

2.1A 100KHz 90V Buck DC to DC Converter**XL7056****Features**

- Operation Voltage from 8V to 80V
- Maximum Duty Cycle up to 85%
- Minimum Drop Out 2.0V
- Adjust VOUT from 1.25V to 20V
- Max. IOUT=2.1A at VOUT=5V
- Max. IOUT=1.2A at VOUT=15V
- Fixed 100KHz Switching Frequency
- Max. Output power less than 20W
- Internal Optimize HV Power MOSFET
- High efficiency up to 93%
- Excellent line and load regulation
- Built in current limit function
- Built in output short Protection Function
- TO263-7L package

General Description

The XL7056 is a 100KHz fixed frequency PWM buck (step-down) DC/DC converter, capable of driving a 2.1A load with high efficiency, low ripple and excellent line and load regulation. Requiring a minimum number of external components, the regulator is simple to use and include internal frequency compensation and a fixed-frequency oscillator.

The PWM control circuit is able to adjust the duty ratio linearly from 0 to 85%.

Applications

- Ebike Controller Power Supply
- Telecom / Networking Equipment

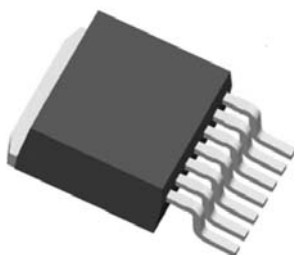


Figure1. Package Type of XL7056

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Pin Configurations

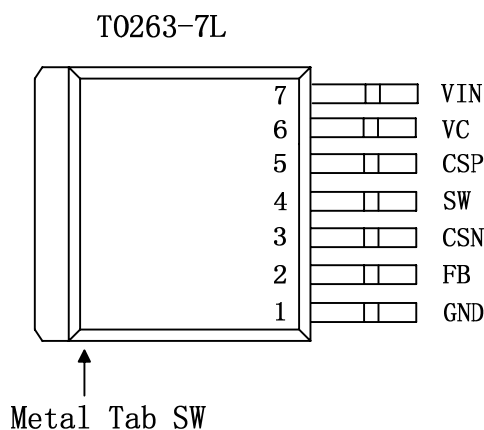


Figure2. Pin Configuration of XL7056 (Top View)

Table 1 Pin Description

Pin Number	Pin Name	Description
1	GND	Ground Pin. Care must be taken in layout. This pin should be placed outside of the Schottky Diode to output capacitor ground path to prevent switching current spikes from inducing voltage noise into XL7056.
2	FB	Feedback Pin (FB). Through an external resistor divider network, Feedback senses the output voltage and regulates it. The feedback threshold voltage is 1.25V.
3	CSN	Current Sense Negative Terminal.
4	SW	Power Switch Output Pin (SW). Output is the switch node that supplies power to the output. The Metal is SW.
5	CSP	Current Sense Positive Terminal.
6	VC	Internal Voltage Regulator Bypass Capacity. In typical system application, The VC pin connect a 1uF capacitor to VIN.
7	VIN	Supply Voltage Input Pin. XL7056 operates from 8V to 80V DC voltage. Bypass Vin to GND with a suitably large capacitor to eliminate noise on the input.

