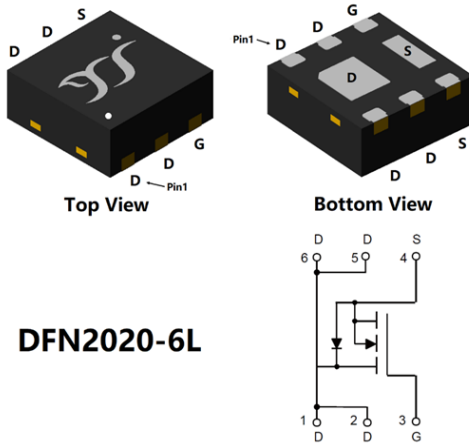




## N-Channel Enhancement Mode Field Effect Transistor



DFN2020-6L

## Product Summary

|                                    |                |
|------------------------------------|----------------|
| • $V_{DS}$                         | 200V           |
| • $I_D$                            | 4.6A           |
| • $R_{DS(ON)}$ ( at $V_{GS}=10V$ ) | <280m $\Omega$ |
| • ESD Level(HBM)                   | H0             |

## General Description

- Excellent package for heat dissipation
- High density cell design for low  $R_{DS(ON)}$
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

## Applications

- Industrial power supply

## ■ Limiting Values

| Parameter                              | Conditions                                |                                                           | Symbol                           | Min | Max  | Unit |
|----------------------------------------|-------------------------------------------|-----------------------------------------------------------|----------------------------------|-----|------|------|
| Drain-source Voltage                   |                                           |                                                           | V <sub>DS</sub>                  | -   | 200  | V    |
| Gate-source Voltage                    |                                           |                                                           | V <sub>GS</sub>                  | -20 | 20   |      |
| Continuous Drain Current (Note 1,2)    | Steady-State                              | T <sub>A</sub> =25°C,V <sub>GS</sub> =10V                 | I <sub>D</sub>                   | -   | 1.6  | A    |
|                                        |                                           | T <sub>A</sub> =100°C,V <sub>GS</sub> =10V                |                                  | -   | 1.1  |      |
| Continuous Drain Current (Note 1,3)    | Steady-State                              | T <sub>C</sub> =25°C,V <sub>GS</sub> =10V,Chip limitation |                                  | -   | 4.6  |      |
|                                        |                                           | T <sub>C</sub> =100°C,V <sub>GS</sub> =10V                |                                  | -   | 3.2  |      |
| Pulsed Drain Current                   | T <sub>C</sub> =25°C,t <sub>p</sub> ≤10μs |                                                           | I <sub>DM</sub>                  | -   | 18.4 |      |
| Maximum Body-Diode Continuous Current  | T <sub>C</sub> =25°C                      |                                                           | I <sub>S</sub>                   |     | 4.6  |      |
| Total Power Dissipation (Note 1,2)     | Steady-State                              | T <sub>A</sub> =25°C                                      | P <sub>D</sub>                   | -   | 1.85 | W    |
|                                        |                                           | T <sub>A</sub> =100°C                                     |                                  | -   | 0.92 |      |
| Total Power Dissipation (Note 1,3)     | Steady-State                              | T <sub>C</sub> =25°C                                      |                                  | -   | 15.4 |      |
|                                        |                                           | T <sub>C</sub> =100°C                                     |                                  | -   | 7.7  |      |
| Junction and Storage Temperature Range |                                           |                                                           | T <sub>J</sub> ,T <sub>STG</sub> | -55 | 175  | °C   |

## ■ Thermal Resistance

| Parameter                                       |              | Symbol          | Typ | Max | Units                |
|-------------------------------------------------|--------------|-----------------|-----|-----|----------------------|
| Thermal Resistance Junction-to-Ambient (Note 2) | Steady-State | $R_{\theta JA}$ | -   | 81  | $^{\circ}\text{C/W}$ |
| Thermal Resistance Junction-to-Case             | Steady-State | $R_{\theta JC}$ | -   | 9.7 |                      |

## ■ Ordering Information (Example)

| PREFERRED P/N | PACKING CODE | Marking | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---------------|--------------|---------|----------------------|-------------------------|----------------------------|---------------|
| YJQT280G20H   | F1           | 280G20  | 3000                 | 30000                   | 120000                     | 7" reel       |



