



深圳市雅创芯瀚电子科技有限公司
SHENZHEN ASTRONG-TECH CO., LTD

AST717 系列

低压差低功耗线性稳压器

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1. 产品说明

AST717系列低压差低功耗线性稳压器(LDO)采用标准的超小型5引脚小外形尺寸(SOT)封装, 包含 SC70(SOT353) 与 SOT23-5L 形式, 部分产品也采用 DFN1x1-4 封装。所有产品均不含铅和卤之类有害物质。

AST717 系列产品内含快速启动电路, 工作时仅需一个10nF低漏电容即可提供非常高的电源抑制比(PSRR), 同时仅消耗50 μ A的超低接地电流。该系列产品采用先进CMOS工艺和功率金属氧化物半导体场效应管PMOS无源器件, 可以实现超低输出噪声, 提供优异的瞬态响应, 并确保在无负载电流时系统稳定。XDL200bq 与1 μ F陶瓷电容或独石电容一起工作时可实现系统稳定, 并且确保在全部的负载, 电源及温度变化范围内实现不低于3%的输出电压精度。该系列产品的设计工作温度范围为-40°C 至 125°C。

AST717 系列所有产品均包含欠压关断, 高温关断及过流保护电路。其过流保护电路在输出端焊盘与地线短路时也充当短路保护器件。

2. 产品特性

输出电压范围: 2.5 V 至 6.5 V

提供多个输出电压版本:

- 固定输出电压范围: 1.0v, 1.2v, 1.5v, 1.8v, 2.0v, 2.5v, 2.8v, 3.0v, 3.3v, 4.0v, 4.5v, 5.0v, 5.5v
- 可调输出电压范围: 1.0 V 至 6.0 V

超高电源抑制比PSRR:

- 150mA负载电流下, 1K/10K/100K/1MHz时分别为70dB/60dB/53dB/45dB

优异的负载响应和线性响应

超低压差: 150 mA负载电流时仅180mV压差

低噪声: 50 μ VRMS 典型值(100 Hz to 100 kHz)

快速启动: 可在EN拉高后于220us达到95%的输出电压 (1 μ F Cout, 10nF Cnr)

3. 应用领域

WiFi, 无线 LAN, 蓝牙 及其他射频应用各类液晶显示器及液晶电视

MP3/MP4 多媒体播放器

DVD 解码器及电视机顶盒

智能手机, 掌上电脑, 平板电脑等手持设备数码相机及摄像机传感器电源

4. 系统框图

AST717系列产品提供高性能可满足高精度模拟电路及射频(RF)应用。其超低静态功耗及超低压差特性使得该系列产品也适用于采取电池供电的应用领域。所有产品均包含欠压关断, 高温关断及过流保护电路。所有固定输出电压版本产品均包含快速启动特性。

