

# FMV05N50E

**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  $R_{DS}(on)$  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±0.5V) High avalanche durability

### Applications

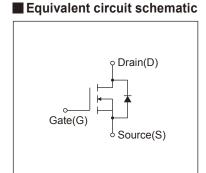
Switching regulators UPS (Uninterruptible Power Supply) DC-DC converters

## ■ Maximum Ratings and Characteristics

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

	r
TO-220F(SLS)  Lot No.  Trademark  Type name  See Note: 1.	2,7 m.2
1,2a2 s s s s s s s s s s s s s s s s s s	Pre-Solder  0.5 % 2,7 to.2
①②③	CONNECTION ① GATE ② DRAIN ③ SOURCE

■ Outline Drawings [mm]



Description	Symbol	Characteristics	Unit	Remarks
Drain 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	Io	±5	A	
Pulsed Drain Current	IDP	±20	А	
Gate-Source Voltage	Vgs	±30	V	
Repetitive and Non-Repetitive Maximum Avalanche Current	Iar	5	А	Note*1
Non-Repetitive Maximum Avalanche Energy	Eas	171	mJ	Note*2
Repetitive Maximum Avalanche Energy	Ear	6.0	mJ	Note*3
Peak Diode Recovery dV/dt	dV/dt	5.3	kV/μs	Note*4
Peak Diode Recovery -di/dt	-di/dt	100	A/µs	Note*5
Manifestore Barrer Biogination	D	2.16	10/	Ta=25°C
Maximum Power Dissipation	P□	21	W	Tc=25°C
Operating and Storage Temperature range	Tch	150	°C	
	Tstg	-55 to +150	°C	
Isolation Voltage	Viso	2	kVrms	t = 60sec, f = 60Hz

#### ● 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)	I <sub>D</sub> =250μA, V <sub>DS</sub> =V <sub>GS</sub>		2.5	3.0	3.5	V	
Zero Gate Voltage Drain Current		V <sub>DS</sub> =500V, V <sub>GS</sub> =0V	Tch=25°C	-	-	25	μА	
	IDSS	V <sub>DS</sub> =400V, V <sub>GS</sub> =0V	T <sub>ch</sub> =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	Ros (on)	I <sub>D</sub> =2.5A, V <sub>GS</sub> =10V		-	1.28	1.50	Ω	
Forward Transconductance	<b>g</b> fs	I <sub>D</sub> =2.5A, V <sub>DS</sub> =25V		2.5	5	-	S	
Input Capacitance	Ciss	V <sub>DS</sub> =25V		-	610	915		
Output Capacitance	Coss	V <sub>GS</sub> =0V		-	66	99	pF	
Reverse Transfer Capacitance	Crss	f=1MHz		-	4.7	7.1		
Turn-On Time	td(on)	Vcc=300V		-	10	15		
	tr	V <sub>GS</sub> =10V		-	7	10.5	1	
Turn-Off Time	td(off)	ID=2.5A		-	45	67.5	ns	
	tf	R <sub>G</sub> =24Ω		-	13.5	20.3	1	
Total Gate Charge	QG	Vcc=250V		-	21	32		
Gate-Source Charge	Qss	I <sub>D</sub> =5A -		6	9	nC		
Gate-Drain Charge	Q <sub>GD</sub>	V <sub>GS</sub> =10V		-	5.5	8.3	7	
Avalanche Capability	lav	L=5.01mH, Tch=25°C		5	-	-	А	
Diode Forward On-Voltage	V <sub>SD</sub>	I <sub>F</sub> =5A, V <sub>GS</sub> =0V, T <sub>ch</sub> =25°C	I <sub>F</sub> =5A, V <sub>GS</sub> =0V, T <sub>ch</sub> =25°C		0.86	1.30	V	
Reverse Recovery Time	trr	I <sub>F</sub> =5A, V <sub>GS</sub> =0V		-	0.28	-	μs	
Reverse Recovery Charge	Qrr	-di/dt=100A/µs, Tch=25°C		-	1.8	-	μC	

### Thermal Characteristics

Description	Symbol	Test Conditions	min.	typ.	max.	Unit
Thermal resistance	Rth (ch-c)	Channel to Case			5.952	°C/W
	Rth (ch-a)	Channel to Ambient			58.0	°C/W

Note \*1 : Tch≤150°C

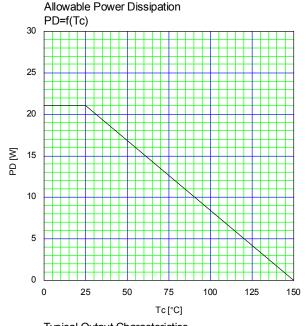
Note \*2 : Stating Tch=25°C, Ias=2A, L=78.3mH, Vcc=50V, Rg=50Ω
Eas limited by maximum channel temperature and avalanche current.
See to 'Avalanche Energy' graph.

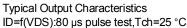
Note \*3 : Repetitive rating : Pulse width limited by maximum channel temperature.

