

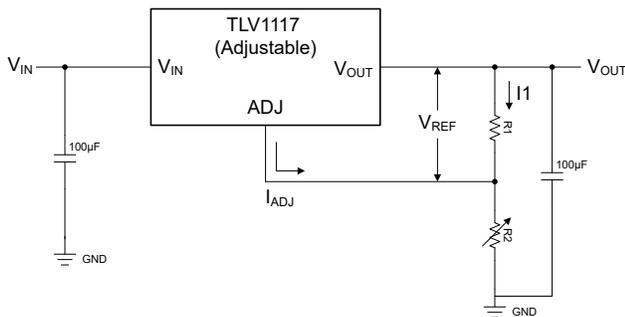
TLV1117 15V、800mA、可调和固定输出线性稳压器

1 特性

- 输入电压范围 V_{IN} : 2.7V 至 15V
- 输出电压选项 :
 - 固定 : 1.5V 至 5V
 - 可调节 : 1.25V 至 13.8V
- 输出电流 : 800mA
- 输出精度 (新芯片) :
 - 固定 : $T_J = 25^\circ\text{C}$ 时为 $\pm 1.0\%$
 - 可调节 : $T_J = 25^\circ\text{C}$ 时为 $\pm 1.0\%$
- 静态电流 (I_Q) :
 - 固定 : 60 μA (典型值, 关断时约 1.5 μA) (新芯片)
 - 可调节 : 5mA (典型值)
- 封装 :
 - 新芯片 :
 - 4 引脚 SOT-223 (DCY), $R_{\theta JA} = 95.4^\circ\text{C/W}$
 - 3 引脚 TO-252 (KVU), $R_{\theta JA} = 67.2^\circ\text{C/W}$
 - 旧芯片 :
 - 3 引脚 TO-263 (KTT), $R_{\theta JA} = 27.5^\circ\text{C/W}$
 - 3 引脚 TO-220 (KCT、KCS), $R_{\theta JA} = 30.1^\circ\text{C/W}$
 - 8 引脚 WSON (DRJ), $R_{\theta JA} = 38.3^\circ\text{C/W}$

2 应用

- 电器
- 家庭影院和娱乐系统
- 电机驱动器
- HVAC 和楼宇安全系统
- 智能电表



可调节稳压器的简化应用原理图

3 说明

TLV1117 是一款线性稳压器, 可提供高达 800mA 的输出电流, 支持的输入电压范围为 2.7V 至 15V。TLV1117 的固定版本支持 1.5V 至 5V 的输出范围, 可调节版本支持 1.25V 至 13.8V 的输出范围。该范围旨在适用于各种应用。

对于可调节版本, 请使用最小 1.7mA (典型值) 的负载电流以确保稳定运行。为了改善瞬态响应和稳定性, 请在输出端放置一个容值至少为 10 μF 的钽电容器。

对于固定版本 (新芯片), 稳压器输出端没有最小负载电流要求。TLV1117 的固定版本 (新芯片) 具有内部软启动功能, 可在启动期间降低浪涌电流。此功能通过尽可能减小输入电容, 有助于节省设计空间和成本。固定版本 (新芯片) 还具有折返电流限制, 可在高负载电流故障或短路事件期间限制器件功率耗散。

封装信息

器件型号	封装 ^{(1) (2)}	封装尺寸 ⁽³⁾
TLV1117	新芯片	
	DCY (SOT-223, 4)	6.5mm × 7mm
	KVU (TO-252, 3)	6.6mm × 10.11mm
	NDP (TO-252, 3)	6.58mm × 9.92mm
	旧芯片	
	DRJ (WSON, 8)	4mm × 4mm
	KCS (TO-220, 3)	10.16mm × 28.65mm
	KCT (TO-220, 3)	10.16mm × 28.65mm
KTT (DDPAK/TO-263, 3)	10.18mm × 15.24mm	

(1) 如需更多信息, 请参阅 [机械、封装和可订购信息](#)。

(2) 有关旧芯片和新芯片的详细信息, 请参阅 [器件命名规则](#) 部分。

(3) 封装尺寸 (长 × 宽) 为标称值, 并包括引脚 (如适用)。



内容

1 特性	1	6.4 器件功能模式.....	21
2 应用	1	7 应用和实施	23
3 说明	1	7.1 应用信息.....	23
4 引脚配置和功能	3	7.2 典型应用 (可调节输出)	25
5 规格	4	7.3 电源相关建议.....	28
5.1 绝对最大额定值.....	4	7.4 布局.....	28
5.2 ESD 等级.....	4	8 器件和文档支持	29
5.3 建议运行条件.....	5	8.1 器件支持.....	29
5.4 热性能信息 (旧芯片)	6	8.2 接收文档更新通知.....	29
5.5 热性能信息 (新芯片)	6	8.3 支持资源.....	29
5.6 电气特性.....	7	8.4 商标.....	29
5.7 典型特性.....	10	8.5 静电放电警告.....	29
6 详细说明	17	8.6 术语表.....	29
6.1 概述.....	17	9 修订历史记录	29
6.2 功能方框图.....	17	10 机械、封装和可订购信息	30
6.3 特性说明.....	18		

4 引脚配置和功能

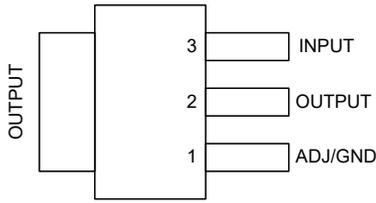


图 4-1. DCY 封装, 4 引脚 SOT (俯视图)

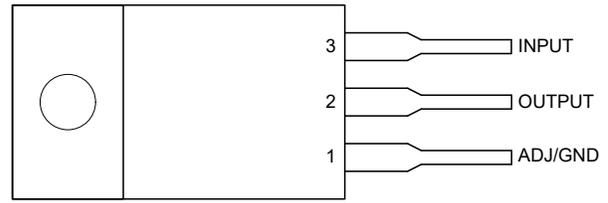


图 4-2. KCT 和 KCS 封装, 3 引脚 TO-220 (俯视图)

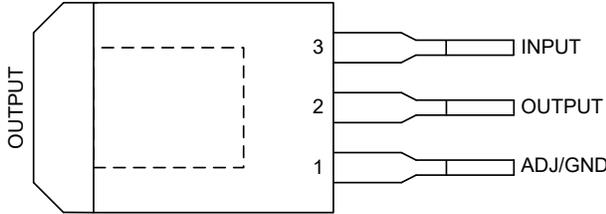


图 4-3. KTT 封装, 3 引脚 TO-263 (顶视图)

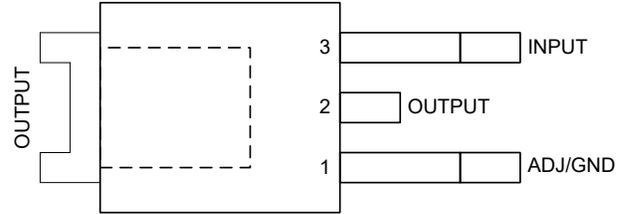


图 4-4. KVV 封装, 3 引脚 TO-252 (顶视图)

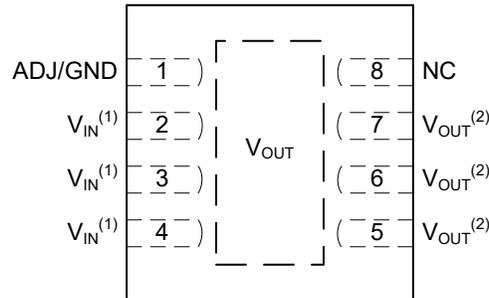


图 4-5. DRJ 封装, 8 引脚 WSON (俯视图)

表 4-1. 引脚功能

名称	引脚					类型	说明
	KTT	KVV	DCY	DRJ	KCT		
ADJ/GND	1	1	1	1	1	I/O	可调节输出版本的调节引脚。固定输出版本的接地引脚。
输入 (V_{IN})	3	3	3	2、3、4	3	I	稳压器的输入电压引脚。对于 DRJ 封装, 将 V_{IN} 和 V_{OUT} 引脚连接在一起。
输出 (V_{OUT})	2	2	2	5、6、7	2	O	稳压器的输出电压引脚。对于 DRJ 封装, 将 V_{IN} 和 V_{OUT} 引脚连接在一起。
NC	—	—	—	8	—	—	无连接。

5 规格

5.1 绝对最大额定值

在自然通风条件下的工作温度范围内测得 (除非另有说明) ⁽¹⁾

		最小值	最大值	单位
V_{IN} ⁽²⁾	连续输入电压	-0.3	16	V
V_{OUT} ⁽³⁾	输出电压 (新芯片, 仅限固定版本)	-0.3	$V_{IN} + 0.3$	V
电源	功率耗散	受限封装 ⁽⁴⁾		W
温度	工作结温 (T_j)	-50	150	°C
	贮存温度 (T_{stg})	-65	150	

- (1) 超出绝对最大额定值运行可能会对器件造成损坏。绝对最大额定值并不表示器件能够在该条件下或在任何超出建议运行条件的其他条件下正常运行。如果在建议运行条件以外,但在绝对最大额定值范围以内使用,器件可能无法完全正常运行,这可能会影响器件的可靠性、功能与性能,并且可能缩短器件寿命。
- (2) 所有电压均以 GND 为基准。
- (3) $V_{IN} + 0.3V$ 或 16V (以较低者为准)。
- (4) 有关更多详细信息,请参阅热性能信息表。

5.2 ESD 等级

		值 (旧芯片)	值 (新芯片, 固定输出)	值 (新芯片, 可调节输出)	单位	
$V_{(ESD)}$	静电放电	人体放电模型 (HBM), 符合 ANSI/ESDA/JEDEC JS-001 标准, 所有引脚 ⁽¹⁾	±2500	±3000	±2000	V
		充电器件模型 (CDM), 符合 JEDEC 规范 JESD22-C101, 所有引脚 ⁽²⁾	±1500	±1000	不适用	

- (1) JEDEC 文档 JEP155 指出: 500V HBM 时能够在标准 ESD 控制流程下安全生产。
- (2) JEDEC 文档 JEP157 指出: 250V CDM 时能够在标准 ESD 控制流程下安全生产。

5.3 建议运行条件

在自然通风条件下的工作温度范围内测得 (除非另有说明)

		最小值	标称值	最大值	单位
V _{IN}	输入电压	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 _{OUT}	输出电流			0.8	A
C _{OUT} ESR ⁽¹⁾	输出电容器 ESR (新芯片, 固定输出)	2		500	mΩ
T _J ⁽²⁾	结温	TLV1117C	0	125	°C
		TLV1117I	-40	125	

- (1) 支持的最大 ESR 范围为 0.5 Ω (新芯片, 固定输出)。对于 ESR 值较高的输出电容器, 可使用一个低 ESR MLCC 电容器。
- (2) 最大功耗是与 T_{J(max)}、R_{θJA} 和 T_A 相关的函数。任何环境温度下允许的最大功耗为 P_D = (T_{J(max)} - T_A)/R_{θJA}。所有数字均适用于直接焊接到 PCB 的封装。

5.4 热性能信息 (旧芯片)

热指标 ⁽¹⁾		旧芯片 ⁽²⁾							单位
		KTE (PowerFlex)	KTP (PowerFlex)	DRJ	DCY	KVU	KCS、KCT	KTT	
		3 引脚	3 引脚	8 引脚	4 引脚	3 引脚	3 引脚	3 引脚	
$R_{\theta JA}$	结至环境热阻	38.6	49.2	38.3	104.3	50.9	30.1	27.5	°C/W
$R_{\theta JC(top)}$	结至外壳 (顶部) 热阻	34.7	60.6	36.5	53.7	57.9	44.6	43.2	°C/W
$R_{\theta JB}$	结至电路板热阻	3.2	3.1	60.5	5.7	34.8	1.2	17.3	°C/W
Ψ_{JT}	结至顶部特征参数	5.9	8.7	0.2	3.1	6	5	2.8	°C/W
Ψ_{JB}	结至电路板特征参数	3.1	3	12	5.5	23.7	1.2	9.3	°C/W
$R_{\theta JC(bot)}$	结至外壳 (底部) 热阻	3	3	4.7	不适用	0.4	0.4	0.3	°C/W
$R_{\theta JP}$	裸片结温与外露焊盘底部之间的热阻。	2.7	1.4	1.78	不适用	不适用	3	1.94	°C/W

- (1) 有关新旧热指标的更多信息, 请参阅[半导体和 IC 封装热指标](#)应用手册。
(2) 如需根据 PCB 覆铜区对该器件进行热量估算, 请参阅[TI PCB 热量计算器](#)。

5.5 热性能信息 (新芯片)

热指标 ⁽¹⁾		固定输出		可调输出		单位
		DCY (SOT - 223)	KVU (TO-252)	DCY (SOT - 223)	KVU (TO - 252)	
		4 引脚	4 引脚	4 引脚	4 引脚	
$R_{\theta JA}$	结至环境热阻	95.4	67.2	61.6	45.1	°C/W
$R_{\theta JC(top)}$	结至外壳 (顶部) 热阻	55.6	71.8	42.5	52.1	°C/W
$R_{\theta JB}$	结至电路板热阻	33.7	45.5	10.4	29.8	°C/W
Ψ_{JT}	结至顶部特征参数	13.9	31.6	2.9	4.5	°C/W
Ψ_{JB}	结至电路板特征参数	33.4	45.4	10.3	29.4	°C/W
$R_{\theta JC(bot)}$	结至外壳 (底部) 热阻	不适用	40.5	不适用	1.3	°C/W

- (1) 有关新旧热指标的更多信息, 请参阅[半导体和 IC 封装热指标](#)应用手册。

5.6 电气特性

$T_J = -40^{\circ}\text{C}$ 至 125°C (I 版本) , $T_J = 0^{\circ}\text{C}$ 至 125°C (C 版本) , 所有典型值均在 $T_J = 25^{\circ}\text{C}$ 条件下测得 (除非另有说明)

参数 ⁽¹⁾		测试条件 ⁽¹⁰⁾		最小值 ⁽⁴⁾	典型值 ⁽⁵⁾	最大值 ⁽⁴⁾	单位
V_{REF}	基准电压	$V_{IN} - V_{OUT} = 2\text{V}$, $I_{OUT} = 10\text{mA}$, $T_J = 25^{\circ}\text{C}$	TLV1117C/I	1.238	1.25	1.262	V
		$V_{IN} - V_{OUT} = 1.4\text{V}$ 至 10V , $I_{OUT} = 10\text{mA}$ 至 800mA	TLV1117C	1.225	1.25	1.27	
			TLV1117I	1.2	1.25	1.29	
V_{OUT}	输出电压	$V_{IN} = 3.5\text{V}$, $I_{OUT} = 10\text{mA}$, $T_J = 25^{\circ}\text{C}$	TLV1117C/I-15	1.485	1.5	1.515	V
		$V_{IN} = 2.9\text{V}$ 至 10V , $I_{OUT} = 0\text{mA}$ 至 800mA	TLV1117C-15	1.455	1.5	1.545	
			TLV1117I-15	1.44	1.5	1.56	
		$V_{IN} = 3.8\text{V}$, $I_{OUT} = 10\text{mA}$, $T_J = 25^{\circ}\text{C}$	TLV1117C/I-18	1.782	1.8	1.818	
		$V_{IN} = 3.2\text{V}$ 至 10V , $I_{OUT} = 0\text{mA}$ 至 800mA	TLV1117C-18	1.746	1.8	1.854	
			TLV1117I-18	1.728	1.8	1.872	
		$V_{IN} = 4.5\text{V}$, $I_{OUT} = 10\text{mA}$, $T_J = 25^{\circ}\text{C}$	TLV1117C/I-25	2.475	2.5	2.525	
		$V_{IN} = 3.9\text{V}$ 至 10V , $I_{OUT} = 0\text{mA}$ 至 800mA	TLV1117C-25	2.450	2.5	2.550	
			TLV1117I-25	2.4	2.5	2.6	
		$V_{IN} = 5\text{V}$, $I_{OUT} = 10\text{mA}$, $T_J = 25^{\circ}\text{C}$	TLV1117C/I-33	3.267	3.3	3.333	
		$V_{IN} = 4.75\text{V}$ 至 10V , $I_{OUT} = 0\text{mA}$ 至 800mA	TLV1117C-33	3.235	3.3	3.365	
			TLV1117I-33	3.168	3.3	3.432	
$V_{IN} = 7\text{V}$, $I_{OUT} = 10\text{mA}$, $T_J = 25^{\circ}\text{C}$	TLV1117C/I-50	4.950	5.0	5.050			
$V_{IN} = 6.5\text{V}$ 至 12V , $I_{OUT} = 0\text{mA}$ 至 800mA	TLV1117C-50	4.900	5.0	5.1			
	TLV1117I-50	4.80	5.0	5.20			
$\Delta V_{OUT(\Delta V_{IN})}$	线路调整	$I_{OUT} = 10\text{mA}$, $V_{IN} - V_{OUT} = 1.5\text{V}$ 至 13.75V	TLV1117C	0.035	0.2	%	
			TLV1117I	0.035	0.3		
		$I_{OUT} = 0\text{mA}$, $V_{IN} = 2.9\text{V}$ 至 10V	TLV1117C-15	1	6	mV	
			TLV1117I-15	1	10		
		$I_{OUT} = 0\text{mA}$, $V_{IN} = 3.2\text{V}$ 至 10V	TLV1117C-18	1	6	mV	
			TLV1117I-18	1	10		
		$I_{OUT} = 0\text{mA}$, $V_{IN} = 3.9\text{V}$ 至 10V	TLV1117C-25	1	6		
			TLV1117I-25	1	10		
		$I_{OUT} = 0\text{mA}$, $V_{IN} = 4.75\text{V}$ 至 15V	TLV1117C-33	1	6		
			TLV1117I-33	1	10		
		$I_{OUT} = 0\text{mA}$, $V_{IN} = 6.5\text{V}$ 至 15V	TLV1117C-50	1	10		
			TLV1117I-50	1	15		
$\Delta V_{OUT(\Delta I_{OUT})}$	负载调整率 ⁽⁶⁾	$I_{OUT} = 0\text{mA}$ 至 800mA , $V_{IN} = 2.9\text{V}$	TLV1117C-15	1	10	mV	
			TLV1117I-15	1	15		
		$I_{OUT} = 0\text{mA}$ 至 800mA , $V_{IN} = 3.2\text{V}$	TLV1117C-18	1	10		
			TLV1117I-18	1	15		
		$I_{OUT} = 0\text{mA}$ 至 800mA , $V_{IN} = 3.9\text{V}$	TLV1117C-25	1	10		
			TLV1117I-25	1	15		
		$I_{OUT} = 0\text{mA}$ 至 800mA , $V_{IN} = 4.75\text{V}$	TLV1117C-33	1	10		
			TLV1117I-33	1	15		
		$I_{OUT} = 0\text{mA}$ 至 800mA , $V_{IN} = 6.5\text{V}$	TLV1117C-50	1	15		
			TLV1117I-50	1	20		
		$V_{IN} - V_{OUT} = 3\text{V}$, $10\text{mA} \leq I_{OUT} \leq 800\text{mA}$, $T_J = 25^{\circ}\text{C}$	TLV1117C/I	0.2	%		
			TLV1117C	0.4			
TLV1117I	0.5						
负载调整 (新芯片, 固定输出)	$0\text{mA} \leq I_{OUT} \leq 800\text{mA}$	TLV1117C/I	0.5	%/A			

