



FEATURES:

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



Models Single output

Model	Input Voltage (V)	Output Voltage (V)	Maximum Rated Current (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	12	7-16		VDC
Filter	Capacitor			
Peak input voltage			20	V
Peak input voltage time			500	ms
Vadj pin input voltage range		0 to 1.25		V
Vadj pin drive current	Vadj = 1.25V		1	mA
DC/DC ON (Leave open if not used)	ON – Open or 0.3V < Vadj < 1.25V			
DC/DC OFF	OFF (shutdown) – Short pin7 and pin 8 or Vadj < 0.15V			
Quiescent Current in Shutdown mode	Vin = 16V		25	uA
PWM dimming	Max PWM Frequency 1KHz, adjust output current from 0% to 100%			
Analog dimming	0.3V < Vadj < 1.25V to adjust output current from 25% to 100%			

Output Specifications

Parameters	Conditions	Typical	Maximum	Units
Current accuracy	300mA model		±5	%
	350mA model		±6	%
	1000mA model		±8	%
	Other models		±7	%
Ripple & noise	20MHz Bandwidth, 300mA model		120	mV p-p
	20MHz Bandwidth, 350mA model		150	mV p-p
	20MHz Bandwidth, 500/600mA models		200	mV p-p
	20MHz Bandwidth, 700/1000mA models		250	mV p-p
Output voltage range	V input = 16	2-14		VDC
Output current	Vin – Vout > 2V to 3V	See model table above		
Short circuit protection	Regulated at the rated current for each model			
Output no load protection	Continuous			
Temperature coefficient	Ta = -40 to +85°C		±0.03	%/°C

General Specifications

Parameters	Conditions	Typical	Maximum	Units
Switching frequency	100% load	60 to 400		KHz
Operating temperature	1000mA model	-40 to +71		°C
	Other models	-40 to +85		°C
Storage temperature		-40 to +125		°C
Maximum case temperature			105	°C
Cooling	Free air convection			
Humidity			95	% RH
Case material	Non-Conductive Black Plastic (UL94-V0 rated)			
Weight		2.1		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

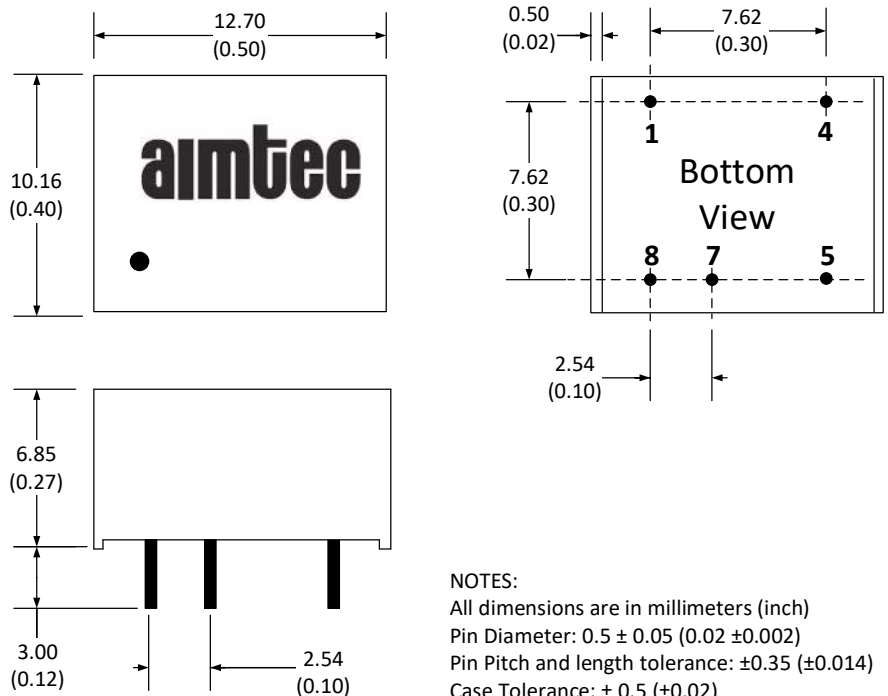
Safety Specifications

Parameters	
Agency Approvals	CE
Standards	EN55015, with recommended EMC circuit EN61547 IEC 61000-4-2 IEC 61000-4-3 IEC 61000-4-4 IEC 61000-4-5, with a Max Clamping Voltage $V_C @ I_{PP} \leq 20V$ TVS at the input IEC 61000-4-6 IEC 61000-4-8 NOTE: also designed to meet IEC/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	Dimming/ON/OFF or leave open if not used
8	- V Input	- DC Supply

Dimensions

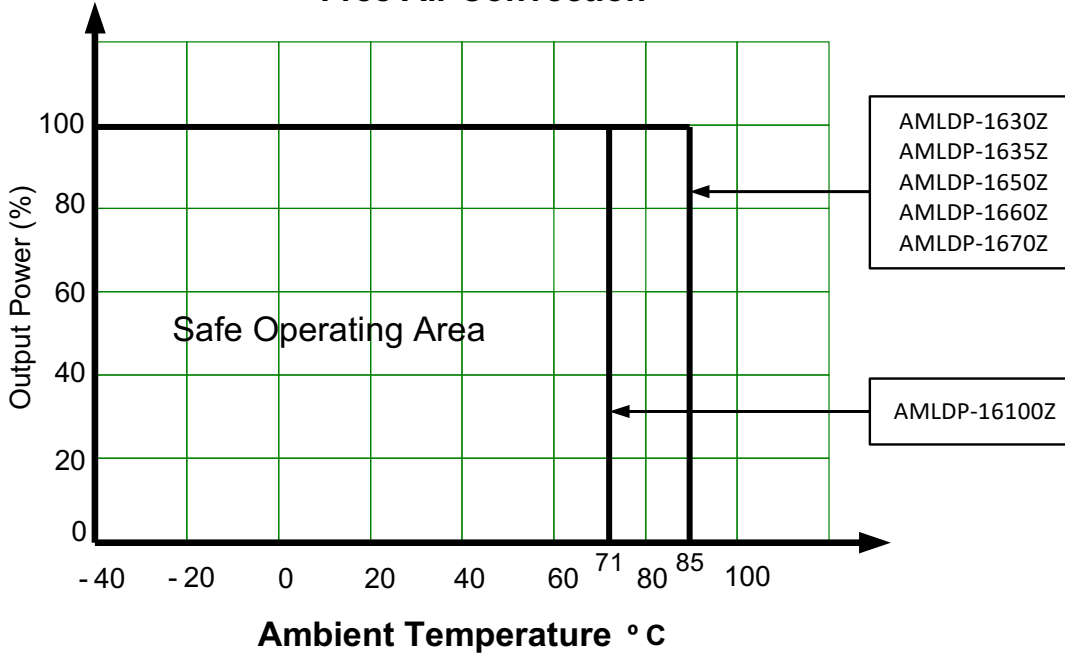


NOTES:

