# Wafer datasheet
# Bluesky-p2p120v2
# Bluesky-3g120
# (900V/120A)

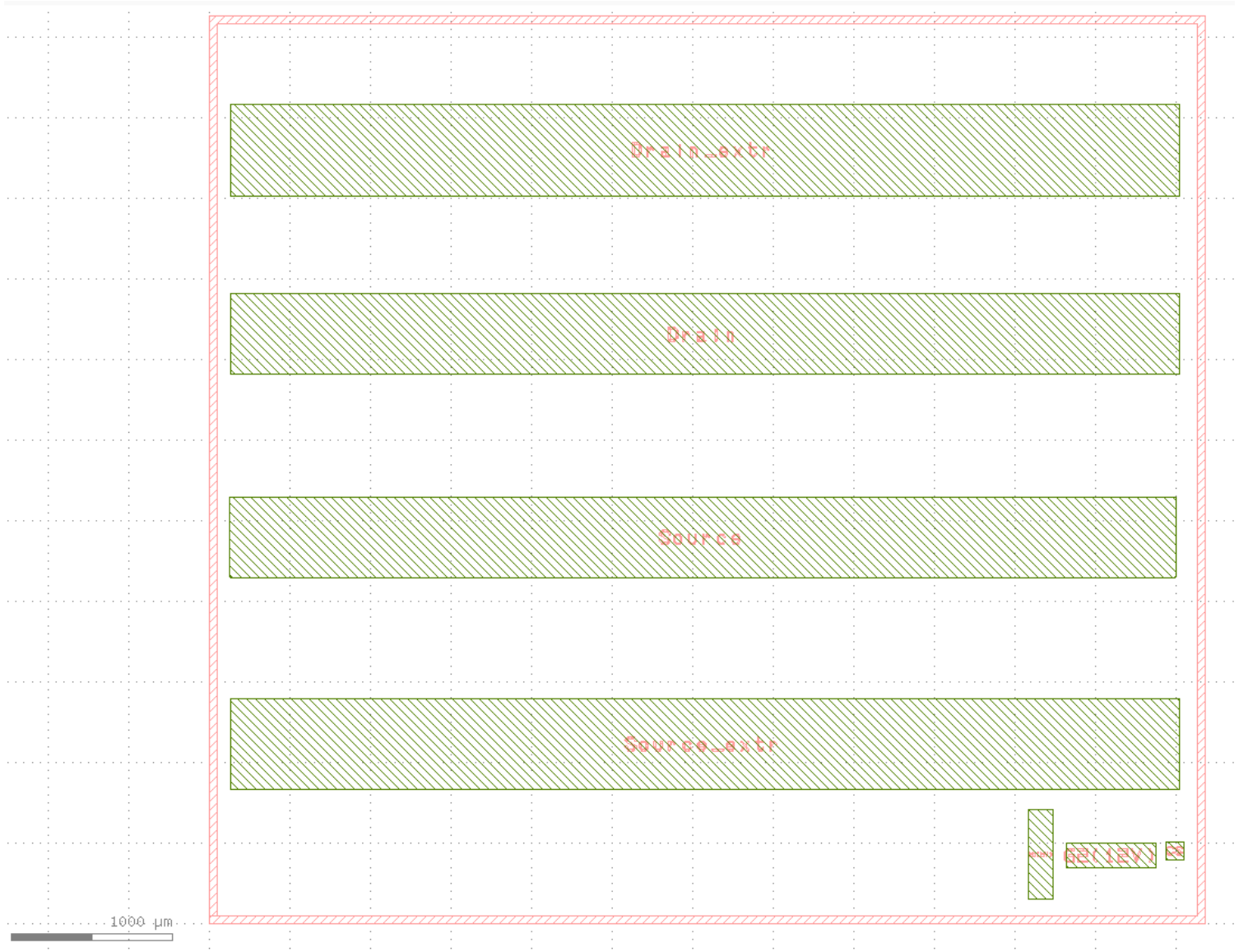
# Features

GaNPower innovative all-GaN-IC enables
3.8V turn-on voltage and
+/-20 V regulated gate driving.  Enhanced system reliability  and compatibility with conventional  gate drivers.

