Series AMLDP-Z

Up to 1000mA | LED Driver



FEATURES:

- Step Down DC/DC LED driver
- Constant current output
- Non-Isolated
- High efficiency up to 93%
- Operating Temperature range -40ºC to +85ºC
- PWM/Digital and Analog Voltage dimming
- Remote ON/OFF Control
- Built with MLCC capacitors only

RoHS CE

Models
Single output

Model	Input Voltage (V)	Output Voltage (V)	Output Current max (mA)	Max Capacitive Load (uF)	Efficiency (%)	Package Type
AMLDP-1630Z	7-16	2-14	300	47	93	DIP8
AMLDP-1635Z	7-16	2-14	350	47	93	DIP8
AMLDP-1650Z	7-16	2-14	500	47	93	DIP8
AMLDP-1660Z	7-16	2-14	600	47	93	DIP8
AMLDP-1670Z	7-16	2-14	700	47	93	DIP8
AMLDP-16100Z	7-16	2-14	1000	47	93	DIP8

NOTE: All specifications in this datasheet are measured at an ambient temperature of 25°C, humidity<75%, nominal input voltage and at rated output load unless otherwise specified.

Input Specifications

Parameters	Nominal	Typical	Maximum	Units
Voltage range	14	7-16		VDC
Filter		Capacitor		
Absolute Maximum Rating			20	VDC
Peak Input Voltage time			500	ms
DC/DC ON (Leave open if not used)		ON – Open or 0..2V<Vadj<0.3V;		
DC/DC OFF		OFF(shutdown) – Vadj <0.15		
Maximum Remote pin drive current	Vadj = 1.25V		1	mA
Quiescent Current in Shutdown mode	Vin = 16V, Vadj <0.25		25	uA
On/Off Control (Digital Control)		Max PWM Frequency 1KHz		
Drive with DC Voltage		0.3V < VADJ<1.25V to adjust output current from 1% to 100%		

Output Specifications

Parameters	Conditions	Typical	Maximum	Units
Current accuracy		±5		%
Output Voltage range	V input = 16	2-14		VDC
Output current	Vin – Vout >1.5V to 3V	See model table above		
Short Circuit protection	Regulated at the rated current for each model			
Output no load Protection	Continuous			
Max load capacitance			47	uF
Temperature coefficient	Ta = -40 to +85°C	±0.03		%/°C
Ripple & Noise	20MHz Bandwidth	120		mV p-p

General Specifications

Parameters	Conditions	Typical	Maximum	Units
Switching frequency	100% load	90-300		KHz
Operating temperature	-40 to +85			°C
Storage temperature	-40 to +125			°C
Maximum case temperature			105	°C
Thermal Impedance	Free air convection	+40		
Cooling	Free air convection			
Humidity				% RH
Case material	Non-Conductive Black Plastic (UL94-V0 rated)			

General Specifications (continued)

Parameters	Conditions	Typical	Maximum	Units
Weight		1.8		g
Dimensions (L x W x H)		0.50 x 0.40 x 0.27 inches 12.70 x 10.16 x 6.85 mm		
MTBF		> 3,300,000 hrs (MIL-HDBK-217 F at +25 °C)		
Maximum soldering temperature	1.5mm from case for 10sec		260	°C

NOTES:
1.Reversed polarity at the input power will damage the driver. The input ground must not be connected to the negative output.
2.Leave the pin VADJ opened if not used , grounding VADJ will shut the driver off, connecting VADJ to +Vin will damage the driver.
3.Maximum output open voltage is equal to input voltage

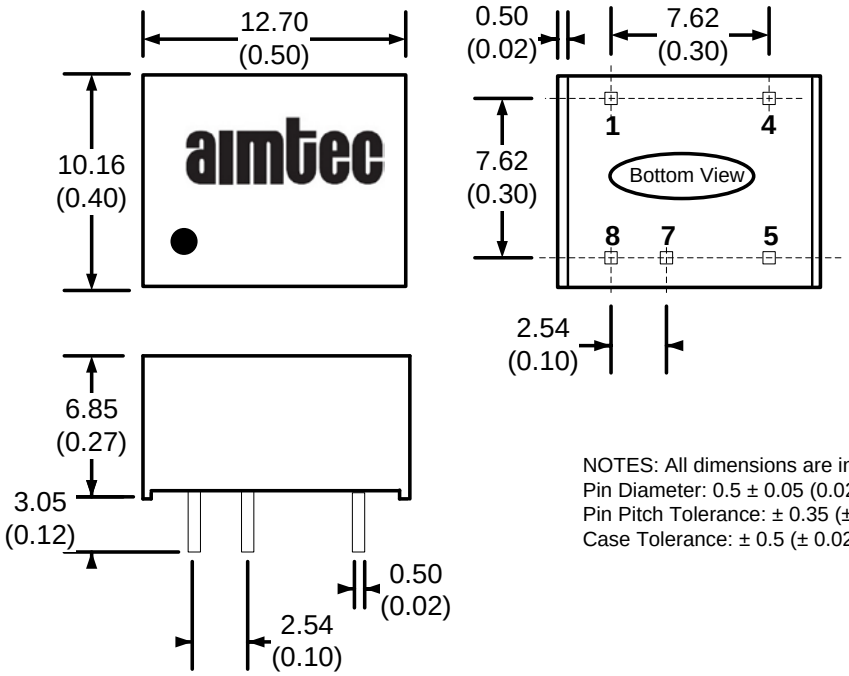
Safety Specifications

Parameters	
Agency Approvals	CE
Standards	EN55015: 2007+A2: 2009 EN61547: 2009 IEC 61000-4-2: 2008 IEC 61000-4-3: 2006+A1: 2007+A2: 2010 IEC 61000-4-4: 2004+A1: 2010 IEC 61000-4-5: 2005 IEC 61000-4-6: 2008 IEC 61000-4-8: 2009 IEC 61000-4-11: 2004 NOTE: also designed to meet EN609501

Pin Out Specifications

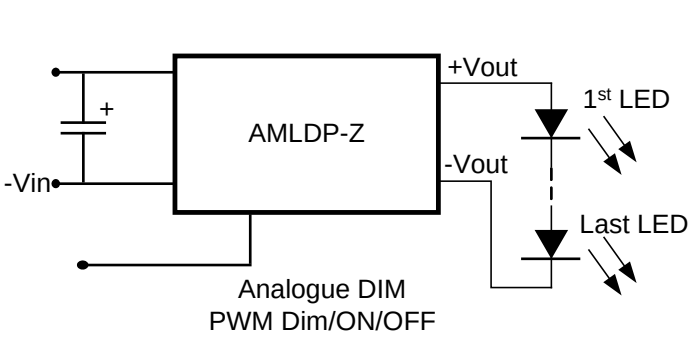
Pin	Single	
1	+ V Input	+ DC Supply
4	+ V Output	LED Anode connection
5	- V Output	LED Cathode connection
7	Vadj	PWM/ON/OFF or not used
8	- V Input	- DC Supply

