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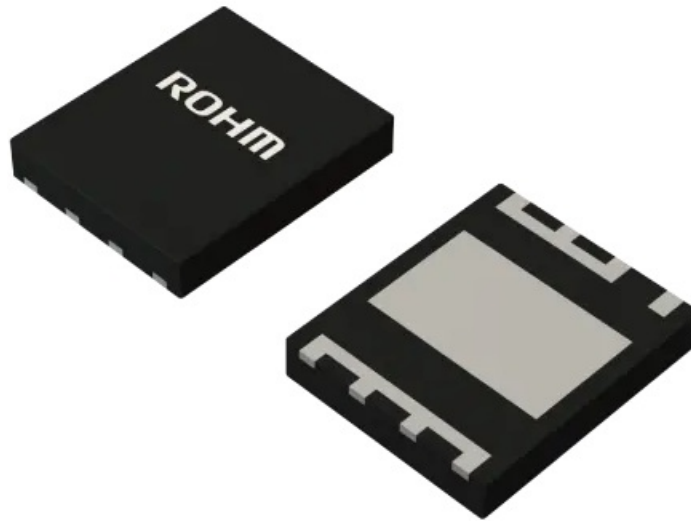
67UG092E
GaN
Enhancement
Mode Power
Transistor

ROHM 67UG092E GaN Enhancement Mode Power Transistor User Guide

Contents

ROHM 67UG092E GaN Enhancement Mode Power Transistor

Specifications

- **Product Name:** ROHM Solution Simulator – GaN Enhancement Mode Power Transistor
- **Simulation Type:** Transient simulation of a Flyback Circuit
- **Features:** Customize parameters, observe node voltages, and pin currents

Product Usage Instructions

Simulation Schematic

- Refer to Figure 1 for the simulation schematic.

How to Simulate

- Configure simulation settings in the 'Simulation Settings' as shown in Figure 2. The default setup is provided in Table 1.

Simulation Conditions

- Refer to Table 2 for the list of simulation condition parameters.

GaN – HEMT Model Pins

- Check Table 3 for the pins used in the simulation and their descriptions.

Peripheral Components

- Table 4 lists the components used in the circuit with default values and variable ranges.

Selectable Devices

- Table 5 displays the selectable devices available for components D1, D2, and Q1.

GaN Flyback Circuit Transient Simulation

This circuit simulates the transient simulation of a Flyback Circuit using GaN Enhancement Mode Power Transistors. You can observe the node voltages and pin currents depending on the condition.
You can customize the parameters of the components shown in blue, such as Vi or peripheral components, and simulate the flyback circuit with the desired operating condition.

General Cautions

1. **Caution 1:** The values from the simulation results are not guaranteed. Please use these results as a guide for your design.
2. **Caution 2:** These model characteristics are specifically at Ta=100°C. Thus, the simulation result with temperature variances may significantly differ from the result with the one done at the actual application board (actual measurement).
3. **Caution 3:** Please refer to the Application note of GaNs for details of the technical information.
4. **Caution 4:** The characteristics may change depending on the actual board design, and ROHM strongly recommend double-checking those characteristics with the actual board where the chips will be mounted.
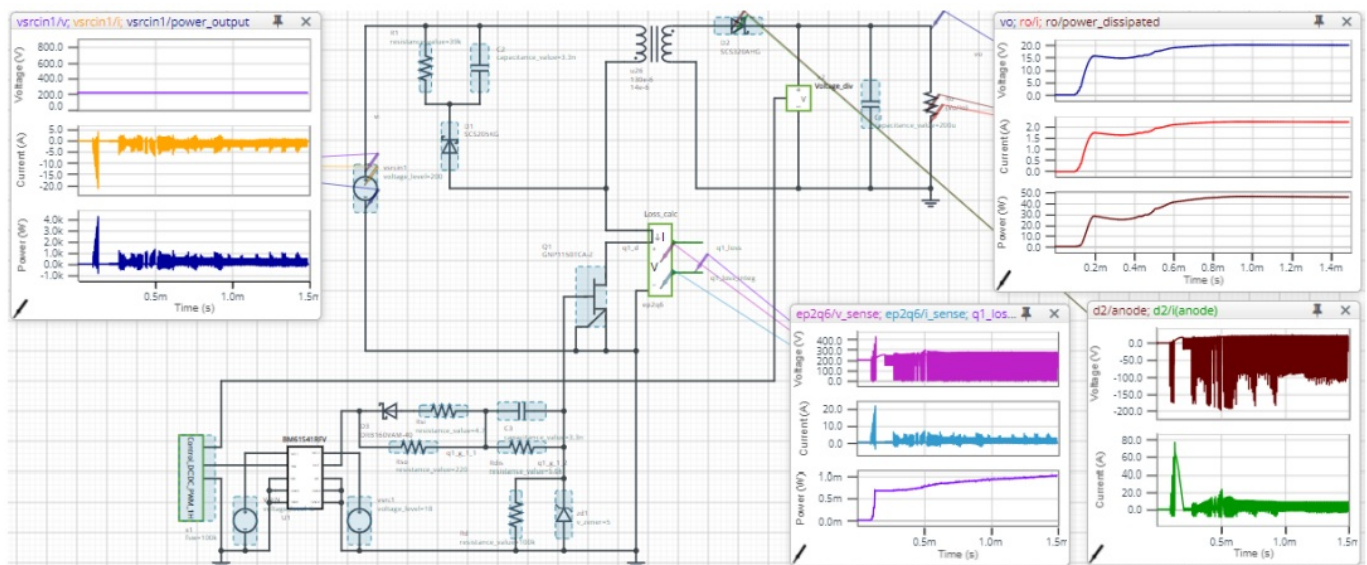
Simulation Schematic

