

1.Basic Features

- Very low quiescent current on and off state
- Back to back configuration
- Boost converter with integrated diode
- Standard level gate voltage
- Input active high and 3.3V compatible
- Under voltage lockout with diagnostic
- Wide operating voltage 6-36V
- Ground loss protection
- Lead-Free, Halogen Free
- Green Product(RoHS compliant)
- AEC-Q100 qualified

3.Application

- Battery switch
- Power switch for Stop and Start board net stabilizer

2.Description

RM7515KSF is a high side Mosfet driver for back to back topology targeting back to back switch. It features a very low quiescent current both on and off state. RM7515KSF is a combination of a boost DC/DC converter using an external inductor and a gate driver. It drives standard level Mosfet even at low battery voltage. The input controls the gate voltage. RM7515KSF integrates an under voltage lock out protection to prevent to drive the Mosfet in linear mode.

4.Product Summary

Operating voltage	V _{CC_NOM}	6...36	V
V _{gate_min}	V _{out_th}	11.5	V

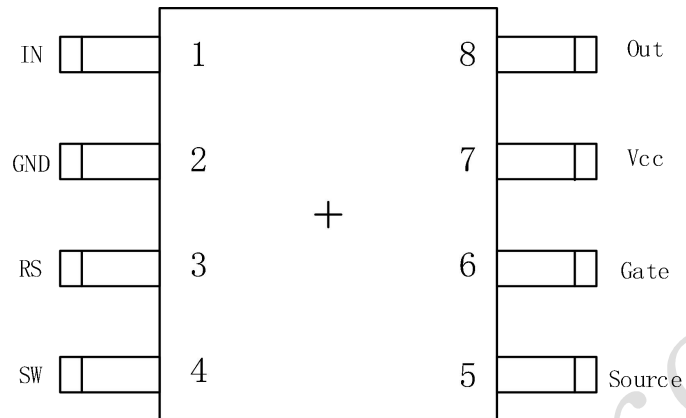
5.Ordering Code

Device	Package Type	Marking	Materials	Package			Package Qty
RM7515KSF	SOP8L	RM7515KSF	Halogen free	Tape&reel	10 reels/box	40k/box	4000/reel

Table of Contents

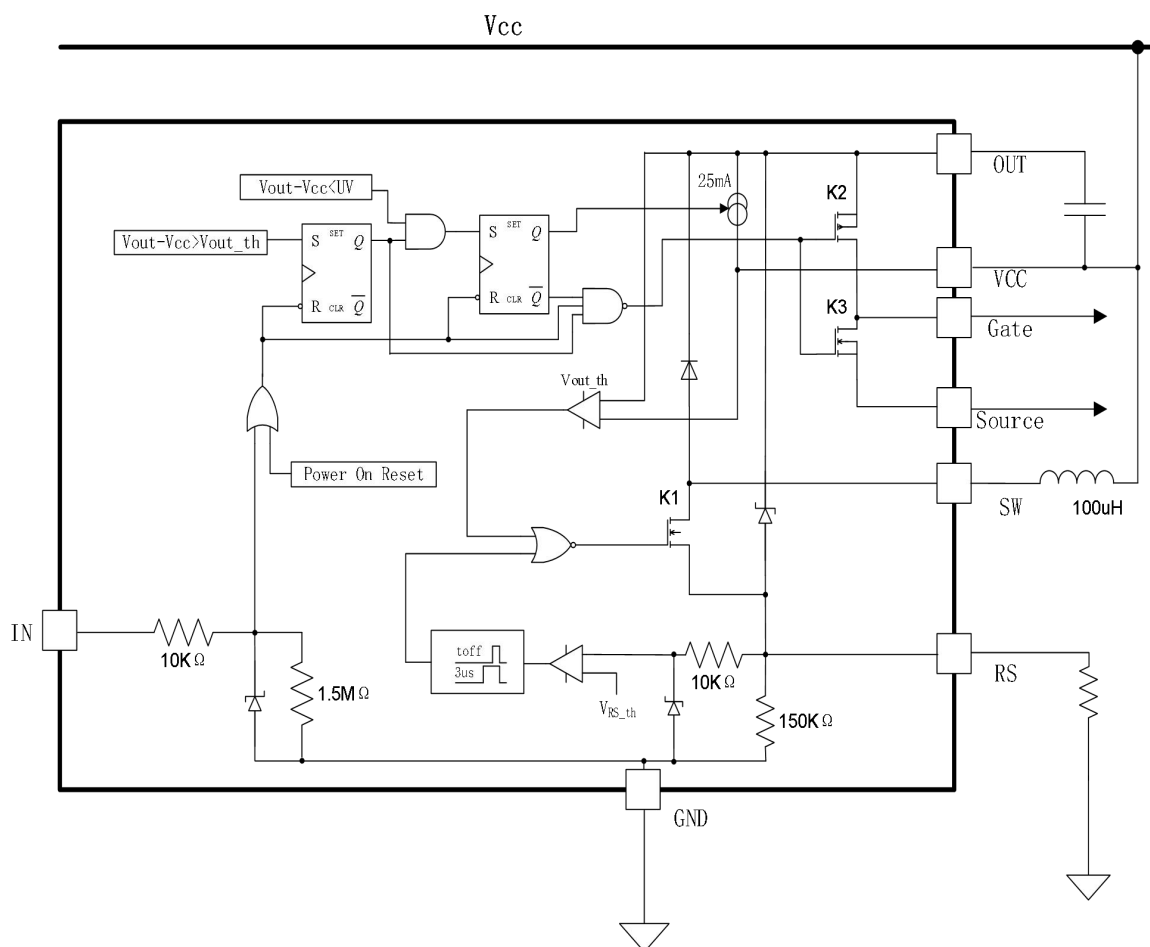
1.Basic Features.....	1
2.Description.....	1
3.Application.....	1
4.Product Summary.....	1
5.Ordering Code.....	1
6.Pin Configuration.....	3
7.Block Diagram.....	4
8.Absolute Maximum Ratings.....	5
9.Electrical Characteristics.....	6
10.Functions.....	8
11.Application Information.....	11
12.Package.....	13
13.Recommended Soldering Footprint.....	14
14.Revision History.....	15

