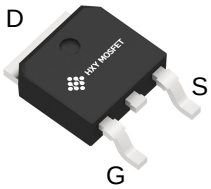
## Description

The FQD2N60CTF uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. This device is suitable for use as a Battery protection or in other Switching application.

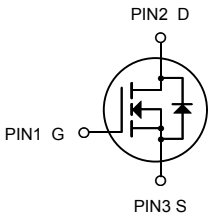



**TO-252-2L**
**(TO-252(DPAK))**

## General Features

$V_{DS}$ = 600V $I_D$ = 2A

$R_{DS(ON)}$ < 4.5Ω @ $V_{GS}$=10V




N-Channel MOSFET

## Application

Battery protection

Load switch

Uninterruptible power supply

## Package Marking and Ordering Information

| Product ID | Pack | Brand | Qty(PCS) |
|---|---|---|---|
| FQD2N60CTF | TO-252-2L(TO-252(DPAK)) | HXY MOSFET | 2500 |

## Absolute Maximum Ratings Tc=25°C unless otherwise noted

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 600 | V |
| $V_{GS}$ | Gate-Source Voltage | ±30 | V |
| $I_D$@$T_C$=25℃ | Continuous Drain Current, $V_{GS}$ @ 10V[1] | 2 | A |
| $I_D$@$T_C$=100℃ | Continuous Drain Current, $V_{GS}$ @ 10V[1] | 1.2 | A |
| $I_{DM}$ | Pulsed Drain Current[2] | 8 | A |
| $P_D$@$T_C$=25℃ | Total Power Dissipation[1] | 31 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | ℃ |
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient[6] | 100 | ℃/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case[1] | 4.0 | ℃/W |

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

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Off characteristics** | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V, $I_D$=250μA | 600 | | | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$=600V, $V_{GS}$ =0V | | | 1.0 | μA |
| Gate-body leakage current | $I_{GSS}$ | $V_{DS}$=0V, $V_{GS}$ =±30V | | | ±100 | nA |
| **On characteristics** [4] | | | | | | |
| Gate-threshold voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$ =250μA | 2.0 | 3.4 | 4.0 | V |
| Static drain-source on-sate resistance | $R_{DS(on)}$ | $V_{GS}$=10V, $I_D$ =1A | | 3.7 | 4.5 | Ω |
| **Dynamic characteristics**[5] | | | | | | |
| Input capacitance | $C_{iss}$ | $V_{DS}$ =25V,$V_{GS}$ =0V, f =1MHz | | 322 | | pF |
| Output capacitance | $C_{oss}$ | | | 38 | | |
| Reverse transfer capacitance | $C_{rss}$ | | | 7 | | |
| Gate resistance | $R_g$ | f =1MHz | | 5.7 | | Ω |
| **Switching characteristics** [5] | | | | | | |
| Total gate charge | $Q_g$ | $V_{GS}$=10V, $V_{DS}$=25V, $I_D$=2A | | 1.6 | | nC |
| Gate-source charge | $Q_{gs}$ | | | 2.1 | | |
| Gate-drain charge | $Q_{gd}$ | | | 6.2 | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$=25V, $V_{GS}$=10V, $R_G$=18Ω, $I_D$ =2A | | 1.8 | | nS |
| Turn-on rise time | $t_r$ | | | 3.2 | | |
| Turn-off delay time | $t_{d(off)}$ | | | 7.4 | | |
| Turn-off fall time | $t_f$ | | | 7.6 | | |
| **Drain-Source Diode Characteristics** | | | | | | |
| Drain-source diode forward voltage[4] | $V_{SD}$ | $V_{GS}$ =0V, $I_S$=2A | | | 1.4 | V |
| Continuous drain-source diode forward current [1] | $I_S$ | | | | 2.0 | A |
| Pulsed drain-source diode forward current [2] | $I_{SM}$ | | | | 8.0 | A |
| Reverse recovery time | trr | dIF/dt = 100A/μs, $I_S$ = 2A, $V_{DD}$ = 400V | | 192 | | ns |
| Reverse recovery charge | Qrr | | | 1027 | | nC |

Notes:

1.$T_C$=25℃ Limited only by maximum temperature allowed.

2.$P_W$≤10μs, Duty cycle≤1%.

3.EAS condition: $V_{DD}$=150V,$V_{GS}$=10V, L=10mH, Rg=25Ω Starting $T_J$ = 25℃.

