

8A 180KHz 40V Buck DC to DC Converter

XL4016

Ordering Information

Order Information	Marking ID	Package Type	Packing Type Supplied As
XL4016E1	XL4016E1	TO220-5L	Tube

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

Absolute Maximum Ratings (Note1)

Parameter	Symbol	Value	Unit
Input Voltage	V_{in}	-0.3 to 45	V
Feedback Pin Voltage	V_{FB}	-0.3 to V_{in}	V
Output Switch Pin Voltage	V_{Output}	-0.3 to V_{in}	V
Power Dissipation	P_D	Internally limited	mW
Thermal Resistance (TO220-5L) (Junction to Ambient, No Heatsink, Free Air)	R_{JA}	30	°C/W
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)		>2000	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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XL4016 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	Feedback Voltage	$V_{in} = 8\text{V to } 40\text{V}, V_{out}=5\text{V}$ $I_{load}=0.5\text{A to } 8\text{A}$	1.225	1.25	1.275	V
Efficiency	η	$V_{in}=12\text{V}, V_{out}=5\text{V}$ $I_{out}=6\text{A}$	-	87	-	%
Efficiency	η	$V_{in}=24\text{V}, V_{out}=12\text{V}$ $I_{out}=6\text{A}$	-	93	-	%

Electrical Characteristics (DC Parameters)

$V_{in} = 12\text{V}$, $GND=0\text{V}$, V_{in} & GND parallel connect a 470uf/50V capacitor; $I_{out}=500\text{mA}$, $T_a = 25^\circ\text{C}$; the others floating unless otherwise specified.

Parameters	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input operation voltage	V_{in}		8		40	V
Quiescent Supply Current	I_q	$V_{FB} = V_{in}$		2.1	5	mA
Oscillator Frequency	F_{osc}		144	180	216	KHz
Output Short Frequency	F_{osp}			48		KHz
Switch Current Limit	I_L	$V_{FB} = 0$		10		A
Max. Duty Cycle	D_{MAX}	$V_{FB}=0\text{V}$		100		%
Output Power PMOS	R_{dson}	$V_{FB}=0\text{V}, V_{in}=12\text{V},$ $I_{SW}=8\text{A}$		40	50	mohm
V_{in} Over Voltage Protection	OVP			45		V

Typical System Application (VOUT=5V/8A)

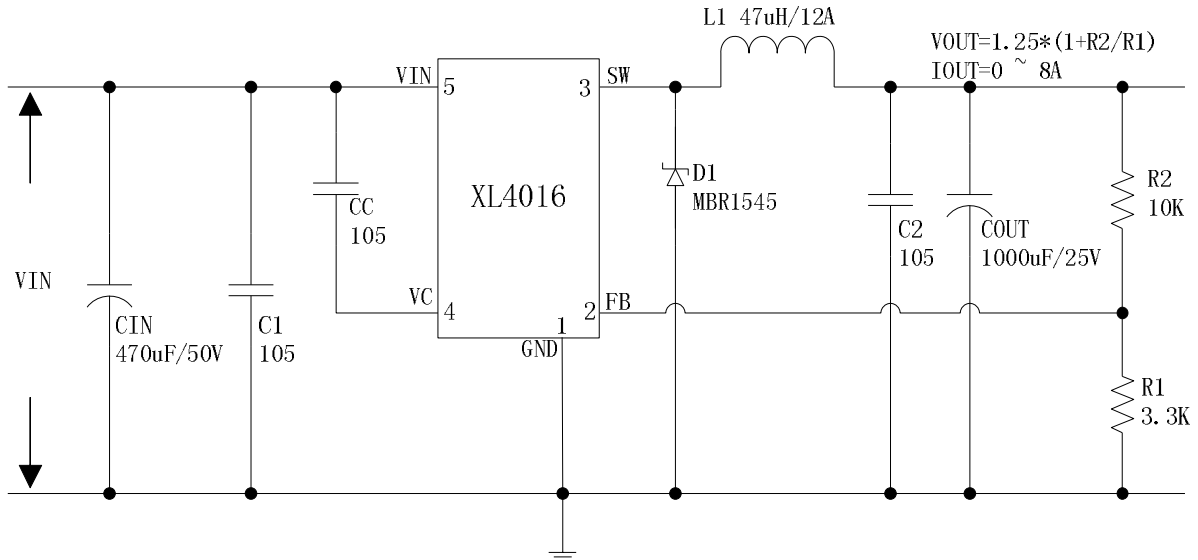


Figure5. XL4016 System Parameters Test Circuit (VIN=8V~40V, VOUT=5V/8A)

