



Comprehensive **Step-by-Step User Guide** for Infineon Gate Driver Recommendation Tool



Infineon Gate Driver Recommendation Tool

Key Features and Benefits



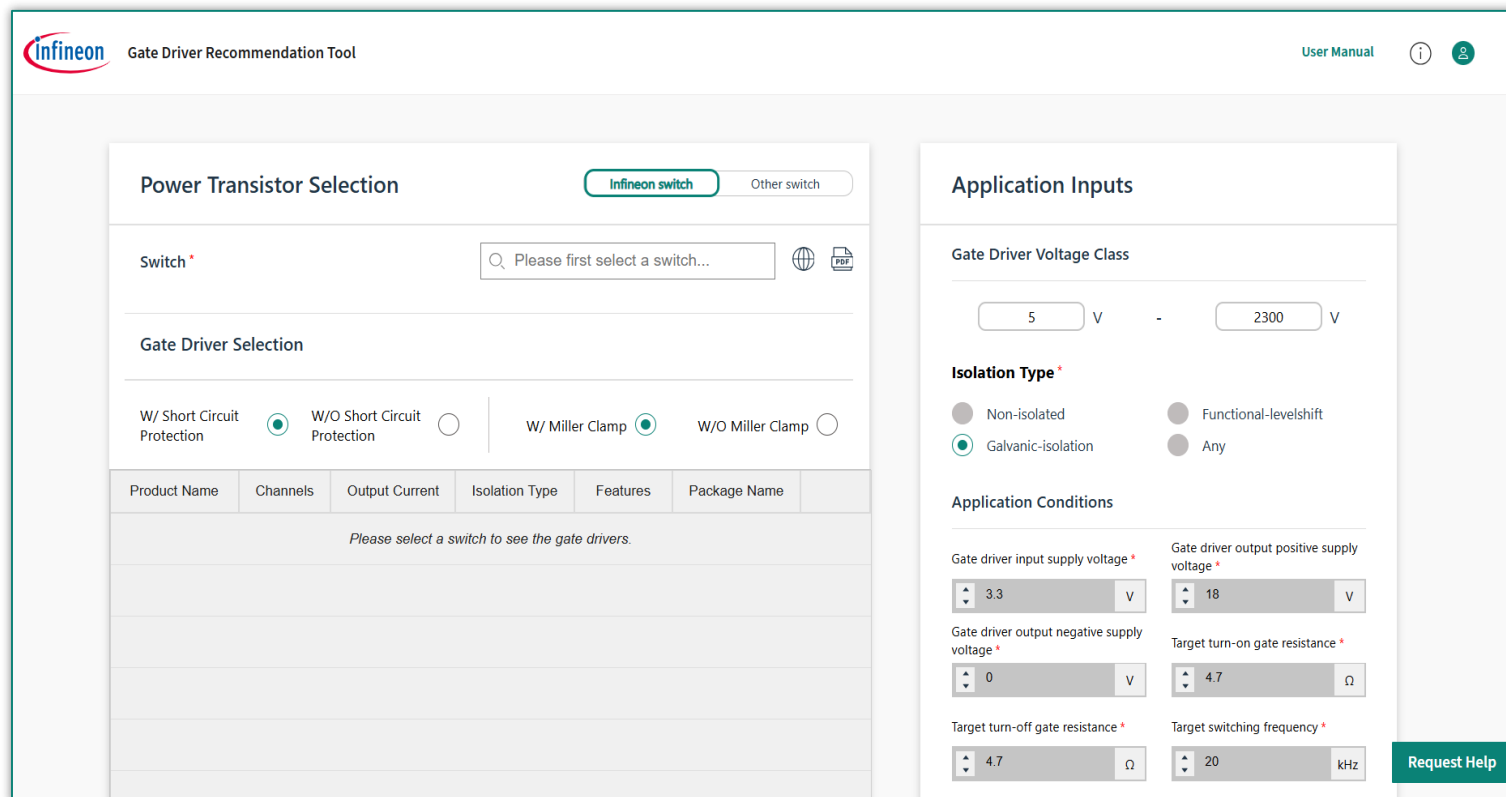
Comprehensive Analysis: Outputs critical electrical, thermal, and application-specific parameters