6.Pin Configuration



Pin	Symbol	Function
1	IN	Input pin
2	GND	Ground pin
3	RS	Current sense input pin
4	SW	Output of K1
5	Source	Connection of the source pin of the Mosfets
6	Gate	Output of the gate driver
7	Vcc	Power supply
8	Out	Output of the boost converter

7. Block Diagram



8. Absolute Maximum Ratings

$T_J = 25^{\circ}\text{C}$; (unless otherwise specified)

Parameter	Symbol	Values	Unit
Vcc voltage	Vcc	65	V
Sw voltage	Vsw	65	V
Vout voltage	Vout	65	V
Vout-Vcc voltage	Vout-Vcc	65	V
Vout-Vgate voltage	Vout-Vgate	65	V
Vgate-Vsource voltage	Vgate-Vsource	75	V
Vout-Vsource voltage	Vout-Vsource	75	V
Rs pin voltage	Vrs	6	V
Sw pin current	Isw	200	mA
Operating junction temperature	Tj	-40 to 150	$^{\circ}\text{C}$
Storage temperature	Tstg	-55 to 150	$^{\circ}\text{C}$

Notes:

- Stresses above the ones listed here may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

9. Electrical Characteristics

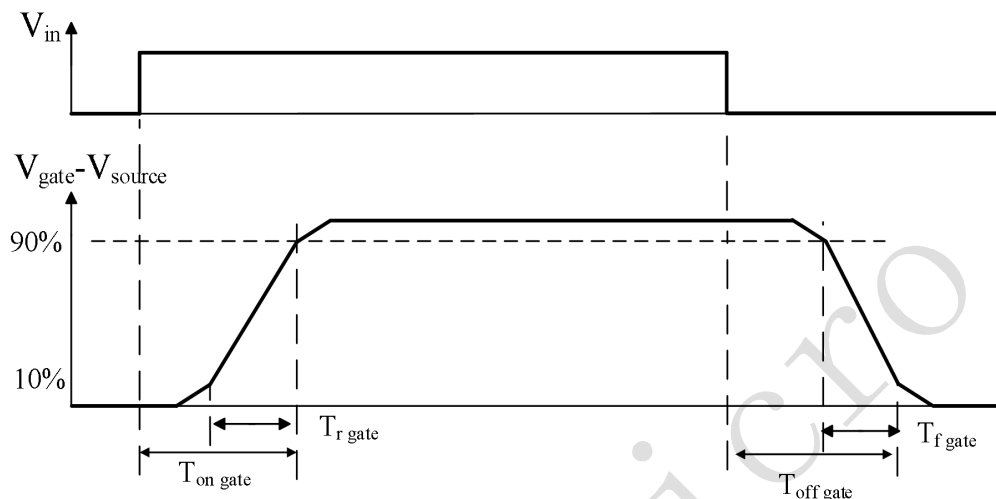
$T_J = -40^{\circ}\text{C}$ to $+150^{\circ}\text{C}$, $V_{CC}=14\text{V}$; (unless otherwise specified)

