

May 1987

GENERAL DESCRIPTION

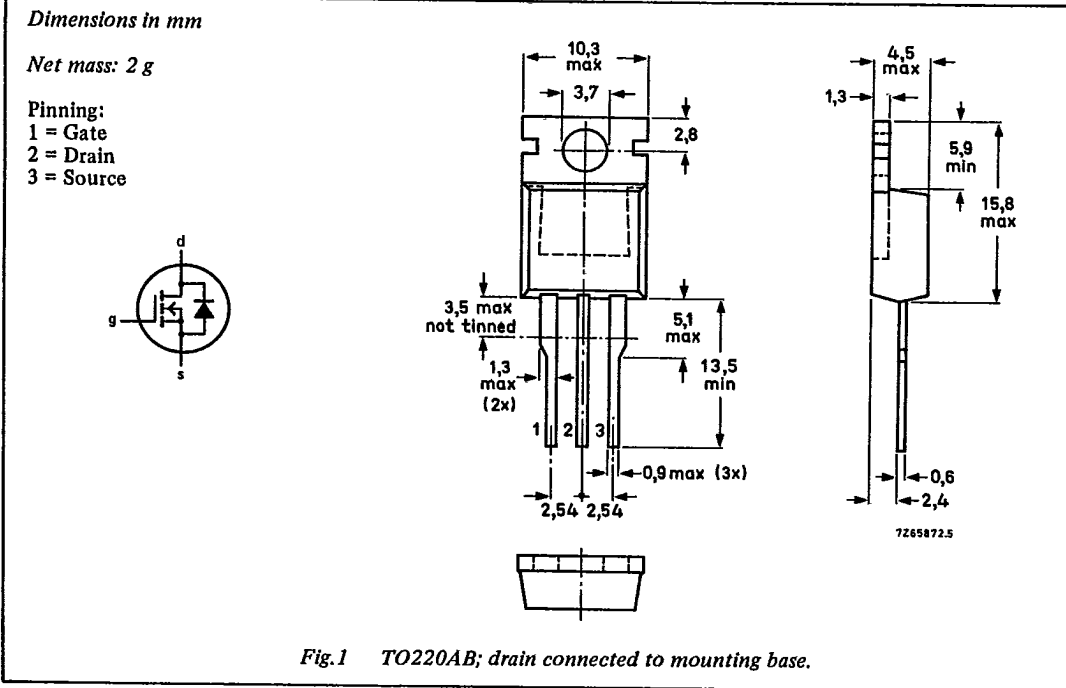
N-channel enhancement mode field-effect power transistor in a plastic envelope.

The device is intended for use in Switched Mode Power Supplies (SMPS), motor control, welding, DC/DC and DC/AC converters, and in general purpose switching applications.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V _{DS}	Drain-source voltage	1000	V
I _D	Drain current (d.c.)	2,5	A
P _{tot}	Total power dissipation	75	W
R _{DS(ON)}	Drain-source on-state resistance	5,0	Ω

MECHANICAL DATA



Notes

1. Observe the general handling precautions for electrostatic-discharge sensitive devices (ESDs) to prevent damage to MOS gate oxide.
2. Accessories supplied on request: refer to Mounting instructions for TO220 envelopes.

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RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V _{DS}	Drain-source voltage	—	—	1000	V
V _{DGR}	Drain-gate voltage	R _{GS} = 20 k Ω	—	1000	V
\pm V _G S	Gate-source voltage	—	—	20	V
I _D	Drain current (d.c.)	T _{mb} = 30 °C	—	2,5	A
I _D	Drain current (d.c.)	T _{mb} = 100 °C	—	1,6	A
I _{DM}	Drain current (pulse peak value)	T _{mb} = 25 °C	—	10	A
P _{tot}	Total power dissipation	T _{mb} = 25 °C	—	75	W
T _{stg}	Storage temperature	—	-55	150	°C
T _j	Junction temperature	—	—	150	°C

