# MY60N03NE5

## 30V N-Channel Enhancement Mode MOSFET

MAOYUANWEI semiconductor

## General Description

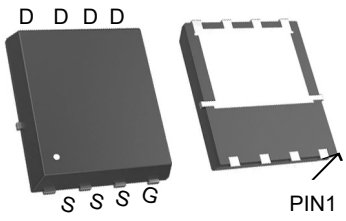
The MY60N03NE5 uses advanced trench technology to provide excellent RDS(ON), low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

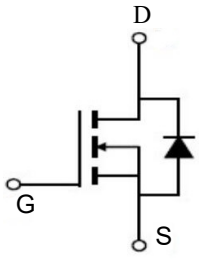
## Features

| | | |
|---|---|---|
| $V_{DSS}$ | 30 | V |
| $I_D$ | 60 | A |
| $R_{DS(ON)}$(at$V_{GS}$ =10V) | 6.2 | mÝ |
| $R_{DS(ON)}$(at$V_{GS}$ =4.5V) | 9.5 | mÝ |

## Application

- Battery protection
- Load switch
- Uninterruptible power supply




### Package Marking and Ordering Information

| Product ID | Pack | Marking | Qty(PCS) |
|---|---|---|---|
| MY60N03NE5 | PDFN5*6-8L | MY60N03NE5 | 5000 |

### Absolute Maximum Ratings ($T_C$=25℃unless otherwise noted)

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 30 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$@$T_C$=25°C | Continuous Drain Current, $V_{GS}$ @ 10V[1,6] | 60 | A |
| $I_D$@$T_C$=100°C | Continuous Drain Current, $V_{GS}$ @ 10V[1,6] | 30 | A |
| $I_{DM}$ | Pulsed Drain Current[2] | 120 | A |
| EAS | Single Pulse Avalanche Energy[3] | 39 | mJ |
| $I_{AS}$ | Avalanche Current | 50 | A |
| $P_D$@$T_C$=25°C | Total Power Dissipation[4] | 18 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | °C |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | °C |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient [1] | 75 | °C/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case[1] | 4.32 | °C/W |

## Electrical Characteristics ($T_J$=25 ℃, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=250uA | 30 | 32 | --- | V |
| $\triangle BV_{DSS}/\triangle T_J$ | $BV_{DSS}$ Temperature Coefficient | Reference to 25℃ , $I_D$=1mA | --- | 0.027 | --- | V/℃ |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance[2] | $V_{GS}$=10V , $I_D$=15A | --- | 6.2 | 8.5 | mΩ |
| | | $V_{GS}$=4.5V , $I_D$=15A | --- | 9.5 | 15 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 1.0 | -- | 2.4 | V |
| $\triangle V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | -5.8 | --- | mV/℃ |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=24V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| | | $V_{DS}$=24V , $V_{GS}$=0V , $T_J$=55℃ | --- | --- | 5 | |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| $R_g$ | Gate Resistance | $V_{DS}$=0V , $V_{GS}$=0V , f=1MHz | --- | 1.7 | --- | |
| $Q_g$ | Total Gate Charge (4.5V) | $V_{DS}$=20V , $V_{GS}$=4.5V , $I_D$=12A | --- | 12.8 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 3.3 | --- | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 6.5 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=12V , $V_{GS}$=10V , $R_G$=3.3 $I_D$=5A | --- | 4.5 | --- | ns |
| $T_r$ | Rise Time | | --- | 10.8 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 25.5 | --- | |
| $T_f$ | Fall Time | | --- | 9.6 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=15V , $V_{GS}$=0V , f=1MHz | --- | 1200 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 163 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 131 | --- | |
| $I_S$ | Continuous Source Current[1,5] | $V_G$=$V_D$=0V , Force Current | --- | --- | 50 | A |
| $I_{SM}$ | Pulsed Source Current[2,5] | | --- | --- | 120 | A |
| $V_{SD}$ | Diode Forward Voltage[2] | $V_{GS}$=0V , $I_S$=1A , $T_J$=25℃ | --- | --- | 1.2 | V |

Note :
1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3. The EAS data shows Max. rating . The test condition is $V_{DD}$=25V,$V_{GS}$=10V,L=0.1mH,$I_{AS}$=34A
4. The power dissipation is limited by 150℃ junction temperature
5. The data is theoretically the same as $I_D$ and $I_{DM}$ , in real applications , should be limited by total power dissipation

