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PowerMOS transistor
Logic level FET

BUK552-100A/B

GENERAL DESCRIPTION

N-channel enhancement mode logic level 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 automotive and general purpose switching applications.

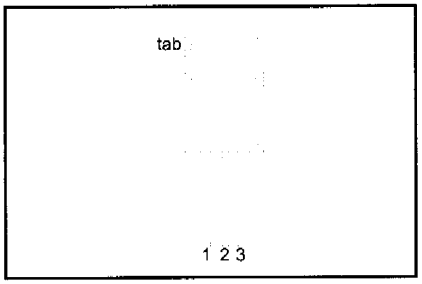
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	UNIT
	BUK552	-100A	-100B	
V_{DS}	Drain-source voltage	100	100	V
I_D	Drain current (DC)	10	8.5	A
P_{tot}	Total power dissipation	60	60	W
T_j	Junction temperature	175	175	°C
$R_{DS(ON)}$	Drain-source on-state resistance; V_{GS} = 5 V	0.28	0.35	Ω

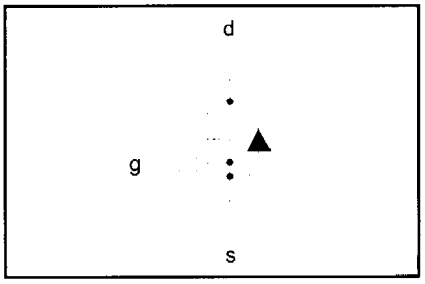
PINNING - TO220AB

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	-	-	100		V
V_{DGR}	Drain-gate voltage	R_{GS} = 20 kΩ	-	100		V
$\pm V_{GS}$	Gate-source voltage	-	-	15		V
$\pm V_{GSM}$	Non-repetitive gate-source voltage	$t_p \leq 50$ µs	-	20		V
				-100A	-100B	
I_D	Drain current (DC)	T_{mb} = 25 °C	-	10	8.5	A
I_D	Drain current (DC)	T_{mb} = 100 °C	-	7	6	A
I_{DM}	Drain current (pulse peak value)	T_{mb} = 25 °C	-	40	34	A
P_{tot}	Total power dissipation	T_{mb} = 25 °C	-	60		W
T_{stg}	Storage temperature	-	- 55	175		°C
T_j	Junction Temperature	-	-	175		°C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	2.5	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient		-	60	-	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	100	-	-	V
$V_{GS(TO)}$	Gate threshold voltage	V_{DS} = V_{GS}; I_D = 1 mA	1.0	1.5	2.0	V
I_{DSS}	Zero gate voltage drain current	V_{DS} = 100 V; V_{GS} = 0 V; T_j = 25 °C	-	1	10	µA
I_{DSS}	Zero gate voltage drain current	V_{DS} = 100 V; V_{GS} = 0 V; T_j =125 °C	-	0.1	1.0	mA
I_{GSS}	Gate source leakage current	V_{GS} = ±15 V; V_{DS} = 0 V	-	10	100	nA
$R_{DS(ON)}$	Drain-source on-state resistance	V_{GS} = 5 V; **BUK552-100A**	-	0.25	0.28	Ω
		I_D = 5.5 A **BUK552-100B**	-	0.3	0.35	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 = 5.5 A	4.5	6	-	S
C_{iss}	Input capacitance	V_{GS} = 0 V; V_{DS} = 25 V; f = 1 MHz	-	400	600	pF
C_{oss}	Output capacitance		-	90	120	pF
C_{rss}	Feedback capacitance		-	35	50	pF
$t_{d\,on}$	Turn-on delay time	V_{DD} = 30 V; I_D = 3 A;	-	12	18	ns
t_r	Turn-on rise time	V_{GS} = 5 V; R_{GS} = 50 Ω;	-	45	70	ns
$t_{d\,off}$	Turn-off delay time	R_{gen} = 50 Ω	-	50	70	ns
t_f	Turn-off fall time		-	30	45	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 LIMITING VALUES AND CHARACTERISTICS

