

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

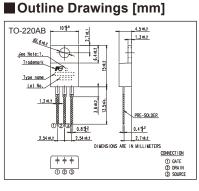
Smaller V<sub>GS</sub> ringing waveform during switching Narrow band of the gate threshold voltage (3.0±0.5V) High avalanche durability

#### Applications

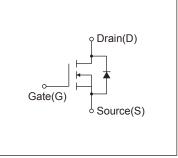
Switching regulators UPS (Uninterruptible Power Supply) **DC-DC** converters

### Maximum Ratings and Characteristics

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



## Equivalent circuit schematic



Description	Symbol	Characteristics	Unit	Remarks	
Durin Origina Visitana	VDS	600	V		
Drain-Source Voltage	VDSX	600	V	V <sub>GS</sub> = -30V	
Continuous Drain Current	lo	±6	A		
Pulsed Drain Current	IDP	±24	A		
Gate-Source Voltage	Vgs	±30	V		
Repetitive and Non-Repetitive Maximum AvalancheCurrent	lar	6	A	Note*1	
Non-Repetitive Maximum Avalanche Energy	Eas	313.7	mJ	Note*2	
Repetitive Maximum Avalanche Energy	Ear	10.5	mJ	Note*3	
Peak Diode Recovery dV/dt	dV/dt	4.5	kV/µs	Note*4	
Peak Diode Recovery -di/dt	-di/dt	100	A/µs	Note*5	
Maximum Davier Discinction	P	2.02	10/	Ta=25°C	
Maximum Power Dissipation	PD	105	W	Tc=25°C	
One watting and Stavage Temperature yearse	Tch	150	°C		
Operating and Storage 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		600	-	-	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> =600V, V <sub>GS</sub> =0V	Tch=25°C	-	-	25	μA
	IDSS	V <sub>DS</sub> =480V, 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)	ID=3.0A, VGS=10V		-	1.03	1.20	Ω
Forward Transconductance	<b>g</b> fs	ID=3.0A, VDS=25V		4	8	-	S
Input Capacitance	Ciss	V <sub>DS</sub> =25V V <sub>GS</sub> =0V f=1MHz		-	1100	1650	pF
Output Capacitance	Coss			-	100	150	
Reverse Transfer Capacitance	Crss			-	7.5	11	
Turn-On Time	td(on)	V <sub>cc</sub> =300V V <sub>cs</sub> =10V I <sub>D</sub> =3.0A R <sub>cs</sub> =24Ω		-	20	30	ns
	tr			-	9.0	14	
Turn-Off Time	td(off)			-	100	150	
	tf			-	17.5	26.5	
Total Gate Charge	QG	V <sub>cc</sub> =300V   <sub>D</sub> =6A   V <sub>GS</sub> =10V		-	35	53	nC
Gate-Source Charge	QGS			-	9.0	14	
Gate-Drain Crossover Charge	Qsw			-	10	15	
Avalanche Capability	lav	L=6.39mH, Tch=25°C		6	-	-	A
Diode Forward On-Voltage	Vsd	IF=6A, VGS=0V, Tch=25°C		-	0.90	1.35	V
Reverse Recovery Time	trr	IF=6A, VGS=0V		-	0.4	-	μS
Reverse Recovery Charge	Qrr	-di/dt=100A/µs, Tch=25°C		-	3.3	-	μC

#### Thermal Characteristics

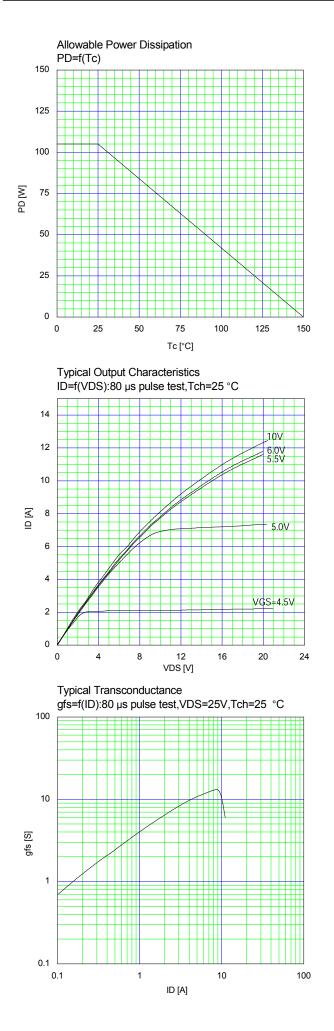
Description	Symbol	Test Conditions	min.	typ.	max.	Unit
Thermal resistance	Rth (ch-c)	Channel to Case			1.19	°C/W
	Rth (ch-a)	Channel to Ambient			62.0	°C/W

