



## Description

The FDP24AN06LA0 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.



**TO-220**

## General Features

$V_{DS} = 60V, I_D = 60A$

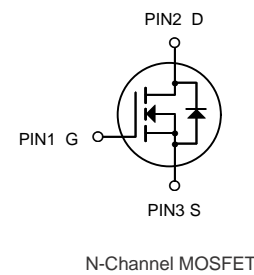
$R_{DS(ON)} < 18m\Omega @ V_{GS}=10V$

## Application

High efficiency switch mode power supplies

Power factor correction

Electronic lamp ballast



**Units Tube**

## Ordering Information

| Product ID   | Pack    | Brand      | Units Tube |
|--------------|---------|------------|------------|
| FDP24AN06LA0 | TO-220C | HXY MOSFET | 50         |

## Absolute Maximum Ratings@ $T_j=25^\circ C$ (unless otherwise specified)

| Symbol               | Parameter                            | Rating     | Units |
|----------------------|--------------------------------------|------------|-------|
| V <sub>DS</sub>      | Drain-Source Voltage                 | 60         | V     |
| V <sub>GS</sub>      | Gate-Source Voltage                  | +20        | V     |
| $I_D@T_C=25^\circ C$ | Drain Current                        | 60         | A     |
| I <sub>DM</sub>      | Pulsed Drain Current <sup>1</sup>    | 240        | A     |
| $P_D@T_C=25^\circ C$ | Total Power Dissipation              | 120        | W     |
| T <sub>STG</sub>     | Storage Temperature Range            | -55 to 150 | °C    |
| T <sub>J</sub>       | Operating Junction Temperature Range | -55 to 150 | °C    |



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

| Parameter  | Symbol              | Condition  | Min | Typ  | Max  | Unit |
|--|---------------------|--|-----|------|------|------|
| <b>Off Characteristics</b>                         |                     |  |     |      |      |      |
| Drain-Source Breakdown Voltage <sup>(Note 1)</sup> | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA   | 60  | -    | -    | V    |
| Zero Gate Voltage Drain Current                    | I <sub>DSS</sub>    | V <sub>DS</sub> =60V, V <sub>GS</sub> =0V  | 60  | 68   | -    | nA   |
| Gate-Body Leakage Current                          | I <sub>GSS</sub>    | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V   | -   | -    | ±100 | nA   |
| <b>On Characteristics</b>                          |                     |  |     |      |      |      |
| Gate Threshold Voltage                             | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                               | 2.0 | -    | 4.0  | V    |
| Drain-Source On-State Resistance                   | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =25A  | -   | 12   | 18   | mΩ   |
| Forward Transconductance                           | g <sub>FS</sub>     | V <sub>DS</sub> =30V, I <sub>D</sub> =40A  | 15  | -    | -    | S    |
| <b>Dynamic Characteristics</b>                     |                     |  |     |      |      |      |
| Input Capacitance                                  | C <sub>iss</sub>    | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V,<br>F=1.0MHz                                 | -   | 4050 | -    | PF   |
| Output Capacitance                                 | C <sub>oss</sub>    |  | -   | 430  | -    | PF   |
| Reverse Transfer Capacitance                       | C <sub>rss</sub>    |  | -   | 110  | -    | PF   |
| <b>Switching Characteristics</b>                   |                     |  |     |      |      |      |
| Turn-on Delay Time                                 | t <sub>d(on)</sub>  | V <sub>DD</sub> =30V, I <sub>D</sub> =40A<br>R <sub>G</sub> =50Ω <sup>(Note 2)</sup>   | -   | 60   | -    | nS   |
| Turn-on Rise Time                                  | t <sub>r</sub>      |  | -   | 185  | -    | nS   |
| Turn-Off Delay Time                                | t <sub>d(off)</sub> |  | -   | 75   | -    | nS   |
| Turn-Off Fall Time                                 | t <sub>f</sub>      |  | -   | 60   | -    | nS   |
| Total Gate Charge                                  | Q <sub>g</sub>      | V <sub>DS</sub> =30V, I <sub>D</sub> =40A,<br>V <sub>GS</sub> =10V <sup>(Note 2)</sup> | -   | 39   | -    | nC   |
| Gate-Source Charge                                 | Q <sub>gs</sub>     |  | -   | 9.3  | -    | nC   |
| Gate-Drain Charge                                  | Q <sub>gd</sub>     |  | -   | 13   | -    | nC   |
| <b>Drain-Source Diode Characteristics</b>          |                     |  |     |      |      |      |
| Diode Forward Voltage                              | V <sub>SD</sub>     | V <sub>GS</sub> =0V, I <sub>S</sub> =60A   | -   | -    | 1.5  | V    |
| Diode Forward Current <sup>(Note 2)</sup>          | I <sub>S</sub>      |  | -   | -    | 60   | A    |

