

FMP20N60S1

FUJI POWER MOSFET

Super J-MOS series

N-Channel enhancement mode power MOSFET

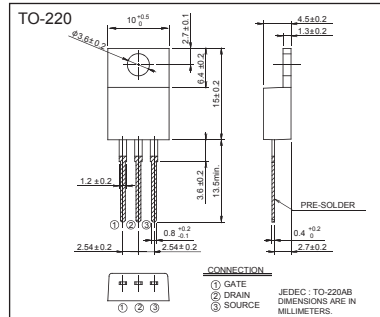
■ Features

- Low on-state resistance
- Low switching loss
- easy to use (more controllable switching dV/dt by R_g)

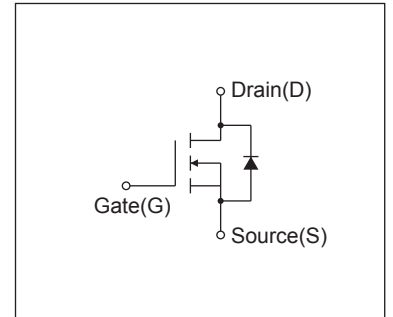
■ Applications

- UPS
- Server
- Telecom
- Power conditioner system
- Power supply

■ Outline Drawings [mm]



■ Equivalent circuit schematic



■ Maximum Ratings and Characteristics

● Absolute Maximum Ratings at T_c=25°C (unless otherwise specified)

| Description | Symbol | Characteristics | Unit | Remarks |
|---|----------------------|-----------------|-------|------------------------------|
| Drain-Source Voltage | V _{DS} | 600 | V | |
| | V _{DSX} | 600 | V | V _{GS} =-30V |
| Continuous Drain Current | I _D | ±20 | A | T _c =25°C Note*1 |
| | | ±12.6 | A | T _c =100°C Note*1 |
| Pulsed Drain Current | I _{DP} | ±60 | A | |
| Gate-Source Voltage | V _{GS} | ±30 | V | |
| Repetitive and Non-Repetitive Maximum Avalanche Current | I _{AR} | 6.6 | A | Note *2 |
| Non-Repetitive Maximum Avalanche Energy | E _{AS} | 472.2 | mJ | Note *3 |
| Maximum Drain-Source dV/dt | dV _{DS} /dt | 50 | kV/μs | V _{DS} ≤ 600V |
| Peak Diode Recovery dV/dt | dV/dt | 15 | kV/μs | Note *4 |
| Peak Diode Recovery -di/dt | -di/dt | 100 | A/μs | Note *5 |
| Maximum Power Dissipation | P _D | 2.02 | W | T _a =25°C |
| | | 150 | | T _c =25°C |
| Operating and Storage Temperature range | T _{ch} | 150 | °C | |
| | T _{stg} | -55 to +150 | °C | |

Note *1 : Limited by maximum channel temperature.

Note *2 : T_{ch} ≤ 150°C, See Fig.1 and Fig.2

Note *3 : Starting T_{ch}=25°C, I_{AS}=2A, L=216mH, V_{DD}=60V, R_G=50Ω, See Fig.1 and Fig.2

E_{AS} limited by maximum channel temperature and avalanche current.

Note *4 : I_F ≤ -I_D, -di/dt=100A/μs, V_{DD} ≤ 400V, T_{ch} ≤ 150°C.

Note *5 : I_F ≤ -I_D, dV/dt=15kV/μs, V_{DD} ≤ 400V, T_{ch} ≤ 150°C.

● Electrical Characteristics at T_c=25°C (unless otherwise specified)
Static Ratings