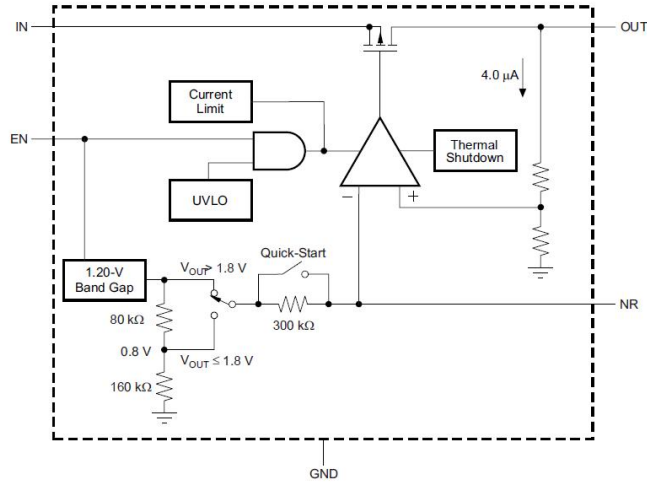


Figure 4.1 固定电压版本结构框图

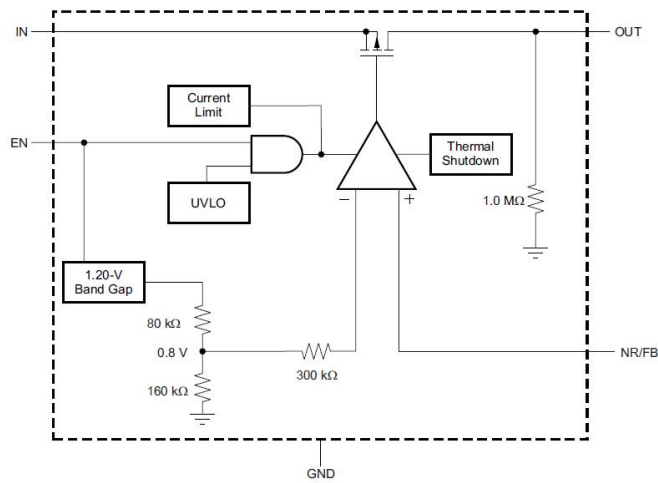


Figure 4.2 可调电压版本结构框图

5. 典型应用示意

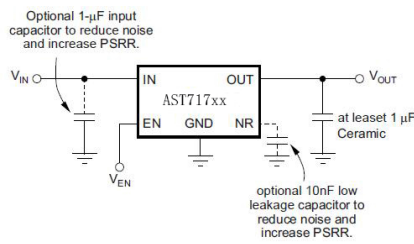


Fig 5.1 典型的固定电压版本应用电路图

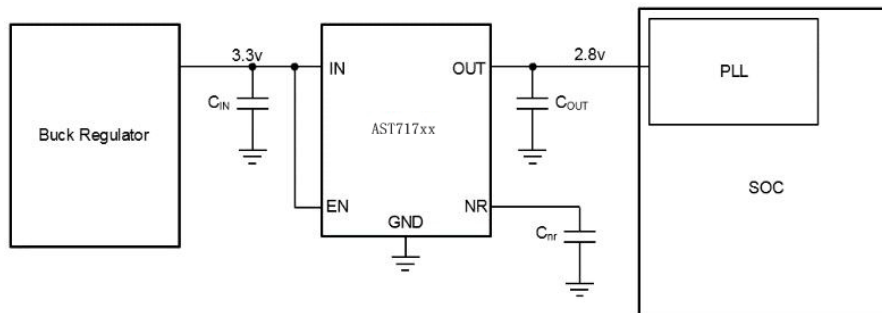


Fig 5.2 AST717系列为SOC系统的锁相环PLL供电时的典型电路图

Table 5.1 焊盘端口说明:

焊盘		IO	注释
名称	端口编号		
EN	3	In	片选/使能信号
FB	4	In	误差放大器外部电压反馈端口, 仅出现在可调电压版本
GND	2	-----	接地
IN	1	In	输入电源, 可选接1uF 陶瓷电容
NR	4	-----	外接降噪电容端口, 仅出现在固定电压版本产品中。可选接10nF降噪电容。由于该端口为高阻抗端口, 外接降噪电容Cnr必须为低漏电容, 绝大多数陶瓷电容即可满足这一条件。
OUT	5	Out	LDO 输出端口, 为保证系统稳定性, 至少需要外接1uF 陶瓷电容或其他低ESR电容

6. 电气特性

6.1 绝对最大额定值

Pin/Parameters	Value	Unit
Power Dissipation	Internal limited	mA
Vin	-0.3 ~ 7.0	V
Ven	-0.3~Vin	V
Vout	-0.3~Vin	V
Lead Temperature Range	260	°C
Storage Temperature Range	-55 ~ 150	°C
Junction Temperature Range	150	°C

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

6.2 隔离电压

		Value	Unit
V(ESD) Electrostatic discharge	Human body model (HBM), per ANSI/ESDA/JEDEC JS-001	+/-2000	V
	Charged device model (CDM), per JEDEC specification JESD22-C101	+/-500	