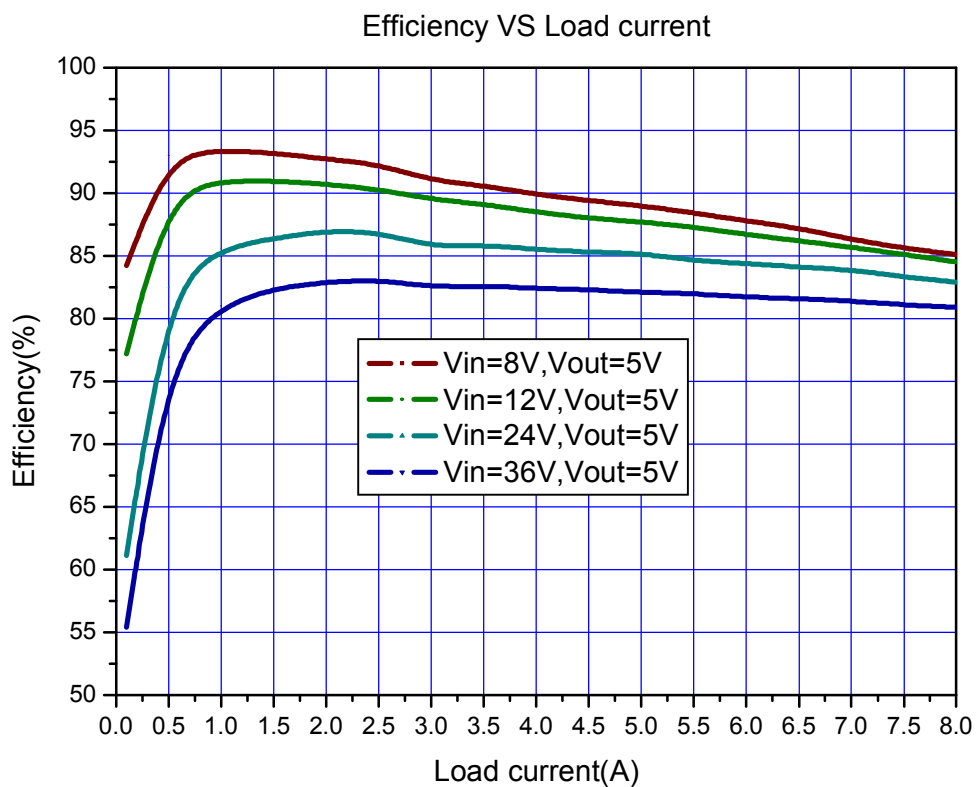


Figure6. XL4016 System Efficiency Curve

Typical System Application (VOUT=12V/6A)

