

PowerMOS transistor

BUK444-600B

GENERAL DESCRIPTION

N-channel enhancement mode field-effect power transistor in a plastic full-pack 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.

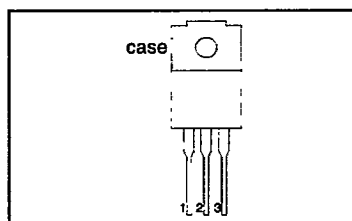
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V_{DS}	Drain-source voltage	600	V
I_D	Drain current (DC)	1.5	A
P_{tot}	Total power dissipation	25	W
$R_{DS(ON)}$	Drain-source on-state resistance	4.5	Ω

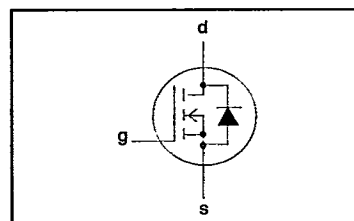
PINNING - SOT186

PIN	DESCRIPTION
1	gate
2	drain
3	source
case	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	-	-	600	V
V_{DGR}	Drain-gate voltage	-	-	600	V
$\pm V_{GS}$	Gate-source voltage	$R_{GS} = 20 \text{ k}\Omega$	-	30	V
I_D	Drain current (DC)	$T_{hs} = 25^\circ\text{C}$	-	1.5	A
I_D	Drain current (DC)	$T_{hs} = 100^\circ\text{C}$	-	0.95	A
I_{DM}	Drain current (pulse peak value)	$T_{hs} = 25^\circ\text{C}$	-	6	A
P_{tot}	Total power dissipation	$T_{hs} = 25^\circ\text{C}$	-	25	W
T_{stg}	Storage temperature	-	-55	150	$^\circ\text{C}$
T_j	Junction Temperature	-	-	150	$^\circ\text{C}$

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th j-hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	5	K/W
$R_{th j-a}$	Thermal resistance junction to ambient		-	55	-	K/W

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STATIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	Drain-source breakdown voltage	$V_{GS} = 0\text{ V}; I_D = 0.25\text{ mA}$	600	-	-	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	$V_{DS} = 600\text{ V}; V_{GS} = 0\text{ V}; T_J = 25\text{ }^{\circ}\text{C}$	-	2	20	μA
I_{DSS}	Zero gate voltage drain current	$V_{DS} = 600\text{ V}; V_{GS} = 0\text{ V}; T_J = 125\text{ }^{\circ}\text{C}$	-	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	$V_{GS} = 10\text{ V}; I_D = 1.2\text{ A}$	-	4.0	4.5	Ω

DYNAMIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
g_{fs}	Forward transconductance	$V_{DS} = 25\text{ V}; I_D = 1.2\text{ A}$	1.9	2.5	-	S
C_{iss}	Input capacitance	$V_{GS} = 0\text{ V}; V_{DS} = 25\text{ V}; f = 1\text{ MHz}$	-	300	500	pF
C_{oss}	Output capacitance		-	50	80	pF
C_{rss}	Feedback capacitance		-	30	55	pF
t_{don}	Turn-on delay time	$V_{DD} = 30\text{ V}; I_D = 2.1\text{ A};$ $V_{GS} = 10\text{ V}; R_{GS} = 50\text{ }\Omega;$ $R_{gen} = 50\text{ }\Omega$	-	15	20	ns
t_r	Turn-on rise time		-	40	60	ns
t_{doff}	Turn-off delay time		-	50	65	ns
t_f	Turn-off fall time		-	30	40	ns
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

ISOLATION

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Repetitive peak voltage from all three terminals to external heatsink	R.H. $\leq 65\%$; clean and dustfree	-	-	1500	V
C_{isol}	Capacitance from T2 to external heatsink	$f = 1\text{ MHz}$	-	12	-	pF

