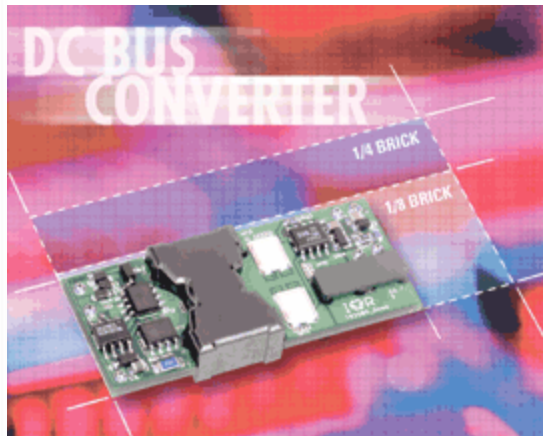


# myPower online Design Center

**Featuring the IR2085/6 Bus Converter**



<http://mypower.irf.com>

Prepared by:  
Dan Barsell

Design Services Applications Engineer

# Home page & login:

POWER TO LEAD

Welcome to MyPower  
International Rectifier's premier site for power design

## Power Factor Correction



PDF Guided Tour (413KB)  
Simple circuit design  
Calculate all part values  
Reduce PCB space 50%  
[Design a PFC Circuit](#)

## Synchronous Rectification



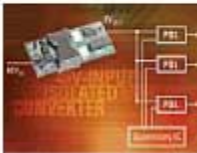
PDF Guided Tour  
Improve circuit efficiency  
Compare MOSFETs  
Calculate all part values  
[Design a Sync Rect Circuit](#)

## Point of Load



PDF Guided Tour 1.1MB  
Simulate iPower circuits  
Compare discrete MOSFETs  
Calculate efficiency and Tj  
[Design a PQL Circuit](#)

## Bus Converter



PDF Guided Tour 433KB  
Multiple Topologies  
Compare diodes  
Calculate efficiency  
[Design a BUS Converter](#)

## Motion Control



PDF Guided Tour 568KB  
Analyze performance  
Compare IGBT modules  
Calculate efficiency and Tj  
[Evaluate & Compare IPMs](#)

## Lighting



PDF Guided Tour  
Create Schematics  
Display output  
AC or DC input  
[Download the](#)

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	Motion Control

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# Bus Converters

POWER TO LEAD

## Calculated MOSFET power losses & junction temperatures & efficiency!

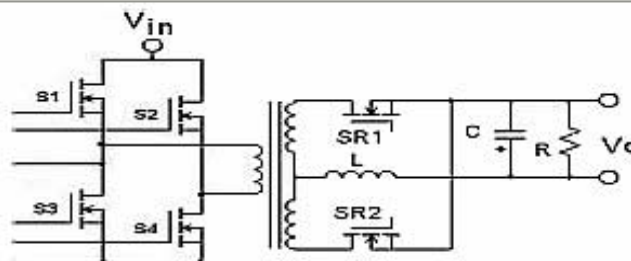


### MOSFET selection tools for Bus Converter circuits

These tools are used to evaluate and compare primary and secondary FET pairings in half-bridge, full bridge and forward converters. You will be able to simplify your search by sorting results.

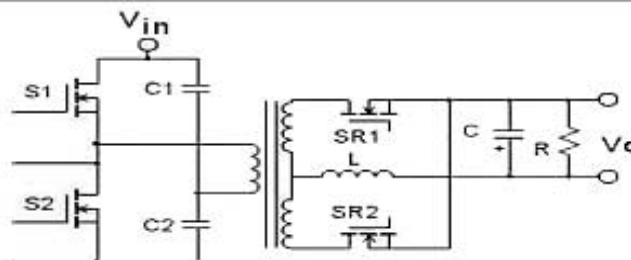
#### Full Bridge

Highest power conversion  
Isolated Output  
Low output ripple current  
Wide 36-72 VDC input range  
Up to 40 amps load current



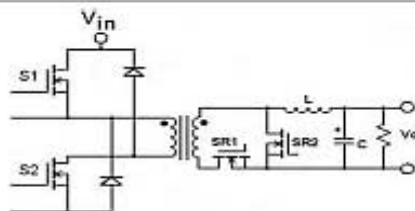
#### Half Bridge

Medium power conversion  
Isolated Output  
Low output ripple current  
Low parts count  
Wide 36-72 VDC input range  
Up to 30 amps load current



#### Forward Converter

Simple design  
Isolated Output  
Low parts count  
Wide 36-72 VDC input range  
Up to 30 amps load current



Design Tools  
available for  
Full Bridge,  
Half Bridge &  
Forward  
DC-DC Bus  
converters

# IR2085 & IR2086

POWER TO LEAD

## Enter Operating Conditions:

Below is a reference bus converter circuit diagram and corresponding input fields.

