

FMV10N80E

FUJI POWER MOSFET

Super FAP-E³ series

N-CHANNEL SILICON POWER MOSFET

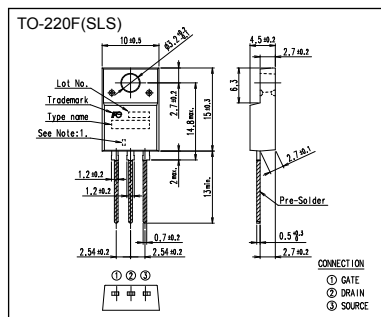
■ Features

- 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

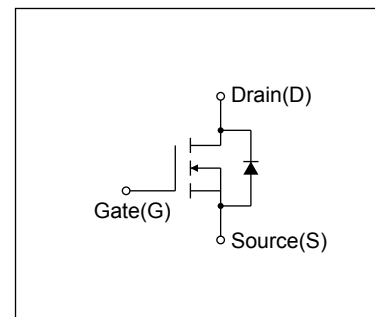
■ Applications

- 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}	800	V	
	V_{DSX}	800	V	$V_{GS} = -30V$
Continuous Drain Current	I_D	± 10	A	
Pulsed Drain Current	I_{DP}	± 40	A	
Gate-Source Voltage	V_{GS}	± 30	V	
Repetitive and Non-Repetitive Maximum AvalancheCurrent	I_{AR}	10	A	Note*1
Non-Repetitive Maximum Avalanche Energy	E_{AS}	572.4	mJ	Note*2
Repetitive Maximum Avalanche Energy	E_{AR}	8.5	mJ	Note*3
Peak Diode Recovery dV/dt	dV/dt	2.1	kV/ μs	Note*4
Peak Diode Recovery -di/dt	$-di/dt$	100	A/ μs	Note*5
Maximum Power Dissipation	P_D	2.16	W	$T_a=25^{\circ}C$
		85		$T_c=25^{\circ}C$
Operating and Storage Temperature range	T_{ch}	150	$^{\circ}C$	
	T_{sto}	-55 to + 150	$^{\circ}C$	

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

Description	Symbol	Conditions	min.	typ.	max.	Unit
Drain-Source Breakdown Voltage	V_{DS}	$I_D=250\mu A, V_{GS}=0V$	800	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$I_D=250\mu A, V_{DS}=V_{GS}$	3.5	4.0	4.5	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=800V, V_{GS}=0V$ $T_{ch}=25^{\circ}C$	-	-	25	μA
		$V_{DS}=640V, V_{GS}=0V$ $T_{ch}=125^{\circ}C$	-	-	250	
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$	-	10	100	nA
Drain-Source On-State Resistance	$R_{DS(on)}$	$I_D=5.0A, V_{GS}=10V$	-	0.9	1.1	Ω
Forward Transconductance	g_{fs}	$I_D=5.0A, V_{DS}=25V$	5.0	10	-	S
Input Capacitance	C_{iss}	$V_{DS}=25V$	-	1650	2500	pF
Output Capacitance	C_{oss}	$V_{GS}=0V$	-	165	250	
Reverse Transfer Capacitance	C_{rss}	$f=1MHz$	-	11	17	
Turn-On Time	$t_d(on)$	$V_{cc}=600V$	-	34	51	ns
	t_r	$V_{GS}=10V$	-	32	48	
Turn-Off Time	$t_d(off)$	$I_D=5.0A$	-	105	160	
	t_f	$R_G=24\Omega$	-	30	45	
Total Gate Charge	Q_G	$V_{cc}=450V$	-	50	75	nC
Gate-Source Charge	Q_{GS}	$I_D=10A$	-	14	21	
Drain-Source Crossover Charge	Q_{SW}	$V_{GS}=10V$	-	6	9	
Gate-Drain Charge	Q_{GD}	See Fig.5	-	17	26	
Avalanche Capability	I_{AV}	$L=4.20mH, T_{ch}=25^{\circ}C$	10	-	-	A
Diode Forward On-Voltage	V_{SD}	$I_F=10A, V_{GS}=0V, T_{ch}=25^{\circ}C$	-	0.90	1.35	V
Reverse Recovery Time	t_{rr}	$I_F=10A, V_{GS}=0V$	-	1.8	-	μS
Reverse Recovery Charge	Q_{rr}	$-di/dt=100A/\mu s, T_{ch}=25^{\circ}C$	-	15	-	μC

