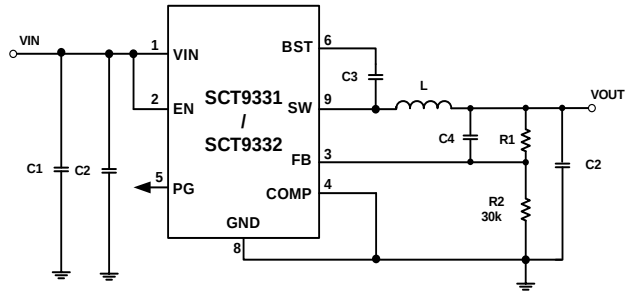
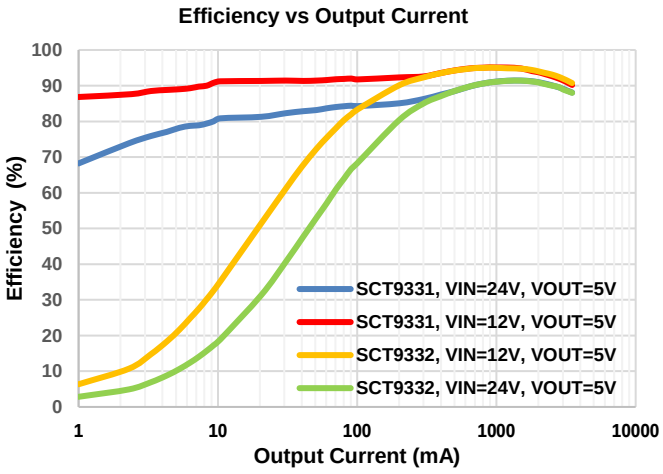
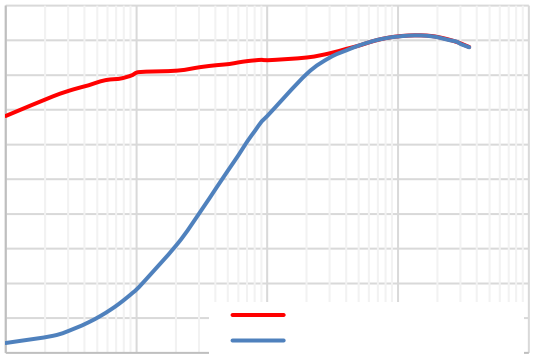

VIN
1
VIN
BST
6
C3
L
VOUT
2
EN
SCT9331
/
SCT9332
SW
9
C4
R1
C2
C1
C2
3
FB
5
PG
COMP
4
R2
30k
GND
8

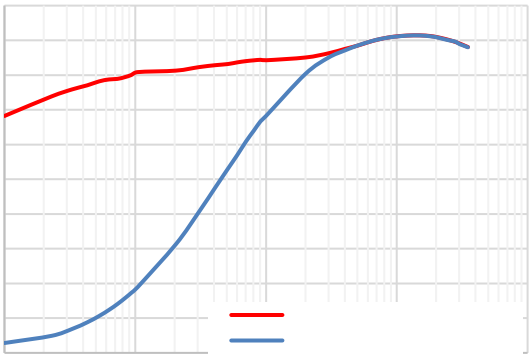

Efficiency vs Output Current
Efficiency (%)
100
90
80
70
60
50
40
30
20
10
0
1
10
100
1000
10000
Output Current (mA)
SCT9331, VIN=24V, VOUT=5V
SCT9331, VIN=12V, VOUT=5V
SCT9332, VIN=12V, VOUT=5V
SCT9332, VIN=24V, VOUT=5V