THERMAL RESISTANCES

From junction to mounting base	R _{th j-mb} = 1,67 K/W
From junction to ambient	R _{th j-a} = 75 K/W

STATIC CHARACTERISTICS

T_{mb} = 25 °C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V _{(BR)DSS}	Drain-source breakdown voltage	V _G S = 0 V; I _D = 0,25 mA	1000	—	—	V
V _G S(TO)	Gate threshold voltage	V _D S = V _G S; I _D = 1 mA	2,1	3,0	4,0	V
I _{DSS}	Zero gate voltage drain current	V _D S = 1000 V; V _G S = 0 V; T _j = 25 °C	—	20	250	μ A
I _{DSS}	Zero gate voltage drain current	V _D S = 1000 V; V _G S = 0 V; T _j = 125 °C	—	0,1	1,0	mA
I _{GSS}	Gate source leakage current	V _G S = \pm 20 V; V _D S = 0 V	—	10	100	nA
R _D S(ON)	Drain-source on-state resistance	V _G S = 10 V; I _D = 1,5 A	—	4,5	5,0	Ω

DYNAMIC CHARACTERISTICS

T_{mb} = 25 °C unless otherwise specified

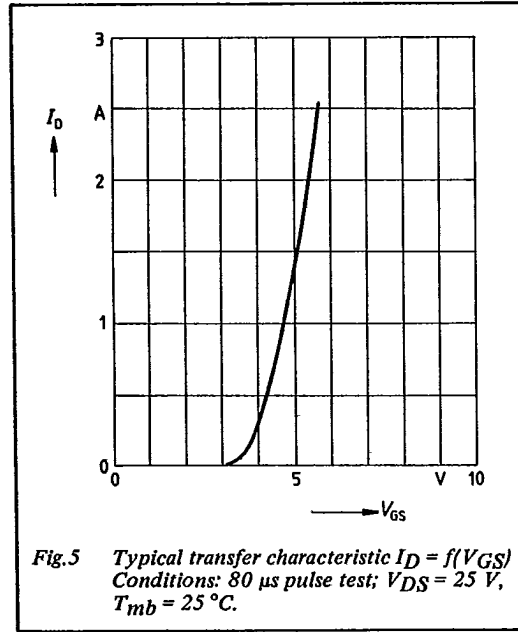
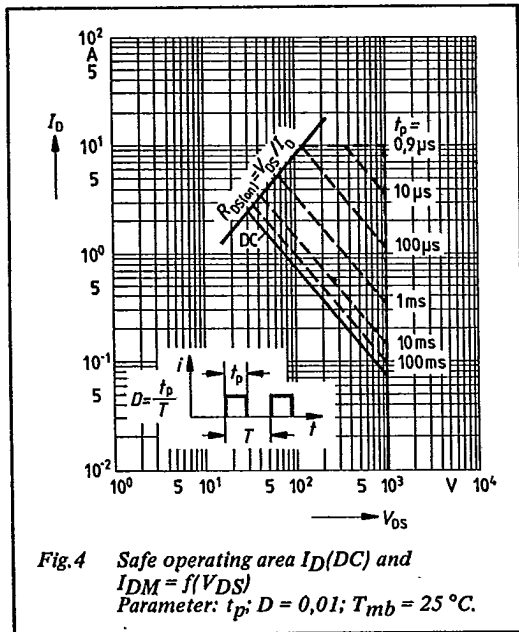
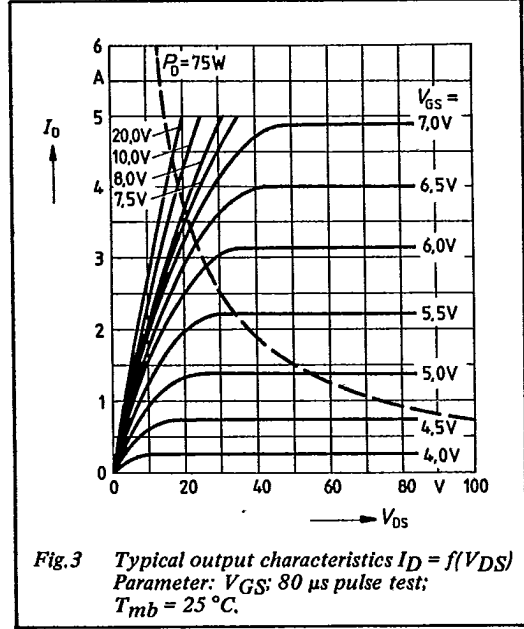
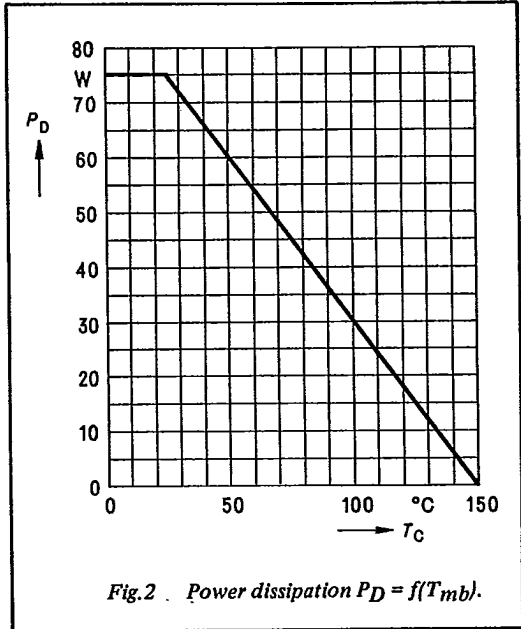
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
g _{fs}	Forward transconductance	V _D S = 25 V; I _D = 1,5 A	0,7	1,5	—	S
C _{iss}	Input capacitance	V _G S = 0 V; V _D S = 25 V; f = 1 MHz	—	1600	2100	pF
