

FMV06N90E

FUJI POWER MOSFET

Super FAP-E³ series

N-CHANNEL SILICON POWER MOSFET

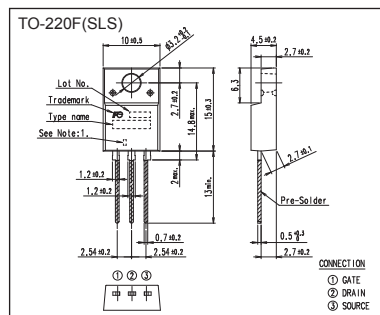
■ Features

- Maintains both low power loss and low noise
- Lower $R_{DS(on)}$ characteristic
- More controllable switching dv/dt by gate resistance
- Smaller V_{GS} ringing waveform during switching
- Narrow band of the gate threshold voltage ($4.0 \pm 0.5V$)
- High avalanche durability

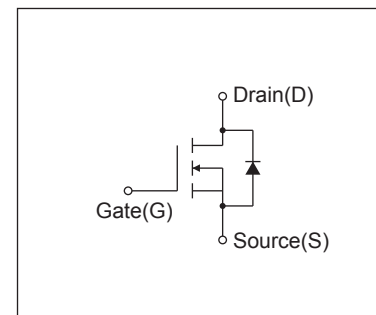
■ Applications

- 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 _{DS}	900	V	
	V _{DSX}	900	V	V _{GS} = -30V
Continuous Drain Current	I _D	±6	A	
Pulsed Drain Current	I _{DP}	±24	A	
Gate-Source Voltage	V _{GS}	±30	V	
Repetitive and Non-Repetitive Maximum AvalancheCurrent	I _{AR}	6	A	Note*1
Non-Repetitive Maximum Avalanche Energy	E _{AS}	323.6	mJ	Note*2
Repetitive Maximum Avalanche Energy	E _{AR}	4.8	mJ	Note*3
Peak Diode Recovery dV/dt	dV/dt	2.0	kV/μs	Note*4
Peak Diode Recovery -di/dt	-di/dt	100	A/μs	Note*5
Maximum Power Dissipation	P _D	2.16	W	Ta=25°C
		48		Tc=25°C
Operating and Storage Temperature range	T _{ch}	150	°C	
	T _{stg}	-55 to + 150	°C	
Isolation	V _{ISO}	2	KVrms	t=60sec, f=60Hz

● Electrical Characteristics at Tc=25°C (unless otherwise specified)

Description	Symbol	Conditions	min.	typ.	max.	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	900	-	-	V
Gate Threshold Voltage	V _{GS} (th)	I _D =250μA, V _{DS} =V _{GS}	3.5	4.0	4.5	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =900V, V _{GS} =0V	-	-	25	μA
		V _{DS} =720V, V _{GS} =0V	-	-	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 =3A, V _{GS} =10V	-	2.1	2.5	Ω
Forward Transconductance	g _{fs}	I _D =3.0A, V _{DS} =25V	3.5	7.0	-	S
Input Capacitance	C _{iss}	V _{DS} =25V	-	980	1500	pF
Output Capacitance	C _{oss}	V _{GS} =0V	-	95	150	
Reverse Transfer Capacitance	C _{rss}	f=1MHz	-	6.5	10	
Turn-On Time	td(on)	V _{ce} =600V	-	33	50	ns
	tr	V _{GS} =10V	-	32	48	
Turn-Off Time	td(off)	I _D =3.0A	-	100	150	
	tf	R _C =39Ω	-	32	48	
Total Gate Charge	Q _G	V _{ce} =450V	-	33	50	nC
Gate-Source Charge	Q _{GS}	I _D =6A	-	10	15	
Drain-Source Crossover Charge	Q _{SW}	V _{GS} =10V	-	3.5	5.5	
Gate-Drain Charge	Q _{GD}		-	11	17	
Avalanche Capability	I _{AV}	L=6.59mH, T _{ch} =25°C	6	-	-	A
Diode Forward On-Voltage	V _{SD}	I _F =6A, V _{GS} =0V, T _{ch} =25°C	-	0.90	1.35	V
Reverse Recovery Time	trr	I _F =6A, V _{GS} =0V	-	1.6	-	μS
Reverse Recovery Charge	Q _{rr}	-di/dt=100A/μs, T _{ch} =25°C	-	9.5	-	μC

