

N-CHANNEL SILICON POWER MOSFET

F- II SERIES

■ Features

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

■ Applications

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

■ 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	4.5	A
Pulsed drain current	$I_{D(puls)}$	12	A
Continuous reverse drain current	I_{DR}	4.5	A
Gate-source peak voltage	V_{GS}	± 30	V
Max. power dissipation	P_D	60	W
Operating and storage temperature range	T_{ch}	+150	$^\circ C$
	T_{stg}	-55 to +150	$^\circ C$

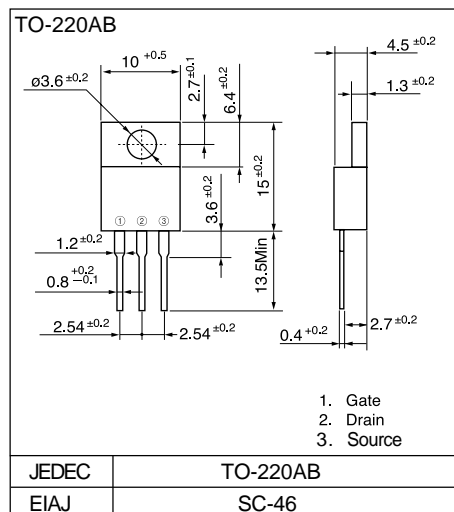
● Electrical characteristics ($T_c = 25^\circ C$ unless otherwise specified)

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	3.5	5.0	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	$R_{DS(on)}$	$I_D = 2.5A$ $V_{GS} = 10V$		1.5	2.2	Ω
Forward transconductance	g_{fs}	$I_D = 2.5A$ $V_{DS} = 25V$	1.5	3.0		S
Input capacitance	C_{iss}	$V_{DS} = 25V$		500	750	pF
Output capacitance	C_{oss}	$V_{GS} = 0V$		70	100	
Reverse transfer capacitance	C_{rss}	$f = 1MHz$		30	45	
Turn-on time t_{on} ($t_{on} = t_{d(on)} + t_r$)	$t_{d(on)}$	$V_{CC} = 300V$ $R_G = 25 \Omega$		10	15	ns
	t_r	$I_D = 4.5A$		50	80	
Turn-off time t_{off} ($t_{off} = t_{d(off)} + t_f$)	$t_{d(off)}$	$V_{GS} = 10V$		80	120	ns
	t_f			50	80	
Diode forward on-voltage	V_{SD}	$I_F = 2 \times I_{DR}$ $V_{GS} = 0V$ $T_{ch} = 25^\circ C$		1.0	1.5	V
Reverse recovery time	t_{rr}	$I_F = I_{DR}$ $di/dt = 100A/\mu s$ $T_{ch} = 25^\circ C$		300		ns

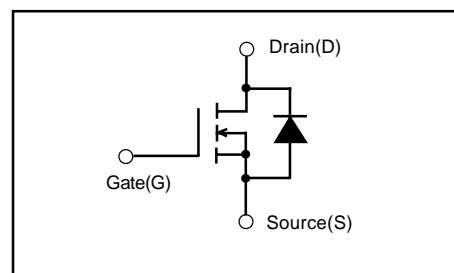
● Thermal characteristics

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	$R_{th(ch-a)}$	channel to ambient			75.0	$^\circ C/W$
	$R_{th(ch-c)}$	channel to case			2.08	$^\circ C/W$

