

2SK3874-01R

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 (Tc=25°C unless otherwise specified)

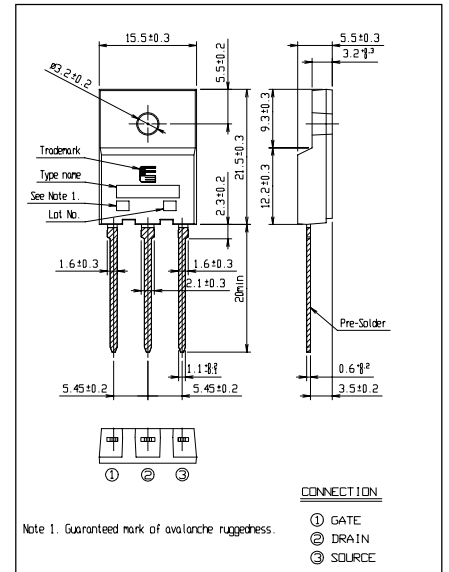
Item	Symbol	Rated	Unit	Remarks
Drain-source voltage	V _{DS}	280	V	
	V _{DSX}	280	V	V _{GS} =-30V
Continuous Drain Current	I _D	56	A	
Pulsed Drain Current	I _{D(puls)}	±224	A	
Gate-Source Voltage	V _{GS}	±30	V	
Maximum Avalanche current	I _{AR}	56	A	Note *1
Non-Repetitive Maximum Avalanche Energy	E _{AS}	1039.1	mJ	Note *2
Repetitive Maximum Avalanche Energy	E _{AR}	21	mJ	Note *3
Maximum Drain-Source dV/dt	dV _{DS} /dt	20	kV/μs	V _{DS} ≤280V
Peak Diode Recovery dV/dt	dV/dt	5	kV/μs	Note *4
Max. Power Dissipation	P _D	210	W	T _C =25°C
		3.13		T _a =25°C
Operating and Storage Temperature range	T _{ch}	+150	°C	
	T _{stg}	-55 to +150	°C	

Electrical characteristics (Tc = 25°C unless otherwise specified)

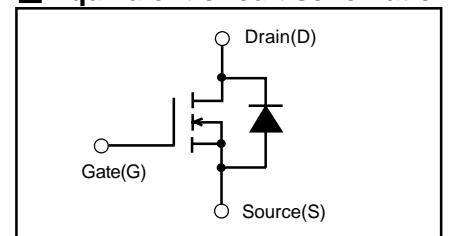
Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage	BV _{DSS}	I _D = 250μA V _{GS} =0V	280			V
Gate Threshold Voltage	V _{GS(th)}	I _D = 250μA V _{DS} =V _{GS}	3.0		5.0	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =280V V _{GS} =0V			25	μA
		V _{DS} =224V V _{GS} =0V			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 =28A V _{GS} =10V		51	61	mΩ
Forward Transconductance	g _{fs}	I _D =28A V _{DS} =25V	12	24		S
Input Capacitance	C _{iss}	V _{DS} =75V		3600	5400	pF
Output Capacitance	C _{oss}	V _{GS} =0V		530	795	
Reverse Transfer Capacitance	C _{rss}	f=1MHz		35	52.5	ns
Turn-On Time t _{on}	td(on)	V _{CC} =180V I _D =28A		40	60	
	t _r	V _{GS} =10V		58	87	
Turn-Off Time t _{off}	td(off)	R _{GS} =10 Ω		80	120	
	t _f			10	15	
Total Gate Charge	Q _G	V _{CC} =140V		80	120	nC
Gate-Source Charge	Q _{GS}	I _D =56A		30	45	
Gate-Drain Charge	Q _{GD}	V _{GS} =10V		25	38	
Diode forward on-voltage	V _{SD}	I _F =56A V _{GS} =0V T _{ch} =25°C		1.20	1.50	V
Reverse recovery time	t _{rr}	I _F =56A V _{GS} =0V		400		ns
Reverse recovery charge	Q _{rr}	-di/dt=100A/μs T _{ch} =25°C		4.5		μC

Thermal characteristics

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	R _{th(ch-c)}	channel to case			0.595	°C/W
	R _{th(ch-a)}	channel to ambient			40.0	°C/W



Equivalent circuit schematic



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

Note *2: Starting T_{ch}=25°C, I_{AS}=23A, L=3.37mH, V_{CC}=48V, R_G=50Ω

E_{AS} 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_F ≤ -I_D, -di/dt=50A/μs, V_{CC} ≤ BV_{DSS}, T_{ch} ≤ 150°C

Characteristics