● Thermal Characteristics

Description	Symbol	Test Conditions	min.	typ.	max.	Unit
Thermal resistance	Rth (ch-c)	Channel to case			1.471	°C/W
	Rth (ch-a)	Channel to ambient			58.0	°C/W

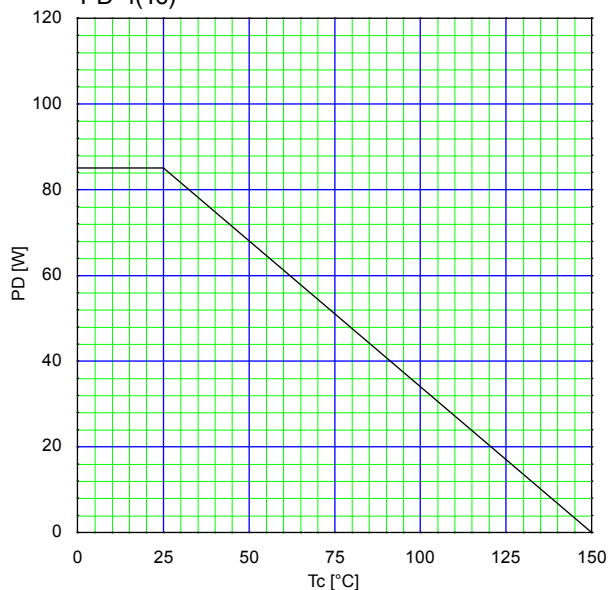
Note *1 : Tch≤150°C.

Note *2 : Stating Tch=25°C, IAS=4.0A, L=65.6mH, Vcc=80V, RG=10Ω,
EAS limited by maximum channel temperature and avalanche current.

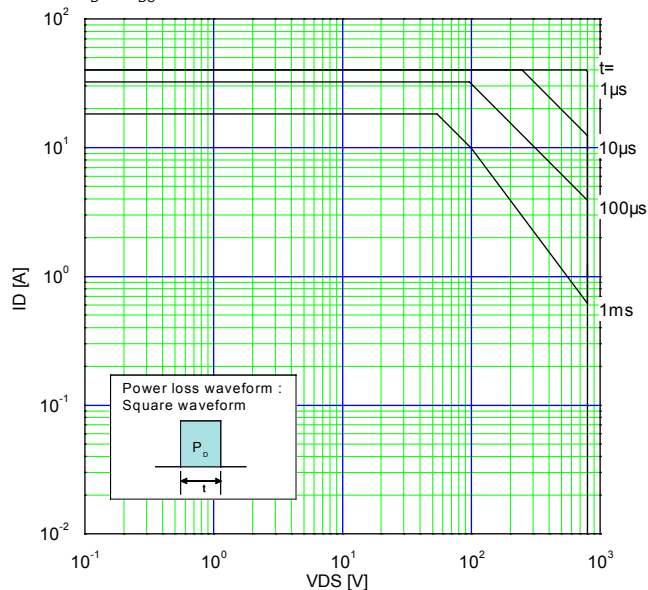
Note *3 : Repetitive rating : Pulse width limited by maximum channel temperature.

Note *5 : $I_F \leq -I_D$, $dv/dt = 2.1 \text{ kV}/\mu\text{s}$, $V_{CC} \leq BV_{DSS}$, $T_{ch} \leq 150^\circ\text{C}$.

