

FMH07N90E

FUJI POWER MOSFET

Super FAP-E³ series

N-CHANNEL SILICON POWER MOSFET

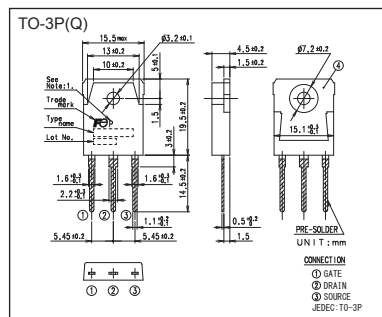
■ Features

- 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

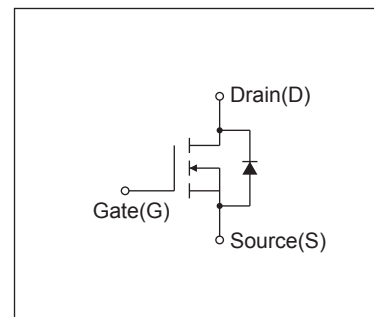
■ Applications

- 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 _{GS} = -30V
	V _{DSX}	900	V	
Continuous Drain Current	I _D	±7	A	
Pulsed Drain Current	I _{DP}	±28	A	
Gate-Source Voltage	V _{GS}	±30	V	
Repetitive and Non-Repetitive Maximum AvalancheCurrent	I _{AR}	7	A	Note*1
Non-Repetitive Maximum Avalanche Energy	E _{AS}	396.3	mJ	Note*2
Repetitive Maximum Avalanche Energy	E _{AR}	14.5	mJ	Note*3
Peak Diode Recovery dV/dt		2.1	kV/μs	Note*4
Peak Diode Recovery -di/dt		100	A/μs	Note*5
Maximum Power Dissipation	P _D	2.5	W	Ta=25°C
		145		Tc=25°C
Operating and Storage Temperature range	T _{ch}	150	°C	
	T _{stg}	-55 to + 150	°C	

● 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 _D =V _{GS}	3.5	4.0	4.5	V
Zero Gate Voltage Drain Current	I _{DSS}	V _D =900V, V _{GS} =0V T _{ch} =25°C	-	-	25	μA
		V _D =720V, V _{GS} =0V T _{ch} =125°C	-	-	250	
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±30V, V _D =0V	-	10	100	nA
Drain-Source On-State Resistance	R _{DS} (on)	I _D =3.5A, V _{GS} =10V	-	1.65	2.0	Ω
Forward Transconductance	g _{fs}	I _D =3.5A, V _D =25V	4.2	8.4	-	S
Input Capacitance	C _{iss}	V _D =25V	-	1200	1800	pF
Output Capacitance	C _{oss}	V _{GS} =0V	-	115	175	
Reverse Transfer Capacitance	C _{rss}	f=1MHz	-	8.5	13	
Turn-On Time	t _d (on)	V _{GS} =600V	-	33	53	ns
	t _r	V _{GS} =10V	-	32	45	
Turn-Off Time	t _d (off)	I _D =3.5A	-	110	165	
	t _f	R _G =36Ω	-	32	45	
Total Gate Charge	Q _G	V _{GS} =450V I _D =7A V _{GS} =10V	-	39	59	nC
Gate-Source Charge	Q _{GS}		-	10	15	
Drain-Source Crossover Charge	Q _{SW}		-	3.6	5.5	
Gate-Drain Charge	Q _{GD}		-	15	23	
Avalanche Capability	I _{AV}	L=5.93mH, T _{ch} =25°C	7	-	-	A
Diode Forward On-Voltage	V _{SD}	I _F =7A, V _{GS} =0V, T _{ch} =25°C	-	0.90	1.35	V
Reverse Recovery Time	t _{rr}	I _F =7A, V _{GS} =0V	-	1.65	-	μS
Reverse Recovery Charge	Q _{rr}	-di/dt=100A/μs, T _{ch} =25°C	-	11	-	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℃

Note *2 : Stating Tch=25°C, IAS=2.8A, L=92.7mH, Vcc=90V, RG=10Ω
EAS limited by maximum channel temperature and avalanche current.
See to 'Avalanche current' graph.

