

BUK7626-100B

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 systems

- General purpose power switching
- Motors, lamps and solenoids

1.4 Quick reference data

Quick reference data Table 1.

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>	-	-	49	Α
P _{tot}	total power dissipation	T _{mb} = 25 °C; see <u>Figure 2</u>	-	-	157	W
Static chara	ecteristics					
R _{DSon}	drain-source on-state resistance	V_{GS} = 10 V; I_D = 25 A; T_j = 25 °C; see <u>Figure 11</u> ; see <u>Figure 12</u>	-	22	26	mΩ



Table 1. Quick reference data ...continued

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
Avalanche	ruggedness					
E _{DS(AL)S}	non-repetitive drain-source avalanche energy	I_D = 49 A; $V_{sup} \le 100 \text{ V}$; R_{GS} = 50 Ω ; V_{GS} = 10 V; $T_{j(init)}$ = 25 °C; unclamped	-	-	144	mJ
Dynamic o	haracteristics					
Q_{GD}	gate-drain charge	$V_{GS} = 10 \text{ V}; I_D = 25 \text{ A};$ $V_{DS} = 80 \text{ V}; T_j = 25 ^{\circ}\text{C};$ see Figure 13	-	13	-	nC

2. Pinning information

Table 2. Pinning information

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

^[1] It is not possible to make a connection to pin 2.

3. Ordering information

Table 3. Ordering information

Type number	Package			
	Name	Description	Version	
BUK7626-100B	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>	-	49	Α		
		T _{mb} = 100 °C; V _{GS} = 10 V; see <u>Figure 1</u>	-	34	Α		
I _{DM}	peak drain current	T_{mb} = 25 °C; pulsed; $t_p \le 10 \mu s$; see Figure 3	-	197	Α		
P _{tot}	total power dissipation	T _{mb} = 25 °C; see <u>Figure 2</u>	-	157	W		
T _{stg}	storage temperature		-55	175	°C		
Tj	junction temperature		-55	175	°C		
Source-drain	diode						
Is	source current	T _{mb} = 25 °C	-	49	Α		
I _{SM}	peak source current	pulsed; $t_p \le 10 \ \mu s$; $T_{mb} = 25 \ ^{\circ}C$	-	197	Α		
Avalanche rug	Avalanche ruggedness						
E _{DS(AL)S}	non-repetitive drain-source avalanche energy	I_D = 49 A; $V_{sup} \le 100$ V; R_{GS} = 50 Ω; V_{GS} = 10 V; $T_{j(init)}$ = 25 °C; unclamped	-	144	mJ		

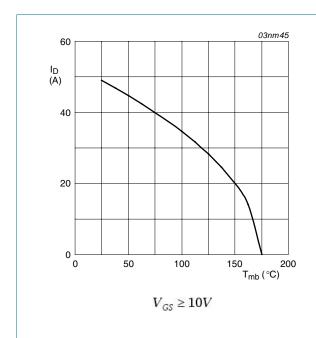


Fig 1. Normalized continuous drain current as a function of mounting base temperature

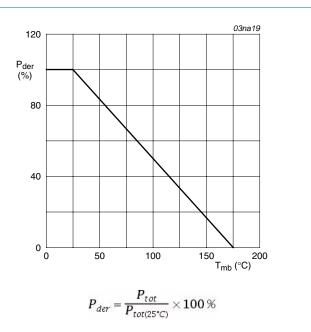
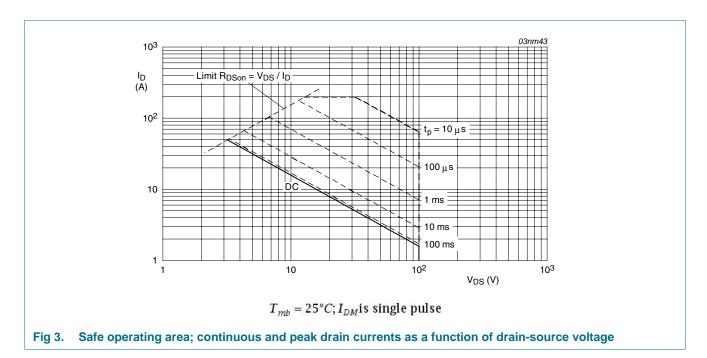


