

FMV23N50E

FUJI POWER MOSFET

Super FAP-E³ series

N-CHANNEL SILICON POWER MOSFET

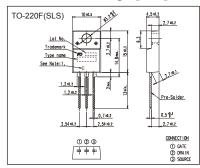
■ Features

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±0.5V) High avalanche durability

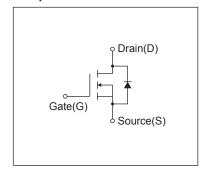
Applications

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

■ Outline Drawings [mm]



■ Equivalent circuit schematic



■ Maximum Ratings and Characteristics

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

Description	Symbol	Characteristics	Unit	Remarks
Dunim Course Voltage	V _{DS}	500	V	
Drain-Source Voltage	V _{DSX}	500	V	V _{GS} = -30V
Continuous Drain Current	ID	±23	А	
Pulsed Drain Current	IDP	±92	А	
Gate-Source Voltage	V _{GS}	±30	V	
Repetitive and Non-Repetitive Maximum Avalanche Current	Iar	23	Α	Note*1
Non-Repetitive Maximum Avalanche Energy	Eas	767.3	mJ	Note*2
Repetitive Maximum Avalanche Energy	Ear	13	mJ	Note*3
Peak Diode Recovery dV/dt	dV/dt	9.3	kV/μs	Note*4
Peak Diode Recovery -di/dt	-di/dt	100	A/µs	Note*5
Maniana Bana Biasiastian	Ь	2.16	W	Ta=25°C
Maximum Power Dissipation	P□	130	VV	Tc=25°C
O	Tch	150	°C	
Operating and Storage Temperature range	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	Conditions		typ.	max.	Unit
Drain-Source Breakdown Voltage	BVDSS	I _D =250μA, V _{GS} =0V		500	-	-	V
Gate Threshold Voltage	V _{GS} (th)	In=250µA, Vns=Vgs	I _D =250µA, V _{DS} =V _{GS}		3.0	3.5	V
Zero Gate Voltage Drain Current		V _{DS} =500V, V _{GS} =0V	T _{ch} =25°C	-	-	25	μA
	IDSS	V _{DS} =400V, V _{GS} =0V	T _{ch} =125°C	-	-	250	
Gate-Source Leakage Current	Igss	V _{GS} =±30V, V _{DS} =0V	V _{GS} =±30V, V _{DS} =0V		10	100	nA
Drain-Source On-State Resistance	Ros (on)	I _D =11.5A, V _{GS} =10V		-	0.21	0.245	Ω
Forward Transconductance	g fs	I _D =9.5A, V _{DS} =25V		10	20	-	S
Input Capacitance	Ciss	V _{DS} =25V		-	3600	5400	pF
Output Capacitance	Coss	V _{GS} =0V	V _{GS} =0V		310	465	
Reverse Transfer Capacitance	Crss	f=1MHz		-	23	35	
Turn-On Time	td(on)	V _{cc} =300V V _{GS} =10V I _D =9.5A R _{GS} =8.2Ω		-	26	39	ns
	tr			-	13	20	
Turn-Off Time	td(off)			-	150	225	
	tf			-	20	30	
Total Gate Charge	Q _G	Vcc=300V	V _∞ =300V		105	160	nC
Gate-Source Charge	QGS	I _D =19A V _{GS} =10V		-	23	35	
Gate-Drain Charge	Q _{GD}			-	30	45	
Avalanche Capability	lav	L=1.71mH, Tch=25°C	L=1.71mH, Tch=25°C		-	-	Α
Diode Forward On-Voltage	V _{SD}	I _F =19A, V _{GS} =0V, T _{ch} =25°	I _F =19A, V _{GS} =0V, T _{ch} =25°C		0.90	1.35	V
Reverse Recovery Time	trr	I _F =19A, V _{GS} =0V	I _F =19A, V _{GS} =0V		0.6	-	μs
Reverse Recovery Charge	Qrr	-di/dt=100A/µs, Tch=25°C		-	10	-	μC

Thermal Characteristics

Description	Symbol	Test Conditions	min.	typ.	max.	Unit
Thermal resistance	Rth (ch-c)	Channel to Case			0.96	°C/W
	Rth (ch-a)	Channel to Ambient			58.0	°C/W

Note *1 : Tch≤150°C

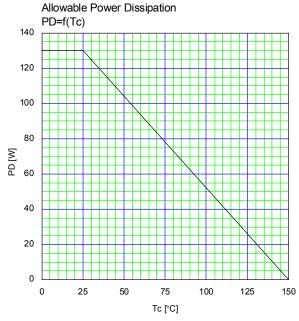
Note *2 : Stating Tch=25°C, I_{AS}=8A, L=22.9mH, Vcc=60V, R_G=50Ω
E_{AS} limited by maximum channel temperature and avalanche current.
See to 'Avalanche Energy' graph.

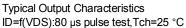
Note *3 : Repetitive rating : Pulse width limited by maximum channel temperature.

