

General Description

The AOZ15333DI is a current-limited load switch targeting applications that require comprehensive protections. The input operating voltage range is between 3.3V and 5.5V. The output terminal is rated 39V absolute maximum. The internal current limiting circuit protects the supply from large load current. The current limit level is set with an external resistor. The soft-start circuit controls inrush current due to highly capacitive loads. The device features very low quiescent current of 125 μ A. The supply current reduces to less than 6 μ A in shutdown. It has under-voltage lockout, over-voltage protection (OVP) and over temperature protections.

The AOZ15333DI has True Reverse-Current Blocking (TRCB) protection to avoid undesired reverse-current from VOUT to VIN.

The AOZ15333DI supports USB PD Fast Role Swap (FRS). When FON pin is high, the device is in fast turn-on mode to ensure output voltage rises quickly to meet USB PD spec. The device also features fast recovery to turn on the power switch once reverse current blocking protection is de-activated.

The AOZ15333DI is available in 3mmx3mm DFN-12L package.

Features

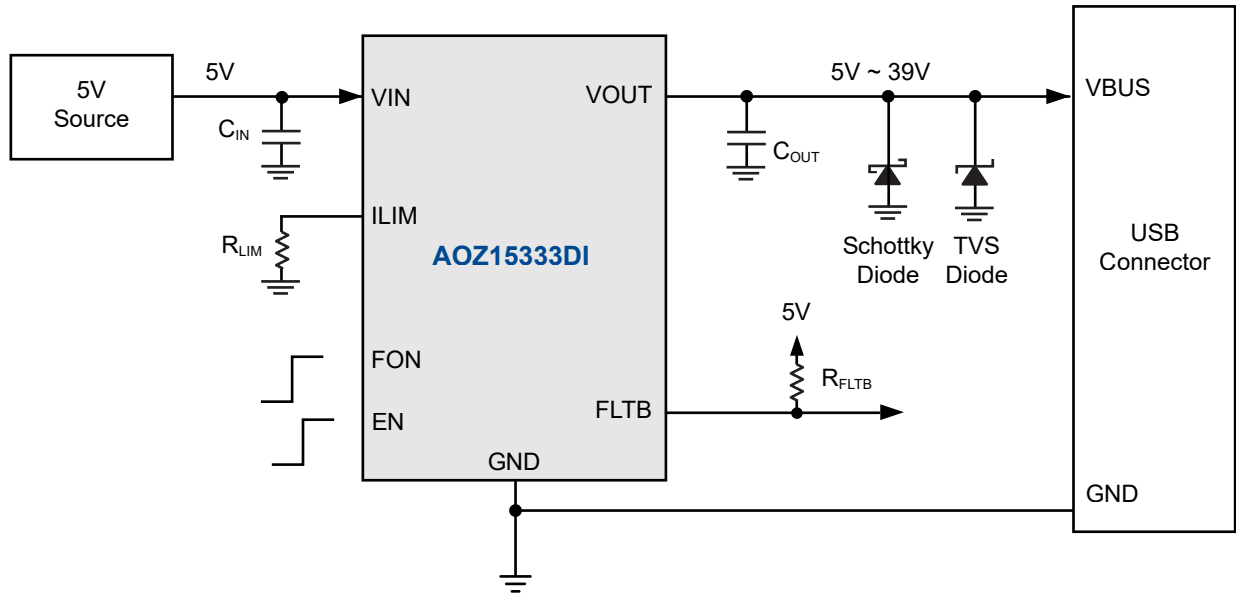
- 39V voltage rating on VOUT pin
- 3.3V to 5.5V operating input voltage
- 3.5A current capability
- 45m Ω typical R_{ON}
- Supports USB PD fast role swap (FRS)
- Programmable current limit
- True reverse-current blocking (TRCB)
- Fast recovery from OVP and TRCB
- Slew-rate control
- 125 μ A quiescent current, 6 μ A shutdown current
- Over-voltage protection (OVP)
- Input under-voltage lockout (UVLO)
- Thermal shutdown protection (TSD)
- ESD protections:
 - \pm 2KV HBM rating
 - \pm 1KV CDM rating
- IEC61000-4-2 (VOUT Pin): \pm 8kV contact, \pm 15kV air discharge
- Package: DFN-12L 3mmx3mm
- IEC 62368-1:2018 (3rd Edition), US-41714-UL, E326264-A6015-CB-1

Applications

- USB PD power source switch
- Smart phone and tablet
- Notebook, ultrabook and desktop
- Portable devices



Typical Application



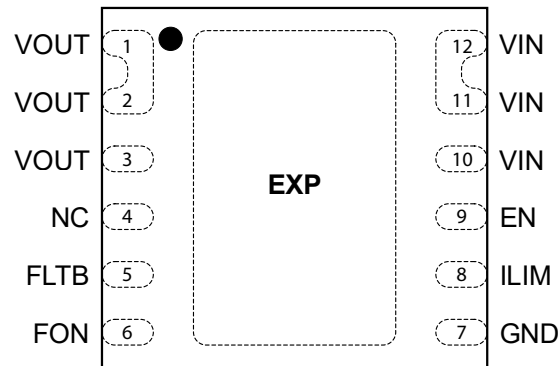
Ordering Information

Part Number	Fault Recovery	Package	Environmental
AOZ15333DI-01	Auto Restart	DFN3x3-12L	RoHS
AOZ15333DI-02	Latch-off	DFN3x3-12L	RoHS



AOS products are offered in packages with Pb-free plating and compliant to RoHS standards. Please visit <https://aosmd.com/sites/default/files/media/AOSGreenPolicy.pdf> for additional information.

Pin Configuration



**Figure 1. DFN3x3-12L
(Top Transparent View)**

Pin Description

Pin Number	Pin Name	Pin Function
1, 2, 3	VOUT	Power output. Connect to adaptor. Pin 3 is internally connected to Pin 1 and Pin 2.
4	NC	No Connect.
5	FLT B	Fault Indicator, Open-drain output, Active-low when fault condition occurs.
6	FON	Fast-On. Active-high. This pin sets device into fast turn on mode. Internally pulled down with a resistor.
7	GND	Ground.
8	ILIM	Current Limit Set Pin. Connect a 1% resistor R _{LIM} from I _{LIM} to GND to set the current limit threshold.
9	EN	Enable Input. Active-High.
10, 11, 12	VIN	Supply input. Connect to internal power regulator. Pin 10 is internally connected to Pin 11 and Pin 12.
EXP	EXP	Exposed Pad, Connect to GND.

Absolute Maximum Ratings

Exceeding the Absolute Maximum ratings may damage the device.

Parameter	Rating
V _{OUT} to GND	-0.3V to +39V
V _{IN} , EN, ILIM, FON, FLTB to GND	-0.3V to +6V
Junction Temperature (T _J)	+130 °C
Storage Temperature (T _S)	-65 °C to +130 °C
ESD Rating HBM/CDM	±2kV / ±1kV

Recommended Operating Conditions

The device is not guaranteed to operate beyond the Maximum Recommended Operating Conditions.

Parameter	Rating
V _{IN} to GND	3.3V to 5.5V
FON, EN, FLTB to GND	0V to 5.5V
ILIM to GND	0V to 2V
Switch Current (I _{SW})	0A to 3.5A
Junction Temperature (T _J)	-40 °C to +125 °C

Electrical Characteristics

T_A = 25 °C, V_{IN} = 5V, EN = 5V, FON = 0V, unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Units
General						
V _{IN}	Input Supply Voltage		3.3		5.5	V
V _{UVLO_R}	Under-voltage Lockout Threshold	V _{IN} Rising	2.95	3.1	3.25	V
V _{UVLO_HYS}	Under-voltage Lockout Hysteresis	V _{IN} Rising - V _{IN} Falling		150		mV
I _{IN_ON}	Input Quiescent Current	I _{OUT} = 0A		125		μA
I _{IN_FON}	FON Standby Current	FON = 5V, EN = 0V		135		μA
I _{IN_OFF}	Input Shutdown Current	FON = 0V, EN = 0V		6	10	μA
R _{ON}	Switch-on Resistance	I _{OUT} = 1A		45		mΩ
V _{EN_H}	Enable Input Logic High Voltage	EN Rising	1.4			V
V _{EN_L}	Enable Input Logic Low Voltage	EN Falling			0.4	V
I _{EN_BIAS}	Enable Input Bias Current	EN = 1.8V		1	1.5	μA
V _{FON_H}	Fast-on Input Logic High Voltage	FON Rising	1.4			V
V _{FON_L}	Fast-on Input Logic Low Voltage	FON Falling			0.4	V
I _{FON_BIAS}	Fast-on Input Logic Bias Current	FON = 1.8V		1.5	4	μA
V _{FLTB_LO}	FLTB Pull-down Voltage	I _{SINK} = 3mA			0.3	V
Input Over-Voltage Protection (OVP)						
V _{IN_OVLO_R}	Over-voltage Lockout Threshold	V _{IN} Rising	5.6	5.8	6.0	V
V _{IN_OVLO_HYS}	Over-voltage Lockout Hysteresis	V _{IN} Rising - V _{IN} Falling (for AOZ15333DI-01 only)		250		mV
t _{DELAY_OVP}	Over-voltage Turn-off Delay			2		μs