● Thermal Characteristics

Description	Symbol	Test Conditions	min.	typ.	max.	Unit
Thermal resistance	Rth (ch-c)	Channel to case			0.862	°C/W
	Rth (ch-a)	Channel to ambient			50.0	°C/W

Note *1 : Tch≤150°C.

Note *2 : Stating Tch=25°C, I_{AS}=2.4A, L=103mH, V_{cc}=90V, R_G=10Ω.

EAS limited by maximum channel temperature and avalanche current.

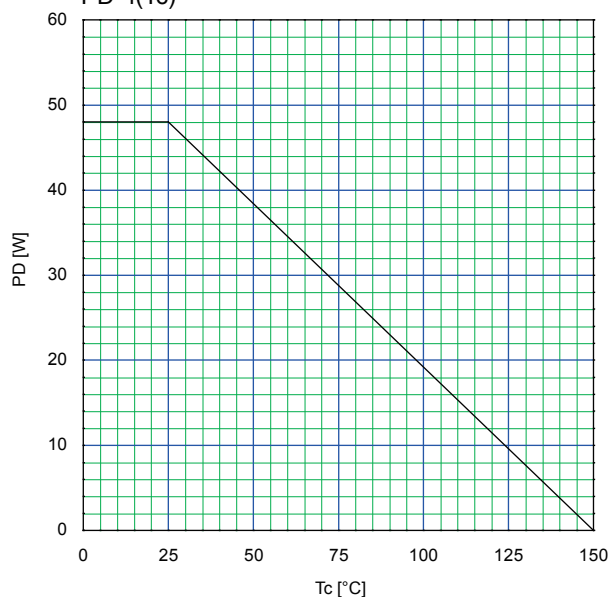
Note *3 : Repetitive rating : Pulse width limited by maximum channel temperature.

Note *4 : $I_F \leq I_D$, $-di/dt = 100A/\mu s$, $V_{CC} \leq BV_{DSS}$, $T_{ch} \leq 150^\circ C$.

Note *5 : $I_F \leq -I_D$, $dv/dt = 2.0 \text{ kV}/\mu\text{s}$, $V_{CC} \leq BV_{DSS}$, $T_{ch} \leq 150^\circ\text{C}$.

