

N-CHANNEL SILICON POWER MOSFET

FAP-III SERIES

Features

- High current
- Low on-resistance
- No secondary breakdown
- Low driving power
- High forward Transconductance
- Avalanche-proof

Applications

- Motor controllers
- General purpose power amplifier
- DC-DC converters

Maximum ratings and characteristics

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

| Item | Symbol | Rating | Unit |
|---|----------------------|-------------|------|
| Drain-source voltage | V _{DS} | 150 | V |
| Continuous drain current | I _D | 20 | A |
| Pulsed drain current | I _{D(puls)} | 80 | A |
| Continuous reverse drain current | I _{DR} | 20 | A |
| Gate-source peak voltage | V _{GS} | ±20 | V |
| Max. power dissipation | P _D | 50 | W |
| Operating and storage temperature range | T _{ch} | +150 | °C |
| | T _{stg} | -55 to +150 | °C |

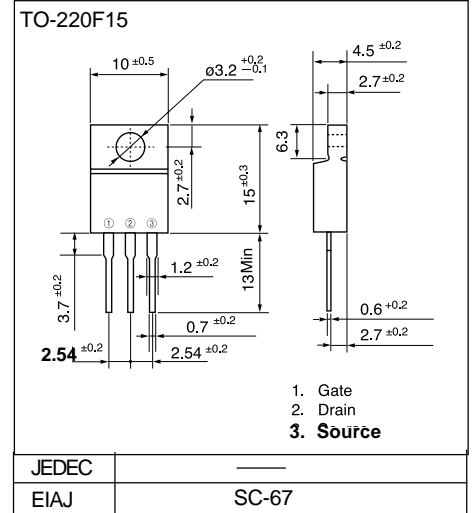
Electrical characteristics (Tc =25°C unless otherwise specified)

| Item | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|--|----------------------|---|------------------------|-------|-------|-------|
| Drain-source breakdown voltage | V _{(BR)DSS} | I _D =1mA V _{GS} =0V | 150 | | | V |
| Gate threshold voltage | V _{GS(th)} | I _D =1mA V _{DS} =V _{GS} | 1.0 | 1.5 | 2.5 | V |
| Zero gate voltage drain current | I _{DSS} | V _{DS} =150V V _{GS} =0V | T _{ch} =25°C | 10 | 500 | μA |
| | | | T _{ch} =125°C | 0.2 | 1.0 | mA |
| Gate-source leakage current | I _{GSS} | V _{GS} =±20V V _{DS} =0V | | 10 | 100 | nA |
| Drain-source on-state resistance | R _{DS(on)} | I _D =10A | V _{GS} =4V | 0.065 | 0.100 | Ω |
| | | | V _{GS} =10V | 0.055 | 0.080 | |
| Forward transconductance | g _{fs} | I _D =10A V _{DS} =25V | 10 | 20 | | S |
| Input capacitance | C _{iss} | V _{DS} =25V | | 2300 | 3450 | pF |
| Output capacitance | C _{oss} | V _{GS} =0V | | 330 | 500 | |
| Reverse transfer capacitance | C _{rss} | f=1MHz | | 150 | 230 | |
| Turn-on time t _{on} (t _{on} =t _{d(on)} +t _r) | t _{d(on)} | V _{CC} =30V R _G =25 Ω | | 15 | 25 | ns |
| | t _r | I _D =20A | | 20 | 30 | |
| Turn-off time t _{off} (t _{off} =t _{d(off)} +t _f) | t _{d(off)} | V _{GS} =10V | | 450 | 700 | |
| | t _f | | | 100 | 150 | |
| Avalanche capability | I _{AV} | L=100μH T _{ch} =25°C | 20 | | | A |
| Diode forward on-voltage | V _{SD} | I _F =2×I _{DR} V _{GS} =0V T _{ch} =25°C | | 1.00 | 1.50 | V |
| Reverse recovery time | t _{rr} | I _F =I _{DR} V _{GS} =0V | | 125 | | ns |
| Reverse recovery charge | Q _{rr} | -di/dt=100A/μs T _{ch} =25°C | | 0.6 | | μC |

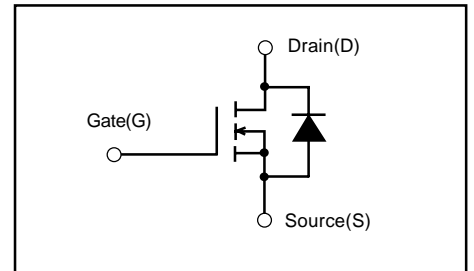
Thermal characteristics

| Item | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|--------------------|-----------------------|--------------------|------|------|------|-------|
| Thermal resistance | R _{th(ch-a)} | channel to ambient | | | 62.5 | °C/W |
| | R _{th(ch-c)} | channel to case | | | | |

