

Power Distribution Switch with Reverse Current Blocking

Features

- VIN supply voltage range from 0.7V to 3.6V
- All time reverse current protection with ultra fast RCP recovery
- Adjustable current limit from 300mA to 800mA
- Auto-restart after OCP
- 28V high voltage tolerance on VOUT pin
- Low ON resistance of the power FETs: 60mΩ (typical) in total
- Over temperature protection
- Specified from -40°C to +85°C ambient temperature

Applications

- Mobile communications
- Notebooks
- Battery powered electronics
- General purpose portable device

General Description

The G3715 is a precision adjustable current-limited power switch with high output absolute rating of 28V. The device is equipped with UVLO and OT protection. ILIM pin defines the over-current limit threshold; FLT pin indicates when a fault condition has occurred. The device has built in soft start to minimize current surges during normal turn on.

A fast RCP recovery circuit has been added to the switch to prevent any reverse current flowing back to power source at all times. When exiting from reverse current protection state, the power MOSFET will turn on within 50μs. The fast RCP recovery ensures the voltage on VOUT doesn't drop too much in a power source swap application.

G3715 is available in the AQFN2X2-12 package.

Ordering Information

ORDER NUMBER	MARKING	TEMP. RANGE	PACKAGE (Green)
G3715AS1U	3715	-40°C~ +85°C	AQFN2X2-12

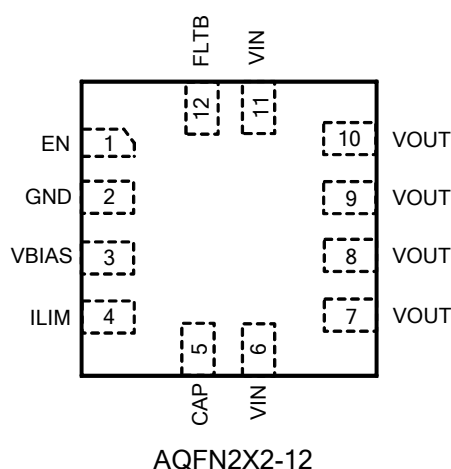
Note: AS: AQFN2X2-12

1: Bonding code

U: Tape & Reel

Green : Lead Free / Halogen Free.

Pin Configuration



Absolute Maximum Ratings

VOUT	-0.3V to 28V
VBIAS, VIN, ILIM, EN, CAP, FLTB	-0.3V to 6V
I _{VOUT} (while applying VIN)	1.5A
Continuous Power Dissipation (T _A = +25°C)	
AQFN2X2-12	1.6W
Junction Temperature	150°C
Thermal Resistance of Junction to Ambient (θ _{JA})	
AQFN2X2-12	80°C/W

Recommended Operating Conditions

VOUT (OFF state)	0V to 24V
VIN	0.7V to 3.6V
VBIAS, ILIM, EN, CAP, FLTB	0V to 5.5V
R _{ILIM}	66KΩ to 176KΩ
C _{OUT}	10μF to 100μF
I _{VOUT}	0.5A
ESD (HBM)	±2KV
ESD (CDM)	±500V
Operating Temperature	-40°C to 85°C

* Please refer to EV Board PCB Layout Section.

Electrical Characteristics

V_{IN} = 1.8V, V_{EN} = V_{BIAS} = 5V, C_{OUT} = 10μF, T_A = 25°C

The device is not guaranteed to function outside its operating conditions. Parameters with MIN and/or MAX limits are 100% tested at +25°C, unless otherwise specified.

