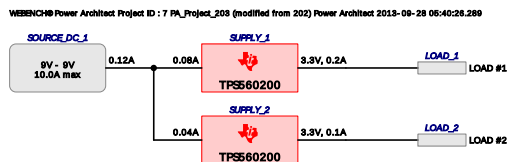


# WEBENCH® Power Architect



## 项目报告

项目 : 3710063/7 : PA\_Project\_203 (modified from 202)

创建 : 2013-09-28 05:40:26.289

Optimize project optFactor=2

### 项目概览

|                                   |                       |
|-----------------------------------|-----------------------|
| 1. 整体系统效率                         | 89.295 %              |
| 2. 总系统 BOM 数量                     | 14.0                  |
| 3. 整体系统大小                         | 226.0 mm <sup>2</sup> |
| 4. 总系统 BOM 成本                     | \$1.71                |
| 5. Total System Power Dissipation | 118.7 mW              |

--> 发布 WEBENCH Power Architect.

## 电源供应

| # 名称        | NSID      | 说明                                                                                    | Vout  | Iout  | 效率    | Foot-print | Cost   | Design | 页面 |
|-------------|-----------|---------------------------------------------------------------------------------------|-------|-------|-------|------------|--------|--------|----|
| 1. SUPPLY_1 | TPS560200 | Switcher : 17V, 500mA,5-pin, Low Iq Synchronous buck converter with Advanced Eco-mode | 3.3 V | 0.2 A | 89.3% | 131        | \$0.85 | 78     | 4  |
| 2. SUPPLY_2 | TPS560200 | Switcher : 17V, 500mA,5-pin, Low Iq Synchronous buck converter with Advanced Eco-mode | 3.3 V | 0.1 A | 89.2% | 95         | \$0.86 | 79     | 9  |

## 电源负载

| # 名称       | VLoad | Iload | 说明                                         |
|------------|-------|-------|--------------------------------------------|
| 1. LOAD #1 | 3.3 V | 0.2 A | VoutRipple=10%, Requires a separate supply |
| 2. LOAD #2 | 3.3 V | 0.1 A | VoutRipple=10%, Requires a separate supply |

Project Diagram



## 电气采购BOM

| 制造商               | 零件编号             | 说明        | 数量 | Budgetary Price | 大小<br>(mm <sup>2</sup> ) |
|-------------------|------------------|-----------|----|-----------------|--------------------------|
| AVX               | 08053C104KAT2A   | 0805      | 2  | \$0.01          | 14                       |
| Kemet             | C0805C106K8PACTU | 0805      | 2  | \$0.05          | 14                       |
| TDK               | C3216X5R0J226K   | 1206      | 2  | \$0.11          | 22                       |
| Vishay-Dale       | CRCW040220K0FKED | 0402      | 2  | \$0.01          | 6                        |
| Vishay-Dale       | CRCW040261K9FKED | 0402      | 2  | \$0.01          | 6                        |
| Bourns            | SDR0403-100ML    | SDR0403   | 1  | \$0.17          | 28                       |
| Bourns            | SRN6045-100M     | SRN6045   | 1  | \$0.16          | 64                       |
| Texas Instruments | TPS560200DBVR    | R-PDSO-G5 | 2  | \$0.50          | 33                       |
| Total             |                  |           | 14 | \$1.71          | 185                      |