5.6 电气特性 (续)

$T_J = -40^{\circ}\text{C}$ 至 125°C (I 版本), $T_J = 0^{\circ}\text{C}$ 至 125°C (C 版本), 所有典型值均在 $T_J = 25^{\circ}\text{C}$ 条件下测得 (除非另有说明)

参数 ⁽¹⁾		测试条件 ⁽¹⁰⁾	最小值 ⁽⁴⁾	典型值 ⁽⁵⁾	最大值 ⁽⁴⁾	单位
V_{DO}	压降电压 ⁽²⁾	$I_{OUT} = 100\text{mA}$	TLV1117C	1.1	1.2	V
			TLV1117I	1.1	1.3	
		$I_{OUT} = 500\text{mA}$	TLV1117C	1.15	1.25	
			TLV1117I	1.15	1.35	
	$I_{OUT} = 800\text{mA}$	TLV1117C	1.2	1.3		
		TLV1117I	1.2	1.4		
压降电压 (新芯片, 固定输出) ⁽⁸⁾	$I_{OUT} = 100\text{mA}$	TLV1117C/I	0.2	0.4	A	
	$I_{OUT} = 500\text{mA}$	TLV1117C/I	0.5	0.8		
	$I_{OUT} = 800\text{mA}$	TLV1117C/I	0.8	1.2		
I_{CL}	输出电流限制 ⁽³⁾	$V_{IN} - V_{OUT} = 5\text{V}$, $T_J = 25^{\circ}\text{C}$	0.8	1.2	1.6	A
	输出电流限制 (新芯片, 固定输出)	$V_{OUT} = 0.9 \times V_{OUT(NOM)}$, $V_{IN} = V_{OUT(nom)} + 1.5\text{V}$ 或 $V_{IN} = 4.3\text{V}$ (以较大者为准)	1.1		1.6	
I_{SC}	短路电流限制 (新芯片, 固定输出)	$V_{OUT} = 0\text{V}$	150	250	350	mA
$I_{MIN(LOAD)}$ ⁽⁷⁾	最小负载电流	$V_{IN} = 15\text{V}$		1.7	5	mA
I_Q	静态电流 (可调节输出)	$V_{IN} \leq 15\text{V}$		5	10	mA
	静态电流 (旧芯片, 固定输出)	$V_{IN} \leq 15\text{V}$	TLV1117C	5	10	
	静态电流 (旧芯片, 固定输出)		TLV1117I	5	15	
	静态电流 (新芯片, 固定输出)	$I_{OUT} = 0\text{mA}$, $V_{IN} = 15\text{V}$	TLV1117C/I	65	110	μA
	热调节	$T_A = 25^{\circ}\text{C}$, 30ms 脉冲		0.01	0.1	%/W
PSRR	纹波抑制	$f_{RIPPLE} = 120\text{Hz}$, $V_{IN} - V_{OUT} = 3\text{V}$, $V_{RIPPLE} = 1\text{V}_{PP}$	60	75		dB
	纹波抑制 (新芯片, 固定输出)	$f_{RIPPLE} = 120\text{Hz}$, $V_{IN} - V_{OUT} = 3\text{V}$, $V_{RIPPLE} = 1\text{V}_{PP}$		70		dB
I_{ADJ}	ADJ 引脚电流 (旧芯片)			80	120	μA
	ADJ 引脚电流 (新芯片)			60	120	
ΔI_{ADJ}	调节引脚电流变化	$V_{IN} - V_{OUT} = 1.4\text{V}$ 至 10V , $I_{OUT} = 10\text{mA}$ 至 800mA	TLV1117C	0.2	5	μA
		$V_{IN} - V_{OUT} = 1.4\text{V}$ 至 10V , $I_{OUT} = 10\text{mA}$ 至 800mA	TLV1117I	0.2	10	
	温度稳定性	$T_J =$ 全范围		0.5		%
	长期稳定性	1000 小时, 空载, $T_A = 125^{\circ}\text{C}$		0.3		%
V_n	RMS 输出噪声 (旧芯片)	V_{OUT} 的百分比, $f = 10\text{Hz}$ 至 100kHz		0.003		%
	RMS 输出噪声 (新芯片, 可调节输出)	V_{OUT} 的百分比, $f = 10\text{Hz}$ 至 10kHz		0.003		
	RMS 输出噪声 (新芯片, 固定输出)	$BW = 10\text{Hz}$ 至 100kHz , $V_{IN} = 3.3\text{V}$, $V_{OUT} = 0.8\text{V}$, $I_{OUT} = 100\text{mA}$			60	μV_{RMS}
$I_{PULLDOWN}$	输出下拉电流 (新芯片, 固定输出) ⁽⁹⁾	$V_{IN} = 1.8\text{V}$, $V_{OUT} = 2.5\text{V}$	0.7		1.1	mA
V_{UVLO+}	UVLO 阈值上升 (新芯片, 固定输出)	V_{IN} 上升		2.2	2.4	V
V_{UVLO-}	UVLO 阈值下降 (新芯片, 固定输出)	V_{IN} 下降	1.9			V
$V_{UVLO(HYS)}$	UVLO 迟滞 (新芯片, 固定输出)			130		mV
$T_{SD(shutdown)}$	热关断温度 (新芯片, 固定输出)	温度升高		180		$^{\circ}\text{C}$
$T_{SD(reset)}$	热关断复位温度 (新芯片, 固定输出)	温度下降		160		$^{\circ}\text{C}$

- 仅对于旧芯片: 在输入端使用 $10\ \mu\text{F}$ 电容器并在输出端使用 $10\ \mu\text{F}$ 电容器测量所有特性。使用脉冲测试技术来保持结温尽可能接近环境温度。
- 压降定义为当 V_{OUT} 下降至比 V_{OUT} 的值低 100mV 时 V_{IN} 至 V_{OUT} 的差分电压, 在 $V_{IN} = V_{OUT(nom)} + 1.5\text{V}$ 时测得。
- 建议运行条件下指定的电流限制测试。
- 仅对于新芯片, 可调节输出: 所有限值均根据测试或统计分析指定。
- 仅对于新芯片, 可调节输出: 典型值表示最可能的参数标准。
- 仅对于新芯片, 可调节输出: 负载调整率和线性调整率是在室内恒定结温下测得的。
- 维持稳压所需的最小输出电流。
- 对于固定输出器件, V_{DO} 是在 $V_{IN} = 95\% \times V_{OUT(nom)}$ 下测得的。当 $V_{OUT} < 2.5\text{V}$ 时, 对于固定输出器件, 不会测量 V_{DO} 。
- $I_{PULLDOWN}$ 是在 $V_{IN} = 1.8\text{V}$ (低于 UVLO 下降阈值且 LDO 处于禁用状态) 以及从外部向 V_{OUT} 施加 2.5V 电压的情况下测得的。

(10) 如果器件名称 (TLV1117C/I) 列未捕获 V_{OUT} 电平，则该特定规范对可调和固定输出器件均有效。

5.7 典型特性

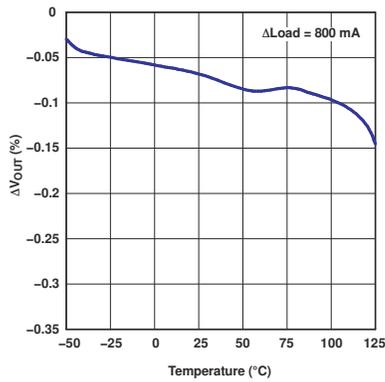


图 5-1. 负载调整 (旧芯片)

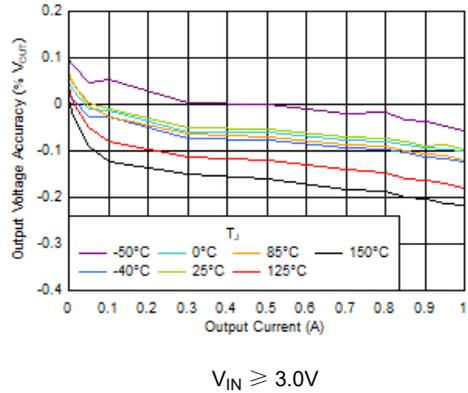


图 5-2. V_{OUT} 精度与 I_{OUT} 之间的关系 (固定输出, 新芯片)

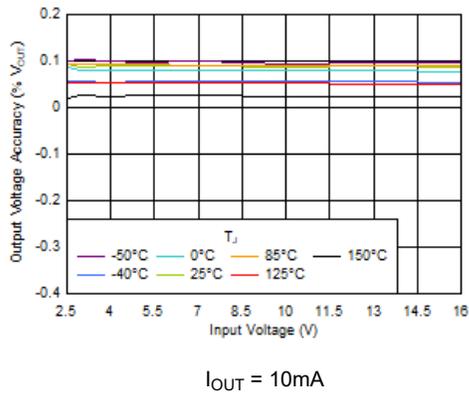


图 5-3. V_{OUT} 精度与 V_{IN} 之间的关系 (固定输出, 新芯片)

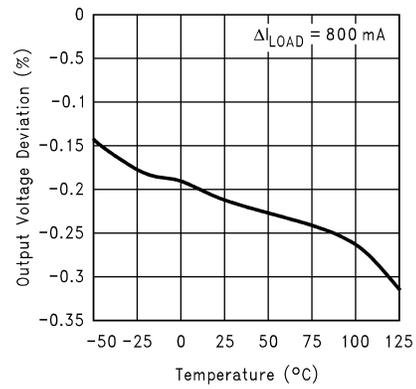


图 5-4. 负载调节 (可调节输出, 新芯片)

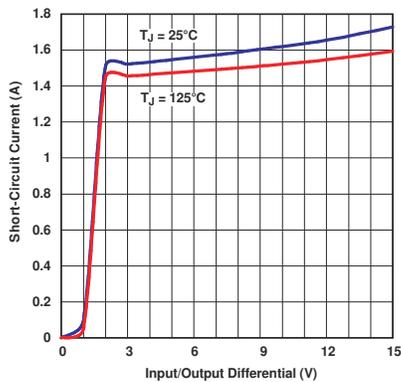


图 5-5. 短路电流与 $(V_{IN} - V_{OUT})$ 之间的关系 (旧芯片)

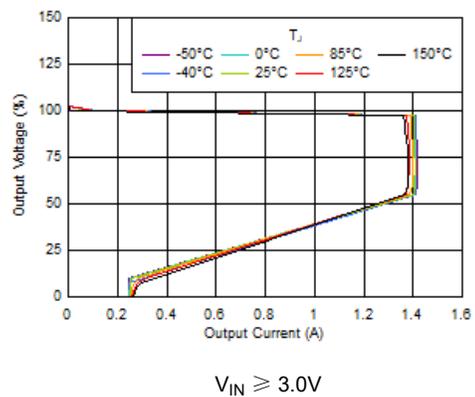


图 5-6. 折返电流限制与温度之间的关系 (固定输出, 新芯片)

5.7 典型特性 (续)

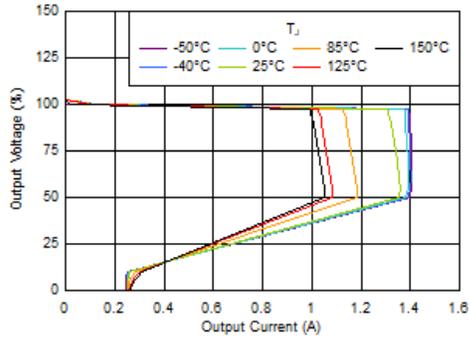


图 5-7. 折返电流限制与温度之间的关系 (固定输出, 新芯片)

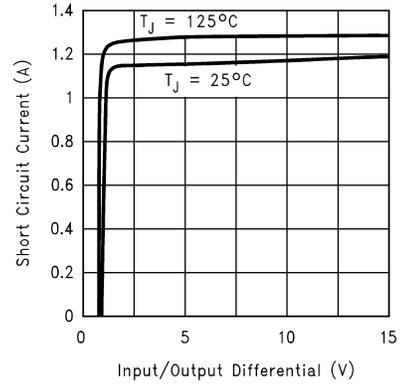


图 5-8. 短路电流 (可调节输出, 新芯片)

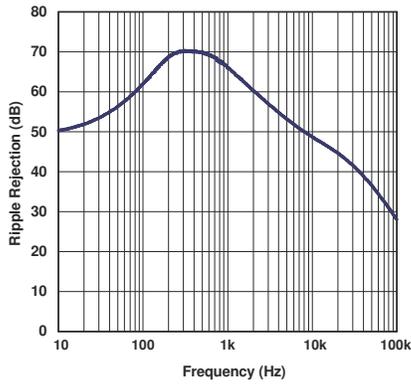


图 5-9. 纹波抑制与频率之间的关系 (可调节输出, 旧芯片)

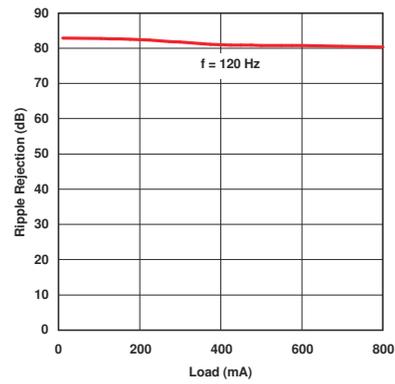
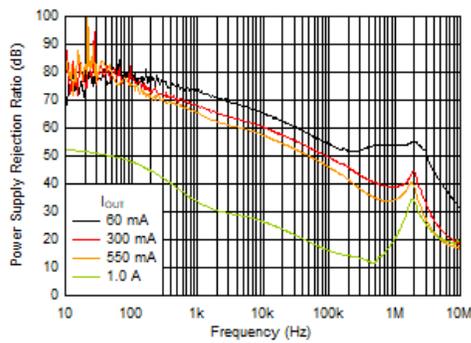
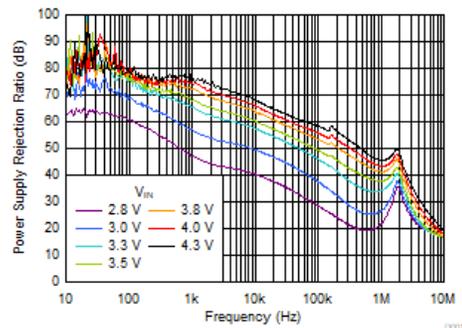


图 5-10. 纹波抑制与负载电流之间的关系 (可调节输出, 旧芯片)



$V_{OUT}=1.8V, V_{IN}=3.3V$

图 5-11. 纹波抑制与频率之间的关系 (固定输出, 新芯片)



$V_{OUT} = 1.8V, I_{OUT} = 0.55A$

图 5-12. 纹波抑制与频率之间的关系 (固定输出, 新芯片)

5.7 典型特性 (续)

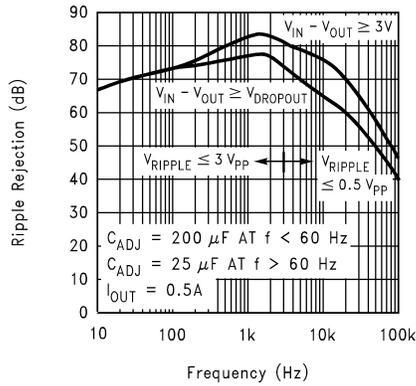


图 5-13. 纹波抑制与频率之间的关系 (可调节输出, 新芯片)

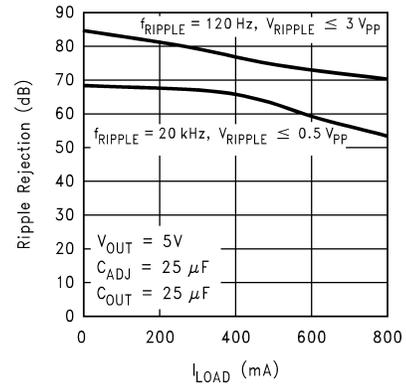


图 5-14. 纹波抑制与频率之间的关系 (可调节输出, 新芯片)

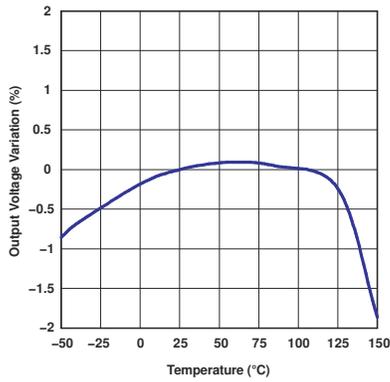


图 5-15. 温度稳定性 (旧芯片)

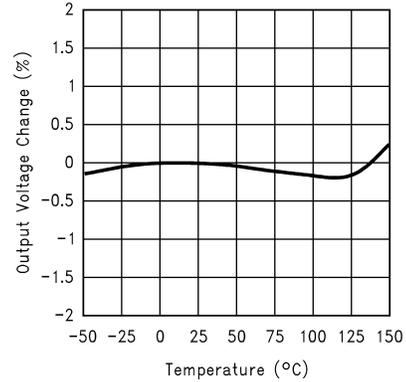


图 5-16. 温度稳定性 (可调节输出, 新芯片)

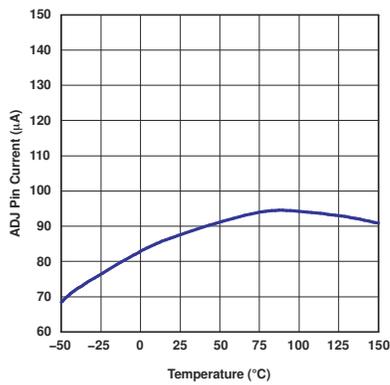


图 5-17. ADJ 引脚电流与温度之间的关系 (旧芯片)

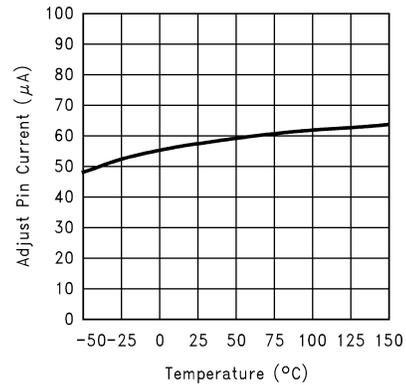


图 5-18. ADJ 引脚电流与温度之间的关系 (新芯片)