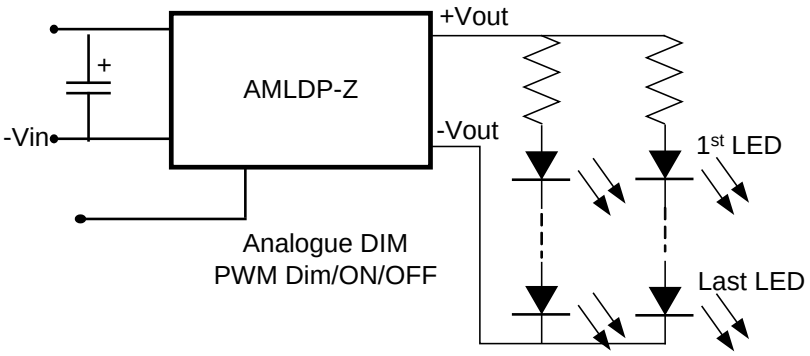
Dimensions

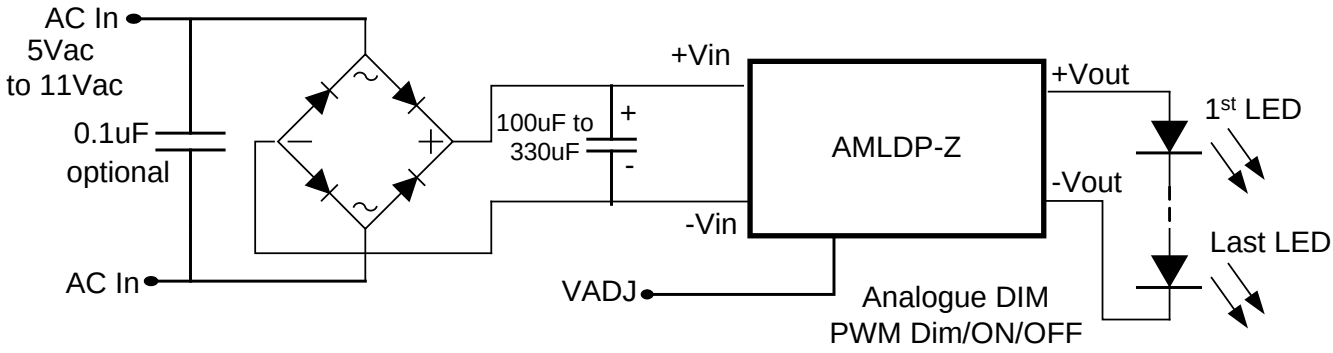


NOTES: All dimensions are in millimeters (inch)
Pin Diameter: 0.5 ± 0.05 (0.02 ± 0.002)
Pin Pitch Tolerance: ± 0.35 (± 0.014)
Case Tolerance: ± 0.5 (± 0.02)

Application circuit examples:



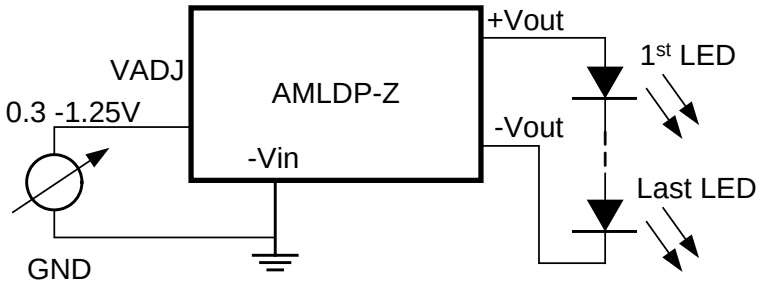


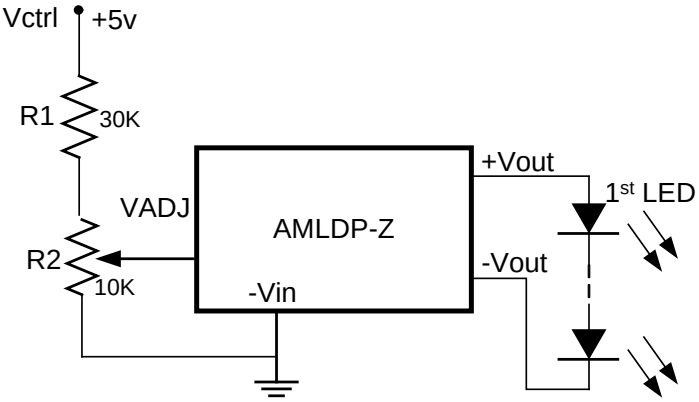


Output Current Adjustment by External DC Control Voltage:

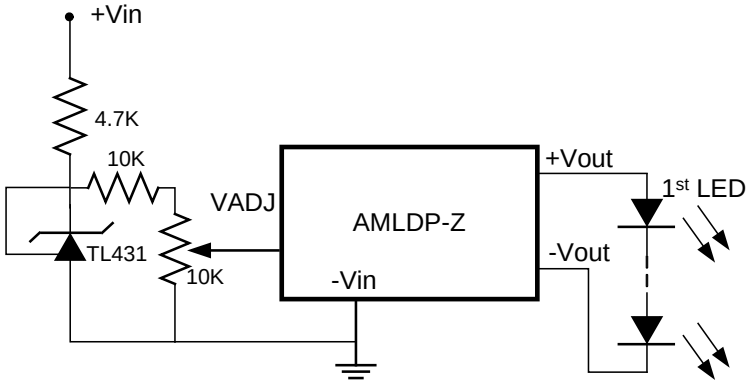
The nominal output current is given by:

$$Ioutnom = Iout \frac{Vadj}{1.25}$$





$$VADJ = \frac{R2}{R1 + R2} X\ Vctrl$$

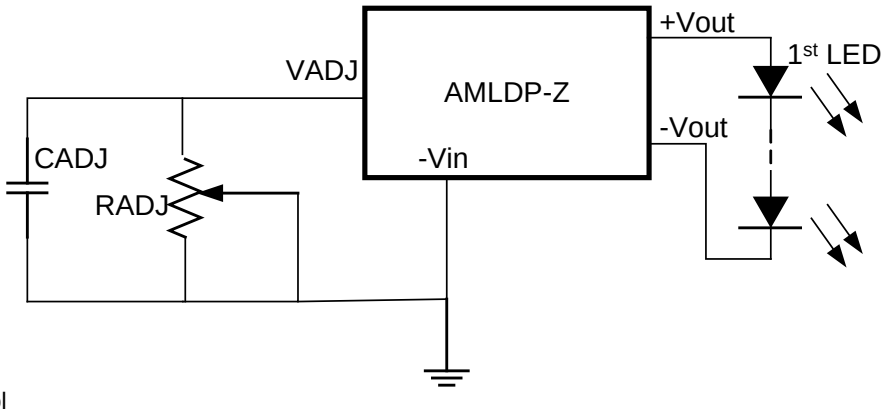


Resistive Dimming Control

A simplified dimming control can be achieved using a variable resistor connected between VADJ and GND. Capacitor CADJ is optional, it is installed to limit AC mains interference and high frequency noise. The recommended value of CADJ is 0.22µF.

The nominal output current is given by:

$$Ioutnom = \frac{Iout \times Radj}{Radj + 200K}$$



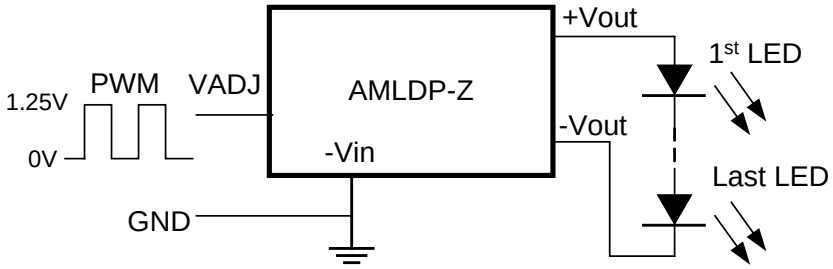
NOTE: Typical error is ±10% with resistive dimming control
If the value of Radj is between 0 to 2MΩ, the maximum adjustment range will be 25% to 90%, (for Vin –Vout <10VDC)

Output Current Adjustment by PWM Control: Driving VADJ Directly

A Pulse Width Modulated (PWM) signal with a duty cycle of DPWM can be applied directly to VADJ pin as shown below.

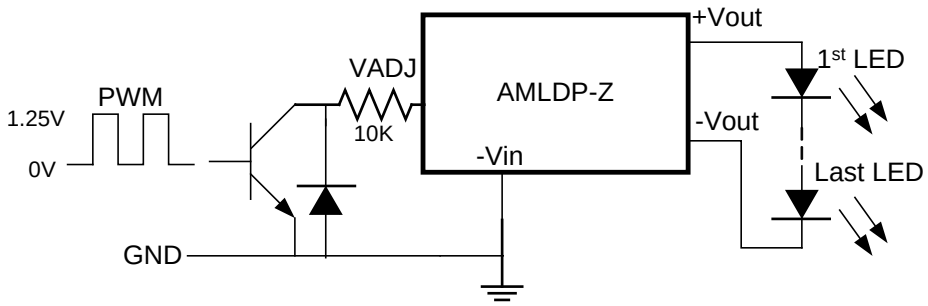
The output current is given by:

Ioutnom = Iout x DPWM [for 0.01<DPWM<1]



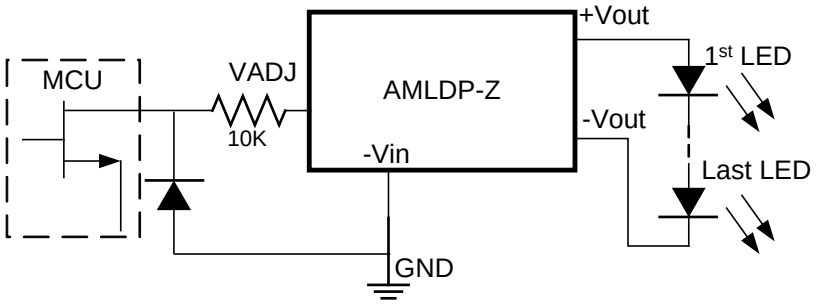
Driving VADJ Via Open Collector Transistor

The VADJ can also be driven via an open collector transistor as shown below.
The diode and resistor serve to suppress any possible high amplitude negative voltage spikes to the VADJ input resulting from the collector to emitter capacitance of the transistor. Any negative voltage spikes will cause errors in output current and/or unstable driver operation.



