

### Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | $I_D$ |
|---------------|-----------------|-------|
| -30V          | 2.4Ω@-10V       | -0.5A |
|               | 4Ω@-4.5V        |       |

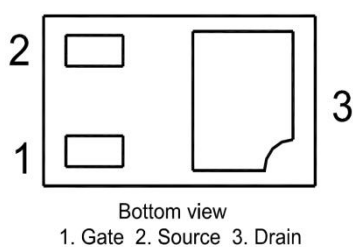
### Feature

- High Speed switch
- Built-in G-S Protection Diode
- ESD Protected

### Application

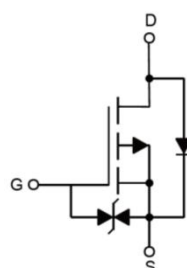
- Portable appliances
- Battery management

### Package



**DFN1006-3L**

### Circuit diagram



### Marking



### Absolute maximum ratings ( $T_A=25^{\circ}\text{C}$ unless otherwise noted)

| Parameter                                                 | Symbol          | Value      | Unit                 |
|-----------------------------------------------------------|-----------------|------------|----------------------|
| Drain-Source Voltage                                      | $V_{DS}$        | -30        | V                    |
| Gate-Source Voltage                                       | $V_{GS}$        | $\pm 20$   | V                    |
| Continuous Drain Current <sup>2)</sup>                    | $I_D$           | -0.5       | A                    |
| Pulsed Drain Current <sup>1)</sup>                        | $I_{DM}$        | -1         | A                    |
| Power Dissipation <sup>2)</sup>                           | $P_D$           | 1.2        | W                    |
| Thermal Resistance from Junction to Ambient <sup>2)</sup> | $R_{\theta JA}$ | 108        | $^{\circ}\text{C/W}$ |
| Junction Temperature                                      | $T_J$           | 150        | $^{\circ}\text{C}$   |
| Storage Temperature                                       | $T_{STG}$       | -55 ~ +150 | $^{\circ}\text{C}$   |

### Electrical characteristics ( $T_A=25^{\circ}\text{C}$ unless otherwise noted)

| Parameter                             | Symbol               | Test Condition                                                                               | Min. | Typ. | Max. | Unit |
|---------------------------------------|----------------------|----------------------------------------------------------------------------------------------|------|------|------|------|
| Static Characteristics                |                      |                                                                                              |      |      |      |      |
| Drain-source breakdown voltage        | V <sub>(BR)DSS</sub> | I <sub>D</sub> =-1mA                                                                         | -30  |      |      | V    |
| Zero gate voltage drain current       | I <sub>DSS</sub>     | V <sub>DS</sub> =-30V                                                                        |      |      | -1   | μA   |
| Gate-body leakage current             | I <sub>GSS</sub>     | V <sub>GS</sub> =±16V                                                                        |      |      | ±10  | μA   |
| Gate threshold voltage                | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA                                    | -1.3 |      | -2.3 | V    |
| Drain-source on-resistance            | R <sub>DS(on)</sub>  | V <sub>GS</sub> =-10V, I <sub>D</sub> =-0.2A                                                 |      |      | 2.4  | Ω    |
|                                       |                      | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-0.2A                                                |      |      | 4    |      |
| Dynamic characteristics <sup>3)</sup> |                      |                                                                                              |      |      |      |      |
| Input Capacitance                     | C <sub>iss</sub>     | V <sub>DS</sub> =-25V,V <sub>GS</sub> =0V,f =1MHz                                            |      | 38   |      | pF   |
| Output Capacitance                    | C <sub>oss</sub>     |                                                                                              |      | 10   |      |      |
| Reverse Transfer Capacitance          | C <sub>rss</sub>     |                                                                                              |      | 6    |      |      |
| Total Gate Charge                     | Q <sub>g</sub>       | V <sub>DS</sub> =-25V,V <sub>GS</sub> =-4.5V,<br>I <sub>D</sub> =-0.1A                       |      | 1.1  |      | nC   |
| Gate-Source Charge                    | Q <sub>gs</sub>      |                                                                                              |      | 0.3  |      |      |
| Gate-Drain Charge                     | Q <sub>gd</sub>      |                                                                                              |      | 0.2  |      |      |
| Turn-on delay time                    | t <sub>d(on)</sub>   | V <sub>DS</sub> =-25V, V <sub>GS</sub> =-10V,<br>I <sub>D</sub> =-0.1A, R <sub>G</sub> =6.8Ω |      | 14   |      | nS   |
| Turn-on rise time                     | t <sub>r</sub>       |                                                                                              |      | 4.3  |      |      |
| Turn-off delay time                   | t <sub>d(off)</sub>  |                                                                                              |      | 15   |      |      |
| Turn-off fall time                    | t <sub>f</sub>       |                                                                                              |      | 76   |      |      |
| Source-Drain Diode characteristics    |                      |                                                                                              |      |      |      |      |
| Diode Forward voltage                 | V <sub>SD</sub>      | V <sub>GS</sub> =0V, I <sub>S</sub> =-0.3A                                                   |      |      | -1.2 | V    |

