



Ultra-small 2.5A Load Switch with Reverse Blocking

Description

The AM6U1325 is a 17mΩ, 2.5A single-channel load switch that is able to switch a power rail ranging from 1.0 V to 5.5 V. It contains reverse current protection and Power Good [PG] signaling pin.

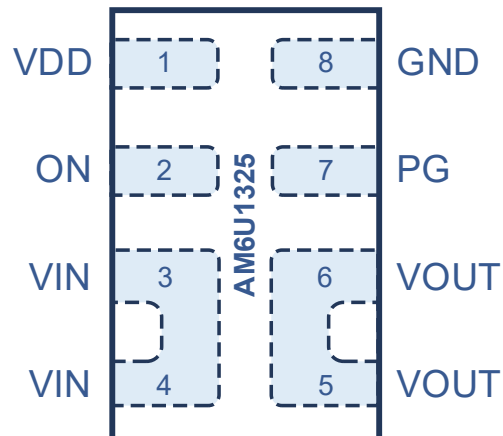
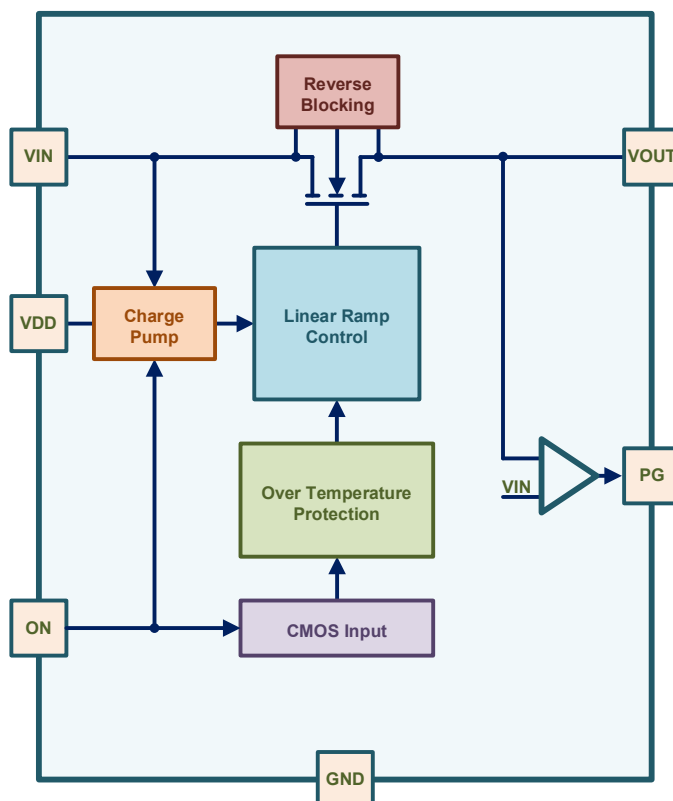
The product is packaged in an ultra-small 1.0x1.6mm package.

Features

- 1.0x1.6x0.55mm U-DFN1610-8 package
- 17mΩ $R_{DS(on)}$
- Over Temperature Protection
- RoHS Compliant / Halogen-Free / Pb-Free
- Operating Temperature: -40 °C to 85 °C
- Operating Voltage: 1.5 V to 5.5 V

