

FMP11N60E

FUJI POWER MOSFET

Super FAP-E³ series

N-CHANNEL SILICON POWER MOSFET

■ Features

Maintains both low power loss and low noise Lower R_{DS}(on) characteristic More controllable switching dv/dt by gate resistance Smaller V_{GS} ringing waveform during switching Narrow band of the gate threshold voltage (3.0±0.5V) High avalanche durability

Applications

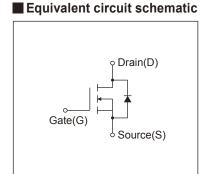
Switching regulators UPS (Uninterruptible Power Supply) DC-DC converters

Maximum Ratings and Characteristics

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

| TO-220AB 10 % 10 % 10 % 10 % 10 % 10 % 10 % 10 | 4,5 t0.2 1,3 t0.2 |
|--|------------------------------------|
| Trademark Type name Lot No. | |
| 1.20.7 | PRE-SOLDER |
| 2.54 = 2.54 = 0.2 | 0.4 % ² 2.7 ±0.2 |
| + + + ① ② ③ | CONNECTION ① GATE ② DRAIN ③ SOURCE |

■ Outline Drawings [mm]



| Description | Symbol | Characteristics | Unit | Remarks |
|--|------------------|-----------------|-------|------------------------|
| Proin Source Voltage | V _{DS} | 600 | V | |
| Drain-Source Voltage | V _{DSX} | 600 | V | V _{GS} = -30V |
| Continuous Drain Current | ID | ±11 | Α | |
| Pulsed Drain Current | IDP | ±44 | Α | |
| Gate-Source Voltage | V _{GS} | ±30 | V | |
| Repetitive and Non-Repetitive Maximum AvalancheCurrent | Iar | 11 | Α | Note*1 |
| Non-Repetitive Maximum Avalanche Energy | Eas | 384 | mJ | Note*2 |
| Repetitive Maximum Avalanche Energy | Ear | 18.0 | mJ | Note*3 |
| Peak Diode Recovery dV/dt | dV/dt | 4.9 | kV/μs | Note*4 |
| Peak Diode Recovery -di/dt | -di/dt | 100 | A/µs | Note*5 |
| Manifester Daniel Dispiration | PD | 2.02 | W | Ta=25°C |
| Maximum Power Dissipation | | 180 | VV | Tc=25°C |
| O | Tch | 150 | °C | |
| Operating and Storage Temperature range | T _{stg} | -55 to + 150 | °C | |

● Electrical Characteristics at Tc=25°C (unless otherwise specified)

| Description | Symbol | Conditions | | min. | typ. | max. | Unit | |
|----------------------------------|----------------------|---|---|------|------|------|----------------|--|
| Drain-Source Breakdown Voltage | BVDSS | I _D =250µA, V _{GS} =0V | | 600 | - | - | V | |
| Gate Threshold Voltage | V _{GS} (th) | I _D =250µA, V _{DS} =V _{GS} | | 2.5 | 3.0 | 3.5 | V | |
| Zero Gate Voltage Drain Current | | V _{DS} =600V, V _{GS} =0V | T _{ch} =25°C | - | - | 25 | μА | |
| | IDSS | V _{DS} =480V, V _{GS} =0V | T _{ch} =125°C | - | - | 250 | | |
| Gate-Source Leakage Current | Igss | V _{GS} =±30V, V _{DS} =0V | V _{GS} =±30V, V _{DS} =0V | | 10 | 100 | nA | |
| Drain-Source On-State Resistance | R _{DS} (on) | I _D =5.5A, V _{GS} =10V | | - | 0.64 | 0.75 | Ω | |
| Forward Transconductance | g fs | I _D =5.5A, V _{DS} =25V | | 6 | 12 | - | S | |
| Input Capacitance | Ciss | V _{DS} =25V - 1700 | | 1700 | 2550 | | | |
| Output Capacitance | Coss | V _{GS} =0V | | - | 150 | 225 | 225 pF 16.5 | |
| Reverse Transfer Capacitance | Crss | f=1MHz | | - | 11 | 16.5 | | |
| Turn-On Time Turn-Off Time | td(on) | Vcc=300V | | - | 21 | 31.5 | | |
| | tr | V _{GS} =10V | | - | 9.5 | 14.3 | 1 | |
| | td(off) | I _D =5.5A | | - | 100 | 150 | ns | |
| | tf | R _G =15Ω | | - | 19 | 28.5 | İ | |
| Total Gate Charge | QG | Vcc=300V | | - | 48.5 | 73 | | |
| Gate-Source Charge | Qss | I _D =11A - | | - | 12.5 | 19 | nC | |
| Gate-Drain Charge | Q _{GD} | V _{GS} =10V | | - | 14 | 21 | 1 | |
| Avalanche Capability | lav | L=2.64mH, Tch=25°C | | 11 | - | - | А | |
| Diode Forward On-Voltage | V _{SD} | I _F =11A, V _{GS} =0V, T _{ch} =25°0 | I _F =11A, V _{GS} =0V, T _{ch} =25°C | | 0.86 | 1.30 | V | |
| Reverse Recovery Time | trr | I _F =11A, V _{GS} =0V | , | - | 0.52 | - | μS | |
| Reverse Recovery Charge | Qrr | -di/dt=100A/µs, Tch=25 | °C | - | 5.5 | - | μC | |

Thermal Characteristics

| Description | Symbol | Test Conditions | min. | typ. | max. | Unit |
|--------------------|------------|--------------------|------|------|-------|------|
| Thermal resistance | Rth (ch-c) | Channel to Case | | | 0.690 | °C/W |
| | Rth (ch-a) | Channel to Ambient | | | 62.0 | °C/W |

