

2SK3512-01L,S,SJ

FUJI POWER MOSFET

Super FAP-G Series

N-CHANNEL SILICON POWER MOSFET

Features

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

Applications

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

Maximum ratings and characteristic

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

Items	Symbol	Ratings	Units	
Drain-source voltage	V _{DS}	500	V	
Continuous drain current	I _D	±14	A	
Pulsed drain current	I _D (puls)	±56	A	
Gate-source voltage	V _{GS}	±30	V	
Repetitive or non-repetitive	I _{AR} (*2)	14	A	
Maximum Avalanche Energy	E _{AS} (*1)	188.2	mJ	
Maximum Drain-Source dV/dt	dV _{DS} /dt (*4)	20	kV/μs	
Peak Diode Recovery dV/dt	dV/dt (*3)	5	kV/μs	
Max. power dissipation	P _D	T _a =25°C	1.67	W
		T _C =25°C	195	
Operating and storage temperature range	T _{ch}	+150	°C	
	T _{stg}	-55 to +150	°C	

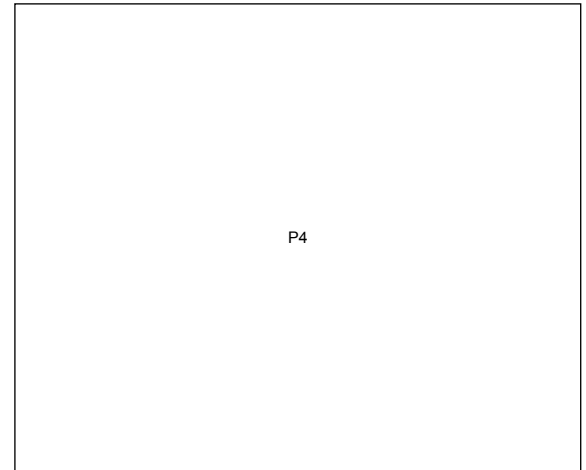
Note *1: L=2.77mH, V_{CC}=50V

Note *2: T_{ch}≤150°C

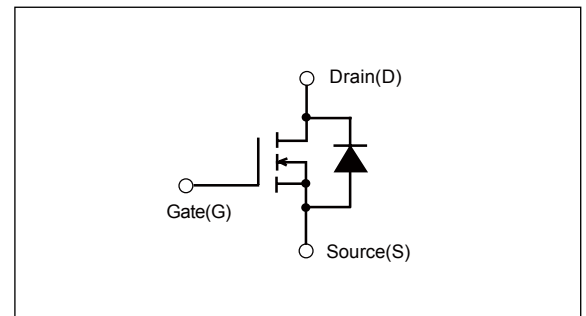
Note *3: I_F≤-I_D, -di/dt=50A/μs, V_{CC}≤BV_{DSS}, T_{ch}≤150°C