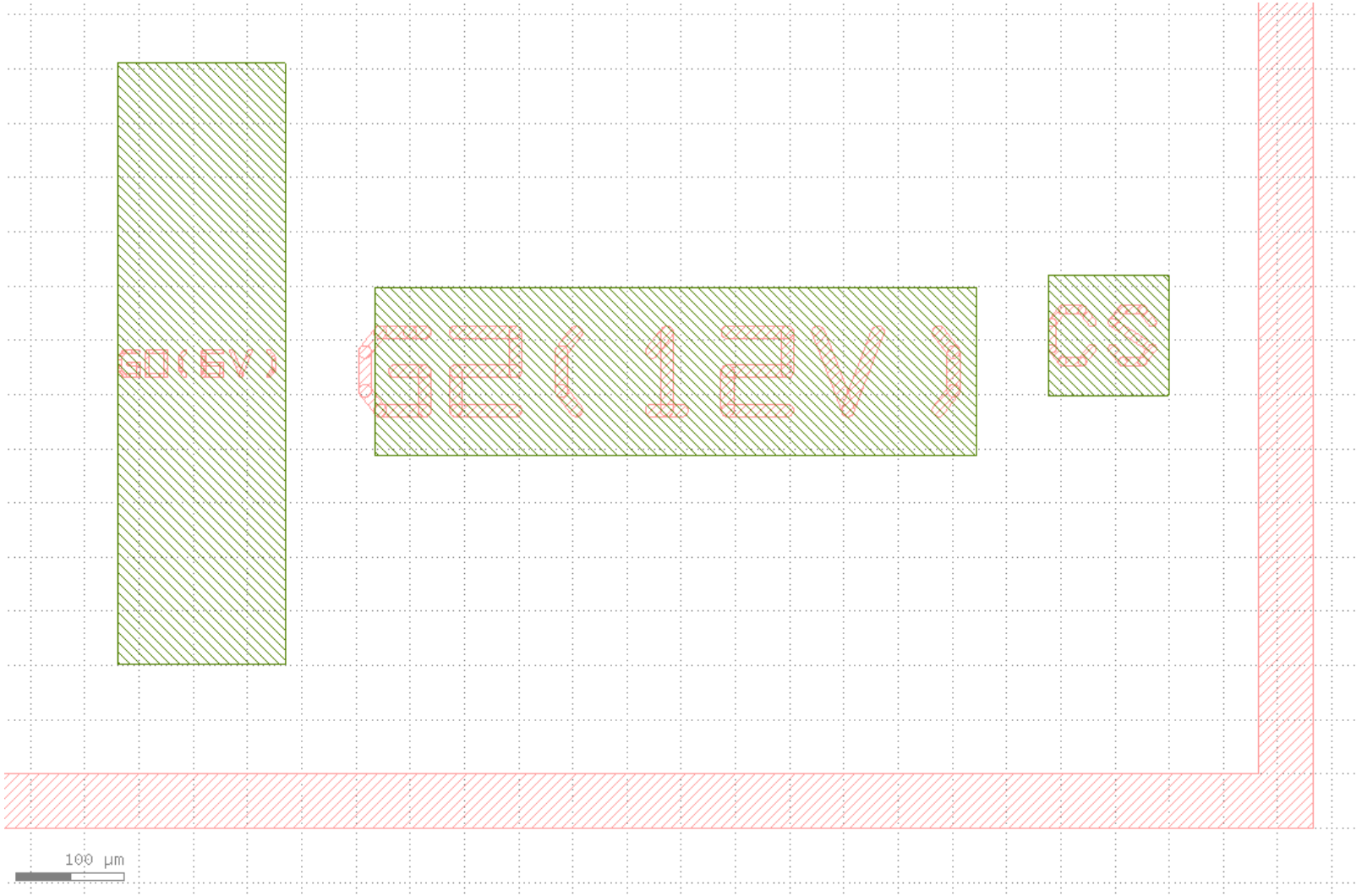
Regulated gate driving enables anti-ringing
Protection / ESD protection

Lossless source side current sensing

| Device-name | x-size | y-size |
| --- | --- | --- |
| p2p120v2 | 6182.60 | 5634.28 |



