

N-Channel Enhancement MOSFET

GENERAL DESCRIPTION

The ME20N03 is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance. These devices are particularly suited for low voltage application such as cellular phone and notebook computer power management and other battery powered circuits where high-side switching, and low in-line power loss are needed in a very small outline surface mount package.

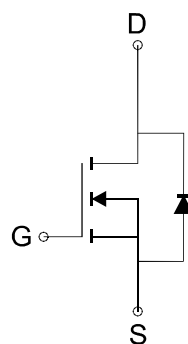
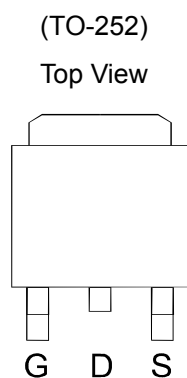
FEATURES

- $R_{DS(ON)} \leq 15m\Omega @ V_{GS}=10V$
- $R_{DS(ON)} \leq 20m\Omega @ V_{GS}=4.5V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability

APPLICATIONS

- Power Management in Desktop Computer
- Video Graphic Accelerate Card
- Battery Powered System
- DC/DC Converter

PIN CONFIGURATION



N-Channel MOSFET

Absolute Maximum Ratings (TA=25°C Unless Otherwise Noted)

| Parameter | | Symbol | Limit | Unit | |
|---|-------------------|-----------------|------------------------|------|------|
| Drain-Source Voltage | | V_{DSS} | 30 | V | |
| Gate-Source Voltage | | V_{GSS} | ± 20 | V | |
| Continuous Drain Current | $T_C=25^\circ C$ | I_D | 39 ^(Note 1) | A | |
| | $T_C=100^\circ C$ | | 25 | | |
| Pulsed Drain Current | | I_{DM} | 100 | A | |
| Maximum Power Dissipation | $T_C=25^\circ C$ | P_D | 37 | W | |
| | $T_C=70^\circ C$ | | 24 | | |
| Operating Junction Temperature | | T_J | -55 to 150 | °C | |
| Thermal Resistance-Junction to Ambient ^{†(Note 2)} | | $R_{\theta JA}$ | $T \leq 10$ sec | 15 | °C/W |
| | | | Steady State | 45 | |
| Thermal Resistance-Junction to Case | | $R_{\theta JC}$ | 3.3 | °C/W | |

