

BUK7628-100A

N-channel TrenchMOS standard level FET Rev. 2 — 26 April 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

1.3 Applications

Automotive and general purpose power switching

1.4 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V_{DS}	drain-source voltage	$T_j \ge 25 \text{ °C}; T_j \le 175 \text{ °C}$	-	-	100	V
I _D	drain current	T _{mb} = 25 °C	-	-	47	Α
P _{tot}	total power dissipation		-	-	166	W
Static char	racteristics					
R _{DSon}	drain-source on-state resistance	$V_{GS} = 10 \text{ V}; I_D = 25 \text{ A};$ $T_j = 25 \text{ °C}$	-	20	28	mΩ
Avalanche	ruggedness					
E _{DS(AL)S}	non-repetitive drain-source avalanche energy	$I_D = 30$ A; $V_{sup} \le 25$ V; $R_{GS} = 50$ Ω ; $V_{GS} = 5$ V; $T_{j(init)} = 25$ °C; unclamped	-	-	45	mJ



2. Pinning information

Table 2. Pinning information

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

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BUK7628-100A	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	$R_{GS} = 20 \text{ k}\Omega$	-	100	V
V_{GS}	gate-source voltage		-20	20	V
I _D	drain current	T _{mb} = 100 °C	-	33	Α
		T _{mb} = 25 °C	-	47	Α
I _{DM}	peak drain current	T _{mb} = 25 °C; pulsed	-	187	Α
P _{tot}	total power dissipation	T _{mb} = 25 °C	-	166	W
T _{stg}	storage temperature		-55	175	°C
Tj	junction temperature		-55	175	°C
Source-drain	n diode				
Is	source current	T _{mb} = 25 °C	-	47	Α
I _{SM}	peak source current	pulsed; T _{mb} = 25 °C	-	187	Α
Avalanche ru	uggedness				
E _{DS(AL)S}	non-repetitive drain-source avalanche energy	I_D = 30 A; V_{sup} ≤ 25 V; R_{GS} = 50 Ω; V_{GS} = 5 V; $T_{j(init)}$ = 25 °C; unclamped	-	45	mJ

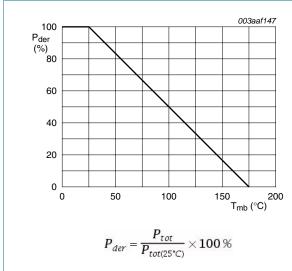


Fig 1. Normalized total power dissipation as a function of mounting base temperature

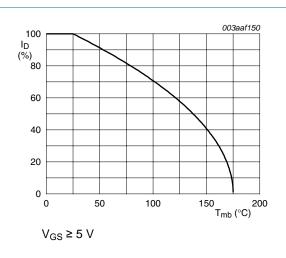


Fig 2. Continuous drain current as a function of mounting base temperature

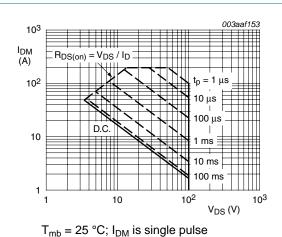
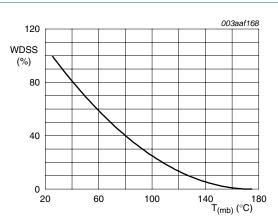
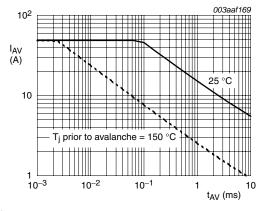


Fig 3. Safe operating area; continuous and peak drain currents as a function of drain-source voltage



I_D = 75 A; unclamped inductive load

Fig 4. Normalised drain-source non-repetitive avalanche energy rating; avalanche energy as a function of mounting base temperature



unclamped inductive load

Fig 5. Single-shot avalanche rating; avalanche current as a function of avalanche period

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		-	-	0.9	K/W
R _{th(j-a)}	thermal resistance from junction to ambient	minimum footprint; FR4 board	-	50	-	K/W

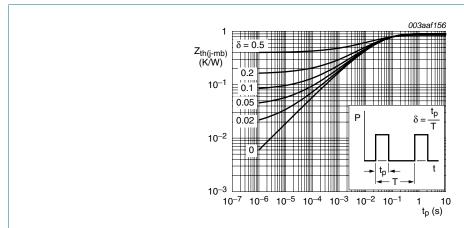


Fig 6. Transient thermal impedance from junction to mounting base as a function of pulse duration