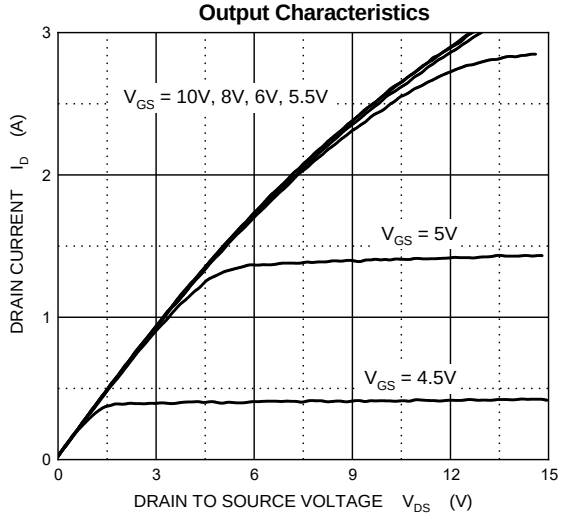
4.Pulse Test : Pulse Width≤300μs, duty cycle ≤2%.

5.Guaranteed by design, not subject to production.

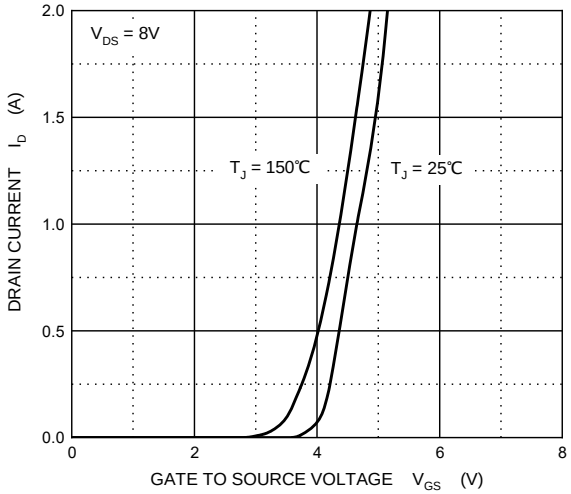
6.The value of RθJA is measured with the device in a still air environment with $T_A$=25℃.