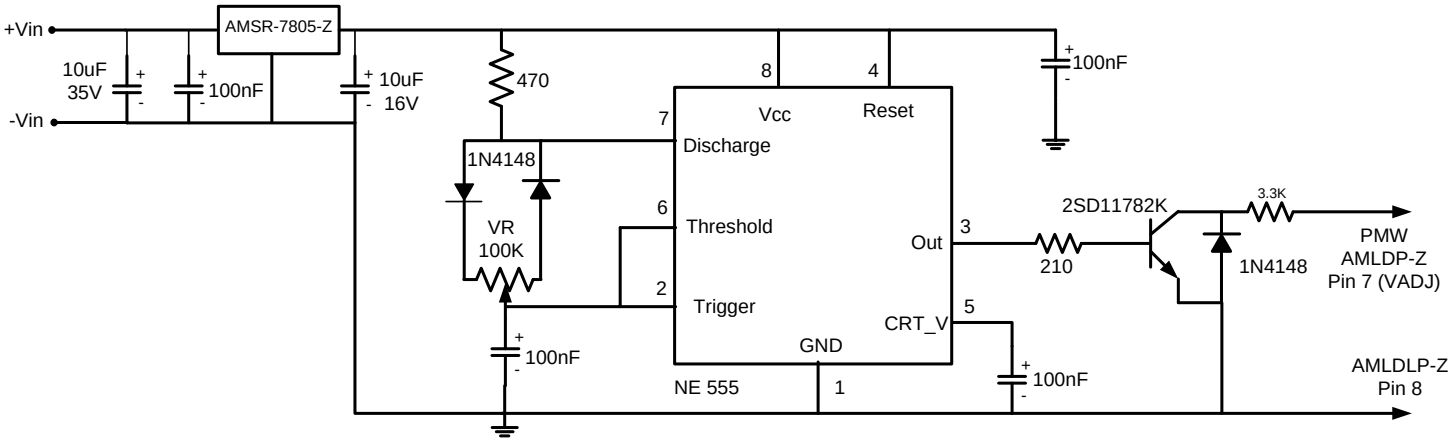
Driving the VADJ from a Microcontroller

The VADJ can be driven from an open drain output of a microcontroller as shown below. The diode and resistor serve to suppress any possible high amplitude negative voltage spikes to the VADJ input resulting from the drain to source capacitance of the FET. Any negative voltage spikes will cause errors in output current and/or unstable driver operation.

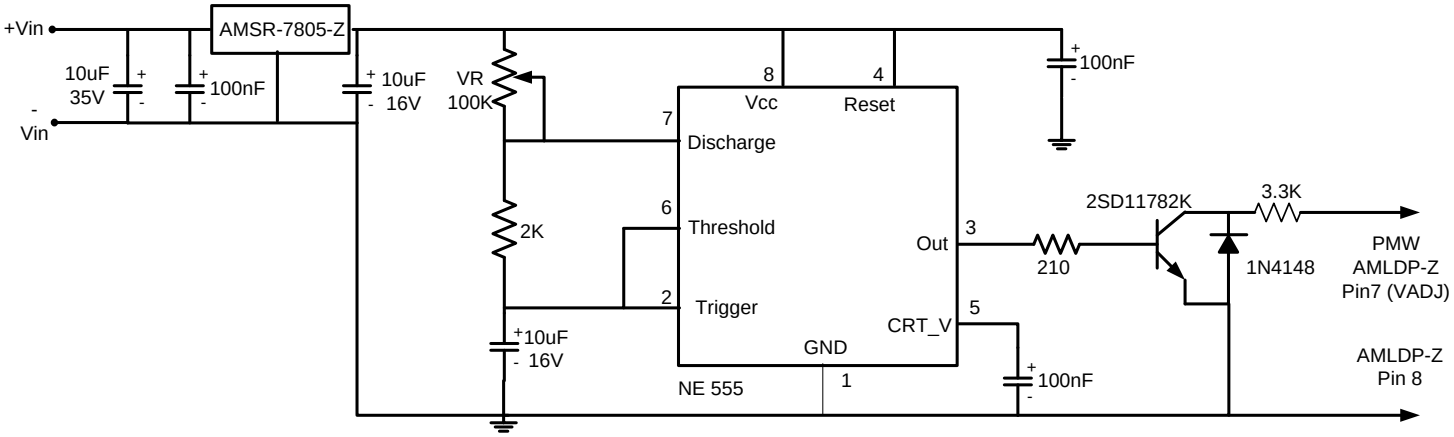


Output Current Adjustment by PWM Control (Dimming):

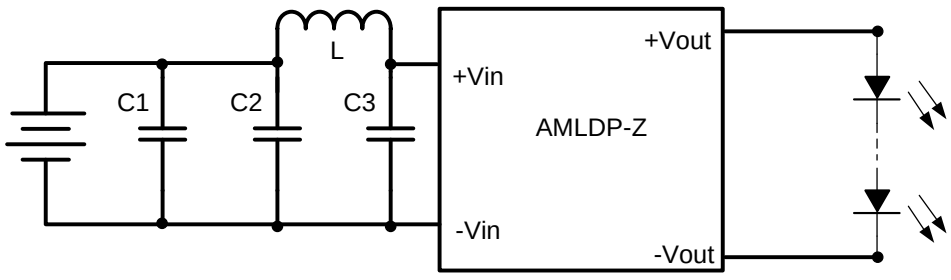
A PWM signal must have a frequency of greater than 100Hz to prevent any visible flicker.



Output Current Adjustment by PWM Control (Flash):



