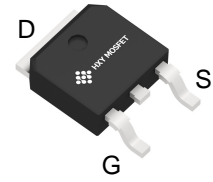




## Description

The HXY20P03D 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

$V_{DS} = -30V$   $I_D = -20A$

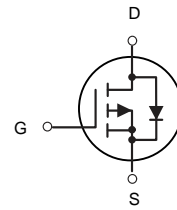
$R_{DS(ON)} < 42 m\Omega @ V_{GS}=10V$

## Application

Battery protection

Load switch

Uninterruptible power supply



P-Channel MOSFET

## Ordering Information

| Product ID | Pack      | Brand      | Qty(PCS) |
|------------|-----------|------------|----------|
| HXY20P03D  | TO-252-2L | HXY MOSFET | 2500     |

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

| Symbol                                | Parameter  | Rating     | Units |
|---------------------------------------|--|------------|-------|
| V <sub>DS</sub>                       | Drain-Source Voltage   | -30        | V     |
| V <sub>GS</sub>                       | Gate-Source Voltage  | ± 20       | V     |
| I <sub>D</sub> @T <sub>C</sub> =25°C  | Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup> | -20        | A     |
| I <sub>D</sub> @T <sub>C</sub> =100°C | Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup> | -15        | A     |
| IDM                                   | Pulsed Drain Current <sup>2</sup>                            | -50        | A     |
| P <sub>D</sub> @T <sub>C</sub> =25°C  | Total Power Dissipation <sup>4</sup>                         | 29         | W     |
| TSTG                                  | Storage Temperature Range                                    | -55 to 150 | °C    |
| T <sub>J</sub>                        | Operating Junction Temperature Range                         | -55 to 150 | °C    |
| R <sub>θJA</sub>                      | Thermal Resistance Junction-ambient <sup>1</sup>             | 75         | °C/W  |
| R <sub>θJC</sub>                      | Thermal Resistance Junction-Case <sup>1</sup>                | 4.32       | °C/W  |



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

| Symbol     | Parameter                                      | Conditions                                | Min. | Typ  | Max. | Unit  |
|------------|--|---|------|------|------|-------|
| BVDSS      | Drain-Source Breakdown Voltage                 | VGS=0V , ID=-250uA                        | -30  |      | ---  | V     |
| ΔBVDSS/ΔTJ | BVDSS Temperature Coefficient                  | Reference to 25°C , ID=-1mA               | ---  | 22   | ---  | V/°C  |
| RDS(ON)    | Static Drain-Source On-Resistance <sup>2</sup> | VGS=-10V , ID=-15A                        | 32   | 38   | 42   | mΩ    |
|            |  | VGS=-4.5V , ID=-10A                       | 48   | 60   | 70   |       |
| VGS(th)    | Gate Threshold Voltage                         | VGS=VDS , ID =-250uA                      | -1.0 | ---  | -2.5 | V     |
| ΔVGS(th)   | VGS(th) Temperature Coefficient                |   | ---  | 4.6  | ---  | mV/°C |
| IDSS       | Drain-Source Leakage Current                   | VDS=-24V , VGS=0V ,<br>TJ=25°C            | ---  | ---  | -1   | uA    |
|            |  | VDS=-24V , VGS=0V ,<br>TJ=55°C            | ---  | ---  | -5   |       |
| IGSS       | Gate-Source Leakage Current                    | VGS=±25V , VDS=0V                         | ---  | ---  | ±100 | nA    |
| gfs        | Forward Transconductance                       | VDS=-5V , ID=-15A                         | ---  | 19   | ---  | S     |
| Rg         | Gate Resistance                                | VDS=0V , VGS=0V , f=1MHz                  | ---  | 13   | ---  |       |
| Qg         | Total Gate Charge (-4.5V)                      |   | ---  | 12.5 | ---  | nC    |
| Qgs        | Gate-Source Charge                             | VDS=-15V , VGS=-4.5V , ID=-15A            | ---  | 5.4  | ---  |       |
| Qgd        | Gate-Drain Charge                              |   | ---  | 5    | ---  |       |
| Td(on)     | Turn-On Delay Time                             |   | ---  | 4.4  | ---  | ns    |
| Tr         | Rise Time                                      | VDD=-15V , VGS=-10V , RG=3.3 ,<br>ID=-15A | ---  | 11.2 | ---  |       |
| Td(off)    | Turn-Off Delay Time                            |   | ---  | 34   | ---  |       |
| Tf         | Fall Time                                      |   | ---  | 18   | ---  |       |
| Ciss       | Input Capacitance                              |   | ---  | 1345 | ---  | pF    |
| Coss       | Output Capacitance                             | VDS=-15V , VGS=0V , f=1MHz                | ---  | 194  | ---  |       |
| Crss       | Reverse Transfer Capacitance                   |   | ---  | 158  | ---  |       |