Outline Drawings

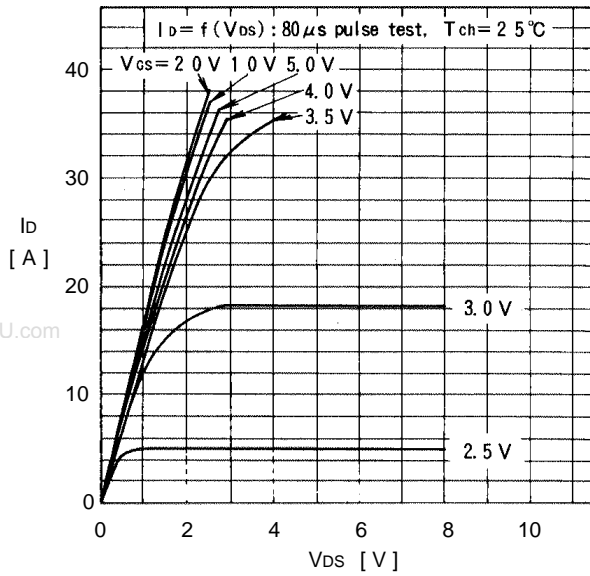


Equivalent circuit schematic

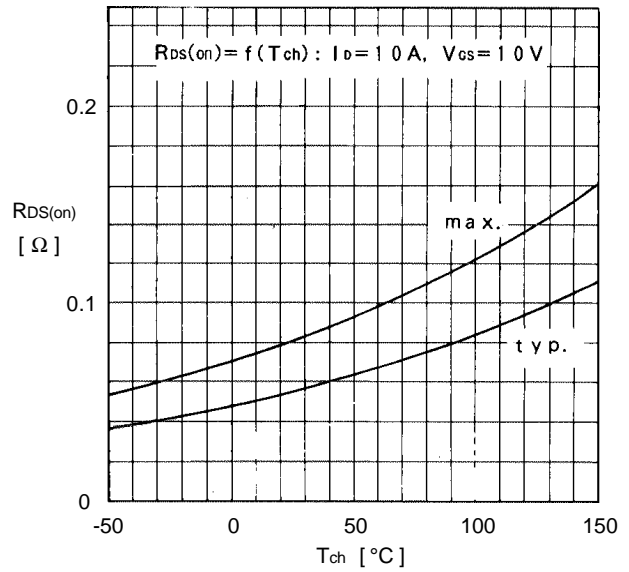


Characteristics

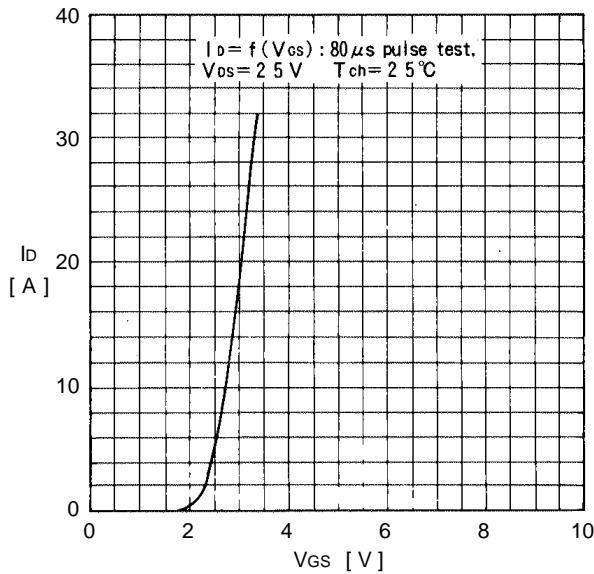
Typical output characteristics



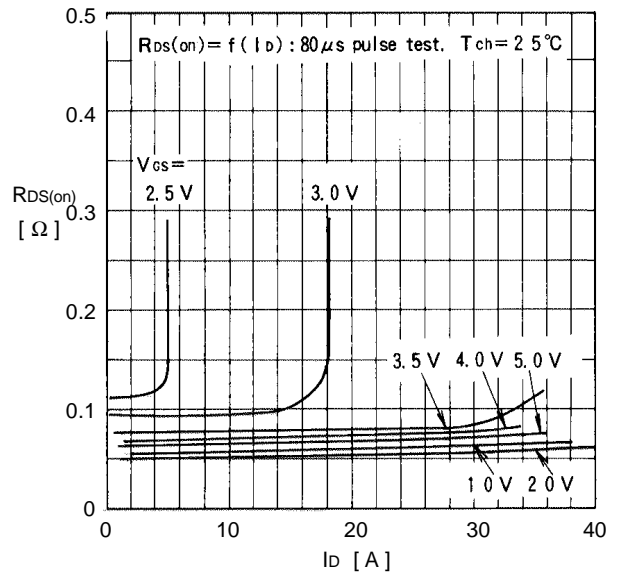