## Typical Characteristics

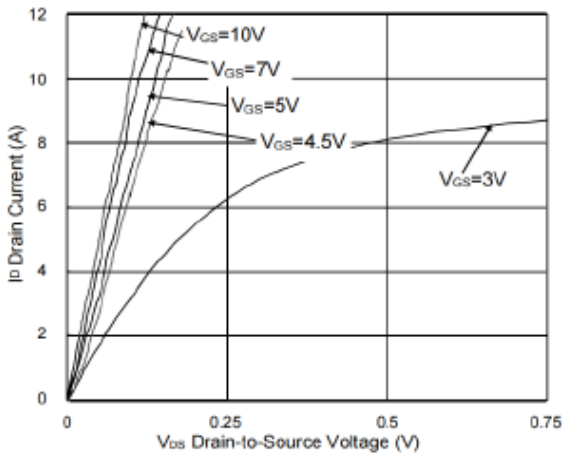



**Fig.1 Typical Output Characteristics**

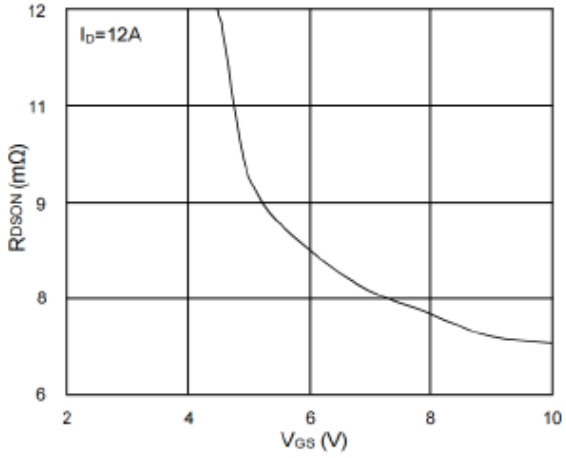



**Fig.2 On-Resistance vs. G-S Voltage**

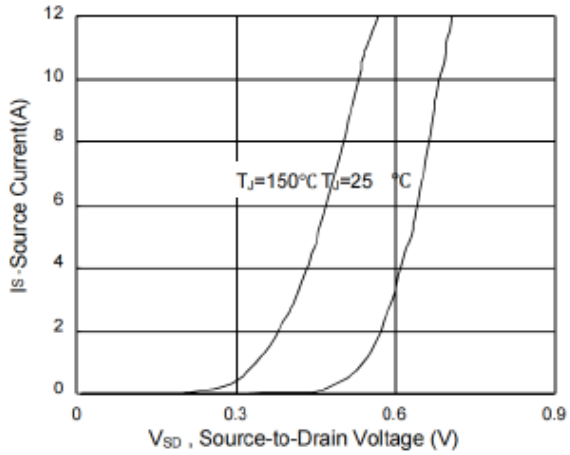



**Fig.3 Forward Characteristics of Reverse**

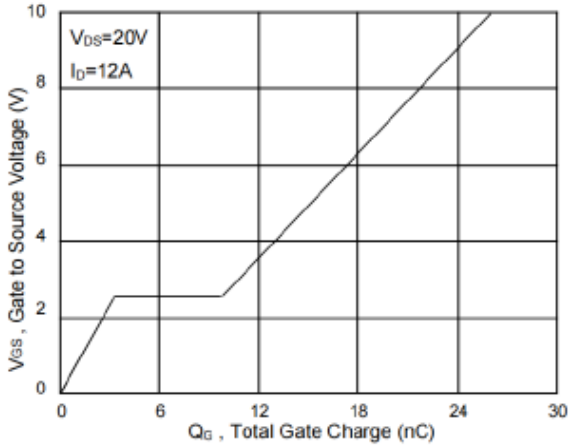



**Fig.4 Gate-Charge Characteristics**

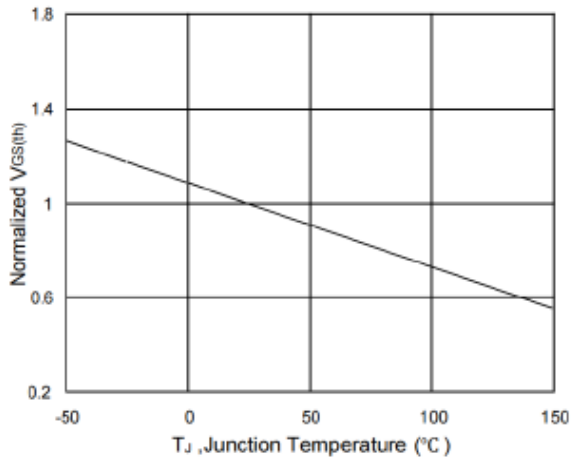



**Fig.5 Normalized $V_{GS(th)}$ vs. $T_J$**

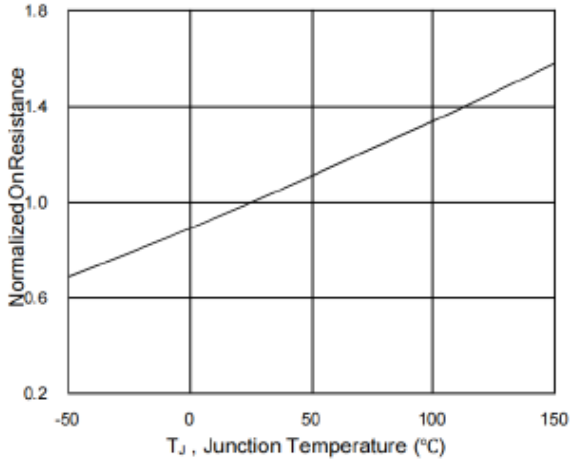



**Fig.6 Normalized $R_{DSON}$ vs. $T_J$**

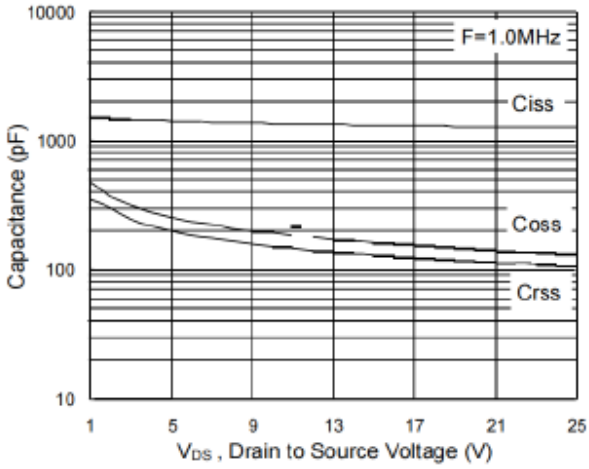



