AP2820

2.0A HIGH-SIDE POWER DISTRIBUTION SWITCH WITH ENABLE AND FLAG

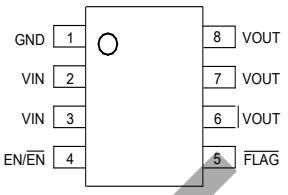
Description

The AP2820 is an integrated high-side power switch that consists of TTL compatible enables input, a charge pump, and N-Channel MOSFET. The switch's low RDS (ON), 70mΩ, meets USB voltage drop requirements. The device includes soft-start to limit inrush current, overcurrent protection with foldback, and thermal shutdown to avoid switch failure during hot plug-in. Undervoltage lockout (UVLO) function ensures the device remains off unless there is a valid input voltage present. A flag output is available to indicate fault conditions to the local USB controller.

The AP2820 is available in standard packages of SOIC-8, MSOP-8, and SOT-23-5.

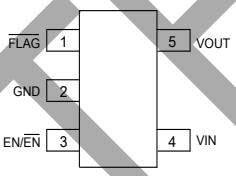
Pin Assignments

(Top View)



SOIC-8/MSOP-8

(Top View)



SOT-23-5

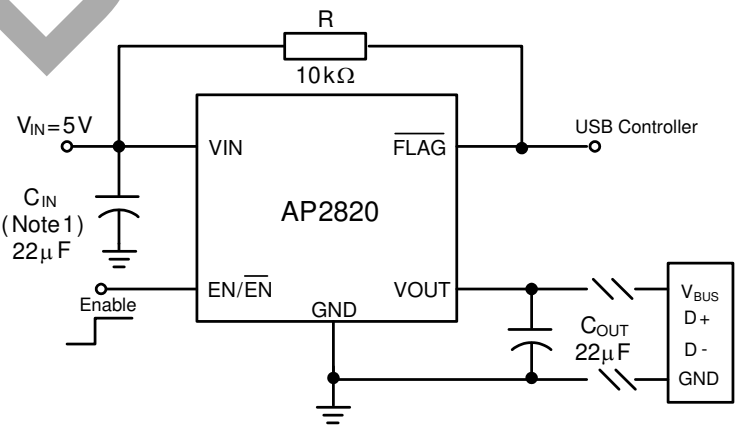
Features

- Low MOSFET on Resistance: 70mΩ @ V_{DD}=5.0V
- Compliant to USB Specifications
- Operating Voltage Range: 2.7V to 6V
- Low Shutdown Current: <1μA
- Guarantee 2.0A Continuous Load
- Current Limit: 2.2A (Minimum), 3.2A (Maximum)
- Undervoltage Lockout
- Soft Start-up
- Overcurrent Protection
- Overtemperature Protection
- Load Short Protection With Foldback
- No Reverse Current When Power Off
- Deglitched Flag Output with Open Drain
- UL Approved (Code TBD)

Applications

- USB Power Management
- USB Bus/Self Powered Hubs
- Hot-Plug Power Supplies
- Battery-Charger Circuits
- Notebook, Motherboard PCs

Typical Applications Circuit



Note: 1. 1μF input capacitor is enough in most application cases. If the PCB trace of power rail to V_{IN} is long, larger input capacitor is necessary.

Pin Descriptions

Pin Number		Pin Name	Function
SOIC-8/MSOP-8	SOT-23-5		
1	2	GND	Ground
2, 3	4	VIN	Supply Input Pin
4	3	EN/$\overline{EN}$	Chip Enable Control Input, Active Low or High
5	1	$\overline{FLAG}$	Fault Flag Pin, Output With Open Drain, Requires a Pull-Up Resistor in Application, Active Low To Indicate OCP or OTP
6, 7, 8	5	VOUT	Switch Output Voltage

Absolute Maximum Ratings (Note 2)