■ Outline Drawings

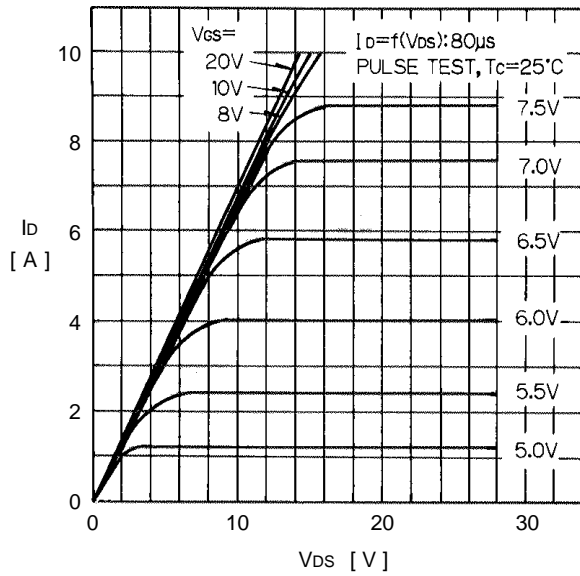


■ Equivalent circuit schematic

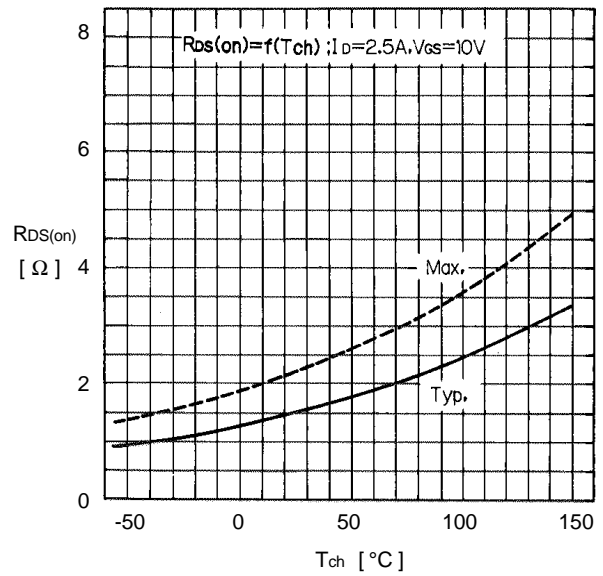


Characteristics

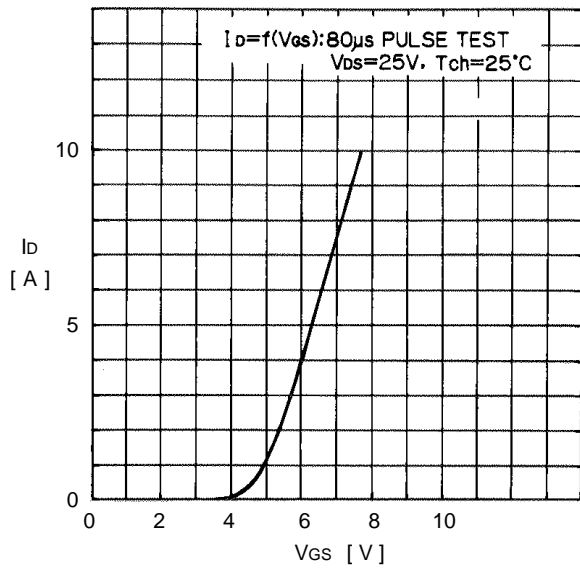
Typical output characteristics



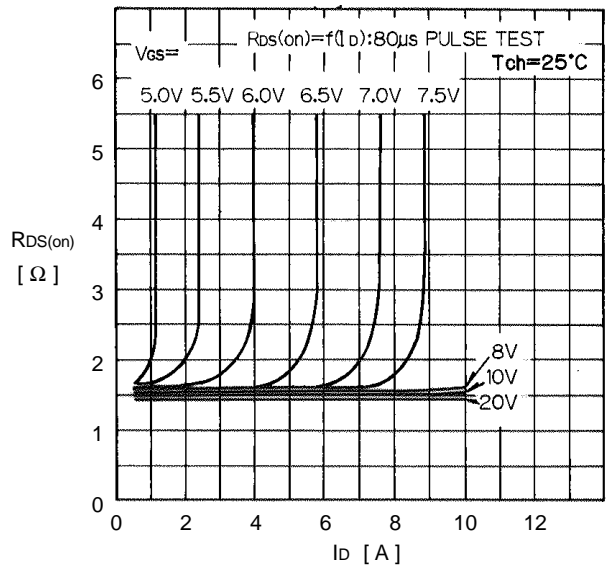
Drain-Source on state resistance vs. T_{ch}



