

July 1987

GENERAL DESCRIPTION

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

FREDFET* with fast-recovery reverse diode.

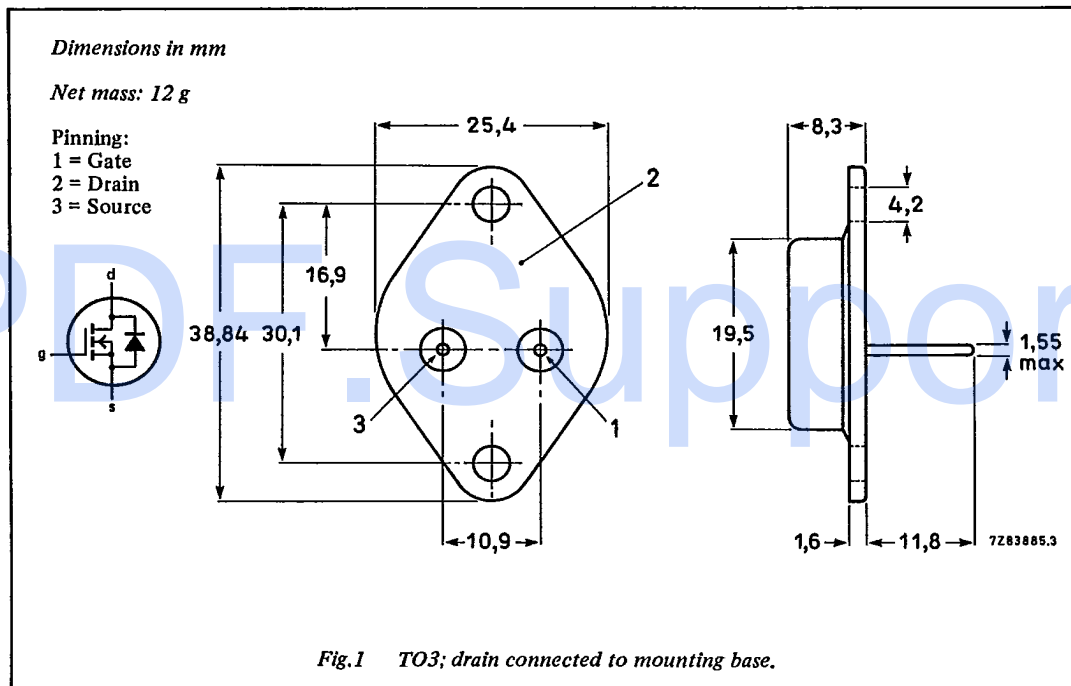
This device is particularly suitable for motor control applications, eg. in full-bridge configurations for which faster recovery characteristics simplify design for inductive loads.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V _{DS}	Drain-source voltage	500	V
I _D	Drain current (d.c.)	9,0	A
P _{tot}	Total power dissipation	125	W
R _{DS(ON)}	Drain-source on-state resistance	0,8	Ω

* Fast Recovery Epitaxial Diode FET.

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	—	—	500	V
V _{DGR}	Drain-gate voltage	R _{GS} = 20 k Ω	—	500	V
\pm V _G S	Gate-source voltage	—	—	20	V
I _D	Drain current (d.c.)	T _{mb} = 25 °C	—	9,0	A
I _D	Drain current (d.c.)	T _{mb} = 100 °C	—	5,7	A
I _{DM}	Drain current (pulse peak value)	T _{mb} = 25 °C	—	36	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 _{th j-mb} = 1,0 K/W
From junction to ambient	R _{th j-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	500	—	—	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} = 500 V; V _{GS} = 0 V; T _j = 25 °C	—	20	250	μ A
I _{DSS}	Zero gate voltage drain current	V _{DS} = 500 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 = 6,5 V	—	0,7	0,8	Ω

