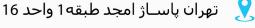






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FMH23N50E

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

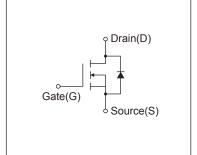
Maximum Ratings and Characteristics

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

TO-3P(Q)

■ Outline Drawings [mm]

■ Equivalent circuit schematic



| Description | Symbol | Characteristics | Unit | Remarks | |
|---|------------------|-----------------|-------|------------------------|--|
| Drain Sauras Valtara | V _{DS} | 500 | V | | |
| Drain-Source Voltage | V _{DSX} | 500 | V | V _{GS} = -30V | |
| Continuous Drain Current | I _D | ±23 | А | | |
| Pulsed Drain Current | IDP | ±92 | А | | |
| Gate-Source Voltage | V _{GS} | ±30 | V | | |
| Repetitive and Non-Repetitive Maximum Avalanche Current | Iar | 23 | А | Note*1 | |
| Non-Repetitive Maximum Avalanche Energy | Eas | 767.3 | mJ | Note*2 | |
| Repetitive Maximum Avalanche Energy | Ear | 31.5 | mJ | Note*3 | |
| Peak Diode Recovery dV/dt | dV/dt | 9.3 | kV/μs | Note*4 | |
| Peak Diode Recovery -di/dt | -di/dt | 100 | A/µs | Note*5 | |
| Maximum Power Dissipation | PD | 2.50 | 14/ | Ta=25°C | |
| | | 315 | W | Tc=25°C | |
| Operating and Storage | Tch | 150 | °C | | |
| Temperature range | T _{stq} | -55 to + 150 | °C | | |

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

| Description | Symbol | Conditions | | min. | typ. | max. | Unit |
|----------------------------------|----------------------|--|------------------------|------|------|-------|------|
| Drain-Source Breakdown Voltage | BV _{DSS} | I _D =250μA, V _{GS} =0V | | 500 | - | - | V |
| Gate Threshold Voltage | V _{GS} (th) | ID=250µA, VDS=VGS | | 2.5 | 3.0 | 3.5 | V |
| Zero Gate Voltage Drain Current | | V _{DS} =500V, V _{GS} =0V | T _{ch} =25°C | - | - | 25 | μA |
| | IDSS | V _{DS} =400V, V _{GS} =0V | T _{ch} =125°C | - | - | 250 | |
| Gate-Source Leakage Current | Igss | V _{GS} =±30V, V _{DS} =0V | | - | 10 | 100 | nA |
| Drain-Source On-State Resistance | R _{DS} (on) | I _D =11.5A, V _{GS} =10V | | - | 0.21 | 0.245 | Ω |
| Forward Transconductance | g fs | I _D =11.5A, V _{DS} =25V | | 14 | 28 | - | S |
| Input Capacitance | Ciss | V _{DS} =25V | - | 3500 | 5250 | pF | |
| Output Capacitance | Coss | V _{GS} =0V | | - | 330 | | 495 |
| Reverse Transfer Capacitance | Crss | f=1MHz | - | 24 | 36 | | |
| Turn-()n Time | td(on) | $V_{cc} = 300V$ $V_{GS} = 10V$ $I_{D} = 11.5A$ $R_{GS} = 5.6\Omega$ | | - | 24 | 36 | ns |
| | tr | | | - | 13 | 19.5 | |
| Turn-Off Time | td(off) | | | - | 150 | 225 | |
| | tf | | | - | 20 | 30 | |
| | Qth | V 050V | | | 11 | 16.5 | nC |
| Total Gate Charge | Q _G | V _{cc} =250V I _D =23A - V _{GS} =10V | | - | 93 | 139.5 | |
| Gate-Source Charge | Q _{GS} | | | - | 24 | 36 | |
| Gate-Drain Charge | Q _{GD} | | | - | 30 | 45 | |
| Avalanche Capability | lav | L=1.16mH, T _{ch} =25°C | | 23 | - | - | Α |
| Diode Forward On-Voltage | VsD | I _F =23A, V _{GS} =0V, T _{ch} =25°C | | - | 0.90 | 1.35 | V |
| Reverse Recovery Time | trr | I _F =23A, V _{GS} =0V | | - | 0.5 | - | μs |
| Reverse Recovery Charge | Qrr | -di/dt=100A/µs, Tch=25°C | | - | 8 | - | μC |

Thermal Characteristics

| Description | Symbol | Test Conditions | min. | typ. | max. | Unit |
|--------------------|------------|--------------------|------|------|------|------|
| Thermal resistance | Rth (ch-c) | Channel to case | | | 0.40 | °C/W |
| | Rth (ch-a) | Channel to ambient | | | 50.0 | °C/W |

Note *1 : Tch≤150°C

Note *2 : Stating Tch=25°C, Ias=10A, L=14.1mH, Vcc=50V, Re=50Ω

Eas limited by maximum channel temperature and avalanche current.

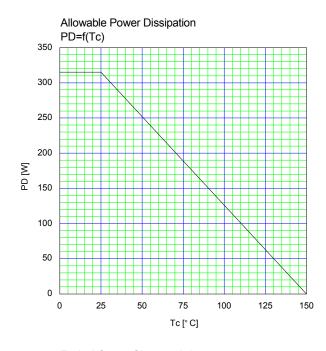
See to 'Avalanche Energy' graph.

