

## TLV1117 可调和固定低压降稳压器

### 1 特性

- 输出电压选项：1.5V、1.8V、2.5V、3.3V、5V 和可调
- 输出电流：800mA
- 在多个电流水平指定压差电压
- 线性调整率最大值：0.2%
- 负载调整率最大值：0.4%
- 有关采用固定输出 SOT-223 封装配置的直接替代产品和改进功能，请参阅 [TLV761](#)

### 2 应用

- 电子销售终端
- 医疗、保健和健身应用
- 打印机
- 电器和白色家电
- 电视机顶盒

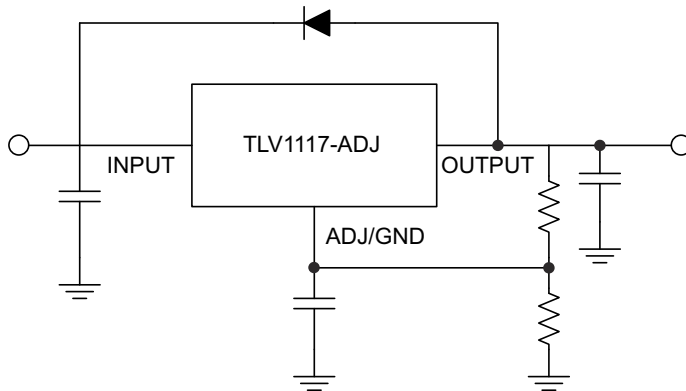
### 3 说明

TLV1117 是一款正低压降稳压器，可提供高达 800 mA 的输出电流。该器件具有 1.5V、1.8V、2.5V、3.3V、5V 和可调输出电压选项。所有内部电路均设计为可在低至 1V 输入/输出差压下运行。额定的最大压差电压为 1.3V ( 电流为 800mA )，该值在较低的负载电流时会降低。

#### 封装信息

| 器件型号    | 封装 <sup>(1)</sup>       | 封装尺寸 ( 标称值 )     |
|---------|-------------------------|------------------|
| TLV1117 | DCY ( SOT-223 , 4 )     | 6.50mm × 3.50mm  |
|         | DRJ ( WSON , 8 )        | 4.00mm × 4.00mm  |
|         | KVU ( TO-252 , 3 )      | 6.60mm × 6.10mm  |
|         | KCS ( TO-220 , 3 )      | 10.16mm × 8.70mm |
|         | KCT ( TO-220 , 3 )      | 10.16mm × 8.59mm |
|         | KTU ( DPAK/TO-263 , 3 ) | 10.18mm × 8.41mm |

(1) 如需了解所有可用封装，请参阅数据表末尾的可订购产品附录。



简化原理图



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## 4 Revision History

注：以前版本的页码可能与当前版本的页码不同

| <b>Changes from Revision L (October 2014) to Revision M (January 2023)</b> | <b>Page</b> |
|----------------------------------------------------------------------------|-------------|
| • 向 <i>特性</i> 部分添加了直接替代产品要点.....                                           | <b>1</b>    |
| • Changed <i>Handling Ratings</i> title to <i>ESD Ratings</i> .....        | <b>3</b>    |
| • Added <i>Application Information</i> section.....                        | <b>11</b>   |

| <b>Changes from Revision K (April 2013) to Revision L (October 2014)</b> | <b>Page</b> |
|--------------------------------------------------------------------------|-------------|
| • 将数据表更新为新的 TI 标准 - 无规格变化。 .....                                         | <b>1</b>    |
| • 删除了“订购信息”表.....                                                        | <b>1</b>    |
| • 删除了“订购信息”表.....                                                        | <b>1</b>    |
| • 添加了“应用” .....                                                          | <b>1</b>    |
| • Added Mechanical, Packaging, and Orderable Information section.....    | <b>14</b>   |

## 5 Pin Configuration and Functions

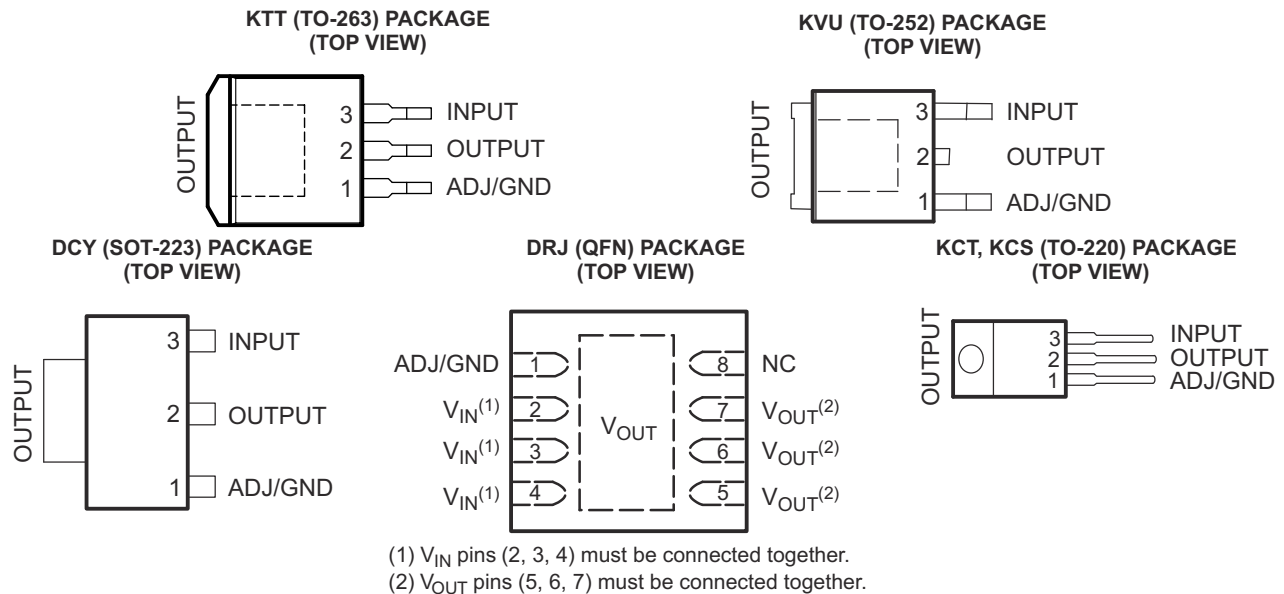


表 5-1. Pin Functions

| PIN     |     |     |     |         |     | TYPE | DESCRIPTION                                                   |
|---------|-----|-----|-----|---------|-----|------|---------------------------------------------------------------|
| NAME    | KTT | KVU | DCY | DRJ     | KCT |      |                                                               |
| ADJ/GND | 1   | 1   | 1   | 1       | 1   | I/O  | Output voltage adjustment pin. Connect to a resistor divider. |
| INPUT   | 3   | 3   | 3   | 2, 3, 4 | 3   | I    | Voltage input                                                 |
| OUTPUT  | 2   | 2   | 2   | 5, 6, 7 | 2   | O    | Voltage output                                                |
| NC      | —   | —   | —   | 8       | —   | —    | No connect                                                    |

## 6 Specifications

### 6.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)<sup>(1)</sup>

|           |                                        | MIN  | MAX | UNIT |
|-----------|----------------------------------------|------|-----|------|
| $V_{IN}$  | Continuous input voltage               |      | 16  | V    |
| $T_J$     | Operating virtual-junction temperature |      | 150 | °C   |
| $T_{stg}$ | Storage temperature                    | - 65 | 150 | °C   |

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

### 6.2 ESD Ratings

|             |                         |                                                                                          | VALUE | UNIT |
|-------------|-------------------------|------------------------------------------------------------------------------------------|-------|------|
| $V_{(ESD)}$ | Electrostatic discharge | Human body model (HBM), per ANSI/ESDA/JEDEC JS-001, all pins <sup>(1)</sup>              | ±2500 | V    |
|             |                         | Charged device model (CDM), per JEDEC specification JESD22-C101, all pins <sup>(2)</sup> | ±1500 |      |

- (1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.  
 (2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

## 6.3 Recommended Operating Conditions

|                 |                                        |            | MIN <sup>(1)</sup> | MAX | UNIT |
|-----------------|----------------------------------------|------------|--------------------|-----|------|
| V <sub>IN</sub> | Input voltage                          | TLV1117    | 2.7                | 15  | V    |
|                 |                                        | TLV1117-15 | 2.9                | 15  |      |
|                 |                                        | TLV1117-18 | 3.2                | 15  |      |
|                 |                                        | TLV1117-25 | 3.9                | 15  |      |
|                 |                                        | TLV1117-33 | 4.7                | 15  |      |
|                 |                                        | TLV1117-50 | 6.4                | 15  |      |
| I <sub>O</sub>  | Output current                         |            |                    | 0.8 | A    |
| T <sub>J</sub>  | Operating virtual-junction temperature | TLV1117C   | 0                  | 125 | °C   |
|                 |                                        | TLV1117I   | -40                | 125 |      |

- (1) The input-to-output differential across the regulator should provide for some margin against regulator operation at the maximum dropout (for a particular current value). This margin is needed to account for tolerances in both the input voltage (lower limit) and the output voltage (upper limit). The absolute minimum V<sub>IN</sub> for a desired maximum output current can be calculated by the following:

$$V_{IN(min)} = V_{OUT(max)} + V_{DO(max \text{ at rated current})}$$

## 6.4 Thermal Information

| THERMAL METRIC <sup>(1) (2) (3)</sup> |                                                                                | TLV1117         |                 |                 |                 |                 |                      |                 | UNITS |
|---------------------------------------|--------------------------------------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------------|-----------------|-------|
|                                       |                                                                                | PowerFlex       |                 | DRJ<br>(8 PINS) | DCY<br>(4 PINS) | KVU<br>(3 PINS) | KCS, KCT<br>(3 PINS) | KTT<br>(3 PINS) |       |
|                                       |                                                                                | KTE<br>(3 PINS) | KTP<br>(3 PINS) |                 |                 |                 |                      |                 |       |
| R <sub>θJA</sub>                      | Junction-to-ambient thermal resistance                                         | 38.6            | 49.2            | 38.3            | 104.3           | 50.9            | 30.1                 | 27.5            | °C/W  |
| R <sub>θJC(top)</sub>                 | Junction-to-case (top) thermal resistance                                      | 34.7            | 60.6            | 36.5            | 53.7            | 57.9            | 44.6                 | 43.2            | °C/W  |
| R <sub>θJB</sub>                      | Junction-to-board thermal resistance                                           | 3.2             | 3.1             | 60.5            | 5.7             | 34.8            | 1.2                  | 17.3            | °C/W  |
| ψ <sub>JT</sub>                       | Junction-to-top characterization parameter                                     | 5.9             | 8.7             | 0.2             | 3.1             | 6               | 5                    | 2.8             | °C/W  |
| ψ <sub>JB</sub>                       | Junction-to-board characterization parameter                                   | 3.1             | 3               | 12              | 5.5             | 23.7            | 1.2                  | 9.3             | °C/W  |
| R <sub>θJC(bot)</sub>                 | Junction-to-case (bottom) thermal resistance                                   | 3               | 3               | 4.7             | n/a             | 0.4             | 0.4                  | 0.3             | °C/W  |
| R <sub>θJP</sub>                      | Thermal resistance between the die junction and the bottom of the exposed pad. | 2.7             | 1.4             | 1.78            | n/a             | n/a             | 3                    | 1.94            | °C/W  |

- (1) For more information about traditional and new thermal metrics, see the [Semiconductor and IC Package Thermal Metrics application note](#).
- (2) For thermal estimates of this device based on PCB copper area, see the [TI PCB Thermal Calculator](#).
- (3) The junction-to-ambient thermal resistance under natural convection is obtained in a simulation on a JEDEC-standard, high-K board, as specified in JESD51-7, in an environment described in JESD51-2a.

## 6.5 TLV1117C Electrical Characteristics

$T_J = 0^\circ\text{C}$  to  $125^\circ\text{C}$ , all typical values are at  $T_J = 25^\circ\text{C}$  (unless otherwise noted)

| PARAMETER                                | TEST CONDITIONS <sup>(1)</sup>                                                                   |                           | MIN    | TYP  | MAX   | UNIT          |
|------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------|--------|------|-------|---------------|
| Reference voltage, $V_{REF}$             | $V_{IN} - V_{OUT} = 2\text{ V}$ , $I_{OUT} = 10\text{ mA}$ , $T_J = 25^\circ\text{C}$            | TLV1117                   | 1.238  | 1.25 | 1.262 | V             |
|                                          | $V_{IN} - V_{OUT} = 1.4\text{ V}$ to $10\text{ V}$ , $I_{OUT} = 10\text{ mA}$ to $800\text{ mA}$ |                           | 1.225  | 1.25 | 1.27  |               |
| Output voltage, $V_{OUT}$                | $V_{IN} = 3.5\text{ V}$ , $I_{OUT} = 10\text{ mA}$ , $T_J = 25^\circ\text{C}$                    | TLV1117-15                | 1.485  | 1.5  | 1.515 |               |
|                                          | $V_{IN} = 2.9\text{ V}$ to $10\text{ V}$ , $I_{OUT} = 0\text{ mA}$ to $800\text{ mA}$            |                           | 1.455  | 1.5  | 1.545 |               |
|                                          | $V_{IN} = 3.8\text{ V}$ , $I_{OUT} = 10\text{ mA}$ , $T_J = 25^\circ\text{C}$                    | TLV1117-18                | 1.782  | 1.8  | 1.818 |               |
|                                          | $V_{IN} = 3.2\text{ V}$ to $10\text{ V}$ , $I_{OUT} = 0\text{ mA}$ to $800\text{ mA}$            |                           | 1.746  | 1.8  | 1.854 |               |
|                                          | $V_{IN} = 4.5\text{ V}$ , $I_{OUT} = 10\text{ mA}$ , $T_J = 25^\circ\text{C}$                    | TLV1117-25                | 2.475  | 2.5  | 2.525 |               |
|                                          | $V_{IN} = 3.9\text{ V}$ to $10\text{ V}$ , $I_{OUT} = 0\text{ mA}$ to $800\text{ mA}$            |                           | 2.450  | 2.5  | 2.550 |               |
|                                          | $V_{IN} = 5\text{ V}$ , $I_{OUT} = 10\text{ mA}$ , $T_J = 25^\circ\text{C}$                      | TLV1117-33                | 3.267  | 3.3  | 3.333 |               |
|                                          | $V_{IN} = 4.75\text{ V}$ to $10\text{ V}$ , $I_{OUT} = 0\text{ mA}$ to $800\text{ mA}$           |                           | 3.235  | 3.3  | 3.365 |               |
|                                          | $V_{IN} = 7\text{ V}$ , $I_{OUT} = 10\text{ mA}$ , $T_J = 25^\circ\text{C}$                      | TLV1117-50                | 4.950  | 5.0  | 5.050 |               |
|                                          | $V_{IN} = 6.5\text{ V}$ to $12\text{ V}$ , $I_{OUT} = 0\text{ mA}$ to $800\text{ mA}$            |                           | 4.900  | 5.0  | 5.100 |               |
| Line regulation                          | $I_{OUT} = 10\text{ mA}$ , $V_{IN} - V_{OUT} = 1.5\text{ V}$ to $13.75\text{ V}$                 | TLV1117                   | 0.035% |      | 0.2%  | mV            |
|                                          | $I_{OUT} = 0\text{ mA}$ , $V_{IN} = 2.9\text{ V}$ to $10\text{ V}$                               | TLV1117-15                | 1      |      | 6     |               |
|                                          | $I_{OUT} = 0\text{ mA}$ , $V_{IN} = 3.2\text{ V}$ to $10\text{ V}$                               | TLV1117-18                | 1      |      | 6     |               |
|                                          | $I_{OUT} = 0\text{ mA}$ , $V_{IN} = 3.9\text{ V}$ to $10\text{ V}$                               | TLV1117-25                | 1      |      | 6     |               |
|                                          | $I_{OUT} = 0\text{ mA}$ , $V_{IN} = 4.75\text{ V}$ to $15\text{ V}$                              | TLV1117-33                | 1      |      | 6     |               |
|                                          | $I_{OUT} = 0\text{ mA}$ , $V_{IN} = 6.5\text{ V}$ to $15\text{ V}$                               | TLV1117-50                | 1      |      | 10    |               |
| Load regulation                          | $I_{OUT} = 10\text{ mA}$ to $800\text{ mA}$ , $V_{IN} - V_{OUT} = 3\text{ V}$                    | TLV1117                   | 0.2%   |      | 0.4%  | mV            |
|                                          | $I_{OUT} = 0\text{ mA}$ to $800\text{ mA}$ , $V_{IN} = 2.9\text{ V}$                             | TLV1117-15                | 1      |      | 10    |               |
|                                          | $I_{OUT} = 0\text{ mA}$ to $800\text{ mA}$ , $V_{IN} = 3.2\text{ V}$                             | TLV1117-18                | 1      |      | 10    |               |
|                                          | $I_{OUT} = 0\text{ mA}$ to $800\text{ mA}$ , $V_{IN} = 3.9\text{ V}$                             | TLV1117-25                | 1      |      | 10    |               |
|                                          | $I_{OUT} = 0\text{ mA}$ to $800\text{ mA}$ , $V_{IN} = 4.75\text{ V}$                            | TLV1117-33                | 1      |      | 10    |               |
|                                          | $I_{OUT} = 0\text{ mA}$ to $800\text{ mA}$ , $V_{IN} = 6.5\text{ V}$                             | TLV1117-50                | 1      |      | 15    |               |
| Dropout voltage, $V_{DO}$ <sup>(2)</sup> | $I_{OUT} = 100\text{ mA}$                                                                        |                           | 1.1    |      | 1.2   | V             |
|                                          | $I_{OUT} = 500\text{ mA}$                                                                        |                           | 1.15   |      | 1.25  |               |
|                                          | $I_{OUT} = 800\text{ mA}$                                                                        |                           | 1.2    |      | 1.3   |               |
| Current limit                            | $V_{IN} - V_{OUT} = 5\text{ V}$ , $T_J = 25^\circ\text{C}$ <sup>(3)</sup>                        |                           | 0.8    | 1.2  | 1.6   | A             |
| Minimum load current                     | $V_{IN} = 15\text{ V}$                                                                           | TLV1117                   | 1.7    |      | 5     | mA            |
| Quiescent current                        | $V_{IN} \leq 15\text{ V}$                                                                        | All fixed-voltage options | 5      |      | 10    | mA            |
| Thermal regulation                       | 30-ms pulse, $T_A = 25^\circ\text{C}$                                                            |                           | 0.01   |      | 0.1   | %/W           |
| Ripple rejection                         | $V_{IN} - V_{OUT} = 3\text{ V}$ , $V_{ripple} = 1\text{ V}_{pp}$ , $f = 120\text{ Hz}$           |                           | 60     | 75   |       | dB            |
| ADJ pin current                          |                                                                                                  |                           | 80     |      | 120   | $\mu\text{A}$ |
| Change in ADJ pin current                | $V_{IN} - V_{OUT} = 1.4\text{ V}$ to $10\text{ V}$ , $I_{OUT} = 10\text{ mA}$ to $800\text{ mA}$ |                           | 0.2    |      | 5     | $\mu\text{A}$ |
| Temperature stability                    | $T_J = \text{full range}$                                                                        |                           | 0.5%   |      |       | —             |
| Long-term stability                      | 1000 hrs, no load, $T_A = 125^\circ\text{C}$                                                     |                           | 0.3%   |      |       | —             |
| Output noise voltage (% of $V_{OUT}$ )   | $f = 10\text{ Hz}$ to $100\text{ kHz}$                                                           |                           | 0.003% |      |       | —             |