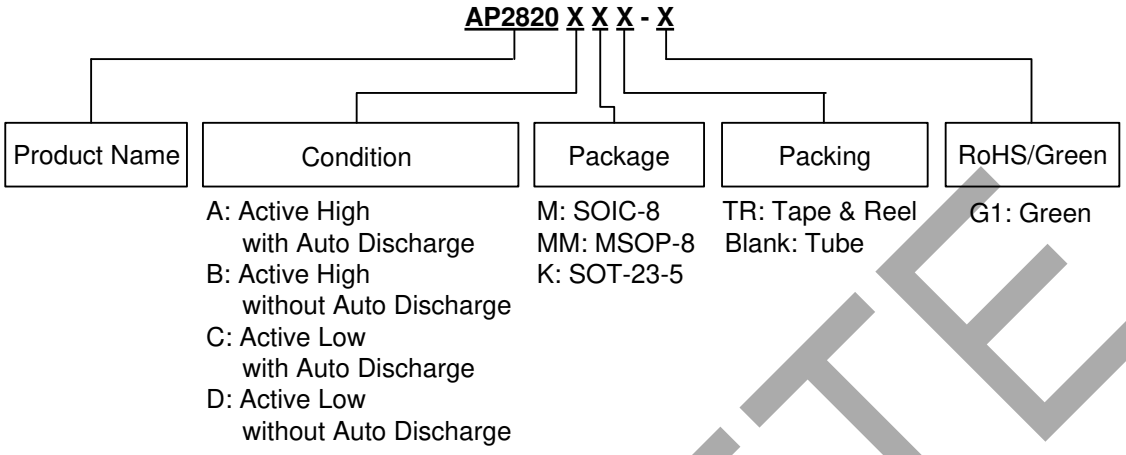
Symbol	Parameter	Rating		Unit
V_{IN}	Power Supply Voltage	6.5		V
T_J	Operating Junction Temperature Range	+150		°C
T_{STG}	Storage Temperature Range	-65 to +150		°C
T_{LEAD}	Lead Temperature (Soldering, 10s)	+260		°C
Θ_{JA}	Thermal Resistance (Junction to Ambient)	SOIC-8	TBD	°C/W
		MSOP-8	TBD	
		SOT-23-5	TBD	
—	ESD (Machine Model)	200		V
—	ESD (Human Body Model)	2000		V

Note: 2. Stresses greater than those listed under *Absolute Maximum Ratings* can cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions* is not implied. Exposure to *Absolute Maximum Ratings* for extended periods can affect device reliability.

Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V_{IN}	Supply Voltage	2.7	6.0	V
T_A	Ambient Operation Temperature Range	-40	+85	°C

