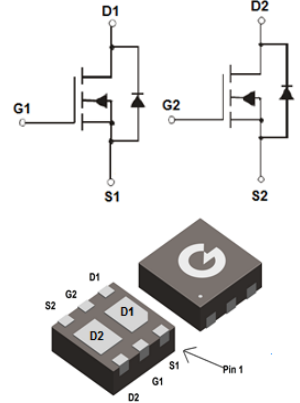


### Features

- Advanced trench technology
- Low on-resistance
- Fast switching speed
- RoHS compliant with Halogen-free
- Qualified to AEC-Q101 Standards

**HF**



**DFN2020-6LC**

### Mechanical Data

- Case: DFN2020-6LC
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208

### Ordering Information

| Part Number  | Package     | Shipping Quantity      | Marking Code |
|--------------|-------------|------------------------|--------------|
| TGBLN2201DF2 | DFN2020-6LC | 3000 pcs / Tape & Reel | N2201        |

### Maximum Ratings (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

| Parameter                                                                 | Symbol    | Value           | Unit             |
|---------------------------------------------------------------------------|-----------|-----------------|------------------|
| Drain-to-Source Voltage                                                   | $V_{DS}$  | 20              | V                |
| Gate-to-Source Voltage                                                    | $V_{GS}$  | $\pm 8$         | V                |
| Continuous Drain Current ( $T_A = 25^\circ\text{C}$ ) <sup>*1</sup>       | $I_D$     | 5               | A                |
| Continuous Drain Current ( $T_A = 70^\circ\text{C}$ ) <sup>*1</sup>       |           | 4               | A                |
| Pulsed Drain Current ( $t_p = 10\mu\text{s}$ , $T_A = 25^\circ\text{C}$ ) | $I_{DM}$  | 20              | A                |
| Single Pulse Avalanche Energy <sup>*3</sup>                               | $E_{AS}$  | 5               | mJ               |
| Power Dissipation ( $T_A = 25^\circ\text{C}$ ) <sup>*1</sup>              | $P_D$     | 1.5             | W                |
| Operating Junction Temperature Range                                      | $T_J$     | $-55 \sim +150$ | $^\circ\text{C}$ |
| Storage Temperature Range                                                 | $T_{STG}$ | $-55 \sim +150$ | $^\circ\text{C}$ |

### Thermal Characteristics

| Parameter                                        | Symbol          | Min. | Typ. | Max. | Unit               |
|--------------------------------------------------|-----------------|------|------|------|--------------------|
| Thermal Resistance Junction-to-Case              | $R_{\theta JC}$ | -    | -    | 30   | $^\circ\text{C/W}$ |
| Thermal Resistance Junction-to-Air <sup>*1</sup> | $R_{\theta JA}$ | -    | -    | 83   | $^\circ\text{C/W}$ |

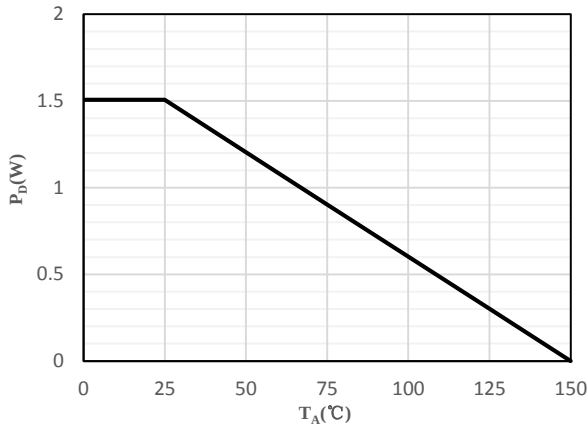
### Electrical Characteristics (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

