

BUK7620-100A

N-channel TrenchMOS standard level FET Rev. 2 — 2 February 2011

Product data sheet

Product profile 1.

1.1 General description

Standard level N-channel enhancement mode Field-Effect Transistor (FET) in a plastic package using TrenchMOS technology. This product has been designed and qualified to the appropriate AEC standard for use in automotive critical applications.

1.2 Features and benefits

- AEC Q101 compliant
- Low conduction losses due to low on-state resistance
- Suitable for standard level gate drive sources
- Suitable for thermally demanding environments due to 175 °C rating

1.3 Applications

- 12 V, 24 V and 42 V loads
- Automotive and general purpose power switching

Motors, lamps and solenoids

1.4 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V_{DS}	drain-source voltage	T _j ≥ 25 °C; T _j ≤ 175 °C	-	-	100	V
I _D	drain current	V _{GS} = 10 V; T _{mb} = 25 °C; see <u>Figure 1</u> ; see <u>Figure 3</u>	-	-	63	Α
P _{tot}	total power dissipation	T _{mb} = 25 °C; see <u>Figure 2</u>	-	-	200	W
Static chara	acteristics					
R _{DSon}	drain-source on-state resistance	V_{GS} = 10 V; I_D = 25 A; T_j = 175 °C; see <u>Figure 12</u> ; see <u>Figure 13</u>	-	-	50	mΩ
		V_{GS} = 10 V; I_D = 25 A; T_j = 25 °C; see <u>Figure 12</u> ; see <u>Figure 13</u>	-	17	20	mΩ
Avalanche	ruggedness					
E _{DS(AL)S}	non-repetitive drain-source avalanche energy	I_D = 60 A; $V_{sup} \le$ 100 V; R_{GS} = 50 Ω ; V_{GS} = 10 V; $T_{j(init)}$ = 25 °C; unclamped	-	-	400	mJ



2. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	G	gate		
2	D	drain	mb	D D
3	S	source		
mb	D	mounting base; connected to drain		mbb076 S
			SOT404 (D2PAK)	

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BUK7620-100A	D2PAK	plastic single-ended surface-mounted package (D2PAK); 3 leads (one lead cropped)	SOT404

4. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	drain-source voltage	T _j ≥ 25 °C; T _j ≤ 175 °C	-	100	V
V_{DGR}	drain-gate voltage	R_{GS} = 20 k Ω	-	100	V
V_{GS}	gate-source voltage		-20	20	V
I _D	drain current	T_{mb} = 25 °C; V_{GS} = 10 V; see <u>Figure 1</u> ; see <u>Figure 3</u>	-	63	Α
		T_{mb} = 100 °C; V_{GS} = 10 V; see <u>Figure 1</u>	-	44	Α
I _{DM}	peak drain current	T_{mb} = 25 °C; pulsed; $t_p \le 10 \mu s$; see <u>Figure 3</u>	-	253	Α
P _{tot}	total power dissipation	T _{mb} = 25 °C; see <u>Figure 2</u>	-	200	W
T _{stg}	storage temperature		-55	175	°C
Tj	junction temperature		-55	175	°C
Source-drain	diode				
Is	source current	T _{mb} = 25 °C	-	63	Α
I _{SM}	peak source current	pulsed; $t_p \le 10 \mu s$; $T_{mb} = 25 ^{\circ}C$	-	253	Α
Avalanche rug	ggedness				
E _{DS(AL)S}	non-repetitive drain-source avalanche energy	I_D = 60 A; $V_{sup} \le$ 100 V; R_{GS} = 50 Ω; V_{GS} = 10 V; $T_{j(init)}$ = 25 °C; unclamped	-	400	mJ

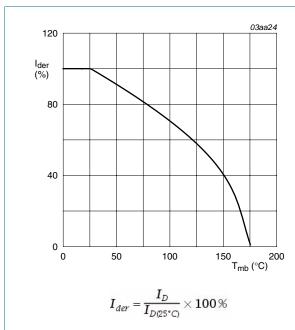


Fig 1. Normalized continuous drain current as a function of mounting base temperature

