

2SK3870-01

N-CHANNEL SILICON POWER MOSFET

■ Outline Drawings (mm) 200406

FUJI POWER MOSFET Super FAP-G Series

■ Features

- High speed switching
- Low on-resistance
- No secondary breakdown
- Low driving power
- Avalanche-proof

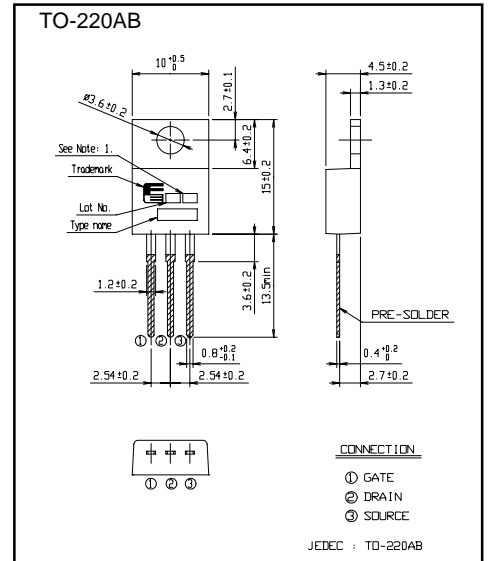
■ Applications

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

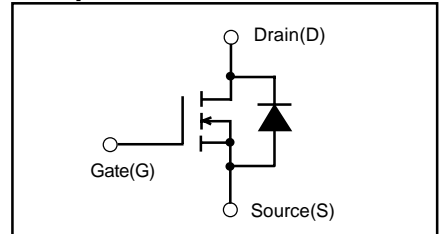
■ Maximum ratings and characteristic

● Absolute maximum ratings (T_c=25°C unless otherwise specified)

Item	Symbol	Ratings	Unit	Remarks
Drain-source voltage	V _{DS}	230	V	
	V _{DSX}	230	V	V _{GS} =-30V
Continuous Drain Current	I _D	40	A	
Pulsed Drain Current	I _{D(puls)}	±160	A	
Gate-Source Voltage	V _{GS}	±30	V	
Maximum Avalanche current	I _{AS}	40	A	Note *1
Non-Repetitive Maximum Avalanche Energy	E _{AS}	633.1	mJ	Note *2
Repetitive Maximum Avalanche Energy	E _{AR}	27	mJ	Note *3
Maximum Drain-Source dV/dt	dV _{DS} /dt	20	kV/μs	V _{DS} ≤230V
Peak Diode Recovery dV/dt	dV/dt	5	kV/μs	Note *4
Max. Power Dissipation	P _D	270	W	T _c =25°C
		2.02		T _a =25°C
Operating and Storage Temperature range	T _{ch}	+150	°C	
	T _{stg}	-55 to +150	°C	



■ Equivalent circuit schematic



Note *1: T_{ch} ≤ 150°C, Repetitive and Non-repetitive

Note *2: Starting T_{ch}=25°C, I_{AS}=16A, L=4.09mH,

V_{CC}=48V, R_G=50Ω

EAS limited by maximum channel temperature and avalanche current.

See to the 'Avalanche Energy' graph

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

See to the 'Transient Thermal impedance' graph

Note *4: I_r ≤ -I_D, -di/dt=50A/μs, V_{CC} ≤ BV_{DSS}, T_{ch} ≤ 150°C

● Electrical characteristics (T_c=25°C unless otherwise specified)

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA V _{GS} =0V	230			V
Gate Threshold Voltage	V _{GS(th)}	I _D =250μA V _{DS} =V _{GS}	3.0		5.0	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =230V V _{GS} =0V			25	μA
		V _{DS} =184V V _{GS} =0V			250	
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±30V V _{DS} =0V			100	nA
Drain-Source On-State Resistance	R _{DS(on)}	I _D =20A V _{GS} =10V		58	76	mΩ
Forward Transconductance	g _{fs}	I _D =20A V _{DS} =25V	12	24		S
Input Capacitance	C _{iss}	V _{DS} =75V		1880	2820	pF
Output Capacitance	C _{oss}	V _{GS} =0V		230	345	
Reverse Transfer Capacitance	C _{rss}	f=1MH		12	18	ns
Turn-On Time t _{on}	td(on)	V _{CC} =180V I _D =20A		28	42	
	t _r	V _{GS} =10V		8.4	12.6	
Turn-Off Time t _{off}	td(off)	R _{GS} =10Ω		56	84	
	t _f			6	9	
Total Gate Charge	Q _G	V _{CC} =115V		42.0	63.0	nC
Gate-Source Charge	Q _{GS}	I _D =40A		18.0	27.0	
Gate-Drain Charge	Q _{GD}	V _{GS} =10V		12.0	18.0	
Diode forward on-voltage	V _{SD}	I _F =40A V _{GS} =0V T _{ch} =25°C		1.10	1.50	V
Reverse recovery time	t _{rr}	I _F =40A V _{GS} =0V		230		ns
Reverse recovery charge	Q _{rr}	-di/dt=100A/μs T _{ch} =25°C		2.5		μC

● Thermal characteristics

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	R _{th(ch-c)}	channel to case			0.463	°C/W
	R _{th(ch-a)}	channel to ambient			62	°C/W

Characteristics

