

FMH23N60E

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

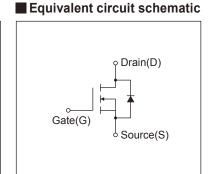
Switching regulators UPS (Uninterruptible Power Supply) DC-DC converters

Maximum Ratings and Characteristics

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

13 to .2 9 9 10 to .2 1 10 to .2 10 to .2 1 10 to .2 10 to .2 1 10 to .2 10 to .2 1 10 to .2 10 t	4,5 to 2 97.2 to 2
1.6.2.7 8 1.6.2.	15.1:2:1
① ② ③ 1.13/i 5.45±0.2 5.45±0.2	0.5 %-2 1.5 PRE-SOLDER UNIT: mm
	CONNECTION ① BASE ② COLLECTOR ③ EMITTER EIAJ: SC-65

■ Outline Drawings [mm]



Description	Symbol	Characteristics	Unit	Remarks
Dusin Course Voltage	V _{DS}	600	V	
Drain-Source Voltage	V _{DSX}	600	V	V _{GS} = -30V
Continuous Drain Current	ID	±23	Α	
Pulsed Drain Current	IDP	±92	Α	
Gate-Source Voltage	V _G s	±30	V	
Repetitive and Non-Repetitive Maximum Avalanche Current	Iar	23	Α	Note*1
Non-Repetitive Maximum Avalanche Energy	Eas	1033.1	mJ	Note*2
Repetitive Maximum Avalanche Energy	Ear	40	mJ	Note*3
Peak Diode Recovery dV/dt	dV/dt	7.5	kV/μs	Note*4
Peak Diode Recovery -di/dt	-di/dt	100	A/µs	Note*5
Mandanian Barras Biratian	PD	2.50	10/	Ta=25°C
Maximum Power Dissipation		400	W	Tc=25°C
0	Tch	150	°C	
Operating and Storage Temperature range	T _{stg}	-55 to + 150	°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		600	-	-	V	
Gate Threshold Voltage	V _{GS} (th)	I _D =250μA, V _{DS} =V _{GS}		2.5	3.0	3.5	V	
Zero Gate Voltage Drain Current		V _{DS} =600V, V _{GS} =0V	T _{ch} =25°C	-	-	25		
	IDSS	V _{DS} =480V, 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	R _{DS} (on)	I _D =11.5A, V _{GS} =10V		-	0.24	0.28	Ω	
Forward Transconductance	g fs	I _D =11.5A, V _{DS} =25V		14	28	-	S	
Input Capacitance	Ciss	V _{DS} =25V		-	4400	6600		
Output Capacitance	Coss	V _{GS} =0V -		-	380	570	pF	
Reverse Transfer Capacitance	Crss	f=1MHz		-	30	45		
Turn-On Time Turn-Off Time	td(on)	Vcc=300V		-	26	39		
	tr	V _{GS} =10V I _D =11.5A		-	12	18	ns	
	td(off)			-	144	216		
	tf	R _{GS} =5.1Ω		-	22	33	33	
Total Gate Charge	Q _G	Vcc=300V	V _{cc} =300V		130	195		
Gate-Source Charge	Qgs	I _D =23A V _{GS} =10V		-	30	45	nC	
Gate-Drain Charge	Q _{GD}			-	40	60		
Avalanche Capability	lav	L=1.56mH, Tch=25°C	L=1.56mH, Tch=25°C		-	-	А	
Diode Forward On-Voltage	V _{SD}	I _F =23A, V _{GS} =0V, T _{ch} =25°	I _F =23A, V _{GS} =0V, T _{ch} =25°C		0.90	1.35	V	
Reverse Recovery Time	trr	I _F =23A, V _{GS} =0V		-	0.92	-	μs	
Reverse Recovery Charge	Qrr	-di/dt=100A/µs, Tch=25°C		-	14	-	μC	

Thermal Characteristics

Description	Symbol	Test Conditions	min.	typ.	max.	Unit
Thermal resistance	Rth (ch-c)	Channel to case			0.313	°C/W
	Rth (ch-a)	Channel to ambient			50.0	°C/W

Note *1 : Tch≤150°C

Note *2: Stating Tch=25°C, Ias=10A, L=18.9mH, Vcc=60V, Re=50Ω

Eas limited by maximum channel temperature and avalanche current.

See to 'Avalanche Energy' graph.

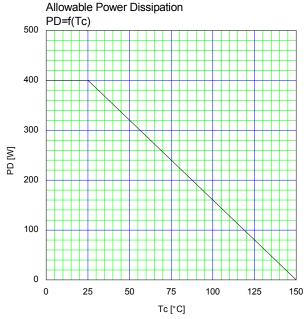
Note $^{\star}3$: Repetitive rating : Pulse width limited by maximum channel temperature

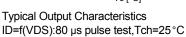
See to the 'Transient Themal impeadance' graph.

