

N-CHANNEL SILICON POWER MOSFET

FAP-IIA SERIES

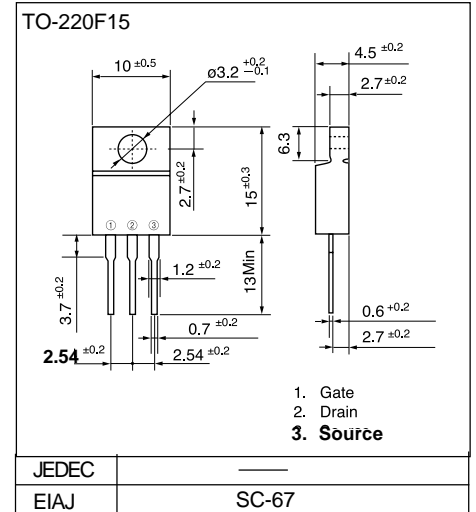
Features

- 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

Outline Drawings

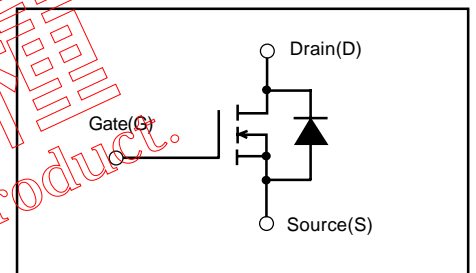


Maximum ratings and characteristics

Absolute maximum ratings ($T_c = 25^\circ C$ 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	$^\circ C$

Equivalent circuit schematic



Electrical characteristics ($T_c = 25^\circ C$ unless otherwise specified)

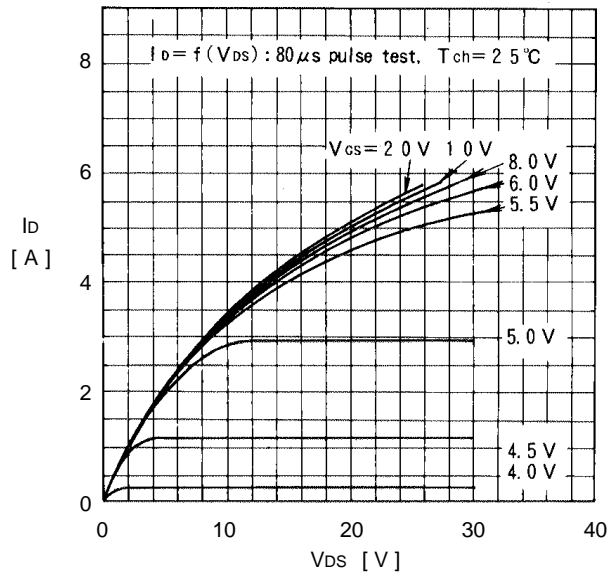
Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 1mA$ $V_{GS} = 0V$	500			V
Gate threshold voltage	$V_{GS(th)}$	$I_D = 1mA$ $V_{DS} = V_{GS}$	2.5	3.0	3.5	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 500V$ $V_{GS} = 0V$	$T_{ch} = 25^\circ C$	10	500	μA
			$T_{ch} = 125^\circ C$	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}	$f = 1MHz$		10	15	
Turn-on time t_{on} ($t_{on} = t_{d(on)} + t_r$)	$t_{d(on)}$	$V_{CC} = 300V$ $R_G = 10\Omega$		15	25	ns
	t_r	$I_D = 3.5A$		10	15	
Turn-off time t_{off} ($t_{off} = t_{d(off)} + t_f$)	$t_{d(off)}$	$V_{GS} = 10V$		40	60	
	t_f			15	25	
Avalanche capability	I_{AV}	$L = 100\mu H$ $T_{ch} = 25^\circ C$	3.5			A
Diode forward on-voltage	V_{SD}	$I_F = 2 \times I_{DR}$ $V_{GS} = 0V$ $T_{ch} = 25^\circ C$		1.1	1.65	V
Reverse recovery time	t_{rr}	$I_F = I_{DR}$ $V_{GS} = 0V$		400		ns
Reverse recovery charge	Q_{rr}	$-di/dt = 100A/\mu s$ $T_{ch} = 25^\circ C$		1.5		μC