| Symbol                             | Parameter                                | Test Condition                                                                                  | Min. | Typ. | Max. | Unit |
|------------------------------------|------------------------------------------|-------------------------------------------------------------------------------------------------|------|------|------|------|
| Static Characteristics             |                                          |                                                                                                 |      |      |      |      |
| V <sub>DSS</sub>                   | Drain-Source Breakdown Voltage           | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA                                                    | 20   | -    | -    | V    |
| I <sub>DSS</sub>                   | Zero Gate Voltage Drain Current          | V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0V                                                     | -    | -    | 1    | μA   |
| I <sub>GSS</sub>                   | Gate-Body Leakage Current                | V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V                                                    | -    | -    | ±100 | nA   |
| On Characteristics                 |                                          |                                                                                                 |      |      |      |      |
| R <sub>DS(ON)</sub>                | Drain-Source On-resistance <sup>*2</sup> | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 3A                                                     | -    | 23   | 35   | mΩ   |
|                                    |                                          | V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 2A                                                     | -    | 29   | 50   |      |
| V <sub>GS(TH)</sub>                | Gate Threshold Voltage                   | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                      | 0.5  | 0.8  | 1.2  | V    |
| R <sub>G</sub>                     | Gate Resistance                          | V <sub>GS</sub> = 0V, f = 1MHz                                                                  | -    | 9    | -    | Ω    |
| Dynamic Characteristics            |                                          |                                                                                                 |      |      |      |      |
| C <sub>ISS</sub>                   | Input Capacitance                        | V <sub>GS</sub> = 0V<br>V <sub>DS</sub> = 10V<br>f = 1.0MHz                                     | -    | 426  | -    | pF   |
| C <sub>OSS</sub>                   | Output Capacitance                       |                                                                                                 | -    | 76   | -    |      |
| C <sub>RSS</sub>                   | Reverse Transfer Capacitance             |                                                                                                 | -    | 66   | -    |      |
| Switching Characteristics          |                                          |                                                                                                 |      |      |      |      |
| t <sub>d(ON)</sub>                 | Turn-on Delay Time <sup>*4</sup>         | V <sub>GS</sub> = 4.5V<br>V <sub>DD</sub> = 10V<br>R <sub>G</sub> = 6Ω<br>I <sub>D</sub> = 3.6A | -    | 9    | -    | ns   |
| t <sub>r</sub>                     | Turn-on Rise Time <sup>*4</sup>          |                                                                                                 | -    | 23   | -    |      |
| t <sub>d(OFF)</sub>                | Turn-Off Delay Time <sup>*4</sup>        |                                                                                                 | -    | 38   | -    |      |
| t <sub>f</sub>                     | Turn-Off Fall Time <sup>*4</sup>         |                                                                                                 | -    | 3    | -    |      |
| Q <sub>G</sub>                     | Total Gate-Charge                        | V <sub>DS</sub> = 10V<br>V <sub>GS</sub> = 4.5V<br>I <sub>D</sub> = 3.6A                        | -    | 6.4  | -    | nC   |
| Q <sub>GS</sub>                    | Gate to Source Charge                    |                                                                                                 | -    | 1.1  | -    |      |
| Q <sub>GD</sub>                    | Gate to Drain (Miller) Charge            |                                                                                                 | -    | 1.8  | -    |      |
| Source-Drain Diode Characteristics |                                          |                                                                                                 |      |      |      |      |
| V <sub>SD</sub>                    | Diode Forward Voltage <sup>*2</sup>      | I <sub>S</sub> = 3A, V <sub>GS</sub> = 0 V                                                      | -    | 0.8  | 1.2  | V    |

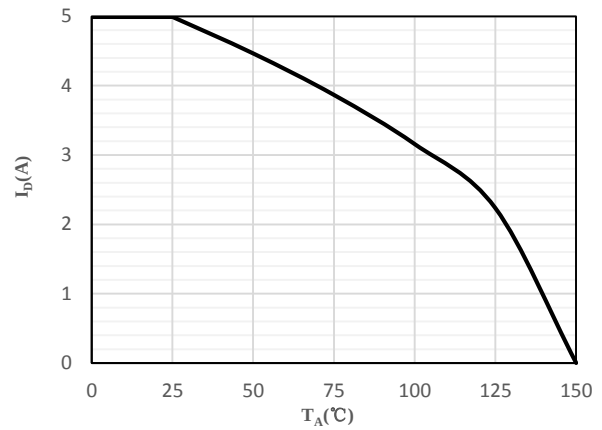
Notes:

1. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper
2. The data tested by pulsed, pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$
3. The  $E_{AS}$  data shows Max. rating. The test condition is  $V_{DD} = 10\text{V}$ ,  $V_{GS} = 6\text{V}$ ,  $L = 0.1\text{mH}$
4. Guaranteed by design, not subject to production

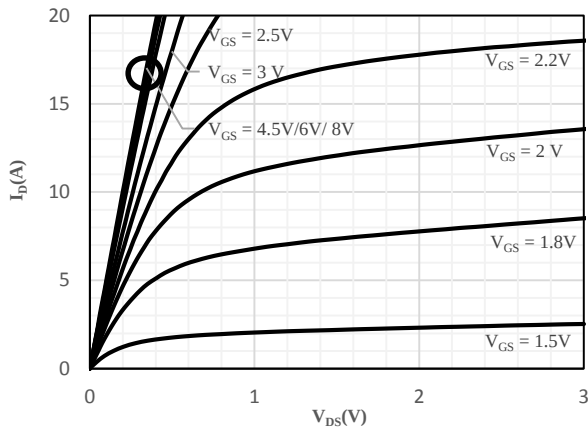
**Ratings and Characteristics Curves** (@  $T_A = 25^\circ\text{C}$  unless otherwise specified)



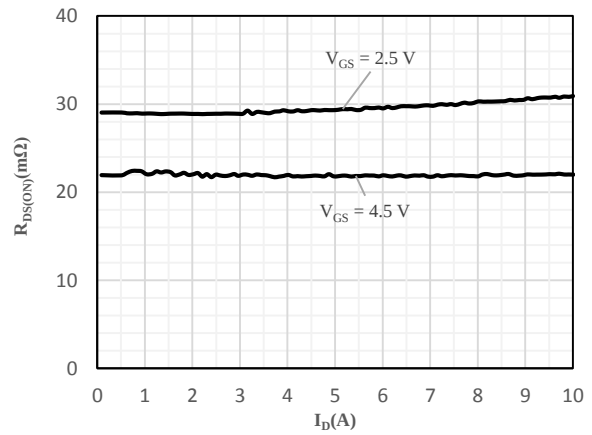
**Fig 1 Power Dissipation**



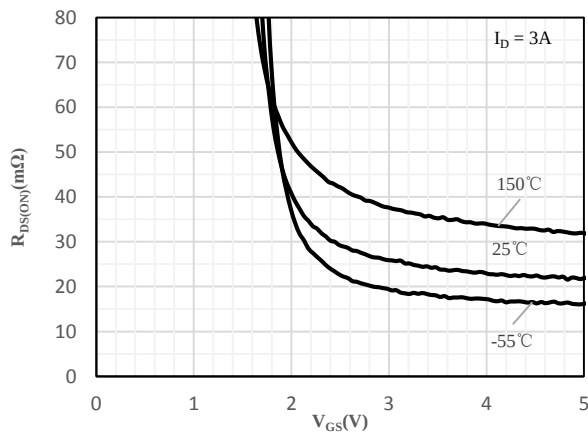
**Fig 2 Drain Current**



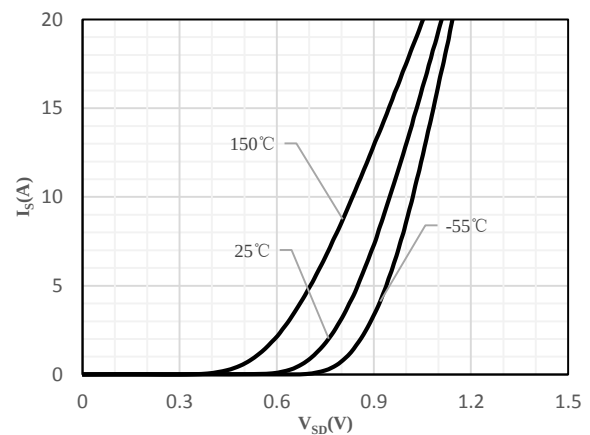
**Fig 3 Typical Output Characteristics**