Applications

- Smartphones
- Tablets
- Notebooks

PIN Configuration**Top View****U-DFN1610-8****Functional Block Diagram**

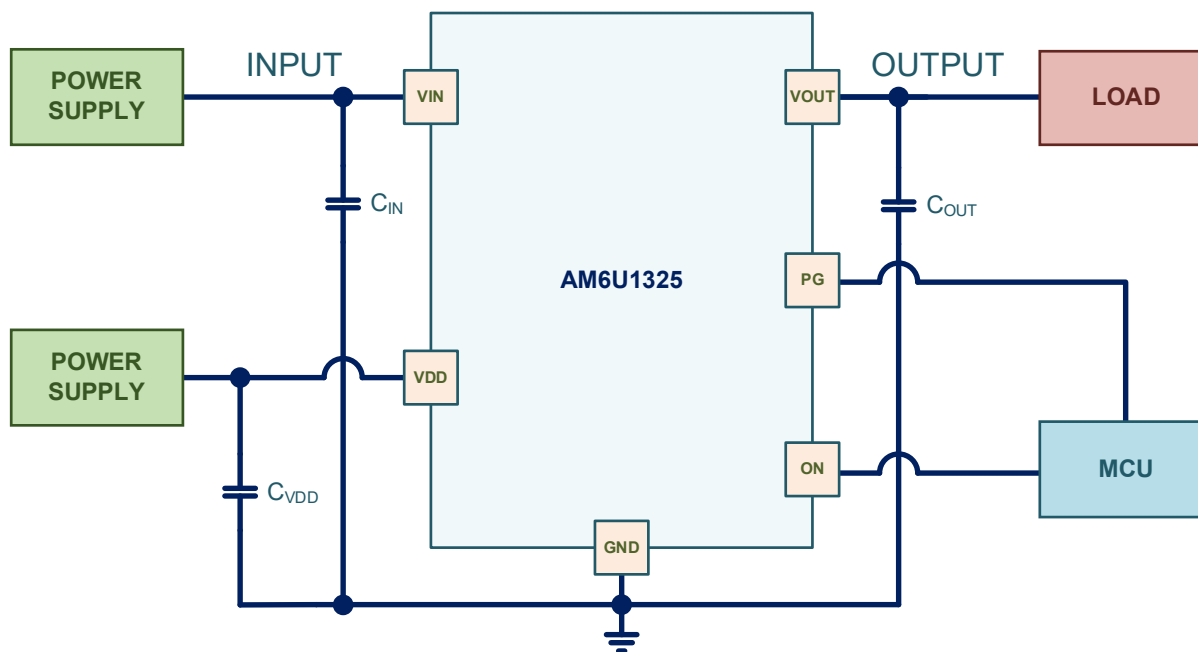


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Pin Description

Pin #	Pin Name	Type	Pin Description
1	VDD	Power	Power supply. Assumes a 0.1 μ F or larger decoupling capacitor.
2	ON	Input	Turns on load switch, active HI. There is an internal pull-down circuit to GND (~5 M Ω).
3, 4	VIN	MOSFET	Drain terminal connection for the load switch. Connect at minimum a low-ESR 10 μ F capacitor from this pin to GND.
5, 6	VOUT	MOSFET	Source terminal connection of the load switch. Connect a low-ESR capacitor from this pin to GND.
7	PG	Output	A push pull output. Indicates Power Good, active HI
8	GND	GND	Ground.

Typical Application Circuit





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Absolute Maximum Ratings

Parameter	Description	Conditions	Min.	Typ.	Max.	Unit
V _{DD}	Power Supply		—	—	7	V
T _S	Storage Temperature		-65	—	150	°C
ESD _{HBM}	ESD Protection	Human Body Model	2000	—	—	V
W _{DIS}	Package Power Dissipation		—	—	0.4	W
MOSFET IDS _{PK}	Peak Current from Drain to Source	For no more than 1 ms with 1% duty cycle	—	—	3.5	A

Electrical Characteristics

T_A = -40 °C to 85 °C unless otherwise stated. Typical values at T_A = 25 °C (unless otherwise stated)

