

5V 3.5A Low Loss Power Distribution Switch with Programmable Current limit

General Description

The CS5711R is an ultra-low $R_{DS(ON)}$ Power Distribution switch with current limit to protect the power source from over current and short circuit conditions. It incorporates over temperature protection and reverse blocking function.

Features

- Input Voltage: 2.4V to 5.5V
- Extremely Low Power Path Resistance: 65mΩ (typ)
- Adjustable Current Limit from 100mA to 3.5A
- Over Temperature Shutdown and Automatic Retry
- Reverse Blocking (No Body Diode)
- Output Capacitor Auto-discharge
- Built-in Soft-start
- RoHS Compliant and Halogen Free

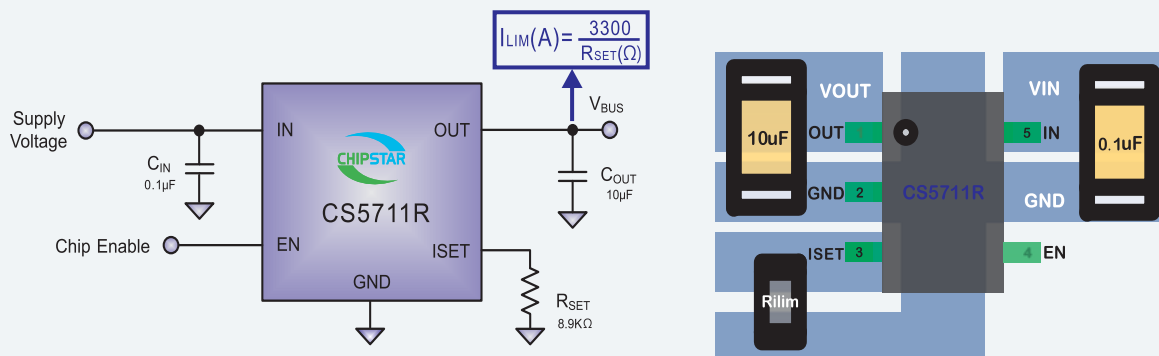
Applications

- USB 3.1 Applications
- USB ports and hubs
- TV board
- USB Charger
- VOIP phone
- Set-top box

Package

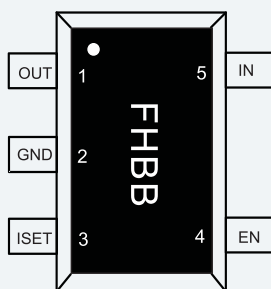
- SOT23-5

Typical Application Circuit and PCB example



Note: If 0.1µF input capacitor will lead to large VIN voltage spike, it is strongly recommended to add additional 10µF ceramic capacitor.

Pinout (Top view)



SOT23-5

Name	NO	Pin Description
OUT	1	Output pin, decoupled with a 10µF capacitor to GND.
GND	2	Ground pin
ISET	3	Current limit programming pin. Connect a resistor R_{SET} from this pin to ground to program current limit: $I_{LIM}(A) = 3300 / R_{SET}(\Omega)$
EN	4	ON/OFF control. Pull high to enable. Do not leave it floating.
IN	5	Input pin, decoupled with a 0.1µF capacitor to GND.

Absolute Maximum Ratings

IN, OUT, ISET, EN	-----	-0.3V to 6.5V
Power Dissipation, PD @ TA = 25°C, SOT23-5	-----	0.94W
Package Thermal Resistance (Note 2)		
θ_{JA}	-----	180°C/W
θ_{JC}	-----	90°C/W
Junction Temperature	-----	150°C
Lead Temperature (Soldering, 10 sec.)	-----	260°C
Storage Temperature Range	-----	-55°C to 150°C
Junction Temperature Range	-----	-40°C to 125°C
Ambient Temperature Range	-----	-40°C to 85°C
ESD HBM(Human Body Mode)	-----	2KV
ESD MM(Machine Mode)	-----	200V

Recommended Operating Conditions(Note 3)

IN, OUT-----	2.4V to 5.5V
All Other Pins -----	0V to 5.5V
Junction Temperature Range -----	-40°C to 125°C
Ambient Temperature Range -----	-40°C to 85°C

Order Information

Device	Package	Making	Reel Size	Tape Width	Quantity
CS5711R	SOT23-5L		7"	8mm	3000

Electrical Characteristics (VIN = 5V, COUT=10μF, TA = 25°C, BOLD values indicate -40°C to 85°C, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range	VIN		2.4		5.5	V
IN UVLO Threshold	VIN,UVLO				2.30	V
IN UVLO Hysteresis	VIN,HYS			0.1		V
Shutdown Input Current	ISHDN	Open load, switch off		0.1	2	μA
		Output grounded, switch off		0.1	2	μA
Reverse Leakage Current	IRVS, LKG	IN ties to GND, VOUT=5V		0.1	2	μA
Reverse Blocking Threshold	VRBT	VOUT - VIN		100		mV
Reverse Blocking Recovery Threshold	VRBT,REC	VOUT - VIN		-30		mV
Quiescent Supply Current	IQ	Open load, switch on		25	50	μA
FET RDS(ON)	RDS(ON)	VIN=5V IOUT=0.5A		65	85	mΩ
Current Limit	ILIM	VOUT=4V, RSET=3.3K (Note 5)	0.90	1.0	1.10	A
		VOUT=4V, RSET=1.60K(Note 5)	1.80	2.0	2.20	A
EN Threshold	Logic -Low Voltage	VIL			0.4	V
	Logic -High Voltage	VIH	1.0			V
EN Input Capacitor	CEN	(Note4)		1		pF
Output Turn -on Time	ton	RL=10Ω, CL=1μF. Measure from EN ON to VOUT reaches VIN x 90%	1	2	5	ms
Output Turn - on Rise Time	tr	RL=10Ω, CL=1μF. Measure from EN ON to VOUT =10% of VIN to 90% of VIN	1	2	5	ms

