

FMH23N50E

Super FAP-E³ series

N-CHANNEL SILICON POWER MOSFET

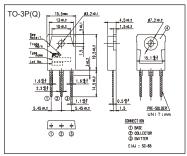
■ Features

Maintains both low power loss and low noise Lower RDS(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

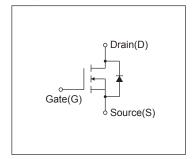
Applications

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	
Drain-Source Voltage	VDS	500	V		
Drain-Source voltage	V _{DSX}	500	V	V _{GS} = -30V	
Continuous Drain Current	Iο	±23	Α		
Pulsed Drain Current	IDP	±92	Α		
Gate-Source Voltage	V _G s	±30	V		
Repetitive and Non-Repetitive Maximum Avalanche Current	lar	23	Α	Note*1	
Non-Repetitive Maximum Avalanche Energy	Eas	767.3	mJ	Note*2	
Repetitive Maximum Avalanche Energy	Ear	31.5	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	
Maximum Power Dissipation	Po	2.50	W	Ta=25°C	
		315	l vv	Tc=25°C	
Operating and Storage	Tch	150	°C		
Temperature range	Tstg	-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		500	-	-	V
Gate Threshold Voltage	V _{GS} (th)	I _D =250μA, V _{DS} =V _{GS}	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	μА
	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	R _{DS} (on)	I _D =11.5A, V _{GS} =10V		-	0.21	0.245	Ω
Forward Transconductance	g _{fs}	I _D =11.5A, V _{DS} =25V	I _D =11.5A, V _{DS} =25V		28	-	S
Input Capacitance	Ciss	V _{DS} =25V		-	3500	5250	pF
Output Capacitance	Coss	V _{GS} =0V	V _{GS} =0V		330	495	
Reverse Transfer Capacitance	Crss	f=1MHz	-	24	36		
Turn-On Time	td(on)	V _{cc} =300V V _{cs} =10V I _D =11.5A R _{cs} =5.6Ω		-	24	36	ns
	tr			-	13	19.5	
Turn-Off Time	td(off)			-	150	225	
	tf			-	20	30	
	Qth	1/ 0501/			11	16.5	nC
Total Gate Charge	QG	V _{cc} =250V lo=23A V _{cs} =10V		-	93	139.5	
Gate-Source Charge	Qss			-	24	36	
Gate-Drain Charge	Q _{GD}			-	30	45	
Avalanche Capability	lav	L=1.16mH, Tch=25°C	L=1.16mH, Tch=25°C		-	-	Α
Diode Forward On-Voltage	V _{SD}	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		-	0.5	-	μs
Reverse Recovery Charge	Qrr	-di/dt=100A/µs, Tch=25°C		-	8	-	μC

Thermal Characteristics

Description	Symbol	Test Conditions	min.	typ.	max.	Unit
Thermal resistance	Rth (ch-c)	Channel to case			0.40	°C/W
	Rth (ch-a)	Channel to ambient			50.0	°C/W

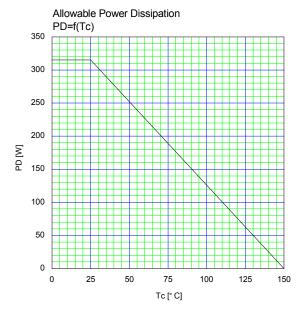
Note *1 : Tch≤150°C

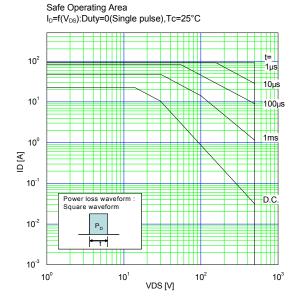
Note *2 : Stating Tch=25°C, Ias=10A, L=14.1mH, Vcc=50V, Rg=50 Ω Eas limited by maximum channel temperature and avalanche current. See to 'Avalanche Energy' graph. Note *3 : Repetitive rating : Pulse width limited by maximum channel temperature.

