

FMH20N50E

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

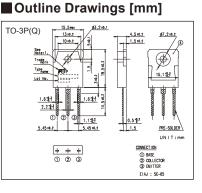
Smaller V_{GS} ringing waveform during switching Narrow band of the gate threshold voltage $(3.0\pm0.5V)$ High avalanche durability

Applications

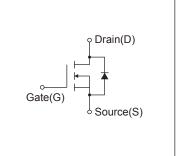
Switching regulators UPS (Uninterruptible Power Supply) DC-DC converters

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 _{GS} = -30V	
Continuous Drain Current	lo	±20	А		
Pulsed Drain Current	IDP	±80	А		
Gate-Source Voltage	Vgs	±30	V		
Repetitive and Non-Repetitive Maximum Avalanche Current	lar	20	A	Note*1	
Non-Repetitive Maximum Avalanche Energy	Eas	582.5	mJ	Note*2	
Repetitive Maximum Avalanche Energy	Ear	23.5	mJ	Note*3	
Peak Diode Recovery dV/dt	dV/dt	7.4	kV/µs	Note*4	
Peak Diode Recovery -di/dt	-di/dt	100	A/µs	Note*5	
Maximum Power Dissipation	PD	2.5	14/	Ta=25°C	
		235	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	Conditions		typ.	max.	Unit
Drain-Source Breakdown Voltage	BVDSS	ID=250µA, VGS=0V		500	-	-	V
Gate Threshold Voltage	Vgs (th)	ID=250µA, VDS=VGS		2.5	3.0	3.5	V
Zero Gate Voltage Drain Current		V _{DS} =500V, V _{GS} =0V	Tch=25°C	-	-	25	μA
	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	RDS (on)	I _D =10A, V _{GS} =10V		-	0.27	0.31	Ω
Forward Transconductance	g fs	ID=10A, VDS=25V		11	22	-	S
Input Capacitance	Ciss	V _{DS} =25V V _{GS} =0V f=1MHz		-	2650	3980	pF
Output Capacitance	Coss			-	250	375	
Reverse Transfer Capacitance	Crss			-	19	28.5	
Turn-On Time	td(on)	V _{cc} =300V V _{GS} =10V I _D =10A R _G =10Ω		-	22	33	ns
	tr			-	11	16.5	
Turn-Off Time	td(off)			-	120	180	
	tf			-	21	31.5	
Total Gate Charge	QG	Vcc=250V I₀=20A Vcs=10V		-	77	115.5	nC
Gate-Source Charge	QGS			-	17	25.5	
Gate-Drain Charge	QGD			-	22	33	
Avalanche Capability	lav	L=1.07mH, Tch=25°C		20	-	-	A
Diode Forward On-Voltage	Vsd	IF=20A, VGS=0V, Tch=25°C		-	0.90	1.35	V
Reverse Recovery Time	trr	I _F =20A, V _{GS} =0V		-	0.5	-	μs
Reverse Recovery Charge	Qrr	-di/dt=100A/µs, Tch=25°C		-	7	-	μC

• Thermal Characteristics

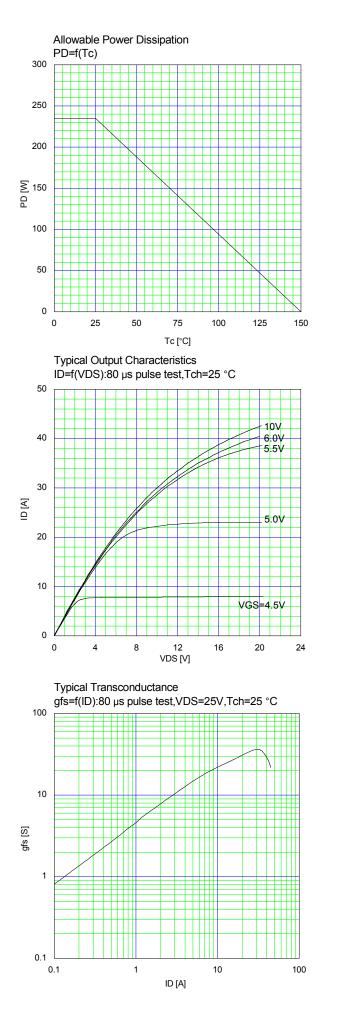
Description	Symbol	Test Conditions	min.	typ.	max.	Unit
Thermal resistance	Rth (ch-c)	Channel to Case			0.532	°C/W
	Rth (ch-a)	Channel to Ambient			50.0	°C/W

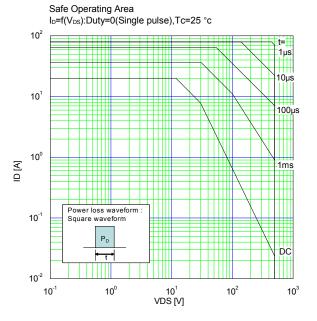
Note *1 : Tch≤150°C

Note *2 : Stating Tch=25°C, IAs=8A, L=16.7mH, Vcc=50V, Rs=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.