5.7 典型特性 (续)

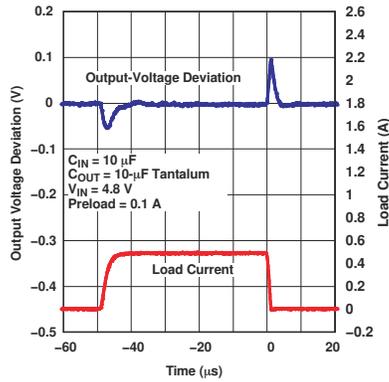
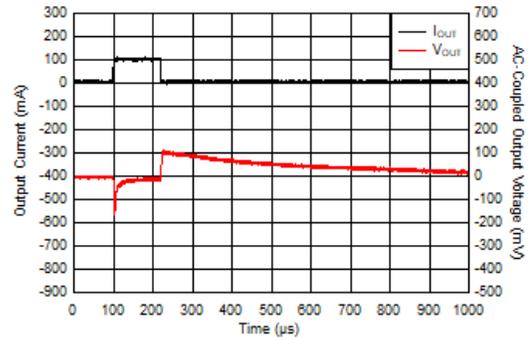
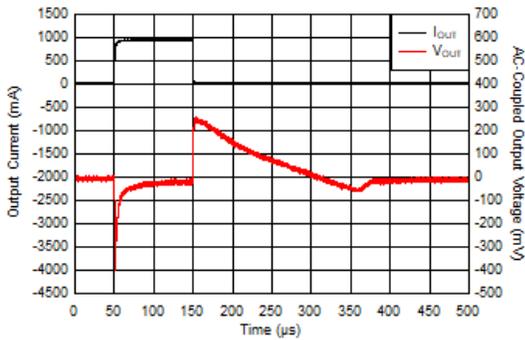


图 5-19. TLV1117-33 负载瞬态响应 (旧芯片)



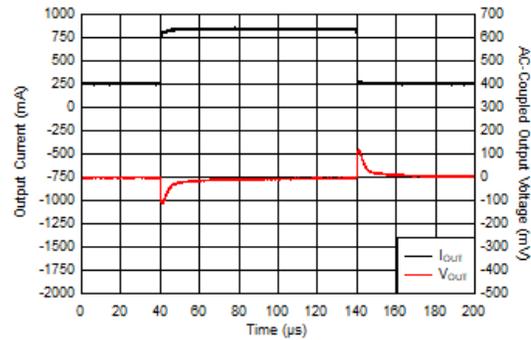
$V_{IN} = 5V$, $V_{OUT} = 3.3V$, 斜升速率 = $0.4A/\mu s$

图 5-20. I_{OUT} 瞬态响应: 0mA 到 100mA (固定输出, 新芯片)



$V_{IN} = 5V$, $V_{OUT} = 3.3V$, 斜升速率 = $0.5A/\mu s$

图 5-21. I_{OUT} 瞬态响应: 1mA 到 1A (固定输出, 新芯片)



$V_{IN} = 5V$, $V_{OUT} = 3.3V$, 斜升速率 = $0.8A/\mu s$

图 5-22. I_{OUT} 瞬态响应: 250mA 到 850mA (固定输出, 新芯片)

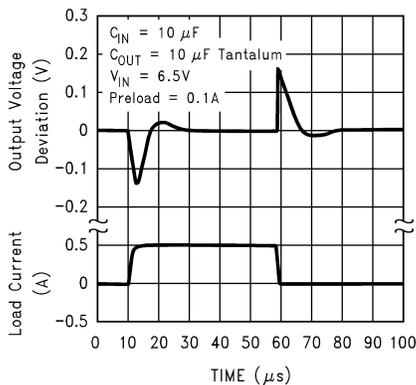


图 5-23. 负载瞬态响应 (可调节输出, 新芯片)

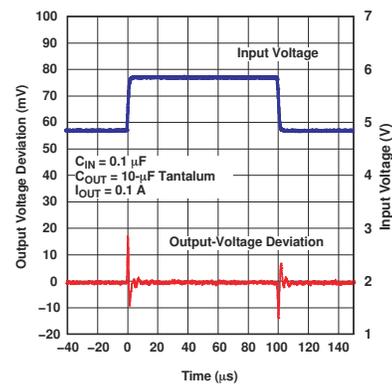
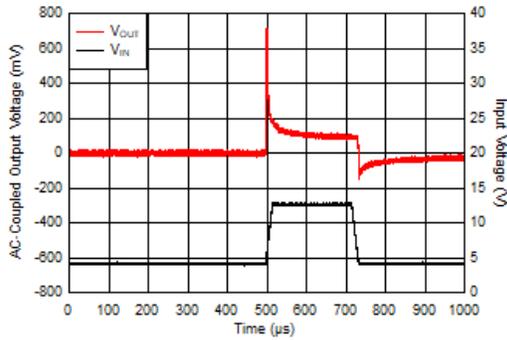


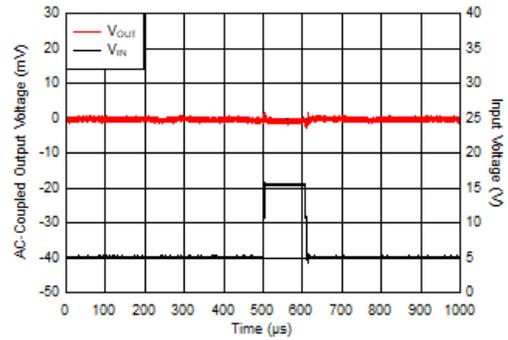
图 5-24. TLV1117-33 线路瞬态响应 (旧芯片)

5.7 典型特性 (续)



$V_{IN} = 5V$, $V_{OUT} = 3.3V$, $I_{OUT} = 1A$, V_{IN} 斜升速率 = $0.6V/\mu s$

图 5-25. V_{IN} 在压降状态下的瞬态响应: 4V 至 13V (固定输出, 新芯片)



$V_{OUT} = 3.3V$, $I_{OUT} = 33 \mu A$, V_{IN} 斜升速率 = $1.6V/\mu s$

图 5-26. V_{IN} 瞬态响应: 5V 至 16V (固定输出, 新芯片)

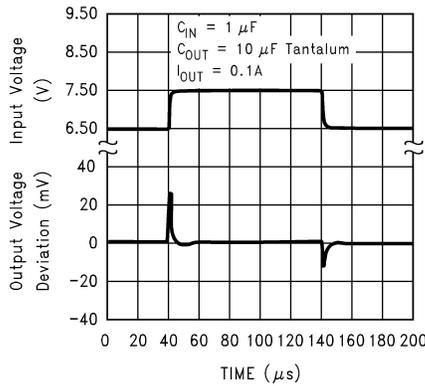


图 5-27. 线路瞬态响应 (可调节输出, 新芯片)

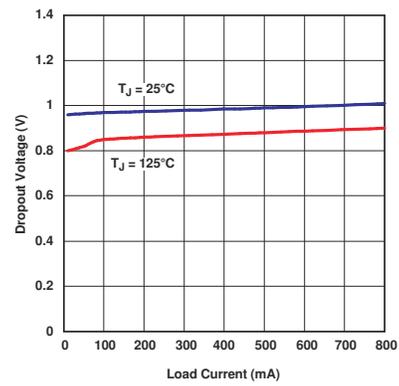


图 5-28. 压降电压与负载电流之间的关系 (旧芯片)

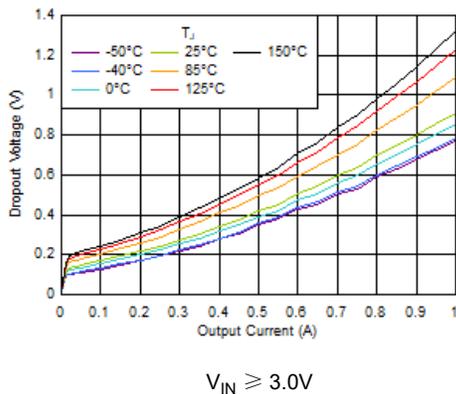


图 5-29. 压降电压与压降电流之间的关系 (固定输出, 新芯片)

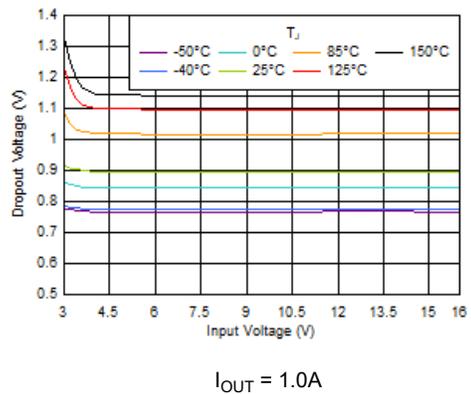


图 5-30. 压降电压与 V_{IN} 之间的关系 (固定输出, 新芯片)

5.7 典型特性 (续)

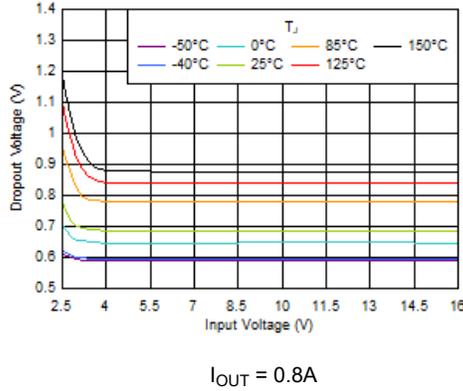


图 5-31. 压降电压与 V_{IN} 之间的关系 (固定输出, 新芯片)

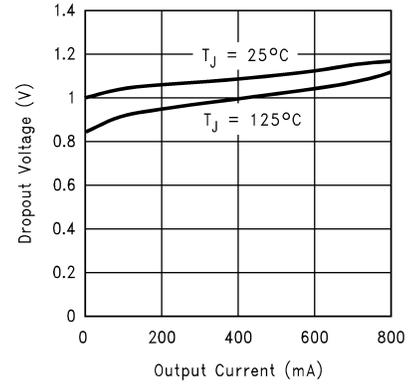


图 5-32. 压降电压与压降电流之间的关系 (可调节输出, 新芯片)

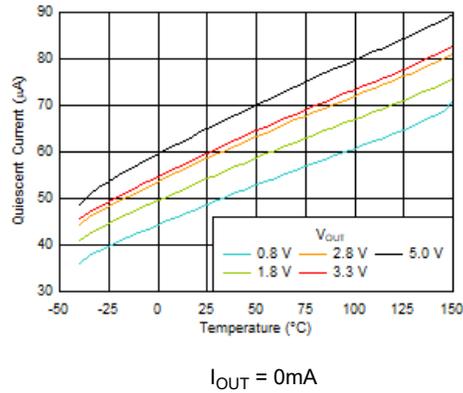


图 5-33. I_Q 与温度之间的关系 (固定输出, 新芯片)

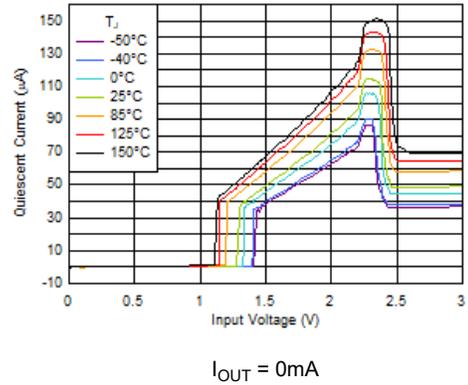


图 5-34. 当电压低于 V_{IN} 时 I_Q 会增加 (固定输出, 新芯片)

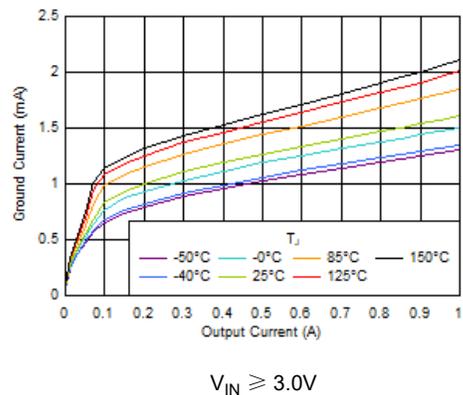


图 5-35. I_{GND} 与 I_{OUT} 之间的关系 (固定输出, 新芯片)

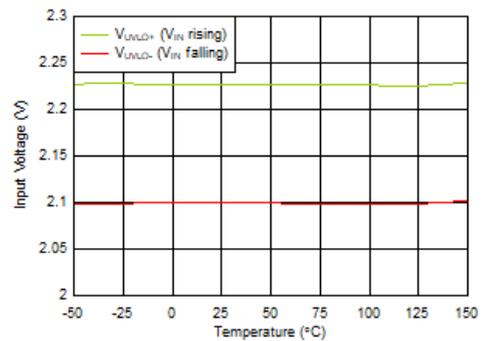
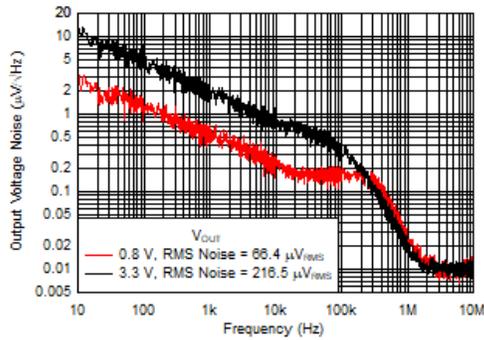


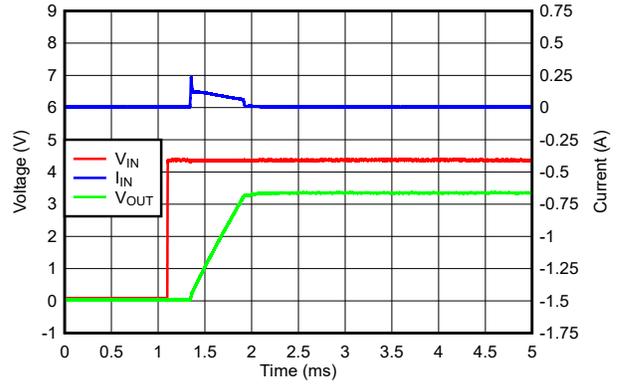
图 5-36. UVLO 阈值与温度之间的关系 (固定输出, 新芯片)

5.7 典型特性 (续)



$I_{OUT} = 0.1A$, RMS 噪声 BW = 10Hz 至 100kHz

图 5-37. 输出噪声 (V_n) 与 V_{OUT} 之间的关系
(固定输出, 新芯片)



$I_{OUT} = 0.1A$, $C_{OUT} = 22\mu F$

图 5-38. C_{OUT} 为 $22\mu F$ 时的浪涌电流
(固定输出, 新芯片)

6 详细说明

6.1 概述

TLV1117 是一款设计为提供高达 800mA 输出电流的正电压低压降稳压器。该器件提供固定 (1.5V 至 5V) 和可调节 (1.25V 至 13.8V) 输出电压配置。对于新芯片配置, 所有内部电路均设计为可在低至 1.5V 的输入到输出差分电压下正常运行。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。

固定电压版本 (新芯片) 具有集成的折返电流限制、热关断、内部输出下拉和欠压锁定 (UVLO) 功能。可调节电压版本 (新芯片) 在 OUTPUT 引脚与 ADJ 引脚之间产生一个 1.25V 的基准电压 V_{REF} 。

6.2 功能方框图

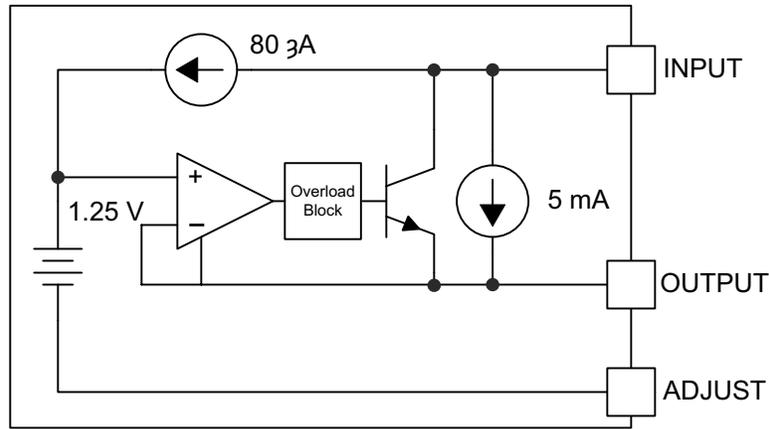


图 6-1. 功能方框图 (旧芯片)

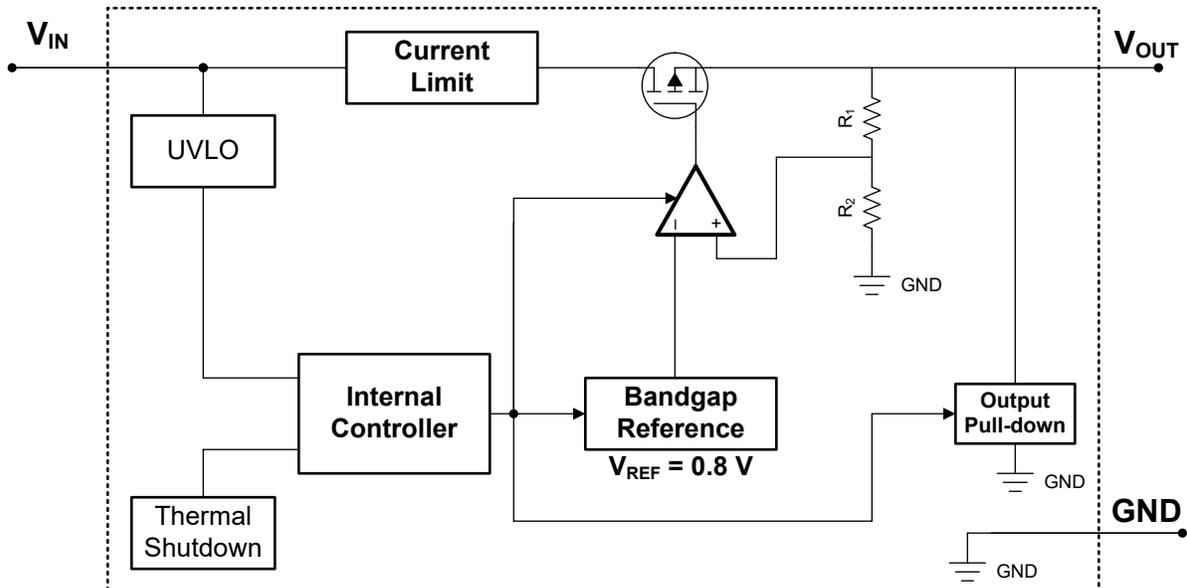


图 6-2. 功能方框图 (固定版本, 新芯片)

