

# **FMH16N50ES**

#### **FUJI POWER MOSFET**

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

### N-CHANNEL SILICON POWER MOSFET

#### Features

Maintains both low power loss and low noise Lower R<sub>DS</sub>(on) characteristic

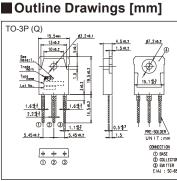
More controllable switching dv/dt by gate resistance Smaller V<sub>GS</sub> ringing waveform during switching Narrow band of the gate threshold voltage (4.2±0.5V) High avalanche durability

#### Applications

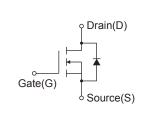
Switching regulators UPS (Uninterruptible Power Supply) DC-DC converters

#### Maximum Ratings and Characteristics

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



Equivalent circuit schematic



Description	Symbol	Characteristics	Unit	Remarks
Drain Source Veltere	VDS	500	V	
Drain-Source Voltage	VDSX	500	V	V <sub>GS</sub> = -30V
Continuous Drain Current	lo	±16	A	
Pulsed Drain Current	IDP	±64	A	
Gate-Source Voltage	Vgs	±30	V	
Repetitive and Non-Repetitive Maximum Avalanche Current	lar	16	A	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	4.8	kV/µs	Note*4
Peak Diode Recovery -di/dt	-di/dt	100	A/µs	Note*5
Manimum Davida Dia air atian	Po	2.50	14/	Ta=25°C
Maximum Power Dissipation		195	W	Tc=25°C
On anothing and Otamora Tamorating analysis	Tch	150	°C	
Operating and Storage 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	BVDSS	I <sub>D</sub> =250µA, V <sub>GS</sub> =0V	ID=250µA, VGS=0V		-	-	V	
Gate Threshold Voltage	Vgs (th)	ID=250µA, VDS=VGS		3.7	4.2	4.7	V	
Zana Cata Valtana Dusin Comunit		V <sub>DS</sub> =500V, V <sub>GS</sub> =0V	Tch=25°C	-	-	25	μΑ	
Zero Gate Voltage Drain Current	IDSS	V <sub>DS</sub> =400V, V <sub>GS</sub> =0V	Tch=125°C	-	-	250		
Gate-Source Leakage Current	Igss	V <sub>GS</sub> =±30V, V <sub>DS</sub> =0V	V <sub>GS</sub> =±30V, V <sub>DS</sub> =0V		10	100	nA	
Drain-Source On-State Resistance	RDs (on)	I <sub>D</sub> =8A, V <sub>GS</sub> =10V	ID=8A, VGS=10V		0.33	0.38	Ω	
Forward Transconductance	<b>g</b> fs	ID=8A, VDS=25V	ID=8A, VDS=25V		11	-	S	
Input Capacitance	Ciss	V <sub>DS</sub> =25V		-	1700	2550		
Output Capacitance	Coss	V <sub>GS</sub> =0V	V <sub>GS</sub> =0V		210	315	pF	
Reverse Transfer Capacitance	Crss	f=1MHz		-	13	19.5		
Turn-On Time	td(on)	Vcc=300V	-	37	55.5			
Turn-On Time	tr	V <sub>GS</sub> =10V		-	30	45	]	
T	td(off)	ID=8A		-	87	130.5	ns	
Turn-Off Time	tf R <sub>GS</sub> =18Ω	-	17	25.5				
Total Gate Charge	QG	- V <sub>cc</sub> =250V - I <sub>D</sub> =16A - V <sub>GS</sub> =10V		-	48	72	nC	
Gate-Source Charge	QGS			-	17	25.5		
Gate-Drain Charge	QGD			-	18	27		
Gate-Drain Crossover Charge	Qsw	VGS-10V		-	7	10.5		
Avalanche Capability	lav	L=1.52mH, Tch=25°C		16	-	-	A	
Diode Forward On-Voltage	Vsd	IF=16A, VGS=0V, Tch=25°C		-	0.90	1.35	V	
Reverse Recovery Time	trr	I⊧=16A, V₀s=0V -di/dt=100A/µs, Tch=25°C		-	0.46	-	μs	
Reverse Recovery Charge	Qrr			-	6.0	-	μC	

#### Thermal Characteristics

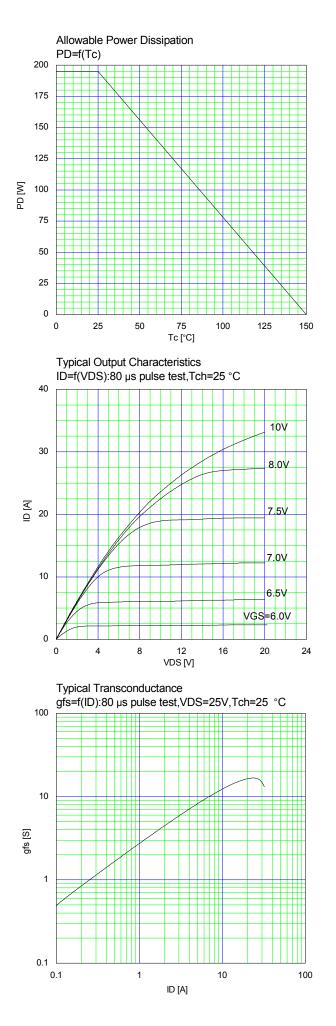
Description	Symbol	Test Conditions	min.	typ.	max.	Unit
Thermal resistance	Rth (ch-c)	Channel to Case			0.641	°C/W
	Rth (ch-a)	Channel to Ambient			50.0	°C/W

