

Data sheet	
status	Preliminary specification
date of issue	March 1991

BUK438-1000A/B

PowerMOS transistor

PHILIPS INTERNATIONAL

56E D ■ 7110826 0044551 058 ■ PHIN

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.

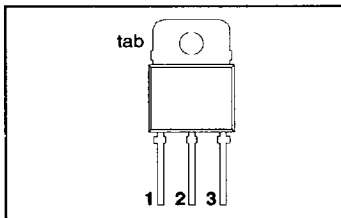
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	UNIT
	BUK438			
V_{DS}	Drain-source voltage	-1000A 1000	-1000B 1000	V
I_D	Drain current (DC)	6.5	5.7	A
P_{tot}	Total power dissipation	220	220	W
$R_{DS(ON)}$	Drain-source on-state resistance	2.0	2.6	Ω

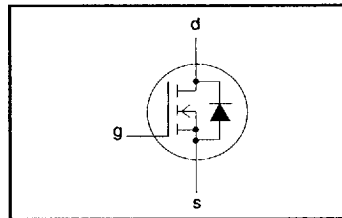
PINNING - SOT93

PIN	DESCRIPTION
1	gate
2	drain
3	source
tab	drain

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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	$R_{GS} = 20 \text{ k}\Omega$	-	1000	V
$\pm V_{GS}$	Gate-source voltage	-	-	30	V
I_D	Drain current (DC)	$T_{mb} = 25 \text{ }^\circ\text{C}$	-	-1000A 6.5	A
I_D	Drain current (DC)	$T_{mb} = 100 \text{ }^\circ\text{C}$	-	4.1	A
I_{DM}	Drain current (pulse peak value)	$T_{mb} = 25 \text{ }^\circ\text{C}$	-	26	A
P_{tot}	Total power dissipation	$T_{mb} = 25 \text{ }^\circ\text{C}$	-	220	W
T_{stg}	Storage temperature	-	-55	150	$^\circ\text{C}$
T_J	Junction Temperature	-	-	150	$^\circ\text{C}$

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THERMAL RESISTANCES

From junction to mounting base	$R_{th\ j-mb} = 0.57\text{ K/W}$
From junction to ambient	$R_{th\ j-a} = 45\text{ K/W}$

STATIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	Drain-source breakdown voltage	$V_{GS} = 0\text{ V}; I_D = 0.25\text{ mA}$	1000	-	-	V
$V_{GS(TO)}$	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	$V_{DS} = 1000\text{ V}; V_{GS} = 0\text{ V}; T_J = 25\text{ °C}$	-	5	50	μA
I_{DSS}	Zero gate voltage drain current	$V_{DS} = 1000\text{ V}; V_{GS} = 0\text{ V}; T_J = 125\text{ °C}$	-	0.1	1.0	mA
I_{GSS}	Gate source leakage current	$V_{GS} = \pm 30\text{ V}; V_{DS} = 0\text{ V}$	-	10	100	nA
$R_{DS(ON)}$	Drain-source on-state resistance	$V_{GS} = 10\text{ V}; I_D = 3.5\text{ A}$	-	1.8	2.0	Ω
		BUK438-1000A	-	2.2	2.6	Ω
		BUK438-1000B	-			

DYNAMIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
g_{fs}	Forward transconductance	$V_{DS} = 25\text{ V}; I_D = 3.5\text{ A}$	2.5	5.0	-	S
C_{iss}	Input capacitance	$V_{GS} = 0\text{ V}; V_{DS} = 25\text{ V}; f = 1\text{ MHz}$	-	3000	3500	pF
C_{oss}	Output capacitance		-	300	350	pF
C_{rss}	Feedback capacitance		-	150	250	pF
t_{don}	Turn-on delay time	$V_{DD} = 30\text{ V}; I_D = 2.5\text{ A};$	-	60	90	ns
t_r	Turn-on rise time	$V_{GS} = 10\text{ V}; R_{GS} = 50\ \Omega;$	-	100	140	ns
t_{doff}	Turn-off delay time	$R_{gen} = 50\ \Omega$	-	350	430	ns
t_f	Turn-off fall time		-	100	140	ns
L_d	Internal drain inductance	Measured from contact screw on tab to centre of die	-	5	-	nH
L_d	Internal drain inductance	Measured from drain lead 6 mm from package to centre of die	-	5	-	nH
L_s	Internal source inductance	Measured from source lead 6 mm from package to source bond pad	-	12.5	-	nH

REVERSE DIODE LIMITING VALUES AND CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{DR}	Continuous reverse drain current	-	-	-	6.5	A
I_{DRM}	Pulsed reverse drain current	-	-	-	26	A
V_{SD}	Diode forward voltage	$I_F = 6.5\text{ A}; V_{GS} = 0\text{ V}$	-	0.9	1.3	V
t_{rr}	Reverse recovery time	$I_F = 6.5\text{ A}; -di_F/dt = 100\text{ A}/\mu\text{s};$	-	1.5	-	μs
Q_{rr}	Reverse recovery charge	$V_{GS} = 0\text{ V}; V_R = 100\text{ V}$	-	20	-	μC

PowerMOS transistor**BUK438-1000A/B**

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AVALANCHE LIMITING VALUE**T-39-15** $T_{mb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
W_{DSS}	Drain-source non-repetitive unclamped inductive turn-off energy	$I_D = 6.5\text{ A}$; $V_{DD} \leq 250\text{ V}$; $V_{GS} = 10\text{ V}$; $R_{GS} = 50\text{ }\Omega$	-	-	750	mJ