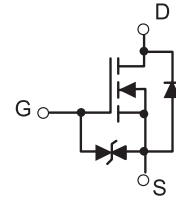
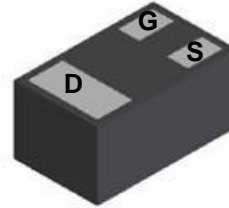




N-Channel 20V,1.2A, N-MOSFET

FEATURES

- TrenchFET® Power MOSFET: 1.8-V Rated
- Gate-Source ESD Protected
- High-Side Switching
- Low On-Resistance: 0.4Ω(max)
- Low Threshold: 0.7V (typ)
- Fast Switching Speed: 10 ns
- S- Prefix for Automotive and Other Applications Requiring



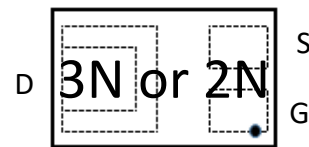
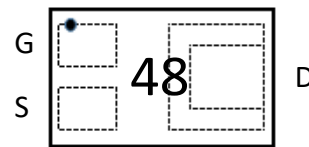
DFN1006-3L

BENEFITS

- Ease in Driving Switches
- Low Offset (Error) Voltage
- Low-Voltage Operation
- High-Speed Circuits
- Low Battery Voltage Operation

APPLICATIONS

- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories
- Battery Operated Systems
- Power Supply Converter Circuits
- Load/Power Switching Cell Phones, Pagers



Marking: 48, 3N, 2N

| ABSOLUTE MAXIMUM RATINGS (T _A = 25°C UNLESS OTHERWISE NOTED) | | | | | |
|---|-----------------------------------|-----------------------|--------------|------|----|
| Parameter | Symbol | 5 secs | Steady State | Unit | |
| Drain-Source Voltage | V _{DS} | 20 | | V | |
| Gate-Source Voltage | V _{GS} | ±8 | | | |
| Continuous Drain Current (T _J = 150°C) ^b | I _D | T _A = 25°C | 1200 | 900 | mA |
| | | T _A = 85°C | 800 | 600 | |
| Pulsed Drain Current ^a | I _{DM} | 2500 | | | |
| Continuous Source Current (diode conduction) ^b | I _S | 275 | 250 | | |
| Maximum Power Dissipation ^b for SC-89 | P _D | T _A = 25°C | 275 | 250 | mW |
| | | T _A = 85°C | 160 | 140 | |
| Operating Junction and Storage Temperature Range | T _J , T _{stg} | -55 to 150 | | °C | |

Notes

- d. Pulse width limited by maximum junction temperature.
- e. Surface Mounted on FR4 Board.



● **Electrical Characteristics (@TA=25°C unless otherwise noted)**

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|----------------------------------|---------------|--|-----|-----|----------|------------|
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$ | 20 | -- | -- | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=16V, V_{GS}=0V$ | -- | -- | 1 | μA |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}=V_{GS}, I_{DS}=250\mu A$ | 0.5 | -- | 1.0 | V |
| Gate Leakage Current | I_{GSS} | $V_{GS}=\pm 8V, V_{DS}=0V$ | -- | -- | ± 10 | μA |
| Drain-Source On-state Resistance | $R_{DS(on)}$ | $V_{GS}=4.5V, I_D=0.5A$ | -- | 250 | 400 | m Ω |
| | | $V_{GS}=2.5V, I_D=0.5A$ | -- | 300 | 500 | m Ω |
| | | $V_{GS}=1.8V, I_D=0.35A$ | -- | 400 | 650 | m Ω |
| Total Gate Charge | Q_g | $V_{GS}=4.5V, V_{DS}=10V, I_D=1A$ | -- | 2 | -- | nC |
| Gate- Source Charge | Q_{gs} | | -- | 0.3 | -- | nC |
| Gate- Drain Charge | Q_{gd} | | -- | 0.3 | -- | nC |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{GS}=4.5V, V_{DS}=10V, R_{GEN}=6\Omega, I_D=2A$ | -- | 1.2 | -- | ns |
| Turn-on Rise Time | t_r | | -- | 25 | -- | ns |
| Turn-off Delay Time | $t_{d(off)}$ | | -- | 14 | -- | ns |
| Turn-off Fall Time | t_f | | -- | 15 | -- | ns |
| Input Capacitance | C_{iss} | $V_{GS}=0V, V_{DS}=10V, f=1MHz$ | -- | 43 | -- | pF |
| Output Capacitance | C_{oss} | | -- | 9 | -- | pF |
| Reverse Transfer Capacitance | C_{rss} | | -- | 6 | -- | pF |

● **Reverse Diode Characteristics (@TA=25°C unless otherwise noted)**

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|----------------------------------|----------|-------------------------------------|-----|-----|-----|------|
| Continuous Diode Forward Current | I_{SD} | $V_G=V_D=0V$, Force Current | -- | -- | 3.5 | A |
| Diode Forward Voltage | V_{SD} | $I_{SD}=0.5A, V_{GS}=0V$ | -- | -- | 1.3 | V |
| Reverse Recovery Time | t_{rr} | $I_F = 1A$ $di/dt = 100 A/\mu s$ | -- | 9 | -- | nS |
| Reverse Recovery Charge | Q_{rr} | | -- | 1 | -- | nC |

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with TA=25C. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature .