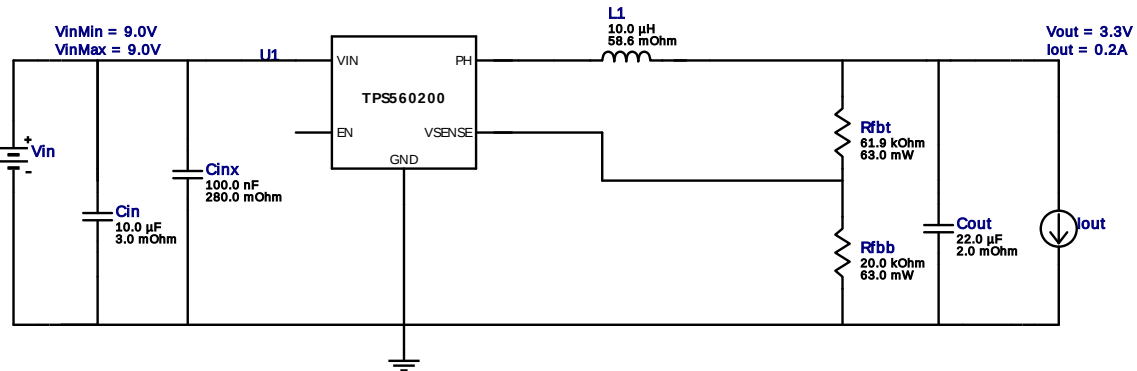


## WEBENCH® 设计报告

Design : 3710063/78 TPS560200DBVR  
TPS560200DBVR 9.0V-9.0V to 3.3V @ 0.2A

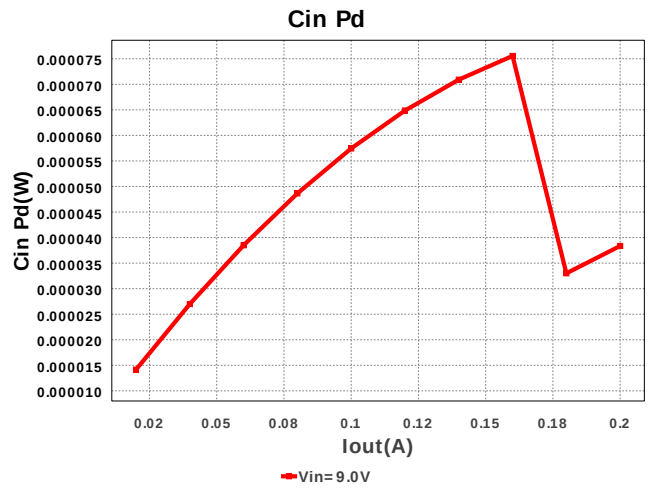
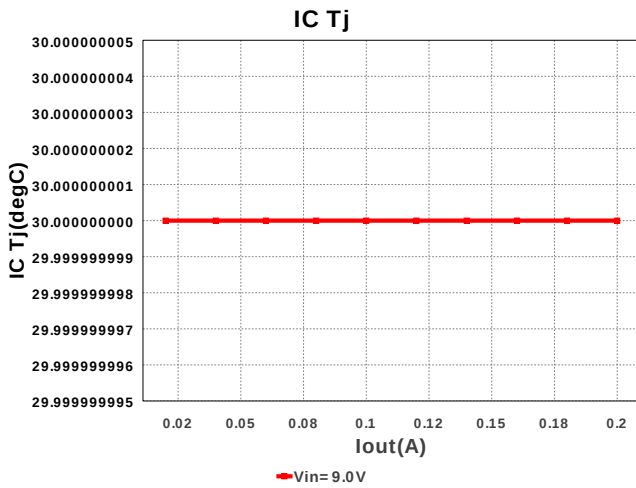
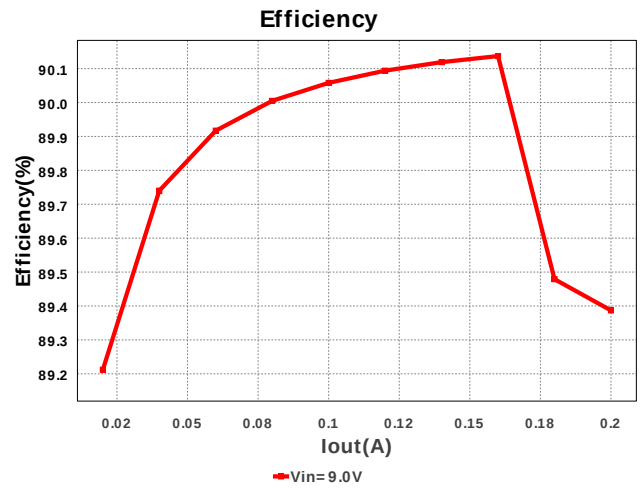
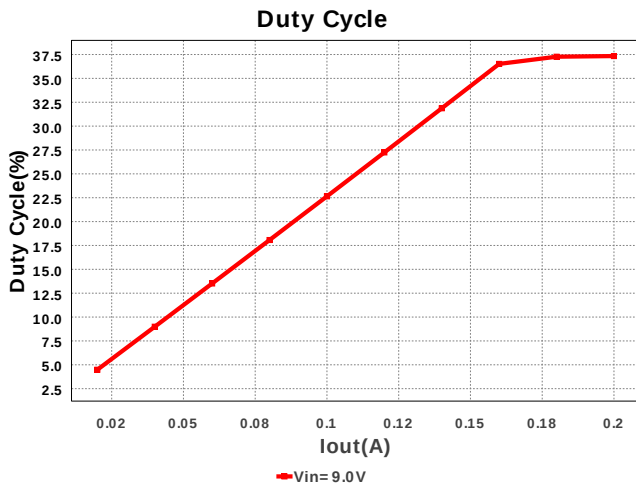
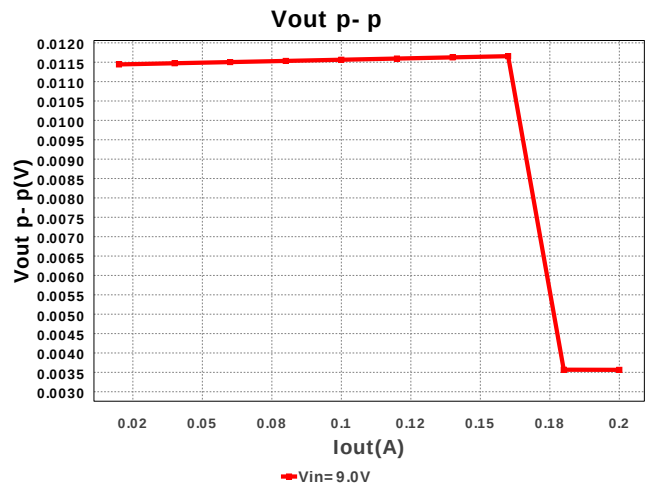
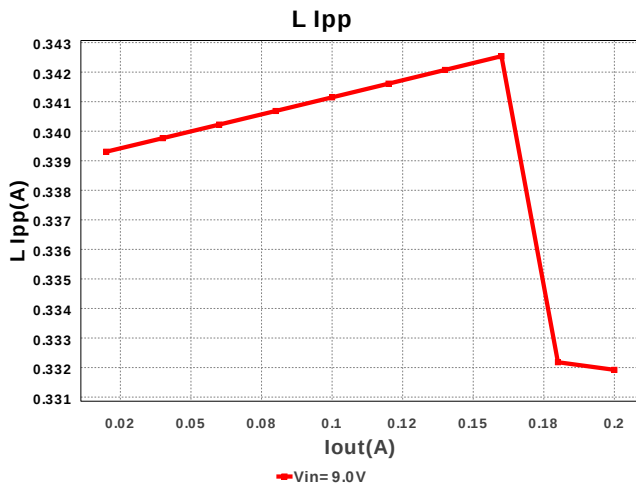
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VinMax = 9.0V  
Vout = 3.3V  
Iout = 0.2A

