

FUJI POWER MOSFET Super FAP-G Series

N-CHANNEL SILICON POWER MOSFET

Features

- High speed switching
- Low on-resistance
- No secondary breakdown
- Low driving power
- Avalanche-proof

Applications

- Switching regulators
- UPS (Uninterruptible Power Supply)
- DC-DC converters

Maximum ratings and characteristic Absolute maximum ratings

($T_c=25^\circ\text{C}$ unless otherwise specified)

| Item | Symbol | Ratings | Unit |
|---|-----------------|------------------------|-------------------|
| Drain-source voltage | V_{DS} | 200 | V |
| | V_{DSX}^*5 | 170 | V |
| Continuous drain current | I_D | ± 45 | A |
| Pulsed drain current | $I_{D(puls)}$ | ± 180 | A |
| Gate-source voltage | V_{GS} | ± 30 | V |
| Non-repetitive Avalanche current | I_{AS}^*2 | 45 | A |
| Maximum Avalanche Energy | E_{AS}^*1 | 258.9 | mJ |
| Maximum Drain-Source dV/dt | dV_{DS}/dt^*4 | 20 | kV/ μs |
| Peak Diode Recovery dV/dt | dV/dt^*3 | 5 | kV/ μs |
| Max. power dissipation | P_D | $T_a=25^\circ\text{C}$ | 2.02 |
| | | $T_c=25^\circ\text{C}$ | 270 |
| Operating and storage temperature range | T_{ch} | +150 | $^\circ\text{C}$ |
| | T_{stg} | -55 to +150 | $^\circ\text{C}$ |

*1 $L=205\mu\text{H}$, $V_{CC}=48\text{V}$, $T_c=25^\circ\text{C}$, See to avalanche Energy Graph *2 $T_{ch} \leq 150^\circ\text{C}$

*3 $I_F \leq -I_D$, $-di/dt=50\text{A}/\mu\text{s}$, $V_{CC} \leq BV_{DSS}$, $T_{ch} \leq 150^\circ\text{C}$ *4 $V_{DS} \leq 200\text{V}$ *5 $V_{GS}=-30\text{V}$

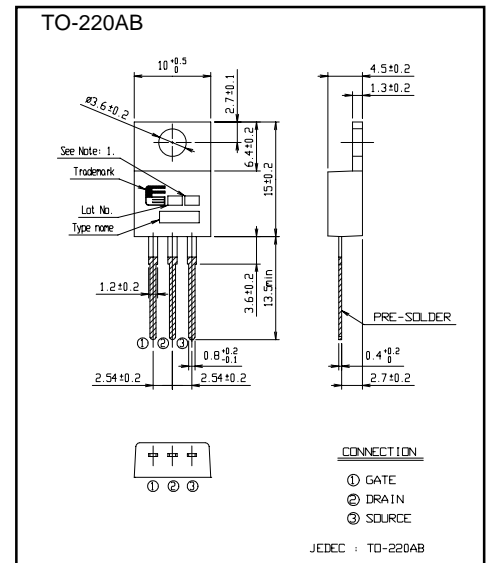
Electrical characteristics ($T_c = 25^\circ\text{C}$ unless otherwise specified)

| Item | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|----------------------------------|---------------|---|------|------|------|------------------|
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $I_D=250\mu\text{A}$ $V_{GS}=0\text{V}$ | 200 | | | V |
| Gate threshold voltage | $V_{GS(th)}$ | $I_D=250\mu\text{A}$ $V_{DS}=V_{GS}$ | 3.0 | | 5.0 | V |
| Zero gate voltage drain current | I_{DSS} | $V_{DS}=200\text{V}$ $V_{GS}=0\text{V}$ | | | 25 | μA |
| | | $V_{DS}=160\text{V}$ $V_{GS}=0\text{V}$ | | | 250 | |
| Gate-source leakage current | I_{GSS} | $V_{GS}=\pm 30\text{V}$ $V_{DS}=0\text{V}$ | | 10 | 100 | nA |
| Drain-source on-state resistance | $R_{DS(on)}$ | $I_D=15\text{A}$ $V_{GS}=10\text{V}$ | | 50 | 66 | $\text{m}\Omega$ |
| Forward transconductance | g_{fs} | $I_D=15\text{A}$ $V_{DS}=25\text{V}$ | 12.5 | 25 | | S |
| Input capacitance | C_{iss} | $V_{DS}=75\text{V}$ | | 1960 | 2940 | pF |
| Output capacitance | C_{oss} | $V_{GS}=0\text{V}$ | | 260 | 390 | |
| Reverse transfer capacitance | C_{rss} | $f=1\text{MHz}$ | | 18 | 27 | |
| Turn-on time t_{on} | $t_{d(on)}$ | $V_{CC}=48\text{V}$ $I_D=15\text{A}$ | | 20 | 30 | ns |
| | t_r | $V_{GS}=10\text{V}$ | | 17 | 26 | |
| Turn-off time t_{off} | $t_{d(off)}$ | $R_{GS}=10\Omega$ | | 53 | 80 | ns |
| | t_f | | | 19 | 29 | |
| Total Gate Charge | Q_G | $V_{CC}=100\text{V}$ | | 51 | 76.5 | nC |
| Gate-Source Charge | Q_{GS} | $I_D=30\text{A}$ | | 15 | 22.5 | |
| Gate-Drain Charge | Q_{GD} | $V_{GS}=10\text{V}$ | | 16 | 24 | |
| Avalanche capability | I_{AV} | $L=205\mu\text{H}$ $T_{ch}=25^\circ\text{C}$ | 45 | | | A |
| Diode forward on-voltage | V_{SD} | $I_F=30\text{A}$ $V_{GS}=0\text{V}$ $T_{ch}=25^\circ\text{C}$ | | 1.10 | 1.65 | V |
| Reverse recovery time | t_{rr} | $I_F=30\text{A}$ $V_{GS}=0\text{V}$ | | 0.19 | | μs |
| Reverse recovery charge | Q_{rr} | $-di/dt=100\text{A}/\mu\text{s}$ $T_{ch}=25^\circ\text{C}$ | | 1.4 | | μC |