Note *1 : Tch≤150°C

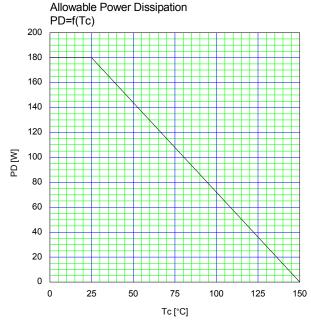
Note 12: Stating Tch=25°C, Ias=5A, L=28.2mH, Vcc=60V, R_G=50Ω

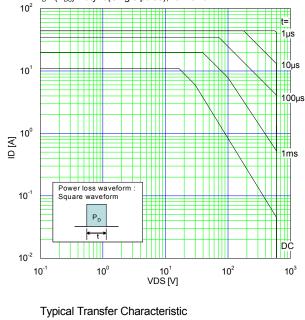
Eas limited by maximum channel temperature and avalanche current.

See to 'Avalanche Energy' graph.

Note *3 : Repetitive rating : Pulse width limited by maximum channel temperature. See to the 'Transient Themal impeadance' graph. Note *4 : $| F \le -1$, -di/dt=100A/ μ s, $Vcc \le BV$ Dss, $Tch \le 150$ °C.

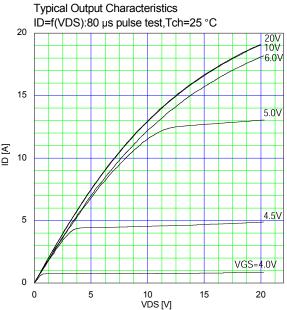
Note *5 : IF≤-ID, dv/dt=4.4kV/ μ s, Vcc≤BVDss, Tch≤150°C.

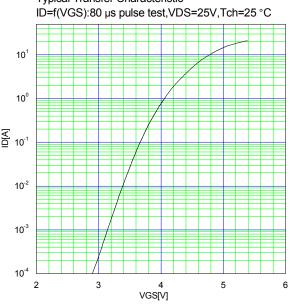


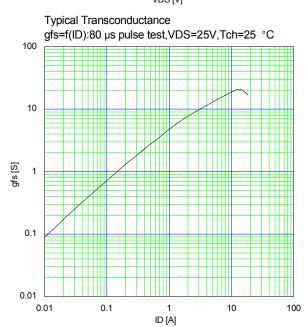


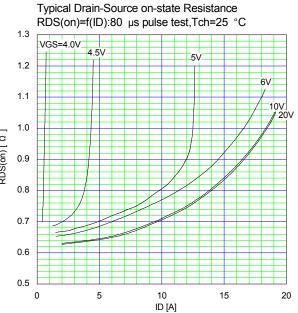
Safe Operating Area

 I_D =f(V_{DS}):Duty=0(Single pulse),Tc=25 °c

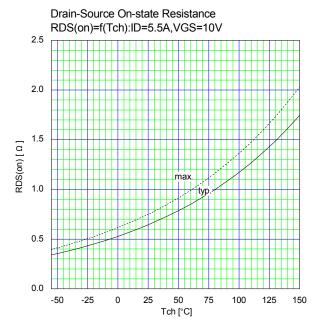


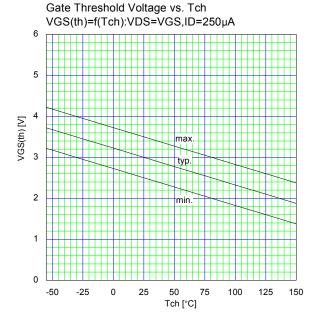


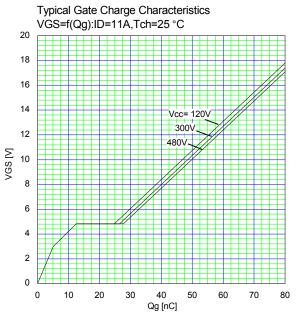


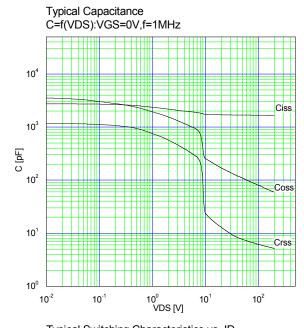


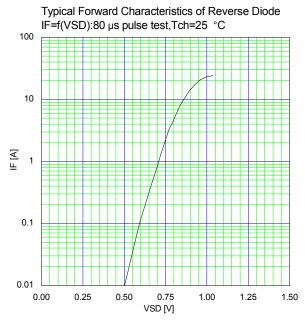
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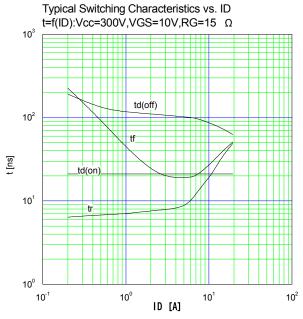


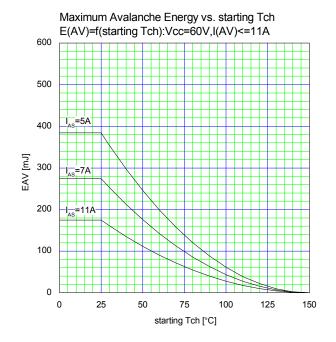


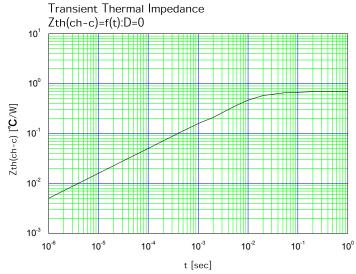












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