Output Turn - off Time	t_{OFF}	$R_L=10\Omega$, $C_L=1\mu F$. Measure from EN OFF to V_{OUT} reaches $V_{IN} \times 10\%$	22	μs
Output Turn - off Fall Time	t_F	$R_L=10\Omega$, $C_L=1\mu F$. Measure from $V_{OUT}=90\%$ of V_{IN} to 10% of V_{IN}	21	μs
Thermal Shutdown Temperature	T_{SD}		150	$^{\circ}C$
Thermal Shutdown Hysteresis	T_{HYS}		20	$^{\circ}C$
Current -limit Response Time	$t_{OC,RES}$	LOAD = $1.2 \times I_{LIMIT}$	25	μs
Short Circuit Response Time	t_{OC}	LOAD = $1.5 \times I_{LIMIT}$	2	μs
Reverse Blocking Response Time	t_{RBT}	(Note 4)	800	ns

Note 1: Stresses beyond the "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

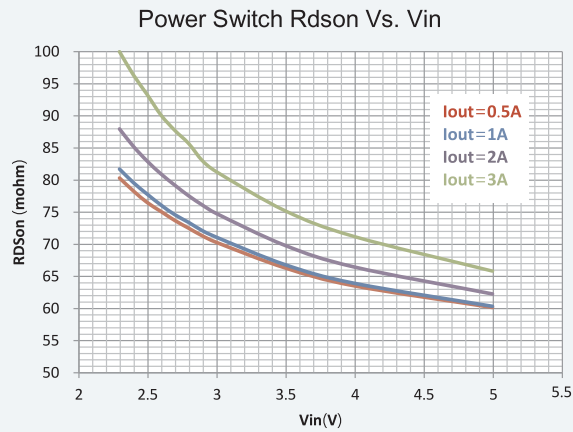
Note 2: θ_{JA} is measured in the natural convection at $T_A = 25^{\circ}C$ on a Silergy's test board. The pin 2 of SOT23-5 package is the case position for θ_{JC} measurement.

Note 3: The device is not guaranteed to function outside its operating conditions.

Note 4: Guaranteed by design but not production tested.

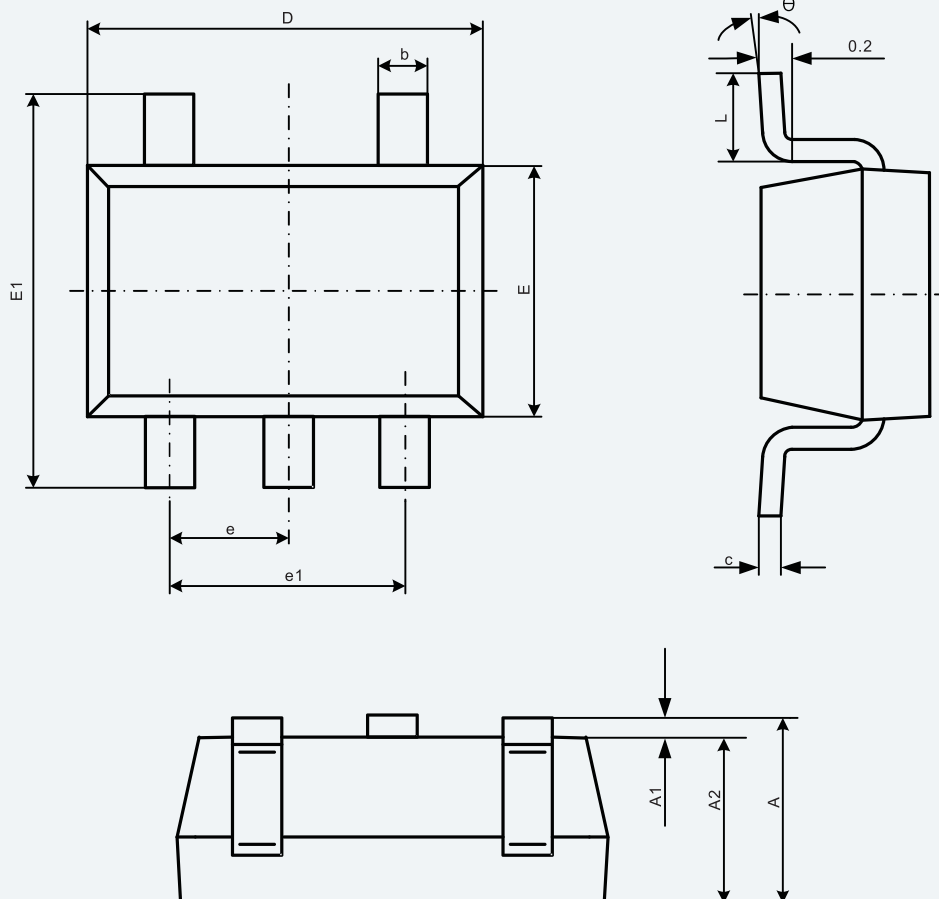
Note 5: Current limit threshold is determined by $I_{LIMIT}=17800/R_{SET}$, where R_{SET} is in Ω .

TYPICAL CHARACTERISTICS (Typical values are at $T_A=25^{\circ}C$ unless otherwise specified.)



Package Information

CS5711R SOT23-5L PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°