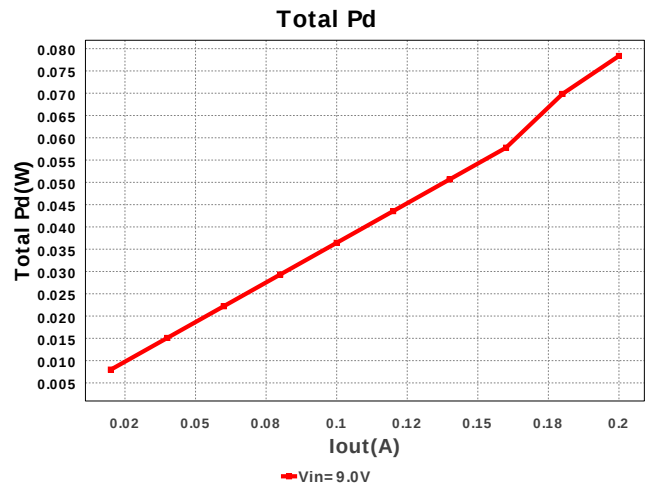
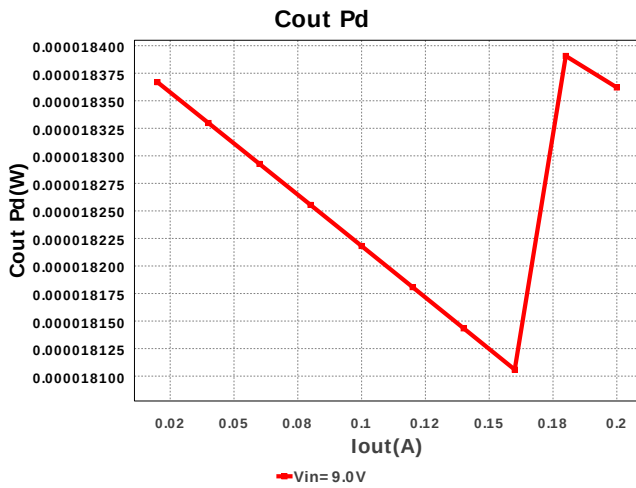
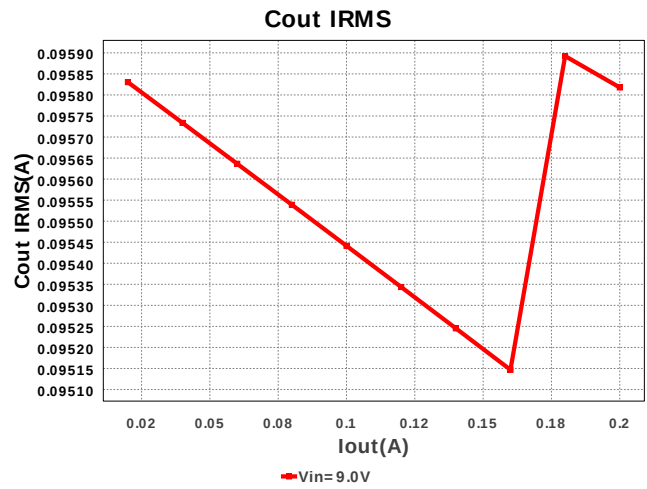
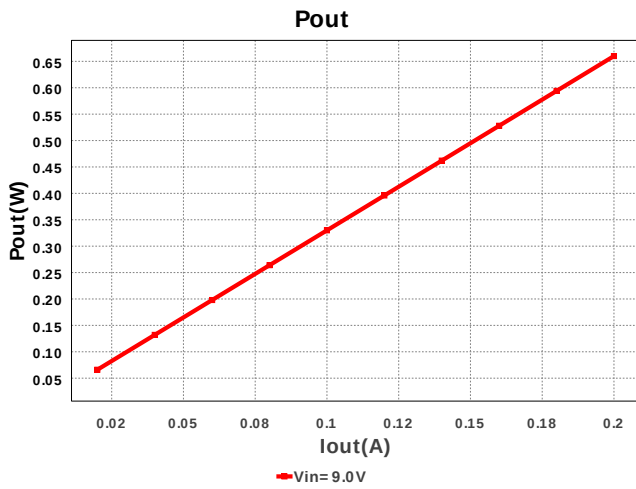
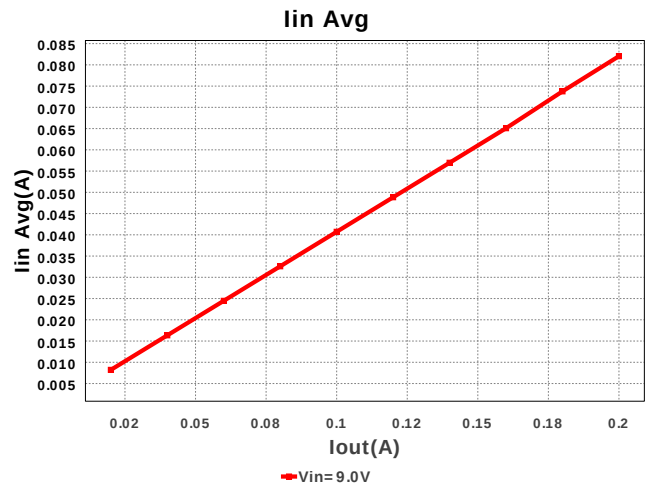
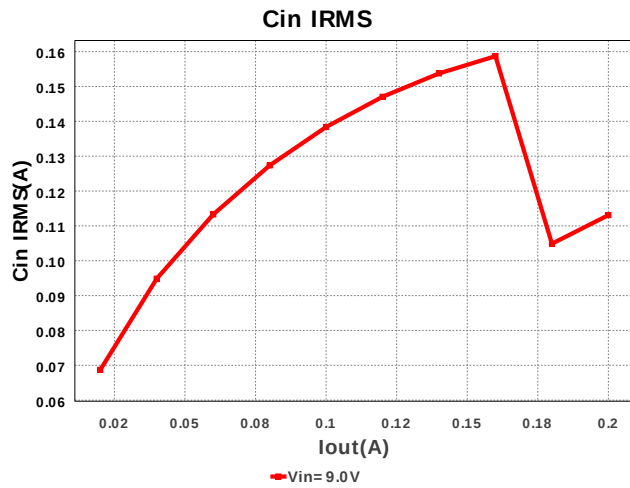
Device = TPS560200DBVR  
Topology = Buck  
创建 = 9/28/13 5:40:20 AM  
BOM成本 = \$0.85  
Total Pd = 0.08W  
大小 = 131.0mm2  
BOM 数量 = 7

