# LM1117 800-mA, Low-Dropout Linear Regulator

## 1 Features

- For a newer drop-in alternative, see the TLV1117
- For drop-in replacements in fixed output SOT-223 package configuration and improved functionality, see the TLV761
- Available in 1.8 V, 2.5 V, 3.3 V, 5 V, and adjustable versions
- Space-saving SOT-223 and WSON packages
- Current limiting and thermal protection
- Output current: 800 mA
- Line regulation: 0.2% (maximum)
- Load regulation: 0.4% (maximum)
- Temperature range:
  - LM1117: 0°C to +125°C
  - LM1117I: –40°C to +125°C

## 2 Applications

- AC drive power stage modules
- Merchant network and server PSU
- Industrial AC/DC
- Ultrasound scanners
- Servo drive control modules

## 3 Description

The LM1117 is a low dropout voltage regulator with a dropout of 1.2 V at 800 mA of load current.

The LM1117 is available in an adjustable version, which can set the output voltage from 1.25 V to 13.8 V with only two external resistors. In addition, the device is available in five fixed voltages, 1.8 V, 2.5 V, 3.3 V, and 5 V.

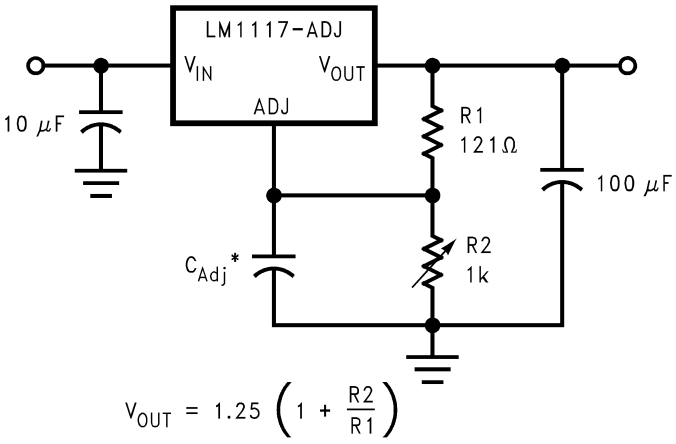
The LM1117 offers current limiting and thermal shutdown. The circuit includes a Zener trimmed band-gap reference to assure output voltage accuracy to within ±1%.

A minimum of 10-µF tantalum capacitor is required at the output to improve the transient response and stability.

**Package Information**

| PART NUMBER | PACKAGE(1) | BODY SIZE (NOM) |
|---|---|---|
| LM1117, LM1117I | DCY (SOT-223, 4) | 6.50 mm × 3.50 mm |
| | NDE (TO-220, 3) | 14.986 mm × 10.16 mm |
| | NDP (TO-252, 3) | 6.58 mm × 6.10 mm |
| | NGN (WSON, 8) | 4.00 mm × 4.00 mm |
| | KTT (TO-263, 3) | 10.18 mm × 8.41 mm |

(1) For all available packages, see the orderable addendum at the end of the data sheet.




*$C_{Adj}$ is optional, however it will improve ripple rejection.

**Adjustable Output Regulator**

An IMPORTANT NOTICE at the end of this data sheet addresses availability, warranty, changes, use in safety-critical applications, intellectual property matters and other important disclaimers. PRODUCTION DATA.

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## 4 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

| Changes from Revision P (July 2022) to Revision Q (January 2023) | Page |
|---|---|
| • Added drop-in replacement bullet for TLV761 to *Features* section | 1 |

| Changes from Revision O (June 2020) to Revision P (July 2022) | Page |
|---|---|
| • Updated the numbering format for tables, figures, and cross-references throughout the document | 1 |


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## 5 Device Comparison Table

| $I_{OUT}$ | PARAMETER | LM1117 | TLV1117 | UNIT |
|---|---|---|---|---|
| 800 mA | Input voltage range (max) | 15 | 15 | V |
| | Load regulation accuracy | 1.6 | 1.6 | % |
| | PSRR (120 Hz) | 75 | 75 | dB |
| | Recommended operating temperature | 0 – 125 | -40 – 125 | °C |
| | SOT-223 $T_{JA}$ | 61.6 | 104.3 | °C/W |
| | TO-220 $T_{JA}$ | 23.8 | 30.1 | °C/W |
| | TO-252 $T_{JA}$ | 45.1 | 50.9 | °C/W |
| | TO-263 $T_{JA}$ | 41.3 | 27.5 | °C/W |
| | WSON-8 $T_{JA}$ | 39.3 | 38.3 | °C/W |

## 6 Pin Configuration and Functions

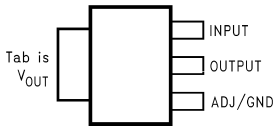



**Figure 6-1. DCY Package, 4-Pin SOT (Top View)**

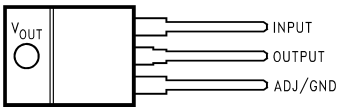



**Figure 6-2. NDE Package, 3-Pin TO-220 (Top View)**

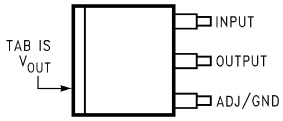



**Figure 6-3. KTT Package, 3-Pin TO-263 (Top View)**

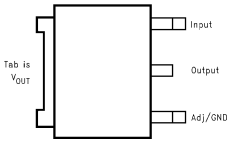
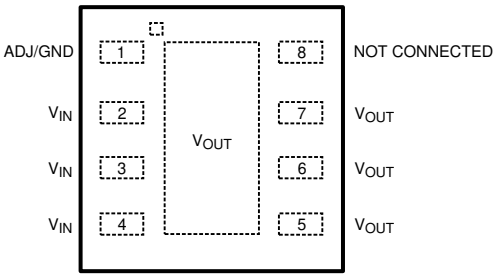



**Figure 6-4. NDP Package, 3-Pin TO-252 (Top View)**




When using the WSON package pins 2, 3, and 4 must be connected together and pins 5, 6, and 7 must be connected together.

**Figure 6-5. NGN Package, 8-Pin WSON (Top View)**

**Table 6-1. Pin Functions**

| PIN | | | | | | I/O | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| NAME | TO-252 | WSON | SOT-223 | TO-263 | TO-220 | | |
| ADJ/GND | 1 | 1 | 1 | 1 | 1 | — | Adjust pin for adjustable output option. Ground pin for fixed output option. |
| $V_{IN}$ | 3 | 2, 3, 4 | 3 | 3 | 3 | I | Input voltage pin for the regulator |
| $V_{OUT}$ | 2 , TAB | 5, 6, 7, TAB | 2, 4 | 2, TAB | 2, TAB | O | Output voltage pin for the regulator |

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# 7 Specifications

## 7.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)(1)

| | MIN | MAX | UNIT |
|---|---|---|---|
| Maximum input voltage ($V_{IN}$ to GND) | | 20 | V |
| Power dissipation(2) | Internally Limited | | |
| Junction temperature ($T_J$)(2) | | 150 | °C |
| Storage temperature, $T_{stg}$ | –65 | 150 | °C |

(1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions*. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) The maximum power dissipation is a function of $T_{J(max)}$ , $R_{\theta JA}$, and $T_A$. The maximum allowable power dissipation at any ambient temperature is $P_D = (T_{J(max)}–T_A)/R_{\theta JA}$. All numbers apply for packages soldered directly into a PCB.

## 7.2 ESD Ratings

| | | | VALUE | UNIT |
|---|---|---|---|---|
| $V_{(ESD)}$ | Electrostatic discharge | Human-body model (HBM), per ANSI/ESDA/JEDEC JS-001(1) | ±2000 | V |

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process. Pins listed as ±2000 V may actually have higher performance.

## 7.3 Recommended Operating Conditions

over operating free-air temperature range (unless otherwise noted)

| | | MIN | MAX | UNIT |
|---|---|---|---|---|
| Input voltage ($V_{IN}$ to GND) | | | 15 | V |
| Junction temperature ($T_J$)(1) | LM1117 | 0 | 125 | °C |
| | LM1117I | −40 | 125 | |

(1) The maximum power dissipation is a function of $T_{J(max)}$ , $R_{\theta JA}$, and $T_A$. The maximum allowable power dissipation at any ambient temperature is $P_D = (T_{J(max)}–T_A)/R_{\theta JA}$. All numbers apply for packages soldered directly into a PCB.

## 7.4 Thermal Information

| THERMAL METRIC(1) | | LM1117, LM1117I | | | | | UNIT |
|---|---|---|---|---|---|---|---|
| | | DCY (SOT-223) | NDE (TO-220) | NDP (TO-252) | NGN (WSON) | KTT (TO-263) | |
| | | 4 PINS | 3 PINS | 3 PINS | 8 PINS | 3 PINS | |
| $R_{\theta JA}$ | Junction-to-ambient thermal resistance | 61.6 | 23.8 | 45.1 | 39.3 | 41.3 | °C/W |
| $R_{\theta JC(top)}$ | Junction-to-case (top) thermal resistance | 42.5 | 16.6 | 52.1 | 31.4 | 44.1 | °C/W |
| $R_{\theta JB}$ | Junction-to-board thermal resistance | 10.4 | 5.3 | 29.8 | 16.5 | 24.2 | °C/W |
| $\psi_{JT}$ | Junction-to-top characterization parameter | 2.9 | 3.1 | 4.5 | 0.3 | 10.9 | °C/W |
| $\psi_{JB}$ | Junction-to-board characterization parameter | 10.3 | 5.3 | 29.4 | 16.7 | 23.2 | °C/W |
| $R_{\theta JC(bot)}$ | Junction-to-case (bottom) thermal resistance | — | 1.5 | 1.3 | 5.6 | 1.3 | °C/W |

(1) For more information about traditional and new thermal metrics, see the *Semiconductor and IC package thermal metrics* application report.


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## 7.5 LM1117 Electrical Characteristics

unless otherwise specified, $T_J$ = 25°C

| PARAMETER | | TEST CONDITIONS | | MIN[1] | TYP[2] | MAX[1] | UNIT |
|---|---|---|---|---|---|---|---|
| $V_{REF}$ | Reference voltage | LM1117-ADJ<br>$I_{OUT}$ = 10 mA, $V_{IN}$ – $V_{OUT}$ = 2 V, $T_J$ = 25°C | | 1.238 | 1.25 | 1.262 | V |
| | | LM1117-ADJ<br>10 mA ≤ $I_{OUT}$ ≤ 800 mA, 1.4 V ≤ $V_{IN}$ – $V_{OUT}$ ≤ 10 V | $T_J$ = 25°C | | 1.25 | | |
| | | | over the junction temperature range 0°C to 125°C | 1.225 | | 1.27 | |
| $V_{OUT}$ | Output voltage | LM1117-1.8<br>$I_{OUT}$ = 10 mA, $V_{IN}$ = 3.8 V, $T_J$ = 25°C | | 1.782 | 1.8 | 1.818 | V |
| | | LM1117-1.8<br>0 ≤ $I_{OUT}$ ≤ 800 mA, 3.2 V ≤ $V_{IN}$ ≤ 10 V | $T_J$ = 25°C | | 1.8 | | |
| | | | over the junction temperature range 0°C to 125°C | 1.746 | | 1.854 | |
| | | LM1117-2.5<br>$I_{OUT}$ = 10 mA, $V_{IN}$ = 4.5 V, $T_J$ = 25°C | | 2.475 | 2.5 | 2.525 | V |
| | | LM1117-2.5<br>0 ≤ $I_{OUT}$ ≤ 800 mA, 3.9 V ≤ $V_{IN}$ ≤ 10 V | $T_J$ = 25°C | | 2.5 | | |
| | | | over the junction temperature range 0°C to 125°C | 2.45 | | 2.55 | |
| | | LM1117-3.3<br>$I_{OUT}$ = 10 mA, $V_{IN}$ = 5 V $T_J$ = 25°C | | 3.267 | 3.3 | 3.333 | V |
| | | LM1117-3.3<br>0 ≤ $I_{OUT}$ ≤ 800 mA, 4.75 V ≤ $V_{IN}$ ≤ 10 V | $T_J$ = 25°C | | 3.3 | | |
| | | | over the junction temperature range 0°C to 125°C | 3.235 | | 3.365 | |
| | | LM1117-5.0<br>$I_{OUT}$ = 10 mA, $V_{IN}$ = 7 V, $T_J$ = 25°C | | 4.95 | 5 | 5.05 | V |
| | | LM1117-5.0<br>0 ≤ $I_{OUT}$ ≤ 800 mA, 6.5 V ≤ $V_{IN}$ ≤ 12 V | $T_J$ = 25°C | | 5 | | |
| | | | over the junction temperature range 0°C to 125°C | 4.9 | | 5.1 | |
| $\Delta V_{OUT}$ | Line regulation[3] | LM1117-ADJ<br>$I_{OUT}$ = 10mA, 1.5V ≤ $V_{IN}$-$V_{OUT}$ ≤ 13.75V | $T_J$ = 25°C | | 0.035% | | |
| | | | over the junction temperature range 0°C to 125°C | | | 0.2% | |
| | | LM1117-1.8<br>$I_{OUT}$ = 0 mA, 3.2 V ≤ $V_{IN}$ ≤ 10 V | $T_J$ = 25°C | | 1 | | mV |
| | | | over the junction temperature range 0°C to 125°C | | | 6 | |
| | | LM1117-2.5<br>$I_{OUT}$ = 0 mA, 3.9 V ≤ $V_{IN}$ ≤ 10 V | $T_J$ = 25°C | | 1 | | mV |
| | | | over the junction temperature range 0°C to 125°C | | | 6 | |
| | | LM1117-3.3<br>$I_{OUT}$ = 0 mA, 4.75 V ≤ $V_{IN}$ ≤ 15 V | $T_J$ = 25°C | | 1 | | mV |
| | | | over the junction temperature range 0°C to 125°C | | | 6 | |
| | | LM1117-5.0<br>$I_{OUT}$ = 0 mA, 6.5 V ≤ $V_{IN}$ ≤ 15 V | $T_J$ = 25°C | | 1 | | mV |
| | | | over the junction temperature range 0°C to 125°C | | | 10 | |
| $\Delta V_{OUT}$ | Load regulation[3] | LM1117-ADJ<br>$V_{IN}$ – $V_{OUT}$ = 3 V, 10 ≤ $I_{OUT}$ ≤ 800 mA | $T_J$ = 25°C | | 0.2% | | |
| | | | over the junction temperature range 0°C to 125°C | | | 0.4% | |
| | | LM1117-1.8<br>$V_{IN}$ = 3.2 V, 0 ≤ $I_{OUT}$ ≤ 800 mA | $T_J$ = 25°C | | 1 | | mV |
| | | | over the junction temperature range 0°C to 125°C | | | 10 | |
| | | LM1117-2.5<br>$V_{IN}$ = 3.9 V, 0 ≤ $I_{OUT}$ ≤ 800 mA | $T_J$ = 25°C | | 1 | | mV |
| | | | over the junction temperature range 0°C to 125°C | | | 10 | |
| | | LM1117-3.3<br>$V_{IN}$ = 4.75 V, 0 ≤ $I_{OUT}$ ≤ 800 mA | $T_J$ = 25°C | | 1 | | mV |
| | | | over the junction temperature range 0°C to 125°C | | | 10 | |
| | | LM1117-5.0<br>$V_{IN}$ = 6.5 V, 0 ≤ $I_{OUT}$ ≤ 800 mA | $T_J$ = 25°C | | 1 | | mV |
| | | | over the junction temperature range 0°C to 125°C | | | 15 | |

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## 7.5 LM1117 Electrical Characteristics (continued)

unless otherwise specified, $T_J$ = 25°C

| PARAMETER | | TEST CONDITIONS | | MIN(1) | TYP(2) | MAX(1) | UNIT |
|---|---|---|---|---|---|---|---|
| $V_{IN}$ – $V_{OUT}$ | Dropout voltage(4) | $I_{OUT}$ = 100 mA | $T_J$ = 25°C | | 1.1 | | V |
| | | | over the junction temperature range 0°C to 125°C | | | 1.2 | |
| | | $I_{OUT}$ = 500 mA | $T_J$ = 25°C | | 1.15 | | V |
| | | | over the junction temperature range 0°C to 125°C | | | 1.25 | |
| | | $I_{OUT}$ = 800 mA | $T_J$ = 25°C | | 1.2 | | V |
| | | | over the junction temperature range 0°C to 125°C | | | 1.3 | |
| $I_{LIMIT}$ | Current limit | $V_{IN}$ – $V_{OUT}$ = 5 V, $T_J$ = 25°C | | 800 | 1200 | 1500 | mA |
| | Minimum load current(5) | LM1117-ADJ $V_{IN}$ = 15 V | $T_J$ = 25°C | | 1.7 | | mA |
| | | | over the junction temperature range 0°C to 125°C | | | 5 | |
| | Quiescent current | LM1117-1.8 $V_{IN}$ ≤ 15 V | $T_J$ = 25°C | | 5 | | mA |
| | | | over the junction temperature range 0°C to 125°C | | | 10 | |
| | | LM1117-2.5 $V_{IN}$ ≤ 15 V | $T_J$ = 25°C | | 5 | | mA |
| | | | over the junction temperature range 0°C to 125°C | | | 10 | |
| | | LM1117-3.3 $V_{IN}$ ≤ 15 V | $T_J$ = 25°C | | 5 | | mA |
| | | | over the junction temperature range 0°C to 125°C | | | 10 | |
| | | LM1117-5.0 $V_{IN}$ ≤ 15 V | $T_J$ = 25°C | | 5 | | mA |
| | | | over the junction temperature range 0°C to 125°C | | | 10 | |
| | Thermal regulation | $T_A$ = 25°C, 30-ms pulse | | | 0.01 | 0.1 | %/W |
| | Ripple regulation | $f_{RIPPLE}$ = 1 20 Hz, $V_{IN}$ – $V_{OUT}$ = 3 V $V_{RIPPLE}$ = 1 $V_{PP}$ | $T_J$ = 25°C | | 75 | | dB |
| | | | over the junction temperature range 0°C to 125°C | 60 | | | |
| | Adjust pin current | $T_J$ = 25°C | | | 60 | | µA |
| | | over the junction temperature range 0°C to 125°C | | | | 120 | |
| | Adjust pin current change | 10 ≤ $I_{OUT}$ ≤ 80 0mA, 1.4 V ≤ $V_{IN}$ – $V_{OUT}$ ≤ 10 V | $T_J$ = 25°C | | 0.2 | | µA |
| | | | over the junction temperature range 0°C to 125°C | | | 5 | |
| | Temperature stability | | | | 0.5% | | |
| | Long term stability | $T_A$ = 125°C, 1000 hours | | | 0.3% | | |
| | RMS output noise | (% of $V_{OUT}$), 10 Hz ≤ f ≤ 10 kHz | | | 0.003% | | |

(1) All limits are ensured by testing or statistical analysis.
(2) Typical Values represent the most likely parametric normal.
(3) Load and line regulation are measured at constant junction room temperature.
(4) The dropout voltage is the input/output differential at which the circuit ceases to regulate against further reduction in input voltage. This voltage is measured when the output voltage has dropped 100 mV from the nominal value obtained at $V_{IN}$ = $V_{OUT}$ + 1.5 V.
(5) The minimum output current required to maintain regulation.


