

e-Front runners

#### **FUJI POWER MOSFET**

# Super FAP-E<sup>3</sup> series

## **N-CHANNEL SILICON POWER MOSFET**

#### Features

Maintains both low power loss and low noise Lower R<sub>DS</sub>(on) characteristic

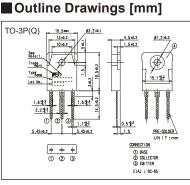
More controllable switching dv/dt by gate resistance Smaller V<sub>GS</sub> ringing waveform during switching Narrow band of the gate threshold voltage  $(3.0\pm0.5V)$ High avalanche durability

#### Applications

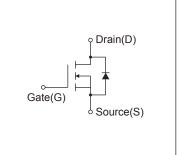
Switching regulators UPS (Uninterruptible Power Supply) **DC-DC** converters

## Maximum Ratings and Characteristics

## Absolute Maximum Ratings at Tc=25°C (unless otherwise specified)



Equivalent circuit schematic



Description	Symbol	Characteristics	Unit	Remarks
	VDS	500	V	
Drain-Source Voltage	VDSX	500	V	V <sub>GS</sub> = -30V
Continuous Drain Current	lo	±23	A	
Pulsed Drain Current	IDP	±92	А	
Gate-Source Voltage	Vgs	±30	V	
Repetitive and Non-Repetitive Maximum Avalanche Current	lar	23	А	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
Mariana Dava Dia dia stian	PD	2.50	10/	Ta=25°C
Maximum Power Dissipation		315	W	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	BVDSS	ID=250µA, VGS=0V		500	-	-	V
Gate Threshold Voltage	Vgs (th)	ID=250µA, VDS=VGS		2.5	3.0	3.5	V
Zero Gate Voltage Drain Current		V <sub>DS</sub> =500V, V <sub>GS</sub> =0V	Tch=25°C	-	-	25	μA
	IDSS	V <sub>DS</sub> =400V, V <sub>GS</sub> =0V	Tch=125°C	-	-	250	
Gate-Source Leakage Current	Igss	V <sub>GS</sub> =±30V, V <sub>DS</sub> =0V		-	10	100	nA
Drain-Source On-State Resistance	RDS (ON)	I <sub>D</sub> =11.5A, V <sub>GS</sub> =10V		-	0.21	0.245	Ω
Forward Transconductance	<b>g</b> <sub>fs</sub>	ID=11.5A, VDS=25V		14	28	-	S
Input Capacitance	Ciss	V <sub>DS</sub> =25V		-	3500	5250	pF
Output Capacitance	Coss	V <sub>GS</sub> =0V	-	330	495		
Reverse Transfer Capacitance	Crss	f=1MHz	-	24	36		
Turn-On Time	td(on)	Vcc=300V	-	24	36	ns	
	tr	V <sub>GS</sub> =10V I₀=11.5A		-	13		19.5
Turn-Off Time	td(off)			-	150		225
	tf	R <sub>GS</sub> =5.6Ω	-	20	30		
	Qth	- V <sub>cc</sub> =250V I <sub>D</sub> =23A - V <sub>GS</sub> =10V		-	11	16.5	nC
Total Gate Charge	QG			-	93	139.5	
Gate-Source Charge	QGS			-	24	36	
Gate-Drain Charge	QGD			-	30	45	
Avalanche Capability	lav	L=1.16mH, Tch=25°C		23	-	-	A
Diode Forward On-Voltage	Vsd	IF=23A, VGS=0V, Tch=25°C		-	0.90	1.35	V
Reverse Recovery Time	trr	IF=23A, VGS=0V		-	0.5	-	μs
Reverse Recovery Charge	Qrr	-di/dt=100A/µs, Tch=25°C		-	8	-	μC

#### Thermal Characteristics

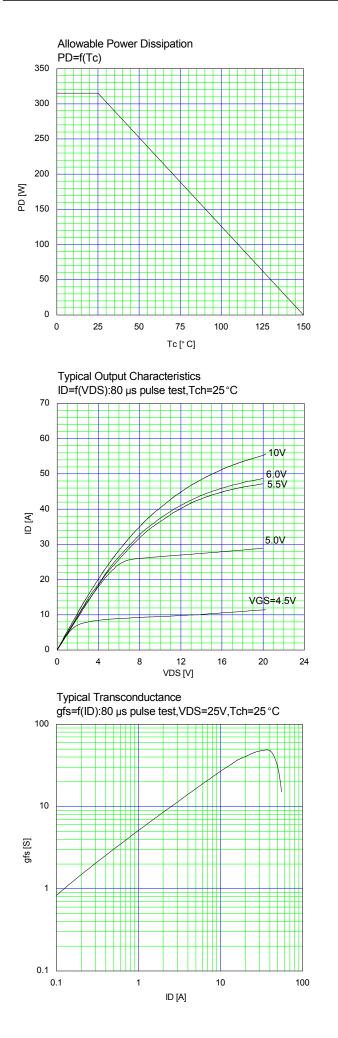
Description	Symbol	Test Conditions	min.	typ.	max.	Unit
Thermal resistance	Rth (ch-c)	Channel to case			0.40	°C/W
	Rth (ch-a)	Channel to ambient			50.0	°C/W

