

# FMV24N25G

FUJI POWER MOSFET

## Super FAP-G series

## N-CHANNEL SILICON POWER MOSFET

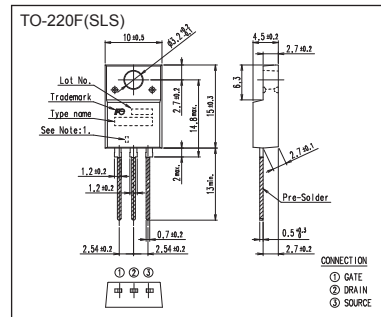
### Features

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

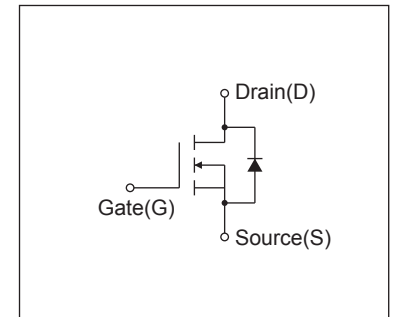
### Applications

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

### Outline Drawings [mm]



### Equivalent circuit schematic



### Maximum Ratings and Characteristics

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

Description	Symbol	Characteristics	Unit	Remarks
Drain-Source Voltage	V <sub>DS</sub>	250	V	
	V <sub>DSSX</sub>	220	V	V <sub>GS</sub> = -30V
Continuous Drain Current	I <sub>D</sub>	±24	A	
Pulsed Drain Current	I <sub>DP</sub>	±96	A	
Gate-Source Voltage	V <sub>GS</sub>	±30	V	
Repetitive and Non-Repetitive Maximum AvalancheCurrent	I <sub>AR</sub>	24	A	Note*1
Non-Repetitive Maximum Avalanche Energy	E <sub>AS</sub>	192	mJ	Note*2
Maximum Drain-Source dV/dt	dV <sub>DS</sub> /dt	20	kV/μs	V <sub>DS</sub> ≤ 200V
Peak Diode Recovery dV/dt	dV/dt	5	kV/μs	Note*3
Maximum Power Dissipation	P <sub>D</sub>	2.16	W	T <sub>a</sub> = 25°C
		65		T <sub>c</sub> = 25°C
Operating and Storage Temperature range	T <sub>ch</sub>	150	°C	
	T <sub>stg</sub>	-55 to +150	°C	
Isolation	V <sub>ISO</sub>	2	KVrms	t = 60sec, f = 60Hz

#### Electrical Characteristics at Tc=25°C (unless otherwise specified) Static Ratings

Description	Symbol	Conditions	min.	typ.	max.	Unit	
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V	250	-	-	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> = 250V, V <sub>GS</sub> = 0V	-	-	25	μA	
		V <sub>DS</sub> = 200V, V <sub>GS</sub> = 0V	-	-	250		
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> = 12A, V <sub>GS</sub> = 10V	-	0.11	0.13	Ω	
Forward Transconductance	g <sub>fs</sub>	I <sub>D</sub> = 12A, V <sub>DS</sub> = 25V	8	16	-	S	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 75V	-	1150	1725	pF	
Output Capacitance	C <sub>oss</sub>	V <sub>GS</sub> = 0V	-	200	300		
Reverse Transfer Capacitance	C <sub>rss</sub>	f = 1MHz	-	13	19.5		
Turn-On Time	t <sub>d(on)</sub>	V <sub>CC</sub> = 72V	-	27	40.5	ns	
		V <sub>GS</sub> = 10V	-	22	33		
Turn-Off Time	t <sub>d(off)</sub>	I <sub>D</sub> = 12A	-	35	52.5		
		R <sub>G</sub> = 10Ω	-	14	21		
Total Gate Charge	Q <sub>G</sub>	V <sub>CC</sub> = 72V	-	36	54		nC
Gate-Source Charge	Q <sub>GS</sub>	I <sub>D</sub> = 24A	-	14.5	21.8		
Gate-Drain Charge	Q <sub>GD</sub>	V <sub>GS</sub> = 10V	-	11.5	17.3		
Avalanche Capability	I <sub>AV</sub>	L = 560μH, T <sub>ch</sub> = 25°C	24	-	-	A	
Diode Forward On-Voltage	V <sub>SD</sub>	I <sub>F</sub> = 24A, V <sub>GS</sub> = 0V, T <sub>ch</sub> = 25°C	-	1.0	1.5	V	
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 24A, V <sub>GS</sub> = 0V	-	0.23	-	μS	
Reverse Recovery Charge	Q <sub>rr</sub>	-di/dt = 100A/μs, T <sub>ch</sub> = 25°C	-	2.5	-	μC	