Set the input fields to match your application needs, then click the **GO** button.

We will list sets of HEXFET Power MOSFETs that best meet your needs, including highly accurate calculations of circuit efficiency, device power loss and junction temperature, as well as links to detailed device information.

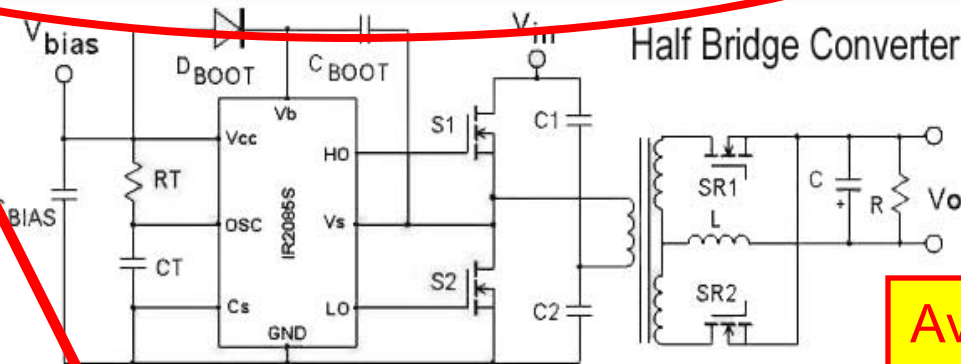
### Step 1: Enter Operating Conditions

V <sub>in</sub> : <input type="radio"/> 36-72 V	FET gate drive voltage: <input type="text" value="12"/> V ?	Inductor: <input type="text" value="1"/> uH ?	Ambient temp: <input type="text" value="45"/> °C ?
<input checked="" type="radio"/> 42-56 V ?	FET gate drive current: <input type="text" value="0.5"/> A ?	Inductor ESR: <input type="text" value="5"/> mOhm ?	Max PCB temp: <input type="text" value="105"/> °C ?
V <sub>out</sub> : <input type="text" value="8"/> V ?	Switching Frequency: <input type="text" value="220"/> kHz ?	Output Cap: <input type="text" value="100"/> uF ?	R <sub>th</sub> PWB to ambient: <input type="text" value="20"/> K/W ?
I <sub>out</sub> max: <input type="text" value="20"/> A ?	PCB Trace Resistance: <input type="text" value="1"/> mOhm ?	Capacitor ESR: <input type="text" value="10"/> mOhm ?	R <sub>th</sub> heatsink to ambient: <input type="text" value="200"/> K/W ?
			R <sub>th</sub> case to heatsink: <input type="text" value="4"/> K/W ?

Enter operating conditions here

### Step 2: See Recommendations **GO**

- Other Options
- RESET**
  - MOSFET DATA**
  - LIST**
  - SAVE DESIGN**
  - FAQ**
  - USER GUIDE**



Click mouse here to see recommendations

Available for Full Bridge, Half Bridge, Forward and Sync-Buck converters

# Bus Converter

POWER TO LEAD

## View Recommendations

We have found 3 sets of IR HEXFET Power MOSFETs that meet your needs.

Click on any IR part number to view data sheets, spice files, packaging information or availability. Use the arrows to sort on any parameter. Click on the power loss to see a detailed evaluation of an individual set. To order parts to start your prototype, use the 'Buy' button to add that pair to your shopping cart.