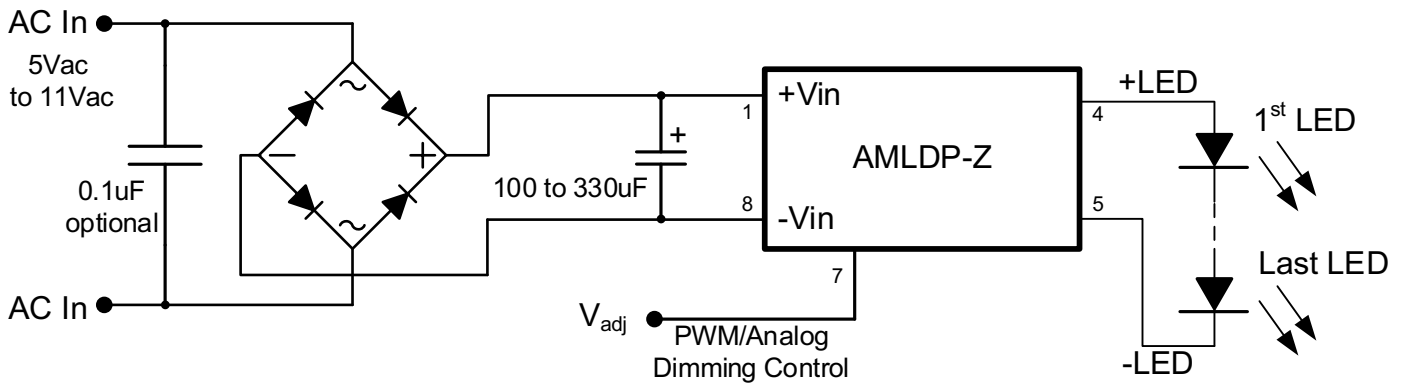
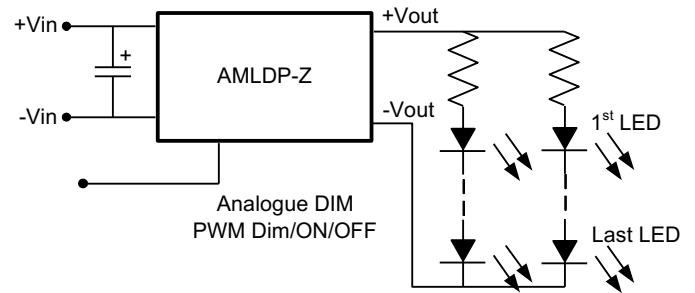
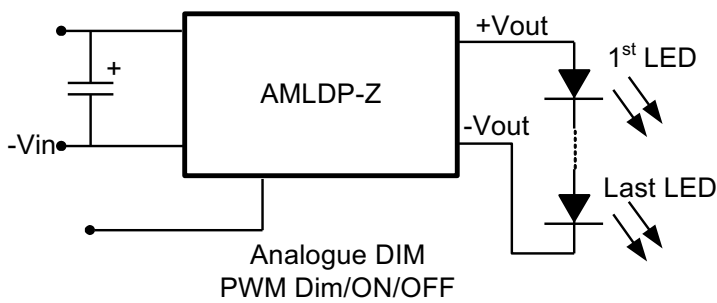
- All dimensions are in millimeters (inch)
Pin Diameter: 0.5 ± 0.05 (0.02 ± 0.002)
Pin Pitch and length tolerance: ± 0.35 (± 0.014)
Case Tolerance: ± 0.5 (± 0.02)

Derating

Free Air Convection



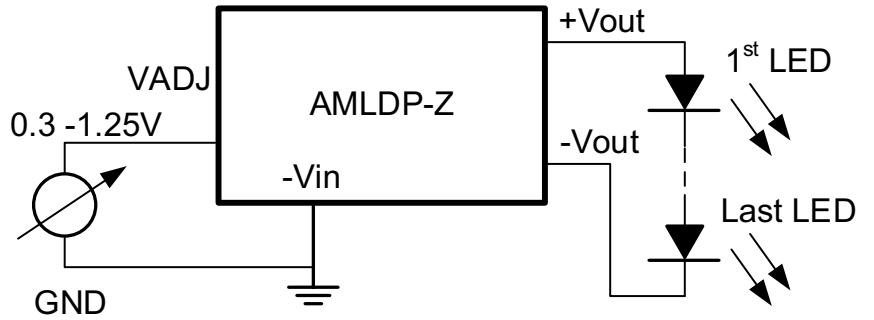
Application circuit examples:



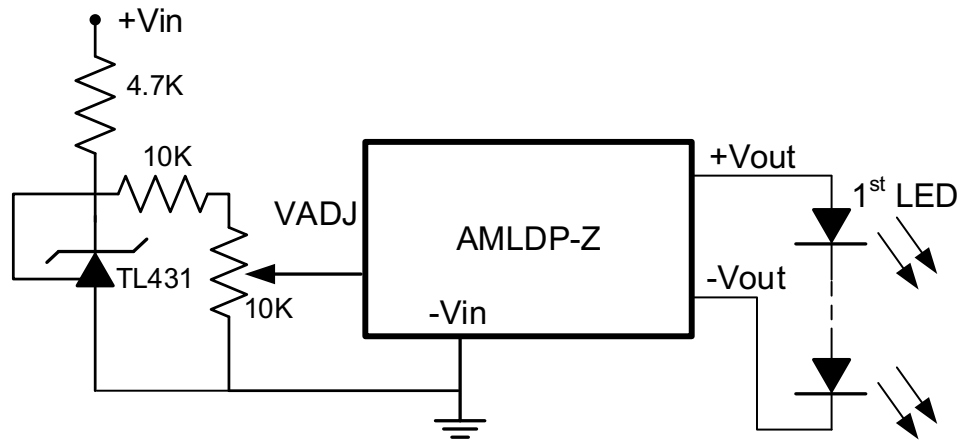
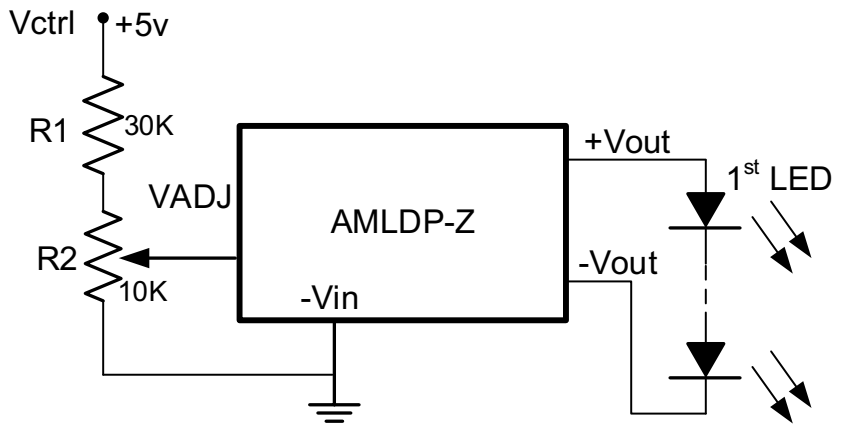
Output Current Adjustment by External DC Control Voltage:

The nominal output current is given by:

$$I_{outnom} = I_{out} \frac{V_{adj}}{1.25}$$



$$V_{ADJ} = \frac{R_2}{R_1 + R_2} \times V_{ctrl}$$

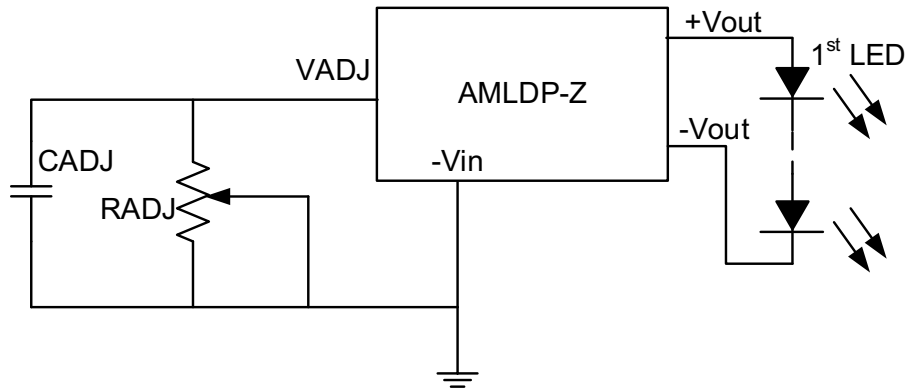


Resistive Dimming Control

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:

$$I_{outnom} = \frac{I_{out} \times R_{adj}}{R_{adj} + 200K}$$



NOTE: Typical error is ±10% with resistive dimming control

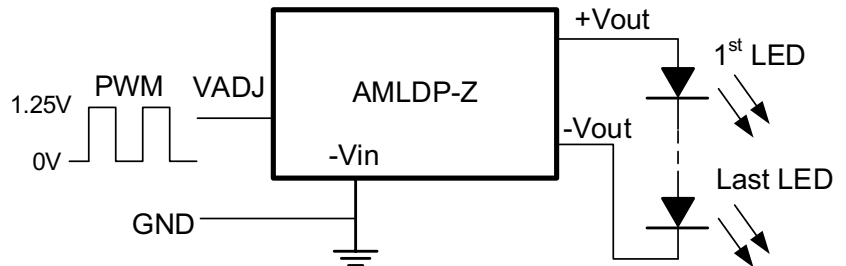
If the value of R_{adj} is between 0 to 2MΩ, the maximum adjustment range will be 25% to 90%, (for V_{in} - V_{out} < 10VDC)

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:

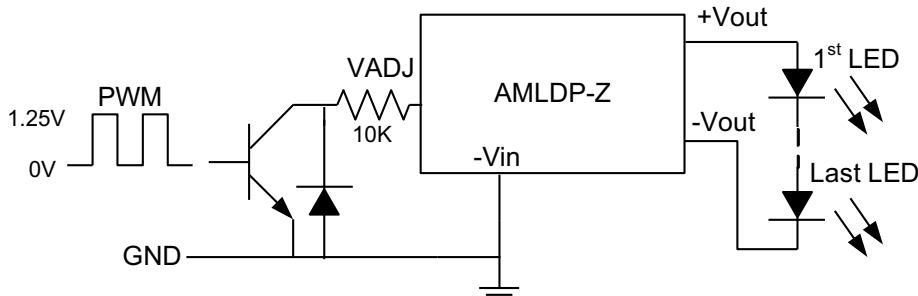
$$I_{outnom} = I_{out} \times DPWM \quad [for \ 0.01 < DPWM < 1]$$



Driving VADJ Via Open Collector Transistor

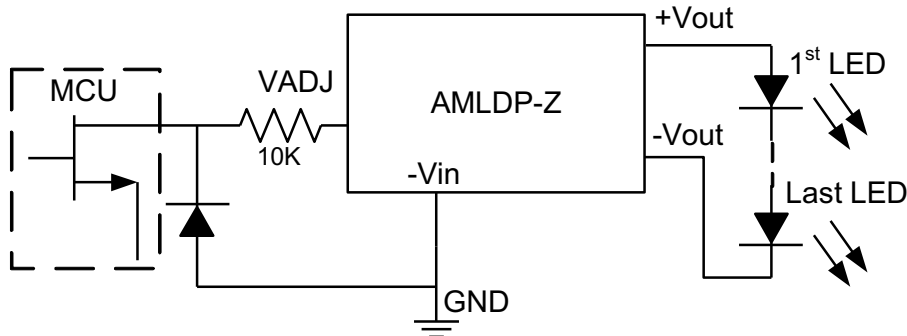
The VADJ can also be driven via an open collector transistor as shown below.

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.



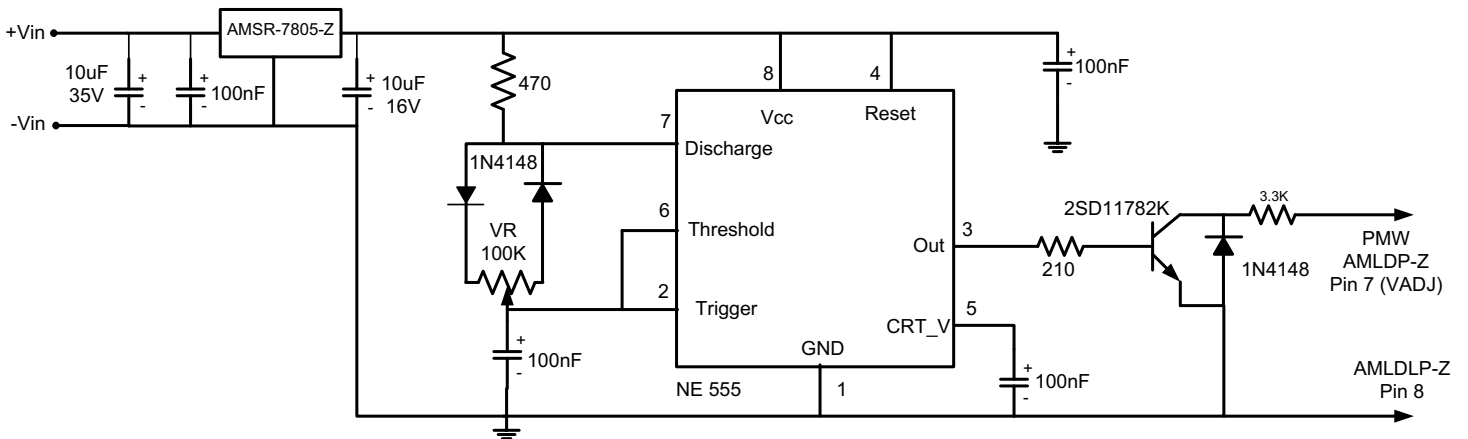
Driving the VADJ from a Microcontroller

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.

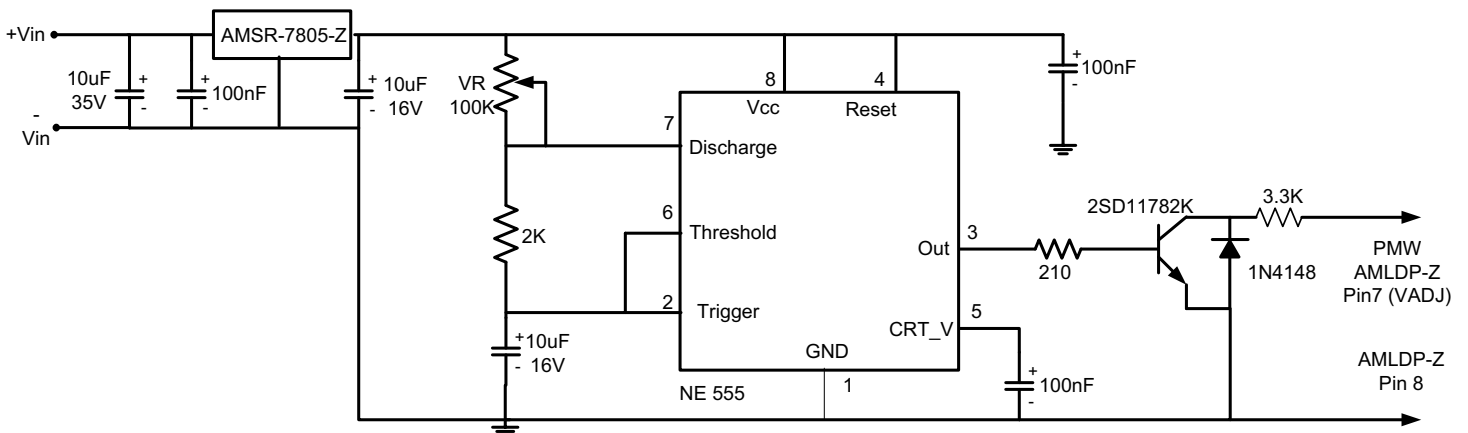


Output Current Adjustment by PWM Control (Dimming):

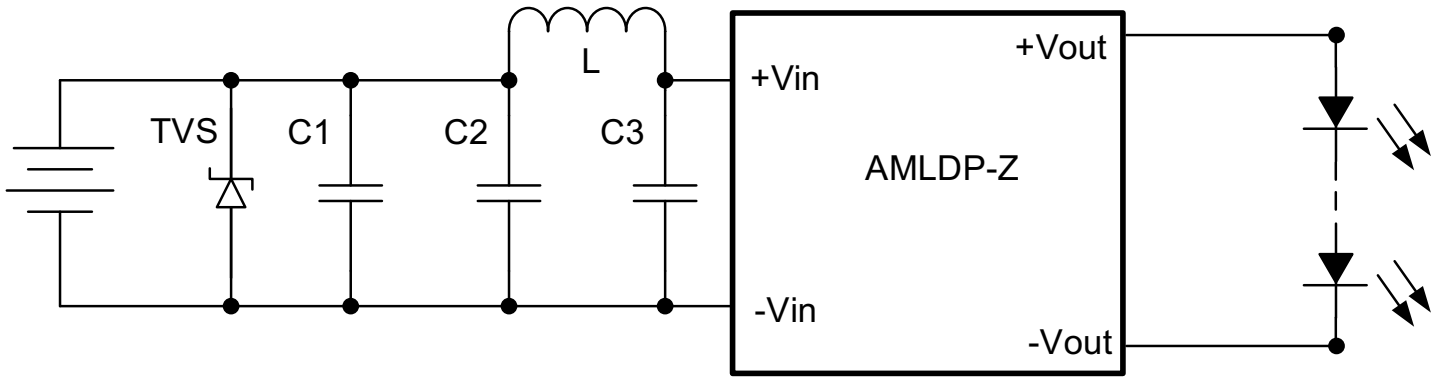
A PWM signal must have a frequency of greater than 100Hz to prevent any visible flicker.