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Function Block

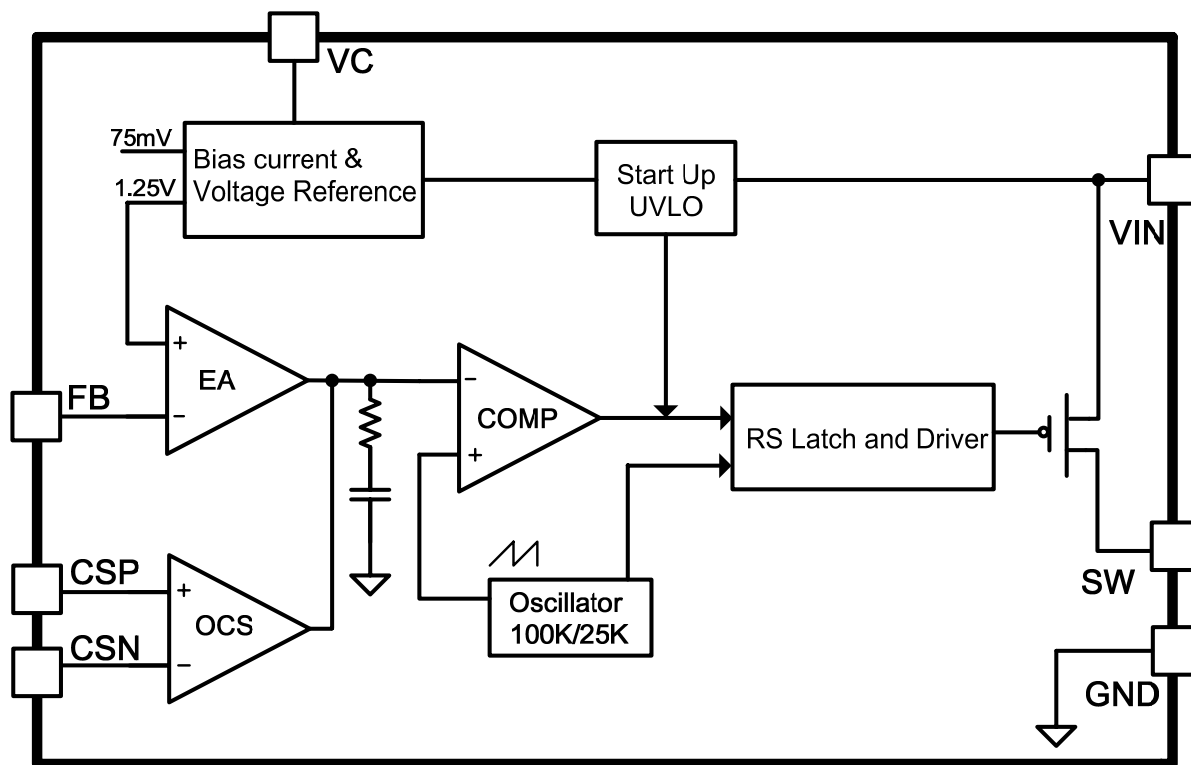
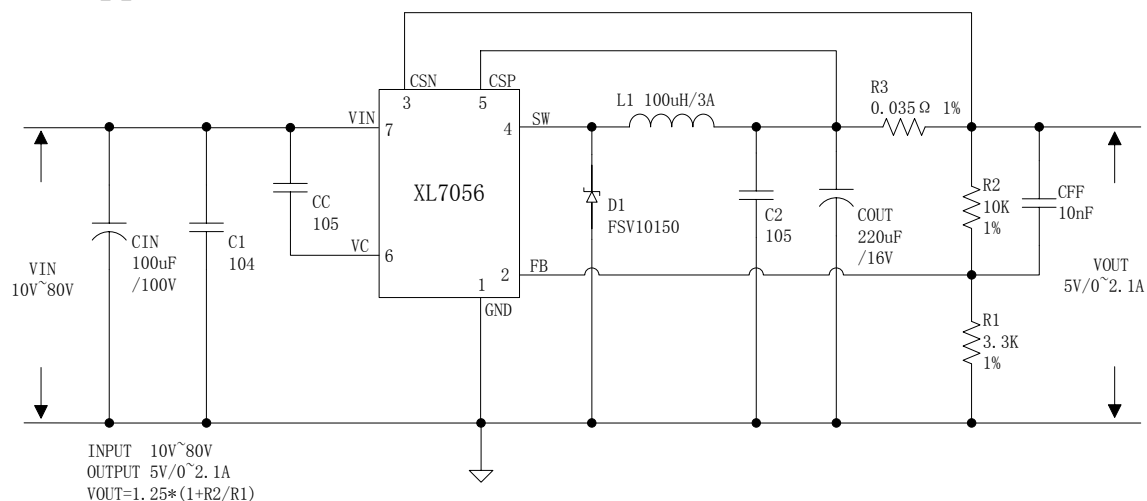


Figure3. Function Block Diagram of XL7056

Typical Application Circuit



R3 for limit maximum output current, R3 choose 0.035ohm in $V_{OUT} \leq 5V$ application; R3 choose 0.055ohm in $V_{OUT} > 5V$ application.