Fig 2. Normalized total power dissipation as a function of mounting base temperature



5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	see <u>Figure 4</u>	-	-	0.95	K/W
R _{th(j-a)}	thermal resistance from junction to ambient	minimum footprint; mounted on a printed-circuit board	-	-	50	K/W

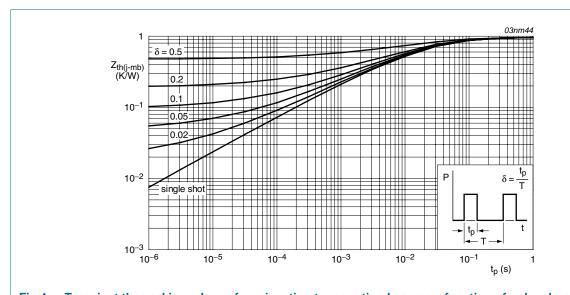


Fig 4. Transient thermal impedance from junction to mounting base as a function of pulse duration

6. Characteristics

Table 6. Characteristics

Table 0.	-					
Symbol	Parameter	Conditions	Min	Тур	Max	Unit
	nracteristics					
$V_{(BR)DSS}$	drain-source	$I_D = 0.25 \text{ mA}; V_{GS} = 0 \text{ V}; T_j = 25 ^{\circ}\text{C}$	100	-	-	V
	breakdown voltage	$I_D = 0.25 \text{ mA}; V_{GS} = 0 \text{ V}; T_j = -55 \text{ °C}$	89	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	I_D = 1 mA; V_{DS} = V_{GS} ; T_j = 175 °C; see <u>Figure 10</u>	1	-	-	V
		I_D = 1 mA; V_{DS} = V_{GS} ; T_j = 25 °C; see <u>Figure 10</u>	2	3	4	V
		I_D = 1 mA; V_{DS} = V_{GS} ; T_j = -55 °C; see <u>Figure 10</u>	-	-	4.4	V
I _{DSS}	drain leakage current	V_{DS} = 100 V; V_{GS} = 0 V; T_j = 175 °C	-	-	500	μΑ
		V _{DS} = 100 V; V _{GS} = 0 V; T _j = 25 °C	-	0.02	1	μΑ
I _{GSS}	gate leakage current	$V_{GS} = 20 \text{ V}; V_{DS} = 0 \text{ V}; T_j = 25 ^{\circ}\text{C}$	-	2	100	nA
		V_{GS} = -20 V; V_{DS} = 0 V; T_j = 25 °C	-	2	100	nA
R _{DSon}	drain-source on-state resistance	V_{GS} = 10 V; I_{D} = 25 A; T_{j} = 175 °C; see <u>Figure 11</u> ; see <u>Figure 12</u>	-	-	65	mΩ
		V_{GS} = 10 V; I_D = 25 A; T_j = 25 °C; see <u>Figure 11</u> ; see <u>Figure 12</u>	-	22	26	mΩ
Dynamic	characteristics					
Q _{G(tot)}	total gate charge	$I_D = 25 \text{ A}; V_{DS} = 80 \text{ V}; V_{GS} = 10 \text{ V};$	-	38	-	nC
Q_{GS}	gate-source charge	T _j = 25 °C; see <u>Figure 13</u>	-	9	-	nC
Q_{GD}	gate-drain charge		-	13	-	nC
C _{iss}	input capacitance	$V_{GS} = 0 \text{ V}; V_{DS} = 25 \text{ V}; f = 1 \text{ MHz};$	-	2168	2891	pF
C _{oss}	output capacitance	T _j = 25 °C; see <u>Figure 14</u>	-	238	286	pF
C _{rss}	reverse transfer capacitance		-	102	140	pF
t _{d(on)}	turn-on delay time	V_{DS} = 30 V; R_{L} = 1.2 Ω ; V_{GS} = 10 V;	-	21	-	ns
t _r	rise time	$R_{G(ext)}$ = 10 Ω ; T_j = 25 °C	-	40	-	ns
t _{d(off)}	turn-off delay time		-	47	-	ns
t _f	fall time		-	19	-	ns
L _D	internal drain inductance	from drain lead 6 mm from package to centre of die; $T_j = 25 ^{\circ}\text{C}$	-	4.5	-	nΗ
		from upper edge of drain mounting base to centre of die; T _j = 25 °C	-	2.5	-	nΗ
L _S	internal source inductance	from source lead 6 mm from package to source bond pad; T _j = 25 °C	-	7.5	-	nΗ
Source-di	rain 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
t _{rr}	reverse recovery time	$I_S = 20 \text{ A; } dI_S/dt = -100 \text{ A/}\mu\text{s;}$	-	94	-	ns
Q _r	recovered charge	V_{GS} = -10 V; V_{DS} = 30 V; T_j = 25 °C	-	115	_	nC