Note 1: Bonding wire current limit

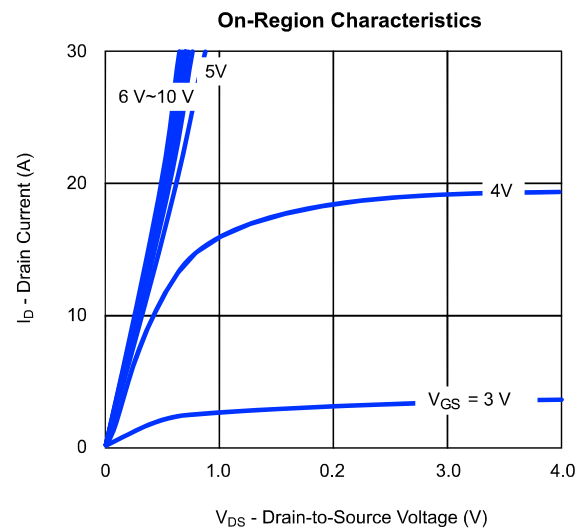
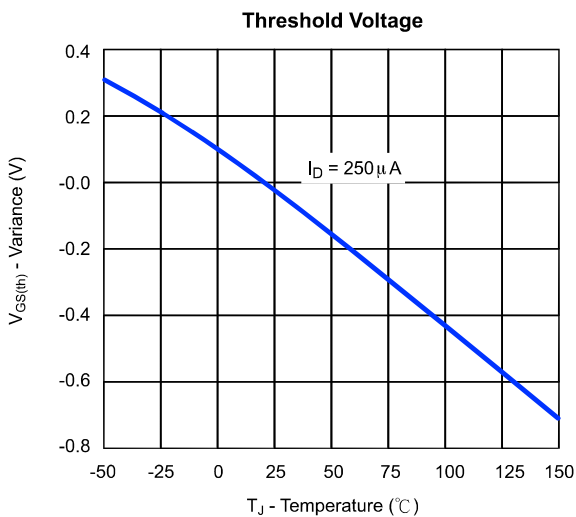
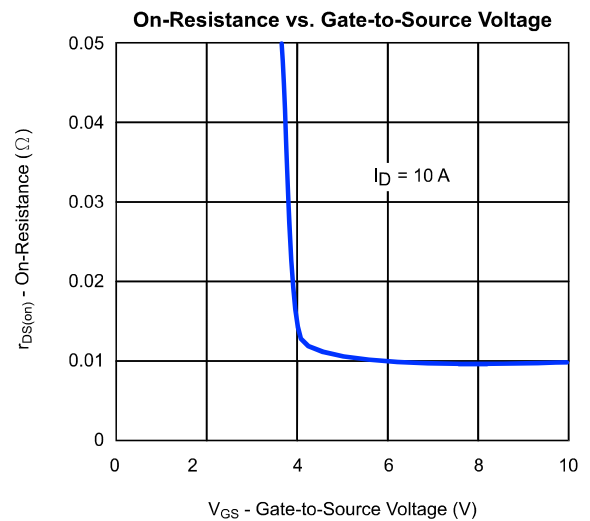
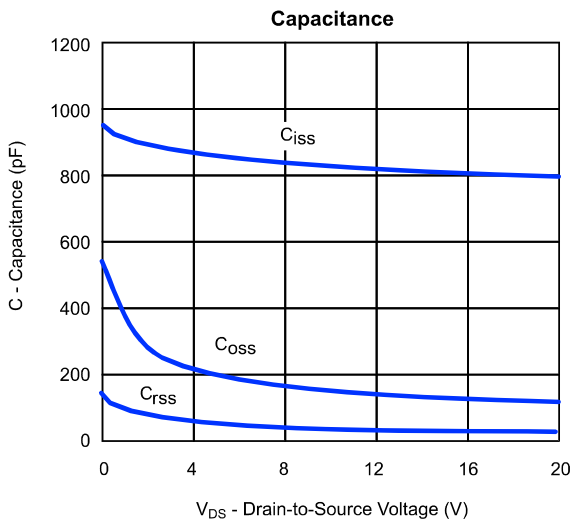
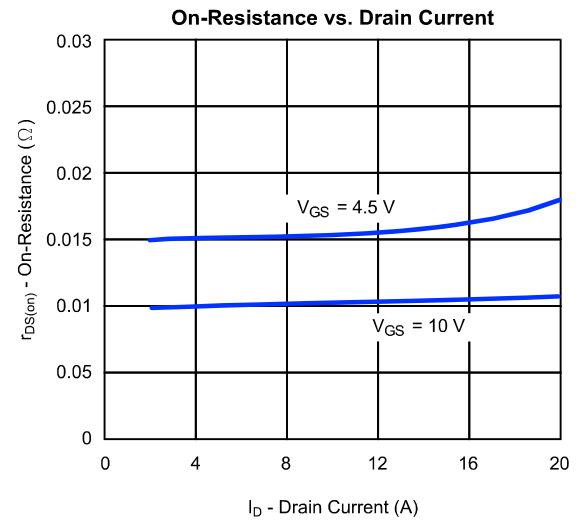
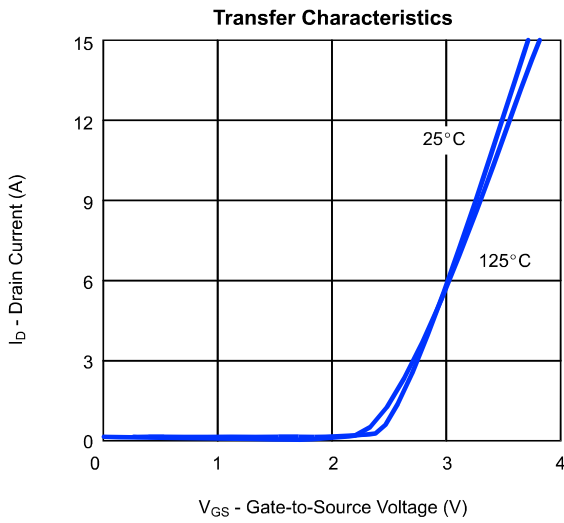
Note 2: The device mounted on 1in² FR4 board with 2 oz copper