6.3 推荐操作条件

Pin/Parameters	Value	Unit
Ven	0~Vin	V
Vin	0 ~ 6.0	V
Vout	1.0~5.5	V
Iout	0~200	mA
Cout	1~100	uF
Junction Temperature Range	-40 ~ 125	°C

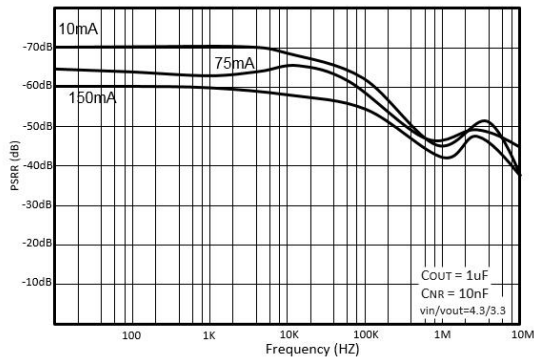
6.4 电气特性

($T_a=27^{\circ}\text{C}$, $V_{IN}=V_{OUT}+1\text{V}$, $C_{IN}=C_{OUT}=1\mu\text{F}$, $C_{nr}=10\text{nF}$, unless otherwise noted)

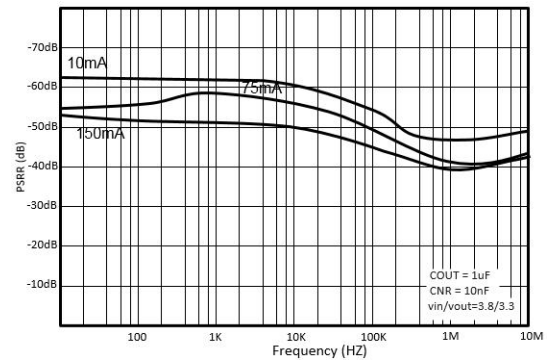
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	$V_{OUT} < 2\text{V}$, $V_{IN}=2.7\text{V}$, $I_{OUT}=1\text{mA}$	$0.97 \cdot V_{OUT}$	V_{OUT}	$1.03 \cdot V_{OUT}$	V
		$V_{OUT} \geq 2\text{V}$, $I_{OUT}=1\text{mA}$	$0.98 \cdot V_{OUT}$	V_{OUT}	$1.02 \cdot V_{OUT}$	
Current Limit	I_{LIM}	$V_{EN}=V_{IN}$	400			mA
Dropout Voltage	V_{DROP}	$V_{OUT}=2.8\text{V}$, $I_{OUT}=150\text{mA}$		180	200	mV
		$V_{OUT}=2.8\text{V}$, $I_{OUT}=20\text{mA}$		200	230	
Line Regulation	ΔV_{LINE}	$V_{IN}=2.7\sim 5.5\text{V}$, $I_{OUT}=1\text{mA}$		0.01	0.15	%/V
Load Regulation	ΔV_{Load}	$V_{OUT}=2.8\text{V}$, $I_{OUT}=1\sim 200\text{mA}$		20	30	mV
Quiescent Current	I_Q	$V_{OUT}=2.8\text{V}$, $I_{OUT}=0$	40	50	60	μA
Short Current	I_{SHORT}	$V_{EN}=V_{IN}$, V_{OUT} Short to GND with 1Ω			400	mA
Shut-down Current	I_{SHDN}	$V_{EN}=0\text{V}$			1.0	μA
Power Supply Rejection Rate	PSRR	$V_{IN}=(V_{OUT}+1\text{V})_{DC}+0.5\text{VP-P}$ $F=1\text{KHz}$, $I_{out}=150\text{mA}$		70		dB
		$V_{IN}=(V_{OUT}+1\text{V})_{DC}+0.5\text{VP-P}$ $F=1\text{MHz}$, $I_{out}=150\text{mA}$		45		
EN logic high voltage	V_{ENH}	$V_{IN}=5.5\text{V}$, $I_{OUT}=1\text{mA}$	1.4			V
EN logic low voltage	V_{ENL}	$V_{IN}=5.5\text{V}$, $V_{OUT}=0\text{V}$			0.4	V
EN Input Current	I_{EN}	$V_{EN}=0$ to 5.5V			1.0	μA
Output Noise Voltage	eNO	100Hz to 100KHz, $C_{OUT}=1\mu\text{F}$		50		μVRMS
$T_{startup}$	T_{su}	Startup time for reaching 95% of V_{out}		220		μs
UVLO	Undervoltage Lockout Hysteresis	Vin rising		2.40		V
		Vin falling		2.20		
T_{sd}	Thermal shutdown	Shutdown, temperature increase		120		$^{\circ}\text{C}$
		Reset, temperature decrease		90		