DYNAMIC CHARACTERISTICS

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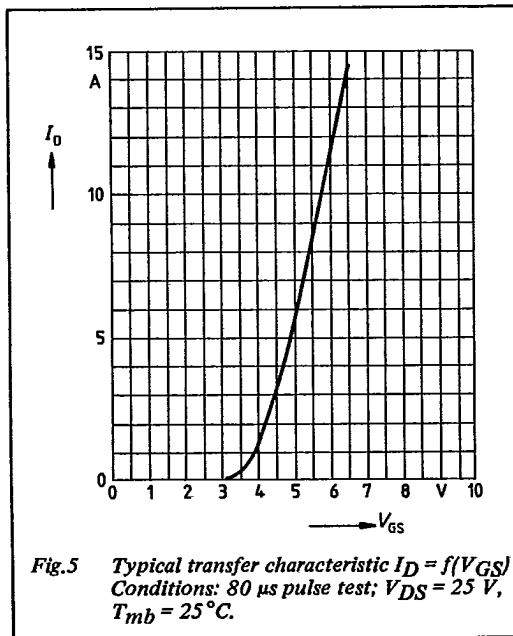
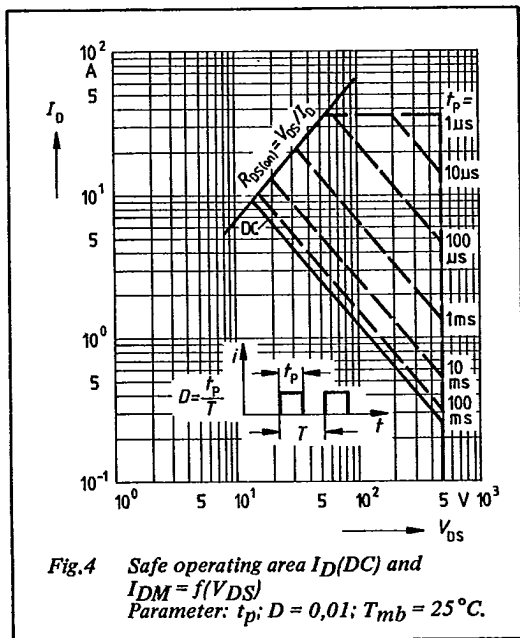
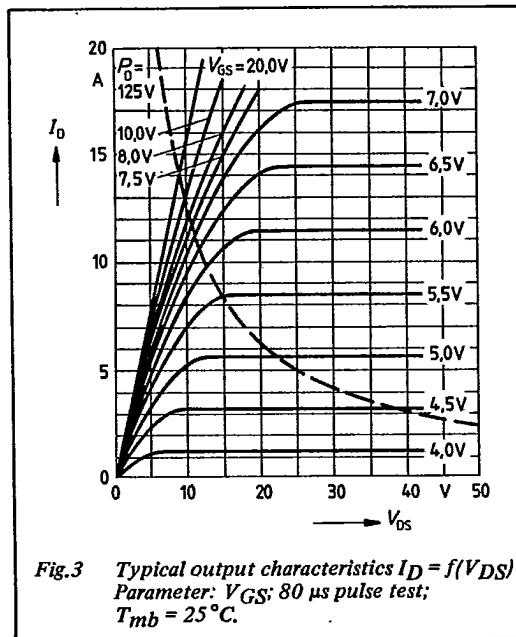
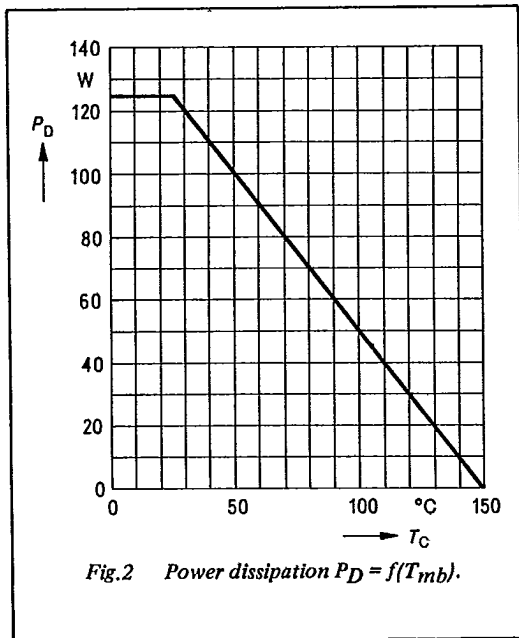
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
g _{fs}	Forward transconductance	V _{DS} = 25 V; I _D = 6,5 A	2,7	5,3	—	S
C _{iss}	Input capacitance	V _{GS} = 0 V; V _{DS} = 25 V; f = 1 MHz	—	3800	4900	pF
C _{oss}	Output capacitance		—	250	400	pF
C _{rss}	Feedback capacitance		—	100	170	pF
t _{d on}	Turn-on delay time	V _{DD} = 30 V; I _D = 2,8 A;	—	50	75	ns
t _r	Turn-on rise time	V _{GS} = 10 V; R _{GS} = 50 Ω ;	—	80	120	ns
t _{d off}	Turn-off delay time	R _{gen} = 50 Ω	—	330	430	ns
t _f	Turn-off fall time		—	110	140	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