T_{mb} = 25 °C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{DR}	Continuous reverse drain current	-	-	-	10	A
I_{DRM}	Pulsed reverse drain current	-	-	-	40	A
V_{SD}	Diode forward voltage	I_F = 10 A ; V_{GS} = 0 V	-	1.2	1.5	V
t_{rr}	Reverse recovery time	I_F = 10 A; -dI_F/dt = 100 A/µs;	-	90	-	ns
Q_{rr}	Reverse recovery charge	V_{GS} = 0 V; V_R = 30 V	-	0.35	-	µC

AVALANCHE LIMITING VALUE

T_{mb} = 25 °C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
W_{DSS}	Drain-source non-repetitive unclamped inductive turn-off energy	I_D = 10 A ; $V_{DD} \leq$ 50 V ; V_{GS} = 5 V ; R_{GS} = 50 Ω	-	-	30	mJ

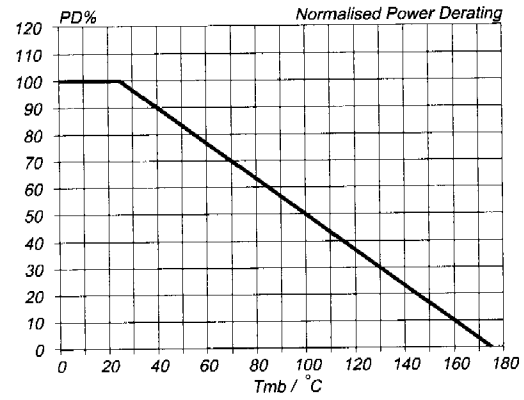


Fig.1. Normalised power dissipation.
PD% = 100·P_D/$P_{D\ 25\ °C}$ = f(T_{mb})

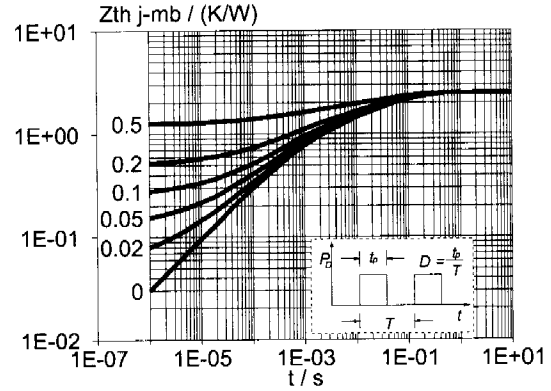


Fig.4. Transient thermal impedance.
$Z_{th\ j\text{-}mb}$ = f(t); parameter D = t_p/T

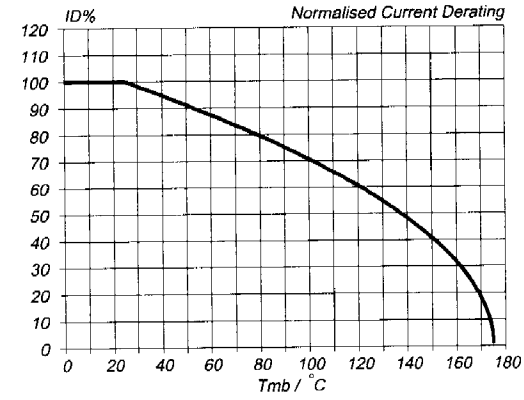


Fig.2. Normalised continuous drain current.
ID% = 100·I_D/$I_{D\ 25\ °C}$ = f(T_{mb}); conditions: V_{GS} ≥ 5 V