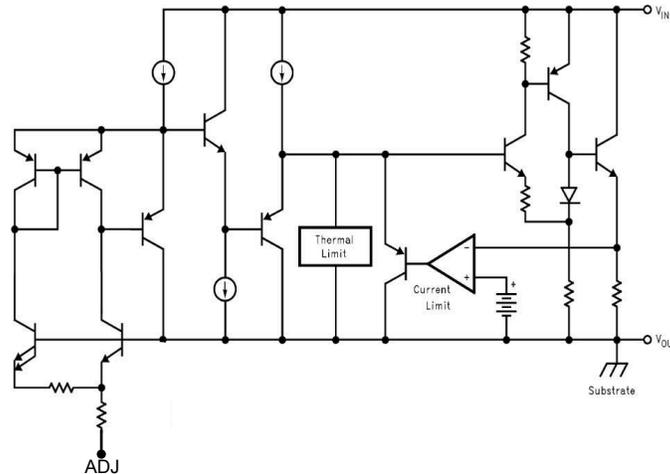


图 6-3. 功能方框图 (可调节版本, 新芯片)

6.3 特性说明

6.3.1 压降电压 (固定输出, 新芯片)

压降电压 (V_{DO}) 定义为额定输出电流 (I_{RATED}) 下的 $V_{IN} - V_{OUT}$ 之差, 此时, 导通晶体管完全导通。 V_{IN} 是输入电压、 V_{OUT} 是输出电压、 I_{RATED} 是 [建议运行条件](#) 表中列出的最大 I_{OUT} 。在该运行点, 导通晶体管驱动为完全导通。压降电压间接指定了一个最小输入电压, 该电压大于输出电压预计保持稳定的标称编程输出电压。如果输入电压降至低于标称输出调节, 输出电压也会下降。

对于 CMOS 稳压器, 压降电压由导通晶体管的漏源导通状态电阻 ($R_{DS(ON)}$) 决定。因此, 如果线性稳压器的工作电流小于额定电流, 该电流的压降电压会相应地变化。以下公式用于计算器件的 $R_{DS(ON)}$ 。

$$R_{DS(ON)} = \frac{V_{DO}}{I_{RATED}} \quad (1)$$

6.3.2 折返电流限制 (固定输出, 新芯片)

该器件具有内部电流限制电路, 可在瞬态高负载电流故障或短路事件期间保护稳压器。电流限制是混合砖墙折返方案。电流限制在折返电压 ($V_{FOLDBACK}$) 下从砖墙式方案转换为折返方案。在输出电压高于 $V_{FOLDBACK}$ 的高负载电流故障中, 砖墙方案将输出电流限制为电流限值 (I_{CL})。当电压降至 $V_{FOLDBACK}$ 以下时, 将激活折返电流限制, 在输出电压接近 GND 时按比例缩小电流。当输出短路时, 该器件会提供一个被称为短路电流限制 (I_{SC}) 的典型电流。电气特性表中列出了 I_{CL} 和 I_{SC} 。

对于此器件, $V_{FOLDBACK} = 50\% \times V_{OUT(nom)}$ 。

当器件处于限流状态时, 不会调节输出电压。当发生电流限制事件时, 由于功率耗散增加, 器件开始发热。当器件处于砖墙式电流限制时, 导通晶体管会耗散功率 $[(V_{IN} - V_{OUT}) \times I_{CL}]$ 。当器件输出短路且输出低于 $V_{FOLDBACK}$ 时, 导通晶体管将耗散功率 $[(V_{IN} - V_{OUT}) \times I_{SC}]$ 。如果触发热关断, 器件将关闭。器件冷却后, 内部热关断电路将器件重新接通。如果输出电流故障条件持续存在, 器件会在电流限制状态和热关断状态之间循环。更多有关电流限制的信息, 请参阅了解限制应用手册。

图 6-4 显示了折返电流限制图。

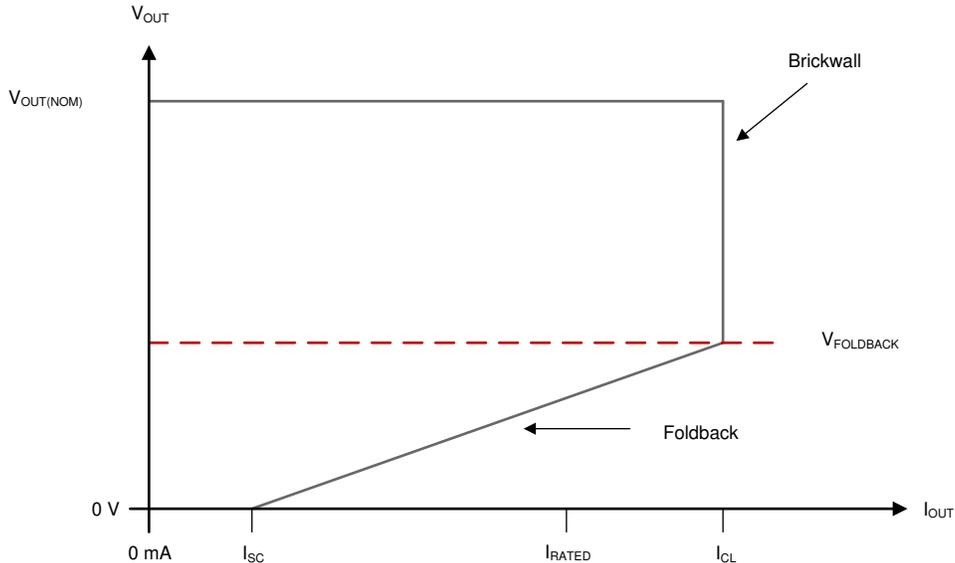


图 6-4. 折返电流限制

6.3.3 欠压锁定 (固定输出, 新芯片)

该器件具有一个独立的欠压锁定 (UVLO) 电路, 用于监控输入电压。此电路可实现受控且一致的输出电压导通和关断。为了防止器件在导通期间输入下降时关断, UVLO 会出现迟滞, 如电气特性表中所示。

6.3.4 热关断 (固定输出, 新芯片)

该器件包含一个热关断保护电路, 用于在导通晶体管的结温 (T_J) 上升到 $T_{SD(shutdown)}$ (典型值) 时禁用器件。热关断迟滞可确保在温度降至 $T_{SD(reset)}$ (典型值) 时器件复位 (导通)。

半导体芯片的热时间常数相当短, 因此当达到热关断时, 器件可以上电下电, 直到功率耗散降低。由于器件上的 $V_{IN} - V_{OUT}$ 压降较大, 或为大型输出电容器充电的浪涌电流较高, 启动期间的功率耗散较高。在某些情况下, 热关断保护功能会在启动完成之前禁用器件。

为了实现可靠运行, 请将结温限制在 [建议运行条件](#) 表中列出的最大值。在超过这个最高温度的情况下运行会导致器件超出运行规格。虽然器件的内部保护电路旨在防止热过载情况, 但此电路并不用于替代适当的散热。使器件持续进入热关断状态或在超过建议的最高结温下运行会降低长期可靠性。

6.3.5 负载调节 (可调节输出, 新芯片)

TLV1117 可调节输出引脚和调节引脚之间的电压。在某些情况下, 线路电阻会给负载上的电压带来误差。为了实现理想的负载调整率, 需要采取一些预防措施。

图 6-5 显示了使用可调节稳压器时的示意图。当电阻 R_1 的正极侧直接连接到稳压器输出端子而不是靠近负载时, 可获得理想性能。这种布局可以有效避免与基准串联出现的线路压降以及调节性能下降问题。例如, 一个 5V 稳压器与负载之间的电阻为 0.05Ω , 其负载调节会受线路电阻 $0.05\Omega \times I_L$ 的影响。如果 R_1 (等于 125Ω) 连接在负载附近, 则有效线路电阻为 $0.05\Omega \times (1 + R_2 / R_1)$ 。在这种情况下, 有效线路电阻会下降为原来的 1/4。此外, 电阻 R_2 的接地侧会返回到负载接地端附近, 从而提供远程接地感测功能并改善负载调节。

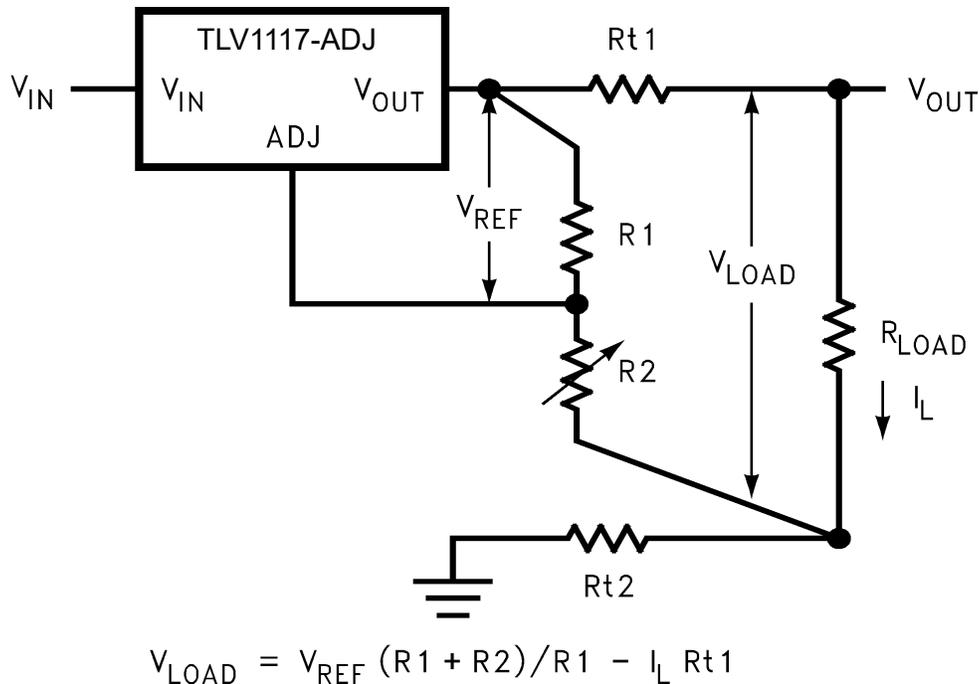


图 6-5. 使用可调输出稳压器实现出色的负载调节

6.4 器件功能模式

6.4.1 器件功能模式比较 (固定输出, 新芯片)

表 6-1 给出了不同工作模式的参数条件。有关参数值, 请参阅 [电气特性](#) 表。

表 6-1. 器件功能模式比较

工作模式	参数		
	V_{IN}	I_{OUT}	T_J
正常运行	$V_{IN} > V_{OUT(nom)} + V_{DO}$ 和 $V_{IN} > V_{IN(min)}$	$I_{OUT} < I_{OUT(max)}$	$T_J < T_{SD(shutdown)}$
压降运行	$V_{IN(min)} < V_{IN} < V_{OUT(nom)} + V_{DO}$	$I_{OUT} < I_{OUT(max)}$	$T_J < T_{SD(shutdown)}$

6.4.2 正常运行 (固定输出)

当满足下列条件时, 器件的输出电压会稳定在标称值:

适用于新芯片:

- 输入电压大于标称输出电压加上压降电压 ($V_{OUT(nom)} + V_{DO}$)
- 输出电流小于电流限制 ($I_{OUT} < I_{CL}$)
- 器件结温低于热关断温度 ($T_J < T_{SD}$)

适用于旧芯片:

- 器件将偏置电流传输至 OUT 引脚。负载或反馈必须消耗 [电气特性](#) 中载明的最小负载电流才能进行调节, 否则输出可能过高。

6.4.3 压降运行 (固定输出, 新芯片)

如果输入电压低于标称输出电压与指定压降电压之和, 则器件在压降模式下运行。在此模式下, 输出电压会跟踪输入电压。在此模式下, 器件的瞬态性能会显著下降。在此模式下, 导通晶体管驱动为完全导通。压降过程中的线路或负载瞬态可能会导致输出电压偏差较大。

当器件处于稳定压降状态时, 导通晶体管驱动为完全导通。此状态定义为器件直接在正常稳压状态后, 而非启动期间处于压降状态。当 $V_{IN} < V_{OUT(NOM)} + V_{DO}$ 时, 发生压降。当稳压器退出压降状态时, 输入电压恢复为 $\geq V_{OUT(NOM)} + V_{DO}$ 的值。在此期间, 输出电压可能会在短时间内过冲。 $V_{OUT(NOM)}$ 是标称输出电压, V_{DO} 是压降电压。在退出压降状态期间, 该器件使导通晶体管从完全导通状态恢复。

6.4.4 保护二极管 (可调节输出, 新芯片)

在正常工作条件下, TLV1117 稳压器不需要保护二极管。对于可调节器件, 调节端子和输出端子之间的内阻会限制电流。即使调节端子上有电容器, 也不需要二极管来转移稳压器周围的电流。调节引脚可以承受相对于输出电压 $\pm 25V$ 的瞬态信号, 而不会损坏器件。

当输出电容器连接到稳压器并且输入端对地短路时, 输出电容器将放电到稳压器的输出端。放电电流取决于电容器的容值、稳压器的输出电压和 V_{IN} 的下降速率。在 TLV1117 稳压器中, 输出引脚和输入引脚之间的内部二极管可以承受 10A 至 20A 的毫秒级浪涌电流。如果使用极大的输出电容器 ($\geq 1000\mu F$) 并且输入瞬时对地短路, 稳压器可能会损坏。

这种情况下，如图 6-6 所示，在输出引脚和输入引脚之间使用外部二极管来保护稳压器。

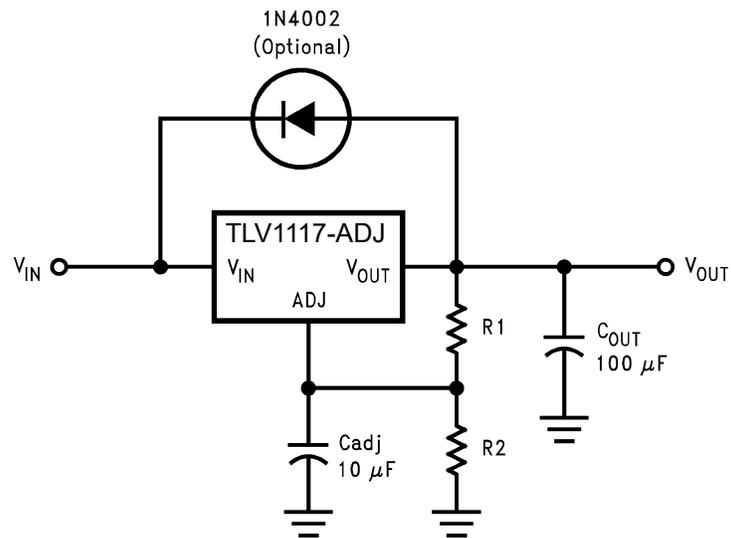


图 6-6. 具有保护二极管的稳压器

7 应用和实例

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。

7.1 应用信息

TLV1117 是一款多功能、高性能的线性稳压器，具有宽温度范围和严格的线性及负载调整率控制。为了进一步改善瞬态响应和稳定性，还需要一个输出电容器。对于可调节电压版本，也可以旁路 ADJ 引脚以实现非常高的纹波抑制比。TLV1117 在器件应用中具有多种用途，包括用作直流/直流转换器、电池充电器和微处理器电源的后置稳压器。

7.1.1 建议的电容器类型 (固定版本, 新芯片)

该器件设计为在输入和输出端使用低等效串联电阻 (ESR) 陶瓷电容器实现稳定。多层陶瓷电容器已成为这类应用的业界标准并推荐使用，但要经过良好的判断后使用。采用 X7R、X5R 和 C0G 额定电介质材料的陶瓷电容器可在整个温度范围内提供相对良好的电容稳定性。但是，由于电容变化较大，因此不建议使用 Y5V 额定电容器。

无论选择哪种陶瓷电容器类型，有效电容都会随工作电压和温度的变化而变化。通常，预计有效电容会降低多达 50%。[建议运行条件](#) 表中列出的输入和输出电容器的有效电容大约为标称值的 50%。

7.1.2 输入和输出电容器要求 (固定输出, 新芯片)

尽管不需要输入电容器来实现稳定性，但良好的模拟设计实践是将电容器从 IN 连接到 GND。该电容可抵消电抗性输入源，并改善瞬态响应、输入纹波和 PSRR。如果源阻抗大于 0.5Ω ，请使用输入电容器。如果预计会有较大且快速的上升时间负载或线路瞬变，请使用更高容值的电容。此外，如果器件距离输入电源几英寸，请使用容值更高的电容器。

通过使用输出电容器来提升器件的动态性能。为确保稳定性，请使用 [建议运行条件](#) 表中指定范围内的输出电容器。

7.1.3 反向电流 (固定输出, 新芯片)

反向电流过大可能会损坏此器件。反向电流流经导通晶体管的固有体二极管，而不是正常的传导通道。如果幅度较大，该电流会降低器件的长期可靠性。

本节概述了会发生反向电流的条件，所有这些条件都可能超过 $V_{OUT} \leq V_{IN} + 0.3V$ 的绝对最大额定值。

- 如果器件具有较大的 C_{OUT} 且输入电源崩溃，则负载电流极小或无负载电流
- 当输入电源未建立时，输出被偏置
- 输出偏置为高于输入电源

如果应用中需要反向电流，请使用外部保护来保护器件。器件中的反向电流不受限制，因此如果预计反向电压工作范围会延长，则需要外部限制。

图 7-1 展示了保护器件的一种方法。

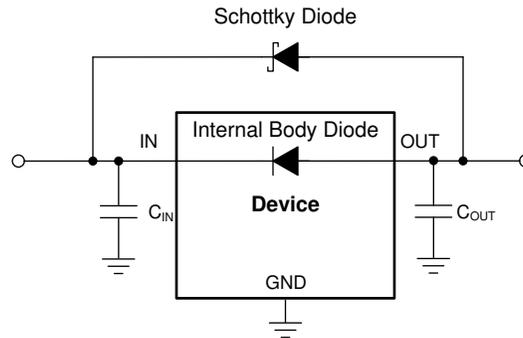


图 7-1. 使用肖特基二极管的反向电流保护示例电路

7.1.4 功率耗散 (固定输出, 新芯片)

实现电路可靠性时需要适当考虑器件功耗、印刷电路板 (PCB) 上的电路位置以及正确的热平面尺寸。确保稳压器周围的 PCB 区域具有少量或没有其他会导致热应力增加的发热器件。