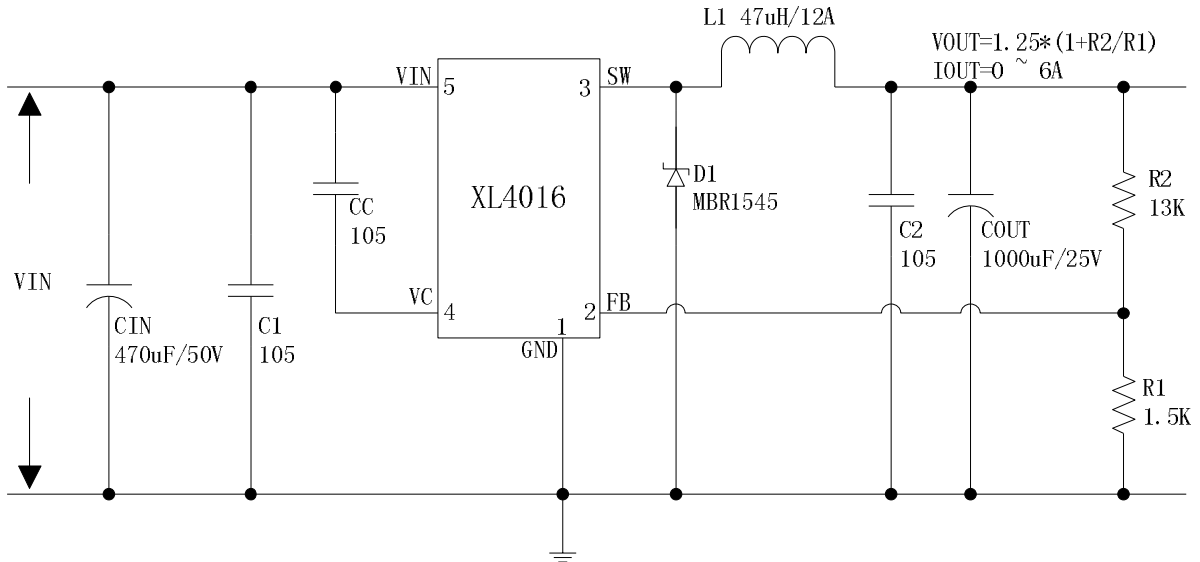


Figure7. XL4016 System Parameters Test Circuit (VIN=15V~40V, VOUT=12V/6A)

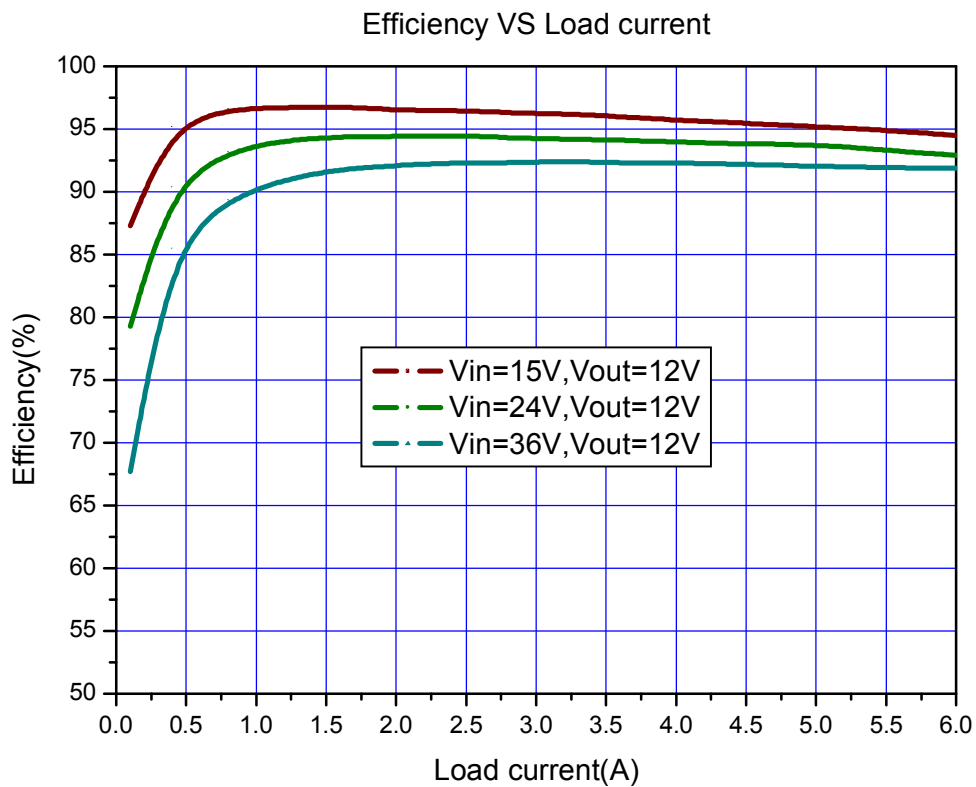


Figure8. XL4016 System Efficiency Curve

Typical System Application (TTL shutdown function)

Logic level signals shutdown function can be used in typical system application with external components. When the TTL high voltage above 3.3V (referenced to ground, lower than VIN), the converter will shutdown, input current less than 5mA; when the TTL Low voltage below 0.8V (referenced to ground), the converter will turn on.