Parameter	Description	Conditions	Min.	Typ.	Max.	Unit
V _{DD}	Power Supply	-40°C to 85°C	1.5	—	5.5	V
V _{IN}	Switch Input Voltage		1.0	—	V _{DD}	V
V _{IH}	High Input Voltage on the ON pin		0.85	—	V _{DD}	V
V _{IL}	Low Input Voltage on the ON pin		-0.3	0	0.3	V
I _{SHDN}	Input Shutdown Current	Disabled, I _{OUT} = 0A	—	—	0.1	μA
I _Q	Input Quiescent Current	Enabled, I _{OUT} = 0A	—	20	50	μA
I _{OUT}	Output Current	Continuous	—	—	2.5	A
I _{REVERSE}	MOSFET Reverse Leakage Current V _{OUT} = 1.0V to 5.5 V, V _{IN} = 0V, ON = 0V, V _{DD} = 1.5V to 5.5V;	T _A = 25°C	—	0.02	0.1	μA
		T _A = 85°C	—	0.1	1	
		T _A = -40°C	—	0.01	0.03	
R _{DS(ON)}	Switch ON Resistance	T _A = 25°C; I _{OUT} = 100mA	—	17.5	20	mΩ
		T _A = 85°C; I _{OUT} = 100mA	—	21.5	23	
R _{Pull-Down}	ON Pull-Down Resistance		—	4.8	—	MΩ
t _{ON_Delay}	ON Delay Time	50% ON to V _{OUT} Ramp Start	—	250	550	μs
V _{OUT(SR)}	Output Slew Rate	10% V _{OUT} to 90% V _{OUT}	—	1.8	—	V/ms
		Example: V _{DD} = V _{IN} = 5V, C _{OUT} = 10μF, R _{LOAD} = 20Ω				
t _{ON}	Total Turn On Time	50% ON to 90% V _{OUT}	—	2.6	—	ms
		Example: V _{DD} = V _{IN} = 5V, C _{OUT} = 10μF, R _{LOAD} = 20Ω				
t _{OFF_Delay}	Off Delay Time	50% ON to V _{OUT} Fall Start, V _{DD} = V _{IN} = 5.0V, R _{LOAD} = 20Ω, no C _{OUT}	—	7	—	μs
C _{OUT}	Output Load Capacitance	C _{OUT} connected from V _{OUT} to GND	—	—	500	μF
PG _{TRIGGER}	Power Good Trigger Level	V _{OUT} % of V _{IN}	—	90	—	%
OTP	Overtemperature Protection ¹	Threshold	—	125	—	°C
		Hysteresis	—	25	—	

Notes:

- Compliance to the datasheet limits is assured by one or more methods: production test, characterization, and/or design.
- Refer to typical timing parameter vs. C_{SLEW} performance charts for additional information.



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Typical Performance Characteristics