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## 7.6 LM1117I Electrical Characteristics

unless otherwise specified, $T_J$ = 25°C

| PARAMETER | | TEST CONDITIONS | | MIN[1] | TYP[2] | MAX[1] | UNIT |
|---|---|---|---|---|---|---|---|
| $V_{REF}$ | Reference voltage | LM1117I-ADJ<br>$I_{OUT}$ = 10 mA, $V_{IN}$ – $V_{OUT}$ = 2 V, $T_J$ = 25°C | | 1.238 | 1.25 | 1.262 | V |
| | | LM1117I-ADJ<br>10 mA ≤ $I_{OUT}$ ≤ 800 mA, 1.4 V ≤ $V_{IN}$ – $V_{OUT}$ ≤ 10 V | $T_J$ = 25°C | | 1.25 | | |
| | | | over the junction temperature range – 40°C to 125°C | 1.2 | | 1.29 | |
| $V_{OUT}$ | Output voltage | LM1117I-3.3<br>$I_{OUT}$ = 10 mA, $V_{IN}$ = 5 V, $T_J$ = 25°C | | 3.267 | 3.3 | 3.333 | V |
| | | LM1117I-3.3<br>0 ≤ $I_{OUT}$ ≤ 800 mA, 4.75 V ≤ $V_{IN}$ ≤ 10 V | $T_J$ = 25°C | | 3.3 | | |
| | | | over the junction temperature range – 40°C to 125°C | 3.168 | | 3.432 | |
| | | LM1117I-5.0<br>$I_{OUT}$ = 10 mA, $V_{IN}$ = 7 V, $T_J$ = 25°C | | 4.95 | 5 | 5.05 | V |
| | | LM1117I-5.0<br>0 ≤ $I_{OUT}$ ≤ 800 mA, 6.5 V ≤ $V_{IN}$ ≤ 12 V | $T_J$ = 25°C | | 5 | | |
| | | | over the junction temperature range – 40°C to 125°C | 4.8 | | 5.2 | |
| $\Delta V_{OUT}$ | Line regulation[3] | LM1117I-ADJ<br>$I_{OUT}$ = 10 mA, 1.5 V ≤ $V_{IN}$ – $V_{OUT}$ ≤ 13.75 V | $T_J$ = 25°C | | 0.035% | | |
| | | | over the junction temperature range – 40°C to 125°C | | | 0.3% | |
| | | LM1117I-3.3<br>$I_{OUT}$ = 0 mA, 4.75 V ≤ $V_{IN}$ ≤ 15 V | $T_J$ = 25°C | | 1 | | mV |
| | | | over the junction temperature range – 40°C to 125°C | | | 10 | |
| | | LM1117I-5.0<br>$I_{OUT}$ = 0 mA, 6.5 V ≤ $V_{IN}$ ≤ 15 V | $T_J$ = 25°C | | 1 | | mV |
| | | | over the junction temperature range – 40°C to 125°C | | | 15 | |
| $\Delta V_{OUT}$ | Load regulation[3] | LM1117I-ADJ<br>$V_{IN}$ – $V_{OUT}$ = 3 V, 10 ≤ $I_{OUT}$ ≤ 800 mA | $T_J$ = 25°C | | 0.2% | | |
| | | | over the junction temperature range – 40°C to 125°C | | | 0.5% | |
| | | LM1117I-3.3<br>$V_{IN}$ = 4.75 V, 0 ≤ $I_{OUT}$ ≤ 800 mA | $T_J$ = 25°C | | 1 | | mV |
| | | | over the junction temperature range – 40°C to 125°C | | | 15 | |
| | | LM1117I-5.0<br>$V_{IN}$ = 6.5 V, 0 ≤ $I_{OUT}$ ≤ 800 mA | $T_J$ = 25°C | | 1 | | mV |
| | | | over the junction temperature range – 40°C to 125°C | | | 20 | |

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## 7.6 LM1117I Electrical Characteristics (continued)

unless otherwise specified, $T_J$ = 25°C

| PARAMETER | | TEST CONDITIONS | | MIN(1) | TYP(2) | MAX(1) | UNIT |
|---|---|---|---|---|---|---|---|
| $V_{IN}$-$V_{OUT}$ | Dropout voltage(4) | $I_{OUT}$ = 100 mA | $T_J$ = 25°C | | 1.1 | | V |
| | | | over the junction temperature range – 40°C to 125°C | | | 1.3 | |
| | | $I_{OUT}$ = 500 mA | $T_J$ = 25°C | | 1.15 | | V |
| | | | over the junction temperature range – 40°C to 125°C | | | 1.35 | |
| | | $I_{OUT}$ = 800 mA | $T_J$ = 25°C | | 1.2 | | V |
| | | | over the junction temperature range – 40°C to 125°C | | | 1.4 | |
| $I_{LIMIT}$ | Current limit | $V_{IN}$ – $V_{OUT}$ = 5 V, $T_J$ = 25°C | | 800 | 1200 | 1500 | mA |
| | Minimum load current(5) | LM1117I-ADJ<br>$V_{IN}$ = 15 V | $T_J$ = 25°C | | 1.7 | | mA |
| | | | over the junction temperature range – 40°C to 125°C | | | 5 | |
| | Quiescent current | LM1117I-3.3<br>$V_{IN}$ ≤ 15 V | $T_J$ = 25°C | | 5 | | mA |
| | | | over the junction temperature range – 40°C to 125°C | | | 15 | |
| | | LM1117I-5.0<br>$V_{IN}$ ≤ 15 V | $T_J$ = 25°C | | 5 | | mA |
| | | | over the junction temperature range – 40°C to 125°C | | | 15 | |
| | Thermal regulation | $T_A$ = 25°C, 30-ms pulse | | | 0.01 | 0.1 | %/W |
| | Ripple regulation | $f_{RIPPLE}$ = 120 Hz, $V_{IN}$ – $V_{OUT}$ = 3 V<br>$V_{RIPPLE}$ = 1 $V_{PP}$ | $T_J$ = 25°C | | 75 | | dB |
| | | | over the junction temperature range – 40°C to 125°C | 60 | | | |
| | Adjust pin current | $T_J$ = 25°C | | | 60 | | µA |
| | | over the junction temperature range –40°C to 125°C | | | | 120 | |
| | Adjust pin current change | 10 ≤ $I_{OUT}$ ≤ 800 mA,<br>1.4 V ≤ $V_{IN}$ – $V_{OUT}$ ≤ 10 V | $T_J$ = 25°C | | 0.2 | | µA |
| | | | over the junction temperature range – 40°C to 125°C | | | 10 | |
| | Temperature stability | | | | 0.5% | | |
| | Long term stability | $T_A$ = 125°C, 1000 hours | | | 0.3% | | |
| | RMS output noise | (% of $V_{OUT}$), 10 Hz ≤ f ≤ 10 kHz | | | 0.003% | | |

(1) All limits are ensured by testing or statistical analysis.
(2) Typical Values represent the most likely parametric normal.
(3) Load and line regulation are measured at constant junction room temperature.
(4) The dropout voltage is the input/output differential at which the circuit ceases to regulate against further reduction in input voltage. This voltage is measured when the output voltage has dropped 100 mV from the nominal value obtained at $V_{IN}$ = $V_{OUT}$ + 1.5 V.
(5) The minimum output current required to maintain regulation.


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## 7.7 Typical Characteristics

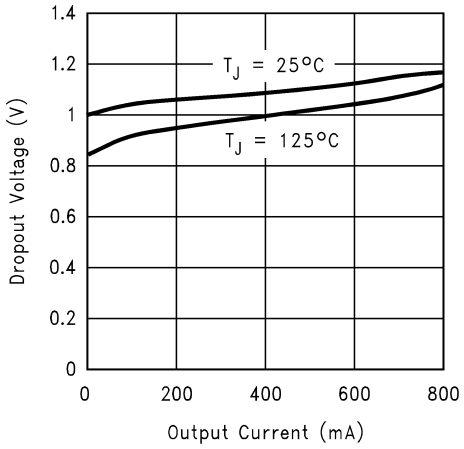



**Figure 7-1. Dropout Voltage ($V_{IN}$ – $V_{OUT}$)**

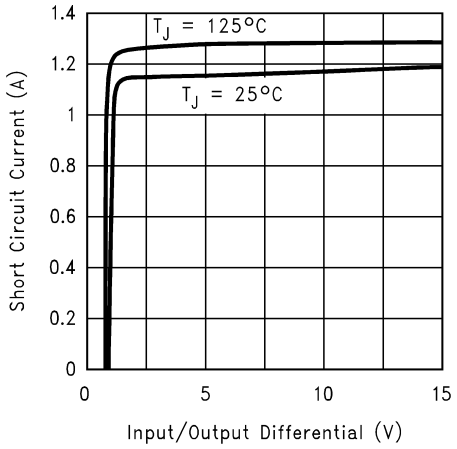



**Figure 7-2. Short-Circuit Current**

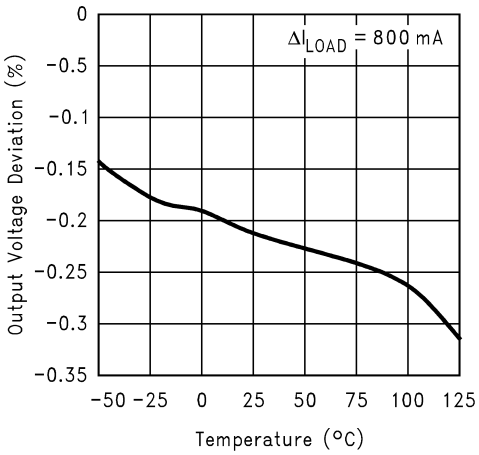



**Figure 7-3. Load Regulation**

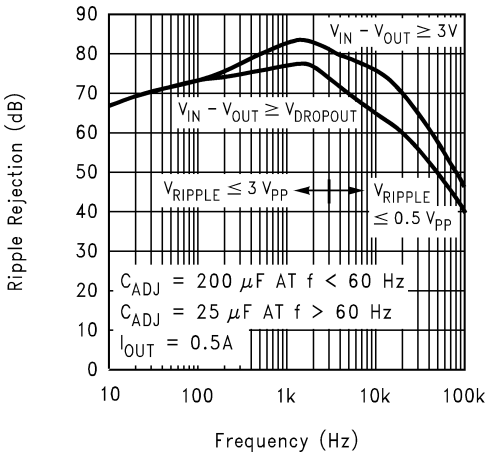



**Figure 7-4. LM1117-ADJ Ripple Rejection**

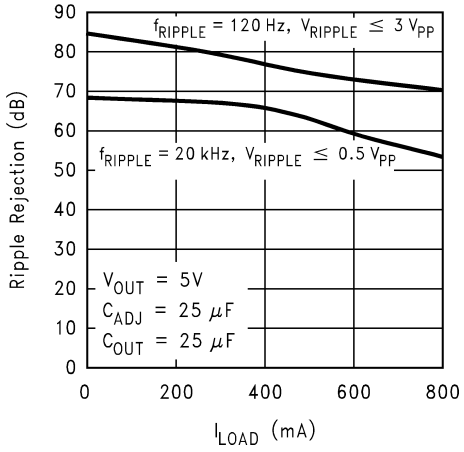



**Figure 7-5. LM1117-ADJ Ripple Rejection vs Current**

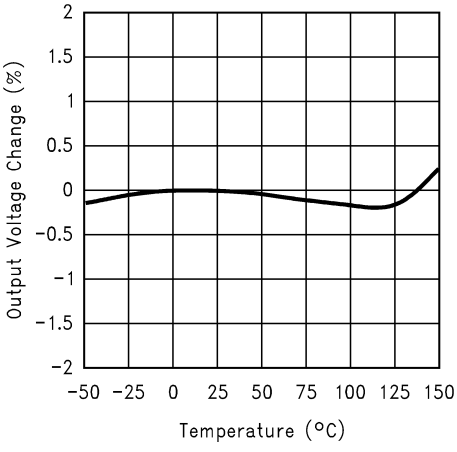



**Figure 7-6. Temperature Stability**

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## 7.7 Typical Characteristics (continued)

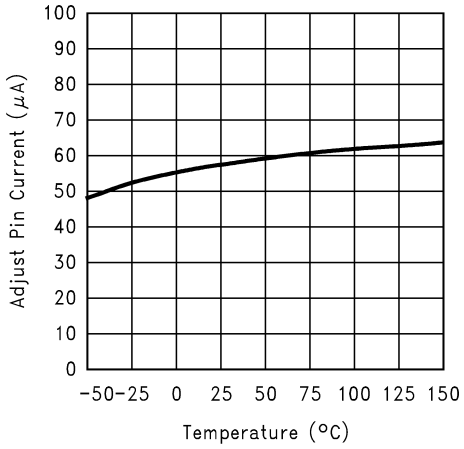



**Figure 7-7. Adjust Pin Current**

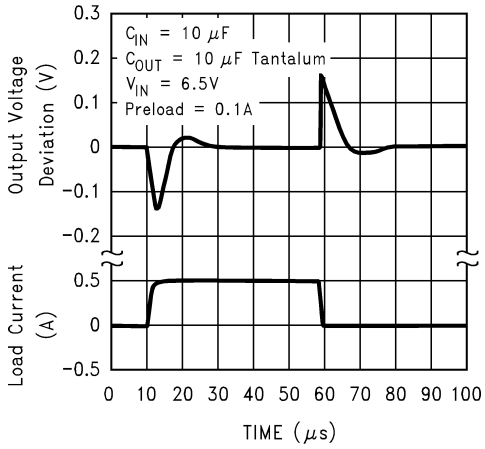



**Figure 7-8. LM1117-5.0 Load Transient Response**

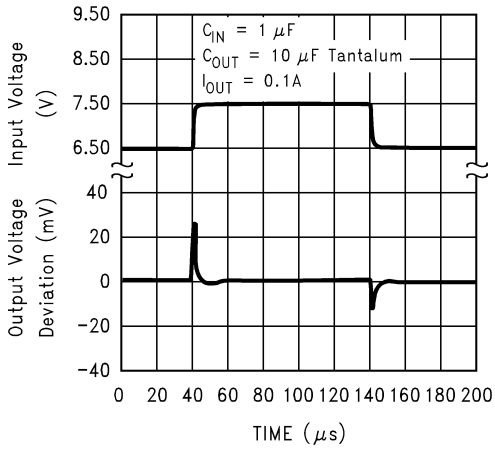



**Figure 7-9. LM1117-5.0 Line Transient Response**


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# 8 Detailed Description

## 8.1 Overview

The LM1117 adjustable version develops a 1.25-V reference voltage, $V_{REF}$, between the output and the adjust pin. As shown in Figure 8-1, this voltage is applied across resistor R1 to generate a constant current I1. The current $I_{ADJ}$ from the adjust pin can introduce error to the output, but because this current is very small (60 µA) compared to the I1 and very constant with line and load changes, the error can be ignored. The constant current I1 then flows through the output set resistor R2 and sets the output voltage to the desired level.

For fixed voltage devices, R1 and R2 are integrated inside the devices.

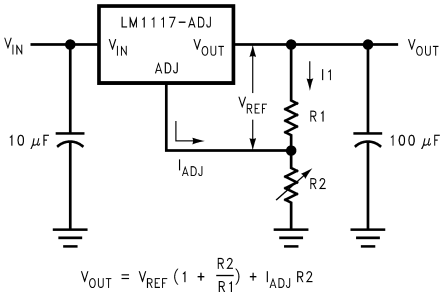
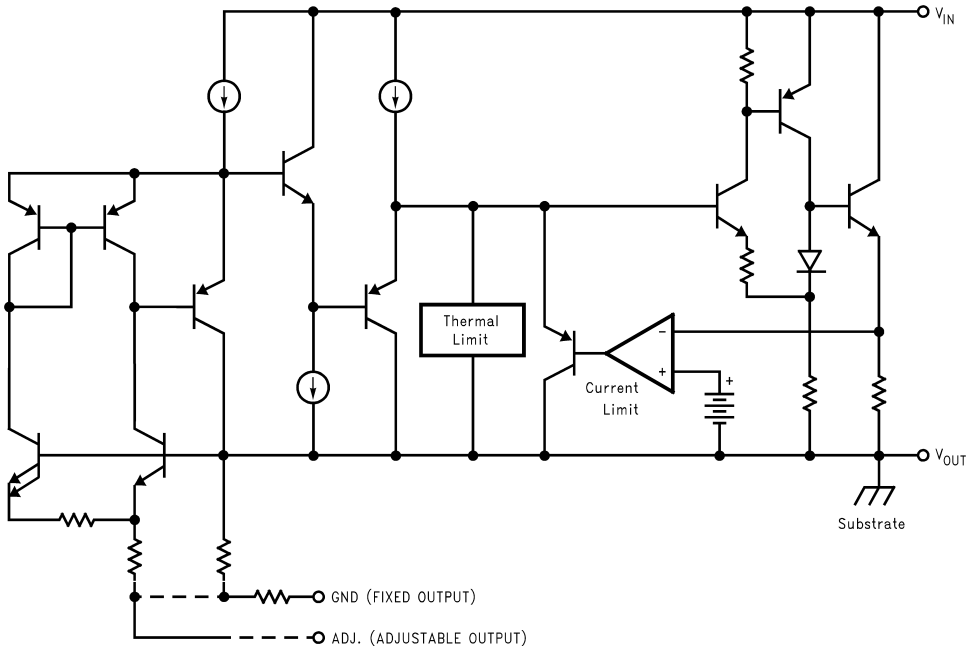



**Figure 8-1. Basic Adjustable Regulator**

## 8.2 Functional Block Diagram




## 8.3 Feature Description

### 8.3.1 Load Regulation

The LM1117 regulates the voltage that appears between the output and ground pins, or between the output and adjust pins. In some cases, line resistances can introduce errors to the voltage across the load. To obtain the best load regulation, a few precautions are needed.

Figure 8-2 illustrates a typical application using a fixed output regulator. The Rt1 and Rt2 are the line resistances. Obviously the $V_{LOAD}$ is less than the $V_{OUT}$ by the sum of the voltage drops along the line resistances. In this case, the load regulation at the $R_{LOAD}$ is degraded from the data sheet specification. To improve this degradation, the load must be tied directly to the output terminal on the positive side and directly tied to the ground terminal on the negative side.