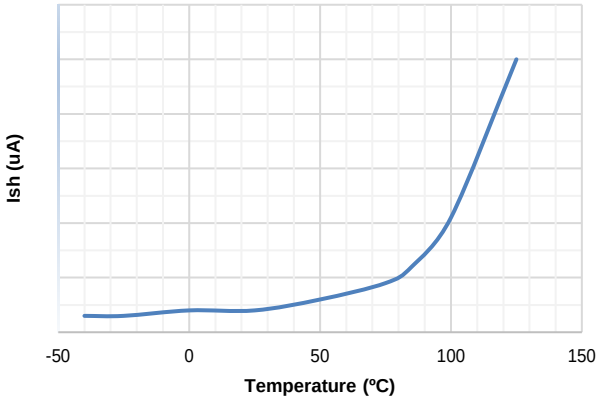
| | | |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

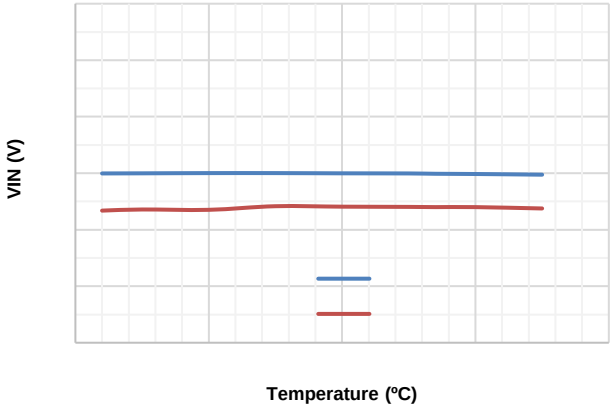
**PARAMET 9 5p14/1**

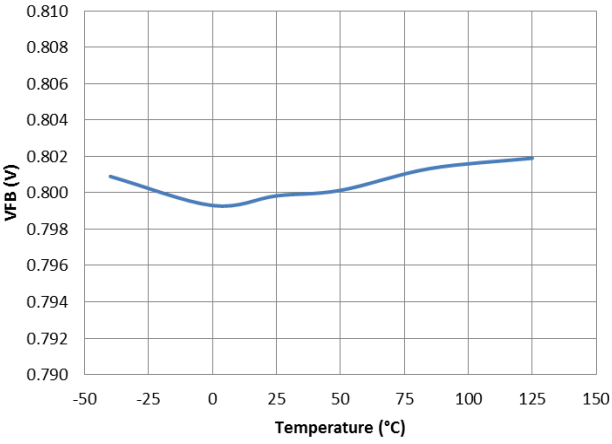
| SYMBOL | PARAMETER | TEST CONDITION | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| **Power MOSFETs** | | | | | | |
| | | | | | | |
| | | | | | | |
| **Feedback and Error Amplifier** | | | | | | |
| | | | | | | |
| **Current Limit** | | | | | | |
| | | | | | | |
| | | | | | | |
| **Switching Frequency** | | | | | | |
| | | | | | | |
| | | | | | | |
| **Soft Start Time** | | | | | | |
| | | | | | | |
| **Protection** | | | | | | |
| | | | | | | |
| | | | | | | |