Simplified Navigation: Intuitive interface for both experienced engineers and new designers



Flexible Compatibility: Supports both Infineon and third-party switches via the **Other Switch** option



The screenshot shows the Infineon Gate Driver Recommendation Tool interface. It features a top navigation bar with the Infineon logo, the tool name, a 'User Manual' link, and user profile icons. The main content area is divided into two panels. The left panel, titled 'Power Transistor Selection', includes a 'Switch' dropdown menu (currently showing 'Please first select a switch...'), a 'Gate Driver Selection' section with radio buttons for 'W/ Short Circuit Protection' (selected), 'W/O Short Circuit Protection', 'W/ Miller Clamp' (selected), and 'W/O Miller Clamp', and a table with columns for Product Name, Channels, Output Current, Isolation Type, Features, and Package Name. The table currently displays a message: 'Please select a switch to see the gate drivers.' The right panel, titled 'Application Inputs', contains several input fields: 'Gate Driver Voltage Class' (5 V to 2300 V), 'Isolation Type' (Non-isolated, Galvanic-isolation selected, Functional-levelshift, Any), 'Application Conditions' (Gate driver input supply voltage: 3.3 V, Gate driver output positive supply voltage: 18 V, Gate driver output negative supply voltage: 0 V, Target turn-on gate resistance: 4.7 Ω, Target turn-off gate resistance: 4.7 Ω, Target switching frequency: 20 kHz), and a 'Request Help' button.

Allows designers not only to select the right gate driver based on switches, but also helps them perform firsthand technical analysis with a simple click.

Note: The calculated values are a preliminary estimation and should be verified by lab measurements.

Step 1: Understanding the Interface

The tool's interface is divided into four sections:

1

Power Transistor Selection

Define the power transistor type and gate driver selection criteria

Power Transistor Selection

Infineon switch Other switch

Switch *

Q, Please first select a switch...

Gate Driver Selection

W/ Short Circuit Protection

W/O Short Circuit Protection

W/ Miller Clamp

W/O Miller Clamp

Product Name	Channels	Output Current	Isolation Type	Features	Package Name
Please select a switch to see the gate drivers.					

2

Application Inputs

Provide inputs from the application to fine-tune the gate driver options

Application Inputs

Gate Driver Voltage Class

5

V

-

2300

V

Isolation Type *

Non-isolated

Galvanic-isolation

Functional-levelshift

Any

Application Conditions

Gate driver input supply voltage *

3.3

V

Gate driver output positive supply voltage *

18

V

Gate driver output negative supply voltage *

0

V

Target turn-on gate resistance *

4.7

Ω

Target turn-off gate resistance *

4.7

Ω

Target switching frequency *

20

kHz

Ambient temperature *

45

°C

3

Gate driver selection

View and select the list of suitable gate driver for the given selection

Power Transistor Selection

Infineon switch Other switch

Switch *

Q, A1MBG120R010M1

Gate Driver Selection

W/ Short Circuit Protection

W/O Short Circuit Protection

W/ Miller Clamp

W/O Miller Clamp

Product Name	Channels	Output Current	Isolation Type	Features	Package Name
☐ 1ED3321MC12N	1	8.5 A	Galvanic isolation - Reinforced	Miller clamp, Short Circuit Protection, Split output, Soft-off	PG-DSO-16
☐ 1ED3890MC12M	1	7.5 A	Galvanic isolation - Reinforced	Condition Monitoring, I2C, Miller clamp, Short Circuit Protection, So...	PG-DSO-16-33
☐ 1ED3141MU12F	1	6.5 A	Galvanic isolation - Functional	Split output	PG-DSO-8-72
☐ 1ED3142MU12F	1	6.5 A	Galvanic isolation - Functional	Split output	PG-DSO-8-72
☐ 1ED3121MU12H	1	5.5 A	Galvanic isolation - Functional	Split output	PG-DSO-8
☐ 1ED3122MC12H	1	9 A	Galvanic isolation - Reinforced	Miller clamp	PG-DSO-8
☐ 1ED3121MC12H	1	5.5 A	Galvanic isolation - Reinforced	Split output	PG-DSO-8

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Results

View the calculated peak current requirement, technical parameters of the selected gate driver and the power dissipation calculations