**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.



### Typical Electrical

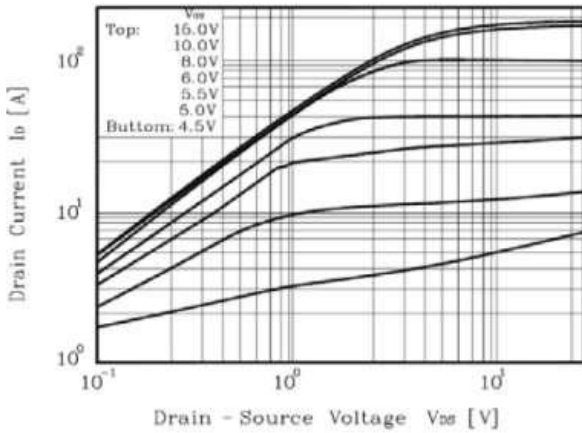


Figure 1. On Region Characteristics

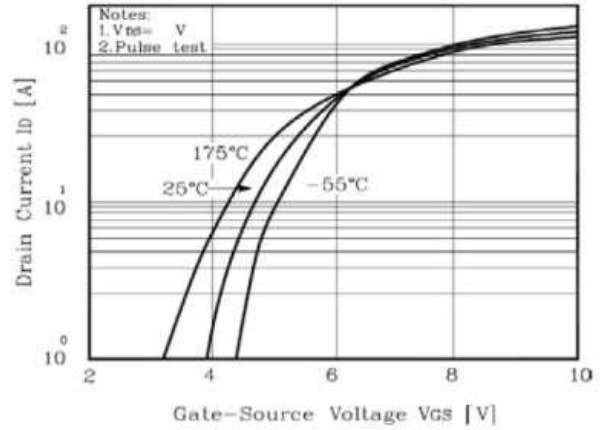


Figure 2. Transfer Characteristics

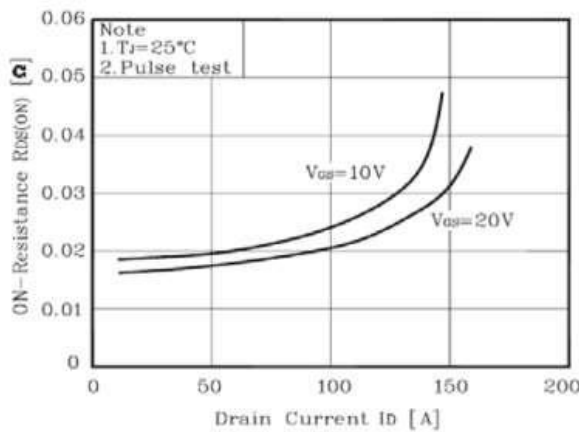


Figure 3. On Resistance Variation vs Drain Current and Gate Voltage