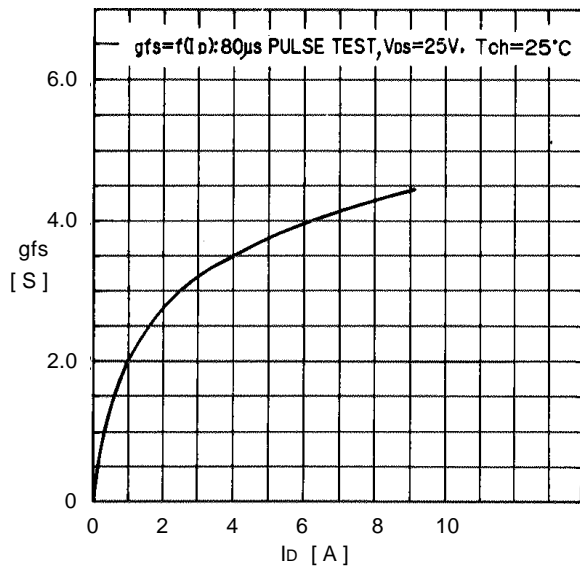
Typical transfer characteristics



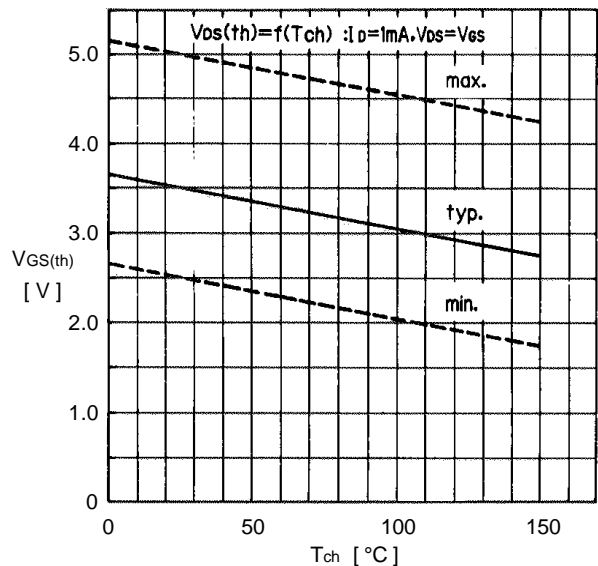
Typical Drain-Source on state resistance vs. I_D



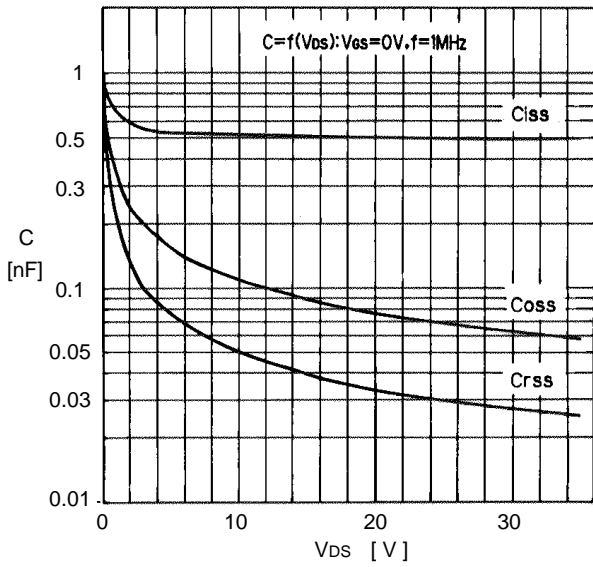
Typical forward transconductance vs. I_D