# YJQT280G20H

## ■ Electrical Characteristics

| Parameter                         | Symbol              | Conditions                                                                                                  | Min | Typ  | Max  | Units |
|-----------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------|-----|------|------|-------|
| Static Parameter                  |                     |                                                                                                             |     |      |      |       |
| Drain-Source Breakdown Voltage    | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA, T <sub>j</sub> =25°C                                            | 200 | -    | -    | V     |
| Zero Gate Voltage Drain Current   | I <sub>DSS</sub>    | V <sub>DS</sub> =160V, V <sub>GS</sub> =0V, T <sub>j</sub> =25°C                                            | -   | -    | 1    | μA    |
|                                   |                     | V <sub>DS</sub> =160V, V <sub>GS</sub> =0V, T <sub>j</sub> =150°C                                           | -   | -    | 100  |       |
| Gate-Source Leakage Current       | I <sub>GSS</sub>    | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V, T <sub>j</sub> =25°C                                            | -   | -    | ±100 | nA    |
| Gate Threshold Voltage            | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA, T <sub>j</sub> =25°C                              | 2.4 | 3.2  | 4    | V     |
| Static Drain-Source On-Resistance | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =2A, T <sub>j</sub> =25°C                                              | -   | 218  | 280  | mΩ    |
| Diode Forward Voltage             | V <sub>SD</sub>     | I <sub>S</sub> =2A, V <sub>GS</sub> =0V, T <sub>j</sub> =25°C                                               | -   | 0.82 | 1.2  | V     |
| Gate Resistance                   | R <sub>G</sub>      | f=1MHz, T <sub>j</sub> =25°C                                                                                | -   | 1.8  | -    | Ω     |
| Dynamic Parameters                |                     |                                                                                                             |     |      |      |       |
| Input Capacitance                 | C <sub>iss</sub>    | V <sub>DS</sub> =100V, V <sub>GS</sub> =0V, f=1MHz, T <sub>j</sub> =25°C                                    | -   | 187  | -    | pF    |
| Output Capacitance                | C <sub>oss</sub>    |                                                                                                             | -   | 22   | -    |       |
| Reverse Transfer Capacitance      | C <sub>rss</sub>    |                                                                                                             | -   | 1.14 | -    |       |
| Switching Parameters              |                     |                                                                                                             |     |      |      |       |
| Total Gate Charge                 | Q <sub>g</sub>      | V <sub>GS</sub> =10V, V <sub>DS</sub> =100V, I <sub>D</sub> =2A, T <sub>j</sub> =25°C                       | -   | 3.8  | -    | nC    |
| Gate-Source Charge                | Q <sub>gs</sub>     |                                                                                                             | -   | 1    | -    |       |
| Gate-Drain Charge                 | Q <sub>gd</sub>     |                                                                                                             | -   | 1.6  | -    |       |
| Reverse Recovery Charge           | Q <sub>rr</sub>     | I <sub>F</sub> =2A, di/dt=100A/μs, V <sub>GS</sub> =0V, V <sub>R</sub> =100V, T <sub>j</sub> =25°C          | -   | 91   | -    | nC    |
| Reverse Recovery Time             | t <sub>rr</sub>     |                                                                                                             | -   | 59   | -    | ns    |
| Turn-on Delay Time                | t <sub>D(on)</sub>  | V <sub>GS</sub> =10V, V <sub>DS</sub> =100V, I <sub>D</sub> =2A, R <sub>GEN</sub> =3Ω, T <sub>j</sub> =25°C | -   | 3.5  | -    | ns    |
| Turn-on Rise Time                 | t <sub>r</sub>      |                                                                                                             | -   | 3.2  | -    |       |
| Turn-off Delay Time               | t <sub>D(off)</sub> |                                                                                                             | -   | 7.8  | -    |       |
| Turn-off Fall Time                | t <sub>f</sub>      |                                                                                                             | -   | 25.2 | -    |       |

### Note:

- The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
- The value of  $R_{\theta JA}$  is measured with the device mounted on the 40mm\*40mm\*1.1mm single layer FR-4 PCB board with 1 in<sup>2</sup> pad of 2oz. Copper, in the still air environment with  $T_A=25^\circ C$ . The maximum allowed junction temperature of 175 $^\circ C$ . The value in any given application depends on the user's specific board design.
- Thermal resistance from junction to soldering point (on the exposed drain pad).



