

FMH20N50ES

FUJI POWER MOSFET

Super FAP-E^{3S} 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 (4.2±0.5V) High avalanche durability

Applications

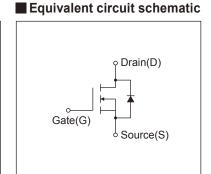
Switching regulators
UPS (Uninterruptible Power Supply)
DC-DC converters

■ Maximum Ratings and Characteristics

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

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Lot No.	4.5 0.2 67.2 0.5 1.5 1.2 7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
+ + + ① ② ③	ODMECTION ① BASE ② COLLECTOR ③ DMITTER EIAJ: SC-65

■ Outline Drawings [mm]



Description Characteristics Unit Symbol Remarks VDS **Drain-Source Voltage** V_{DSX} 500 V V_{GS} = -30V **Continuous Drain Current** lο ±20 Α **Pulsed Drain Current** IDP ±80 Α Gate-Source Voltage Vgs ±30 Repetitive and Non-Repetitive Maximum Avalanche Current I_{AR} 20 Α Note*1 Non-Repetitive Maximum Avalanche Energy 582.5 Note*2 EAS mJ Repetitive Maximum Avalanche Energy EAR 23.5 mJ Note*3 Peak Diode Recovery dV/dt dV/dt Note*4 46 kV/us Peak Diode Recovery -di/dt -di/dt 100 Note*5 A/µs 2.50 Ta=25°C **Maximum Power Dissipation** P_D W 235 Tc=25°C Tch 150 °C **Operating and Storage Temperature range** -55 to + 150 Tstg °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)	I _D =250µA, V _{DS} =V _{GS}		3.7	4.2	4.7	V	
Zero Gate Voltage Drain Current	Ioss	V _{DS} =500V, V _{GS} =0V	T _{ch} =25°C	-	-	25		
		V _{DS} =400V, V _{GS} =0V	T _{ch} =125°C	-	-	250	μA	
Gate-Source Leakage Current	Igss	V _{GS} =±30V, V _{DS} =0V		-	10	100	nA	
Drain-Source On-State Resistance	Ros (on)	I _D =10A, V _{GS} =10V		-	0.27	0.31	Ω	
Forward Transconductance	g _{fs}	I _D =10A, V _{DS} =25V		5	10	-	S	
Input Capacitance	Ciss	V _{0s} =25V V _{0s} =0V f=1MHz		-	2100	3150	pF	
Output Capacitance	Coss			-	250	375		
Reverse Transfer Capacitance	Crss			-	15	22.5		
Turn-On Time	td(on)	V_{cs} =300V V_{Gs} =10V I_{D} =10A R_{Gs} =15 Ω		-	40	60	ns	
	tr			-	38	57		
Turn-Off Time	td(off)			-	85	127.5		
	tf			-	17	25.5		
Total Gate Charge	Q _G	V _{cc} =250V I _D =20A V _{GS} =10V		-	57	85.5	nC	
Gate-Source Charge	Qgs			-	21	31.5		
Gate-Drain Charge	Q _{GD}			-	21	31.5		
Gate-Drain Crossover Charge	Qsw			-	10	15		
Avalanche Capability	lav	L=1.07mH, Tch=25°C		20	-	-	Α	
Diode Forward On-Voltage	V _{SD}	I _F =20A, V _{GS} =0V, T _{ch} =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		-	7.0	-	μC	

Thermal Characteristics

Description	Symbol	Test Conditions	min.	typ.	max.	Unit
Thermal resistance	Rth (ch-c)	Channel to Case			0.530	°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, Rc=50Ω.

Eas limited by maximum channel temperature and avalanche current.

See to 'Avalanche Energy' graph.

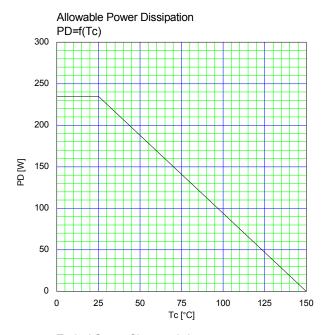
Note *3 : Repetitive rating : Pulse width limited by maximum channel temperature

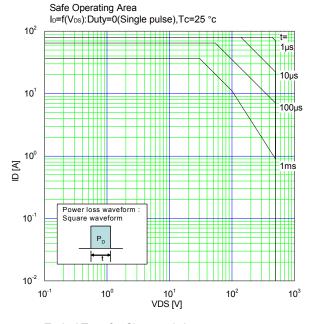
See to the 'Transient Themal impeadance' graph.

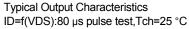
Note *4 : Ir≤-Ip, -di/dt=100A/µs, Vcc≤BVpss, Tch≤150°C.