6. Characteristics

Table 6. Characteristics

Table 6.	Characteristics					
Symbol	Parameter	Conditions	Min	Тур	Max	Unit
Static cha	racteristics					
V _{(BR)DSS} drain-sou	drain-source	$I_D = 0.25 \text{ mA}; V_{GS} = 0 \text{ V}; T_j = 25 \text{ °C}$	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	$I_D = 1 \text{ mA}; V_{DS} = V_{GS}; T_j = 25 \text{ °C}$	2	3	4	V
voltage	voltage	$I_D = 1 \text{ mA}; V_{DS} = V_{GS}; T_j = -55 \text{ °C}$	-	-	4.4	V
		$I_D = 1 \text{ mA}; V_{DS} = V_{GS}; T_j = 175 \text{ °C}$	1	-	-	V
I _{DSS}	drain leakage current	$V_{DS} = 100 \text{ V}; V_{GS} = 0 \text{ V}; T_j = 175 \text{ °C}$	-	-	500	μΑ
		$V_{DS} = 100 \text{ V}; V_{GS} = 0 \text{ V}; T_j = 25 \text{ °C}$	-	0.05	10	μΑ
I _{GSS}	gate leakage current	$V_{GS} = 20 \text{ V}; V_{DS} = 0 \text{ V}; T_j = 25 ^{\circ}\text{C}$	-	2	100	nΑ
		$V_{GS} = -20 \text{ V}; V_{DS} = 0 \text{ V}; T_j = 25 \text{ °C}$	-	2	100	nΑ
R _{DSon}	drain-source on-state	$V_{GS} = 10 \text{ V}; I_D = 25 \text{ A}; T_j = 175 \text{ °C}$	-	-	76	mΩ
	resistance	$V_{GS} = 10 \text{ V}; I_D = 25 \text{ A}; T_j = 25 ^{\circ}\text{C}$	-	20	28	$m\Omega$
Dynamic	characteristics					
C _{iss}	input capacitance	$V_{GS} = 0 \text{ V}; V_{DS} = 25 \text{ V}; f = 1 \text{ MHz};$	-	2320	3100	pF
C _{oss}	output capacitance	T _j = 25 °C	-	315	378	pF
C _{rss}	reverse transfer capacitance		-	187	256	pF
t _{d(on)}	turn-on delay time	$V_{DS} = 30 \text{ V}; R_L = 1.2 \Omega; V_{GS} = 10 \text{ V}; R_{G(ext)} 10 \Omega; T_j = 25 ^{\circ}C$	-	15	23	ns
t _r	rise time	$V_{DS} = 30 \text{ V}; R_L = 1.2 \Omega; V_{GS} = 10 \text{ V};$	-	70	105	ns
t _{d(off)}	turn-off delay time	$R_{G(ext)} = 10 \Omega$; $T_j = 25 °C$	-	83	116	ns
t _f	fall time		-	45	63	ns
L _D	internal drain inductance	from upper edge of drain tab 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
L _S	internal source inductance	from source lead to source bond pad; $T_j = 25 ^{\circ}\text{C}$	-	7.5	-	nΗ
Source-d	rain diode					
V _{SD}	source-drain voltage	$I_S = 25 \text{ A}; V_{GS} = 0 \text{ V}; T_j = 25 \text{ °C}$	-	0.85	1.2	V
		$I_S = 47 \text{ A}; V_{GS} = 0 \text{ V}; T_j = 25 \text{ °C}$	-	1.1	-	V
t _{rr}	reverse recovery time	$I_S = 47 \text{ A}$; $dI_S/dt = -100 \text{ A/}\mu\text{s}$;	-	66	-	ns
Qr	recovered charge	$V_{GS} = -10 \text{ V}; V_{DS} = 30 \text{ V}; T_j = 25 \text{ °C}$	-	0.24	-	μC

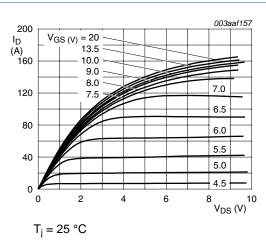


Fig 7. Output characteristics: drain current as a function of drain-source voltage; typical values

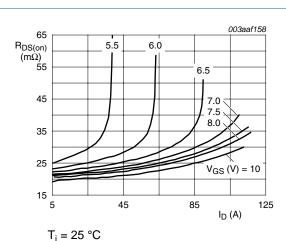


Fig 8. Drain-source on-state resistance as a function of drain current; typical values

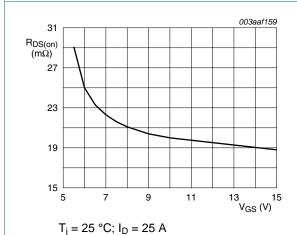


Fig 9. Drain-source on-state resistance as a function of gate-source voltage; typical values

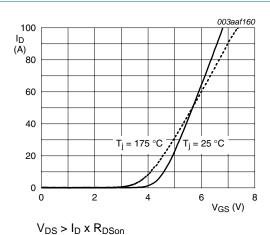


Fig 10. Transfer characteristics: drain current as a function of gate-source voltage; typical values