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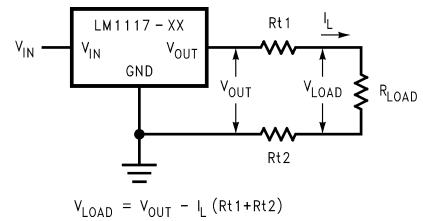



**Figure 8-2. Typical Application Using Fixed Output Regulator**

When the adjustable regulator is used (Figure 8-3), the best performance is obtained with the positive side of the resistor R1 tied directly to the output terminal of the regulator rather than near the load. This eliminates line drops from appearing effectively in series with the reference and degrading regulation. For example, a 5-V regulator with 0.05-Ω resistance between the regulator and load has a load regulation resulting from the line resistance of 0.05 Ω × $I_L$. If R1 (= 125 Ω) is connected near the load, the effective line resistance is 0.05 Ω (1 + R2 / R1) or in this case, four times worse. In addition, the ground side of the resistor R2 can be returned near the ground of the load to provide remote ground sensing and improve load regulation.

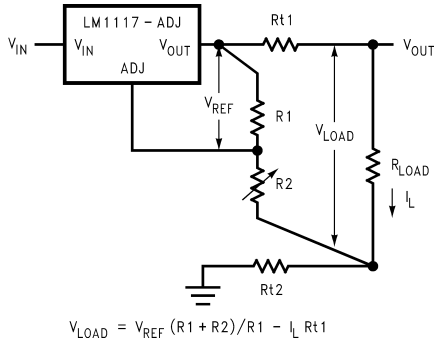



**Figure 8-3. Best Load Regulation Using Adjustable Output Regulator**


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## 8.4 Device Functional Modes

### 8.4.1 Protection Diodes

Under normal operation, the LM1117 regulators do not need any protection diode. With the adjustable device, the internal resistance between the adjust and output terminals limits the current. No diode is needed to divert the current around the regulator even with capacitor on the adjust terminal. The adjust pin can take a transient signal of ±25V with respect to the output voltage without damaging the device.

When a output capacitor is connected to a regulator and the input is shorted to ground, the output capacitor will discharge into the output of the regulator. The discharge current depends on the value of the capacitor, the output voltage of the regulator, and rate of decrease of $V_{IN}$. In the LM1117 regulators, the internal diode between the output and input pins can withstand microsecond surge currents of 10A to 20A. With an extremely large output capacitor (≥1000 µF), and with input instantaneously shorted to ground, the regulator could be damaged.

In this case, an external diode is recommended between the output and input pins to protect the regulator, as shown in Figure 8-4.

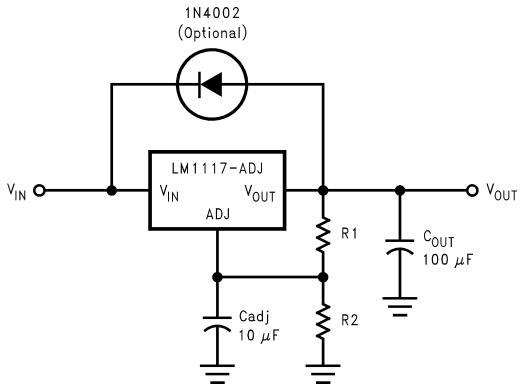



**Figure 8-4. Regulator With Protection Diode**

# 9 Application and Implementation

**Note**

Information in the following applications sections is not part of the TI component specification, and TI does not warrant its accuracy or completeness. TI's customers are responsible for determining suitability of components for their purposes, as well as validating and testing their design implementation to confirm system functionality.

## 9.1 Application Information

The LM1117 is a versatile and high performance linear regulator with a wide temperature range and tight line/load regulation operation. An output capacitor is required to further improve transient response and stability. For the adjustable option, the ADJ pin can also be bypassed to achieve very high ripple-rejection ratios. The LM1117 is versatile in its applications, including being used as a post regulator for DC/DC converters, battery chargers, and microprocessor supplies.

## 9.2 Typical Application

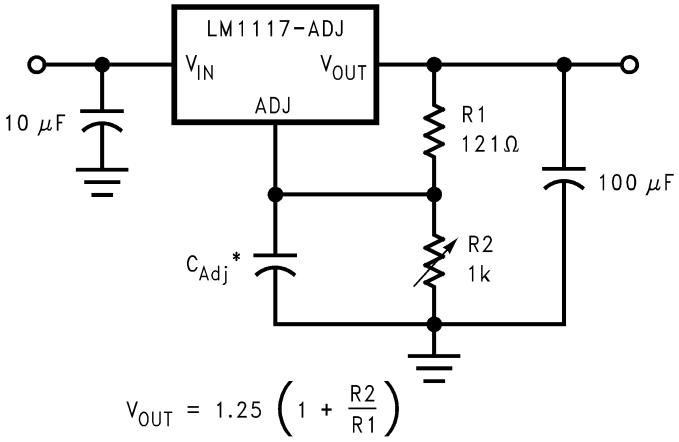



**Figure 9-1. 1.25-V to 10-V Adjustable Regulator With Improved Ripple Rejection**

### 9.2.1 Design Requirements

The device component count is very minimal, employing two resistors as part of a voltage divider circuit and an output capacitor for load regulation. A 10-µF tantalum on the input is a suitable input capacitor for almost all applications. An optional bypass capacitor across R2 can also be used to improve PSRR. See the *Recommended Operating Conditions* table for more information.

### 9.2.2 Detailed Design Procedure

The output voltage is set based on the selection of the two resistors, R1 and R2, as shown in Figure 9-1. For details on capacitor selection, see the *External Capacitors* section.

#### *9.2.2.1 External Capacitors*

##### 9.2.2.1.1 Input Bypass Capacitor

An input capacitor is recommended. A 10-µF tantalum on the input is a suitable input capacitor for almost all applications.

##### 9.2.2.1.2 Adjust Terminal Bypass Capacitor

The adjust terminal can be bypassed to ground with a bypass capacitor ($C_{ADJ}$) to improve ripple rejection. This bypass capacitor prevents ripple from being amplified as the output voltage is increased. At any ripple frequency, the impedance of the $C_{ADJ}$ must be less than R1 to prevent the ripple from being amplified:


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$$1 / (2\pi \times f_{RIPPLE} \times C_{ADJ}) < R1 \quad (1)$$

The R1 is the resistor between the output and the adjust pin. The value is normally in the range of 100 Ω to 200 Ω. For example, with R1 = 124 Ω and $f_{RIPPLE}$ = 120 Hz, the $C_{ADJ}$ must be > 11µF.

#### 9.2.2.1.3 Output Capacitor

The output capacitor is critical in maintaining regulator stability, and must meet the required conditions for both minimum amount of capacitance and equivalent series resistance (ESR). The minimum output capacitance required by the LM1117 is 10 µF, if a tantalum capacitor is used. Any increase of the output capacitance will merely improve the loop stability and transient response. The ESR of the output capacitor should range between 0.3 Ω to 22 Ω. In the case of the adjustable regulator, when the $C_{ADJ}$ is used, a larger output capacitance (22-µF tantalum) is required.

### 9.2.3 Application Curve

As shown in Figure 9-2, the dropout voltage will vary with output current and temperature. Care should be taken during design to ensure the dropout voltage requirement is met across the entire operating temperature and output current range.

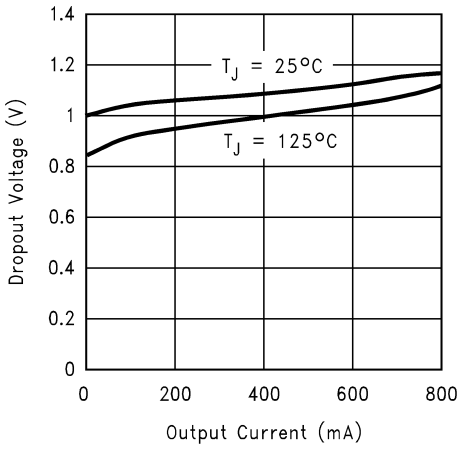



**Figure 9-2. Dropout Voltage ($V_{IN}$ – $V_{OUT}$)**

## 9.3 System Examples

Several circuits can be realized with the LM1117. The circuit diagrams in this section demonstrate multiple system examples that can be utilized in many applications.

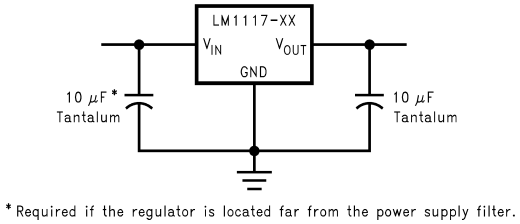



**Figure 9-3. Fixed Output Regulator**

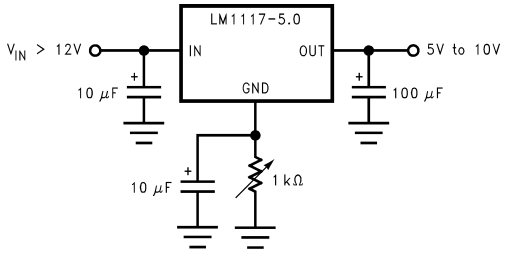



**Figure 9-4. Adjusting Output of Fixed Regulators**

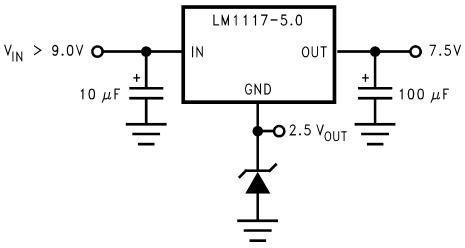



**Figure 9-5. Regulator With Reference**

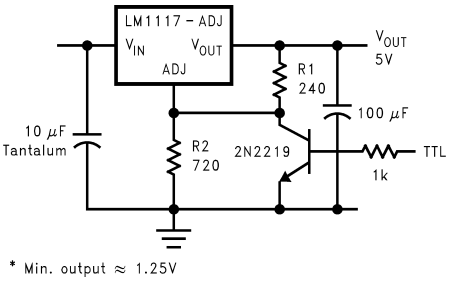



**Figure 9-6. 5-V Logic Regulator With Electronic Shutdown***

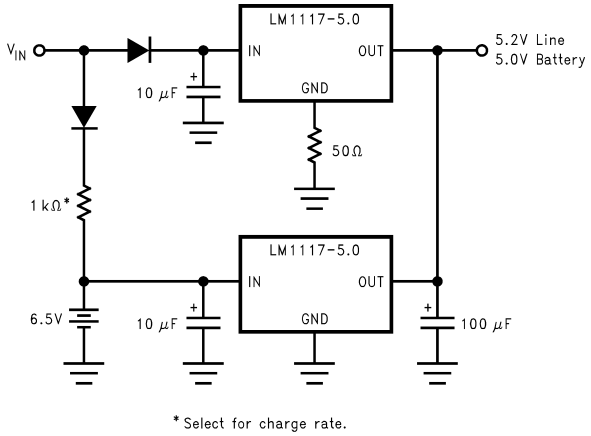



**Figure 9-7. Battery Backed-Up Regulated Supply**

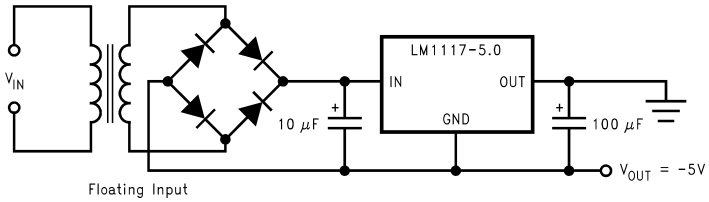



**Figure 9-8. Low Dropout Negative Supply**


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## 9.4 Power Supply Recommendations

The input supply to the LM1117 must be kept at a voltage level such that the maximum rating is not exceeded. The minimum dropout voltage must also be met with extra headroom when possible to keep the LM1117 in regulation. An input capacitor is recommended. For more information regarding capacitor selection, see the *External Capacitors* section.

## 9.5 Layout

### 9.5.1 Layout Guidelines

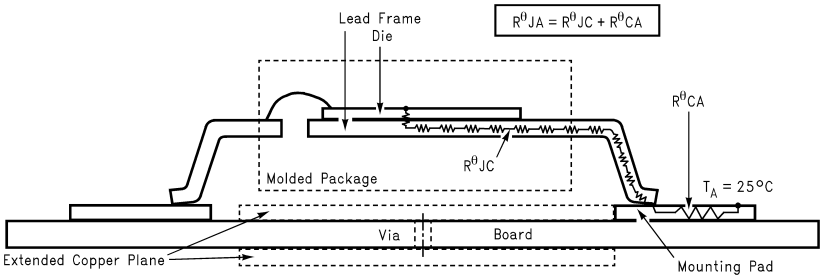
Some layout guidelines must be followed to ensure proper regulation of the output voltage with minimum noise. Traces carrying the load current must be wide to reduce the amount of parasitic trace inductance and the feedback loop from $V_{OUT}$ to ADJ must be kept as short as possible. To improve PSRR, a bypass capacitor can be placed at the ADJ pin and must be located as close as possible to the IC. In cases when $V_{IN}$ shorts to ground, an external diode must be placed from $V_{OUT}$ to $V_{IN}$ to divert the surge current from the output capacitor and protect the IC. The diode must be placed close to the corresponding IC pins to increase their effectiveness.

#### *9.5.1.1 Heat Sink Requirements*

When an integrated circuit operates with an appreciable current, the junction temperature is elevated. The thermal limits must be quantified in order to achieve acceptable performance and reliability. This limit is determined by summing the individual parts consisting of a series of temperature rises from the semiconductor junction to the operating environment. A one-dimensional steady-state model of conduction heat transfer is demonstrated in Figure 9-9. The heat generated at the device junction flows through the die to the die attach pad, through the lead frame to the surrounding case material, to the printed circuit board, and eventually to the ambient environment. Below is a list of variables that may affect the thermal resistance and in turn the need for a heat sink.

**Table 9-1. Component and Application Variables**

| $R_{\theta JC}$ (COMPONENT VARIABLES) | $R_{\theta JA}$ (Application Variables) |
|---|---|
| Lead frame size and material | Mounting pad size, material, and location |
| No. of conduction pins | Placement of mounting pad |
| Die size | PCB size and material |
| Die attach material | Traces length and width |
| Molding compound size and material | Adjacent heat sources |
| | Volume of air |
| | Ambient temperature |
| | Shape of mounting pad |




The case temperature is measured at the point where the leads contact with the mounting pad surface

**Figure 9-9. Cross-Sectional View of Integrated Circuit Mounted on a Printed Circuit Board**

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The LM1117 regulators have internal thermal shutdown to protect the device from over-heating. Under all possible operating conditions, the junction temperature of the LM1117 must be within the range of 0°C to +125°C. A heat sink can be required depending on the maximum power dissipation and maximum ambient temperature of the application. To determine if a heat sink is needed, the power dissipated by the regulator, $P_D$ , must be calculated:

$$I_{IN} = I_L + I_G \quad (2)$$

$$P_D = (V_{IN}-V_{OUT})I_L + V_{IN}I_G \quad (3)$$

Figure 9-10 shows the voltages and currents which are present in the circuit.

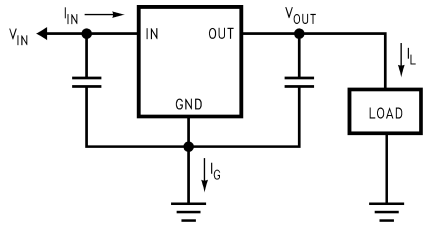



**Figure 9-10. Power Dissipation Diagram**

The next parameter which must be calculated is the maximum allowable temperature rise, $T_R$(max):

$$T_R(max) = T_J(max)-T_A(max) \quad (4)$$

where

- $T_J$(max) is the maximum allowable junction temperature (125°C) which is encountered in the application
- $T_A$(max) is the maximum ambient temperature which is encountered in the application

Using the calculated values for $T_R$(max) and $P_D$, the maximum allowable value for the junction-to-ambient thermal resistance ($R_{\theta JA}$) can be calculated:

$$R_{\theta JA} = T_R(max) / P_D \quad (5)$$

For the maximum allowable value for $\theta_{JA}$, see the *Thermal Information* table.

As a design aid, Table 9-2 shows the value of the $\theta_{JA}$ of SOT-223 and TO-252 for different heat sink area. Figure 9-11 and Figure 9-12 reflects the same test results as what are in the Table 9-2

Figure 9-13 and Figure 9-14 shows the maximum allowable power dissipation vs. ambient temperature for the SOT-223 and TO-252 device. Figure 9-15 and Figure 9-16 shows the maximum allowable power dissipation vs. copper area ($in^2$) for the SOT-223 and TO-252 devices. Please see AN1028 for power enhancement techniques to be used with SOT-223 and TO-252 packages.

The *AN-1187 Leadless Leadframe Package (LLP)* application note discusses improved thermal performance and power dissipation for the WSON.