Output Current Adjustment by PWM Control (Flash):



Recommended EMC circuit

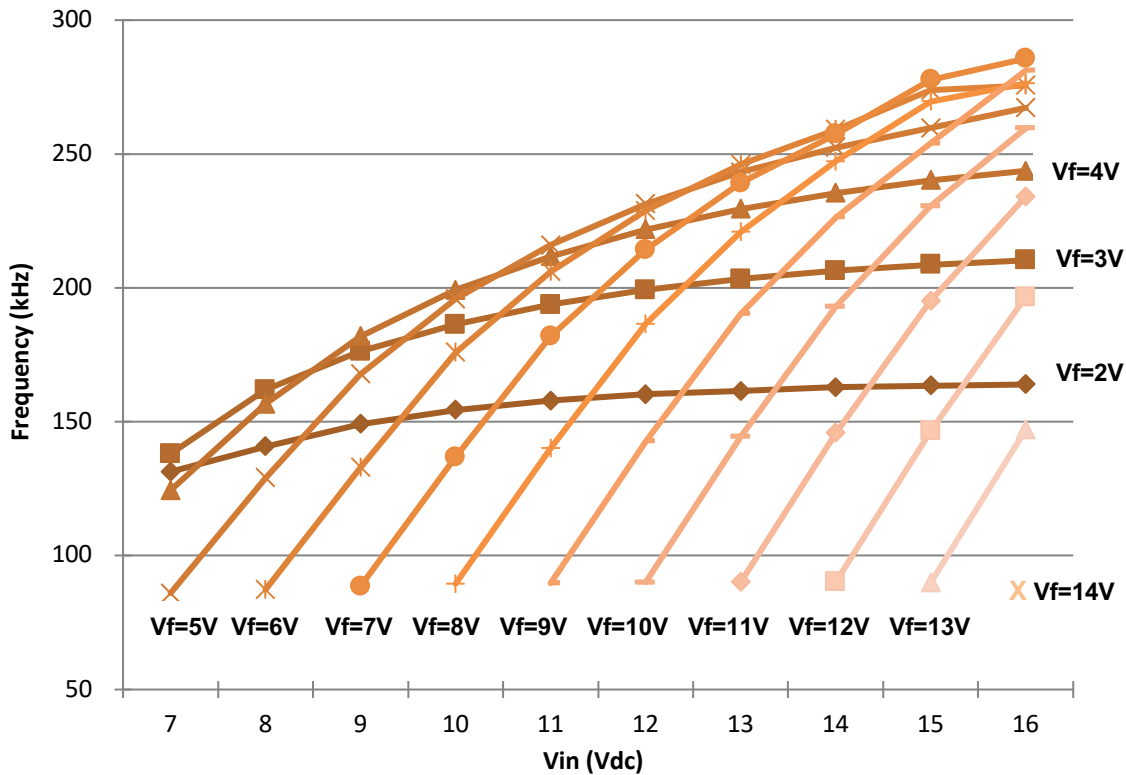


C1	C2	L	C3	TVS
10uF	10uF	47uH	47uF	$V_C @ I_{PP} \leq 20V$

Typical Characteristics: AMLDP-1630Z

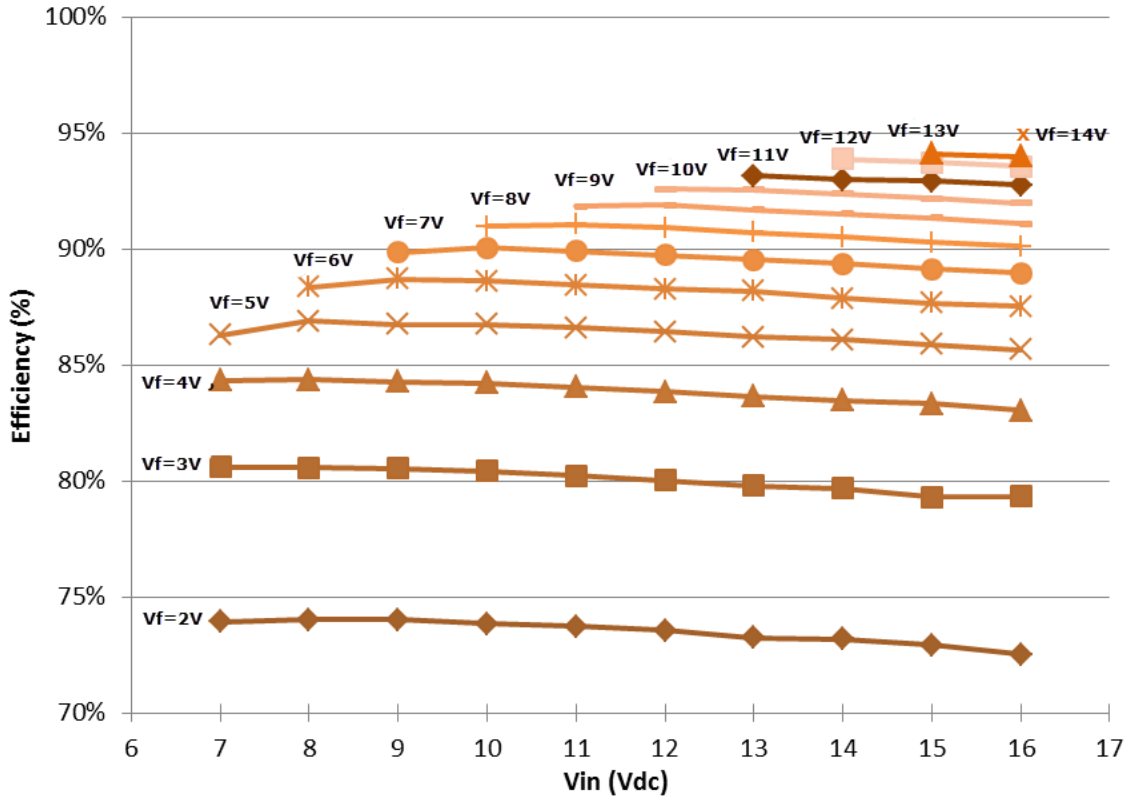
Operating Frequency vs Input Voltage

Operating Frequency vs. Input Voltage



Efficiency vs Vin

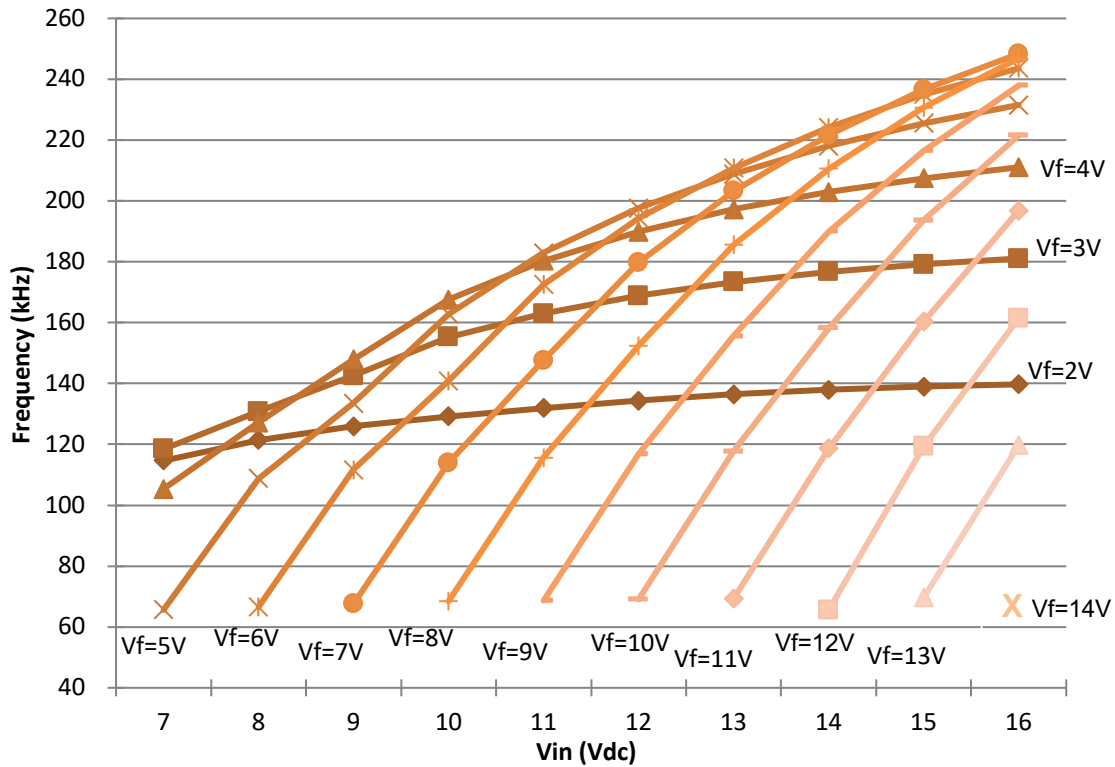