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Input Voltage	V _{IN}		0.7	---	3.6	V
Supply Voltage	V _{BIAS}		2.7	---	5.5	V
Under Voltage Lockout Voltage	V _{UVLO}	VBIAS Pin	---	2.3	2.5	V
Under Voltage Lockout Hysteresis Voltage	V _{HYS(UVLO)}		---	100	---	mV
VBIAS Supply Current	I _{BIAS}	V _{EN} =0V		1		μA
		V _{EN} =V _{BIAS} =5V, No load	---	180	---	μA
VIN Off-state Leakage Current	I _{S(OFF)}	V _{IN} =1.8V, V _{OUT} =0V, V _{EN} =0V	-5	0.1	---	μA
VOUT Off-state Leakage Current		V _{IN} =1.8V, V _{OUT} =1.8V, V _{EN} =0V	-5	0.1	---	μA
		V _{IN} =0V, V _{OUT} =20V, V _{EN} =0V	-5	0.1	---	μA
On Resistance	R _{DS(on)}	I _{VIN} =0.2A	---	60	---	mΩ
VIN-VOUT Regulation Voltage	V _R	I _{VIN} =0.2A	10	20	30	mV
Over Current Protection Current	I _{OC}	ILIM open	---	0.2	---	A
		R _{ILIM} =176KΩ	---	0.3	---	A
		R _{ILIM} =66KΩ	---	0.8	---	A
		ILIM short to GND	---	1.6	---	A
Turn on Delay (From EN to VOUT=10%)	t _{DON}	see figure 1	---	0.45	---	ms
VOUT LOW to HIGH output transition time	t _{TLH}	see figure 1	---	0.72	---	ms
RCP recovery time From VOUT drops below VIN to FET-B ON	T _{ON(RCP)}	V _{EN} =5V	---	---	50	μs
FET-B RCP Turn off Time	t _{dis(RCP)}	FET-B RCP turn OFF time *1	---	1	---	μs
FLTB De-glitch Time	t _{deg}	FLTB in OCP	---	10	---	ms
EN High-level Input Voltage	V _{IH}	V _{BIAS} =5V	1.2	---	---	V
EN Low-level Input Voltage	V _{IL}	V _{BIAS} =5V	---	---	0.4	V
EN Input Leakage Current	I _{Leak}	V _{EN} =V _{BIAS} =5V	---	---	7	μA
FLTB Low-level Output Voltage	V _{FTLB}	I _{FLTB} =4mA	---	---	0.3	V
Over Temperature Shutdown Threshold Temperature	OT	*1	---	140	---	°C
Hysteresis of Over Temperature Protection Threshold Temperature	OT _{HYS}	*1	---	25	---	°C

Note

*1 Guaranteed by designed

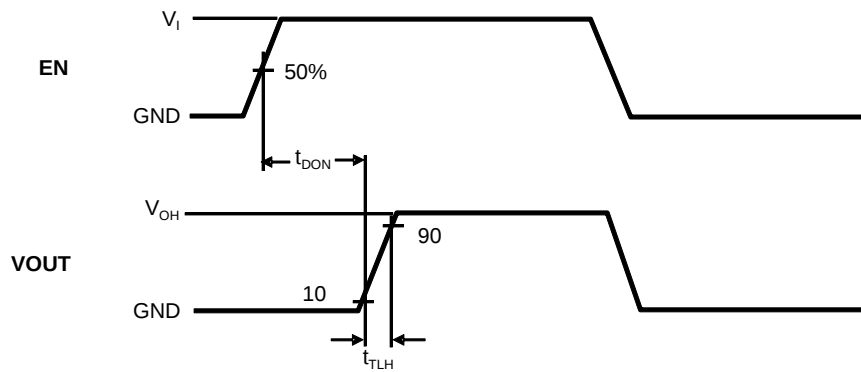
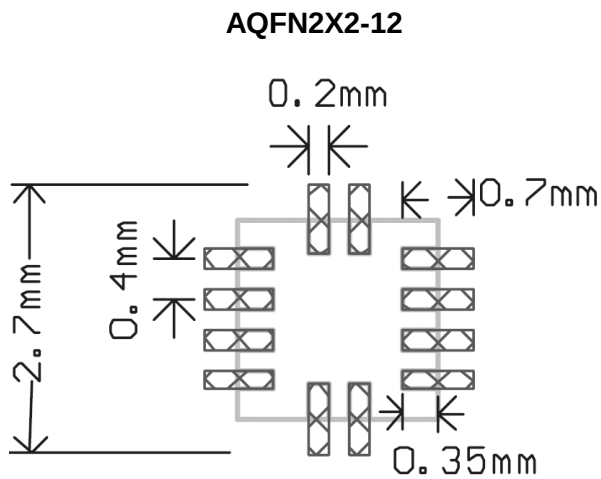