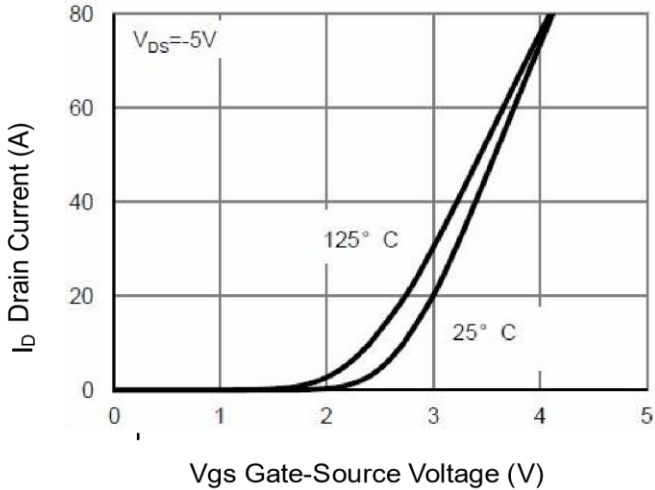
**Notes:**

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

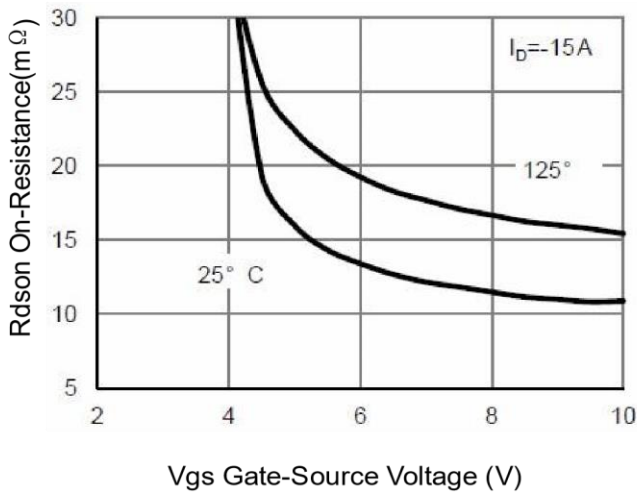


## Typical Electrical and Thermal Characteristics

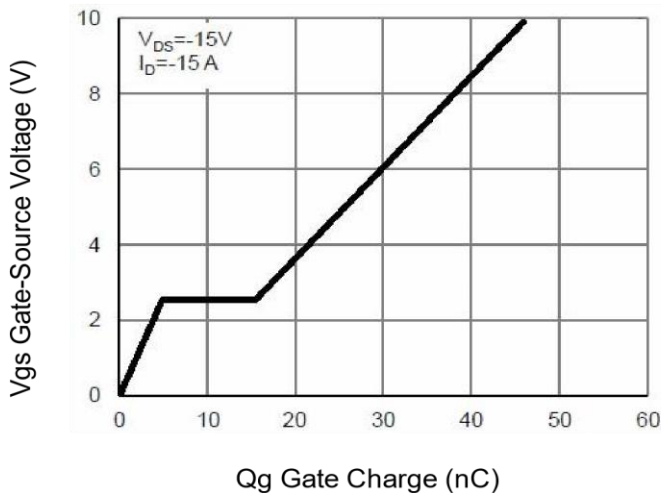
### Figure 5 Output Characteristics



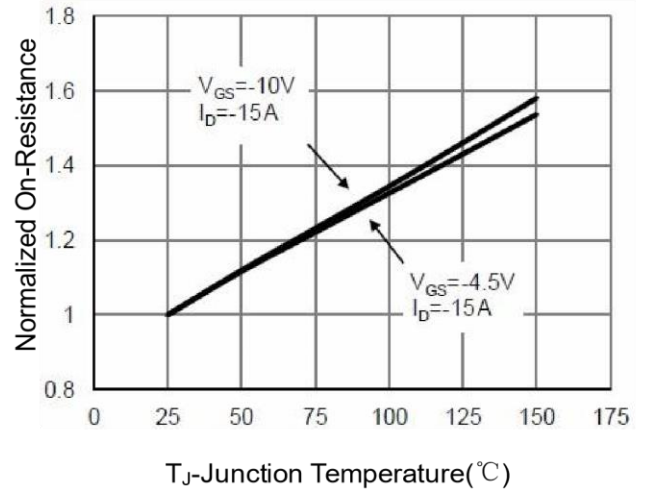
### Figure 7 Transfer Characteristics



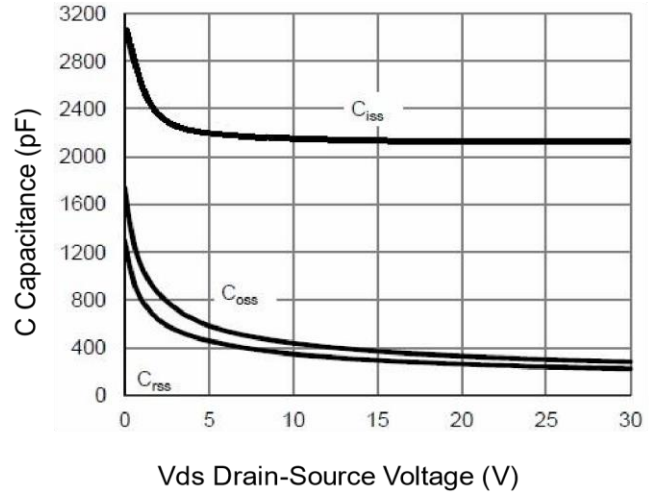
### Figure 9 Rdson vs Vgs



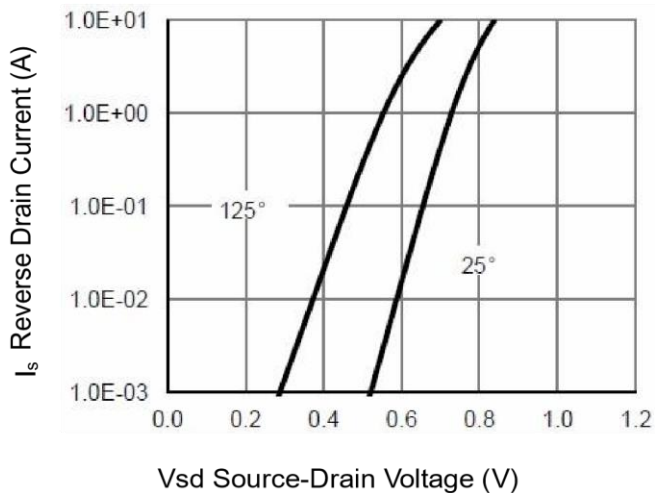