- (1) All characteristics are measured with a  $10\text{-}\mu\text{F}$  capacitor across the input and a  $10\text{-}\mu\text{F}$  capacitor across the output. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.
- (2) Dropout is defined as the  $V_{IN}$  to  $V_{OUT}$  differential at which  $V_{OUT}$  drops 100 mV below the value of  $V_{OUT}$ , measured at  $V_{IN} = V_{OUT(nom)} + 1.5\text{ V}$ .
- (3) Current limit test specified under recommended operating conditions.

## 6.6 TLV1117I Electrical Characteristics

$T_J = -40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ , all typical values are at  $T_J = 25^{\circ}\text{C}$  (unless otherwise noted)

| PARAMETER                                | TEST CONDITIONS <sup>(1)</sup>                                                                   |                           | MIN    | TYP  | MAX   | UNIT           |
|------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------|--------|------|-------|----------------|
| Reference voltage, $V_{REF}$             | $V_{IN} - V_{OUT} = 2\text{ V}$ , $I_{OUT} = 10\text{ mA}$ , $T_J = 25^{\circ}\text{C}$          | TLV1117                   | 1.238  | 1.25 | 1.262 | V              |
|                                          | $V_{IN} - V_{OUT} = 1.4\text{ V}$ to $10\text{ V}$ , $I_{OUT} = 10\text{ mA}$ to $800\text{ mA}$ |                           | 1.200  | 1.25 | 1.29  |                |
| Output voltage, $V_{OUT}$                | $V_{IN} = 3.5\text{ V}$ , $I_{OUT} = 10\text{ mA}$ , $T_J = 25^{\circ}\text{C}$                  | TLV1117-15                | 1.485  | 1.5  | 1.515 |                |
|                                          | $V_{IN} = 2.9\text{ V}$ to $10\text{ V}$ , $I_{OUT} = 0\text{ mA}$ to $800\text{ mA}$            |                           | 1.44   | 1.5  | 1.56  |                |
|                                          | $V_{IN} = 3.8\text{ V}$ , $I_{OUT} = 10\text{ mA}$ , $T_J = 25^{\circ}\text{C}$                  | TLV1117-18                | 1.782  | 1.8  | 1.818 |                |
|                                          | $V_{IN} = 3.2\text{ V}$ to $10\text{ V}$ , $I_{OUT} = 0\text{ mA}$ to $800\text{ mA}$            |                           | 1.728  | 1.8  | 1.872 |                |
|                                          | $V_{IN} = 4.5\text{ V}$ , $I_{OUT} = 10\text{ mA}$ , $T_J = 25^{\circ}\text{C}$                  | TLV1117-25                | 2.475  | 2.5  | 2.525 |                |
|                                          | $V_{IN} = 3.9\text{ V}$ to $10\text{ V}$ , $I_{OUT} = 0\text{ mA}$ to $800\text{ mA}$            |                           | 2.4    | 2.5  | 2.6   |                |
|                                          | $V_{IN} = 5\text{ V}$ , $I_{OUT} = 10\text{ mA}$ , $T_J = 25^{\circ}\text{C}$                    | TLV1117-33                | 3.267  | 3.3  | 3.333 |                |
|                                          | $V_{IN} = 4.75\text{ V}$ to $10\text{ V}$ , $I_{OUT} = 0\text{ mA}$ to $800\text{ mA}$           |                           | 3.168  | 3.3  | 3.432 |                |
|                                          | $V_{IN} = 7\text{ V}$ , $I_{OUT} = 10\text{ mA}$ , $T_J = 25^{\circ}\text{C}$                    | TLV1117-50                | 4.95   | 5.0  | 5.05  |                |
|                                          | $V_{IN} = 6.5\text{ V}$ to $12\text{ V}$ , $I_{OUT} = 0\text{ mA}$ to $800\text{ mA}$            |                           | 4.80   | 5.0  | 5.20  |                |
| Line regulation                          | $I_{OUT} = 10\text{ mA}$ , $V_{IN} - V_{OUT} = 1.5\text{ V}$ to $13.75\text{ V}$                 | TLV1117                   | 0.035% |      | 0.3%  | mV             |
|                                          | $I_{OUT} = 0\text{ mA}$ , $V_{IN} = 2.9\text{ V}$ to $10\text{ V}$                               | TLV1117-15                | 1      |      | 10    |                |
|                                          | $I_{OUT} = 0\text{ mA}$ , $V_{IN} = 3.2\text{ V}$ to $10\text{ V}$                               | TLV1117-18                | 1      |      | 10    |                |
|                                          | $I_{OUT} = 0\text{ mA}$ , $V_{IN} = 3.9\text{ V}$ to $10\text{ V}$                               | TLV1117-25                | 1      |      | 10    |                |
|                                          | $I_{OUT} = 0\text{ mA}$ , $V_{IN} = 4.75\text{ V}$ to $15\text{ V}$                              | TLV1117-33                | 1      |      | 10    |                |
|                                          | $I_{OUT} = 0\text{ mA}$ , $V_{IN} = 6.5\text{ V}$ to $15\text{ V}$                               | TLV1117-50                | 1      |      | 15    |                |
| Load regulation                          | $I_{OUT} = 10\text{ mA}$ to $800\text{ mA}$ , $V_{IN} - V_{OUT} = 3\text{ V}$                    | TLV1117                   | 0.2%   |      | 0.5%  | mV             |
|                                          | $I_{OUT} = 0\text{ mA}$ to $800\text{ mA}$ , $V_{IN} = 2.9\text{ V}$                             | TLV1117-15                | 1      |      | 15    |                |
|                                          | $I_{OUT} = 0\text{ mA}$ to $800\text{ mA}$ , $V_{IN} = 3.2\text{ V}$                             | TLV1117-18                | 1      |      | 15    |                |
|                                          | $I_{OUT} = 0\text{ mA}$ to $800\text{ mA}$ , $V_{IN} = 3.9\text{ V}$                             | TLV1117-25                | 1      |      | 15    |                |
|                                          | $I_{OUT} = 0\text{ mA}$ to $800\text{ mA}$ , $V_{IN} = 4.75\text{ V}$                            | TLV1117-33                | 1      |      | 15    |                |
|                                          | $I_{OUT} = 0\text{ mA}$ to $800\text{ mA}$ , $V_{IN} = 6.5\text{ V}$                             | TLV1117-50                | 1      |      | 20    |                |
| Dropout voltage, $V_{DO}$ <sup>(2)</sup> | $I_{OUT} = 100\text{ mA}$                                                                        |                           | 1.1    |      | 1.3   | V              |
|                                          | $I_{OUT} = 500\text{ mA}$                                                                        |                           | 1.15   |      | 1.35  |                |
|                                          | $I_{OUT} = 800\text{ mA}$                                                                        |                           | 1.2    |      | 1.4   |                |
| Current limit                            | $V_{IN} - V_{OUT} = 5\text{ V}$ , $T_J = 25^{\circ}\text{C}$ <sup>(3)</sup>                      |                           | 0.8    | 1.2  | 1.6   | A              |
| Minimum load current                     | $V_{IN} = 15\text{ V}$                                                                           | TLV1117                   | 1.7    |      | 5     | mA             |
| Quiescent current                        | $V_{IN} \leq 15\text{ V}$                                                                        | All fixed-voltage options | 5      |      | 15    | mA             |
| Thermal regulation                       | 30-ms pulse, $T_A = 25^{\circ}\text{C}$                                                          |                           | 0.01   |      | 0.1   | %/W            |
| Ripple rejection                         | $V_{IN} - V_{OUT} = 3\text{ V}$ , $V_{ripple} = 1\text{ V}_{pp}$ , $f = 120\text{ Hz}$           |                           | 60     | 75   |       | dB             |
| ADJ pin current                          |                                                                                                  |                           | 80     |      | 120   | $\mu\text{ A}$ |
| Change in ADJ pin current                | $V_{IN} - V_{OUT} = 1.4\text{ V}$ to $10\text{ V}$ , $I_{OUT} = 10\text{ mA}$ to $800\text{ mA}$ |                           | 0.2    |      | 10    | $\mu\text{ A}$ |
| Temperature stability                    | $T_J = \text{full range}$                                                                        |                           | 0.5%   |      |       | —              |
| Long-term stability                      | 1000 hrs, No load, $T_A = 125^{\circ}\text{C}$                                                   |                           | 0.3%   |      |       | —              |
| Output noise voltage (% of $V_{OUT}$ )   | $f = 10\text{ Hz}$ to $100\text{ kHz}$                                                           |                           | 0.003% |      |       | —              |

(1) All characteristics are measured with a  $10\text{-}\mu\text{F}$  capacitor across the input and a  $10\text{-}\mu\text{F}$  capacitor across the output. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.

(2) Dropout is defined as the  $V_{IN}$  to  $V_{OUT}$  differential at which  $V_{OUT}$  drops 100 mV below the value of  $V_{OUT}$ , measured at  $V_{IN} = V_{OUT(nom)} + 1.5\text{ V}$ .

(3) Current limit test specified under recommended operating conditions

## 6.7 Typical Characteristics

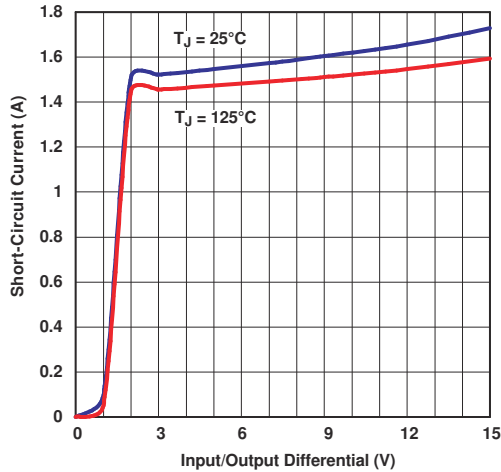


图 6-1. Short-Circuit Current vs ( $V_{IN} - V_{OUT}$ )

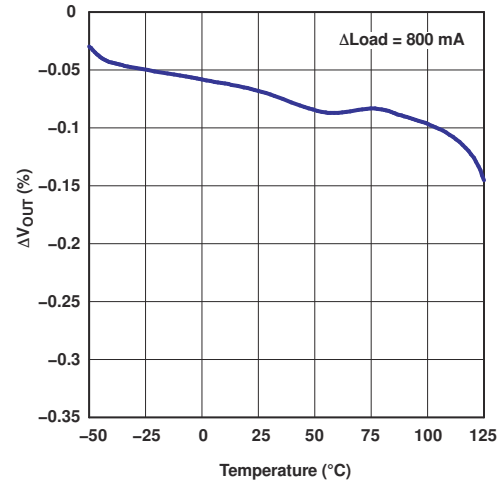


图 6-2. Load Regulation

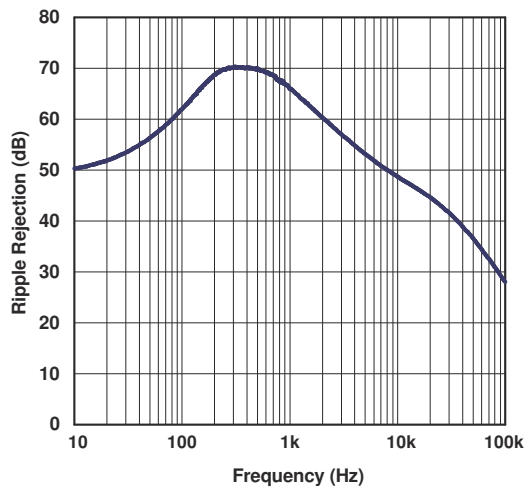


图 6-3. Ripple Rejection vs Frequency (ADJ Version)

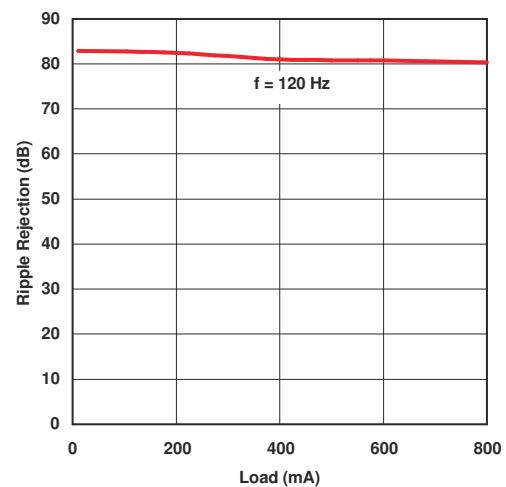


图 6-4. Ripple Rejection vs Load Current (ADJ Version)