6.5 典型特性

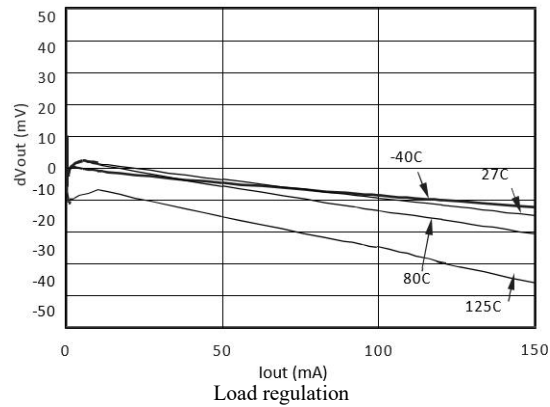
Over operation temperature range ($T_j = -40^\circ\text{C}$ to 125°C), $V_{IN} = V_{OUT}(\text{nom}) + 0.5\text{V}$ or 2.8V , whichever is greater; $V_{en} = V_{in}$, $C_{OUT} = 1\mu\text{F}$, $C_{nr} = 10\text{nF}$, unless otherwise noted; Typical values are at $T_a = 27^\circ\text{C}$



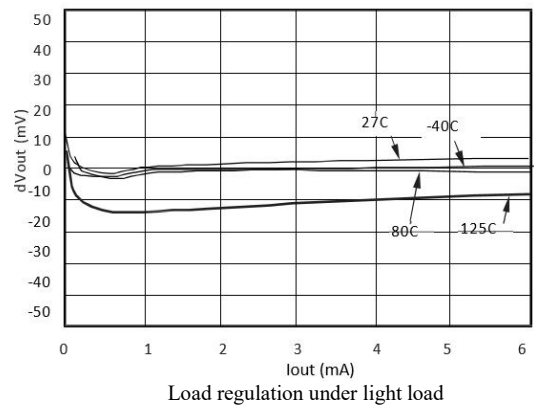
PSRR with $1\mu\text{F}$ Cout, $V_{in} - V_{out} = 1.0\text{V}$



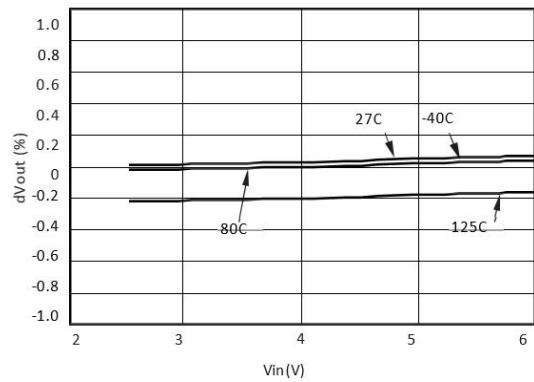
PSRR with $1\mu\text{F}$ Cout, $V_{in} - V_{out} = 0.5\text{V}$



