



BUK7618-55

N-channel TrenchMOS standard level FET

Rev. 2 — 26 April 2011

Product data sheet

1. Product profile

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
- Electrostatically robust due to integrated protection diodes
- Low conduction losses due to low on-state resistance

1.3 Applications

- Automotive and general purpose power switching

1.4 Quick reference data

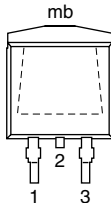
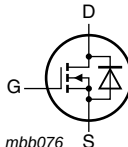
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DS}	drain-source voltage	$T_j \geq 25\text{ °C}; T_j \leq 175\text{ °C}$	-	-	55	V
I_D	drain current	$T_{mb} = 25\text{ °C}$	-	-	57	A
P_{tot}	total power dissipation		-	-	125	W
Static characteristics						
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = 10\text{ V}; I_D = 25\text{ A}; T_j = 25\text{ °C}$	-	15	18	mΩ
Avalanche ruggedness						
$E_{DS(AL)S}$	non-repetitive drain-source avalanche energy	$I_D = 50\text{ A}; V_{sup} \leq 25\text{ V}; R_{GS} = 50\text{ Ω}; V_{GS} = 10\text{ V}; T_{j(init)} = 25\text{ °C}; \text{unclamped}$	-	-	125	mJ



2. Pinning information

Table 2. Pinning information

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

3. Ordering information

Table 3. Ordering information

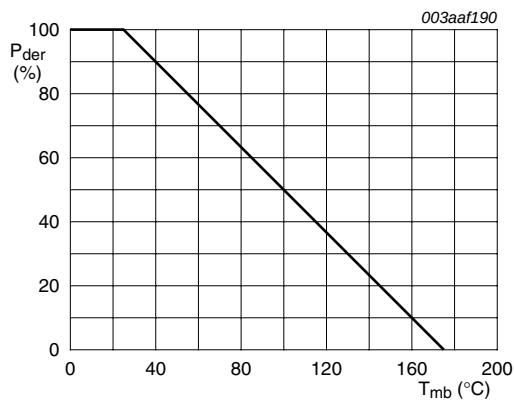
Type number	Package		Version
	Name	Description	
BUK7618-55	D2PAK	plastic single-ended surface-mounted package (D2PAK); 3 leads (one lead cropped)	SOT404

4. Limiting values

Table 4. Limiting values

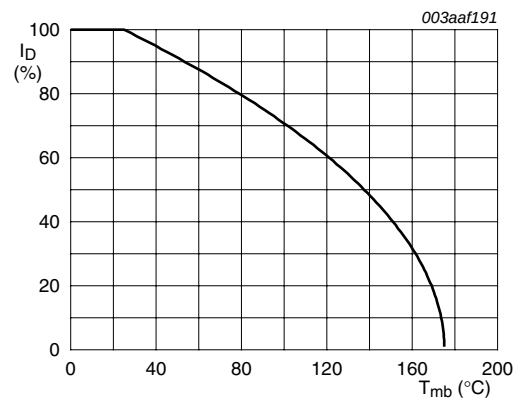
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	drain-source voltage	$T_j \geq 25\text{ }^{\circ}\text{C}$; $T_j \leq 175\text{ }^{\circ}\text{C}$	-	55	V
V_{DGR}	drain-gate voltage	$R_{GS} = 20\text{ k}\Omega$	-	55	V
V_{GS}	gate-source voltage		-16	16	V
I_D	drain current	$T_{mb} = 25\text{ }^{\circ}\text{C}$	-	57	A
		$T_{mb} = 100\text{ }^{\circ}\text{C}$	-	40	A
I_{DM}	peak drain current	$T_{mb} = 25\text{ }^{\circ}\text{C}$; pulsed	-	228	A
P_{tot}	total power dissipation	$T_{mb} = 25\text{ }^{\circ}\text{C}$	-	125	W
T_{stg}	storage temperature		-55	175	$^{\circ}\text{C}$
T_j	junction temperature		-55	175	$^{\circ}\text{C}$
Source-drain diode					
I_S	source current	$T_{mb} = 25\text{ }^{\circ}\text{C}$	-	57	A
I_{SM}	peak source current	pulsed; $T_{mb} = 25\text{ }^{\circ}\text{C}$	-	200	A
Avalanche ruggedness					
$E_{DS(AL)S}$	non-repetitive drain-source avalanche energy	$I_D = 50\text{ A}$; $V_{sup} \leq 25\text{ V}$; $R_{GS} = 50\text{ }\Omega$; $V_{GS} = 10\text{ V}$; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; unclamped	-	125	mJ
Electrostatic discharge					
V_{esd}	electrostatic discharge voltage	HBM; $C = 100\text{ pF}$; $R = 1.5\text{ k}\Omega$; (all pins)	-	2	kV