Figure4. XL7056 Typical Application Circuit

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Ordering Information

Order Information	Marking ID	Package Type	Packing Type Supplied As
XL7056E1	XL7056E1	TO263-7L	800 Units on Tape & Reel

XLSEMI Pb-free products, as designated with “E1” suffix in the par number, are RoHS compliant.

Absolute Maximum Ratings (Note1)

Parameter	Symbol	Value	Unit
VIN Pin Voltage	V_{IN}	-0.3 to 90	V
FB Pin Voltage	V_{FB}	-0.3 to 5	V
SW Pin Voltage	V_{SW}	-0.3 to VIN	V
Power Dissipation	P_D	Internally limited	mW
Thermal Resistance (TO263-7L) (Junction to Ambient, No Heatsink, Free Air)	R_{JA}	30	°C/W
Maximum Junction Temperature	T_J	-40 to 150	°C
Operating Junction Temperature	T_J	-40 to 125	°C
Storage Temperature	T_{STG}	-65 to 150	°C
Lead Temperature (Soldering, 10 sec)	T_{LEAD}	260	°C
ESD (HBM)		>3000	V

Note1: Stresses greater than those listed under Maximum Ratings may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operation is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

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XL7056 Electrical Characteristics
 $T_a = 25^{\circ}\text{C}$; unless otherwise specified.

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
<i>System parameters test circuit figure4</i>						
VFB	FB Voltage	$V_{in}=20\text{V to }80\text{V}, V_{out}=15\text{V}$ $I_{load}=0.5\text{A}$	1.225	1.25	1.275	V
η	Efficiency	$V_{in}=24\text{V}, V_{out}=15\text{V}$ $I_{out}=1.2\text{A}$	-	95	-	%
η	Efficiency	$V_{in}=36\text{V}, V_{out}=15\text{V}$ $I_{out}=1.2\text{A}$	-	94	-	%
η	Efficiency	$V_{in}=48\text{V}, V_{out}=15\text{V}$ $I_{out}=1.2\text{A}$	-	93	-	%
η	Efficiency	$V_{in}=60\text{V}, V_{out}=15\text{V}$ $I_{out}=1.2\text{A}$	-	92	-	%
η	Efficiency	$V_{in}=72\text{V}, V_{out}=15\text{V}$ $I_{out}=1.2\text{A}$	-	91	-	%

Electrical Characteristics (DC Parameters)
 $V_{in} = 48\text{V}$, $GND=0\text{V}$, V_{in} & GND parallel connect a $47\mu\text{f}/100\text{V}$ capacitor; $I_{out}=0.2\text{A}$, $T_a = 25^{\circ}\text{C}$; the others floating unless otherwise specified.

Parameters	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input operation voltage	V_{in}				80	V
VIN UVLO	V_{in_uvlo}			6		V
Quiescent Supply Current	I_q	$V_{FB}=2\text{V}$		2.1	5	mA
Oscillator Frequency	F_{osc}		75	100	135	KHz
Switch Current Limit	I_L	$V_{FB}=0$, $R_3=0.035\ \Omega$		2.3		A
Output Power PMOS	R_{dson}	$V_{IN}=48\text{V}$, $I_{SW}=1.0\text{A}$			260	mohm