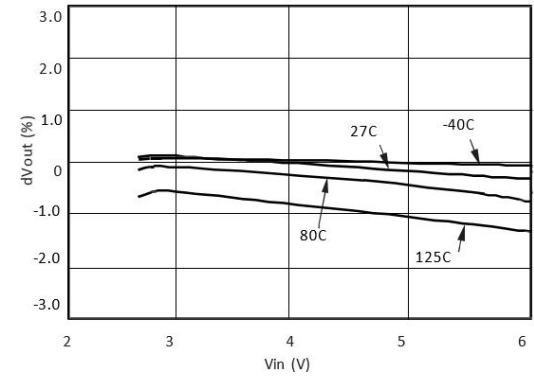
Load regulation



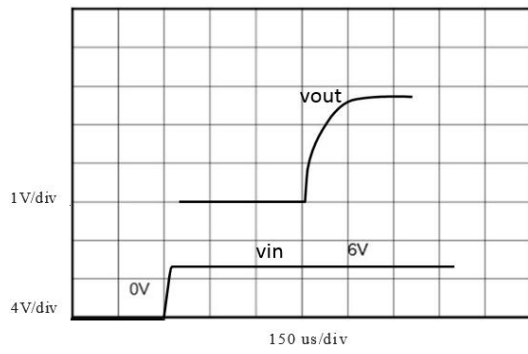
Load regulation under light load



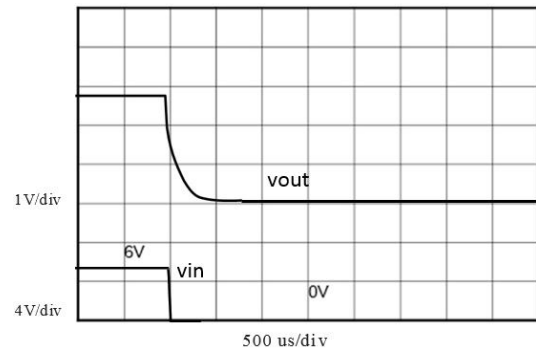
Line regulation with 1mA I_{out}



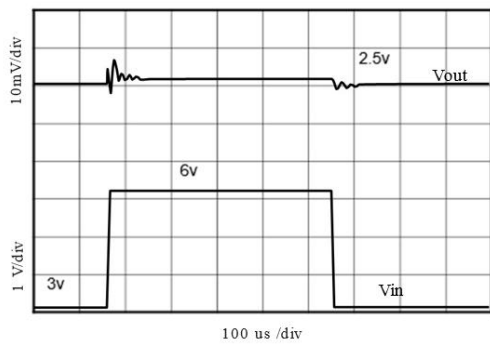
Line regulation with 150mA I_{out}



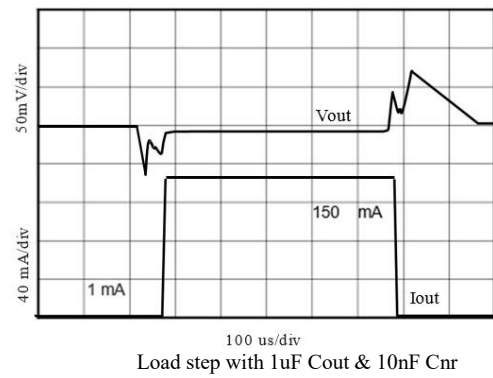
Power-up with 1uF Cout



Power-down with 1uF Cout



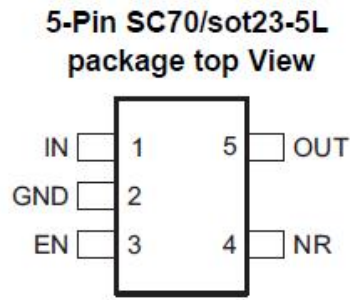
Line step with 1uF Cout & 10nF Cnr



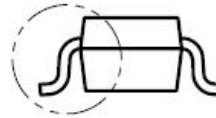