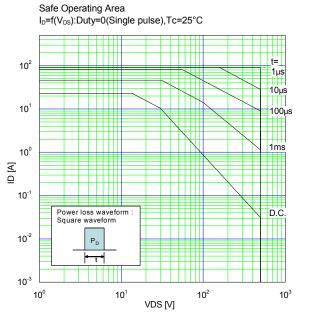
Note \*1 : Tch≤150°C

Note 1 : Italia 50 °C, IAs=10A, L=14.1mH, Vcc=50V, RG=50Ω EAs limited by maximum channel temperature and avalanche current. See to 'Avalanche Energy' graph.

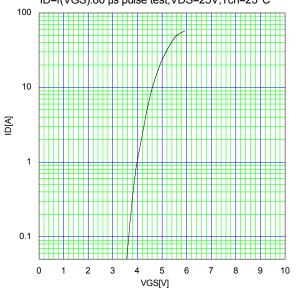
Note \*3 : Repetitive rating : Pulse width limited by maximum channel temperature. See to the 'Transient Themal impeadance' graph.

Note \*4 : IFS-ID, -di/dt=100A/µs, VccSBVDss, TchS150°C. Note \*5 : IFS-ID, dv/dt=5.0kV/µs, VccSBVDss, TchS150°C.

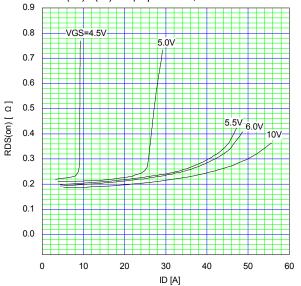


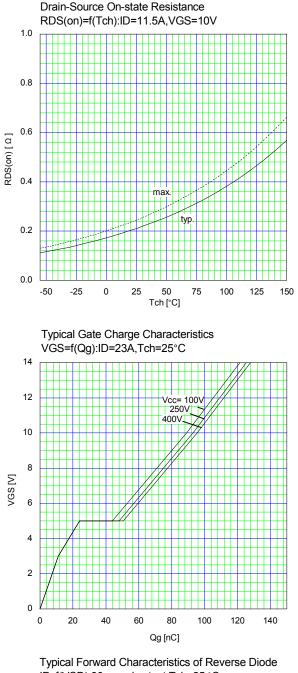


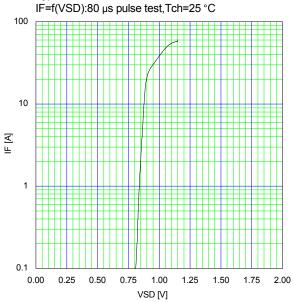
Typical Transfer Characteristic ID=f(VGS):80 µs pulse test,VDS=25V,Tch=25°C

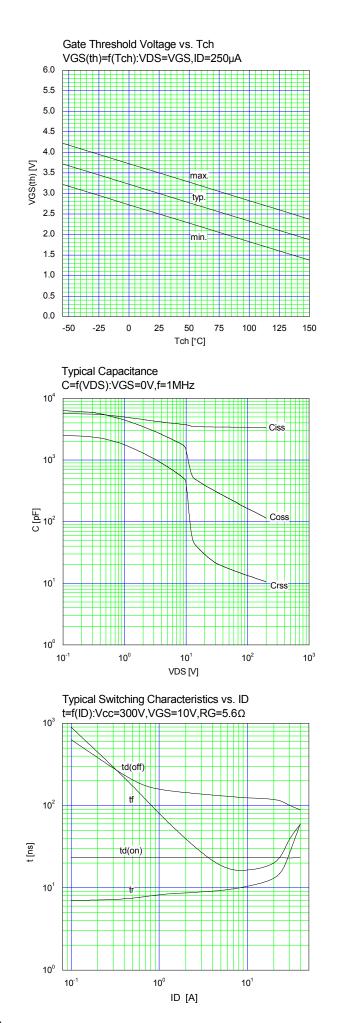


Typical Drain-Source on-state Resistance RDS(on)=f(ID):80  $\mu$ s pulse test,Tch=25°C

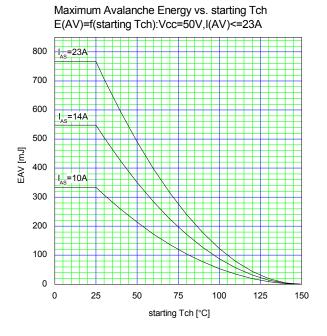




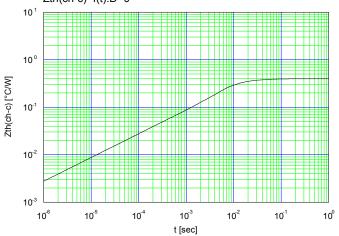




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Maximum Transient Thermal Impedance Zth(ch-c)=f(t):D=0



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