对于一阶近似, 稳压器中的功率耗散取决于输入到输出电压差和负载条件。以下公式可计算功率耗散 (P_D)。

$$P_D = (V_{IN} - V_{OUT}) \times I_{OUT} \quad (2)$$

备注

通过正确选择系统电压轨, 可更大幅度地降低功率耗散, 从而实现更高的效率。为了实现更低功率耗散, 请使用正确输出调节所需的最小输入电压。

对于带有散热焊盘的器件, 器件封装的主要热传导路径是通过散热焊盘到 PCB。将散热焊盘焊接到器件下方的铜焊盘区域。确保此焊盘区域包含一组电镀过孔, 这些过孔会将热量传导至额外的铜平面以增加散热。

最大功耗决定了该器件允许的最高环境温度 (T_A)。根据以下公式, 功率耗散和结温通常与 PCB 和器件封装组合的结至环境热阻 ($R_{\theta JA}$) 和环境空气温度 (T_A) 有关。

最大功耗决定了该器件允许的最高环境温度 (T_A)。功率耗散和结温通常与 PCB 和器件封装组合的 $R_{\theta JA}$ 以及与 T_A 有关。 $R_{\theta JA}$ 是结至环境热阻, T_A 是环境空气温度。以下公式描述了这种关系。

$$T_J = T_A + (R_{\theta JA} \times P_D) \quad (3)$$

热阻 ($R_{\theta JA}$) 在很大程度上取决于特定 PCB 设计中内置的散热能力。因此, 该热阻会根据总铜面积、铜重量和平面位置而变化。[热性能信息](#) 表中列出的结至环境热阻由 JEDEC 标准 PCB 和铜扩散面积决定。 $R_{\theta JA}$ 用作封装热性能的相对测量值。

7.1.5 估算结温 (固定输出, 新芯片)

JEDEC 标准现在建议使用 ψ (Psi) 热指标来估算现象稳压器在典型 PCB 板应用电路中的结温。此类指标不是热阻参数, 但提供了一种估算结温的相对实用方法。已确定这些 ψ 指标与可用于散热的铜面积明显无关。热性能信息表列出了主要的热指标, 即结至顶部特征参数 (ψ_{JT}) 和结至电路板特征参数 (ψ_{JB})。这些参数提供了两种计算结温 (T_J) 的方法, 如以下公式所述。结合使用结至顶部特征参数 (ψ_{JT}) 和器件封装顶部中间位置的温度 (T_T) 来计算结温。结合使用结至电路板特征参数 (ψ_{JB}) 和距器件封装 1mm 印刷电路板 (PCB) 表面温度 (T_B) 来计算结温。

$$T_J = T_T + \psi_{JT} \times P_D \quad (4)$$

其中:

- P_D 是耗散功率
- T_T 器件封装顶部中间位置的温度

$$T_J = T_B + \psi_{JB} \times P_D \quad (5)$$

其中:

- T_B 是在距器件封装 1mm 且位于封装边缘中心位置测得的 PCB 表面温度

有关热指标及其使用方法的详细信息, 请参阅 [半导体和 IC 封装热指标应用手册](#)。

7.2 典型应用 (可调节输出)

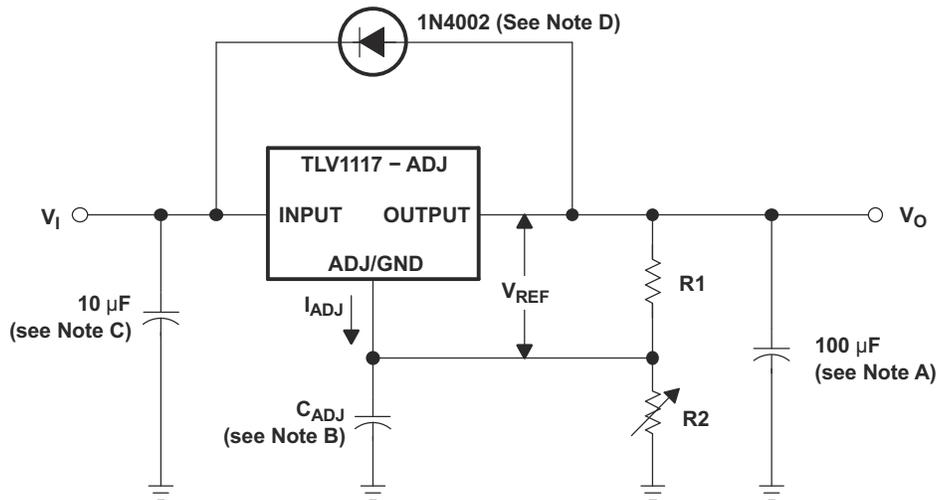


图 7-2. 基本可调节稳压器

备注

[设计要求 \(可调节输出\)](#) 部分列出图 7-2 了中引用的注释的详细信息。

TLV1117 的可调节版本采用 2.7V 至 15V 输入。 V_{REF} 电压是指输出引脚和调节引脚之间的电压, 通常为 1.25V。 V_{REF} 电压导致电流流过 R1, 该电流与流过 R2 的电流相同 (减去可忽略的 $50\mu A I_{ADJ}$)。因此, 调整 R2 以从 GND 产生更大的压降并设置输出电压。[详细设计过程 \(可调节输出\)](#) 部分中介绍了输出电压公式。

7.2.1 设计要求 (可调节输出)

此部分的要点参考了图 7-2。

- 注 A：输出电容器的选择对于稳压器的稳定性至关重要。较大的 C_{OUT} 值有助于改善稳压器的瞬态响应和环路稳定性。该器件设计为使用 ESR 介于 $0.2\ \Omega$ 至 $10\ \Omega$ 之间的钽和铝电解输出电容器实现稳定。
- 注 B：使用 C_{ADJ} 改善纹波抑制。如果使用 C_{ADJ} ，请确保使用的 C_{OUT} 的值大于 C_{ADJ} 。
- 注 C：如果 TLV1117 不靠近电源滤波器，请使用 C_{IN} 。
- 注 D：如果输入瞬态对 GND 短路，请使用外部二极管来保护稳压器。

7.2.2 详细设计过程

7.2.2.1 详细设计过程 (固定输出, 新芯片)

此设计示例选择了 3.3V 固定版本 TLV1117-3.3，它由标准 12V 输入电源供电。对于 3.3V 输出电压选项，将压降电压 (V_{DO}) 保持在 TLV1117-3.3 压降电压规格范围内。该电压电平以使该器件在本设计的所有负载和温度条件下保持稳定。使用 $1.0\ \mu\text{F}$ 输出电容器，以实现出色的负载瞬态响应。输入电容器是可选的，用于降低电路的输入阻抗并改善瞬态响应。

与任何其他稳压器一样，增大输出电容可减小过冲和下冲幅度。

7.2.2.2 详细设计过程 (可调输出)

使用以下公式计算输出电压：

$$V_{OUT} = V_{REF} \times \left(1 + \frac{R_2}{R_1}\right) + (I_{ADJ} \times R_2) \quad (6)$$

在大多数应用中，允许忽略 I_{ADJ} ，因为该值大约为 $50\ \mu\text{A}$ (新芯片) 和 $80\ \mu\text{A}$ (旧芯片)。

7.2.3 应用曲线

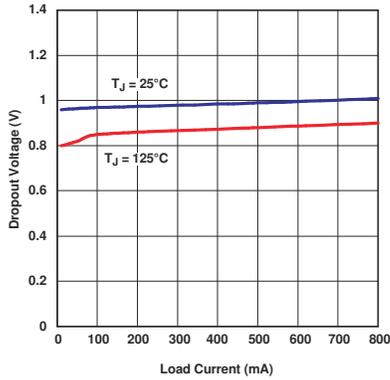


图 7-3. 压降电压与负载电流之间的关系 (旧芯片)

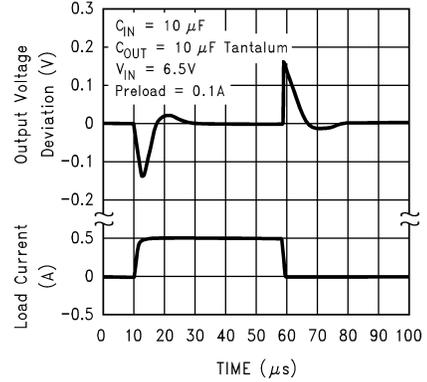


图 7-4. 负载瞬态响应 (可调节输出, 新芯片)

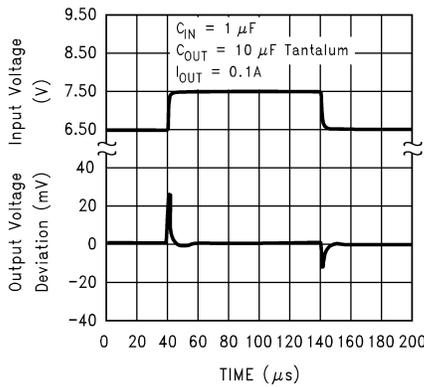
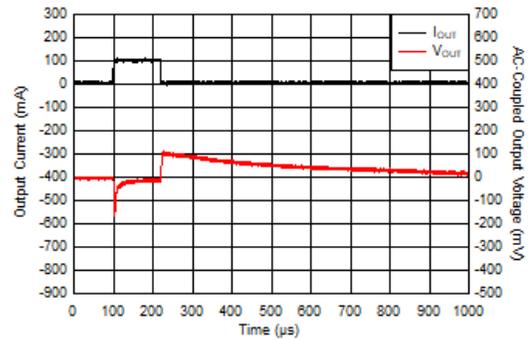
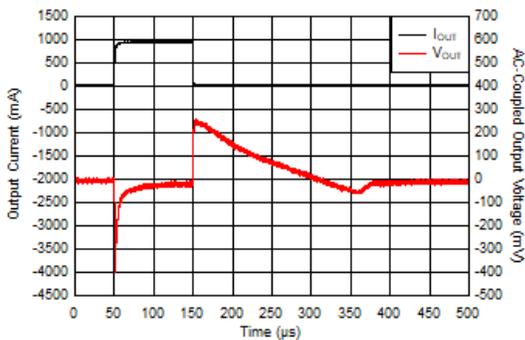


图 7-5. 线路瞬态响应 (可调节输出, 新芯片)



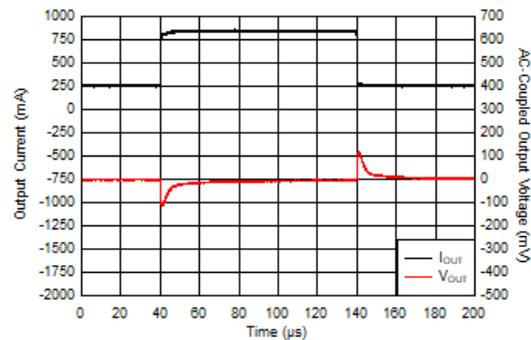
$V_{IN} = 5V$, $V_{OUT} = 3.3V$, 斜升速率 = $0.4A/\mu s$

图 7-6. 负载瞬态响应, 1mA 至 100mA (固定输出, 新芯片)



$V_{IN} = 5V$, $V_{OUT} = 3.3V$, 斜升速率 = $0.5A/\mu s$

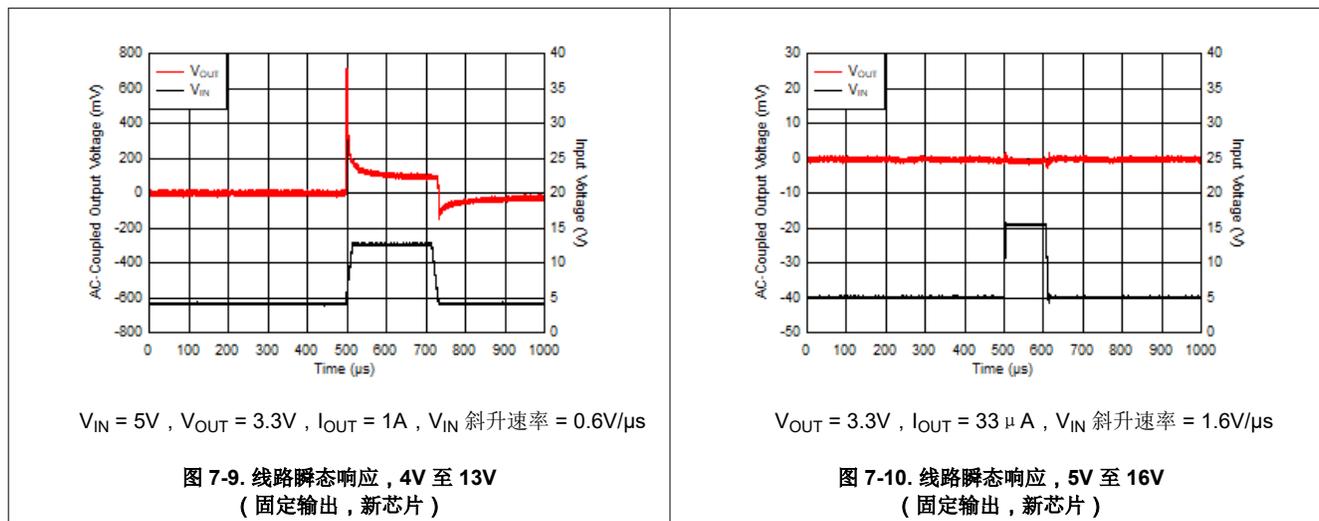
图 7-7. 负载瞬态响应, 1mA 至 1A (固定输出, 新芯片)



$V_{IN} = 5V$, $V_{OUT} = 3.3V$, 斜升速率 = $0.8A/\mu s$

图 7-8. 负载瞬态响应, 250mA 至 850mA (固定输出, 新芯片)

7.2.3 应用曲线 (续)



7.3 电源相关建议

TLV1117 的固定和可调节版本具有不同的建议工作电压范围。有关具体工作范围, 请参阅 [建议运行条件](#) 表。

7.4 布局

7.4.1 布局指南

如果 TLV1117 不靠近电源输出滤波电容器, 建议使用一个或两个输入电容器。这些电容器可滤除高频噪声并缓解输入端的短暂电压浪涌。确保器件输入和输出引脚的布线足够宽, 以支持应用中所需的整个电流范围, 从而更最大限度地减小 $I \times R$ 压降。

7.4.2 布局示例

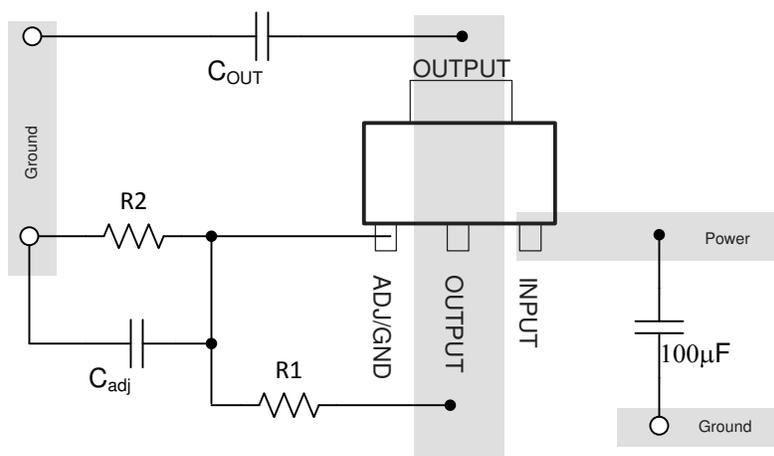


图 7-11. 布局示例

8 器件和文档支持

8.1 器件支持

8.1.1 器件命名规则

表 8-1. 提供的选项

产品 ^{(1) (2)}	V _{OUT}
TLV1117-aaxyyyz 旧芯片	aa 为标称输出电压 (例如 33 = 3.3V)。 x 为工作温度范围。yyy 为封装指示符。 z 为封装数量。封装标签上的制造厂来源, CSO : SFB。
TLV1117-aaxyyyz 新芯片	aa 为标称输出电压 (例如 33 = 3.3V)。 x 为工作温度范围。yyy 为封装指示符。 z 为封装数量。封装标签上的制造厂来源, CSO : RFB 或 CSO : FFAB。

- (1) 由于该器件可能搭载旧芯片或新芯片, 产品将通过封装标签上的制造厂来源进行标识。(CSO : RFB, CSO : FFAB = 新芯片; CSO : SFB = 旧芯片)。通篇对新芯片和旧芯片的相关性能进行了相应区分。
- (2) 如需了解最新的封装及订购信息, 请参阅本文档末尾的封装选项附录, 或访问 www.ti.com 查看器件产品文件夹。

8.2 接收文档更新通知

要接收文档更新通知, 请导航至 ti.com 上的器件产品文件夹。点击 [通知](#) 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。

8.3 支持资源

[TI E2E™ 中文支持论坛](#) 是工程师的重要参考资料, 可直接从专家处获得快速、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, 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](#)。

8.4 商标

TI E2E™ is a trademark of Texas Instruments.