Figure 1. Simulation Schematic

How to simulate

- The simulation settings, such as parameter sweep or convergence options, are configurable from the 'Simulation Settings' shown in Figure 2, and Table 1 shows the default setup of the simulation.
- In case of a simulation convergence issue, you can change advanced options to solve it. The temperature is set to 100 °C in the default statement in 'Manual Options. ' You can modify it.
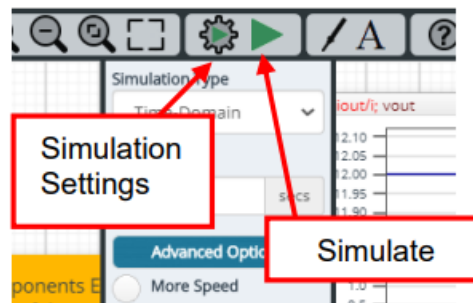
Figure 2. Simulation Settings and execution

Table 1. Simulation settings default setup

Parameters	Default		Note
Simulation Type	Time-Domain		Do not change Simulation Type
End Time	1.5 ms		–
Advanced options	Simulation Resolution		7e-5
	No other settings		–
Manual Options	.TEMP 100 .param Vo=20 Io=2.25 PI=3.14159265359 .RAMP dc 1m .option method=gear		Change TEMP if needed

Simulation Conditions

Table 2. List of the simulation condition parameters

Instance Name	Type	Parameters	Default Value	Variable Range		Unit
				Min	Max	
Vi	Voltage Source	Voltage_level	200	100	400	V
		AC_magnitude	0.0	fixed		V
		AC_phase	0.0	fixed		°
VS	Voltage Source	Voltage_level	18	10	20	V
		AC_magnitude	0.0	fixed		V
		AC_phase	0.0	fixed		°
VD	Voltage Source	Voltage_level	5	free		V
		AC_magnitude	0.0	fixed		V
		AC_phase	0.0	fixed		°
FSW	PWM Controller	fsw	100k	30k	300k	Hz
		Other parameters	–	fixed		–

GaN – HEMT model

- Table 3 shows the model pin function implemented.
- Note that the GaN – HEMT refers to GaN (Gallium Nitride) – HEMT (High Electron Mobility Transistor)

Table 3. GaN – HEMT model pins used for the simulation

Pin Name	Description
D	Drain
G	Gate
S	Source
KS	Kelvin Source

Peripheral Components

Bill of Materials

- Table 4 shows the list of components used in the schematic. You can modify the values of each component.

Table 4. List of components used in the simulation circuit

Type	Instance Name	Default Value	Variable Range		Units
			Min	**Max**	
Resistor	R1	39k	free		Ω
	Rsi	4.7	0.1	–	Ω
	Rso	220	0.1	–	Ω
	Rdis	5.6k	free		Ω
	Rd	100k	free		Ω
	Ro	Vo/Io	free		Ω
Capacitor	C1	200u	1u	2m	F
	C2	3.3n	1p	1m	F
	C3	3.3n	free		F
Devices	ZD1	Ideal Vz = 5V	fixed		–
	D3	DRB160VAM-40	fixed		–
	GDIC	BM61S41RFV-C	fixed		–
	D1 and D2	Selectable	See Table 5		–
	Q1	Selectable	See Table 5		–

Selectable Devices

Table 5 shows the list available in the selectable button in the components D1, D2 and Q1

Table 5. Selectable Devices list

Instance Name	Component	Product No.	Feature
D1 and D2	SiC SBD	SCS205KG (*)	1200V, 5A
		SCS206AG	650V, 6A
		SCS208AG	650V, 8A
		SCS210AG	650V, 10A
		SCS210KG	1200V, 10A
		SCS212AG	650V, 12A
		SCS215AG	650V, 15A
		SCS215KG	1200V, 15A
		SCS220AG	650V, 20A
		SCS220KG	1200V, 20A
		SCS302AHG	650V, 2A, High surge resistance
		SCS304AHG	650V, 4A, High surge resistance
		SCS306AHG	650V, 6A, High surge resistance
		SCS308AHG	650V, 8A, High surge resistance
		SCS310AHG	650V, 10A, High surge resistance
		SCS312AHG	650V, 12A, High surge resistance
		SCS315AHG	650V, 15A, High surge resistance
		SCS320AHG (**)	650V, 20A, High surge resistance
Q1	GaN-HEMT	GNP1070TC-Z (***)	650V, 70mΩ
		GNP1150TCA-Z	650V, 150mΩ

- **(*)** default for D1
- **(**)** default for D2
- **(***)** default for Q1

Recommended Products

GaN – HEMT

- **GNP1070TC-Z:** 650V 70mΩ GaN Enhancement Mode Power Transistor. **[Product] [Datasheet] [Buy]**
- **GNP1150TCA-Z:** 650V 150mΩ GaN Enhancement Mode Power Transistor. **[Product] [Datasheet] [Buy]**
- Technical Articles and Tools can be found in the Design Resources section on the product web page.

Notice

1. The information contained in this document is intended to introduce ROHM Group (hereafter referred to as

FAQ

- **Q: How do I customize component values in the simulation?**
  - **A:** You can modify the values of components listed in Table 4 to customize the simulation circuit.
- **Q: Can I change the simulation type?**
  - **A:** It is recommended not to change the simulation type. Refer to the manual for more information.
- **Q: What are the default setup parameters for simulation?**
  - **A:** The default setup parameters are provided in Table 1 under 'Simulation Settings.

Documents / Resources
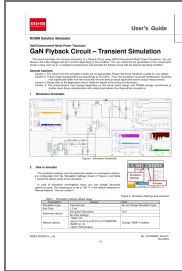
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References

- **[User Manual](#)**