



## N-Channel Enhancement Mode Field Effect Transistor

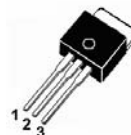
### ■ Applications

- Portable Equipment.
- LCD Display Inverter.
- DC/DC converters
- Other switching applications.

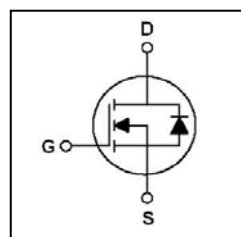
### ■ Features

- 50A, 30V(See Note),  $R_{DS(on)} < 6.6mV\Omega @ V_{GS} = 10V$
- Fast switching
- 100% avalanche tested
- Minimize input capacitance and gate charge
- Equivalent Type:ME70N03

TO-251



1- G 2-D 3-S



### ■ Maximum Ratings (Ta=25°C unless otherwise specified)

|                |                                                       |       |           |
|----------------|-------------------------------------------------------|-------|-----------|
| $T_{stg}$      | Storage Temperature                                   | ----- | -55~150°C |
| $T_j$          | Operating Junction Temperature                        | ----- | 150°C     |
| $V_{DSS}$      | Drain-Source Voltage                                  | ----- | 30V       |
| $V_{GSS}$      | Gate-Source Voltage                                   | ----- | ±20V      |
| $I_D$          | Drain Current (Continuous)( $T_c=25^\circ C$ )        | ----- | 50A       |
| $I_{DM}$       | Pulsed Drain Current (Note 1)                         | ----- | 100A      |
| $P_D$          | Maximum Power Dissipation ( $T_c=25^\circ C$ )        | ----- | 40W       |
| $E_{AS}$       | Pulsed Avalanche Energy( $L=0.5mH$ , $R_g=25\Omega$ ) | ----- | 115mJ     |
| $R_{thj-case}$ | Thermal Resistance Junction-case                      | ----- | 20°C/W    |