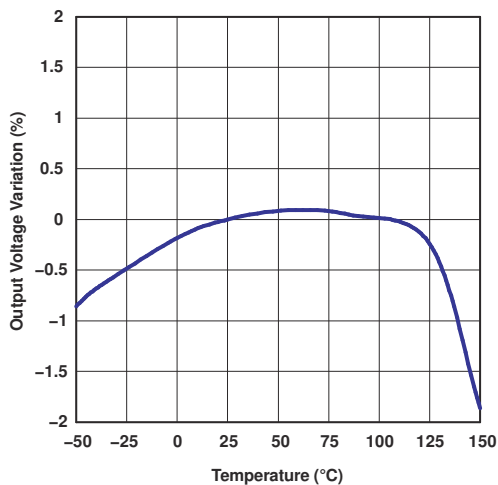


图 6-5. Temperature Stability

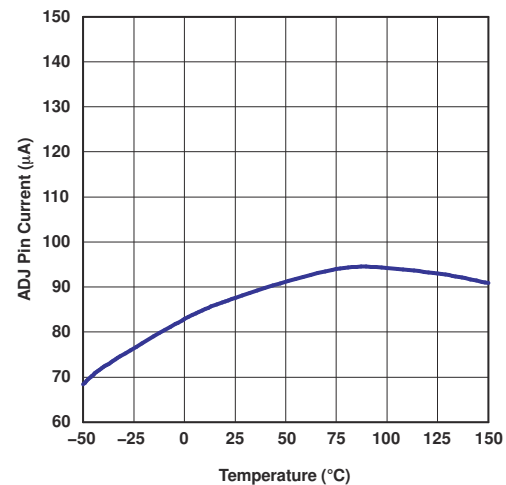


图 6-6. ADJ Pin Current vs Temperature

## 6.7 Typical Characteristics (continued)

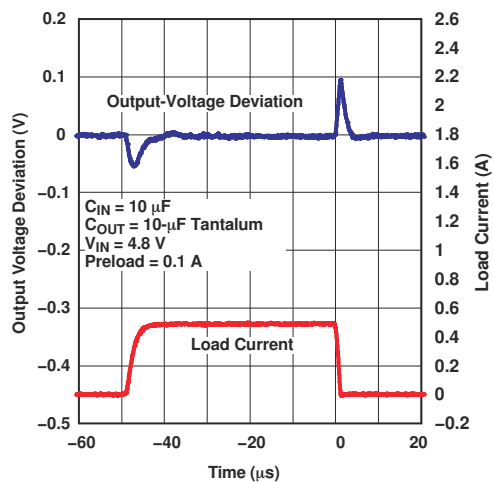


图 6-7. TLV1117-33 Load Transient Response

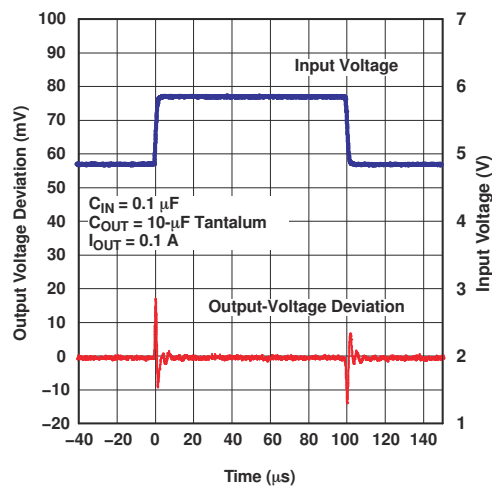


图 6-8. TLV1117-33 Line Transient Response



## 7 Detailed Description

### 7.1 Overview

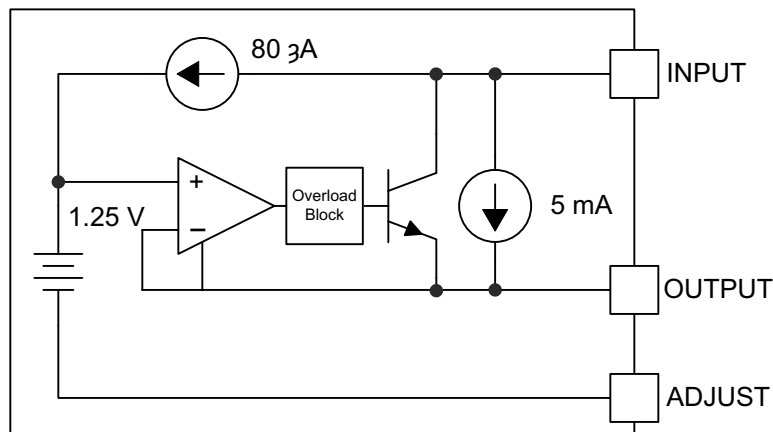
The TLV1117 is a positive low-dropout voltage regulator designed to provide up to 800 mA of output current. The device is available in 1.5-V, 1.8-V, 2.5-V, 3.3-V, 5-V, and adjustable-output voltage options. All internal circuitry is designed to operate down to a 1-V, input-to-output differential. Dropout voltage is specified at a maximum of 1.3 V at 800 mA, decreasing at lower load currents.

The TLV1117 is designed to be stable with tantalum and aluminum electrolytic output capacitors having an equivalent series resistance (ESR) between 0.2  $\Omega$  and 10  $\Omega$ .

Unlike positive-negative-positive (PNP)-type regulators, in which up to 10% of the output current is wasted as quiescent current, the quiescent current of the TLV1117 flows into the load, increasing efficiency.

The TLV1117C is characterized for operation over the virtual junction temperature range of 0°C to +125°C, and the TLV1117I is characterized for operation over the virtual junction temperature range of -40°C to +125°C.

### 7.2 Functional Block Diagram



### 7.3 Feature Description

#### 7.3.1 NPN Output Drive

Negative-positive-negative (NPN) output topology provides lower output impedance than most LDOs. However, an output capacitor is required. To support maximum current and lowest temperature, use a 1.4-V headroom (less for lower currents) ( $V_I - V_O$ ).

#### 7.3.2 Overload Block

Current limiting and overtemperature shutdown protects against overload or under heat sinking.

#### 7.3.3 Programmable Feedback

An op amp with a 1.25-V offset input at the ADJUST pin provides easy output voltage programming. For current regulation applications, use a single resistor whose resistance value is  $1.25 \text{ V} / I_{\text{OUT}}$  with a power rating greater than  $(1.25 \text{ V})^2 / R$ . For voltage regulation applications, two resistors set the output voltage.

## 7.4 Device Functional Modes

### 7.4.1 Normal Operation

The device OUTPUT pin sources current necessary to make the OUTPUT pin 1.25 V greater than the ADJUST terminal to provide output regulation.

### 7.4.2 Operation With Low Input Voltage

The adjustable version of the device requires a 1-V headroom ( $V_I - V_O$ ) to operate in regulation. With less headroom, the device can drop out and the OUTPUT voltage is the INPUT voltage minus the dropout voltage.

### 7.4.3 Operation at Light Loads

The device passes the bias current to the OUTPUT pin. The load or feedback must consume this minimum current for regulation or the output can possibly be too high.

### 7.4.4 Operation in Self Protection

When an overload occurs, the device shuts down the output stage or reduces the output current to prevent device damage. The device automatically resets from the overload. The output can be reduced or alternate between on and off until the overload is removed.

## 8 Application and Implementation

### 备注

以下应用部分中的信息不属于 TI 器件规格的范围，TI 不担保其准确性和完整性。TI 的客户应负责确定器件是否适用于其应用。客户应验证并测试其设计，以确保系统功能。

### 8.1 Application Information

The TLV1117 is a versatile and high-performance, linear regulator with a wide temperature range and tight line and 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 TLV1117 is versatile in the device applications, including being used as a post regulator for DC/DC converters, battery chargers, and microprocessor supplies.

### 8.2 Typical Application

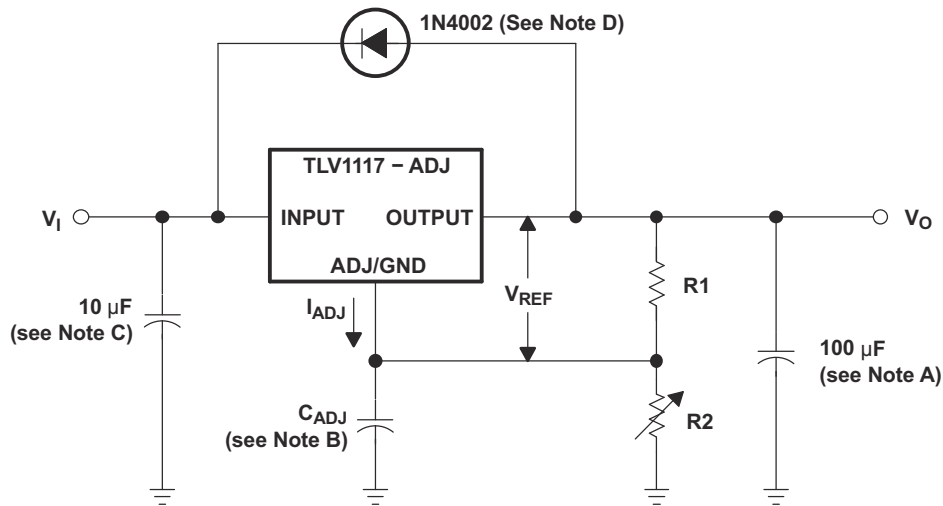


图 8-1. Basic Adjustable Regulator

The adjustable version of the TLV1117 takes a 2.7-V to 15-V input. The voltage  $V_{REF}$  refers to the voltage between the output and the ADJUST pin, typically 1.25 V. The  $V_{REF}$  voltage causes a current to flow across R1, which is the same current that flows across R2 (minus the negligible 50-µA  $I_{ADJ}$ ). Therefore, R2 can be adjusted to create a larger voltage drop from GND and set the output voltage. The output voltage equation is described in the [Detailed Design Procedure](#) section.

#### 8.2.1 Design Requirements

- (A) Output capacitor selection is critical for regulator stability. Larger  $C_{OUT}$  values benefit the regulator by improving transient response and loop stability. This device is designed to be stable with tantalum and aluminum electrolytic output capacitors having an ESR between 0.2  $\Omega$  and 10  $\Omega$ .
- (B)  $C_{ADJ}$  can be used to improve ripple rejection. If  $C_{ADJ}$  is used, a  $C_{OUT}$  that is larger in value than  $C_{ADJ}$  must be used.
- (C)  $C_{IN}$  is recommended if the TLV1117 is not located near the power-supply filter.
- (D) An external diode is recommended to protect the regulator if the input instantaneously is shorted to GND.

### 8.2.2 Detailed Design Procedure

The output voltage can be calculated as shown in [方程式 1](#):

$$V_{OUT} = V_{REF} \left( 1 + \frac{R2}{R1} \right) + (I_{ADJ} \times R2) \quad (1)$$

$I_{ADJ}$  can be neglected in most applications because the value is approximately 80  $\mu A$ .

### 8.2.3 Application Curve

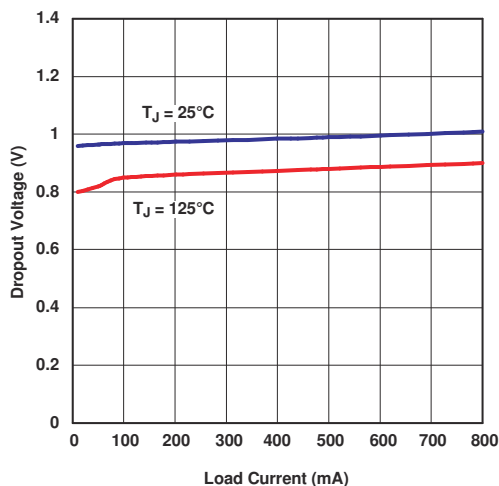


图 8-2. Dropout Voltage vs Load Current

### 8.3 Power Supply Recommendations

The fixed and adjustable versions of the TLV1117 have different recommended ranges of operating voltage. See the [Recommended Operating Conditions](#) table for specific operating ranges.

## 8.4 Layout

### 8.4.1 Layout Guidelines

One or two input capacitors are recommended if the TLV1117 is not located near the power-supply output filter capacitor. These capacitors can filter high-frequency noise and mitigate brief voltage surges from the input. Traces on the input and output pins of the device must be wide enough to support the full range of current needed in the application to minimize  $I \times R$  drop.

### 8.4.2 Layout Example

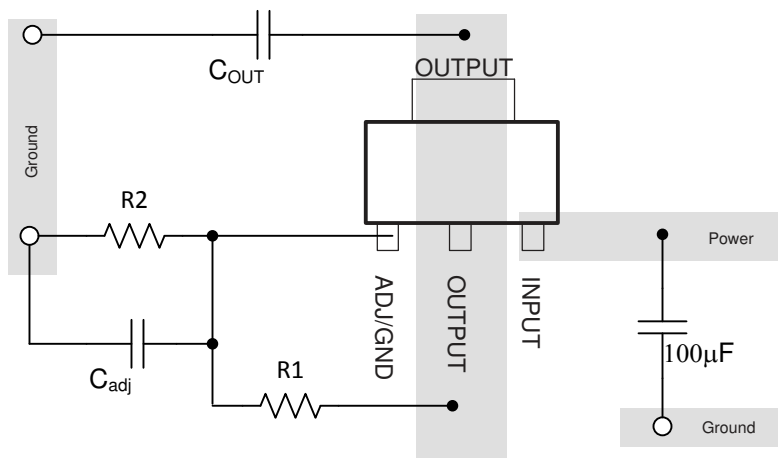


图 8-3. Layout Example

## 9 Device and Documentation Support

### 9.1 接收文档更新通知

要接收文档更新通知，请导航至 [ti.com](https://ti.com) 上的器件产品文件夹。点击 [订阅更新](#) 进行注册，即可每周接收产品信息更改摘要。有关更改的详细信息，请查看任何已修订文档中包含的修订历史记录。

### 9.2 支持资源

**TI E2E™ 支持论坛** 是工程师的重要参考资料，可直接从专家获得快速、经过验证的解答和设计帮助。搜索现有解答或提出自己的问题可获得所需的快速设计帮助。

链接的内容由各个贡献者“按原样”提供。这些内容并不构成 TI 技术规范，并且不一定反映 TI 的观点；请参阅 TI 的《[使用条款](#)》。

### 9.3 Trademarks

TI E2E™ is a trademark of Texas Instruments.