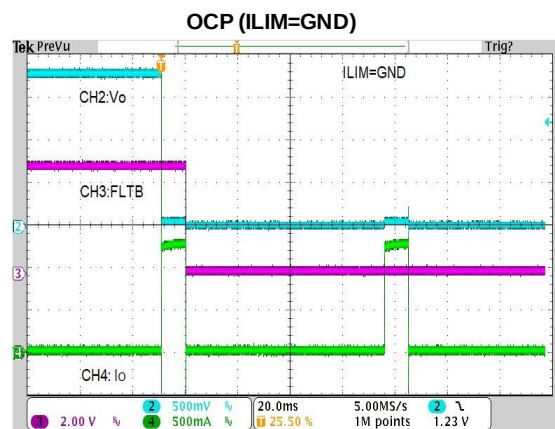
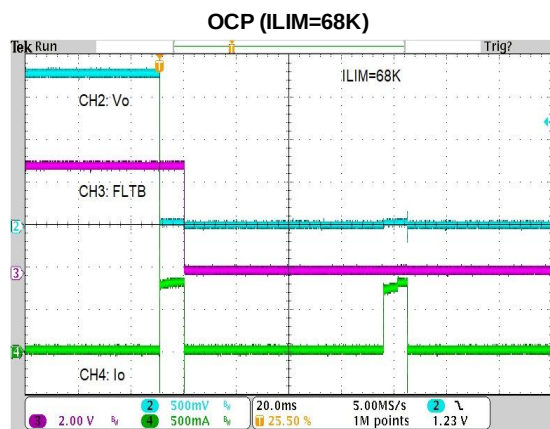
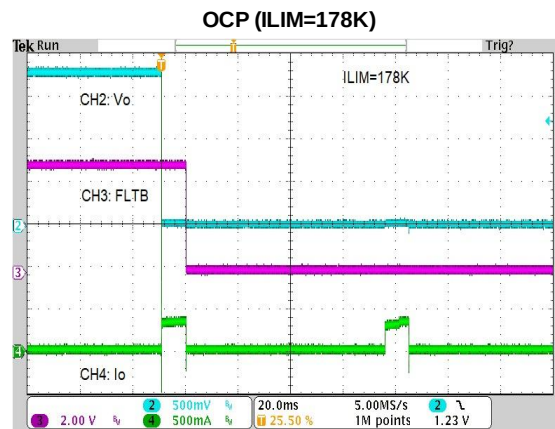
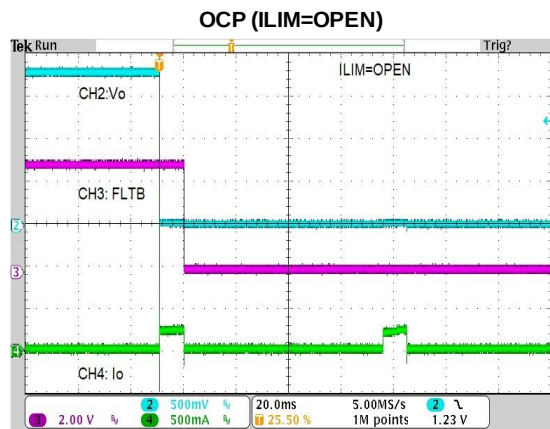
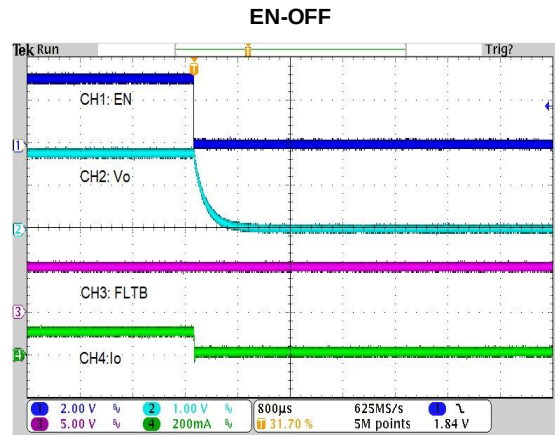
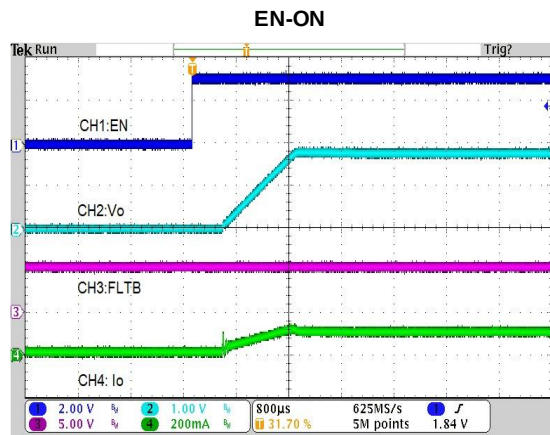
Figure 1