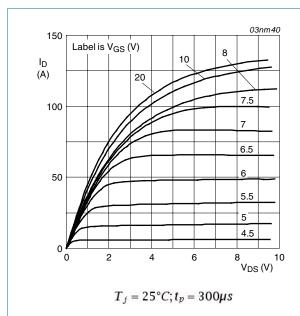


Fig 5. Output characteristics: drain current as a function of drain-source voltage; typical values

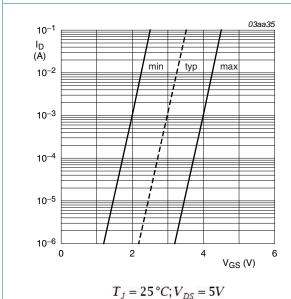


Fig 7. Sub-threshold drain current as a function of gate-source voltage

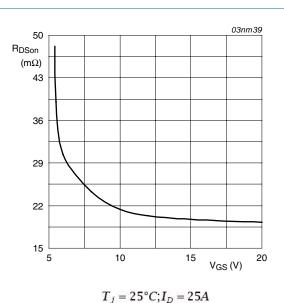


Fig 6. Drain-source on-state resistance as a function of gate-source voltage; typical values

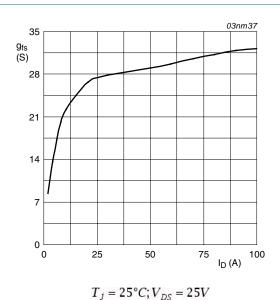


Fig 8. Forward transconductance as a function of drain current; typical values

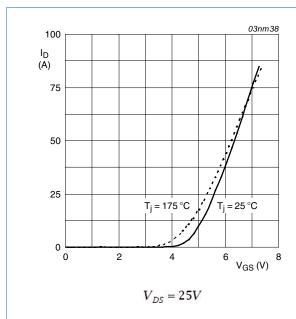


Fig 9. Transfer characteristics: drain current as a function of gate-source voltage; typical values

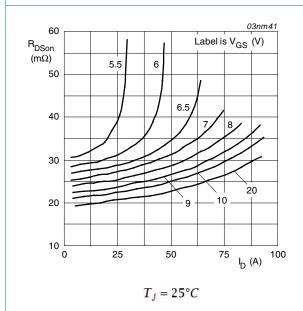


Fig 11. Drain-source on-state resistance as a function of drain current; typical values