Symbol	Parameter	Test Condition	Values			Unit
			Min	Typ	Max	
V_{CC_NOM}	Operating voltage		6	-	36	V
V_{CC_EXT}	Extended Operating voltage		6	-	48	V
I_{VCCoff}	Operating current	$T_J=25^{\circ}\text{C}$, $V_{IN}=0\text{V}$, $V_{OUT}-V_{CC}=14\text{V}$, K1/K2 off, K3 on	-	12	20	μA
		$T_J=150^{\circ}\text{C}$, $V_{IN}=0\text{V}$, $V_{OUT}-V_{CC}=14\text{V}$, K1/K2 off, K3 on	-	13	25	μA
I_{VCCon}	Operating current	$T_J=25^{\circ}\text{C}$, $V_{IN}=5\text{V}$, $V_{OUT}-V_{CC}=14\text{V}$, K1/K3 off, K2 on	-	12	25	μA
		$T_J=150^{\circ}\text{C}$, $V_{IN}=5\text{V}$, $V_{OUT}-V_{CC}=14\text{V}$, K1/K3 off, K2 on	-	13	30	μA
I_{OUToff}	Quiescent current on Out pin	$T_J=25^{\circ}\text{C}$, $V_{IN}=0\text{V}$, $V_{OUT}-V_{CC}=14\text{V}$, K1/K2 off, K3 on	-	3	8	μA
		$T_J=150^{\circ}\text{C}$, $V_{IN}=0\text{V}$, $V_{OUT}-V_{CC}=14\text{V}$, K1/K2 off, K3 on	-	4	10	μA
I_{OUTon}	Quiescent current on Out pin	$T_J=25^{\circ}\text{C}$, $V_{IN}=5\text{V}$, $V_{OUT}-V_{CC}=14\text{V}$, K1/K3 off, K2 on	-	12	25	μA
		$T_J=150^{\circ}\text{C}$, $V_{IN}=5\text{V}$, $V_{OUT}-V_{CC}=14\text{V}$, K1/K3 off, K2 on	-	13	30	μA
V_{br_OUT}	Breakdown voltage	Breakdown voltage between Out and Source, $I=10\text{mA}$	75	90	-	V
V_{br_GATE}	Breakdown voltage	Breakdown voltage between Gate and Source, $I=10\text{mA}$	75	90	-	V
I_{IN}	Input current	$V_{IN}=5\text{V}$	-	4	6	μA
V_{in_th}	Input voltage threshold		0.8	1.5	2.5	V
V_{out_th}	Output voltage threshold		11.5	12.5	14	V
U_{V_LO}	Output undervoltage protection	V_{OUT} and V_{CC}	6.5	8	10	V
R_{dson}	On-state resistance	K1, $T_J=-40^{\circ}\text{C}$, $I=100\text{mA}$, $V_{CC}-V_{OUT}=12.5\text{V}$	-	8	13	Ω
		K1, $T_J=25^{\circ}\text{C}$, $I=100\text{mA}$, $V_{CC}-V_{OUT}=12.5\text{V}$	-	11	15	Ω
		K1, $T_J=125^{\circ}\text{C}$, $I=100\text{mA}$, $V_{CC}-V_{OUT}=12.5\text{V}$	-	15	20	Ω
		K2, $T_J=25^{\circ}\text{C}$, $I=100\text{mA}$	-	23	-	Ω
		K3, $T_J=25^{\circ}\text{C}$, $I=100\text{mA}$	-	17	-	Ω
V_f	Forward voltage of rectifier diode	$I=100\text{mA}$, $T_J=25^{\circ}\text{C}$	-	0.85	1.1	V
T_{off}	Off time of K1		2	3	5	μs