Minimum Footprint PCB Layout Section



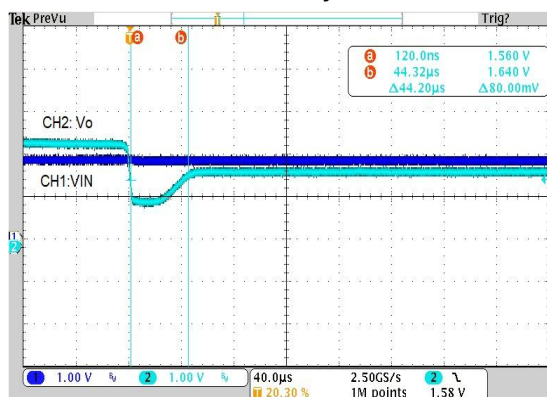
Typical Performance Characteristics

$V_{BIAS}=5V$, $V_{IN}=1.8V$, $C_{OUT}=10\mu F$, $T_A=25^{\circ}C$, unless otherwise note.

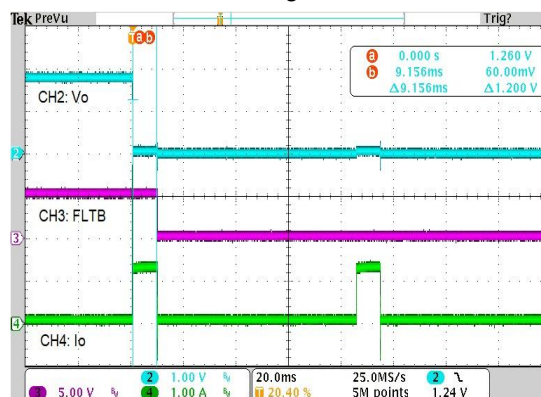


Typical Performance Characteristics (continued)

RCP recovery time

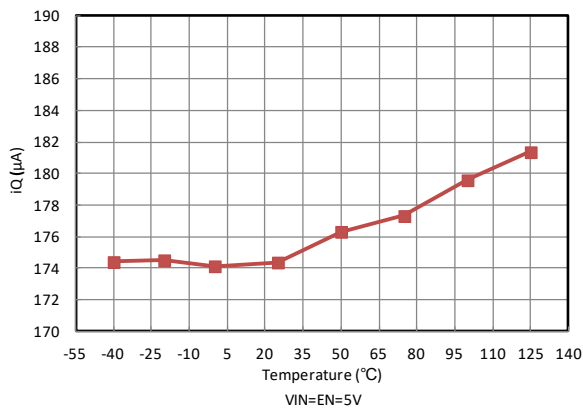


FLT B De-glitch time

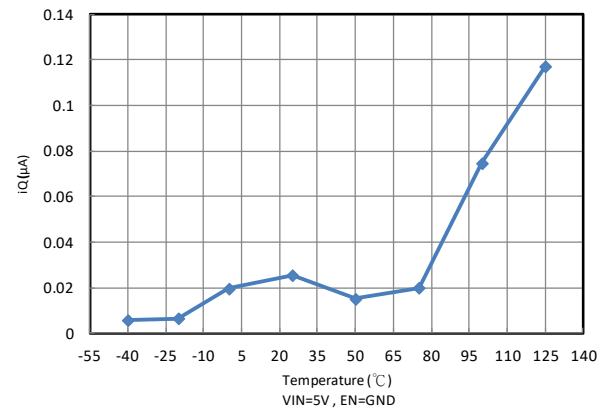


Typical Performance Characteristics (continued)

