



## Description

The ST16N10 uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications.

## General Features

$V_{DS} = 100V, I_D = 10A$

$R_{DS(ON)} < 160m\Omega @ V_{GS}=10V$

$R_{DS(ON)} < 170m\Omega @ V_{GS}=4.5V$

High density cell design for ultra low  $R_{dson}$

Fully characterized avalanche voltage and current

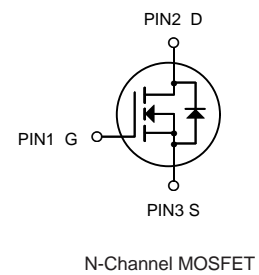
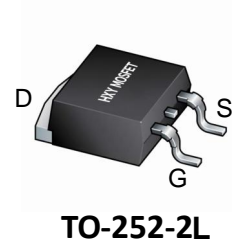
Excellent package for good heat dissipation

## Application

Power switching application

Hard switched and high frequency circuits

Uninterruptible power supply



## Package Marking and Ordering Information

| Product ID | Pack      | Brand      | Qty(PCS) |
|------------|-----------|------------|----------|
| ST16N10    | TO-252-2L | HXY MOSFET | 2500     |

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

| Parameter  | Symbol          | Limit      | Unit         |
|--|-----------------|------------|--------------|
| Drain-Source Voltage                             | $V_{DS}$        | 100        | V            |
| Gate-Source Voltage                              | $V_{GS}$        | $\pm 20$   | V            |
| Drain Current-Continuous                         | $I_D$           | 10         | A            |
| Drain Current-Pulsed (Note 1)                    | $I_{DM}$        | 20         | A            |
| Maximum Power Dissipation                        | $P_D$           | 40         | W            |
| Operating Junction and Storage Temperature Range | $T_J, T_{STG}$  | -55 To 175 | $^\circ C$   |
| Thermal Resistance, Junction-to-Case (Note 2)    | $R_{\theta JC}$ | 3.75       | $^\circ C/W$ |



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

| Parameter                                 | Symbol              | Condition   | Min | Typ  | Max  | Unit |
|---|---------------------|---|-----|------|------|------|
| Drain-Source Breakdown Voltage            | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V I <sub>D</sub> =250μA   | 100 | -    | -    | V    |
| Zero Gate Voltage Drain Current           | I <sub>DSS</sub>    | V <sub>DS</sub> =100V, V <sub>GS</sub> =0V  | -   | -    | 1    | μA   |
| Gate-Body Leakage Current                 | I <sub>GSS</sub>    | V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V  | -   | -    | ±100 | nA   |
| Gate Threshold Voltage                    | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                              | 1.0 |      | 2.5  | V    |
| Drain-Source On-State Resistance          | R <sub>DS(on)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =3A  | -   | 140  | 160  | mΩ   |
|   |                     | V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A   | -   | 160  | 170  |      |
| Forward Transconductance                  | g <sub>FS</sub>     | V <sub>DS</sub> =5V, I <sub>D</sub> =3A   | -   | 5    | -    | S    |
| Input Capacitance                         | C <sub>iss</sub>    | V <sub>DS</sub> =50V, V <sub>GS</sub> =0V,<br>F=1.0MHz                                | -   | 650  | -    | PF   |
| Output Capacitance                        | C <sub>oss</sub>    |   | -   | 25   | -    | PF   |
| Reverse Transfer Capacitance              | C <sub>rss</sub>    |   | -   | 20   | -    | PF   |
| Turn-on Delay Time                        | t <sub>d(on)</sub>  | V <sub>DD</sub> =50V, R <sub>L</sub> =19Ω<br>V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω | -   | 6    | -    | nS   |
| Turn-on Rise Time                         | t <sub>r</sub>      |   | -   | 4    | -    | nS   |
| Turn-Off Delay Time                       | t <sub>d(off)</sub> |   | -   | 20   | -    | nS   |
| Turn-Off Fall Time                        | t <sub>f</sub>      |   | -   | 4    | -    | nS   |
| Total Gate Charge                         | Q <sub>g</sub>      | V <sub>DS</sub> =50V, I <sub>D</sub> =3A,<br>V <sub>GS</sub> =10V                     | -   | 20.6 |      | nC   |
| Gate-Source Charge                        | Q <sub>gs</sub>     |   | -   | 2.1  | -    | nC   |
| Gate-Drain Charge                         | Q <sub>gd</sub>     |   | -   | 3.3  | -    | nC   |
| Diode Forward Voltage <sup>(Note 3)</sup> | V <sub>SD</sub>     | V <sub>GS</sub> =0V, I <sub>S</sub> =3A   | -   | -    | 1.2  | V    |
| Diode Forward Current <sup>(Note 2)</sup> | I <sub>S</sub>      |   | -   | -    | 7    | A    |