#### Thermal Characteristics

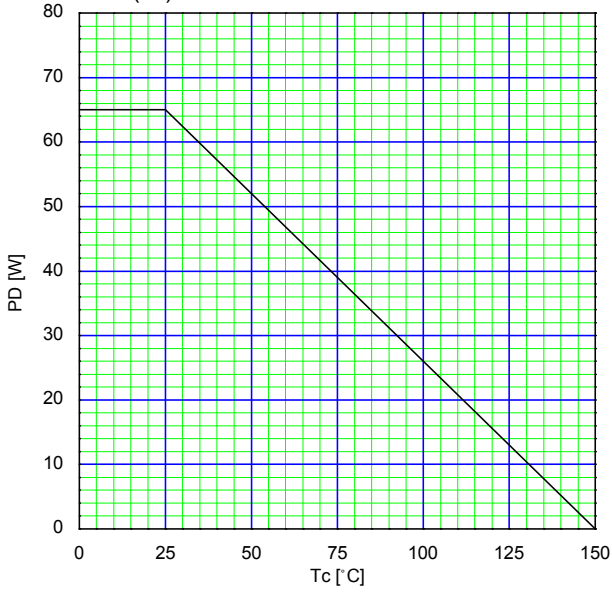
Description	Symbol	min.	typ.	max.	Unit
Channel to Case	R <sub>th(ch-c)</sub>			1.923	°C/W
Channel to Ambient	R <sub>th(ch-a)</sub>			58.0	°C/W

Note \*1 : T<sub>ch</sub> ≤ 150°C

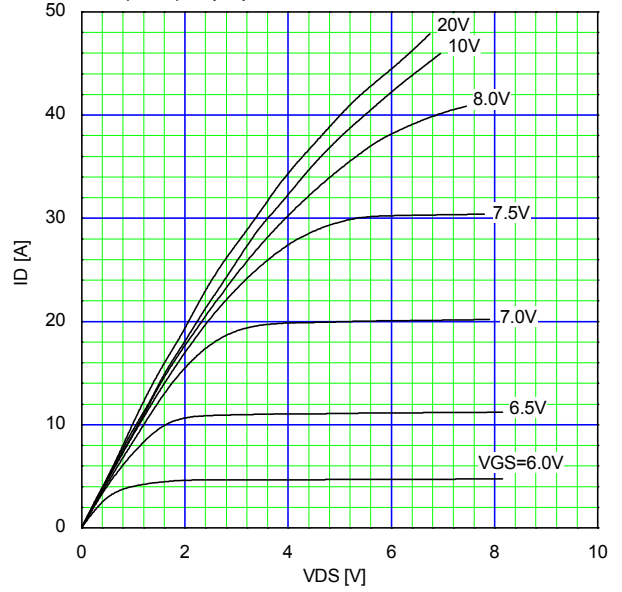
Note \*2 : Stating T<sub>ch</sub> = 25°C, I<sub>AS</sub> = A, L = 560μH, V<sub>CC</sub> = 48V, R<sub>G</sub> = 50Ω, E<sub>AS</sub> limited by maximum channel temperature and avalanche current.

Note \*3 : I<sub>F</sub> = I<sub>D</sub>, -di/dt = 50A/μs, V<sub>CC</sub> ≤ BV<sub>DSS</sub>, T<sub>ch</sub> ≤ 150°C.