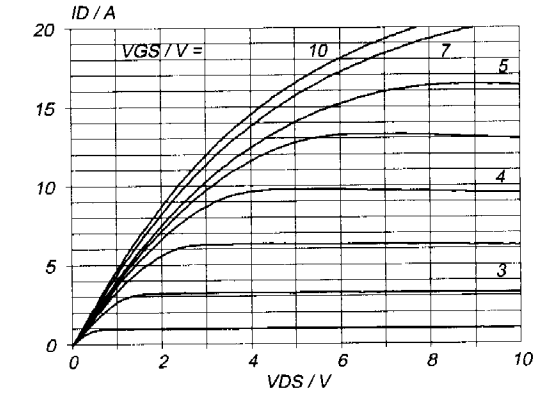


Fig.5. Typical output characteristics, T_j = 25 °C.
I_D = f(V_{DS}); parameter V_{GS}

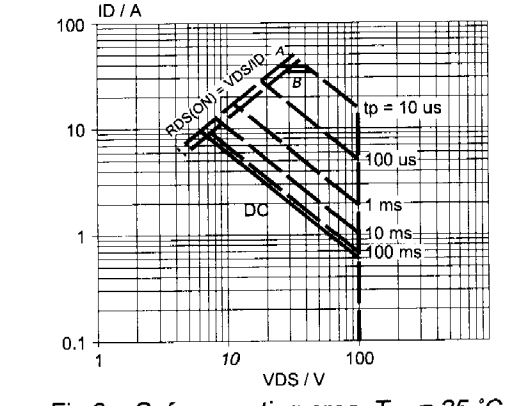


Fig.3. Safe operating area. T_{mb} = 25 °C
I_D & I_{DM} = f(V_{DS}); I_{DM} single pulse; parameter t_p

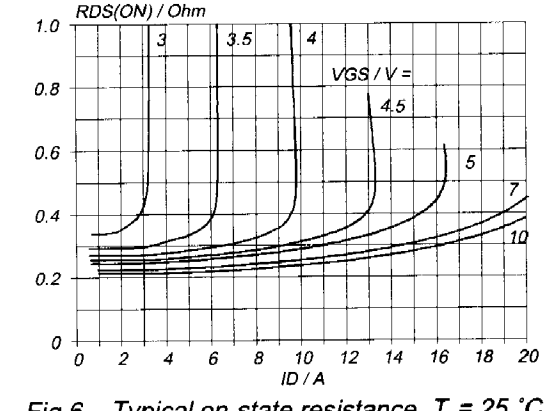


Fig.6. Typical on-state resistance, T_j = 25 °C.
$R_{DS(ON)}$ = f(I_D); parameter V_{GS}

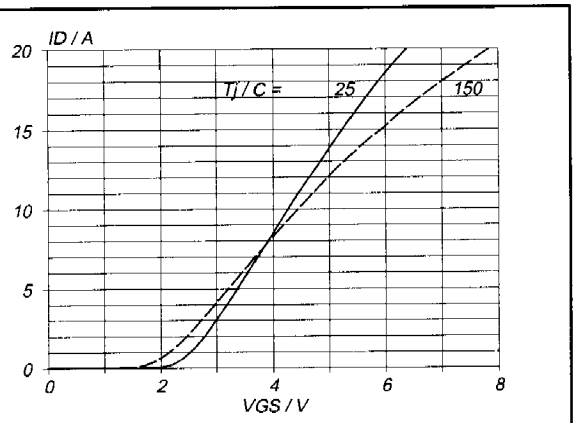


Fig.7. Typical transfer characteristics.
$I_D = f(V_{GS})$; conditions: V_{DS} = 25 V; parameter T_j

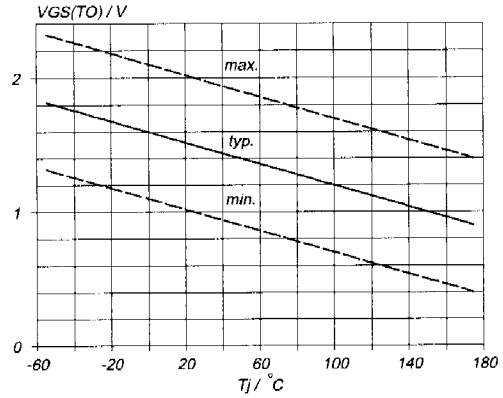


Fig.10. Gate threshold voltage.
$V_{GS(TO)} = f(T_j)$; conditions: I_D = 1 mA; $V_{DS} = V_{GS}$