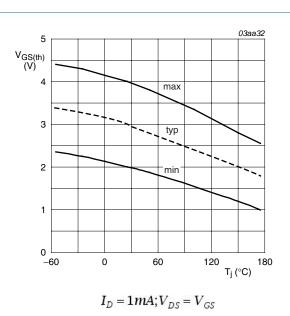


Fig 10. Gate-source threshold voltage as a function of junction temperature

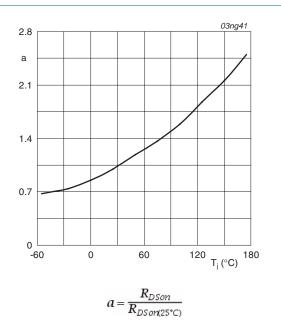


Fig 12. Normalized drain-source on-state resistance factor as a function of junction temperature

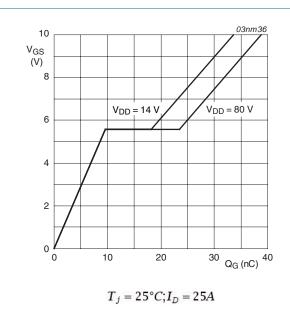
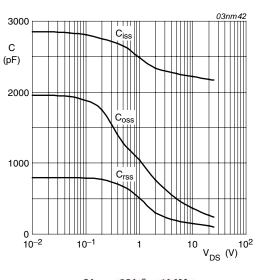


Fig 13. Gate-source voltage as a function of gate charge; typical values



 $V_{GS} = 0V; f = 1MHz$

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

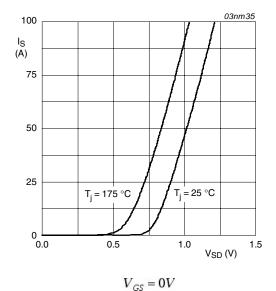


Fig 15. Source current as a function of source-drain voltage; typical values

7. Package outline

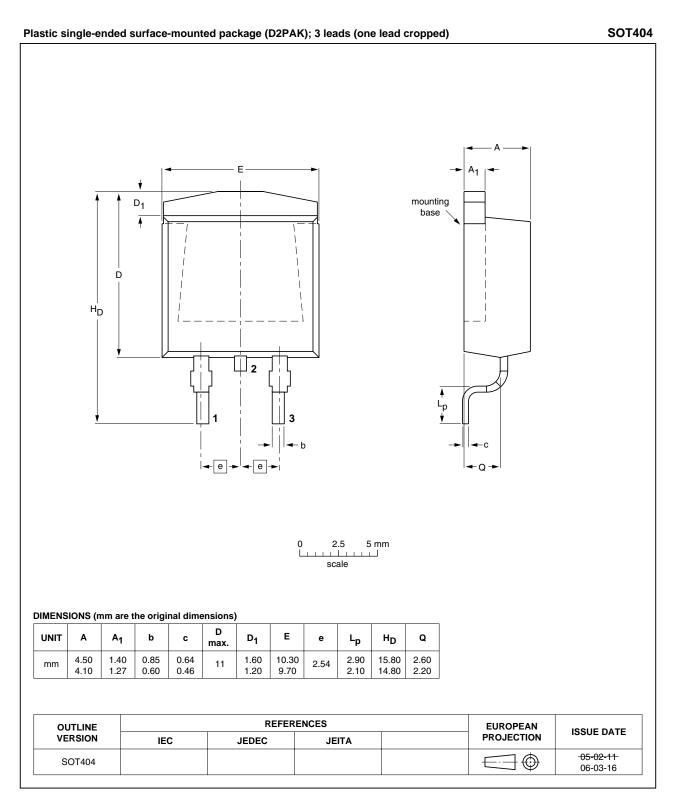


Fig 16. Package outline SOT404 (D2PAK)

8. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BUK7626-100B v.2	20110202	Product data sheet	-	BUK75_7626_100B-01
Modifications:	of NXP Semicondu	data sheet has been rede actors. een adapted to the new c		
	•	7626-100B separated fro		•
BUK75_7626_100B-01 (9397 750 11238)	20030411	Product data	-	-

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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

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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