

N-CHANNEL SILICON POWER MOSFET

FAP-IIA SERIES

■ Features

- High speed switching
- Low on-resistance
- No secondary breakdown
- Low driving power
- High voltage
- $V_{GS}=\pm 30V$ Guarantee
- Avalanche-proof

■ Applications

- Switching regulators
- UPS
- DC-DC converters
- General purpose power amplifier

■ Maximum ratings and characteristics

● Absolute maximum ratings ($T_c=25^\circ\text{C}$ unless otherwise specified)

Item	Symbol	Rating	Unit
Drain-source voltage	V_{DS}	500	V
Continuous drain current	I_D	3.5	A
Pulsed drain current	$I_{D(puls)}$	14	A
Continuous reverse drain current	I_{DR}	3.5	A
Gate-source peak voltage	V_{GS}	± 30	V
Max. power dissipation	P_D	30	W
Operating and storage temperature range	T_{ch} T_{stg}	$+150$ -55 to $+150$	$^\circ\text{C}$ $^\circ\text{C}$

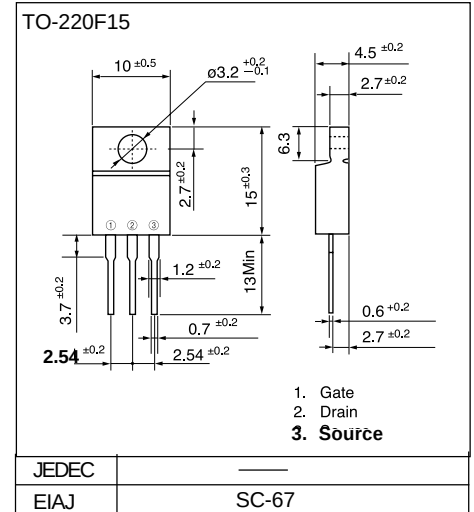
● Electrical characteristics ($T_c = 25^\circ\text{C}$ unless otherwise specified)

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D=1\text{mA}$ $V_{GS}=0V$	500			V
Gate threshold voltage	$V_{GS(th)}$	$I_D=1\text{mA}$ $V_{DS}=V_{GS}$	2.5	3.0	3.5	V
Zero gate voltage drain current	I_{DSS}	$V_{DS}=500V$ $V_{GS}=0V$		10	500	μA
				0.2	1.0	mA
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 30V$ $V_{DS}=0V$		10	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$I_D=1.5A$ $V_{GS}=10V$		2.0	3.0	Ω
Forward transconductance	g_{fs}	$I_D=1.5A$ $V_{DS}=25V$	1.5	3.0		S
Input capacitance	C_{iss}	$V_{DS}=25V$		600	900	pF
Output capacitance	C_{oss}	$V_{GS}=0V$		50	75	
Reverse transfer capacitance	C_{rss}	$f=1\text{MHz}$		10	15	ns
Turn-on time t_{on}	$t_{d(on)}$	$V_{CC}=300V$ $R_G=10\Omega$ $I_D=3.5A$		15	25	
	t_r			10	15	
Turn-off time t_{off}	$t_{d(off)}$	$V_{GS}=10V$		40	60	
	t_f			15	25	
Avalanche capability	I_{AV}	$L=100\mu\text{H}$ $T_{ch}=25^\circ\text{C}$	3.5			A
Diode forward on-voltage	V_{SD}	$I_F=2I_{DR}$ $V_{GS}=0V$ $T_{ch}=25^\circ\text{C}$		1.1	1.65	V
Reverse recovery time	t_{rr}	$I_F=I_{DR}$ $V_{GS}=0V$		400		ns
Reverse recovery charge	Q_{rr}	$-di/dt=100A/\mu\text{s}$ $T_{ch}=25^\circ\text{C}$		1.5		μC

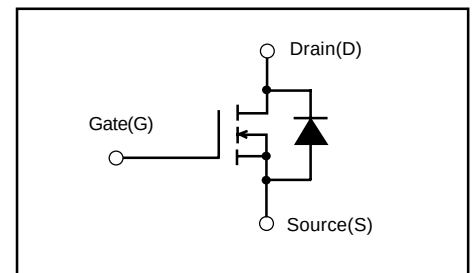
● Thermal characteristics

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	$R_{th(ch-a)}$	channel to ambient			62.5	$^\circ\text{C/W}$
	$R_{th(ch-c)}$	channel to case			4.17	$^\circ\text{C/W}$