C: The current rating is based on the t<10s junction to ambient thermal resistance rating.



● TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

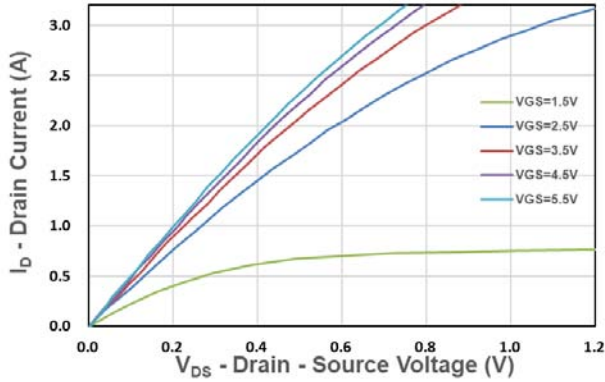


Figure 1. Output Characteristics

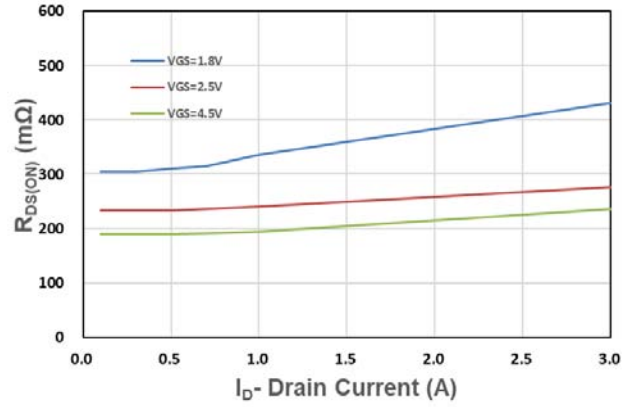


Figure 2. On-Resistance vs. I

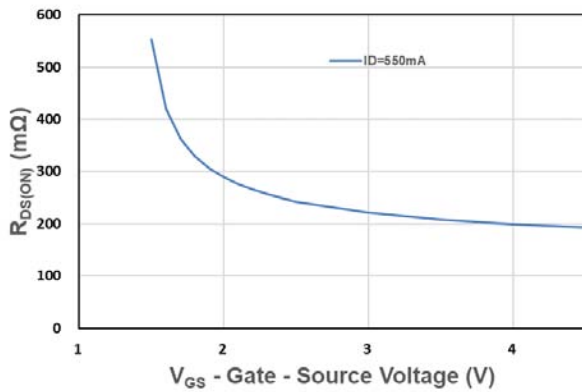


Figure 3. On-Resistance vs. V_{GS}

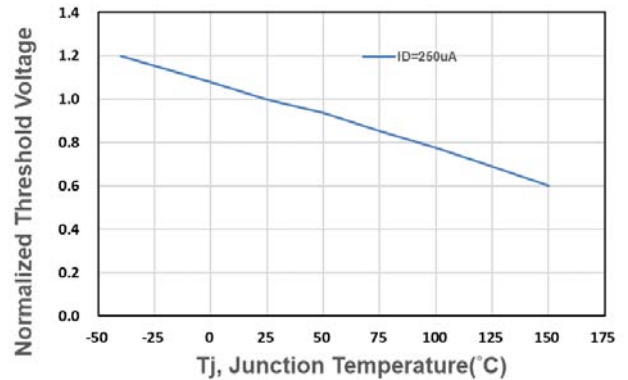


Figure 4. Gate Threshold Voltage

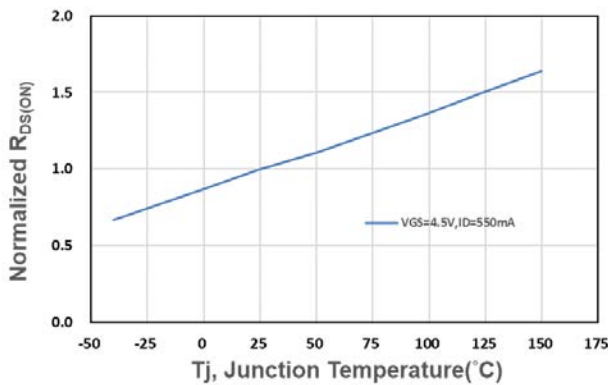


Figure 5. Drain-Source On Resistance

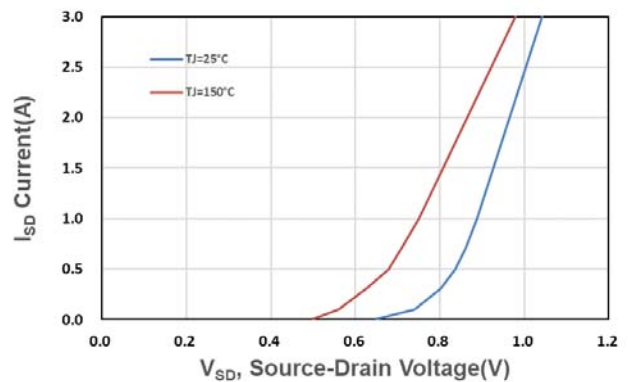


Figure 6. Source-Drain Diode Forward

