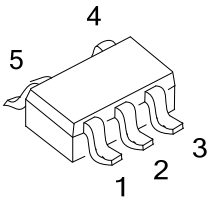
0.5A TO 2.0A HIGH-SIDE POWER DISTRIBUTION SWITCHES



SOT-25

■ DESCRIPTION

The UTC **US222** are low voltage cost-effective high-side power switches with flag function. These devices are particularly suitable for self-powered and bus-powered USB applications. The build-in N-MOSFET's $R_{DS(ON)}$ which meets the requirements of USB voltage drop is as low as 85 mΩ.

The UTC **US222** contains a charge pump circuitry to drive the internal MOSFET switch and also incorporate such protection circuits: soft-start circuit protect these devices from being damaged by limiting inrush current during plug-in; thermal shutdown circuit is used to prevent catastrophic switch failure from high-current loads. UVLO is used to ensure that the device remains off unless there is a valid input voltage present. A flag output is designed to indicate fault conditions to the local USB controller.

■ FEATURES

* Low MOSFET On Resistance: 85mΩ
* Compliant to USB Specifications
* Available 4 Versions of Continuous Load: 0.5A/1.0A/1.5A/2.0A
* Logic Level Enable Pin: Available with Active-high or Active-low Version
* Low Supply Current: 68μA (Typ.)
* Low Shutdown Current: 1.0μA (Max)
* Soft Start-up
* Under-voltage Lockout
* Over-current Protection
* Over Temperature Protection
* Load Short Protection with Fold-back
* Deglitched FLAG Output with Open Drain
* No Reverse Current When Power Off
* With Output Shutdown Pull-low Resistor

■ ORDERING INFORMATION

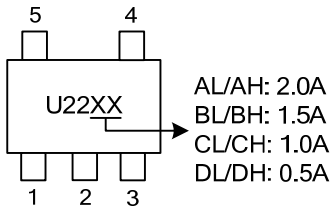
Ordering Number		Package	Packing
Lead Free	Halogen Free		
US222XXL-AF5-R	US222XXG-AF5-R	SOT-25	Tape Reel

US222XXG-AF5-R

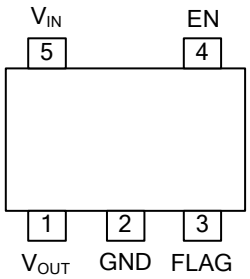
(1)Packing Type
(2)Package Type
(3)Green Package
(4)Active
(5)Current Limit

(1) R: Tape Reel
(2) AF5: SOT-25
(3) G: Halogen Free and Lead Free, L: Lead Free
(4) L: Low, H: High
(5) A: 2.0A, B: 1.5A, C: 1.0A, D: 0.5A

■ MARKING



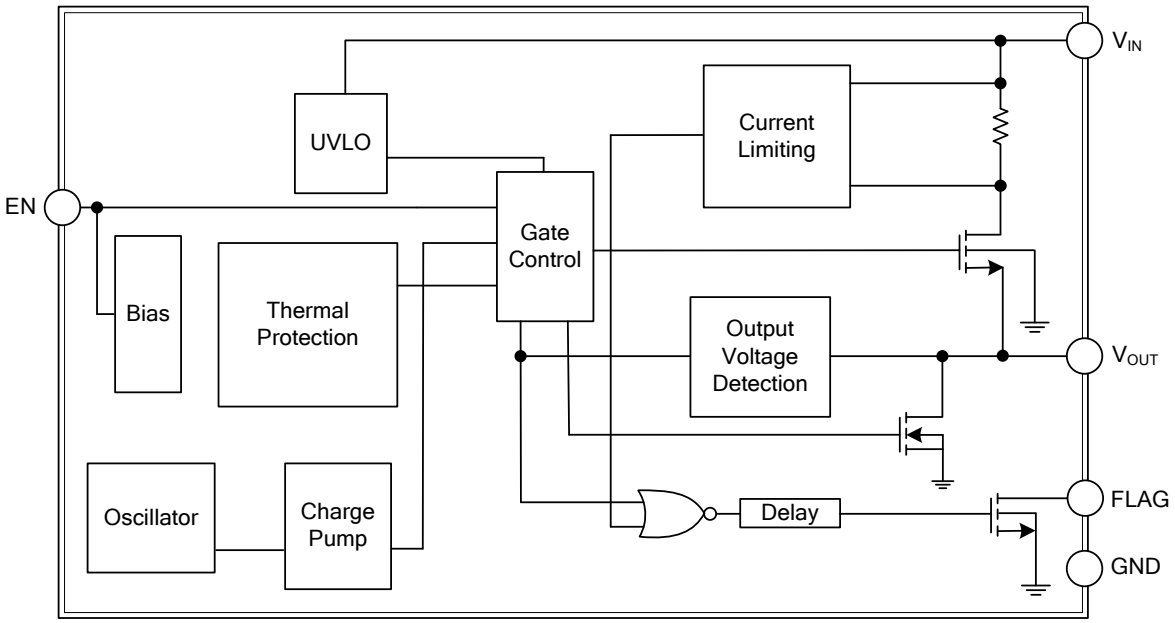
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	V_{OUT}	Switch output voltage
2	GND	Ground
3	FLAG	Fault flag pin, output with open drain, need a pull-up resistor in application, active low to indicate OCP or OTP
4	EN	Chip enable control input, active low or high
5	V_{IN}	Supply input pin