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

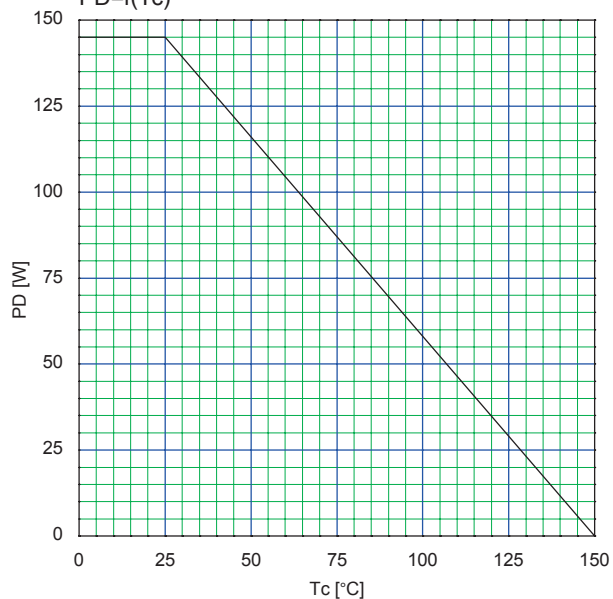
Note 3 : Repetitive rating : Pulse width limited by maximum
See to the 'Transient Thermal impedance' graph.

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 : $|I_F| \leq |I_D$, $dv/dt = 2.1 \text{ kV}/\mu\text{s}$, $V_{CC} \leq BV_{DSS}$, $T_{ch} \leq 150^\circ\text{C}$.

