

## General Description

The MY40N20P is N-channel Enhanced VDMOSFETs, obtained by the self-aligned planar Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy.

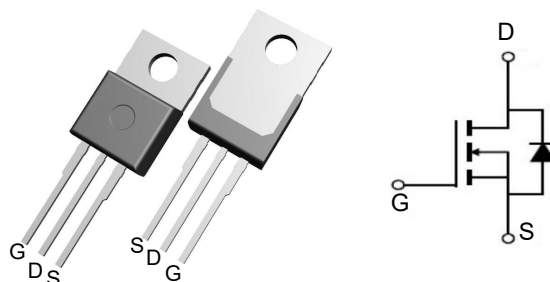


## Features

|                                          |     |                  |
|------------------------------------------|-----|------------------|
| $V_{DSS}$                                | 200 | V                |
| $I_D$                                    | 40  | A                |
| $P_D$ ( $T_C = 25^\circ\text{C}$ )       | 250 | W                |
| $R_{DS(ON)}$ (at $V_{GS} = 10\text{V}$ ) | 72  | $\text{m}\Omega$ |

## Application

- High efficiency switch mode power supplies
- Power factor correction
- Electronic lamp ballast



## Package Marking and Ordering Information

| Product ID | Pack   | Marking  | Qty(PCS) |
|------------|--------|----------|----------|
| MY40N20P   | TO-220 | MY40N20P | 1000     |

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

| Symbol    | Parameters                           | Ratings  | Unit                      |
|-----------|--------------------------------------|----------|---------------------------|
| $V_{DSS}$ | Drain-Source Voltage                 | 200      | V                         |
| $V_{GS}$  | Gate-Source Voltage-Continuous       | $\pm 20$ | V                         |
| $I_D$     | Drain Current-Continuous (Note 2)    | 40       | A                         |
| $I_{DM}$  | Drain Current-Single Pulsed (Note 1) | 160      | A                         |
| $P_D$     | Power Dissipation (Note 2)           | 250      | W                         |
| $T_j$     | Max.Operating junction temperature   | 150      | $^\circ\text{C}/\text{W}$ |

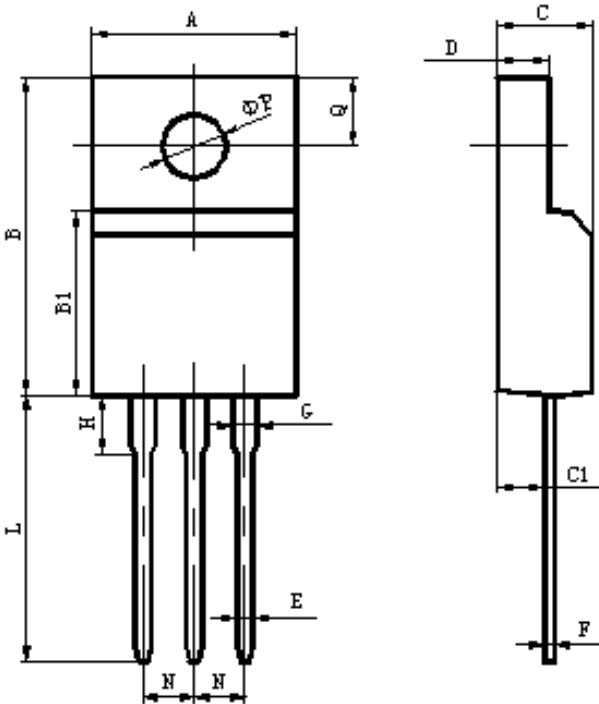
**Electrical Characteristics ( $T_c=25\text{ }^{\circ}\text{C}$ , unless otherwise noted)**

