

2SK3789-01R

N-CHANNEL SILICON POWER MOSFET

FUJI
ELECTRIC

FUJI POWER MOSFET Super FAP-G Series

Features

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

Applications

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

Maximum ratings and characteristic

Absolute maximum ratings (T_c=25°C unless otherwise specified)

| Item | Symbol | Ratings | Unit | Remarks |
|---|-----------------------|-------------|-------|-----------------------|
| Drain-source voltage | V _{DS} | 150 | V | |
| | V _{DSX} | 150 | V | V _{GS} =-30V |
| Continuous Drain Current | I _D | 92 | A | |
| Pulsed Drain Current | I _D (puls) | ±368 | A | |
| Gate-Source Voltage | V _{GS} | ±30 | V | |
| Maximum Avalanche current | I _{AR} | 92 | A | Note *1 |
| Non-Repetitive Maximum Avalanche Energy | E _{AS} | 1205.7 | mJ | Note *2 |
| Repetitive Maximum Avalanche Energy | E _{AR} | 41 | mJ | Note *3 |
| Maximum Drain-Source dV/dt | dV _{DS} /dt | 20 | kV/μs | V _{DS} ≤150V |
| Peak Diode Recovery dV/dt | dV/dt | 5 | kV/μs | Note *4 |
| Max. Power Dissipation | P _D | 210 | W | T _c =25°C |
| | | 3.13 | | T _a =25°C |
| Operating and Storage Temperature range | T _{ch} | +150 | °C | |
| | T _{stg} | -55 to +150 | °C | |

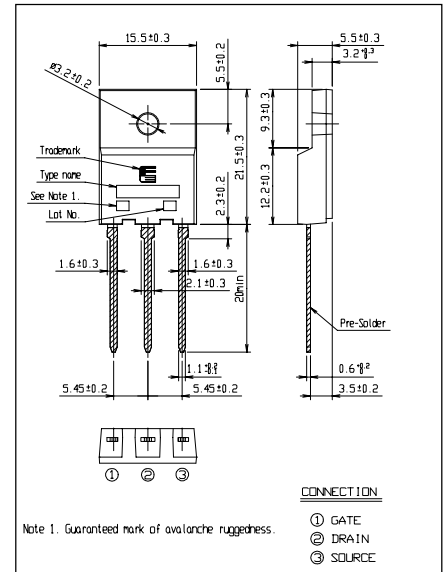
Electrical characteristics (T_c=25°C unless otherwise specified)

| Item | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|----------------------------------|---------------------|--|------|------|------|-------|
| Drain-Source Breakdown Voltage | BV _{DSS} | I _D =250μA V _{GS} =0V | 150 | | | V |
| Gate Threshold Voltage | V _{GS(th)} | I _D =250μA V _{DS} =V _{GS} | 3.0 | | 5.0 | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =150V V _{GS} =0V T _{ch} =25°C | | | 25 | μA |
| | | V _{DS} =120V V _{GS} =0V T _{ch} =125°C | | | 250 | |
| Gate-Source Leakage Current | I _{GSS} | V _{GS} =±30V V _{DS} =0V | | | 100 | nA |
| Drain-Source On-State Resistance | R _{DS(on)} | I _D =46A V _{GS} =10V | | 21 | 26 | mΩ |
| Forward Transconductance | g _{fs} | I _D =46A V _{DS} =25V | 12 | 24 | | S |
| Input Capacitance | C _{iss} | V _{DS} =75V | | 3800 | 5400 | pF |
| Output Capacitance | C _{oss} | V _{GS} =0V | | 530 | 795 | |
| Reverse Transfer Capacitance | C _{rss} | f=1MHz | | 35 | 52.5 | |
| Turn-On Time t _{on} | td(on) | V _{CC} =48V I _D =46A | | 40 | 60 | ns |
| | t _r | V _{GS} =10V | | 112 | 168 | |
| Turn-Off Time t _{off} | td(off) | R _{GS} =10Ω | | 56 | 84 | |
| | t _f | | | 30 | 45 | |
| Total Gate Charge | Q _G | V _{CC} =75V | | 80 | 120 | nC |
| Gate-Source Charge | Q _{GS} | I _D =92A | | 30 | 45 | |
| Gate-Drain Charge | Q _{GD} | V _{GS} =10V | | 25 | 38 | |
| Diode forward on-voltage | V _{SD} | I _F =92A V _{GS} =0V T _{ch} =25°C | | 1.20 | 1.50 | V |
| Reverse recovery time | t _{rr} | I _F =92A V _{GS} =0V | | 250 | | ns |
| Reverse recovery charge | Q _{rr} | -di/dt=100A/μs T _{ch} =25°C | | 2.0 | | μC |