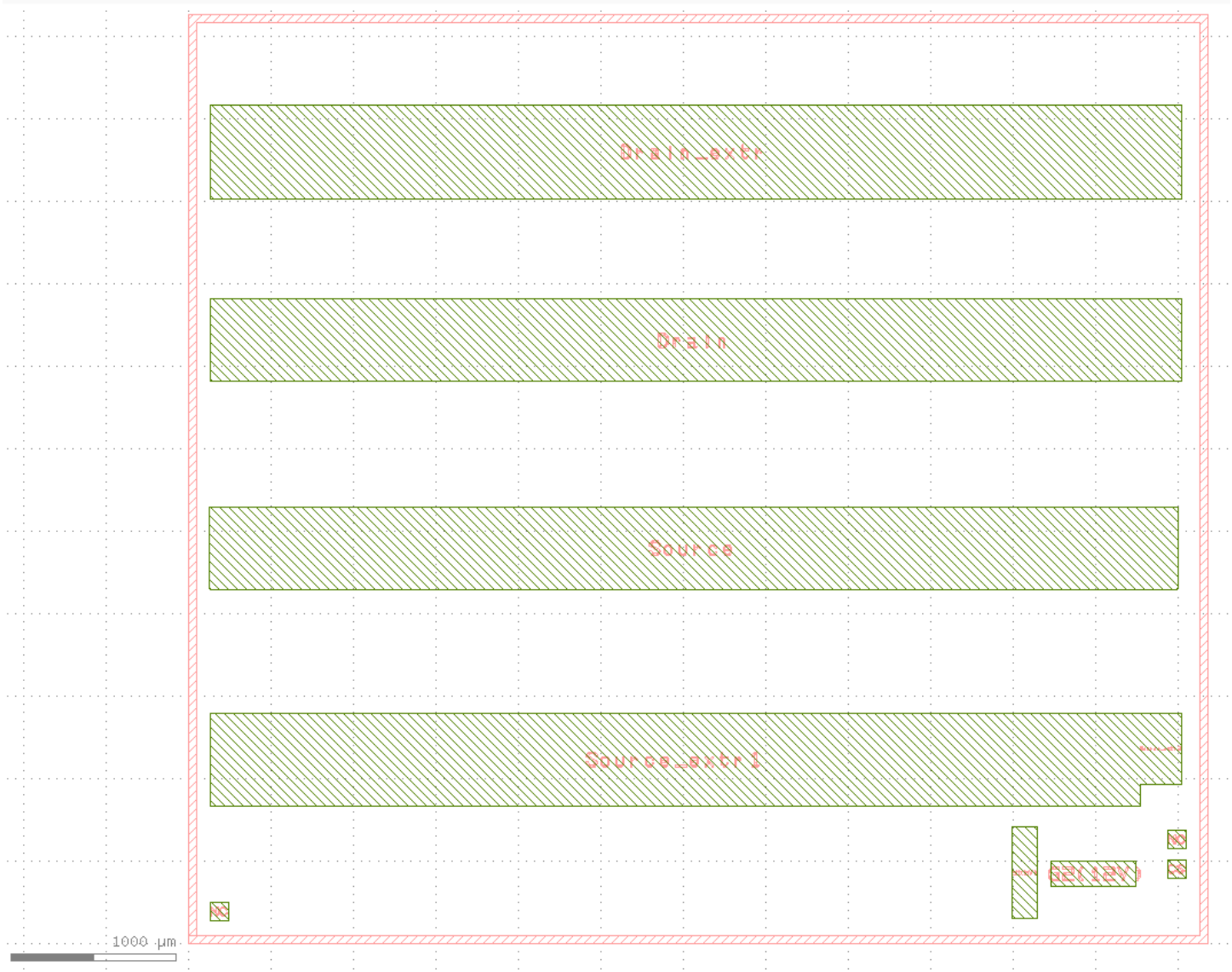
| Device-name | x-size | y-size |
| --- | --- | --- |
| p2p120v2 | 6182.60 | 5634.28 |