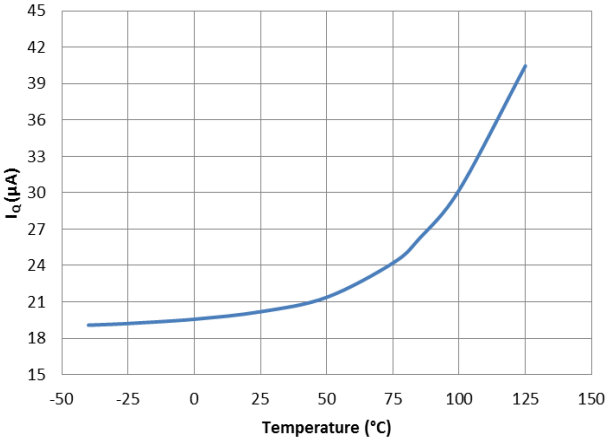


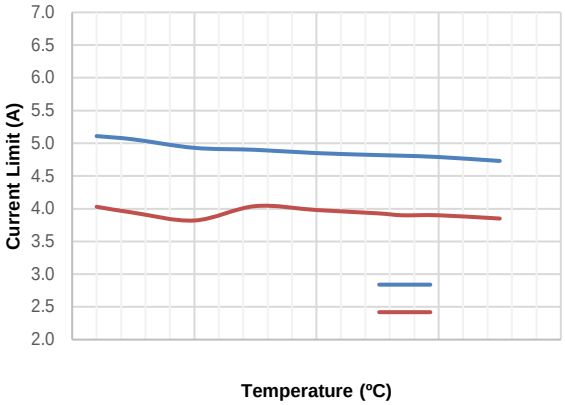


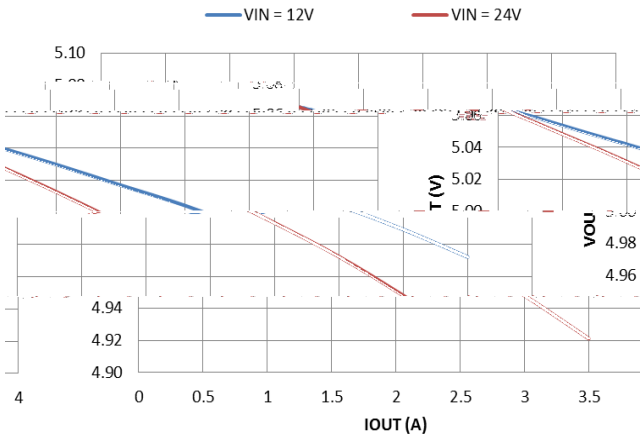

Ish (uA)
-50
0
50
100
150
Temperature (ºC)