T _{off_K1}	Turn-off delay of K1		-	0.1	-	
P _{OR_Delay}	Power On Reset delay	T _j =25°C	200	500	1200	
T _{reset}	Time to reset the under voltage latches		-	0.8	100	us

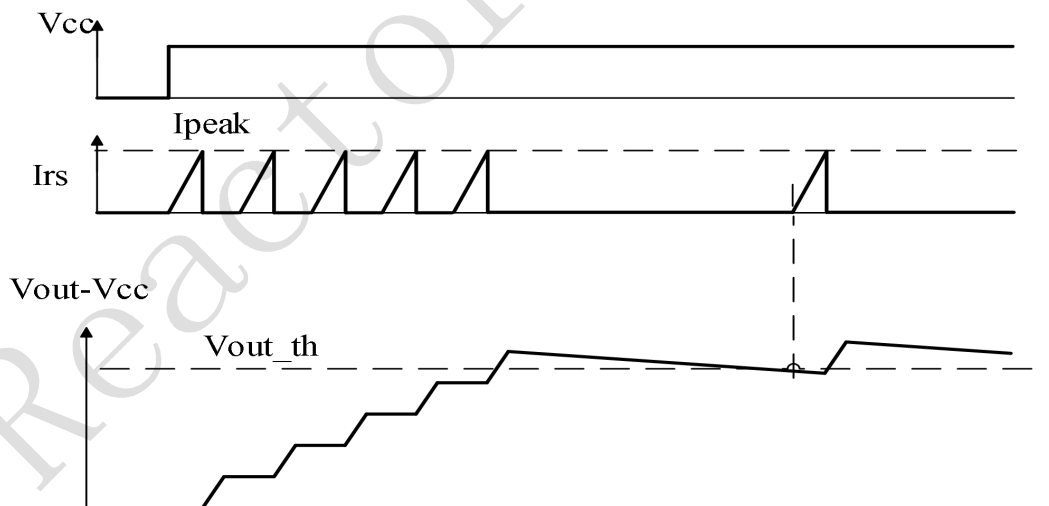
10.Functions

10.1 Input Circuit



The input control circuitry drives the output gate driver stage. The input is active high. With a low level input voltage, the gate is shorted to the source. With a high level input, the output gate driver turn on when V_{out} reaches V_{out_th} .

10.2 Description

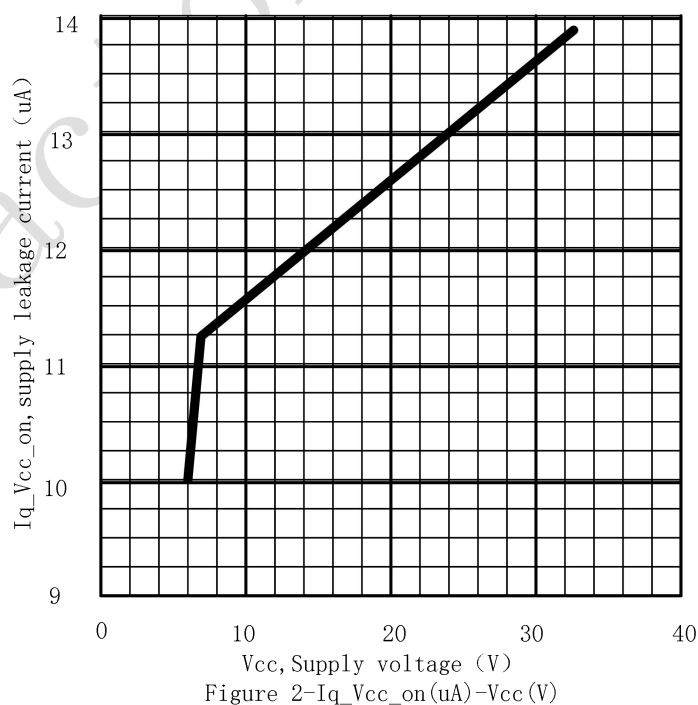
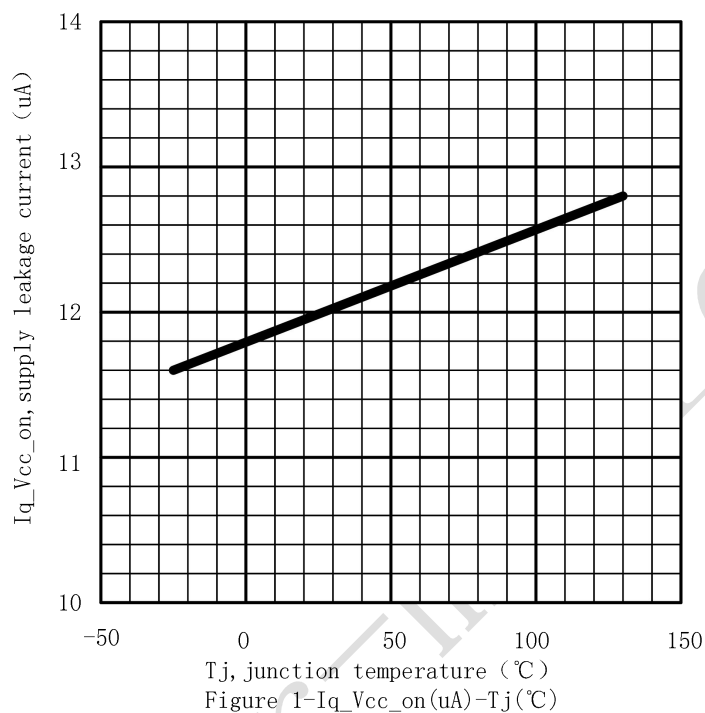