Efficiency vs. Input Voltage



Typical Characteristics: AMLDP-1635Z

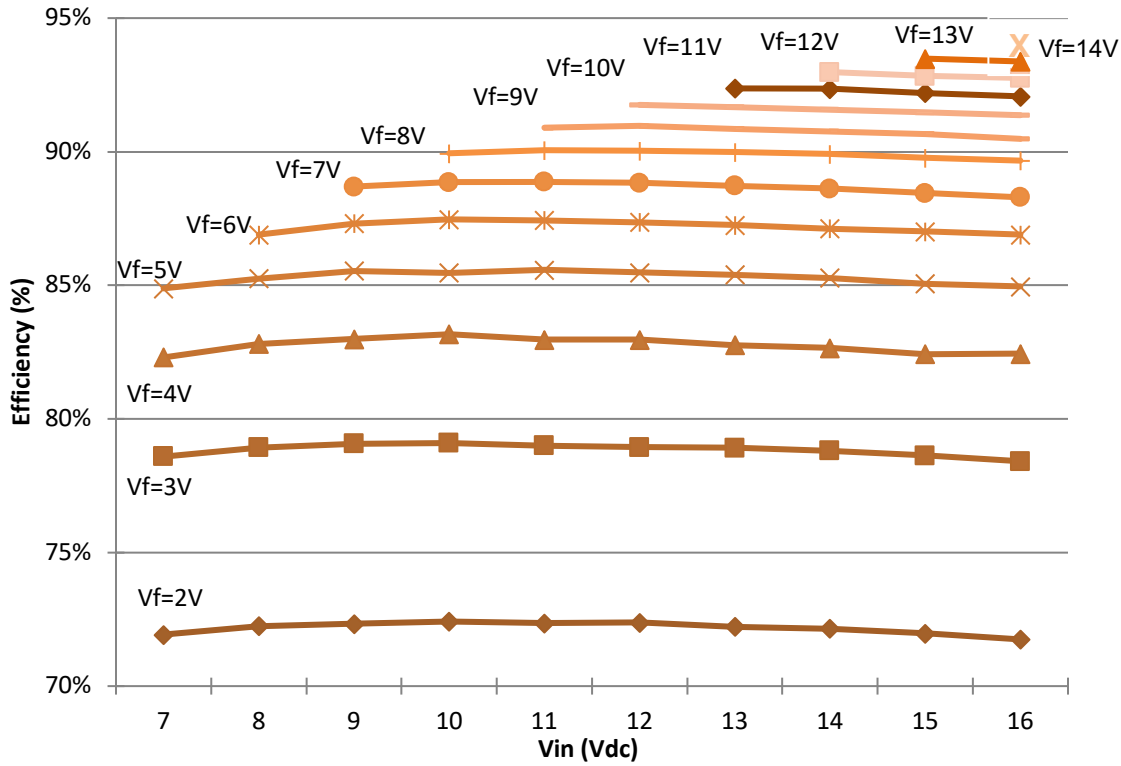
Operating Frequency vs Input Voltage

Operating Frequency vs. Input Voltage



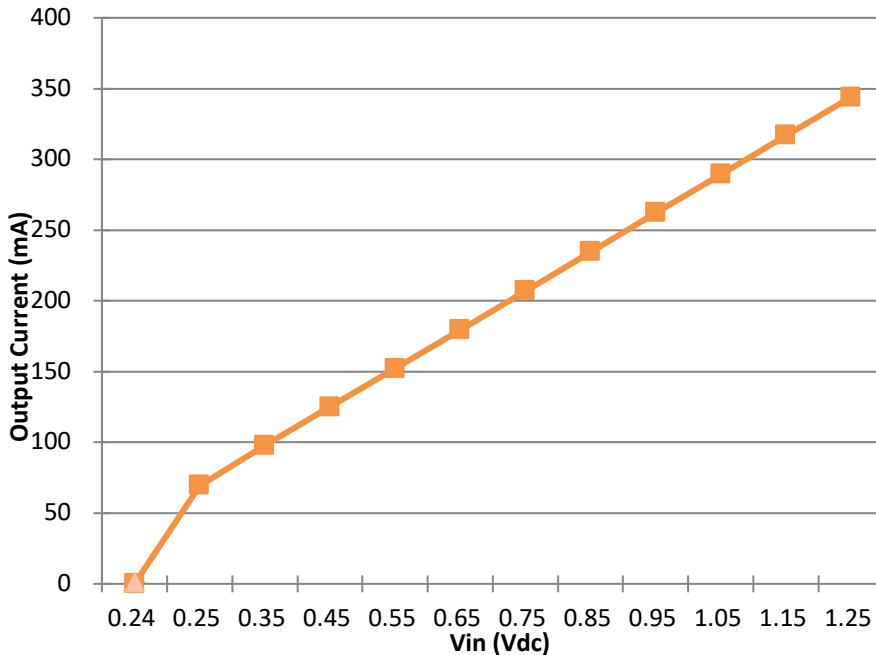
Efficiency vs Vin

Efficiency vs. Input Voltage



Output Current Vs VADJ

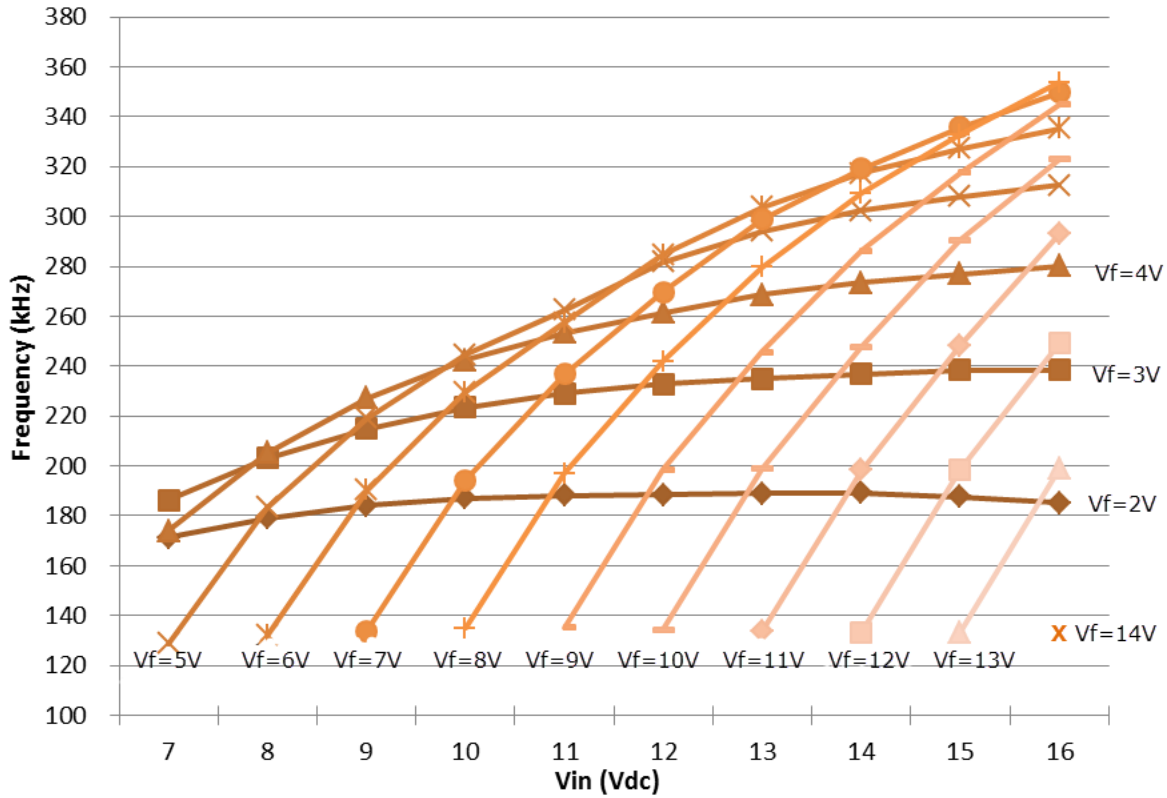
Output Current vs. VADJ