**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production



### Typical Electrical and Thermal Characteristics (Curves)

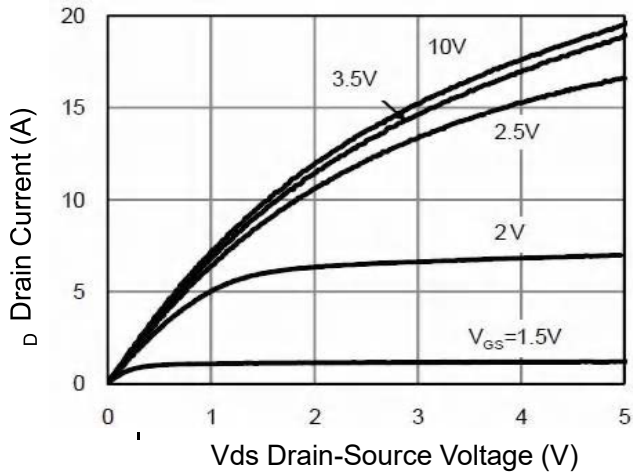


Figure 1 Output Characteristics

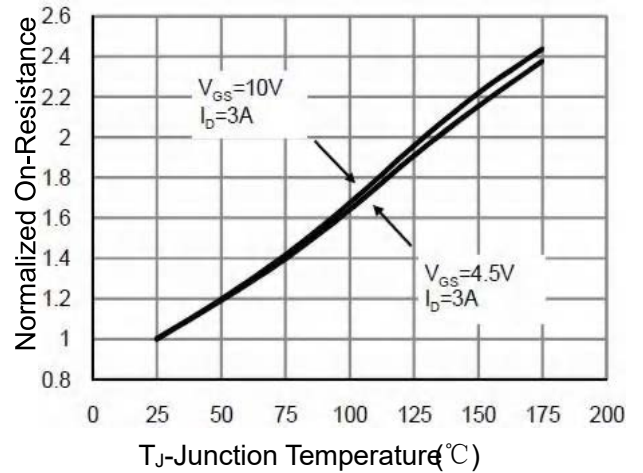


Figure 4 Rdson-Junction Temperature

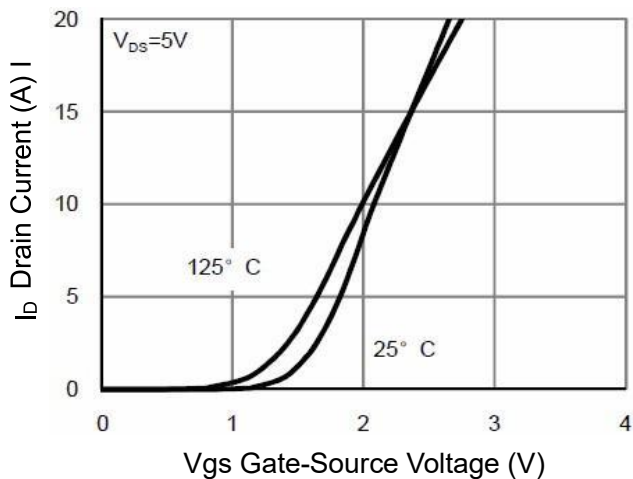


Figure 2 Transfer Characteristics

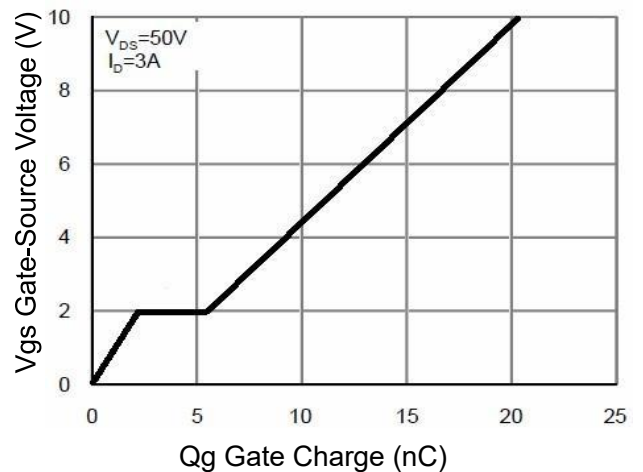


Figure 5 Gate Charge

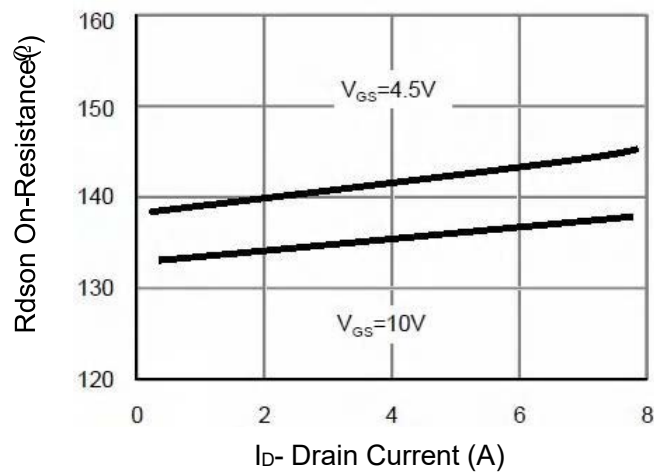


Figure 3 Rdson-Drain Current

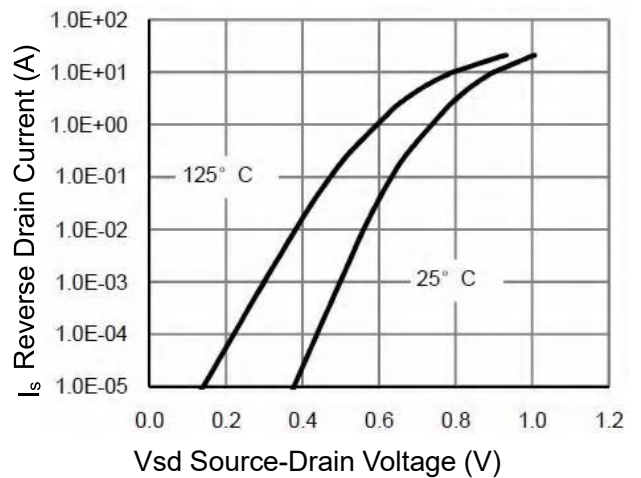


Figure 6 Source-Drain Diode Forward

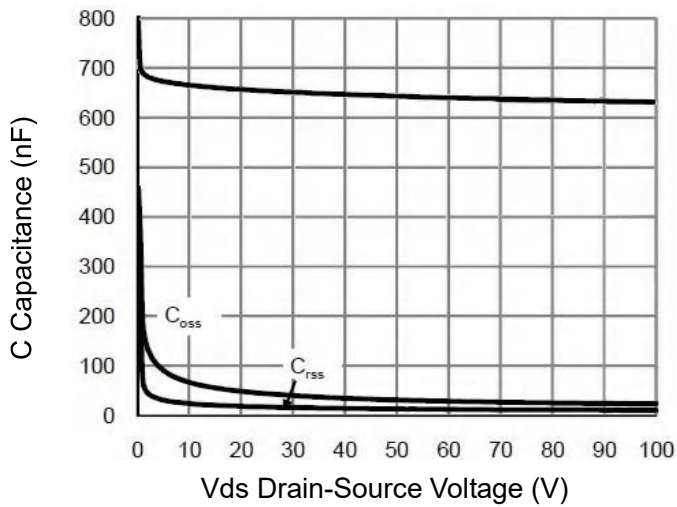


Figure 7 Capacitance vs Vds

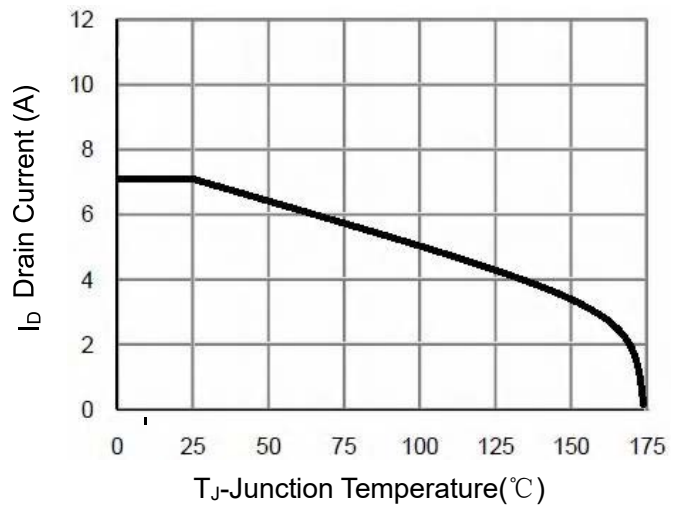