■ Outline Drawings

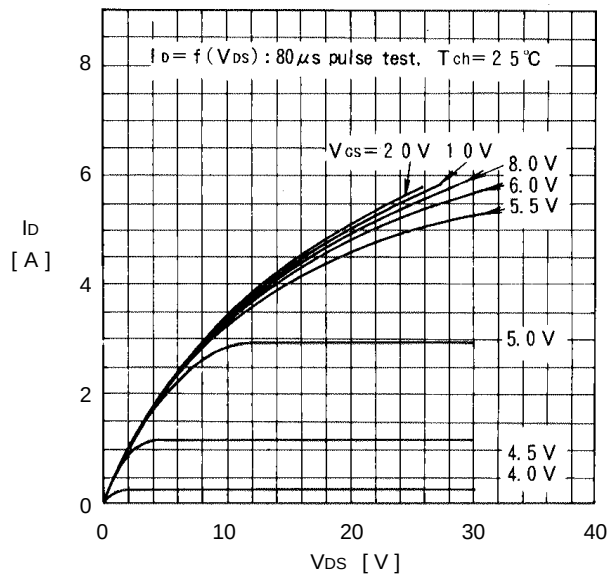
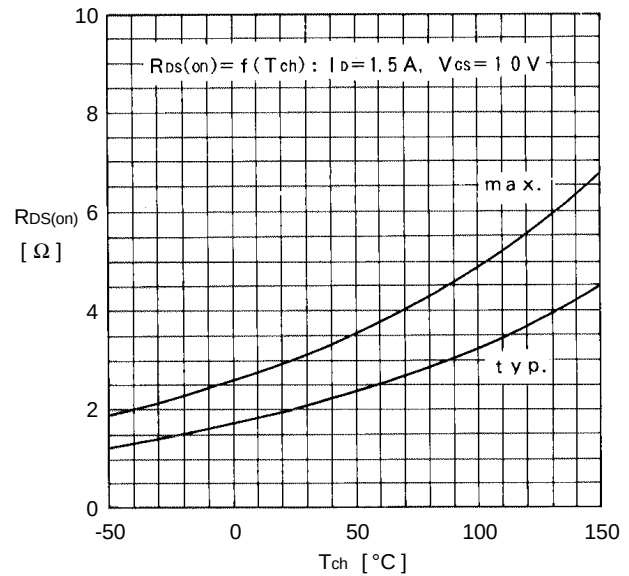