Peak source current

Peak sink current

Gate Driver Parameters from Datasheet

Results

Total gate circuit losses, P_{TOT}	-	mW
External gate resistance dissipation	-	mW
Turn-on Rg losses, $P_{ext,ON}(typ)$	-	mW
Turn-off Rg losses, $P_{ext,OFF}(typ)$	-	mW
Gate Driver IC dissipation	-	mW
Gate driver turn-on losses, $P_{GD,ON}(typ)$	-	mW
Gate driver turn-off losses, $P_{GD,OFF}(typ)$	-	mW
Gate driver input quiescent losses, $P_{GD,Q1}(max)$	-	mW
Gate driver output quiescent losses, $P_{GD,Q2}(max)$	-	mW
Total gate driver IC losses, $P_{GD,tot}(max)$	-	mW
Gate driver IC temperature rise	-	°K
Junction temperature rise, $\Delta T_j(typ)$	-	°K
Junction temperature, $T_j(typ)$	-	°C

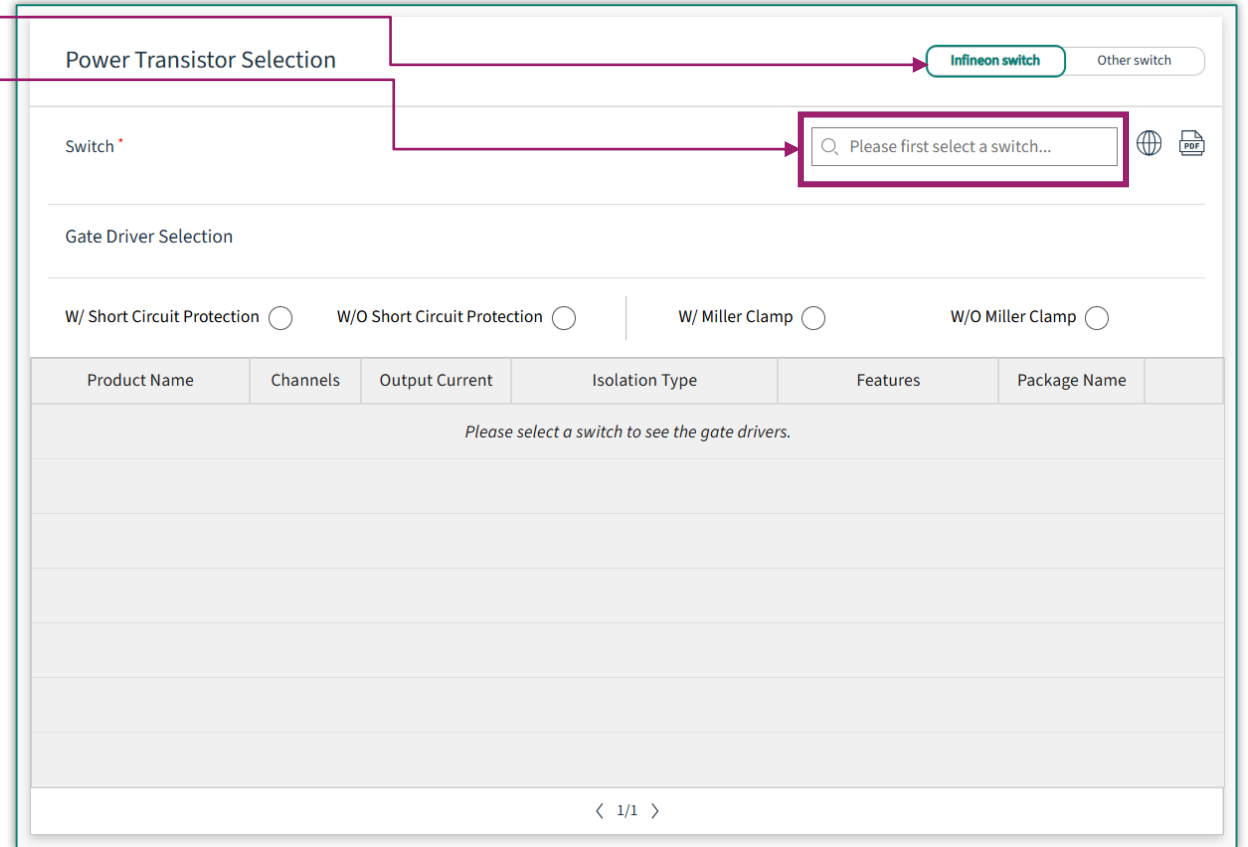
Step 2: Power Transistor Selection

Option1: Infineon switch

Default option: Infineon Switch

1. Search for the Infineon switch and select one from the available options
2. Select Gate Driver Features
 - Select the “with” or “without” Short Circuit Protection and/or Miller Clamp options according to your requirements

A list of relevant drivers will appear after providing inputs.