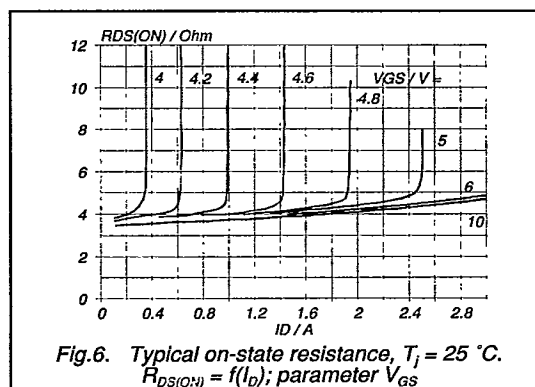
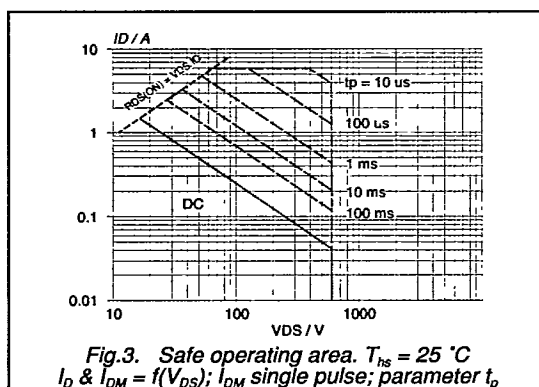
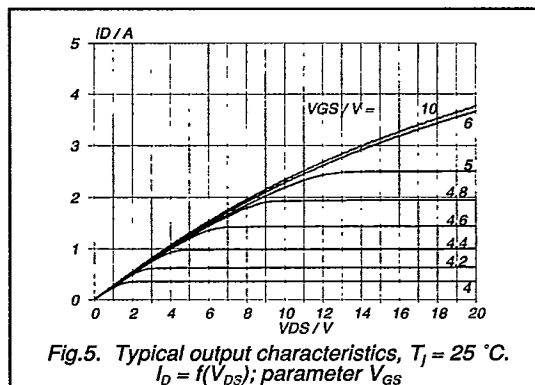
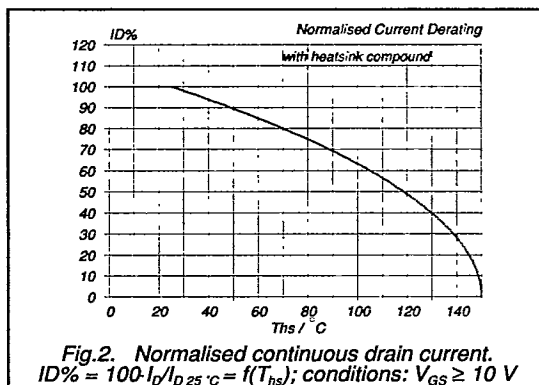
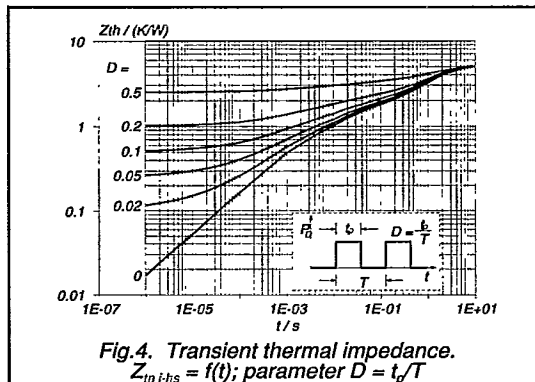
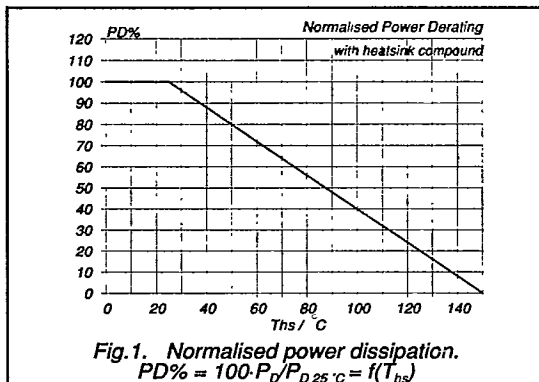
REVERSE DIODE LIMITING VALUES AND CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{DR}	Continuous reverse drain current	-	-	-	1.6	A
I_{DRM}	Pulsed reverse drain current	-	-	-	6.4	A
V_{SD}	Diode forward voltage	$I_F = 1.6\text{ A}; V_{GS} = 0\text{ V}$	-	1.0	1.3	V
t_{rr}	Reverse recovery time	$I_F = 1.6\text{ A}; -dI_F/dt = 100\text{ A}/\mu\text{s};$ $V_{GS} = 0\text{ V}; V_R = 100\text{ V}$	-	280	-	ns
Q_{rr}	Reverse recovery charge		-	1.5	-	μC