## ■ Typical Electrical and Thermal Characteristics Diagrams

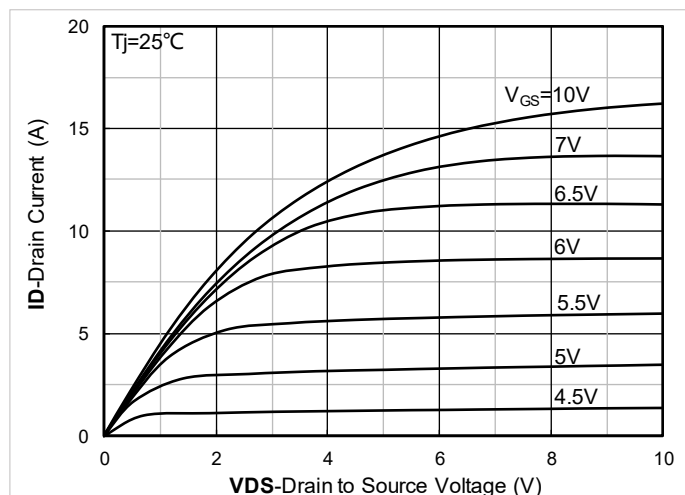


Figure 1. Output Characteristics; typical values

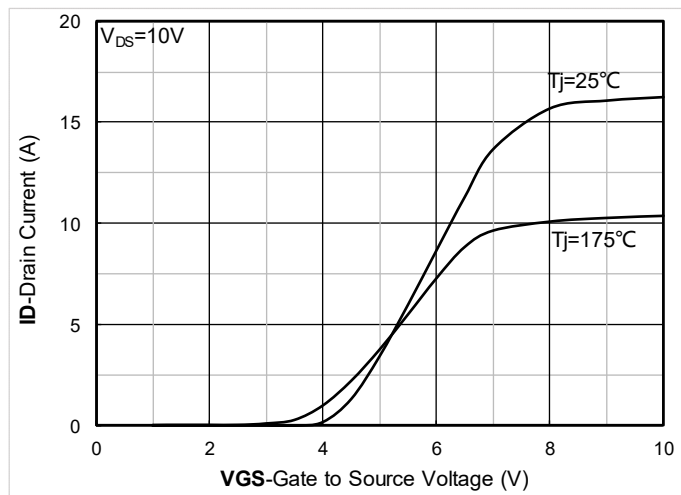


Figure 2. Transfer Characteristics; typical values

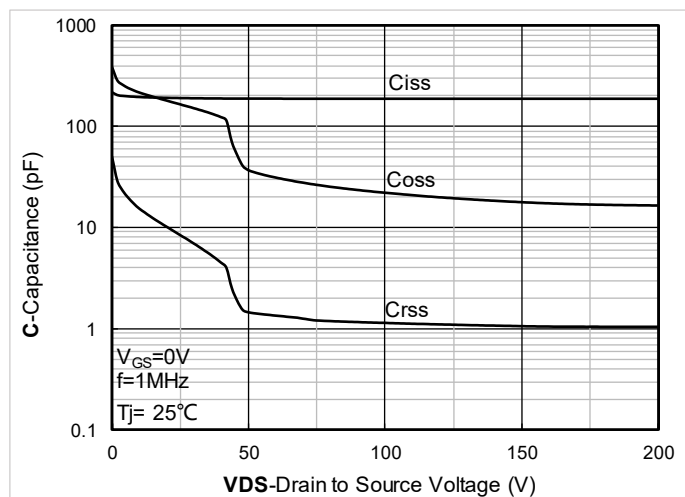


Figure 3. Capacitance Characteristics; typical values