Thermal characteristics

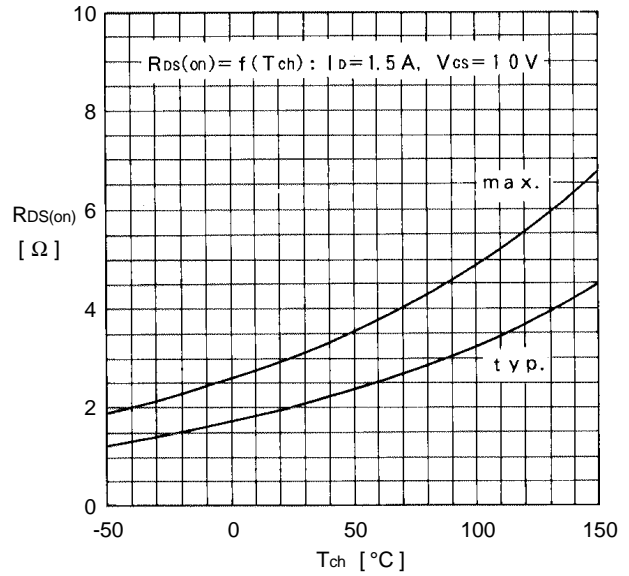
Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	$R_{th(ch-a)}$	channel to ambient			62.5	$^\circ C/W$
	$R_{th(ch-c)}$	channel to case			4.17	$^\circ C/W$