### Figure 11 Gate Charge



### Figure 8 Drain-Source On-Resistance



### Figure 10 Capacitance vs Vds



### Figure 12 Source- Drain Diode Forward

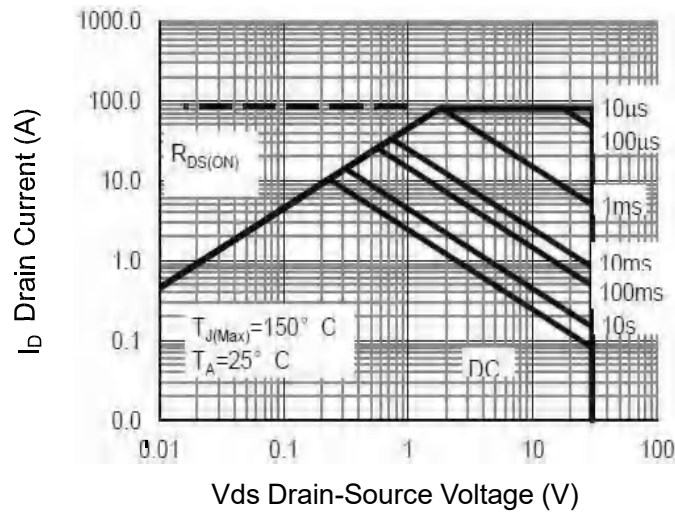


Figure 13 Safe Operation Area

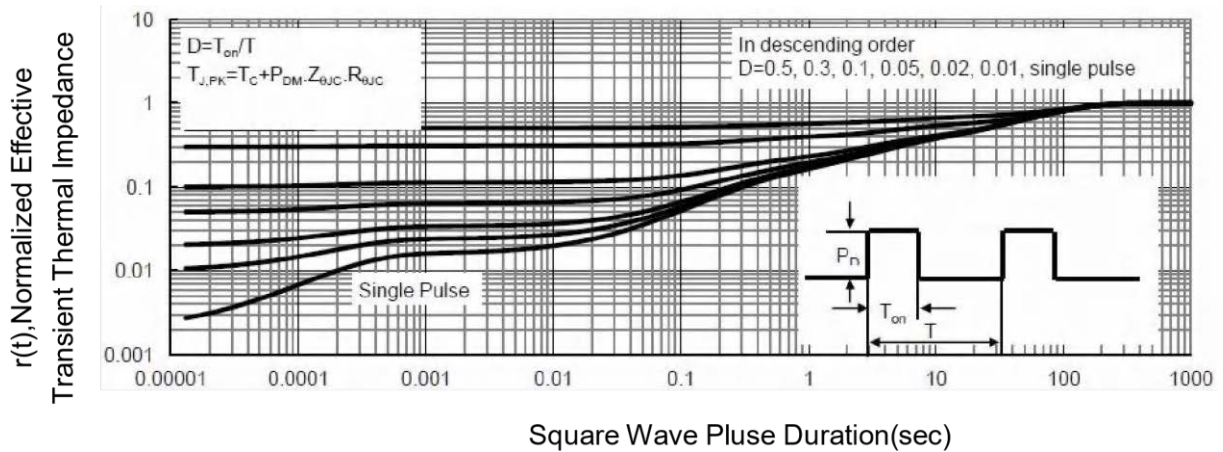
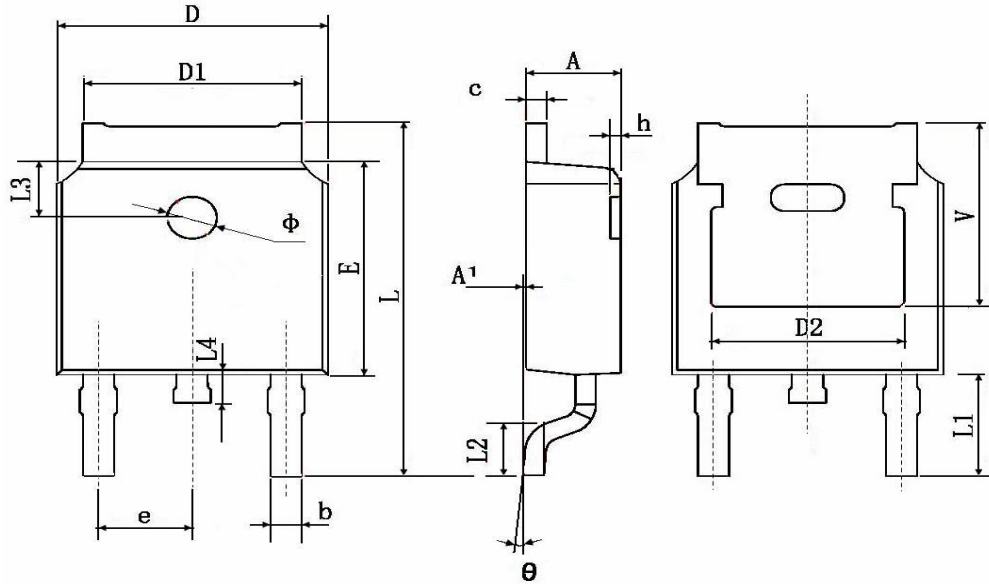


Figure 14 Normalized Maximum Transient Thermal Impedance



### 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     | 4.830 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 |
| Φ      | 1.100                     | 1.300  | 0.043                | 0.051 |
| θ      | 0°                        | 8°     | 0°                   | 8°    |
| h      | 0.000                     | 0.300  | 0.000                | 0.012 |
| V      | 5.350 TYP.                |        | 0.211 TYP.           |       |



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