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### 9.4 静电放电警告



静电放电 (ESD) 会损坏这个集成电路。德州仪器 (TI) 建议通过适当的预防措施处理所有集成电路。如果不遵守正确的处理和安装程序，可能会损坏集成电路。

ESD 的损坏小至导致微小的性能降级，大至整个器件故障。精密的集成电路可能更容易受到损坏，这是因为非常细微的参数更改都可能会导致器件与其发布的规格不相符。

### 9.5 术语表

**TI 术语表** 本术语表列出并解释了术语、首字母缩略词和定义。

## 10 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.

## PACKAGING INFORMATION

| Orderable part number             | Status<br>(1) | Material type<br>(2) | Package   Pins    | Package qty   Carrier | RoHS<br>(3) | Lead finish/<br>Ball material<br>(4) | MSL rating/<br>Peak reflow<br>(5) | Op temp (°C) | Part marking<br>(6) |
|-----------------------------------|---------------|----------------------|-------------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|---------------------|
| <a href="#">TLV1117-15CDCY</a>    | Active        | Production           | SOT-223 (DCY)   4 | 80   TUBE             | Yes         | SN                                   | Level-2-260C-1 YEAR               | 0 to 125     | T2                  |
| <a href="#">TLV1117-15CDCYR</a>   | Active        | Production           | SOT-223 (DCY)   4 | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | 0 to 125     | T2                  |
| <a href="#">TLV1117-15CDCYRG3</a> | Active        | Production           | SOT-223 (DCY)   4 | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | 0 to 125     | T2                  |
| <a href="#">TLV1117-15CDRJR</a>   | Active        | Production           | SON (DRJ)   8     | 3000   LARGE T&R      | Yes         | NIPDAU                               | Level-2-260C-1 YEAR               | 0 to 125     | ZYH                 |
| <a href="#">TLV1117-15IDCY</a>    | Active        | Production           | SOT-223 (DCY)   4 | 80   TUBE             | Yes         | SN                                   | Level-2-260C-1 YEAR               | -40 to 125   | T3                  |
| <a href="#">TLV1117-15IDCYR</a>   | Active        | Production           | SOT-223 (DCY)   4 | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | -40 to 125   | T3                  |
| <a href="#">TLV1117-15IKVURG3</a> | Active        | Production           | TO-252 (KVU)   3  | 2500   LARGE T&R      | Yes         | SN                                   | Level-3-260C-168 HR               | -40 to 125   | ZF15                |
| <a href="#">TLV1117-18CDCY</a>    | Active        | Production           | SOT-223 (DCY)   4 | 80   TUBE             | Yes         | SN                                   | Level-2-260C-1 YEAR               | 0 to 125     | T4                  |
| <a href="#">TLV1117-18CDCYR</a>   | Active        | Production           | SOT-223 (DCY)   4 | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | 0 to 125     | T4                  |
| <a href="#">TLV1117-18CDCYRG3</a> | Active        | Production           | SOT-223 (DCY)   4 | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | 0 to 125     | T4                  |
| <a href="#">TLV1117-18CDRJR</a>   | Active        | Production           | SON (DRJ)   8     | 3000   LARGE T&R      | Yes         | NIPDAU                               | Level-2-260C-1 YEAR               | 0 to 125     | ZYK                 |
| <a href="#">TLV1117-18CKVURG3</a> | Active        | Production           | TO-252 (KVU)   3  | 2500   LARGE T&R      | Yes         | SN                                   | Level-3-260C-168 HR               | 0 to 125     | ZE18                |
| <a href="#">TLV1117-18IDCY</a>    | Active        | Production           | SOT-223 (DCY)   4 | 80   TUBE             | Yes         | SN                                   | Level-2-260C-1 YEAR               | -40 to 125   | T5                  |
| <a href="#">TLV1117-18IDCYR</a>   | Active        | Production           | SOT-223 (DCY)   4 | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | -40 to 125   | T5                  |
| <a href="#">TLV1117-18IDCYRG3</a> | Active        | Production           | SOT-223 (DCY)   4 | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | -40 to 125   | T5                  |
| <a href="#">TLV1117-18IDRJR</a>   | Active        | Production           | SON (DRJ)   8     | 1000   LARGE T&R      | Yes         | NIPDAU                               | Level-2-260C-1 YEAR               | -40 to 125   | ZYL                 |
| <a href="#">TLV1117-18IKVURG3</a> | Active        | Production           | TO-252 (KVU)   3  | 2500   LARGE T&R      | Yes         | SN                                   | Level-3-260C-168 HR               | -40 to 125   | ZF18                |
| <a href="#">TLV1117-25CDCY</a>    | Active        | Production           | SOT-223 (DCY)   4 | 80   TUBE             | Yes         | SN                                   | Level-2-260C-1 YEAR               | 0 to 125     | T6                  |
| <a href="#">TLV1117-25CDCYR</a>   | Active        | Production           | SOT-223 (DCY)   4 | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | 0 to 125     | T6                  |
| <a href="#">TLV1117-25CDCYRG3</a> | Active        | Production           | SOT-223 (DCY)   4 | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | 0 to 125     | T6                  |
| <a href="#">TLV1117-25CKVURG3</a> | Active        | Production           | TO-252 (KVU)   3  | 2500   LARGE T&R      | Yes         | SN                                   | Level-3-260C-168 HR               | 0 to 125     | ZE25                |
| <a href="#">TLV1117-25IDCY</a>    | Active        | Production           | SOT-223 (DCY)   4 | 80   TUBE             | Yes         | SN                                   | Level-2-260C-1 YEAR               | -40 to 125   | T8                  |
| <a href="#">TLV1117-25IDCYR</a>   | Active        | Production           | SOT-223 (DCY)   4 | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | -40 to 125   | T8                  |
| <a href="#">TLV1117-25IDRJR</a>   | Active        | Production           | SON (DRJ)   8     | 3000   LARGE T&R      | Yes         | NIPDAU                               | Level-2-260C-1 YEAR               | -40 to 125   | ZYN                 |
| <a href="#">TLV1117-33CDCY</a>    | Active        | Production           | SOT-223 (DCY)   4 | 80   TUBE             | Yes         | SN                                   | Level-2-260C-1 YEAR               | 0 to 125     | V3                  |
| <a href="#">TLV1117-33CDCYRG3</a> | Active        | Production           | SOT-223 (DCY)   4 | 80   TUBE             | Yes         | SN                                   | Level-2-260C-1 YEAR               | 0 to 125     | V3                  |
| <a href="#">TLV1117-33CDCYR</a>   | Active        | Production           | SOT-223 (DCY)   4 | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | 0 to 125     | V3                  |
| <a href="#">TLV1117-33CDCYRG3</a> | Active        | Production           | SOT-223 (DCY)   4 | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | 0 to 125     | V3                  |
| <a href="#">TLV1117-33CDRJR</a>   | Active        | Production           | SON (DRJ)   8     | 1000   LARGE T&R      | Yes         | NIPDAU                               | Level-2-260C-1 YEAR               | 0 to 125     | ZYP                 |

| Orderable part number             | Status<br>(1) | Material type<br>(2) | Package   Pins             | Package qty   Carrier | RoHS<br>(3) | Lead finish/<br>Ball material<br>(4) | MSL rating/<br>Peak reflow<br>(5) | Op temp (°C) | Part marking<br>(6) |
|-----------------------------------|---------------|----------------------|----------------------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|---------------------|
| <a href="#">TLV1117-33CKVURG3</a> | Active        | Production           | TO-252 (KVU)   3           | 2500   LARGE T&R      | Yes         | SN                                   | Level-3-260C-168 HR               | 0 to 125     | ZE33                |
| <a href="#">TLV1117-33IDCY</a>    | Active        | Production           | SOT-223 (DCY)   4          | 80   TUBE             | Yes         | SN                                   | Level-2-260C-1 YEAR               | -40 to 125   | (V3, VS)            |
| <a href="#">TLV1117-33IDCYG3</a>  | Active        | Production           | SOT-223 (DCY)   4          | 80   TUBE             | Yes         | SN                                   | Level-2-260C-1 YEAR               | -40 to 125   | (V3, VS)            |
| <a href="#">TLV1117-33IDCYR</a>   | Active        | Production           | SOT-223 (DCY)   4          | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | -40 to 125   | VS                  |
| <a href="#">TLV1117-33IDCYRG3</a> | Active        | Production           | SOT-223 (DCY)   4          | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | -40 to 125   | VS                  |
| <a href="#">TLV1117-33IDRJR</a>   | Active        | Production           | SON (DRJ)   8              | 1000   LARGE T&R      | Yes         | NIPDAU                               | Level-2-260C-1 YEAR               | -40 to 125   | ZYR                 |
| <a href="#">TLV1117-33IKVURG3</a> | Active        | Production           | TO-252 (KVU)   3           | 2500   LARGE T&R      | Yes         | SN                                   | Level-3-260C-168 HR               | -40 to 125   | ZF33                |
| <a href="#">TLV1117-50CDCY</a>    | Active        | Production           | SOT-223 (DCY)   4          | 80   TUBE             | Yes         | SN                                   | Level-2-260C-1 YEAR               | 0 to 125     | VT                  |
| <a href="#">TLV1117-50CDCYG3</a>  | Active        | Production           | SOT-223 (DCY)   4          | 80   TUBE             | Yes         | SN                                   | Level-2-260C-1 YEAR               | 0 to 125     | VT                  |
| <a href="#">TLV1117-50CDCYR</a>   | Active        | Production           | SOT-223 (DCY)   4          | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | 0 to 125     | VT                  |
| <a href="#">TLV1117-50CDCYRG3</a> | Active        | Production           | SOT-223 (DCY)   4          | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | 0 to 125     | VT                  |
| <a href="#">TLV1117-50CDRJR</a>   | Active        | Production           | SON (DRJ)   8              | 3000   LARGE T&R      | Yes         | NIPDAU                               | Level-2-260C-1 YEAR               | 0 to 125     | ZE50                |
| <a href="#">TLV1117-50CKVURG3</a> | Active        | Production           | TO-252 (KVU)   3           | 2500   LARGE T&R      | Yes         | SN                                   | Level-3-260C-168 HR               | 0 to 125     | ZE50                |
| <a href="#">TLV1117-50IDCY</a>    | Active        | Production           | SOT-223 (DCY)   4          | 80   TUBE             | Yes         | SN                                   | Level-2-260C-1 YEAR               | -40 to 125   | VU                  |
| <a href="#">TLV1117-50IDCYR</a>   | Active        | Production           | SOT-223 (DCY)   4          | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | -40 to 125   | VU                  |
| <a href="#">TLV1117-50IDCYRG3</a> | Active        | Production           | SOT-223 (DCY)   4          | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | -40 to 125   | VU                  |
| <a href="#">TLV1117-50IDRJR</a>   | Active        | Production           | SON (DRJ)   8              | 1000   LARGE T&R      | Yes         | NIPDAU                               | Level-2-260C-1 YEAR               | -40 to 125   | ZF50                |
| <a href="#">TLV1117-50IDRJRG4</a> | Active        | Production           | SON (DRJ)   8              | 1000   LARGE T&R      | Yes         | NIPDAU                               | Level-2-260C-1 YEAR               | -40 to 125   | ZF50                |
| <a href="#">TLV1117-50IKVURG3</a> | Active        | Production           | TO-252 (KVU)   3           | 2500   LARGE T&R      | Yes         | SN                                   | Level-3-260C-168 HR               | -40 to 125   | ZF50                |
| <a href="#">TLV1117CDCY</a>       | Active        | Production           | SOT-223 (DCY)   4          | 80   TUBE             | Yes         | SN                                   | Level-2-260C-1 YEAR               | 0 to 125     | V4                  |
| <a href="#">TLV1117CDCYG3</a>     | Active        | Production           | SOT-223 (DCY)   4          | 80   TUBE             | Yes         | SN                                   | Level-2-260C-1 YEAR               | 0 to 125     | V4                  |
| <a href="#">TLV1117CDCYR</a>      | Active        | Production           | SOT-223 (DCY)   4          | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | 0 to 125     | V4                  |
| <a href="#">TLV1117CDCYR.Z</a>    | Active        | Production           | SOT-223 (DCY)   4          | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | -40 to 125   | V4                  |
| <a href="#">TLV1117CDCYRG3</a>    | Active        | Production           | SOT-223 (DCY)   4          | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | 0 to 125     | V4                  |
| <a href="#">TLV1117CDRJR</a>      | Active        | Production           | SON (DRJ)   8              | 1000   LARGE T&R      | Yes         | NIPDAU                               | Level-2-260C-1 YEAR               | 0 to 125     | ZYS                 |
| <a href="#">TLV1117CKCS</a>       | Active        | Production           | TO-220 (KCS)   3           | 50   TUBE             | Yes         | SN                                   | N/A for Pkg Type                  | 0 to 125     | TLV1117C            |
| <a href="#">TLV1117CKTTR</a>      | Active        | Production           | DDPAK/<br>TO-263 (KTT)   3 | 500   LARGE T&R       | Yes         | SN                                   | Level-3-245C-168 HR               | 0 to 125     | TLV1117C            |
| <a href="#">TLV1117CKTTRG3</a>    | Active        | Production           | DDPAK/<br>TO-263 (KTT)   3 | 500   LARGE T&R       | Yes         | SN                                   | Level-3-245C-168 HR               | 0 to 125     | TLV1117C            |
| <a href="#">TLV1117CKVURG3</a>    | Active        | Production           | TO-252 (KVU)   3           | 2500   LARGE T&R      | Yes         | SN                                   | Level-3-260C-168 HR               | 0 to 125     | TV1117              |



| Orderable part number          | Status<br>(1) | Material type<br>(2) | Package   Pins             | Package qty   Carrier | RoHS<br>(3) | Lead finish/<br>Ball material<br>(4) | MSL rating/<br>Peak reflow<br>(5) | Op temp (°C) | Part marking<br>(6) |
|--------------------------------|---------------|----------------------|----------------------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|---------------------|
| TLV1117CKVURG3.Z               | Active        | Production           | TO-252 (KVU)   3           | 2500   LARGE T&R      | Yes         | SN                                   | Level-3-260C-168 HR               | -40 to 125   | TV1117              |
| <a href="#">TLV1117IDCY</a>    | Active        | Production           | SOT-223 (DCY)   4          | 80   TUBE             | Yes         | SN                                   | Level-2-260C-1 YEAR               | -40 to 125   | V2                  |
| TLV1117IDCYG3                  | Active        | Production           | SOT-223 (DCY)   4          | 80   TUBE             | Yes         | SN                                   | Level-2-260C-1 YEAR               | -40 to 125   | V2                  |
| <a href="#">TLV1117IDCYR</a>   | Active        | Production           | SOT-223 (DCY)   4          | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | -40 to 125   | V2                  |
| TLV1117IDCYR.Z                 | Active        | Production           | SOT-223 (DCY)   4          | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | -40 to 125   | V2                  |
| TLV1117IDCYRG3                 | Active        | Production           | SOT-223 (DCY)   4          | 2500   LARGE T&R      | Yes         | SN                                   | Level-2-260C-1 YEAR               | -40 to 125   | V2                  |
| <a href="#">TLV1117IDRJ</a>    | Active        | Production           | SON (DRJ)   8              | 1000   LARGE T&R      | Yes         | NIPDAU                               | Level-2-260C-1 YEAR               | -40 to 125   | ZYT                 |
| <a href="#">TLV1117IKCS</a>    | Active        | Production           | TO-220 (KCS)   3           | 50   TUBE             | Yes         | SN                                   | N/A for Pkg Type                  | -40 to 125   | TLV1117I            |
| TLV1117IKCSE3                  | Active        | Production           | TO-220 (KCS)   3           | 50   TUBE             | Yes         | SN                                   | N/A for Pkg Type                  | -40 to 125   | TLV1117I            |
| <a href="#">TLV1117IKTTR</a>   | Active        | Production           | DDPAK/<br>TO-263 (KTT)   3 | 500   LARGE T&R       | Yes         | SN                                   | Level-3-245C-168 HR               | -40 to 125   | TLV1117I            |
| <a href="#">TLV1117IKVURG3</a> | Active        | Production           | TO-252 (KVU)   3           | 2500   LARGE T&R      | Yes         | SN                                   | Level-3-260C-168 HR               | -40 to 125   | TY1117              |
| TLV1117IKVURG3.Z               | Active        | Production           | TO-252 (KVU)   3           | 2500   LARGE T&R      | Yes         | SN                                   | Level-3-260C-168 HR               | -40 to 125   | TY1117              |

<sup>(1)</sup> **Status:** For more details on status, see our [product life cycle](#).

<sup>(2)</sup> **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.

<sup>(3)</sup> **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

<sup>(4)</sup> **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.

<sup>(5)</sup> **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.