**Electrical Characteristics** (Ta=25℃ unless otherwise specified)

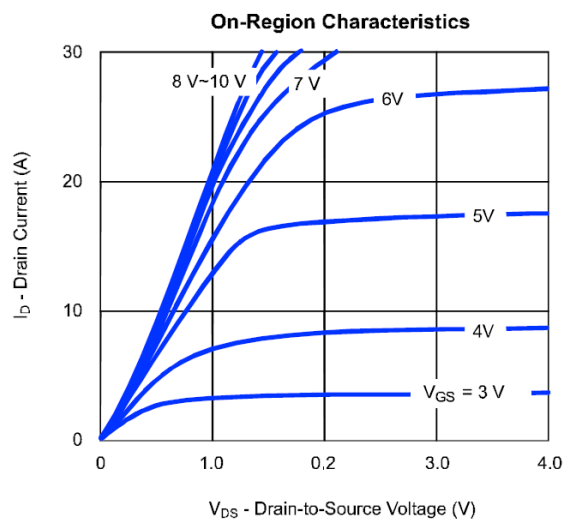
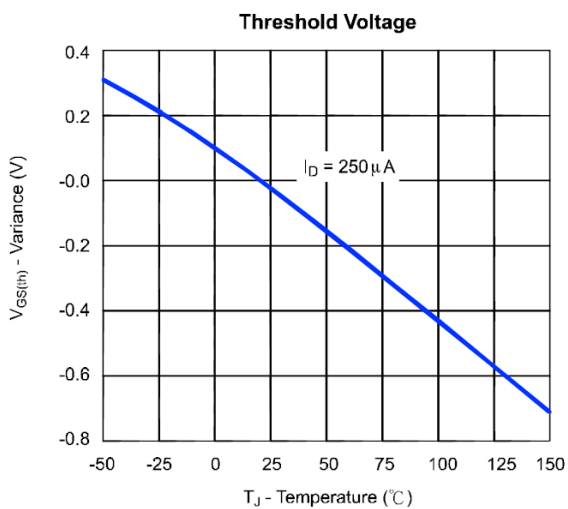
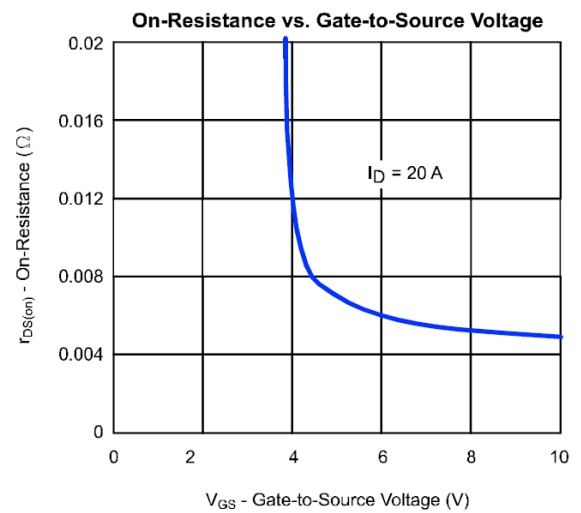
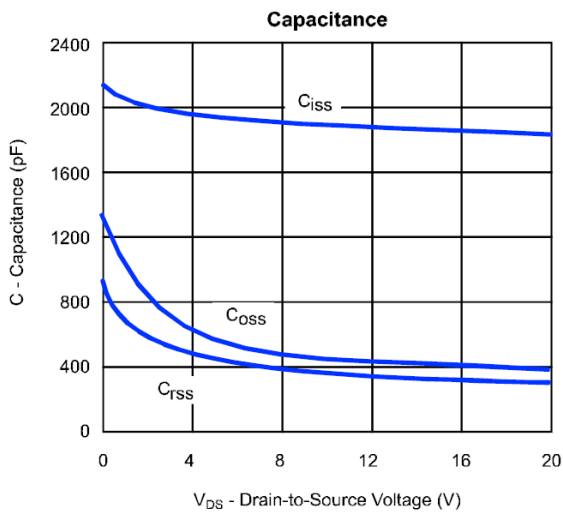
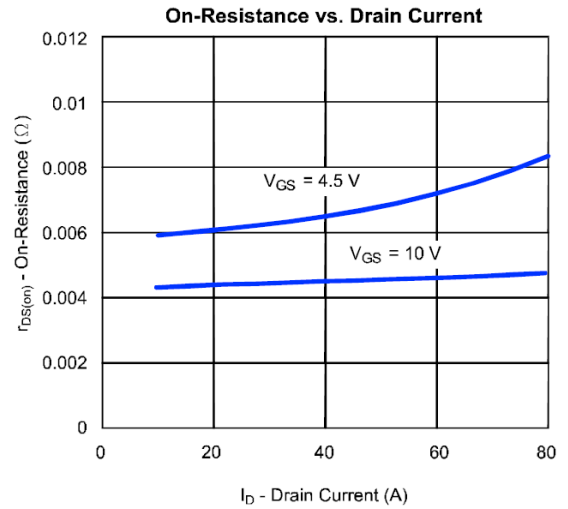
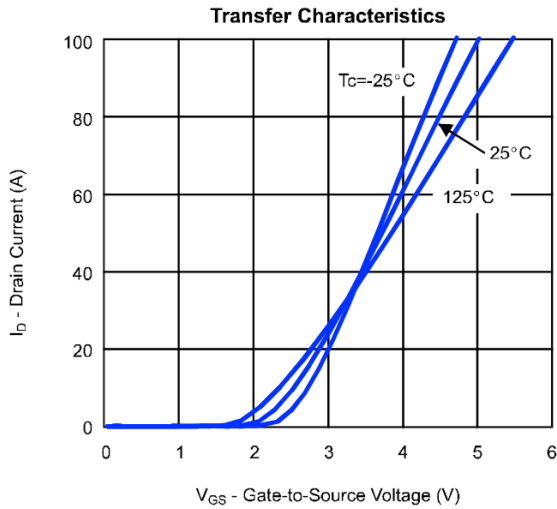
| Symbol                                                 | Items                                         | Min. | Typ. | Max. | Unit | Conditions                                                                                               |
|--------------------------------------------------------|-----------------------------------------------|------|------|------|------|----------------------------------------------------------------------------------------------------------|
| Off Characteristics                                    |                                               |      |      |      |      |                                                                                                          |
| BV <sub>DSS</sub>                                      | Drain-Source Breakdown Voltage                | 30   |      |      | V    | I <sub>D</sub> =250μA ,V <sub>GS</sub> =0V                                                               |
| I <sub>DSS</sub>                                       | Zero Gate Voltage Drain Current               |      |      | 1    | μA   | V <sub>DS</sub> =30V, V <sub>GS</sub> =0V                                                                |
| I <sub>GSS</sub>                                       | Gate – Body Leakage                           |      |      | ±100 | nA   | V <sub>GS</sub> = ±20V , V <sub>DS</sub> =0V                                                             |
| On Characteristics                                     |                                               |      |      |      |      |                                                                                                          |
| V <sub>GS(th)</sub>                                    | Gate Threshold Voltage                        | 1.0  |      | 3.0  | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA                                                |
| R <sub>DS(on)</sub>                                    | Static Drain-Source On-Resistance             |      | 5.5  | 6.6  | mΩ   | V <sub>GS</sub> =10V, I <sub>D</sub> =30A (Note 2)                                                       |
|                                                        |                                               |      | 8.5  | 11   | mΩ   | V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A (Note 2)                                                      |
| Dynamic Characteristics and Switching Characteristics  |                                               |      |      |      |      |                                                                                                          |
| C <sub>iss</sub>                                       | Input Capacitance                             |      | 1640 |      | pF   | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V,<br>f = 1.0 MHz                                              |