$$P_{der} = \frac{P_{tot}}{P_{tot(25^{\circ}\text{C})}} \times 100\%$$

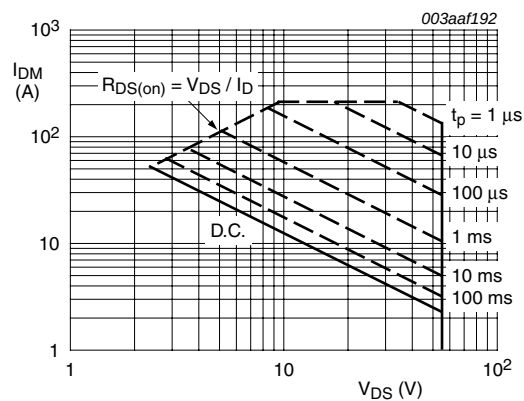
Fig 1. Normalized total power dissipation as a function of mounting base temperature



$$I_{der} = \frac{I_D}{I_{D(25^{\circ}\text{C})}} \times 100\%$$

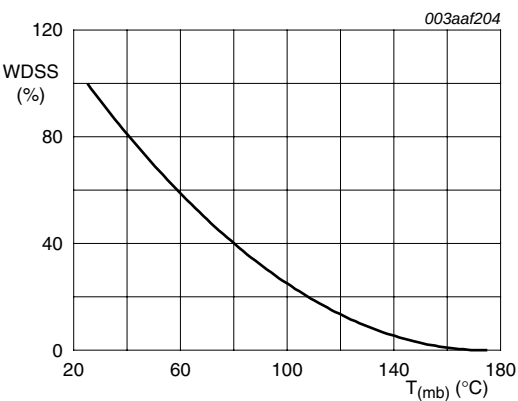
$V_{GS} \geq 5\text{ V}$

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



$T_{mb} = 25\text{ }^{\circ}\text{C}$; I_{DM} is single pulse

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



$I_D = 75\text{ A}$

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

5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base		-	-	1.2	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	minimum footprint; FR4 board	-	50	-	K/W

