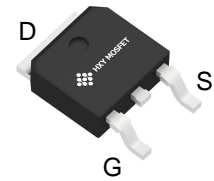




## Description

The 30N03A uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , 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.



TO-252-2L

## General Features

$V_{DS} = 30V$   $I_D = 100A$

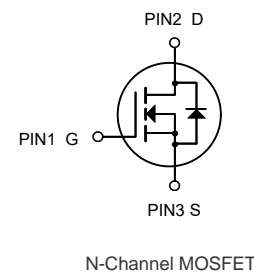
$R_{DS(ON)} < 5m\Omega @ V_{GS}=10V$

## Application

Battery protection

Load switch

Uninterruptible power supply



## Ordering Information

| Product ID | Pack     | Brand      | Qty(PCS) |
|------------|----------|------------|----------|
| 30N03A     | TO252-2L | HXY MOSFET | 2500     |

## Absolute Maximum Ratings ( $T_C=25^\circ C$ unless otherwise noted)

| Symbol                | Parameter  | Rating     |      | Units        |
|-----------------------|--|------------|------|--------------|
| VDS                   | Drain- Source Voltage  | 30         |      | V            |
| VGS                   | Gate-Source Voltage  | $\pm 20$   |      | V            |
| $I_D@T_C=25^\circ C$  | Continuous Drain Current, $V_{GS} @ 10V^1$                       | 100        |      | A            |
| $I_D@T_C=100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$                       | 57         |      | A            |
| $I_D@T_A=25^\circ C$  | Continuous Drain Current, $V_{GS} @ 10V^1$                       | 27         | 17   | A            |
| $I_D@T_A=70^\circ C$  | Continuous Drain Current, $V_{GS} @ 10V^1$                       | 23         | 14.5 | A            |
| $I_{DM}$              | Pulsed Drain Current <sup>2</sup>                                | 160        |      | A            |
| EAS                   | Single Pulse Avalanche Energy <sup>3</sup>                       | 115.2      |      | mJ           |
| $I_{AS}$              | Avalanche Current  | 48         |      | A            |
| $P_D@T_C=25^\circ C$  | Total Power Dissipation <sup>4</sup>                             | 53         |      | W            |
| $P_D@T_A=25^\circ C$  | Total Power Dissipation <sup>4</sup>                             | 6          | 2.4  | W            |
| $T_{STG}$             | Storage Temperature Range  | -55 to 175 |      | $^\circ C$   |
| $T_J$                 | Operating Junction Temperature Range                             | -55 to 175 |      | $^\circ C$   |
| $R_{\theta JA}$       | Thermal Resistance Junction-ambient (Steady State) <sup>1</sup>  | 62         |      | $^\circ C/W$ |
| $R_{\theta JA}$       | Thermal Resistance Junction-Ambient <sup>1</sup> (t $\leq 10s$ ) | 25         |      | $^\circ C/W$ |
| $R_{\theta JC}$       | Thermal Resistance Junction-Case <sup>1</sup>                    | 2.8        |      | $^\circ C/W$ |