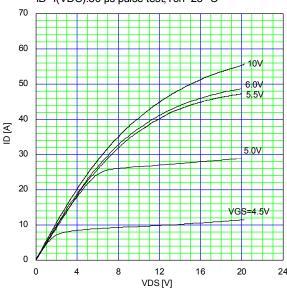
See to the 'Transient Themal impeadance' graph.

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

Note *5 : Ir≤-lp, dv/dt=5.0kV/µs, Vcc≤BVbss, Tch≤150°C.

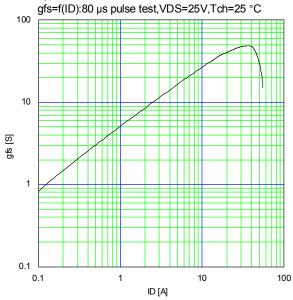




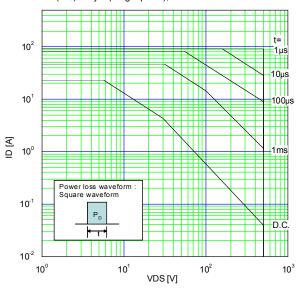


Typical Transconductance

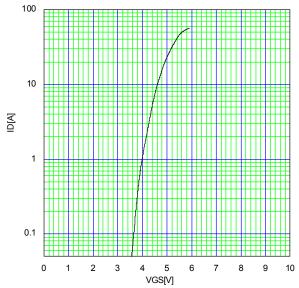
ofs=f(ID):80 us pulse test VDS=25V Tch=25 °C



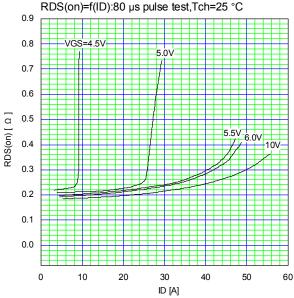
Safe Operating Area I_D =f(V $_D$ s):Duty=0(Single pulse),Tc=25 °c

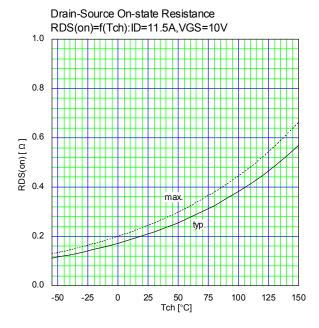


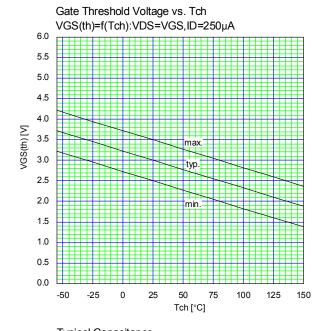
Typical Transfer Characteristic ID=f(VGS):80 µs pulse test,VDS=25V,Tch=25 °C

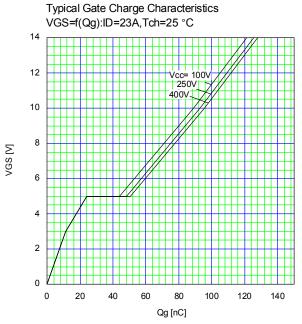


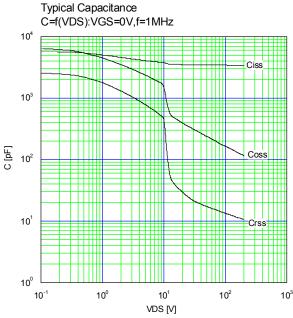
Typical Drain-Source on-state Resistance RDS(on)=f(ID):80 µs pulse test,Tch=25 °C

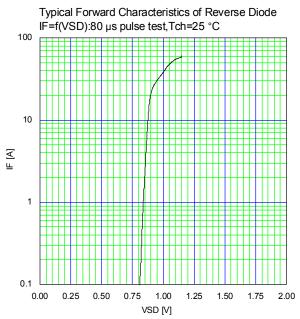


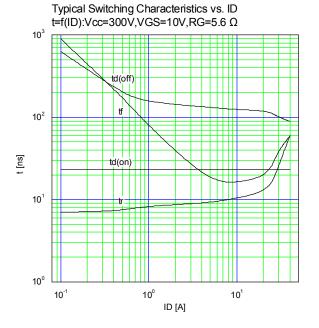




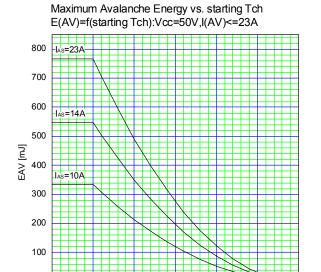








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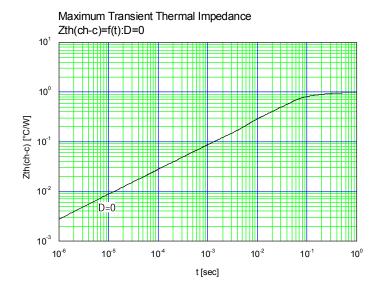
75

starting Tch [°C]

100

125

150



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