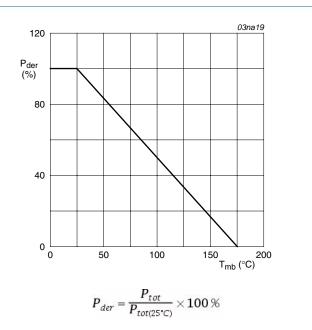
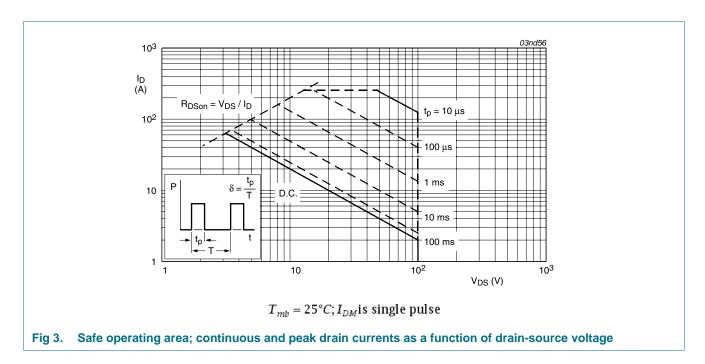


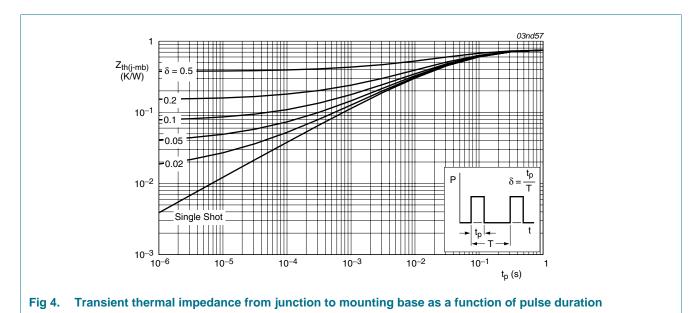
Fig 2. Normalized total power dissipation as a function of mounting base temperature



5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
$R_{th(j\text{-}mb)}$	thermal resistance from junction to mounting base	see <u>Figure 4</u>	-	-	0.75	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	mounted on a printed-circuit board; minimum footprint	-	50	-	K/W



BUK7620-100A

6. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
Static char	racteristics					
V _{(BR)DSS} drain-source		$I_D = 0.25 \text{ mA}; V_{GS} = 0 \text{ V}; T_j = 25 ^{\circ}\text{C}$	100	-	-	V
	breakdown voltage	$I_D = 0.25 \text{ mA}; V_{GS} = 0 \text{ V}; T_j = -55 ^{\circ}\text{C}$	89	-	-	V
V _{GS(th)} gate-source threshold voltage	I_D = 1 mA; V_{DS} = V_{GS} ; T_j = 25 °C; see <u>Figure 11</u>	2	3	4	V	
		I_D = 1 mA; V_{DS} = V_{GS} ; T_j = -55 °C; see <u>Figure 11</u>	-	-	4.4	V
	I_D = 1 mA; V_{DS} = V_{GS} ; T_j = 175 °C; see <u>Figure 11</u>	1	-	-	V	
I _{DSS} drain leakage current	V_{DS} = 100 V; V_{GS} = 0 V; T_j = 25 °C	-	0.05	10	μΑ	
		V_{DS} = 100 V; V_{GS} = 0 V; T_j = 175 °C	-	-	500	μΑ
I _{GSS}	gate leakage current	V _{GS} = 20 V; V _{DS} = 0 V; T _j = 25 °C	-	2	100	nΑ
	$V_{GS} = -20 \text{ V}; V_{DS} = 0 \text{ V}; T_j = 25 \text{ °C}$	-	2	100	nA	
R _{DSon} drain-source on- resistance	drain-source on-state resistance	V_{GS} = 10 V; I_D = 25 A; T_j = 175 °C; see <u>Figure 12</u> ; see <u>Figure 13</u>	-	-	50	mΩ
		V_{GS} = 10 V; I_D = 25 A; T_j = 25 °C; see Figure 12; see Figure 13	-	17	20	mΩ
Dynamic c	haracteristics					
C _{iss}	input capacitance	$V_{GS} = 0 \text{ V}; V_{DS} = 25 \text{ V}; f = 1 \text{ MHz};$	-	3430	4373	pF
C _{oss}	output capacitance	T _j = 25 °C; see <u>Figure 14</u>	-	440	525	pF
C _{rss}	reverse transfer capacitance		-	260	352	pF
t _{d(on)}	turn-on delay time	V_{DS} = 30 V; R_{L} = 1.2 Ω ; V_{GS} = 10 V;	-	21	-	ns
r	rise time	$R_{G(ext)}$ = 10 Ω ; T_j = 25 °C	-	87	-	ns
d(off)	turn-off delay time		-	108	-	ns
if	fall time		-	56	-	ns
L _D	internal drain inductance	from upper edge of drain mounting base to centre of die; T_j = 25 °C	-	2.5	-	nΗ
		from drain lead 6 mm from package to centre of die; T_j = 25 °C	-	4.5	-	nΗ
-S	internal source inductance	from source lead to source bond pad; $T_j = 25 ^{\circ}\text{C}$	-	7.5	-	nΗ
Source-dra	ain diode					
V_{SD}	source-drain voltage	I_S = 25 A; V_{GS} = 0 V; T_j = 25 °C; see <u>Figure 15</u>	-	0.85	1.2	V
·rr	reverse recovery time	$I_S = 20 \text{ A}; dI_S/dt = -100 \text{ A/}\mu\text{s};$	-	76	-	ns
Q _r	recovered charge	recovered charge $V_{GS} = -10 \text{ V}; V_{DS} = 30 \text{ V}; T_j = 25 ^{\circ}\text{C}$		282	-	nC