**Electrical Characteristics (T<sub>J</sub>=25°C, unless otherwise noted)**

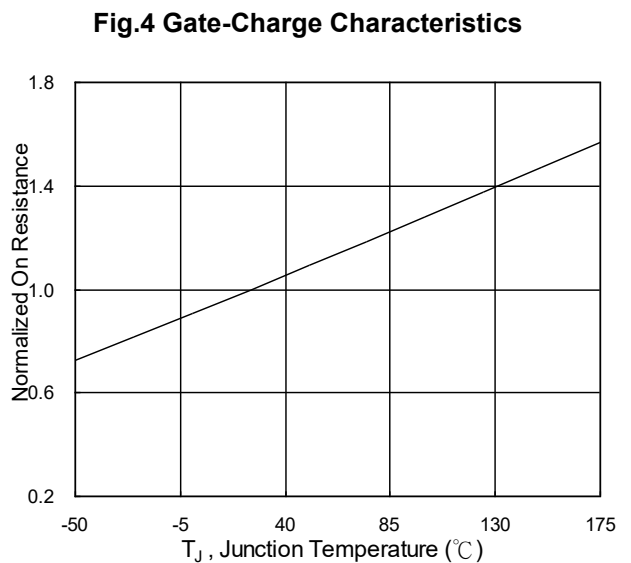
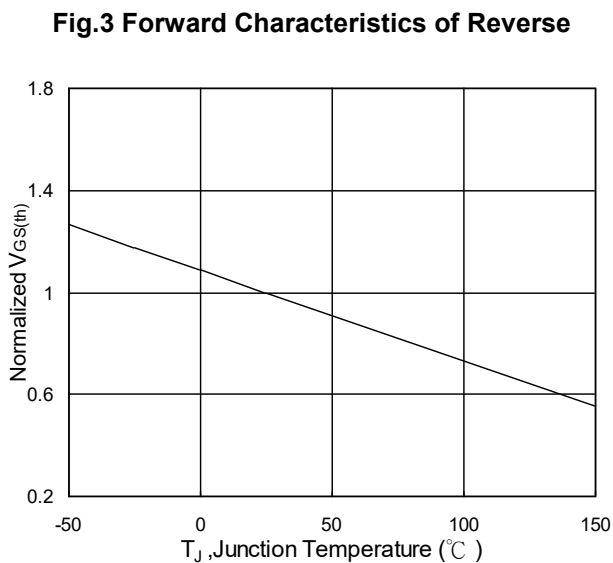
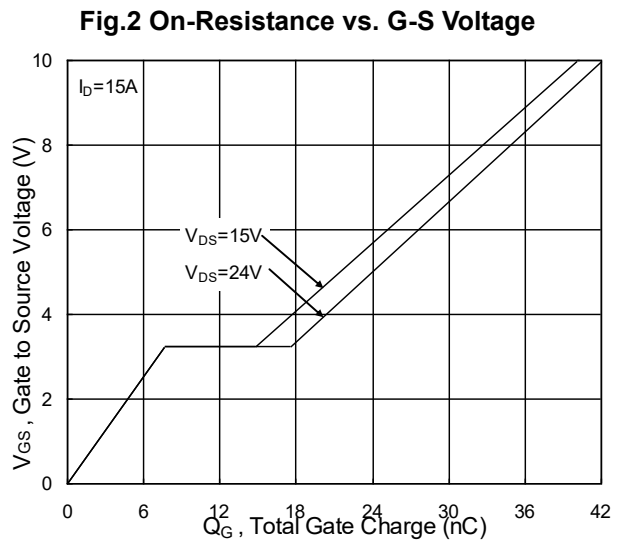
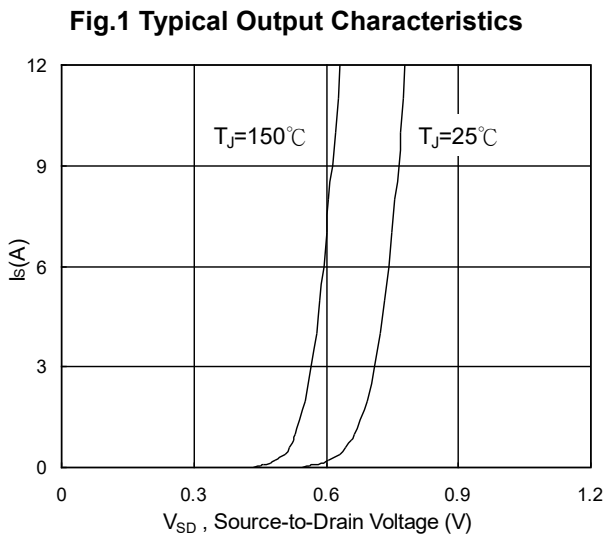
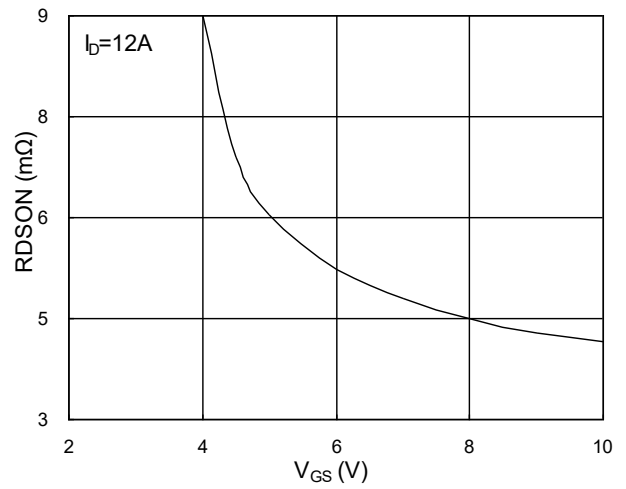
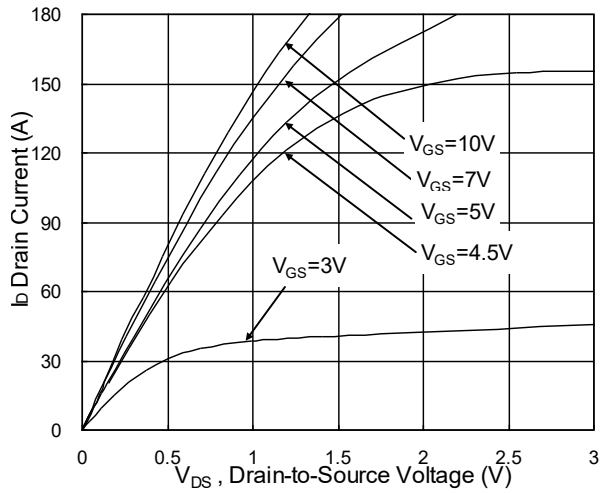
| Symbol                              | Parameter                                      | Conditions   | Min. | Typ.  | Max.  | Unit  |
|-------------------------------------|--|--|------|-------|-------|-------|
| BV <sub>DSS</sub>                   | Drain-Source Breakdown Voltage                 | V <sub>GS</sub> =0V , I <sub>D</sub> =250uA  | 30   | ---   | ---   | V     |
| ΔBV <sub>DSS</sub> /ΔT <sub>J</sub> | BVDSS Temperature Coefficient                  | Reference to 25°C , I <sub>D</sub> =1mA  | ---  | 0.028 | ---   | V/°C  |
| .R <sub>DS(ON)</sub>                | Static Drain-Source On-Resistance <sup>2</sup> | V <sub>GS</sub> =10V , I <sub>D</sub> =30A   | ---  | 3.8   | 5.5   | mΩ    |
|                                     |  | V <sub>GS</sub> =4.5V , I <sub>D</sub> =15A  | ---  | 7.5   | 9     |       |
| V <sub>GS(th)</sub>                 | Gate Threshold Voltage                         | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA                                 | 1.0  | 1.5   | 2.5   | V     |
| ΔV <sub>GS(th)</sub>                | V <sub>GS(th)</sub> Temperature Coefficient    |  | ---  | -6.16 | ---   | mV/°C |
| I <sub>DSS</sub>                    | Drain-Source Leakage Current                   | V <sub>DS</sub> =24V , V <sub>GS</sub> =0V , T <sub>J</sub> =25°C                        | ---  | ---   | 1     | uA    |