Typical Characteristics: AMLDP-1650Z

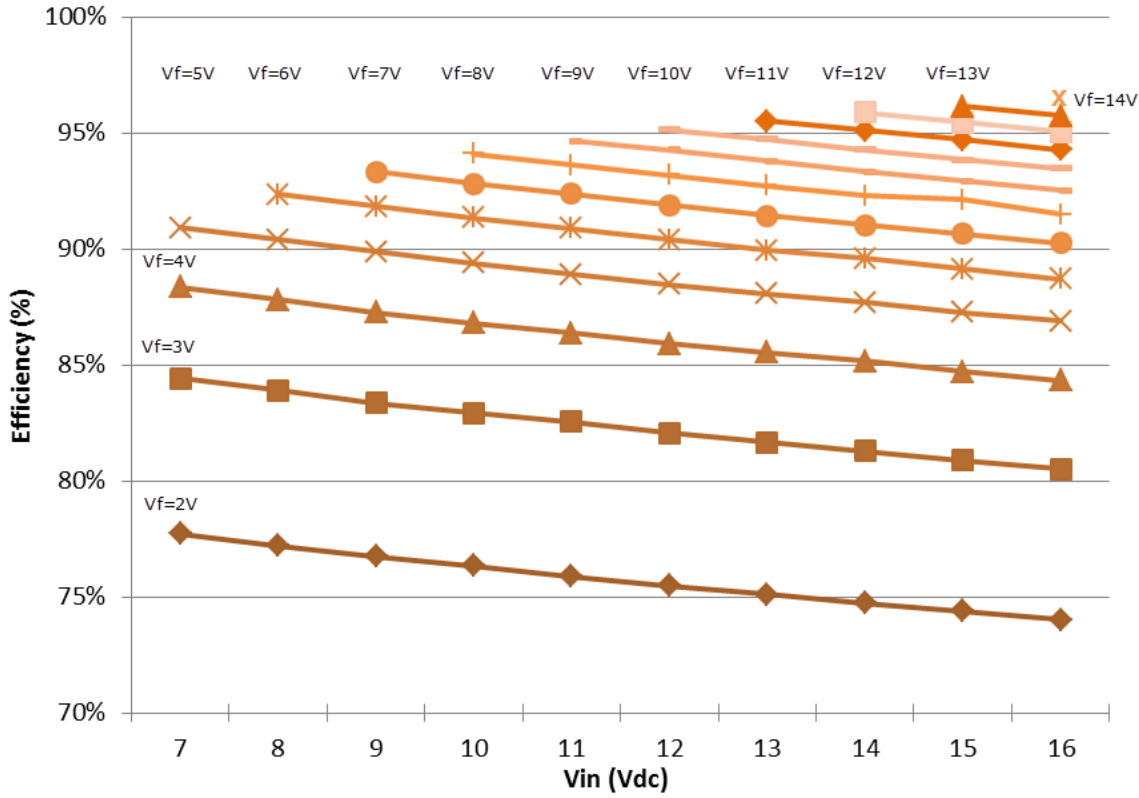
Operating Frequency vs Input Voltage

Operating Frequency vs. Input Voltage



Efficiency vs Vin

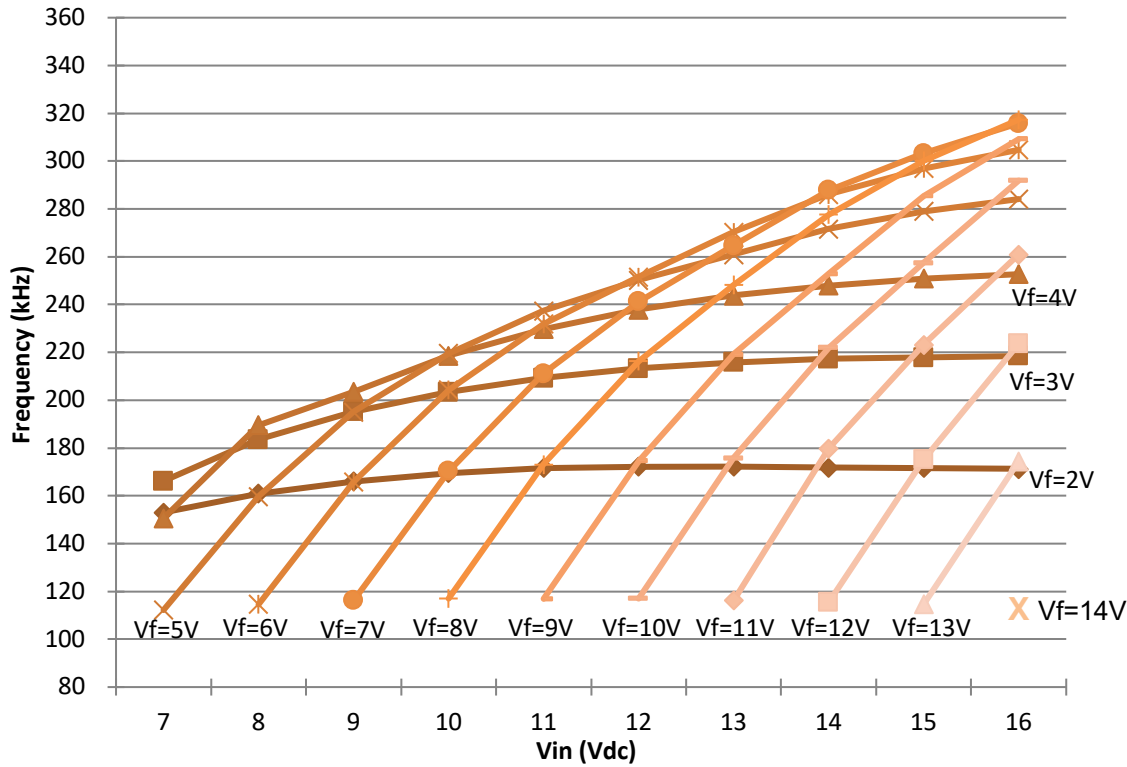
Efficiency vs. Input Voltage



Typical Characteristics: AMLDP-1660Z

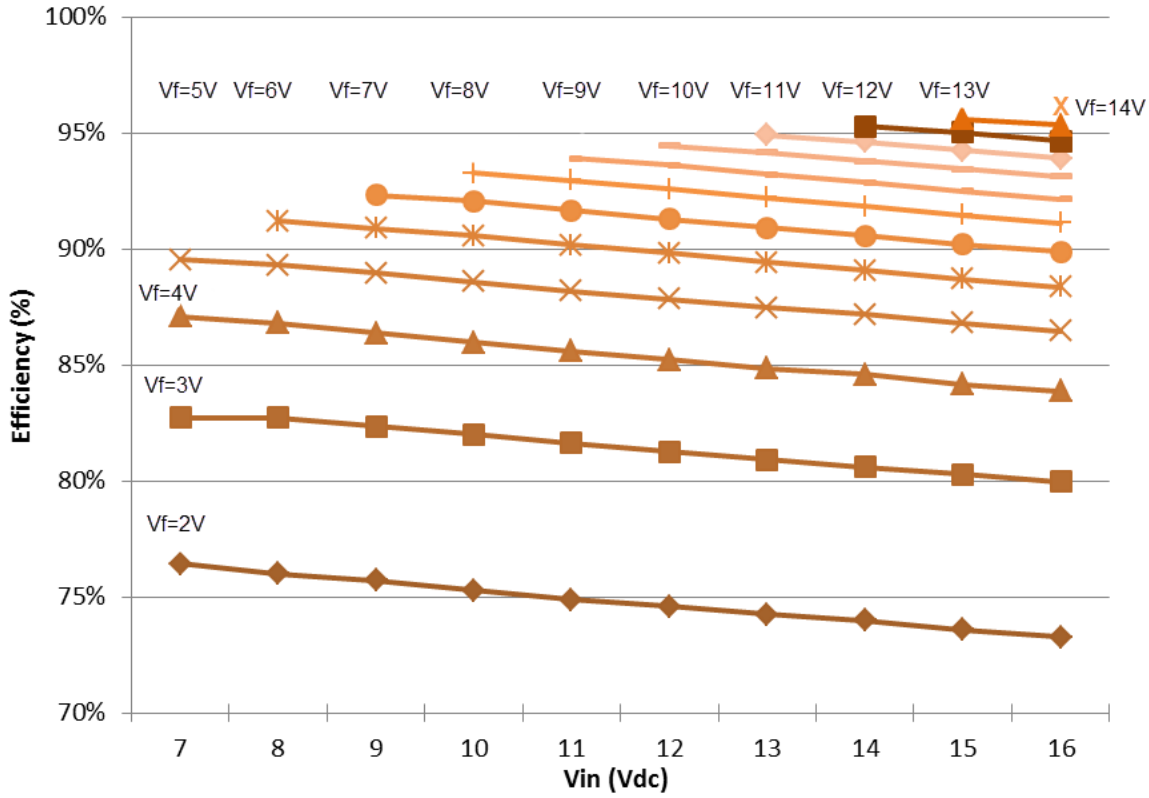
Operating Frequency vs Input Voltage

Operating Frequency vs. Input Voltage