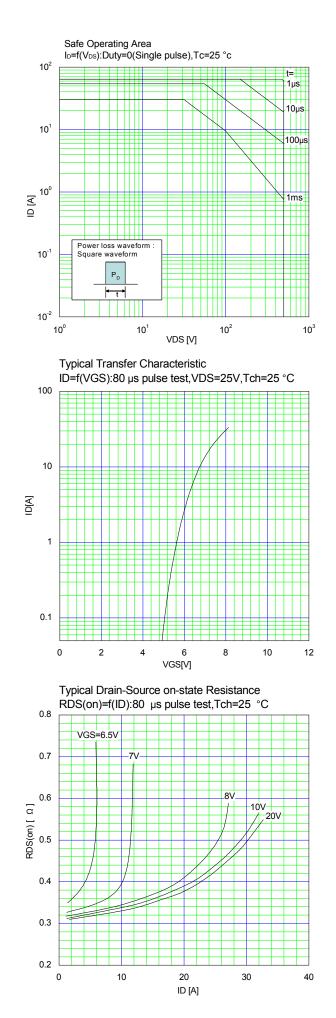
Note \*1 : Tch≤150°C.

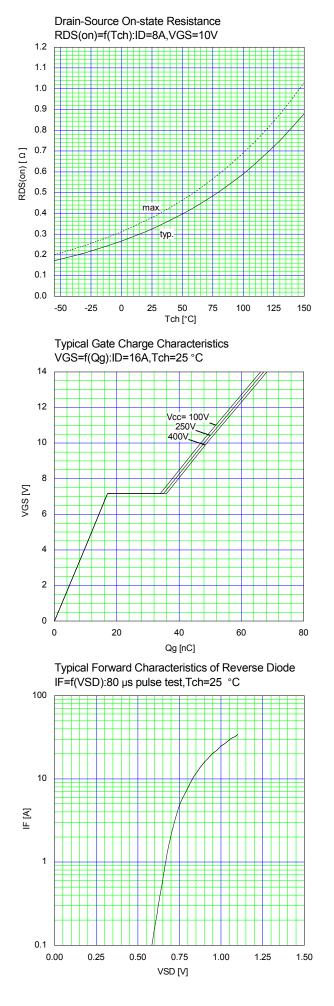
Note \*2 : Stating Tch=25°C, IAs=7A, L=18.1mH, Vcc=50V, R<sub>6</sub>=50Ω. E<sub>AS</sub> limited by maximum channel temperature and avalanche current. See to 'Avalanche Energy' graph. Note \*3 : Repetitive rating : Pulse width limited by maximum channel temperature.

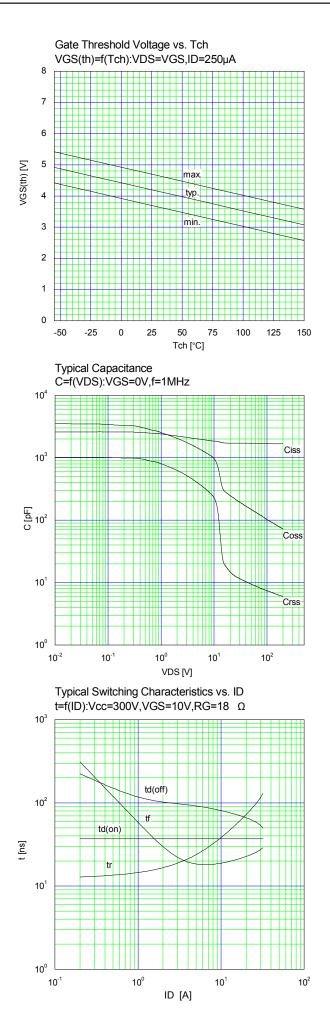
See to the 'Transient Themal impeadance' graph. Note \*4 : I⊧≤-I₀, -di/dt=100A/µs, Vcc≤BV₀ss, Tch≤150°C.

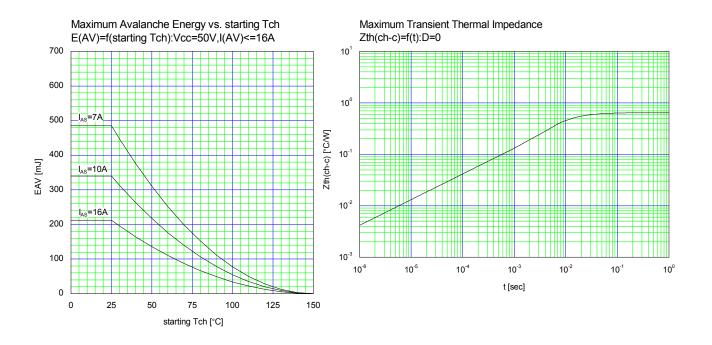
Note \*5 : I⊧≤-ID, dv/dt=4.8kV/µs, Vcc≤BvDss, Tch≤150°C











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