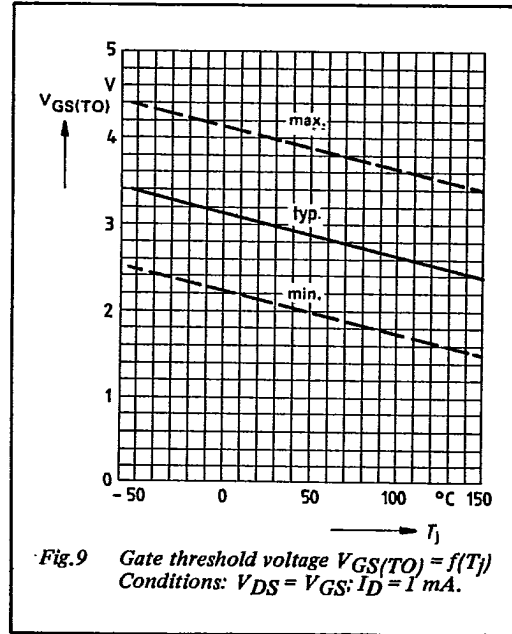
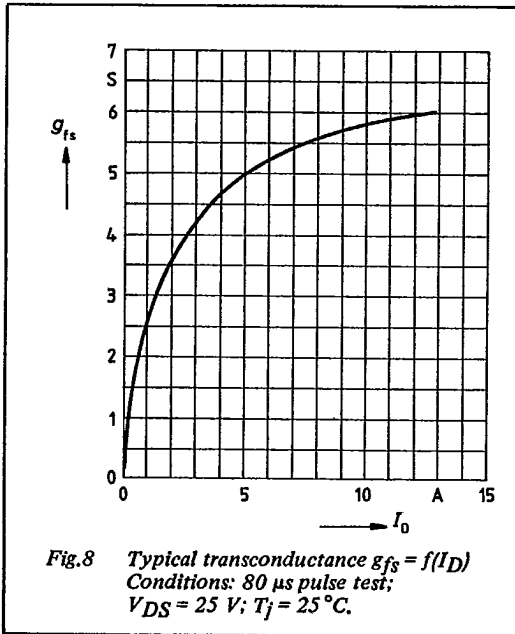
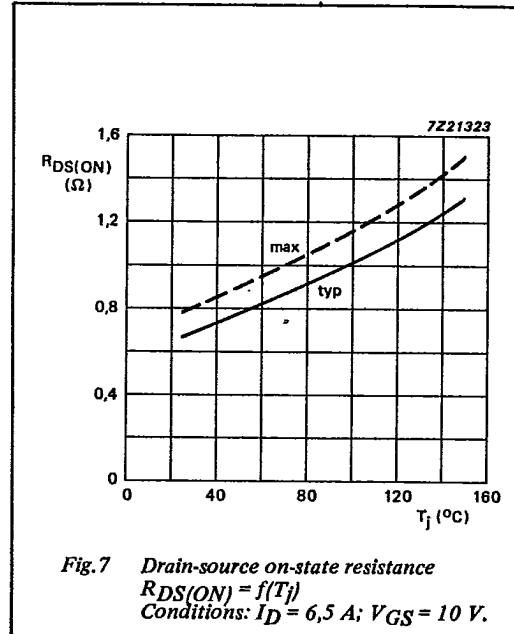
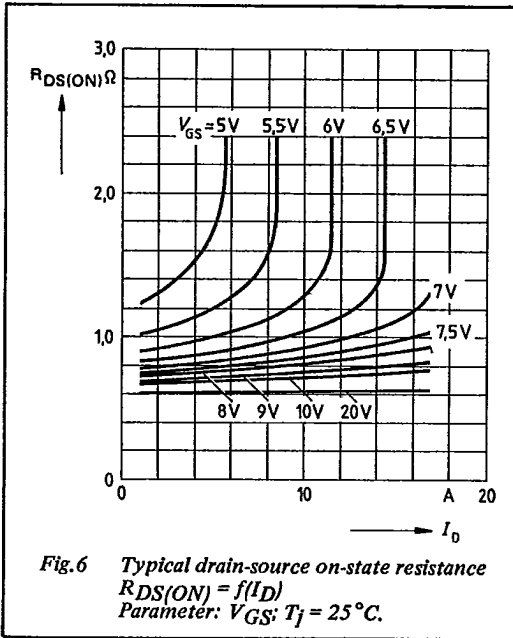
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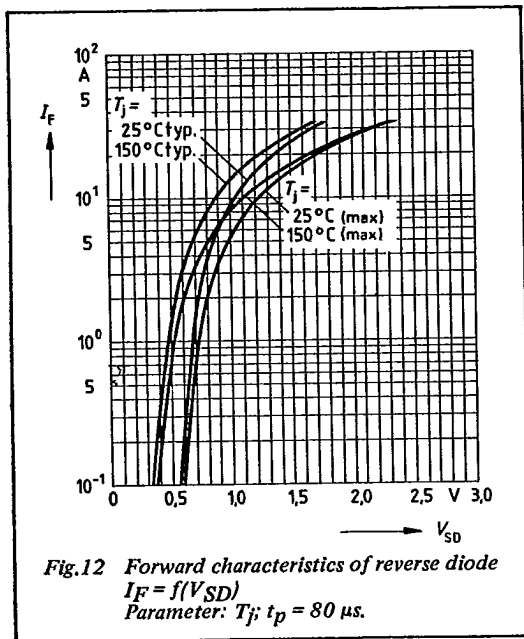
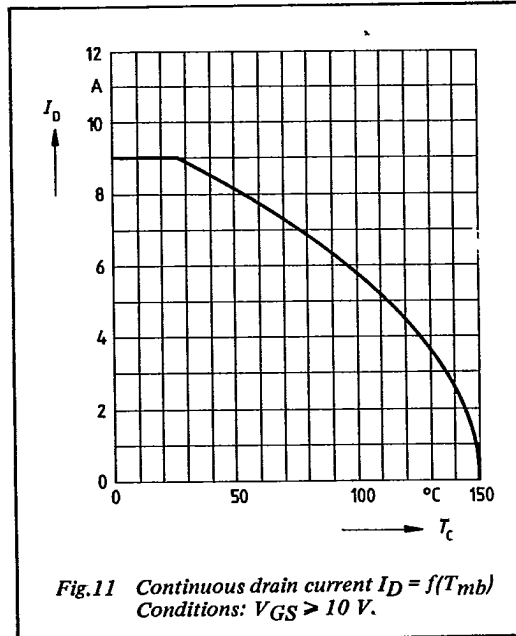
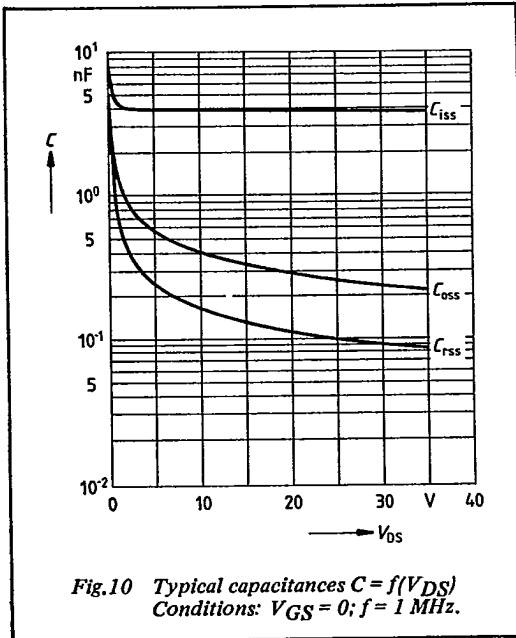
REVERSE DIODE RATINGS AND CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{DR}	Continuous reverse drain current	$T_{mb} = 25^{\circ}\text{C}$	—	—	9,0	A
I_{DRM}	Pulsed reverse drain current	$T_{mb} = 25^{\circ}\text{C}$	—	—	36	A
V_{SD}	Diode forward on-voltage	$I_F = 18\text{ A}; V_{GS} = 0\text{ V};$ $T_j = 25^{\circ}\text{C}$	—	1,3	1,6	V
t_{rr}	Reverse recovery time	$I_F = 9,0\text{ A}; T_j = 25^{\circ}\text{C}$ $-dI_F/dt = 100\text{ A}/\mu\text{s}; T_j = 150^{\circ}\text{C}$	—	180 220	250 300	ns ns
Q_{rr}	Reverse recovery charge	$I_F = 9,0\text{ A}; T_j = 25^{\circ}\text{C}$ $V_{GS} = 0\text{ V}; T_j = 150^{\circ}\text{C}$	—	0,65 2,6	1,2 5,0	μC μC
I_{rrm}	Reverse recovery current	$V_R = 100\text{ V}; T_j = 150^{\circ}\text{C}$	—	15	—	A