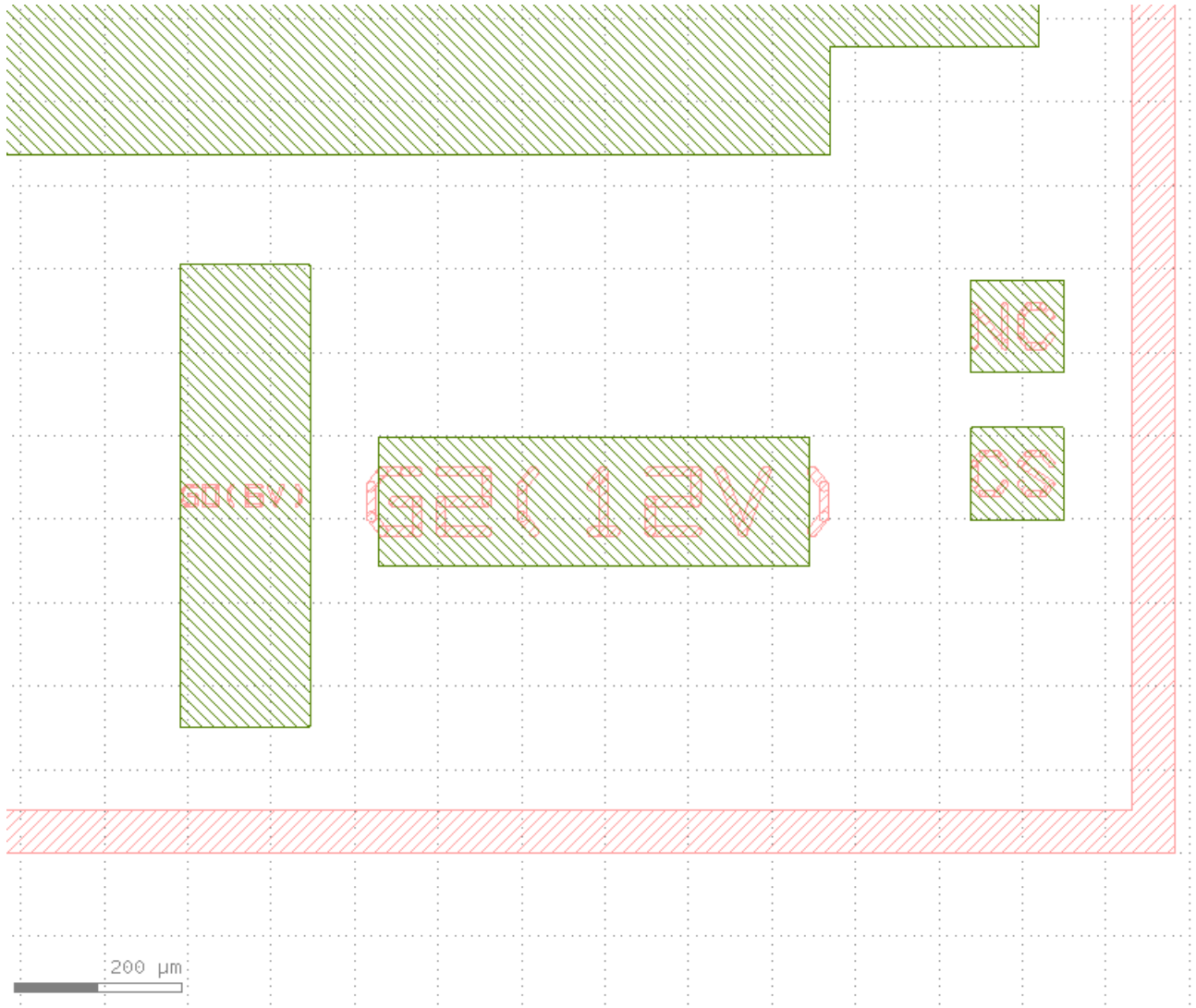
p2p120v2

| PAD | Dx | Dy | Center_x | Center_y |
|---|---|---|---|---|
| Source | 5868.47 | 500.00 | 3062.04 | 2397.14 |
| Source_extr | 5889.47 | 560.00 | 3074.54 | 1116.70 |
| Drain | 5889.47 | 500.00 | 3074.54 | 3657.14 |
| Drain_extr | 5889.47 | 567.00 | 3074.54 | 4799.98 |
| CS | 111.00 | 111.00 | 5993.77 | 454.30 |
| G0(6V) | 155.00 | 555.00 | 5157.70 | 428.30 |
| G2(12V) | 585.00 | 185.00 | 5594.95 | 421.30 |