Note *4: V_{DS}≤500V

Outline Drawings



Equivalent circuit schematic



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

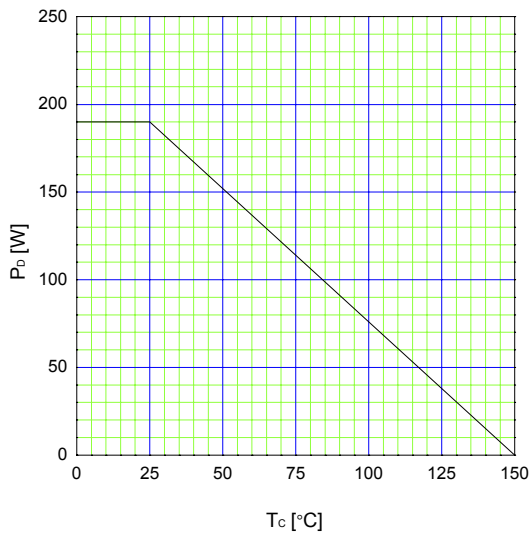
Items	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	V _{(BR)DSS}	I _D =250μA V _{GS} =0V	500			V
Gate threshold voltage	V _{GS(th)}	I _D = 250μA V _{DS} =V _{GS}	3.0		5.0	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =500V V _{GS} =0V T _{ch} =25°C			25	μA
		V _{DS} =400V V _{GS} =0V T _{ch} =125°C			250	
Gate-source leakage current	I _{GSS}	V _{GS} =±30V V _{DS} =0V		10	100	nA
Drain-source on-state resistance	R _{DS(on)}	I _D =6A V _{GS} =10V		0.40	0.52	Ω
Forward transconductance	g _{fs}	I _D =6A V _{DS} =25V	5.5	11		S
Input capacitance	C _{iss}	V _{DS} =25V		1200	1800	pF
Output capacitance	C _{oss}	V _{GS} =0V		140	210	
Reverse transfer capacitance	C _{rss}	f=1MHz		6.0	9.0	
Turn-on time t _{on}	t _{d(on)}	V _{CC} =300V I _D =6A V _{GS} =10V R _{GS} =10 Ω		17	26	ns
	t _r			15	23	
Turn-off time t _{off}	t _{d(off)}			34	51	
	t _f			7	11	
Total Gate Charge	Q _G	V _{CC} =250V		30	45	nC
Gate-Source Charge	Q _{GS}	I _D =12A		11	16.5	
Gate-Drain Charge	Q _{GD}	V _{GS} =10V		10	15	
Avalanche capability	I _{AV}	L=1.76mH T _{ch} =25°C	14			A
Diode forward on-voltage	V _{SD}	I _F =12A V _{GS} =0V T _{ch} =25°C		1.00	1.50	V
Reverse recovery time	t _{rr}	I _F =12A V _{GS} =0V		0.7		μs
Reverse recovery charge	Q _{rr}	-di/dt=100A/μs T _{ch} =25°C		4.5		μC

Thermal Characteristics

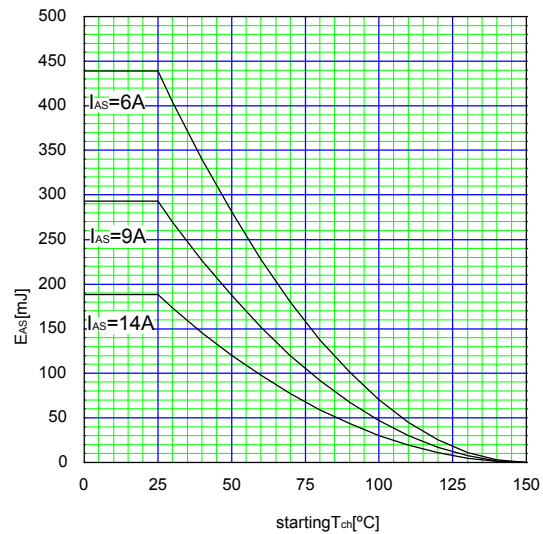
Items	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	R _{th(ch-c)}	channel to case			0.641	°C/W
	R _{th(ch-a)}	channel to ambient			75.0	°C/W

■ Characteristics

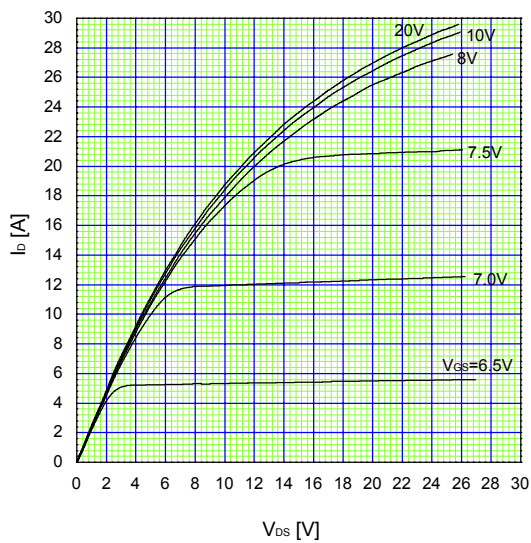
Allowable Power Dissipation
 $P_D = f(T_C)$