| Symbol                    | Parameters                                            | Min | Typ  | Max  | Units | Conditions                                                                                           |
|---------------------------|-------------------------------------------------------|-----|------|------|-------|------------------------------------------------------------------------------------------------------|
| Static Characteristics    |                                                       |     |      |      |       |                                                                                                      |
| B <sub>V</sub> DSS        | Drain-Source Breakdown VoltageCurrent (Note 1)        | 200 | --   | --   | mA    | I <sub>D</sub> =250μA<br>V <sub>GS</sub> =0V , T <sub>J</sub> =25°C                                  |
| V <sub>GS</sub> (th)      | Gate Threshold Voltage                                | 2.0 | --   | 4.0  | V     | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                             |
| R <sub>DS</sub> (on)      | Drain-Source On-Resistance                            | --  | --   | 72   | mΩ    | V <sub>GS</sub> =10V , I <sub>D</sub> =16A                                                           |
| I <sub>GSS</sub>          | Gate-Body Leakage Current                             | --  | --   | ±100 | nA    | V <sub>GS</sub> =±20V , V <sub>DS</sub> =0                                                           |
| I <sub>DSS</sub>          | Zero Gate Voltage Drain Current                       | --  | --   | 1    | μA    | V <sub>DS</sub> =200V , V <sub>GS</sub> =0                                                           |
| Switching Characteristics |                                                       |     |      |      |       |                                                                                                      |
| T <sub>d (on )</sub>      | Turn-On Delay Time                                    | --  | 28   | --   | ns    | V <sub>DS</sub> =100V, I <sub>D</sub> =30A,<br>R <sub>G</sub> =25Ω,V <sub>GS</sub> =10V<br>(Note 2 ) |
| T <sub>r</sub>            | Rise Time                                             | --  | 36   | --   | ns    |                                                                                                      |
| T <sub>d (off)</sub>      | Turn-Off Delay Time                                   | --  | 153  | --   | ns    |                                                                                                      |
| T <sub>f</sub>            | Fall Time                                             | --  | 88   | --   | ns    |                                                                                                      |
| Q <sub>g</sub>            | Total Gate Charge                                     | --  | 55   | --   | nC    | V <sub>DS</sub> =160V,V <sub>GS</sub> =10V<br>I <sub>D</sub> =30A (Note 2 )                          |
| Q <sub>gs</sub>           | Gate-Source Charge                                    | --  | 11   | --   | nC    |                                                                                                      |
| Q <sub>gd</sub>           | Gate-Drain Charge                                     | --  | 18   | --   | nC    |                                                                                                      |
| Dynamic Characteristics   |                                                       |     |      |      |       |                                                                                                      |
| C <sub>iss</sub>          | Input Capacitance                                     | --  | 1450 | --   | pF    | V <sub>DS</sub> =25V , V <sub>GS</sub> =0,<br>f=1MHz                                                 |
| C <sub>oss</sub>          | Output Capacitance                                    | --  | 350  | --   | pF    |                                                                                                      |
| C <sub>rss</sub>          | Reverse Transfer Capacitance                          | --  | 38   | --   | pF    |                                                                                                      |
| I <sub>s</sub>            | Continuous Drain-Source Diode ForwardCurrent (Note 2) | --  | --   | 40   | A     |                                                                                                      |
| V <sub>SD</sub>           | Diode Forward On-Voltage                              | --  | --   | 1.4  | V     | I <sub>S</sub> =30A , V <sub>GS</sub> =0                                                             |
| R <sub>th(j-c)</sub>      | Thermal Resistance, Junction to Case                  | --  | --   | 0.5  | C/ W  |                                                                                                      |

Note 1: Repetitive Rating : Pulse width limited by maximum junction temperature

Note 2: Pulse test:  $PW \leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .

Package Mechanical Data-TO-220 Single



| Items | Values(mm) |      |
|-------|------------|------|
|       | MIN        | MAX  |
| A     | 9.60       | 10.4 |
| B     | 15.4       | 16.2 |
| B1    | 8.90       | 9.50 |
| C     | 4.30       | 4.90 |
| C1    | 2.10       | 3.00 |
| D     | 2.40       | 3.00 |
| E     | 0.60       | 1.00 |
| F     | 0.30       | 0.60 |
| G     | 1.12       | 1.42 |
| H     | 3.40       | 3.80 |
|       | 2.40       | 2.90 |
| L*    | 12.0       | 14.0 |
| N     | 2.34       | 2.74 |
| Q     | 3.15       | 3.55 |
| Φ P   | 2.90       | 3.30 |