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

General Description

The CS5711R is an ultra-low RDS(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

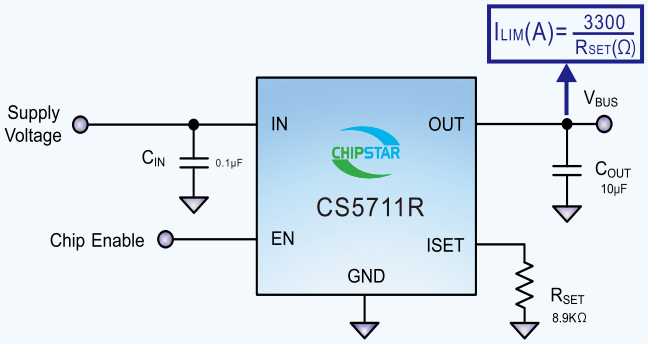
Applications

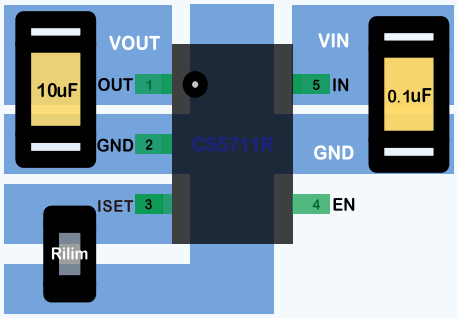
- USB 3.1 Applications
- USB ports and hubs
- TV board
- USB Charger
- VOIP phone
- Set-top box

Package

- SOT23-5

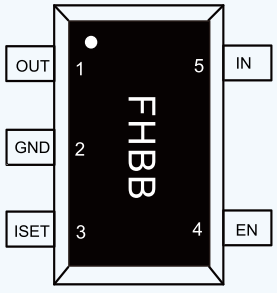
Typical Application Circuit and PCB example





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 RSET from this pin to ground to program current limit:ILIM(A)=3300/RSET(Ω)
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.

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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		V_{IN}		2.4		5.5	V
IN UVLO Threshold		$V_{IN,UVLO}$				2.30	V
IN UVLO Hysteresis		$V_{IN,HYS}$			0.1		V
Shutdown Input Current		I_{SHDN}	Open load, switch off		0.1	2	μA
			Output grounded, switch off		0.1	2	μA
Reverse Leakage Current		$I_{RVS, LKG}$	IN ties to GND, V_{OUT}=5V		0.1	2	μA
Reverse Blocking Threshold		V_{RBT}	V_{OUT} - V_{IN}		100		mV
Reverse Blocking Recovery Threshold		$V_{RBT,REC}$	V_{OUT} - V_{IN}		-30		mV
Quiescent Supply Current		I_Q	Open load , switch on		25	50	μA
FET R DS(ON)		$R_{DS(ON)}$	V_{IN}=5V I_{OUT}=0.5A		65	85	mΩ
Current Limit		I_{LIM}	V_{OUT}=4V, R_{SET}=3.3K (Note 5)	0.90	1.0	1.10	A
			V_{OUT}=4V, R_{SET}=1.0K (Note 5)	3.00	3.30	3.60	A
EN Threshold	Logic -Low Voltage	V_{IL}				0.4	V
	Logic -High Voltage	V_{IH}		1.0			V
EN Input Capacitor		C_{EN}	(Note4)		1		pF
Output Turn-on Time		t_{ON}	R_L=10Ω, C_L=1μF. Measure from EN ON to V_{OUT} reaches V_{IN} x 90%	1	2	5	ms
Output Turn - on Rise Time		t_R	R_L=10Ω, C_L=1μF. Measure from EN ON to V_{OUT} =10% of V_{IN} to 90% of V_{IN}	1	2	5	ms

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Output Turn-off Time	t_{OFF}	R_L=10Ω, C_L=1μF.Measure from EN OFF to V_{OUT} reaches V_{IN} x10%		22		μs
Output Turn-off Fall Time	t_F	R_L=10Ω, C_L=1μF. Measure from V_{OUT}=90% of V_{IN} to 10% of V_{IN}		21		μs
Thermal Shutdown Temperature	T_{SD}			150		°C
Thermal Shutdown Hysteresis	T_{HYS}			20		°C
Current-limit Response Time	$t_{OC,RES}$	I_{LOAD} =1.2x I_{LIMIT}		25		μs
Short Circuit Response Time	t_{OC}	I_{LOAD} =1.5x 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.

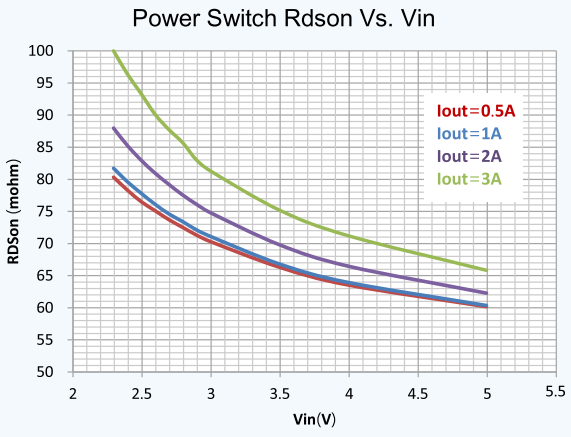
Note 2: θ_{JA} is measured in the natural convection at TA = 25°C on a Silergy's test board. The pin 2 of SOT23-5 package is the case position for θ_{JC} measurement.