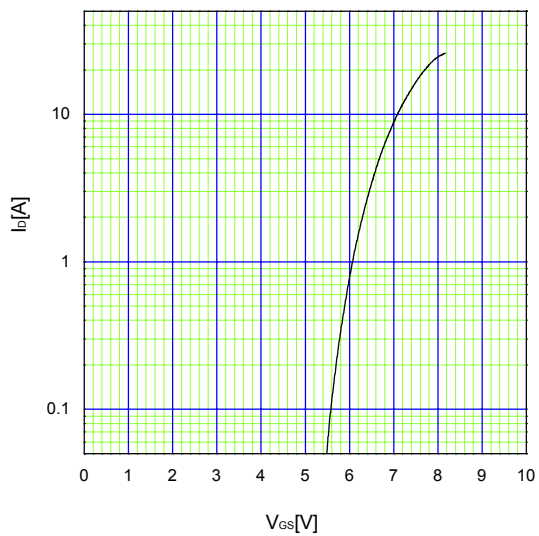
Maximum Avalanche Energy vs. starting T_{ch}
 $E_{AS} = f(\text{starting } T_{ch}): V_{CC} = 50V$



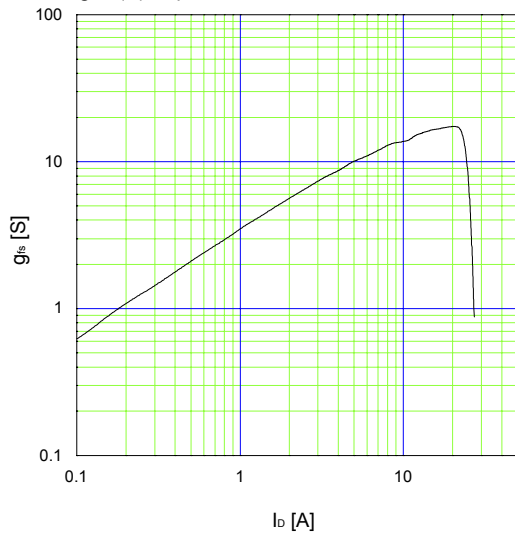
Typical Output Characteristics
 $I_D = f(V_{DS}): 80\mu s$ Pulse test, $T_{ch} = 25^\circ C$



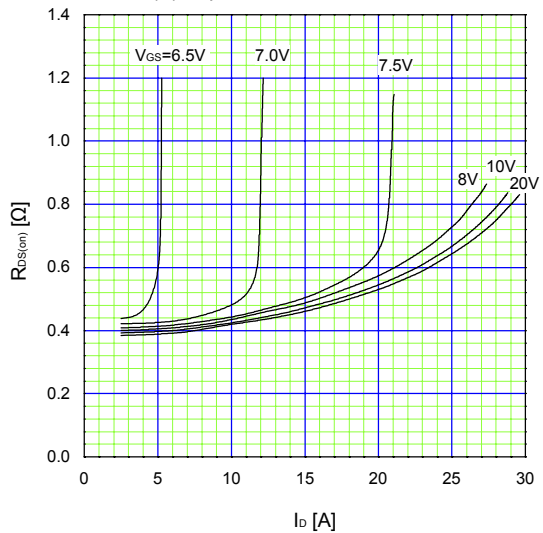
Typical Transfer Characteristic
 $I_D = f(V_{GS}): 80\mu s$ Pulse test, $V_{DS} = 25V, T_{ch} = 25^\circ C$



Typical Transconductance
 $g_{fs} = f(I_D): 80\mu s$ Pulse test, $V_{DS} = 25V, T_{ch} = 25^\circ C$

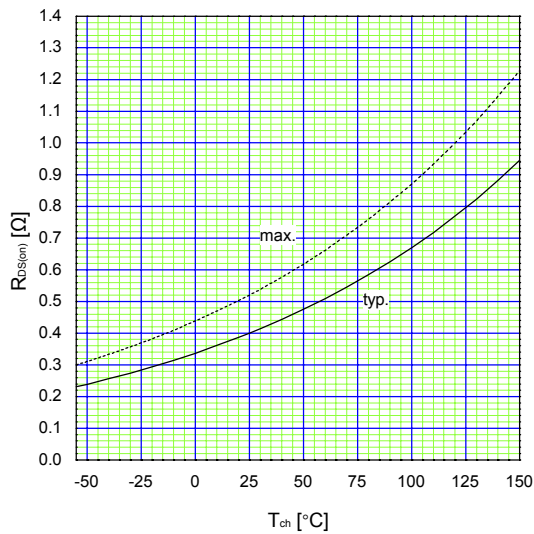


Typical Drain-Source on-state Resistance
 $R_{DS(on)} = f(I_D): 80\mu s$ Pulse test, $T_{ch} = 25^\circ C$