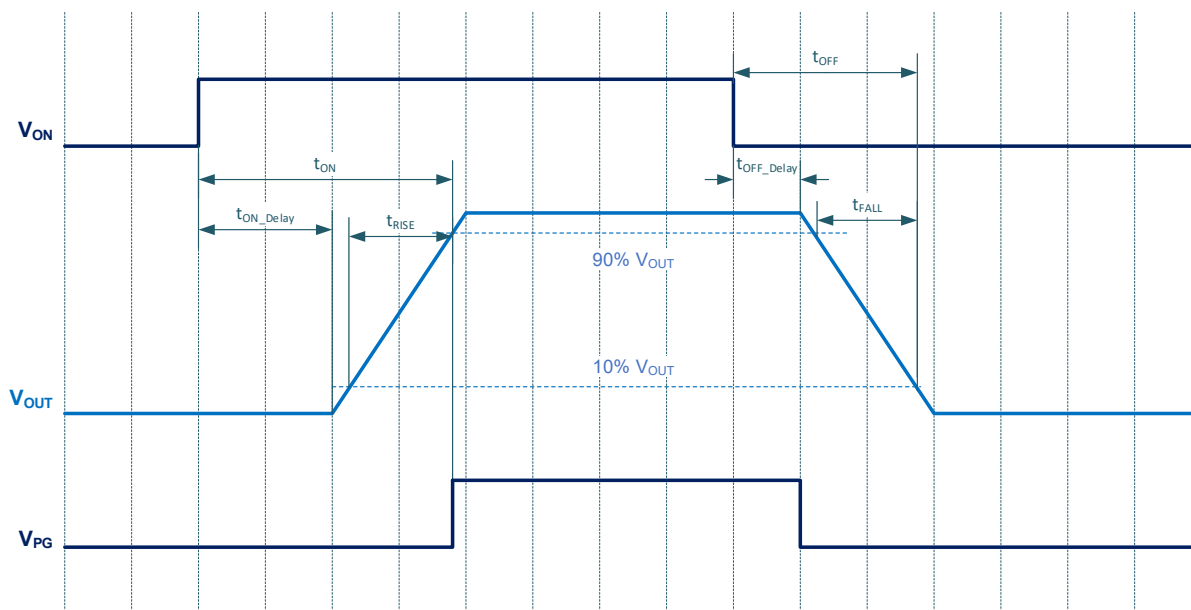
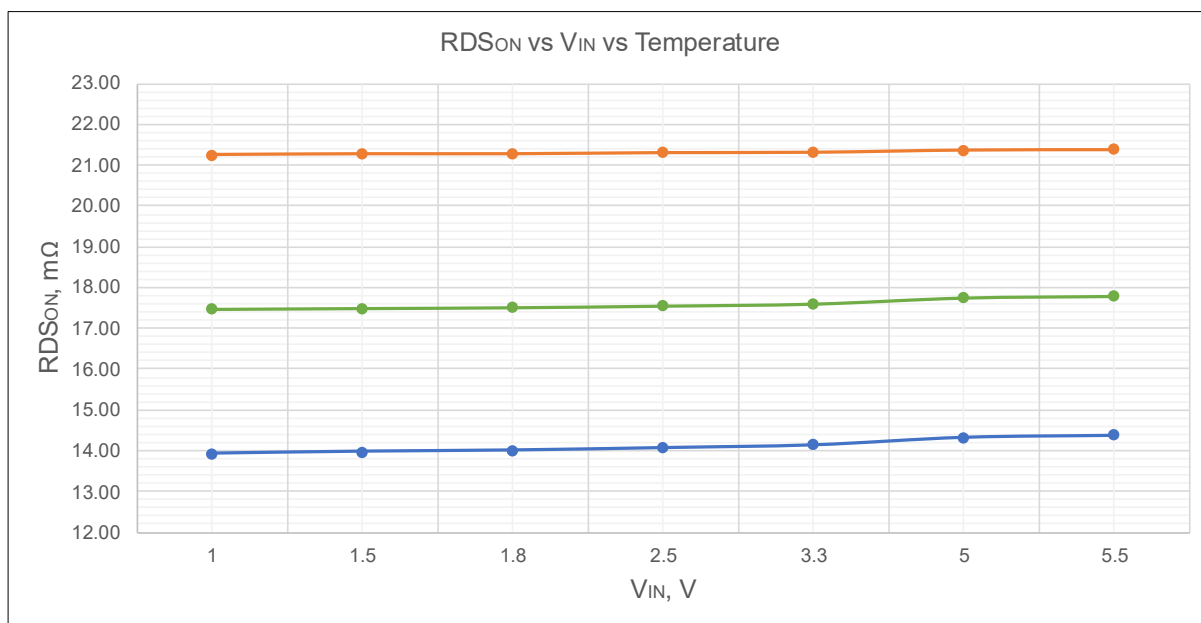


Figure 1. Basic Timing Parameters

Figure 2. $R_{DS(on)}$ vs. V_{IN} and Temperature at $V_{DD} = 5.5V$ and $I_{OUT} = 100mA$



Application Information

Typical Operation

For correct operability per the AM6U1325 EC table a proper power-up sequence must be applied. Apply V_{DD} first, followed by V_{IN} , then ON signal to power-up the device

During operation, should a system fault occur, V_{IN} should be returned to Recommended Operating Conditions before the load switch is transitioned between its on and off states to reduce out-of-spec transitional stress on the device.

