

July 1987

GENERAL DESCRIPTION

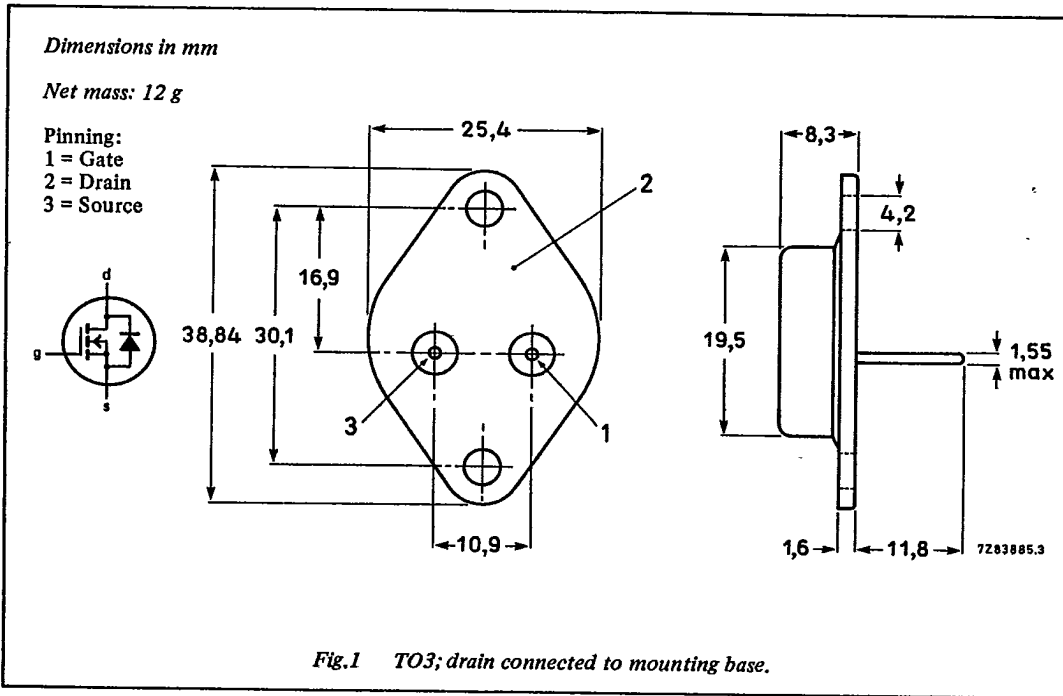
N-channel enhancement mode field-effect power transistor in a metal envelope.

This 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	50	V
I _D	Drain current (d.c.)	45	A
P _{tot}	Total power dissipation	125	W
R _{DS(ON)}	Drain-source on-state resistance	0,03	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 TO3 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	—	—	50	V
V _{DGR}	Drain-gate voltage	R _{GS} = 20 k Ω	—	50	V
\pm V _{GS}	Gate-source voltage	—	—	20	V
I _D	Drain current (d.c.)	T _{mb} = 25 °C	—	45	A
I _D	Drain current (d.c.)	T _{mb} = 100 °C	—	28,5	A
I _{DM}	Drain current (pulse peak value)	T _{mb} = 25 °C	—	180	A
P _{tot}	Total power dissipation	T _{mb} = 25 °C	—	125	W
T _{stg}	Storage temperature	—	-55	150	°C
T _j	Junction temperature	—	—	150	°C

THERMAL RESISTANCES

From junction to mounting base	R _{thj-mb} = 1,0 K/W
From junction to ambient	R _{thj-a} = 35 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 _{GS} = 0 V; I _D = 0,25 mA	50	65	—	V
V _{GS(TO)}	Gate threshold voltage	V _{DS} = V _{GS} ; I _D = 1 mA	2,1	3,0	4,0	V
I _{DSS}	Zero gate voltage drain current	V _{DS} = 50 V; V _{GS} = 0 V; T _j = 25 °C	—	20	250	μ A
I _{DSS}	Zero gate voltage drain current	V _{DS} = 50 V; V _{GS} = 0 V; T _j = 125 °C	—	0,1	1,0	mA
I _{GSS}	Gate source leakage current	V _{GS} = \pm 20 V; V _{DS} = 0 V	—	10	100	nA
R _{DS(ON)}	Drain-source on-state resistance	V _{GS} = 10 V; I _D = 22 A	—	0,025	0,03	Ω