Typical Performance Characteristics

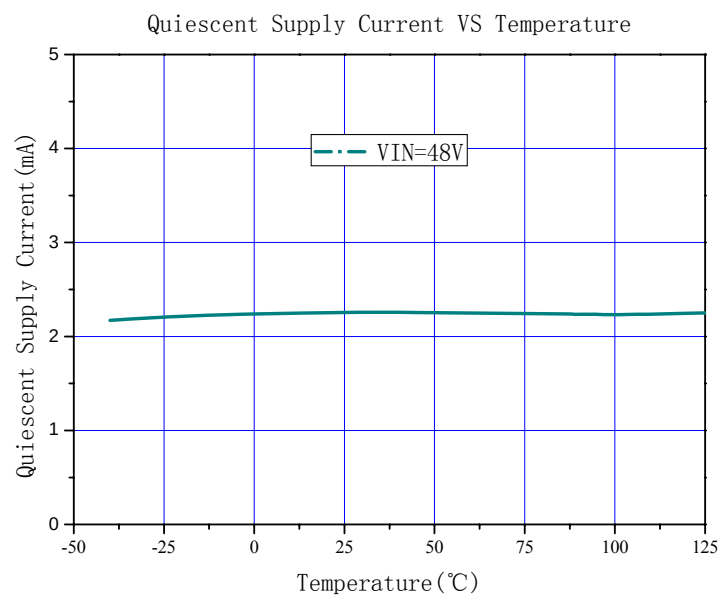


Figure5. Quiescent Current Curve

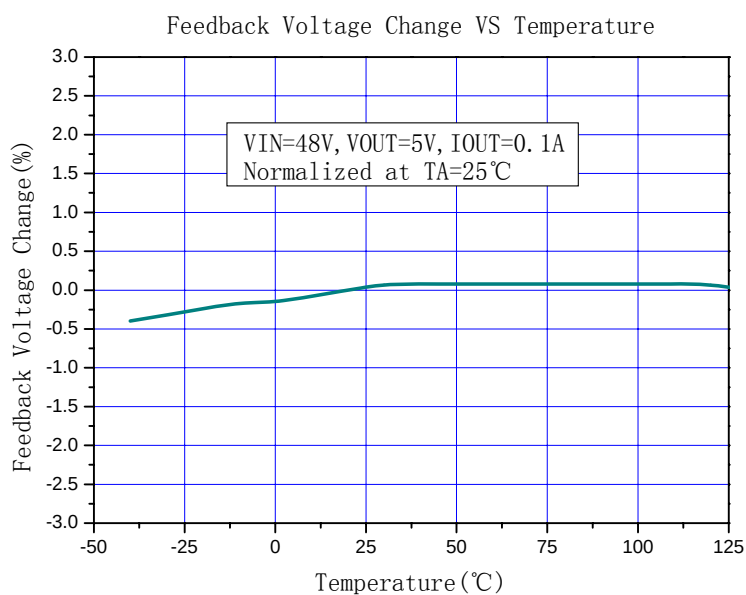


Figure6. Feedback Voltage Curve

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Typical System Application (VOUT=15V, IOU=0~1.2A)