Ordering Information

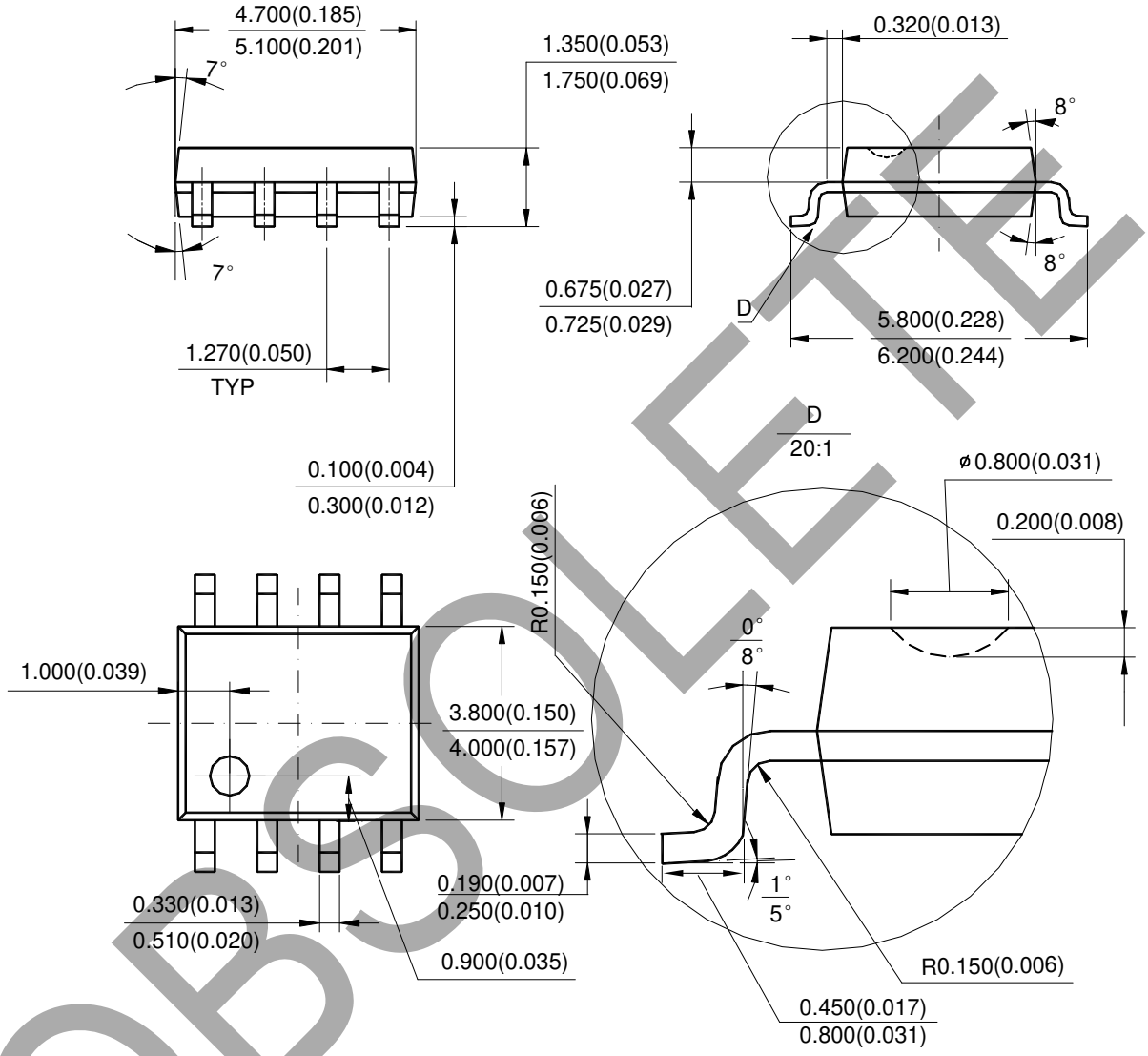


Product	Package	Condition	Temperature Range	Part Number	Marking ID	Packing
AP2820	SOIC-8	Active High With Auto Discharge	-40°C to +85°C	AP2820AM-G1 (EOL)	2820AM-G1	Tube
				AP2820AMTR-G1 (EOL)	2820AM-G1	Tape & Reel
	MSOP-8			AP2820AMM-G1 (EOL)	2820AMM-G1	Tube
				AP2820AMMTR-G1 (EOL)	2820AMM-G1	Tape & Reel
	SOT-23-5			AP2820AKTR-G1 (EOL)	GCW	Tape & Reel
	SOIC-8	Active High Without Auto Discharge	-40°C to +85°C	AP2820BM-G1 (EOL)	2820BM-G1	Tube
				AP2820BMTR-G1 (EOL)	2820BM-G1	Tape & Reel
	MSOP-8			AP2820BMM-G1 (EOL)	2820BMM-G1	Tube
				AP2820BMMTR-G1 (EOL)	2820BMM-G1	Tape & Reel
	SOT-23-5			AP2820BKTR-G1 (EOL)	G6Z	Tape & Reel
	SOIC-8	Active Low With Auto Discharge	-40°C to +85°C	AP2820CM-G1 (EOL)	2820CM-G1	Tube
				AP2820CMTR-G1 (EOL)	2820CM-G1	Tape & Reel
	MSOP-8			AP2820CMM-G1 (EOL)	2820CMM-G1	Tube
				AP2820CMMTR-G1 (EOL)	2820CMM-G1	Tape & Reel
	SOT-23-5			AP2820CKTR-G1 (EOL)	GCZ	Tape & Reel
	SOIC-8	Active Low Without Auto Discharge	-40°C to +85°C	AP2820DM-G1 (EOL)	2820DM-G1	Tube
				AP2820DMTR-G1 (EOL)	2820DM-G1	Tape & Reel
	MSOP-8			AP2820DMM-G1 (EOL)	2820DMM-G1	Tube
				AP2820DMMTR-G1 (EOL)	2820DMM-G1	Tape & Reel
	SOT-23-5			AP2820DKTR-G1 (EOL)	G7Z	Tape & Reel

Note: 3. End of life (EOL).

Package Outline Dimensions (All dimensions in mm (inch).)

(1) Package Type: SOIC-8



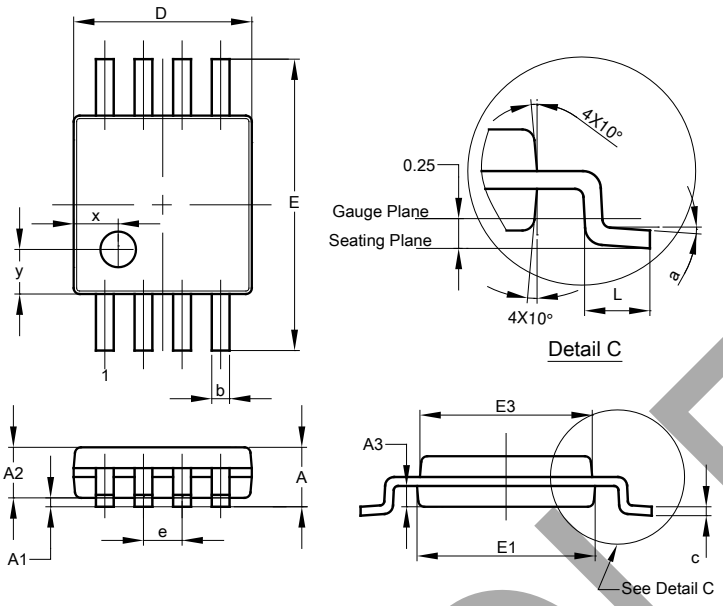
Note: Eject hole, oriented hole and mold mark is optional.