|                                     |  | V <sub>DS</sub> =24V , V <sub>GS</sub> =0V , T <sub>J</sub> =55°C                        | ---  | ---   | 5     |       |
| I <sub>GSS</sub>                    | Gate-Source Leakage Current                    | V <sub>GS</sub> =± 20V , V <sub>DS</sub> =0V   | ---  | ---   | ± 100 | nA    |
| g <sub>fs</sub>                     | Forward Transconductance                       | V <sub>DS</sub> =5V , I <sub>D</sub> =30A  | ---  | 22    | ---   | S     |
| R <sub>g</sub>                      | Gate Resistance                                | V <sub>DS</sub> =0V , V <sub>GS</sub> =0V , f=1MHz                                       | ---  | 1.7   | 3.4   | Ω     |
| Q <sub>g</sub>                      | Total Gate Charge (4.5V)                       | V <sub>DS</sub> =15V , V <sub>GS</sub> =4.5V , I <sub>D</sub> =15A                       | ---  | 20    | ---   | nC    |
| Q <sub>gs</sub>                     | Gate-Source Charge                             |  | ---  | 7.6   | ---   |       |
| Q <sub>gd</sub>                     | Gate-Drain Charge                              |  | ---  | 7.2   | ---   |       |
| T <sub>d(on)</sub>                  | Turn-On Delay Time                             | V <sub>DD</sub> =15V , V <sub>GS</sub> =10V , R <sub>G</sub> =3.3<br>I <sub>D</sub> =15A | ---  | 7.8   | ---   | ns    |
| T <sub>r</sub>                      | Rise Time                                      |  | ---  | 15    | ---   |       |