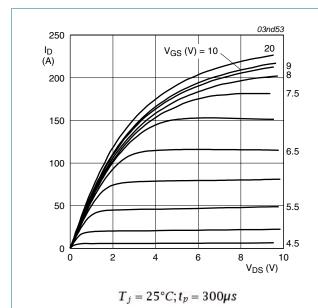


Fig 5. Output characteristics: drain current as a function of drain-source voltage; typical values

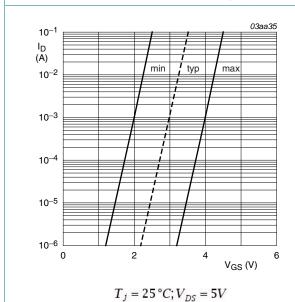
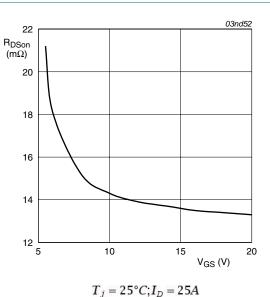
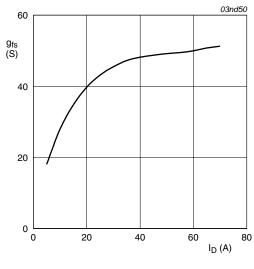


Fig 7. Sub-threshold drain current as a function of gate-source voltage



 $T_j = 25 \text{ C}, T_D = 25A$

Fig 6. Drain-source on-state voltage as a function of gate-source voltage; typical values



 $T_j = 25^{\circ}C; V_{DS} = 25V$

Fig 8. Forward transconductance as a function of drain current; typical values

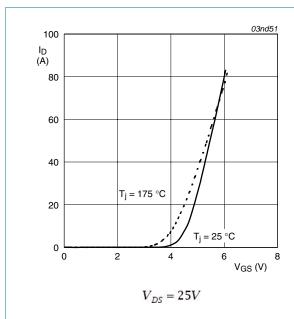


Fig 9. Transfer characteristics: drain current as a function of gate source voltage; typical values

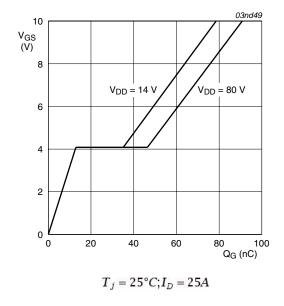


Fig 10. Gate-source voltage as a function of turn-on gate charge; typical values

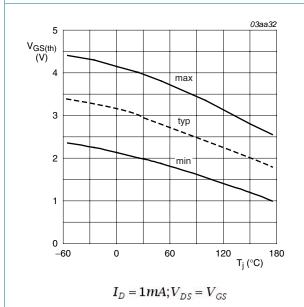


Fig 11. Gate-source threshold voltage as a function of junction temperature

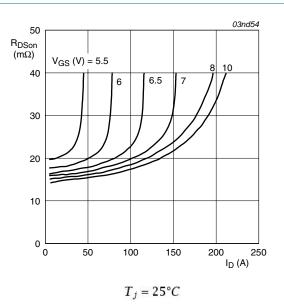


Fig 12. Drain-source on-state resistance as a function of drain current; typical values