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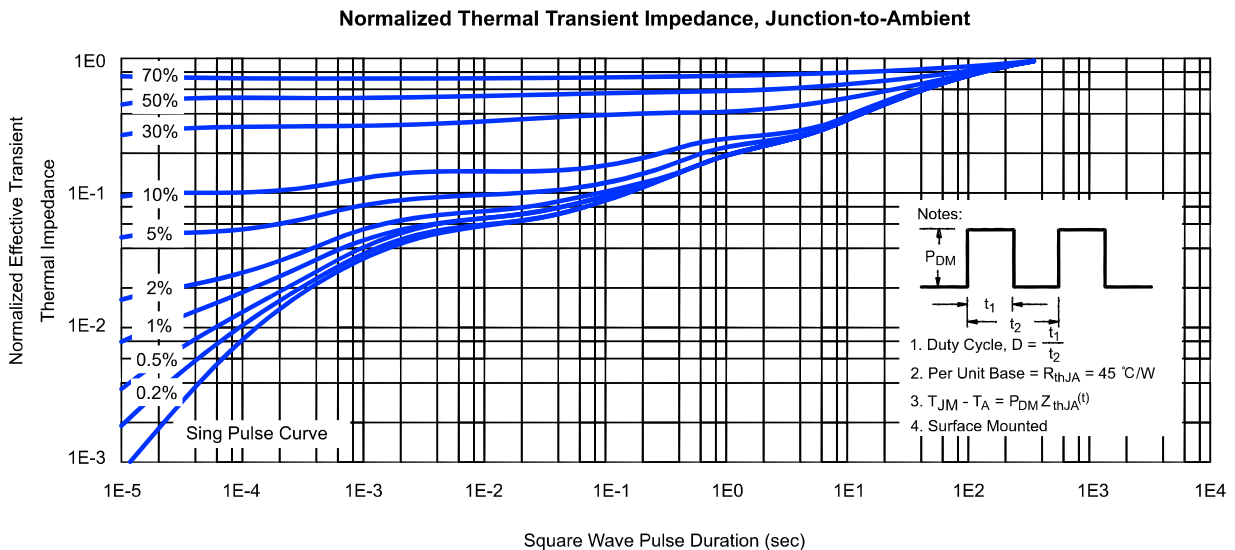
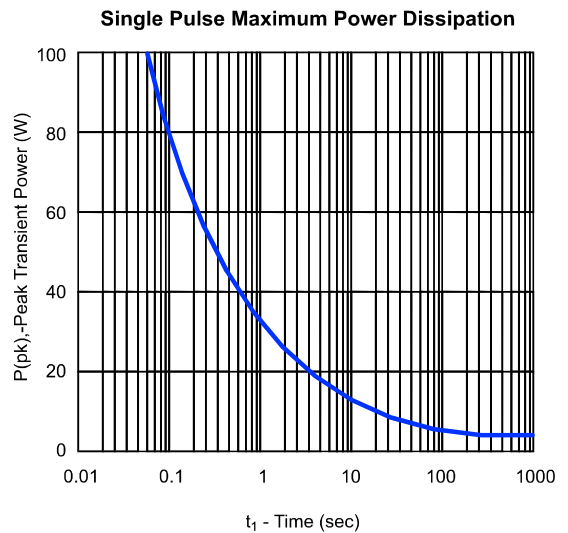
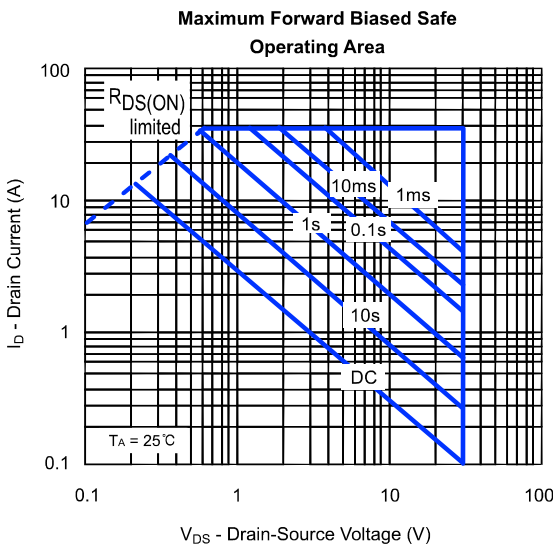
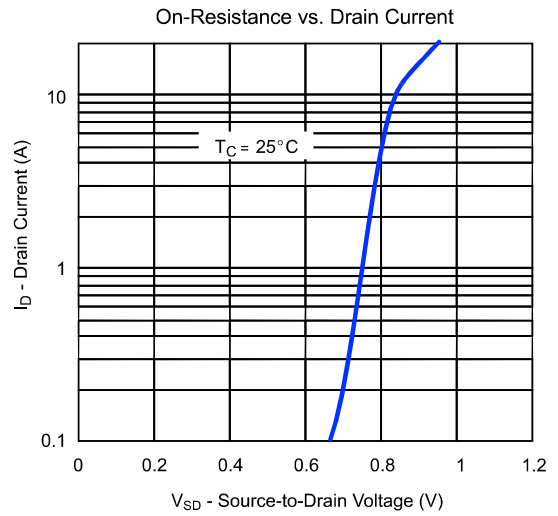
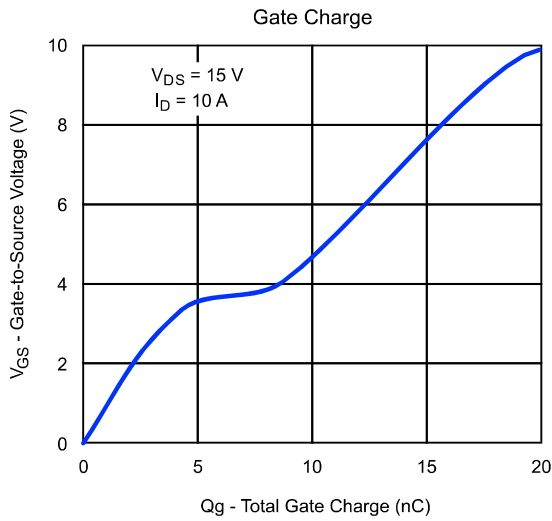
Electrical Characteristics (TA=25°C Unless Otherwise Specified)