## Typical Characteristics

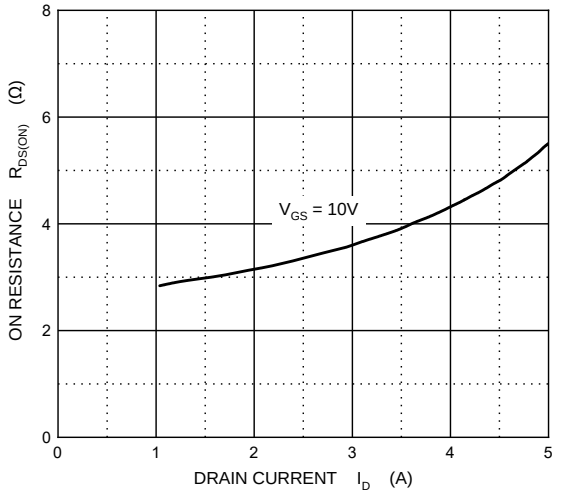
**Output Characteristics**



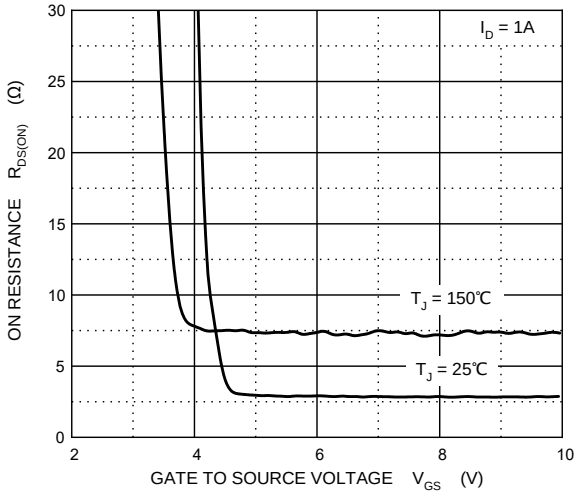

**Transfer Characteristics**



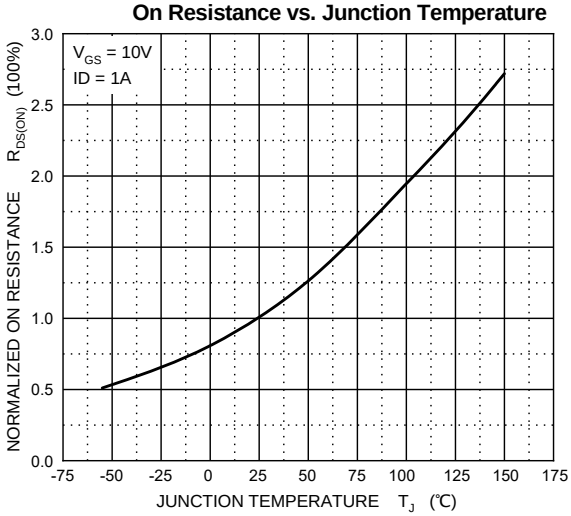

**On Resistance vs. Drain Current**



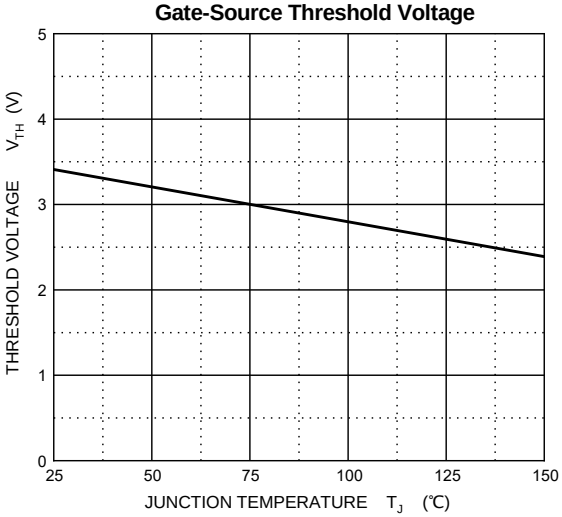

**On Resistance vs. Gate-Source Bias**



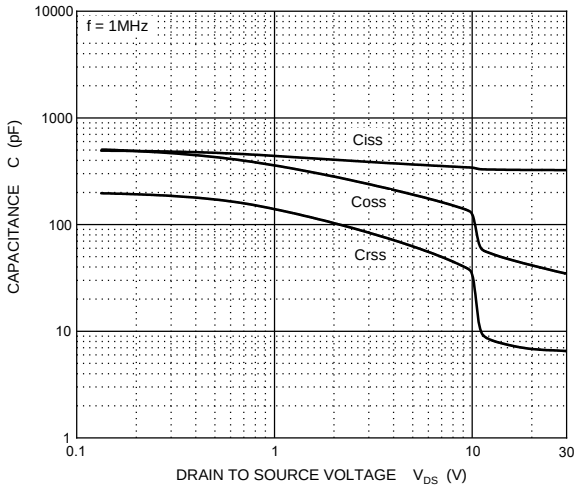

**On Resistance vs. Junction Temperature**



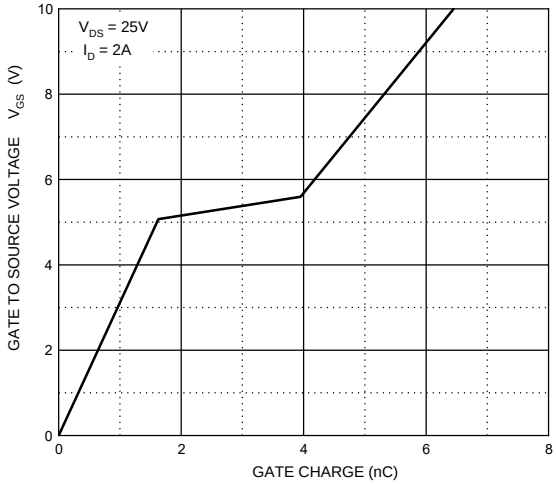

**Gate-Source Threshold Voltage**



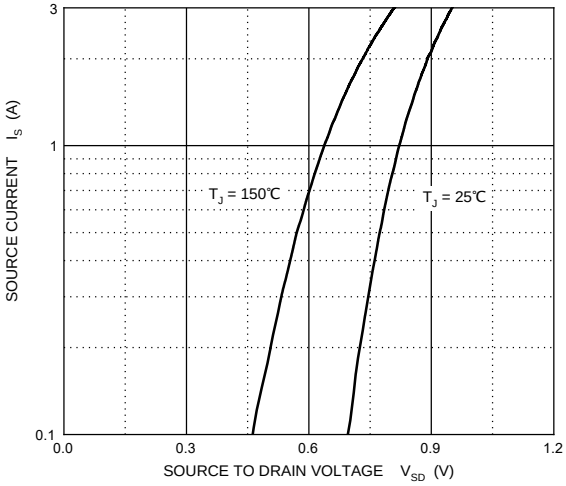
