

FML20N50ES

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 (4.2±0.5V) High avalanche durability

Applications

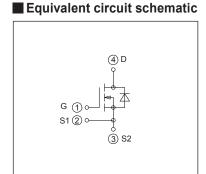
Switching regulators UPS (Uninterruptible Power Supply) DC-DC converters

Maximum Ratings and Characteristics

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

2000 B B

■Outline Drawings [mm]



Description Symbol Characteristics Unit Remarks VDS **Drain-Source Voltage** V_{DSX} 500 V V_{GS} = -30V **Continuous Drain Current** ΙD ±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 9.5 mJ Note*3 Peak Diode Recovery dV/dt dV/dt kV/us Note*4 46 Peak Diode Recovery -di/dt -di/dt 100 Note*5 A/µs 2.16 Ta=25°C **Maximum Power Dissipation** P_{D} W 95 Tc=25°C Tch 150 °C **Operating and Storage Temperature range** Tstg -55 to + 150 °C Isolation Voltage kVrms t = 60 sec, f = 60 HzViso 2

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)	ID=250µA, VDS=VGS		3.7	4.2	4.7	V	
Zero Gate Voltage Drain Current		V _{DS} =500V, V _{GS} =0V	T _{ch} =25°C	-	-	25		
	IDSS	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 _{DS} =25V	-	2100	3150	pF		
Output Capacitance	Coss	V _{GS} =0V	-	250	375			
Reverse Transfer Capacitance	Crss	f=1MHz	-	15	22.5			
Turn-On Time	td(on)	Vcc=300V	-	40	60	ns		
	tr	V _{GS} =10V I _D =10A		-	38		57	
Turn-Off Time	td(off)			-	85		127.5	
	tf	R _{GS} =15Ω	-	17	25.5			
Total Gate Charge	Q _G			-	57	85.5	nC	
Gate-Source Charge	QGS	V _{cc} =250V 	-	21	31.5			
Gate-Drain Charge	Q _{GD}	V _{GS} =10V	-	21	31.5			
Gate-Drain Crossover Charge	Qsw	VG3-10 V	-	10	15			
Avalanche Capability	lav	L=1.07mH, T _{ch} =25°C		20	-	-	А	
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			1.320	°C/W
	Rth (ch-a)	Channel to Ambient			58.0	°C/W

Note *1 : Tch≤150°C.

Note '2: Stating Tch=25°C, Ias=8A, L=16.7mH, Vcc=50V, Re=50Ω.

Eas limited by maximum channel temperature and avalanche current.

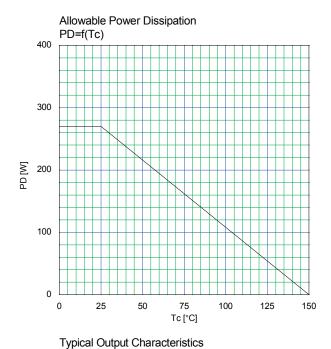
See to 'Avalanche Energy' graph.

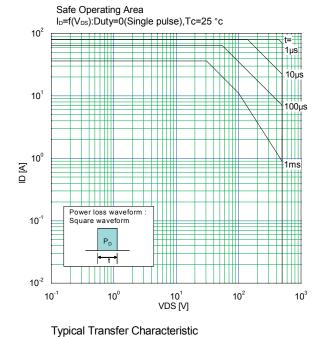
Note *3 : Repetitive rating : Pulse width limited by maximum channel temperature.

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

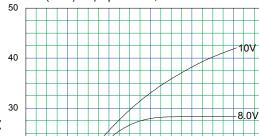
Note *5 : IF≤-ID, dv/dt=4.6kV/µs, Vcc≤BVDss, Tch≤150°C.