Some typical operation waveforms are illustrated below.

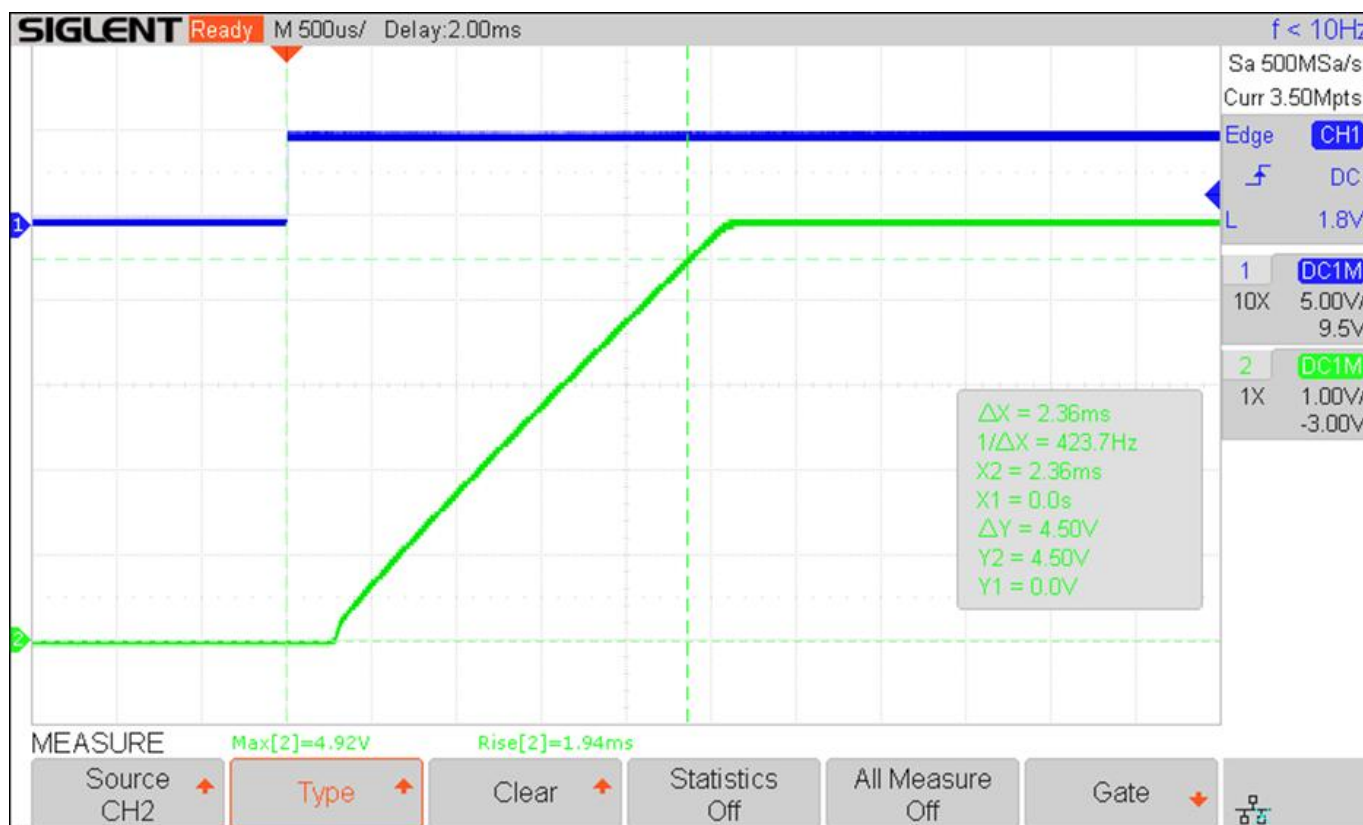


Figure 3. AM6U1325 Typical Power-Up Operation Waveform. $V_{DD} = V_{IN} = 5\text{V}$, $R_{LOAD} = 20\Omega$, $C_{OUT} = 10\mu\text{F}$