DYNAMIC CHARACTERISTICS

T_{mb} = 25 °C unless otherwise specified

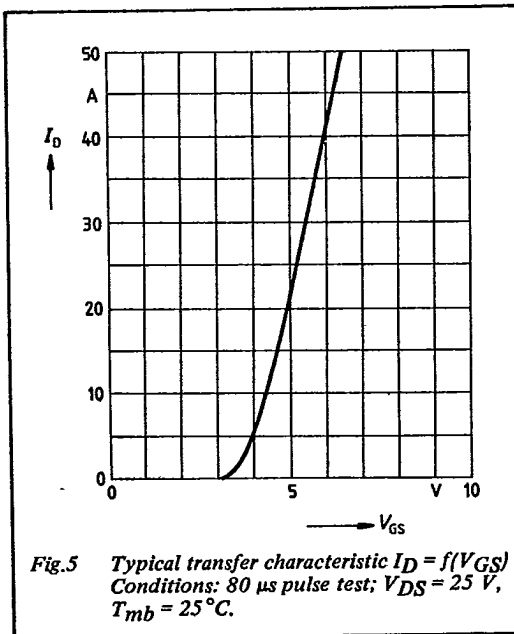
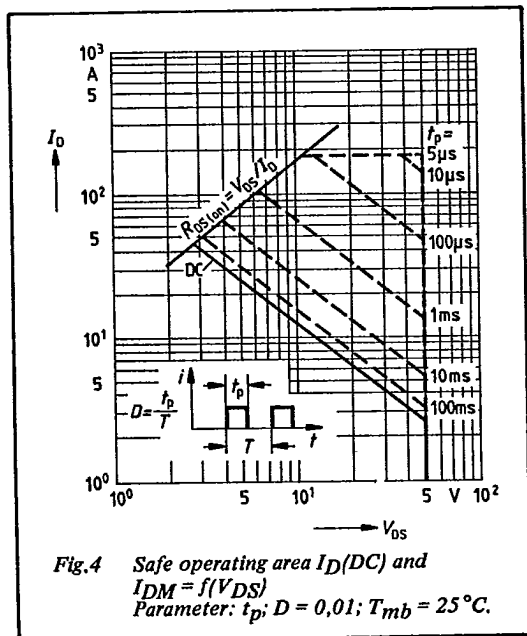
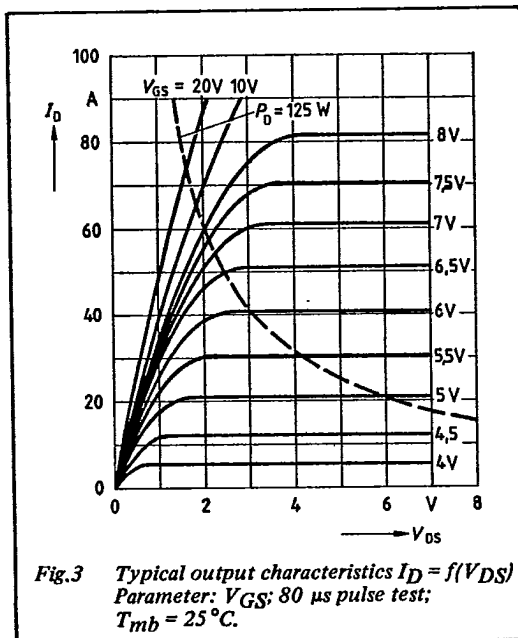
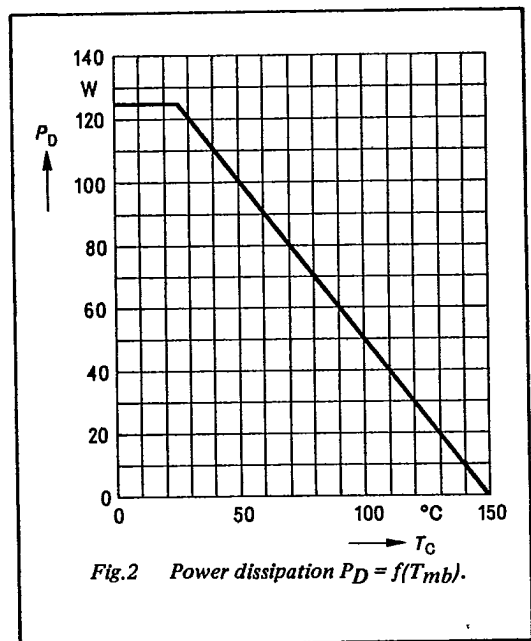
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
g _{fs}	Forward transconductance	V _{DS} = 25 V; I _D = 22 A	7,0	18	—	S
C _{iss}	Input capacitance	V _{GS} = 0 V; V _{DS} = 25 V; f = 1 MHz	—	1600	2100	pF
C _{oss}	Output capacitance		—	1300	2000	pF
C _{rss}	Feedback capacitance		—	500	800	pF
t _{d on}	Turn-on delay time	V _{DD} = 30 V; I _D = 3 A;	—	30	45	ns
t _r	Turn-on rise time	V _{GS} = 10 V; R _{GS} = 50 Ω ;	—	110	170	ns
t _{d off}	Turn-off delay time	R _{gen} = 50 Ω	—	330	430	ns
t _f	Turn-off fall time		—	250	330	ns
L _d	Internal drain inductance	Measured from contact screw on header closer to source pin and centre of die	—	5,0	—	nH
L _s	Internal source inductance	Measured from source lead 6 mm from package to source bond pad	—	12,5	—	nH