| C <sub>oss</sub>                                       | Output Capacitance                            |      | 260  |      | pF   |                                                                                                          |
| C <sub>rss</sub>                                       | Reverse Transfer Capacitance                  |      | 84   |      | pF   |                                                                                                          |
| t <sub>d(on)</sub>                                     | Turn - On Delay Time                          |      | 19   |      | nS   | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 10 V,<br>R <sub>L</sub> =15 Ω ,R <sub>G</sub> = 3 Ω<br>(Note 2) |
| t <sub>r</sub>                                         | Rise Time                                     |      | 15   |      | nS   |                                                                                                          |
| t <sub>d(off)</sub>                                    | Turn - Off Delay Time                         |      | 54   |      | nS   |                                                                                                          |
| t <sub>f</sub>                                         | Fall Time                                     |      | 6.5  |      | nS   |                                                                                                          |
| Q <sub>g</sub>                                         | Total Gate Charge                             |      | 8.7  |      | nC   | V <sub>DS</sub> =15V, I <sub>D</sub> =25A,<br>V <sub>GS</sub> = 4.5V (Note 2)                            |
| Q <sub>gs</sub>                                        | Gate–Source Charge                            |      | 4.4  |      | nC   |                                                                                                          |
| Q <sub>gd</sub>                                        | Gate–Drain Charge                             |      | 3.6  |      | nC   |                                                                                                          |
| R <sub>g</sub>                                         | Gate Resistance                               |      | 0.9  |      | Ω    | f=1MHz                                                                                                   |
| Drain-Source Diode Characteristics and Maximun Ratings |                                               |      |      |      |      |                                                                                                          |
| I <sub>S</sub>                                         | Continuous Source–Drain Diode Forward Current |      |      | 20   | A    |                                                                                                          |
| I <sub>SM</sub>                                        | Pulsed Drain-Source Diode Forward Current     |      |      | 40   | A    |                                                                                                          |
| V <sub>SD</sub>                                        | Source–Drain Diode Forward On–Voltage         |      | 0.85 | 1.2  | V    | I <sub>S</sub> =20A,V <sub>GS</sub> =0(Note 2)                                                           |