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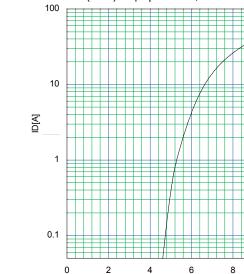


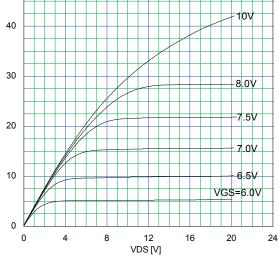


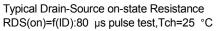
ID=f(VGS):80 µs pulse test, VDS=25V, Tch=25 °C



ID=f(VDS):80 µs pulse test,Tch=25 °C



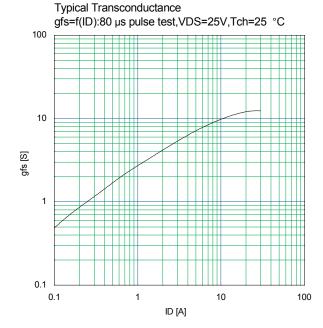


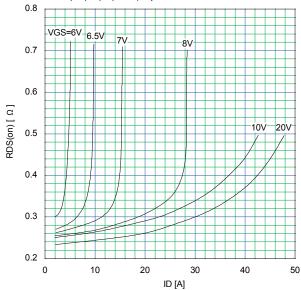


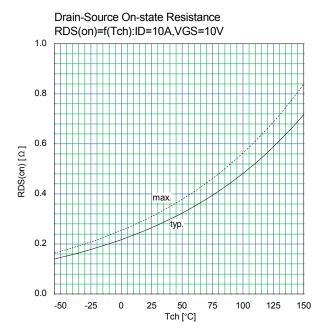
VGS[V]

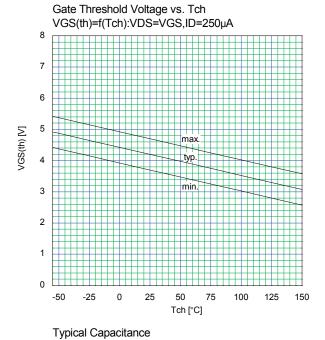
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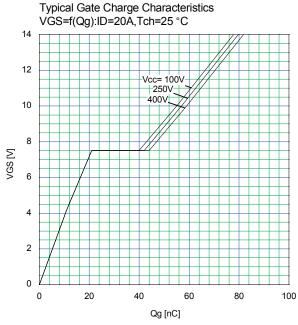
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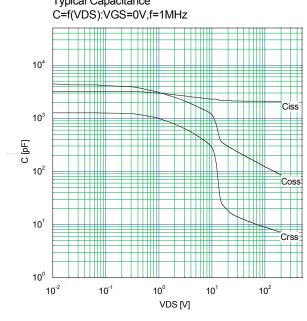


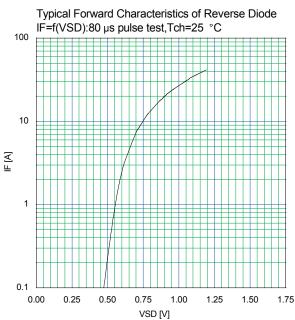


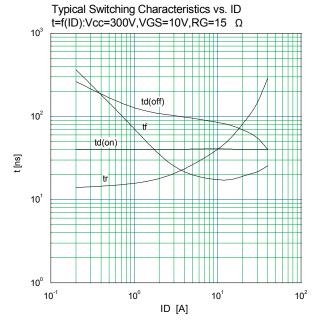




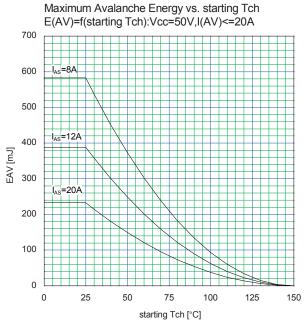


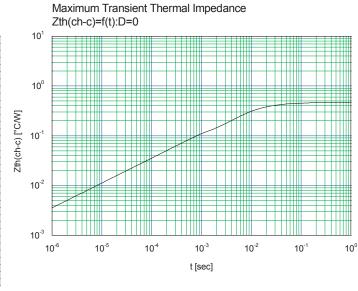






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