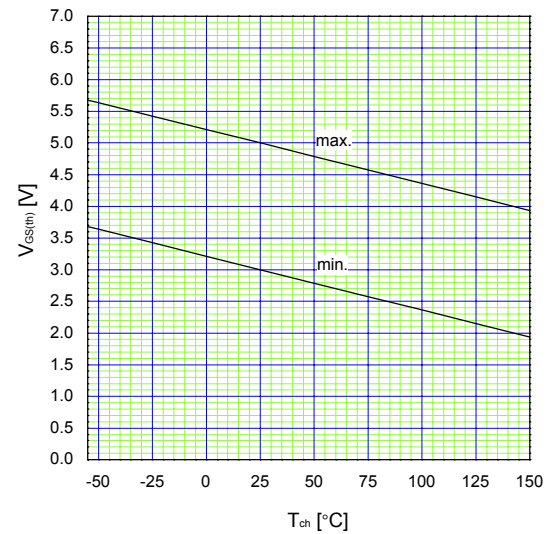


Drain-Source On-state Resistance

$$R_{DS(on)} = f(T_{ch}): I_D = 6A, V_{GS} = 10V$$

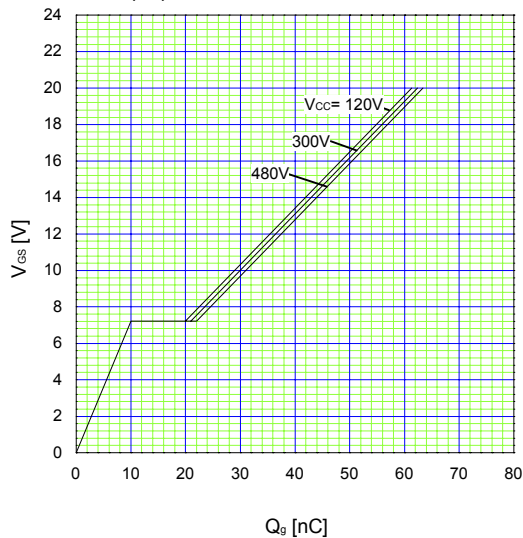
Gate Threshold Voltage vs. T_{ch}

$$V_{GS(th)} = f(T_{ch}): V_{DS} = V_{GS}, I_D = 250\mu A$$



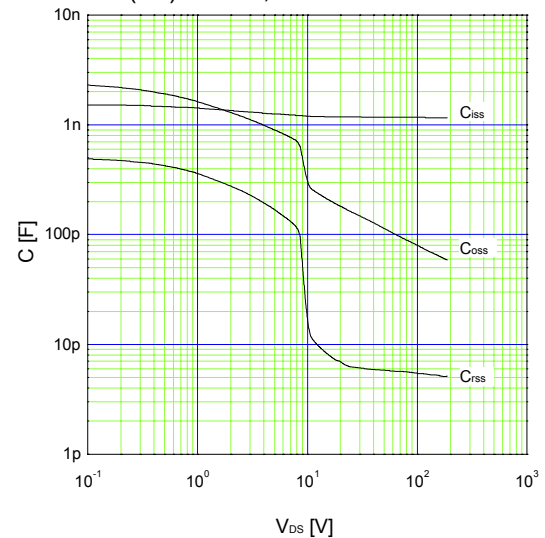
Typical Gate Charge Characteristics

$$V_{GS} = f(Q_g): I_D = 12A, T_{ch} = 25^{\circ}C$$