Characteristics

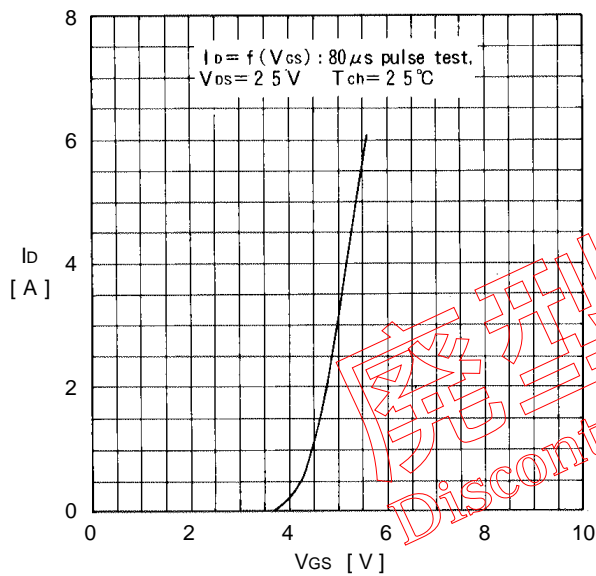
Typical output characteristics



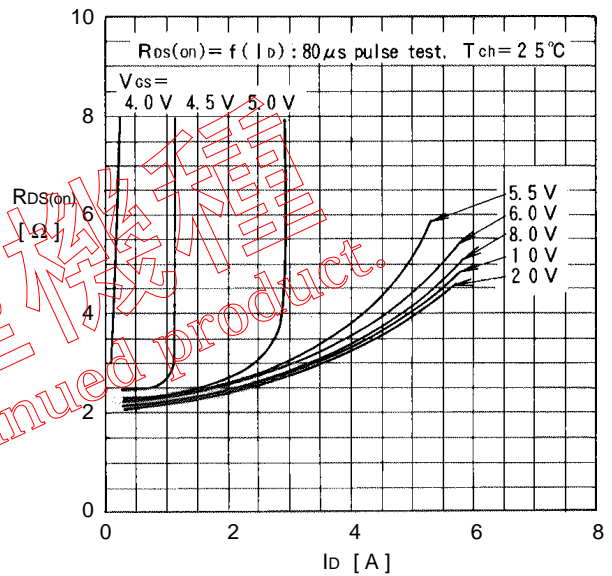
On state resistance vs. T_{ch}



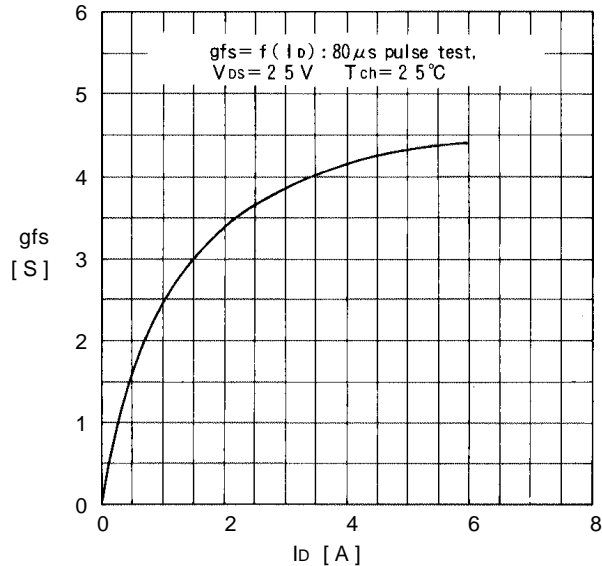
Typical transfer characteristics



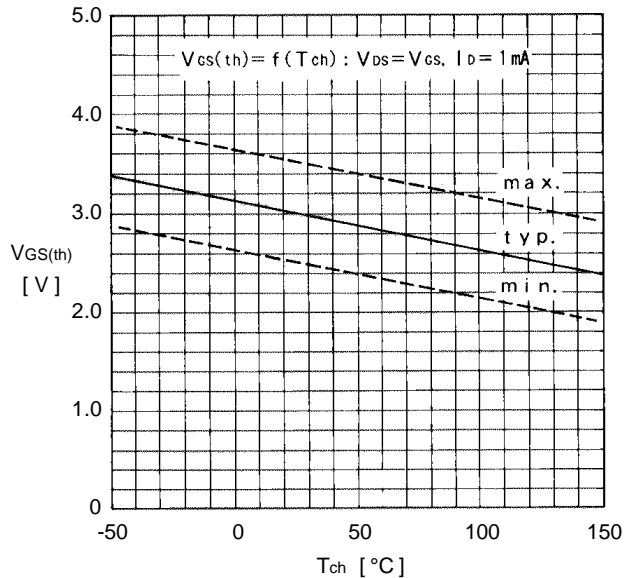
Typical Drain-Source on state resistance vs. I_D



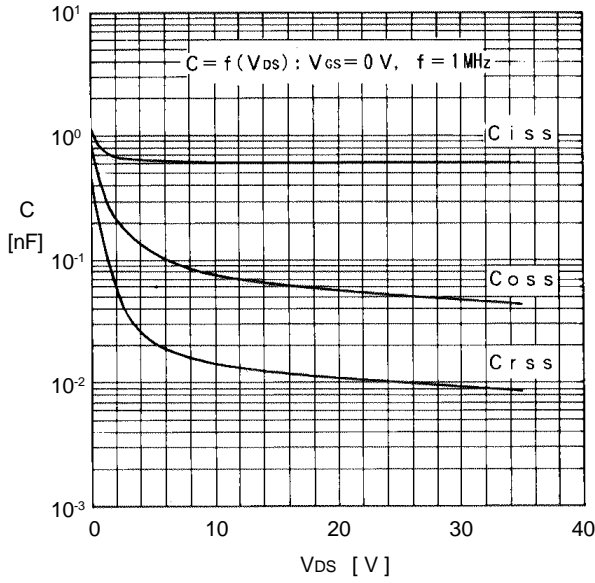
Typical forward transconductance vs. I_D