**Fig 4 On-Resistance vs. Drain Current and Gate Voltage**



**Fig 5 On-Resistance vs. Gate-Source Voltage**



**Fig 6 Body-Diode Characteristics**

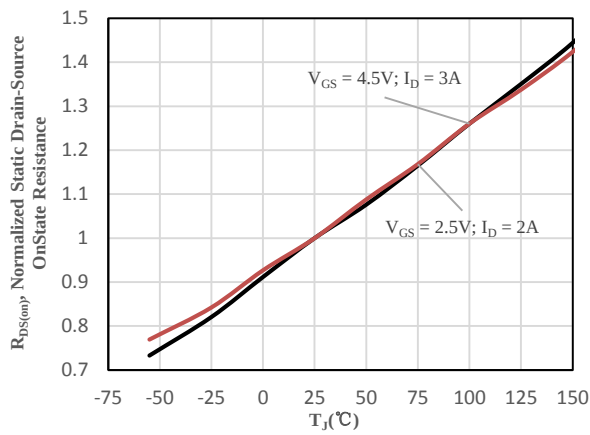


Fig 7 Normalized On-Resistance vs. Junction Temperature

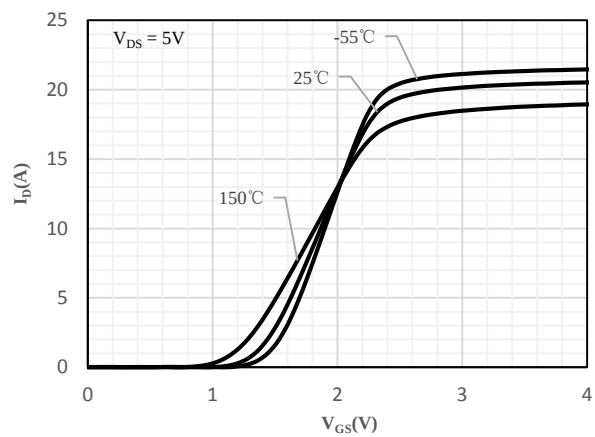


Fig 8 Transfer Characteristics

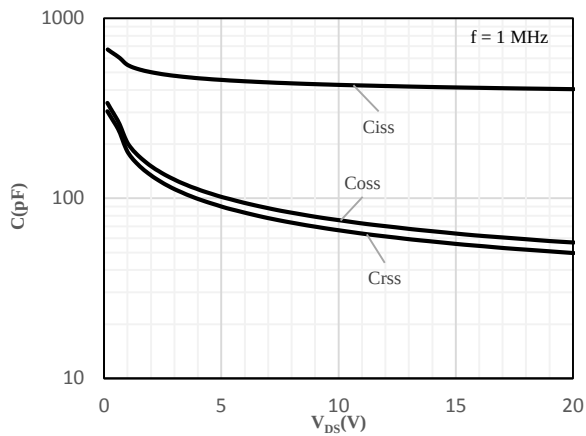


Fig 9 Capacitance Characteristics