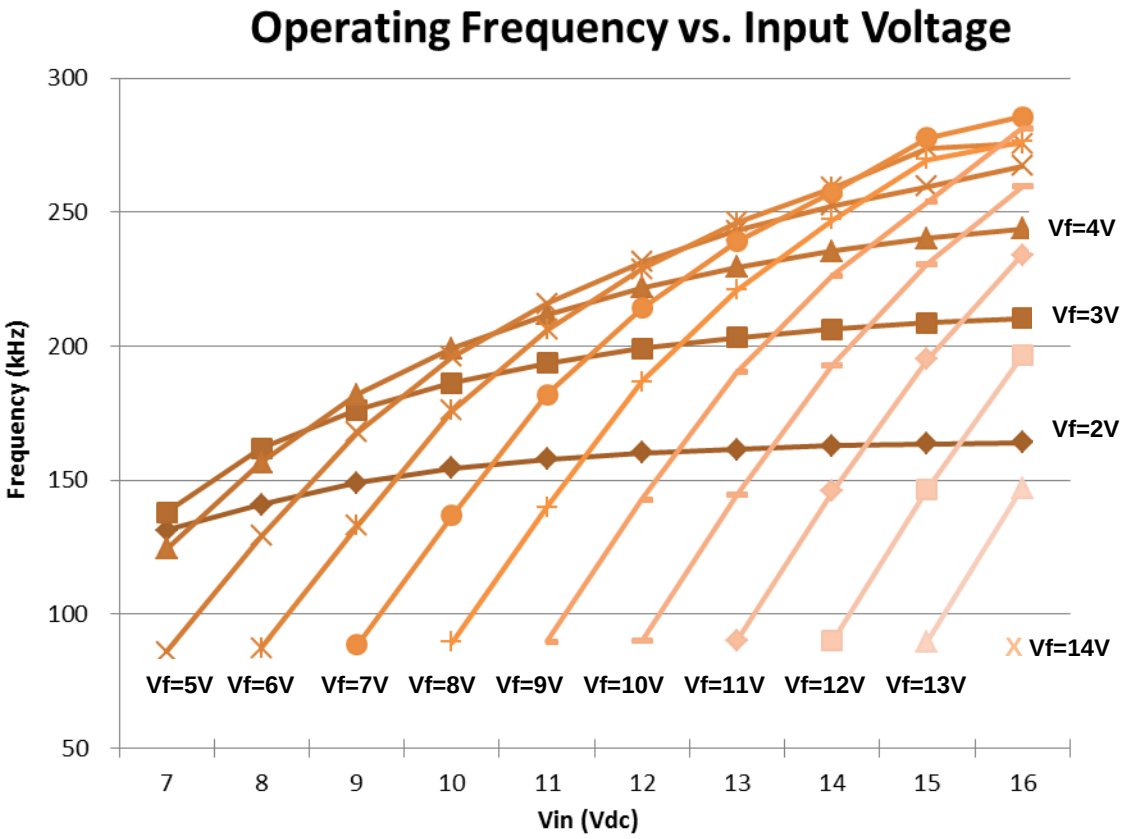
Radiated & Conducted Emissions



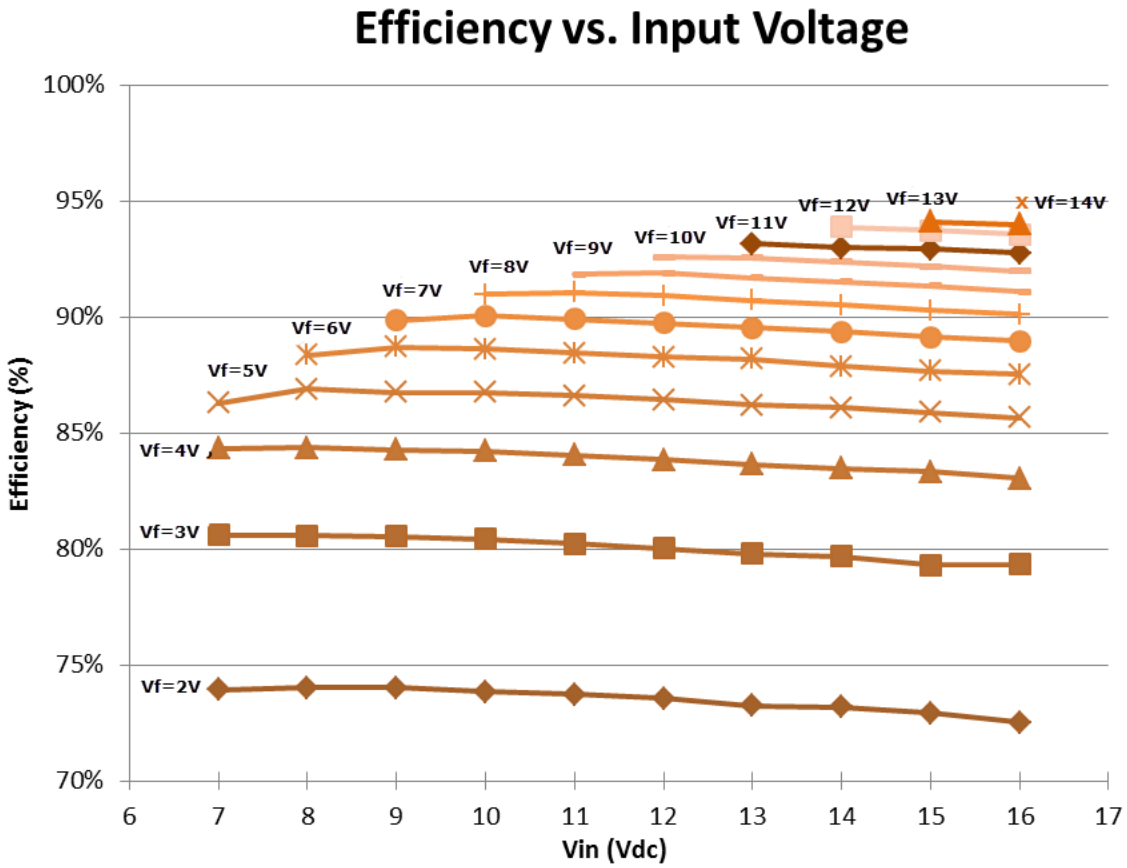
C1	C2	L	C3
10uF/35V	10uF/35V	47 uH	47 uF/100V