Electrical Characteristics

$T_A = 25^\circ\text{C}$, $V_{IN} = 5\text{V}$, $V_{EN} = 5\text{V}$, $V_{FON} = 0\text{V}$, unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Over-Current Protection (OCP)						
I_{LIM}	Current Limit Threshold	$R_{LIM} = 3.57\text{k}\Omega$	3.6	4	4.4	A
		$R_{LIM} = 4.02\text{k}\Omega$	3.15	3.5	3.85	A
		$R_{LIM} = 7.15\text{k}\Omega$	1.78	2.00	2.22	A
		$R_{LIM} = 14.3\text{k}\Omega$	0.9	1.0	1.1	A
$I_{LIM_FOLDBACK}$	Current Limit Foldback	$R_{LIM} = 4.02\text{k}\Omega$		8 ⁽¹⁾		% I_{LIM}
t_{OCP_FLTB}	Over-current Flag Delay	From $I_{OUT} \geq I_{LIM}$ to $FLTB = \text{Low}$		12		ms
Short Circuit Protection (SCP)						
V_{SCP}	SCP Threshold	$V_{IN} - V_{OUT}$ difference at which V_{OUT} short condition is detected		400		mV
t_{SCP}	SCP Response Time			1		μs
True Reverse Current Blocking (TRCB)						
V_{T_TRCB}	TRCB Protection Trip Point	$V_{OUT} - V_{IN}$, V_{OUT} Rising		25		mV
V_{R_TRCB}	TRCB Protection Release Point	$V_{IN} - V_{OUT}$, V_{OUT} Falling		40		mV
t_{TRCB}	TRCB Response Time			1.2		μs
t_{TRCB_REC}	TRCB Fast Recovery	$C_{OUT} = 1\mu\text{F}$, $R_{LOAD} = 100\Omega$		60		μs
Thermal Shutdown (TSD)						
T_{SD}	Thermal Shutdown Threshold	Temperature Rising		140		$^\circ\text{C}$
T_{SD_HYS}	Thermal Shutdown Hysteresis	Temperature Falling (for AOZ15333DI-01 only)		20		$^\circ\text{C}$
Dynamic Characteristics						
t_{D_ON}	Turn-on Delay	From $V_{EN} = V_{EN_H}$ to $V_{OUT} = 0.5\text{V}$ $C_{OUT} = 1\mu\text{F}$, $R_{LOAD} = 100\Omega$, $R_{LIM} = 14.3\text{k}\Omega$		2.1		ms
t_{ON}	Turn-on Time	V_{OUT} from 0.5V to 4.5V $C_{OUT} = 1\mu\text{F}$, $R_{LOAD} = 100\Omega$, $R_{LIM} = 14.3\text{k}\Omega$		2.7		ms
t_{FON}	Fast Turn-on Time	From $V_{EN} = V_{EN_H}$ to $V_{OUT} = 4.75\text{V}$ $V_{FON} = 5\text{V}$, $C_{OUT} = 1\mu\text{F}$, $R_{LOAD} = 100\Omega$, $R_{LIM} = 14.3\text{k}\Omega$		50	100	μs
t_{S_FON}	FON Setup Time prior to EN		100			μs
t_{H_FON}	FON Hold Time after EN		40			μs

Note:

1. Guaranteed by characterization and design.

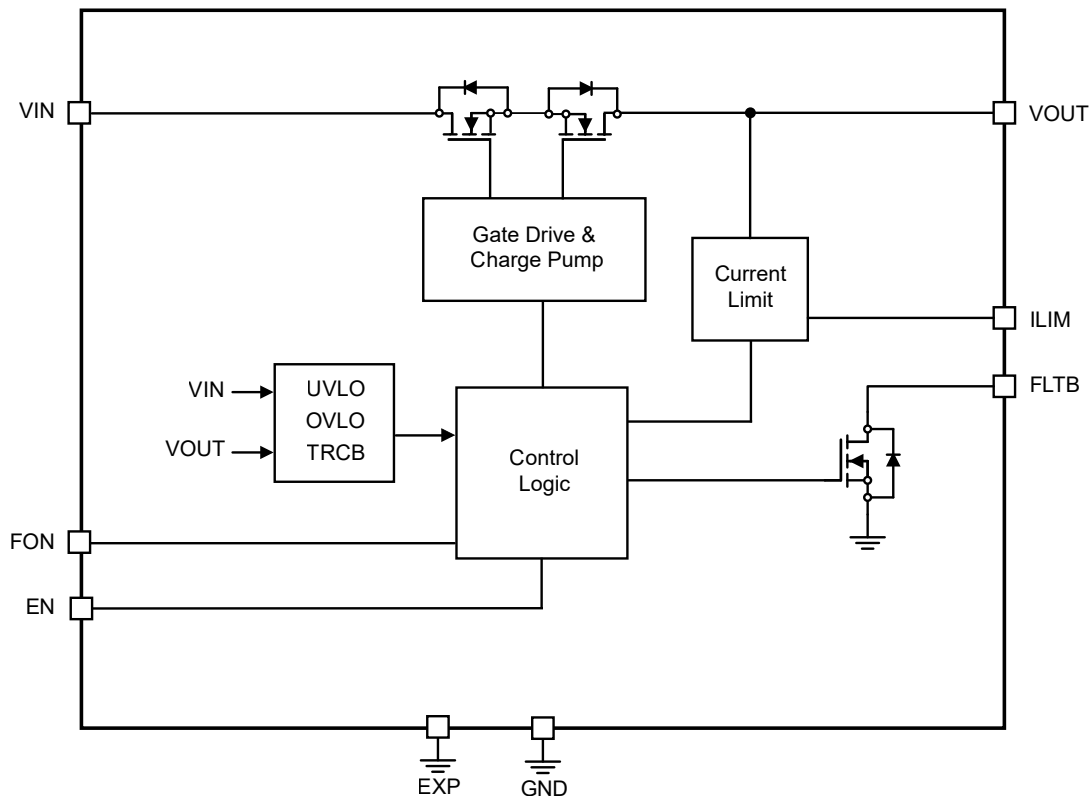
Thermal Characteristics

Symbol	Parameter	Conditions	Typ	Units
$R_{TH(J-A)}$	Thermal Resistance from Junction to Ambient	Note ⁽²⁾	50	°C/W

Note:

2. $R_{TH(J-A)}$ is dependent upon board layout. To minimize, ensure all pins have a solid connection to larger copper layer areas.

Functional Block Diagram



Timing Diagrams

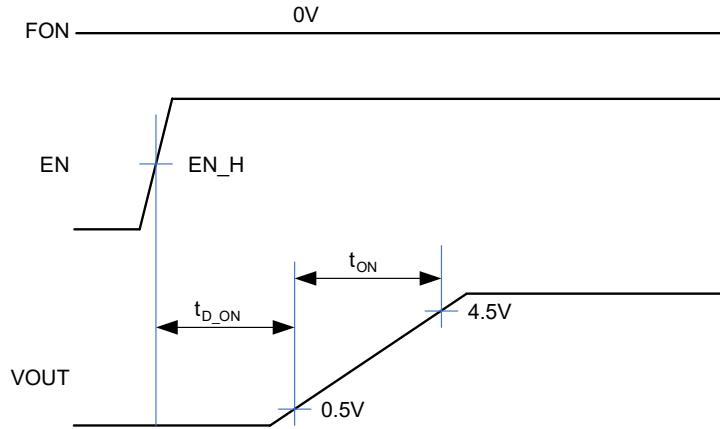


Figure 2. Standard Turn-on Delay and Turn-on Time (FON=0V)

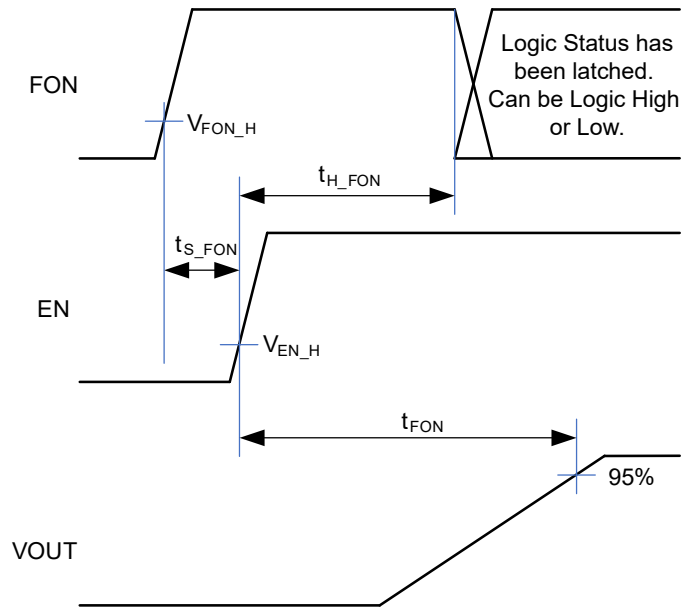


Figure 3. Fast Turn-on Time (FON=5V before EN)