| Symbol | Parameter | Limit | Min | Typ | Max | Unit |
|-----------------------|----------------------------------|---|-----|------|------|------|
| STATIC | | | | | | |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250 μA | 1 | 2 | 3 | V |
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250 μA | 30 | | | |
| I _{GSS} | Gate-Body Leakage Current | V _{DS} =0V, V _{GS} =±20V | | | ±100 | nA |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =30V, V _{GS} =0V | | | 1 | μA |
| | | V _{DS} =30V, V _{GS} =0V T _J =55°C | | | 5 | |
| R _{DS(ON)} | Drain-Source On-State Resistance | V _{GS} =10V, I _D =15A | | 11 | 15 | mΩ |
| | | V _{GS} =4.5V, I _D =15A | | 16 | 20 | |
| V _{SD} | Diode Forward Voltage | I _S =1A, V _{GS} =0V | | 0.75 | 1.1 | V |
| DYNAMIC | | | | | | |
| C _{iss} | Input Capacitance | V _{DS} =15V, V _{GS} =0V, f=1MHz | | 700 | 800 | pF |
| C _{oss} | Output Capacitance | | | 120 | | |
| C _{rss} | Reverse Transfer Capacitance | | | 35 | | |
| R _g | Gate Resistance | V _{DS} =0, V _{GS} =0V, f=1MHz | | 0.9 | | Ω |
| Q _g (4.5V) | Total Gate Charge | V _{DS} =15V, V _{GS} =4.5V, I _D =10A | | 11 | 14 | nC |
| Q _g (10V) | Total Gate Charge | V _{DS} =15V, V _{GS} =10V, I _D =10A | | 20 | 26 | |
| Q _{gs} | Gate-Source Charge | | | 5 | | |
| Q _{gd} | Gate-Drain Charge | | | 4.9 | | |
| t _{d(on)} | Turn-On Delay Time | V _{DS} =15V, R _L =1.5Ω V _{GS} =1A, R _{GEN} =3Ω R _G =6Ω | | 14 | 17 | ns |
| t _r | Turn-On Rise Time | | | 12 | 15 | |
| t _{d(off)} | Turn-Off Delay Time | | | 43 | 55 | |
| t _f | Turn-On Fall Time | | | 4 | 6 | |