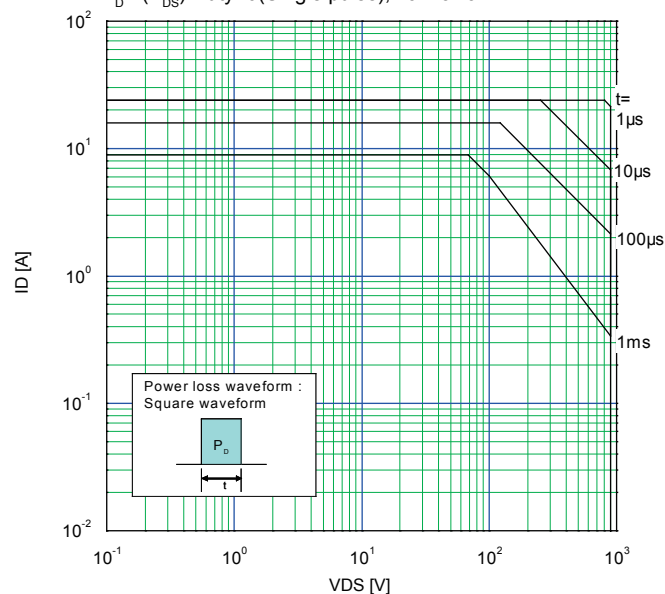
Allowable Power Dissipation

$PD=f(T_c)$



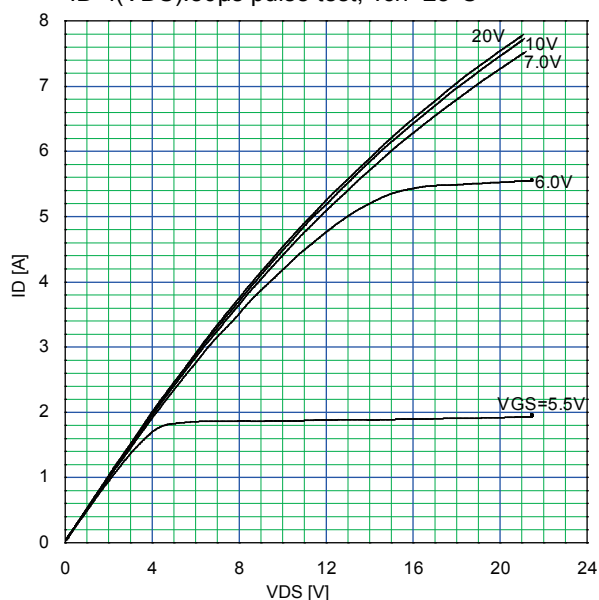
Safe Operating Area

$I_D=f(V_{DS}):Duty=0(\text{Single pulse}), T_c=25^{\circ}C$



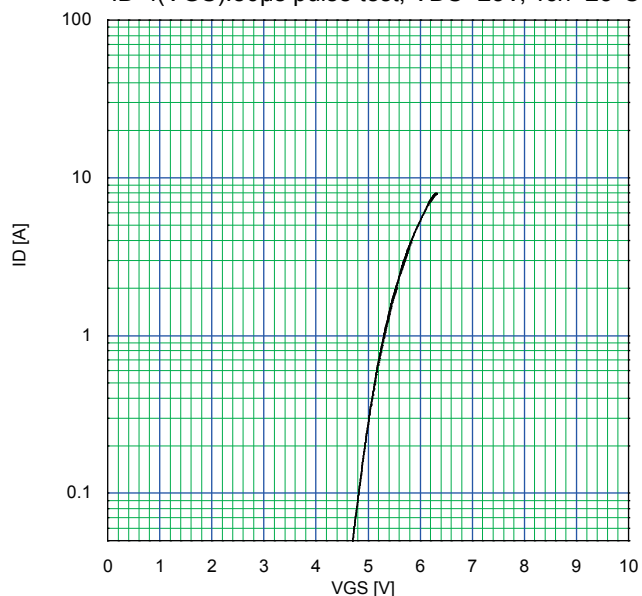
Typical Output Characteristics

$I_D=f(V_{DS}):80\mu s \text{ pulse test}, T_{ch}=25^{\circ}C$



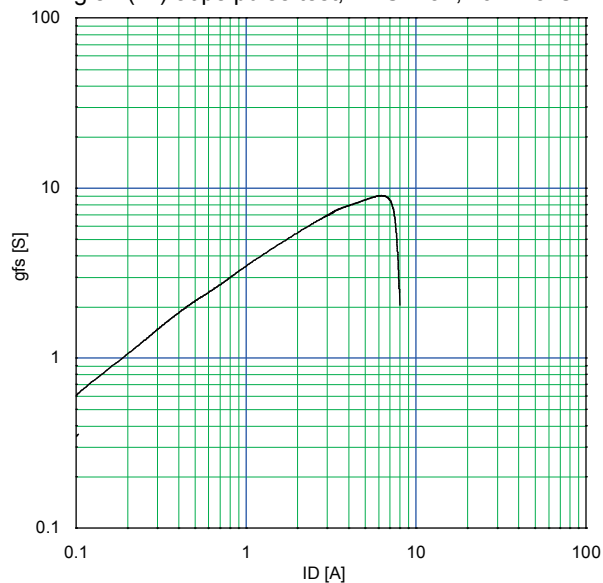