Note: If no options appear when searching for an Infineon switch, refresh the page and try again.

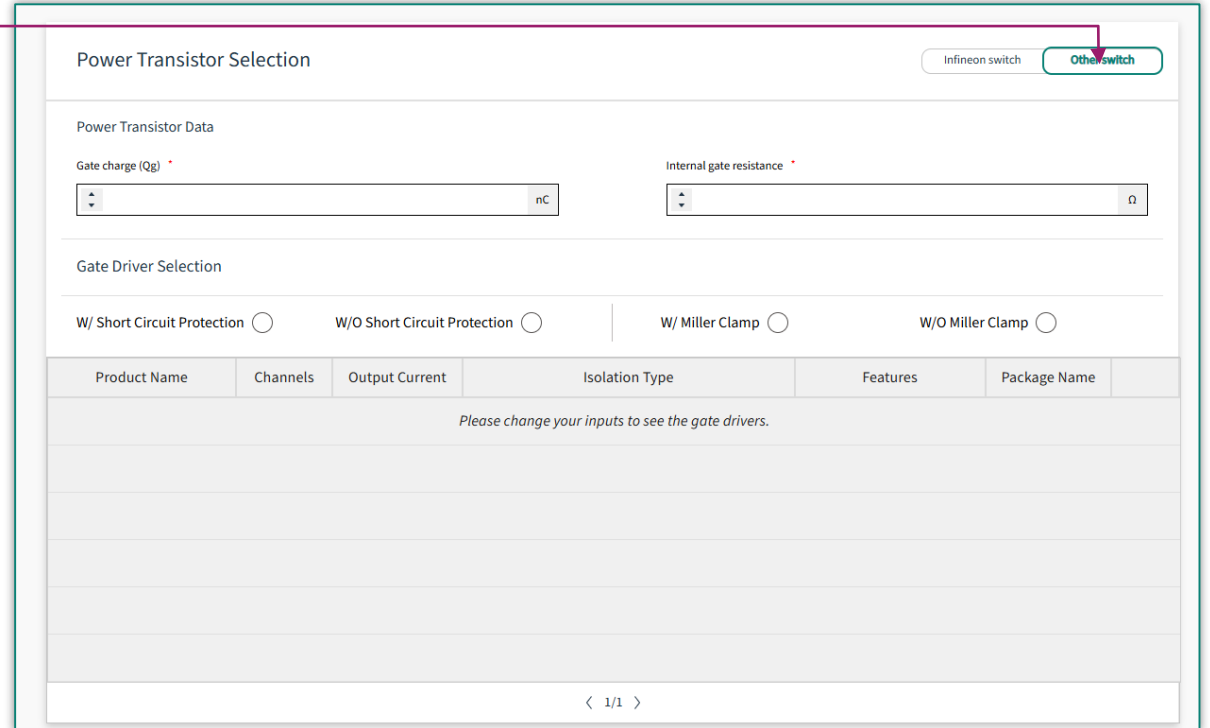
Step 2: Power Transistor Selection

Option2: Other switch

Default option: Other Switch

1. If the Infineon switch is unavailable, use *Other Switch* option
2. Input power transistor parameters: *Gate Charge (Qg)* and *Internal Gate Resistance (Rg)*. – Use switch datasheet to get these values
3. Select Gate Driver Features
 - Select the “with” or “without” Short Circuit Protection and/or Miller Clamp options according to your requirements

A list of relevant drivers will appear after providing inputs.