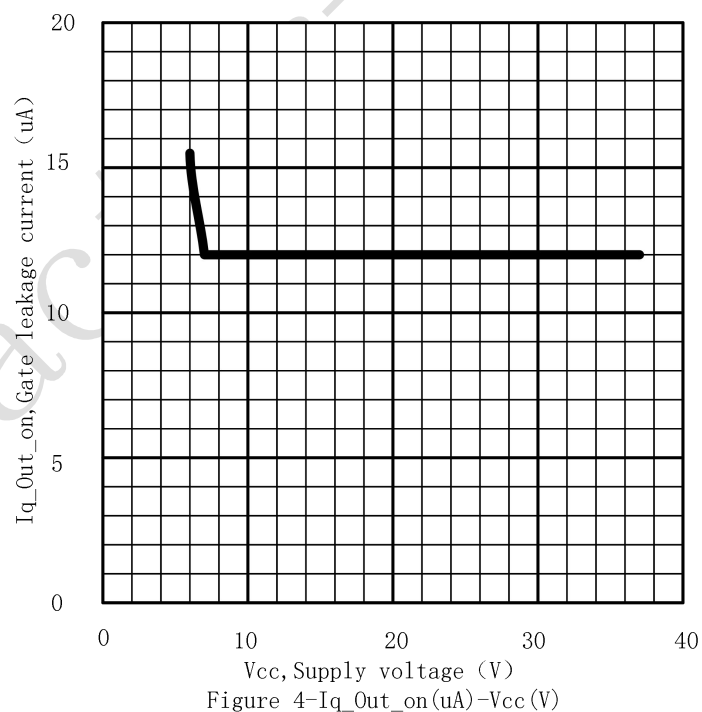
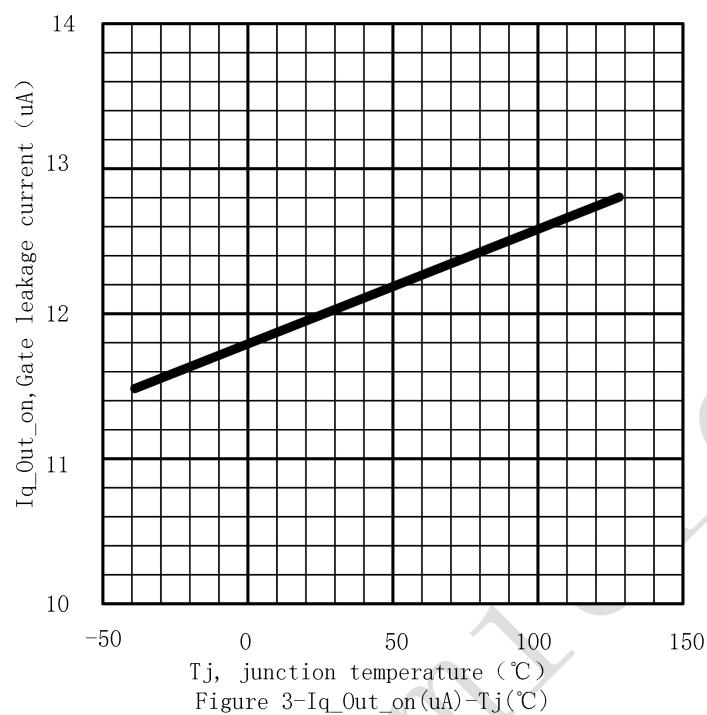
The topology of the RM7515KSF is a boost DC/DC converter working in current mode. The DC/DC is working once the RM7515KSF is powered regardless the input level.