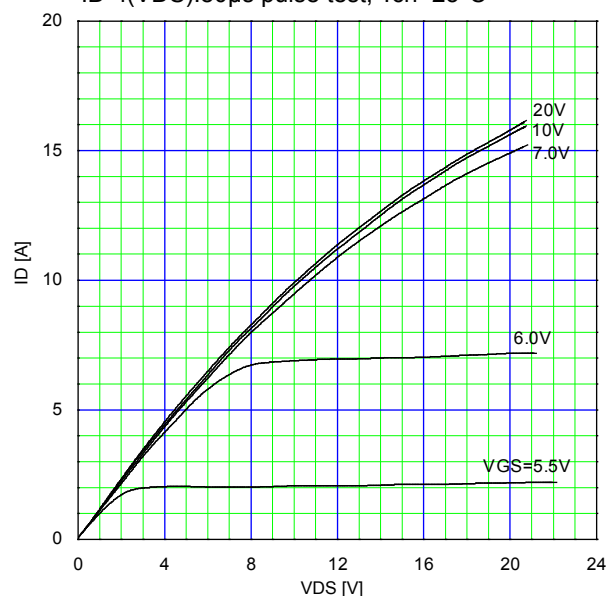
Allowable Power Dissipation
 $PD=f(T_c)$



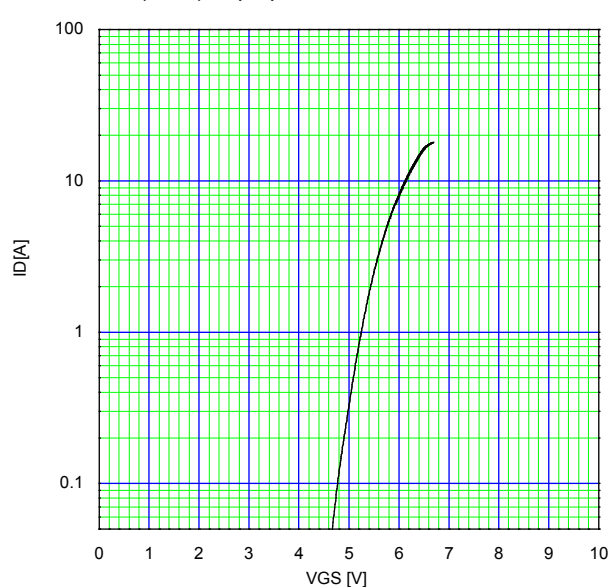
Safe Operating Area
 $I_D=f(V_{DS}): \text{Duty}=0(\text{Single pulse}), T_c=25^\circ\text{C}$



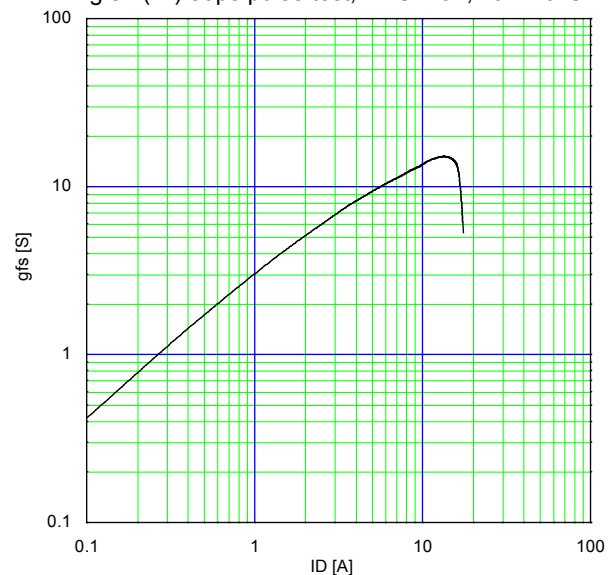
Typical Output Characteristics
 $I_D=f(V_{DS}): 80\mu\text{s}$ pulse test, $T_{ch}=25^\circ\text{C}$