Power Transistor Selection

Infineon switch **Other switch**

Power Transistor Data

Gate charge (Qg) * nC

Internal gate resistance * Ω

Gate Driver Selection

W/ Short Circuit Protection ☐ W/O Short Circuit Protection ☐ | W/ Miller Clamp ☐ W/O Miller Clamp ☐

Product Name	Channels	Output Current	Isolation Type	Features	Package Name
Please change your inputs to see the gate drivers.					

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Step 3: Application Inputs

- **Voltage and Isolation**
 - Set the voltage range (e.g., **5V to 2300V**) for the driver
 - Select **Galvanic-isolation** (*only option currently available*)
- **Application Conditions**
 - Default values are loaded based on type of selected Infineon switch (SiC MOSFET, IGBT, MOSFET)
 - Update the values as needed to match your specific use case:
 - **Input and output supply voltages (V)**
 - **Turn-on and Turn-off Gate Resistance (Ω)**
 - **Switching Frequency (kHz) and Ambient Temperature ($^{\circ}\text{C}$)**

Application Inputs

Gate Driver Voltage Class

5

V

-

2300

V

Isolation Type *

Non-isolated

Functional-levelshift

☒ Galvanic-isolation

Any

Application Conditions

Gate driver input supply voltage *

3.3

V

Gate driver output positive supply voltage *

18

V

Gate driver output negative supply voltage *

0

V

Target turn-on gate resistance *

4.7

Ω

Target turn-off gate resistance *

4.7

Ω

Target switching frequency *

20

kHz

Ambient temperature *

45

$^{\circ}\text{C}$

Step 4: Gate driver selection

Power Transistor Selection

Infineon switch Other switch

Switch *

AIMBG120R010M1

Gate Driver Selection

W/ Short Circuit Protection ☐

W/O Short Circuit Protection ☐

W/ Miller Clamp ☐

W/O Miller Clamp ☐

	Product Name	Channels	Output Current	Isolation Type	Features	Package Name	
☐	1ED3321MC12N	1	8.5 A	Galvanic isolation - Reinforced	Miller clamp, Short Circuit Protection, Split output, Soft-off	PG-DSO-16	 
☐	1ED3890MC12M	1	7.5 A	Galvanic isolation - Reinforced	Condition Monitoring, I2C, Miller clamp, Short Circuit Protection, So...	PG-DSO-16-33	 
☐	1ED3141MU12F	1	6.5 A	Galvanic isolation - Functional	Split output	PG-DSO-8-72	 
☐	1ED3142MU12F	1	6.5 A	Galvanic isolation - Functional	Split output	PG-DSO-8-72	 
☐	1ED3121MU12H	1	5.5 A	Galvanic isolation - Functional	Split output	PG-DSO-8	 
☐	1ED3122MC12H	1	9 A	Galvanic isolation - Reinforced	Miller clamp	PG-DSO-8	 
☐	1ED3121MC12H	1	5.5 A	Galvanic isolation - Reinforced	Split output	PG-DSO-8	 

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- Based on the selected switch and application inputs, the tool will only show the suitable options for the gate driver
- Review driver options in the list:
 - Product Name, Channels, Output Current, Isolation Type, Features, and Package Name**
 - Carefully assess these parameters to identify the driver that best fits your application requirements
 - For more details, click the rightmost icons in each product row to open the product webpage or datasheet
 - Select a driver that fits your design

Step 5: Analyze the results

Peak current and gate driver parameters

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- The required peak current based on the selected switch and application conditions
- The relevant gate driver parameters can be viewed by clicking on the dropdown:
 - Peak output current values (High/Low).
 - Power dissipation ($P_{D,OUT}$)
 - Quiescent current
 - Thermal resistance and other specifications

This additional data aids in determining if the selected gate driver meets your design's power and thermal needs.