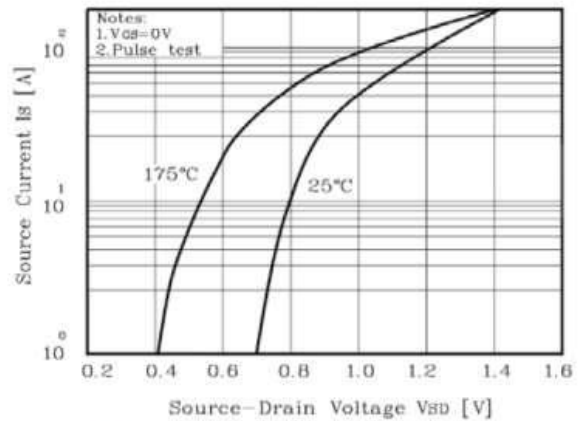


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

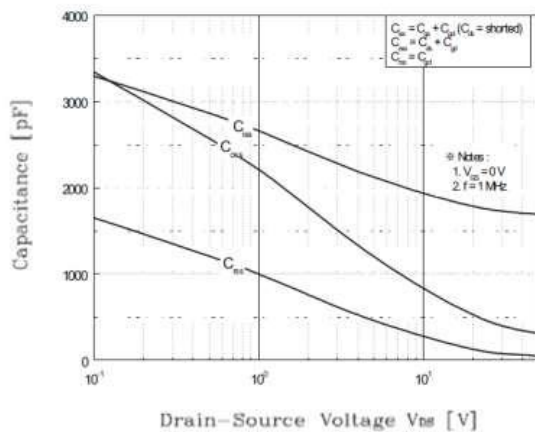


Figure 5. Capacitance Characteristics

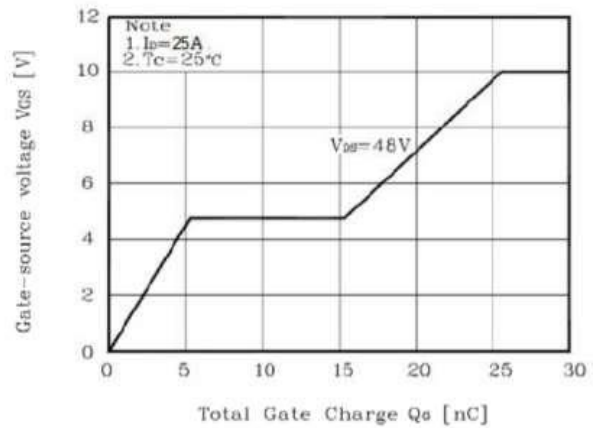


Figure 6. Gate Charge Characteristics

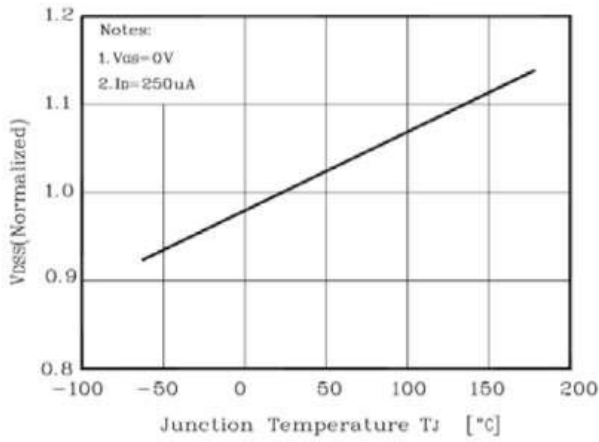


Figure 7. Breakdown Voltage Variation vs Temperature