**Table 9-2. $R_{\theta JA}$ Different Heat Sink Area**

| LAYOUT | COPPER AREA | | THERMAL RESISTANCE | |
|---|---|---|---|---|
| | Top Side ($in^2$)(1) | Bottom Side ($in^2$) | ($\theta_{JA}$,°C/W) SOT-223 | ($\theta_{JA}$,°C/W) TO-252 |
| 1 | 0.0123 | 0 | 136 | 103 |
| 2 | 0.066 | 0 | 123 | 87 |
| 3 | 0.3 | 0 | 84 | 60 |
| 4 | 0.53 | 0 | 75 | 54 |
| 5 | 0.76 | 0 | 69 | 52 |
| 6 | 1 | 0 | 66 | 47 |
| 7 | 0 | 0.2 | 115 | 84 |


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**Table 9-2. $R_{\theta JA}$ Different Heat Sink Area (continued)**

| LAYOUT | COPPER AREA | | THERMAL RESISTANCE | |
|---|---|---|---|---|
| 8 | 0 | 0.4 | 98 | 70 |
| 9 | 0 | 0.6 | 89 | 63 |
| 10 | 0 | 0.8 | 82 | 57 |
| 11 | 0 | 1 | 79 | 57 |
| 12 | 0.066 | 0.066 | 125 | 89 |
| 13 | 0.175 | 0.175 | 93 | 72 |
| 14 | 0.284 | 0.284 | 83 | 61 |
| 15 | 0.392 | 0.392 | 75 | 55 |
| 16 | 0.5 | 0.5 | 70 | 53 |

(1) Tab of device attached to topside copper

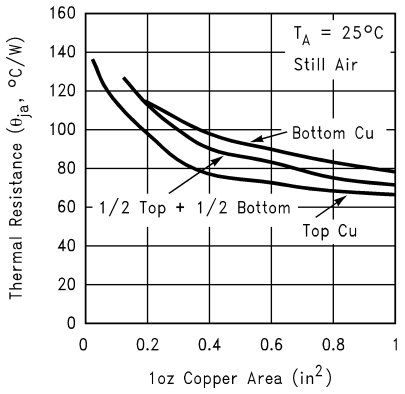



**Figure 9-11. $R_{\theta JA}$ vs 1-oz Copper Area for SOT-223**

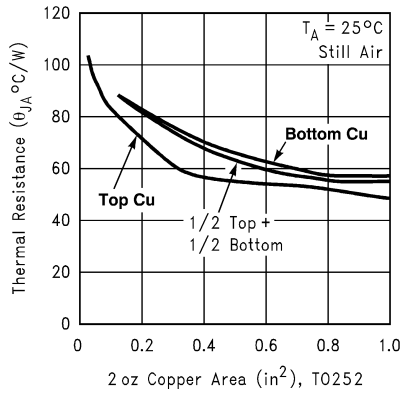



**Figure 9-12. $R_{\theta JA}$ vs 2-oz Copper Area for TO-252**

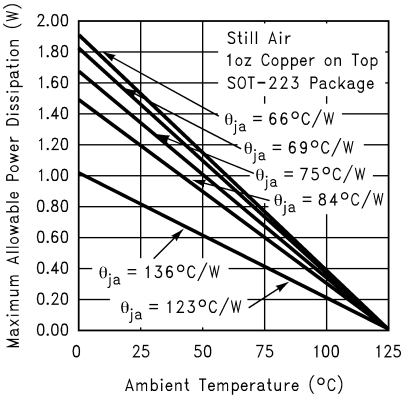



**Figure 9-13. Maximum Allowable Power Dissipation vs Ambient Temperature for SOT-223**

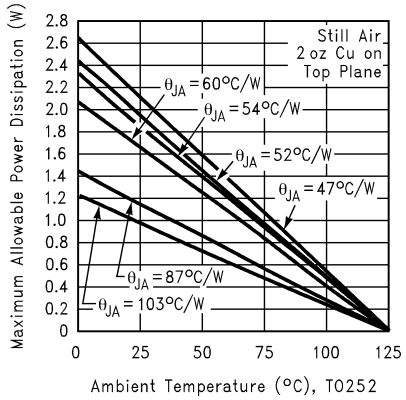



**Figure 9-14. Maximum Allowable Power Dissipation vs Ambient Temperature for TO-252**

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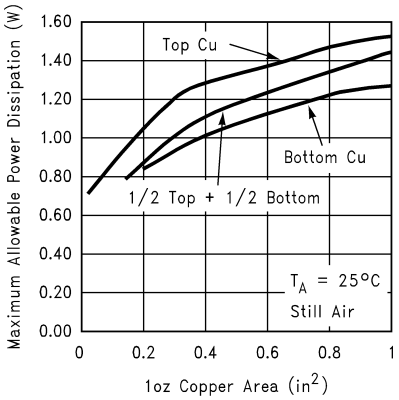



**Figure 9-15. Maximum Allowable Power Dissipation vs 1-oz Copper Area for SOT-223**

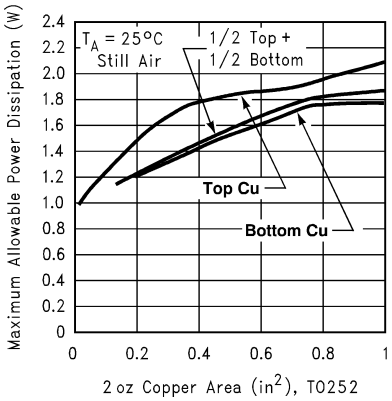



**Figure 9-16. Maximum Allowable Power Dissipation vs 2-oz Copper Area for TO-252**

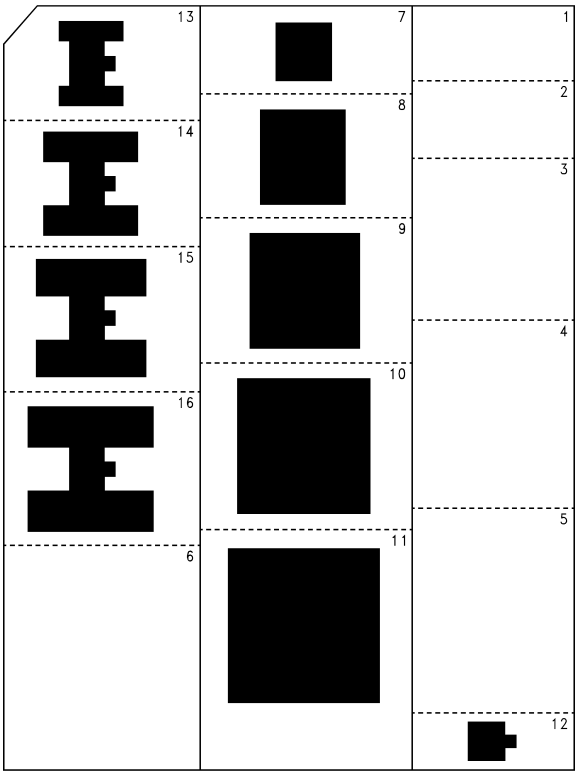



**Figure 9-17. Top View of the Thermal Test Pattern in Actual Scale**


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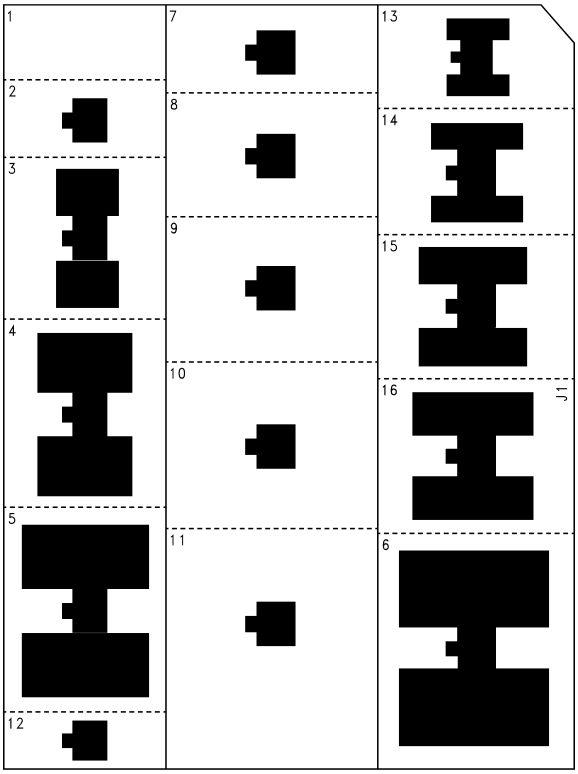



**Figure 9-18. Bottom View of the Thermal Test Pattern in Actual Scale**

### 9.5.2 Layout Example

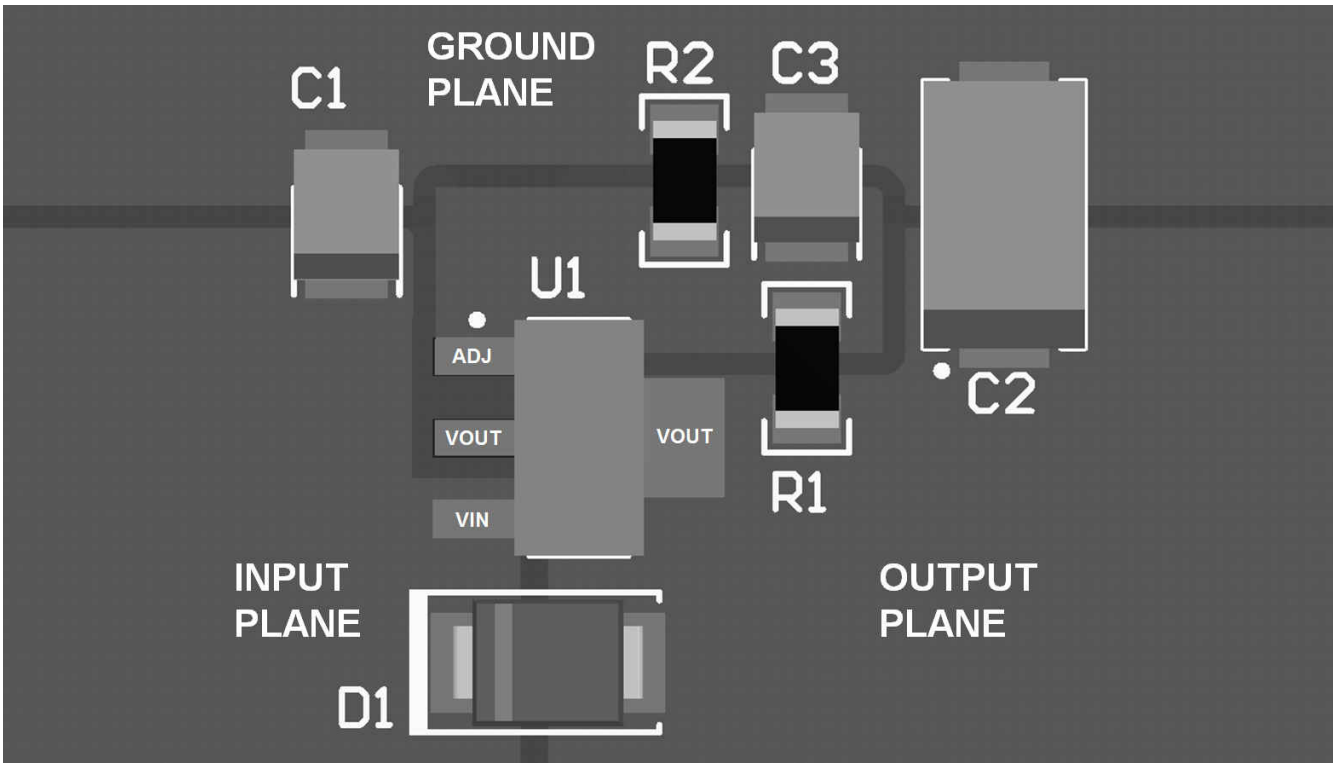



**Figure 9-19. Layout Example (SOT-223)**

# 10 Device and Documentation Support

## 10.1 Documentation Support

### 10.1.1 Related Documentation

For related documentation see the following:

Texas Instruments, *AN-1187 Leadless Leadframe Package (LLP)* application note

## 10.2 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on ti.com. Click on *Subscribe to updates* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

## 10.3 Support Resources

TI E2E™ support forums are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

Linked content is provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's Terms of Use.

## 10.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.
All trademarks are the property of their respective owners.

## 10.5 Electrostatic Discharge Caution



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

## 10.6 Glossary

| | |
|---|---|
| TI Glossary | This glossary lists and explains terms, acronyms, and definitions. |

# 11 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.


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## PACKAGING INFORMATION

| Orderable part number | Status (1) | Material type (2) | Package \| Pins | Package qty \| Carrier | RoHS (3) | Lead finish/ Ball material (4) | MSL rating/ Peak reflow (5) | Op temp (°C) | Part marking (6) |
|---|---|---|---|---|---|---|---|---|---|
| LM1117DT-1.8/NOPB | Active | Production | TO-252 (NDP) \| 3 | 75 \| TUBE | Yes | SN | Level-2-260C-1 YEAR | 0 to 125 | LM1117 DT-1.8 |
| LM1117DT-1.8/NOPB.B | Active | Production | TO-252 (NDP) \| 3 | 75 \| TUBE | Yes | SN | Level-2-260C-1 YEAR | 0 to 125 | LM1117 DT-1.8 |
| LM1117DT-2.5/NOPB | Active | Production | TO-252 (NDP) \| 3 | 75 \| TUBE | Yes | SN | Level-2-260C-1 YEAR | 0 to 125 | LM1117 DT-2.5 |
| LM1117DT-2.5/NOPB.B | Active | Production | TO-252 (NDP) \| 3 | 75 \| TUBE | Yes | SN | Level-2-260C-1 YEAR | 0 to 125 | LM1117 DT-2.5 |
| LM1117DT-3.3/NOPB | Active | Production | TO-252 (NDP) \| 3 | 75 \| TUBE | Yes | SN | Level-2-260C-1 YEAR | 0 to 125 | LM1117 DT-3.3 |
| LM1117DT-3.3/NOPB.B | Active | Production | TO-252 (NDP) \| 3 | 75 \| TUBE | Yes | SN | Level-2-260C-1 YEAR | 0 to 125 | LM1117 DT-3.3 |
| LM1117DT-5.0/NOPB | Active | Production | TO-252 (NDP) \| 3 | 75 \| TUBE | Yes | SN | Level-2-260C-1 YEAR | 0 to 125 | LM1117 DT-5.0 |
| LM1117DT-5.0/NOPB.B | Active | Production | TO-252 (NDP) \| 3 | 75 \| TUBE | Yes | SN | Level-2-260C-1 YEAR | 0 to 125 | LM1117 DT-5.0 |
| LM1117DT-ADJ/NOPB | Active | Production | TO-252 (NDP) \| 3 | 75 \| TUBE | Yes | SN | Level-2-260C-1 YEAR | 0 to 125 | LM1117 DT-ADJ |
| LM1117DT-ADJ/NOPB.B | Active | Production | TO-252 (NDP) \| 3 | 75 \| TUBE | Yes | SN | Level-2-260C-1 YEAR | 0 to 125 | LM1117 DT-ADJ |
| LM1117DTX-1.8/NOPB | Active | Production | TO-252 (NDP) \| 3 | 2500 \| LARGE T&R | Yes | SN | Level-2-260C-1 YEAR | 0 to 125 | LM1117 DT-1.8 |
| LM1117DTX-1.8/NOPB.B | Active | Production | TO-252 (NDP) \| 3 | 2500 \| LARGE T&R | Yes | SN | Level-2-260C-1 YEAR | 0 to 125 | LM1117 DT-1.8 |
| LM1117DTX-2.5/NOPB | Active | Production | TO-252 (NDP) \| 3 | 2500 \| LARGE T&R | Yes | SN | Level-2-260C-1 YEAR | 0 to 125 | LM1117 DT-2.5 |
| LM1117DTX-2.5/NOPB.B | Active | Production | TO-252 (NDP) \| 3 | 2500 \| LARGE T&R | Yes | SN | Level-2-260C-1 YEAR | 0 to 125 | LM1117 DT-2.5 |
| LM1117DTX-3.3/NOPB | Active | Production | TO-252 (NDP) \| 3 | 2500 \| LARGE T&R | Yes | SN | Level-2-260C-1 YEAR | 0 to 125 | LM1117 DT-3.3 |
| LM1117DTX-3.3/NOPB.B | Active | Production | TO-252 (NDP) \| 3 | 2500 \| LARGE T&R | Yes | SN | Level-2-260C-1 YEAR | 0 to 125 | LM1117 DT-3.3 |

| Orderable part number | Status (1) | Material type (2) | Package \| Pins | Package qty \| Carrier | RoHS (3) | Lead finish/ Ball material (4) | MSL rating/ Peak reflow (5) | Op temp (°C) | Part marking (6) |
|---|---|---|---|---|---|---|---|---|---|
| LM1117DTX-5.0/NOPB | Active | Production | TO-252 (NDP) \| 3 | 2500 \| LARGE T&R | Yes | SN | Level-2-260C-1 YEAR | 0 to 125 | LM1117 DT-5.0 |
| LM1117DTX-5.0/NOPB.B | Active | Production | TO-252 (NDP) \| 3 | 2500 \| LARGE T&R | Yes | SN | Level-2-260C-1 YEAR | 0 to 125 | LM1117 DT-5.0 |
| LM1117DTX-ADJ/NOPB | Active | Production | TO-252 (NDP) \| 3 | 2500 \| LARGE T&R | Yes | SN | Level-2-260C-1 YEAR | 0 to 125 | LM1117 DT-ADJ |
| LM1117DTX-ADJ/NOPB.B | Active | Production | TO-252 (NDP) \| 3 | 2500 \| LARGE T&R | Yes | SN | Level-2-260C-1 YEAR | 0 to 125 | LM1117 DT-ADJ |
| LM1117IDT-3.3/NOPB | Active | Production | TO-252 (NDP) \| 3 | 75 \| TUBE | Yes | SN | Level-2-260C-1 YEAR | -40 to 125 | LM1117 IDT-3.3 |
| LM1117IDT-3.3/NOPB.B | Active | Production | TO-252 (NDP) \| 3 | 75 \| TUBE | Yes | SN | Level-2-260C-1 YEAR | -40 to 125 | LM1117 IDT-3.3 |
| LM1117IDT-5.0/NOPB | Active | Production | TO-252 (NDP) \| 3 | 75 \| TUBE | Yes | SN | Level-2-260C-1 YEAR | -40 to 125 | LM1117 IDT-5.0 |
| LM1117IDT-5.0/NOPB.B | Active | Production | TO-252 (NDP) \| 3 | 75 \| TUBE | Yes | SN | Level-2-260C-1 YEAR | -40 to 125 | LM1117 IDT-5.0 |
| LM1117IDT-ADJ/NOPB | Active | Production | TO-252 (NDP) \| 3 | 75 \| TUBE | Yes | SN | Level-2-260C-1 YEAR | -40 to 125 | LM1117 IDT-ADJ |
| LM1117IDT-ADJ/NOPB.B | Active | Production | TO-252 (NDP) \| 3 | 75 \| TUBE | Yes | SN | Level-2-260C-1 YEAR | -40 to 125 | LM1117 IDT-ADJ |
| LM1117IDTX-3.3/NOPB | Active | Production | TO-252 (NDP) \| 3 | 2500 \| LARGE T&R | Yes | SN | Level-2-260C-1 YEAR | -40 to 125 | LM1117 IDT-3.3 |
| LM1117IDTX-5.0/NOPB | Active | Production | TO-252 (NDP) \| 3 | 2500 \| LARGE T&R | Yes | SN | Level-2-260C-1 YEAR | -40 to 125 | LM1117 IDT-5.0 |
| LM1117IDTX-ADJ/NOPB | Active | Production | TO-252 (NDP) \| 3 | 2500 \| LARGE T&R | Yes | SN | Level-2-260C-1 YEAR | -40 to 125 | LM1117 IDT-ADJ |
| LM1117ILD-ADJ/NOPB | Active | Production | WSON (NGN) \| 8 | 1000 \| SMALL T&R | Yes | SN | Level-3-260C-168 HR | -40 to 125 | 1117IAD |
| LM1117ILD-ADJ/NOPB.B | Active | Production | WSON (NGN) \| 8 | 1000 \| SMALL T&R | Yes | SN | Level-3-260C-168 HR | -40 to 125 | 1117IAD |
| LM1117IMP-3.3/NOPB | Active | Production | SOT-223 (DCY) \| 4 | 1000 \| SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | N05B |
| LM1117IMP-3.3/NOPB.B | Active | Production | SOT-223 (DCY) \| 4 | 1000 \| SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | N05B |
| LM1117IMP-5.0/NOPB | Active | Production | SOT-223 (DCY) \| 4 | 1000 \| SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | N06B |
| LM1117IMP-5.0/NOPB.B | Active | Production | SOT-223 (DCY) \| 4 | 1000 \| SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | N06B |
| LM1117IMP-ADJ/NOPB | Active | Production | SOT-223 (DCY) \| 4 | 1000 \| SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | N03B |
| LM1117IMP-ADJ/NOPB.B | Active | Production | SOT-223 (DCY) \| 4 | 1000 \| SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | N03B |