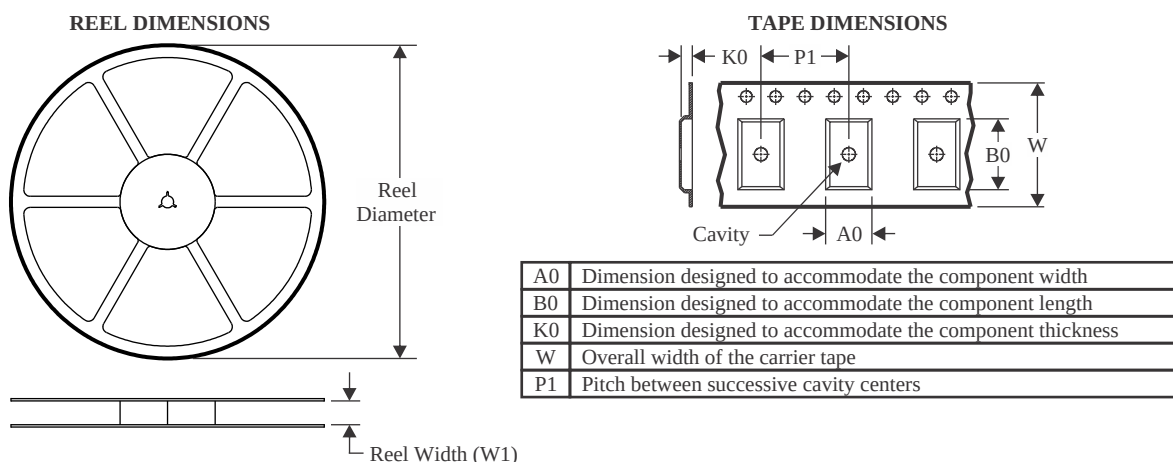
<sup>(6)</sup> **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

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.

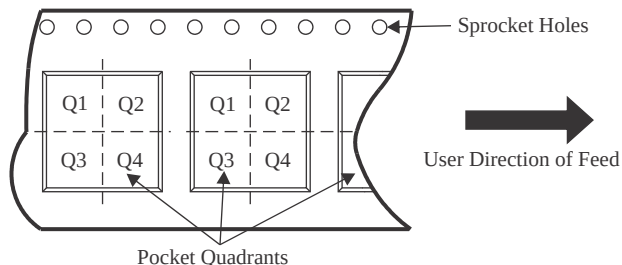
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## TAPE AND REEL INFORMATION



### QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE

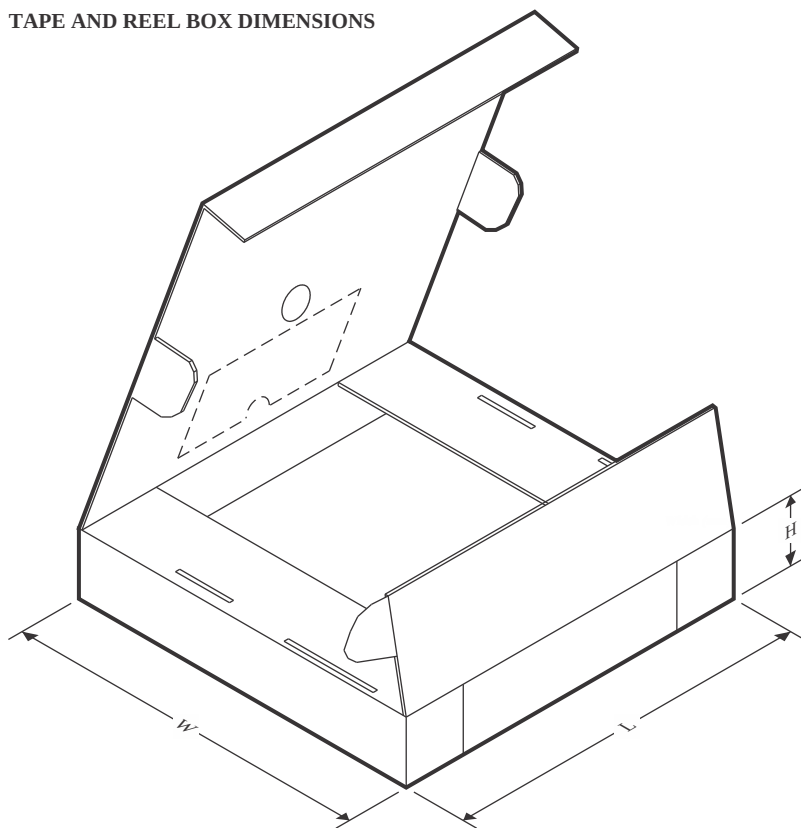


\*All dimensions are nominal

| 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 |
|-------------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| TLV1117-15CDCYR   | SOT-223      | DCY             | 4    | 2500 | 330.0              | 12.4               | 7.05    | 7.4     | 1.9     | 8.0     | 12.0   | Q3            |
| TLV1117-15CDRJ    | SON          | DRJ             | 8    | 3000 | 330.0              | 12.4               | 4.25    | 4.25    | 1.15    | 8.0     | 12.0   | Q2            |
| TLV1117-15IDCYR   | SOT-223      | DCY             | 4    | 2500 | 330.0              | 12.4               | 7.05    | 7.4     | 1.9     | 8.0     | 12.0   | Q3            |
| TLV1117-15IDCYR   | SOT-223      | DCY             | 4    | 2500 | 330.0              | 12.4               | 6.55    | 7.25    | 1.9     | 8.0     | 12.0   | Q3            |
| TLV1117-15IKVURG3 | TO-252       | KVU             | 3    | 2500 | 330.0              | 16.4               | 6.9     | 10.5    | 2.7     | 8.0     | 16.0   | Q2            |
| TLV1117-18CDCYR   | SOT-223      | DCY             | 4    | 2500 | 330.0              | 12.4               | 6.55    | 7.25    | 1.9     | 8.0     | 12.0   | Q3            |
| TLV1117-18CDRJ    | SON          | DRJ             | 8    | 3000 | 330.0              | 12.4               | 4.25    | 4.25    | 1.15    | 8.0     | 12.0   | Q2            |
| TLV1117-18CKVURG3 | TO-252       | KVU             | 3    | 2500 | 330.0              | 16.4               | 6.9     | 10.5    | 2.7     | 8.0     | 16.0   | Q2            |
| TLV1117-18IDCYR   | SOT-223      | DCY             | 4    | 2500 | 330.0              | 12.4               | 6.55    | 7.25    | 1.9     | 8.0     | 12.0   | Q3            |
| TLV1117-18IDRJ    | SON          | DRJ             | 8    | 1000 | 180.0              | 12.4               | 4.25    | 4.25    | 1.15    | 8.0     | 12.0   | Q2            |
| TLV1117-18IKVURG3 | TO-252       | KVU             | 3    | 2500 | 330.0              | 16.4               | 6.9     | 10.5    | 2.7     | 8.0     | 16.0   | Q2            |
| TLV1117-25CDCYR   | SOT-223      | DCY             | 4    | 2500 | 330.0              | 12.4               | 6.55    | 7.25    | 1.9     | 8.0     | 12.0   | Q3            |
| TLV1117-25CDCYR   | SOT-223      | DCY             | 4    | 2500 | 330.0              | 12.4               | 7.05    | 7.4     | 1.9     | 8.0     | 12.0   | Q3            |
| TLV1117-25CKVURG3 | TO-252       | KVU             | 3    | 2500 | 330.0              | 16.4               | 6.9     | 10.5    | 2.7     | 8.0     | 16.0   | Q2            |
| TLV1117-25IDCYR   | SOT-223      | DCY             | 4    | 2500 | 330.0              | 12.4               | 7.05    | 7.4     | 1.9     | 8.0     | 12.0   | Q3            |
| TLV1117-25IDRJ    | SON          | DRJ             | 8    | 3000 | 330.0              | 12.4               | 4.25    | 4.25    | 1.15    | 8.0     | 12.0   | Q2            |

| 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 |
|-------------------|------------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| TLV1117-33CDCYR   | SOT-223          | DCY             | 4    | 2500 | 330.0              | 12.4               | 7.05    | 7.4     | 1.9     | 8.0     | 12.0   | Q3            |
| TLV1117-33CDCYR   | SOT-223          | DCY             | 4    | 2500 | 330.0              | 12.4               | 6.55    | 7.25    | 1.9     | 8.0     | 12.0   | Q3            |
| TLV1117-33CDRJ    | SON              | DRJ             | 8    | 1000 | 180.0              | 12.4               | 4.25    | 4.25    | 1.15    | 8.0     | 12.0   | Q2            |
| TLV1117-33CKVURG3 | TO-252           | KVU             | 3    | 2500 | 330.0              | 16.4               | 6.9     | 10.5    | 2.7     | 8.0     | 16.0   | Q2            |
| TLV1117-33IDCYR   | SOT-223          | DCY             | 4    | 2500 | 330.0              | 12.4               | 7.05    | 7.4     | 1.9     | 8.0     | 12.0   | Q3            |
| TLV1117-33IDCYR   | SOT-223          | DCY             | 4    | 2500 | 330.0              | 12.4               | 6.55    | 7.25    | 1.9     | 8.0     | 12.0   | Q3            |
| TLV1117-33IDRJ    | SON              | DRJ             | 8    | 1000 | 180.0              | 12.4               | 4.25    | 4.25    | 1.15    | 8.0     | 12.0   | Q2            |
| TLV1117-33IKVURG3 | TO-252           | KVU             | 3    | 2500 | 330.0              | 16.4               | 6.9     | 10.5    | 2.7     | 8.0     | 16.0   | Q2            |
| TLV1117-50CDCYR   | SOT-223          | DCY             | 4    | 2500 | 330.0              | 12.4               | 7.05    | 7.4     | 1.9     | 8.0     | 12.0   | Q3            |
| TLV1117-50CDRJ    | SON              | DRJ             | 8    | 3000 | 330.0              | 12.4               | 4.25    | 4.25    | 1.15    | 8.0     | 12.0   | Q2            |
| TLV1117-50CKVURG3 | TO-252           | KVU             | 3    | 2500 | 330.0              | 16.4               | 6.9     | 10.5    | 2.7     | 8.0     | 16.0   | Q2            |
| TLV1117-50IDCYR   | SOT-223          | DCY             | 4    | 2500 | 330.0              | 12.4               | 6.55    | 7.25    | 1.9     | 8.0     | 12.0   | Q3            |
| TLV1117-50IDCYR   | SOT-223          | DCY             | 4    | 2500 | 330.0              | 12.4               | 7.05    | 7.4     | 1.9     | 8.0     | 12.0   | Q3            |
| TLV1117-50IDRJ    | SON              | DRJ             | 8    | 1000 | 180.0              | 12.4               | 4.25    | 4.25    | 1.15    | 8.0     | 12.0   | Q2            |
| TLV1117-50IKVURG3 | TO-252           | KVU             | 3    | 2500 | 330.0              | 16.4               | 6.9     | 10.5    | 2.7     | 8.0     | 16.0   | Q2            |
| TLV1117CDCYR      | SOT-223          | DCY             | 4    | 2500 | 330.0              | 12.4               | 7.05    | 7.4     | 1.9     | 8.0     | 12.0   | Q3            |
| TLV1117CDCYR      | SOT-223          | DCY             | 4    | 2500 | 330.0              | 12.4               | 6.55    | 7.25    | 1.9     | 8.0     | 12.0   | Q3            |
| TLV1117CDRJ       | SON              | DRJ             | 8    | 1000 | 180.0              | 12.4               | 4.25    | 4.25    | 1.15    | 8.0     | 12.0   | Q2            |
| TLV1117CKTTR      | DDPAK/<br>TO-263 | KT              | 3    | 500  | 330.0              | 24.4               | 10.8    | 16.3    | 5.11    | 16.0    | 24.0   | Q2            |
| TLV1117CKVURG3    | TO-252           | KVU             | 3    | 2500 | 330.0              | 16.4               | 6.9     | 10.5    | 2.7     | 8.0     | 16.0   | Q2            |
| TLV1117IDCYR      | SOT-223          | DCY             | 4    | 2500 | 330.0              | 12.4               | 7.05    | 7.4     | 1.9     | 8.0     | 12.0   | Q3            |
| TLV1117IDCYR      | SOT-223          | DCY             | 4    | 2500 | 330.0              | 12.4               | 6.55    | 7.25    | 1.9     | 8.0     | 12.0   | Q3            |
| TLV1117IDRJ       | SON              | DRJ             | 8    | 1000 | 180.0              | 12.4               | 4.25    | 4.25    | 1.15    | 8.0     | 12.0   | Q2            |
| TLV1117IKTTR      | DDPAK/<br>TO-263 | KT              | 3    | 500  | 330.0              | 24.4               | 10.8    | 16.3    | 5.11    | 16.0    | 24.0   | Q2            |
| TLV1117IKVURG3    | TO-252           | KVU             | 3    | 2500 | 330.0              | 16.4               | 6.9     | 10.5    | 2.7     | 8.0     | 16.0   | Q2            |

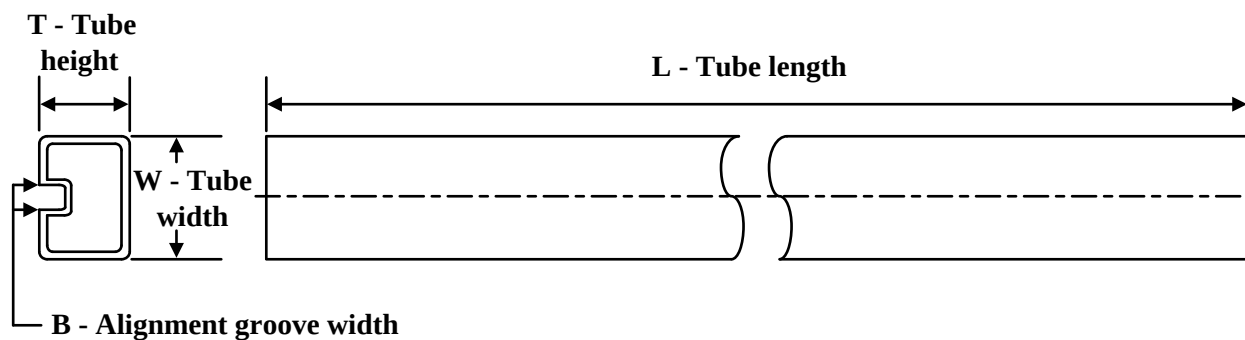
## TAPE AND REEL BOX DIMENSIONS



\*All dimensions are nominal

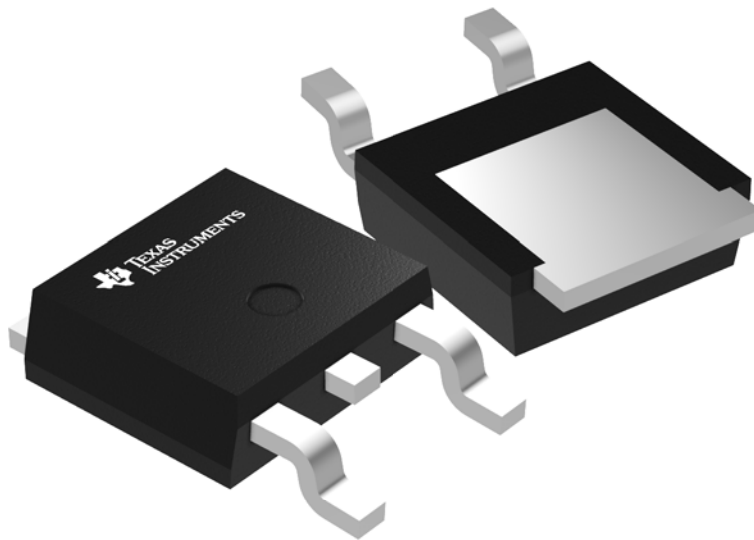
| Device            | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|-------------------|--------------|-----------------|------|------|-------------|------------|-------------|
| TLV1117-15CDCYR   | SOT-223      | DCY             | 4    | 2500 | 340.0       | 340.0      | 38.0        |
| TLV1117-15CDRJ    | SON          | DRJ             | 8    | 3000 | 367.0       | 367.0      | 35.0        |
| TLV1117-15IDCYR   | SOT-223      | DCY             | 4    | 2500 | 340.0       | 340.0      | 38.0        |
| TLV1117-15IDCYR   | SOT-223      | DCY             | 4    | 2500 | 336.0       | 336.0      | 48.0        |
| TLV1117-15IKVURG3 | TO-252       | KVU             | 3    | 2500 | 340.0       | 340.0      | 38.0        |
| TLV1117-18CDCYR   | SOT-223      | DCY             | 4    | 2500 | 336.0       | 336.0      | 48.0        |
| TLV1117-18CDRJ    | SON          | DRJ             | 8    | 3000 | 367.0       | 367.0      | 35.0        |
| TLV1117-18CKVURG3 | TO-252       | KVU             | 3    | 2500 | 340.0       | 340.0      | 38.0        |
| TLV1117-18IDCYR   | SOT-223      | DCY             | 4    | 2500 | 336.0       | 336.0      | 48.0        |
| TLV1117-18IDRJ    | SON          | DRJ             | 8    | 1000 | 210.0       | 185.0      | 35.0        |
| TLV1117-18IKVURG3 | TO-252       | KVU             | 3    | 2500 | 340.0       | 340.0      | 38.0        |
| TLV1117-25CDCYR   | SOT-223      | DCY             | 4    | 2500 | 336.0       | 336.0      | 48.0        |
| TLV1117-25CDCYR   | SOT-223      | DCY             | 4    | 2500 | 340.0       | 340.0      | 38.0        |
| TLV1117-25CKVURG3 | TO-252       | KVU             | 3    | 2500 | 340.0       | 340.0      | 38.0        |
| TLV1117-25IDCYR   | SOT-223      | DCY             | 4    | 2500 | 340.0       | 340.0      | 38.0        |
| TLV1117-25IDRJ    | SON          | DRJ             | 8    | 3000 | 367.0       | 367.0      | 35.0        |
| TLV1117-33CDCYR   | SOT-223      | DCY             | 4    | 2500 | 340.0       | 340.0      | 38.0        |
| TLV1117-33CDCYR   | SOT-223      | DCY             | 4    | 2500 | 336.0       | 336.0      | 48.0        |