Typical Transfer Characteristic

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



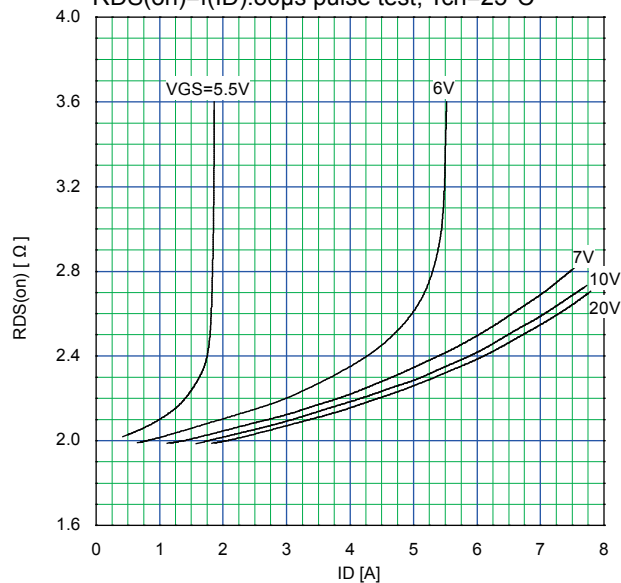
Typical Transconductance

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

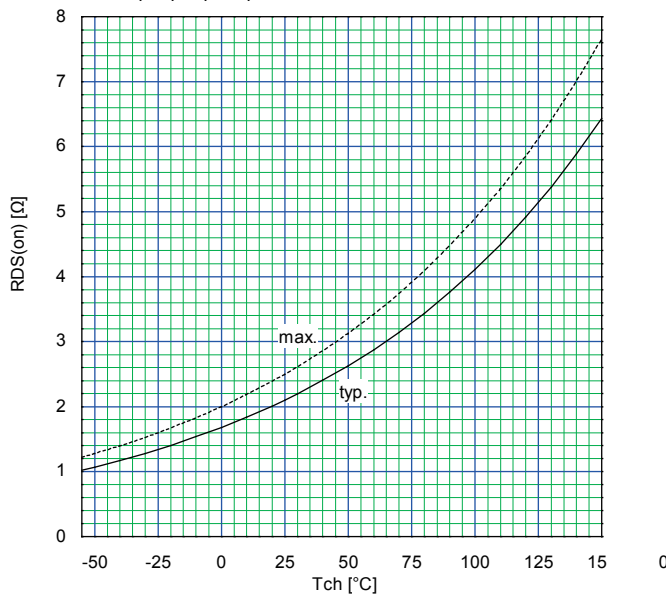


Typical Drain-Source on-state Resistance

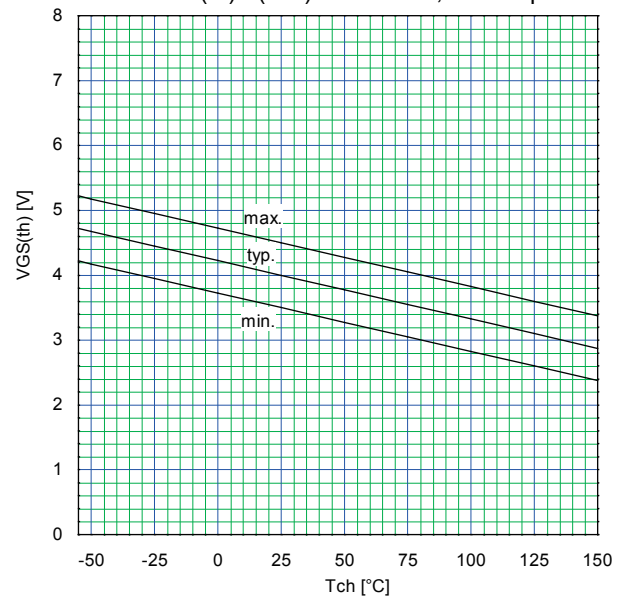
$R_{DS(on)}=f(I_D):80\mu s \text{ pulse test}, T_{ch}=25^{\circ}C$