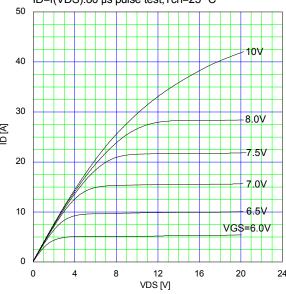
Note *5 : Ir≤-Ip, dv/dt=4.6kV/µs, Vcc≤BVpss, Tch≤150°C.

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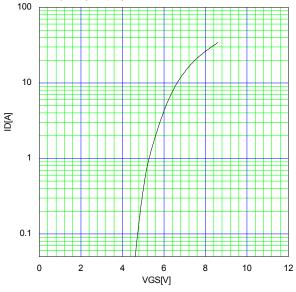




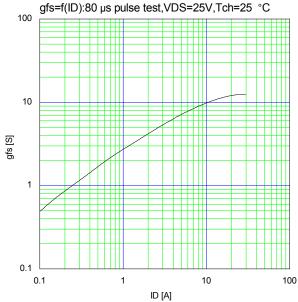




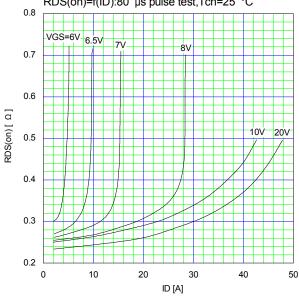
Typical Transfer Characteristic ID=f(VGS):80 µs pulse test,VDS=25V,Tch=25 °C



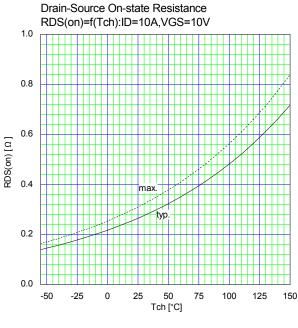
Typical Transconductance qfs=f(ID):80 µs pulse test,VDS=25V,Tch=25 °C

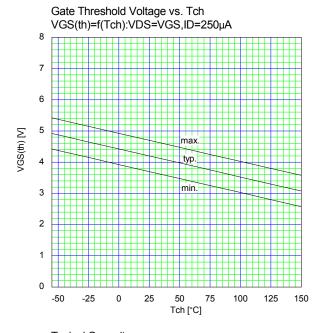


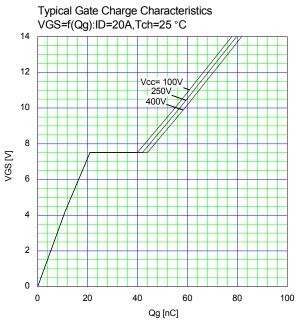
Typical Drain-Source on-state Resistance RDS(on)=f(ID):80 $\,\mu s$ pulse test,Tch=25 $\,^{\circ}C$

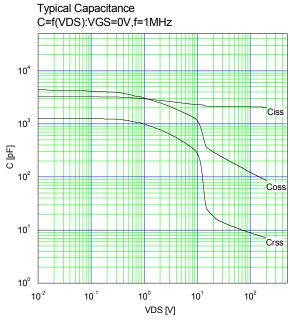


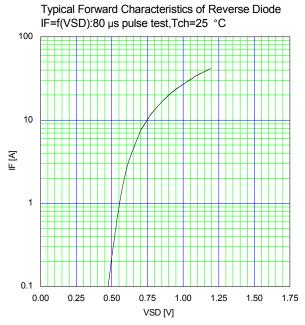
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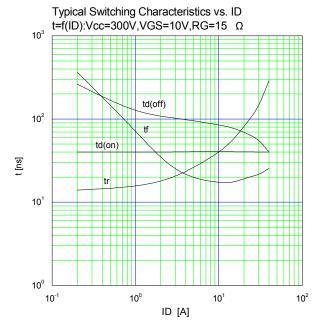


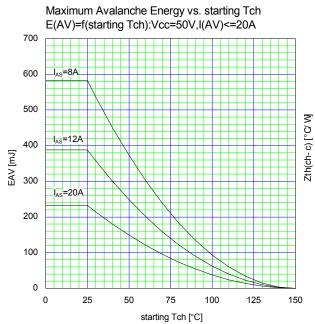


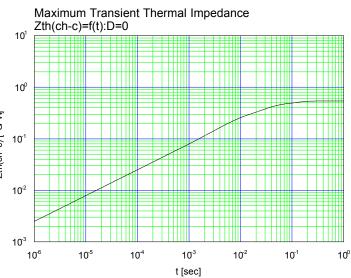












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· Aeronautic equipment

Safety devices

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