Step 6: Analyze the results

Power dissipation and Thermal Analysis

Results					
Total gate circuit losses, P_{tot} ⓘ		64.08	mW		
External gate resistance dissipation					
Turn-on Rg losses, $P_{ext,ON}(typ)$ ⓘ		18.82	mW	Turn-off Rg losses, $P_{ext,OFF}(typ)$ ⓘ	19.81 mW
Gate Driver IC dissipation					
Gate driver turn-on losses, $P_{GD,ON}(typ)$ ⓘ		3.6	mW	Gate driver turn-on losses, $P_{GD,ON}(max)$ ⓘ	7.31 mW
Gate driver turn-off losses, $P_{GD,OFF}(typ)$ ⓘ		2.11	mW	Gate driver turn-off losses, $P_{GD,OFF}(max)$ ⓘ	4.3 mW
Gate driver input quiescent losses, $P_{GD,Q1}(max)$ ⓘ		3.63	mW	Gate driver output quiescent losses, $P_{GD,Q2}(max)$ ⓘ	24.3 mW
Total gate driver IC losses, $P_{GD,tot}(typ)$ ⓘ		33.64	mW	Total gate driver IC losses, $P_{GD,tot}(max)$ ⓘ	39.54 mW
Gate driver IC temperature rise					
Junction temperature rise, $\Delta T_j(typ)$ ⓘ		4.34	°K	Junction temperature rise, $\Delta T_j(max)$ ⓘ	5.1 °K
Junction temperature, $T_j(typ)$ ⓘ		49.34	°C	Junction temperature, $T_j(max)$ ⓘ	50.1 °C

- Results section provides the estimated power loss and thermal performance indicators for the selected solution:
 - Total Circuit Power Losses (P_{tot}):** Estimated total power dissipated during switch turn-on and turn-off
 - Gate Driver IC Dissipation:** Total power dissipation within the gate driver IC
 - Thermal Metrics:**
 - Junction Temperature Rise (ΔT_j):** Estimated increase in the IC junction temperature
 - Maximum Junction Temperature ($T_j(max)$):** Check that the junction temperature remains within the specified limits to ensure safe operation
 - Use the **download icons** in the upper-right corner of the Results section to export the results in **PDF** or **Excel** format

Note: Use these results to confirm the selected driver meets your application's electrical and thermal requirements, and validate them with lab measurements.

Step 7: Restart or Modify Selections

Power Transistor Selection

Infineon switch
Other switch

Switch *

Gate Driver Selection

W/ Short Circuit Protection
☒

W/O Short Circuit Protection
☐

W/ Miller Clamp
☒

W/O Miller Clamp
☐

Product Name	Channels	Output Current	Isolation Type	Features
☐ 1ED3321MC12N	1	8.5 A	Galvanic isolation - Reinforced	Miller clamp, Short Circuit Protection, Split output, Soft-off
☐ 1ED3890MC12M	1	7.5 A	Galvanic isolation - Reinforced	Condition Monitoring, I2C, Miller clamp, Short Circuit Protection, Soft-off, Two-lev...
☐ 1ED3461MC12M	1	5 A	Galvanic isolation - Reinforced	Miller clamp, Short Circuit Protection, Soft-off
☐ 1ED3491MC12M	1	7.5 A	Galvanic isolation - Reinforced	Miller clamp, Short Circuit Protection, Soft-off
☐ 1ED3491MU12M	1	7.5 A	Galvanic isolation - Functional	Miller clamp, Short Circuit Protection, Soft-off
☐ 1ED3320MC12N	1	6 A	Galvanic isolation - Reinforced	Miller clamp, Short Circuit Protection, Split output, Soft-off
☐ 1ED3323MC12N	1	8.5 A	Galvanic isolation - Reinforced	Miller clamp, Short Circuit Protection

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Application Inputs

Gate Driver Voltage Class

V
-
 V

Isolation Type *

☐ Non-isolated
☒ Galvanic-isolation

☐ Functional-levelshift
☐ Any

Application Conditions

Gate driver input supply voltage *
 V

Gate driver output positive supply voltage *
 V

Gate driver output negative supply voltage *
 V

Target turn-on gate resistance *
 Ω

Target turn-off gate resistance *
 Ω

Target switching frequency *
 kHz

Ambient temperature *
 °C

Request Help

- At any point in the design process, you can modify any tool input to automatically update the results
- To start over, select **Infineon Switch** or **Other Switch** at the top and repeat the workflow
- For additional support, click **Request Help** in the bottom-right corner to contact an expert

This guide will walk you through the tool, ensuring a seamless navigation and helping you choose the ideal gate driver for your specific application. The tool simplifies the design process by matching drivers based on switch requirements and technical analysis.

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Revision history

Version	Release Date	Description of changes
1.00		Initial Release Note: Only Galvanic-isolated Gate Drivers are supported by the tool.