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REVERSE DIODE RATINGS AND CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{DR}	Continuous reverse drain current	$T_{mb} = 25^{\circ}\text{C}$	—	—	45	A
I_{DRM}	Pulsed reverse drain current	$T_{mb} = 25^{\circ}\text{C}$	—	—	180	A
V_{SD}	Diode forward on-voltage	$I_F = 90\text{ A}; V_{GS} = 0\text{ V}$ $T_j = 25^{\circ}\text{C}$	—	1,6	2,4	V
t_{rr}	Reverse recovery time	$I_F = 45\text{ A}; T_j = 25^{\circ}\text{C}$ $-dI_F/dt = 100\text{ A}/\mu\text{s};$ $T_j = 25^{\circ}\text{C} V_{GS} = 0\text{ V};$	—	150	—	ns
$-Q_{rr}$	Reverse recovery charge	$V_R = 30\text{ V}$	—	1,0	—	μC



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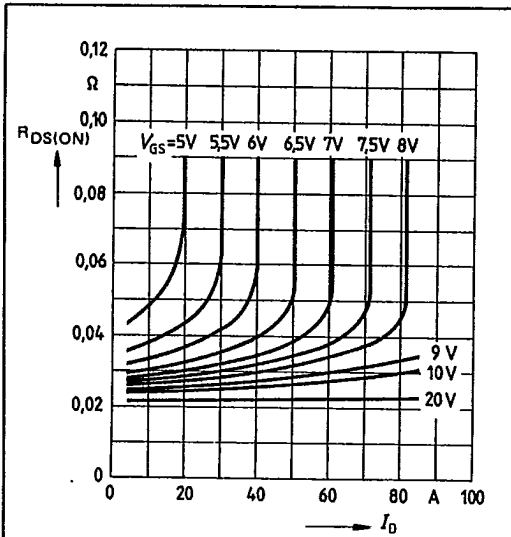


Fig.6 Typical drain-source on-state resistance $R_{DS(ON)} = f(I_D)$
Parameter: V_{GS} ; $T_j = 25^\circ\text{C}$.

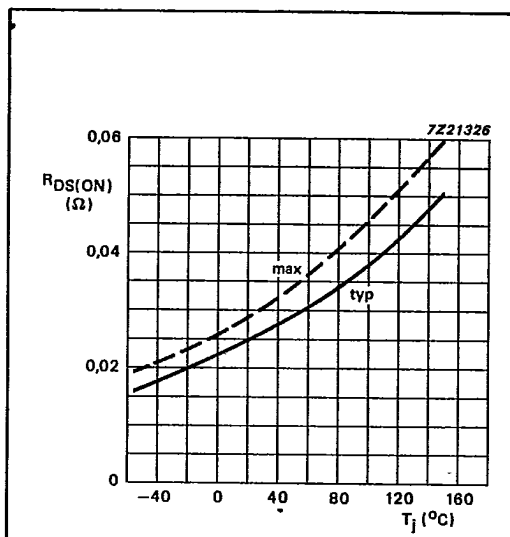


Fig.7 Drain-source on-state resistance $R_{DS(ON)} = f(T_j)$
Conditions: $I_D = 22\text{ A}$; $V_{GS} = 10\text{ V}$.