Efficiency vs Vin

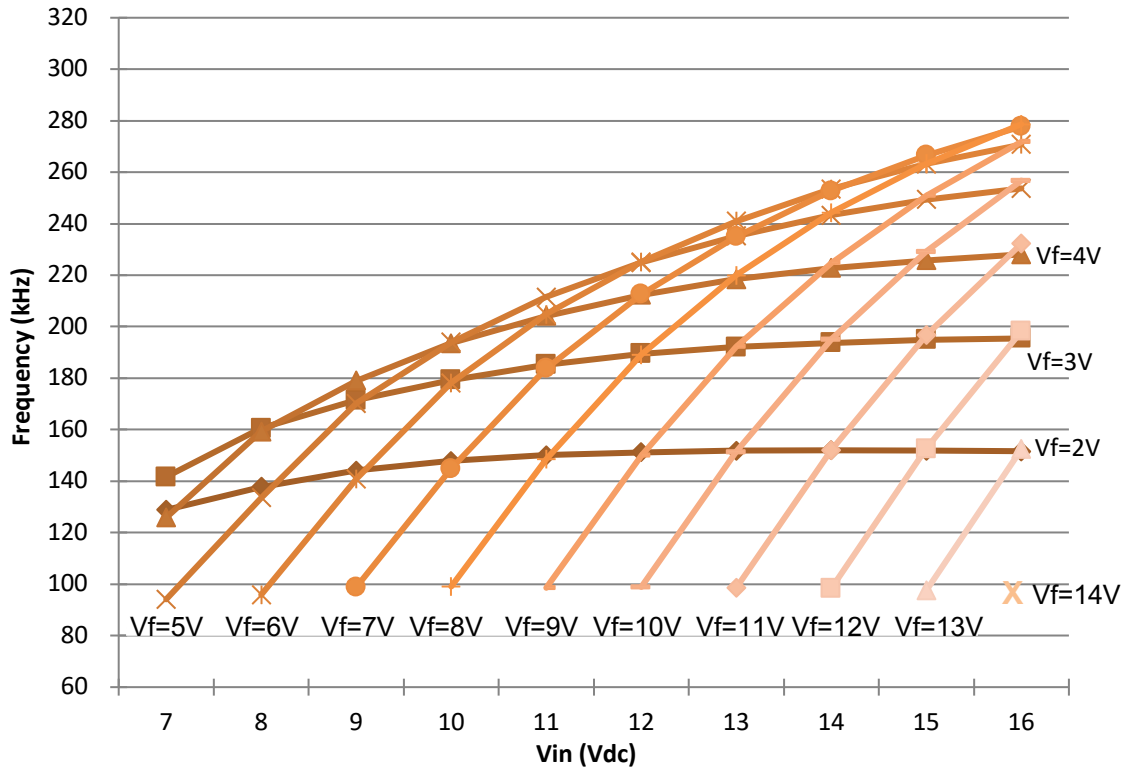
Efficiency vs. Input Voltage



Typical Characteristics: AMLDP-1670Z

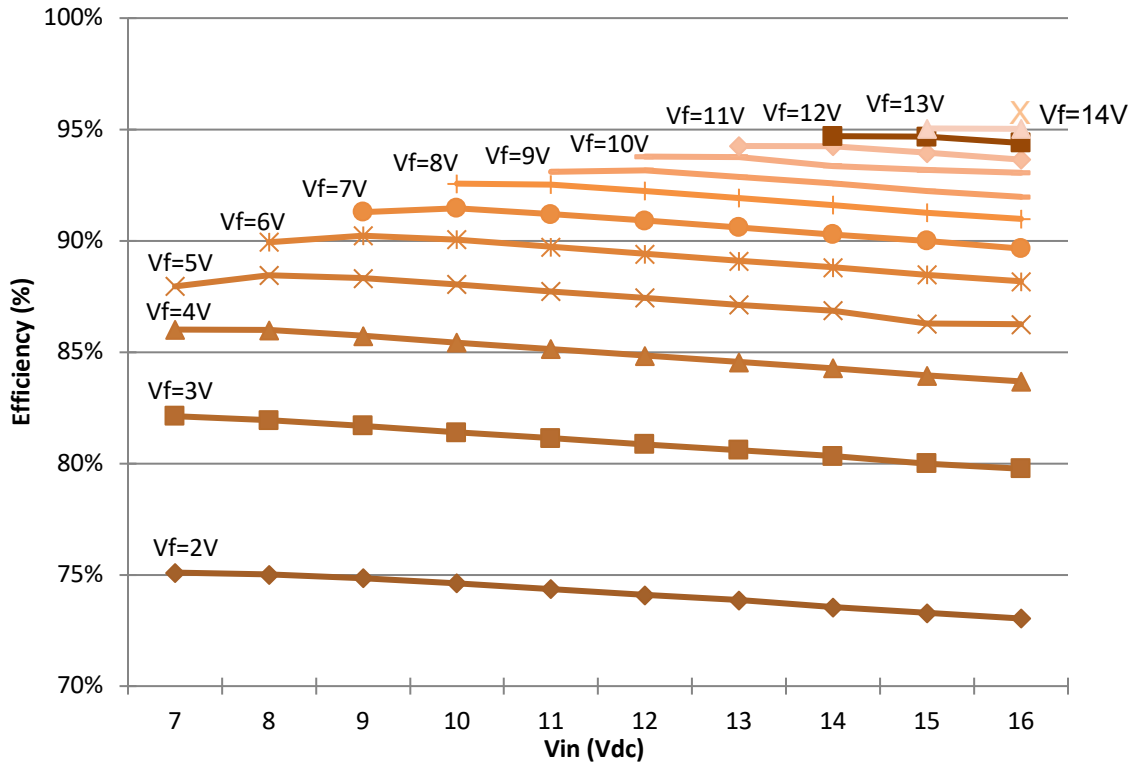
Operating Frequency vs Input Voltage

Operating Frequency vs. Input Voltage



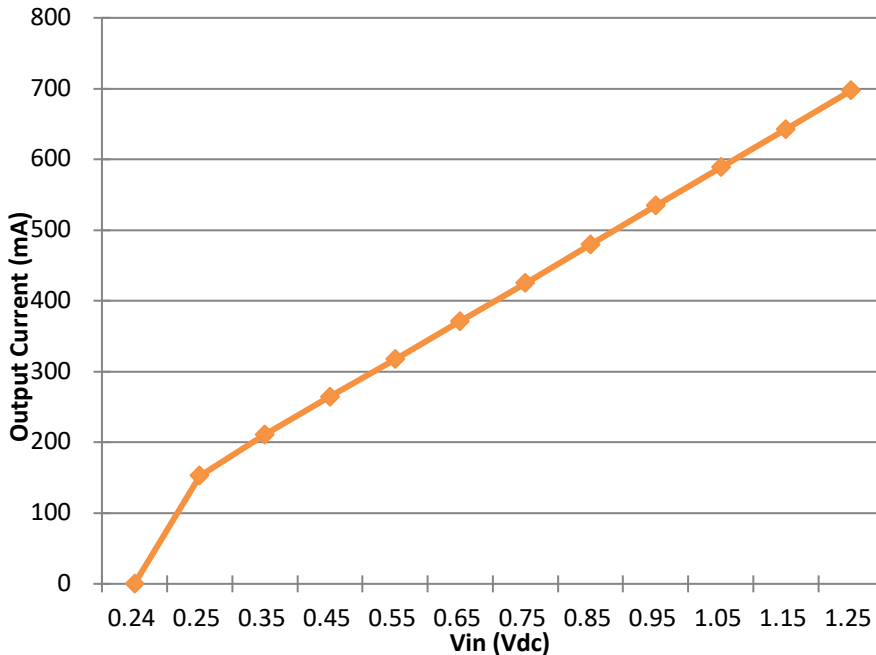
Efficiency vs Vin

Efficiency vs. Input Voltage



Output Current Vs VADJ

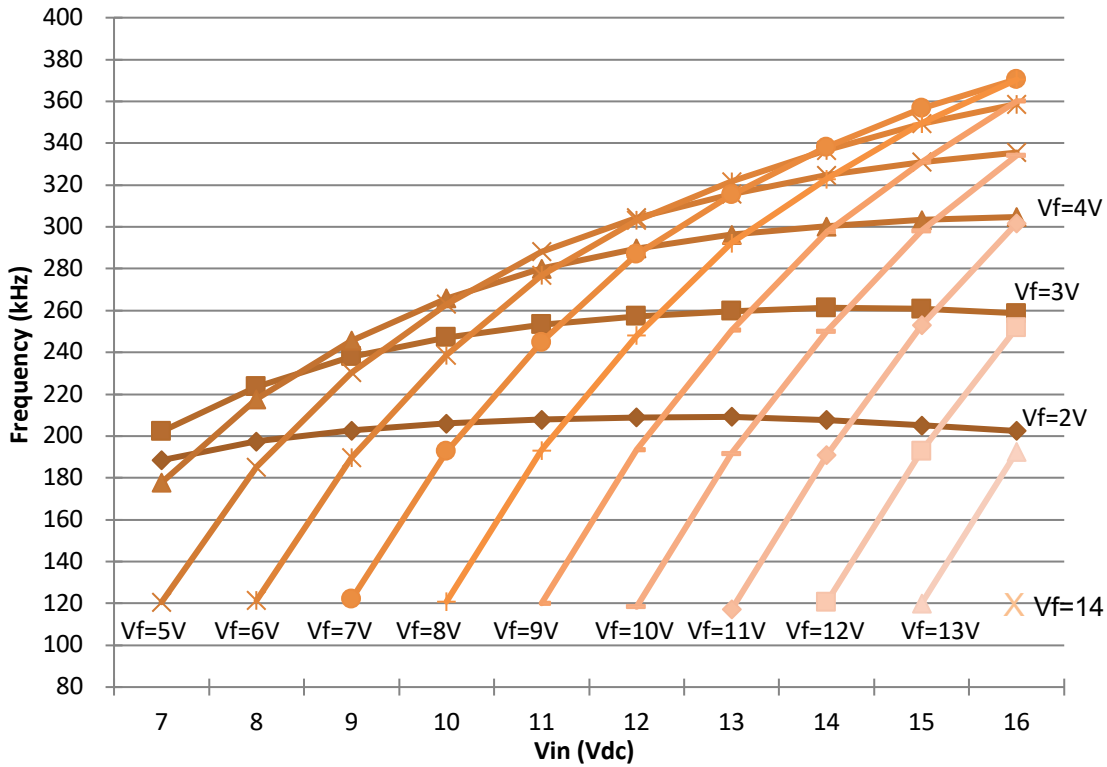