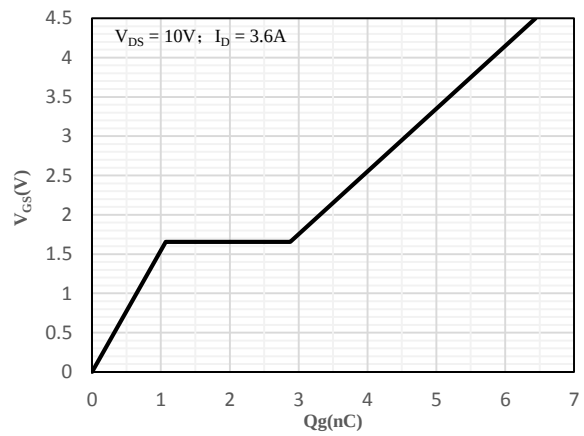


Fig 10 Gate-Charge Characteristics

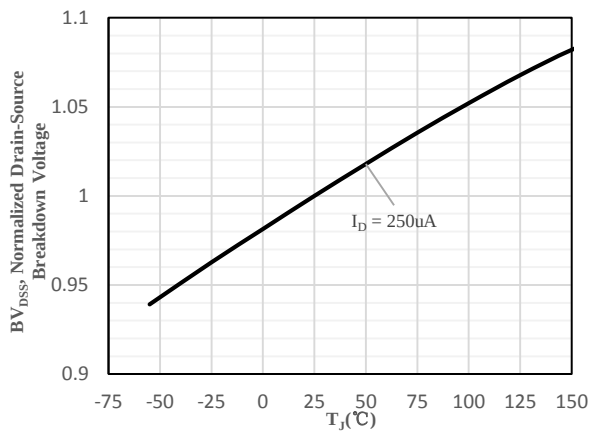


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

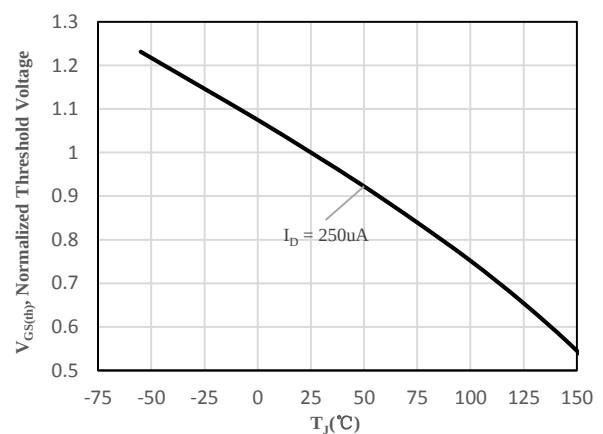
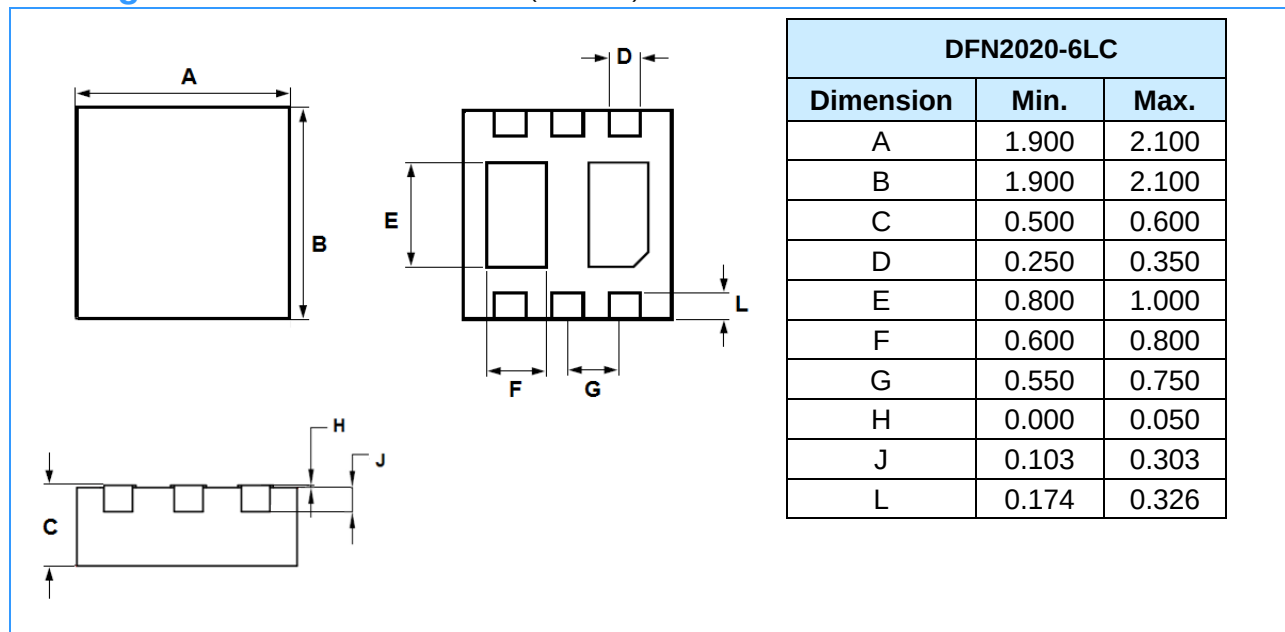


Fig 12 Normalized  $V_{GS(th)}$  vs. Junction Temperature

**Package Outline Dimensions** (Unit: mm)



**Mounting Pad Layout** (Unit: mm)