| Device            | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|-------------------|--------------|-----------------|------|------|-------------|------------|-------------|
| TLV1117-33CDRJR   | SON          | DRJ             | 8    | 1000 | 210.0       | 185.0      | 35.0        |
| TLV1117-33CKVURG3 | TO-252       | KVU             | 3    | 2500 | 340.0       | 340.0      | 38.0        |
| TLV1117-33IDCYR   | SOT-223      | DCY             | 4    | 2500 | 340.0       | 340.0      | 38.0        |
| TLV1117-33IDCYR   | SOT-223      | DCY             | 4    | 2500 | 336.0       | 336.0      | 48.0        |
| TLV1117-33IDRJR   | SON          | DRJ             | 8    | 1000 | 210.0       | 185.0      | 35.0        |
| TLV1117-33IKVURG3 | TO-252       | KVU             | 3    | 2500 | 340.0       | 340.0      | 38.0        |
| TLV1117-50CDCYR   | SOT-223      | DCY             | 4    | 2500 | 340.0       | 340.0      | 38.0        |
| TLV1117-50CDRJR   | SON          | DRJ             | 8    | 3000 | 367.0       | 367.0      | 35.0        |
| TLV1117-50CKVURG3 | TO-252       | KVU             | 3    | 2500 | 340.0       | 340.0      | 38.0        |
| TLV1117-50IDCYR   | SOT-223      | DCY             | 4    | 2500 | 336.0       | 336.0      | 48.0        |
| TLV1117-50IDCYR   | SOT-223      | DCY             | 4    | 2500 | 340.0       | 340.0      | 38.0        |
| TLV1117-50IDRJR   | SON          | DRJ             | 8    | 1000 | 210.0       | 185.0      | 35.0        |
| TLV1117-50IKVURG3 | TO-252       | KVU             | 3    | 2500 | 340.0       | 340.0      | 38.0        |
| TLV1117CDCYR      | SOT-223      | DCY             | 4    | 2500 | 340.0       | 340.0      | 38.0        |
| TLV1117CDCYR      | SOT-223      | DCY             | 4    | 2500 | 336.0       | 336.0      | 48.0        |
| TLV1117CDRJR      | SON          | DRJ             | 8    | 1000 | 210.0       | 185.0      | 35.0        |
| TLV1117CKTTR      | DDPAK/TO-263 | KTT             | 3    | 500  | 340.0       | 340.0      | 38.0        |
| TLV1117CKVURG3    | TO-252       | KVU             | 3    | 2500 | 340.0       | 340.0      | 38.0        |
| TLV1117IDCYR      | SOT-223      | DCY             | 4    | 2500 | 340.0       | 340.0      | 38.0        |
| TLV1117IDCYR      | SOT-223      | DCY             | 4    | 2500 | 336.0       | 336.0      | 48.0        |
| TLV1117IDRJR      | SON          | DRJ             | 8    | 1000 | 210.0       | 185.0      | 35.0        |
| TLV1117IKTTR      | DDPAK/TO-263 | KTT             | 3    | 500  | 340.0       | 340.0      | 38.0        |
| TLV1117IKVURG3    | TO-252       | KVU             | 3    | 2500 | 340.0       | 340.0      | 38.0        |

**TUBE**


\*All dimensions are nominal

| Device           | Package Name | Package Type | Pins | SPQ | L (mm) | W (mm) | T (μm) | B (mm) |
|------------------|--------------|--------------|------|-----|--------|--------|--------|--------|
| TLV1117-15CDCY   | DCY          | SOT-223      | 4    | 80  | 559    | 8.6    | 500    | 3.6    |
| TLV1117-15IDCY   | DCY          | SOT-223      | 4    | 80  | 559    | 8.6    | 500    | 3.6    |
| TLV1117-18CDCY   | DCY          | SOT-223      | 4    | 80  | 559    | 8.6    | 500    | 3.6    |
| TLV1117-18IDCY   | DCY          | SOT-223      | 4    | 80  | 559    | 8.6    | 500    | 3.6    |
| TLV1117-25CDCY   | DCY          | SOT-223      | 4    | 80  | 559    | 8.6    | 500    | 3.6    |
| TLV1117-25IDCY   | DCY          | SOT-223      | 4    | 80  | 559    | 8.6    | 500    | 3.6    |
| TLV1117-33CDCY   | DCY          | SOT-223      | 4    | 80  | 559    | 8.6    | 500    | 3.6    |
| TLV1117-33CDCYG3 | DCY          | SOT-223      | 4    | 80  | 559    | 8.6    | 500    | 3.6    |
| TLV1117-33IDCY   | DCY          | SOT-223      | 4    | 80  | 559    | 8.6    | 500    | 3.6    |
| TLV1117-33IDCYG3 | DCY          | SOT-223      | 4    | 80  | 559    | 8.6    | 500    | 3.6    |
| TLV1117-50CDCY   | DCY          | SOT-223      | 4    | 80  | 559    | 8.6    | 500    | 3.6    |
| TLV1117-50CDCYG3 | DCY          | SOT-223      | 4    | 80  | 559    | 8.6    | 500    | 3.6    |
| TLV1117-50IDCY   | DCY          | SOT-223      | 4    | 80  | 559    | 8.6    | 500    | 3.6    |
| TLV1117CDCY      | DCY          | SOT-223      | 4    | 80  | 542.9  | 8.6    | 3606   | 2.67   |
| TLV1117CDCY      | DCY          | SOT-223      | 4    | 80  | 559    | 8.6    | 500    | 3.6    |
| TLV1117CDCYG3    | DCY          | SOT-223      | 4    | 80  | 559    | 8.6    | 500    | 3.6    |
| TLV1117CDCYG3    | DCY          | SOT-223      | 4    | 80  | 542.9  | 8.6    | 3606   | 2.67   |
| TLV1117CKCS      | KCS          | TO-220       | 3    | 50  | 532    | 34.1   | 700    | 9.6    |
| TLV1117CKCS      | KCS          | TO-220       | 3    | 50  | 532    | 34.1   | 700    | 9.6    |
| TLV1117IDCY      | DCY          | SOT-223      | 4    | 80  | 542.9  | 8.6    | 3606   | 2.67   |
| TLV1117IDCY      | DCY          | SOT-223      | 4    | 80  | 559    | 8.6    | 500    | 3.6    |
| TLV1117IDCYG3    | DCY          | SOT-223      | 4    | 80  | 542.9  | 8.6    | 3606   | 2.67   |
| TLV1117IDCYG3    | DCY          | SOT-223      | 4    | 80  | 559    | 8.6    | 500    | 3.6    |
| TLV1117IKCS      | KCS          | TO-220       | 3    | 50  | 532    | 34.1   | 700    | 9.6    |
| TLV1117IKCS      | KCS          | TO-220       | 3    | 50  | 532    | 34.1   | 700    | 9.6    |
| TLV1117IKCSE3    | KCS          | TO-220       | 3    | 50  | 532    | 34.1   | 700    | 9.6    |
| TLV1117IKCSE3    | KCS          | TO-220       | 3    | 50  | 532    | 34.1   | 700    | 9.6    |



Images above are just a representation of the package family, actual package may vary.  
Refer to the product data sheet for package details.



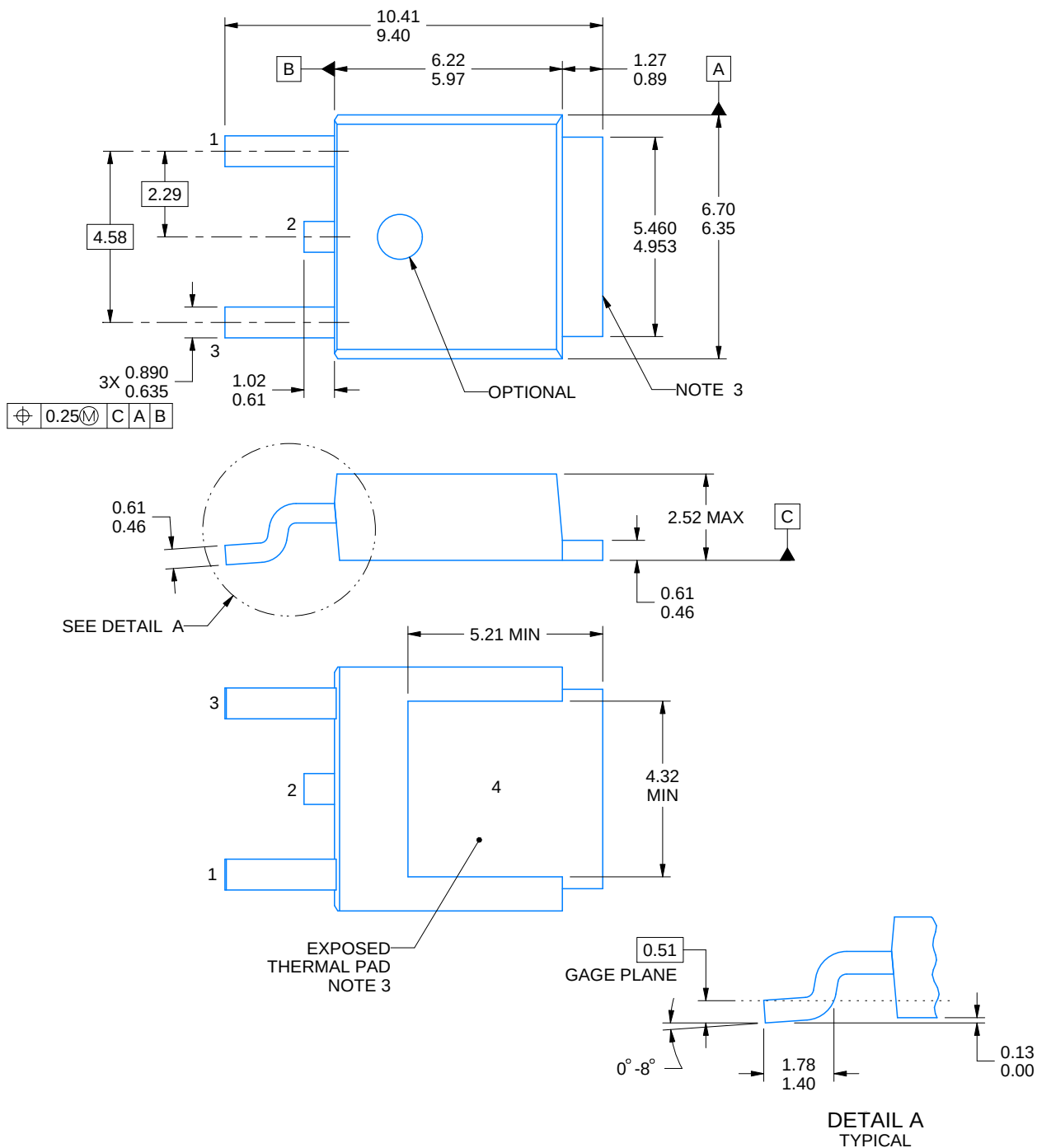


# PACKAGE OUTLINE

KVU0003A

TO-252 - 2.52 mm max height

TO-252



4218915/A 02/2017

## NOTES:

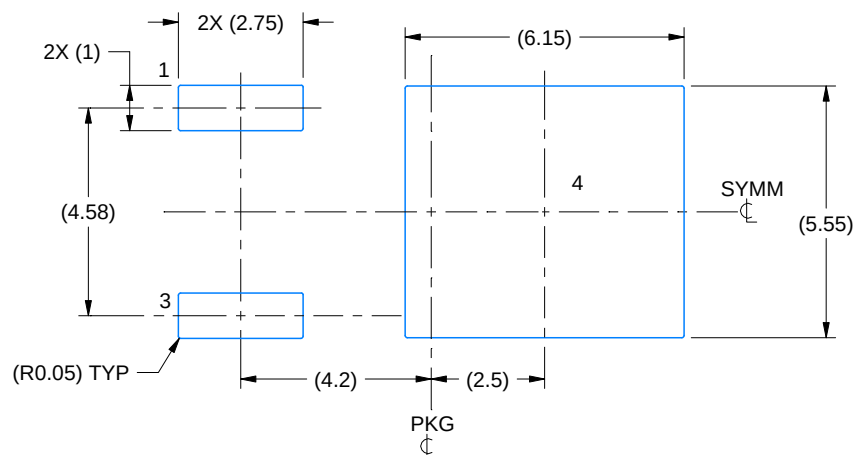
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Shape may vary per different assembly sites.
4. Reference JEDEC registration TO-252.