■ Equivalent circuit schematic

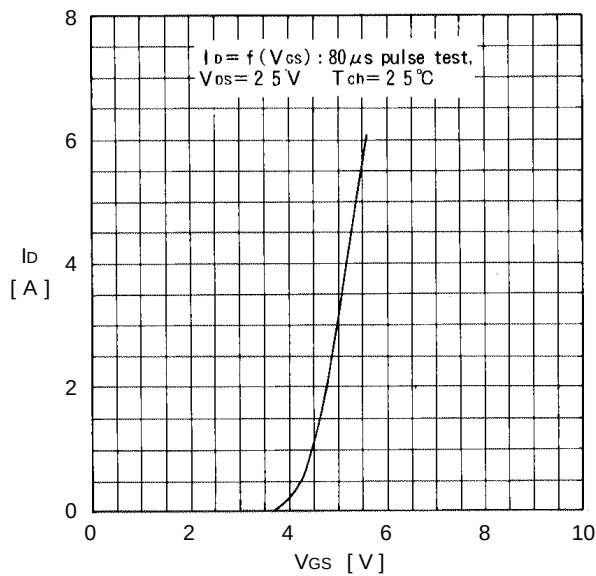
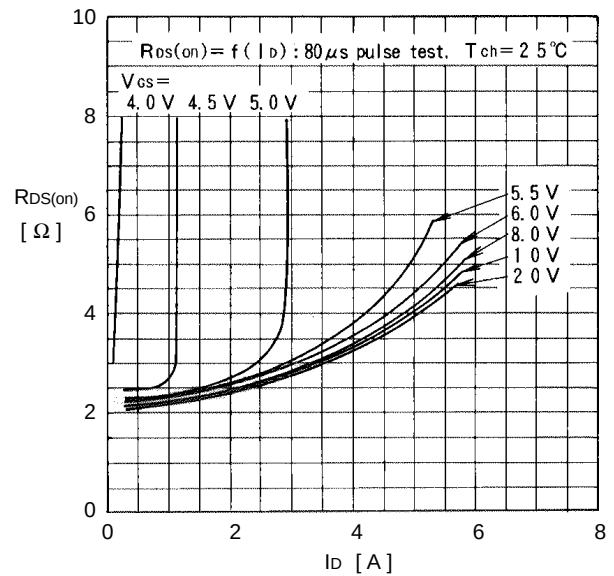
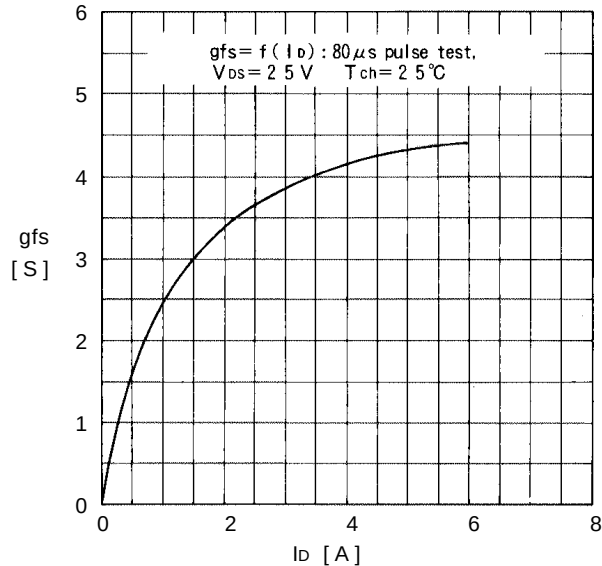
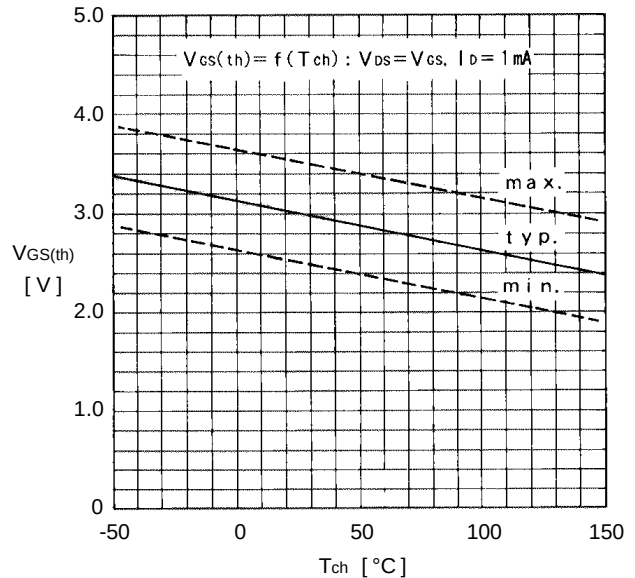