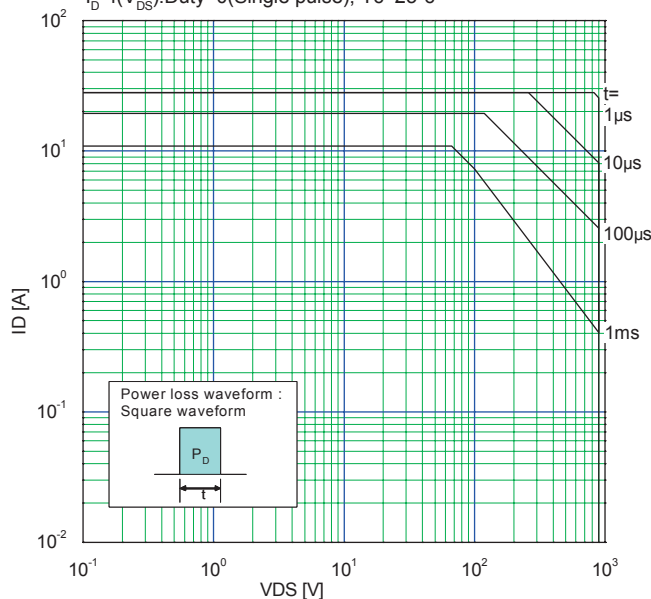
Allowable Power Dissipation

$PD=f(T_c)$



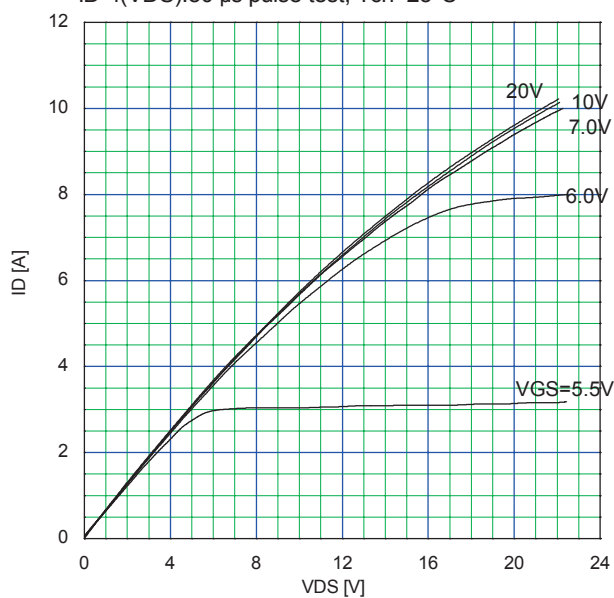
Safe Operating Area

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



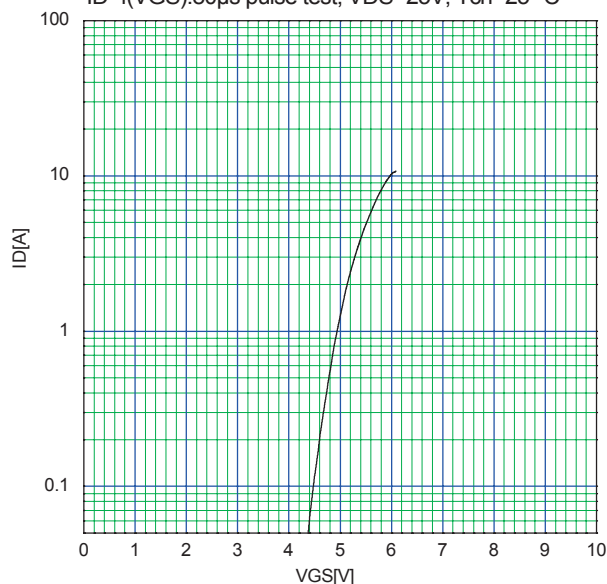
Typical Output Characteristics

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



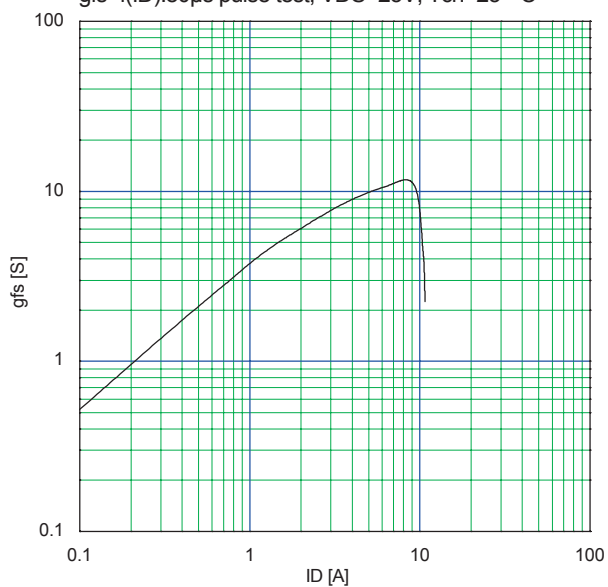
Typical Transfer Characteristic

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



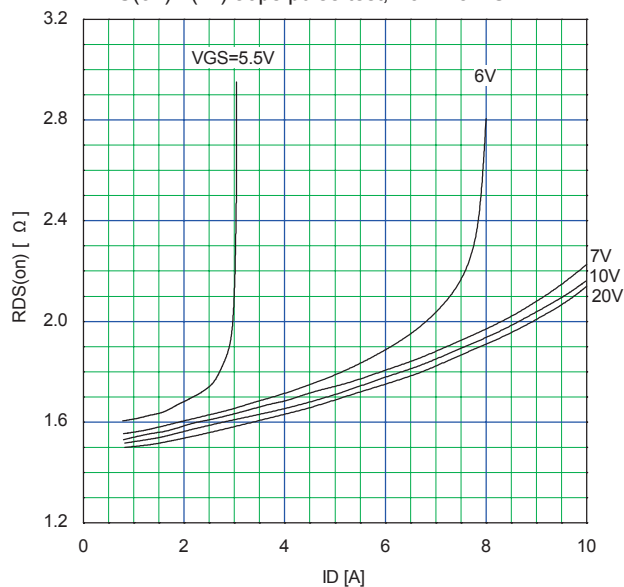
Typical Transconductance

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

