

FMH16N50E

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

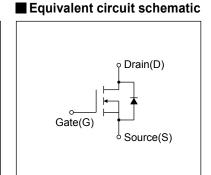
Applications

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) 15.5mm 15.5mm 15.24.1 1.64.2 1.5.0.2 1.5.0.2 1.5.0.2 1.5.1



Symbol Description Characteristics Unit Remarks V_{DS} **Drain-Source Voltage** VDSX 500 V V_{GS} = -30V **Continuous Drain Current** ΙD ±16 Α **Pulsed Drain Current** I_{DP} ±64 Α Gate-Source Voltage Vgs ±30 Repetitive and Non-Repetitive Maximum Avalanche Current I_{AR} 16 Α Note*1 Non-Repetitive Maximum Avalanche Energy 485 Note*2 EAS mJ Repetitive Maximum Avalanche Energy E_{AR} 19.5 Note*3 Peak Diode Recovery dV/dt dV/dt kV/µs Note*4 78 Peak Diode Recovery -di/dt -di/dt 100 Note*5 A/µs 2.5 Ta=25°C **Maximum Power Dissipation** P_{D} W 195 Tc=25°C **Operating and Storage** Tch 150 °C Temperature range Tsta -55 to +150 °C

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

Description	Symbol	Conditions		min.	typ.	max.	Unit
Drain-Source Breakdown Voltage	BVoss	I _D =250μA, V _{GS} =0V		500	-	-	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	Ipss	V _{DS} =500V, V _{GS} =0V	Tch=25°C	-	-	25	- μΑ
	IDSS	V _{DS} =400V, V _{GS} =0V	Tch=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 =8A, V _{GS} =10V		-	0.33	0.38	Ω
Forward Transconductance	g _{fs}	I _D =8A, V _{DS} =25V		8.5	17	-	S
Input Capacitance	Ciss	V _{DS} =25V V _{GS} =0V f=1MHz		-	2150	3225	pF
Output Capacitance	Coss			-	210	315	
Reverse Transfer Capacitance	Crss			-	16	24	
Turn-On Time	td(on)	V _{cc} =300V V _{ss} =10V I _D =8A R _G =10Ω		-	21	31.5	ns
	tr			-	9	13.5	
Turn-Off Time	td(off)			-	100	150	
	tf			-	16	24	
Total Gate Charge	QG	Vcc=250V In=16A Vcs=10V		-	60	90	nC
Gate-Source Charge	QGS			-	17	25.5	
Gate-Drain Charge	Q _{GD}			-	18	27	
Avalanche Capability	lav	L=1.52mH, Tch=25°C		16	-	-	Α
Diode Forward On-Voltage	V _{SD}	I _F =16A, V _{GS} =0V, T _{ch} =25°C		-	0.90	1.08	V
Reverse Recovery Time	trr	I _F =16A, V _{GS} =0V	I _F =16A, V _{GS} =0V		0.46	-	μs
Reverse Recovery Charge	Qrr	-di/dt=100A/µs, Tch=25°C		-	6.0	-	μC

Thermal Characteristics

Description	Symbol	Test Conditions	min.	typ.	max.	Unit
Thermal resistance	Rth (ch-c)	Channel to Case			0.641	°C/W
	Rth (ch-a)	Channel to Ambient			50.0	°C/W

Note *1 : Tch≤150°C

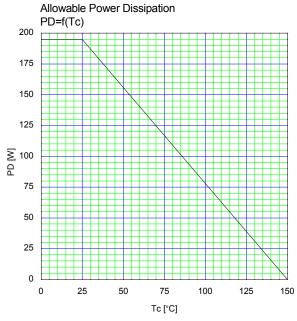
Note *2 : Stating Tch=25°C, Ias=7A, L=18.1mH, Vcc=50V, Rg=50Ω
Eas limited by maximum channel temperature and avalanche current.
See to 'Avalanche Energy' graph.

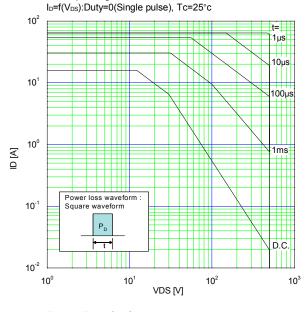
Note *3 : Repetitive rating : Pulse width limited by maximum channel temperature.

See to the 'Transient Themal impeadance' graph.

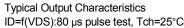
Note *4 : $I_F \le -I_D$, $-di/dt = 100A/\mu s$, $Vcc \le BV_D ss$, $Tch \le 150^{\circ}C$ Note *5 : $I_F \le -I_D$, $dv/dt = 7.4kV/\mu s$, $Vcc \le BV_D ss$, $Tch \le 150^{\circ}C$.