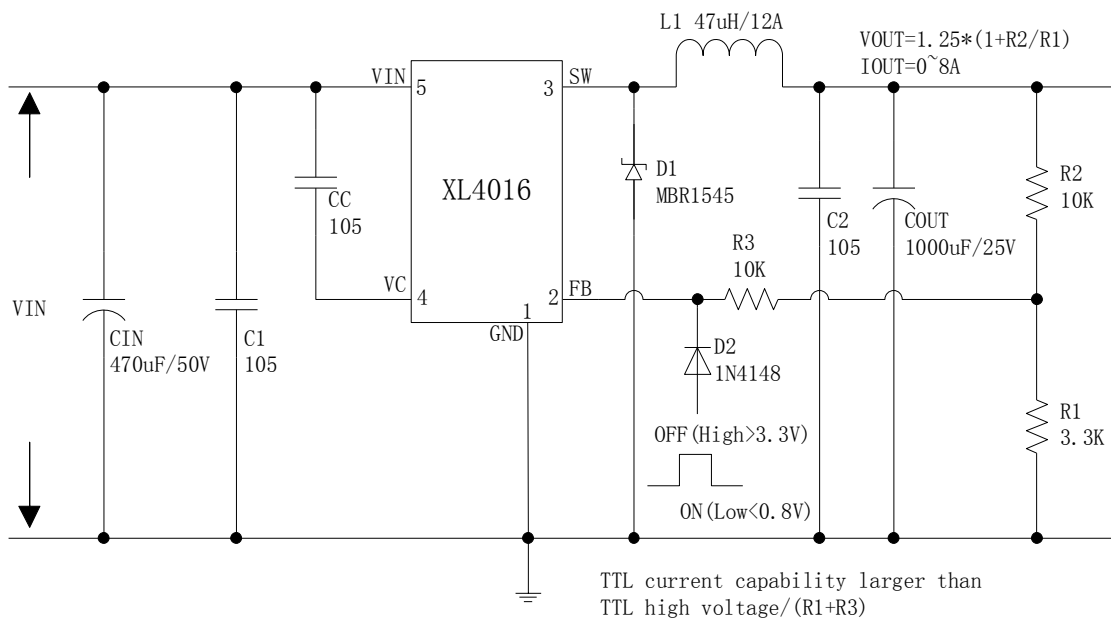


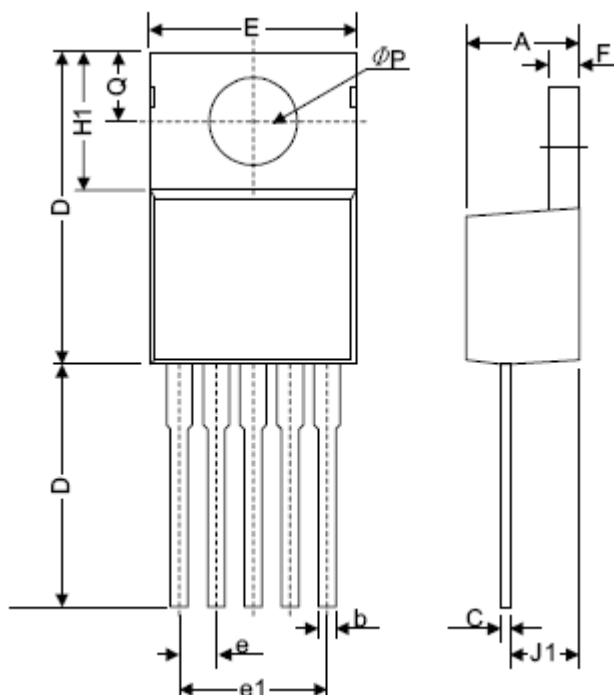
Figure9. XL4016 Typical Application Circuit

Schottky Diode Selection Table

Current	Surface Mount	Through Hole	VR (The same as system maximum input voltage)				
			20V	30V	40V	50V	60V
1A		✓	1N5817	1N5818	1N5819		
3A		✓	1N5820	1N5821	1N5822		
		✓	MBR320	MBR330	MBR340	MBR350	MBR360
	✓		SK32	SK33	SK34	SK35	SK36
	✓			30WQ03	30WQ04	30WQ05	
		✓		31DQ03	31DQ04	31DQ05	
		✓	SR302	SR303	SR304	SR305	SR306
5A		✓	1N5823	1N5824	1N5825		
		✓	SR502	SR503	SR504	SR505	SR506
		✓	SB520	SB530	SB540	SB550	SB560
	✓			50WQ03	50WQ04	50WQ05	
8A		✓	SR820	SR830	SR840	SR850	SR860
16A		✓	SR1620	SR1630	SR1640	SR1650	SR1660

Package Information

TO220-5L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.06	4.83	0.160	0.190
b	0.76	1.02	0.030	0.040
C	0.36	0.64	0.014	0.025
D	14.22	15.49	0.560	0.610
E	9.78	10.54	0.385	0.415
e	1.57	1.85	0.062	0.073
e(1)	6.68	6.93	0.263	0.273
F	1.14	1.40	0.045	0.055
H(1)	5.46	6.86	0.215	0.270
J(1)	2.29	3.18	0.090	0.125
L	13.21	14.73	0.520	0.580
ϕP	3.68	3.94	0.145	0.155
Q	2.54	2.92	0.100	0.115