K1 is switched on when the gate voltage is lower than V_{out} threshold. When R_s pin reaches $V_{rs\ th}$, K1 is turned off and the inductor charges the Out capacitor through D. The system cannot restart during T_{off} after $V_{rs\ th}$ has been reached. The DC/DC restart only when the Out and the V_{cc} voltage difference is lower than V_{out_th} in order to achieve low quiescent current on the power supply. To turn off the power Mosfet, the input must be low. Then K2 is turned off and K3 shorts the gate to the source.

10.3 General Product Characteristics

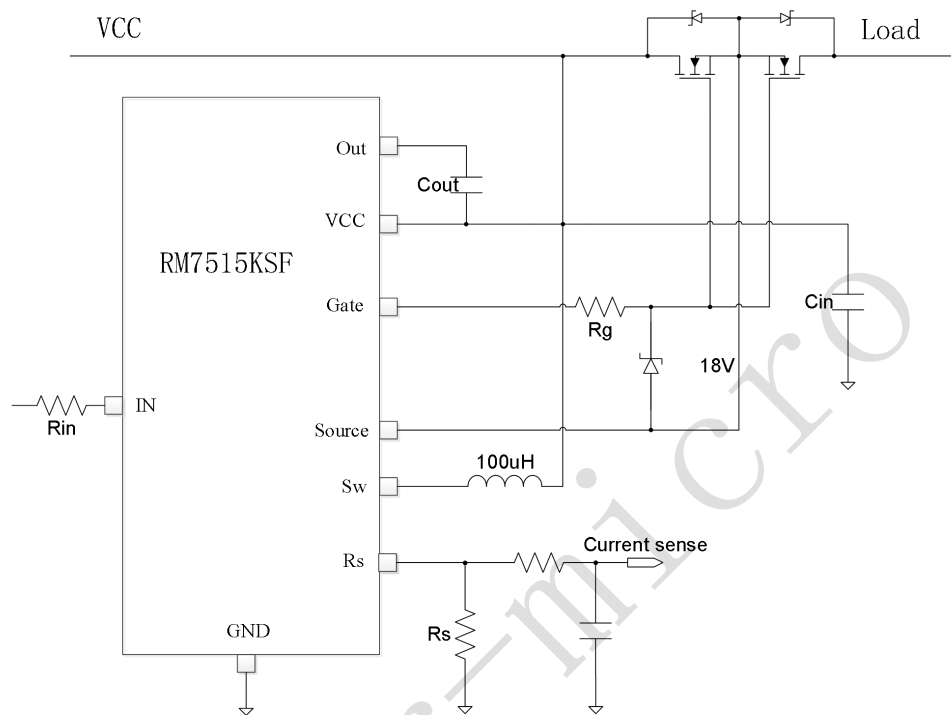
Figures are given for typical value ($V_{CC}=14V$ and $T_j=25^{\circ}C$ otherwise specified)



