

T-39-15

Philips Components

Data sheet	
status	Preliminary specification
date of issue	March 1991

# BUK416-1000AE/BE

## PowerMOS transistor

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56E D ■ 7110826 0044542 045 ■ PHIN

### GENERAL DESCRIPTION

N-channel enhancement mode field-effect power transistor in ISOTOP 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.

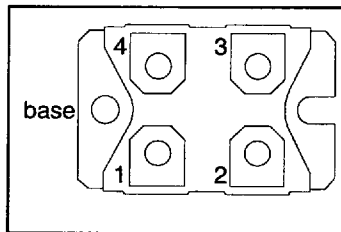
### QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	UNIT
	<b>BUK416</b>	<b>-1000AE</b>	<b>-1000BE</b>	
$V_{DS}$	Drain-source voltage	1000	1000	V
$I_D$	Drain current (DC)	12.2	10.9	A
$P_{tot}$	Total power dissipation	310	310	W
$R_{DS(ON)}$	Drain-source on-state resistance	0.8	1.0	$\Omega$

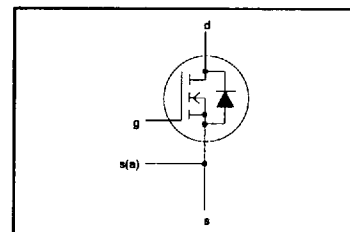
### PINNING - SOT227B

PIN	DESCRIPTION
1	source
2	gate
3	drain
4	ancillary source
base	isolated

### 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)	$T_{mb} = 25 \text{ }^\circ\text{C}$	-	<b>-1000AE</b> 12.2	A
$I_D$	Drain current (DC)	$T_{mb} = 100 \text{ }^\circ\text{C}$	-	<b>-1000BE</b> 10.9	A
$I_{DM}$	Drain current (pulse peak value)	$T_{mb} = 25 \text{ }^\circ\text{C}$	-	7.8	A
$I_{S(A)M}$	Ancillary Source current (pulse peak value)	-	-	49	A
$P_{tot}$	Total power dissipation	$T_{mb} = 25 \text{ }^\circ\text{C}$	-	5.0	A
$T_{stg}$	Storage temperature	-	-40	310	$^\circ\text{C}$
$T_J$	Junction Temperature	-	-	150	$^\circ\text{C}$

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## THERMAL RESISTANCES

From junction to mounting base	with heatsink compound	$R_{th\ j-mb} = 0.40\text{ K/W}$
From mounting base to heatsink		$R_{th\ mb-hs} = 0.05\text{ K/W}$

## STATIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	Drain-source breakdown voltage	$V_{GS} = 0\text{ V}; I_D = 1.0\text{ mA}$	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	$V_{DS} = 1000\text{ V}; V_{GS} = 0\text{ V}; T_j = 25\text{ °C}$	-	10	100	$\mu\text{A}$
$I_{DSS}$	Zero gate voltage drain current	$V_{DS} = 1000\text{ V}; V_{GS} = 0\text{ V}; T_j = 125\text{ °C}$	-	1.0	5.0	mA
$I_{GSS}$	Gate source leakage current	$V_{GS} = \pm 30\text{ V}; V_{DS} = 0\text{ V}$	-	10	200	nA
$R_{DS(ON)}$	Drain-source on-state resistance	$V_{GS} = 10\text{ V}; I_D = 7.5\text{ A}$ BUK416-1000AE BUK416-1000BE	-	0.7 0.9	0.8 1.0	$\Omega$

## DYNAMIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$g_{fs}$	Forward transconductance	$V_{DS} = 25\text{ V}; I_D = 7.5\text{ A}$	10	20	-	S
$C_{iss}$	Input capacitance	$V_{GS} = 0\text{ V}; V_{DS} = 25\text{ V}; f = 1\text{ MHz}$	-	5.0	6.25	nF
$C_{oss}$	Output capacitance		-	0.40	0.60	nF
$C_{rss}$	Feedback capacitance		-	0.15	0.25	nF
$t_{d\ on}$	Turn-on delay time	$V_{DD} = 30\text{ V}; I_D = 3\text{ A};$ $V_{GS} = 10\text{ V}; R_{GS} = 50\ \Omega;$ $R_{gen} = 50\ \Omega$ Resistive Load	-	50	125	ns
$t_r$	Turn-on rise time		-	125	200	ns
$t_{d\ off}$	Turn-off delay time		-	650	800	ns
$t_f$	Turn-off fall time		-	200	300	ns
$t_{d\ on}$	Turn-on delay time	$V_{DD} = 50\text{ V}; I_D = 12.2\text{ A};$ $V_{GS} = 10\text{ V}; R_{gen} = 3.3\ \Omega$ Resistive Load	-	25	-	ns
$t_r$	Turn-on rise time		-	150	-	ns
$t_{d\ off}$	Turn-off delay time		-	150	-	ns
$t_f$	Turn-off fall time		-	70	-	ns
$L_d$	Internal drain inductance	Measured from contact screw on terminal 3 to centre of die	-	5	-	nH
$L_s$	Internal source inductance	Measured from contact screw on terminal 1 to source bond pad	-	5	-	nH

## ISOLATION

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{isol}$	R.M.S. voltage from terminals to mounting base	Sinusoidal voltage waveform; $f = 50 - 60\text{ Hz}$	-	-	2500	V
$C_{isol}$	Capacitance from T3 to mounting base	$f = 1\text{ MHz}$	-	45	-	pF

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## REVERSE DIODE LIMITING VALUES 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	-	-	-	12.2	A
$I_{DRM}$	Pulsed reverse drain current	-	-	-	49	A
$V_{SD}$	Diode forward voltage	$I_F = 12.2\text{ A}; V_{GS} = 0\text{ V}$	-	1.0	1.3	V
$t_{rr}$	Reverse recovery time	$I_F = 12.2\text{ A}; -di_F/dt = 100\text{ A}/\mu\text{s};$ $V_{GS} = 0\text{ V}; V_R = 200\text{ V}$	-	1800	-	ns
$Q_{rr}$	Reverse recovery charge	$V_{GS} = 0\text{ V}; V_R = 200\text{ V}$	-	40	-	$\mu\text{C}$