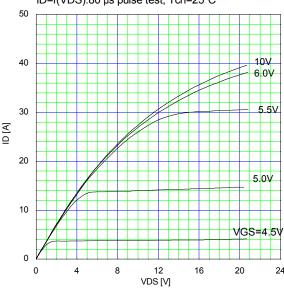
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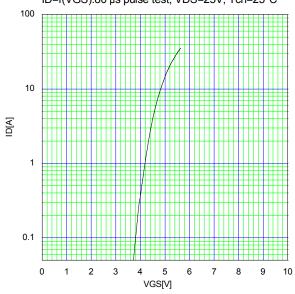


Safe Operating Area

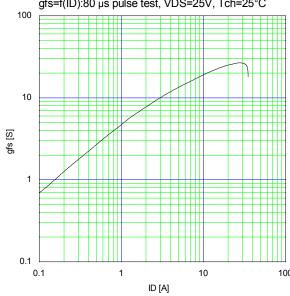




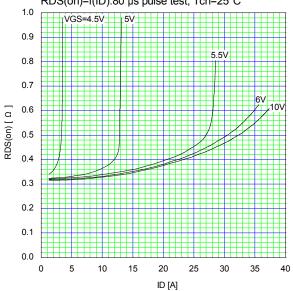
Typical Transfer Characteristic ID=f(VGS):80 µs pulse test, VDS=25V, Tch=25°C



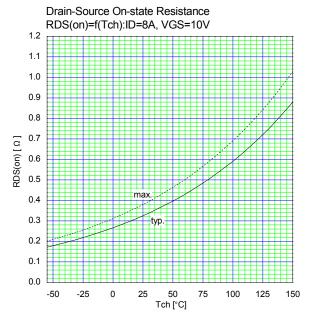
Typical Transconductance gfs=f(ID):80 µs pulse test, VDS=25V, Tch=25°C

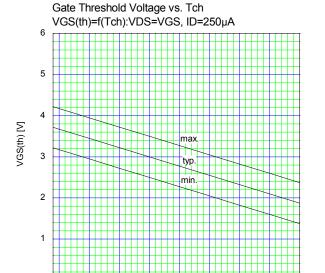


Typical Drain-Source on-state Resistance RDS(on)=f(ID):80 μs pulse test, Tch=25°C

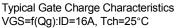


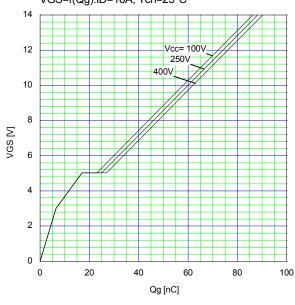
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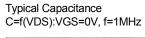


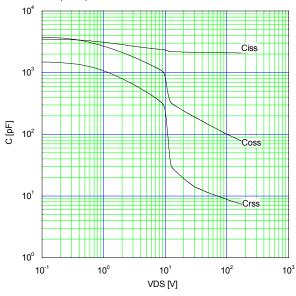


Tch [°C]

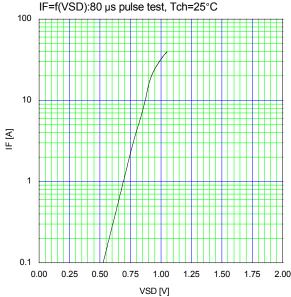




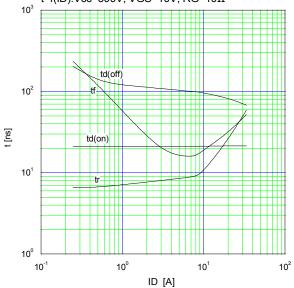




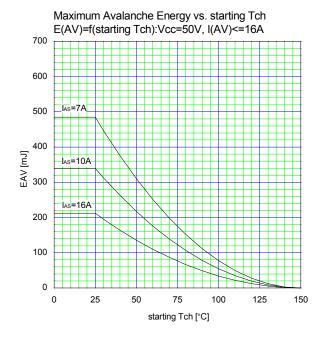
Typical Forward Characteristics of Reverse Diode IF=f(VSD):80 µs pulse test, Tch=25°C

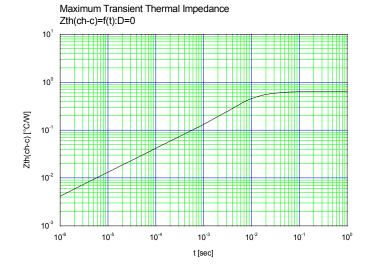


Typical Switching Characteristics vs. ID t=f(ID):Vcc=300V, VGS=10V, RG=10 Ω



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WARNING

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 - Computers
- · OA equipment
- Communications equipment (terminal devices)
- Measurement equipment

· Machine tools

becomes faulty.

- Audiovisual equipment
- Electrical home appliances
- Personal equipment Industrial robots etc.

Trunk communications equipment

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