| Device-name | x-size | y-size |
|---|---|---|
| 3g120 | 6182.60 | 5634.28 |



| Device-name | x-size | y-size |
| --- | --- | --- |
| 3g120 | 6182.60 | 5634.28 |



| Device-name | x-size | y-size |
|---|---|---|
| 3g120 | 6182.60 | 5634.28 |

3g120

| PAD | dx | dy | center_x | center_y |
|---|---|---|---|---|
| Source | 5868.47 | 500.00 | 3062.04 | 2397.14 |
| Source_extr1 | 5639.47 | 561.00 | 2949.54 | 1117.20 |
| Source_extr2 | 250.00 | 431.00 | 5894.27 | 1182.20 |
| Drain | 5889.47 | 500.00 | 3074.54 | 3657.14 |
| Drain_extr | 5889.47 | 570.00 | 3074.54 | 4798.48 |
| CS | 111.00 | 111.00 | 5993.77 | 454.30 |
| G0(6V) | 155.00 | 555.00 | 5068.90 | 428.30 |
| G2(12V) | 585.00 | 185.00 | 5506.15 | 421.30 |
| NC | 111.00 | 111.00 | 5993.77 | 631.30 |
| NC | 111.00 | 111.00 | 188.88 | 196.30 |

# Basic specifications

| | |
|---|---|
| Back metal | None |
| Front metal | AlCu 4um |
| Wafer diameter | 6 inch |
| Wafer thickness  before dicing | 1000 um |
| Recommended die thickness after dicing | 250-300um |
| Street width | 80 um |
| Recommended storage | N2 environment |
| | |
| | |

# Wire bonding suggestion

Larger pads use 10mil or 12mil  Al .

Smaller pads use Cu, PdCu , or Au  (1.5 mil – 2 mil)

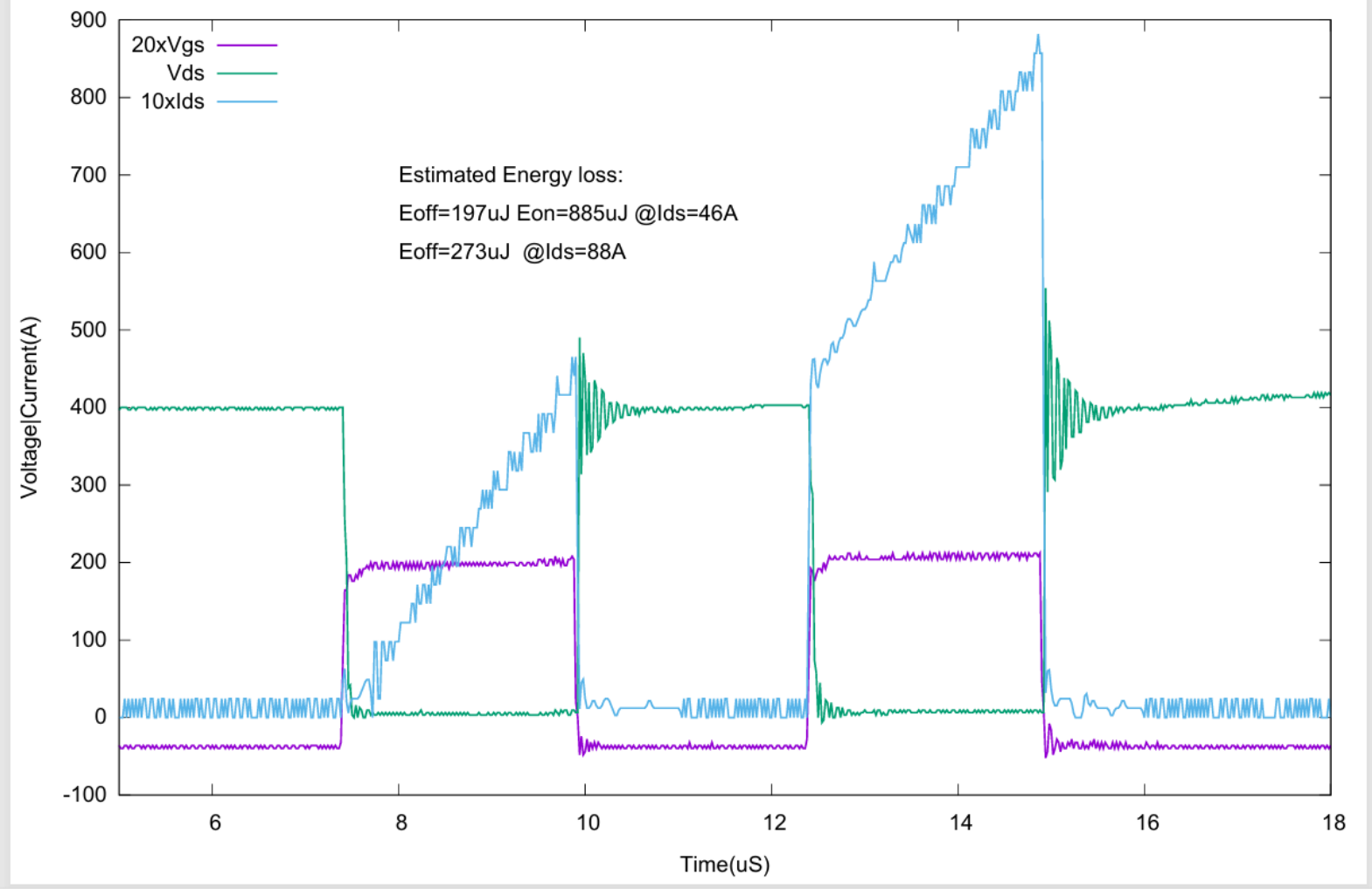
Backside must be glued to backplate using conductive glue