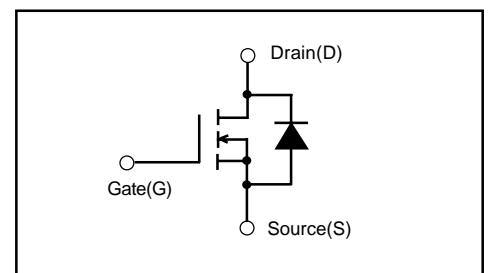
Thermal characteristics

| Item | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|--------------------|----------------|--------------------|------|------|-------|---------------------------|
| Thermal resistance | $R_{th(ch-c)}$ | channel to case | | | 0.463 | $^\circ\text{C}/\text{W}$ |
| | $R_{th(ch-a)}$ | channel to ambient | | | 62.0 | $^\circ\text{C}/\text{W}$ |

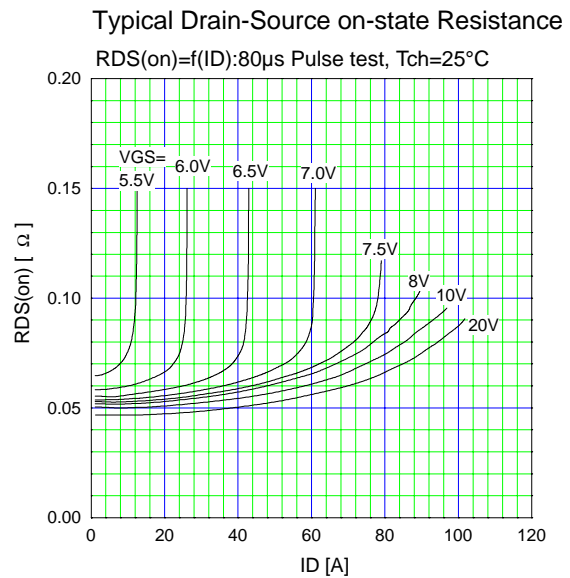
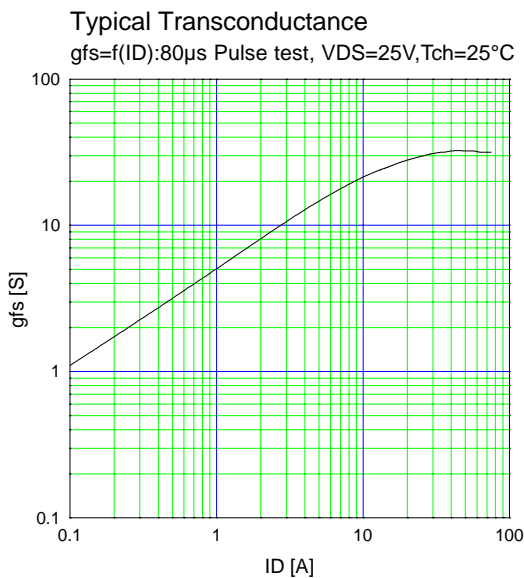
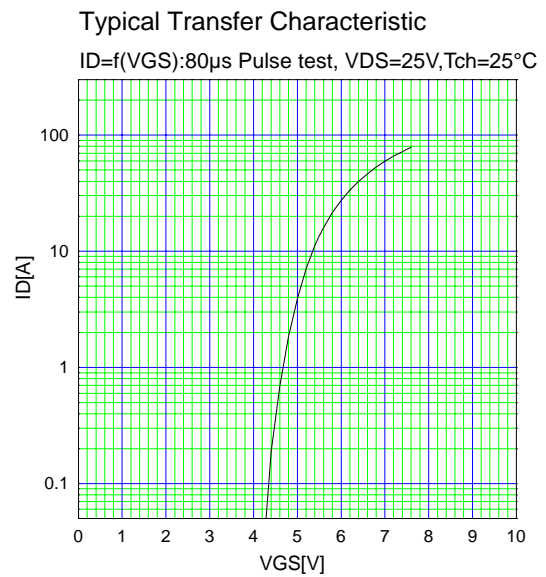
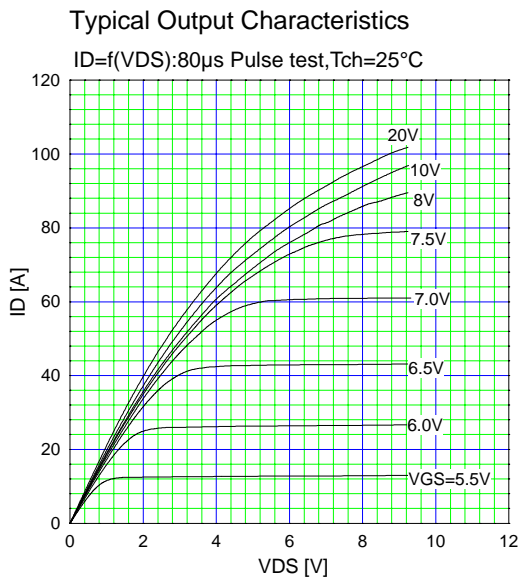
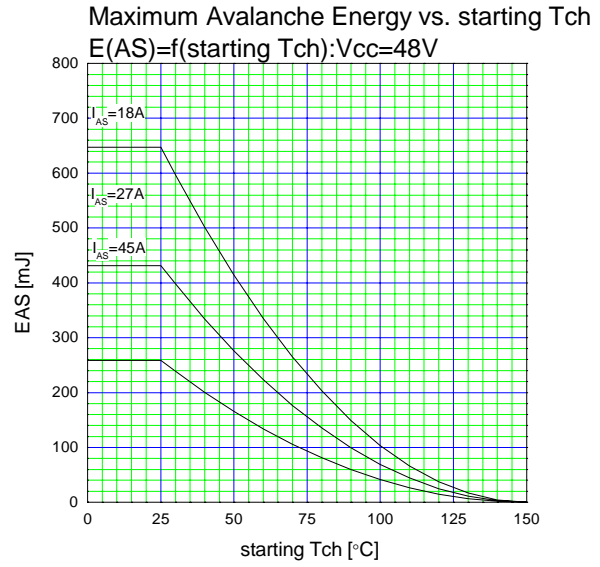
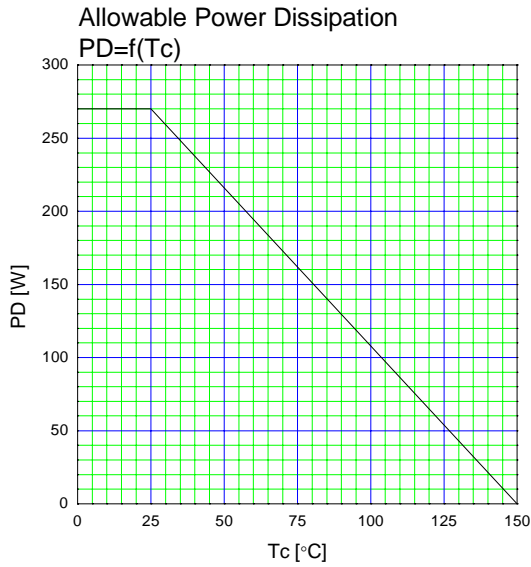
Outline Drawings (mm)