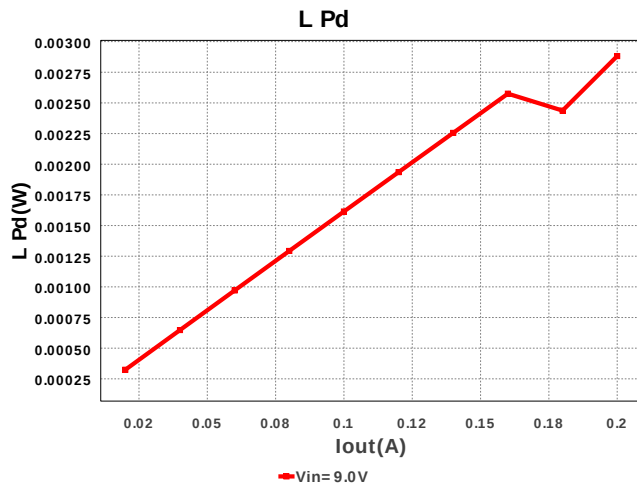
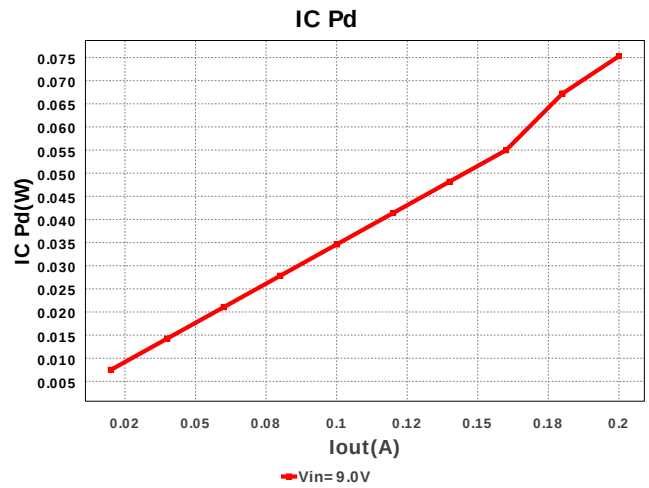
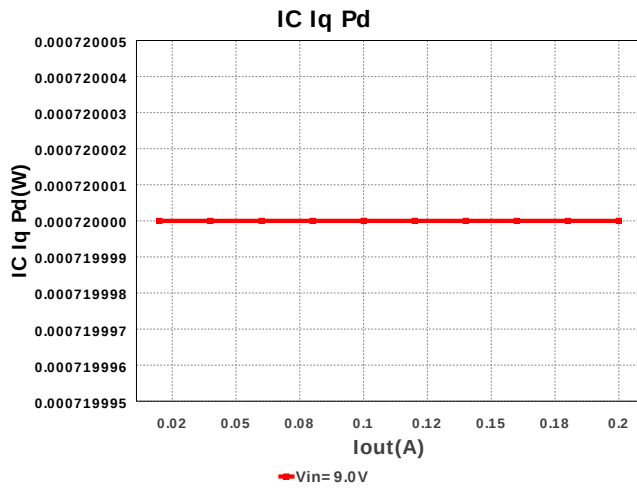


## 电气材料清单

| #  | 名称    | 制造商               | 零件编号                                  | 属性                                                             | Qty | Price  | 大小                                                                                                       |
|----|-------|-------------------|---------------------------------------|----------------------------------------------------------------|-----|--------|----------------------------------------------------------------------------------------------------------|
| 1. | Cin   | Kemet             | C0805C106K8PACTU<br>Series= X5R       | Cap= 10.0 µF<br>ESR= 3.0 mOhm<br>VDC= 10.0 V<br>IRMS= 11.43 A  | 1   | \$0.05 | <br>0805 7mm2       |
| 2. | Cinx  | AVX               | 08053C104KAT2A<br>Series= X7R         | Cap= 100.0 nF<br>ESR= 280.0 mOhm<br>VDC= 25.0 V<br>IRMS= 0.0 A | 1   | \$0.01 | <br>0805 7mm2       |
| 3. | Cout  | TDK               | C3216X5R0J226K<br>Series= X5R         | Cap= 22.0 µF<br>ESR= 2.0 mOhm<br>VDC= 6.3 V<br>IRMS= 3.62 A    | 1   | \$0.11 | <br>1206 11mm2      |
| 4. | L1    | Bourns            | SRN6045-100M                          | L= 10.0 µH<br>DCR= 58.6 mOhm                                   | 1   | \$0.16 | <br>SRN6045 64mm2   |
| 5. | Rfbb  | Vishay-Dale       | CRCW040220K0FKED<br>Series= CRCW...e3 | Res= 20.0 kOhm<br>Power= 63.0 mW<br>Tolerance= 1.0%            | 1   | \$0.01 | <br>0402 3mm2       |
| 6. | Rfbbt | Vishay-Dale       | CRCW040261K9FKED<br>Series= CRCW...e3 | Res= 61.9 kOhm<br>Power= 63.0 mW<br>Tolerance= 1.0%            | 1   | \$0.01 | <br>0402 3mm2       |
| 7. | U1    | Texas Instruments | TPS560200DBVR                         | Switcher                                                       | 1   | \$0.50 | <br>R-PDSO-G5 16mm2 |







## 工作数值

| #   | 名称         | 数值                    | 类别       | 说明                         |
|-----|------------|-----------------------|----------|----------------------------|
| 1.  | Cin IRMS   | 113.102 mA            | Current  | 输入电容器均方根纹波电流               |
| 2.  | Cout IRMS  | 95.848 mA             | Current  | 输出电容器均方根纹波电流               |
| 3.  | Iin Avg    | 82.083 mA             | Current  | 平均输入电流                     |
| 4.  | L Ipp      | 332.029 mA            | Current  | 峰值到峰值电感器纹波电流               |
| 5.  | BOM 数量     | 7                     | General  | Total Design BOM count     |
| 6.  | 大小         | 131.0 mm <sup>2</sup> | General  | BOM组件的总所占面积                |
| 7.  | 频率         | 626.21 kHz            | General  | 开关频率                       |
| 8.  | Pout       | 660.0 mW              | General  | 总输出功率                      |
| 9.  | 总 BOM      | \$0.85                | General  | Total BOM Cost             |
| 10. | Vout OP    | 3.3 V                 | Op_Point | Operational Output Voltage |
| 11. | 占空比        | 37.354 %              | Op_point | 占空比                        |
| 12. | 效率         | 89.341 %              | Op_point | 稳态效率                       |
| 13. | IC Tj      | 37.567 degC           | Op_point | 电路接点温度                     |
| 14. | ICThetaJA  | 100.0 degC/W          | Op_point | 电路接点到环境热敏电阻                |
| 15. | IOUT_OP    | 200.0 mA              | Op_point | Iout 操作点                   |
| 16. | VIN_OP     | 9.0 V                 | Op_point | Vin操作点                     |
| 17. | Vout p-p   | 3.566 mV              | Op_point | 峰值到峰值输出纹波电压                |
| 18. | Cin Pd     | 38.376 μW             | Power    | 输入电容器功率耗散                  |
| 19. | Cout Pd    | 18.374 μW             | Power    | 输出电容器功率耗散                  |
| 20. | 电路静态电流功率耗散 | 720.0 μW              | Power    | 电路静态电流功率耗散                 |
| 21. | IC Pd      | 75.673 mW             | Power    | 电路功率耗散                     |
| 22. | L Pd       | 2.882 mW              | Power    | 电感器功率耗散                    |
| 23. | 整体 Pd      | 78.743 mW             | Power    | 总功率耗散                      |