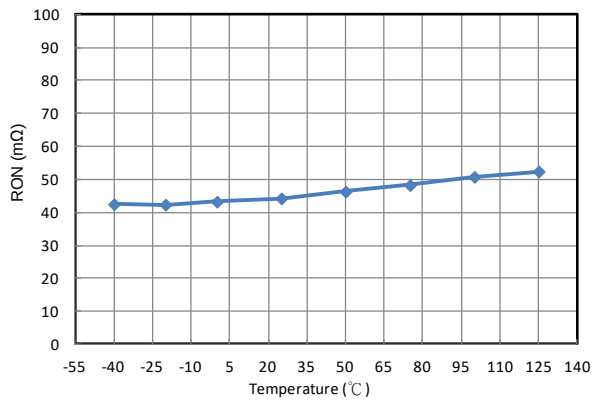
ON state supply current vs. temperature



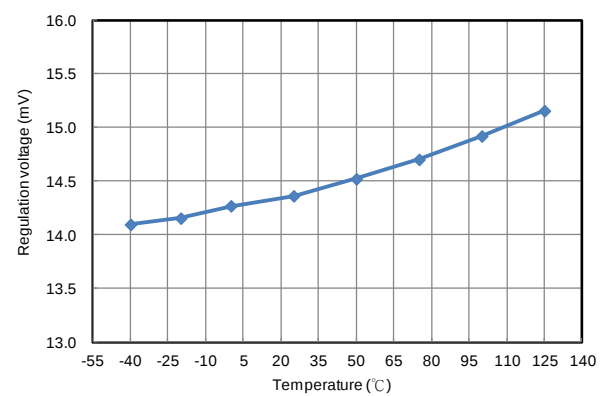
OFF state supply current vs. temperature