所有商标均为其各自所有者的财产。

8.5 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。

8.6 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。

9 修订历史记录

注: 以前版本的页码可能与当前版本的页码不同

Changes from Revision N (April 2025) to Revision O (June 2025)	Page
• 更新了建议运行条件表, 以突出旧芯片和新芯片之间的相同之处.....	5
• 更新了电气特性表, 以突出旧芯片和新芯片之间的性能相同之处.....	7

Changes from Revision M (January 2023) to Revision N (April 2025)
Page

• 向文档添加了新芯片器件.....	1
• 更改了整个文档，以识别旧芯片和新芯片的功能和差异以及器件的可调节和固定版本.....	1
• 删除了 <i>器件功能模式比较</i> 表中的 <i>禁用行</i>	21
• 添加了 <i>器件命名规则</i> 部分.....	29

10 机械、封装和可订购信息

以下页面包含机械、封装和可订购信息。这些信息是指定器件可用的最新数据。数据如有变更，恕不另行通知，且不会对此文档进行修订。如需获取此数据表的浏览器版本，请查阅左侧的导航栏。

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)
TLV1117-15CDCY	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	0 to 125	T2
TLV1117-15CDCY.A	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	T2
TLV1117-15CDCYR	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	0 to 125	T2
TLV1117-15CDCYR.A	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	T2
TLV1117-15CDCYRG3	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	0 to 125	T2
TLV1117-15CDRJR	Active	Production	SON (DRJ) 8	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	0 to 125	ZYH
TLV1117-15CDRJR.A	Active	Production	SON (DRJ) 8	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	ZYH
TLV1117-15IDCY	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	T3
TLV1117-15IDCY.A	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	T3
TLV1117-15IDCYR	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	T3
TLV1117-15IDCYR.A	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	T3
TLV1117-15IKVURG3	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	-40 to 125	ZF15
TLV1117-15IKVURG3.A	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	-40 to 125	ZF15
TLV1117-18CDCY	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	0 to 125	T4
TLV1117-18CDCY.A	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	T4
TLV1117-18CDCYR	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	0 to 125	T4
TLV1117-18CDCYR.A	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	T4
TLV1117-18CDCYRG3	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	0 to 125	T4
TLV1117-18CDRJR	Active	Production	SON (DRJ) 8	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	0 to 125	ZYK
TLV1117-18CDRJR.A	Active	Production	SON (DRJ) 8	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	ZYK
TLV1117-18CKVURG3	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	0 to 125	ZE18
TLV1117-18CKVURG3.A	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	-40 to 125	ZE18
TLV1117-18IDCY	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	T5
TLV1117-18IDCY.A	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	T5
TLV1117-18IDCYR	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	T5
TLV1117-18IDCYR.A	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	T5
TLV1117-18IDCYRG3	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	T5
TLV1117-18IDRJR	Active	Production	SON (DRJ) 8	1000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	ZYL
TLV1117-18IDRJR.A	Active	Production	SON (DRJ) 8	1000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	ZYL

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)
TLV1117-18IKVURG3	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	-40 to 125	ZF18
TLV1117-18IKVURG3.A	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	-40 to 125	ZF18
TLV1117-25CDCY	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	0 to 125	T6
TLV1117-25CDCY.A	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	T6
TLV1117-25CDCYR	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	0 to 125	T6
TLV1117-25CDCYR.A	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	T6
TLV1117-25CDCYRG3	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	0 to 125	T6
TLV1117-25CKVURG3	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	0 to 125	ZE25
TLV1117-25CKVURG3.A	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	-40 to 125	ZE25
TLV1117-25IDCY	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	T8
TLV1117-25IDCY.A	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	T8
TLV1117-25IDCYR	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	T8
TLV1117-25IDCYR.A	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	T8
TLV1117-25IDRJR	Active	Production	SON (DRJ) 8	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	ZYN
TLV1117-25IDRJR.A	Active	Production	SON (DRJ) 8	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	ZYN
TLV1117-33CDCY	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	0 to 125	V3
TLV1117-33CDCY.A	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	V3
TLV1117-33CDCYRG3	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	0 to 125	V3
TLV1117-33CDCYR	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	0 to 125	V3
TLV1117-33CDCYR.A	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	V3
TLV1117-33CDCYRG3	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	0 to 125	V3
TLV1117-33CDRJR	Active	Production	SON (DRJ) 8	1000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	0 to 125	ZYP
TLV1117-33CDRJR.A	Active	Production	SON (DRJ) 8	1000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	ZYP
TLV1117-33CKVURG3	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	0 to 125	ZE33
TLV1117-33CKVURG3.A	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	-40 to 125	ZE33
TLV1117-33IDCY	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	(V3, VS)
TLV1117-33IDCY.A	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	(V3, VS)
TLV1117-33IDCYG3	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	(V3, VS)
TLV1117-33IDCYR	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	VS
TLV1117-33IDCYR.A	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	VS
TLV1117-33IDCYRG3	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	VS

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)
TLV1117-33IDRJR	Active	Production	SON (DRJ) 8	1000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	ZYR
TLV1117-33IDRJR.A	Active	Production	SON (DRJ) 8	1000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	ZYR
TLV1117-33IKVURG3	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	-40 to 125	ZF33
TLV1117-33IKVURG3.A	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	-40 to 125	ZF33
TLV1117-50CDCY	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	0 to 125	VT
TLV1117-50CDCY.A	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	0 to 125	VT
TLV1117-50CDCYRG3	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	0 to 125	VT
TLV1117-50CDCYR	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	0 to 125	VT
TLV1117-50CDCYR.A	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	0 to 125	VT
TLV1117-50CDCYRG3	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	0 to 125	VT
TLV1117-50CDRJR	Active	Production	SON (DRJ) 8	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	0 to 125	ZE50
TLV1117-50CDRJR.A	Active	Production	SON (DRJ) 8	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	0 to 125	ZE50
TLV1117-50CKVURG3	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	0 to 125	ZE50
TLV1117-50CKVURG3.A	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	0 to 125	ZE50
TLV1117-50IDCY	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	VU
TLV1117-50IDCY.A	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	VU
TLV1117-50IDCYR	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	VU
TLV1117-50IDCYR.A	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	VU
TLV1117-50IDCYRG3	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	VU
TLV1117-50IDRJR	NRND	Production	SON (DRJ) 8	1000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	ZF50
TLV1117-50IDRJR.A	NRND	Production	SON (DRJ) 8	1000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	ZF50
TLV1117-50IDRJR.G4	NRND	Production	SON (DRJ) 8	1000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	ZF50
TLV1117-50IKVURG3	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	-40 to 125	ZF50
TLV1117-50IKVURG3.A	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	-40 to 125	ZF50
TLV1117CDCY	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	0 to 125	V4
TLV1117CDCY.A	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	V4
TLV1117CDCYRG3	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	0 to 125	V4
TLV1117CDCYR	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	0 to 125	V4
TLV1117CDCYR.A	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	V4
TLV1117CDCYR.B	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	V4
TLV1117CDCYRG3	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	0 to 125	V4

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)
TLV1117CDRJR	Active	Production	SON (DRJ) 8	1000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	0 to 125	ZYS
TLV1117CDRJR.A	Active	Production	SON (DRJ) 8	1000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	ZYS
TLV1117CKCS	Active	Production	TO-220 (KCS) 3	50 TUBE	Yes	SN	N/A for Pkg Type	0 to 125	TLV1117C
TLV1117CKCS.A	Active	Production	TO-220 (KCS) 3	50 TUBE	Yes	SN	N/A for Pkg Type	-40 to 125	TLV1117C
TLV1117CKTTR	Active	Production	DDPAK/ TO-263 (KTT) 3	500 LARGE T&R	Yes	SN	Level-3-245C-168 HR	0 to 125	TLV1117C
TLV1117CKTTR.A	Active	Production	DDPAK/ TO-263 (KTT) 3	500 LARGE T&R	Yes	SN	Level-3-245C-168 HR	-40 to 125	TLV1117C
TLV1117CKTTRG3	Active	Production	DDPAK/ TO-263 (KTT) 3	500 LARGE T&R	Yes	SN	Level-3-245C-168 HR	0 to 125	TLV1117C
TLV1117CKVURG3	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	0 to 125	TV1117
TLV1117CKVURG3.A	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	-40 to 125	TV1117
TLV1117CKVURG3.B	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	-40 to 125	TV1117
TLV1117IDCY	Active	Production	SOT-223 (DCY) 4	80 TUBE	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	V2
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
TLV1117IDCYR	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	V2
TLV1117IDCYR.A	Active	Production	SOT-223 (DCY) 4	2500 LARGE T&R	Yes	SN	Level-2-260C-1 YEAR	-40 to 125	V2
TLV1117IDCYR.B	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
TLV1117IDRJR	Active	Production	SON (DRJ) 8	1000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	ZYT
TLV1117IDRJR.A	Active	Production	SON (DRJ) 8	1000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	ZYT
TLV1117IKCS	Active	Production	TO-220 (KCS) 3	50 TUBE	Yes	SN	N/A for Pkg Type	-40 to 125	TLV1117I
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
TLV1117IKTTR	Active	Production	DDPAK/ TO-263 (KTT) 3	500 LARGE T&R	Yes	SN	Level-3-245C-168 HR	-40 to 125	TLV1117I
TLV1117IKTTR.A	Active	Production	DDPAK/ TO-263 (KTT) 3	500 LARGE T&R	Yes	SN	Level-3-245C-168 HR	-40 to 125	TLV1117I
TLV1117IKVURG3	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	-40 to 125	(TV1117, TY1117)
TLV1117IKVURG3.A	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	-40 to 125	(TV1117, TY1117)
TLV1117IKVURG3.B	Active	Production	TO-252 (KVU) 3	2500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	-40 to 125	(TV1117, TY1117)

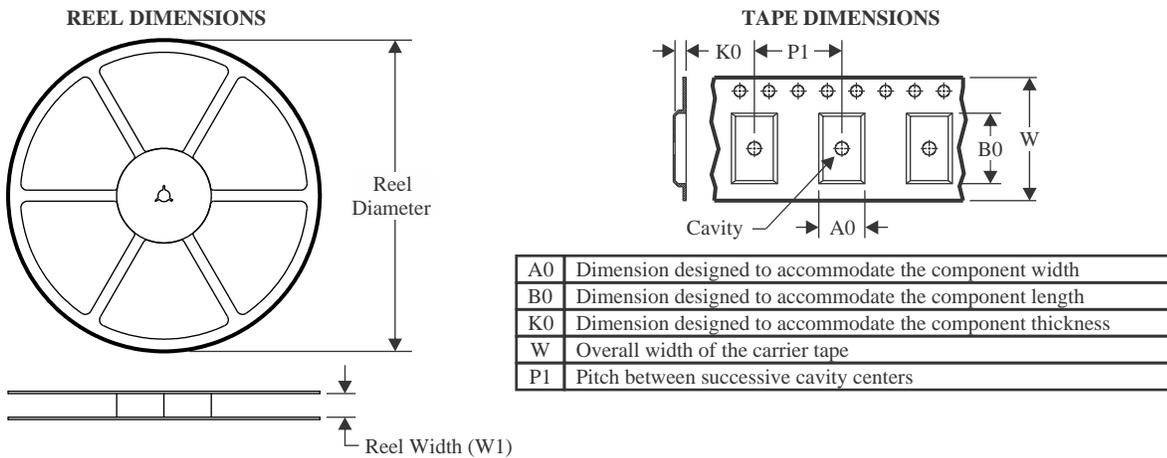
- (1) **Status:** For more details on status, see our [product life cycle](#).
- (2) **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, 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.

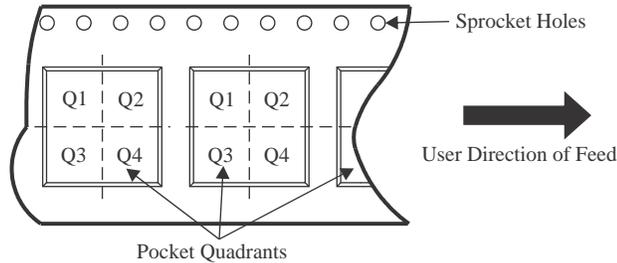
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TAPE AND REEL INFORMATION



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
TLV1117-15CDRJR	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
TLV1117-18CDRJR	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
TLV1117-18IDRJR	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
TLV1117-25IDRJR	SON	DRJ	8	3000	330.0	12.4	4.25	4.25	1.15	8.0	12.0	Q2

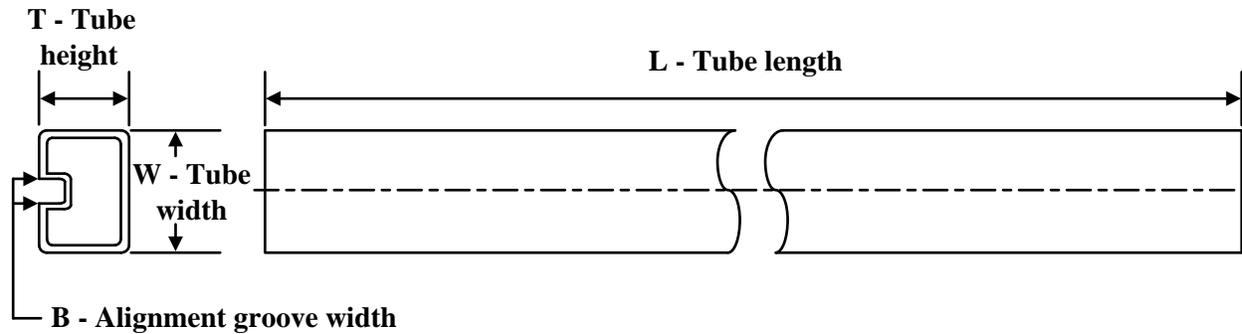
Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
TLV1117-33CDCYR	SOT-223	DCY	4	2500	330.0	12.4	6.55	7.25	1.9	8.0	12.0	Q3
TLV1117-33CDCYR	SOT-223	DCY	4	2500	330.0	12.4	7.05	7.4	1.9	8.0	12.0	Q3
TLV1117-33CDRJR	SON	DRJ	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
TLV1117-33IDRJR	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
TLV1117-50CDRJR	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
TLV1117-50IDRJR	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	6.55	7.25	1.9	8.0	12.0	Q3
TLV1117CDCYR	SOT-223	DCY	4	2500	330.0	12.4	6.85	7.3	1.88	8.0	12.0	Q3
TLV1117CDCYR	SOT-223	DCY	4	2500	330.0	12.4	7.05	7.4	1.9	8.0	12.0	Q3
TLV1117CKTTR	DDPAK/ TO-263	KTT	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
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	6.85	7.3	1.88	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
TLV1117IDCYR	SOT-223	DCY	4	2500	330.0	12.4	7.05	7.4	1.9	8.0	12.0	Q3
TLV1117IDRJR	SON	DRJ	8	1000	180.0	12.4	4.25	4.25	1.15	8.0	12.0	Q2
TLV1117IKTTR	DDPAK/ TO-263	KTT	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
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
TLV1117-15CDRJR	SON	DRJ	8	3000	353.0	353.0	32.0
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
TLV1117-18CDRJR	SON	DRJ	8	3000	353.0	353.0	32.0
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
TLV1117-18IDRJR	SON	DRJ	8	1000	213.0	191.0	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
TLV1117-25IDRJR	SON	DRJ	8	3000	353.0	353.0	32.0
TLV1117-33CDCYR	SOT-223	DCY	4	2500	336.0	336.0	48.0
TLV1117-33CDCYR	SOT-223	DCY	4	2500	340.0	340.0	38.0

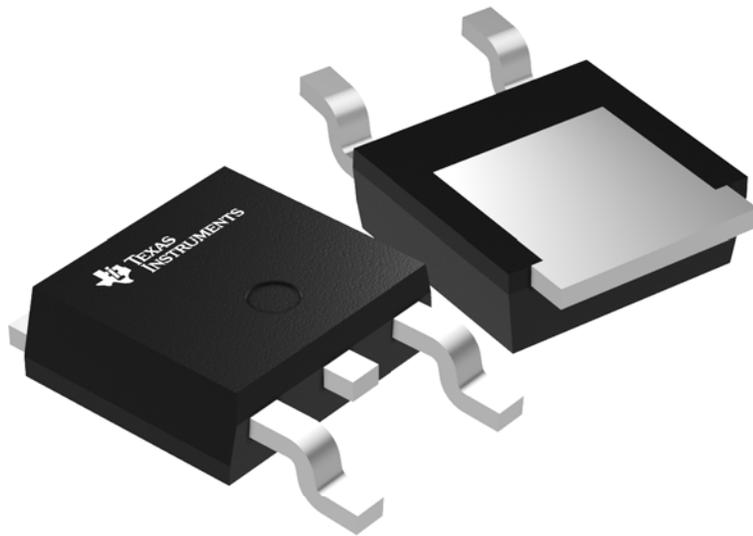
Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TLV1117-33CDRJR	SON	DRJ	8	1000	213.0	191.0	35.0
TLV1117-33CKVURG3	TO-252	KVU	3	2500	340.0	340.0	38.0
TLV1117-33IDCYR	SOT-223	DCY	4	2500	340.0	340.0	38.0
TLV1117-33IDRJR	SON	DRJ	8	1000	213.0	191.0	35.0
TLV1117-33IKVURG3	TO-252	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	353.0	353.0	32.0
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	213.0	191.0	35.0
TLV1117-50IKVURG3	TO-252	KVU	3	2500	340.0	340.0	38.0
TLV1117CDCYR	SOT-223	DCY	4	2500	336.0	336.0	48.0
TLV1117CDCYR	SOT-223	DCY	4	2500	367.0	367.0	35.0
TLV1117CDCYR	SOT-223	DCY	4	2500	340.0	340.0	38.0
TLV1117CKTTR	DDPAK/TO-263	KTT	3	500	340.0	340.0	38.0
TLV1117CKVURG3	TO-252	KVU	3	2500	356.0	356.0	35.0
TLV1117CKVURG3	TO-252	KVU	3	2500	340.0	340.0	38.0
TLV1117IDCYR	SOT-223	DCY	4	2500	367.0	367.0	35.0
TLV1117IDCYR	SOT-223	DCY	4	2500	336.0	336.0	48.0
TLV1117IDCYR	SOT-223	DCY	4	2500	340.0	340.0	38.0
TLV1117IDRJR	SON	DRJ	8	1000	213.0	191.0	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
TLV1117IKVURG3	TO-252	KVU	3	2500	356.0	356.0	35.0

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
TLV1117-15CDCY.A	DCY	SOT-223	4	80	559	8.6	500	3.6
TLV1117-15IDCY	DCY	SOT-223	4	80	559	8.6	500	3.6
TLV1117-15IDCY.A	DCY	SOT-223	4	80	559	8.6	500	3.6
TLV1117-18CDCY	DCY	SOT-223	4	80	559	8.6	500	3.6
TLV1117-18CDCY.A	DCY	SOT-223	4	80	559	8.6	500	3.6
TLV1117-18IDCY	DCY	SOT-223	4	80	559	8.6	500	3.6
TLV1117-18IDCY.A	DCY	SOT-223	4	80	559	8.6	500	3.6
TLV1117-25CDCY	DCY	SOT-223	4	80	559	8.6	500	3.6
TLV1117-25CDCY.A	DCY	SOT-223	4	80	559	8.6	500	3.6
TLV1117-25IDCY	DCY	SOT-223	4	80	559	8.6	500	3.6
TLV1117-25IDCY.A	DCY	SOT-223	4	80	559	8.6	500	3.6
TLV1117-33CDCY	DCY	SOT-223	4	80	559	8.6	500	3.6
TLV1117-33CDCY.A	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
TLV1117-33IDCY.A	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
TLV1117-50CDCY.A	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
TLV1117-50IDCY.A	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
TLV1117CDCY.A	DCY	SOT-223	4	80	542.9	8.6	3606	2.67
TLV1117CDCY.A	DCY	SOT-223	4	80	559	8.6	500	3.6
TLV1117CDCYG3	DCY	SOT-223	4	80	542.9	8.6	3606	2.67
TLV1117CDCYG3	DCY	SOT-223	4	80	559	8.6	500	3.6

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
TLV1117CKCS	KCS	TO-220	3	50	532	34.1	700	9.6
TLV1117CKCS.A	KCS	TO-220	3	50	532	34.1	700	9.6
TLV1117IDCY	DCY	SOT-223	4	80	559	8.6	500	3.6
TLV1117IDCY	DCY	SOT-223	4	80	542.9	8.6	3606	2.67
TLV1117IDCY.A	DCY	SOT-223	4	80	542.9	8.6	3606	2.67
TLV1117IDCY.A	DCY	SOT-223	4	80	559	8.6	500	3.6
TLV1117IDCYG3	DCY	SOT-223	4	80	559	8.6	500	3.6
TLV1117IDCYG3	DCY	SOT-223	4	80	542.9	8.6	3606	2.67
TLV1117IKCS	KCS	TO-220	3	50	532	34.1	700	9.6
TLV1117IKCS.A	KCS	TO-220	3	50	532	34.1	700	9.6
TLV1117IKSE3	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.