C _{oss}	Output capacitance		—	70	120	pF
C _{rss}	Feedback capacitance		—	30	50	pF
t _{d on}	Turn-on delay time	V _{DD} = 30 V; I _D = 2 A;	—	30	45	ns
t _r	Turn-on rise time	V _G S = 10 V; R _{GS} = 50 Ω ;	—	40	60	ns
t _{d off}	Turn-off delay time	R _{gen} = 50 Ω	—	110	140	ns
t _f	Turn-off fall time		—	60	80	ns
L _d	Internal drain inductance	Measured from contact screw on tab to centre of die	—	3,5	—	nH
L _d	Internal drain inductance	Measured from drain lead 6 mm from package to centre of die	—	4,5	—	nH
L _s	Internal source inductance	Measured from source lead 6 mm from package to source bond pad	—	7,5	—	nH

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REVERSE DIODE RATINGS AND CHARACTERISTICS

 $T_{mb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{DR}	Continuous reverse drain current	$T_{mb} = 25\text{ }^{\circ}\text{C}$	—	—	2,5	A
I_{DRM}	Pulsed reverse drain current	$T_{mb} = 25\text{ }^{\circ}\text{C}$	—	—	10	A
V_{SD}	Diode forward on-voltage	$I_F = 5,0\text{ A}; V_{GS} = 0\text{ V}$	—	1,05	1,3	V
t_{rr}	Reverse recovery time	$I_F = 2,5\text{ A};$ $-dI_F/dt = 100\text{ A}/\mu\text{s};$ $V_{GS} = 0\text{ V}; V_R = 100\text{ V}$	—	2000	—	ns
Q_{rr}	Reverse recovery charge		—	15	—	μC