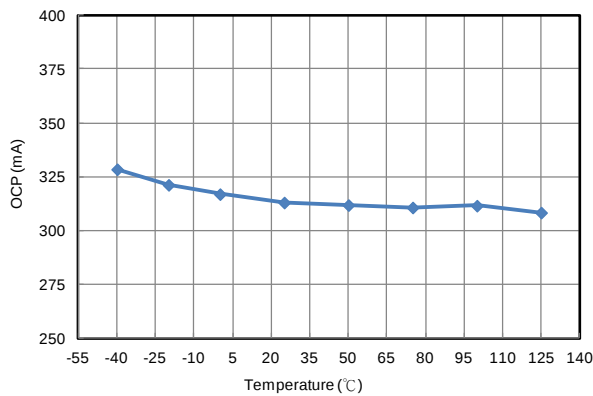
RON vs. temperature



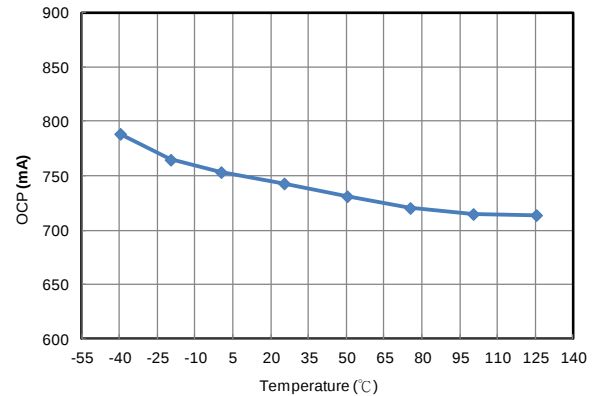
Regulation voltage vs. temperature



OCP (ILIM=176K) vs. temperature



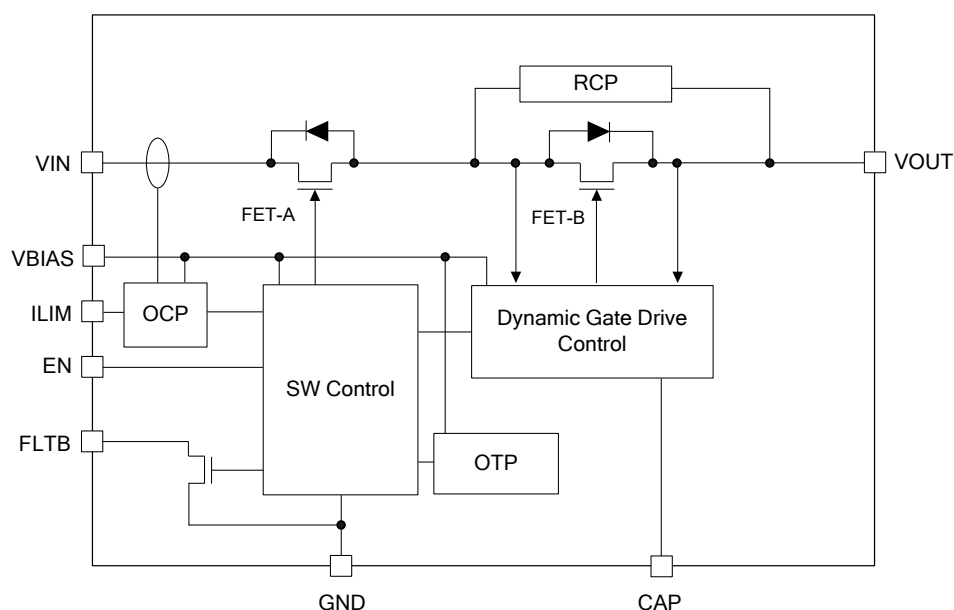
OCP (ILIM=66K) vs. temperature



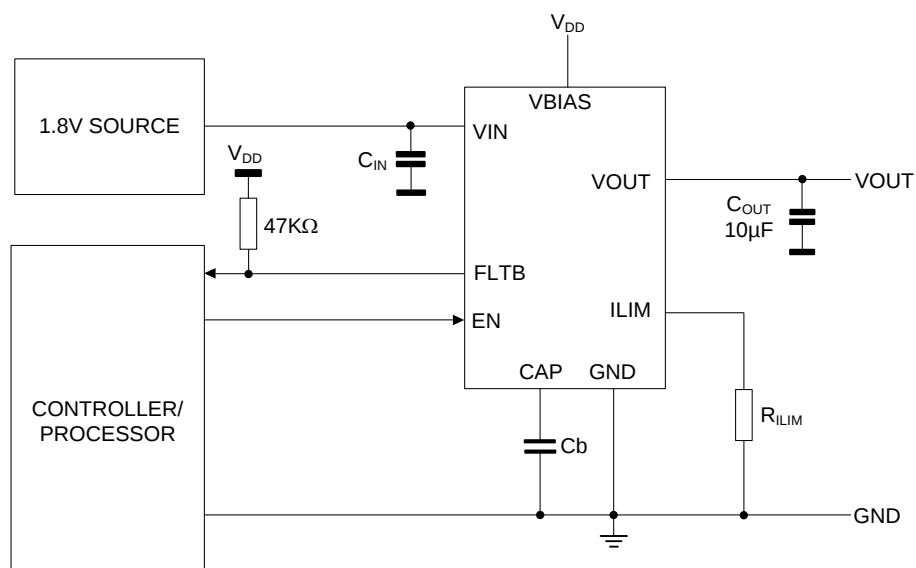
Pin Description

Pin	Name	Type	Description
1	EN	I	Enable input (active HIGH with internal 1M Ω pull down resister)
2	GND		Ground
3	VBIAS	I	Supply power
4	ILIM	I	Current limit setting. Connect a resistor to GND to adjust the current limit level.
5	CAP	O	Connect a capacitor to GND
6,11	VIN	I	Input voltage.
7,8,9,10	VOUT	O	Output voltage
12	FLT_B	O	Fault condition indicator (open-drain output)

Function Diagram



Application Diagram



Functional Description

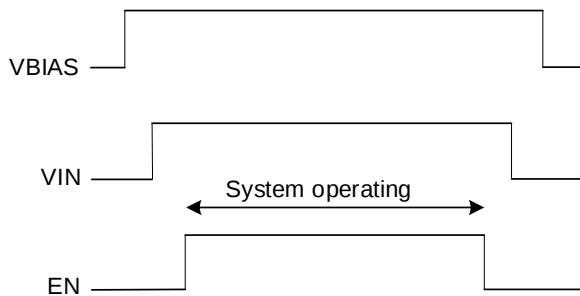
VBIAS, VIN, and VOUT

VBIAS is the power supply for the controller logic circuitry. VIN is the power supply connecting the drain of the MOSFET. VOUT is the source of the MOSFET. In a typical application, current flows through the MOSFET from VIN to VOUT toward the load.

