

## N-CHANNEL SILICON POWER MOSFET

200407

### FUJI POWER MOSFET Super FAP-G Series

#### Features

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

#### Applications

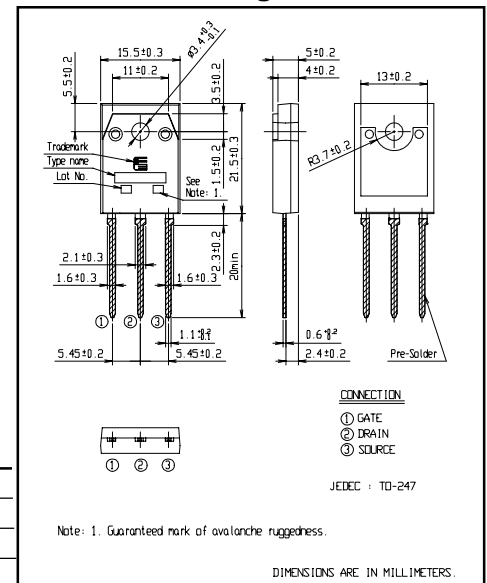
- Switching regulators
- UPS (Uninterruptible Power Supply)
- DC-DC converters

#### Maximum ratings and characteristic

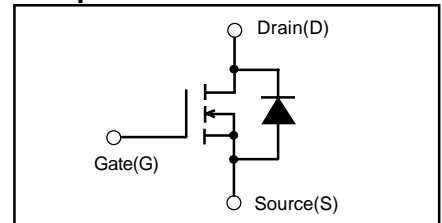
- Absolute maximum ratings (T<sub>c</sub>=25°C unless otherwise specified)

Item	Symbol	Rated Values	Unit	Remarks
Drain-source voltage	V <sub>DS</sub>	600	V	
	V <sub>DSX</sub>	600	V	V <sub>GS</sub> =-30V
Continuous Drain Current	I <sub>D</sub>	±42	A	
		±2.7	A	T <sub>a</sub> =25°C
Pulsed Drain Current	I <sub>D</sub> (puls)	±168	A	
Gate-Source Voltage	V <sub>GS</sub>	±30	V	
Non-Repetitive Maximum Avalanche current	I <sub>AR</sub>	42	A	T <sub>ch</sub> ≤ 25°C
Repetitive Maximum Avalanche current	I <sub>AR</sub>	21	A	T <sub>ch</sub> ≤ 150°C
Non-Repetitive Maximum Avalanche Energy	E <sub>AS</sub>	828	mJ	Note *2
Maximum Drain-Source dV/dt	dV <sub>DS</sub> /dt	20	kV/μs	V <sub>DS</sub> ≤ 600V
Peak Diode Recovery dV/dt	dV/dt	5	kV/μs	Note *3
Peak Diode Recovery di/dt	-di/dt	100	A/μs	Note *4
Max. Power Dissipation	P <sub>D</sub>	600	W	T <sub>c</sub> =25°C
		2.50	W	T <sub>a</sub> =25°C
Operating and Storage Temperature range	T <sub>ch</sub>	+150	°C	
	T <sub>stg</sub>	-55 to +150	°C	

#### Outline Drawings (mm)



#### Equivalent circuit schematic



Note \*2: Starting T<sub>ch</sub>=25°C, L=861μH, V<sub>CC</sub>=60V

See to the 'Avalanche Energy' graph

Note \*3: I<sub>F</sub> ≤ -I<sub>D</sub>, -di/dt = 100A/μs, V<sub>CC</sub> ≤ BV<sub>DSS</sub>, T<sub>ch</sub> ≤ 150°C

Note \*4: I<sub>F</sub> ≤ -I<sub>D</sub>, -dV/dt = 5kV/μs, V<sub>CC</sub> ≤ BV<sub>DSS</sub>, T<sub>ch</sub> ≤ 150°C

#### Electrical characteristics (T<sub>c</sub> =25°C unless otherwise specified)

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> =250μA V <sub>GS</sub> =0V	600			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	I <sub>D</sub> =250μA V <sub>DS</sub> =V <sub>GS</sub>	3.0		5.0	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =600V V <sub>GS</sub> =0V		10	25	μA
		V <sub>DS</sub> =480V V <sub>GS</sub> =0V		1.0	2.0	mA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±30V V <sub>DS</sub> =0V		10	100	nA
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	I <sub>D</sub> =21A V <sub>GS</sub> =10V		0.14	0.17	Ω
Forward Transconductance	g <sub>fs</sub>	I <sub>D</sub> =21A V <sub>DS</sub> =25V	20	40		S
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V		5100	7650	pF
Output Capacitance	C <sub>oss</sub>	V <sub>GS</sub> =0V		700	1050	pF
Reverse Transfer Capacitance	C <sub>rss</sub>	f=1MHz		48	72	pF
Turn-On Time t <sub>on</sub>	t <sub>d(on)</sub>	V <sub>CC</sub> =300V		60	90	ns
	t <sub>r</sub>	I <sub>D</sub> =21A		90	135	ns
Turn-Off Time t <sub>off</sub>	t <sub>d(off)</sub>	V <sub>GS</sub> =10V		180	270	ns
	t <sub>f</sub>	R <sub>GS</sub> =10Ω		30	45	ns
Total Gate Charge	Q <sub>G</sub>	V <sub>CC</sub> =300V		105	160	nC
Gate-Source Charge	Q <sub>GS</sub>	I <sub>D</sub> =42A		44	65	nC
Gate-Drain Charge	Q <sub>GD</sub>	V <sub>GS</sub> =10V		30	45	nC
Avalanche Capability	I <sub>AV</sub>	L=861μH T <sub>ch</sub> =25°C	42			A
Diode forward on-voltage	V <sub>SD</sub>	I <sub>F</sub> =42A V <sub>GS</sub> =0V T <sub>ch</sub> =25°C		1.10	1.70	V
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> =42A V <sub>GS</sub> =0V		160	250	ns
Reverse recovery charge	Q <sub>rr</sub>	-di/dt=100A/μs T <sub>ch</sub> =25°C		1.00	2.5	μC

#### Thermal characteristics

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	R <sub>th(ch-c)</sub>	channel to case			0.208	°C/W
	R <sub>th(ch-a)</sub>	channel to ambient			50.0	°C/W

## Characteristics