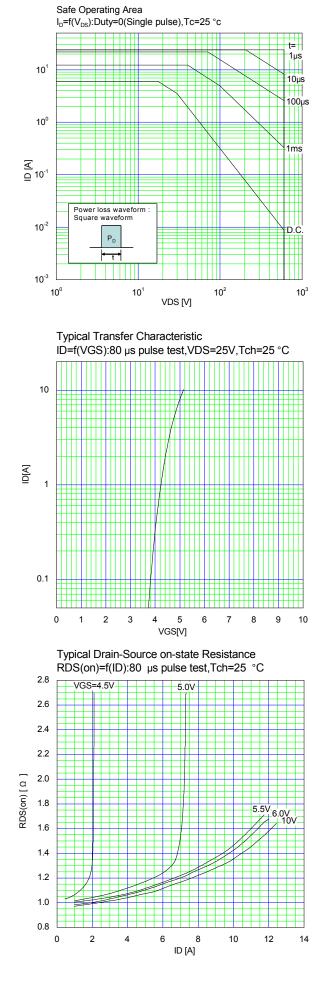
Note \*1 : Tch≤150°C

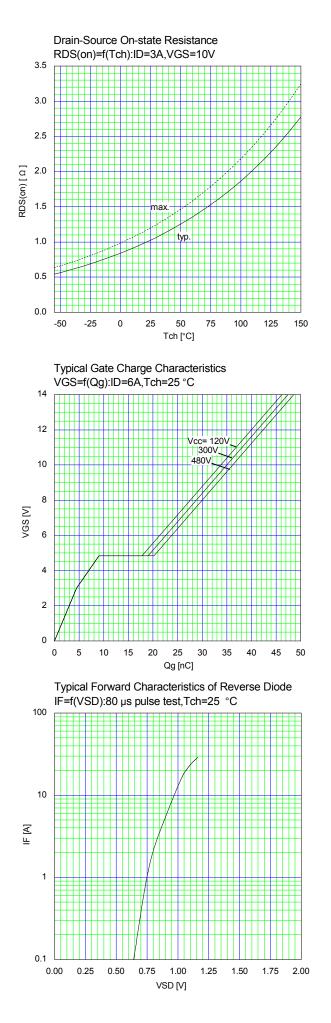
Note 1 : Italia 50 °C, IAs=2 4A, L=99.8mH, Vcc=60V, Rg=50Ω EAs limited by maximum channel temperature and avalanche current. See to 'Avalanche Energy' graph.

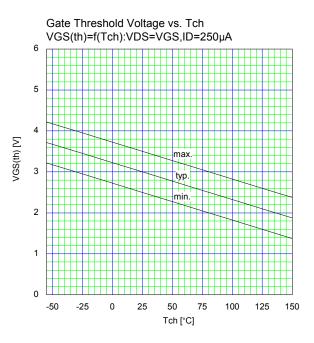
Note \*3 : Repetitive rating : Pulse width limited by maximum channel temperature

See to the 'Transient Themal impeadance' graph. Note \*4 : IFS-ID, -di/dt=100A/µs, Vcc≤BVoss, Tch≤150°C. Note \*5 : IFS-ID, dv/dt≤4.5kV/µs, Vcc≤BVoss, Tch≤150°C.

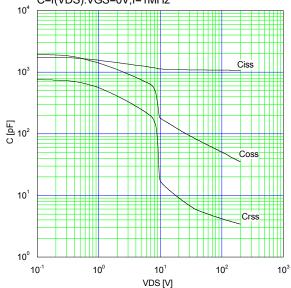




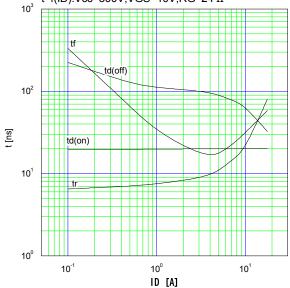


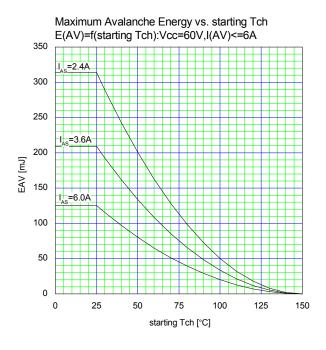


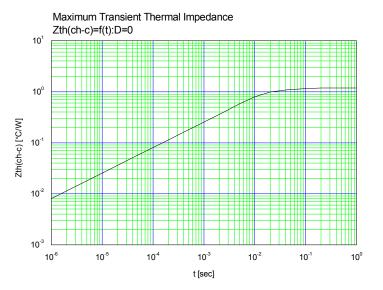
Typical Capacitance C=f(VDS):VGS=0V,f=1MHz



Typical Switching Characteristics vs. ID t=f(ID):Vcc=300V,VGS=10V,RG=24  $\Omega$ 







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