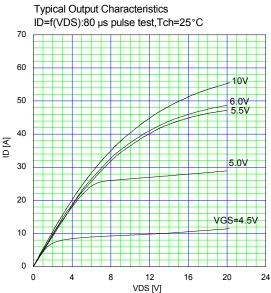
See to the 'Transient Themal impeadance' graph.

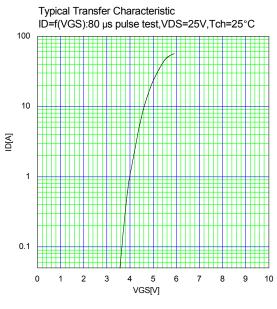
Note *4 : Ir≤-Ip, -di/dt=100A/µs, Vcc≤BVbss, Tch≤150°C.

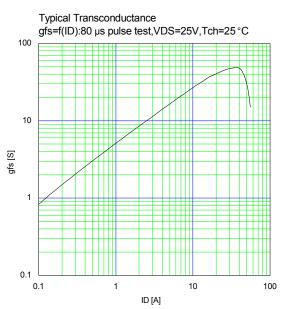
Note *5 : Ir≤-Ip, dv/dt=5.0kV/µs, Vcc≤BVbss, Tch≤150°C.

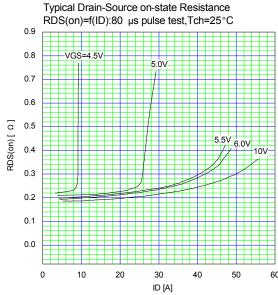


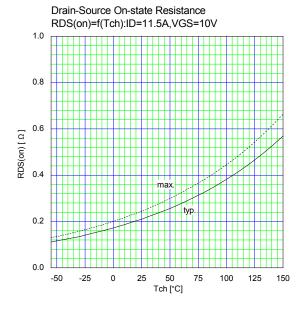


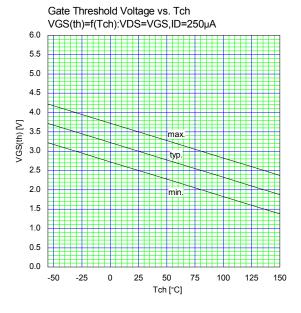


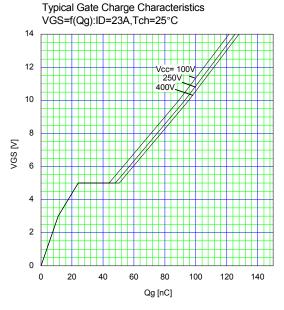


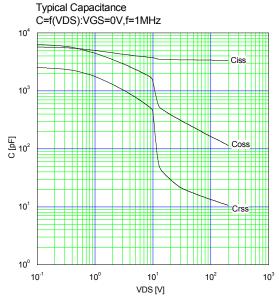


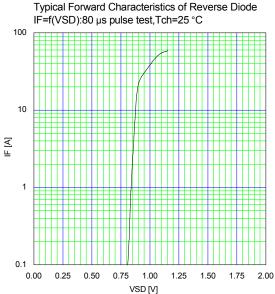


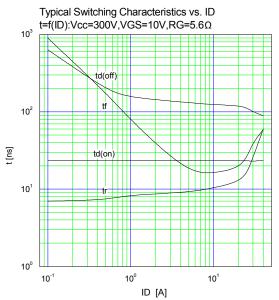


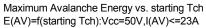


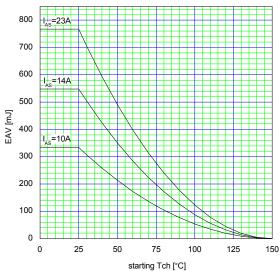




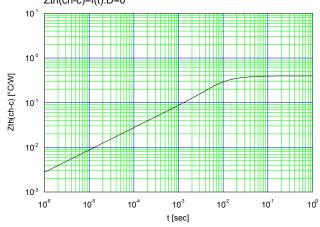








$\label{eq:maximum} \begin{array}{ll} \text{Maximum Transient Thermal Impedance} \\ \text{Zth(ch-c)=f(t):D=0} \end{array}$



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