Timing Diagrams

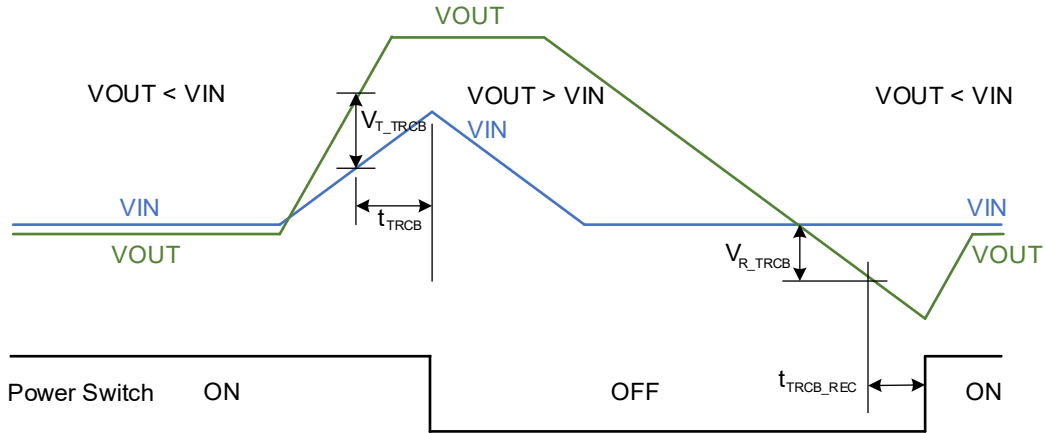


Figure 4. True Reverse Current Blocking (TRCB) Operation

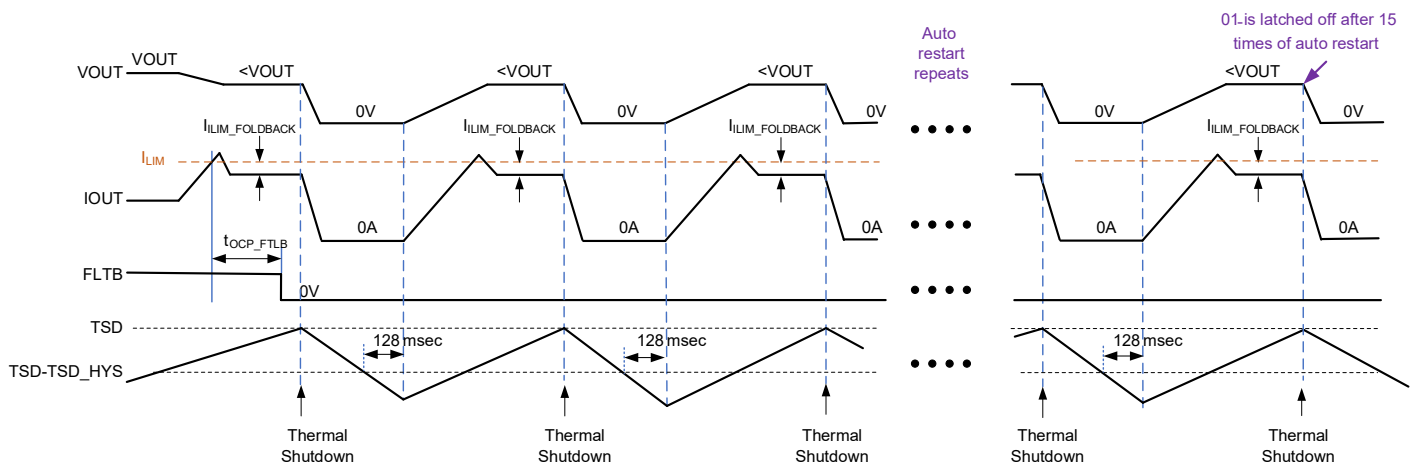


Figure 5. Over Current Protection (OCP) Operation: AOZ15333DI-01 OCP Response

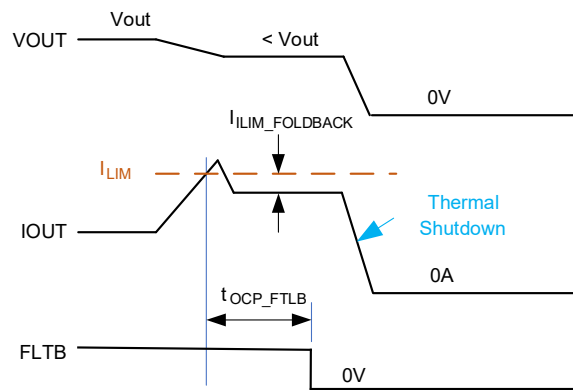


Figure 6. Over Current Protection (OCP) Operation: AOZ15333DI-02 OCP Response

Timing Diagrams

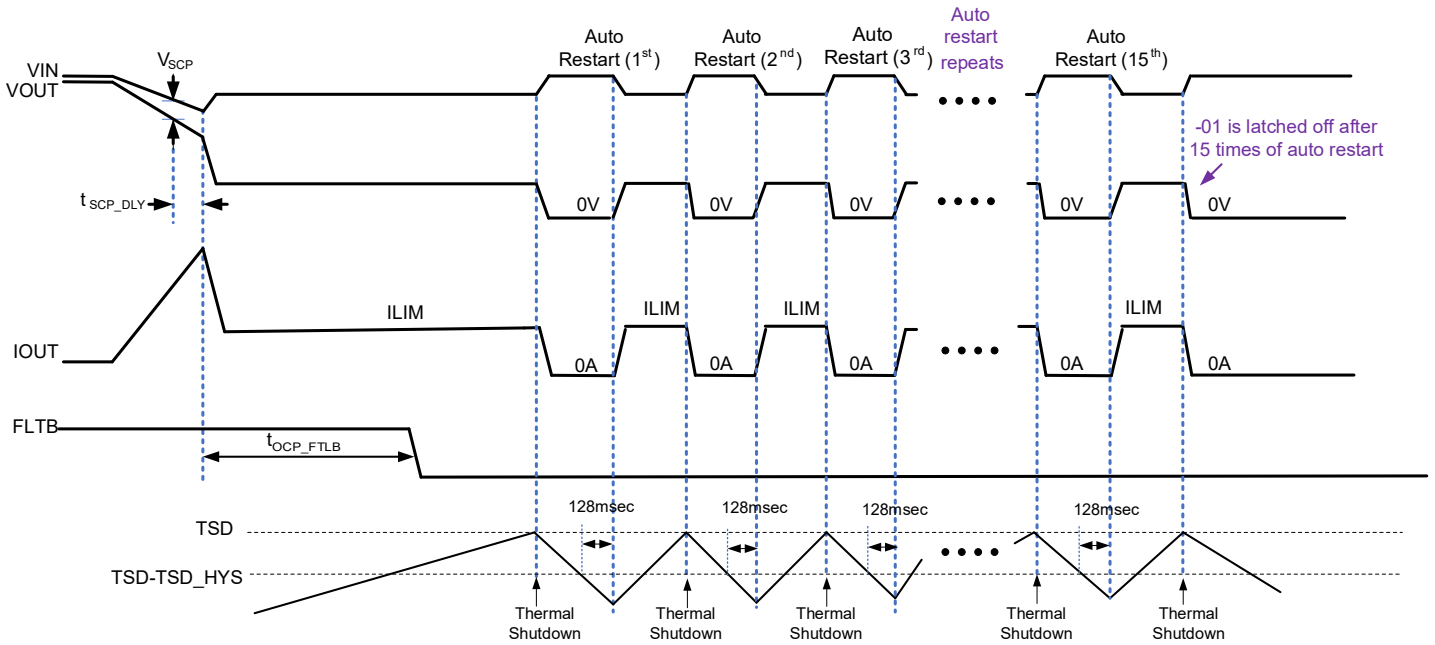


Figure 7. Short Circuit Protection (SCP) Operation: AOZ15333DI-01 SCP Response

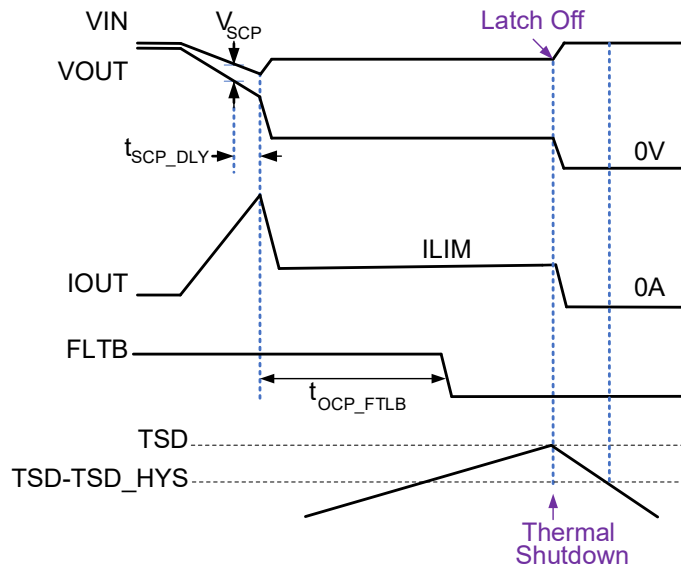
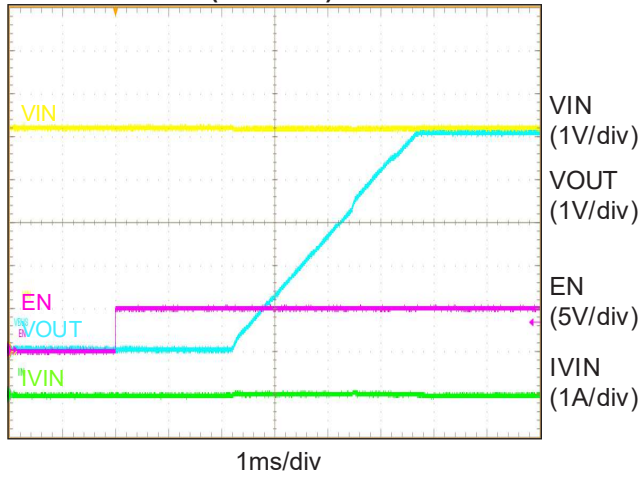


Figure 8. Short Circuit Protection (SCP) Operation: AOZ15333DI-02 SCP Response

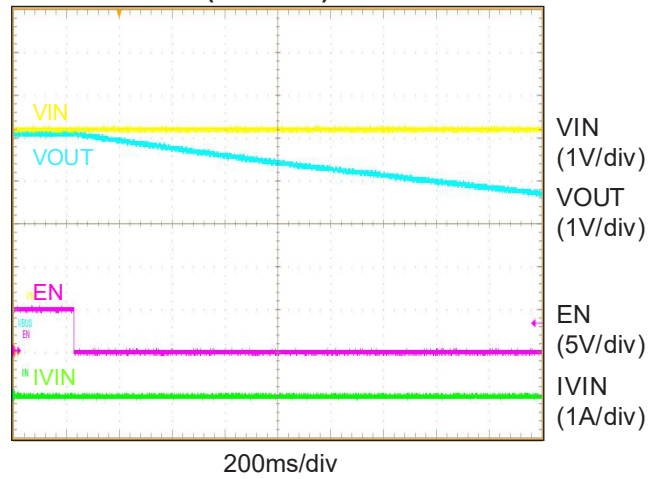