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Power Supply Voltage	V_{IN}	6.0	V
Operating Junction Temperature Range	T_J	150	°C
Storage Temperature Range	T_{STG}	-65~+150	°C
Lead Temperature (Soldering, 10sec)	T_{LEAD}	260	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage	V_{IN}			5.5	V
Operating Ambient Temperature Range	T_A	-40		85	°C

■ THERMAL DATA

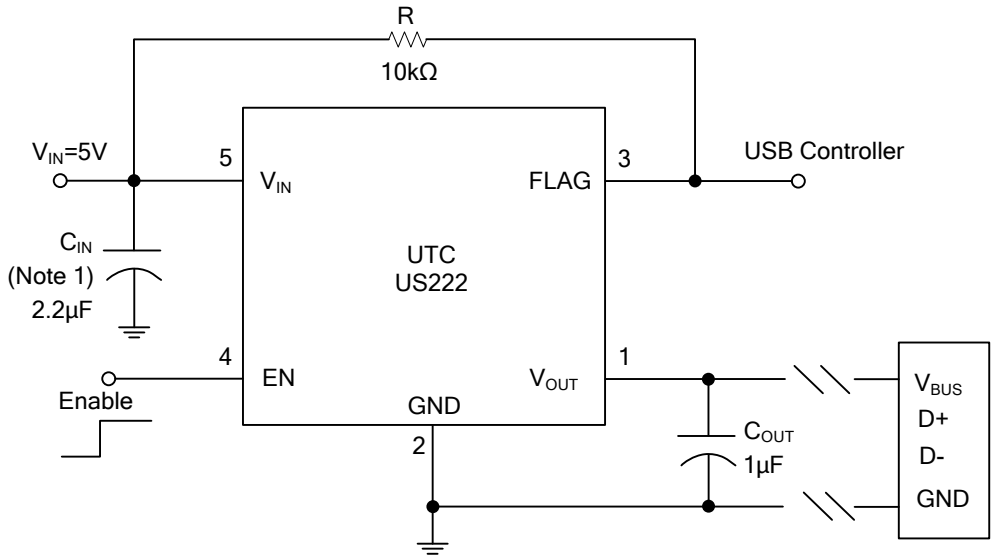
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	300	°C/W

■ ELECTRICAL CHARACTERISTICS

(V_{IN}=5.0V, C_{IN}=2.2μF, C_{OUT}=1.0μF, Typical T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{IN}				5.5	V
Switch On Resistance	$R_{DS(ON)}$	V_{IN}=5.0V, I_{OUT}=0.5A		85	110	mΩ
Supply Current	I_{SUPPLY}	V_{IN}=5.0V, No Load		68	95	μA
Current Limit	I_{LIMIT}	US222AL/AH (2.0A), V_{OUT}=4.0V	2.1	2.7	3.6	A
		US222BL/BH (1.5A), V_{OUT}=4.0V	1.6	2.0	2.8	A
		US222CL/CH (1.0A), V_{OUT}=4.0V	1.1	1.5	2.1	A
		US222DL/DH (0.5A) , V_{OUT}=4.0V	0.6	1.0	1.4	A
Fold-back Short Current	I_{SHORT}	US222A/B/C/D, V_{OUT}=0V		1.0		A
Shutdown Supply Current	$I_{SHUTDOWN}$	Chip Disable, Shutdown Mode		0.1	5.0	μA
Enable High Input Threshold	V_{ENH}		2.0			V
Enable Low Input Threshold	V_{ENL}				0.8	V
Enable Pin Input Current	I_{EN}	Force 0V to 5.0V at EN Pin	-1.0		1.0	μA
Under Voltage Lockout Threshold Voltage	V_{UVLO}	V_{IN} Increasing from 0V		2.5		V
Under Voltage Hysteresis	V_{UVLOHY}			0.2		V
Output Pull Low Resistance after Shutdown	$R_{DISCHARGE}$			100		Ω
Output Turn-on Time	t_{ON}	From Enable Active to 90% of Output		400		μs
FLAG Pin Delay Time	t_{DFLG}	From Over Current Fault Condition to Flag Active		12		ms
FLAG Pin Low Voltage	V_{FLG}	I_{SINK}=1.0mA		35		mV
FLAG Pin Leakage Current	$I_{LEAKAGE}$	FLAG Disable, Force 5.0V			1.0	μA
Thermal Shutdown Temperature	T_{OTSD}			150		°C
Thermal Shutdown Hysteresis	T_{HYOTSD}			30		°C

■ TYPICAL APPLICATION CIRCUIT



Note: 2.2μF input capacitor is enough in most application cases.
If the V_{OUT} is short to ground frequently during usage, large size input capacitor is necessary, recommend 22μF.