# EXAMPLE BOARD LAYOUT

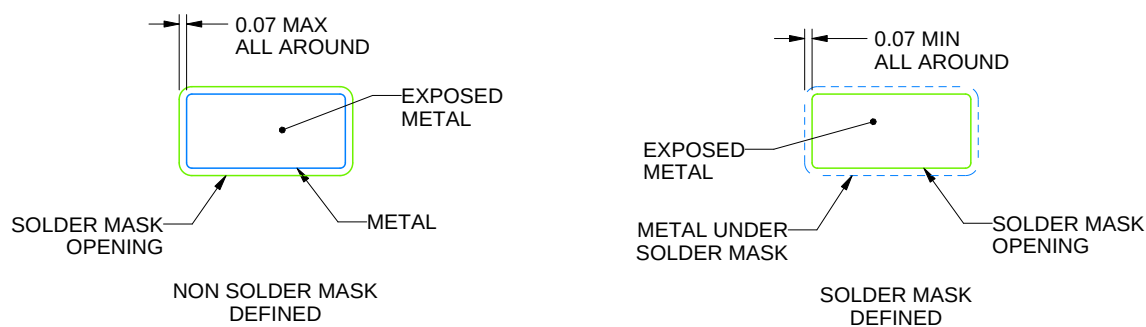
KVU0003A

TO-252 - 2.52 mm max height

TO-252



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE:6X



SOLDER MASK DETAILS  
NOT TO SCALE

4218915/A 02/2017

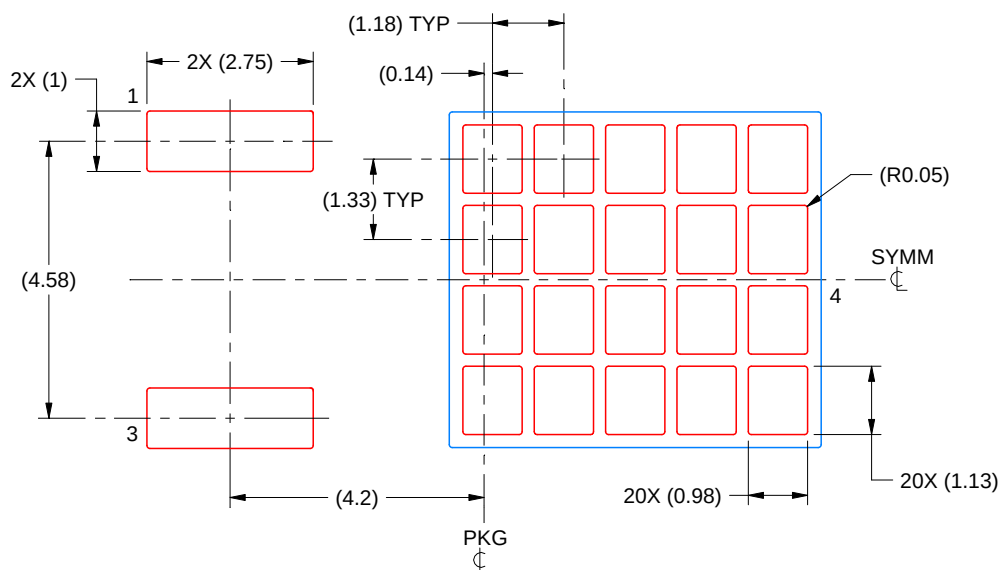
NOTES: (continued)

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](http://www.ti.com/lit/slm002)) and SLMA004 ([www.ti.com/lit/slma004](http://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.

**KVU0003A**

**TO-252 - 2.52 mm max height**

TO-252



## SOLDER PASTE EXAMPLE BASED ON 0.125 mm THICK STENCIL

EXPOSED PAD  
65% PRINTED SOLDER COVERAGE BY AREA  
SCALE:8X

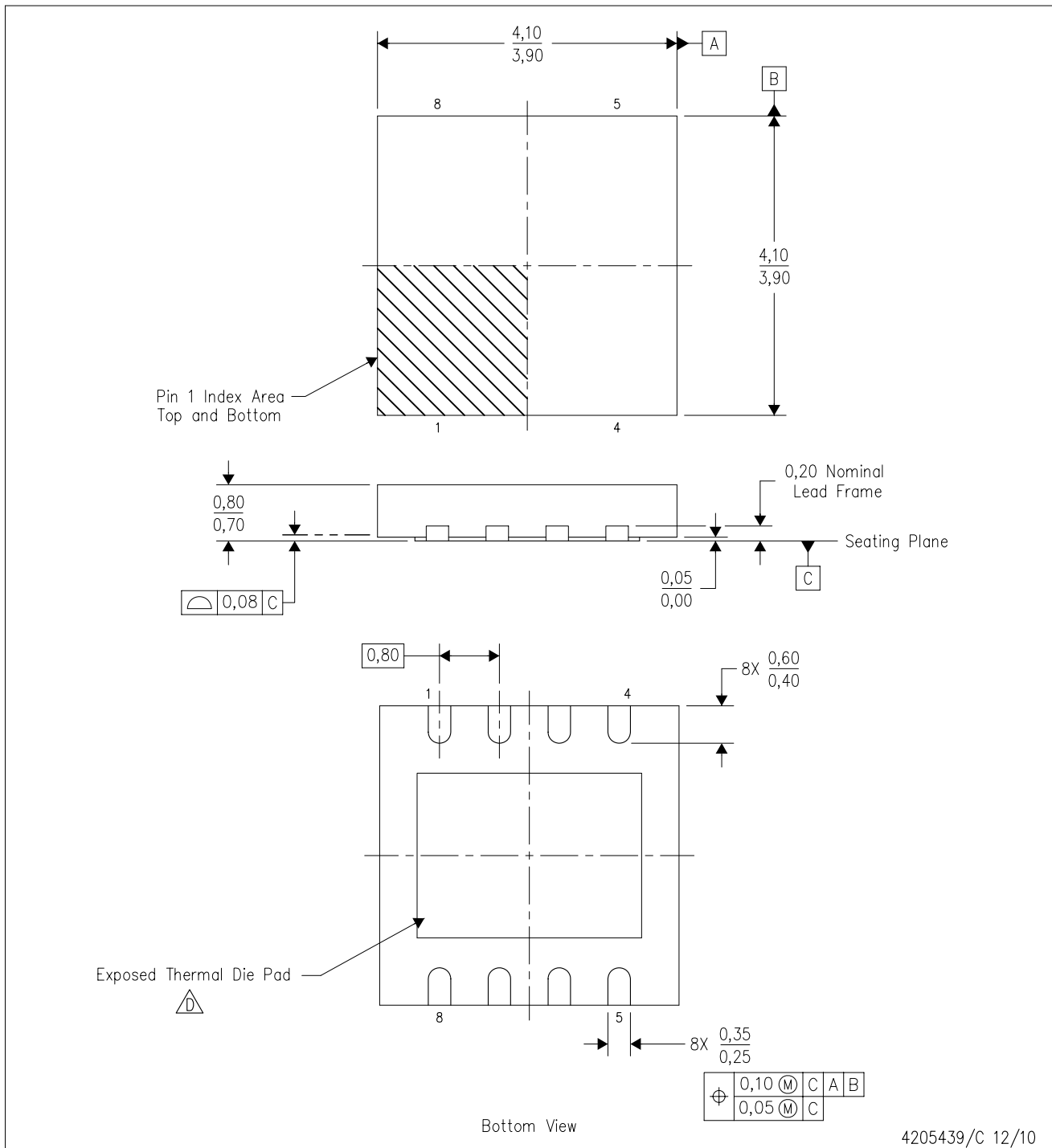
4218915/A 02/2017

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.

DRJ (S-PWSON-N8)

PLASTIC SMALL OUTLINE NO-LEAD



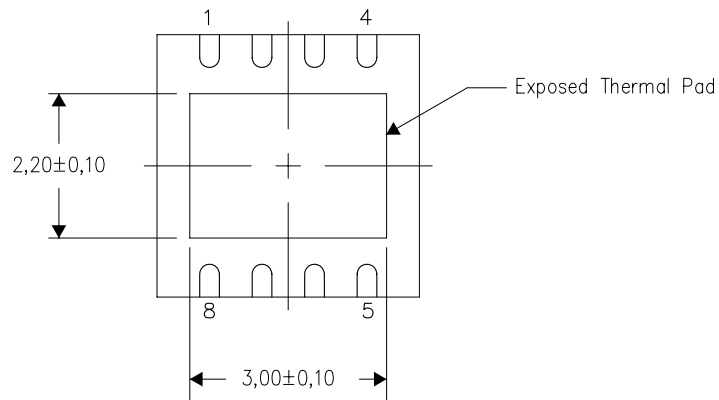
- NOTES:
- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
  - B. This drawing is subject to change without notice.
  - C. SON (Small Outline No-Lead) package configuration.
  - The package thermal pad must be soldered to the board for thermal and mechanical performance. See the Product Data Sheet for details regarding the exposed thermal pad dimensions.
  - E. Package complies to JEDEC MO-229 variation WGGB.

### THERMAL INFORMATION

This package incorporates an exposed thermal pad that is designed to be attached directly to an external heatsink. The thermal pad must be soldered directly to the printed circuit board (PCB). After soldering, the PCB can be used as a heatsink. In addition, through the use of thermal vias, the thermal pad can be attached directly to the appropriate copper plane shown in the electrical schematic for the device, or alternatively, can be attached to a special heatsink structure designed into the PCB. This design optimizes the heat transfer from the integrated circuit (IC).

For information on the Quad Flatpack No-Lead (QFN) package and its advantages, refer to Application Report, QFN/SON PCB Attachment, Texas Instruments Literature No. SLUA271. This document is available at [www.ti.com](http://www.ti.com).

The exposed thermal pad dimensions for this package are shown in the following illustration.



Bottom View

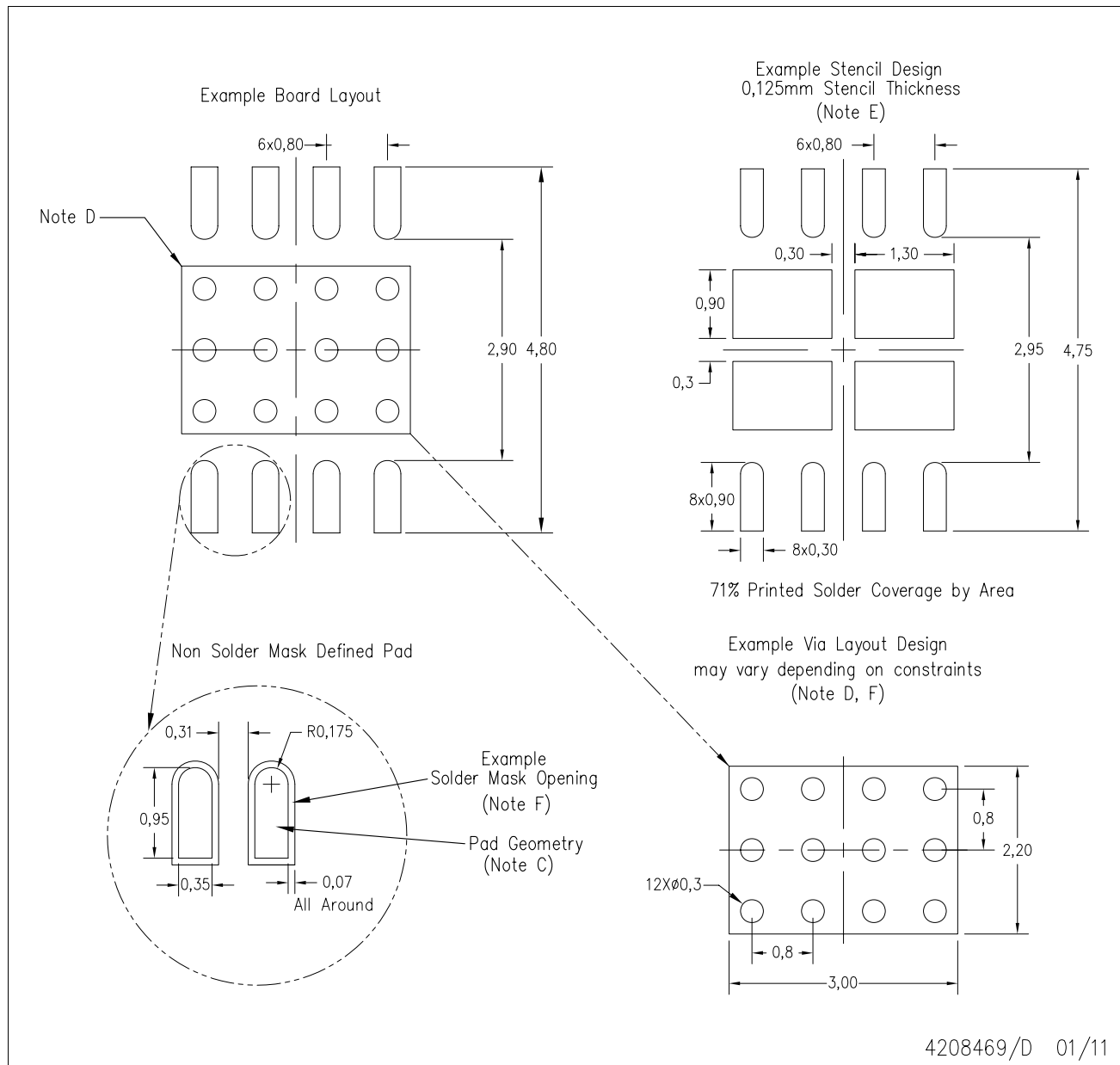
Exposed Thermal Pad Dimensions

4206882/F 01/11

NOTE: All linear dimensions are in millimeters

DRJ (S-PWSON-N8)

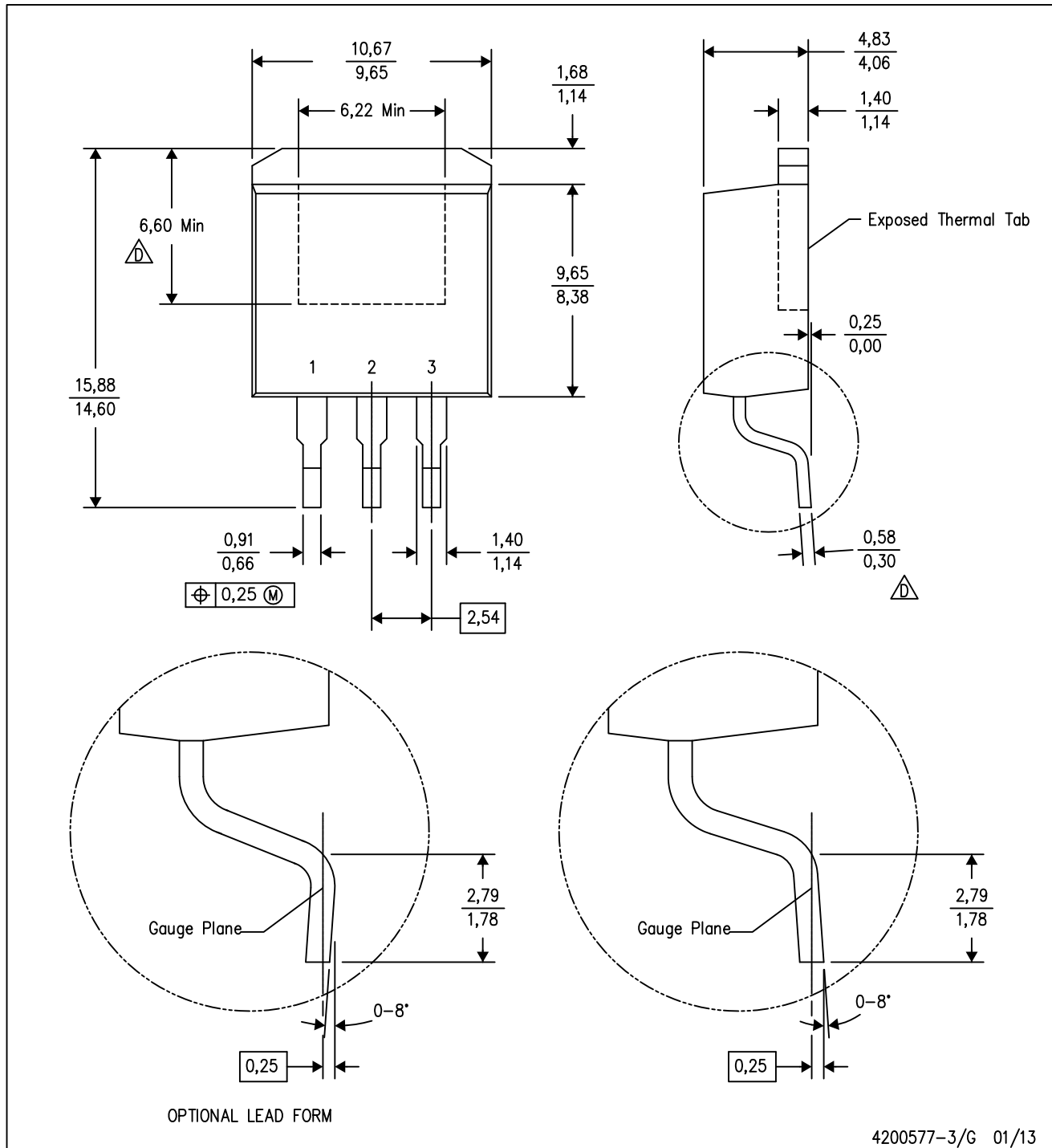
SMALL PACKAGE OUTLINE NO-LEAD



- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Publication IPC-7351 is recommended for alternate designs.
  - D. This package is designed to be soldered to a thermal pad on the board. Refer to Application Note, Quad Flat-Pack Packages, Texas Instruments Literature No. SLUA271, and also the Product Data Sheets for specific thermal information, via requirements, and recommended board layout. These documents are available at [www.ti.com](http://www.ti.com) <<http://www.ti.com>>.
  - E. Laser cutting apertures with electropolish and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC 7525 for stencil design considerations.
  - F. Customers should contact their board fabrication site for solder mask tolerances and vias tenting recommendations for vias placed in the thermal pad.