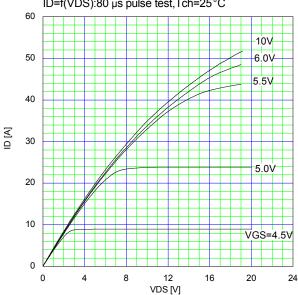
Note *4 : I₅≤-I₀, -di/dt=100A/μ₅, Vcc≤BVbss, Tch≤150°C.

Note *5 : I₅≤-I₀, dv/dt=7.5kV/μ₅, Vcc≤BVbss, Tch≤150°C.

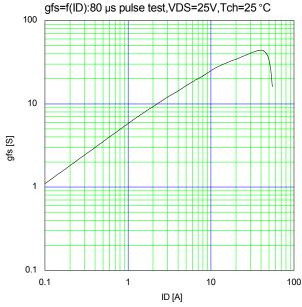
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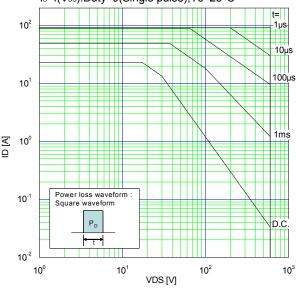




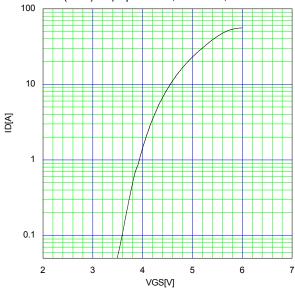
Typical Transconductance



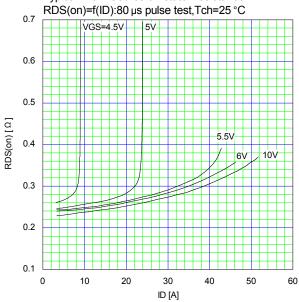
Safe Operating Area I_D=f(V_{DS}):Duty=0(Single pulse),Tc=25°C

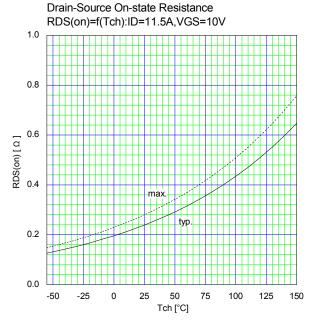


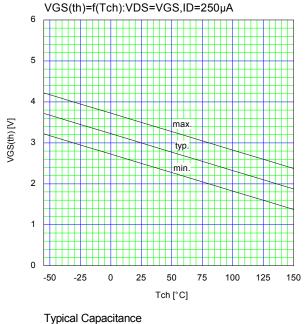
Typical Transfer Characteristic ID=f(VGS):80 µs pulse test,VDS=25V,Tch=25°C



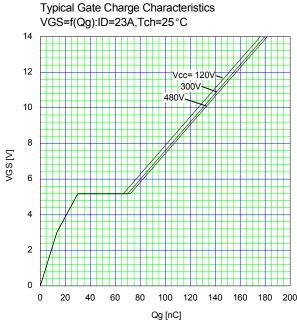
Typical Drain-Source on-state Resistance

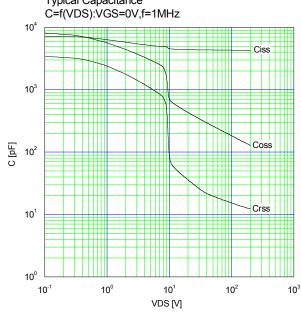


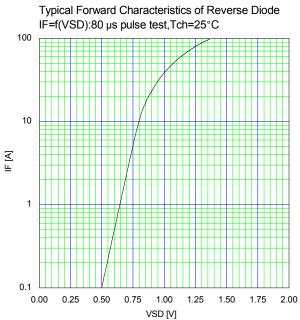


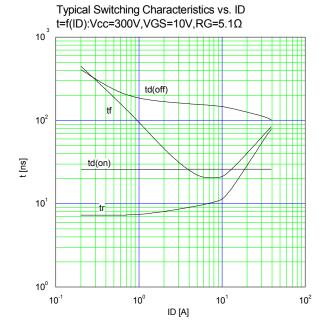


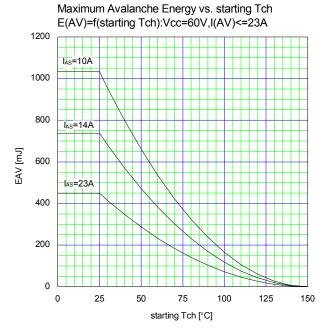
Gate Threshold Voltage vs. Tch

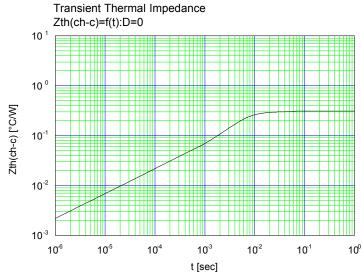












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