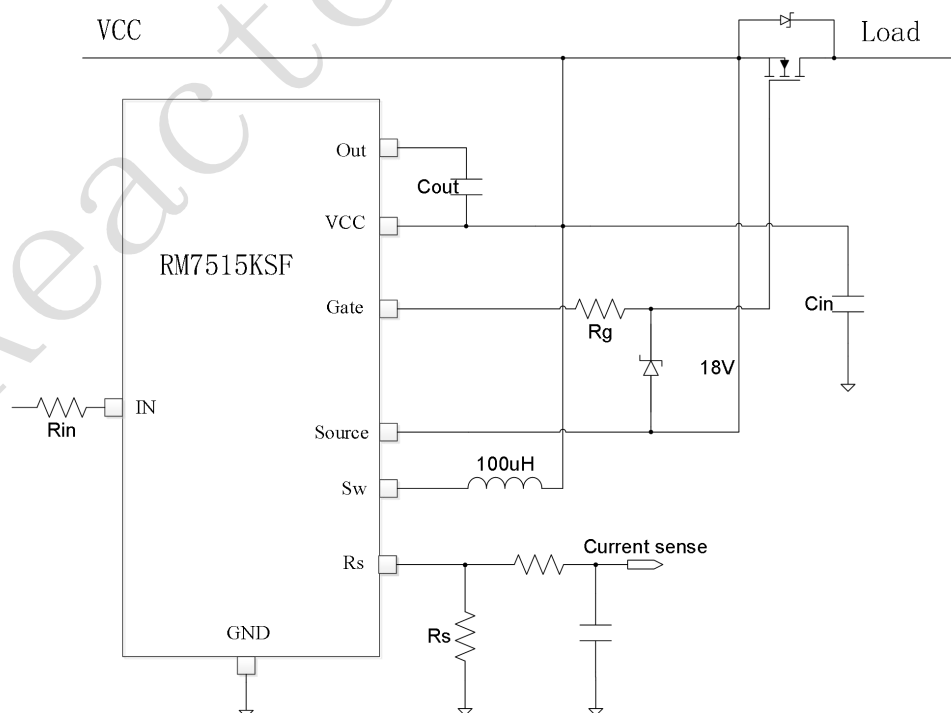


11. Application Information

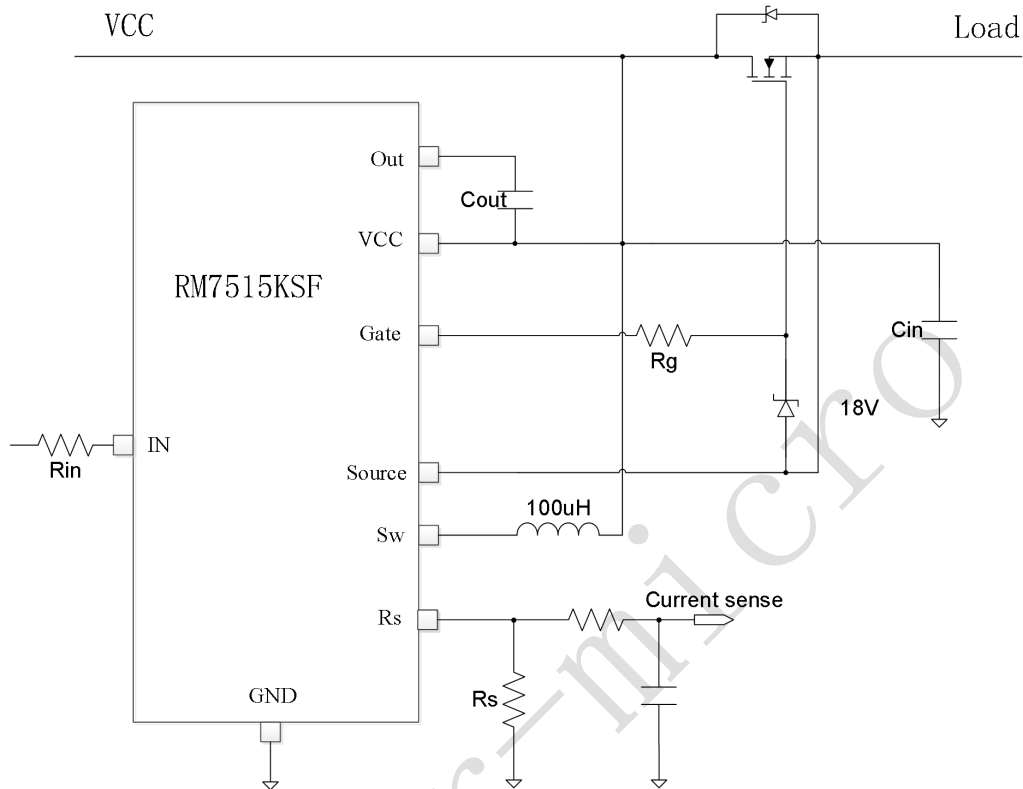
11.1 Typical back to back connection



11.2 Typical connection

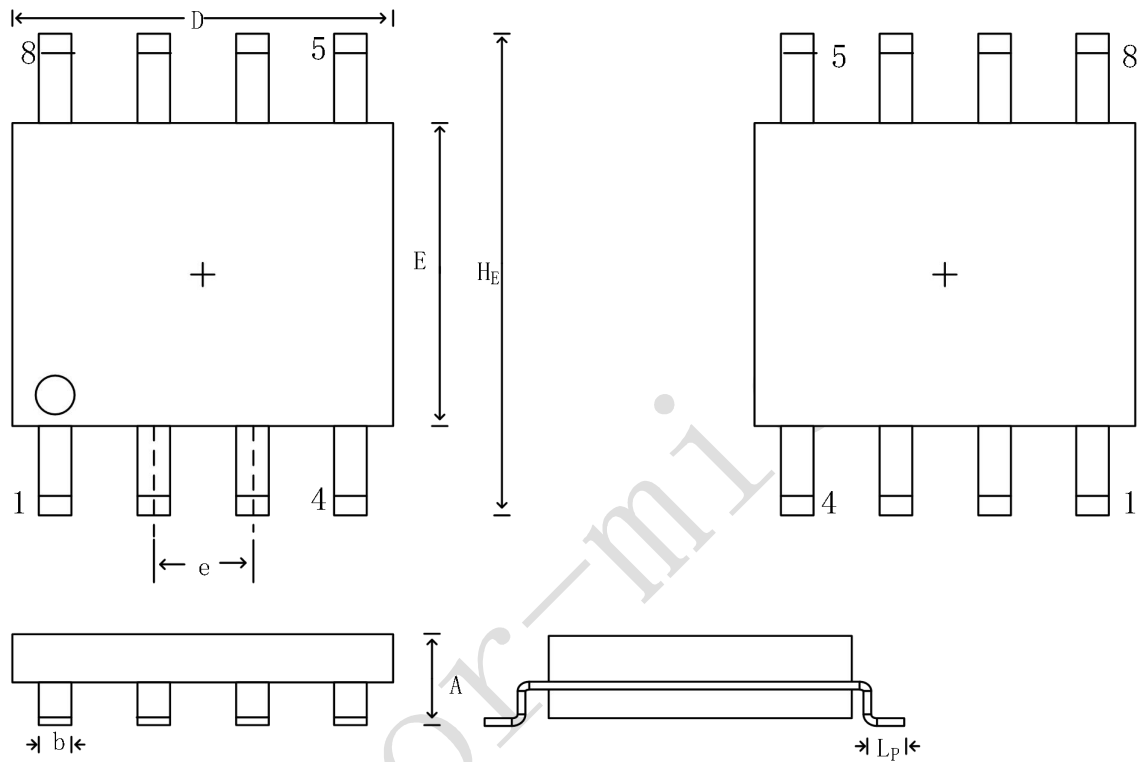


11.3 Typical Power Switch connection



12.Package

SOP-8L

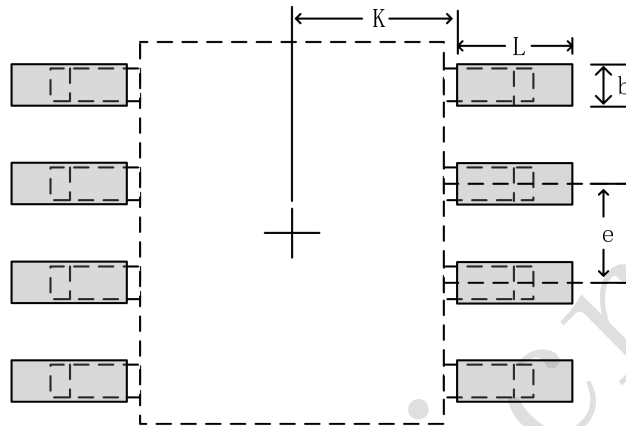


Unit :mm

Symbol	MIN	NOM	MAX
D	4.70	4.90	5.10
E	3.70	3.90	4.10
H _E	6	6.20	6.40
e	1.27BSC		
A	1.35	1.55	1.75
b	0.35	0.42	0.49
L _P	0.40	0.825	1.25

13.Recommended Soldering Footprint

SOP-8L



Unit : mm

Symbol	NOM	Symbol	NOM
e	1.27	L	1.8
b	0.6	K	2.1

14.Revision History

Version	Change Description	Date
1.0	Initial Version	2024/08/09