Typical Characteristics: AMLDP-1630Z

Operating Frequency vs Input Voltage

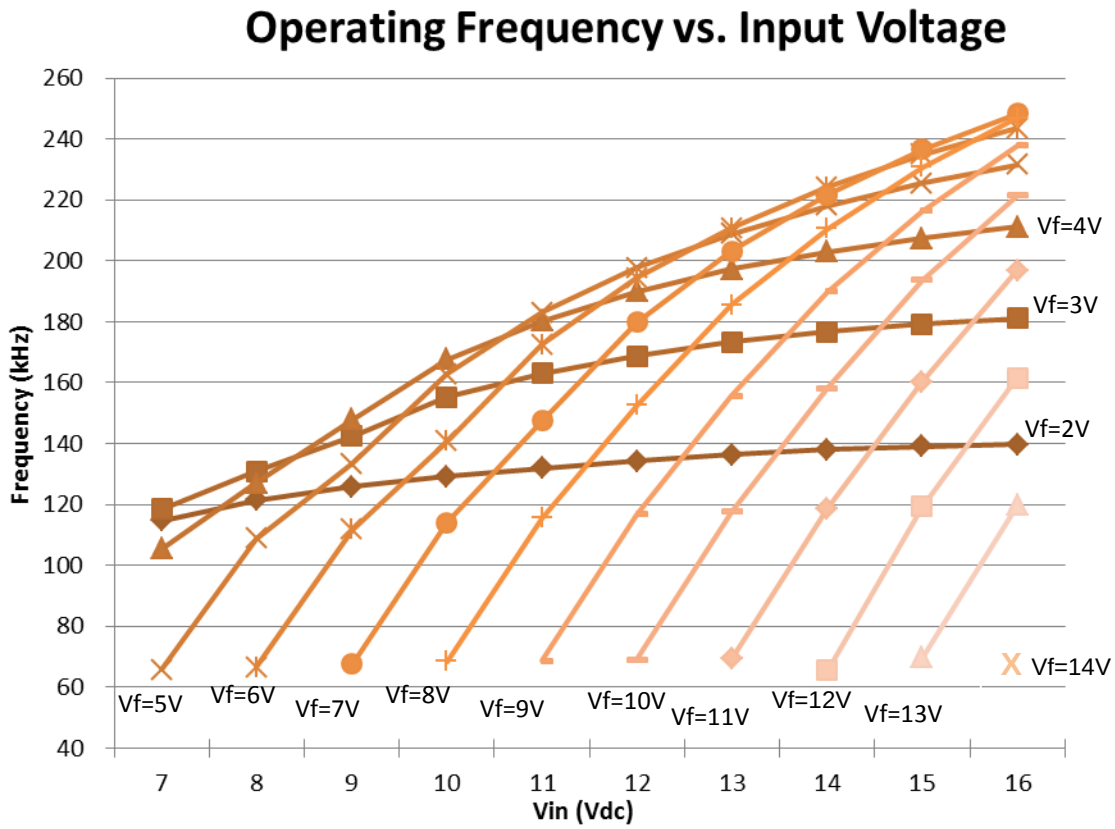


Efficiency vs Vin

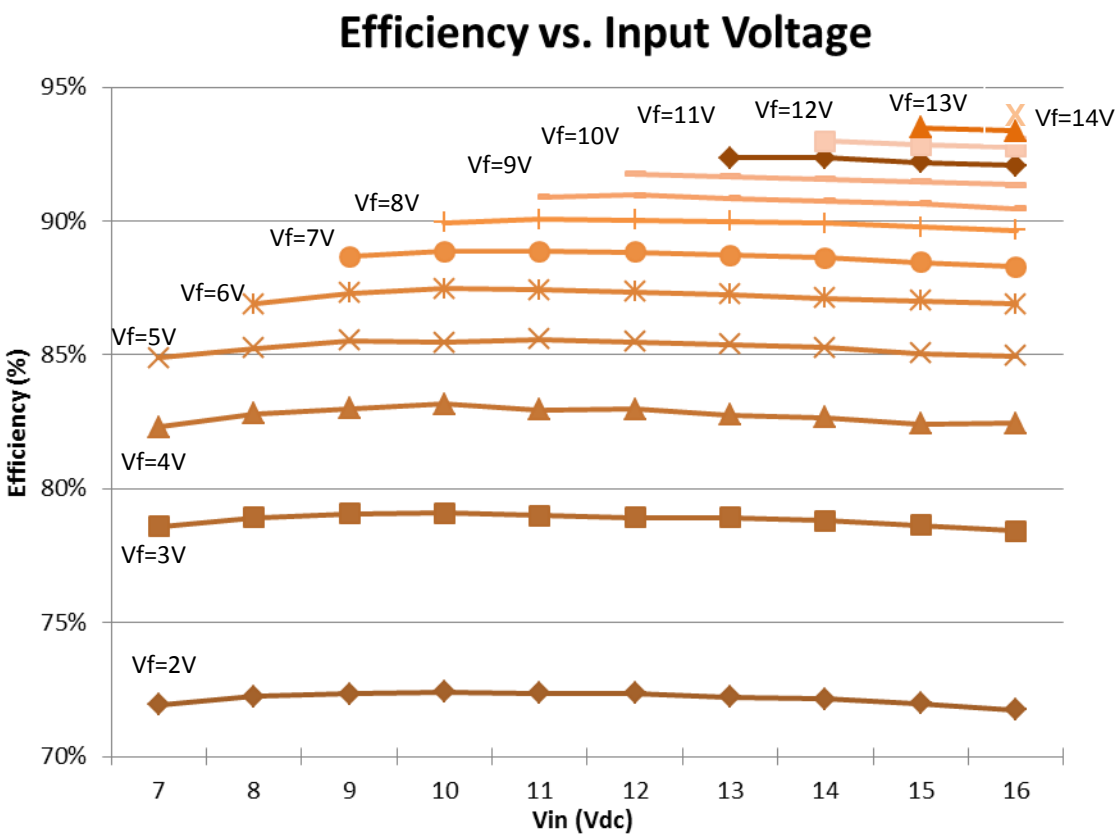


Typical Characteristics: AMLDP-1635Z

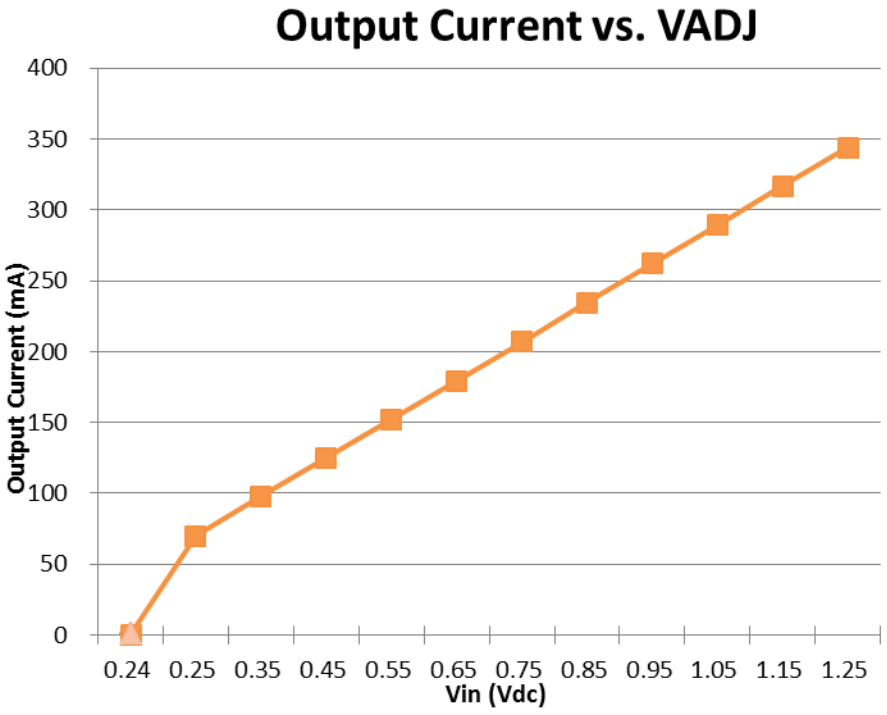
Operating Frequency vs Input Voltage



Efficiency vs Vin