Output Current vs. VADJ



Typical Characteristics: AMLDP-16100Z

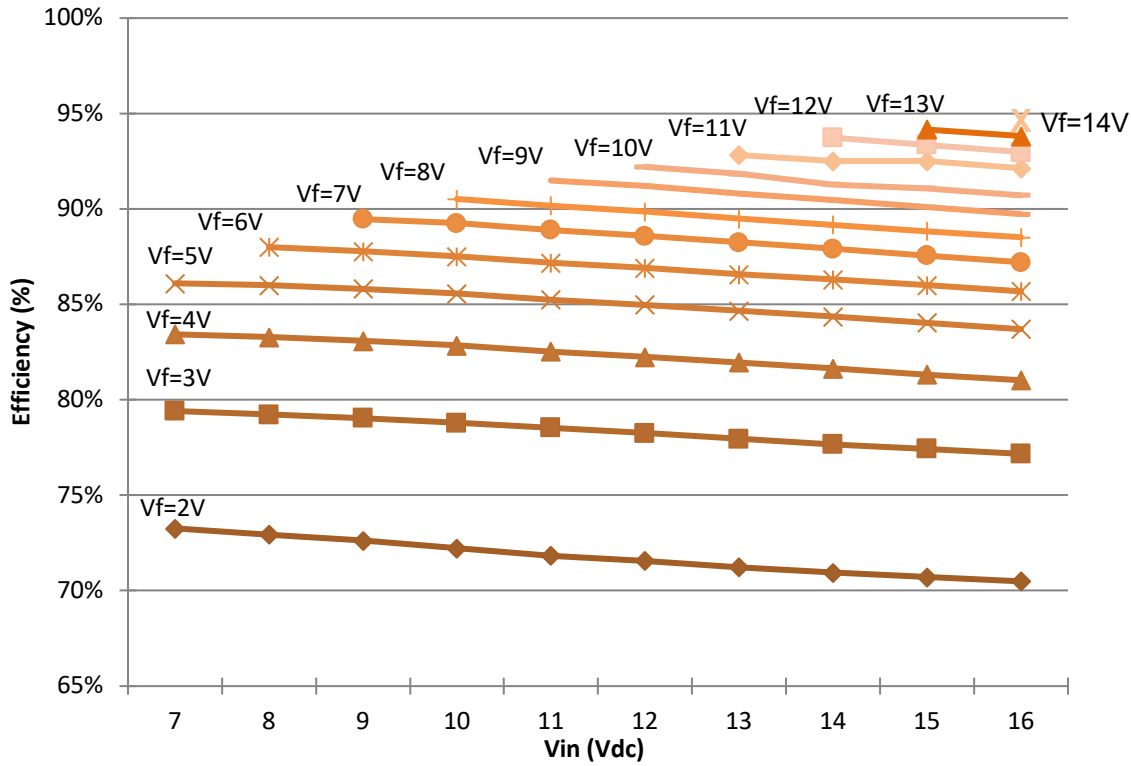
Operating Frequency vs Input Voltage

Operating Frequency vs. Input Voltage



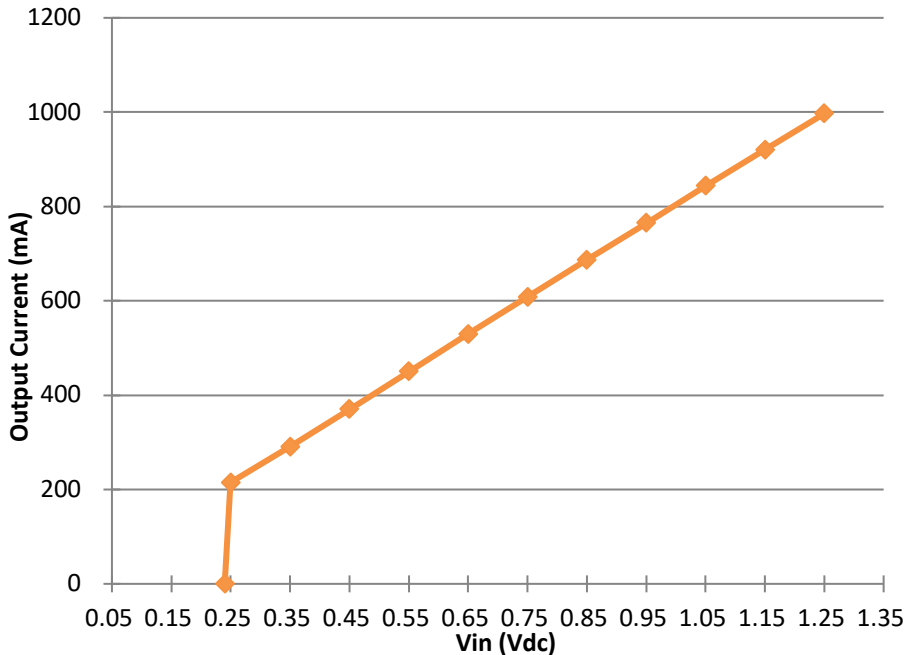
Efficiency vs Vin

Efficiency vs. Input Voltage



Output Current Vs VADJ

Output Current vs. VADJ



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