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Pulse Test: Pulse width≤300μS, Duty Cycle≤2%

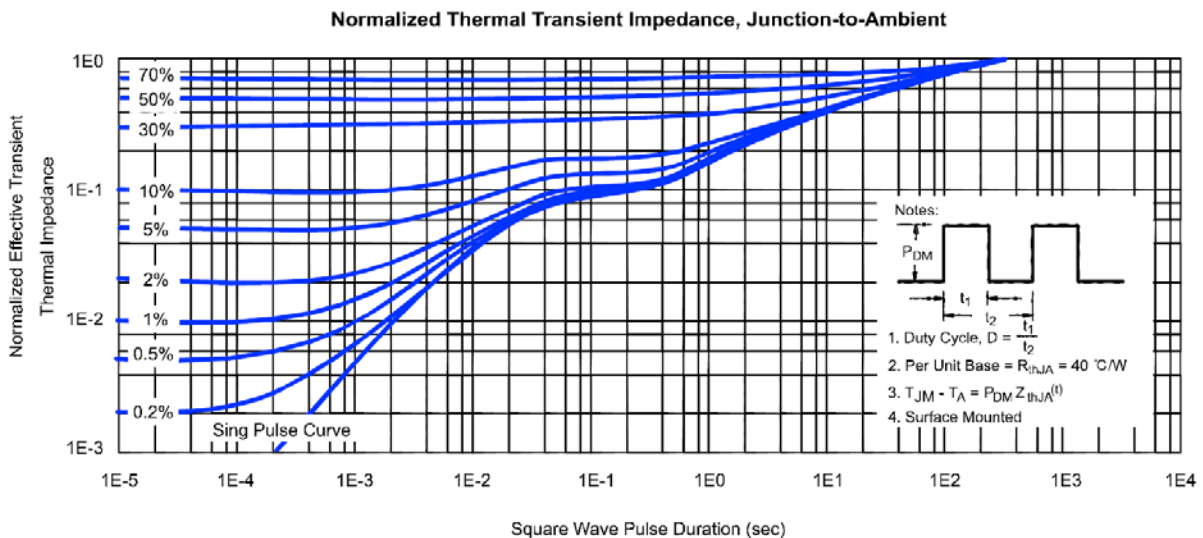
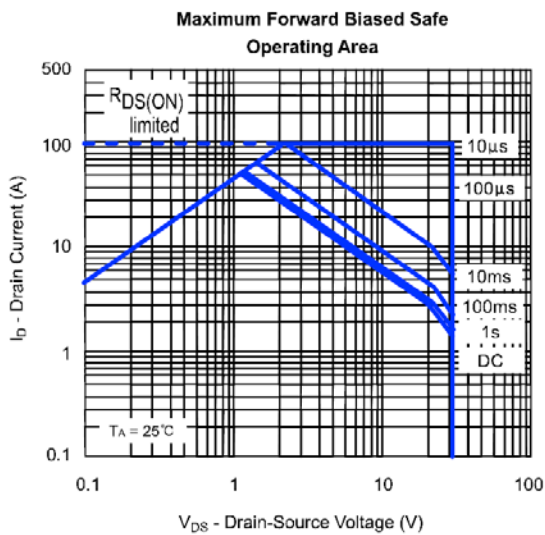
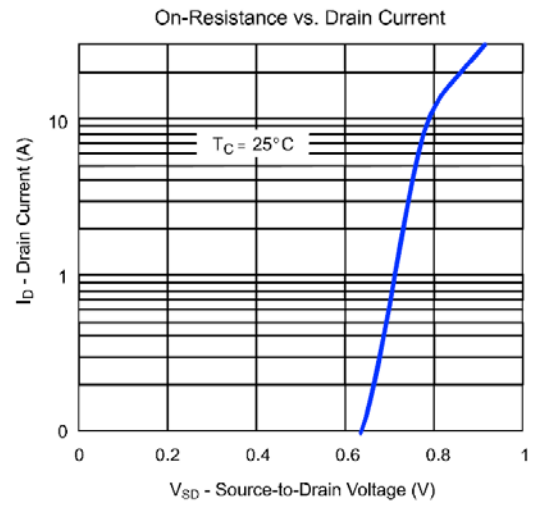
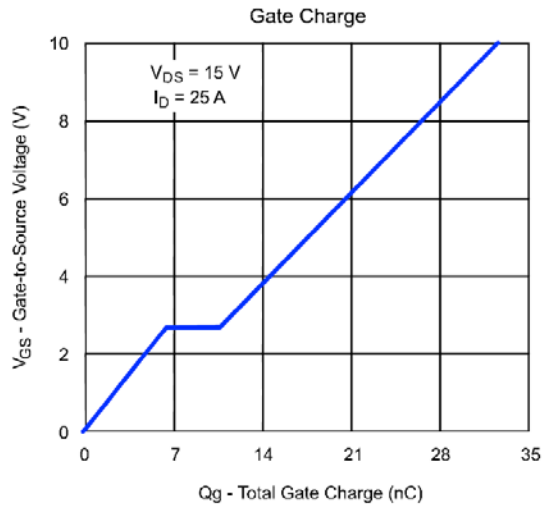