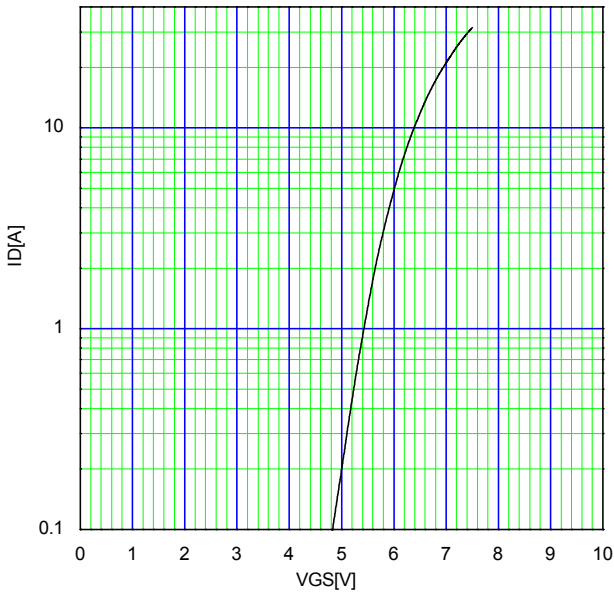
Allowable Power Dissipation  
 $PD=f(T_c)$



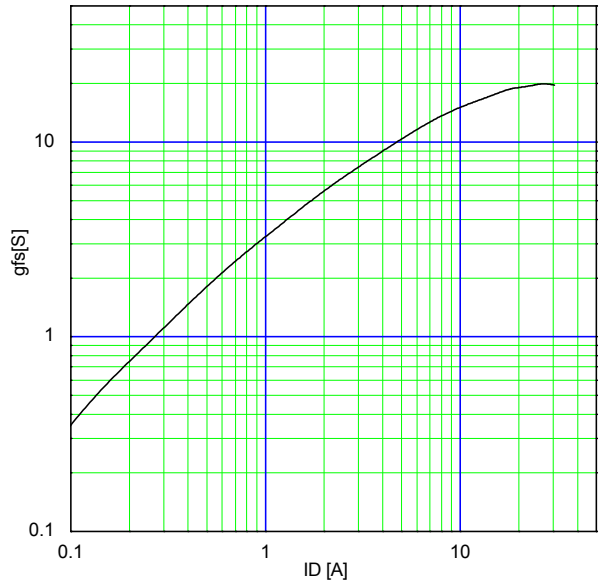
Typical Output Characteristics  
 $ID=f(V_{DS}): 80\mu s$  pulse test,  $T_{ch}=25^\circ C$



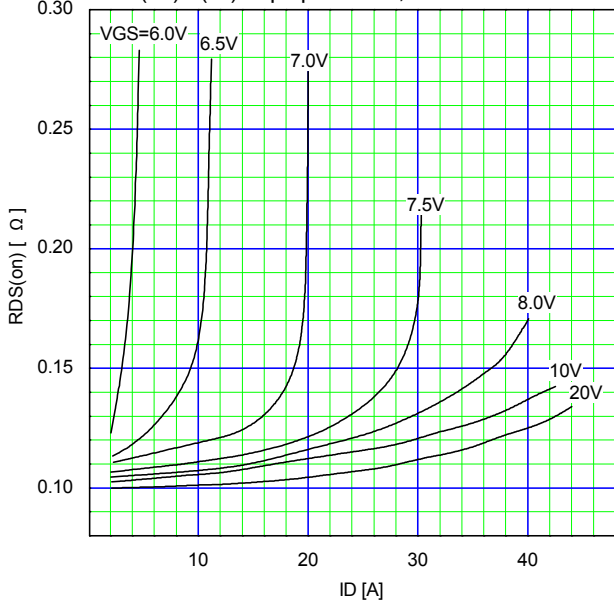
Typical Transfer Characteristic  
 $ID=f(V_{GS}): 80\mu s$  pulse test,  $V_{DS}=25V$ ,  $T_{ch}=25^\circ C$