Overtemperature Protection

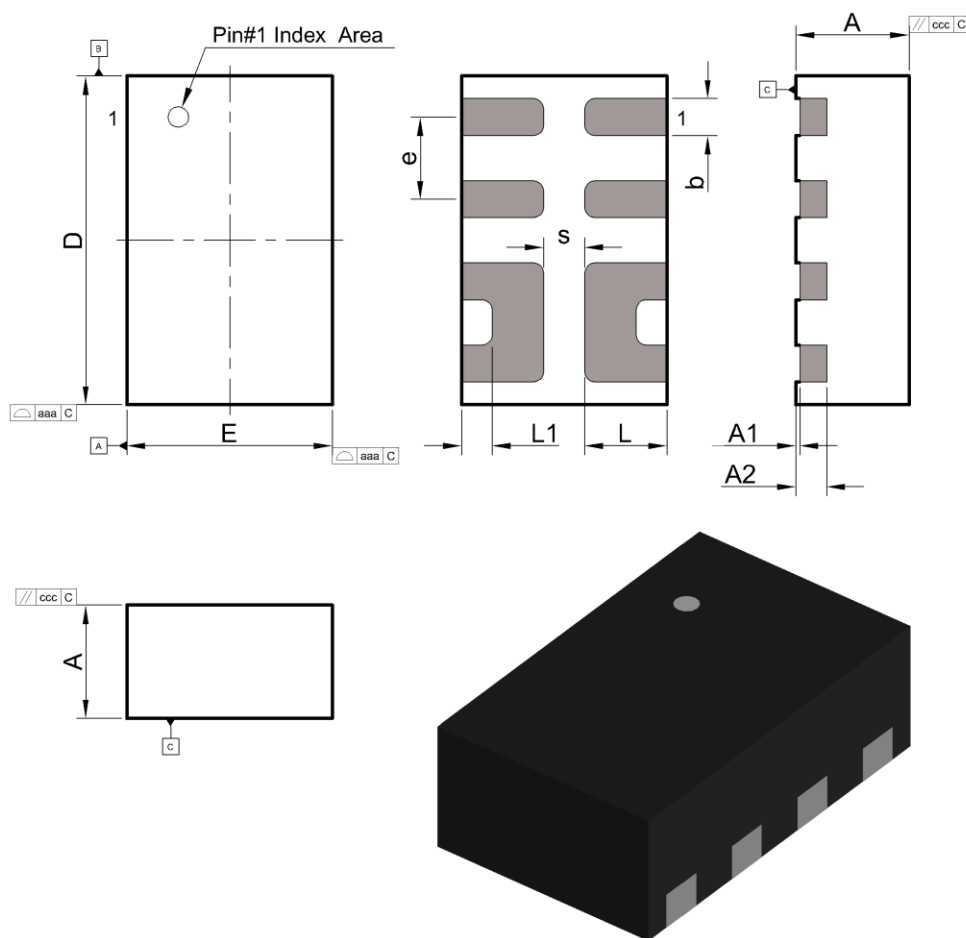
The AM6U1325 has a built-in thermal protection. When the combination of the load and the ambient temperature may lead to die overheat, the load switch's internal Thermal Shutdown Protection circuit can be activated. If the die temperature exceeds the listed $THERM_{ON}$ specification, the FET is shut OFF completely to allow the die to cool. When the die cools to the listed $THERM_{OFF}$ temperature threshold, the FET is allowed to turn back on. This process may repeat as long as the output current overload condition persists.