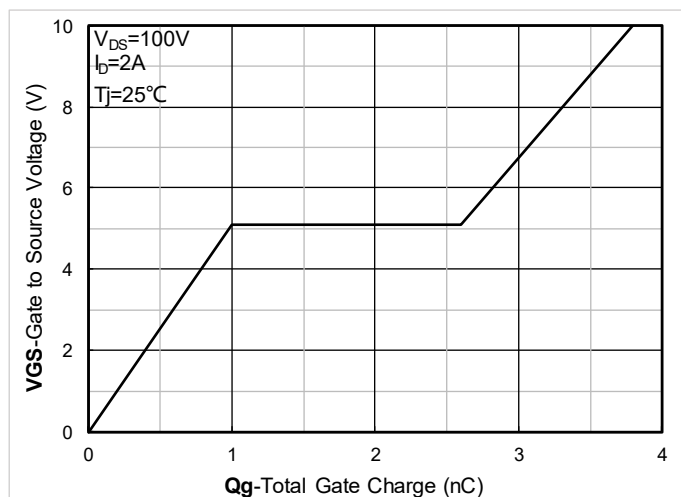


Figure 4. Gate Charge; typical values

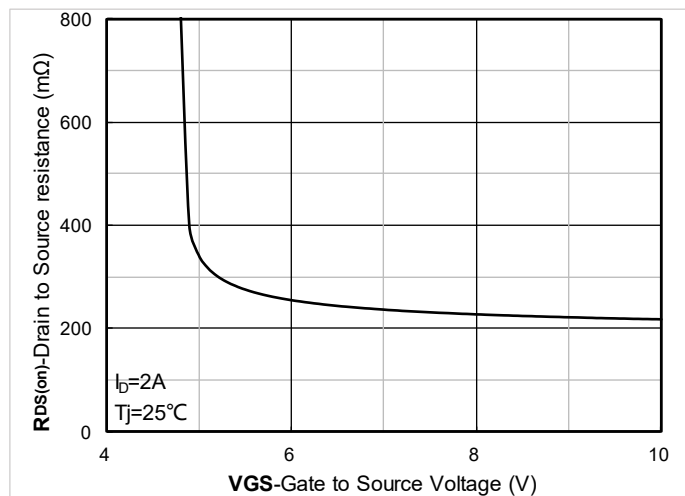


Figure 5. On-Resistance vs. Gate to Source Voltage; typical values

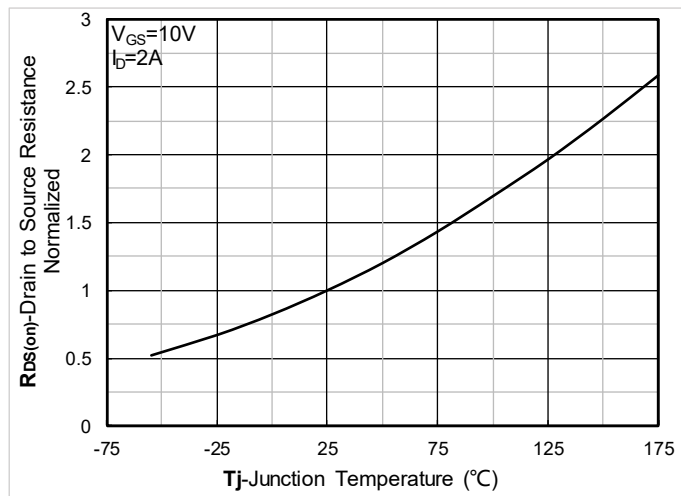


Figure 6. Normalized On-Resistance

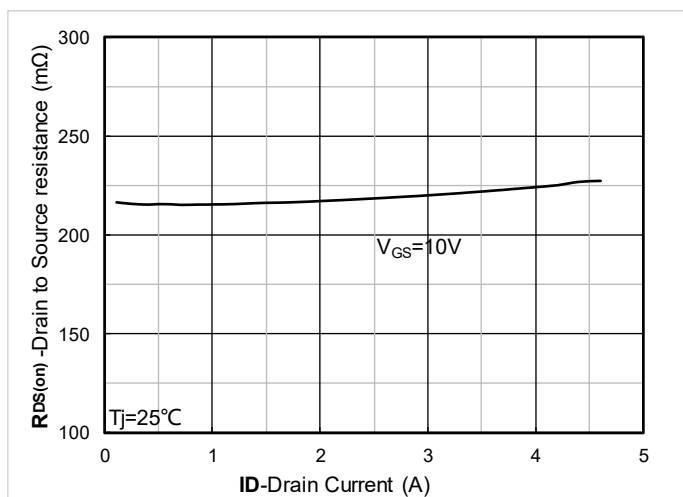