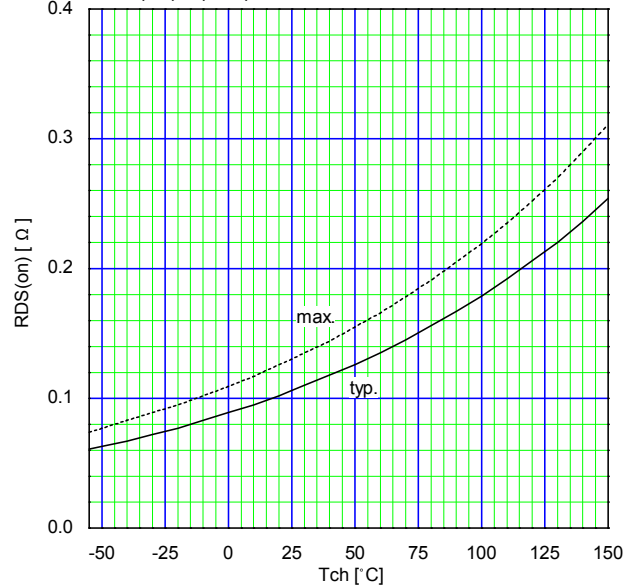
Typical Transconductance  
 $g_{fs}=f(ID): 80\mu s$  pulse test,  $V_{DS}=25V$ ,  $T_{ch}=25^\circ C$