| Description | Symbol | Conditions | min. | typ. | max. | Unit |
|--|---------------------|---|------|-------|------|------|
| Drain-Source Breakdown Voltage | BV _{DSS} | I _D =250μA V _{GS} =0V | 600 | - | - | V |
| Gate Threshold Voltage | V _{GS(th)} | I _D =250μA V _{DS} =V _{GS} | 2.5 | 3 | 3.5 | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =600V V _{GS} =0V T _{ch} =25°C | - | - | 25 | μA |
| | | V _{DS} =480V V _{GS} =0V T _{ch} =125°C | - | - | 250 | |
| Gate-Source Leakage Current | I _{GSS} | V _{GS} = ± 30V V _{DS} =0V | - | 10 | 100 | nA |
| Drain-Source On-State Resistance | R _{DS(on)} | I _D =10A V _{GS} =10V | - | 0.161 | 0.19 | Ω |
| Gate resistance | R _G | f=1MHz, open drain | - | 3.7 | - | Ω |
| Forward Transconductance | g _{fs} | I _D =10A V _{DS} =25V | 8.5 | 17.5 | - | S |
| Input Capacitance | C _{iss} | V _{DS} =10V | - | 1470 | - | pF |
| Output Capacitance | C _{oss} | V _{GS} =0V | - | 3120 | - | |
| Reverse Transfer Capacitance | C _{rss} | f=1MHz | - | 280 | - | |
| Effective output capacitance, energy related (Note *6) | C _{o(er)} | V _{GS} =0V V _{DS} =0...480V | - | 90 | - | |
| Effective output capacitance, time related (Note *7) | C _{o(tr)} | V _{GS} =0V V _{DS} =0...480V I _D =constant | - | 305 | - | |
| Turn-On Time | t _{d(on)} | V _{DD} =400V, V _{GS} =10V I _D =10A, R _G =27Ω | - | 22 | - | ns |
| | t _r | | - | 40 | - | |
| Turn-Off Time | t _{d(off)} | See Fig.3 and Fig.4 | - | 162 | - | |
| | t _r | | - | 22 | - | |
| Total Gate Charge | Q _G | V _{DD} =480V, I _D =20A V _{GS} =10V See Fig.5 | - | 48 | - | nC |
| Gate-Source Charge | Q _{GS} | | - | 12.5 | - | |
| Gate-Drain Charge | Q _{GD} | | - | 15 | - | |
| Drain-Source crossover Charge | Q _{SW} | | - | 8 | - | |
| Avalanche Capability | I _{AV} | L=6.02mH, T _{ch} =25°C See Fig.1 and Fig.2 | 6.6 | - | - | A |
| Diode Forward On-Voltage | V _{SD} | I _F =20A, V _{GS} =0V T _{ch} =25°C | - | 0.9 | 1.35 | V |
| Reverse Recovery Time | t _{rr} | I _F =20A, V _{GS} =0V V _{DD} =400V | | 370 | - | ns |
| Reverse Recovery Charge | Q _{rr} | -di/dt=100A/μs T _{ch} =25°C | - | 6.2 | - | μC |
| Peak Reverse Recovery Current | I _{rp} | See Fig.6 | - | 32 | - | A |