Figure 7. RDS(on) vs. Drain Current; typical values

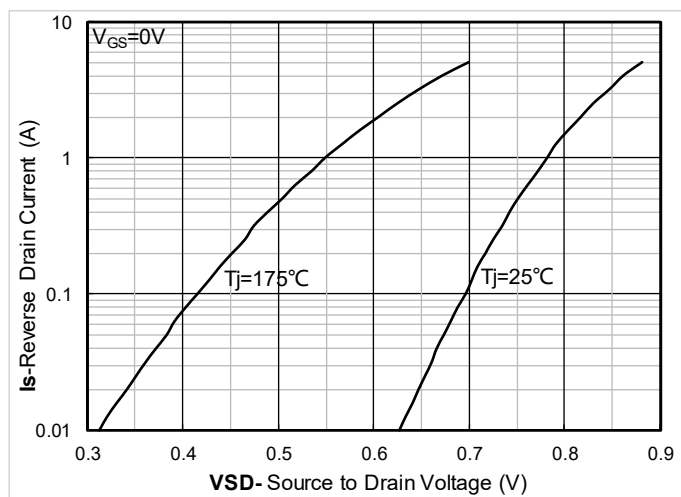


Figure 8. Forward characteristics of reverse diode; typical values

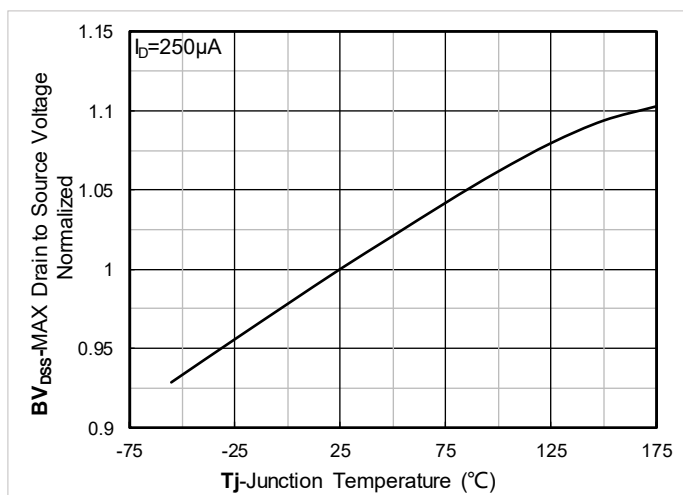


Figure 9. Normalized breakdown voltage

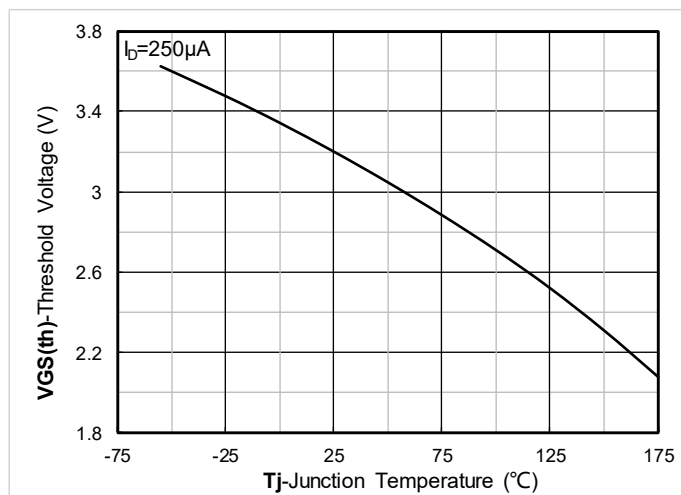


Figure 10. Gate Threshold voltage; typical values

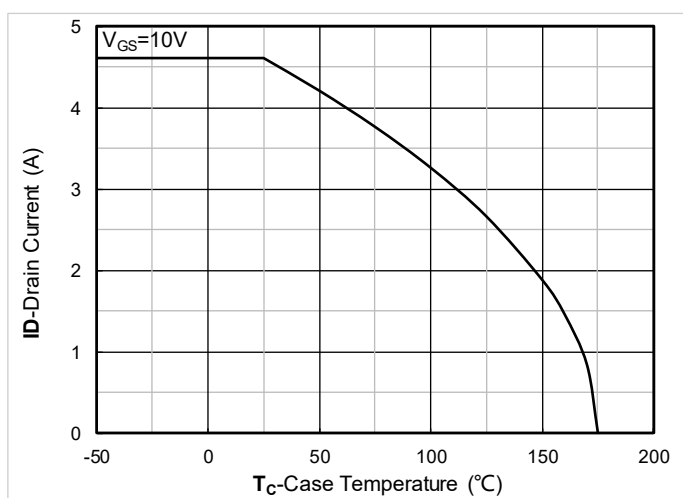