Backplate must be connected to the source of the GaNFET using wire bonding

# Characteristics

| | | Condition | min | typical | max | |
|---|---|---|---|---|---|---|
| Ids-max | Max current at 125C | Vgs=6/15 125C | | 120 | | A |
| Ids-max | Max current at 25C | Vgs=6/15 25C | | 240 | | A |
| Vds-max | D-S breakdown voltage | Vgs=0 25C < 10uA | | 900 | | V |
| Vg0s | Original gate voltage | | -3 | | 7 | V |
| Vg1s | Regulated | | -20 | | 20 | |
| Vgth (G0) | Gate threshold voltage | Vgs=Vds Ids=35mA | | 1.3 | | V |
| Vgth (G1) | Regulated threshold | Vg1s=Vds Ids=35 mA | | 3.5 | | V |
| Idss | Drain leakage | Vg1s=0 / Vg0s=0 25C Vds=900 | | | 100 | uA |
| Igss | Forward gate leakage | Vg0s=6/Vg1s=15 Vds=0 | | | 1/150 | mA |
| Rdson | On resistance | Vg0s=6/Vg1s=15 Ids=1A 25C | | 12 | | mOhm |
| Rdson | On resistance | Vg0s=6/Vg1s=15 Ids=1A 150C | | 26 | | mOhm |
| Vcs | Current sensing | Ids=+/-120A | -2.5 | | 2.5 | V |
| Qg | Gate charge | Vbus=500V Turn-off from Ids=120A Vg0s from 6 to 0 25C | | 29 | | nC |