**Fig.7 Capacitance**

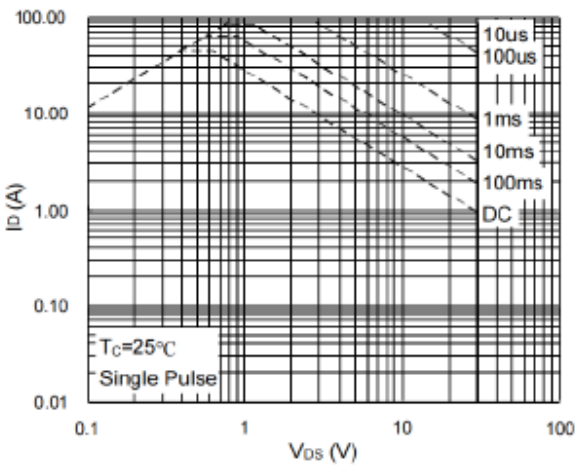



**Fig.8 Safe Operating Area**

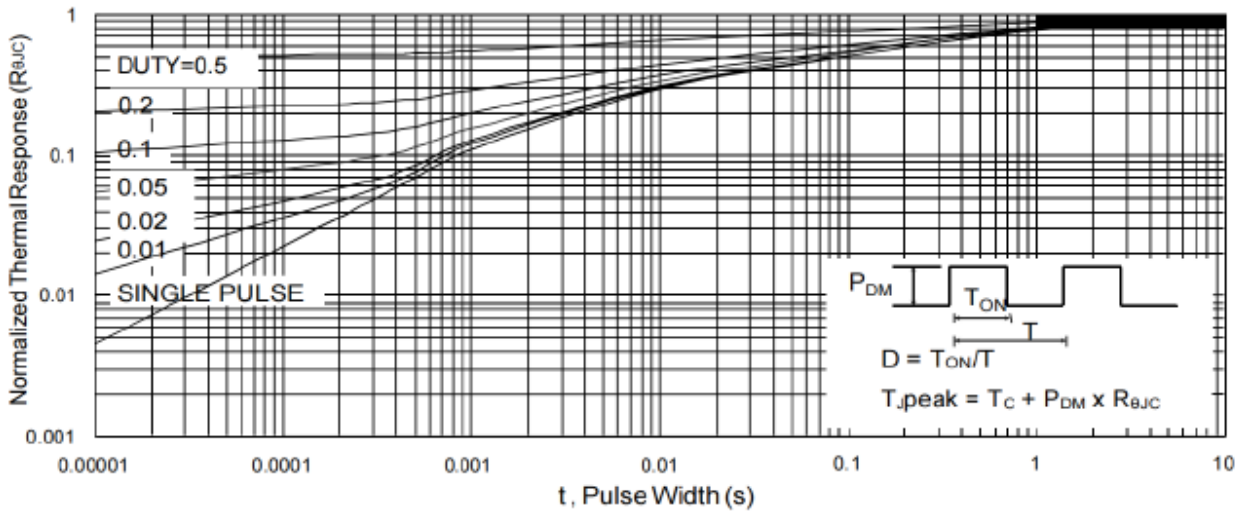



**Fig.9 Normalized Maximum Transient Thermal Impedance**

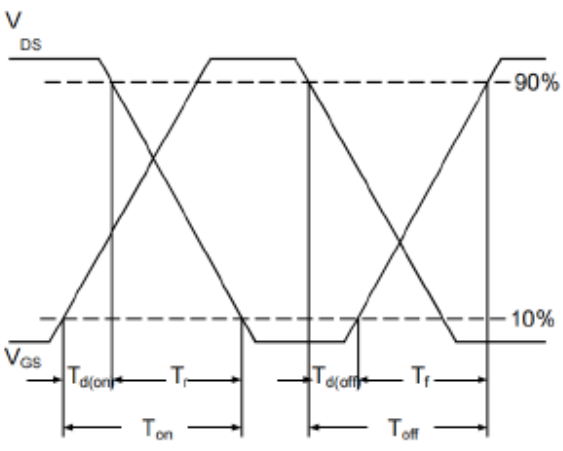



**Fig.10 Switching Time Waveform**

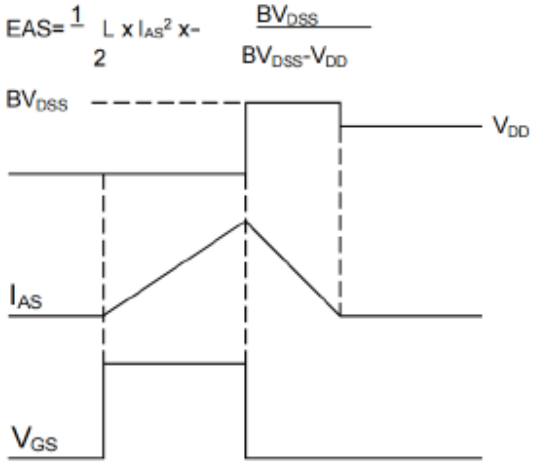
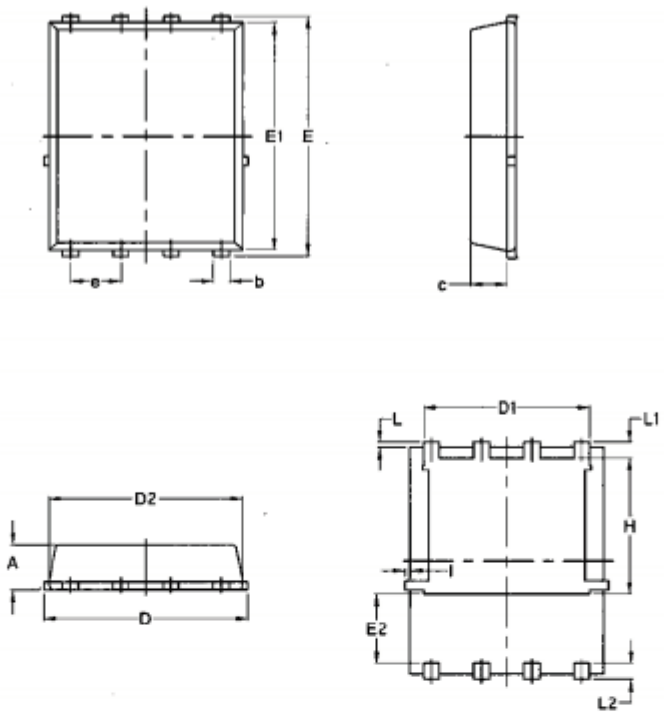



**Fig.11 Unclamped Inductive Switching Waveform**

## Package Mechanical Data-DFN5*6




| Symbol | Common | | | |
|---|---|---|---|---|
| | mm | | Inch | |
| | Mim | Max | Min | Max |
| A | 1.03 | 1.17 | 0.0406 | 0.0461 |
| b | 0.34 | 0.48 | 0.0134 | 0.0189 |
| c | 0.824 | 0.0970 | 0.0324 | 0.082 |
| D | 4.80 | 5.40 | 0.1890 | 0.2126 |
| D1 | 4.11 | 4.31 | 0.1618 | 0.1697 |
| D2 | 4.80 | 5.00 | 0.1890 | 0.1969 |
| E | 5.95 | 6.15 | 0.2343 | 0.2421 |
| E1 | 5.65 | 5.85 | 0.2224 | 0.2303 |
| E2 | 1.60 | / | 0.0630 | / |
| e | 1.27 BSC | | 0.05 BSC | |
| L | 0.05 | 0.25 | 0.0020 | 0.0098 |
| L1 | 0.38 | 0.50 | 0.0150 | 0.0197 |
| L2 | 0.38 | 0.50 | 0.0150 | 0.0197 |
| H | 3.30 | 3.50 | 0.1299 | 0.1378 |
| I | / | 0.18 | / | 0.0070 |