| Orderable part number | Status (1) | Material type (2) | Package \| Pins | Package qty \| Carrier | RoHS (3) | Lead finish/ Ball material (4) | MSL rating/ Peak reflow (5) | Op temp (°C) | Part marking (6) |
|---|---|---|---|---|---|---|---|---|---|
| LM1117IMPX-3.3/NOPB | Active | Production | SOT-223 (DCY) \| 4 | 2000 \| LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | N05B |
| LM1117IMPX-5.0/NOPB | Active | Production | SOT-223 (DCY) \| 4 | 2000 \| LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | N06B |
| LM1117IMPX-ADJ/NOPB | Active | Production | SOT-223 (DCY) \| 4 | 2000 \| LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | N03B |
| LM1117LD-1.8/NOPB | Active | Production | WSON (NGN) \| 8 | 1000 \| SMALL T&R | Yes | SN | Level-3-260C-168 HR | 0 to 125 | 1117-18 |
| LM1117LD-1.8/NOPB.B | Active | Production | WSON (NGN) \| 8 | 1000 \| SMALL T&R | Yes | SN | Level-3-260C-168 HR | 0 to 125 | 1117-18 |
| LM1117LD-2.5/NOPB | Active | Production | WSON (NGN) \| 8 | 1000 \| SMALL T&R | Yes | SN | Level-3-260C-168 HR | 0 to 125 | 1117-25 |
| LM1117LD-2.5/NOPB.B | Active | Production | WSON (NGN) \| 8 | 1000 \| SMALL T&R | Yes | SN | Level-3-260C-168 HR | 0 to 125 | 1117-25 |
| LM1117LD-3.3/NOPB | Active | Production | WSON (NGN) \| 8 | 1000 \| SMALL T&R | Yes | SN | Level-3-260C-168 HR | 0 to 125 | 1117-33 |
| LM1117LD-3.3/NOPB.B | Active | Production | WSON (NGN) \| 8 | 1000 \| SMALL T&R | Yes | SN | Level-3-260C-168 HR | 0 to 125 | 1117-33 |
| LM1117LD-ADJ/NOPB | Active | Production | WSON (NGN) \| 8 | 1000 \| SMALL T&R | Yes | SN | Level-3-260C-168 HR | 0 to 125 | 1117ADJ |
| LM1117LD-ADJ/NOPB.B | Active | Production | WSON (NGN) \| 8 | 1000 \| SMALL T&R | Yes | SN | Level-3-260C-168 HR | 0 to 125 | 1117ADJ |
| LM1117LDX-1.8/NOPB | Active | Production | WSON (NGN) \| 8 | 4500 \| LARGE T&R | Yes | SN | Level-3-260C-168 HR | 0 to 125 | 1117-18 |
| LM1117LDX-1.8/NOPB.B | Active | Production | WSON (NGN) \| 8 | 4500 \| LARGE T&R | Yes | SN | Level-3-260C-168 HR | 0 to 125 | 1117-18 |
| LM1117LDX-ADJ/NOPB | Active | Production | WSON (NGN) \| 8 | 4500 \| LARGE T&R | Yes | SN | Level-3-260C-168 HR | 0 to 125 | 1117ADJ |
| LM1117LDX-ADJ/NOPB.B | Active | Production | WSON (NGN) \| 8 | 4500 \| LARGE T&R | Yes | SN | Level-3-260C-168 HR | 0 to 125 | 1117ADJ |
| LM1117MP-1.8/NOPB | Active | Production | SOT-223 (DCY) \| 4 | 1000 \| SMALL T&R | Yes | SN | Level-1-260C-UNLIM | 0 to 125 | N12A |
| LM1117MP-1.8/NOPB.B | Active | Production | SOT-223 (DCY) \| 4 | 1000 \| SMALL T&R | Yes | SN | Level-1-260C-UNLIM | 0 to 125 | N12A |
| LM1117MP-2.5/NOPB | Active | Production | SOT-223 (DCY) \| 4 | 1000 \| SMALL T&R | Yes | SN | Level-1-260C-UNLIM | 0 to 125 | N13A |
| LM1117MP-2.5/NOPB.B | Active | Production | SOT-223 (DCY) \| 4 | 1000 \| SMALL T&R | Yes | SN | Level-1-260C-UNLIM | 0 to 125 | N13A |
| LM1117MP-3.3/NOPB | Active | Production | SOT-223 (DCY) \| 4 | 1000 \| SMALL T&R | Yes | SN | Level-1-260C-UNLIM | 0 to 125 | N05A |
| LM1117MP-3.3/NOPB.B | Active | Production | SOT-223 (DCY) \| 4 | 1000 \| SMALL T&R | Yes | SN | Level-1-260C-UNLIM | 0 to 125 | N05A |
| LM1117MP-5.0/NOPB | Active | Production | SOT-223 (DCY) \| 4 | 1000 \| SMALL T&R | Yes | SN | Level-1-260C-UNLIM | 0 to 125 | N06A |
| LM1117MP-5.0/NOPB.B | Active | Production | SOT-223 (DCY) \| 4 | 1000 \| SMALL T&R | Yes | SN | Level-1-260C-UNLIM | 0 to 125 | N06A |
| LM1117MP-ADJ/NOPB | Active | Production | SOT-223 (DCY) \| 4 | 1000 \| SMALL T&R | Yes | SN | Level-1-260C-UNLIM | 0 to 125 | N03A |
| LM1117MP-ADJ/NOPB.B | Active | Production | SOT-223 (DCY) \| 4 | 1000 \| SMALL T&R | Yes | SN | Level-1-260C-UNLIM | 0 to 125 | N03A |
| LM1117MPX-1.8/NOPB | Active | Production | SOT-223 (DCY) \| 4 | 2000 \| LARGE T&R | Yes | SN | Level-1-260C-UNLIM | 0 to 125 | N12A |
| LM1117MPX-1.8/NOPB.B | Active | Production | SOT-223 (DCY) \| 4 | 2000 \| LARGE T&R | Yes | SN | Level-1-260C-UNLIM | 0 to 125 | N12A |
| LM1117MPX-2.5/NOPB | Active | Production | SOT-223 (DCY) \| 4 | 2000 \| LARGE T&R | Yes | SN | Level-1-260C-UNLIM | 0 to 125 | N13A |
| LM1117MPX-2.5/NOPB.B | Active | Production | SOT-223 (DCY) \| 4 | 2000 \| LARGE T&R | Yes | SN | Level-1-260C-UNLIM | 0 to 125 | N13A |
| LM1117MPX-3.3/NOPB | Active | Production | SOT-223 (DCY) \| 4 | 2000 \| LARGE T&R | Yes | SN | Level-1-260C-UNLIM | 0 to 125 | N05A |
| LM1117MPX-3.3/NOPB.B | Active | Production | SOT-223 (DCY) \| 4 | 2000 \| LARGE T&R | Yes | SN | Level-1-260C-UNLIM | 0 to 125 | N05A |

| Orderable part number | Status (1) | Material type (2) | Package \| Pins | Package qty \| Carrier | RoHS (3) | Lead finish/ Ball material (4) | MSL rating/ Peak reflow (5) | Op temp (°C) | Part marking (6) |
|---|---|---|---|---|---|---|---|---|---|
| LM1117MPX-5.0/NOPB | Active | Production | SOT-223 (DCY) \| 4 | 2000 \| LARGE T&R | Yes | SN | Level-1-260C-UNLIM | 0 to 125 | N06A |
| LM1117MPX-5.0/NOPB.B | Active | Production | SOT-223 (DCY) \| 4 | 2000 \| LARGE T&R | Yes | SN | Level-1-260C-UNLIM | 0 to 125 | N06A |
| LM1117MPX-ADJ/NOPB | Active | Production | SOT-223 (DCY) \| 4 | 2000 \| LARGE T&R | Yes | SN | Level-1-260C-UNLIM | 0 to 125 | N03A |
| LM1117MPX-ADJ/NOPB.B | Active | Production | SOT-223 (DCY) \| 4 | 2000 \| LARGE T&R | Yes | SN | Level-1-260C-UNLIM | 0 to 125 | N03A |
| LM1117S-ADJ/NOPB | Active | Production | DDPAK/ TO-263 (KTT) \| 3 | 45 \| TUBE | ROHS Exempt | SN | Level-3-245C-168 HR | 0 to 125 | LM1117S ADJ |
| LM1117S-ADJ/NOPB.B | Active | Production | DDPAK/ TO-263 (KTT) \| 3 | 45 \| TUBE | ROHS Exempt | SN | Level-3-245C-168 HR | 0 to 125 | LM1117S ADJ |
| LM1117SX-3.3/NOPB | Active | Production | DDPAK/ TO-263 (KTT) \| 3 | 500 \| LARGE T&R | ROHS Exempt | SN | Level-3-245C-168 HR | 0 to 125 | LM1117S 3.3 |
| LM1117SX-3.3/NOPB.B | Active | Production | DDPAK/ TO-263 (KTT) \| 3 | 500 \| LARGE T&R | ROHS Exempt | SN | Level-3-245C-168 HR | 0 to 125 | LM1117S 3.3 |
| LM1117SX-5.0/NOPB | Active | Production | DDPAK/ TO-263 (KTT) \| 3 | 500 \| LARGE T&R | ROHS Exempt | SN | Level-3-245C-168 HR | 0 to 125 | LM1117S 5.0 |
| LM1117SX-5.0/NOPB.B | Active | Production | DDPAK/ TO-263 (KTT) \| 3 | 500 \| LARGE T&R | ROHS Exempt | SN | Level-3-245C-168 HR | 0 to 125 | LM1117S 5.0 |
| LM1117SX-ADJ/NOPB | Active | Production | DDPAK/ TO-263 (KTT) \| 3 | 500 \| LARGE T&R | ROHS Exempt | SN | Level-3-245C-168 HR | 0 to 125 | LM1117S ADJ |
| LM1117SX-ADJ/NOPB.B | Active | Production | DDPAK/ TO-263 (KTT) \| 3 | 500 \| LARGE T&R | ROHS Exempt | SN | Level-3-245C-168 HR | 0 to 125 | LM1117S ADJ |
| LM1117T-2.5/NOPB | Active | Production | TO-220 (NDE) \| 3 | 45 \| TUBE | Yes | SN | Level-1-NA-UNLIM | 0 to 125 | LM1117T 2.5 |
| LM1117T-2.5/NOPB.B | Active | Production | TO-220 (NDE) \| 3 | 45 \| TUBE | Yes | SN | Level-1-NA-UNLIM | 0 to 125 | LM1117T 2.5 |
| LM1117T-3.3/NOPB | Active | Production | TO-220 (NDE) \| 3 | 45 \| TUBE | Yes | SN | Level-1-NA-UNLIM | 0 to 125 | LM1117T 3.3 |
| LM1117T-3.3/NOPB.B | Active | Production | TO-220 (NDE) \| 3 | 45 \| TUBE | Yes | SN | Level-1-NA-UNLIM | 0 to 125 | LM1117T 3.3 |
| LM1117T-5.0/NOPB | Active | Production | TO-220 (NDE) \| 3 | 45 \| TUBE | Yes | SN | Level-1-NA-UNLIM | 0 to 125 | LM1117T 5.0 |
| LM1117T-5.0/NOPB.B | Active | Production | TO-220 (NDE) \| 3 | 45 \| TUBE | Yes | SN | Level-1-NA-UNLIM | 0 to 125 | LM1117T 5.0 |
| LM1117T-ADJ/NOPB | Active | Production | TO-220 (NDE) \| 3 | 45 \| TUBE | Yes | SN | Level-1-NA-UNLIM | 0 to 125 | LM1117T ADJ |

| Orderable part number | Status (1) | Material type (2) | Package \| Pins | Package qty \| Carrier | RoHS (3) | Lead finish/ Ball material (4) | MSL rating/ Peak reflow (5) | Op temp (°C) | Part marking (6) |
|---|---|---|---|---|---|---|---|---|---|
| LM1117T-ADJ/NOPB.B | Active | Production | TO-220 (NDE) \| 3 | 45 \| TUBE | Yes | SN | Level-1-NA-UNLIM | 0 to 125 | LM1117T ADJ |

(1) **Status:** For more details on status, see our product life cycle.

(2) **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the TI RoHS Statement for additional information and value definition.

(4) **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

(6) **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

**Important Information and Disclaimer:**The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

**OTHER QUALIFIED VERSIONS OF LM1117 :**

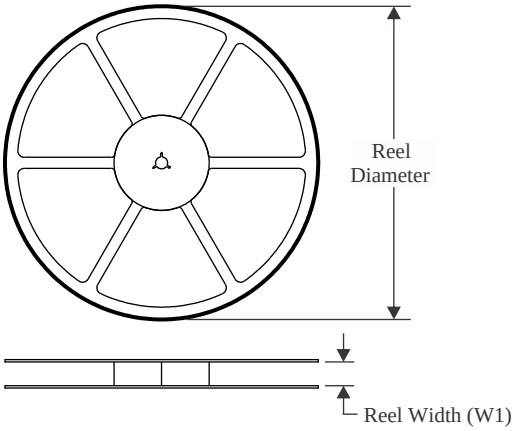
- Automotive : LM1117-Q1

NOTE: Qualified Version Definitions:

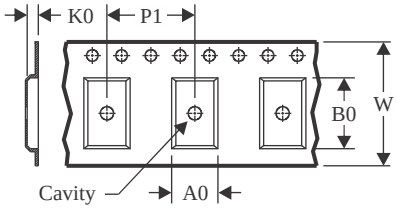
- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects

## TAPE AND REEL INFORMATION

**REEL DIMENSIONS**

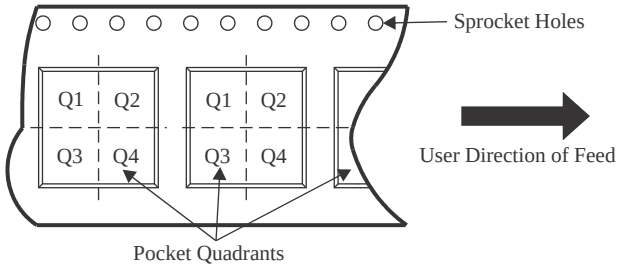



**TAPE DIMENSIONS**




| | |
|---|---|
| A0 | Dimension designed to accommodate the component width |
| B0 | Dimension designed to accommodate the component length |
| K0 | Dimension designed to accommodate the component thickness |
| W | Overall width of the carrier tape |
| P1 | Pitch between successive cavity centers |

**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**

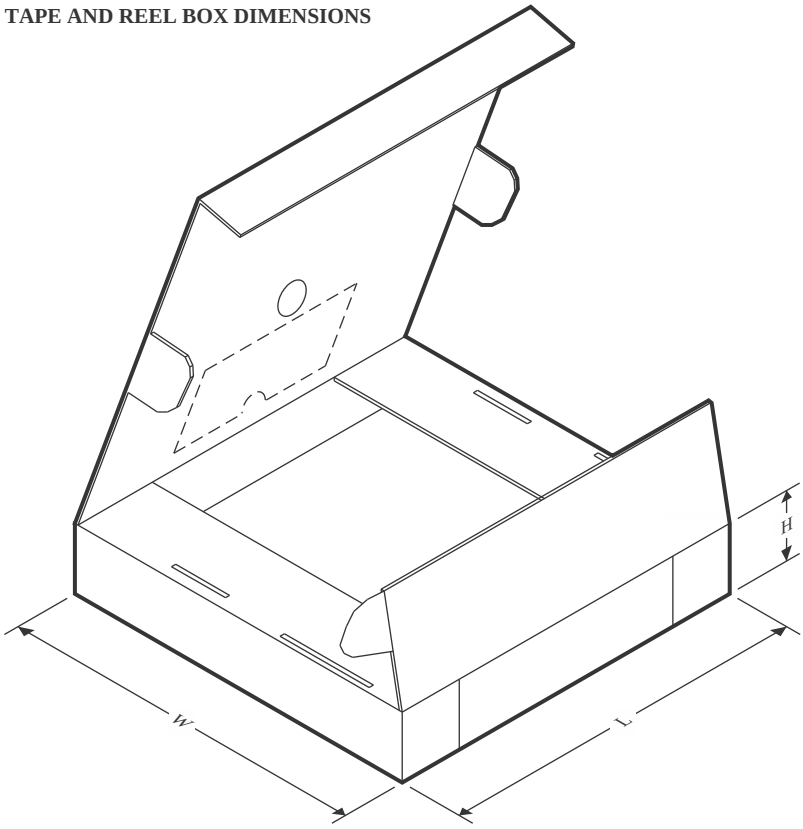



*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LM1117DTX-1.8/NOPB | TO-252 | NDP | 3 | 2500 | 330.0 | 16.4 | 6.9 | 10.5 | 2.7 | 8.0 | 16.0 | Q2 |
| LM1117DTX-2.5/NOPB | TO-252 | NDP | 3 | 2500 | 330.0 | 16.4 | 6.9 | 10.5 | 2.7 | 8.0 | 16.0 | Q2 |
| LM1117DTX-3.3/NOPB | TO-252 | NDP | 3 | 2500 | 330.0 | 16.4 | 6.9 | 10.5 | 2.7 | 8.0 | 16.0 | Q2 |
| LM1117DTX-5.0/NOPB | TO-252 | NDP | 3 | 2500 | 330.0 | 16.4 | 6.9 | 10.5 | 2.7 | 8.0 | 16.0 | Q2 |
| LM1117DTX-ADJ/NOPB | TO-252 | NDP | 3 | 2500 | 330.0 | 16.4 | 6.9 | 10.5 | 2.7 | 8.0 | 16.0 | Q2 |
| LM1117IDTX-3.3/NOPB | TO-252 | NDP | 3 | 2500 | 330.0 | 16.4 | 6.9 | 10.5 | 2.7 | 8.0 | 16.0 | Q2 |
| LM1117IDTX-5.0/NOPB | TO-252 | NDP | 3 | 2500 | 330.0 | 16.4 | 6.9 | 10.5 | 2.7 | 8.0 | 16.0 | Q2 |
| LM1117IDTX-ADJ/NOPB | TO-252 | NDP | 3 | 2500 | 330.0 | 16.4 | 6.9 | 10.5 | 2.7 | 8.0 | 16.0 | Q2 |
| LM1117ILD-ADJ/NOPB | WSON | NGN | 8 | 1000 | 177.8 | 12.4 | 4.3 | 4.3 | 1.3 | 8.0 | 12.0 | Q1 |
| LM1117IMP-3.3/NOPB | SOT-223 | DCY | 4 | 1000 | 330.0 | 16.4 | 7.0 | 7.5 | 2.2 | 12.0 | 16.0 | Q3 |
| LM1117IMP-5.0/NOPB | SOT-223 | DCY | 4 | 1000 | 330.0 | 16.4 | 7.0 | 7.5 | 2.2 | 12.0 | 16.0 | Q3 |
| LM1117IMP-ADJ/NOPB | SOT-223 | DCY | 4 | 1000 | 330.0 | 16.4 | 7.0 | 7.5 | 2.2 | 12.0 | 16.0 | Q3 |
| LM1117IMPX-3.3/NOPB | SOT-223 | DCY | 4 | 2000 | 330.0 | 16.4 | 7.0 | 7.5 | 2.2 | 12.0 | 16.0 | Q3 |
| LM1117IMPX-5.0/NOPB | SOT-223 | DCY | 4 | 2000 | 330.0 | 16.4 | 7.0 | 7.5 | 2.2 | 12.0 | 16.0 | Q3 |
| LM1117IMPX-ADJ/NOPB | SOT-223 | DCY | 4 | 2000 | 330.0 | 16.4 | 7.0 | 7.5 | 2.2 | 12.0 | 16.0 | Q3 |
| LM1117LD-1.8/NOPB | WSON | NGN | 8 | 1000 | 177.8 | 12.4 | 4.3 | 4.3 | 1.3 | 8.0 | 12.0 | Q1 |