Figure 11. Current dissipation

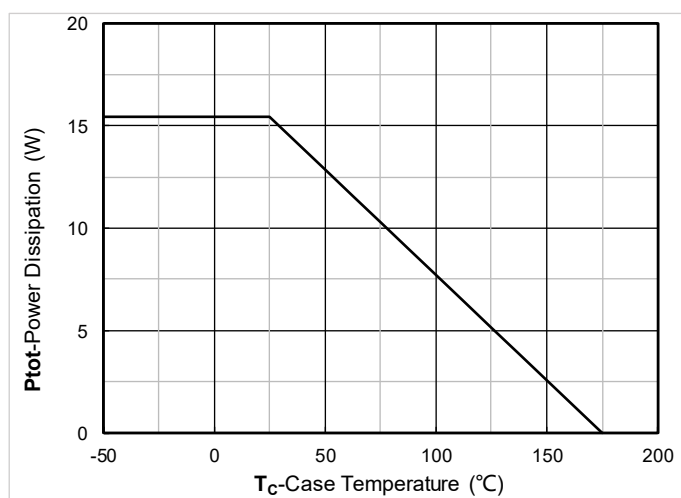


Figure 12. Power dissipation

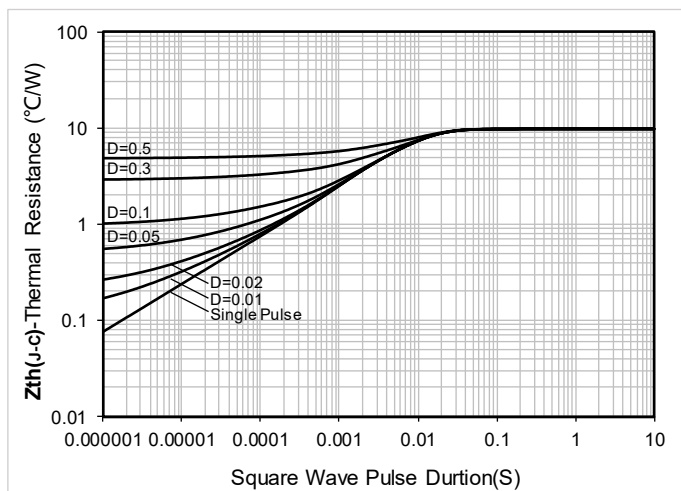


Figure 13. Maximum Transient Thermal Impedance

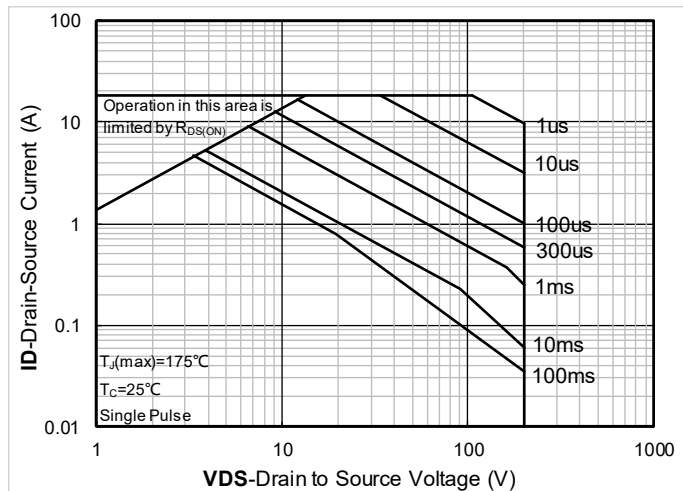


Figure 14. Safe Operation Area

## ■ Test Circuits & Waveforms

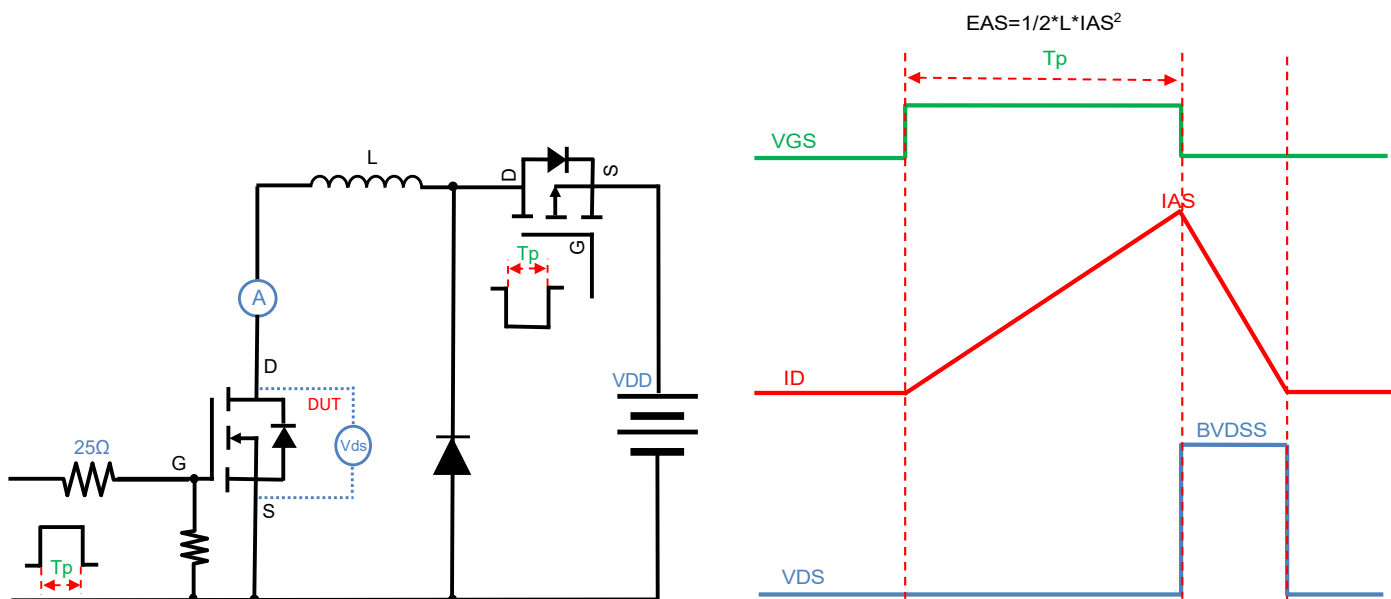