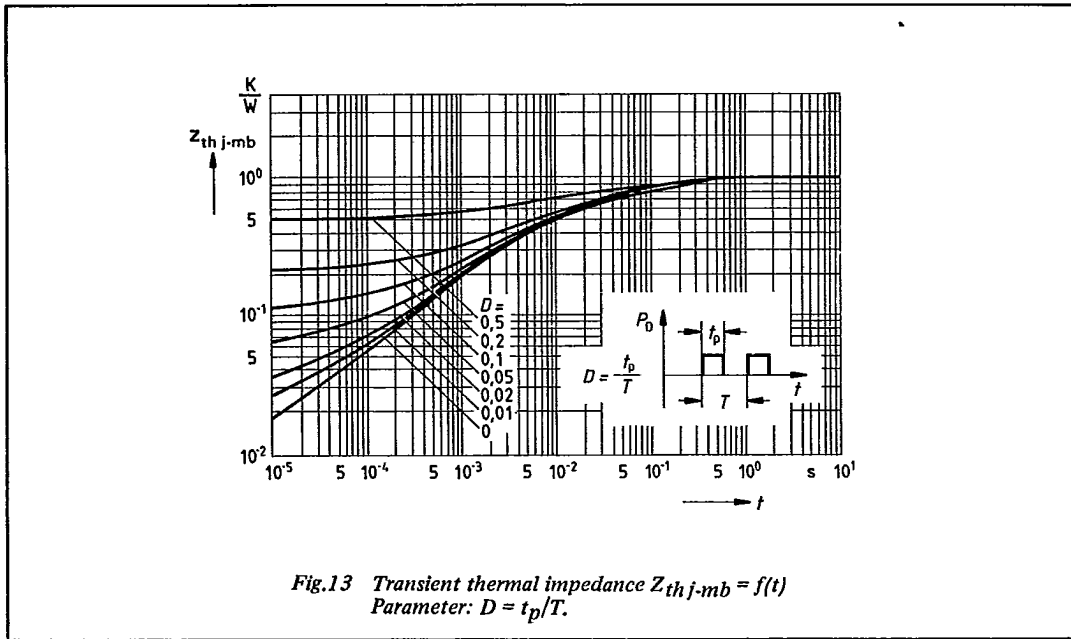


Fig.13 Transient thermal impedance $Z_{thj-mb} = f(t)$
Parameter: $D = t_p/T$.

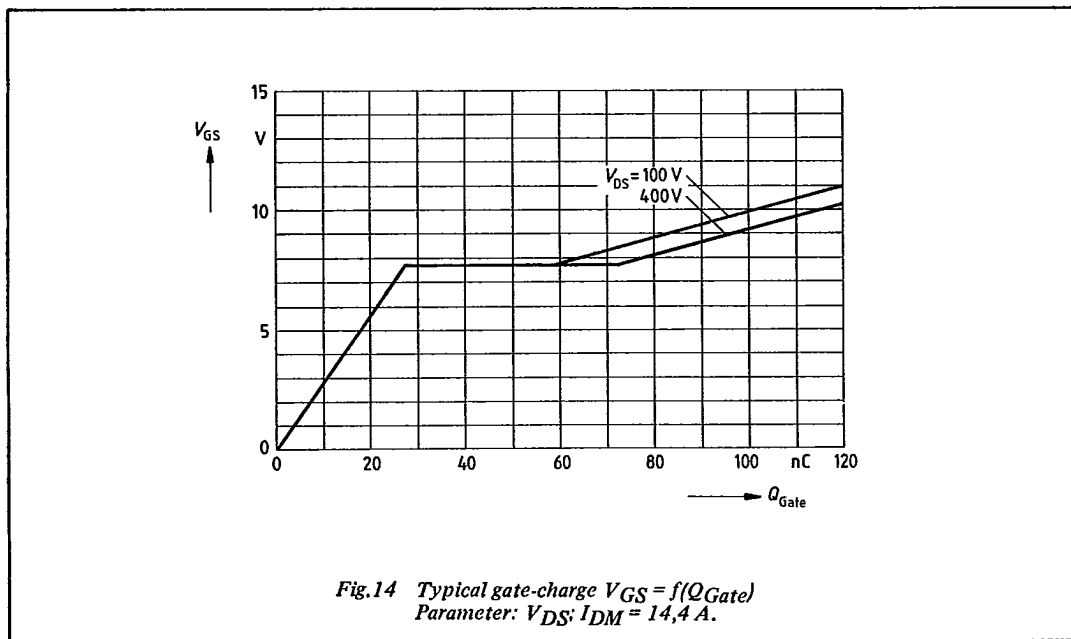


Fig.14 Typical gate-charge $V_{GS} = f(Q_{Gate})$
Parameter: $V_{DS}; I_{DM} = 14,4 A$.