Typical Characteristics

$T_A=25^\circ\text{C}$, $V_{IN}=5\text{V}$, $F_{ON}=0\text{V}$, $R_{LIM}=4.02\text{k}\Omega$, unless otherwise specified.

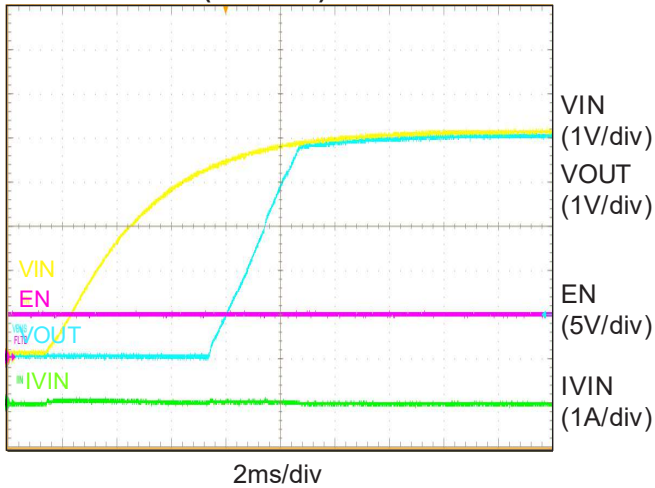
Soft-start by EN
(No Load)



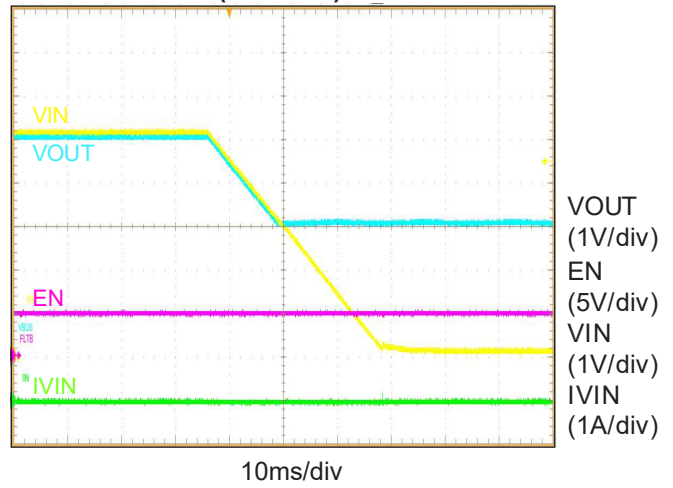
Shut-down by EN
(No Load)



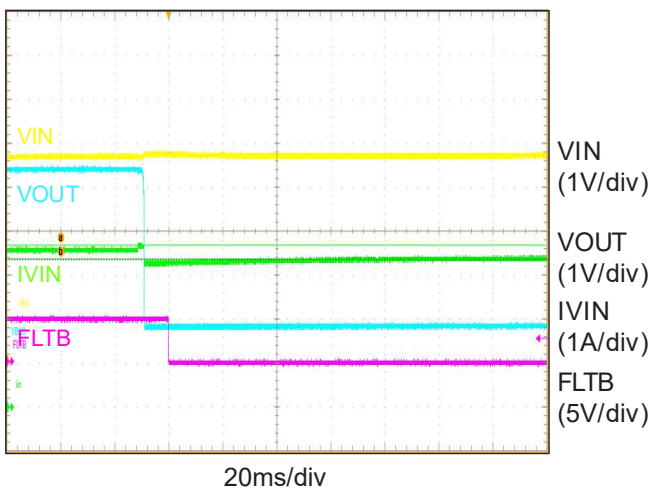
Soft-start by VIN
(No Load)



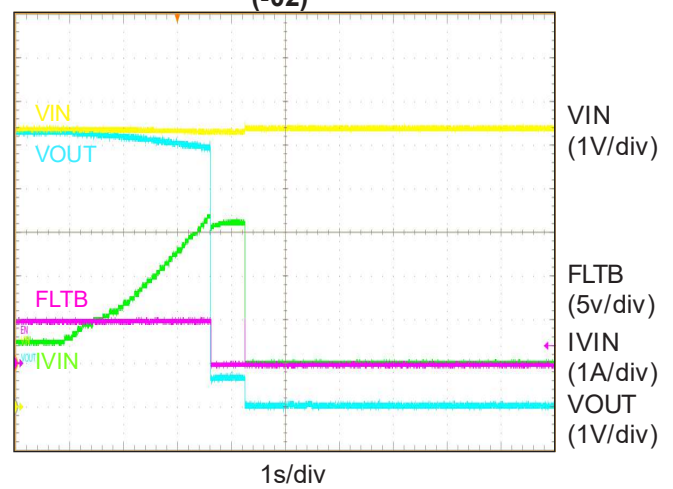
Shut-down by VIN
(No Load)



Over-current FLT B Timing



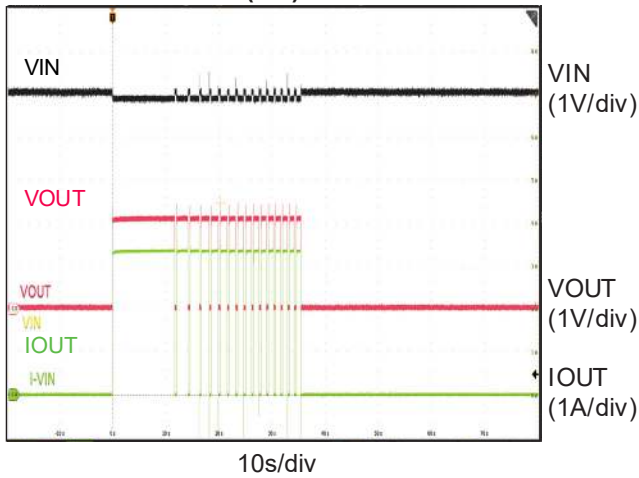
Over-current Protection
(-02)



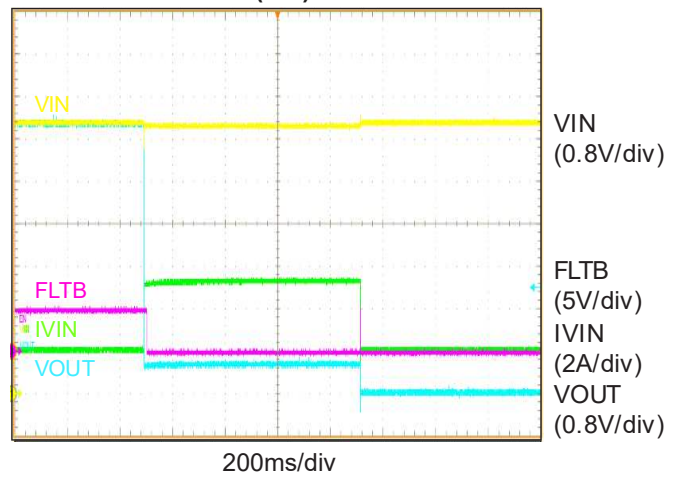
Typical Characteristics

T_A=25°C, VIN=5V, FON=0V, RLIM=4.02kΩ, unless otherwise specified.