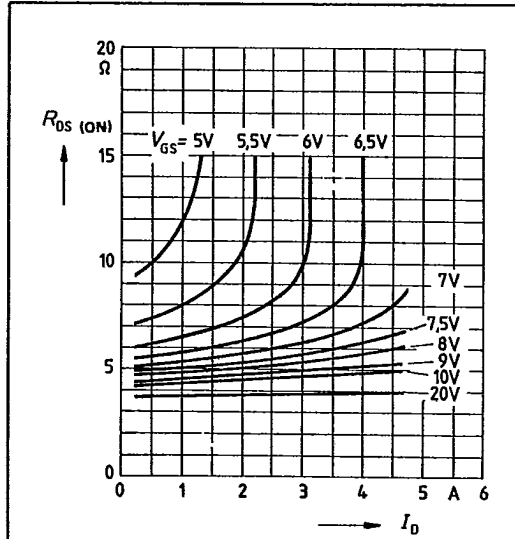


Fig. 6 Typical drain-source on-state resistance
 $R_{DS(ON)} = f(I_D)$
 Parameter: V_{GS} ; $T_j = 25^\circ\text{C}$.

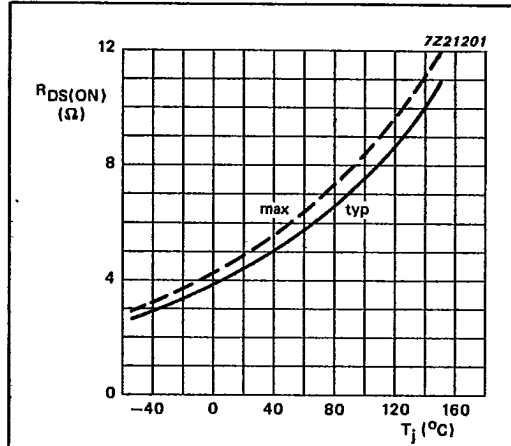


Fig. 7 Drain-source on-state resistance
 $R_{DS(ON)} = f(T_j)$
 Conditions: $I_D = 1.5\text{ A}$; $V_{GS} = 10\text{ V}$.

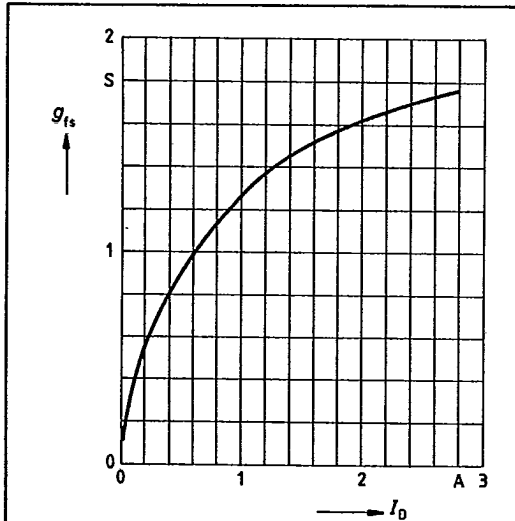


Fig. 8 Typical transconductance $g_{fs} = f(I_D)$
 Conditions: 80 μs pulse test;
 $V_{DS} = 25\text{ V}$; $T_j = 25^\circ\text{C}$.

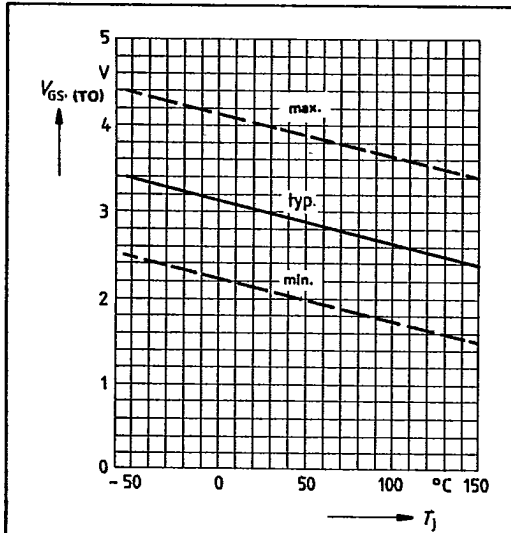


Fig. 9 Gate threshold voltage $V_{GS(TO)} = f(T_j)$
 Conditions: $V_{DS} = V_{GS}$; $I_D = 1\text{ mA}$.