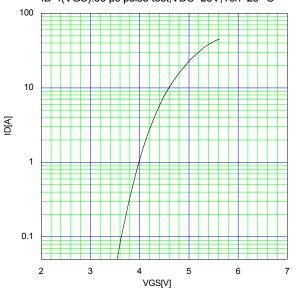
See to the 'Transient Themal impeadance' graph. Note *4 : IFS-ID, -di/dt=100A/µs, Vcc≤BVbss, Tch≤150°C.

Note *5 : IF≤-ID, dv/dt=7.4kV/µs, Vcc≤BVDss, Tch≤150°C.

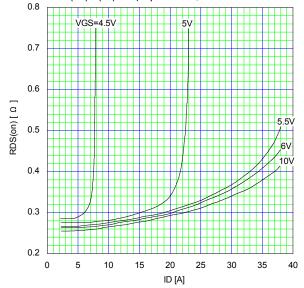


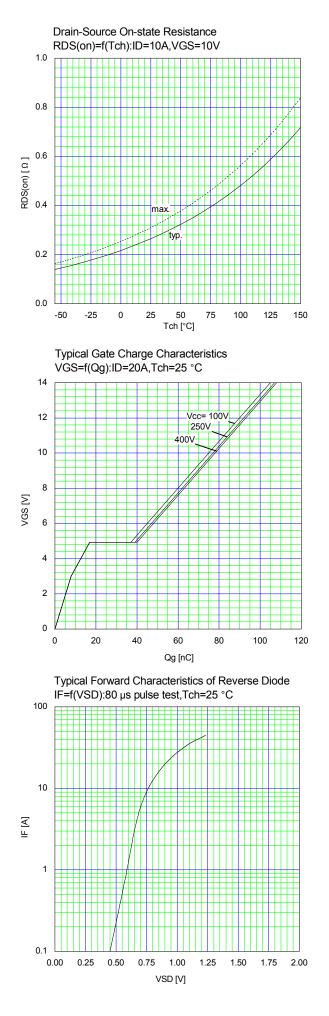


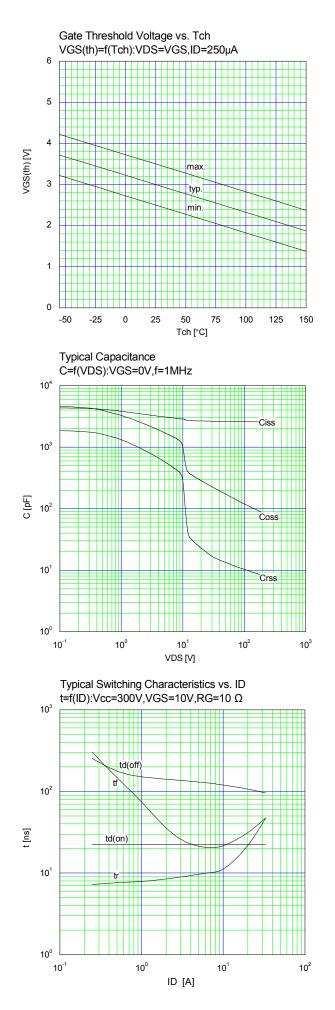
Typical Transfer Characteristic ID=f(VGS):80 µs pulse test,VDS=25V,Tch=25 °C

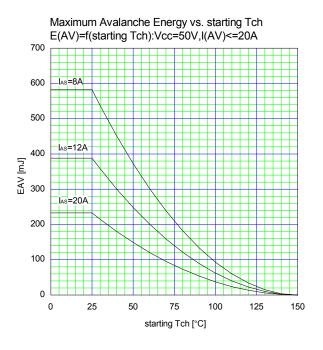


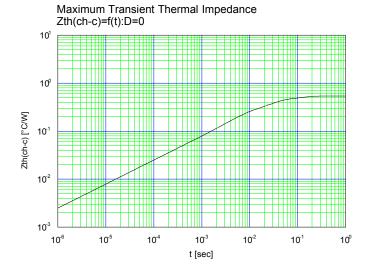
Typical Drain-Source on-state Resistance RDS(on)=f(ID):80 µs pulse test,Tch=25 °C











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