**Typical Capacitances**



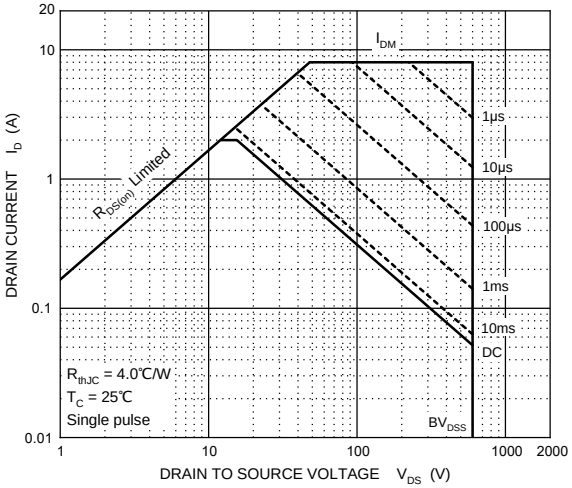

**Gate Charge**



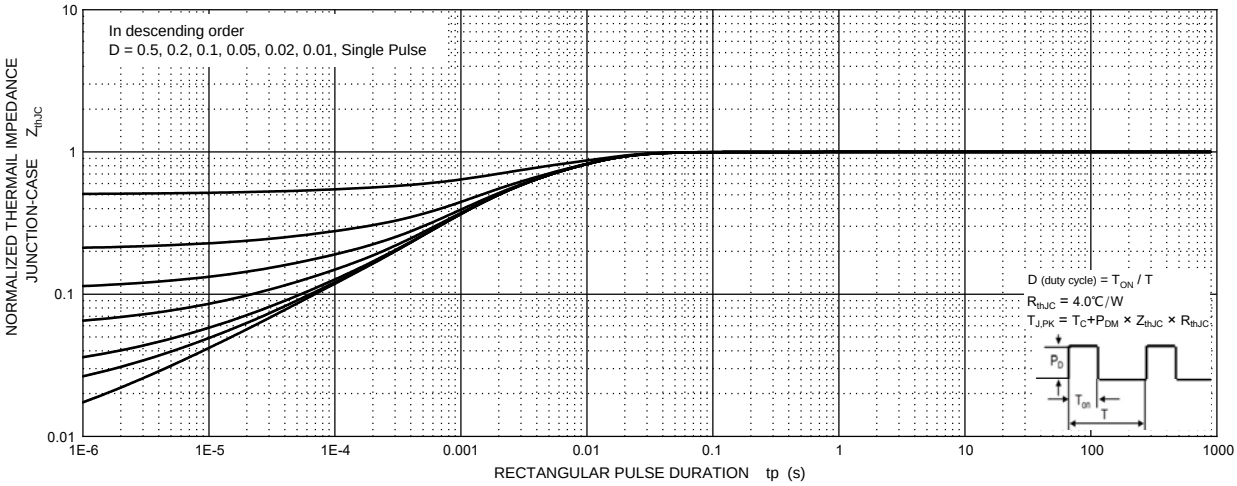

**Source-Drain Diode Forward Characteristics**



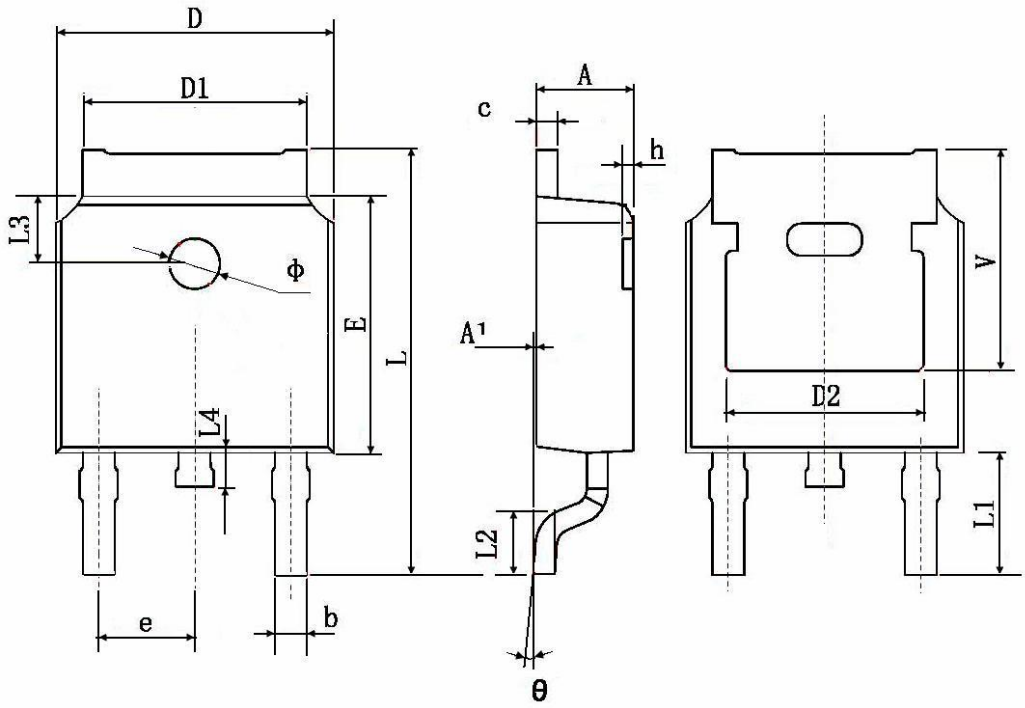

**Maximum Safe Operating Area**




**Transient Thermal Impedance, Junction-Case**



## TO-252-2L(TO-252(DPAK)) 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 |
| 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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