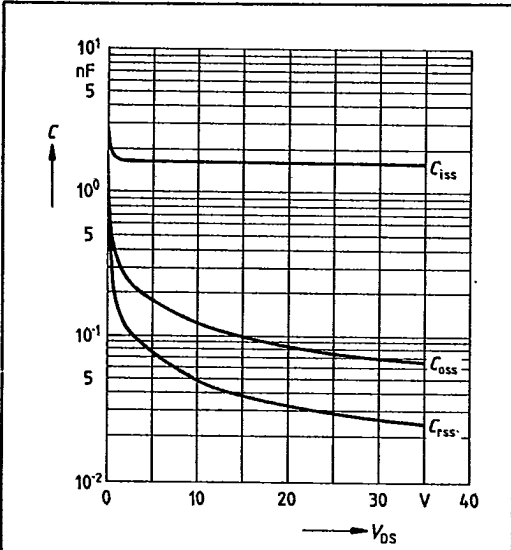


Fig.10 Typical capacitances $C = f(V_{DS})$
Conditions: $V_{GS} = 0$; $f = 1$ MHz.

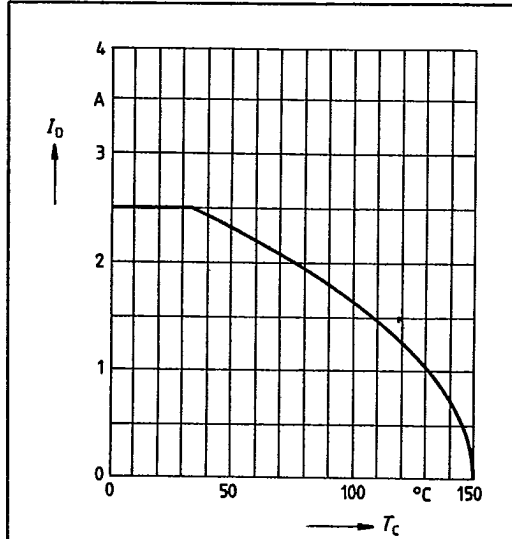


Fig.11 Continuous drain current $I_D = f(T_{mb})$
Conditions: $V_{GS} \geq 10$ V.

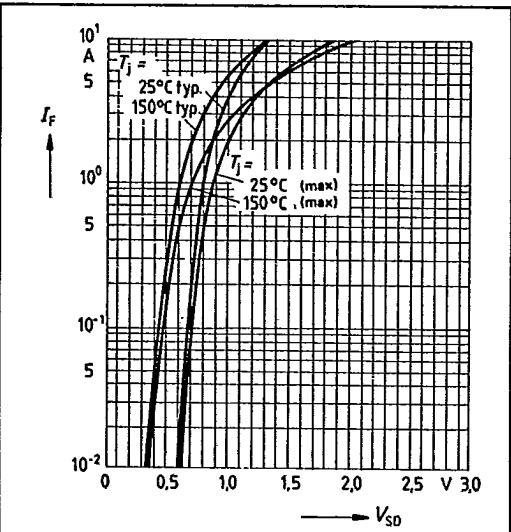


Fig.12 Forward characteristics of reverse diode
 $I_F = f(V_{SD})$
Parameter: T_j ; $t_p = 80 \mu s$.