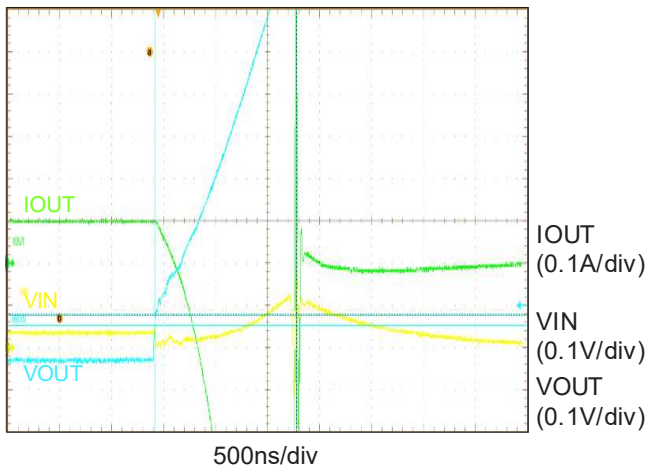
Over-current Protection (-01)



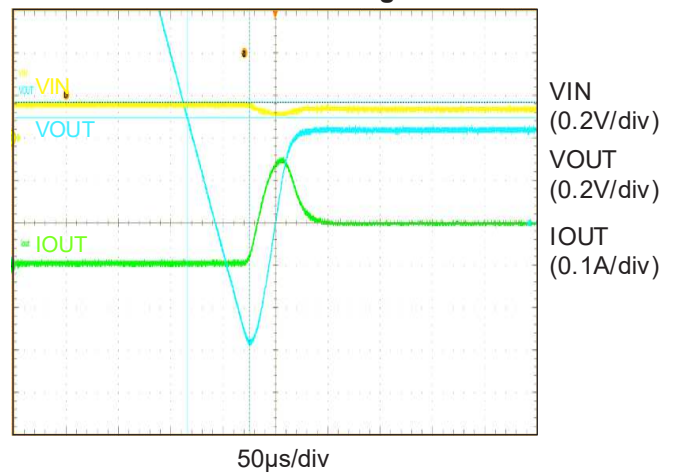
Short-circuit Protection (-02)



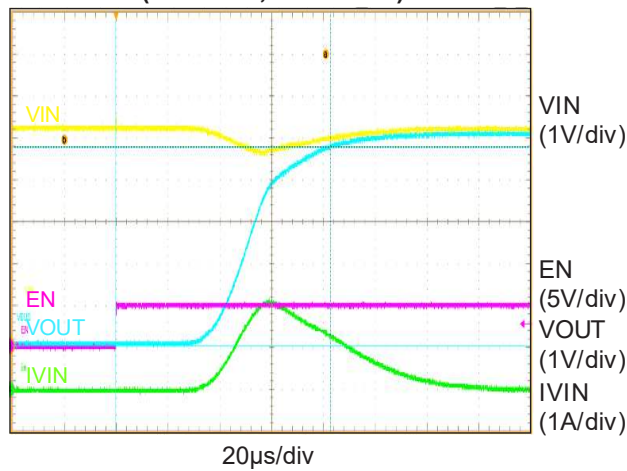
True Reverse Current Blocking (VOUT = 20V)



Recovery from True Reverse Current Blocking



Fast Role Swap (FON=5V, NO LOAD)



Typical Characteristics

$T_A = 25^\circ\text{C}$, $V_{IN} = 5\text{V}$, $FON = 0\text{V}$, $RLIM = 4.02\text{k}\Omega$, unless otherwise specified.