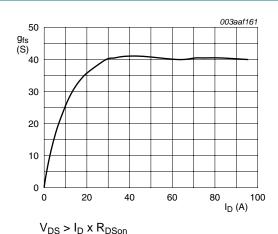


Fig 11. Forward transconductance as a function of drain current; typical values

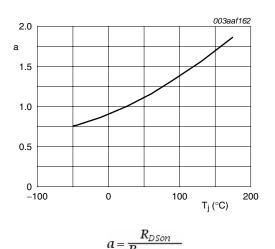


Fig 12. Normalized drain-source on-state resistance factor as a function of junction temperature

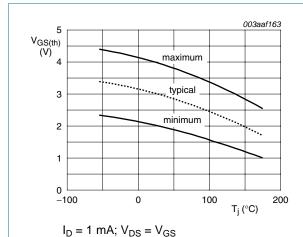


Fig 13. Gate-source threshold voltage as a function of junction temperature

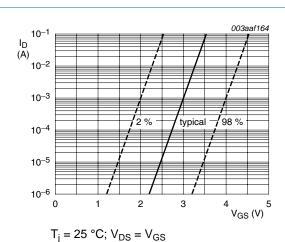


Fig 14. Sub-threshold drain current as a function of gate-source voltage

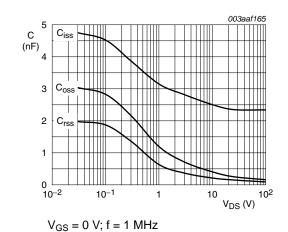


Fig 15. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values

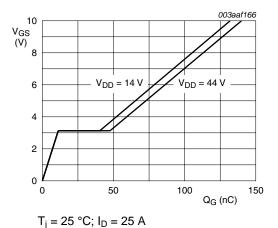


Fig 16. Gate-source voltage as a function of gate charge; typical values

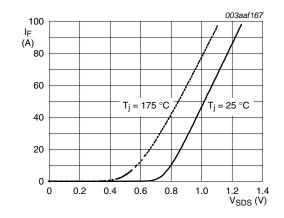


Fig 17. Source (diode forward) current as a function of source-drain (diode forward) voltage; typical values

 $V_{GS} = 0 V$

7. Package outline

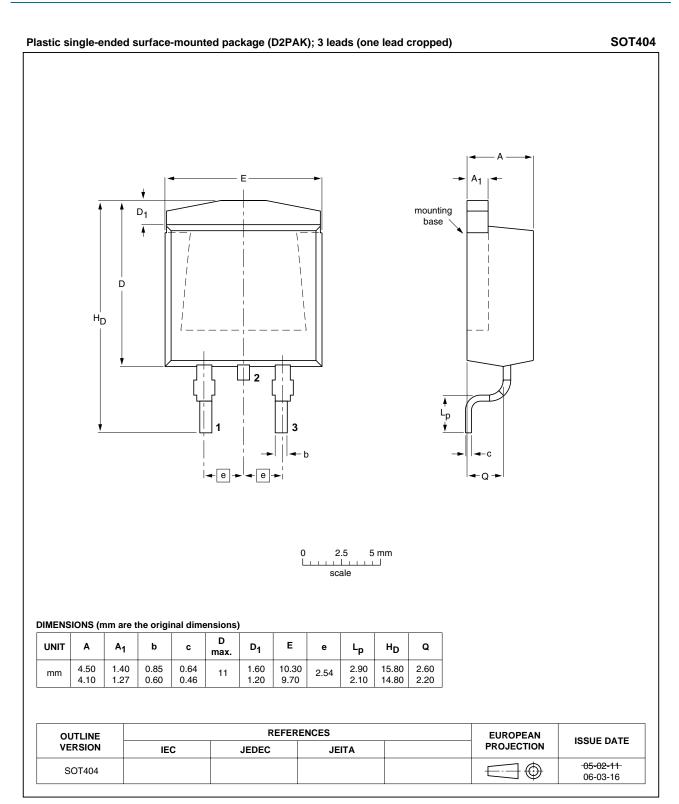


Fig 18. Package outline SOT404 (D2PAK)

8. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BUK7628-100A v.2	20110426	Product data sheet	-	BUK7528_7628-100A_1
Modifications:		of this data sheet has been of NXP Semiconductors.	en redesigned to co	mply with the new identity
	 Legal texts 	have been adapted to the	new company nan	ne where appropriate.
	 Type number 	er BUK7628-100A separa	ited from data shee	et BUK7528_7628-100A_1.
BUK7528_7628-100A_1	20000301	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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N-channel TrenchMOS standard level FET

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