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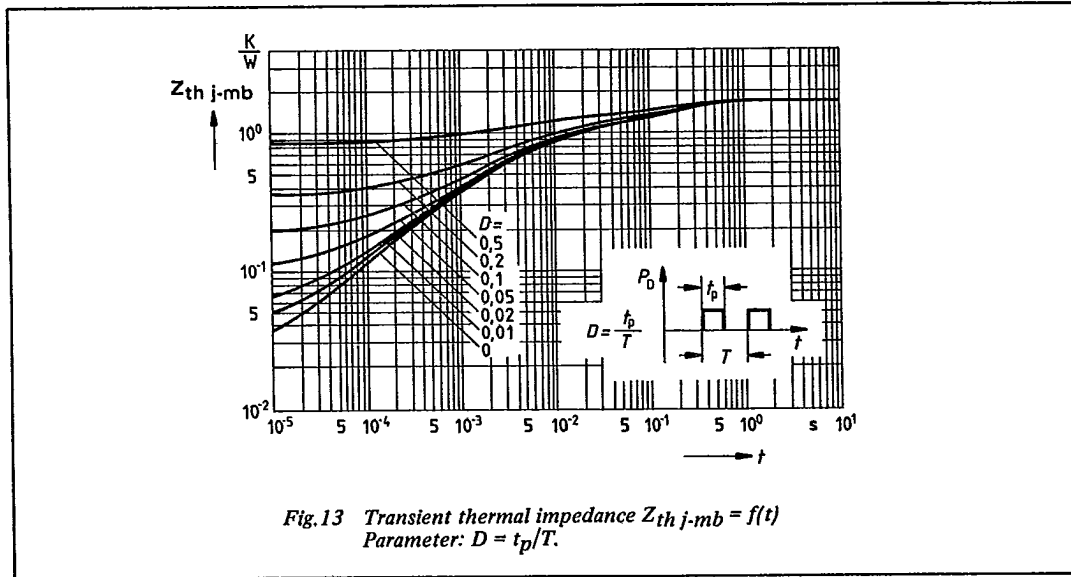


Fig.13 Transient thermal impedance $Z_{th\ j-mb} = f(t)$
Parameter: $D = t_p/T$.

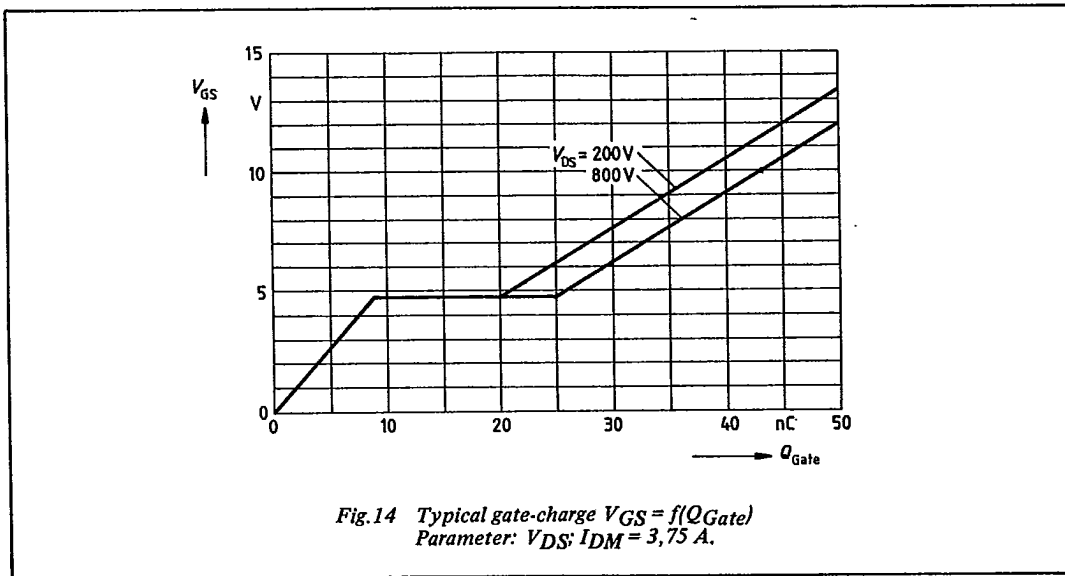


Fig.14 Typical gate-charge $V_{GS} = f(Q_{Gate})$
Parameter: $V_{DS}; I_{DM} = 3,75 A$.