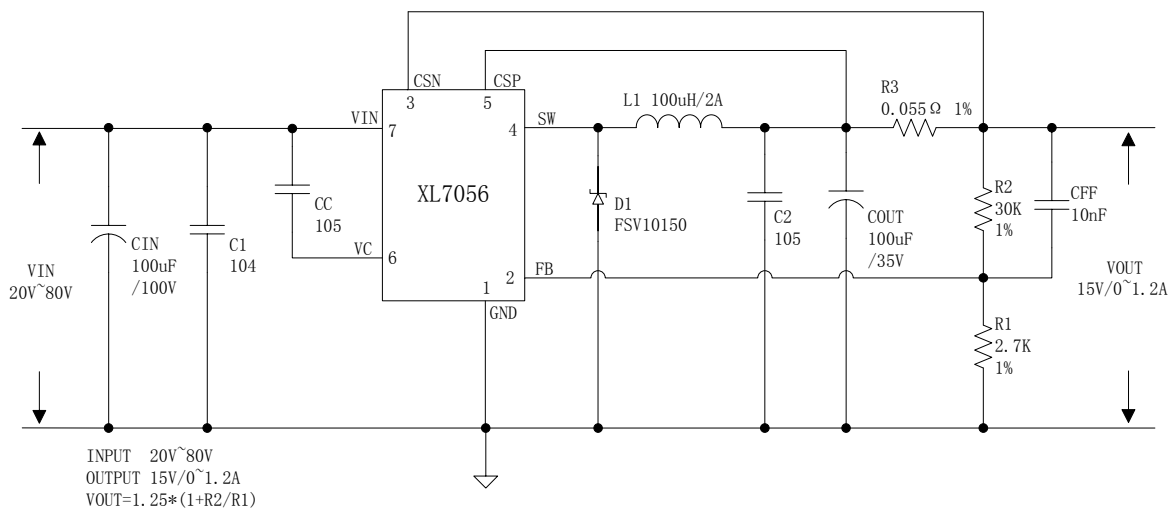


Figure7. XL7056 System Application (VIN=20V~80V, VOUT=15V, IOU=0~1.2A)

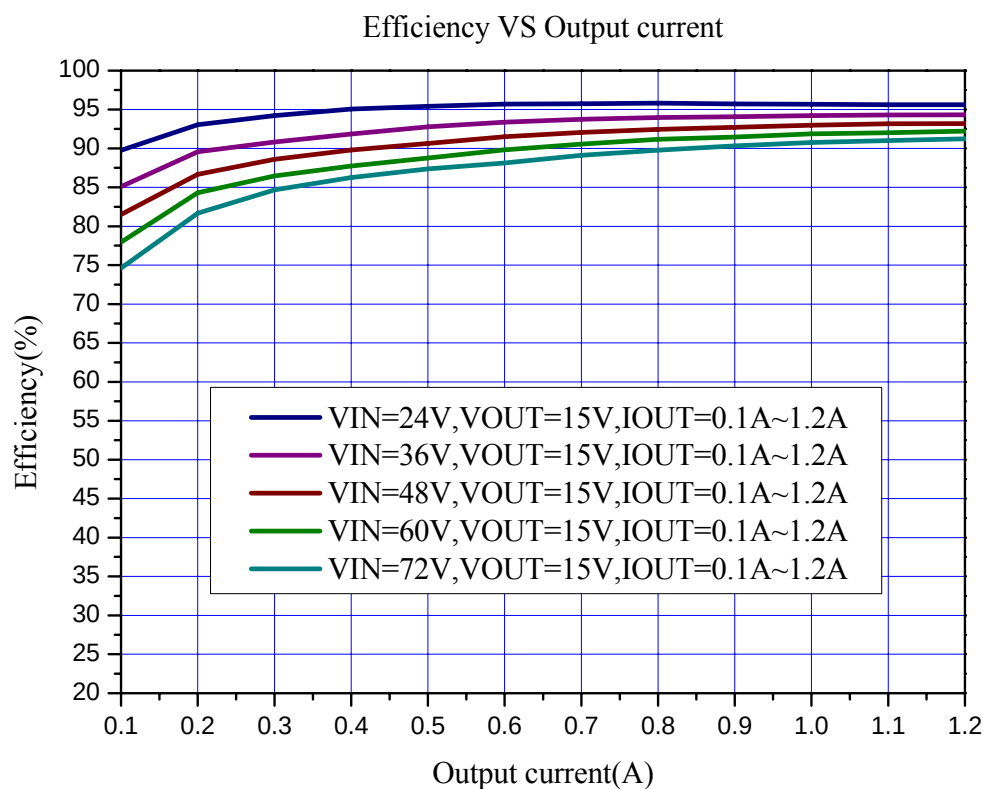


Figure8. XL7056 System Application (Efficiency VS Output Current)

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Typical System Application (VOUT=5V, IOU=0~2.1A)