| Device | Package Type | Package Drawing | Pins | SPQ | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LM1117LD-2.5/NOPB | WSON | NGN | 8 | 1000 | 177.8 | 12.4 | 4.3 | 4.3 | 1.3 | 8.0 | 12.0 | Q1 |
| LM1117LD-3.3/NOPB | WSON | NGN | 8 | 1000 | 177.8 | 12.4 | 4.3 | 4.3 | 1.3 | 8.0 | 12.0 | Q1 |
| LM1117LD-ADJ/NOPB | WSON | NGN | 8 | 1000 | 177.8 | 12.4 | 4.3 | 4.3 | 1.3 | 8.0 | 12.0 | Q1 |
| LM1117LDX-1.8/NOPB | WSON | NGN | 8 | 4500 | 330.0 | 12.4 | 4.3 | 4.3 | 1.3 | 8.0 | 12.0 | Q1 |
| LM1117LDX-ADJ/NOPB | WSON | NGN | 8 | 4500 | 330.0 | 12.4 | 4.3 | 4.3 | 1.3 | 8.0 | 12.0 | Q1 |
| LM1117MP-1.8/NOPB | SOT-223 | DCY | 4 | 1000 | 330.0 | 16.4 | 7.0 | 7.5 | 2.2 | 12.0 | 16.0 | Q3 |
| LM1117MP-2.5/NOPB | SOT-223 | DCY | 4 | 1000 | 330.0 | 16.4 | 7.0 | 7.5 | 2.2 | 12.0 | 16.0 | Q3 |
| LM1117MP-3.3/NOPB | SOT-223 | DCY | 4 | 1000 | 330.0 | 16.4 | 7.0 | 7.5 | 2.2 | 12.0 | 16.0 | Q3 |
| LM1117MP-5.0/NOPB | SOT-223 | DCY | 4 | 1000 | 330.0 | 16.4 | 7.0 | 7.5 | 2.2 | 12.0 | 16.0 | Q3 |
| LM1117MP-ADJ/NOPB | SOT-223 | DCY | 4 | 1000 | 330.0 | 16.4 | 7.0 | 7.5 | 2.2 | 12.0 | 16.0 | Q3 |
| LM1117MPX-1.8/NOPB | SOT-223 | DCY | 4 | 2000 | 330.0 | 16.4 | 7.0 | 7.5 | 2.2 | 12.0 | 16.0 | Q3 |
| LM1117MPX-2.5/NOPB | SOT-223 | DCY | 4 | 2000 | 330.0 | 16.4 | 7.0 | 7.5 | 2.2 | 12.0 | 16.0 | Q3 |
| LM1117MPX-3.3/NOPB | SOT-223 | DCY | 4 | 2000 | 330.0 | 16.4 | 7.0 | 7.5 | 2.2 | 12.0 | 16.0 | Q3 |
| LM1117MPX-5.0/NOPB | SOT-223 | DCY | 4 | 2000 | 330.0 | 16.4 | 7.0 | 7.5 | 2.2 | 12.0 | 16.0 | Q3 |
| LM1117MPX-ADJ/NOPB | SOT-223 | DCY | 4 | 2000 | 330.0 | 16.4 | 7.0 | 7.5 | 2.2 | 12.0 | 16.0 | Q3 |
| LM1117SX-3.3/NOPB | DDPAK/ TO-263 | KTT | 3 | 500 | 330.0 | 24.4 | 10.75 | 14.85 | 5.0 | 16.0 | 24.0 | Q2 |
| LM1117SX-5.0/NOPB | DDPAK/ TO-263 | KTT | 3 | 500 | 330.0 | 24.4 | 10.75 | 14.85 | 5.0 | 16.0 | 24.0 | Q2 |
| LM1117SX-ADJ/NOPB | DDPAK/ TO-263 | KTT | 3 | 500 | 330.0 | 24.4 | 10.75 | 14.85 | 5.0 | 16.0 | 24.0 | Q2 |

TAPE AND REEL BOX DIMENSIONS

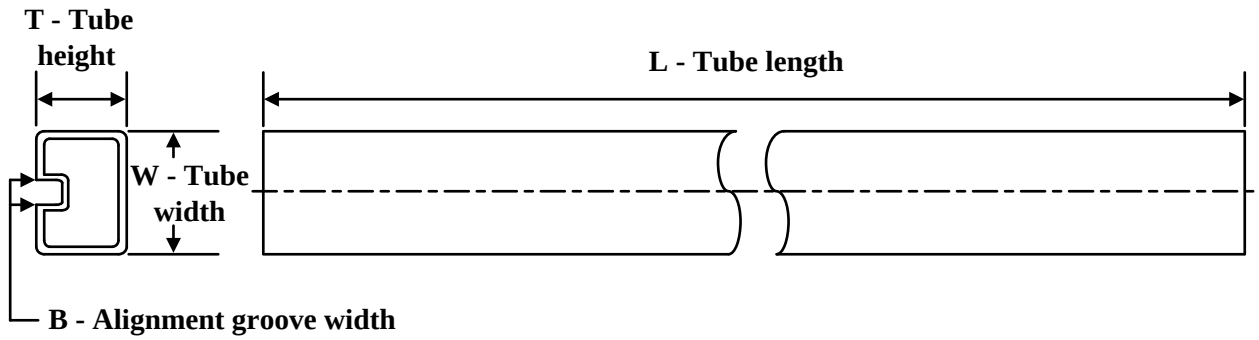



*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|---|---|---|---|---|---|---|---|
| LM1117DTX-1.8/NOPB | TO-252 | NDP | 3 | 2500 | 356.0 | 356.0 | 36.0 |
| LM1117DTX-2.5/NOPB | TO-252 | NDP | 3 | 2500 | 356.0 | 356.0 | 36.0 |
| LM1117DTX-3.3/NOPB | TO-252 | NDP | 3 | 2500 | 356.0 | 356.0 | 36.0 |
| LM1117DTX-5.0/NOPB | TO-252 | NDP | 3 | 2500 | 356.0 | 356.0 | 36.0 |
| LM1117DTX-ADJ/NOPB | TO-252 | NDP | 3 | 2500 | 356.0 | 356.0 | 36.0 |
| LM1117IDTX-3.3/NOPB | TO-252 | NDP | 3 | 2500 | 356.0 | 356.0 | 36.0 |
| LM1117IDTX-5.0/NOPB | TO-252 | NDP | 3 | 2500 | 356.0 | 356.0 | 36.0 |
| LM1117IDTX-ADJ/NOPB | TO-252 | NDP | 3 | 2500 | 356.0 | 356.0 | 36.0 |
| LM1117ILD-ADJ/NOPB | WSON | NGN | 8 | 1000 | 208.0 | 191.0 | 35.0 |
| LM1117IMP-3.3/NOPB | SOT-223 | DCY | 4 | 1000 | 367.0 | 367.0 | 35.0 |
| LM1117IMP-5.0/NOPB | SOT-223 | DCY | 4 | 1000 | 367.0 | 367.0 | 35.0 |
| LM1117IMP-ADJ/NOPB | SOT-223 | DCY | 4 | 1000 | 367.0 | 367.0 | 35.0 |
| LM1117IMPX-3.3/NOPB | SOT-223 | DCY | 4 | 2000 | 367.0 | 367.0 | 35.0 |
| LM1117IMPX-5.0/NOPB | SOT-223 | DCY | 4 | 2000 | 367.0 | 367.0 | 35.0 |
| LM1117IMPX-ADJ/NOPB | SOT-223 | DCY | 4 | 2000 | 367.0 | 367.0 | 35.0 |
| LM1117LD-1.8/NOPB | WSON | NGN | 8 | 1000 | 208.0 | 191.0 | 35.0 |
| LM1117LD-2.5/NOPB | WSON | NGN | 8 | 1000 | 208.0 | 191.0 | 35.0 |
| LM1117LD-3.3/NOPB | WSON | NGN | 8 | 1000 | 208.0 | 191.0 | 35.0 |

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|---|---|---|---|---|---|---|---|
| LM1117LD-ADJ/NOPB | WSON | NGN | 8 | 1000 | 208.0 | 191.0 | 35.0 |
| LM1117LDX-1.8/NOPB | WSON | NGN | 8 | 4500 | 356.0 | 356.0 | 36.0 |
| LM1117LDX-ADJ/NOPB | WSON | NGN | 8 | 4500 | 356.0 | 356.0 | 36.0 |
| LM1117MP-1.8/NOPB | SOT-223 | DCY | 4 | 1000 | 367.0 | 367.0 | 35.0 |
| LM1117MP-2.5/NOPB | SOT-223 | DCY | 4 | 1000 | 367.0 | 367.0 | 35.0 |
| LM1117MP-3.3/NOPB | SOT-223 | DCY | 4 | 1000 | 367.0 | 367.0 | 35.0 |
| LM1117MP-5.0/NOPB | SOT-223 | DCY | 4 | 1000 | 367.0 | 367.0 | 35.0 |
| LM1117MP-ADJ/NOPB | SOT-223 | DCY | 4 | 1000 | 367.0 | 367.0 | 35.0 |
| LM1117MPX-1.8/NOPB | SOT-223 | DCY | 4 | 2000 | 367.0 | 367.0 | 35.0 |
| LM1117MPX-2.5/NOPB | SOT-223 | DCY | 4 | 2000 | 367.0 | 367.0 | 35.0 |
| LM1117MPX-3.3/NOPB | SOT-223 | DCY | 4 | 2000 | 367.0 | 367.0 | 35.0 |
| LM1117MPX-5.0/NOPB | SOT-223 | DCY | 4 | 2000 | 367.0 | 367.0 | 35.0 |
| LM1117MPX-ADJ/NOPB | SOT-223 | DCY | 4 | 2000 | 367.0 | 367.0 | 35.0 |
| LM1117SX-3.3/NOPB | DDPAK/TO-263 | KTT | 3 | 500 | 356.0 | 356.0 | 45.0 |
| LM1117SX-5.0/NOPB | DDPAK/TO-263 | KTT | 3 | 500 | 356.0 | 356.0 | 45.0 |
| LM1117SX-ADJ/NOPB | DDPAK/TO-263 | KTT | 3 | 500 | 356.0 | 356.0 | 45.0 |

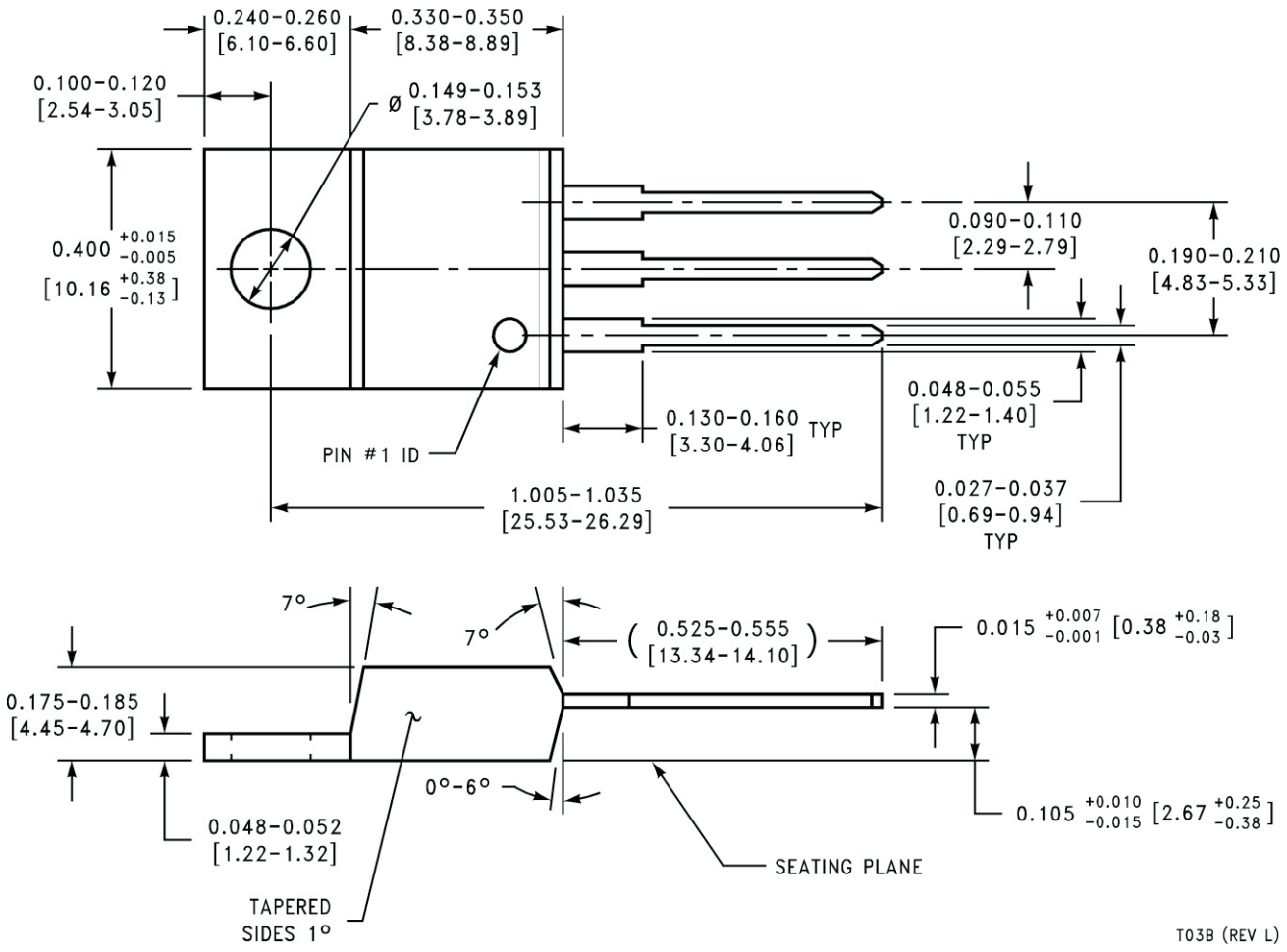
## TUBE



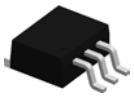

*All dimensions are nominal

| Device | Package Name | Package Type | Pins | SPQ | L (mm) | W (mm) | T (µm) | B (mm) |
|---|---|---|---|---|---|---|---|---|
| LM1117DT-1.8/NOPB | NDP | TO-252 | 3 | 75 | 508 | 20 | 4165.6 | 3.1 |
| LM1117DT-1.8/NOPB.B | NDP | TO-252 | 3 | 75 | 508 | 20 | 4165.6 | 3.1 |
| LM1117DT-2.5/NOPB | NDP | TO-252 | 3 | 75 | 508 | 20 | 4165.6 | 3.1 |
| LM1117DT-2.5/NOPB.B | NDP | TO-252 | 3 | 75 | 508 | 20 | 4165.6 | 3.1 |
| LM1117DT-3.3/NOPB | NDP | TO-252 | 3 | 75 | 508 | 20 | 4165.6 | 3.1 |
| LM1117DT-3.3/NOPB.B | NDP | TO-252 | 3 | 75 | 508 | 20 | 4165.6 | 3.1 |
| LM1117DT-5.0/NOPB | NDP | TO-252 | 3 | 75 | 508 | 20 | 4165.6 | 3.1 |
| LM1117DT-5.0/NOPB.B | NDP | TO-252 | 3 | 75 | 508 | 20 | 4165.6 | 3.1 |
| LM1117DT-ADJ/NOPB | NDP | TO-252 | 3 | 75 | 508 | 20 | 4165.6 | 3.1 |
| LM1117DT-ADJ/NOPB.B | NDP | TO-252 | 3 | 75 | 508 | 20 | 4165.6 | 3.1 |
| LM1117IDT-3.3/NOPB | NDP | TO-252 | 3 | 75 | 508 | 20 | 4165.6 | 3.1 |
| LM1117IDT-3.3/NOPB.B | NDP | TO-252 | 3 | 75 | 508 | 20 | 4165.6 | 3.1 |
| LM1117IDT-5.0/NOPB | NDP | TO-252 | 3 | 75 | 508 | 20 | 4165.6 | 3.1 |
| LM1117IDT-5.0/NOPB.B | NDP | TO-252 | 3 | 75 | 508 | 20 | 4165.6 | 3.1 |
| LM1117IDT-ADJ/NOPB | NDP | TO-252 | 3 | 75 | 508 | 20 | 4165.6 | 3.1 |
| LM1117IDT-ADJ/NOPB.B | NDP | TO-252 | 3 | 75 | 508 | 20 | 4165.6 | 3.1 |
| LM1117S-ADJ/NOPB | KTT | TO-263 | 3 | 45 | 502 | 25 | 8204.2 | 9.19 |
| LM1117S-ADJ/NOPB.B | KTT | TO-263 | 3 | 45 | 502 | 25 | 8204.2 | 9.19 |
| LM1117T-2.5/NOPB | NDE | TO-220 | 3 | 45 | 502 | 33 | 6985 | 4.06 |
| LM1117T-2.5/NOPB.B | NDE | TO-220 | 3 | 45 | 502 | 33 | 6985 | 4.06 |
| LM1117T-3.3/NOPB | NDE | TO-220 | 3 | 45 | 502 | 33 | 6985 | 4.06 |
| LM1117T-3.3/NOPB.B | NDE | TO-220 | 3 | 45 | 502 | 33 | 6985 | 4.06 |
| LM1117T-5.0/NOPB | NDE | TO-220 | 3 | 45 | 502 | 33 | 6985 | 4.06 |
| LM1117T-5.0/NOPB.B | NDE | TO-220 | 3 | 45 | 502 | 33 | 6985 | 4.06 |
| LM1117T-ADJ/NOPB | NDE | TO-220 | 3 | 45 | 502 | 33 | 6985 | 4.06 |
| LM1117T-ADJ/NOPB.B | NDE | TO-220 | 3 | 45 | 502 | 33 | 6985 | 4.06 |