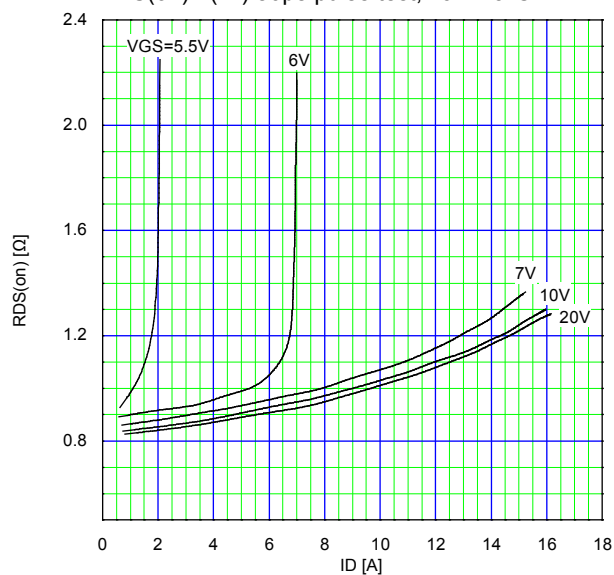
Typical Transfer Characteristic
 $I_D=f(V_{GS}): 80\mu\text{s}$ pulse test, $V_{DS}=25\text{V}, T_{ch}=25^\circ\text{C}$



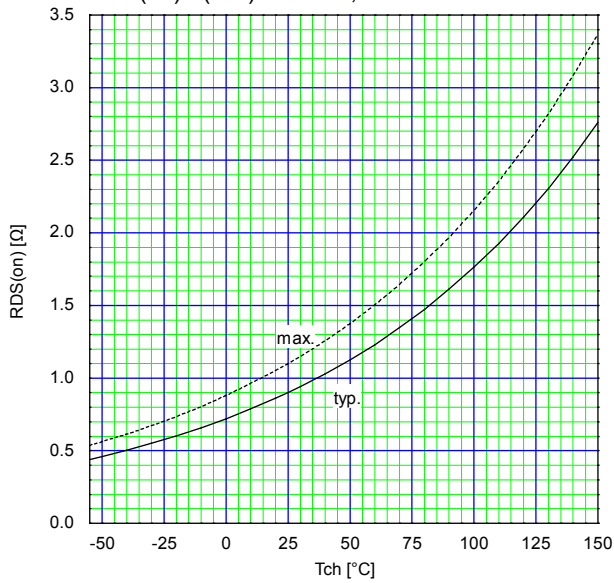
Typical Transconductance
 $g_{fs}=f(I_D): 80\mu\text{s}$ pulse test, $V_{DS}=25\text{V}, T_{ch}=25^\circ\text{C}$



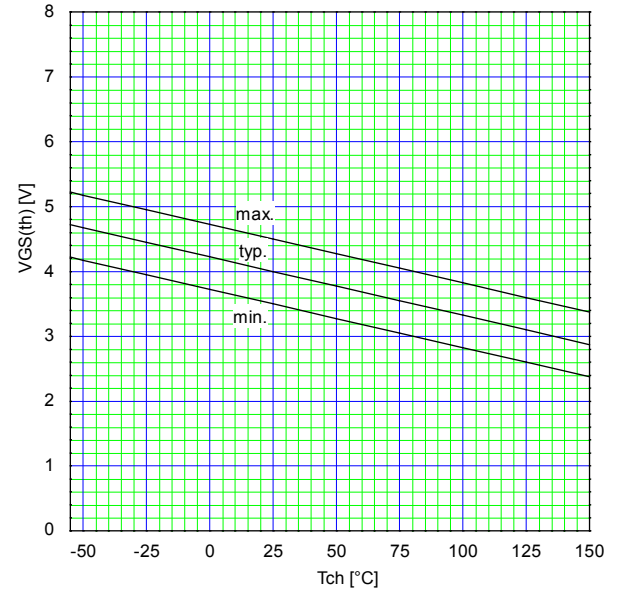
Typical Drain-Source on-state Resistance
 $R_{DS(on)}=f(I_D): 80\mu\text{s}$ pulse test, $T_{ch}=25^\circ\text{C}$