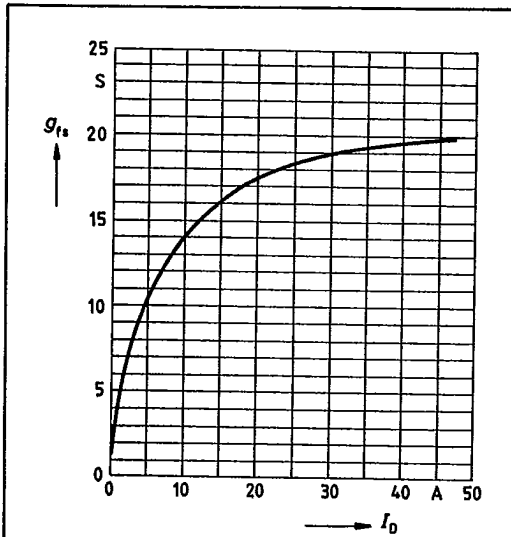


Fig.8 Typical transconductance $g_{fs} = f(I_D)$
Conditions: $80\ \mu\text{s}$ pulse test;
 $V_{DS} = 25\text{ V}$; $T_j = 25^\circ\text{C}$.

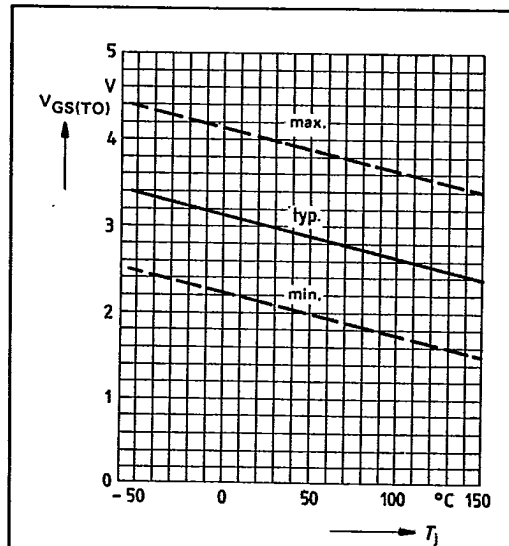


Fig.9 Gate threshold voltage $V_{GS(TO)} = f(T_j)$
Conditions: $V_{DS} = V_{GS}$; $I_D = 1\text{ mA}$.

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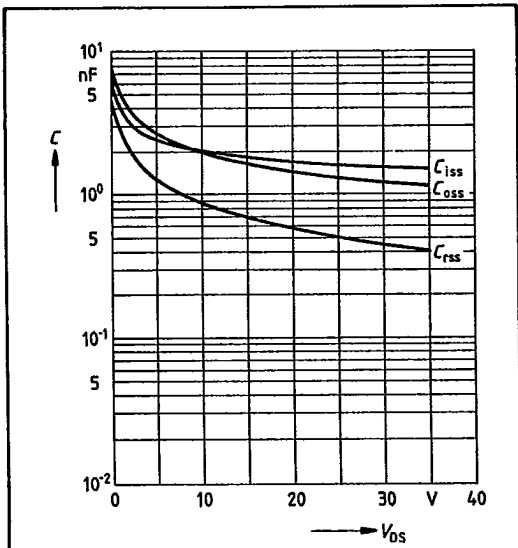


Fig.10 Typical capacitances $C = f(V_{DS})$
 Conditions: $V_{GS} = 0$; $f = 1$ MHz.