Notes:

- 1) Pulse Test: Pulse Width  $\leq 100 \mu\text{s}$ , Duty Cycle  $\leq 2\%$ , Repetitive rating, pulse width limited by junction temperature  $T_{J(max)} = 150^{\circ}\text{C}$ .
- 2) Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate.
- 3) Guaranteed by design, not subject to production testing.

## Typical Characteristics

Fig. 1 Output Characteristics

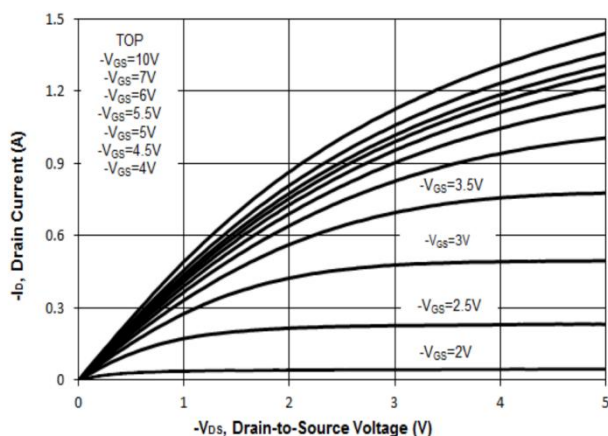


Fig. 2 Transfer Characteristics

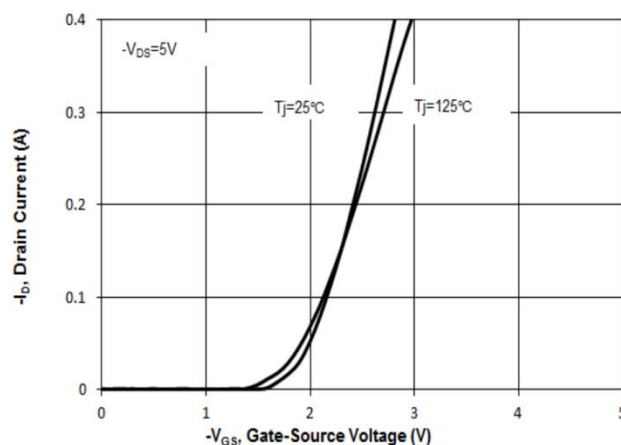


Fig. 3 On-Resistance vs. Drain Current

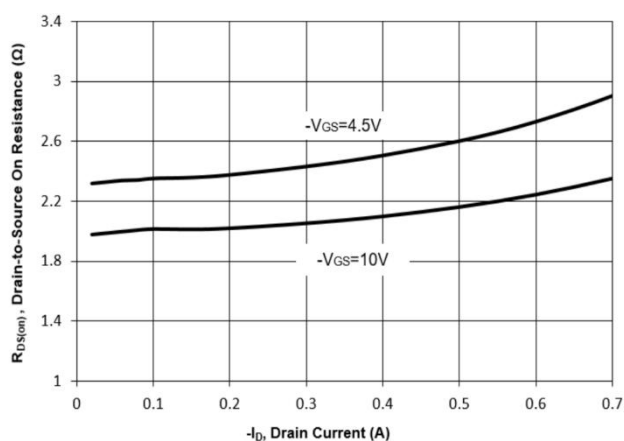


Fig. 4 On Resistance vs. Gate-Source Voltage

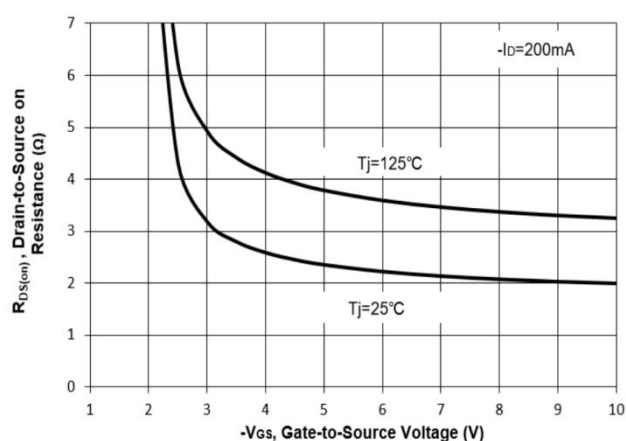


Fig. 5 Capacitance Characteristics

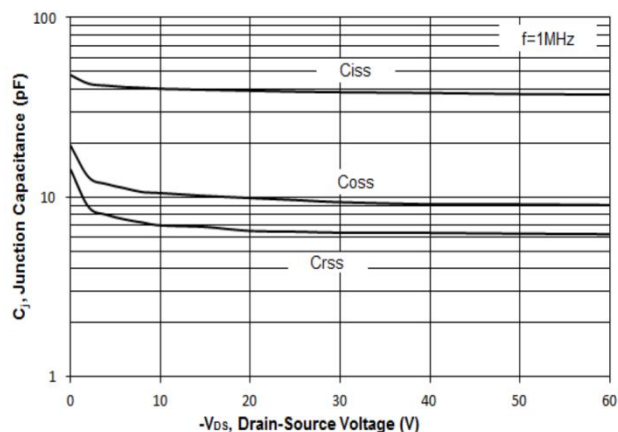
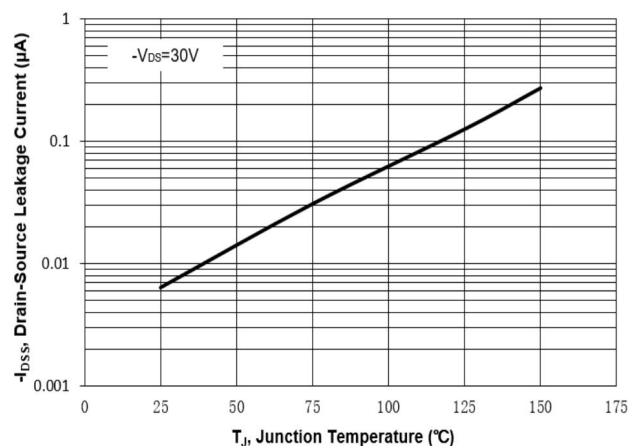