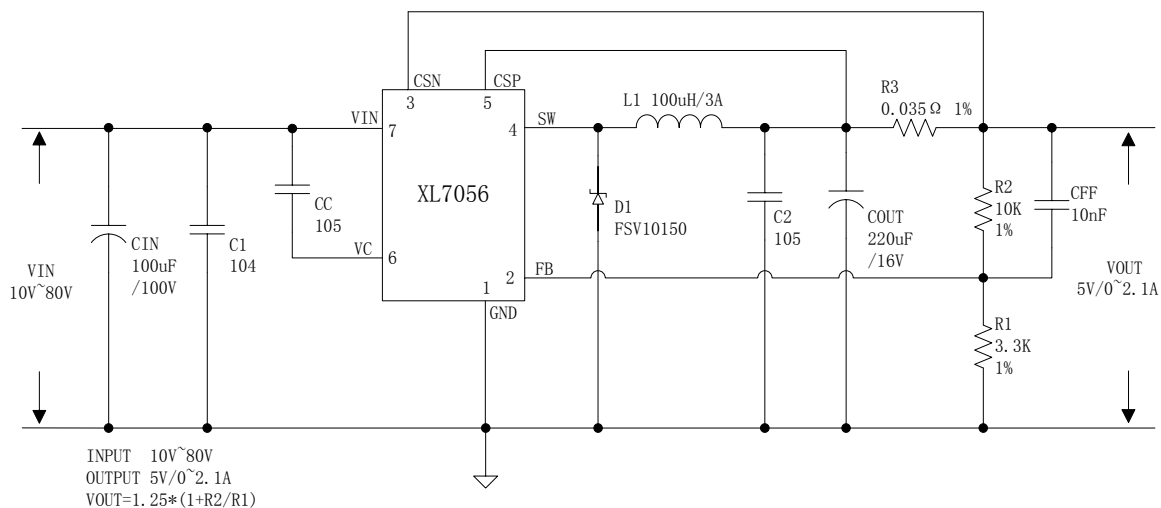


Figure9. XL7056 System Application (VIN=10V~80V, VOUT=5V, IOU=0~2.1A)