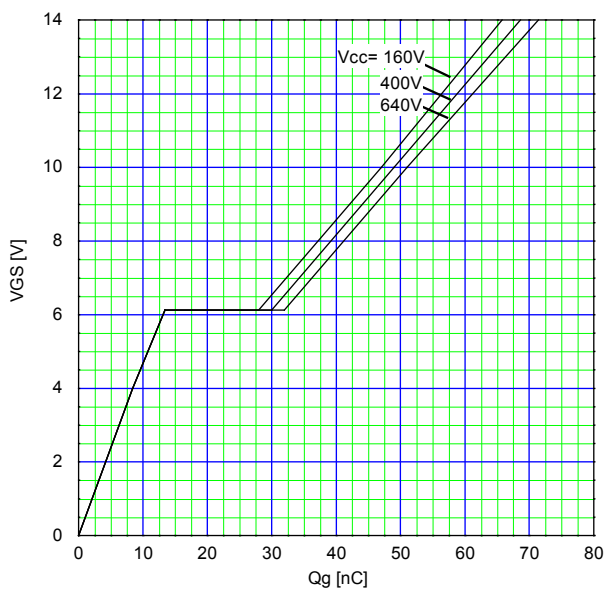
Drain-Source On-state Resistance
 $R_{DS(on)} = f(T_{ch}): I_D = 5.0A, V_{GS} = 10V$



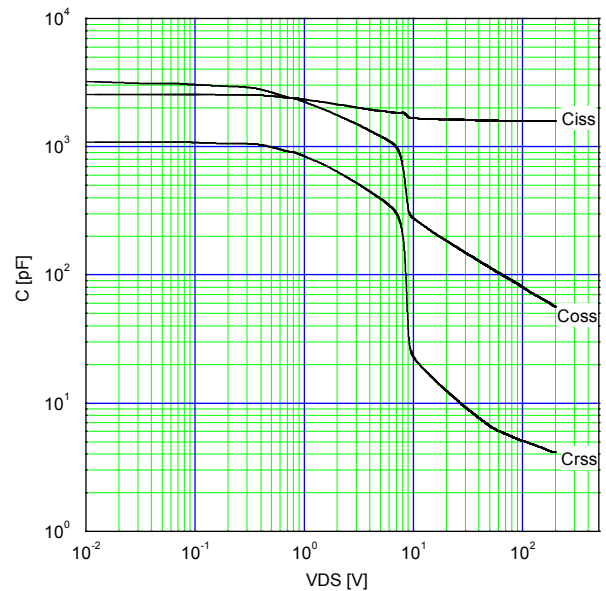
Gate Threshold Voltage vs. T_{ch}
 $V_{GS(th)} = f(T_{ch}): V_{DS} = V_{GS}, I_D = 250\mu A$



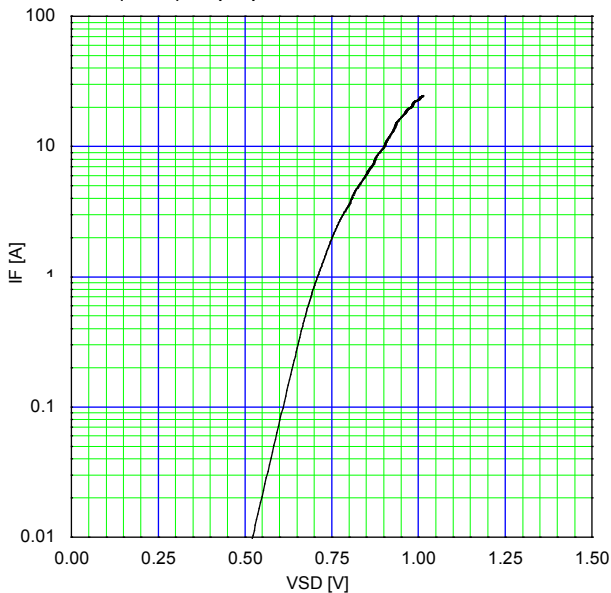
Typical Gate Charge Characteristics
 $V_{GS} = f(Q_g): I_D = 10A, T_{ch} = 25^{\circ}C$