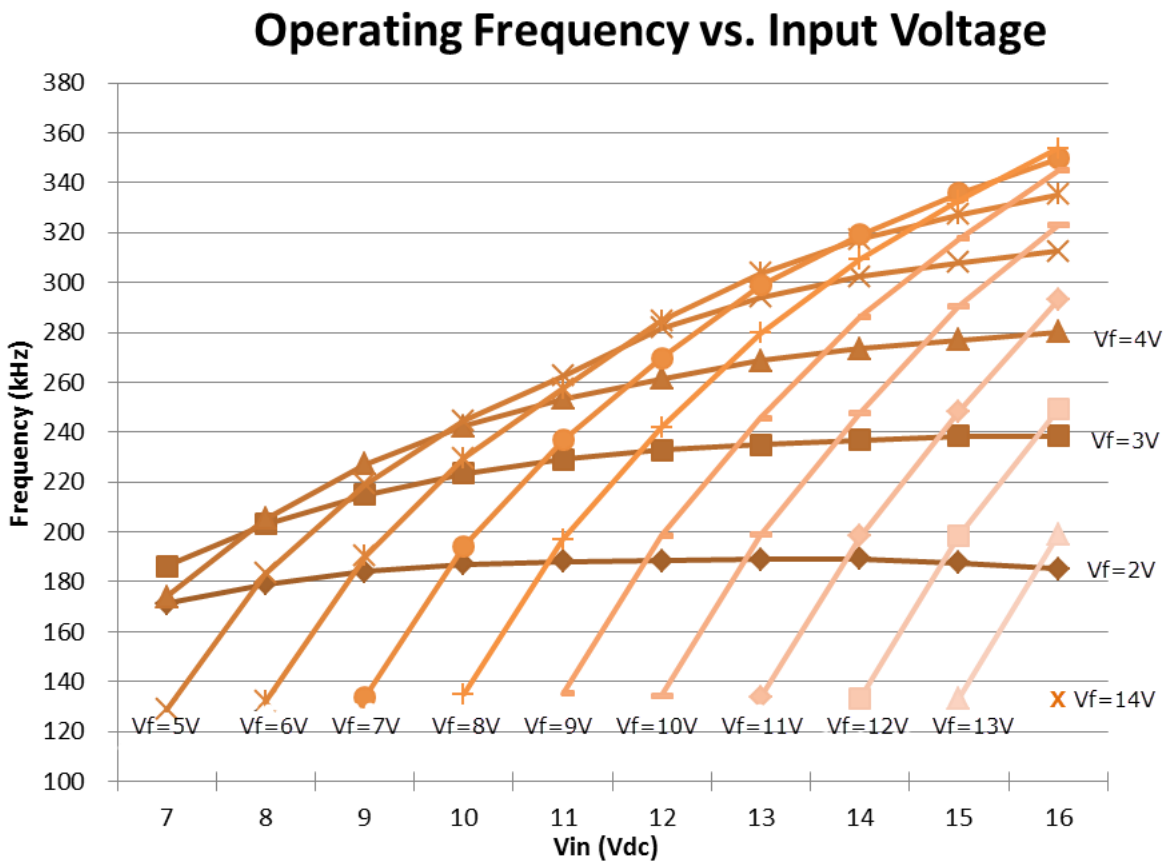


Output Current Vs V_{ADJ}

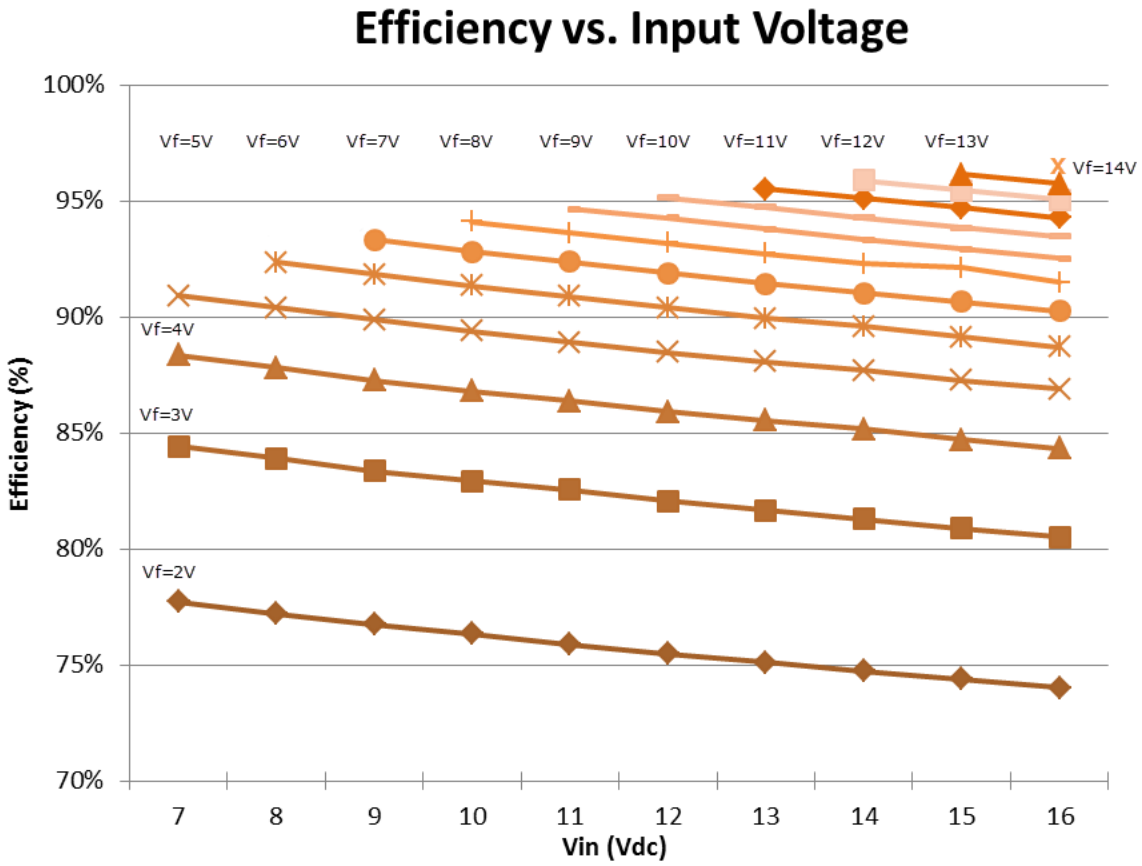


Typical Characteristics: AMLDP-1650Z

Operating Frequency vs Input Voltage

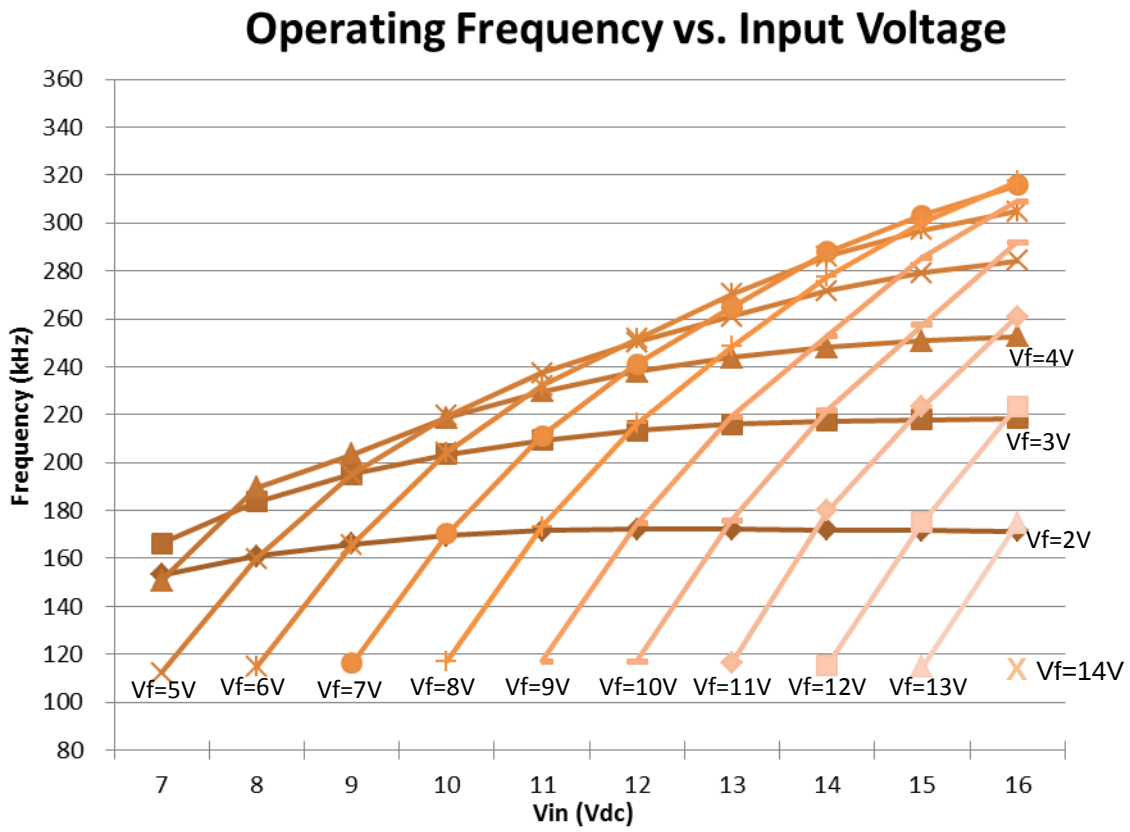


Efficiency vs Vin

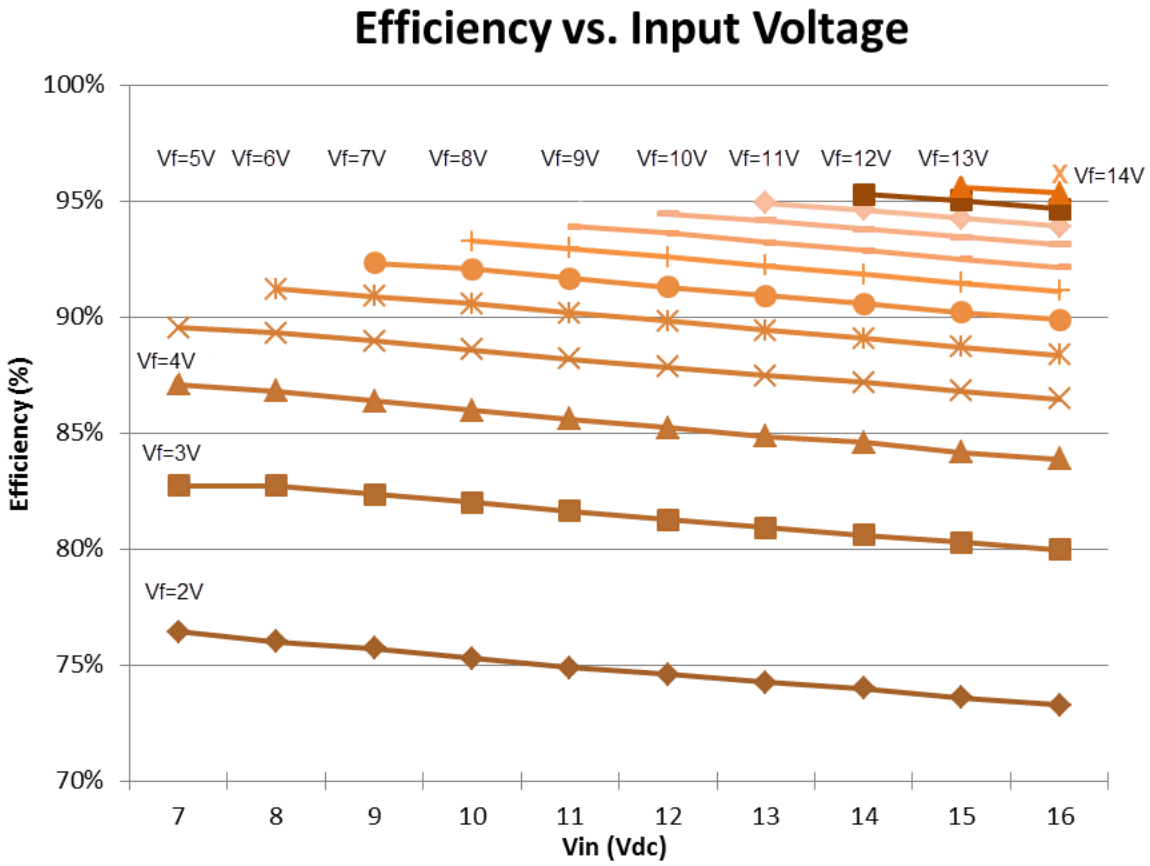


Typical Characteristics: AMLDP-1660Z