On state resistance vs. T_{ch}



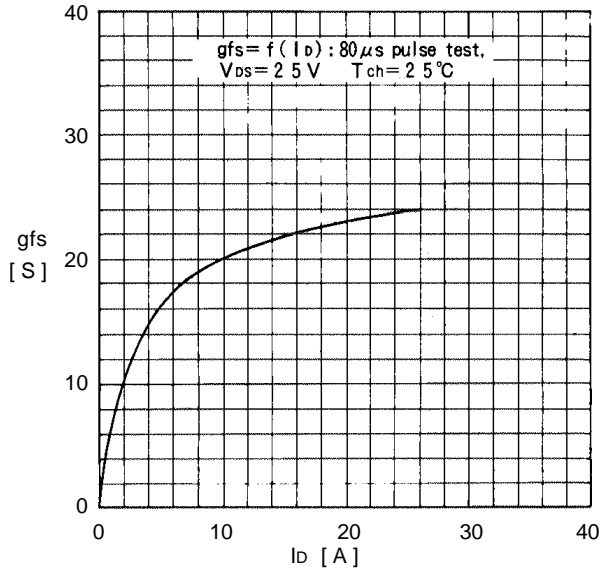
Typical transfer characteristics



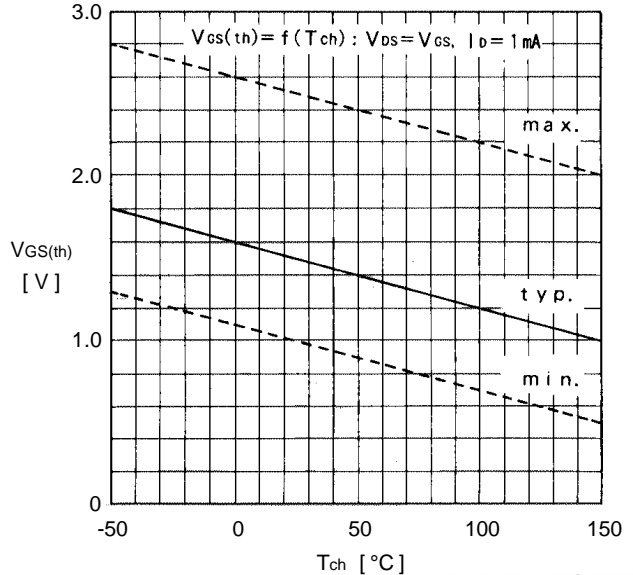
Typical Drain-Source on state resistance vs. I_D



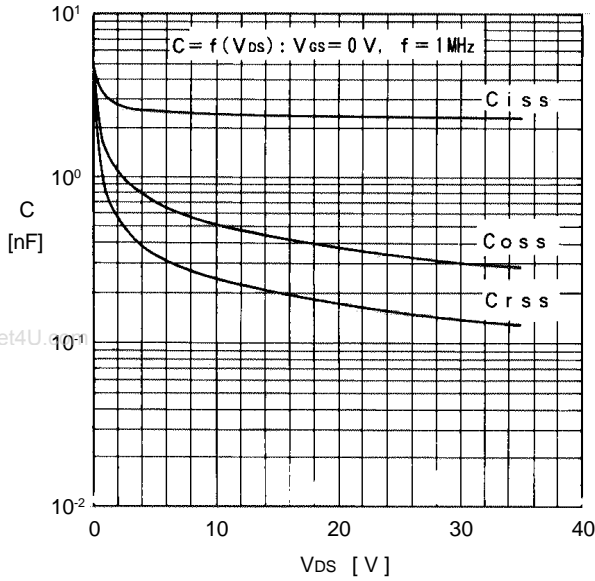
Typical forward transconductance vs. I_D