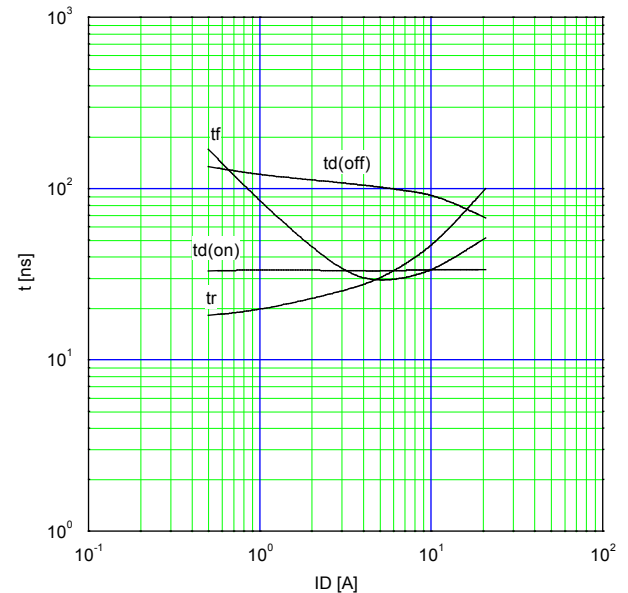
Typical Capacitance
 $C = f(V_{DS}): V_{GS} = 0V, f = 1MHz$

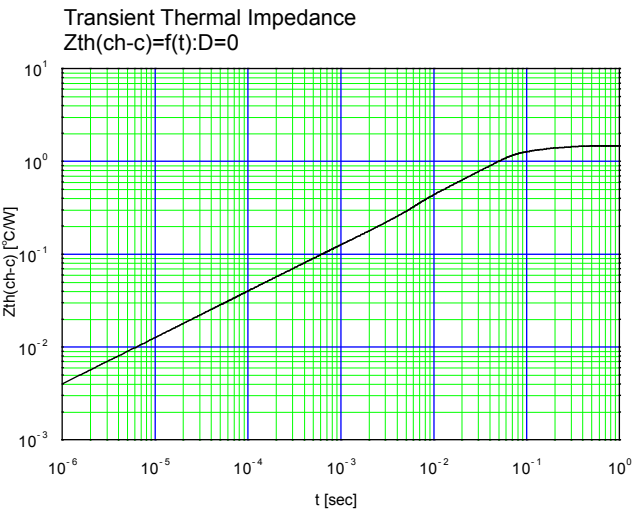
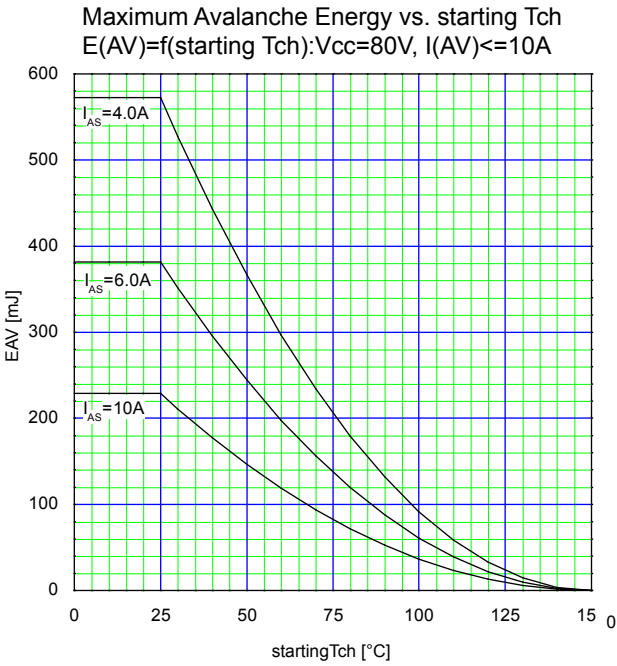


Typical Forward Characteristics of Reverse Diode
 $I_F = f(V_{SD}): 80\mu s$ pulse test, $T_{ch} = 25^{\circ}C$



Typical Switching Characteristics vs. I_D
 $t = f(I_D): V_{CC} = 600V, V_{GS} = 10V, R_G = 24\Omega$





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