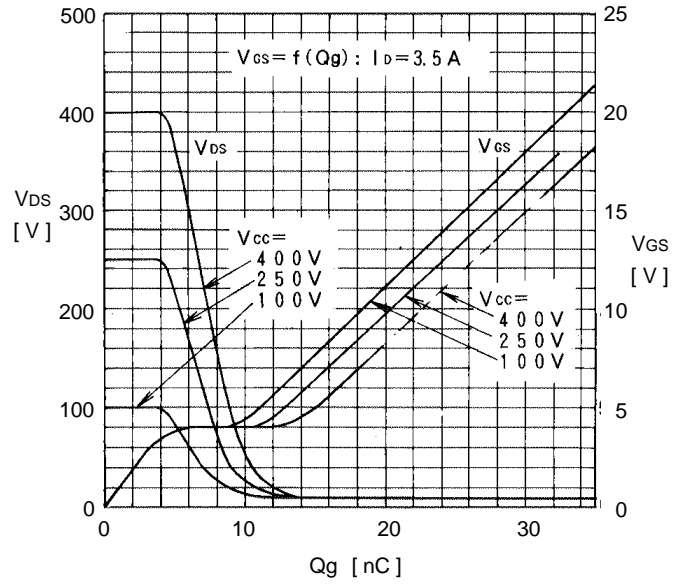
Gate threshold voltage vs. T_{ch}



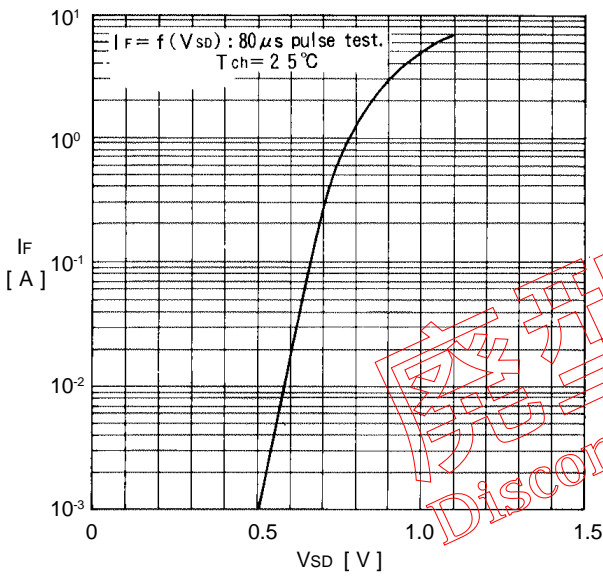
Typical capacitance vs. V_{DS}



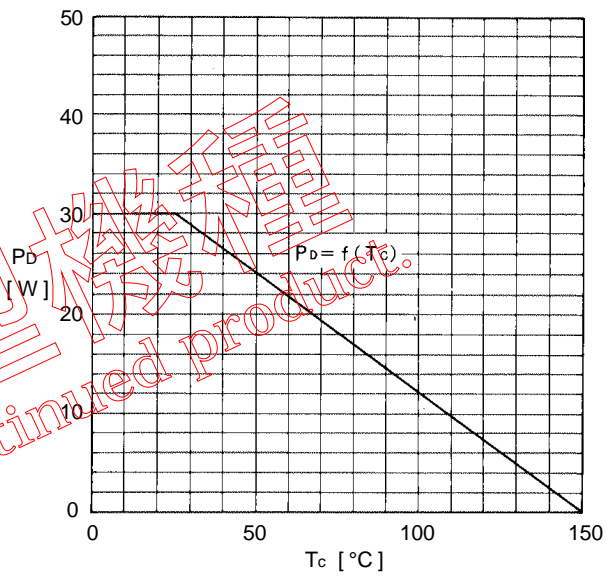
Typical input charge



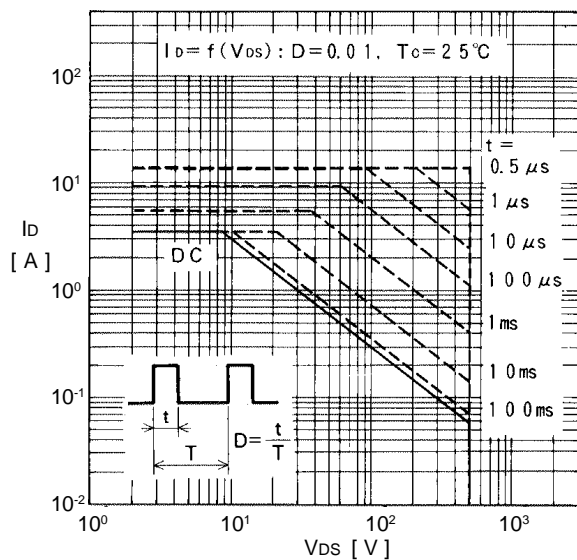
Forward characteristics of reverse diode



Allowable power dissipation vs. T_c



Safe operating area



Transient thermal impedance