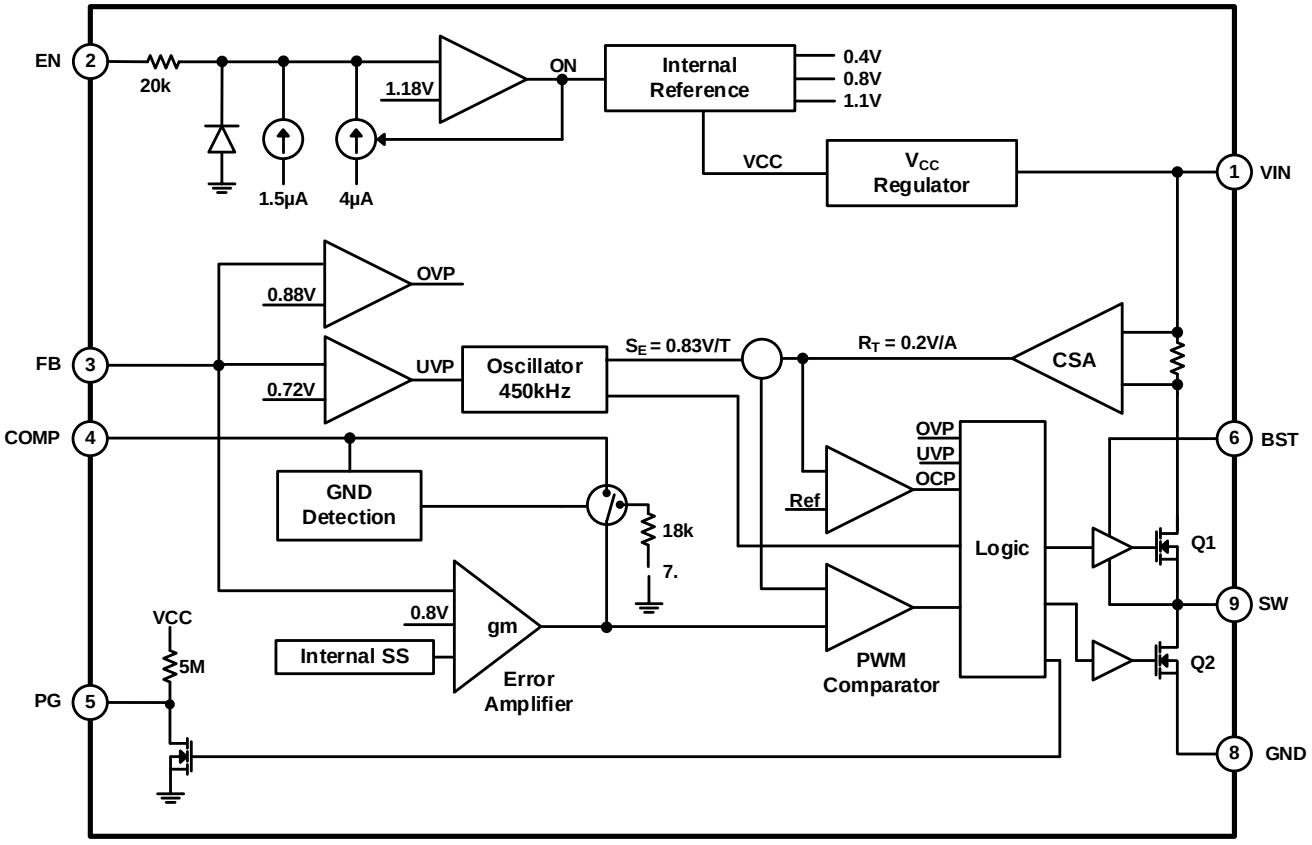

VIN (V)
Temperature (ºC)


VFB (V)
0.810
0.808
0.806
0.804
0.802
0.800
0.798
0.796
0.794
0.792
0.790
-50
-25
0
25
50
75
100
125
150
Temperature (°C)


IQ (µA)
45
42
39
36
33
30
27
24
21
18
15
-50
-25
0
25
50
75
100
125
150
Temperature (°C)


7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
Current Limit (A)
Temperature (ºC)


VIN = 12V
VIN = 24V
5.10
5.04
5.02
4.98
4.96
4.94
4.92
4.90
4
0
0.5
1
1.5
2
2.5
3
3.5
IOUT (A)


EN
2
20k
1.18V
ON
Internal Reference
0.4V
0.8V
1.1V
VCC
VCC Regulator
1
VIN
1.5μA
4μA
OVP
0.88V
FB
3
UVP
0.72V
Oscillator 450kHz
SE = 0.83V/T
RT = 0.2V/A
CSA
COMP
4
OVP
UVP
OCP
6
BST
GND Detection
Ref
18k
7.
Logic
Q1
9
SW
VCC
0.8V
gm
Internal SS
5M
Error Amplifier
PWM Comparator
Q2
PG
5
8
GND