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Package Outline Dimensions

U-DFN1610-8



Symbol	Min.	Typ.	Max.	Symbol	Min.	Typ.	Max.
A	0.500	0.550	0.600	e	—	0.400	—
A1	0.010	—	0.000	L	0.375	0.400	0.425
A2	0.125	0.150	0.175	L1	0.125	0.150	0.175
b	0.155	0.180	0.205	s	—	0.200	—
D	1.550	1.600	1.650	aaa	—	0.050	—
E	0.950	1.000	1.050	ccc	—	0.050	—
All Dimensions in mm							



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Package Top Marking



NN – Identification Code: C2

Y – Year: 0~9

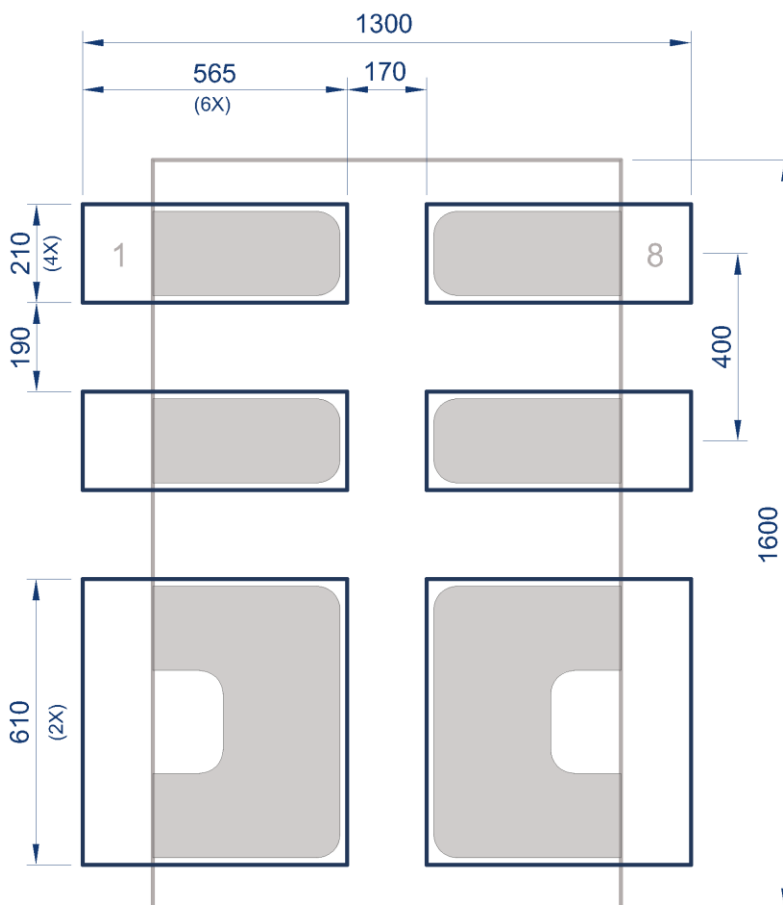
W – Week: A~Z – 1~26 week

a~z – 27~52 week, z represents 52 and 53 week

N – Internal Code

Suggested Pad Layout

U-DFN1610-8





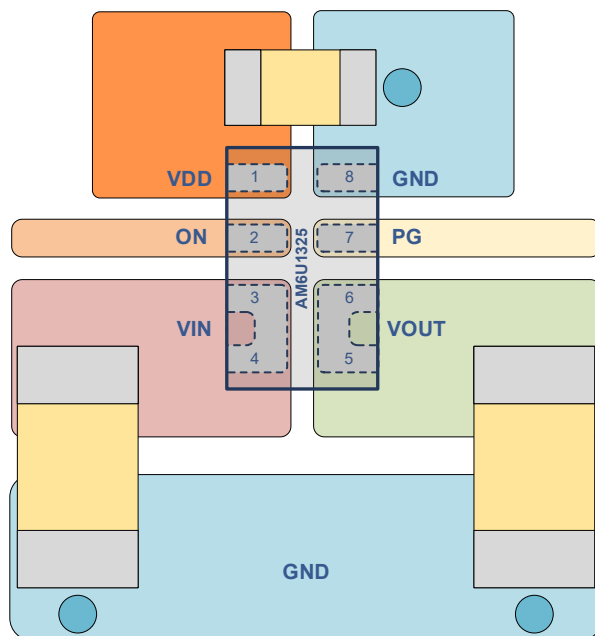
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Recommended Layout

It is important to have a proper PCB layout for high-performance device operation. The list below provides some basic rules for PCB layout.