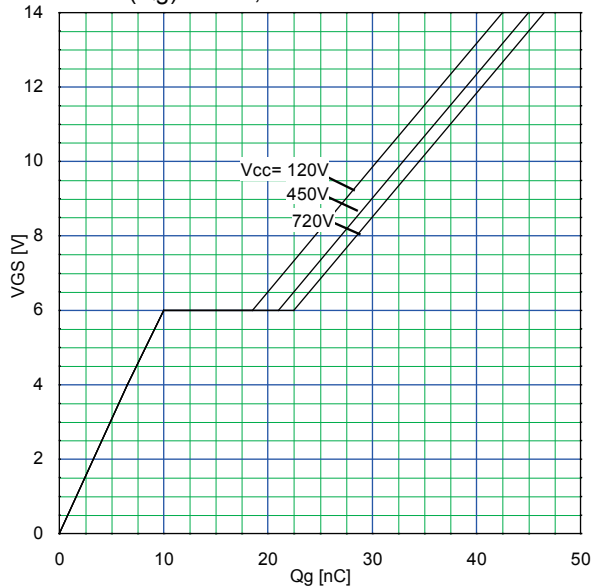
Drain-Source On-state Resistance
 $R_{DS(on)} = f(T_{ch}): I_D = 3.0A, V_{GS} = 10V$



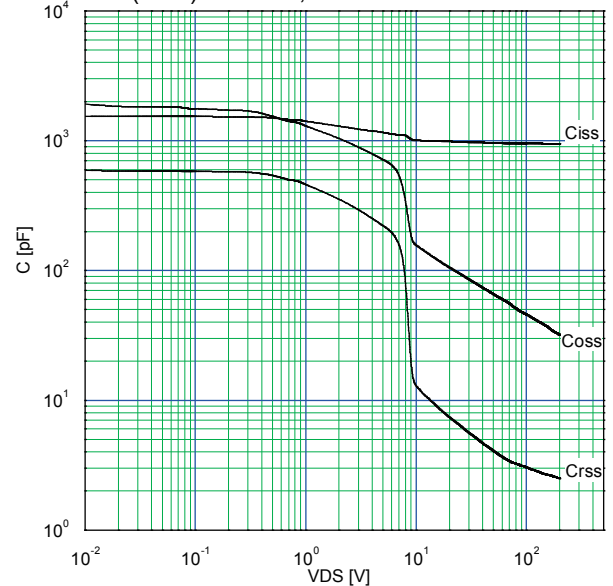
Gate Threshold Voltage vs. T_{ch}
 $V_{GS(th)} = f(T_{ch}): V_{DS} = V_{GS}, I_D = 250\mu A$



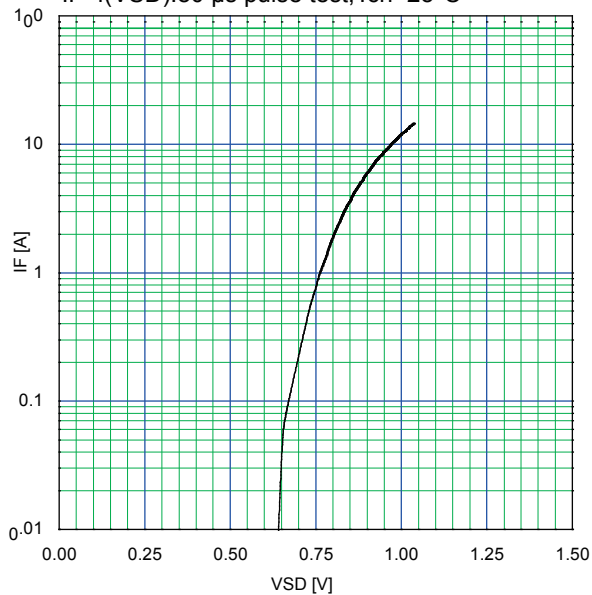
Typical Gate Charge Characteristics
 $V_{GS} = f(Q_g): I_D = 6A, T_{ch} = 25^\circ C$