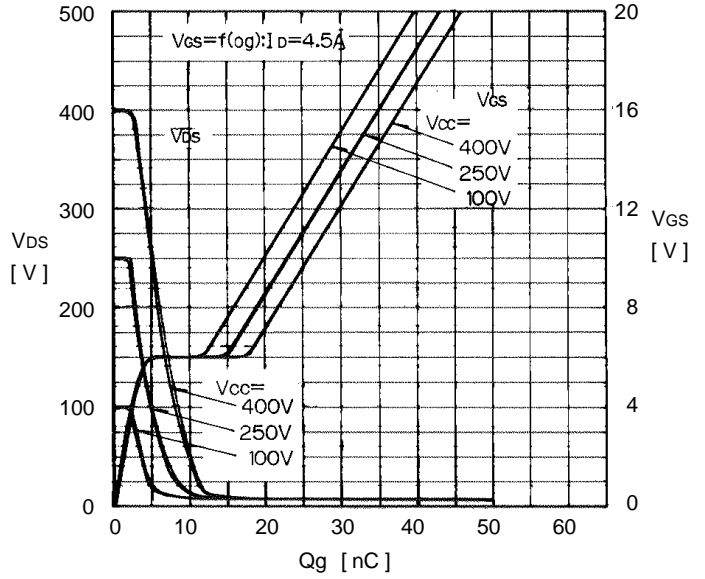
Gate threshold voltage vs. T_{ch}



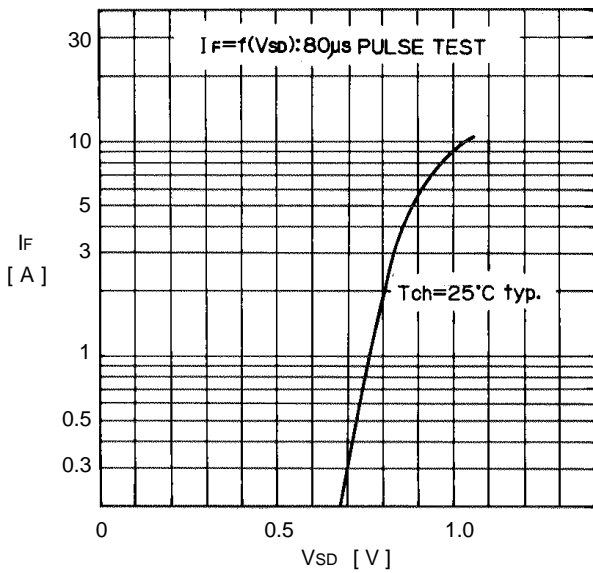
Typical capacitance vs. V_{DS}



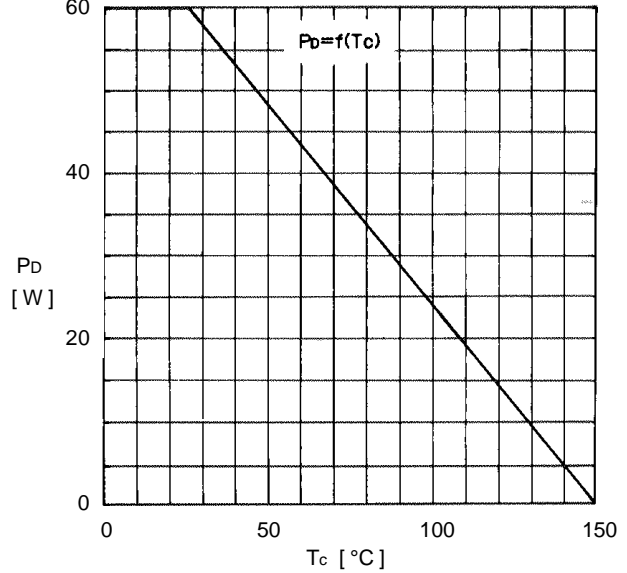
Typical input charge



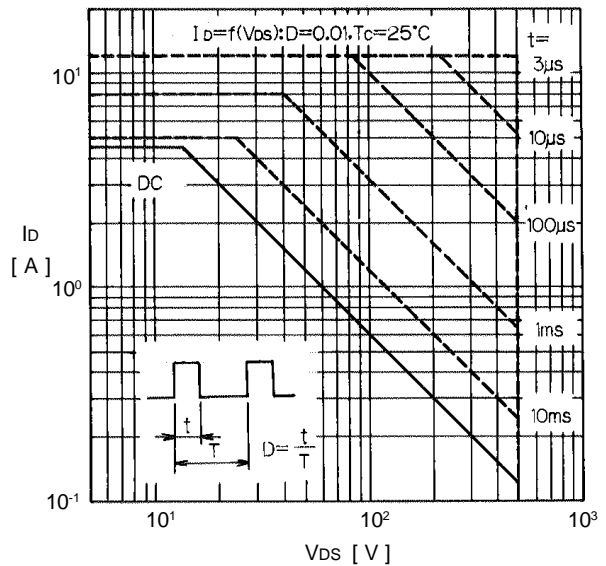
Forward characteristics of reverse diode



Allowable power dissipation vs. T_c



Safe operating area



Transient thermal impedance

