

# **FMH16N50E**

**FUJI POWER MOSFET** 

## Super FAP-E<sup>3</sup> series

## **N-CHANNEL SILICON POWER MOSFET**

#### ■ Features

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

## Applications

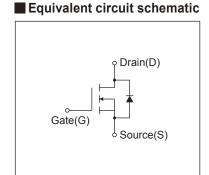
Switching regulators UPS (Uninterruptible Power Supply) DC-DC converters

## Maximum Ratings and Characteristics

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

TO-3P(Q) 5,5,5m 63,2 m.1 13.0.2 10.0.2 10.0.2 17.00 10.0.2	0.5 \$\frac{4}{2}\$	97,2:9.2 ②
+ + + ① ② ③	ONNECTION  OBJECTION  OBJECTION  OBJECTION  OBJECTION	
	EIAJ : SC-65	

■ Outline Drawings [mm]



Description	Symbol	Characteristics	Unit	Remarks	
Proin Course Voltoge	V <sub>DS</sub>	500	V		
Drain-Source Voltage	V <sub>DSX</sub>	500	V	V <sub>GS</sub> = -30V	
Continuous Drain Current	In	±16	Α		
Pulsed Drain Current	IDP	±64	Α		
Gate-Source Voltage	V <sub>G</sub> s	±30	V		
Repetitive and Non-Repetitive Maximum Avalanche Current	Iar	16	Α	Note*1	
Non-Repetitive Maximum Avalanche Energy	Eas	485	mJ	Note*2	
Repetitive Maximum Avalanche Energy	Ear	19.5	mJ	Note*3	
Peak Diode Recovery dV/dt	dV/dt	7.8	kV/μs	Note*4	
Peak Diode Recovery -di/dt	-di/dt	100	A/µs	Note*5	
Mandanian Barras Biasinatian	Po	2.5	10/	Ta=25°C	
Maximum Power Dissipation		195	W	Tc=25°C	
Operating and Storage	Tch	150	°C		
Temperature range	Tstg	-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 <sub>D</sub> =250μA, V <sub>GS</sub> =0V		500	-	-	V	
Gate Threshold Voltage	V <sub>GS</sub> (th)	In=250µA, Vns=Vgs	I <sub>D</sub> =250µA, V <sub>DS</sub> =V <sub>GS</sub>		3.0	3.5	V	
Zero Gate Voltage Drain Current	Ipss	V <sub>DS</sub> =500V, V <sub>GS</sub> =0V	T <sub>ch</sub> =25°C	-	-	25		
	IDSS	V <sub>DS</sub> =400V, V <sub>GS</sub> =0V	T <sub>ch</sub> =125°C	-	-	250	μA	
Gate-Source Leakage Current	Igss	V <sub>GS</sub> =±30V, V <sub>DS</sub> =0V		-	10	100	nA	
Drain-Source On-State Resistance	Ros (on)	I <sub>D</sub> =8A, V <sub>GS</sub> =10V		-	0.33	0.38	Ω	
Forward Transconductance	<b>g</b> fs	I <sub>D</sub> =8A, V <sub>DS</sub> =25V		8.5	17	-	S	
Input Capacitance	Ciss	V <sub>DS</sub> =25V		-	2150	3225	pF	
Output Capacitance	Coss	V <sub>GS</sub> =0V	V <sub>GS</sub> =0V		210	315		
Reverse Transfer Capacitance	Crss	f=1MHz -		16	24			
Turn-On Time	td(on)	V <sub>cc</sub> =300V V <sub>GS</sub> =10V I <sub>D</sub> =8A		-	21	31.5	ns	
	tr			-	9	13.5		
Turn-Off Time	td(off)			-	100	150		
	tf	R <sub>G</sub> =10Ω		-	16	24	1	
Total Gate Charge	QG	Vcc=250V	Vcc=250V		60	90	nC	
Gate-Source Charge	QGS	I <sub>D</sub> =16A		-	17	25.5		
Gate-Drain Charge	Q <sub>GD</sub>	V <sub>GS</sub> =10V		-	18	27		
Avalanche Capability	lav	L=1.52mH, Tch=25°C	L=1.52mH, Tch=25°C		-	-	Α	
Diode Forward On-Voltage	V <sub>SD</sub>	I <sub>F</sub> =16A, V <sub>GS</sub> =0V, T <sub>ch</sub> =25°	I <sub>F</sub> =16A, V <sub>GS</sub> =0V, T <sub>ch</sub> =25°C		0.90	1.08	V	
Reverse Recovery Time	trr	I <sub>F</sub> =16A, V <sub>GS</sub> =0V	I <sub>F</sub> =16A, V <sub>GS</sub> =0V		0.46	-	μs	
Reverse Recovery Charge	Qrr	-di/dt=100A/µs, Tch=25	°C	-	6.0	-	μC	

#### Thermal Characteristics

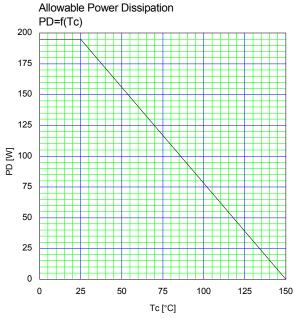
Description	Symbol	Test Conditions		typ.	max.	Unit
Thermal resistance	Rth (ch-c)	Channel to Case			0.641	°C/W
	Rth (ch-a)	Channel to Ambient			50.0	°C/W

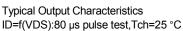
Note \*1 : Tch≤150°C

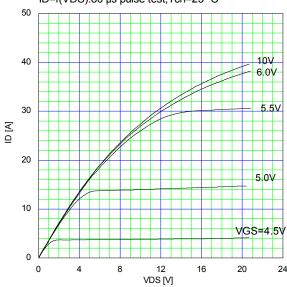
Note \*2 : Stating Tch=25°C, Ias=7A, L=18.1mH, Vcc=50V, Rg=50 $\Omega$ Eas limited by maximum channel temperature and avalanche current. See to 'Avalanche Energy' graph. Note \*3 : Repetitive rating : Pulse width limited by maximum channel temperature.