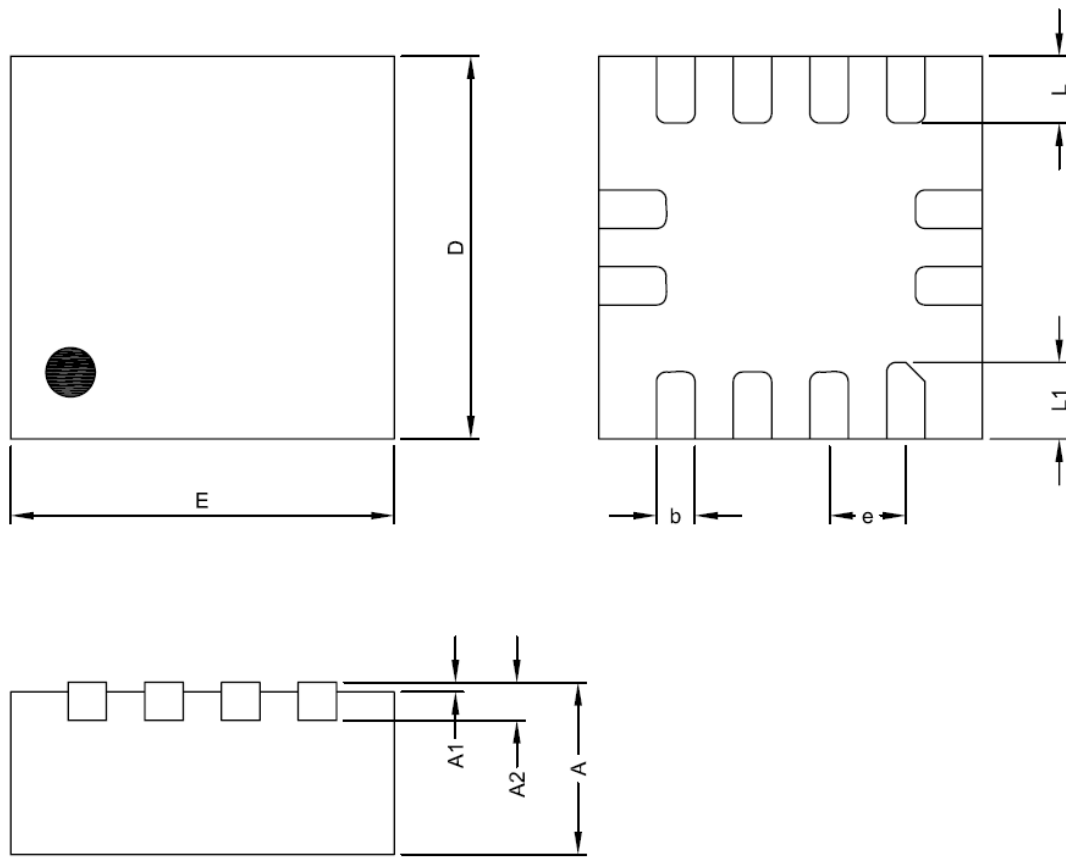
EN

EN must be driven logic high or logic low for a clearly defined input. EN should not be allowed to go negative with respect to GND.

Power Sequence Timing



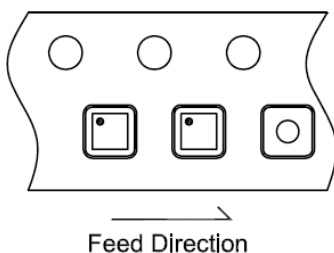
Package Information



AQFN2X2-12 Package

Symbol	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.80	0.90	1.00	0.0315	0.0354	0.0394
A1	0.00	---	0.05	0.0000	---	0.0020
A2	0.20 REF			0.0079 REF		
D	1.95	2.00	2.05	0.0768	0.0787	0.0807
E	1.95	2.00	2.05	0.0768	0.0787	0.0807
b	0.15	0.20	0.25	0.0059	0.0079	0.0098
e	0.40 BSC			0.0157 BSC		
L	0.30	0.35	0.40	0.0118	0.0138	0.0157
L1	0.35	0.40	0.45	0.0138	0.0157	0.0177

Taping Specification



PACKAGE	Q'TY/REEL
AQFN2X2-12	3,000 ea

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