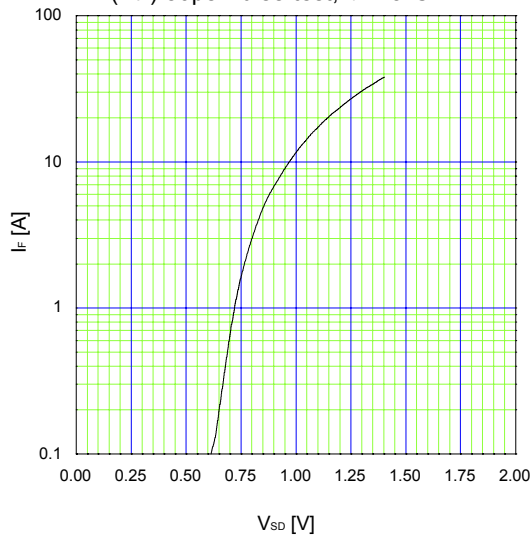
Typical Capacitance

$$C = f(V_{DS}): V_{GS} = 0V, f = 1MHz$$

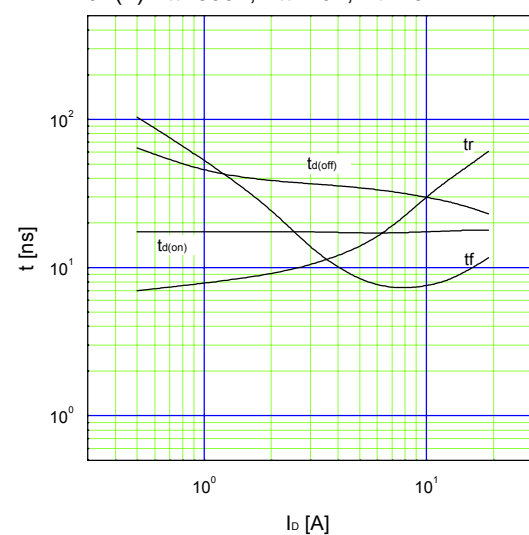


Typical Forward Characteristics of Reverse Diode

$$I_F = f(V_{SD}): 80\mu s \text{ Pulse test}, T_{ch} = 25^{\circ}C$$

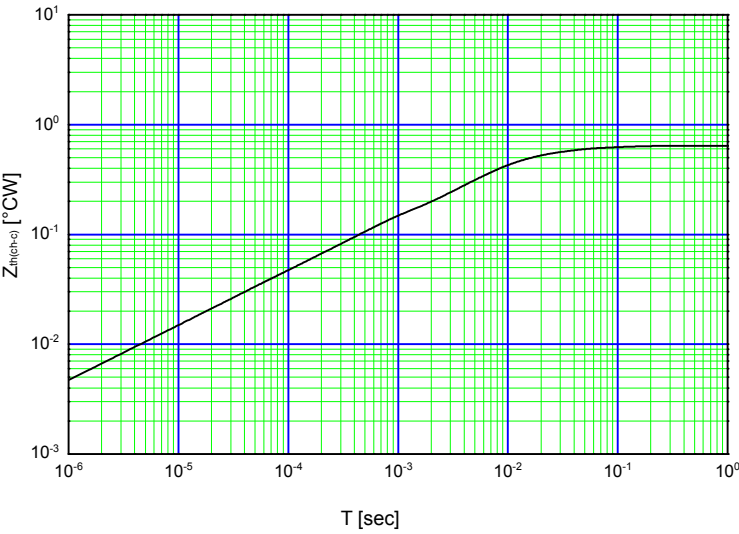
Typical Switching Characteristics vs. I_D