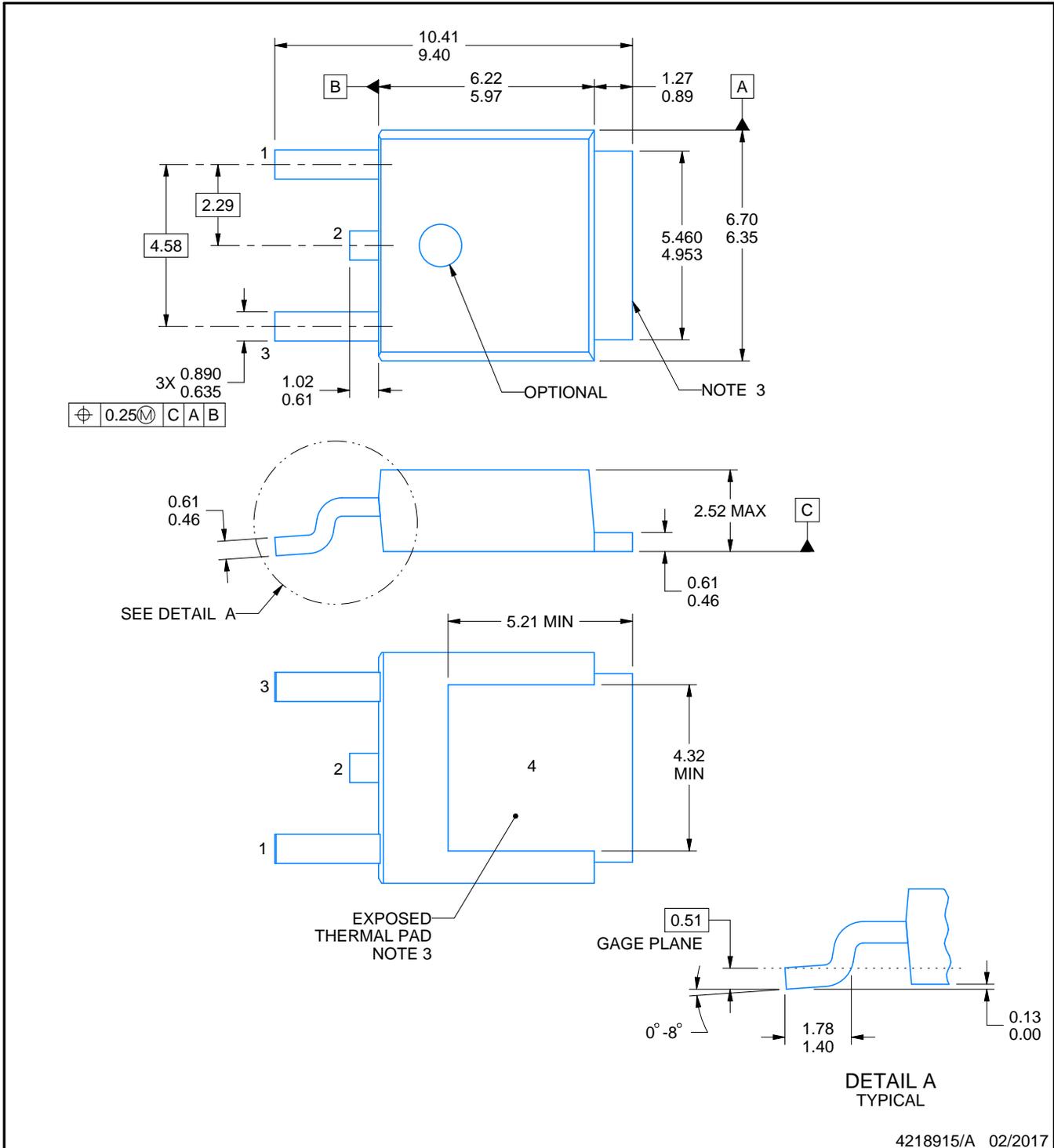


PACKAGE OUTLINE

KVVU0003A

TO-252 - 2.52 mm max height

TO-252



4218915/A 02/2017

NOTES:

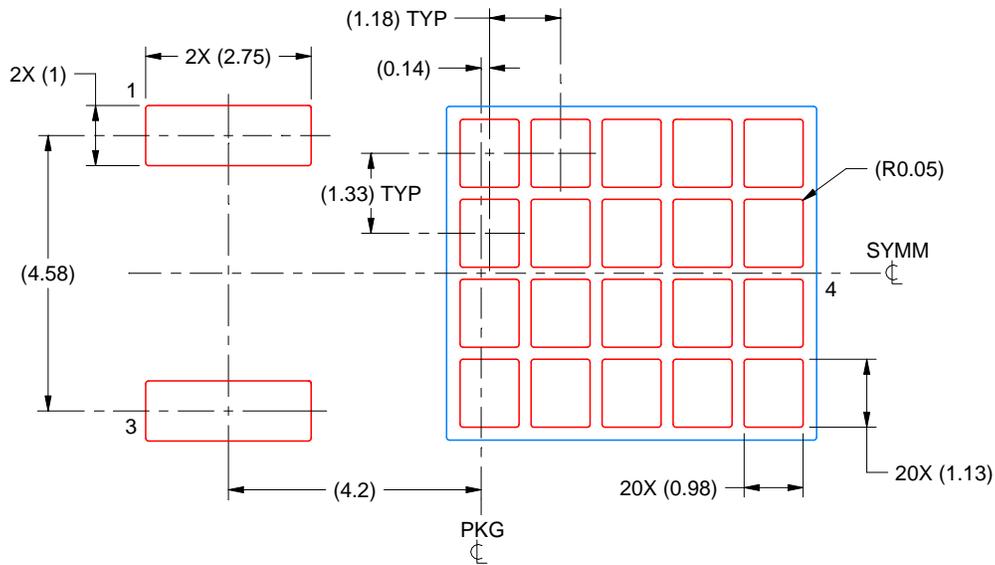
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Shape may vary per different assembly sites.
4. Reference JEDEC registration TO-252.

EXAMPLE STENCIL DESIGN

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

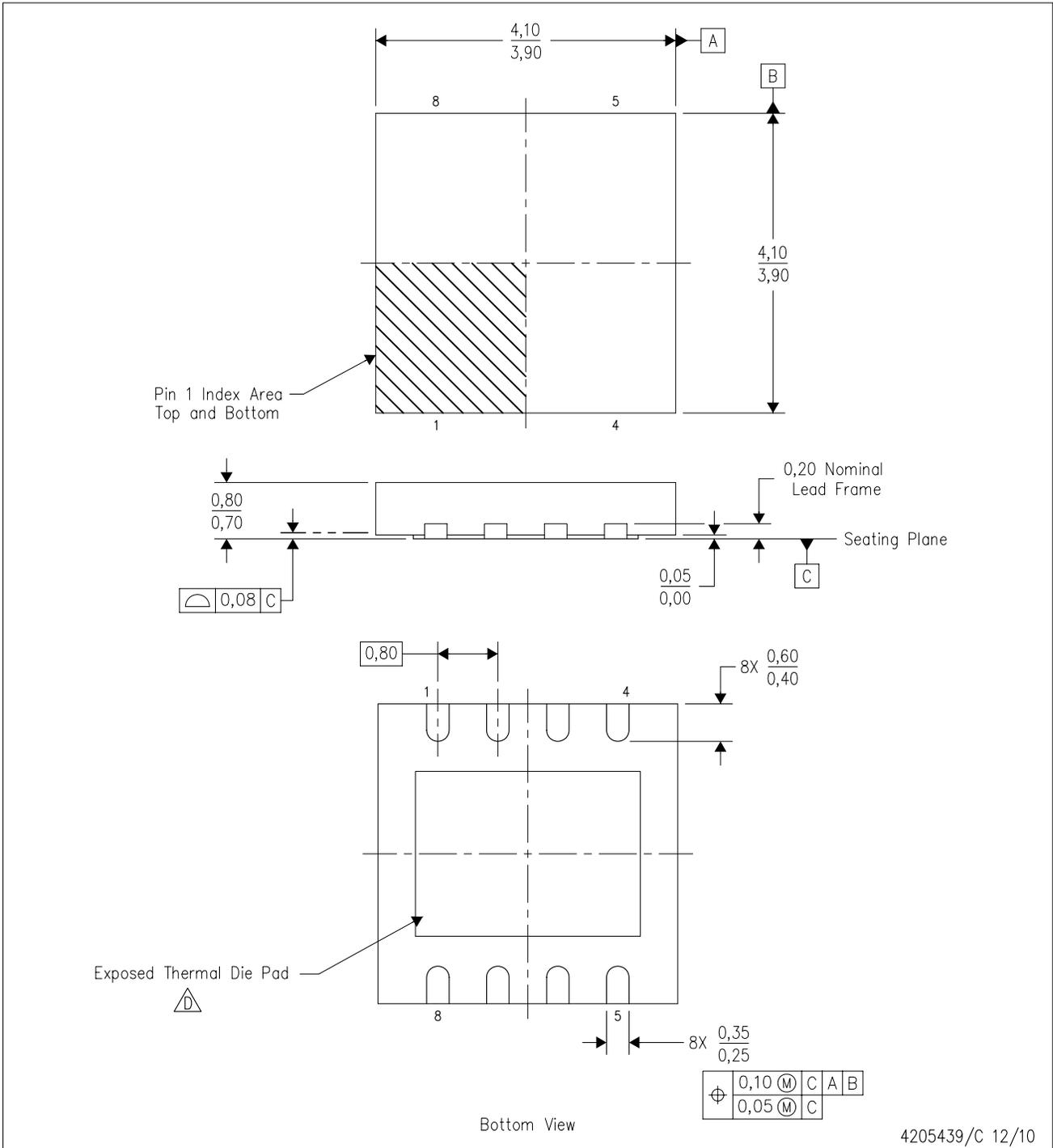
4218915/A 02/2017

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



4205439/C 12/10

- 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 PAD MECHANICAL DATA

DRJ (S-PWSON-N8)

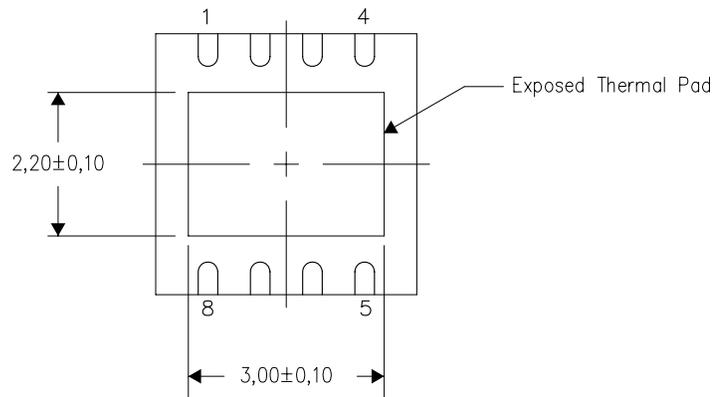
PLASTIC SMALL OUTLINE NO-LEAD

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.

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



Bottom View

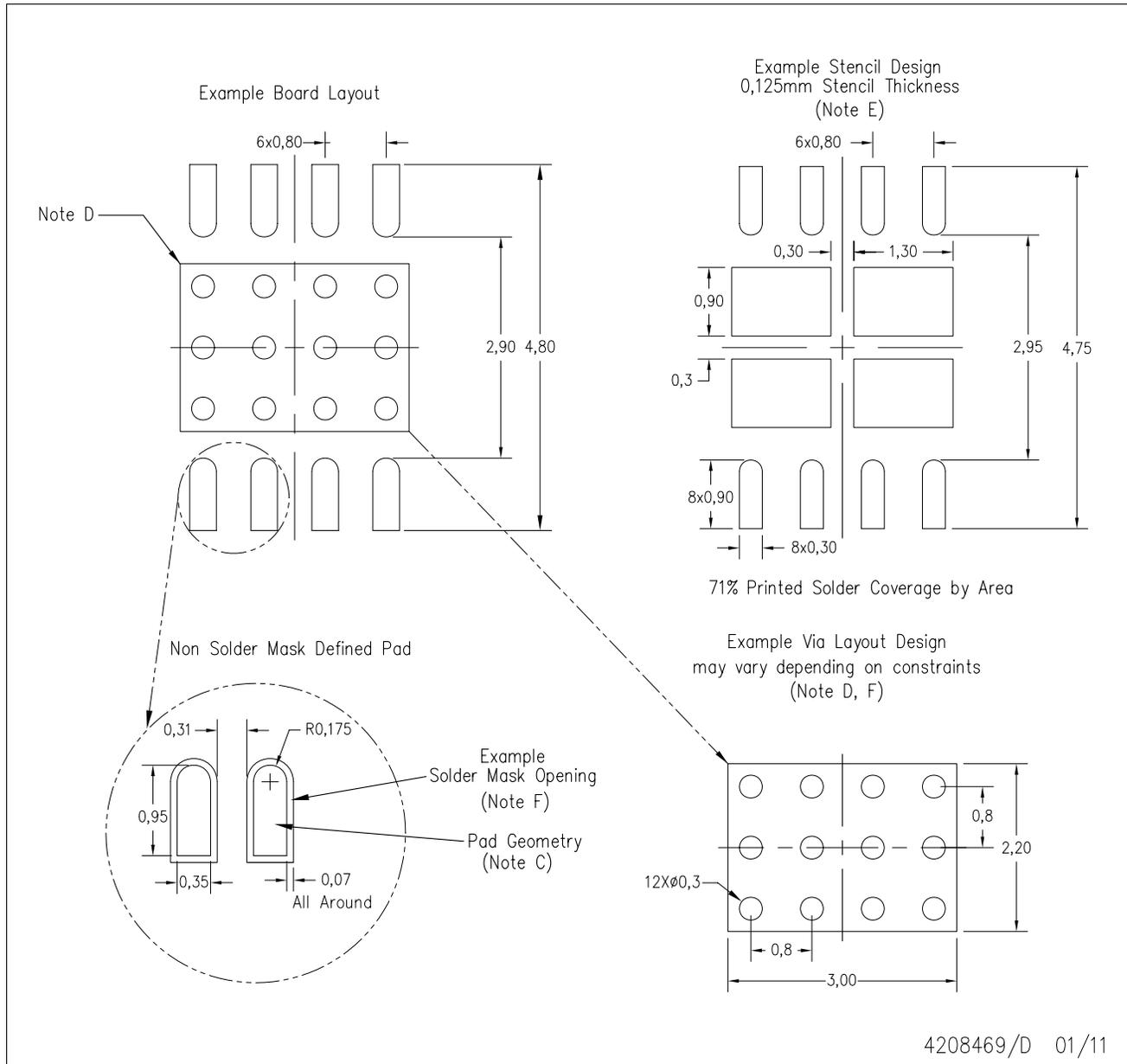
Exposed Thermal Pad Dimensions

4206882/F 01/11

NOTE: All linear dimensions are in millimeters

DRJ (S-PWSON-N8)

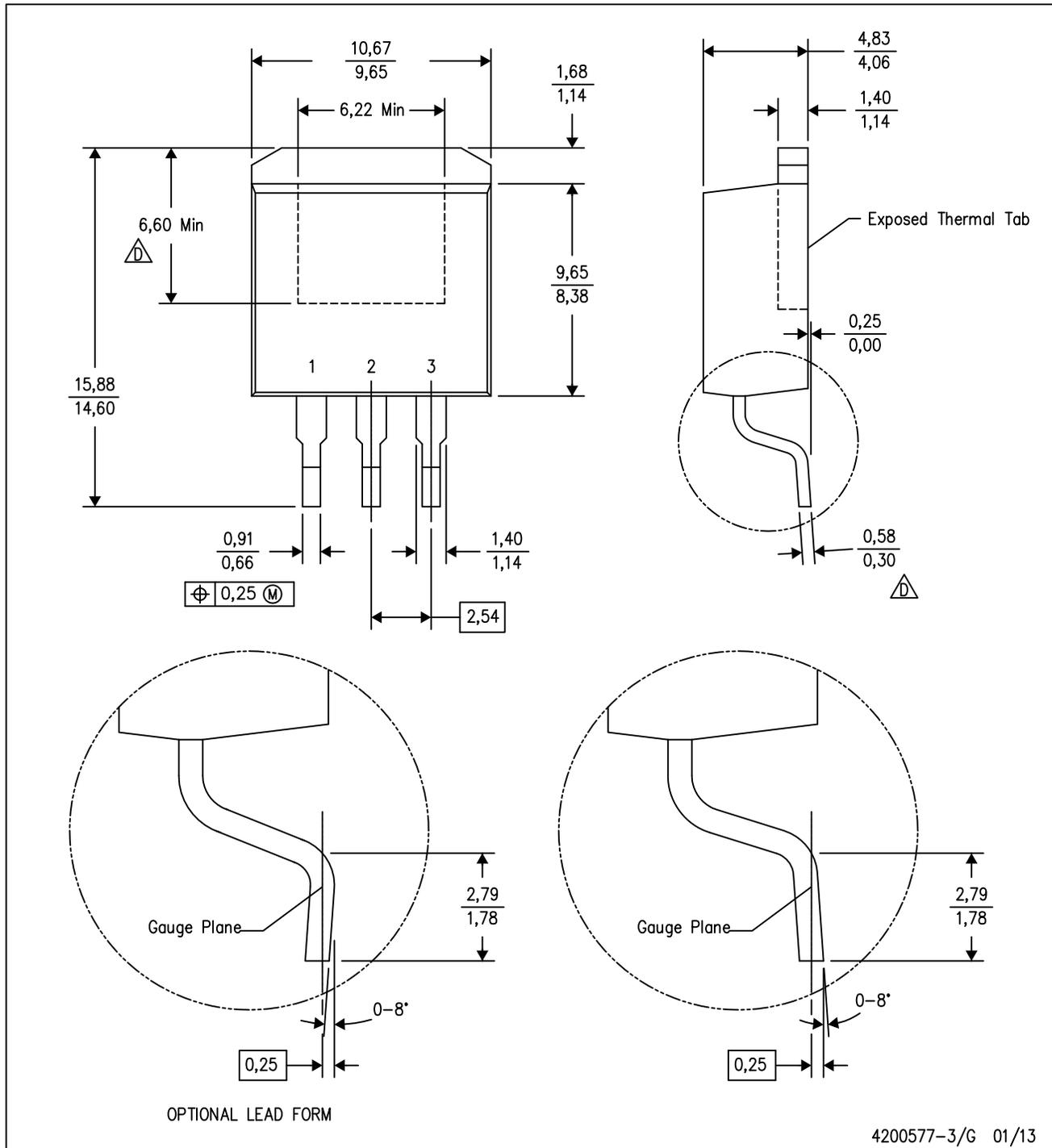
SMALL PACKAGE OUTLINE NO-LEAD



- 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>>.
 - 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)