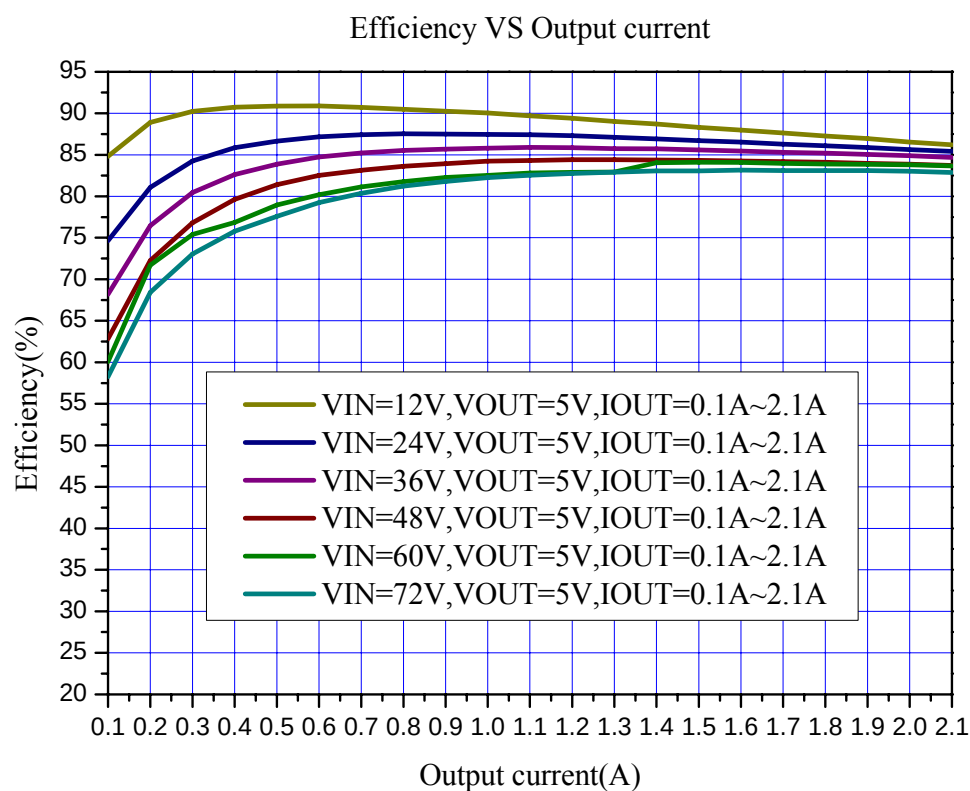


Figure10. XL7056 System Application (Efficiency VS Output Current)

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Typical System Application (VOUT=3.3V, IOU=0~2.1A)

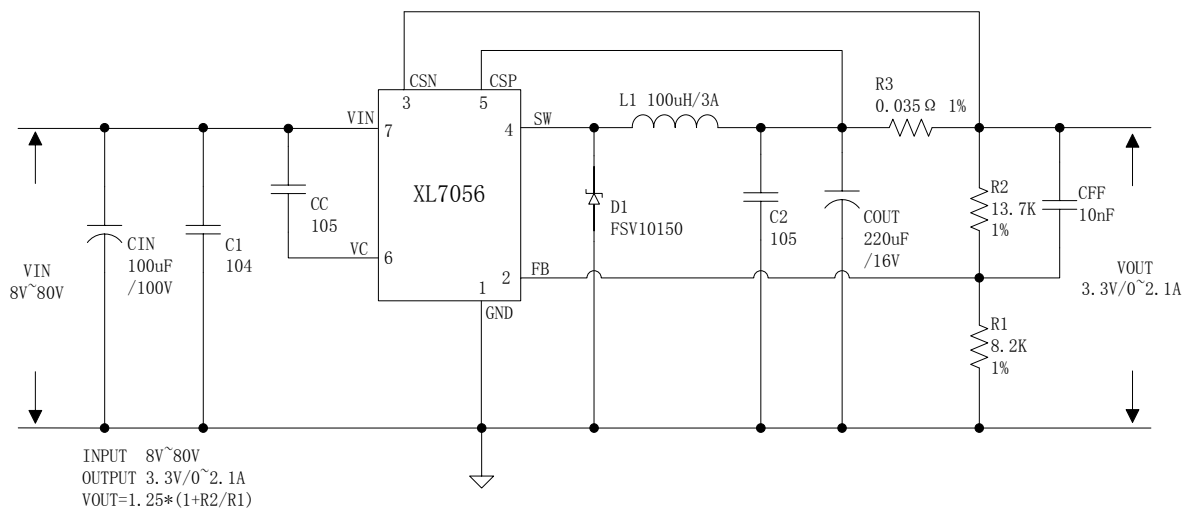


Figure11. XL7056 System Application (VIN=8V~80V, VOUT=3.3V, IOU=0~2.1A)