Fig. 6 Drain Leakage Current vs. Temperature



## Typical Characteristics

Fig. 7  $V_{(BR)DSS}$  vs. Junction Temperature

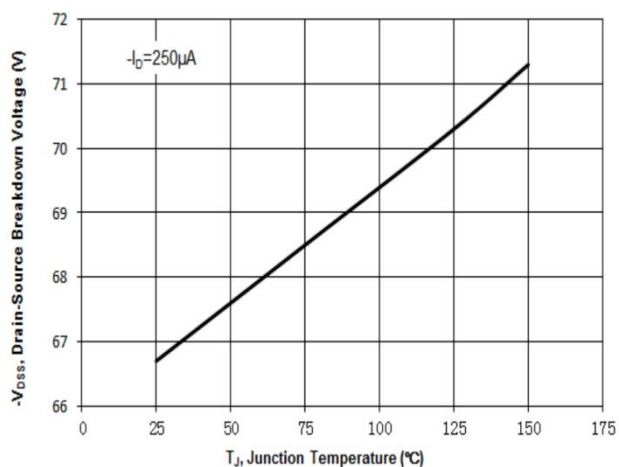


Fig. 8 Source-Drain Diode Forward

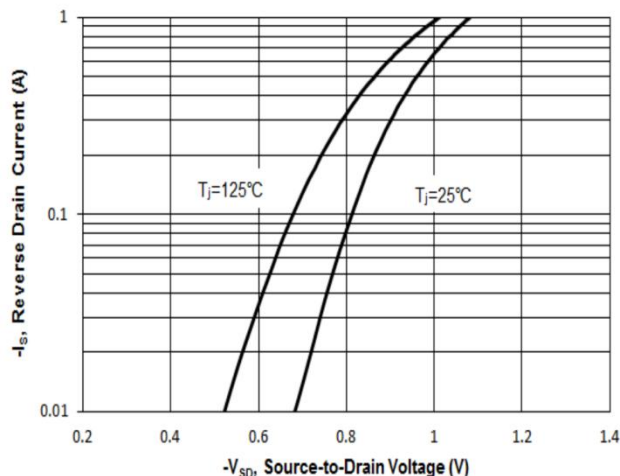


Fig. 9 Gate-Source Threshold Voltage vs. Temperature

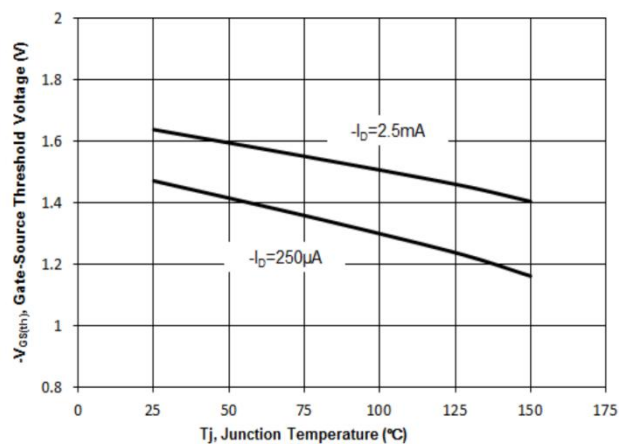


Fig. 10 On-Resistance vs. Temperature

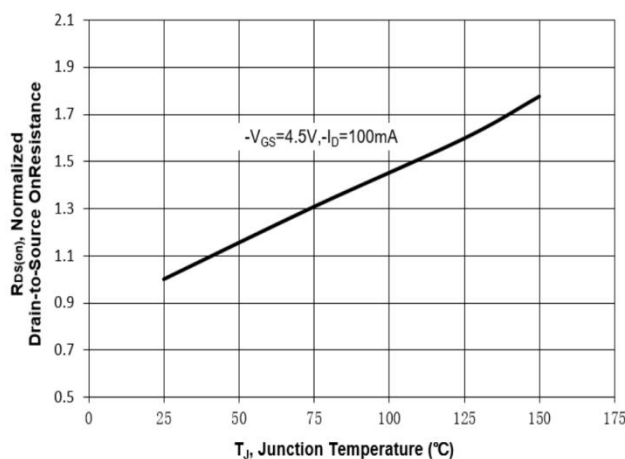
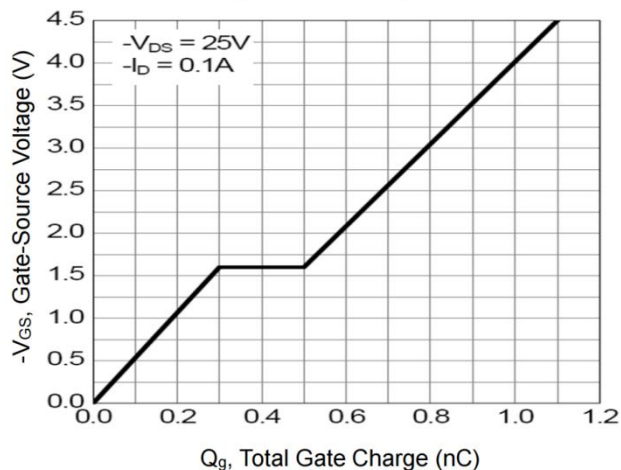
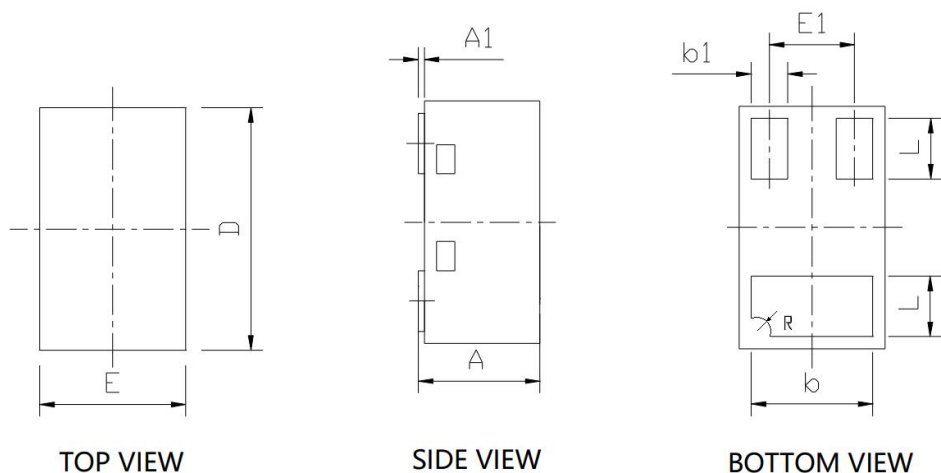


Fig. 11 Gate Charge



### DFN1006-3L Package Information



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 0.460                     | 0.510 | 0.018                | 0.020 |
| A1     | 0.000                     | 0.050 | 0.000                | 0.002 |
| b      | 0.450                     | 0.550 | 0.018                | 0.022 |
| b1     | 0.100                     | 0.200 | 0.004                | 0.008 |
| D      | 0.950                     | 1.050 | 0.037                | 0.041 |
| E      | 0.550                     | 0.650 | 0.022                | 0.026 |
| E1     | 0.325 BSC                 |       | 0.013 BSC            |       |
| L      | 0.200                     | 0.300 | 0.008                | 0.012 |
| R      | 0.050                     | 0.150 | 0.002                | 0.006 |