## 设计输入

| #  | 名称     | 数值          | 说明                |
|----|--------|-------------|-------------------|
| 1. | 输出电流   | 200.0 mA    | 最大输出电流            |
| 2. | Iout1  | 200.0 mAmps | Output Current #1 |
| 3. | Vin 最大 | 9.0 V       | 最高输入电压            |
| 4. | Vin 最小 | 9.0 V       | 最低输入电压            |

| #  | 名称      | 数值        | 说明                |
|----|---------|-----------|-------------------|
| 5. | 输出电压:   | 3.3 V     | 输出电压              |
| 6. | Vout1   | 3.3 Volt  | Output Voltage #1 |
| 7. | base_pn | TPS560200 | 美国国家半导体的产品编号      |
| 8. | 源       | DC        | 输入源类别             |
| 9. | 工作环境温度  | 30.0 degC | 环境温度              |

## 设计协助

1. TPS560200 Product Folder : <http://www.ti.com/product/TPS560200> : contains the data sheet and other resources.

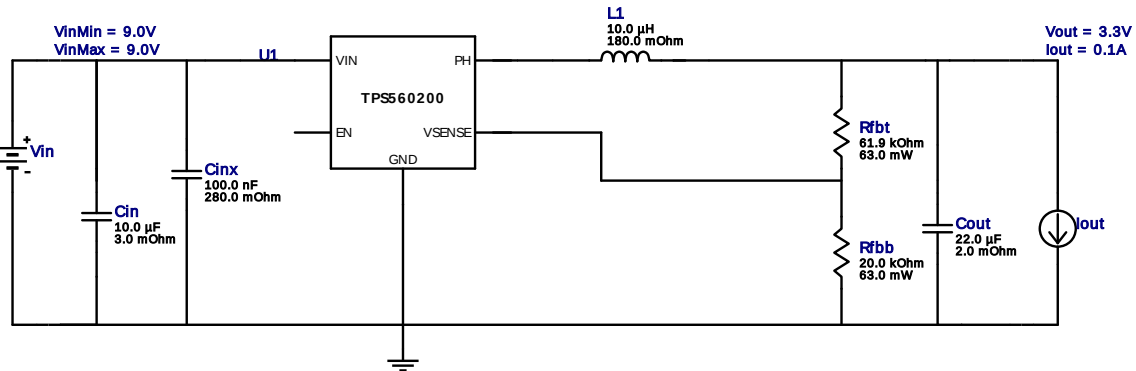


## WEBENCH® 设计报告

Design : 3710063/79 TPS560200DBVR  
TPS560200DBVR 9.0V-9.0V to 3.3V @ 0.1A

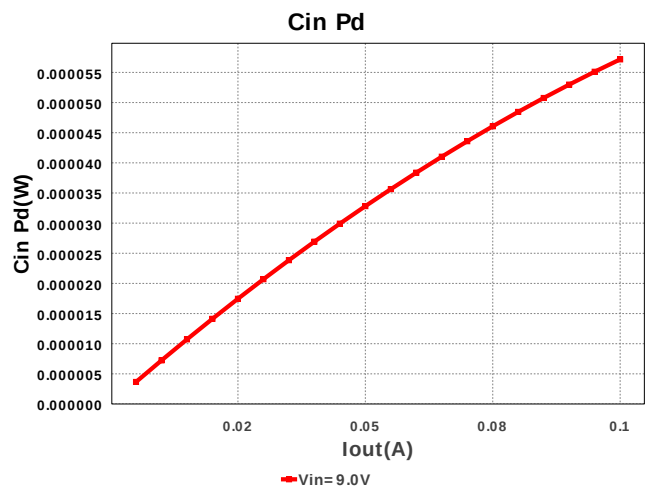
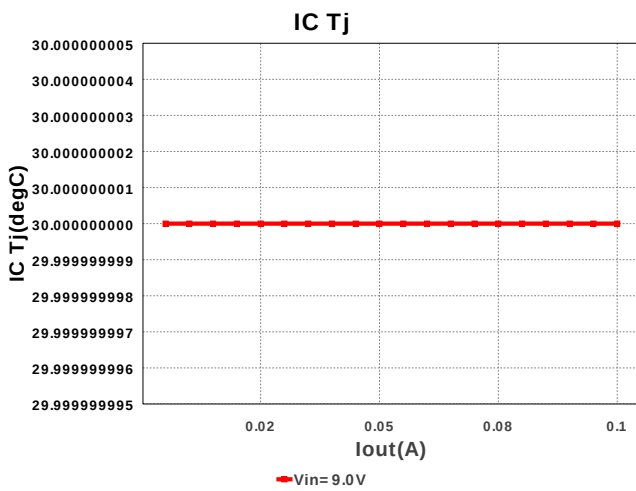
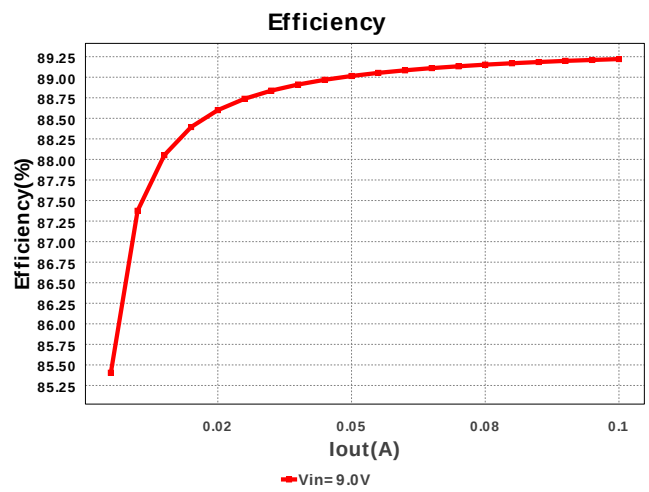
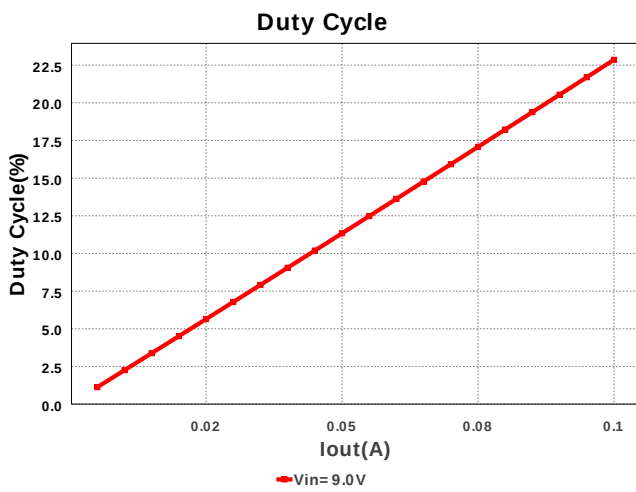
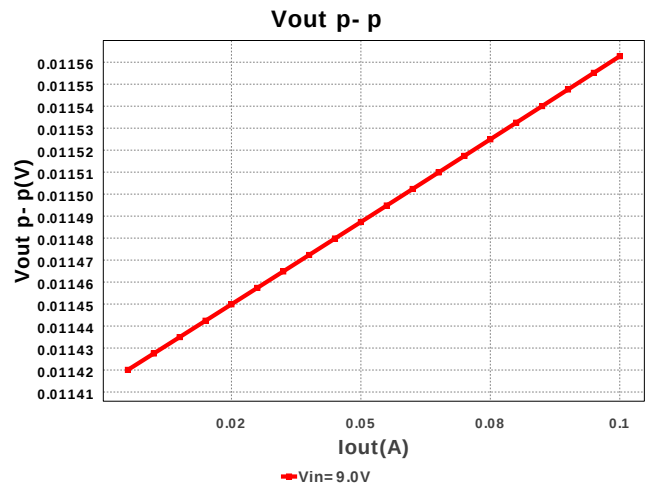
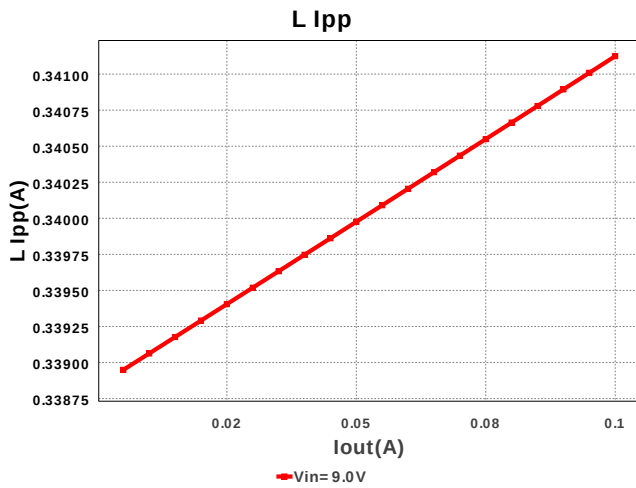
VinMin = 9.0V  
VinMax = 9.0V  
Vout = 3.3V  
Iout = 0.1A