Operating Frequency vs Input Voltage

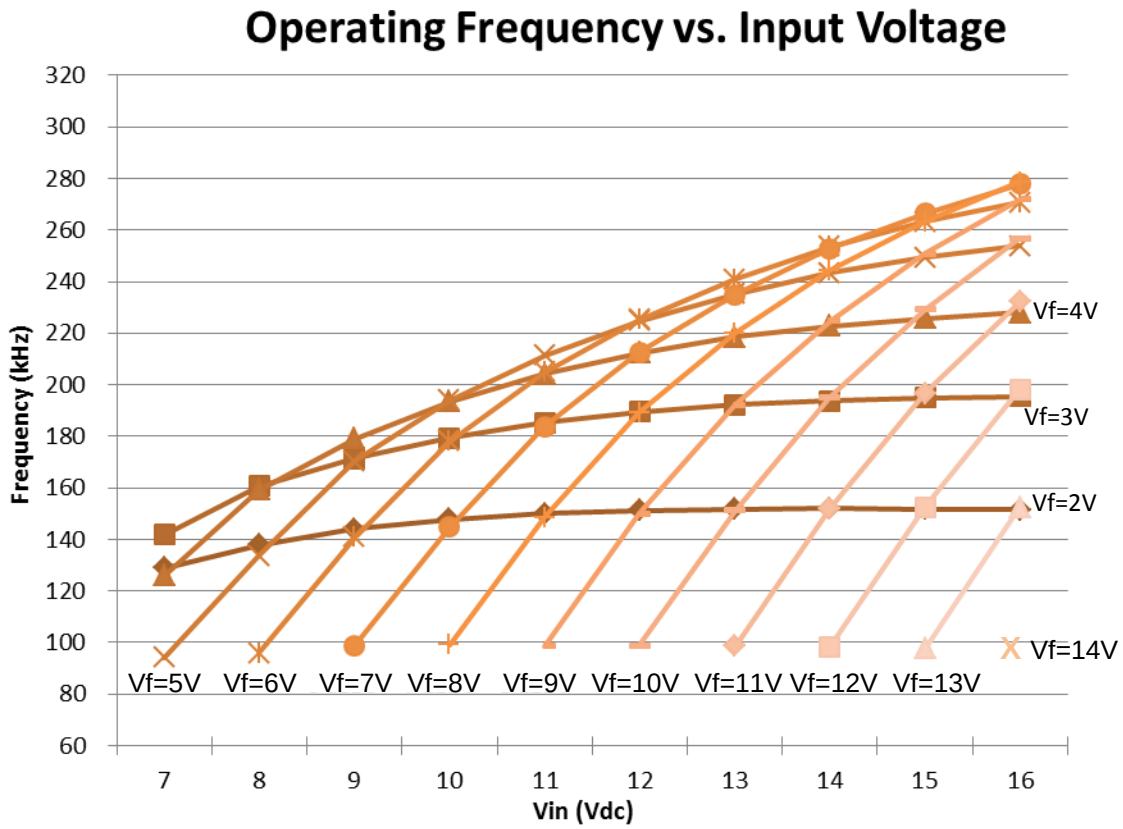


Efficiency vs Vin

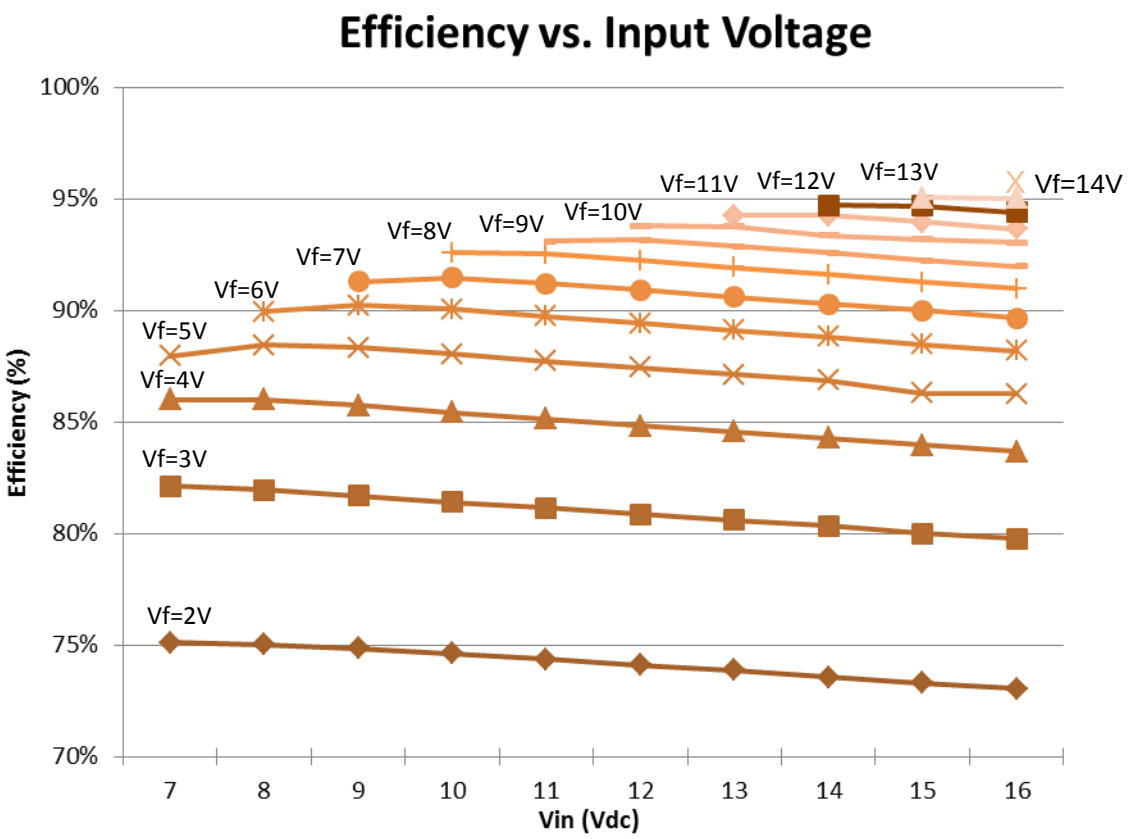


Typical Characteristics: AMLDP-1670Z

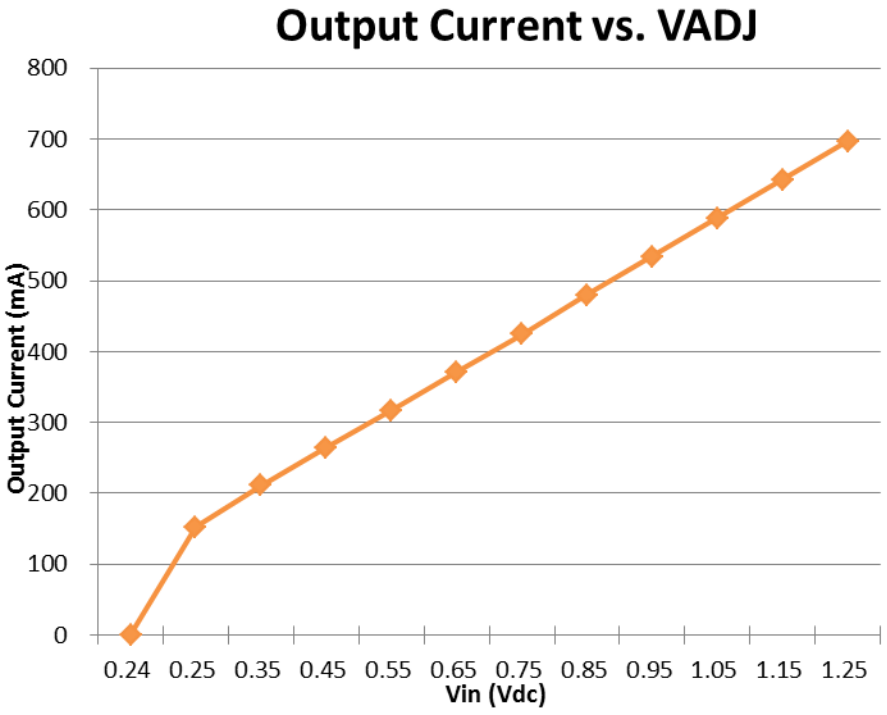
Operating Frequency vs Input Voltage



Efficiency vs Vin