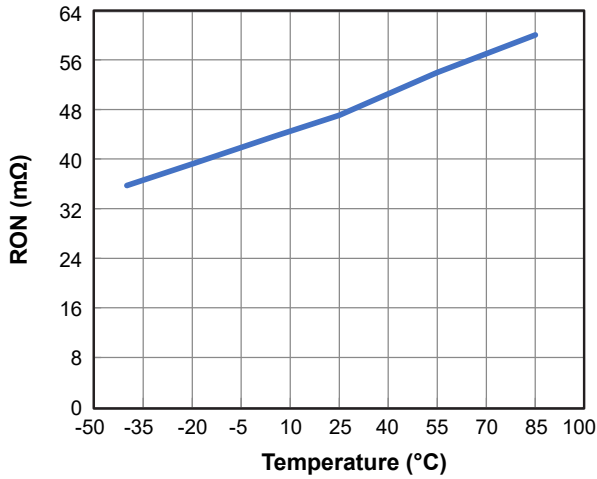


Figure 9. RON vs. Temperature

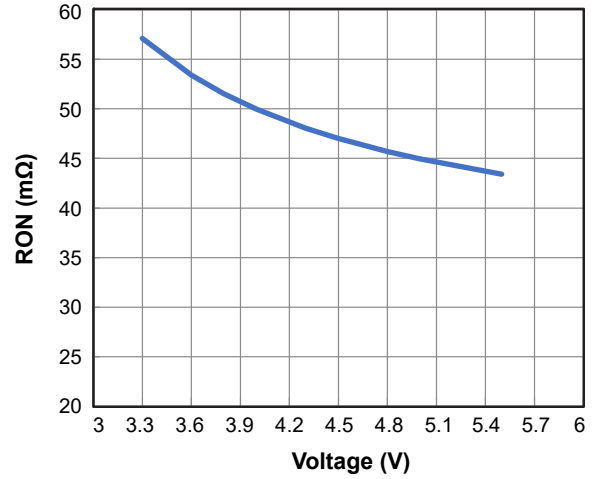


Figure 10. RON vs. Input Voltage

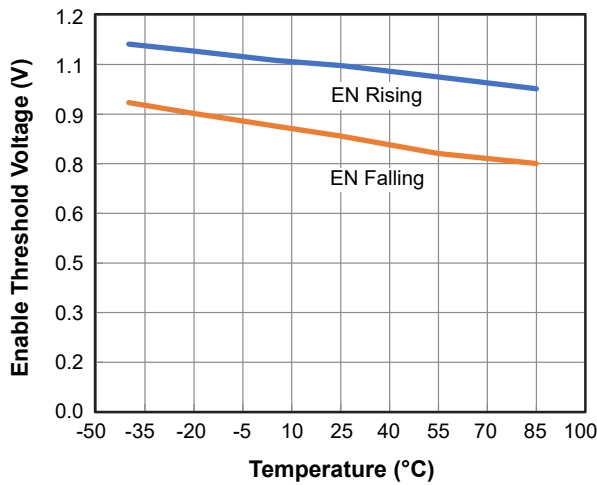


Figure 11. EN Threshold vs. Temperature

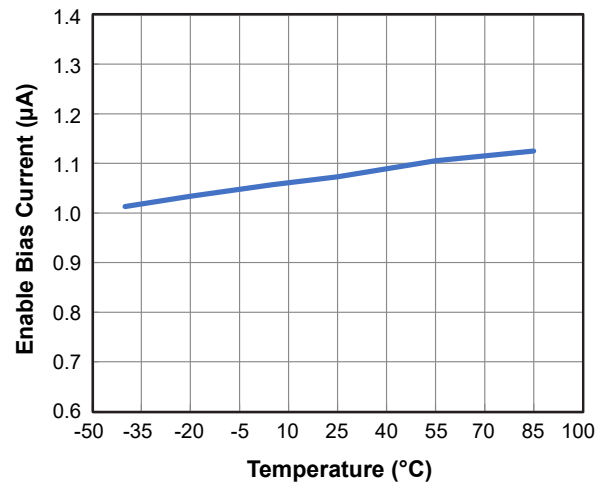


Figure 12. EN Bias Current vs. Temperature

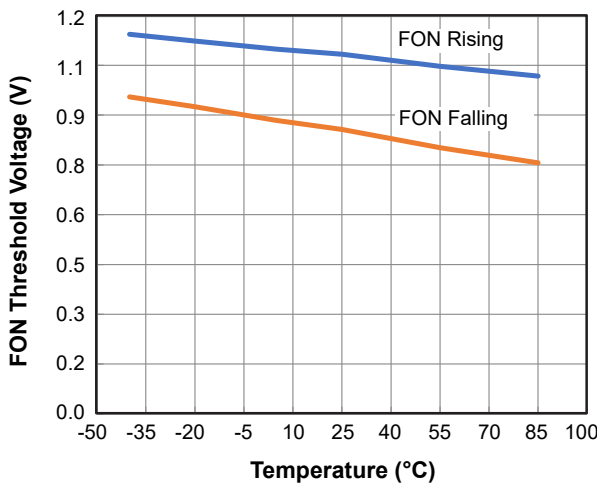


Figure 13. FON Threshold vs. Temperature

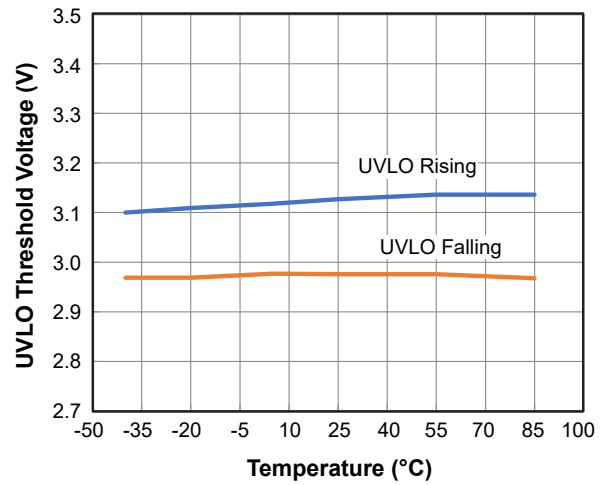


Figure 14. UVLO Threshold vs. Temperature

Typical Characteristics

$T_A = 25^\circ\text{C}$, $V_{IN} = 5\text{V}$, $F_{ON} = 0\text{V}$, $R_{LIM} = 4.02\text{k}\Omega$, unless otherwise specified.

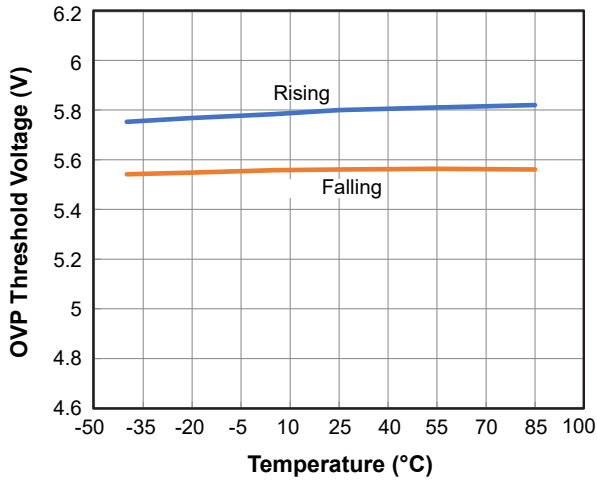


Figure 15. OVP Threshold vs. Temperature

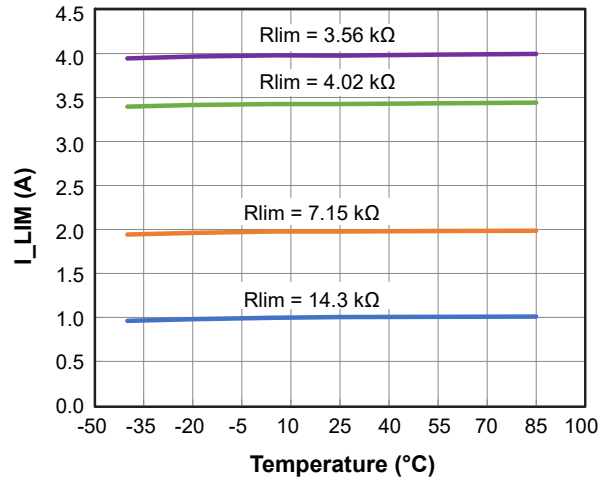


Figure 16. Current Limit Threshold vs. Temperature

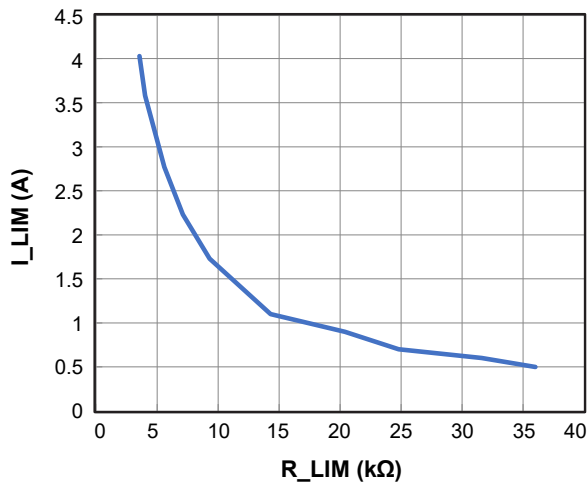


Figure 17. Current Limit vs. RLIM

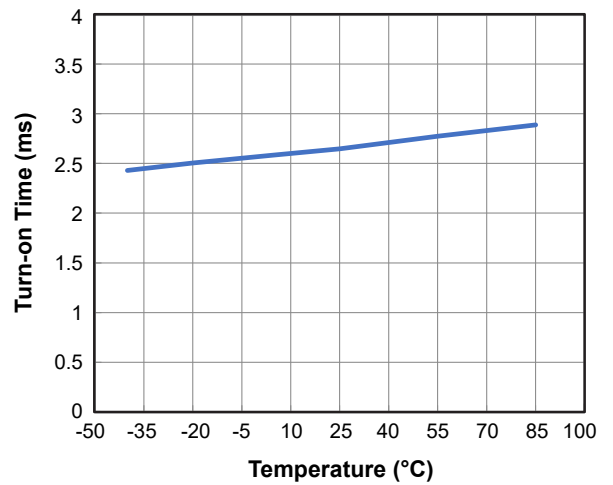


Figure 18. Turn-on Time vs. Temperature

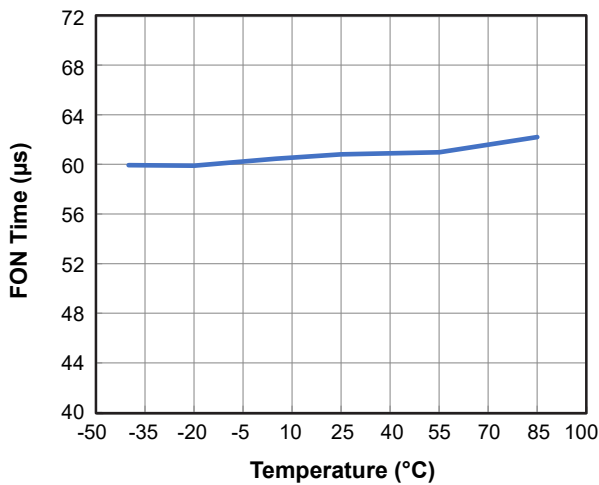


Figure 19. FON Time vs. Temperature

Detailed Description

The AOZ15333DI is a current limited power switch with over-voltage, over-current, and thermal shutdown protections. The VOUT pin is rated at 39V absolute maximum. The operating input voltage ranges from 3.3V to 5.5V. The switch current is rated up to 3.5A.

The device has true reverse-current blocking features that will prevent undesired current flow from output to its input in either enabled or disabled state.

Enable

The EN pin is the ON/OFF control for the power switch. The device is enabled when EN pin is high and not in under-voltage lockout state. The EN pin must be driven to a logic high or logic low state to guarantee operation. While disabled, the AOZ15333DI only draws less than 6µA from supply.

For AOZ15333DI-02, toggle EN pin to restart the device and clear fault flag after device latches off due to fault.

Startup

The device is enabled when $EN \geq V_{EN_H}$ and input voltage is higher than UVLO threshold. The device first checks if any fault condition exists. When no fault exists, the power switch is turned on and the output is then ramped up. Power switch is kept off if fault condition was detected.

Soft-Start

The AOZ15333DI has internal soft-start circuitry to limit in-rush current due to large capacitive load. The turn-on time is 2.7 ms.

Input Under-Voltage Lockout (UVLO)

The under-voltage lockout (UVLO) circuit monitors the input voltage. The power switch is only allowed to turn on when input voltage is higher than UVLO threshold. Otherwise the switch is off.

Over-Voltage Protection (OVP)

The voltage at VIN terminal is constantly monitored once the device is enabled. In case input voltage exceeds the over-voltage lockout threshold ($V_{IN_OVLO_R}$), the power switch is either turned off immediately or kept off, depending on its initial state.

AOZ15333DI-01 restarts when VIN drops by over-voltage lockout hysteresis ($V_{IN_OVLO_HYS}$).

Programmable Current Limit and Over-Current Protection (OCP)

The AOZ15333DI has current limit that ensures the current passing through the switch does not exceed the current limit threshold set by the external resistor R_{LIM} .