| T <sub>d(off)</sub>                 | Turn-Off Delay Time                            |  | ---  | 37.3  | ---   |       |
| T <sub>f</sub>                      | Fall Time                                      |  | ---  | 10.6  | ---   |       |
| C <sub>iss</sub>                    | Input Capacitance                              | V <sub>DS</sub> =15V , V <sub>GS</sub> =0V , f=1MHz                                      | ---  | 2295  | ---   | pF    |
| C <sub>oss</sub>                    | Output Capacitance                             |  | ---  | 267   | ---   |       |
| C <sub>rss</sub>                    | Reverse Transfer Capacitance                   |  | ---  | 210   | ---   |       |
| I <sub>S</sub>                      | Continuous Source Current <sup>1,5</sup>       | V <sub>G</sub> =V <sub>D</sub> =0V , Force Current                                       | ---  | ---   | 80    | A     |
| I <sub>SM</sub>                     | Pulsed Source Current <sup>2,5</sup>           |  | ---  | ---   | 160   | A     |
| V <sub>SD</sub>                     | Diode Forward Voltage <sup>2</sup>             | V <sub>GS</sub> =0V , I <sub>S</sub> =1A , T <sub>J</sub> =25°C                          | ---  | ---   | 1     | V     |
| t <sub>rr</sub>                     | Reverse Recovery Time                          | I <sub>F</sub> =30A , dI/dt=100A/μs , T <sub>J</sub> =25°C                               | ---  | 14    | ---   | nS    |
| Q <sub>rr</sub>                     | Reverse Recovery Charge                        | T <sub>J</sub> =25°C   | ---  | 5     | ---   | nC    |

Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width .The EAS data shows Max. rating .
- 3.The test cond≤ 300us , duty cycle ition is V<sub>DD=25</sub>≤V , V 2%<sub>GS</sub> =10V,L=0.1mH,I<sub>AS</sub>=53.8A
- 4.The power dissipation is limited by 175°C junction temperature
- 5.The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.



### Typical Characteristics



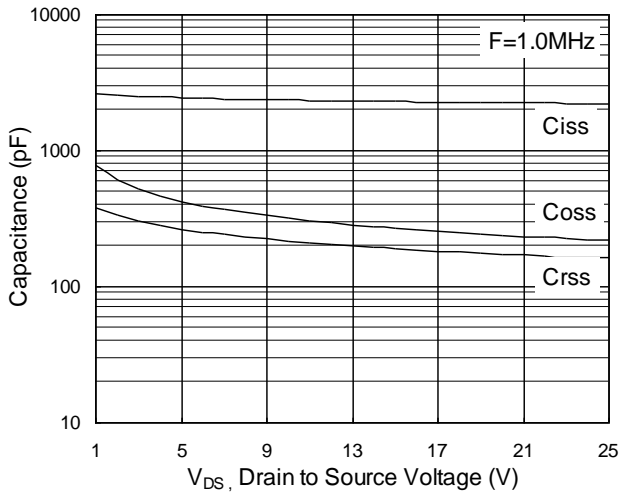


Fig.7 Capacitance

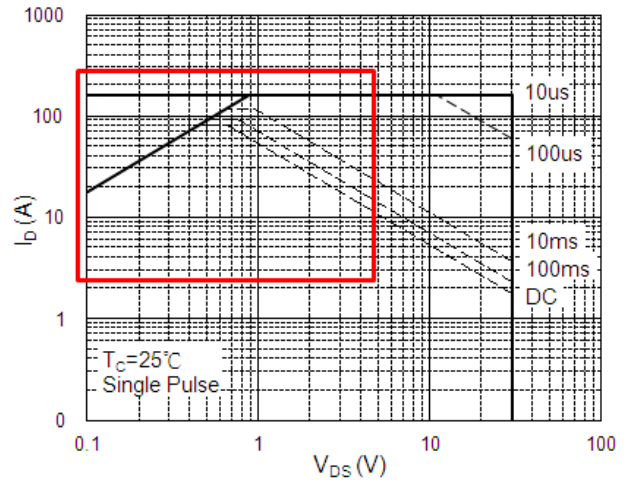


Fig.8 Safe Operating Area

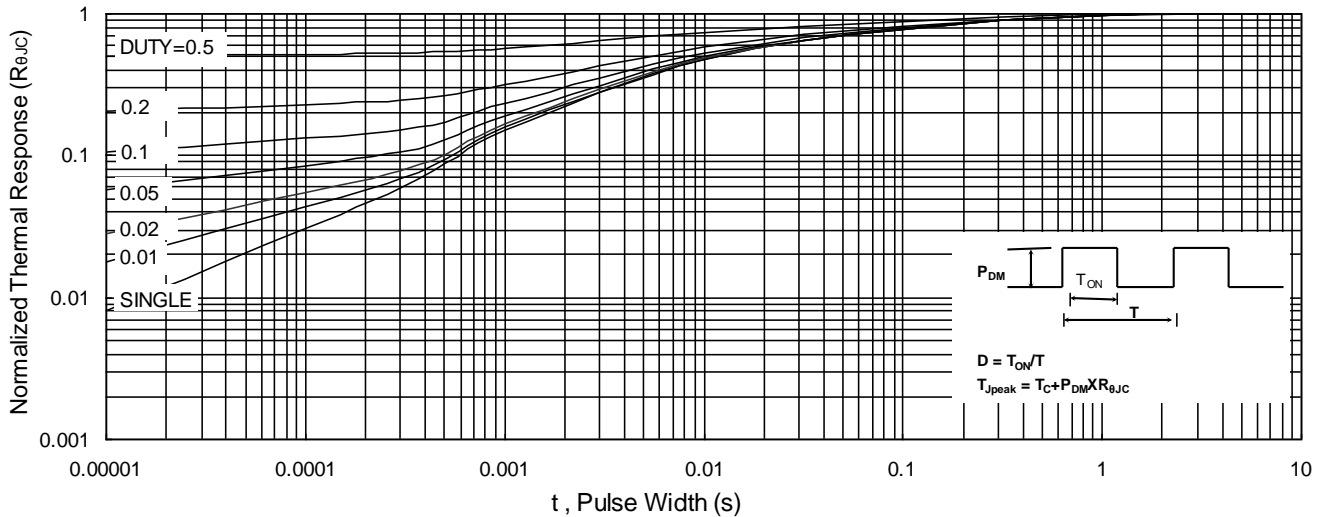


Fig.9 Normalized Maximum Transient Thermal Impedance

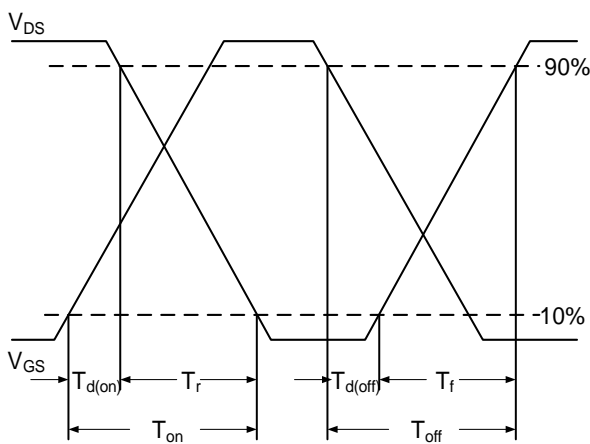


Fig.10 Switching Time Waveform

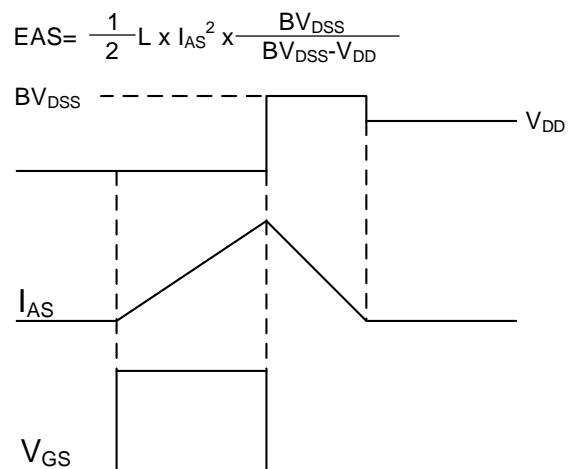


Fig.11 Unclamped Inductive Switching Waveform





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