Characteristics

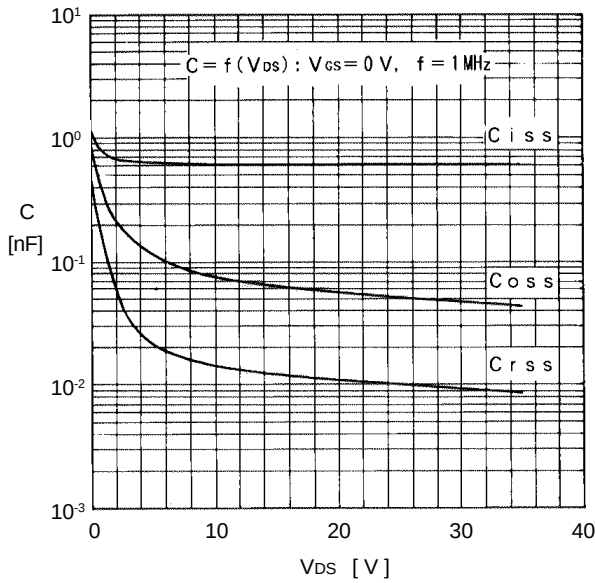
Typical output characteristics

On state resistance vs. T_{ch} 

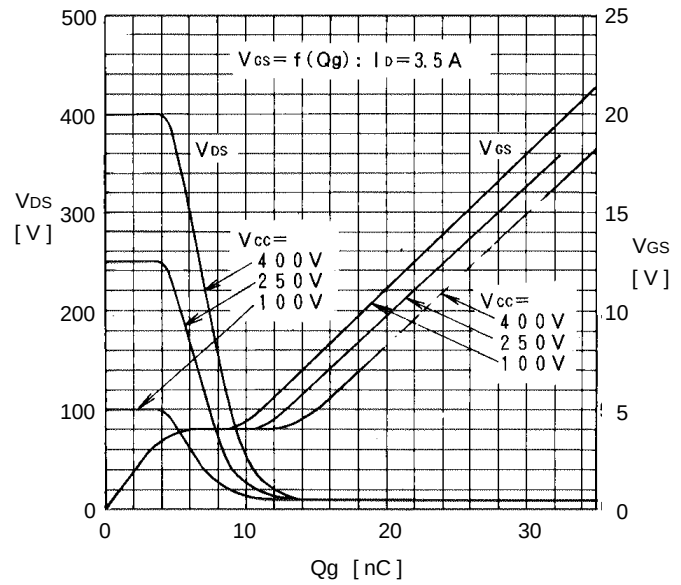
Typical transfer characteristics

Typical Drain-Source on state resistance vs. I_D Typical forward transconductance vs. I_D Gate threshold voltage vs. T_{ch} 

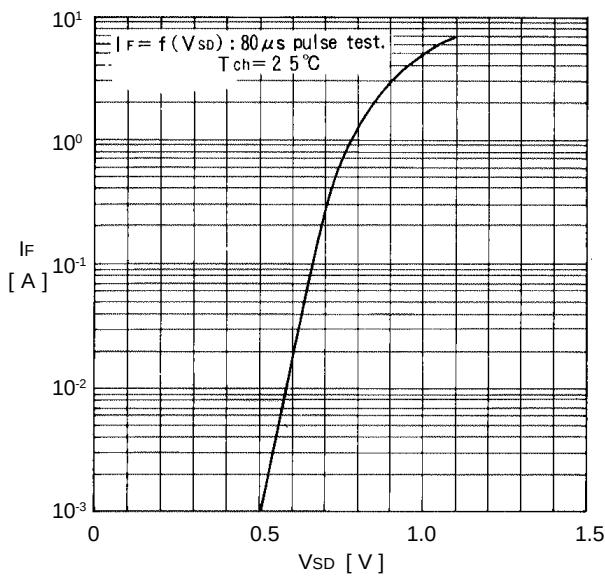
Typical capacitance vs. V_{DS}



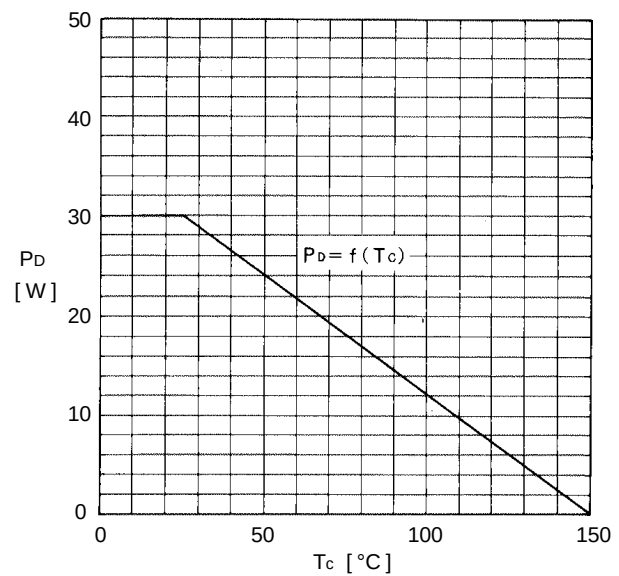
Typical input charge



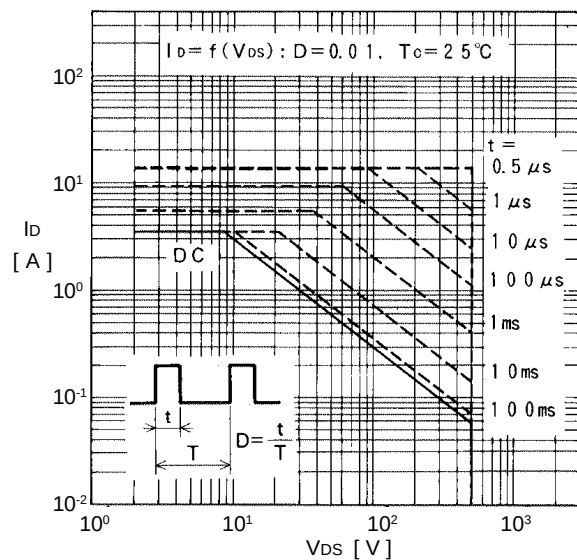
Forward characteristics of reverse diode



Allowable power dissipation vs. T_c



Safe operating area



Transient thermal impedance