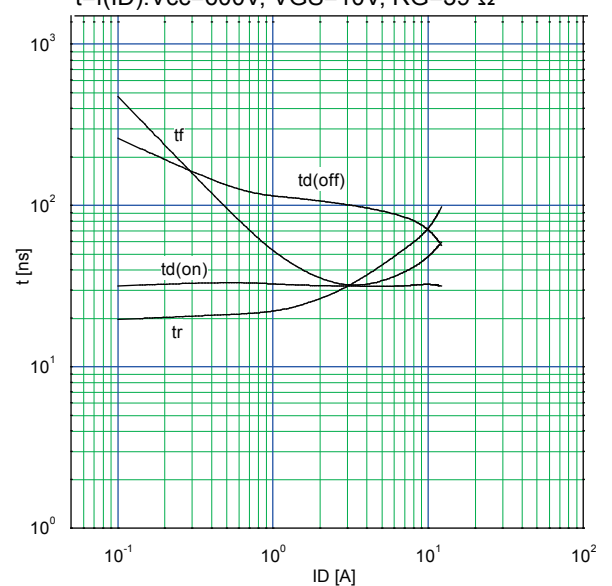
Typical Capacitance
 $C = f(V_{DS}): V_{GS} = 0V, f = 1MHz$



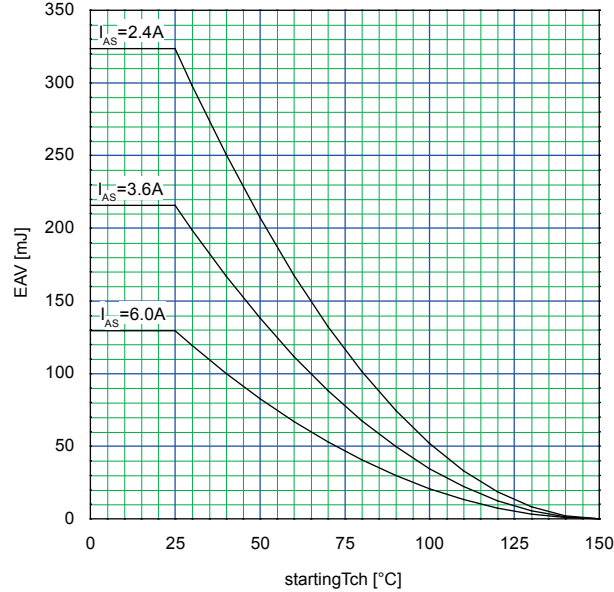
Typical Forward Characteristics of Reverse Diode
 $I_F = f(V_{SD}): 80\mu s \text{ pulse test}, T_{ch} = 25^\circ C$



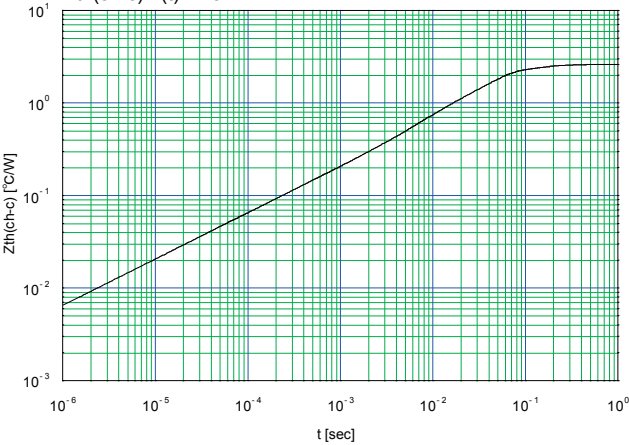
Typical Switching Characteristics vs. I_D
 $t = f(I_D): V_{CC} = 600V, V_{GS} = 10V, R_G = 39\Omega$



Maximum Avalanche Energy vs. starting Tch
 $E(AV)=f(\text{startingTch}):V_{CC}=90V, I(AV)\leq 6A$



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



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