Figure 9  $BV_{DSS}$  vs Junction Temperature

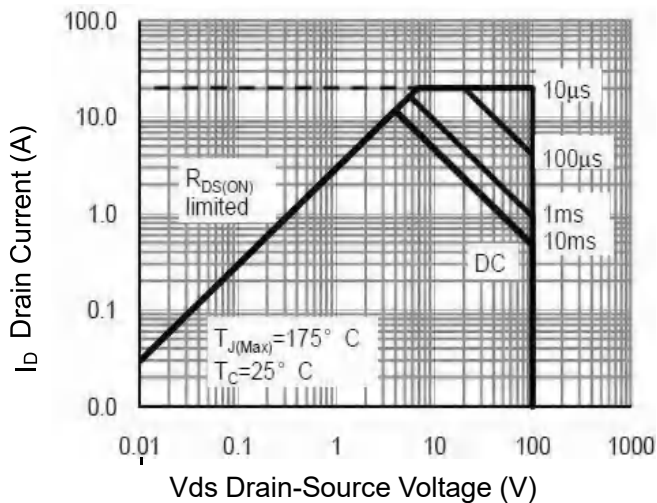


Figure 8 Safe Operation Area

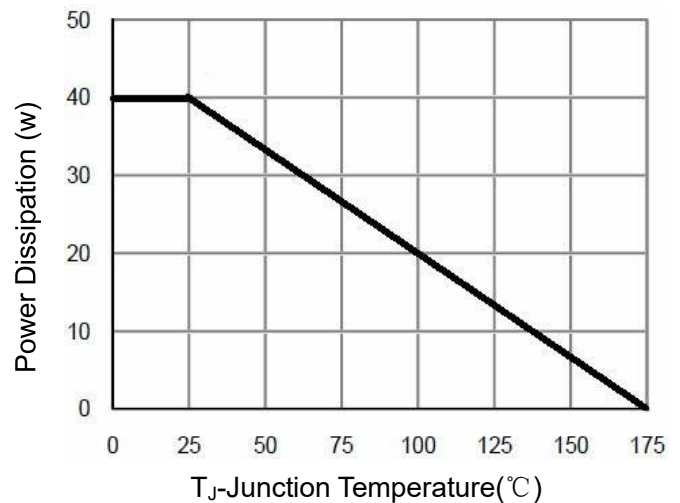


Figure 10 Power De-rating

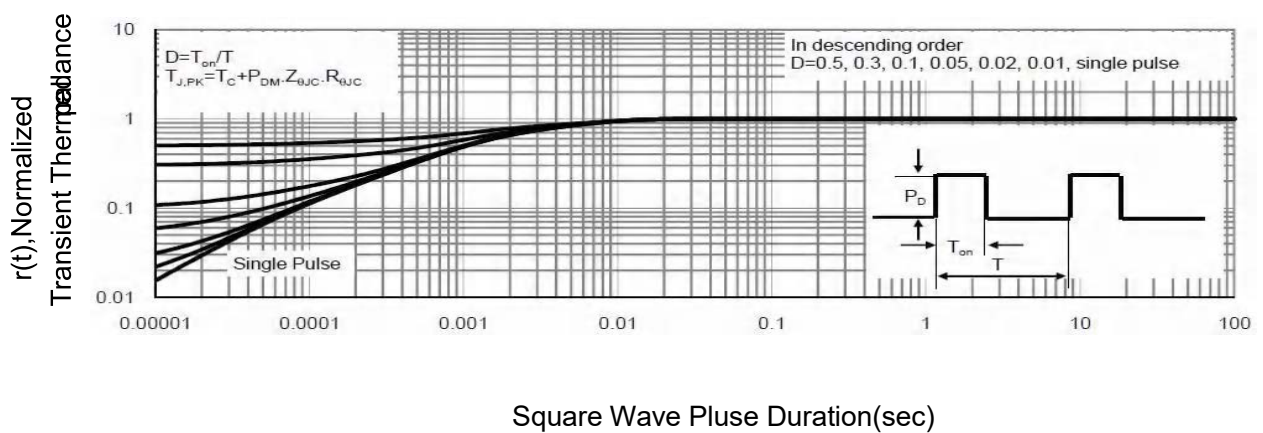
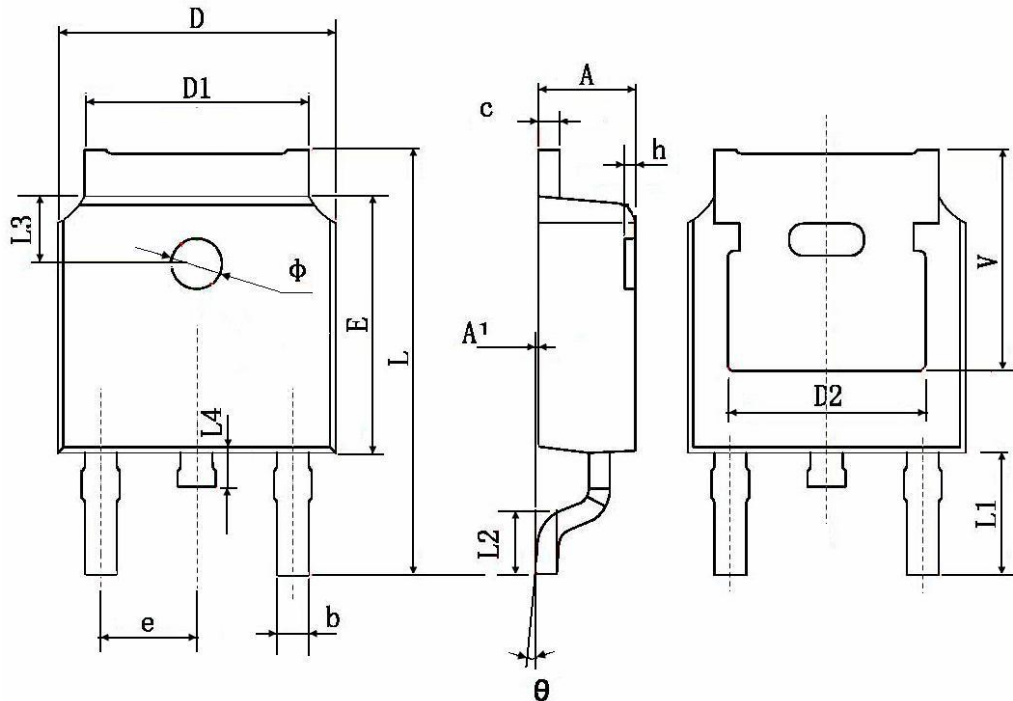


Figure 11 Normalized Maximum Transient Thermal Impedance



**TO-252-2L Package Information**



| Symbol | Dimensions In Millimeters |        | Dimensions In Inches |       |
|--------|---------------------------|--------|----------------------|-------|
|        | Min.                      | Max.   | Min.                 | Max.  |
| A      | 2.200                     | 2.400  | 0.087                | 0.094 |
