

## PowerMOS transistor

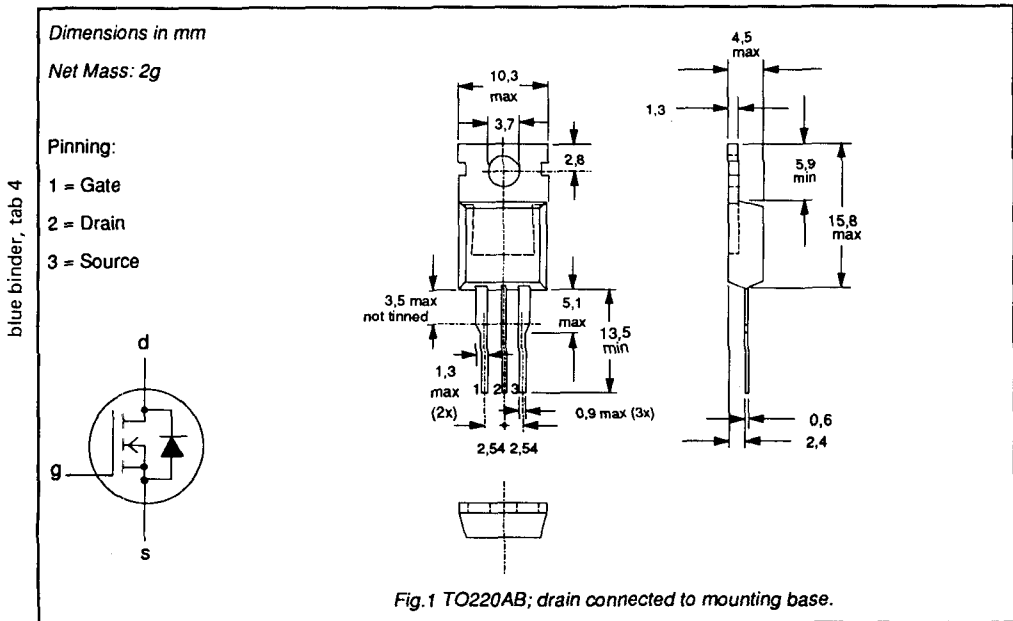
### GENERAL DESCRIPTION

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 AC/DC converters, and in general purpose switching applications.

### QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	UNIT
$V_{DS}$	Drain-source voltage	-200A 200	-200B 200	V
$I_D$	Drain current (DC)	14	13	A
$P_{tot}$	Total power dissipation	125	125	W
$T_j$	Junction temperature	175	175	°C
$R_{DS(ON)}$	Drain-source on-state resistance	0.23	0.28	$\Omega$

### MECHANICAL DATA



### Notes

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

January 1989

**RATINGS**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{DS}$	Drain-source voltage	-	-	200	V
$V_{DGR}$	Drain-gate voltage	$R_{GS} = 20 \text{ k}\Omega$	-	200	V
$\pm V_{GS}$	Gate-source voltage	-	-	30	V
$I_D$	Drain current (DC)	$T_{mb} = 25 \text{ }^\circ\text{C}$	-	-200A	A
$I_D$	Drain current (DC)	$T_{mb} = 100 \text{ }^\circ\text{C}$	-	14	A
$I_{DM}$	Drain current (pulse peak value)	$T_{mb} = 25 \text{ }^\circ\text{C}$	-	13	A
				56	A
$P_{tot}$	Total power dissipation	$T_{mb} = 25 \text{ }^\circ\text{C}$	-	125	W
$T_{stg}$	Storage temperature	-	-55	175	$^\circ\text{C}$
$T_j$	Junction Temperature	-	-	175	$^\circ\text{C}$

**THERMAL RESISTANCES**

From junction to mounting base	$R_{th,jmb} = 1.2 \text{ K/W}$
From junction to ambient	$R_{th,ja} = 60 \text{ K/W}$

**STATIC CHARACTERISTICS**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	Drain-source breakdown voltage	$V_{GS} = 0 \text{ V}; I_D = 0.25 \text{ mA}$	200	-	-	V
$V_{GS(TQ)}$	Gate threshold voltage	$V_{DS} = V_{GS}; I_D = 1 \text{ mA}$	2.1	3.0	4.0	V
$I_{DSS}$	Zero gate voltage drain current	$V_{DS} = 200 \text{ V}; V_{GS} = 0 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	1	10	$\mu\text{A}$
$I_{DSS}$	Zero gate voltage drain current	$V_{DS} = 200 \text{ V}; V_{GS} = 0 \text{ V}; T_j = 125 \text{ }^\circ\text{C}$	-	0.1	1.0	$\text{mA}$
$I_{GSS}$	Gate source leakage current	$V_{GS} = \pm 30 \text{ V}; V_{DS} = 0 \text{ V}$	-	10	100	$\text{nA}$
$R_{DS(ON)}$	Drain-source on-state resistance	$V_{GS} = 10 \text{ V}; I_D = 7 \text{ A}$	-	0.2	0.23	$\Omega$
			-	0.22	0.28	$\Omega$

**DYNAMIC CHARACTERISTICS**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$g_{fs}$	Forward transconductance	$V_{DS} = 25 \text{ V}; I_D = 7 \text{ A}$	6	8.4	-	S
$C_{iss}$	Input capacitance	$V_{GS} = 0 \text{ V}; V_{DS} = 25 \text{ V}; f = 1 \text{ MHz}$	-	1400	1750	$\text{pF}$
$C_{oss}$	Output capacitance		-	190	250	$\text{pF}$
$C_{rss}$	Feedback capacitance		-	55	80	$\text{pF}$
$t_{don}$	Turn-on delay time	$V_{DD} = 30 \text{ V}; I_D = 3 \text{ A}; V_{GS} = 10 \text{ V}; R_{GS} = 50 \text{ } \Omega;$	-	18	30	ns
$t_r$	Turn-on rise time	$R_{gen} = 50 \text{ } \Omega$	-	35	60	ns
$t_{doff}$	Turn-off delay time		-	85	120	ns
$t_f$	Turn-off fall time		-	35	50	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

**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	-	-	-	14	A
$I_{DRM}$	Pulsed reverse drain current	-	-	-	56	A
$V_{SD}$	Diode forward voltage	$I_F = 14\text{ A}; V_{GS} = 0\text{ V}$	-	1.0	1.5	V
$t_r$	Reverse recovery time	$I_F = 14\text{ A}; -di_F/dt = 100\text{ A}/\mu\text{s}; V_{GS} = 0\text{ V}; V_R = 30\text{ V}$	-	200	-	ns
$Q_r$	Reverse recovery charge	$I_F = 14\text{ A}; -di_F/dt = 100\text{ A}/\mu\text{s}; V_{GS} = 0\text{ V}; V_R = 30\text{ V}$	-	0.25	-	$\mu\text{C}$

**AVALANCHE RATING**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$W_{DSS}$	Drain-source non-repetitive unclamped inductive turn-off energy	$I_D = 14\text{ A}; V_{DS} \leq 100\text{ V}; V_{GS} = 10\text{ V}; R_{GS} = 50\text{ }\Omega$	-	-	100	mJ