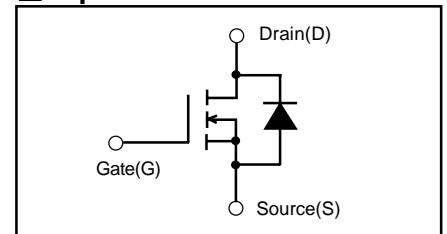
Thermal characteristics

| Item | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|--------------------|-----------------------|--------------------|------|------|-------|-------|
| Thermal resistance | R _{th(ch-c)} | channel to case | | | 0.595 | °C/W |
| | R _{th(ch-a)} | channel to ambient | | | | |

Outline Drawings (mm) 200406



Equivalent circuit schematic



Note *1: T_{ch}≤150°C, Repetitive and Non-repetitive

Note *2: Starting T_{ch}=25°C, I_{AS}=37A, L=1.29mH, V_{CC}=48V, R_G=50Ω

EAS limited by maximum channel temperature and avalanche current.

See to the 'Avalanche Energy' graph

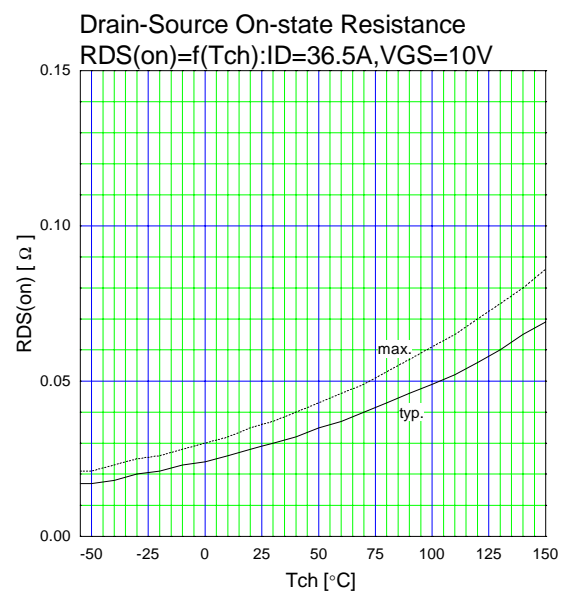
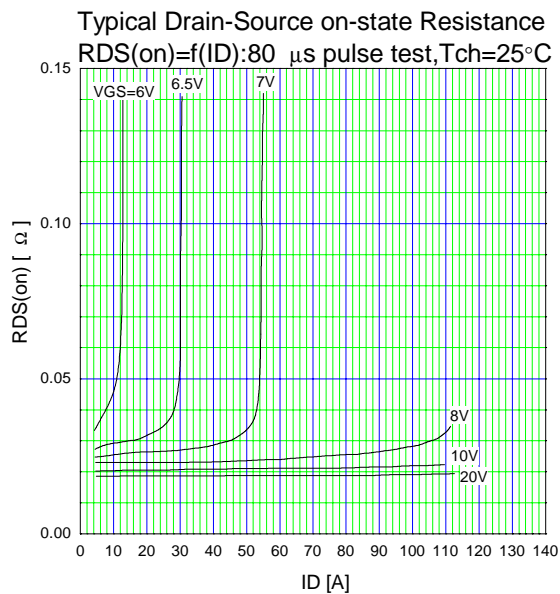
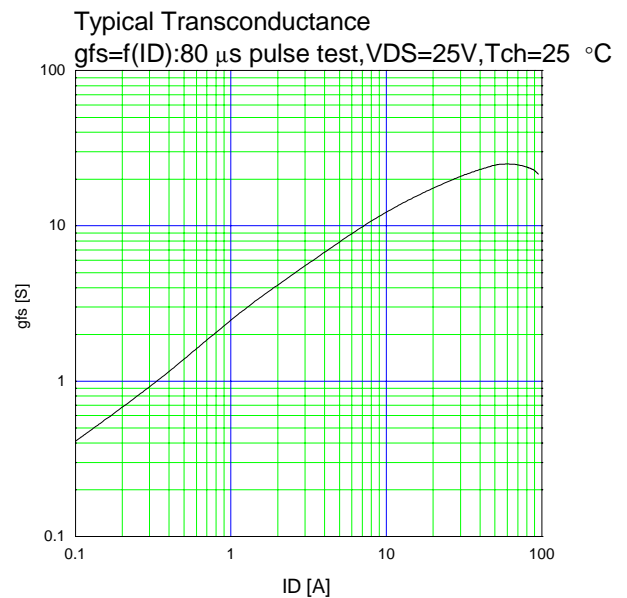
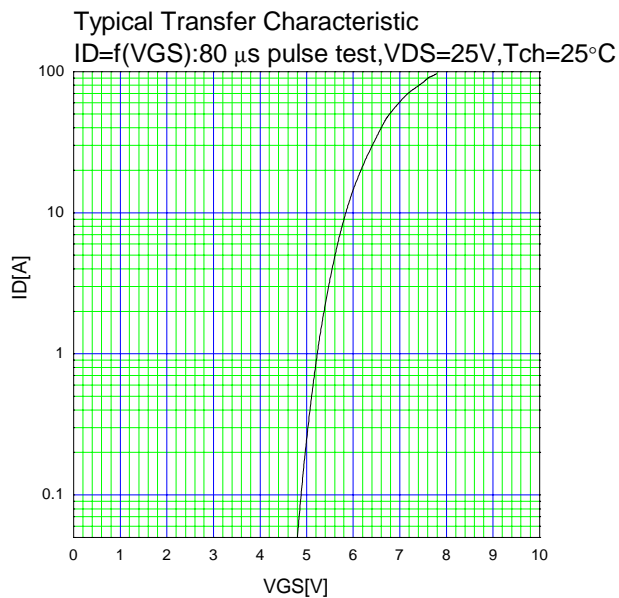
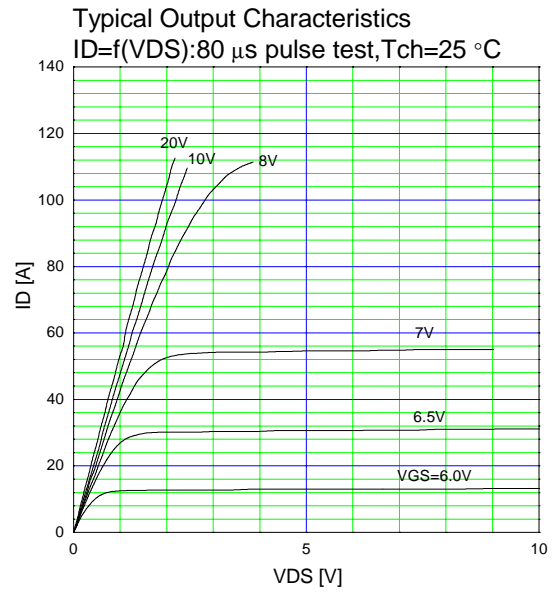
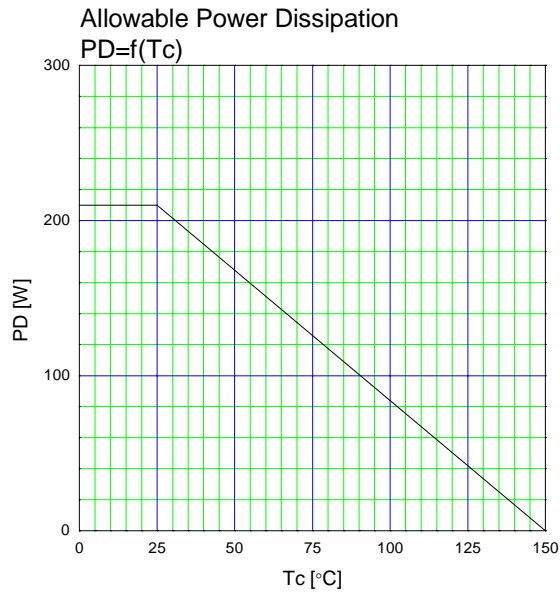
Note *3: Repetitive rating: Pulse width limited by maximum channel temperature.