| A1     | 0.000                     | 0.127  | 0.000                | 0.005 |
| b      | 0.660                     | 0.860  | 0.026                | 0.034 |
| c      | 0.460                     | 0.580  | 0.018                | 0.023 |
| D      | 6.500                     | 6.700  | 0.256                | 0.264 |
| D1     | 5.100                     | 5.460  | 0.201                | 0.215 |
| D2     | 0.483 TYP.                |        | 0.190 TYP.           |       |
| E      | 6.000                     | 6.200  | 0.236                | 0.244 |
| e      | 2.186                     | 2.386  | 0.086                | 0.094 |
| L      | 9.800                     | 10.400 | 0.386                | 0.409 |
| L1     | 2.900 TYP.                |        | 0.114 TYP.           |       |
| L2     | 1.400                     | 1.700  | 0.055                | 0.067 |
| L3     | 1.600 TYP.                |        | 0.063 TYP.           |       |
| L4     | 0.600                     | 1.000  | 0.024                | 0.039 |
| phi    | 1.100                     | 1.300  | 0.043                | 0.051 |
| theta  | 0°                        | 8°     | 0°                   | 8°    |
| h      | 0.000                     | 0.300  | 0.000                | 0.012 |
| V      | 5.350 TYP.                |        | 0.211 TYP.           |       |



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