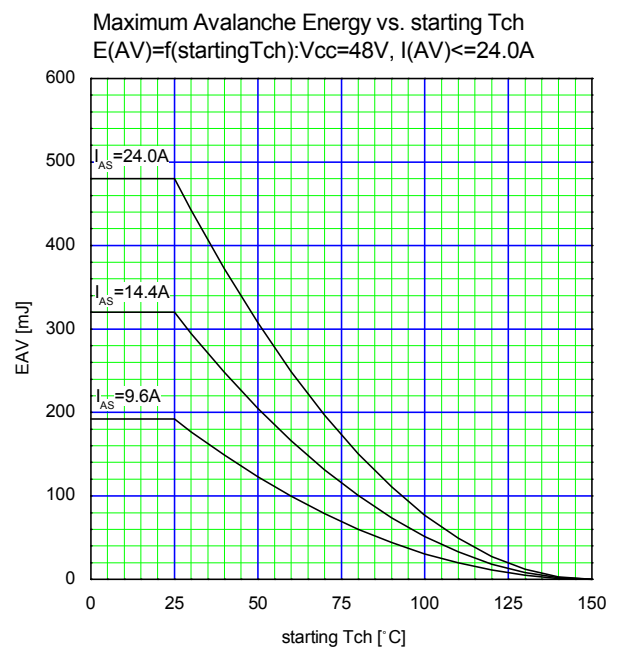
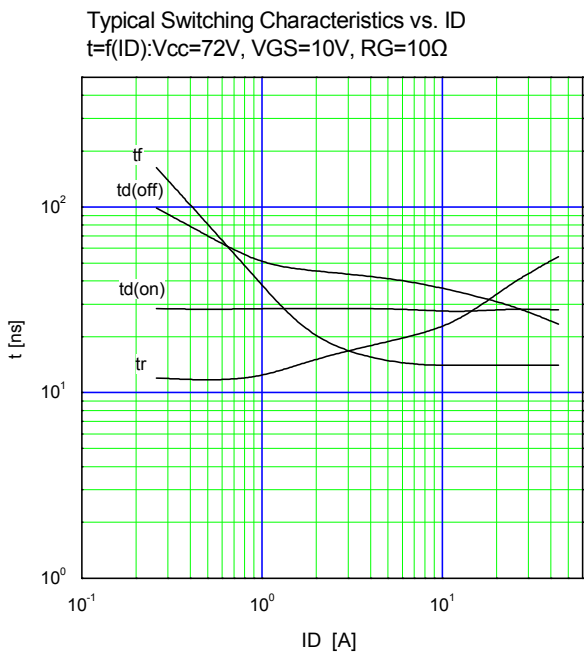
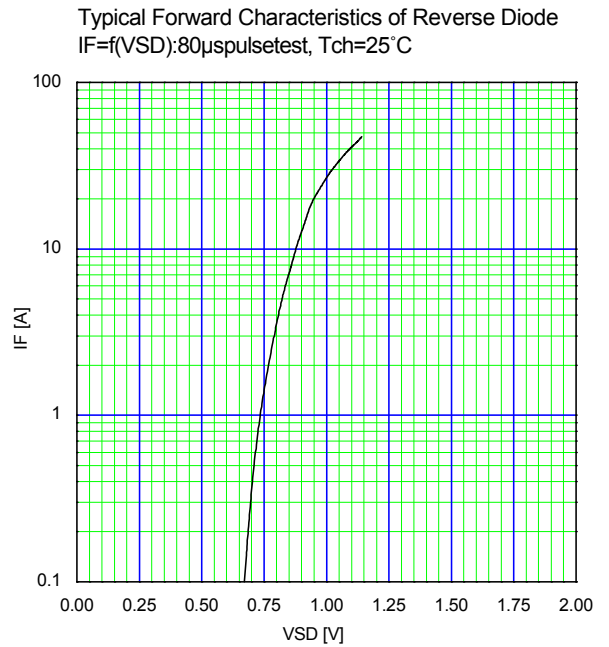
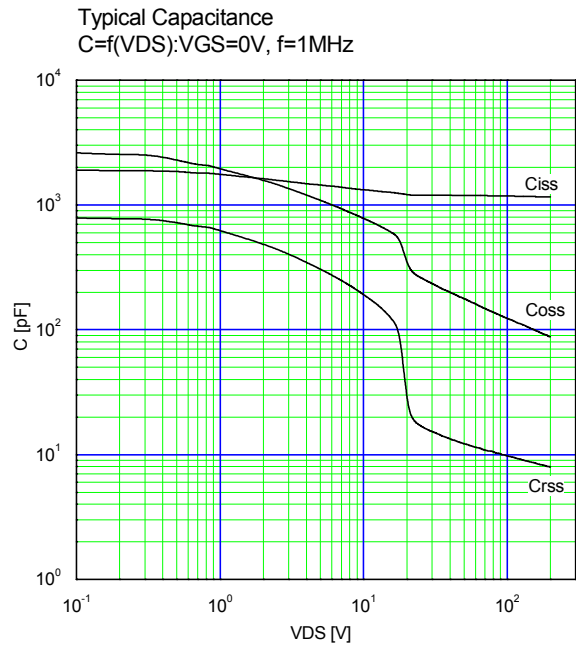
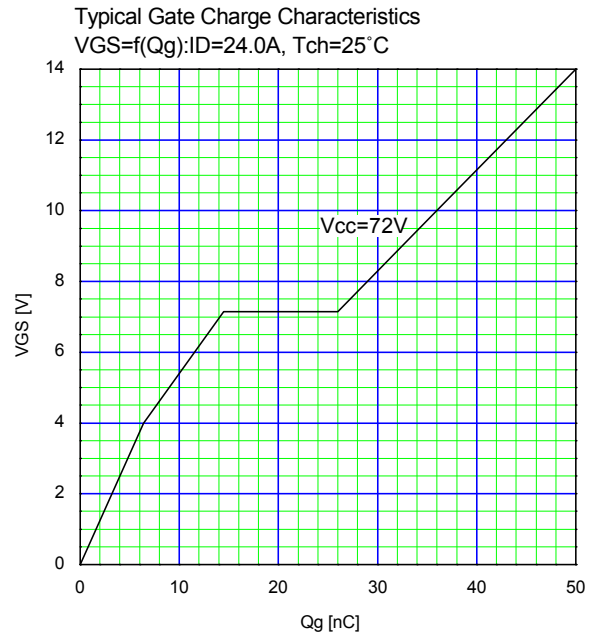
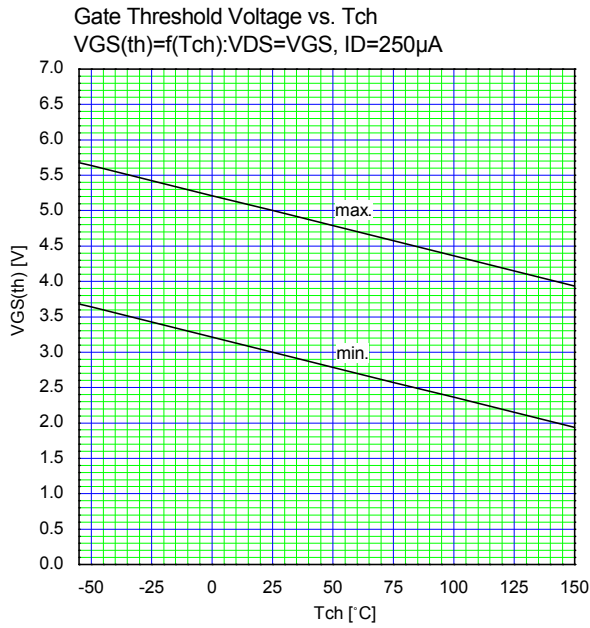