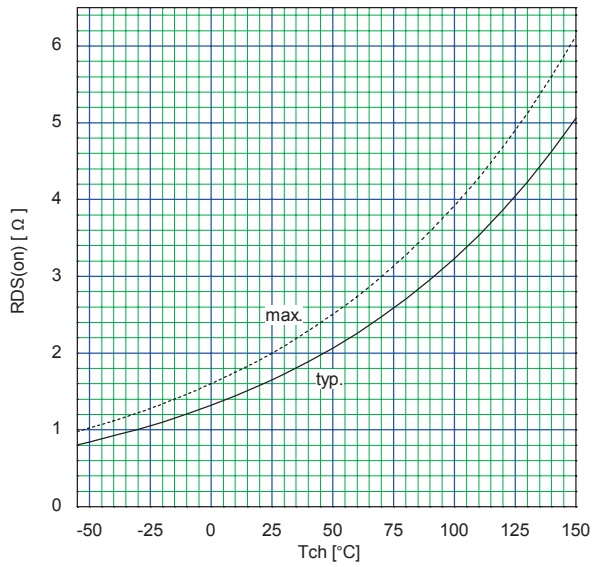


Typical Drain-Source on-state Resistance

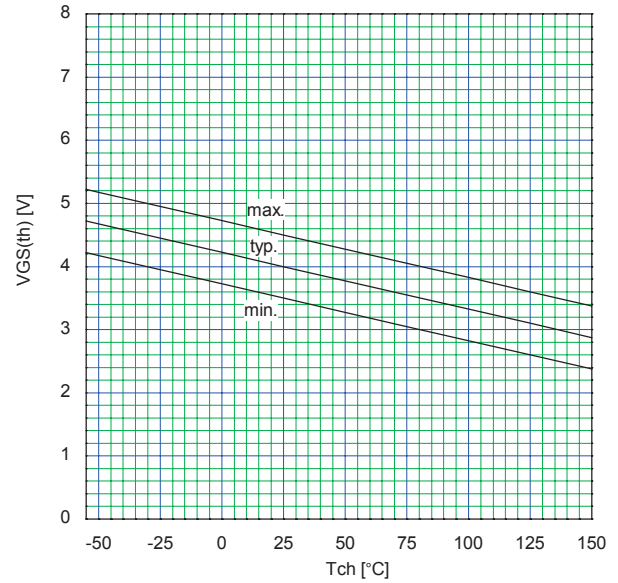
$R_{DS(on)}=f(I_D): 80\mu s \text{ pulse test}, T_{ch}=25^{\circ}C$



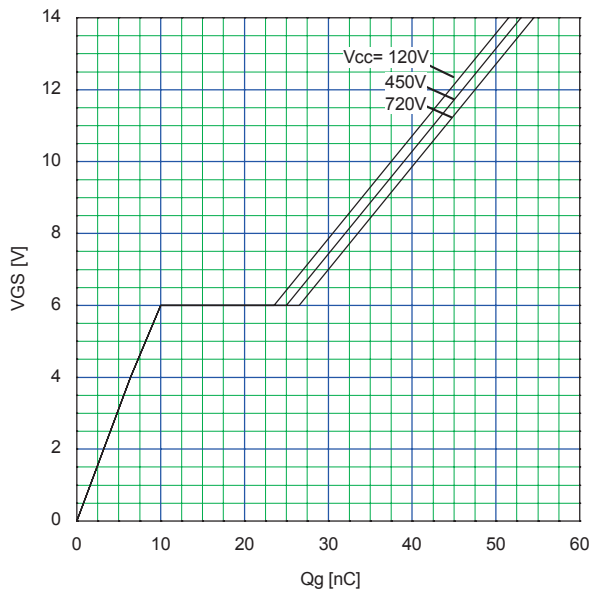
Drain-Source On-state Resistance
 $R_{DS(on)} = f(T_{ch}): I_D = 3.5A, V_{GS} = 10V$



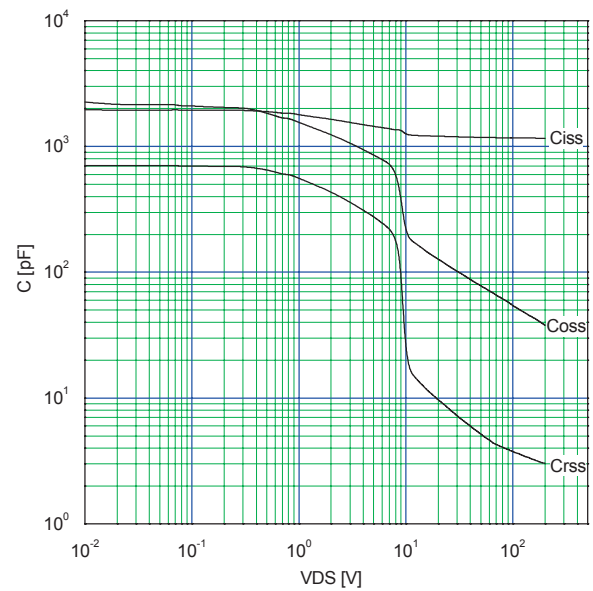
Gate Threshold Voltage vs. T_{ch}
 $V_{GS(th)} = f(T_{ch}): V_{DS} = V_{GS}, I_D = 250\mu A$



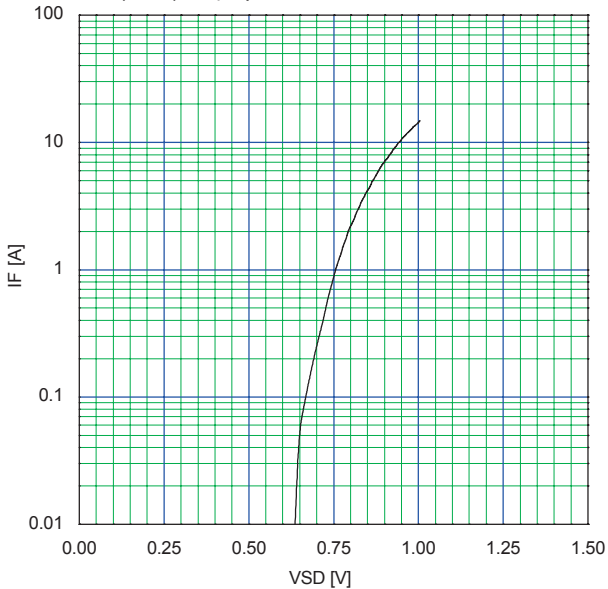
Typical Gate Charge Characteristics
 $V_{GS} = f(Q_g): I_D = 7A, T_{ch} = 25^{\circ}C$