NDE0003B


0.240-0.260
[6.10-6.60]
0.330-0.350
[8.38-8.89]
0.100-0.120
[2.54-3.05]
Ø 0.149-0.153
[3.78-3.89]
0.400 +0.015 -0.005
[10.16 +0.38 -0.13]
0.090-0.110
[2.29-2.79]
0.190-0.210
[4.83-5.33]
PIN #1 ID
0.130-0.160 TYP
[3.30-4.06]
0.048-0.055
[1.22-1.40]
TYP
1.005-1.035
[25.53-26.29]
0.027-0.037
[0.69-0.94]
TYP
7°
7°
( 0.525-0.555
[13.34-14.10] )
0.015 +0.007 -0.001 [0.38 +0.18 -0.03]
0.175-0.185
[4.45-4.70]
0°-6°
0.105 +0.010 -0.015 [2.67 +0.25 -0.38]
0.048-0.052
[1.22-1.32]
SEATING PLANE
TAPERED
SIDES 1°
T03B (REV L)

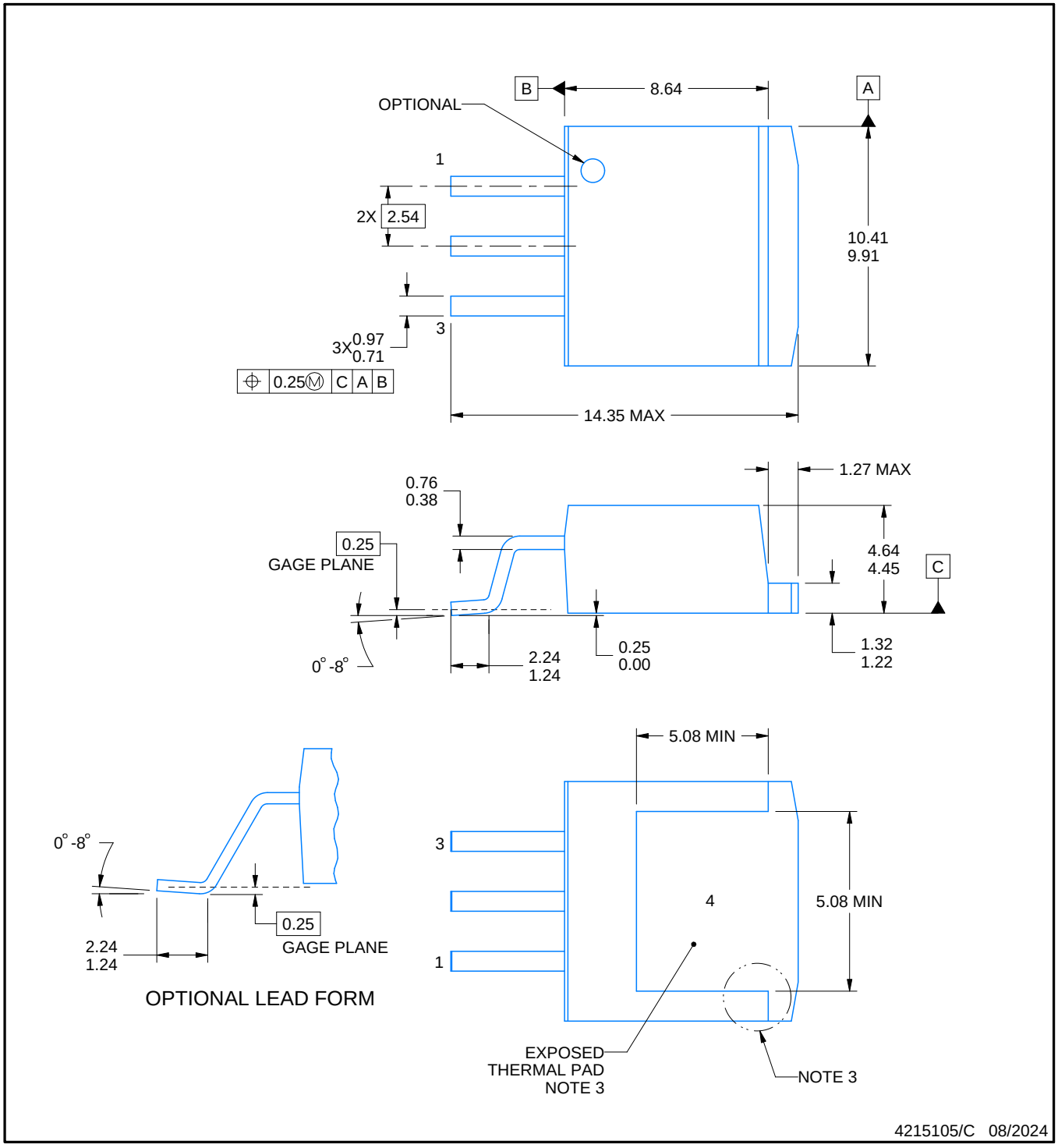
# KTT0003B



# PACKAGE OUTLINE

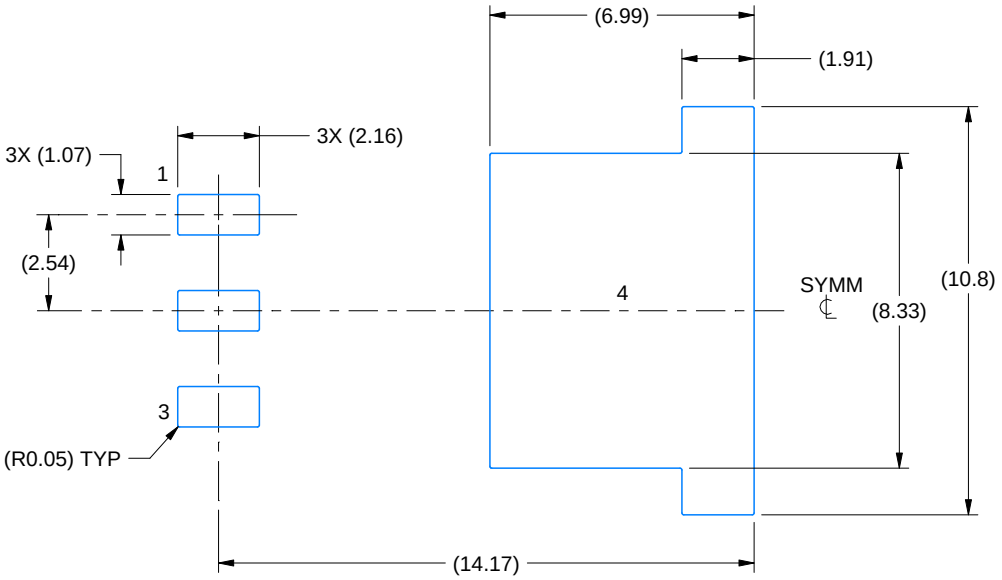
## TO-263 - 4.83 mm max height

TRANSISTOR OUTLINE

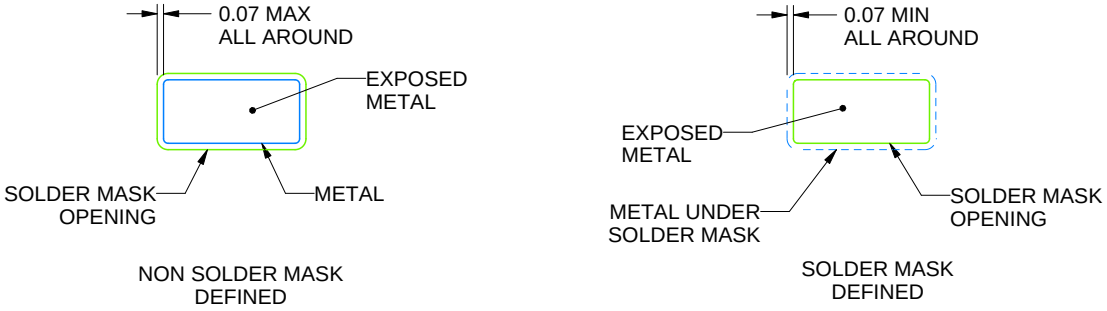



NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Features may not exist and shape may vary per different assembly sites.
4. Reference JEDEC registration TO-263, except minimum lead thickness and minimum exposed pad length.




LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:5X

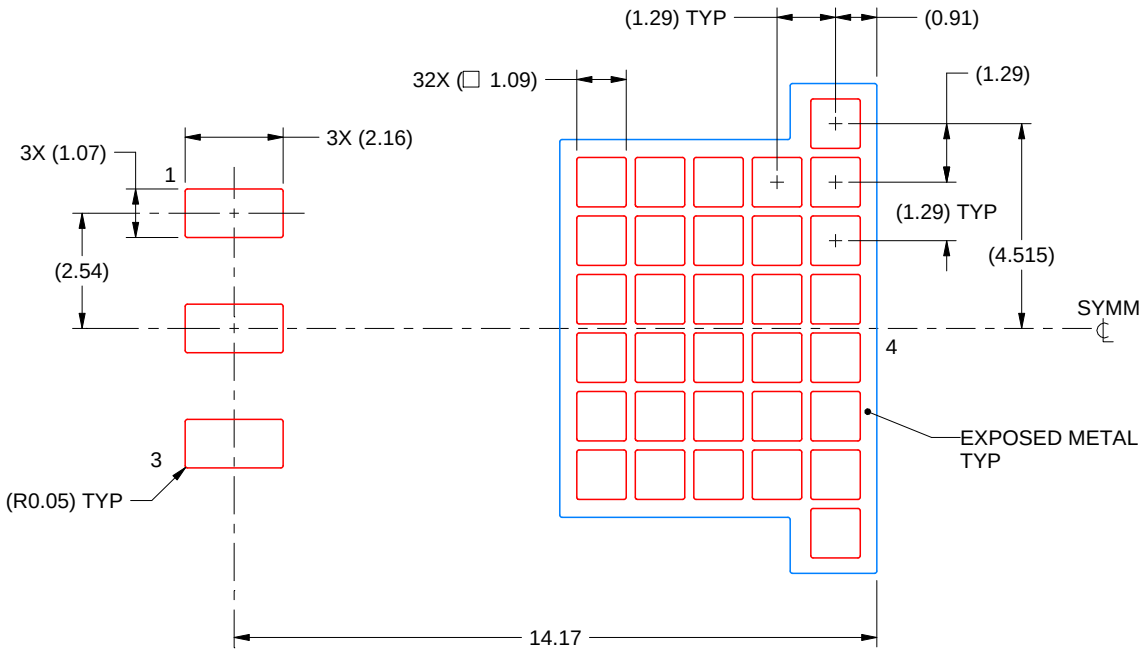



SOLDER MASK DETAILS

4215105/C 08/2024

NOTES: (continued)

5. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature numbers SLMA002(www.ti.com/lit/slm002) and SLMA004 (www.ti.com/lit/slma004).
6. Vias are optional depending on application, refer to device data sheet. It is recommended that vias under paste be filled, plugged or tented.




SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL

EXPOSED PAD
60% PRINTED SOLDER COVERAGE BY AREA
SCALE:6X

4215105/C 08/2024

NOTES: (continued)

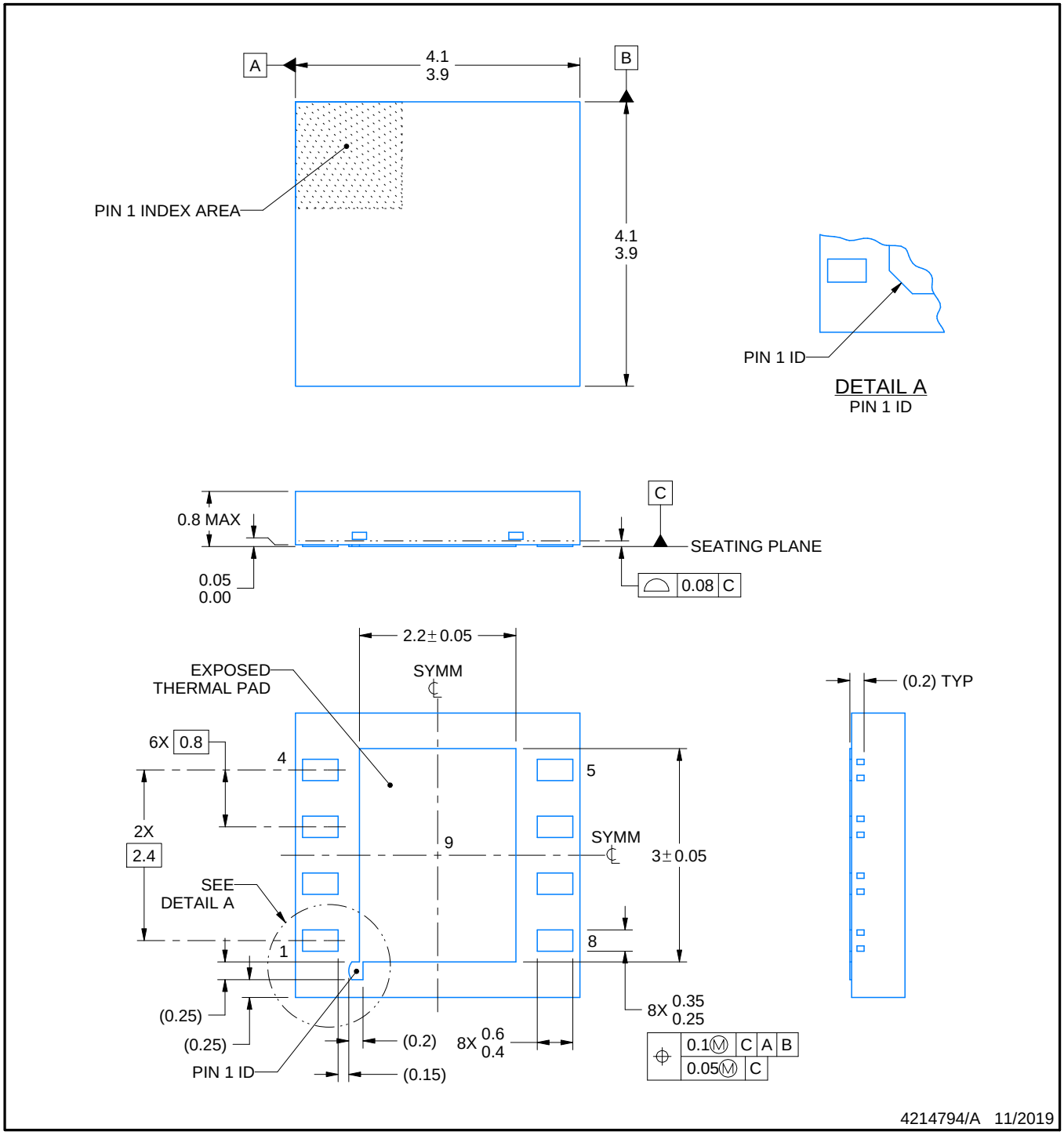
7. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
8. Board assembly site may have different recommendations for stencil design.

# PACKAGE OUTLINE

## NGN0008A

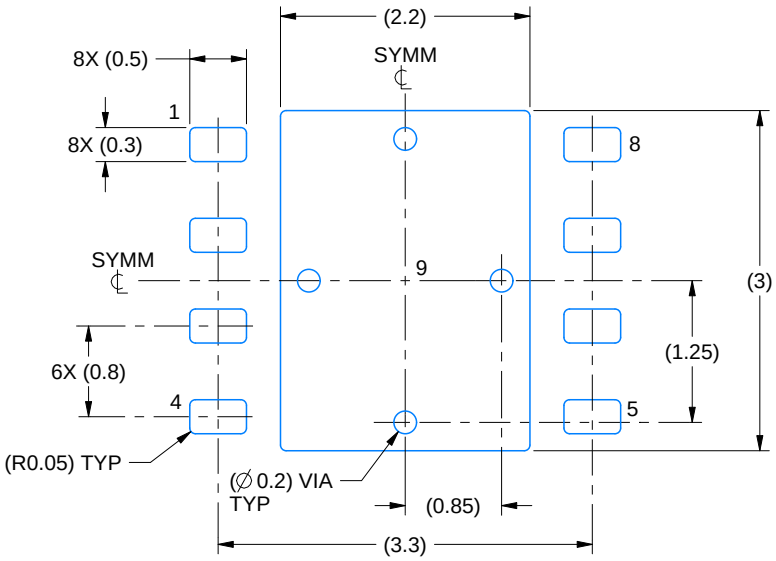
## WSON - 0.8 mm max height

PLASTIC SMALL OUTLINE - NO LEAD

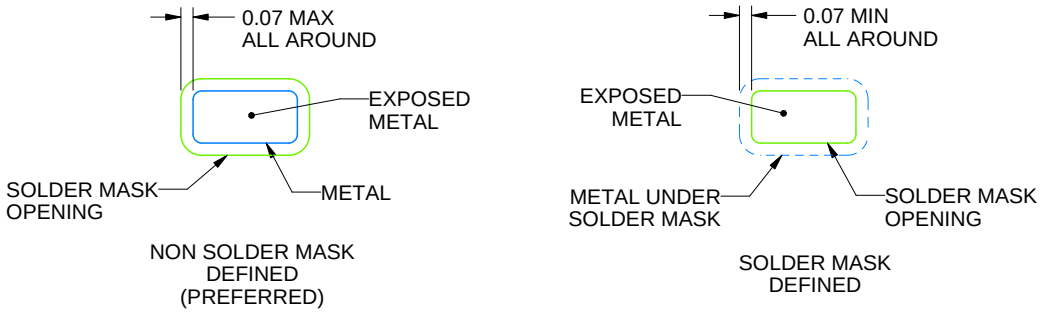



NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.




LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:15X

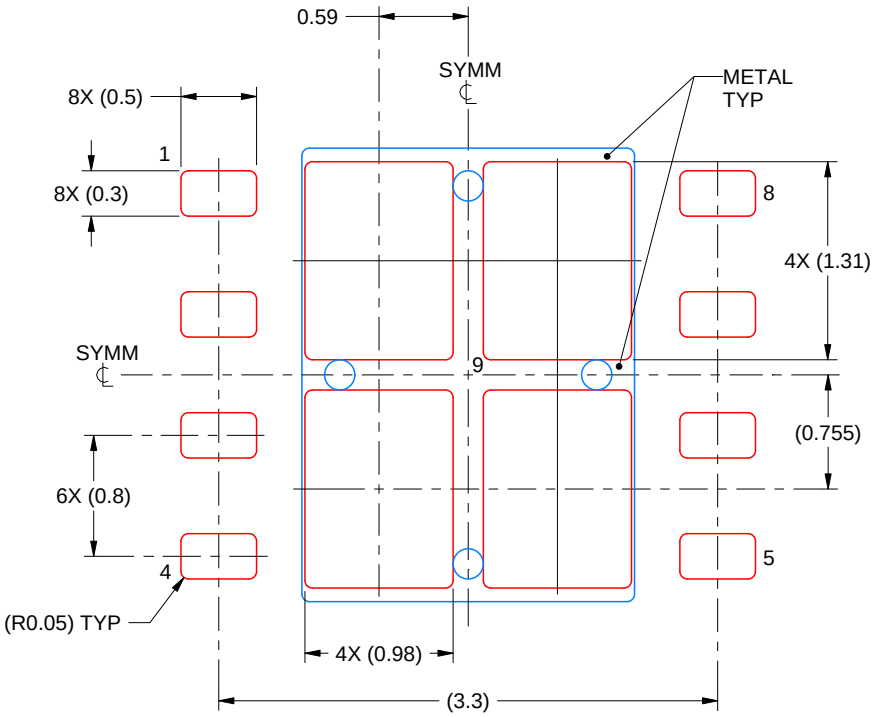



SOLDER MASK DETAILS

4214794/A 11/2019

NOTES: (continued)

4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).
5. Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown on this view. It is recommended that vias under paste be filled, plugged or tented.




SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL

EXPOSED PAD 9:
78% PRINTED SOLDER COVERAGE BY AREA UNDER PACKAGE
SCALE:20X

4214794/A 11/2019

NOTES: (continued)

6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

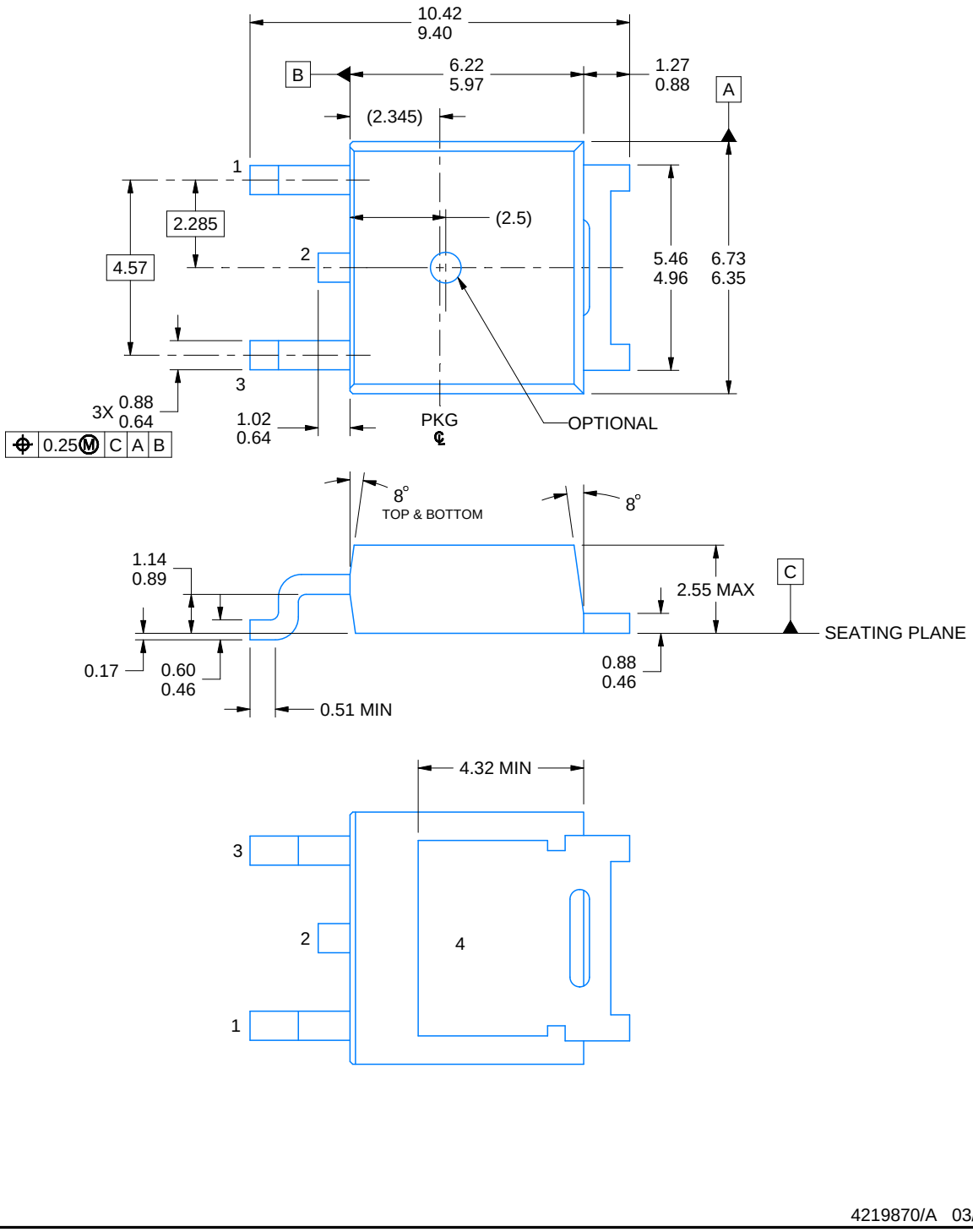
# NDP0003B



# PACKAGE OUTLINE

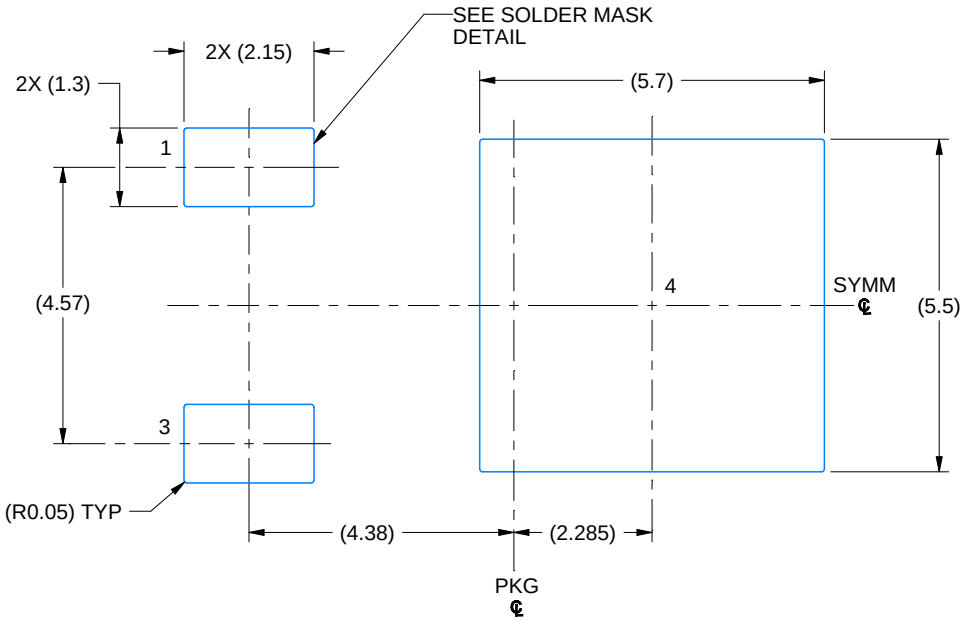
## TO-252 - 2.55 mm max height

TRANSISTOR OUTLINE

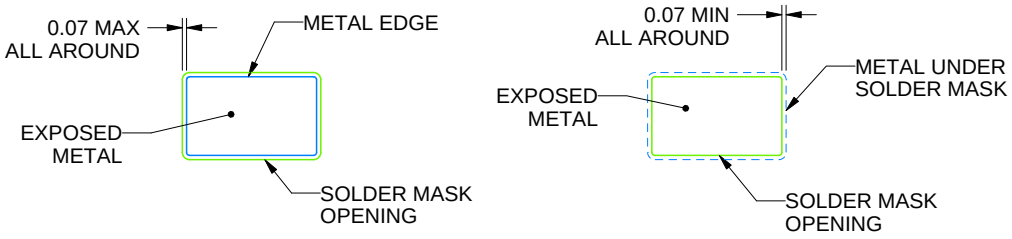



NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Reference JEDEC registration TO-252.




LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 8X

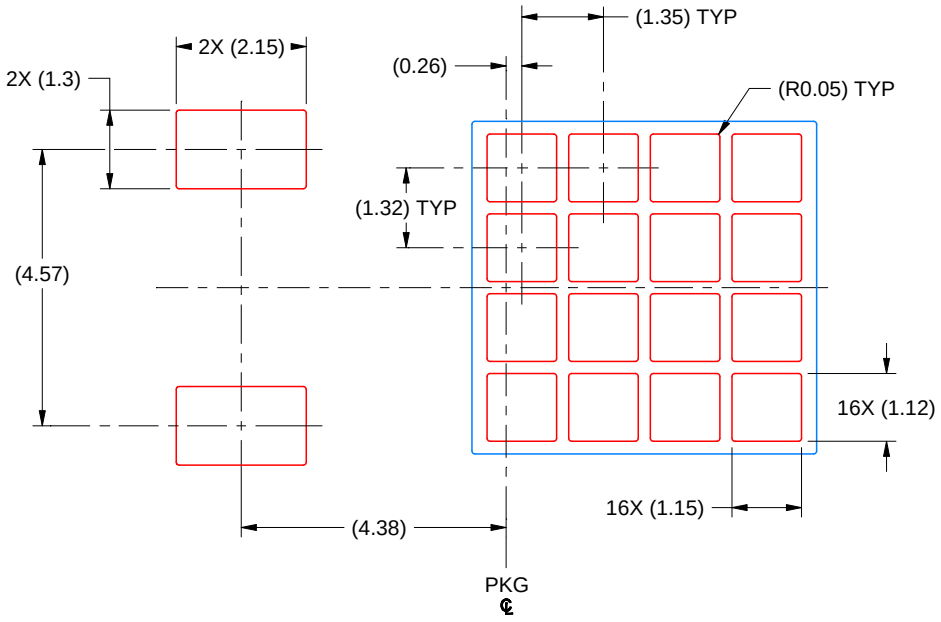



SOLDER MASK DETAIL

4219870/A 03/2018

NOTES: (continued)

4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature numbers SLMA002(www.ti.com/lit/slm002) and SLMA004 (www.ti.com/lit/slma004).
5. Vias are optional depending on application, refer to device data sheet. It is recommended that vias under paste be filled, plugged or tented.




SOLDER PASTE EXAMPLE
BASED ON 0.125 MM THICK STENCIL
SCALE: 8X

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NOTES: (continued)

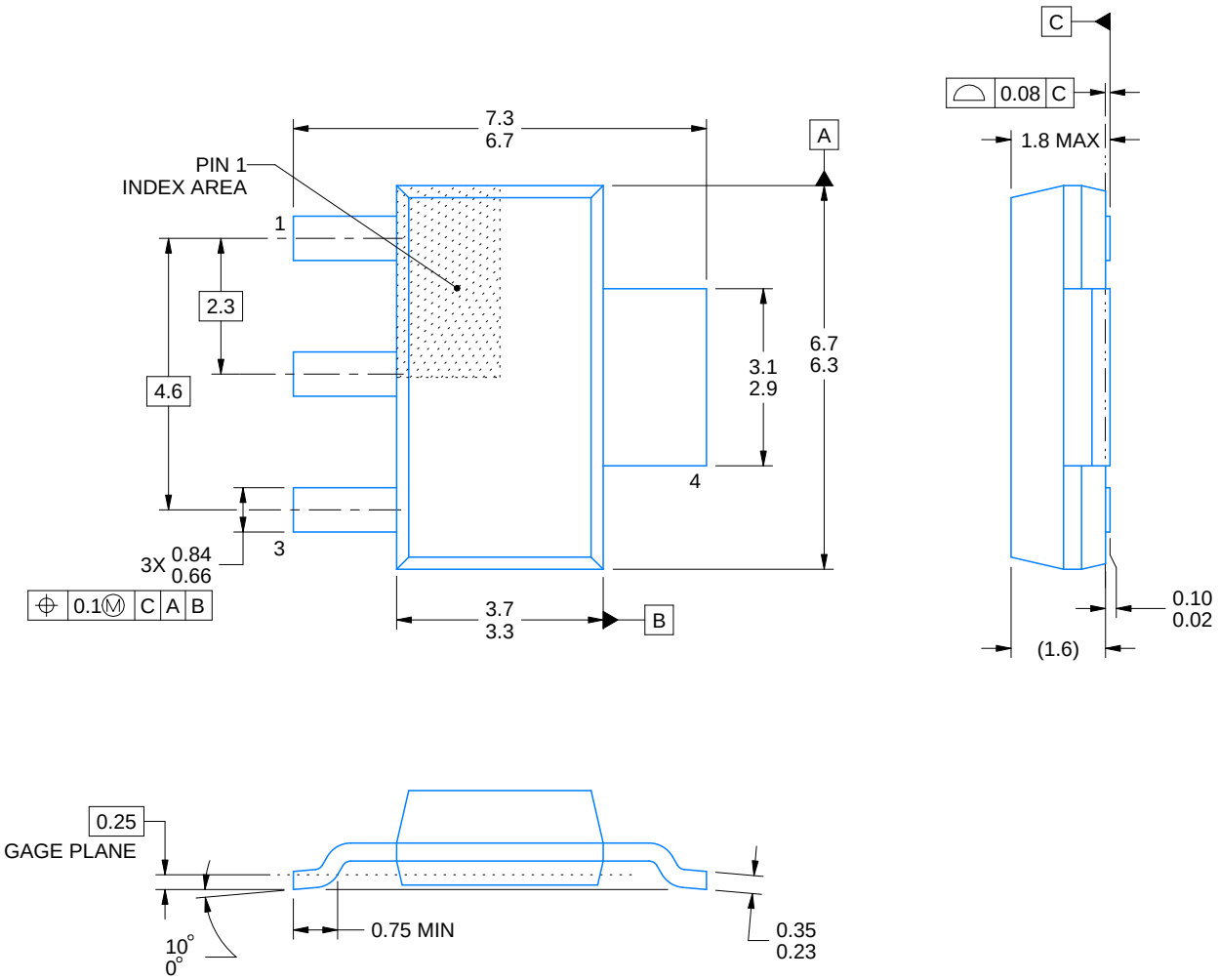
6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
7. Board assembly site may have different recommendations for stencil design.

# PACKAGE OUTLINE

## DCY0004A

## SOT-223 - 1.8 mm max height

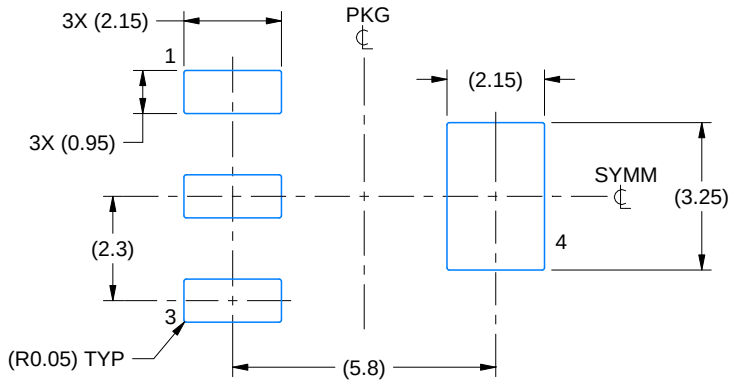
PLASTIC SMALL OUTLINE



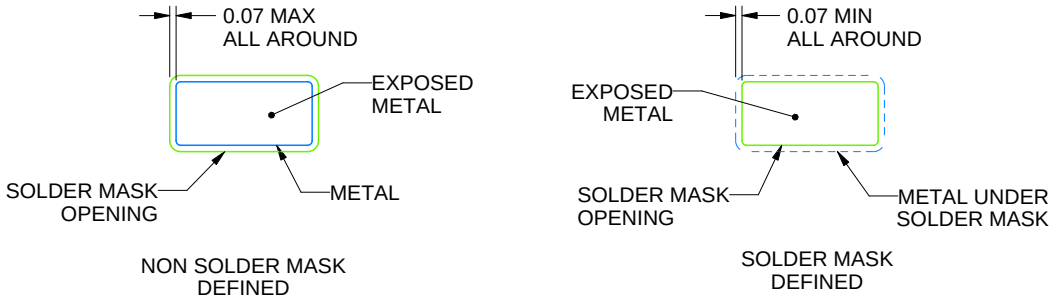

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NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Reference JEDEC TO-261.




LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:6X




SOLDER MASK DETAILS

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NOTES: (continued)

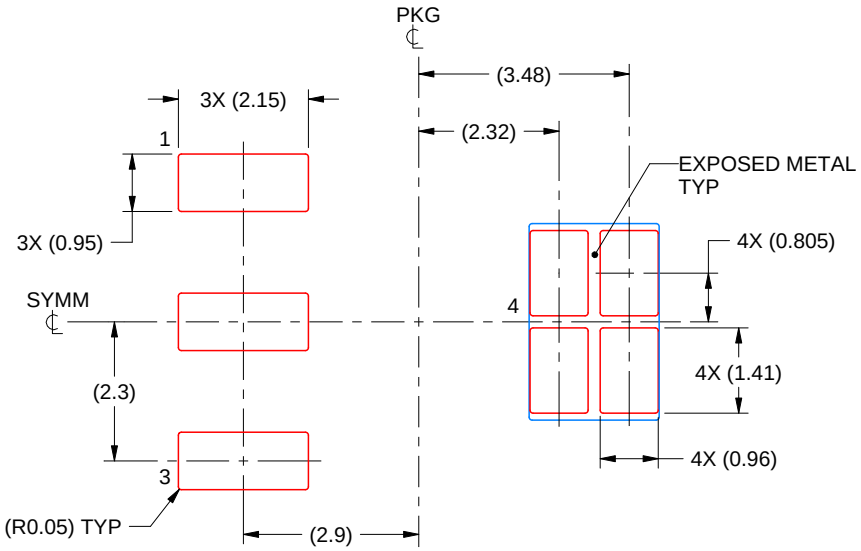
4. Publication IPC-7351 may have alternate designs.
5. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# EXAMPLE STENCIL DESIGN

## DCY0004A

## SOT-223 - 1.8 mm max height

PLASTIC SMALL OUTLINE




SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:8X

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