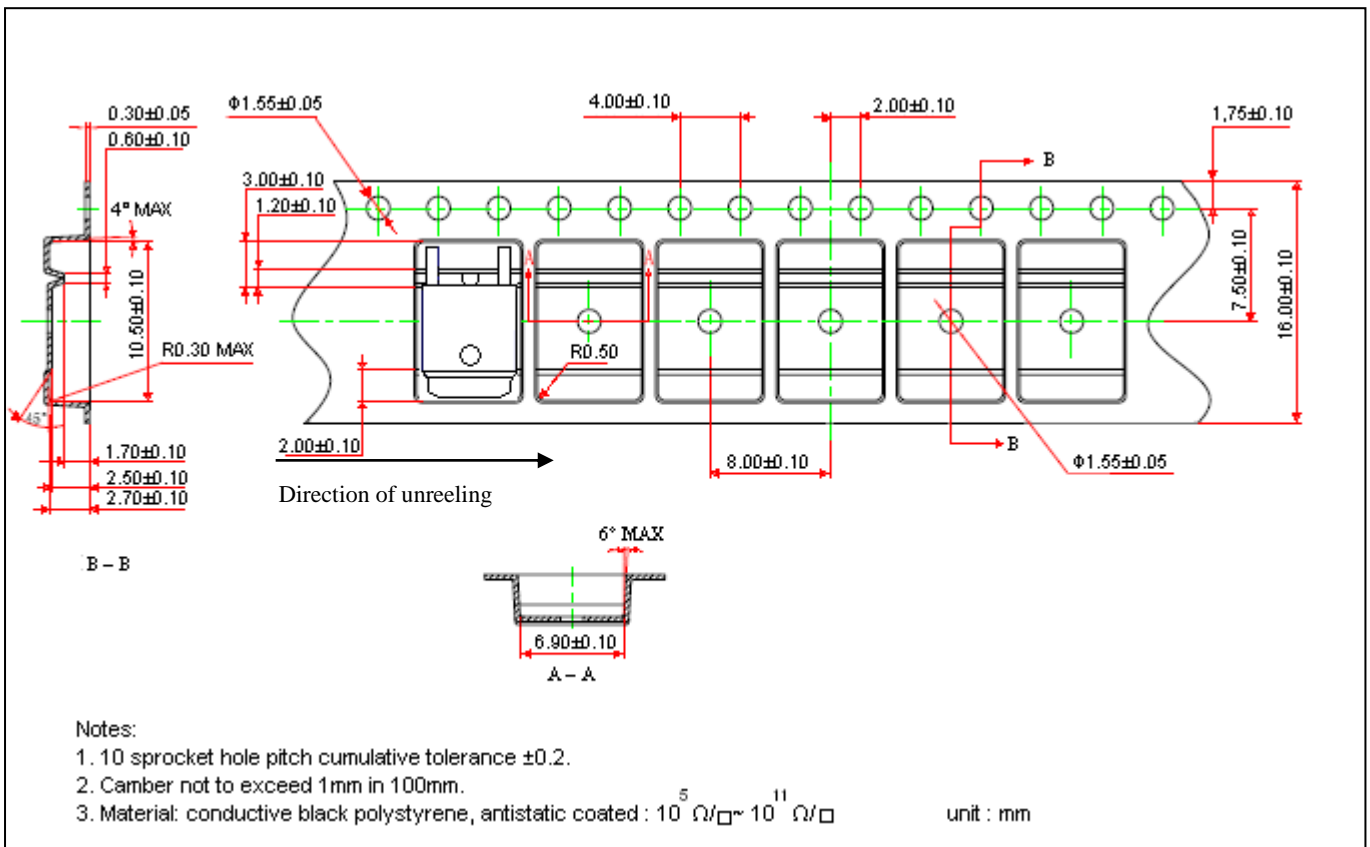


Load Transient Response

Reel Dimension



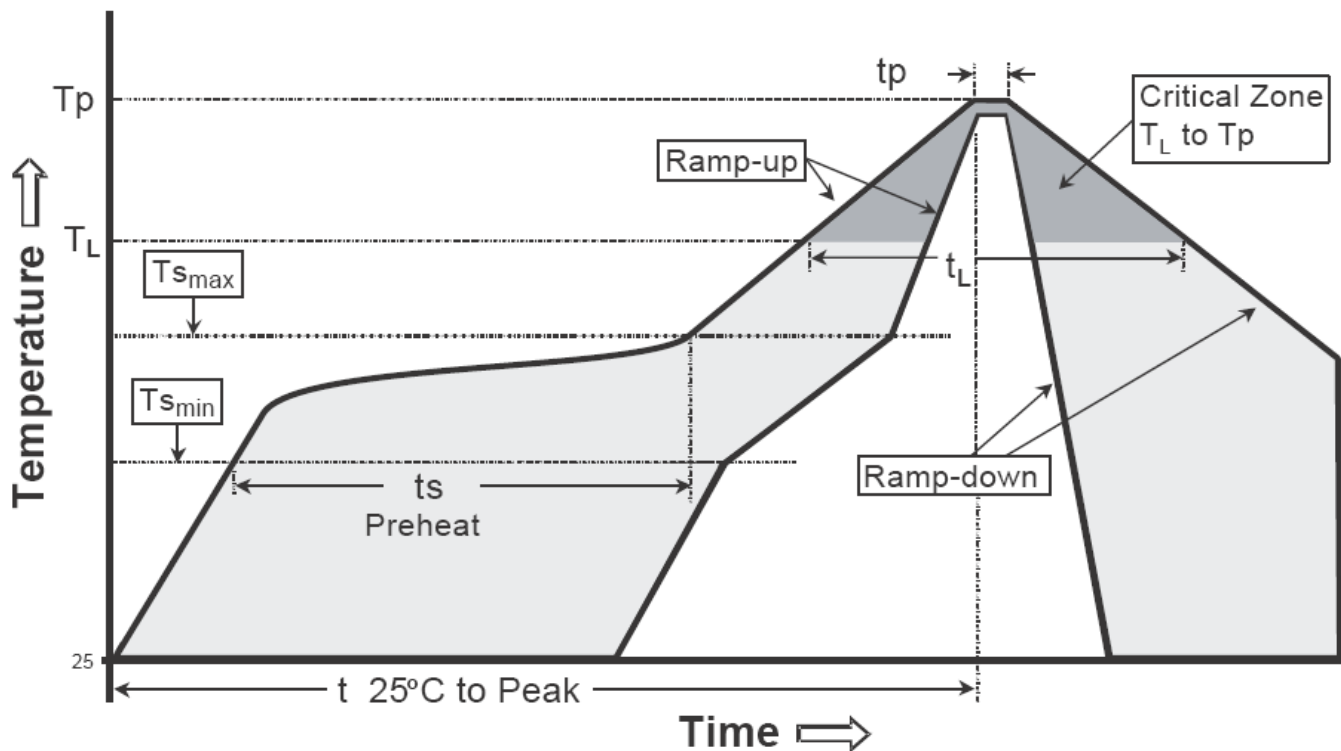
Carrier Tape Dimension



Recommended wave soldering condition

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

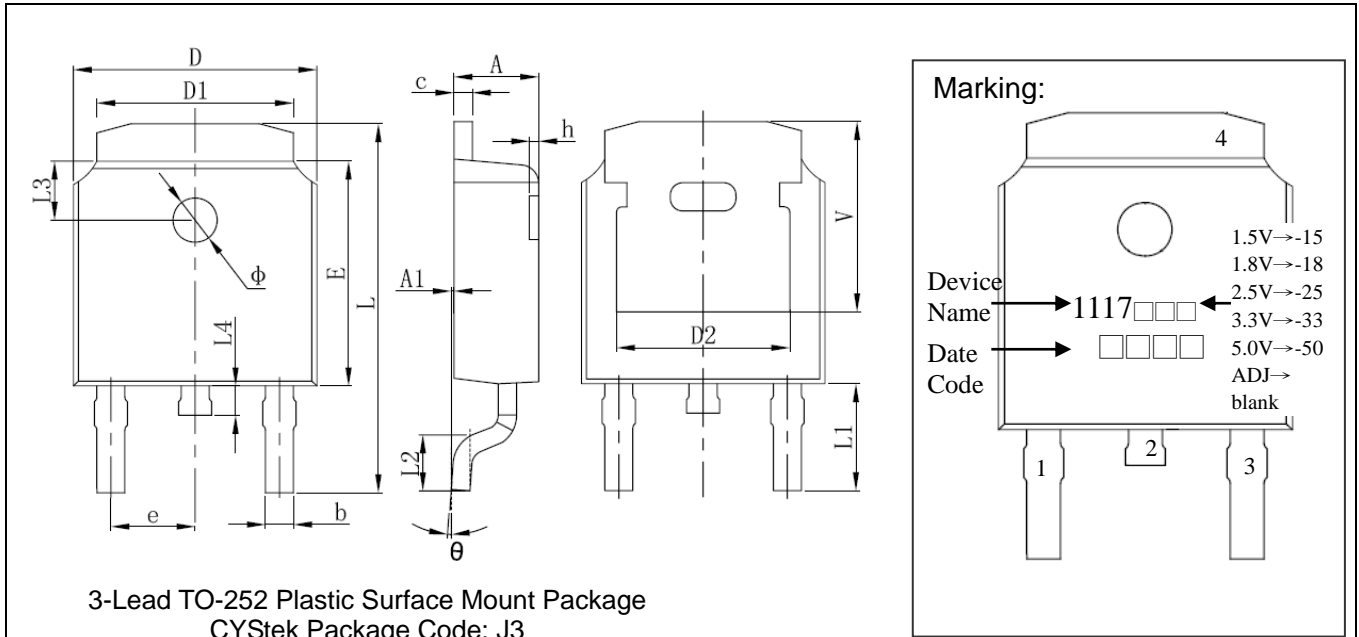
Recommended temperature profile for IR reflow



| 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.

TO-252 Dimension



3-Lead TO-252 Plastic Surface Mount Package
 CYStek Package Code: J3

Date Code :
 First Code : Last digit of Christian Year
 Second Code : Month Code : Jan→A, Feb→B, Mar→C, Apr→D, May→E, Jun→F, Jul→G, Aug→H, Sep→J, Oct→K, Nov→L, Dec→M