## Overview

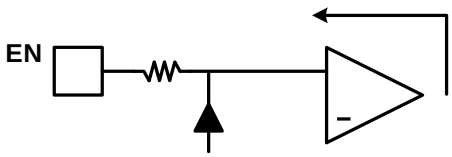
## PSM Working Modes

## FPWM Working Modes

## VIN Power

**Under Voltage Lockout UVLO**

**Enable and Start up**



- 
- 
- 

**Power-GOOD (PG) Indicator**

**Peak Current Limit and Hiccup Mode**

**Over Voltage Protection and Minimum On-time**

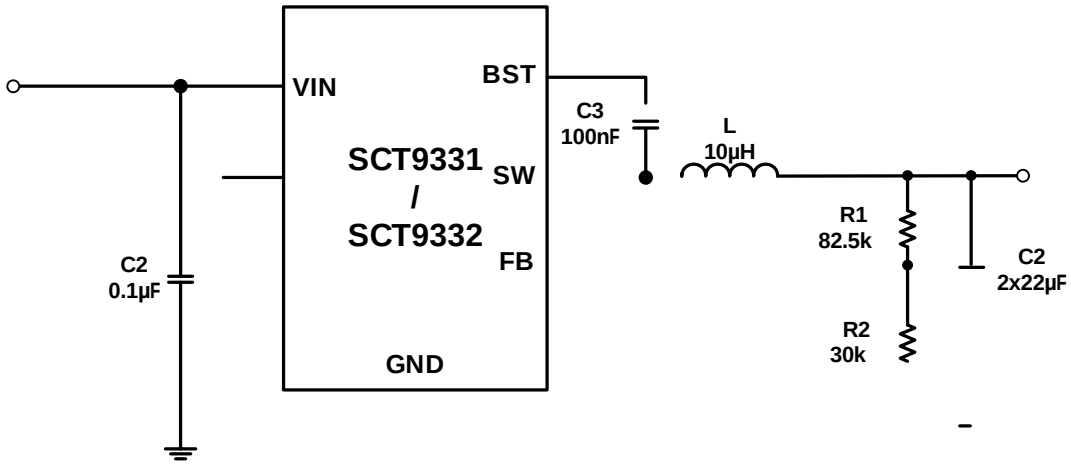
**Bootstrap Voltage Regulator**

**EMI Reduction with Switching Node Ringing-free**

**Thermal Shutdown**

- 
- 

**Typical Application**



### Input Capacitor Selection

- 
- 
- 

### Inductor Selection

**Output Capacitor Selection**

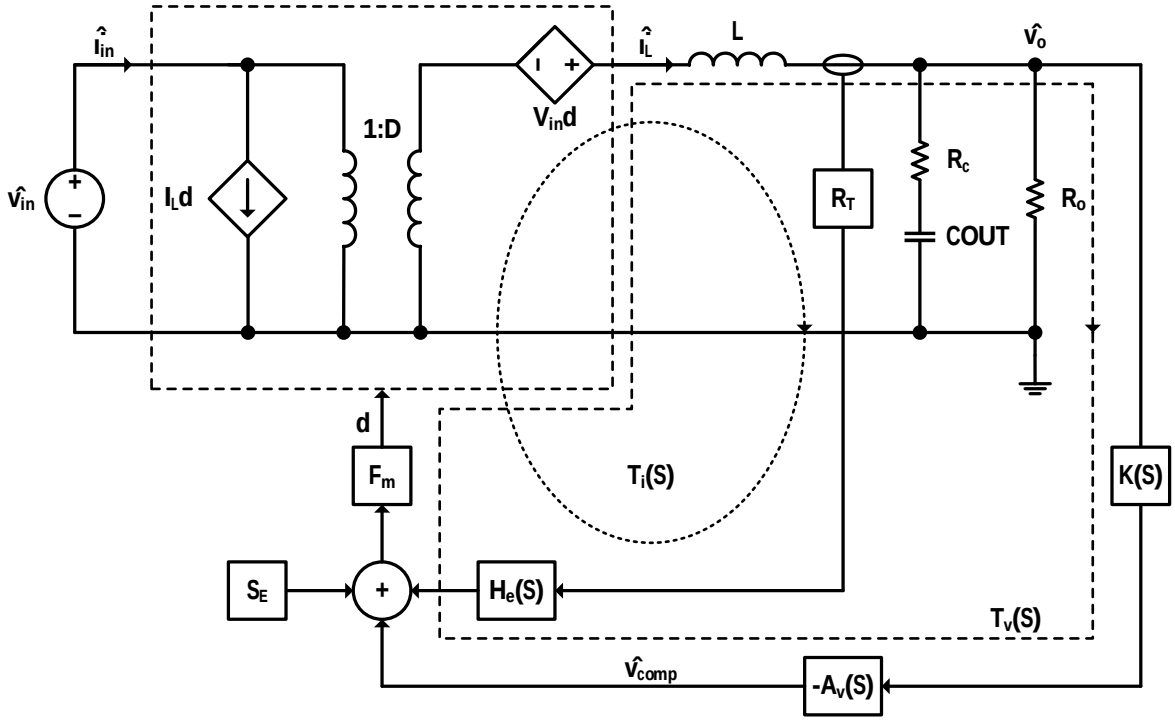
**Output Feed-Forward Capacitor Selection**

**Output Feedback Resistor Divider Selection**

**Table 1. Recommended External Components**

| Vout | L1 | COUT | R1 | R2 | Rt | C4 |
|---|---|---|---|---|---|---|
| 3.3V | 6.5uH | 3*22uF | 93.5k | 30k | | 22p |
| 5V | 10uH | 3*22uF | 158k | 30k | 2k | 100p |
| 12V | 22uH | 3*22uF | 422k | 30k | 2k | 330p |