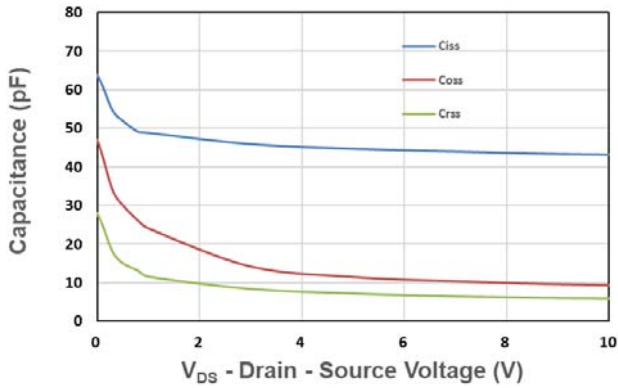


Figure 7. Capacitance

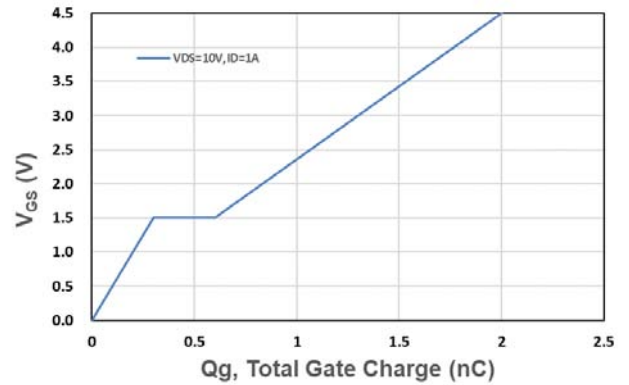


Figure 8. Gate Charge Characteristics

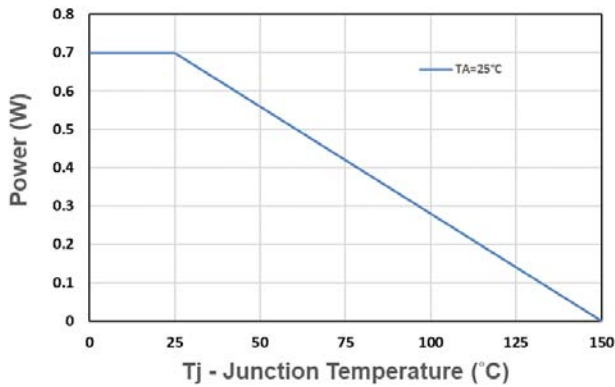


Figure 9. Power Dissipation

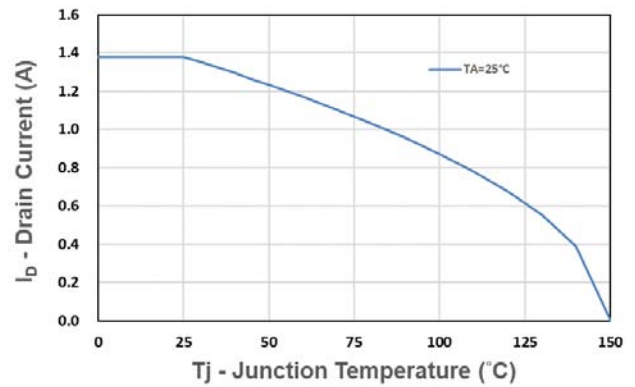


Figure 10. Drain Current

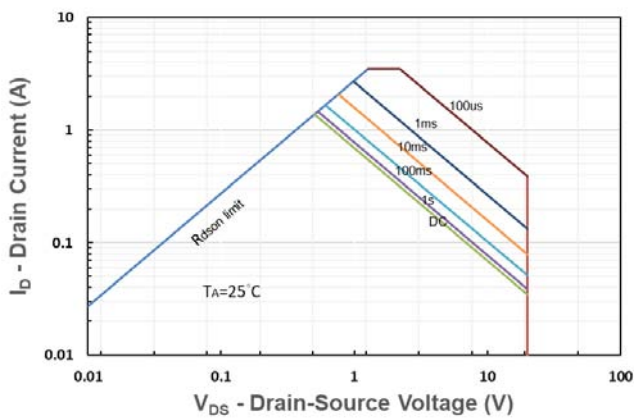


Figure 11. Safe Operating Area

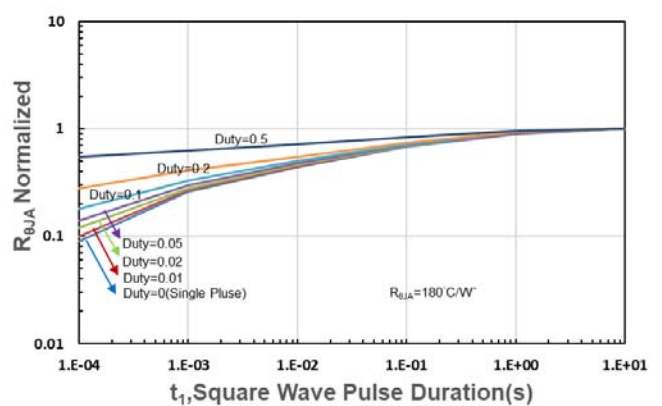
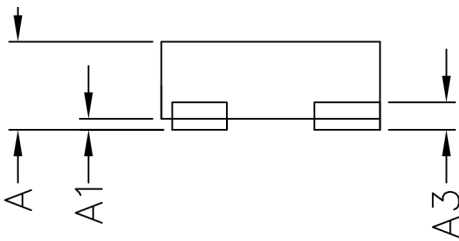
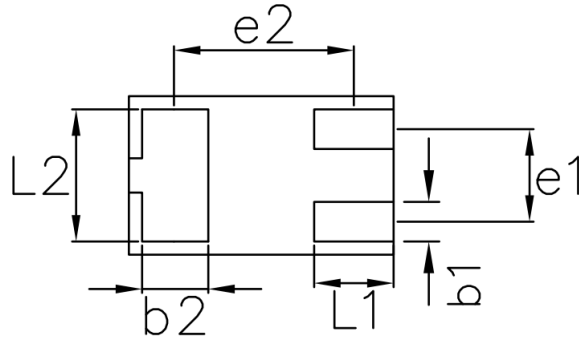
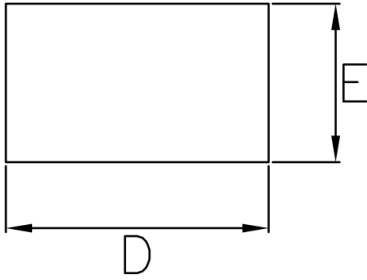


Figure 12. $R_{\theta JA}$ Transient Thermal Impedance



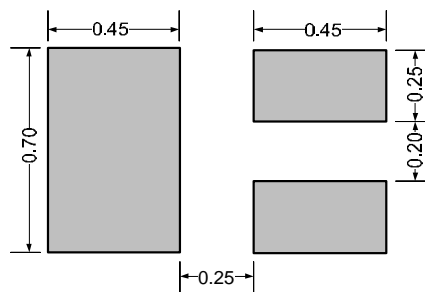
DFN1006-3L Package Outline Dimensions



| COMMON DIMENSIONS(MM) | | | |
|-----------------------|------------------|------|------|
| PKG. | X1: EXTREME THIN | | |
| REF. | MIN. | NOM. | MAX |
| A | >0.40 | — | 0.50 |
| A1 | 0.00 | — | 0.05 |
| A3 | 0.125 REF. | | |
| D | 0.95 | 1.00 | 1.05 |
| E | 0.55 | 0.60 | 0.65 |
| b1 | 0.10 | 0.15 | 0.20 |
| b2 | 0.20 | 0.25 | 0.30 |
| L1 | 0.20 | 0.30 | 0.40 |
| L2 | 0.40 | 0.50 | 0.60 |
| e1 | 0.35 BSC | | |
| e2 | 0.675 BSC | | |

DFN1006-3L Suggested Pad Layout

Recommend land pattern (Unit: mm)



Note: This land pattern is for your reference only. Actual pad layouts may vary depending on application.