Typical Drain-Source on-state Resistance  
 $R_{DS(on)}=f(ID): 80\mu s$  pulse test,  $T_{ch}=25^\circ C$



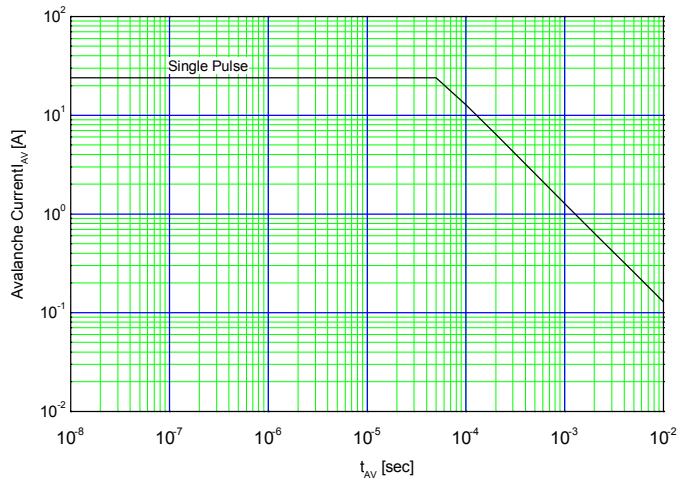
Drain-Source On-state Resistance  
 $R_{DS(on)}=f(T_{ch}): ID=12.0A$ ,  $V_{GS}=10V$





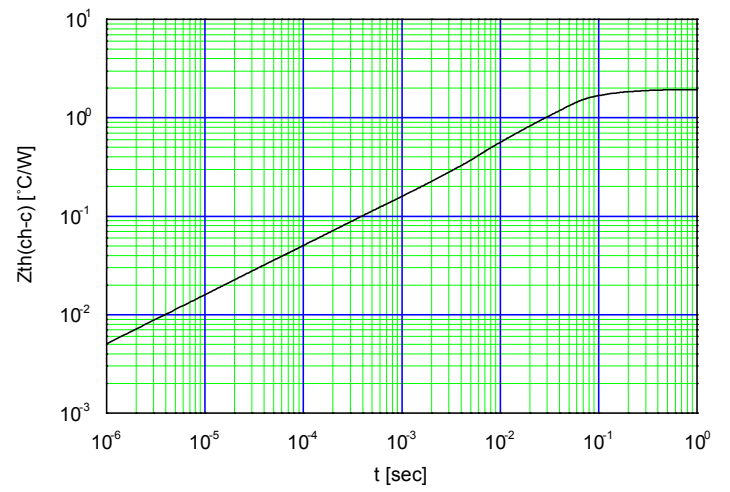
Maximum Avalanche Current Pulse width

$I_{AV} = f(t_{AV})$ : starting Tch=25°C, Vcc=48V



Transient Thermal Impedance

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



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