- Connect a 0.1 μ F capacitor from VDD pin to GND. It should be placed as close to device as possible.
- Place high-quality low-ESR input C_{IN} (10 μ F min) and output C_{OUT} capacitors close to the device VIN and VOUT pins to minimize the effects of parasitic inductance.
- Make sure to have a solid Ground connection.
- All traces should be as short, wide and direct as possible.
- VIN and VOUT pins have the most heat dissipation during high-current operations. Use polygon planes and/or 2 oz. copper for VIN and VOUT connections.

Examples below illustrate described layout guidelines implementation.



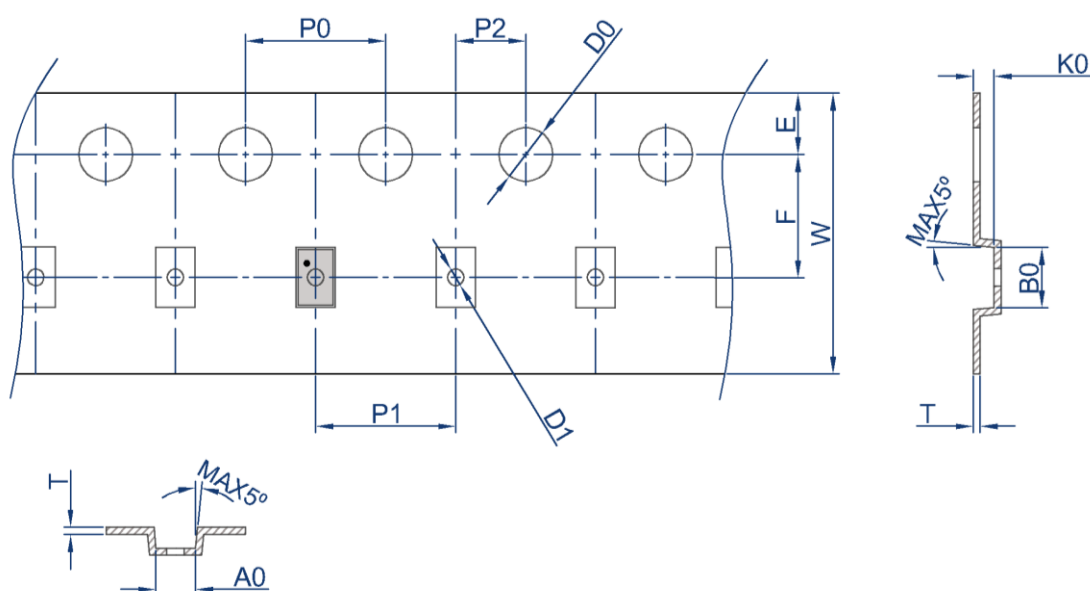


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Tape and Reel Specifications

Package Type	# of Pins	Nominal Package Size [mm]	Max Units		Reel & Hub Size [mm]	Leader (min)		Trailer (min)		Tape Width [mm]	Part Pitch [mm]
			per Reel	per Box		Pockets	Length [mm]	Pockets	Length [mm]		
U-DFN1610-8	8	1.0 x 1.6 x 0.55	3000	3000	178/60	100	400	100	400	8	4

Package Type	A0	B0	K0	P0	P1	P2	T	D0	D1	E	F	W
U-DFN1610-8	1.12	1.72	0.70	4.00	4.00	2.00	0.20	1.55	0.50	1.75	3.50	8.00



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Revision History

Date	Version	Change
June 16, 2023	Rev.001	Initial release
June 11, 2025	Rev.002	Updated EC table and Recommended Layout. Added Lase Marking section



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