KTT (R-PSFM-G3)

PLASTIC FLANGE-MOUNT PACKAGE

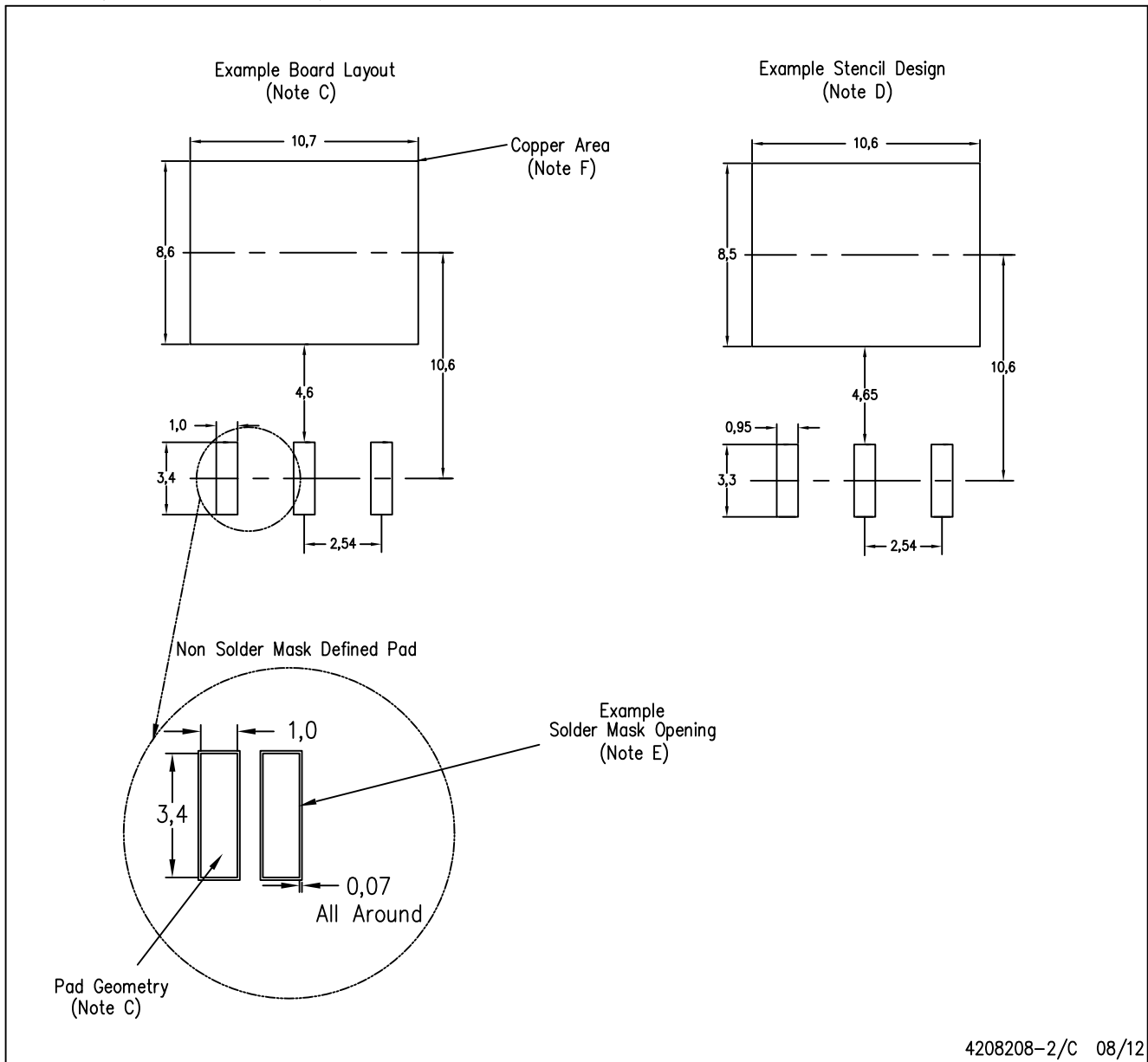


4200577-3/G 01/13

- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion. Mold flash or protrusion not to exceed 0.005 (0,13) per side.
- Falls within JEDEC TO-263 variation AA, except minimum lead thickness and minimum exposed pad length.

KTT (R-PSFM-G3)

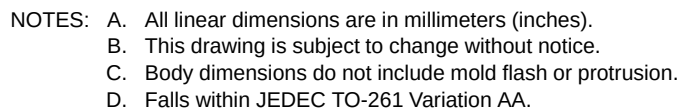
PLASTIC FLANGE-MOUNT PACKAGE



- NOTES:
- All linear dimensions are in millimeters.
  - This drawing is subject to change without notice.
  - Publication IPC-SM-782 is recommended for alternate designs.
  - Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525.
  - Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.
  - This package is designed to be soldered to a thermal pad on the board. Refer to the Product Datasheet for specific thermal information, via requirements, and recommended thermal pad size. For thermal pad sizes larger than shown a solder mask defined pad is recommended in order to maintain the solderable pad geometry while increasing copper area.

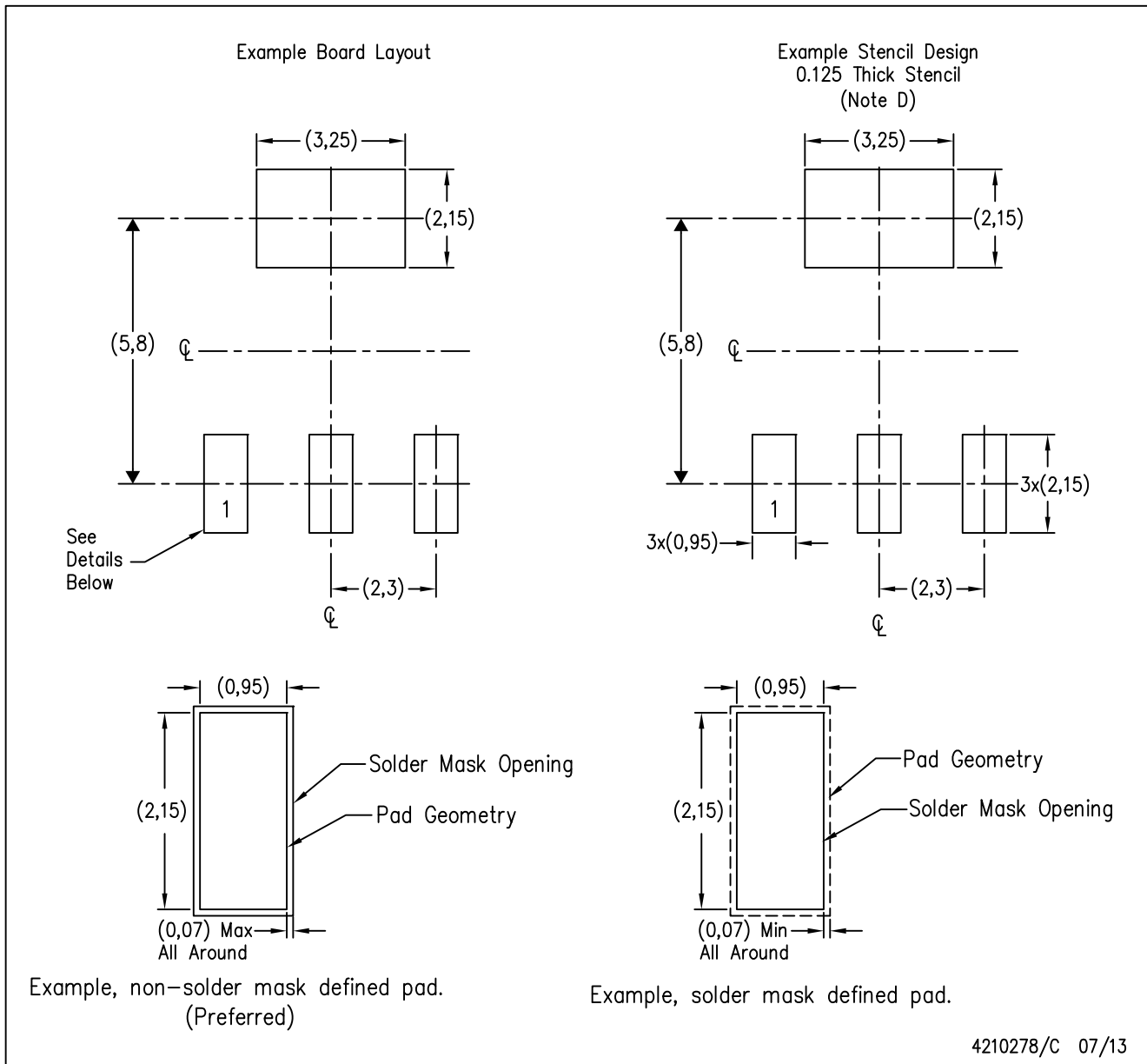


## PLASTIC SMALL-OUTLINE

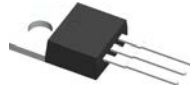


DCY (R-PDSO-G4)

PLASTIC SMALL OUTLINE



- NOTES:
- All linear dimensions are in millimeters.
  - This drawing is subject to change without notice.
  - Publication IPC-7351 is recommended for alternate designs.
  - Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil recommendations. Refer to IPC 7525 for stencil design considerations.

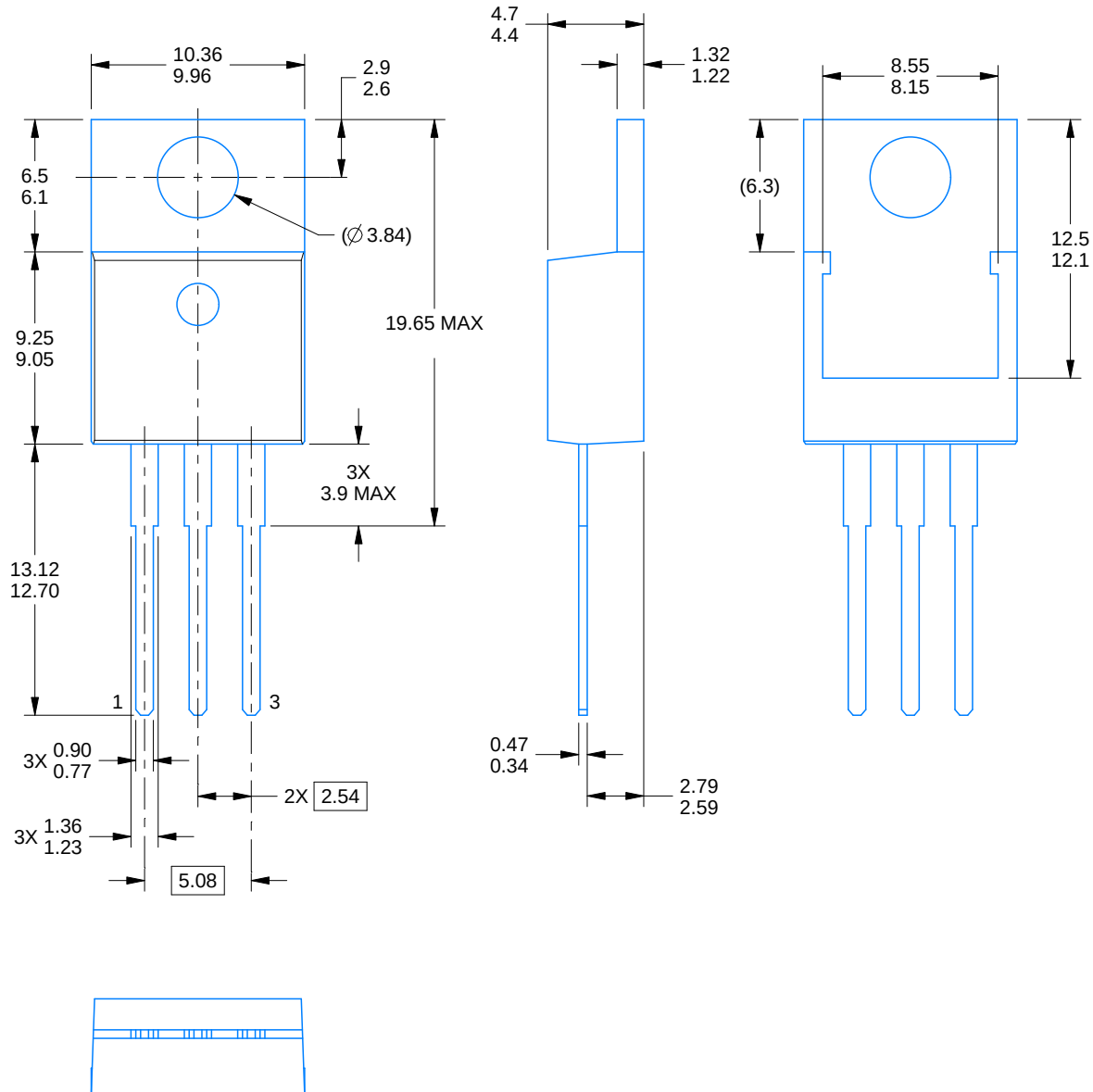


## PACKAGE OUTLINE

KCS0003B

TO-220 - 19.65 mm max height

TO-220



4222214/B 08/2018

### NOTES:

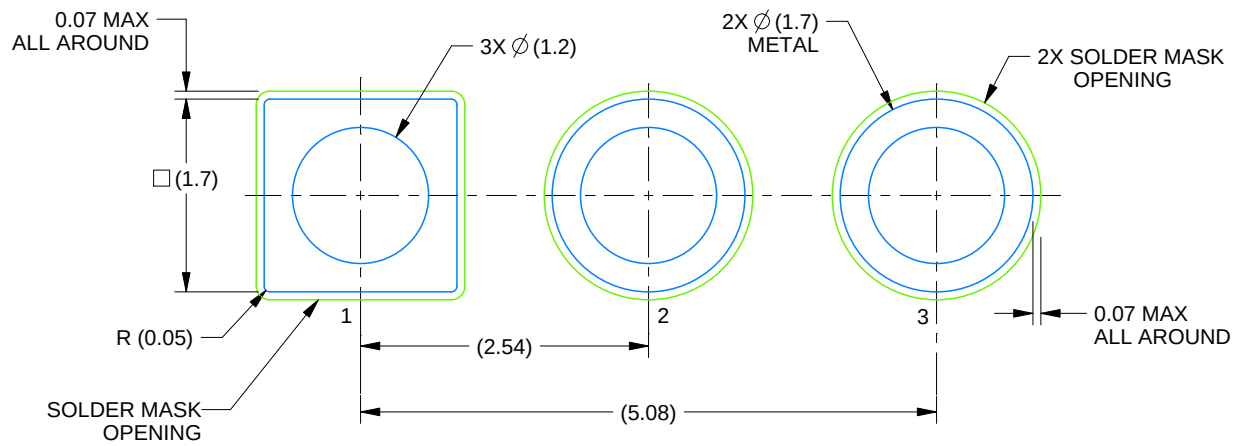
1. Dimensions are in millimeters. Any dimension in brackets or parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Reference JEDEC registration TO-220.

# EXAMPLE BOARD LAYOUT

KCS0003B

TO-220 - 19.65 mm max height

TO-220



LAND PATTERN EXAMPLE  
NON-SOLDER MASK DEFINED  
SCALE:15X

4222214/B 08/2018

## 重要通知和免责声明

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