See to the 'Transient Thermal impedance' graph

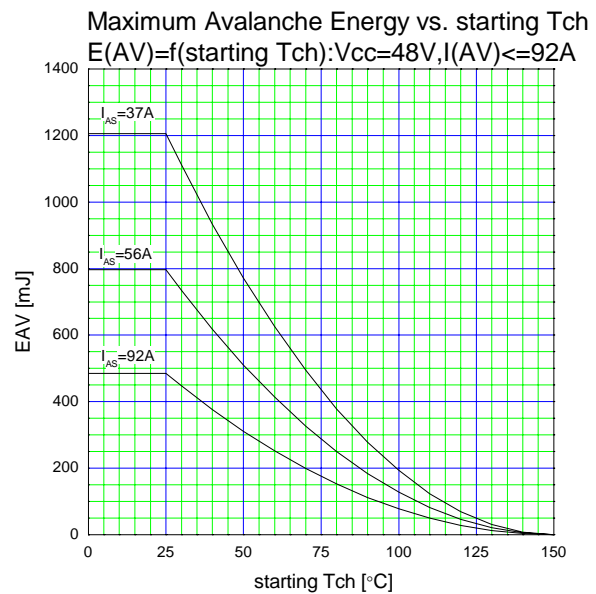
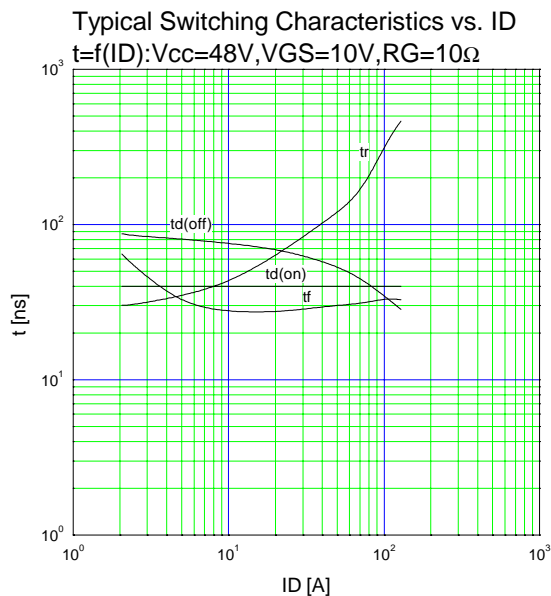
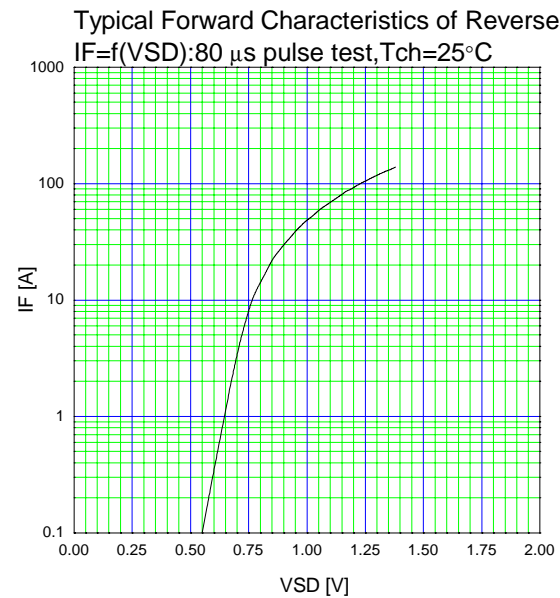
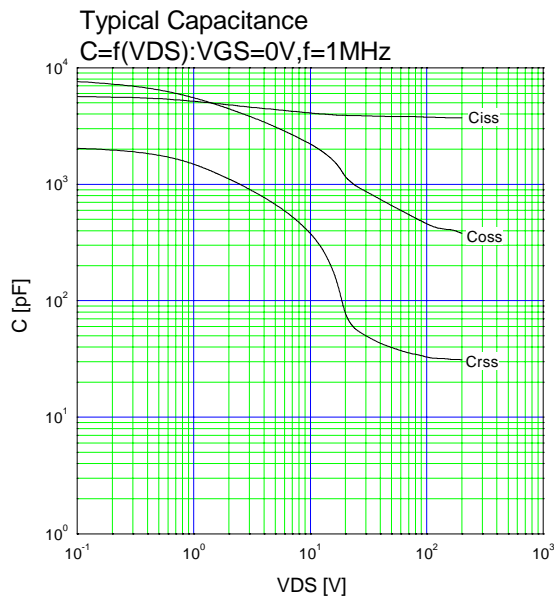