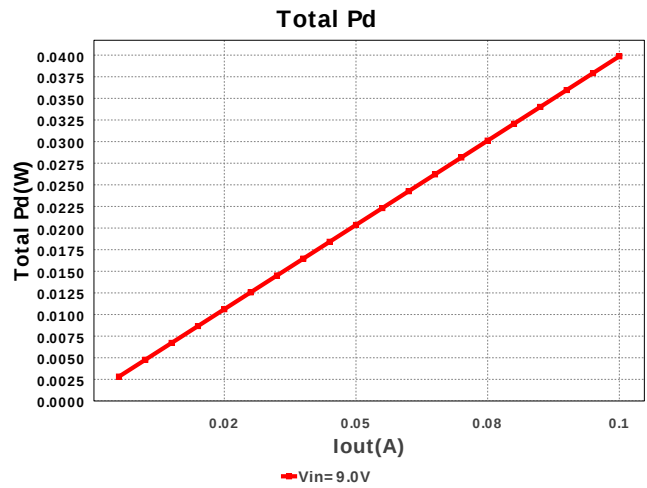
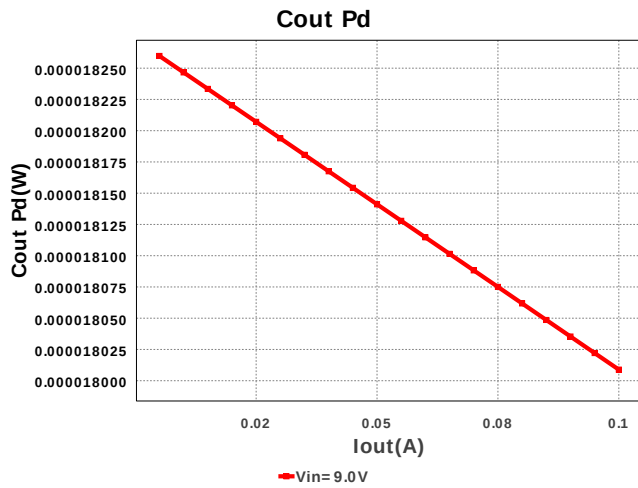
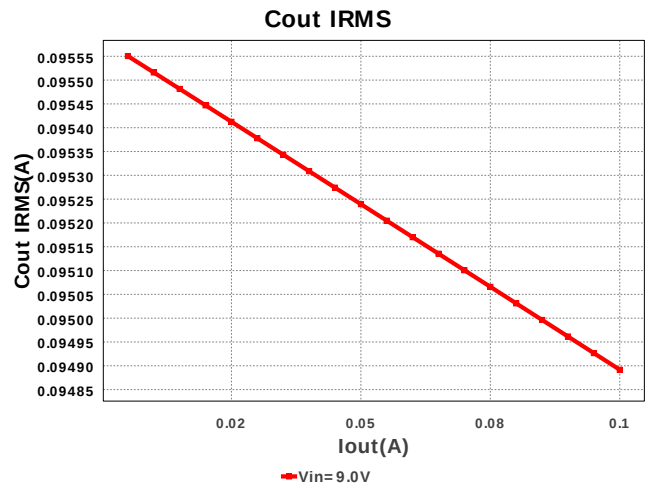
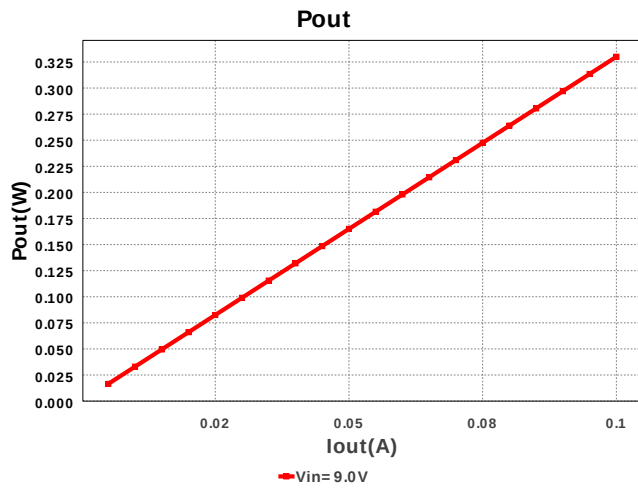
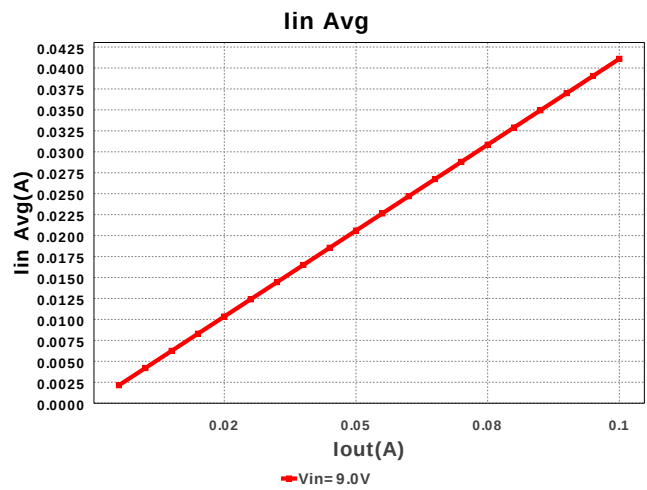
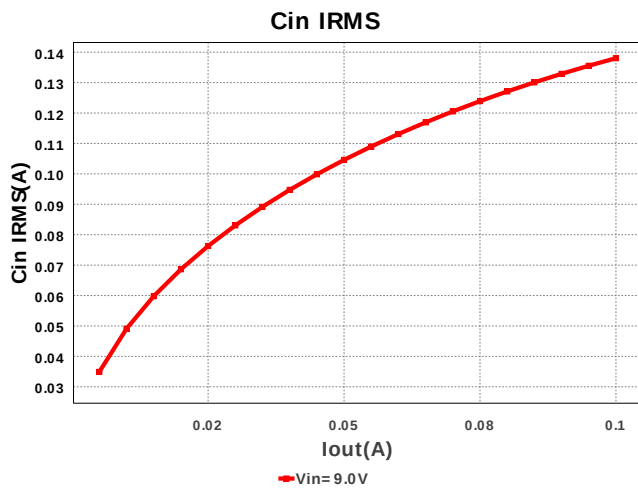