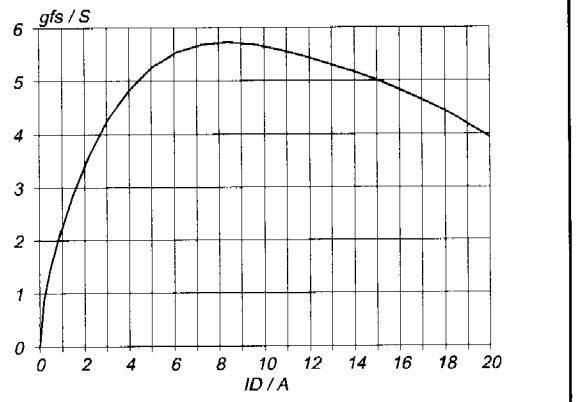


Fig.8. Typical transconductance, T_j = 25 °C.
$g_{fs} = f(I_D)$; conditions: V_{DS} = 25 V

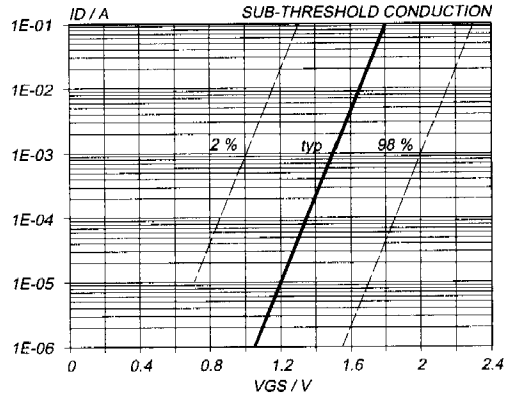


Fig.11. Sub-threshold drain current.
$I_D = f(V_{GS})$; conditions: T_j = 25 °C; $V_{DS} = V_{GS}$

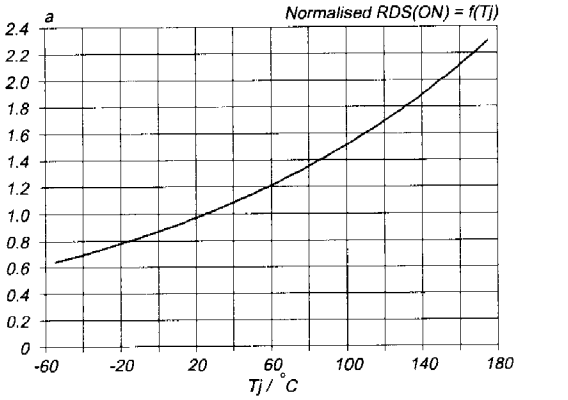


Fig.9. Normalised drain-source on-state resistance.
$a = R_{DS(ON)}/R_{DS(ON)25\ °C} = f(T_j)$; I_D = 5.5 A; V_{GS} = 5 V

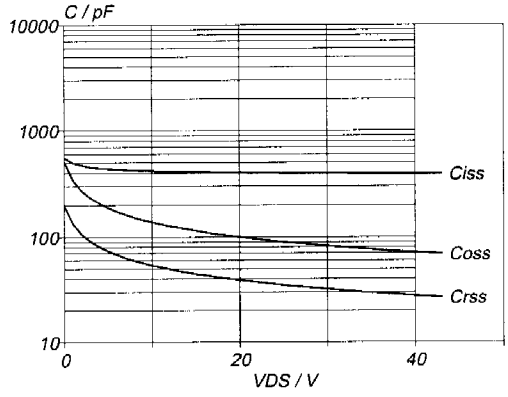


Fig.12. Typical capacitances, C_{iss}, C_{oss}, C_{rss}.
$C = f(V_{DS})$; conditions: V_{GS} = 0 V; f = 1 MHz