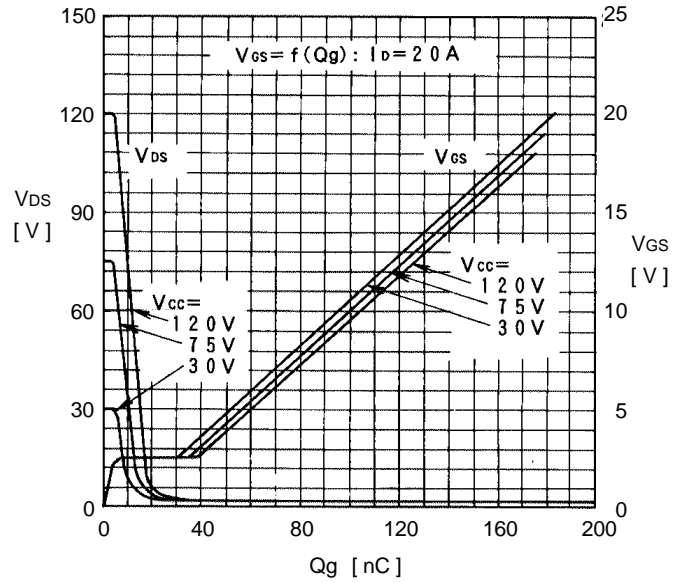
Gate threshold voltage vs. T_{ch}



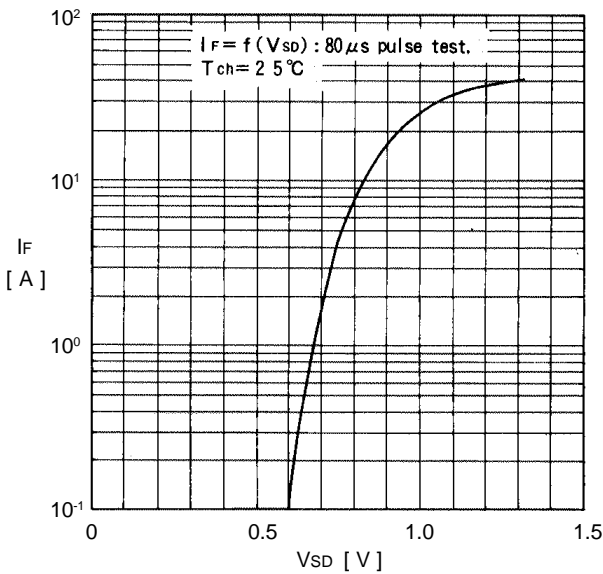
Typical capacitance vs. V_{DS}



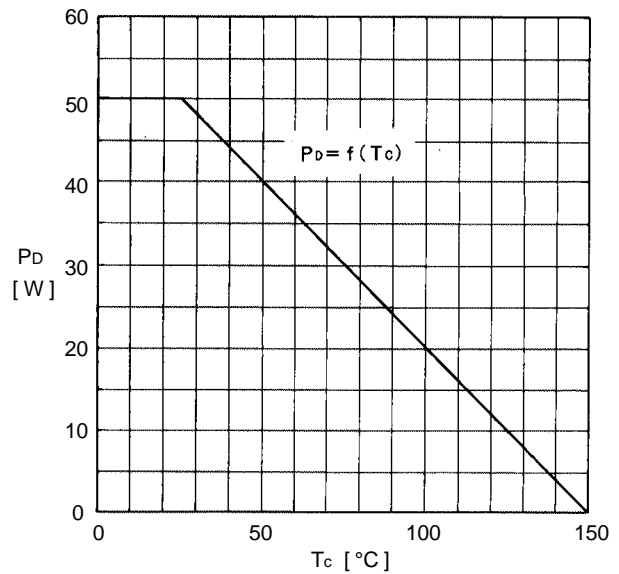
Typical input charge



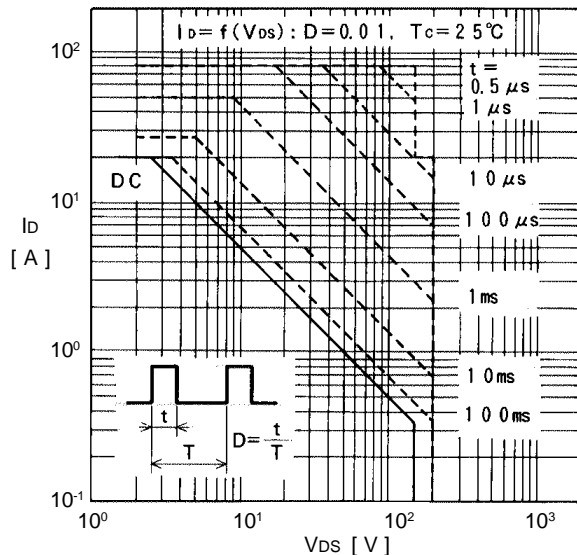
Forward characteristics of reverse diode



Allowable power dissipation vs. T_c



Safe operating area



Transient thermal impedance