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Topology = Buck  
创建 = 9/28/13 5:40:22 AM  
BOM成本 = \$0.86  
Total Pd = 0.04W  
大小 = 95.0mm2  
BOM 数量 = 7

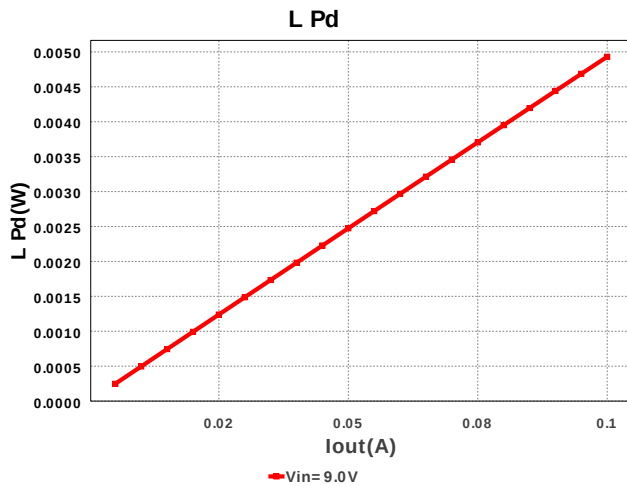
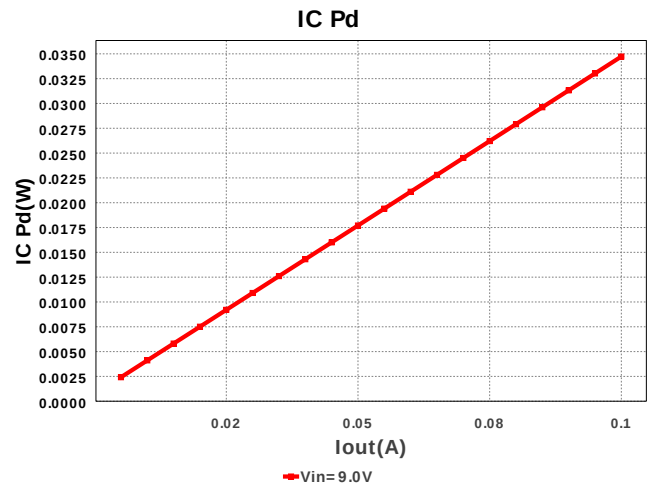
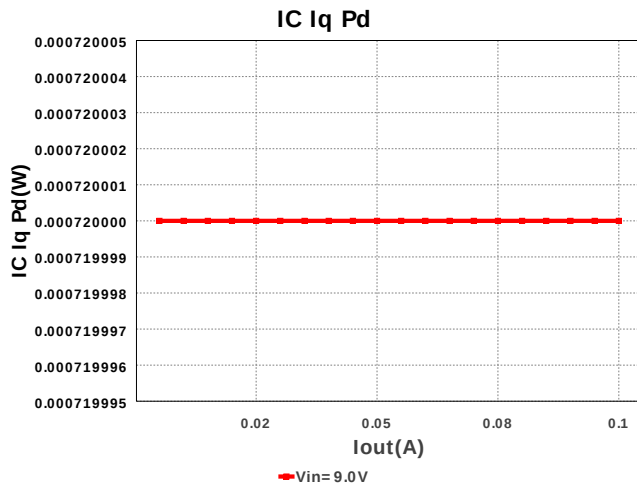


