

GaN FET Selection Tool for Buck Converters User Guide

Overview

The GaN FET Selection Tool for buck converters is an enhanced product selection tool that uses estimation and calculation for a hard-switched buck converter. The objective of this selection tool is to help you find the best GaN FETs to fit your design needs.

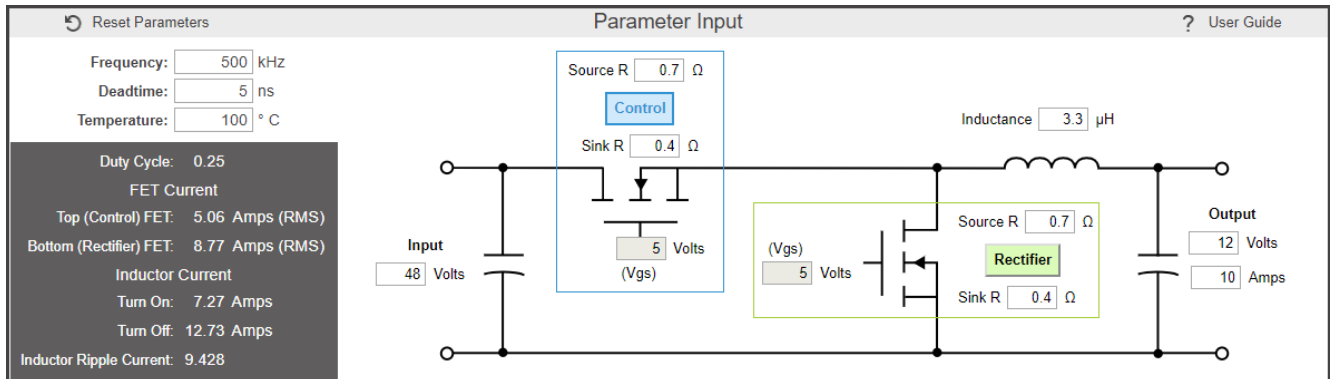
Operation

1. Converter parameters specific to your design specifications.
2. The calculator starts with default values. To return the parameter Input and table results to default values, click the “Reset Parameters” icon.
3. Control switch and Rectifier switch are calculated separately. The Control switch is the default, to switch to the Rectifier switch, click the **Rectifier** button, to change back to Control, press the **Control** button. The “Total Power (W)” column will be highlighted in light blue for the Control parameters and light green for Rectifier parameters.

Results

1. Power loss breakdown can be used to determine possible parameter tradeoffs.
2. Results are sorted by increasing power dissipation in the “Total Power (W)” column.
3. Results are power dissipation caused by the device. Some of the charge losses are dissipated in other components, such as Q_{oss} losses of the low-side are dissipated in the high-side, and some of the Q_G losses are dissipated in the gate driver.
4. The Gate driver is modeled as a resistance. The transient gate drive current is based on gate drive voltage minus gate plateau voltage divided by gate drive resistance plus R_G .

Buck Converter Tool Parameter Input Panel



Reset parameters – Reset Input Parameters and apply default values to calculations.

Frequency – Must be greater than 0

Deadtime – Must be greater than 0

Temperature – The devices thermal system must be applied to power dissipation to estimate junction temperature. Valid ranges are -55 ° C to 150 ° C. Default junction temperature is 100 ° C.

Duty Cycle – Automatically calculated by dividing the Output Voltage by the Input Voltage

FET Current, Amps RMS

Top (Control) FET – Control FET parameter automatically calculated by converter parameters.

Bottom (Rectifier) FET – Rectifier FET parameter automatically calculated by converter parameters.

Inductor Current, Amps (peak to peak)

Turn-on and turn-off current – Inductor current; automatically calculated by converter parameters

Inductor Ripple Current – Automatically calculated by converter parameters; verify ripple current and adjust output inductor if necessary. Changing circuit parameters changes the ripple current.

Inductance – Must be greater than 0

Input Voltage – As with all buck converters, V_{IN} must be higher than V_{OUT} .

Output Voltage -- As with all buck converters, V_{OUT} must be less than V_{IN} .

Gate Drives (for both control and rectifier switches)

Source R – Source Resistance in Ohms

Sink R – Sink Resistance in Ohms

Voltage – Gate drive voltage, defaults to 5 V.

Parallel dropdown selector – Drop down with range to 1 - 10, located in the Configuration column of the results table. Parallel devices may be calculated by varying the x number (i.e., x2 for 2 in

Single

parallel). Power dissipation for parallel devices is the total for all devices.

Parallel: x 1 ▼

Table Header Functions

Reset Table Save Table Filters Download Table **Top (Control) FET** Product Selector Guide

Reset Table – Resets the tables range selector and search filters.

Save Table Filters – Is a toggle button, which will save the tables range selectors and search filters until it is unselected. The values saved will reset when the “Reset Table” button is selected.

Download Table – download an Excel spreadsheet of the current calculated filtered table data and parameters.

Product Selector Guide– Download a pdf containing all of EPC product offerings, with their parameters.

Table Data Filtering

Part Number	Configuration	V _{DS}	R@100C (mΩ)	P _{ON} (W)	Q _{GD} (nC)	P _{SW (on)}	P _{SW (off)}	Q _G (nC)	P _{gate} (mW)	Q _{OSS} (nC)	P _{OSS} (mW)	Total Power (W)	Efficiency η (%)	Package (mm)	Buy eGaN FETs & ICs
		350 120	3300 0	100 0	3.4 0	100 0	100 0	19 0	100 0	90 0	100 0	100 0	100 0	15 0	
EPC2010C	Single Parallel: x 1	200	27.00	0.418	0.66	0.095	0.298	3.85	9.63	35.2	704	1.525	98.75	LGA 3.6 x 1.6	Buy Now
EPC2050	Single Parallel: x 1	350	60.06	0.930	0.34	0.044	0.129	3.55	8.88	32.6	652	1.763	98.55	BGA 1.95 x 1.95	Buy Now
EPC2034	Single Parallel: x 1	200	11.13	0.172	1.75	0.135	0.404	9.23	23.07	66.0	1320	2.054	98.32	BGA 4.6 x 2.6	Buy Now

Part Number input – Enter a part number or partial number to display parts containing that value. For example, “EPC21” will show all of the EPC2100 series parts.

Configuration – Filter the table based on the FET configuration type

Range sliders – narrow down value ranges with selector handles. The values could reset when parameters are on the Parameter Input panel. Not all ranges will be available on the mobile version.

Note: Table parameters are scaled for the inputted converter conditions. For device parameters please refer to the datasheet.

Calculations and Final Note

While we strive to provide the best data calculations possible, EPC is not responsible for errors in the results. Refer to FET datasheet for accurate part parameters to calculate and verify component power dissipation.

If you have any questions or notice an anomaly, please contact EPC at info@epc-co.com.