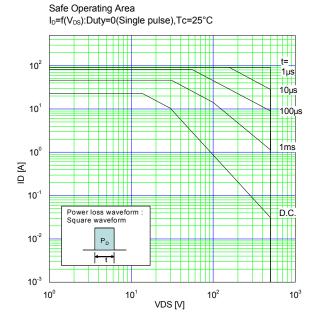
Note $^{\star}3$: Repetitive rating : Pulse width limited by maximum channel temperature

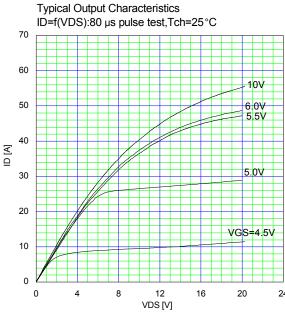
See to the 'Transient Themal impeadance' graph.

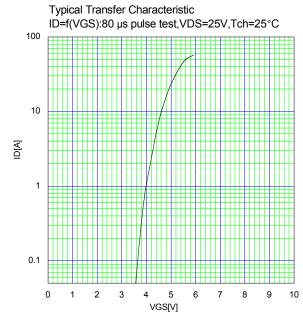
Note *4 : I₅≤-I₀, -di/dt=100A/μ₅, Vcc≤BV₀ss, Tch≤150°C.

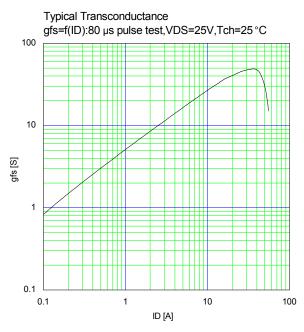
Note *5 : I₅≤-I₀, dv/dt=5.0kV/μ₅, Vcc≤BV₀ss, Tch≤150°C.

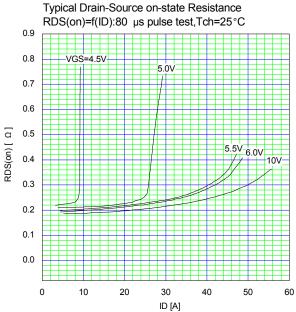


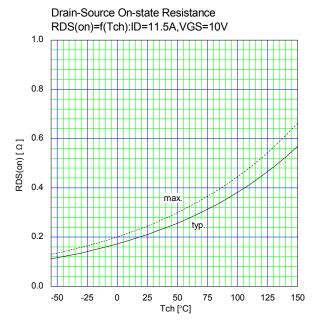


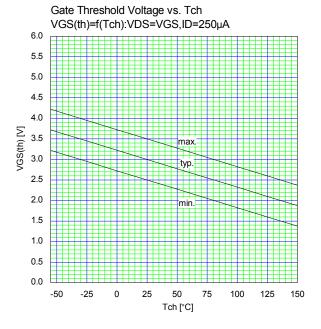


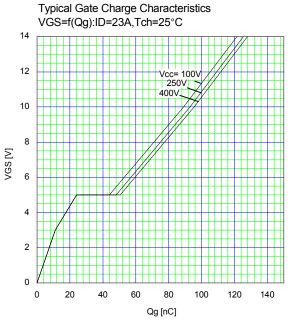


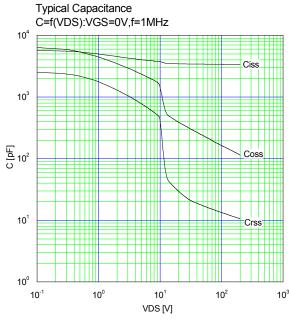


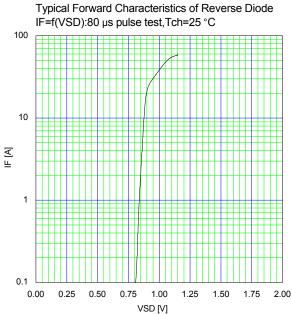


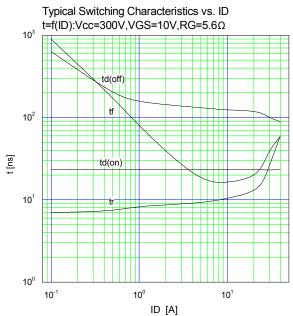




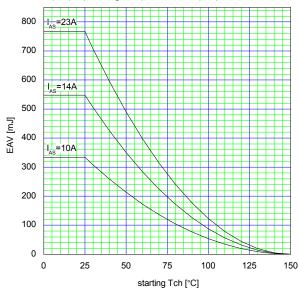




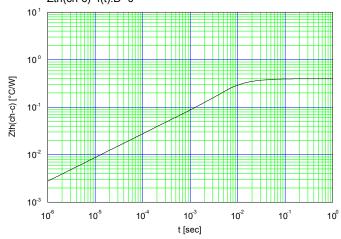




Maximum Avalanche Energy vs. starting Tch E(AV)=f(starting Tch):Vcc=50V,I(AV)<=23A



 $\label{eq:maximum Transient Thermal Impedance Zth(ch-c)=f(t):D=0} \\ \text{Maximum Transient Thermal Impedance Zth(ch-c)=f(t):D=0}$



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