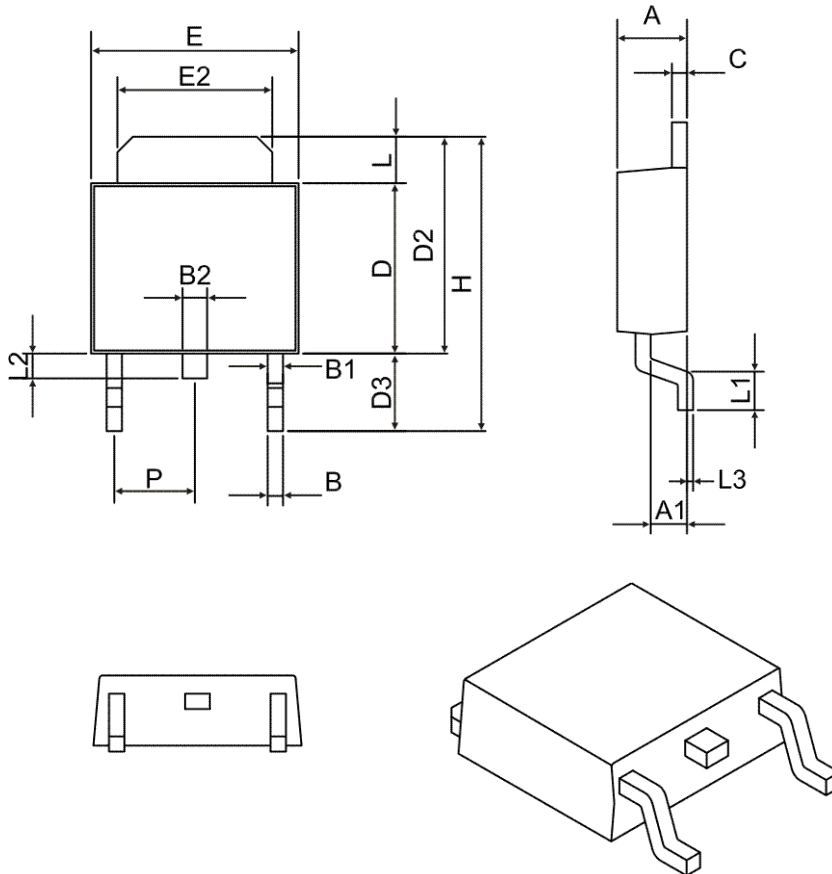
Typical Characteristics (T_J = 25°C Noted)



Typical Characteristics (T_J = 25°C Noted)



TO-252 Package Outline



| SYMBOL | MILLIMETERS (mm) | |
|--------|------------------|-------|
| | MIN | MAX |
| A | 2.00 | 2.50 |
| A1 | 0.90 | 1.30 |
| B | 0.50 | 0.85 |
| B1 | 0.50 | 0.80 |
| B2 | 0.50 | 1.00 |
| C | 0.40 | 0.60 |
| D | 5.20 | 5.70 |
| D2 | 6.50 | 7.30 |
| D3 | 2.20 | 3.00 |
| H | 9.50 | 10.50 |
| E | 6.30 | 6.80 |
| E2 | 4.50 | 5.50 |
| L | 1.30 | 1.70 |
| L1 | 0.90 | 1.70 |
| L2 | 0.50 | 1.10 |
| L3 | 0 | 0.30 |
| P | 2.00 | 2.80 |