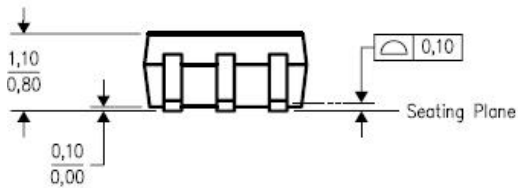
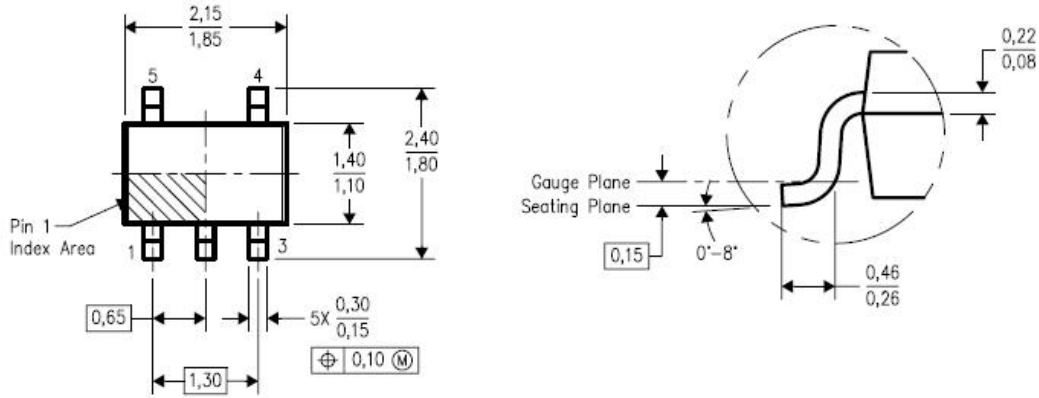
Load step with 1uF Cout & 10nF Cnr

7. 封装尺寸

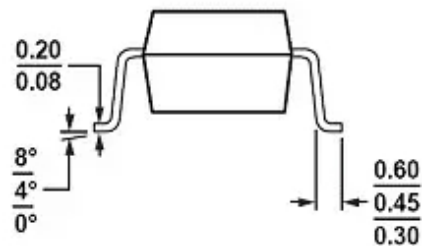
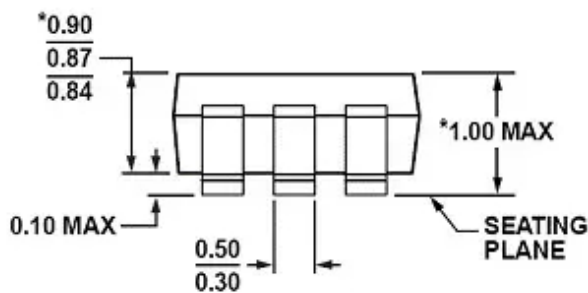
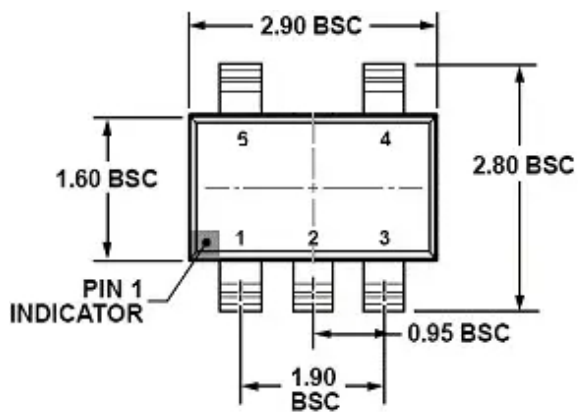
7.1 产品引脚说明



7.2 SC70-5封装尺寸



7.3 SOT23-5L封装尺寸



8. 订货型号

订购信息

型号	输出电压	封装形式	质量等级	工作温度
AST71733IST	3.3V	SOT23-5L	工业级	-40°C ~ +125°C
AST71728IST	2.8V	SOT23-5L	工业级	-40°C ~ +125°C
AST71733ISC	3.3V	SC70-5	工业级	-40°C ~ +125°C
AST71728ISC	2.8V	SC70-5	工业级	-40°C ~ +125°C