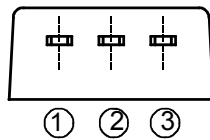
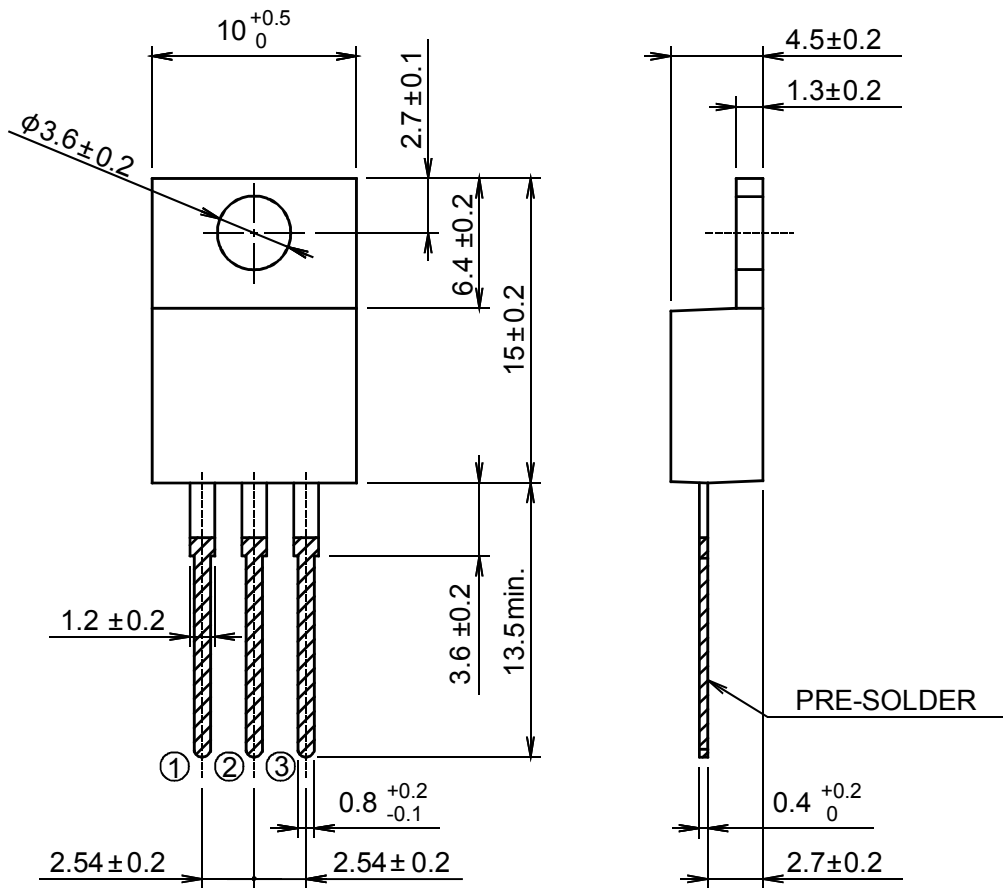
Note *6 : C_{o(er)} is a fixed capacitance that gives the same stored energy as C_{oss} while V_{DS} is rising from 0 to 80% BV_{DSS}.

Note *7 : C_{o(tr)} is a fixed capacitance that gives the same charging times as C_{oss} while V_{DS} is rising from 0 to 80% BV_{DSS}.

● Thermal Characteristics

| Description | Symbol | min. | typ. | max. | Unit |
|--------------------|-----------------------|------|------|------|------|
| Channel to Case | R _{th(ch-c)} | | | 0.83 | °C/W |
| Channel to Ambient | R _{th(ch-a)} | | | 62 | °C/W |

■ Outview: TO-220 Package

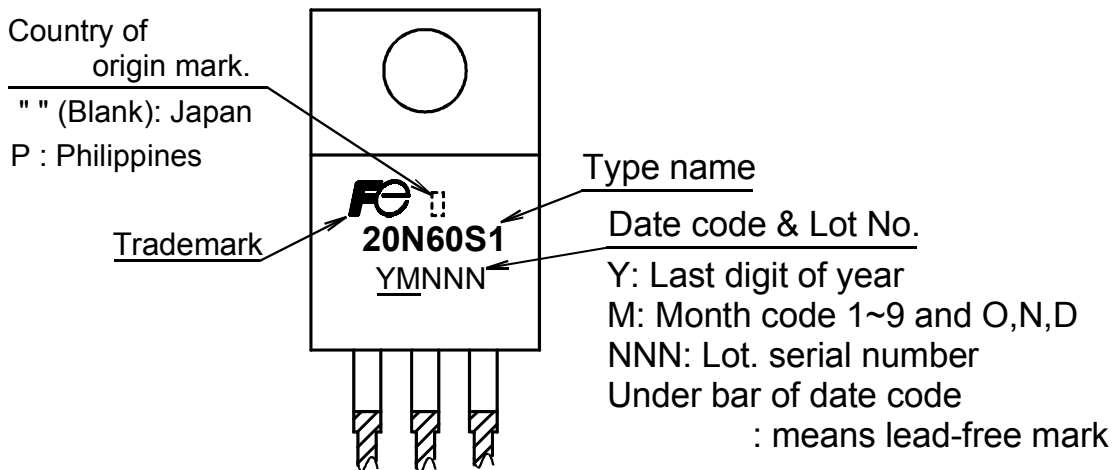


CONNECTION

- ① GATE
- ② DRAIN
- ③ SOURCE

JEDEC : TO-220AB
 DIMENSIONS ARE IN MILLIMETERS.

■ Marking



* The font (font type,size) and the trademark-size might be actually different.