Package Outline Dimensions (continued) (All dimensions in mm(inch).)

Please see http://www.diodes.com/package-outlines.html for the latest version.

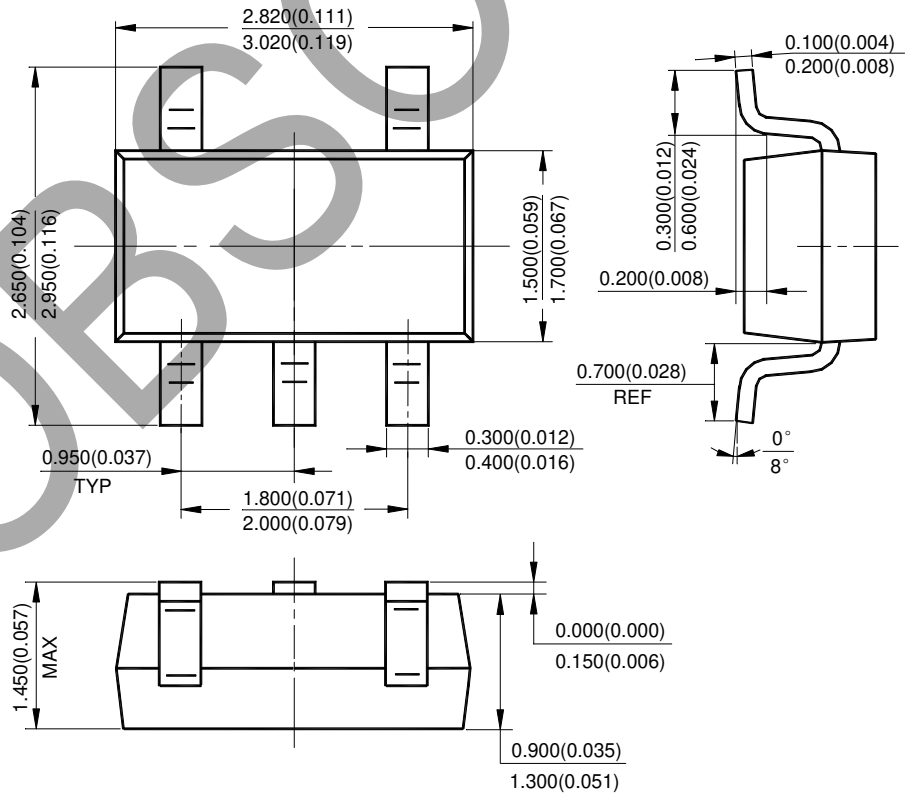
(2) Package Type: MSOP-8

MSOP-8



MSOP-8			
Dim	Min	Max	Typ
A	—	1.10	—
A1	0.05	0.15	0.10
A2	0.75	0.95	0.86
A3	0.29	0.49	0.39
b	0.22	0.38	0.30
c	0.08	0.23	0.15
D	2.90	3.10	3.00
E	4.70	5.10	4.90
E1	2.90	3.10	3.00
E3	2.85	3.05	2.95
e	—	—	0.65
L	0.40	0.80	0.60
a	0°	8°	4°
x	—	—	0.750
y	—	—	0.750
All Dimensions in mm			

(3) Package Type: SOT-23-5

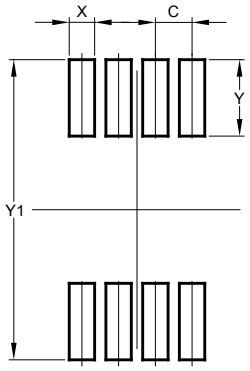


Suggested Pad Layout (All dimensions in mm(inch).)

Please see http://www.diodes.com/package-outlines.html for the latest version.

(1) Package Type: MSOP-8

MSOP-8



Dimensions	Value (in mm)
C	0.650
X	0.450
Y	1.350
Y1	5.300

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