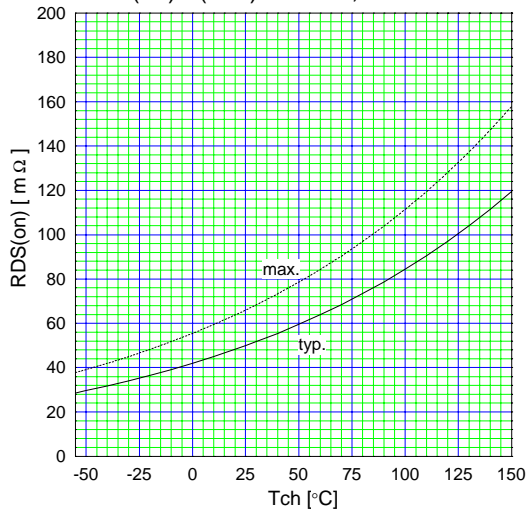
Equivalent circuit schematic



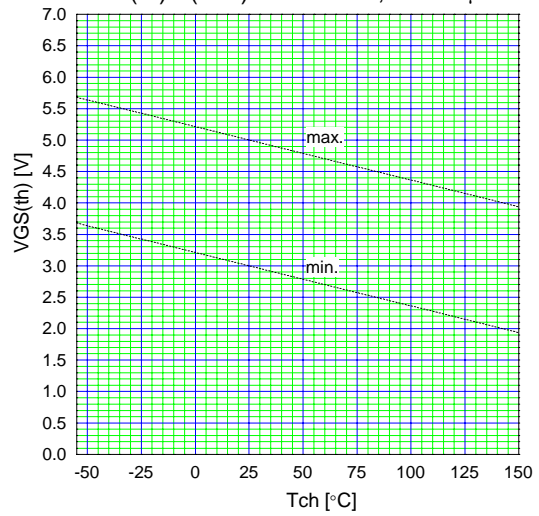
Characteristics



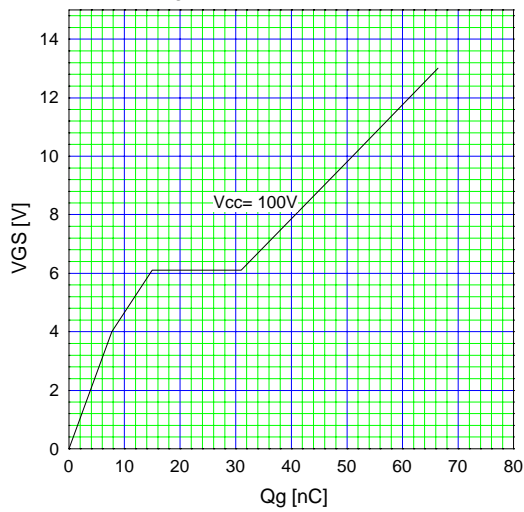
Drain-Source On-state Resistance
 $R_{DS(on)}=f(T_{ch}):I_D=15A, V_{GS}=10V$



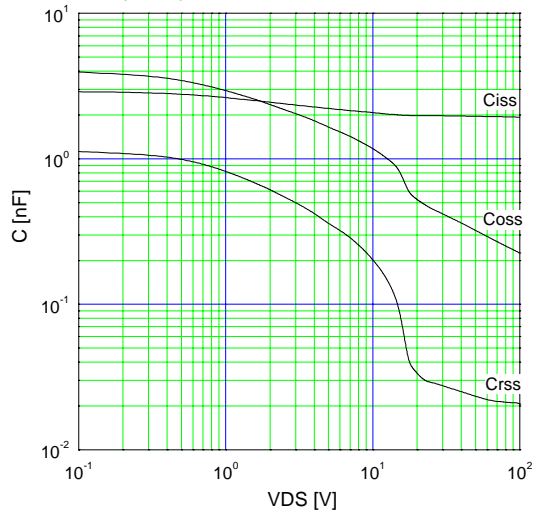
Gate Threshold Voltage vs. Tch
 $V_{GS(th)}=f(T_{ch}):V_{DS}=V_{GS}, I_D=250\mu A$



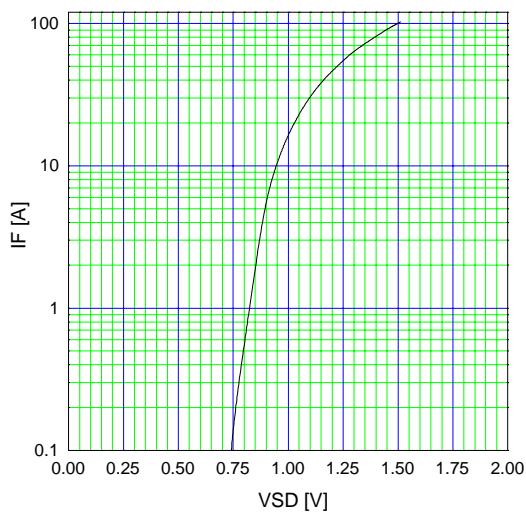
Typical Gate Charge Characteristics
 $V_{GS}=f(Q_g):I_D=30A, T_{ch}=25^\circ C$



Typical Capacitance
 $C=f(V_{DS}):V_{GS}=0V, f=1MHz$



Typical Forward Characteristics of Reverse Diode
 $I_F=f(V_{SD}):80\mu s \text{ Pulse test}, T_{ch}=25^\circ C$



Typical Switching Characteristics vs. ID
 $t=f(I_D):V_{cc}=48V, V_{GS}=10V, R_G=10\Omega$