# Double pulse testing

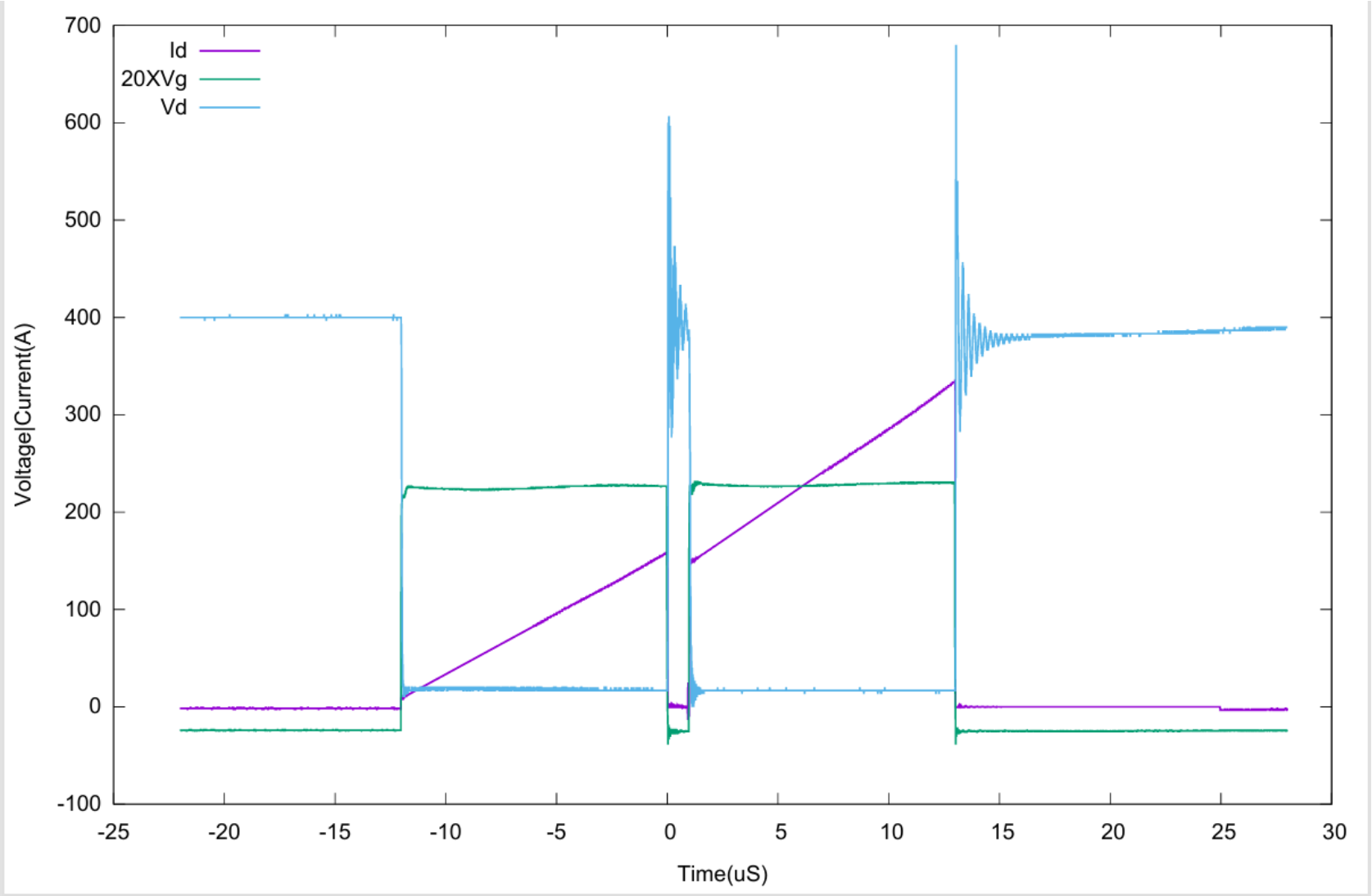



Double pulse testing for bare die packaged within TO247-4. Rgon=10 Rgoff=0. Vg from -2 to 10. Peak to peak averaging method were used for Ids(t) to remove some strong ringing near switching edge in order to estimate Eon/Eoff.

# Double pulse testing (3-parallelized TO247-4)


Double pulse testing for bare die packaged within TO247-4. Rgon=2 Rgoff=0. Vg from -1 to 12.