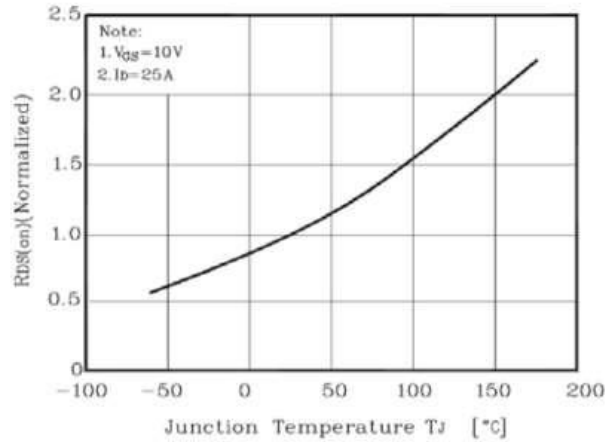


Figure 8. On-Resistance Variation vs Temperature

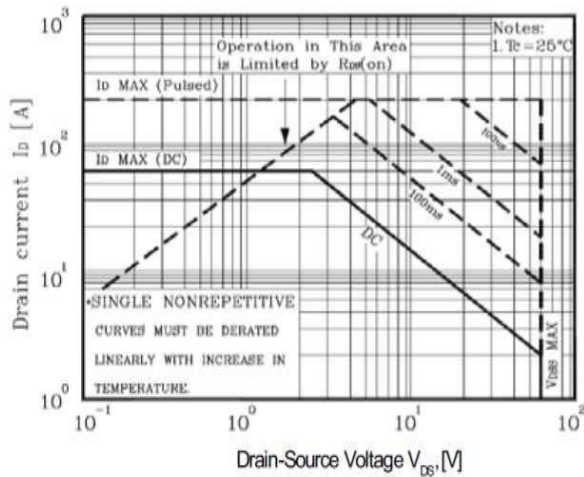


Figure 9. Maximum Safe Operating Area

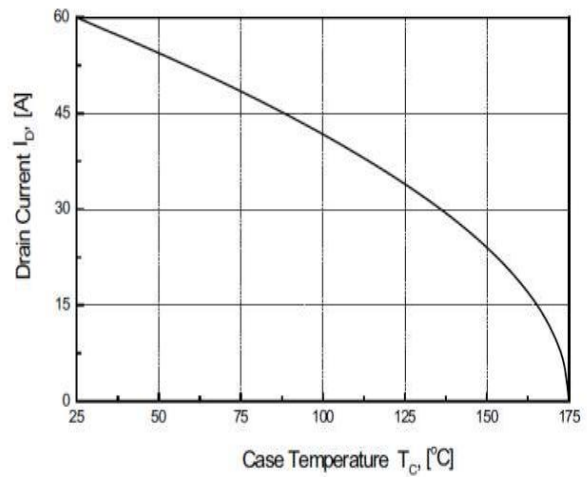


Figure 10. Maximum Drain Current vs Case Temperature

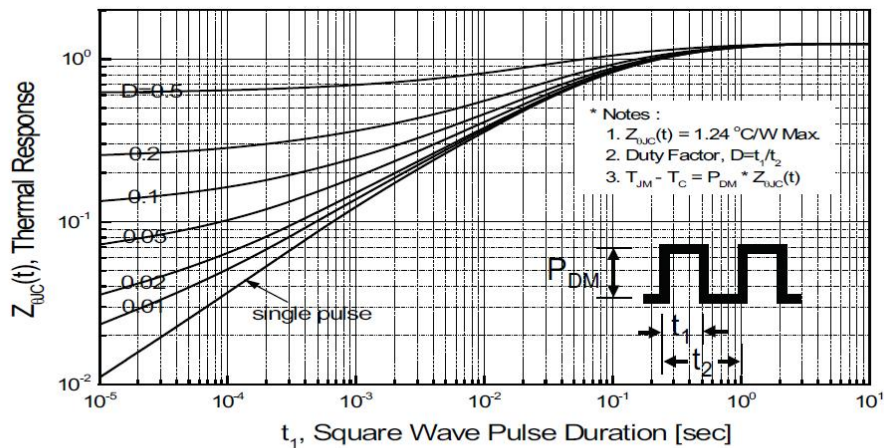
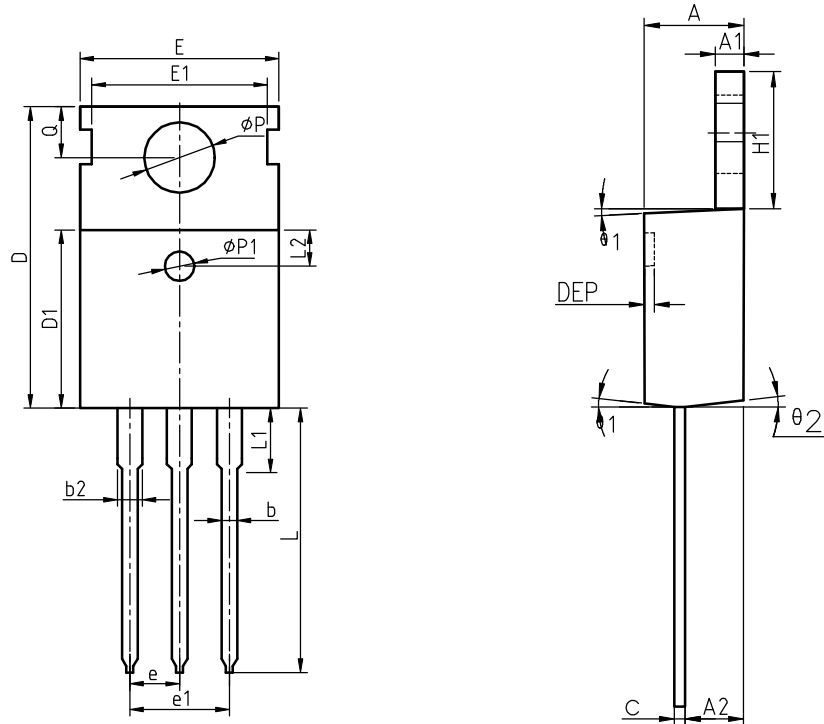