## Typical Characteristics





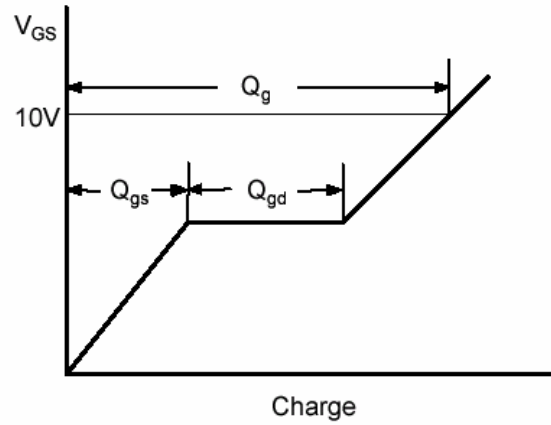
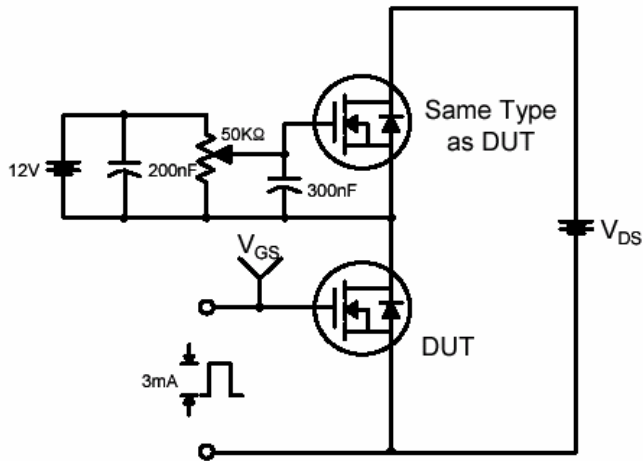
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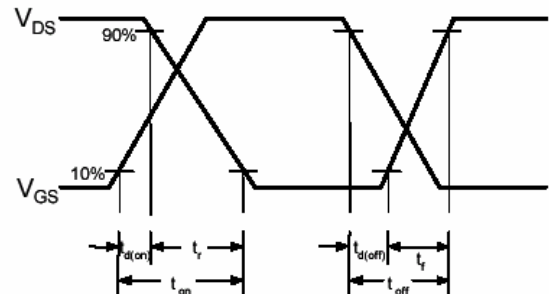
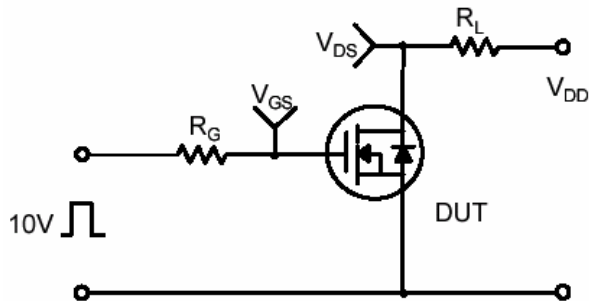


## Typical Characteristics

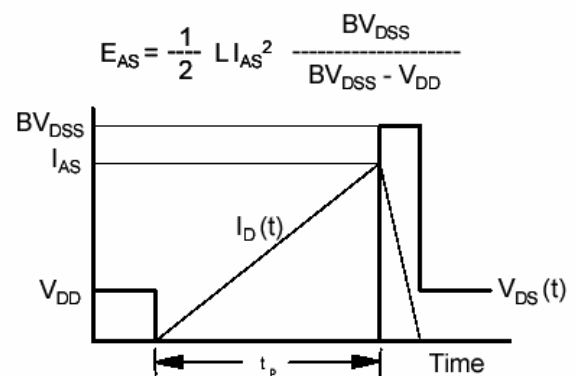
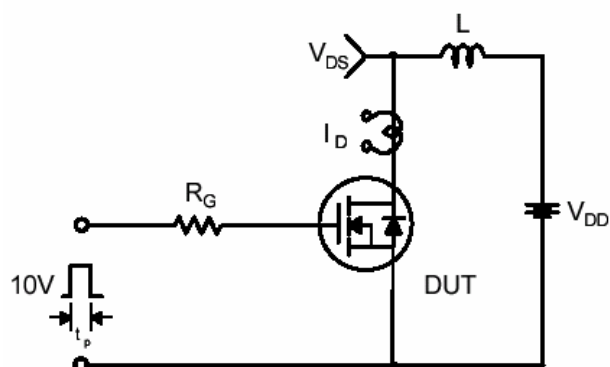
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms





# HFU70N03V

## ■ Typical Characteristics

### Peak Diode Recovery dv/dt Test Circuit & Waveforms