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

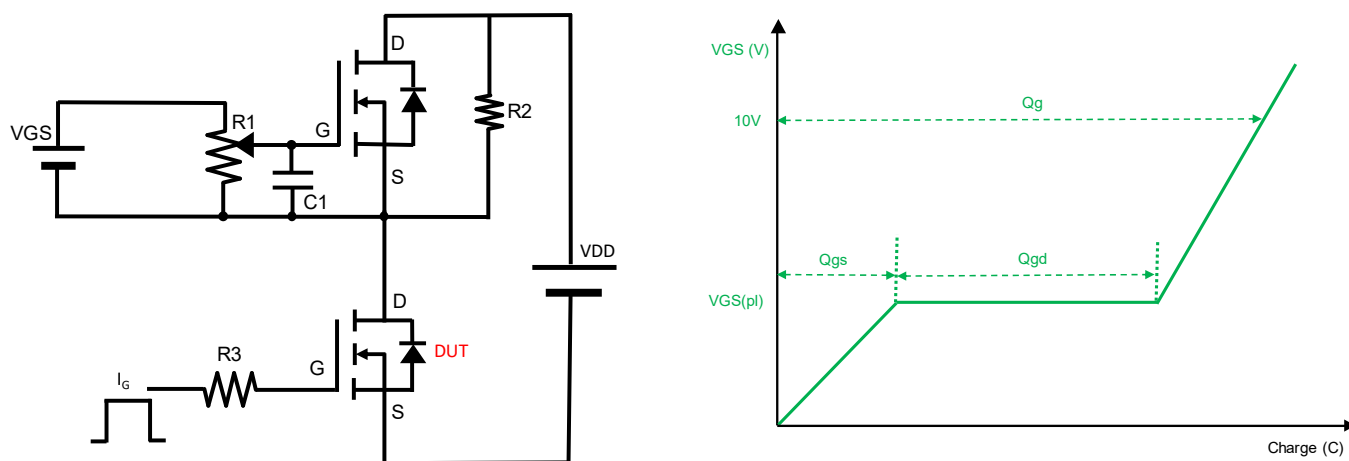


Figure B. Gate Charge Test Circuit & Waveform

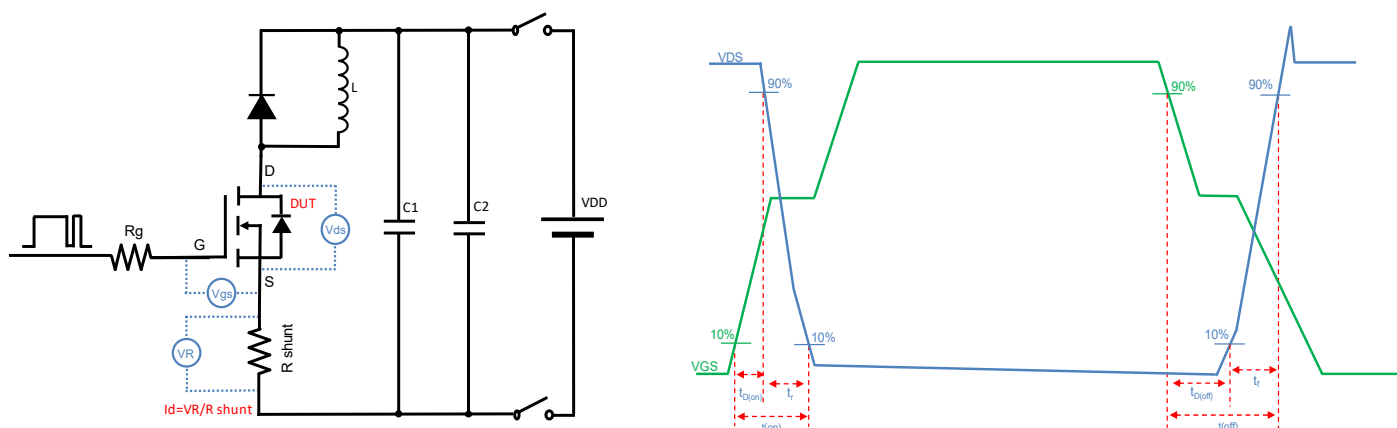


Figure C. Resistive Switching Test Circuit & Waveform

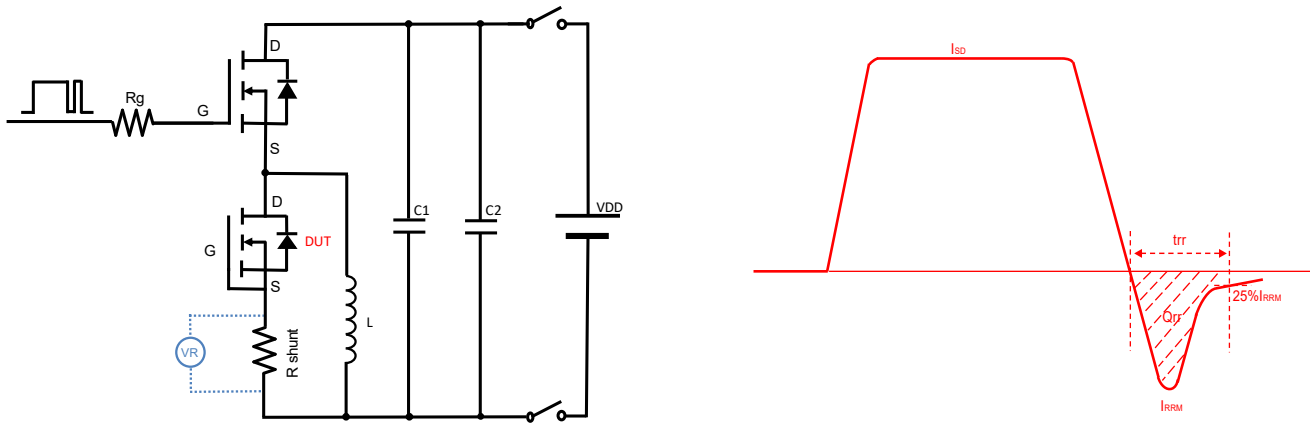
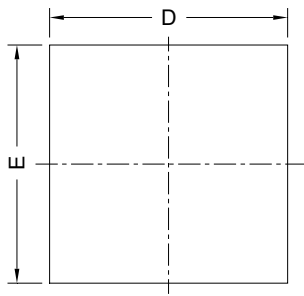