## 电气材料清单

| #  | 名称    | 制造商               | 零件编号                                 | 属性                                                             | Qty | Price  | 大小                                                                                                    |
|----|-------|-------------------|--------------------------------------|----------------------------------------------------------------|-----|--------|-------------------------------------------------------------------------------------------------------|
| 1. | Cin   | Kemet             | C0805C106K8PACTU<br>Series= X5R      | Cap= 10.0 µF<br>ESR= 3.0 mOhm<br>VDC= 10.0 V<br>IRMS= 11.43 A  | 1   | \$0.05 |  0805 7mm2       |
| 2. | Cinx  | AVX               | 08053C104KAT2A<br>Series= X7R        | Cap= 100.0 nF<br>ESR= 280.0 mOhm<br>VDC= 25.0 V<br>IRMS= 0.0 A | 1   | \$0.01 |  0805 7mm2       |
| 3. | Cout  | TDK               | C3216X5R0J226K<br>Series= X5R        | Cap= 22.0 µF<br>ESR= 2.0 mOhm<br>VDC= 6.3 V<br>IRMS= 3.62 A    | 1   | \$0.11 |  1206 11mm2      |
| 4. | L1    | Bourns            | SDR0403-100ML                        | L= 10.0 µH<br>DCR= 180.0 mOhm                                  | 1   | \$0.17 |  SDR0403 28mm2   |
| 5. | Rfbb  | Vishay-Dale       | CRCW040220K0FKED<br>Series= CRCW..e3 | Res= 20.0 kOhm<br>Power= 63.0 mW<br>Tolerance= 1.0%            | 1   | \$0.01 |  0402 3mm2       |
| 6. | Rfbbt | Vishay-Dale       | CRCW040261K9FKED<br>Series= CRCW..e3 | Res= 61.9 kOhm<br>Power= 63.0 mW<br>Tolerance= 1.0%            | 1   | \$0.01 |  0402 3mm2       |
| 7. | U1    | Texas Instruments | TPS560200DBVR                        | Switcher                                                       | 1   | \$0.50 |  R-PDSO-G5 16mm2 |







## 工作数值

| #   | 名称         | 数值                   | 类别       | 说明                         |
|-----|------------|----------------------|----------|----------------------------|
| 1.  | Cin IRMS   | 138.033 mA           | Current  | 输入电容器均方根纹波电流               |
| 2.  | Cout IRMS  | 94.892 mA            | Current  | 输出电容器均方根纹波电流               |
| 3.  | Iin Avg    | 41.105 mA            | Current  | 平均输入电流                     |
| 4.  | L Ipp      | 341.124 mA           | Current  | 峰值到峰值电感器纹波电流               |
| 5.  | BOM 数量     | 7                    | General  | Total Design BOM count     |
| 6.  | 大小         | 95.0 mm <sup>2</sup> | General  | BOM组件的总所占面积                |
| 7.  | 频率         | 381.946 kHz          | General  | 开关频率                       |
| 8.  | Pout       | 330.0 mW             | General  | 总输出功率                      |
| 9.  | 总 BOM      | \$0.86               | General  | Total BOM Cost             |
| 10. | Vout OP    | 3.3 V                | Op_Point | Operational Output Voltage |
| 11. | 占空比        | 22.858 %             | Op_point | 占空比                        |
| 12. | 效率         | 89.203 %             | Op_point | 稳态效率                       |
| 13. | IC Tj      | 33.48 degC           | Op_point | 电路接点温度                     |
| 14. | ICThetaJA  | 100.0 degC/W         | Op_point | 电路接点到环境热敏电阻                |
| 15. | IOUT_OP    | 100.0 mA             | Op_point | Iout 操作点                   |
| 16. | VIN_OP     | 9.0 V                | Op_point | Vin操作点                     |
| 17. | Vout p-p   | 11.563 mV            | Op_point | 峰值到峰值输出纹波电压                |
| 18. | Cin Pd     | 57.16 $\mu$ W        | Power    | 输入电容器功率耗散                  |
| 19. | Cout Pd    | 18.009 $\mu$ W       | Power    | 输出电容器功率耗散                  |
| 20. | 电路静态电流功率耗散 | 720.0 $\mu$ W        | Power    | 电路静态电流功率耗散                 |
| 21. | IC Pd      | 34.805 mW            | Power    | 电路功率耗散                     |
| 22. | L Pd       | 4.931 mW             | Power    | 电感器功率耗散                    |
| 23. | 整体 Pd      | 39.943 mW            | Power    | 总功率耗散                      |

## 设计输入

| #  | 名称     | 数值          | 说明                |
|----|--------|-------------|-------------------|
| 1. | 输出电流   | 100.0 mA    | 最大输出电流            |
| 2. | Iout1  | 100.0 mAmps | Output Current #1 |
| 3. | Vin 最大 | 9.0 V       | 最高输入电压            |
| 4. | Vin 最小 | 9.0 V       | 最低输入电压            |

| #  | 名称      | 数值        | 说明                |
|----|---------|-----------|-------------------|
| 5. | 输出电压:   | 3.3 V     | 输出电压              |
| 6. | Vout1   | 3.3 Volt  | Output Voltage #1 |
| 7. | base_pn | TPS560200 | 美国国家半导体的产品编号      |
| 8. | 源       | DC        | 输入源类别             |
| 9. | 工作环境温度  | 30.0 degC | 环境温度              |

## 设计协助

1. TPS560200 Product Folder : <http://www.ti.com/product/TPS560200> : contains the data sheet and other resources.

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**You should completely validate and test your design implementation to confirm the system functionality for your application prior to production.**

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