$$t = f(I_D): V_{CC} = 300V, V_{GS} = 10V, R_G = 10\Omega$$



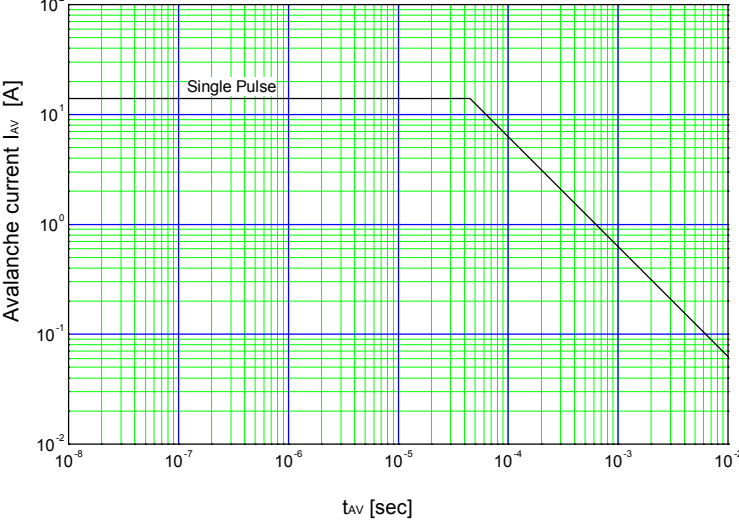
Maximum Transient Thermal Impedance

$Z_{th(ch-c)}=f(t):D=0$



Maximum Avalanche Current vs Pulse width

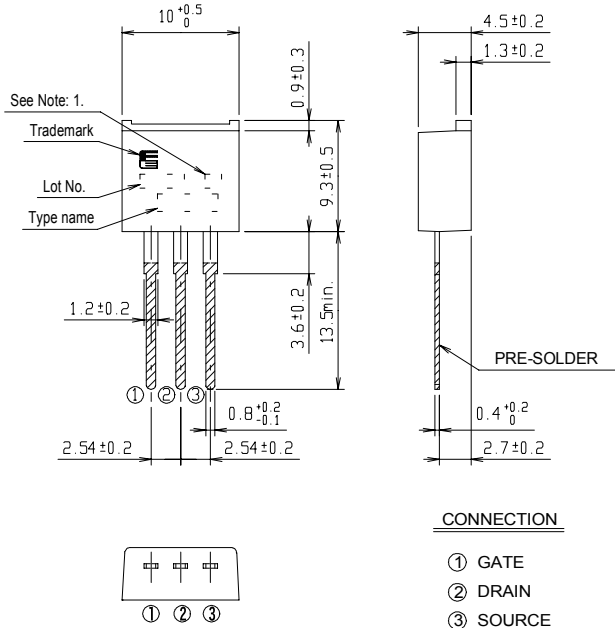
$I_{AV}=f(t_{AV}): \text{starting } T_{ch}=25^{\circ}\text{C}, V_{CC}=50\text{V}$



■ Outline Drawings [mm]

Type(L)

FUJI POWER MOS FET

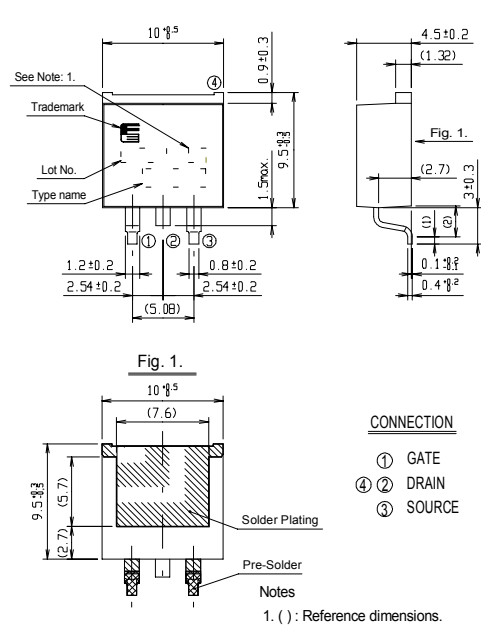


Note: 1. Guaranteed mark of avalanche ruggedness.

DIMENSIONS ARE IN MILLIMETERS.

Type(S)

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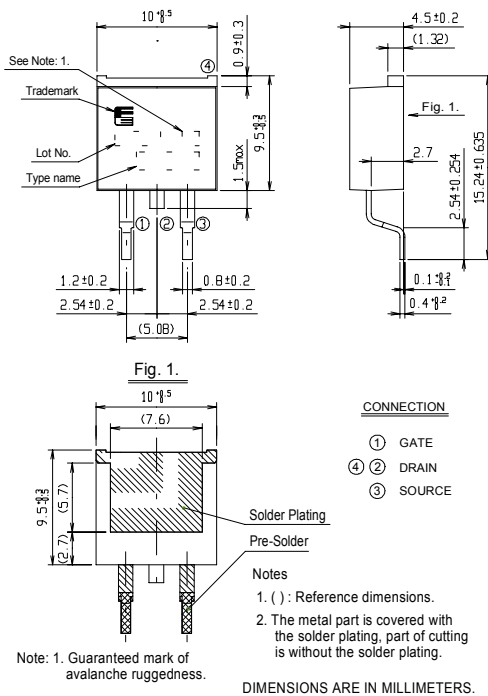


Note: 1. Guaranteed mark of avalanche ruggedness.

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Type(SJ)

FUJI POWER MOS FET



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