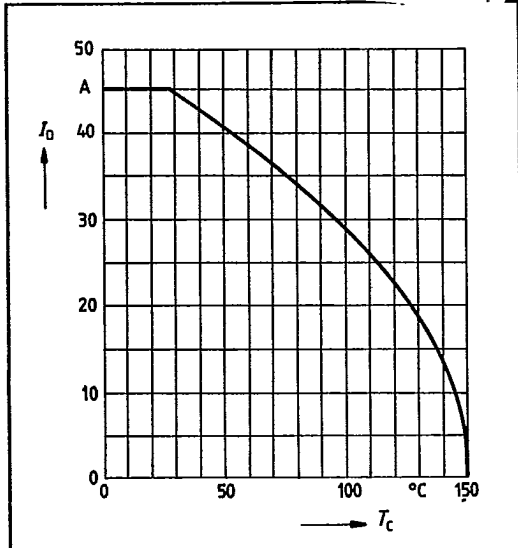


Fig.11 Continuous drain current $I_D = f(T_{mb})$
 Conditions: $V_{GS} > 10$ V.

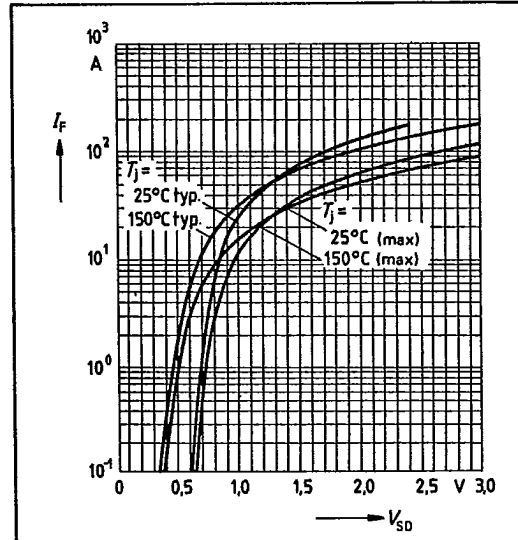


Fig.12 Forward characteristics of reverse diode
 $I_F = f(V_{SD})$
 Parameter: T_j ; $t_p = 80 \mu s$.

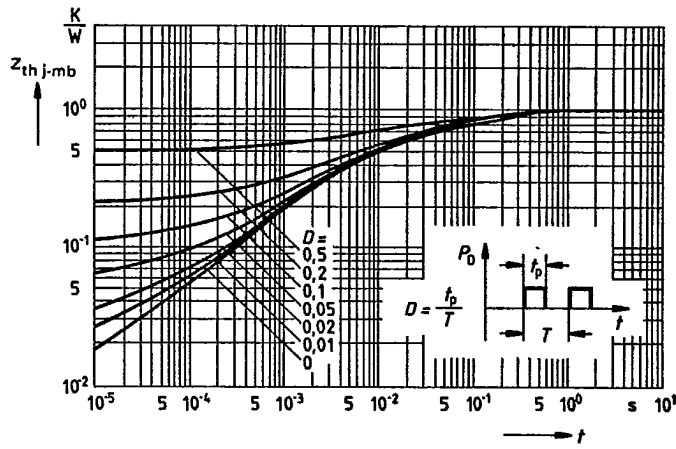


Fig.13 Transient thermal impedance $Z_{thj-mb} = f(t)$
Parameter: $D = t_p/T$.

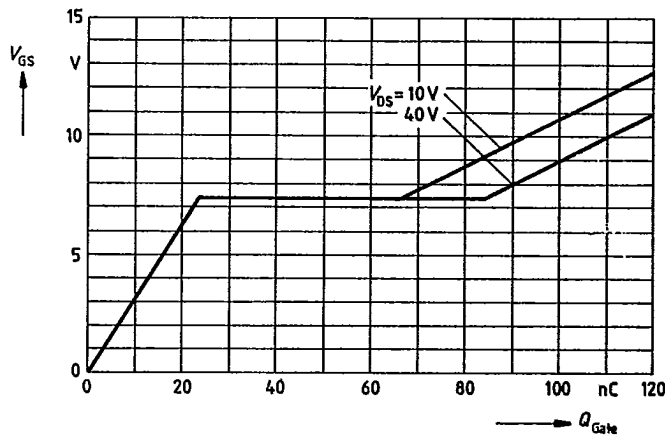


Fig.14 Typical gate-charge $V_{GS} = f(Q_{Gate})$
Parameter: $V_{DS}; I_{DM} = 67,5 A$.