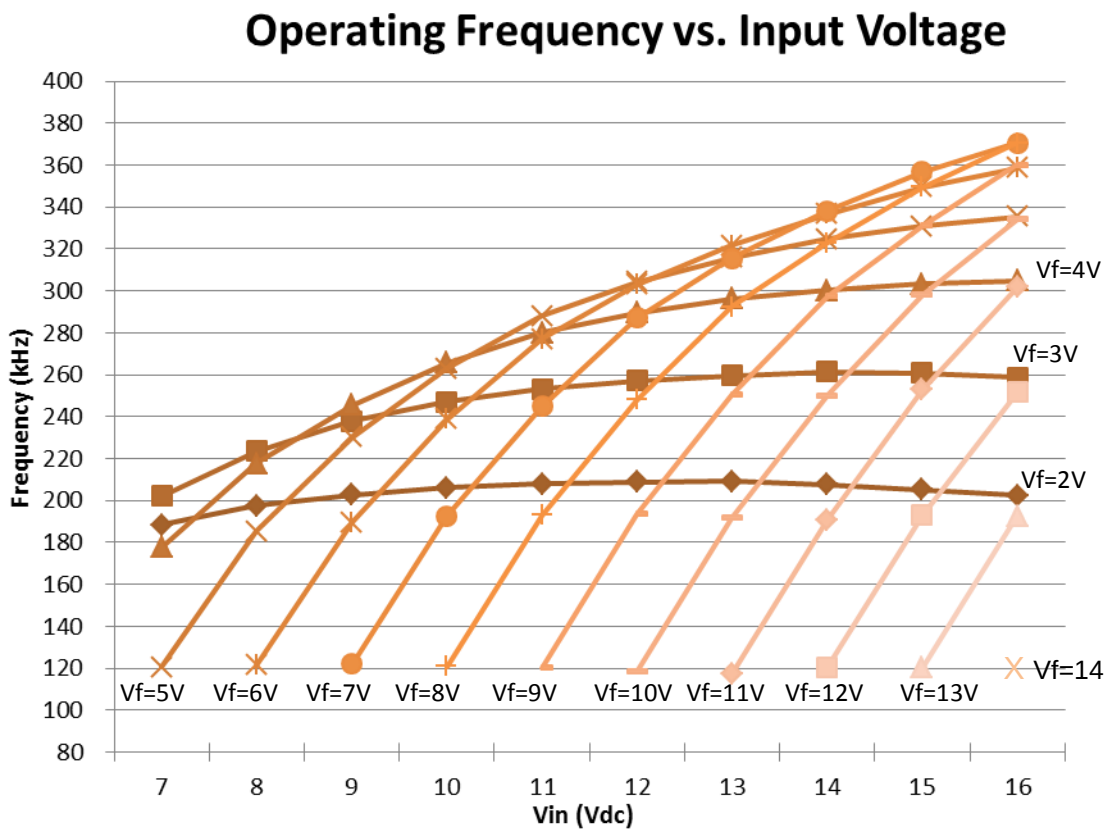


Output Current Vs V_{ADJ}

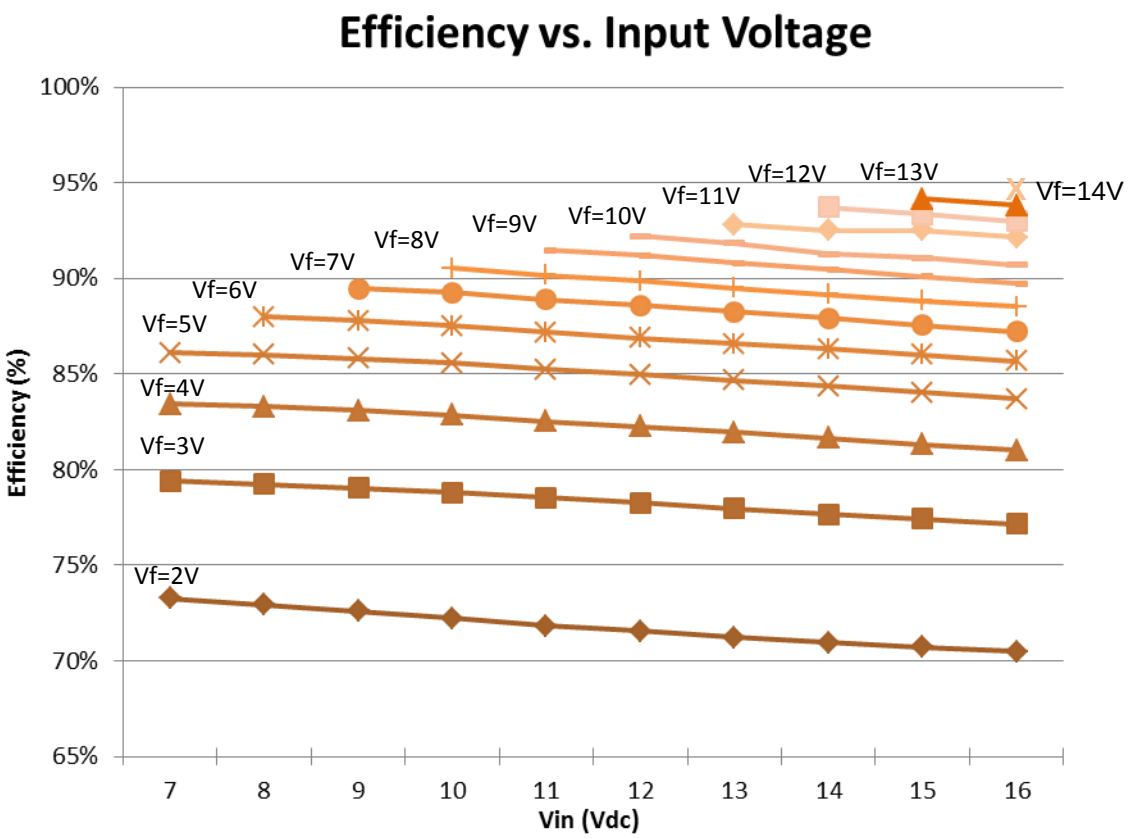


Typical Characteristics: AMLDP-16100Z

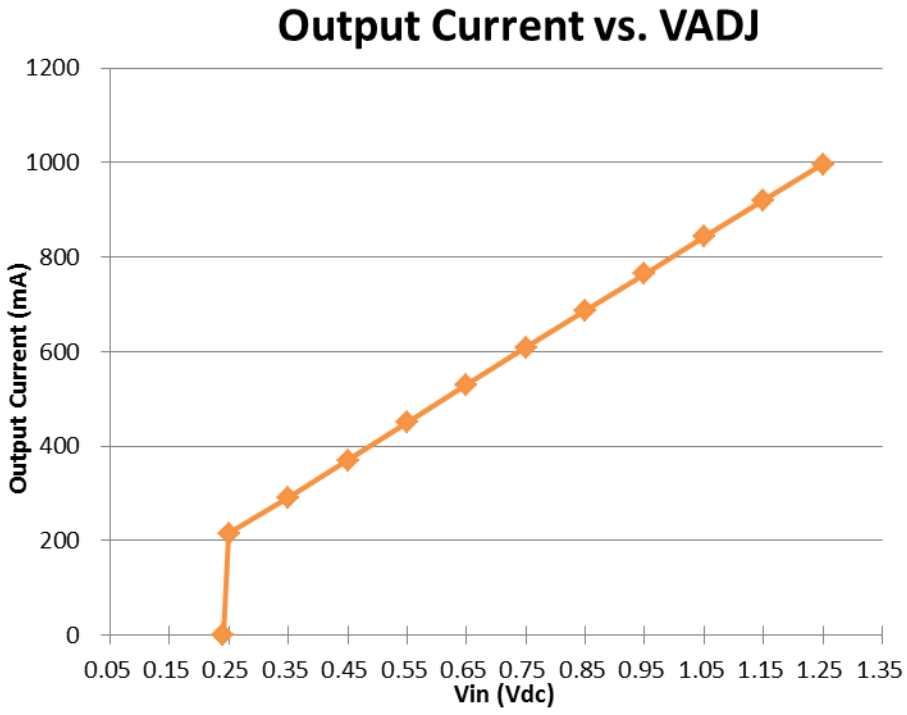
Operating Frequency vs Input Voltage



Efficiency vs Vin



Output Current Vs V_{ADJ}



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