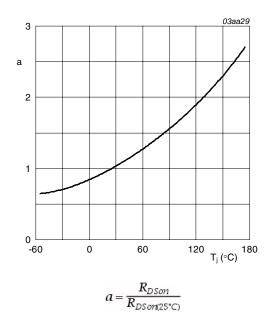


Fig 13. Normalized drain-source on-state resistance factor as a function of junction temperature

Fig 14. Input, output and reverse capacitances as a function of drain-source voltage; typical values

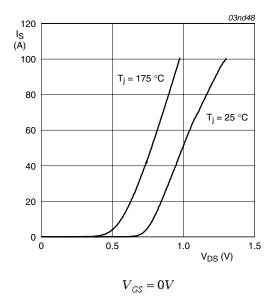


Fig 15. Reverse diode current as a function of reverse diode voltage; typical values

7. Package outline

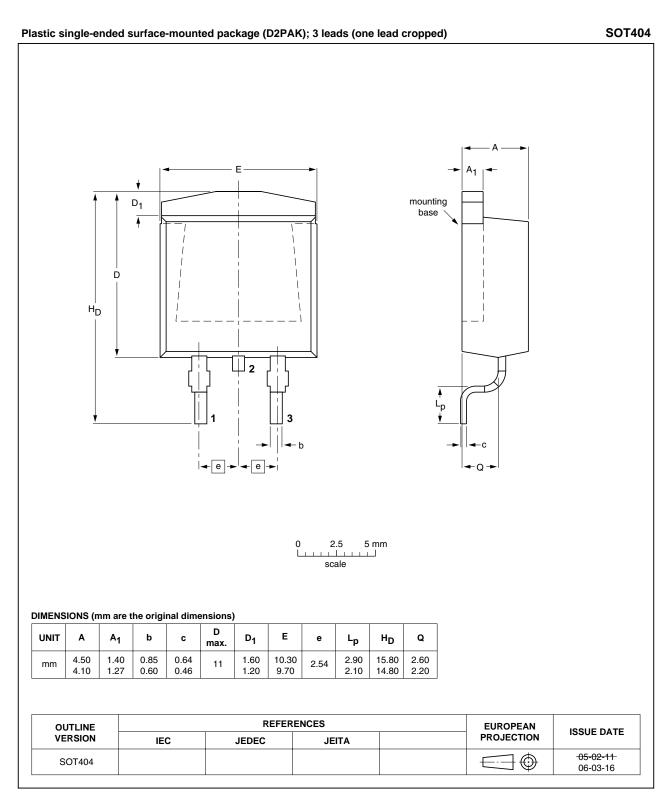


Fig 16. Package outline SOT404 (D2PAK)

N-channel TrenchMOS standard level FET

8. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BUK7620-100A v.2	20110202	Product data sheet	-	BUK7520_7620_100A-01
Modifications:		of this data sheet has be of NXP Semiconductors.	en redesigned to c	comply with the new identity
	 Legal texts 	have been adapted to the	e new company na	ime where appropriate.
	 Type numb 	er BUK7620-100A separ	ated from data she	et BUK7520_7620_100A-01.
BUK7520_7620_100A-01	20010205	Product specification	-	-

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9.1 Data sheet status

Document status[1][2]	Product status[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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- [2] The term 'short data sheet' is explained in section "Definitions"
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N-channel TrenchMOS standard level FET

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11. Contents

1	Product profile
1.1	General description
1.2	Features and benefits
1.3	Applications
1.4	Quick reference data1
2	Pinning information2
3	Ordering information2
4	Limiting values3
5	Thermal characteristics4
6	Characteristics5
7	Package outline9
8	Revision history10
9	Legal information11
9.1	Data sheet status
9.2	Definitions11
9.3	Disclaimers
9.4	Trademarks12
10	Contact information12

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