See to the 'Transient Themal impeadance' graph.

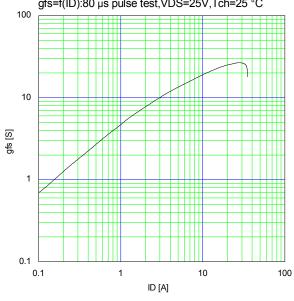
Note \*4 : I<sub>F</sub>≤-I<sub>D</sub>, -di/dt=100A/μs, Vcc≤BV<sub>DSS</sub>, Tch≤150°C. Note \*5 : I<sub>F</sub>≤-I<sub>D</sub>, dv/dt=7.4kV/μs, Vcc≤BV<sub>DSS</sub>, Tch≤150°C.



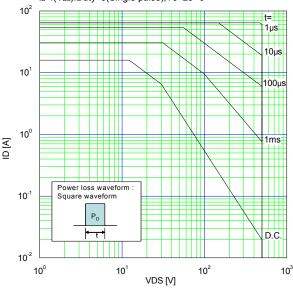




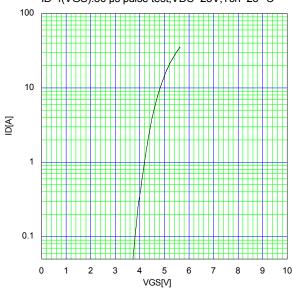
Typical Transconductance gfs=f(ID):80  $\mu$ s pulse test,VDS=25V,Tch=25  $^{\circ}$ C



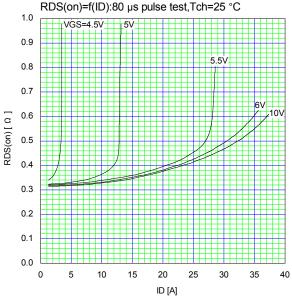
Safe Operating Area  $I_D$ =f(V $_D$ s):Duty=0(Single pulse),Tc=25 °c

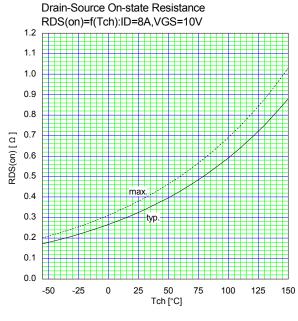


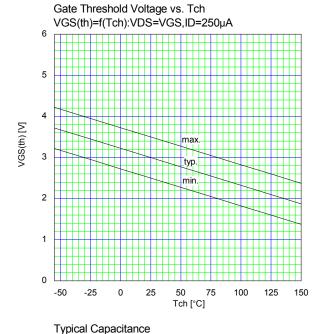
Typical Transfer Characteristic ID=f(VGS):80 µs pulse test,VDS=25V,Tch=25 °C

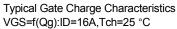


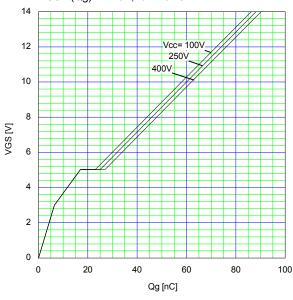
Typical Drain-Source on-state Resistance RDS(on)=f(ID):80  $\mu$ s pulse test,Tch=25 °C

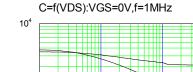


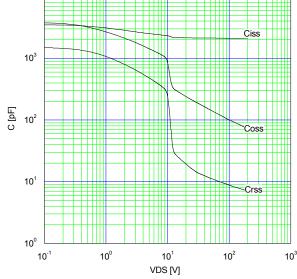




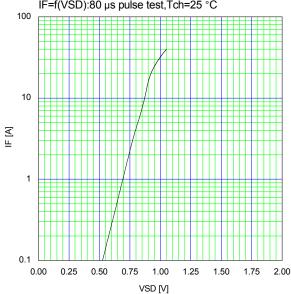




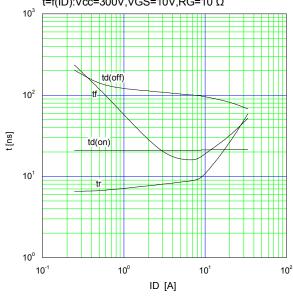


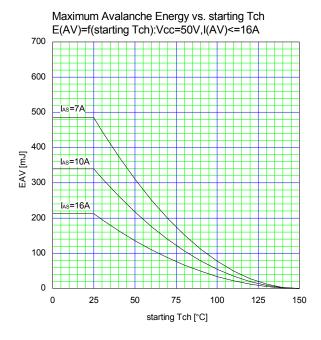


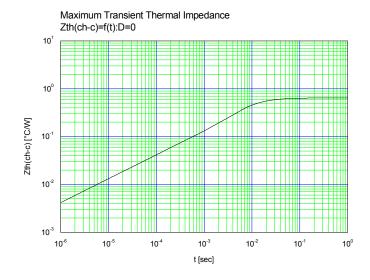
Typical Forward Characteristics of Reverse Diode IF=f(VSD):80 μs pulse test,Tch=25 °C



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







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