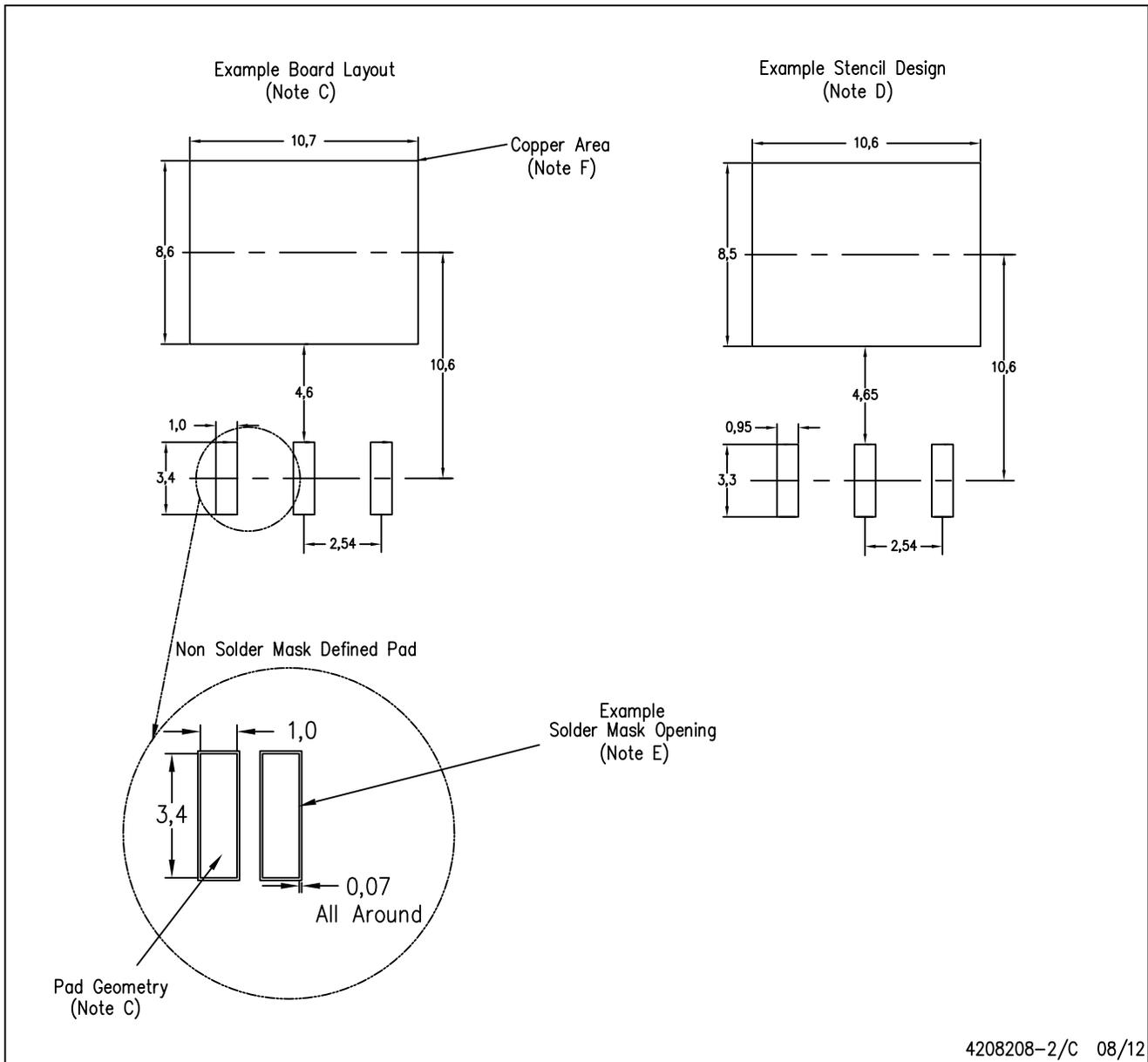
PLASTIC FLANGE-MOUNT PACKAGE



- 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)

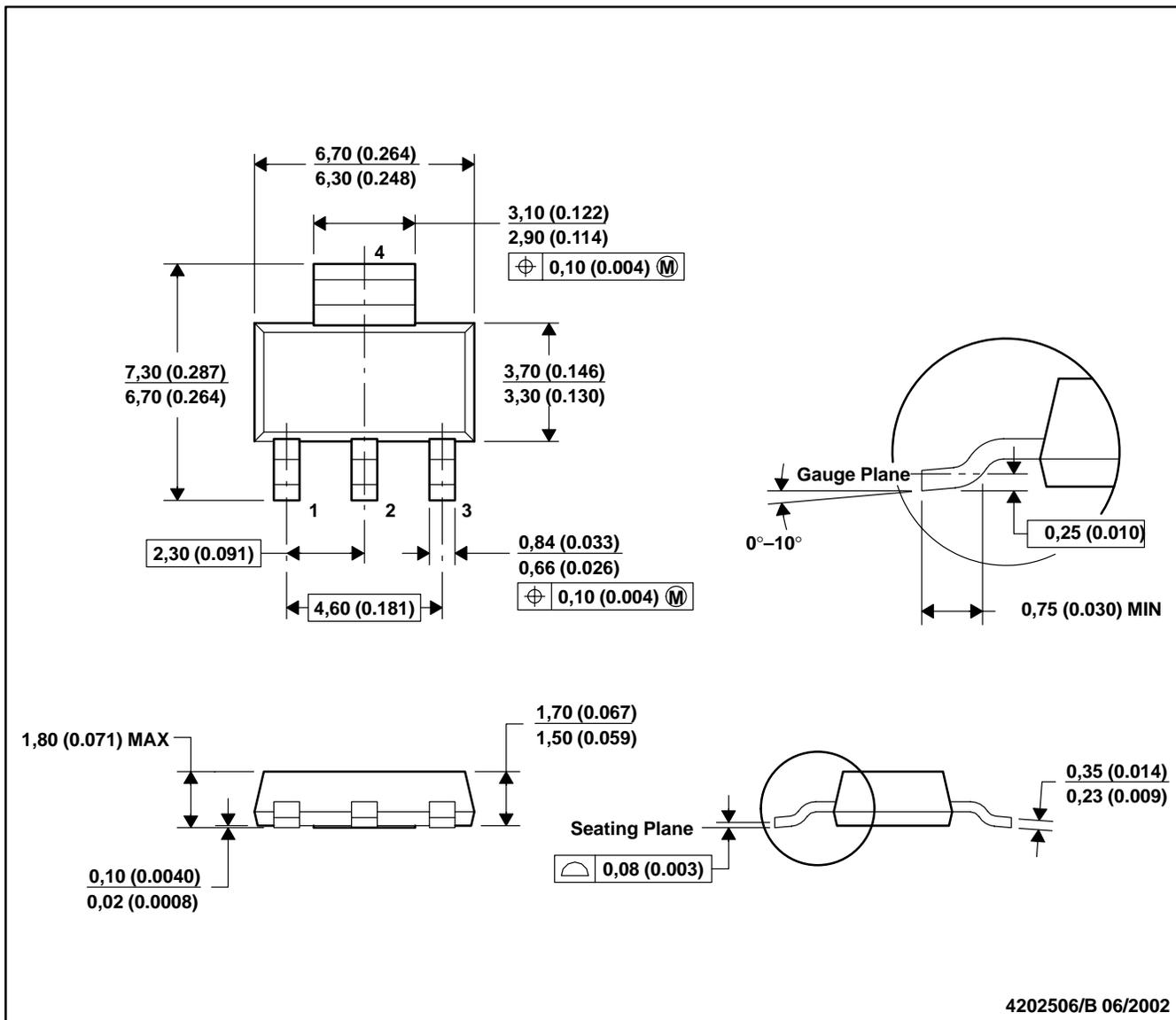
PLASTIC FLANGE-MOUNT PACKAGE



- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Publication IPC-SM-782 is recommended for alternate designs.
 - D. 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.
 - E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.
 - F. 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.

DCY (R-PDSO-G4)

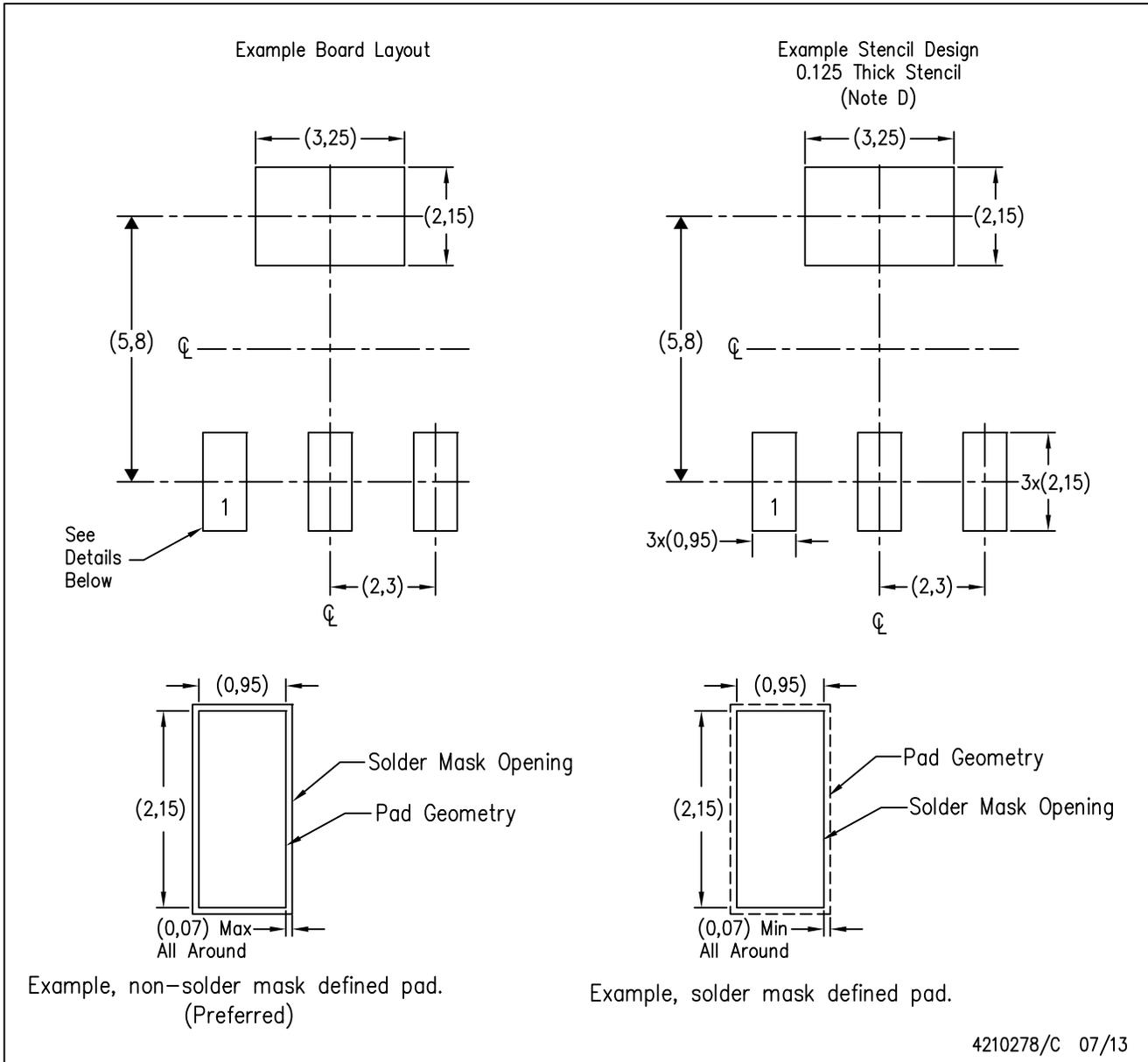
PLASTIC SMALL-OUTLINE



- NOTES: A. All linear dimensions are in millimeters (inches).
 B. This drawing is subject to change without notice.
 C. Body dimensions do not include mold flash or protrusion.
 D. Falls within JEDEC TO-261 Variation AA.

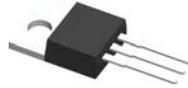
DCY (R-PDSO-G4)

PLASTIC SMALL OUTLINE



- 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. 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.

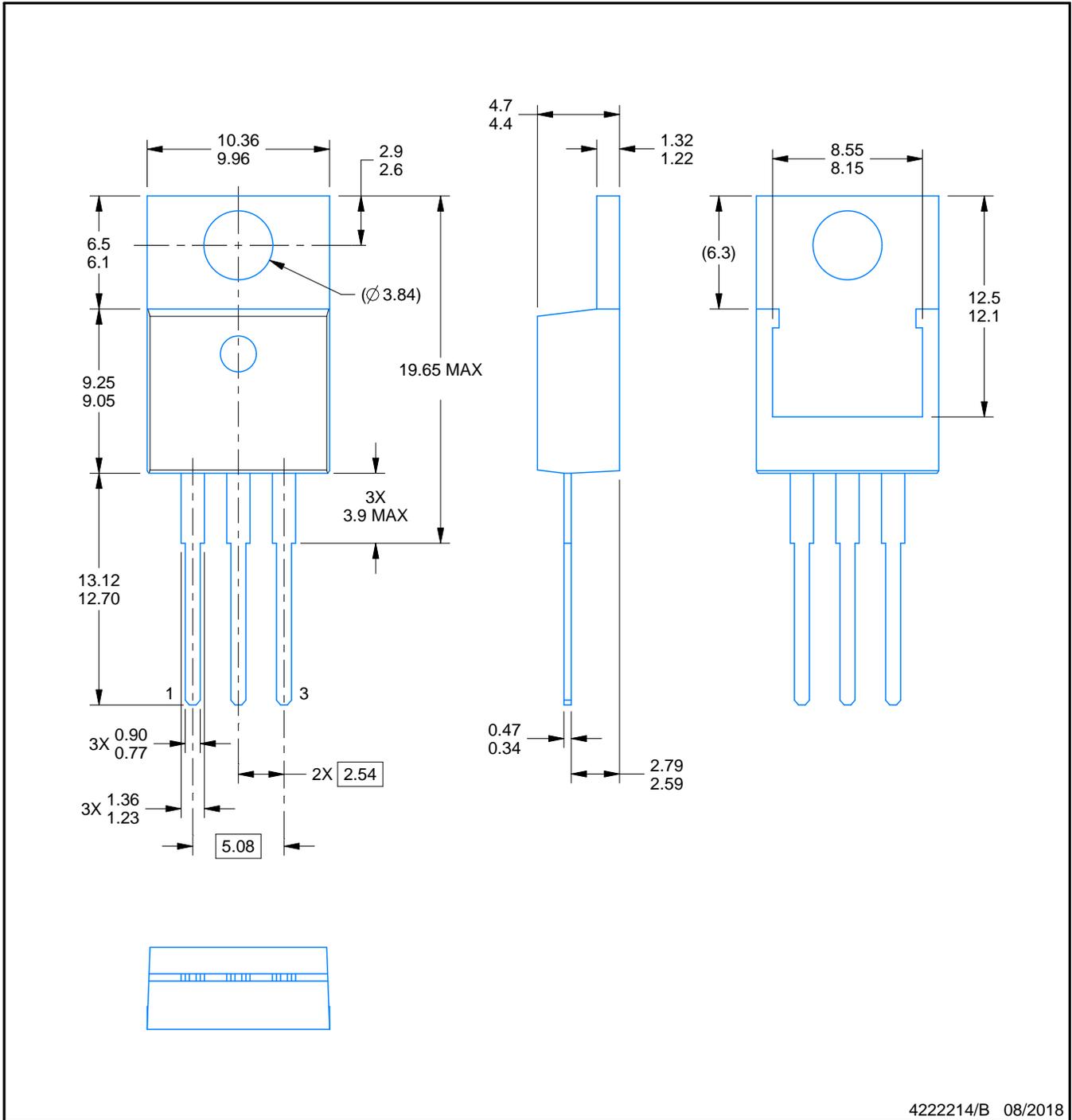
KCS0003B



PACKAGE OUTLINE

TO-220 - 19.65 mm max height

TO-220



4222214/B 08/2018

NOTES:

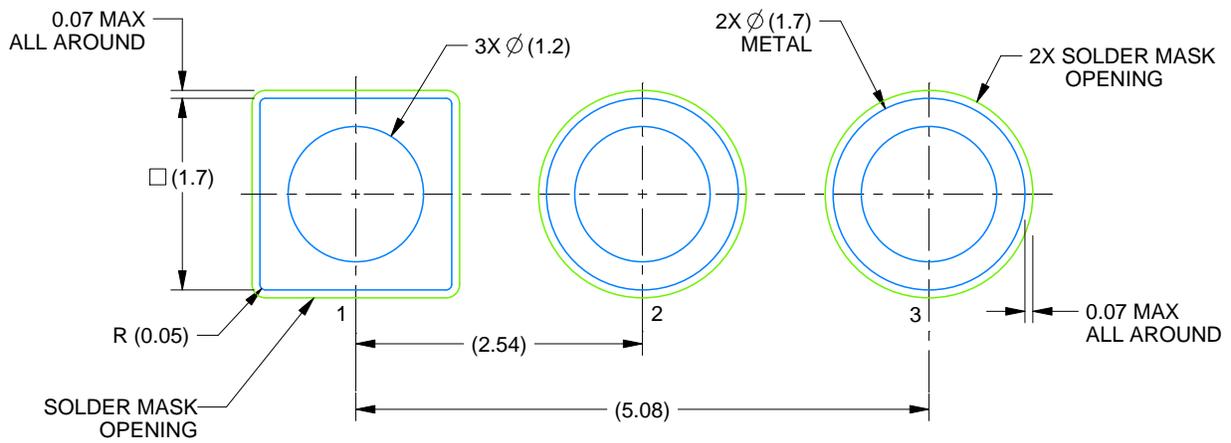
1. Dimensions are in millimeters. Any dimension in brackets or parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Reference JEDEC registration TO-220.

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

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