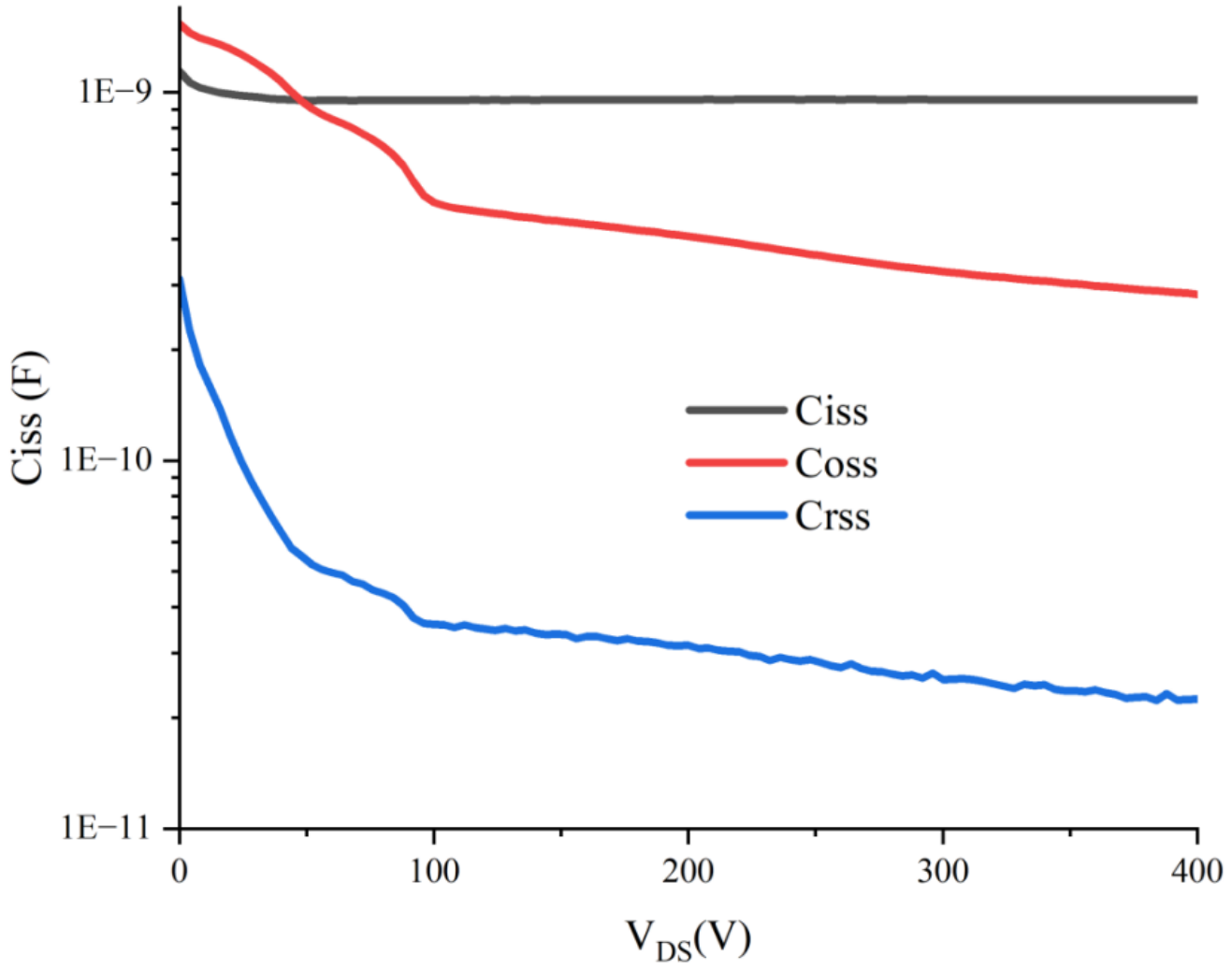
# Double pulse testing (3-parallelized TO247-4)




Ring at Id smoothed out for clarity.

Double pulse testing for bare die packaged within TO247-4. Rgon=2 Rgoff=0.
Vg from -1 to 12. Eoff and Eon at 168A are 600uJ and 2350 uJ, respectively. Eoff at 335A is 700 uJ.

# Capacitance at 1MHz in TO247-4



# Application note on G1 (15V) driving

**Negative Gate Turn-off**

As with most EMODE GaNFET, it is best to use negative turn off gate driving to achieve fast turn off. In such a case, G0 can be left not connected (NC). Negative gate voltage of -1 to -3 are recommended.

**Zero Gate Turn-off**

When using G1 for driving (either 0-12V or 0-15V),it is best to wire bond a bare die of low voltage diode (max rating 20V, max current 0.5A) between G0 and G1 such that the forward direction of the diode points from G0 to G1. Caution: at light loading (less than 0.5A), turn-off may be slow.

Recommended Rgoff=0 Rgon=0 to 5 Ohm. Recommended driver: 1EDBX275F , or other driver with stronger current capability. It is also possible to drive multiple devices/dies at parallel. When parallelizing more than three Star120, paralleled multiple-driver is recommended.

# Application note on G0 (6V) driving

G0 can be used as a standard EMODE p-GaN gate. Recommended Rgoff=0 Rgon=5-10 Ohm

## Choice of G1 or G0:

## For better system reliability, G1 is recommended.