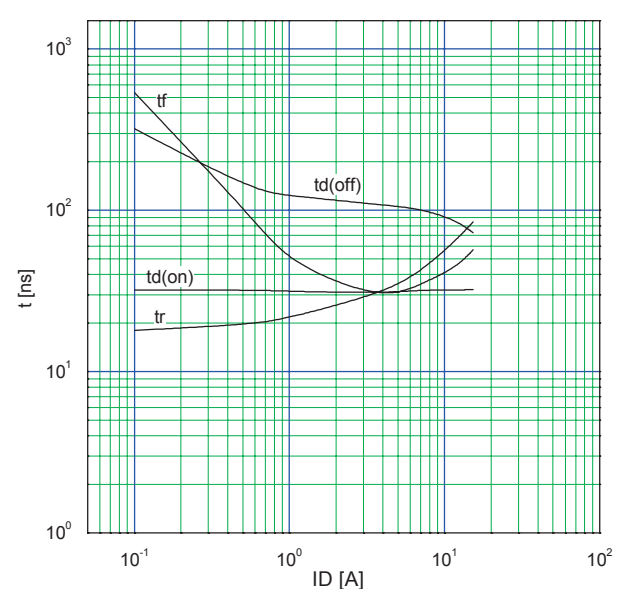
Typical Capacitance
 $C = f(V_{DS}): V_{GS} = 0V, f = 1MHz$

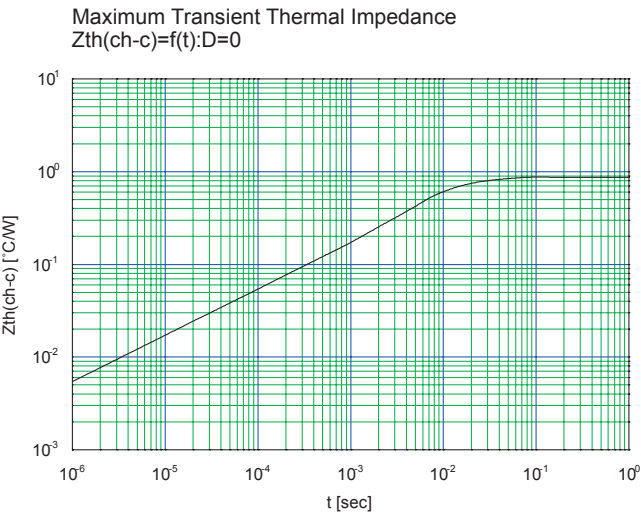
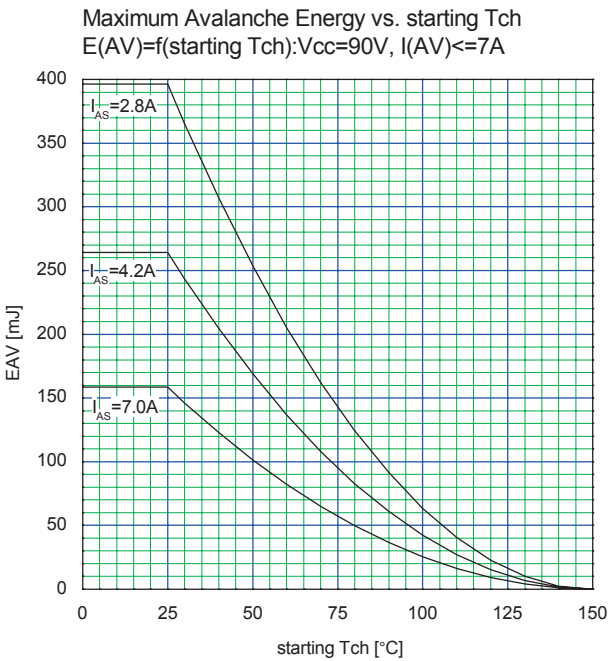


Typical Forward Characteristics of Reverse Diode
 $I_F = f(V_{SD}): 80\mu s$ pulse test, $T_{ch} = 25^{\circ}C$



Typical Switching Characteristics vs. I_D
 $t = f(I_D): V_{CC} = 600V, V_{GS} = 10V, R_G = 3\Omega$





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