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

Note 4: Guaranteed by design but not production tested.

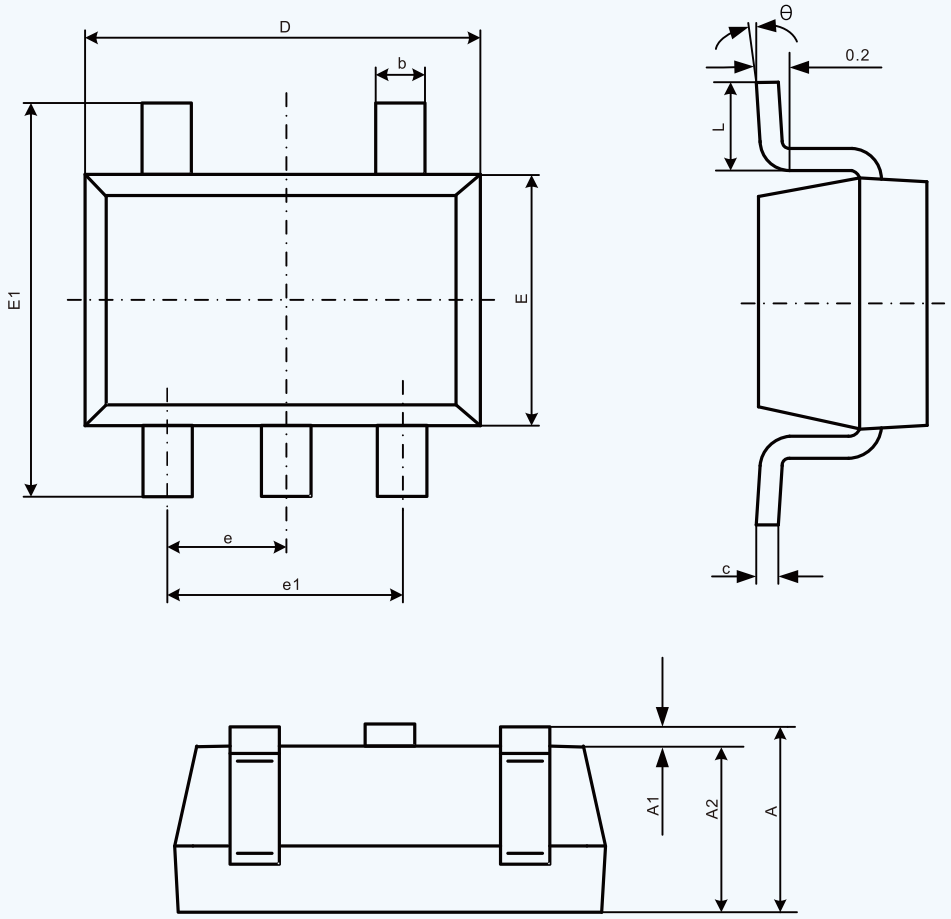
Note 5: Current limit threshold is determined by I_{LIMIT}=3300/R_{SET}, where R_{SET} is in Ω.

TYPICAL CHARACTERISTICS (Typical values are at TA =25°C unless otherwise specified.)



Package Information

CS5711R SOT23-5L PACKAGE INFORMATION

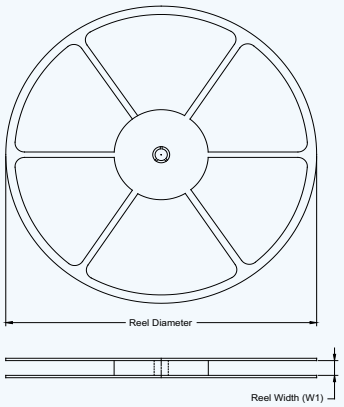


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)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

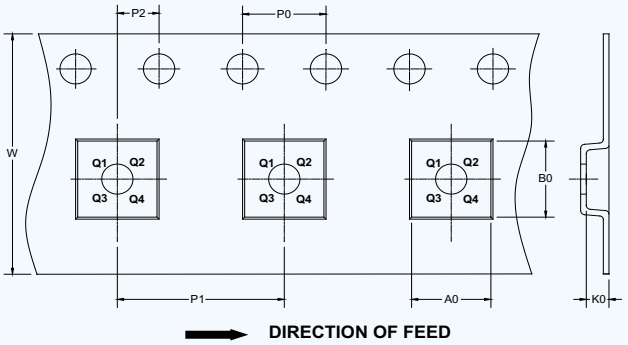
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TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SOT-23-5	7"	8.0	3.20	3.20	1.40	4.0	4.0	2.0	8.0	Q3

MOS电路操作注意事项：

静电在很多地方都会产生，采取下面的预防措施，可以有效防止MOS电路由于受静电放电影响而引起的损坏：

- 操作人员要通过防静电腕带接地
- 设备外壳必须接地
- 装配过程中使用的工具必须接地
- 必须采用导体包装货防静电材料包装或运输



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