Figure D. Diode Recovery Test Circuit & Waveform

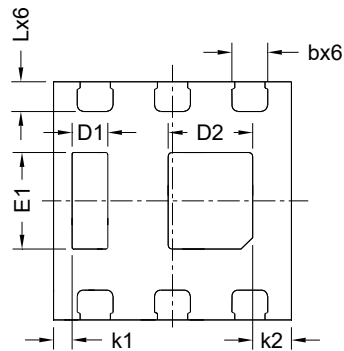


# YJQT280G20H

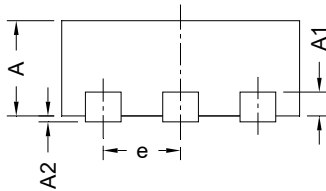
## ■ DFN2020-6L-E-0.8MM Package information



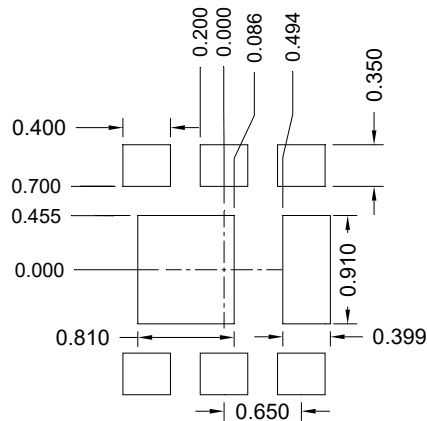
Top View  
正面视图



Bottom View  
背面视图



Side View  
侧面视图



Suggested Solder Pad Layout  
Top View

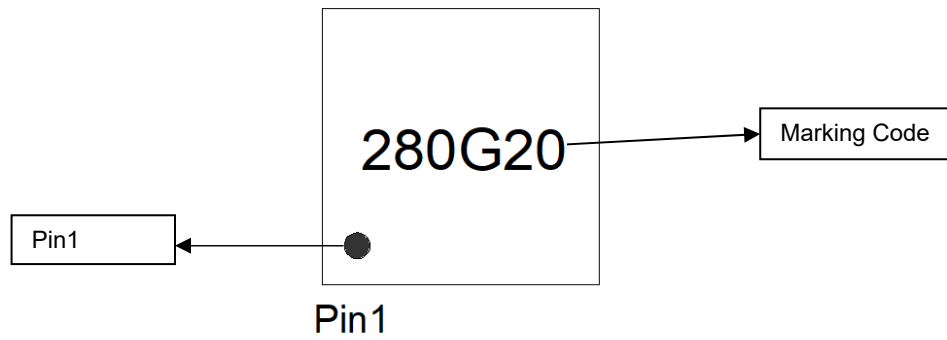
| SYMBOL | MILLIMETER |      |      |
|--------|------------|------|------|
|        | MIN        | NOM  | MAX  |
| D      | 1.90       | 2.00 | 2.10 |
| E      | 1.90       | 2.00 | 2.10 |
| A      | 0.70       | 0.80 | 0.90 |
| A1     | 0.20 BSC   |      |      |
| A2     |            |      | 0.10 |
| D1     | 0.20       | 0.30 | 0.40 |
| D2     | 0.61       | 0.71 | 0.81 |
| E1     | 0.71       | 0.81 | 0.91 |
| L      | 0.15       | 0.25 | 0.35 |
| b      | 0.20       | 0.30 | 0.40 |
| e      | 0.65 BSC   |      |      |
| k1     | 0.156 BSC  |      |      |
| k2     | 0.326 BSC  |      |      |

### Note:

- 1.Controlling dimension:in millimeters.
- 2.General tolerance:±0.10mm.
- 3.The pad layout is for reference purposes only.



## ■ Marking Information



### Note:

1. All marking is at middle of the product body
2. All marking is in laser printing
3. 280G20 is marking code
4. Body color: Black



## YJQT280G20H

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