Figure 11. Transient Thermal Response Curve

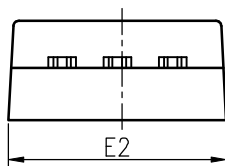


Package Information  
TO-220C



COMMON DIMENSIONS

| SYMBOL  | MIN   | NOM   | MAX   | MIN   | NOM   | MAX   |
|---------|-------|-------|-------|-------|-------|-------|
| A       | 4.40  | 4.57  | 4.70  | 0.173 | 0.180 | 0.185 |
| A1      | 1.27  | 1.30  | 1.33  | 0.050 | 0.051 | 0.052 |
| A2      | 2.35  | 2.40  | 2.50  | 0.093 | 0.094 | 0.098 |
| b       | 0.77  | 0.80  | 0.90  | 0.030 | 0.031 | 0.035 |
| b2      | 1.17  | 1.27  | 1.36  | 0.046 | 0.050 | 0.054 |
| c       | 0.48  | 0.50  | 0.56  | 0.019 | 0.020 | 0.022 |
| D       | 15.40 | 15.60 | 15.80 | 0.606 | 0.614 | 0.622 |
| D1      | 9.00  | 9.10  | 9.20  | 0.354 | 0.358 | 0.362 |
| DEP     | 0.05  | 0.10  | 0.20  | 0.002 | 0.004 | 0.008 |
| E       | 9.80  | 10.00 | 10.20 | 0.386 | 0.394 | 0.402 |
| E1      | -     | 8.70  | -     | -     | 0.343 | -     |
| E2      | 9.80  | 10.00 | 10.20 | 0.386 | 0.394 | 0.402 |
| e       |       | 2.54  | BSC   |       | 0.100 | BSC   |
| e1      |       | 5.08  | BSC   |       | 0.200 | BSC   |
| H1      | 6.40  | 6.50  | 6.60  | 0.252 | 0.256 | 0.260 |
| L       | 12.75 | 13.50 | 13.65 | 0.502 | 0.531 | 0.537 |
| L1      | -     | 3.10  | 3.30  | -     | 0.122 | 0.130 |
| L2      |       | 2.50  | REF   |       | 0.098 | REF   |
| P       | 3.50  | 3.60  | 3.63  | 0.138 | 0.142 | 0.143 |
| P1      | 3.50  | 3.60  | 3.63  | 0.138 | 0.142 | 0.143 |
| Q       | 2.73  | 2.80  | 2.87  | 0.107 | 0.110 | 0.113 |
| theta 1 | 5°    | 7°    | 9°    | 5°    | 7°    | 9°    |
| theta 2 | 1°    | 3°    | 5°    | 1°    | 3°    | 5°    |
| theta 3 | 1°    | 3°    | 5°    | 1°    | 3°    | 5°    |





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