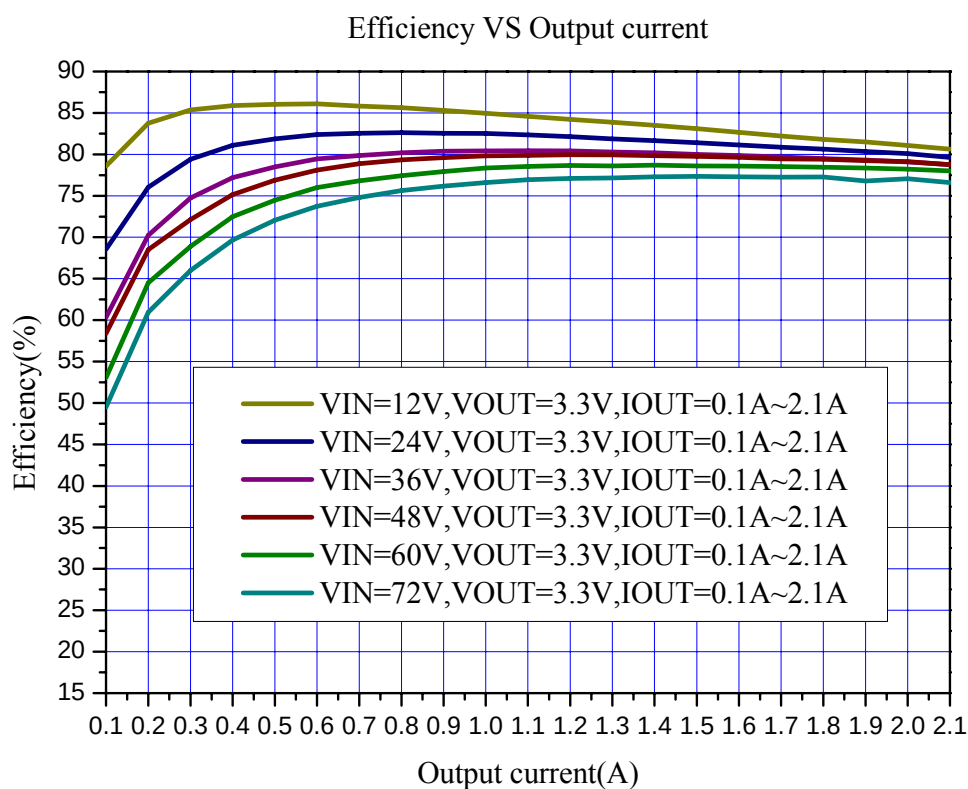
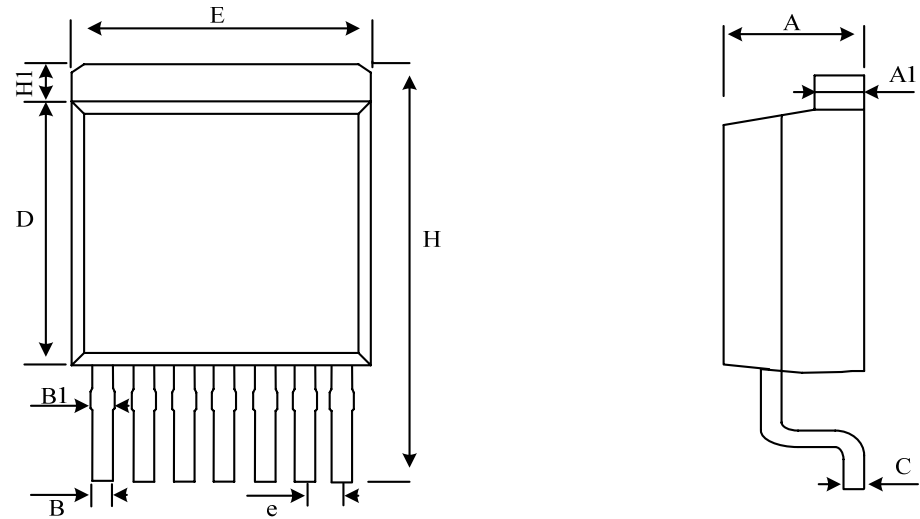


Figure12. XL7056 System Application (Efficiency VS Output Current)

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Package Information

Package Information (TO263-7L)



字符	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.25	4.55	0.167	0.179
A1	1.20	1.40	0.047	0.055
B	0.50	0.70	0.020	0.028
B1	0.58	0.84	0.023	0.033
C	0.40	0.60	0.016	0.024
D	9.05	9.45	0.356	0.372
E	9.80	10.20	0.386	0.402
e	1.27 (BSC)		0.050 (BSC)	
H	14.65	15.35	0.577	0.604
H1	0.80	1.20	0.031	0.047

2.1A 100KHz 90V Buck DC to DC Converter**XL7056****Important Notice**

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For the latest product information, go to www.xlsemi.com.