The current limit threshold can be estimated using the equation below for the range from 2.5A to 3.5A:

$$\text{Current Limit} = 14300/R_{LIM}$$

For example, for 3.5A current limit, a 4.02kΩ R_{LIM} should be selected. 1% resistor is recommended for R_{LIM} .

For current limit less than 2.5A, Table 1 values are recommended due to second order non-linearity effects.

Table 1. R_{LIM} Resistor Value vs. Current Limit Threshold

Typical Current Limit (A)	Resistor Value $\pm 1\%$ (kΩ)
4.0	3.57
3.5	4.02
3.0	4.65
2.5	5.62
2.0	7.15
1.0	14.3

AOZ15333DI continuously limits the output current when output is overloaded. Under current-limiting condition, FLTB is pulled low after delay (t_{OCP_FLTB}). Severe overload causes power dissipation and die temperature to increase and may trigger thermal shutdown.

In AOZ15333DI-01 version, the TSD due to OCP event will latch off the power switch after failing to retry 15 times. Power switch can only be turned on again by either toggling EN pin or recycling the input supply. In the event of the successful retry before 15 times, the retry counter will be reset if there is no Thermal Shut Down for 2s.

Current Limit Foldback

Once the system detects an over current condition, the controlled current is reduced (folded back) by 8% from the R_{LIM} set point. For example, if the $I_{LIM} = 3A$, then after detecting current limit the current is regulated to 8% lower or 2.76A.

The AOZ15333DI has a blank out time for over-current pulses to avoid reporting false fault conditions. During plug in or when the output capacitor has been discharged, the system may experience momentary large currents greater than the programmed current limit.

Short Circuit Protection (SCP)

When VOUT drops V_{SCP} below VIN, the system interprets that as a VOUT shorted to GND condition. From that point it takes t_{SCP} to respond and open the switch which will isolate VIN from VOUT.

In AOZ15333DI-01 version, the TSD due to SCP event will latch-off the power switch after failing to retry 15 times. Power switch can only be turned on again by either toggling EN pin or recycling the input supply. In the event of the successful retry before 15 times, the retry counter will be reset if there is no Thermal Shut Down for 2s.

True Reverse-Current Blocking Protection (TRCB)

True reverse-current blocking prevents current flow from output to input when power switch is in either on or off state. When device is enabled, power switch is quickly turned off whenever output voltage is higher than input voltage by V_{T_TRCB} . The power switch is turned on again when output voltage falls below input by V_{R_TRCB} .

Fast Recovery from TRCB

Once TRCB event is removed, power switch turns on again quickly. The recovery time is 60µs typical.

Fast Role Swap (FRS) Support

The FON pin allows the power switch to turn-on quickly. FON should be asserted before device is enabled. If $V_{IN} > V_{OUT}$, the power switch turns on quickly by minimizing turn on delay and disables over-current protection

The Fast Turn-On and Fast Recovery from TRCB allows AOZ15333DI to support Fast Role Swap operation defined in USB Power Delivery Specification Rev 3.0. It allows system to change its role from power consumer to power provider and recover VOUT voltage to > 4.75V in less than 100µs typ. FRS support would be active if $FON = 5V$.

Thermal Shutdown Protection

Thermal shutdown protects device from excessive temperature. The power switch is turned off when the die temperature reaches thermal shutdown threshold of 140°C.

In AOZ15333DI-01 version, there is a 20°C hysteresis. Power switch is allowed to turn on again if die temperature drops below approximately 120°C. The TSD will latch-off the power switch after failing to retry 15 times. Power switch can only be turned on again by either toggling EN pin or recycling the input supply.

Fault Reporting

AOZ15333DI protects itself and load from the following fault condition: over-voltage, over-current, short circuit, reverse-current, and over-temperature.

The FLTB pin is an open drain output that is asserted low when either an over-current, SCP or over-temperature condition occurs. The FLTB pin becomes high impedance when the fault conditions are removed. A pull-up resistor (R_{FLTB}) must be connected between FLTB to 5V to provide a logic signal.

When thermal shutdown is activated, FLTB is pulled low immediately to report fault condition to host. FLTB is pull-high once fault is removed.

In case of output overload, FLTB pin is pulled low about 12ms (t_{OCP_FLTB}) after device is in current limiting. Power switch is then turned off after thermal shut down.

There is no fault reporting for UVLO, OVP and TRCB event.

Table 2. Fault Response

Protection	Fault Response (-01)	Fault Response (-02)	FLTB Status
OVP	Auto restart	Latch-off	High Impedance
OCP	Latch-off after 15 times auto restart	Latch-off by thermal shutdown	Low
SCP	Latch-off after 15 times auto restart	Latch-off by thermal shutdown	Low
OTP	Auto restart	Latch-off	Low
TRCB	Auto recovery	Auto recovery	High Impedance

Auto-restart or Latch-off

AOZ15333DI-01 (Auto-restart version)

The device will try to restart 128ms after junction temperature is lower by TSD_HYS during OCP and SCP fault events. The TSD due to SCP, OCP, TSD event will latch-off the power switch after failing to retry 15 times. Power switch can only be turned on again by either toggling EN pin or recycling the input supply.

Power switch is turned on immediately after OVP or TRCB event is removed.

AOZ15333DI-02 (Latch-off version)

The device keeps off even after fault event is removed. Power switch can only be turned on again by either toggling EN pin or recycling the input supply.

Input Capacitor Selection

The input capacitor prevents large voltage transients from appearing at the input, and provides the instantaneous current needed each time the switch turns on to charge output capacitors and to limit input voltage drop. It also prevents high-frequency noise on the power line from passing through to the output. The input capacitor should be located as close to the pin as possible. A minimum of 10µF ceramic capacitor should be used. However, higher capacitor value is strongly recommended to further reduce the transient voltage drop at the input.

Output Capacitor Selection

The output capacitor acts in a similar way. Also, the output capacitor has to supply enough current for a large load that it may encounter during system transient. This bulk capacitor must be large enough to supply fast transient load in order to prevent the output from dropping.

The USB specification limits the capacitance on VBUS (VOUT) to a maximum of 10µF. Use this maximum value for noise immunity due to the system and cable plug/unplug transients.

Power Dissipation Calculation

Calculate the power dissipation for normal load condition using the following equation:

$$\text{Power Dissipated} = R_{\text{ON}} \times (I_{\text{OUT}})^2$$

The worst case power dissipation occurs when the load current hits the current limit due to over-current.

The power dissipation can be calculated using the following equation:

$$\text{Power Dissipated} = |V_{\text{IN}} - V_{\text{OUT}}| \times \text{Current Limit}$$

Layout Guidelines

Good PCB layout is important for improving the thermal and overall performance. To optimize the switch response time to output short-circuit conditions, keep all traces as short as possible to reduce the effect of unwanted parasitic inductance. Place the input and output bypass capacitors as close as possible to the VIN and VOUT pins. The input and output PCB traces should be as wide as possible for the given PCB space. Use a ground plane to enhance the power dissipation capability of the device.

On the top layer expand the exposed pad island as much as possible for optimal thermal performance. The exposed pad copper plane must be connected to ground. RLIM needs to be populated on top layer, close to IC.

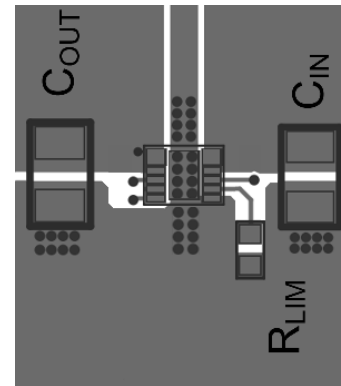


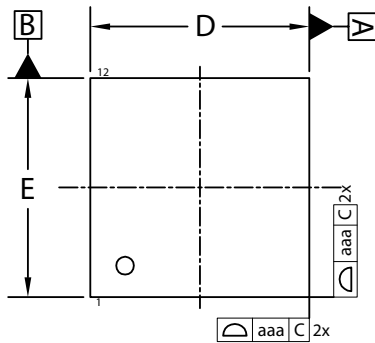
Figure 20. Top Layer

In addition to the top plane, if available, connect to the bottom layer ground plane for best thermal performance.