 Last Two Codes : Production Serial Code. 01~99

Style: Pin 1.Adj/Ground 2.Vout 3.Vin
 4.Vout

| DIM | Inches | | Millimeters | | DIM | Inches | | Millimeters | |
|-----|--------|-------|-------------|-------|-----|--------|-------|-------------|--------|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | 0.087 | 0.094 | 2.200 | 2.400 | e | 0.086 | 0.094 | 2.186 | 2.386 |
| A1 | 0.000 | 0.005 | 0.000 | 0.127 | e1 | 0.172 | 0.188 | 4.372 | 4.772 |
| B | 0.039 | 0.048 | 0.990 | 1.210 | H | 0.163 | REF | 4.140 | REF |
| b | 0.026 | 0.034 | 0.660 | 0.860 | K | 0.190 | REF | 4.830 | REF |
| b1 | 0.026 | 0.034 | 0.660 | 0.860 | L | 0.386 | 0.409 | 9.800 | 10.400 |
| C | 0.018 | 0.023 | 0.460 | 0.580 | L1 | 0.114 | REF | 2.900 | REF |
| C1 | 0.018 | 0.023 | 0.460 | 0.580 | L2 | 0.055 | 0.067 | 1.400 | 1.700 |
| D | 0.256 | 0.264 | 6.500 | 6.700 | L3 | 0.024 | 0.039 | 0.600 | 1.000 |
| D1 | 0.201 | 0.215 | 5.100 | 5.460 | P | 0.026 | REF | 0.650 | REF |
| E | 0.236 | 0.244 | 6.000 | 6.200 | V | 0.211 | REF | 5.350 | REF |

- 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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