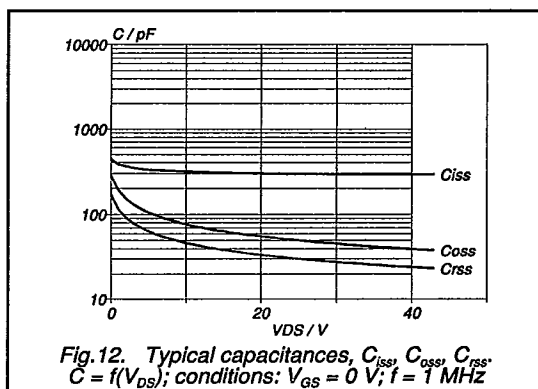
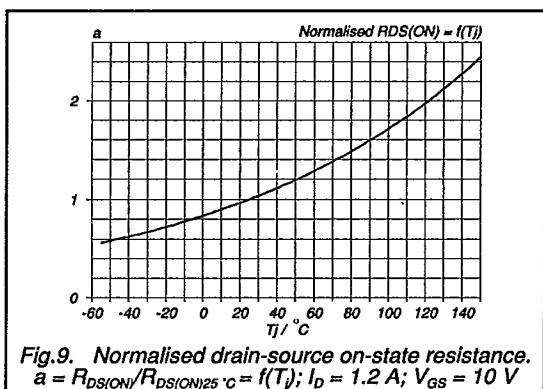
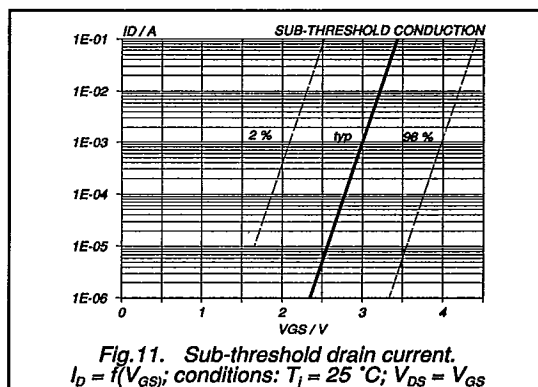
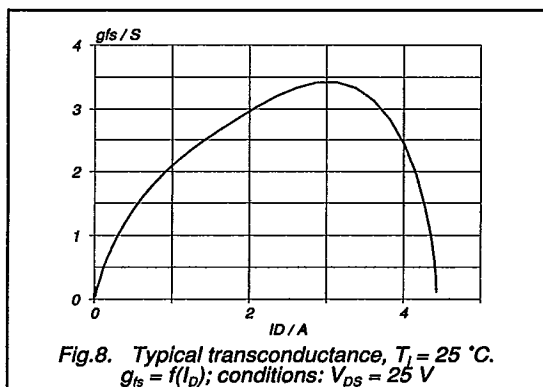
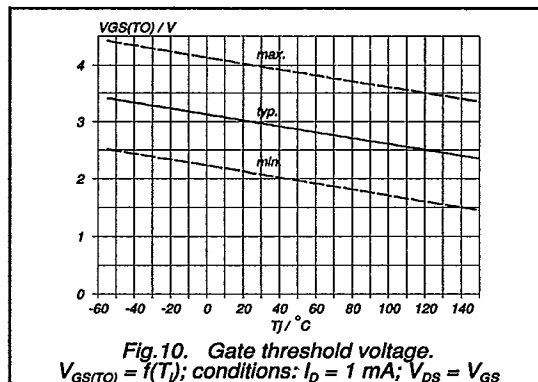
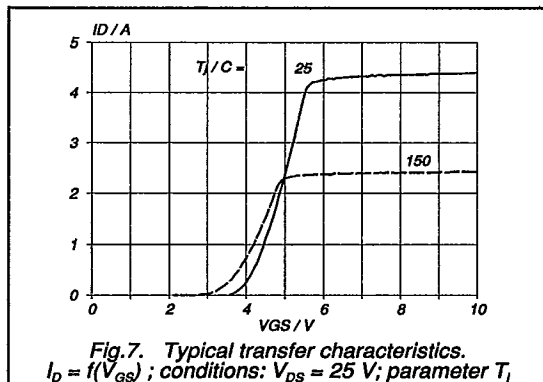
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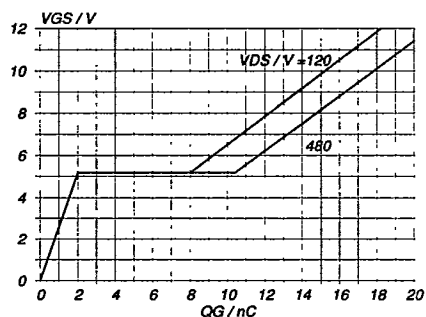


Fig. 13. Typical turn-on gate-charge characteristics.
 $V_{GS} = f(Q_G)$; conditions: $I_D = 2.8$ A; parameter V_{DS}

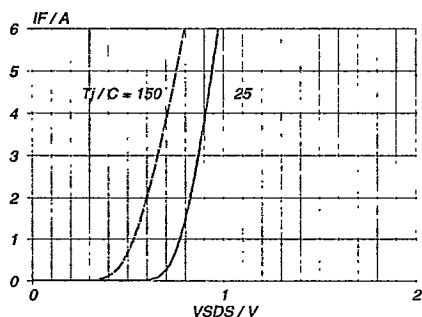


Fig. 14. Typical reverse diode current.
 $I_F = f(V_{SDS})$; conditions: $V_{GS} = 0$ V; parameter T_J