	IR P/N	$B_{Vdss}$	$I_D$ @25°C	Power Loss	$T_j$ (°C)	Efficiency	Package	Price*
	S1	<a href="#">IRF6668</a>	80 V	55 A	<a href="#">1.49 W</a>	104		1.34
	S2	<a href="#">IRF6668</a>	80 V	55 A	<a href="#">1.49 W</a>	104		1.34
	SR1	<a href="#">IRF6618</a>	30 V	150 A	<a href="#">1.21 W</a>	103	95.4 %	1.98
	SR2	<a href="#">IRF6618</a>	30 V	150 A	<a href="#">1.21 W</a>	103		1.98
	S1	<a href="#">IRF6668</a>	80 V	55 A	<a href="#">1.49 W</a>	104		1.34
	S2	<a href="#">IRF6668</a>	80 V	55 A	<a href="#">1.49 W</a>	104		1.34
	SR1	<a href="#">IRF6635</a>	30 V	180 A	<a href="#">1.24 W</a>	104	95.3 %	2.08
	SR2	<a href="#">IRF6635</a>	30 V	180 A	<a href="#">1.24 W</a>	104		2.08
	S1	<a href="#">IRF6668</a>	80 V	55 A	<a href="#">1.50 W</a>	106		1.34
	S2	<a href="#">IRF6668</a>	80 V	55 A	<a href="#">1.50 W</a>	106		1.34
	SR1	<a href="#">IRF6619</a>	20 V	150 A	<a href="#">1.30 W</a>	105	95.2 %	1.62
	SR2	<a href="#">IRF6619</a>	20 V	150 A	<a href="#">1.30 W</a>	105		1.62

\*note on pricing:

The price shown is in \$US, per FET, based on MSRP in 1K quantities.

[FAQ](#) [USER GUIDE](#) [BACK](#) [PRINT](#)

Here are the **Operating Conditions** you provided, for reference:

V in: <b>42-56 V</b>	FET gate drive voltage: <b>12 V</b>	Inductor: <b>1 uH</b>	Ambient temp: <b>45 oC</b>
V out: <b>8 V</b>	FET gate drive current: <b>0.5 A</b>	Inductor ESR: <b>5 mOhm</b>	Max PCB temp: <b>105 oC</b>
I out max: <b>26 A</b>	Switching Frequency: <b>220 kHz</b>	Output Cap: <b>100 uF</b>	Rth PWB to ambient: <b>20 K/W</b>
	PCB Trace Resistance: <b>1 mOhm</b>	Capacitor ESR: <b>10 mOhm</b>	Rth heatsink to ambient: <b>200 K/W</b>
			Rth case to heatsink: <b>4 K/W</b>

Results can be sorted by rated voltage, rated current, power loss, junction temperature, efficiency, package or price!

Details of power losses can be found by clicking here

# Bus Converter Details

POWER TO LEAD

## HALF BRIDGE CONVERTER PART SET DETAIL

ADD TO CART BACK

VIEW INPUT PDF

Summary: Total Power Losses <span>HELP</span>		
Component	Loss (W)	% of Total Power Loss
Control IC & Qg losses	0.232	2.29
Input Caps	0.368	3.64
Input Inductor	0.037	0.36
Output Caps	0.000	0.00
Output Inductors	3.380	33.44
Board Trace Impedance Loss	0.676	6.69
Primary FET Losses	2.986	29.54
SR FET Losses	2.430	24.04
<b>Total Power Loss</b>	<b>10.109</b>	<b>100.00</b>

FET Parameters (typ)	IRF6668	IRF6618
BVdss	80 V	30 V
ID@ 25 °C	55 A	150 A
Vgs	12 V	12 V
RDson @ Vgs	11.0 mOhm	1.4 mOhm
Qg	22 nC	43 nC
Qgs2	2 nC	4 nC
Qgd	7.8 nC	15.0 nC
Qoss	12.0 nC	28 nC
Qrr	40 nC	46 nC
Body Diode Vf @ 25°C	1.30 V	0.78 V
Package	DirectFET	DirectFET
Price**	\$1.34	\$1.98

Detailed: FET Power Losses Per Device		
Component	Loss (W)	% of Total Power Loss
<b>Primary FET: IRF6668</b>		
Conduction Loss*	0.543	5.37
Qg Gate Charge Losses	0.058	0.57
Switching Loss*	0.860	8.51
Output Loss*	0.032	0.31
<b>SR FET: IRF6618</b>		
Conduction Loss	0.590	5.84
Qg Gate Charge Losses	0.114	1.12
Reverse Rec. Loss*	0.081	0.80
Deadtime Loss	0.406	4.01
Output Loss*	0.025	0.24

\* Loss is dissipated in Primary FET

Summary: Other Key Parameters	
Total Circuit Efficiency	95.37 %
Primary FET Tj	104 °C
SR FET Tj	103 °C
IR2085 Tj	53 °C
PCB Temp	103 °C
Heatsink Temp	103 °C
P-P Inductor Ripple Current	0.7 A
P-P Output Voltage Ripple	7 mV

\*\*note on pricing:  
The price shown is in \$US, per FET, based on MSRP in 1K quantities.

- MOSFET parameters
- Losses in passives
- Circuit Efficiency
- Junction temperatures
- FET switching losses
- FET conduction losses