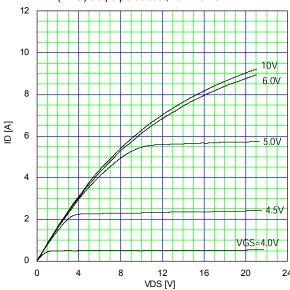
See to the 'Transient Themal impeadance' graph.

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

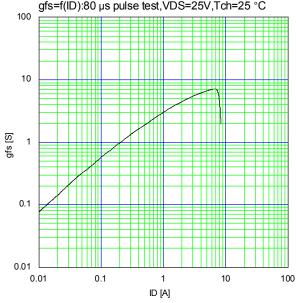
Note \*5 : Ir≤-lp, dv/dt=5.3kV/µs, Vcc≤BVbss, Tch≤150°C.



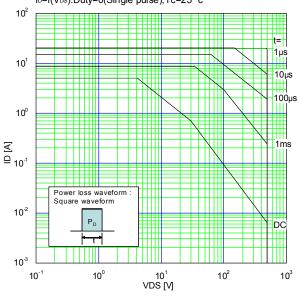




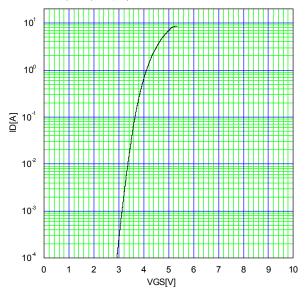
Typical Transconductance gfs=f(ID):80 µs pulse test, VDS=25V,Tch=25 °C



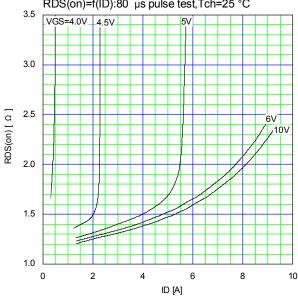
Safe Operating Area
Ib=f(Vbs):Duty=0(Single pulse),Tc=25 °c



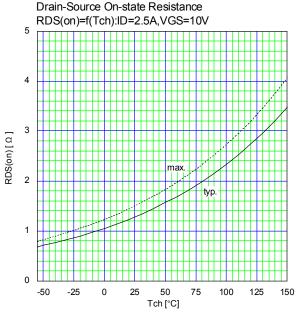
Typical Transfer Characteristic ID=f(VGS):80 µs pulse test,VDS=25V,Tch=25 °C

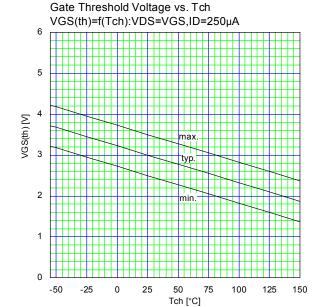


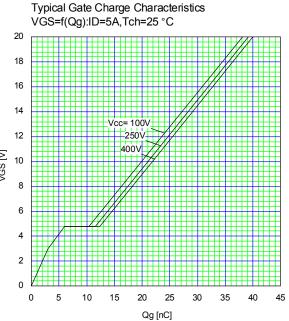
Typical Drain-Source on-state Resistance RDS(on)=f(ID):80 µs pulse test,Tch=25 °C

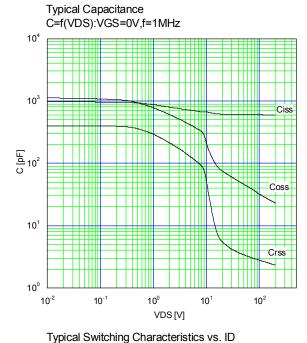


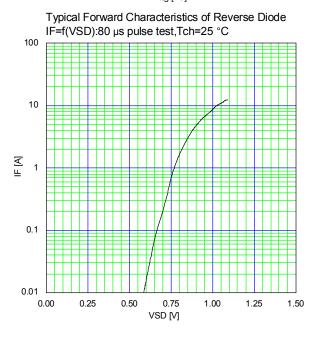
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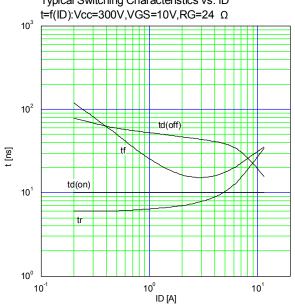


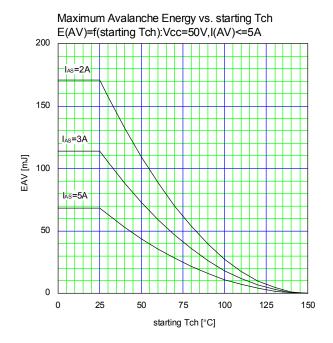


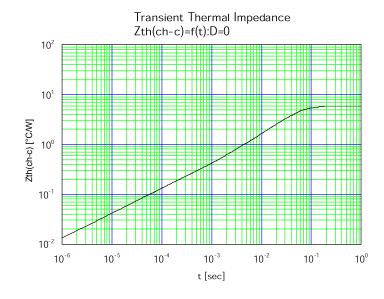












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