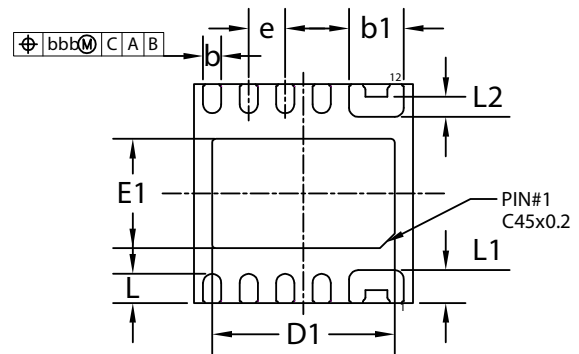


Figure 21. Bottom Layer

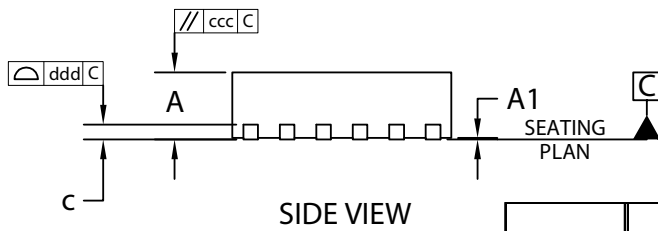
Package Dimensions, DFN3x3-12L



TOP VIEW

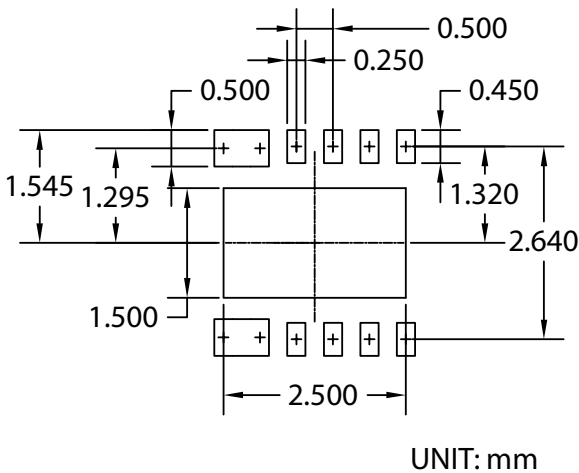


BOTTOM VIEW



SIDE VIEW

RECOMMENDED LAND PATTERN



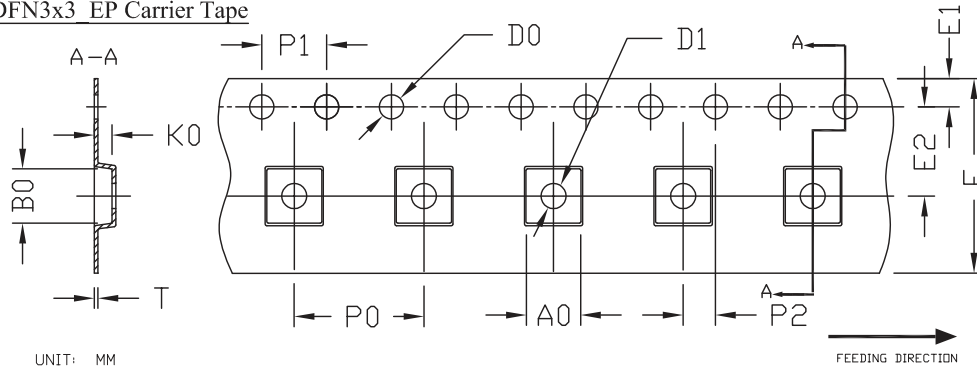
SYMBOLS	DIMENSION IN MM			DIMENSION IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.80	0.90	1.00	0.031	0.035	0.039
A1	0.00	0.02	0.05	0.000	0.001	0.002
b	0.20	0.25	0.30	0.008	0.010	0.012
b1	0.70	0.75	0.80	0.028	0.030	0.031
c	0.195	0.203	0.211	0.008	0.008	0.008
D	2.90	3.00	3.10	0.114	0.118	0.122
D1	2.40	2.50	2.60	0.094	0.098	0.102
E	2.90	3.00	3.10	0.114	0.118	0.122
E1	1.40	1.50	1.60	0.055	0.059	0.063
e	0.50 BSC			0.020 BSC		
L	0.30	0.40	0.50	0.012	0.016	0.020
L1	0.35	0.45	0.55	0.014	0.018	0.022
L2	0.22	0.27	0.32	0.009	0.011	0.013
aaa	0.15			0.006		
bbb	0.10			0.004		
ccc	0.10			0.004		
ddd	0.08			0.003		

NOTE:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5M-1994.
2. CONTROLLING DIMENSION IS MILLIMETER.
CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.
3. DIMENSION b APPLIES TO METALLIZED TERMINAL AND IS MEASURED BETWEEN 0.15mm. AND 0.30mm FROM THE TERMINAL TIP. IF THE TERMINAL HAS THE OPTIONAL RADIUS ON THE OTHER END OF THE TERMINAL, THE DIMENSION b SHOULD NOT BE MEASURED IN THAT RADIUS AREA.
4. COPLANARITY ddd APPLIES TO THE TERMINALS AND ALL OTHER BOTTOM SURFACE METALLIZATION.

Tape and Reel Dimensions, DFN3x3-12L

DFN3x3 EP Carrier Tape

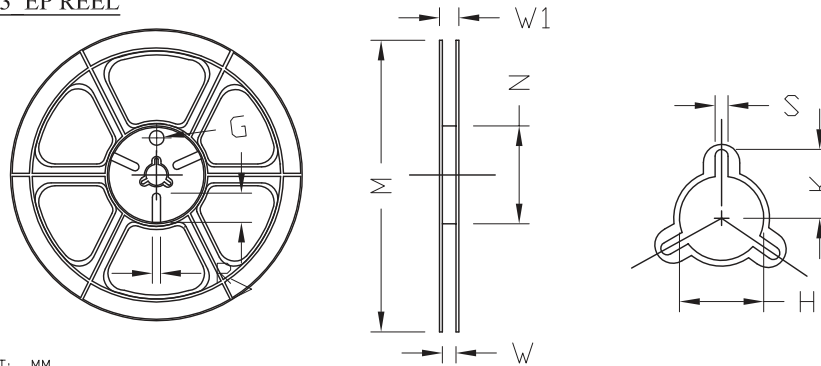


UNIT: MM

FEEDING DIRECTION

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
DFN3x3_EP	3.40 ±0.10	3.35 ±0.10	1.10 ±0.10	1.50 +0.10 -0	1.50 +0.10 -0	12.00 ±0.30	1.75 ±0.10	5.50 ±0.05	8.00 ±0.10	4.00 ±0.10	2.00 ±0.05	0.30 ±0.05

DFN3x3 EP REEL



UNIT: MM

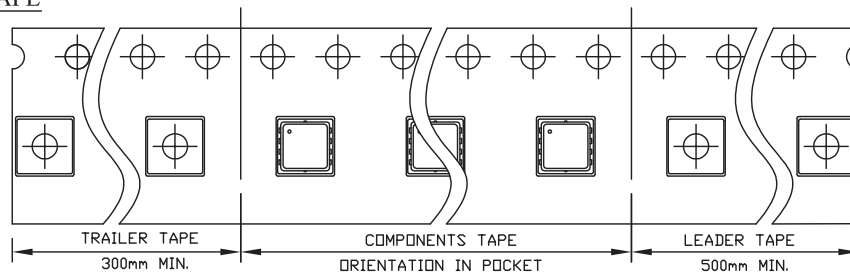
TAPE SIZE	REEL SIZE	M	N	W	W1	H	K	S	G	R	V
12 mm	φ330	φ330.00 ±0.50	φ97.00 ±0.10	13.00 ±0.30	17.40 ±1.00	φ13.00 +0.50 -0.20	10.60	2.00 ±0.50	---	---	---

DFN3x3 EP TAPE

Leader / Trailer & Orientation

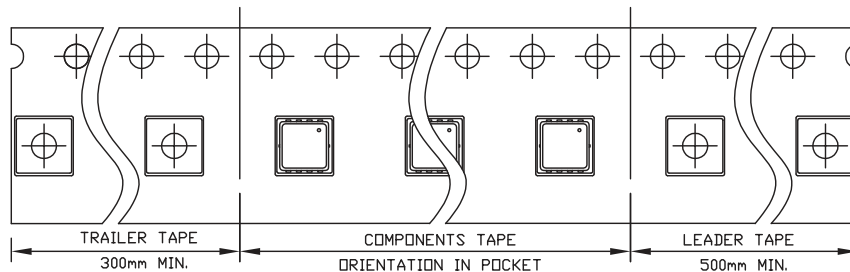
MOS

Unit Per Reel:
5000pcs

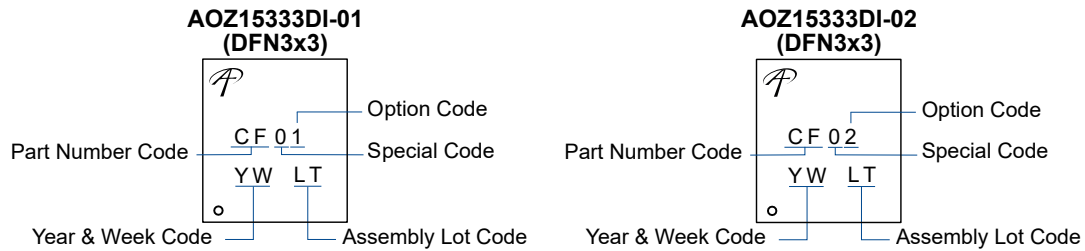


PIC

Unit Per Reel:
5000pcs



Part Marking



Part Number	Fault Recovery	Code
AOZ15333DI-01	Auto Restart	CF01
AOZ15333DI-02	Latch-off	CF02

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2. A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.