**Loop Response Design**


$\hat{i}_{in}$
$\hat{v}_{in}$
$I_L d$
1:D
$V_{in} d$
$\hat{i}_L$
L
$\hat{v}_o$
$R_T$
$R_c$
COUT
$R_o$
d
$F_m$
$T_i(S)$
K(S)
$S_E$
$H_e(S)$
$T_v(S)$
$\hat{v}_{comp}$
$-A_v(S)$

- 

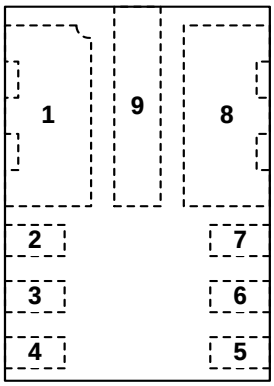
- 
- 
- 

ω

## Application Waveforms

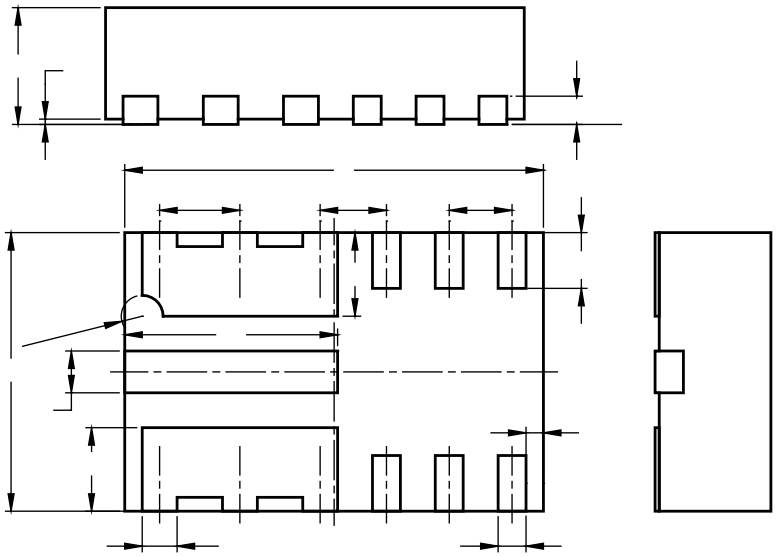
F

**Layout Guideline**



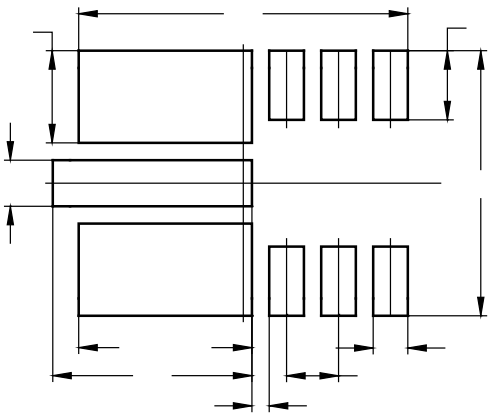
## Thermal Considerations

**V-DFN3020-13 (Type A)**



| V-DFN3020-13 | | | |
|---|---|---|---|
| Dim | Min | Max | Typ |
| A | | | |
| A1 | | | |
| A3 | | | |
| b | | | |
| b2 | | | |
| b3 | | | |
| D | | | |
| E | | | |
| e | | | |
| e1 | | | |
| e2 | | | |
| L | | | |
| La | | | |
| Lb | | | |
| z | | | |
| All Dimensions in mm | | | |

**V-DFN3020-13 (Type A)**



| Dimensions | Value (in mm) |
|---|---|
| C | |
| G | |
| X | |
| X1 | |
| X2 | |
| X3 | |
| Y | |
| Y1 | |
| Y2 | |
| Y3 | |