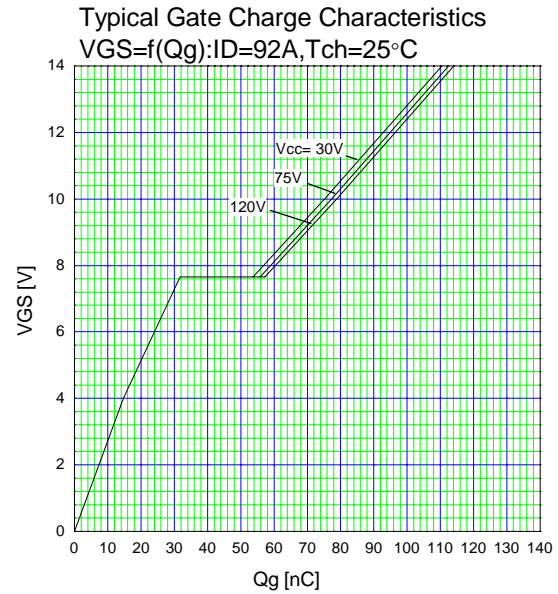
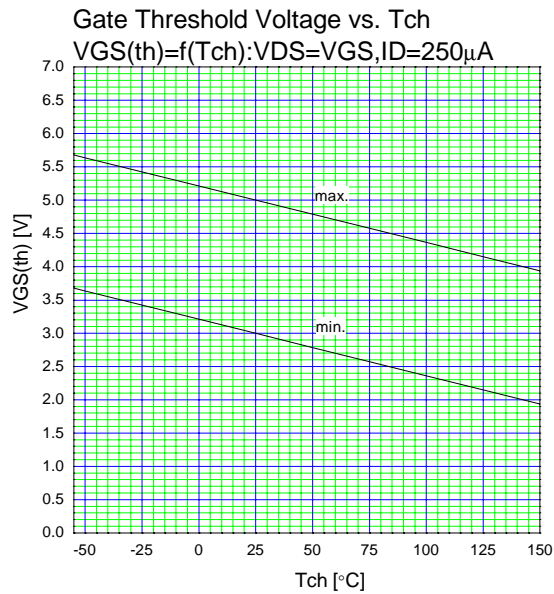
Note *4: I_F≤-I_D, -di/dt=50A/μs, V_{CC}≤BV_{DSS}, T_{ch}≤150°C

Characteristics

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