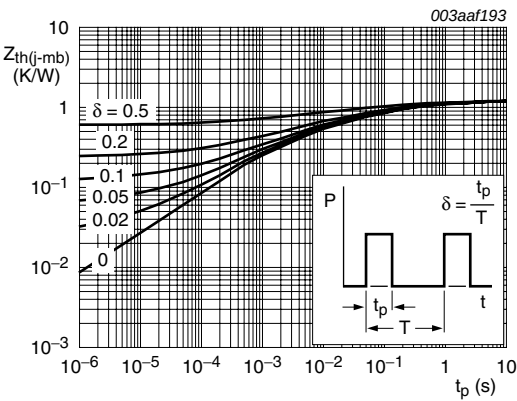


Fig 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

6. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V _{(BR)DSS}	drain-source breakdown voltage	I _D = 0.25 mA; V _{GS} = 0 V; T _j = 25 °C	55	-	-	V
		I _D = 0.25 mA; V _{GS} = 0 V; T _j = -55 °C	50	-	-	V
V _{GS(th)}	gate-source threshold voltage	I _D = 1 mA; V _{DS} = V _{GS} ; T _j = 25 °C	2	3	4	V
		I _D = 1 mA; V _{DS} = V _{GS} ; T _j = 175 °C	1	-	-	V
		I _D = 1 mA; V _{DS} = V _{GS} ; T _j = -55 °C	-	-	4.4	V
I _{DSS}	drain leakage current	V _{DS} = 55 V; V _{GS} = 0 V; T _j = 175 °C	-	-	500	μA
		V _{DS} = 55 V; V _{GS} = 0 V; T _j = 25 °C	-	0.05	10	μA
I _{GSS}	gate leakage current	V _{GS} = 10 V; V _{DS} = 0 V; T _j = 25 °C	-	0.02	1	μA
		V _{GS} = -10 V; V _{DS} = 0 V; T _j = 25 °C	-	0.02	1	μA
		V _{GS} = 10 V; V _{DS} = 0 V; T _j = 175 °C	-	-	20	μA
		V _{GS} = -10 V; V _{DS} = 0 V; T _j = 175 °C	-	-	20	μA
R _{DSon}	drain-source on-state resistance	V _{GS} = 10 V; I _D = 25 A; T _j = 175 °C	-	-	38	mΩ
		V _{GS} = 10 V; I _D = 25 A; T _j = 25 °C	-	15	18	mΩ
V _{(BR)GSS}	gate-source breakdown voltage	V _{DS} = 0 V; T _j = 25 °C; I _G = 1 mA	16	-	-	V
		V _{DS} = 0 V; T _j = 25 °C; I _G = -1 mA	16	-	-	V
Dynamic characteristics						
C _{iss}	input capacitance	V _{GS} = 0 V; V _{DS} = 25 V; f = 1 MHz; T _j = 25 °C	-	1500	2000	pF
C _{oss}	output capacitance		-	370	470	pF
C _{rss}	reverse transfer capacitance		-	170	250	pF
t _{d(on)}	turn-on delay time	V _{DS} = 30 V; R _L = 1.2 Ω; V _{GS} = 10 V; R _{G(ext)} = 10 Ω; I _D = 25 A; T _j = 25 °C	-	15	22	ns
t _r	rise time		-	30	60	ns
t _{d(off)}	turn-off delay time		-	35	50	ns
t _f	fall time		-	25	38	ns
L _D	internal drain inductance	measured from upper edge of drain mounting base to centre of die; T _j = 25 °C	-	2.5	-	nH
L _S	internal source inductance	measured from source lead soldering point to source bond pad; T _j = 25 °C	-	7.5	-	nH
g _{fs}	transfer conductance	V _{DS} = 25 V; I _D = 25 A; T _j = 25 °C	6	30	-	S
Source-drain diode						
V _{SD}	source-drain voltage	I _S = 50 A; V _{GS} = 0 V; T _j = 25 °C	-	1	-	V
		I _S = 25 A; V _{GS} = 0 V; T _j = 25 °C	-	0.95	1.2	V
t _{rr}	reverse recovery time	I _S = 50 A; dI _S /dt = -100 A/μs; V _{GS} = -10 V; V _{DS} = 30 V; T _j = 25 °C	-	48	-	ns
Q _r	recovered charge		-	0.1	-	μC

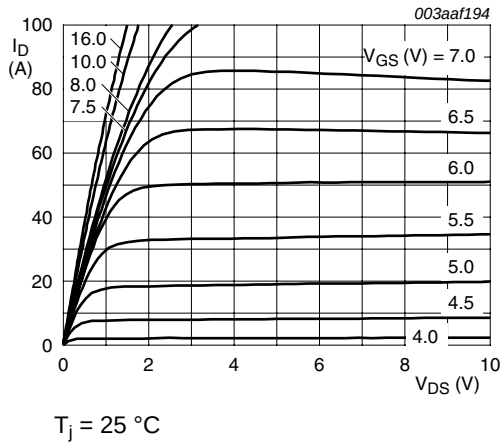


Fig 6. Output characteristics: drain current as a function of drain-source voltage; typical values

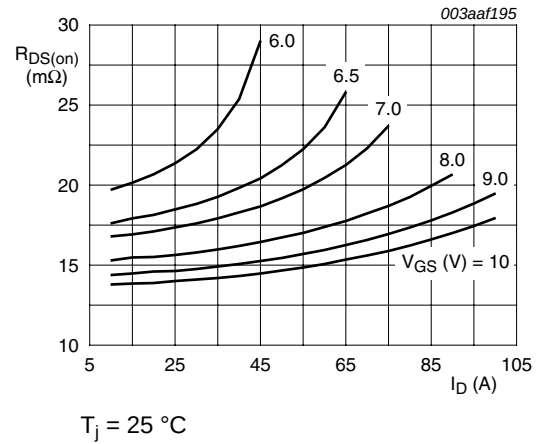


Fig 7. Drain-source on-state resistance as a function of drain current; typical values

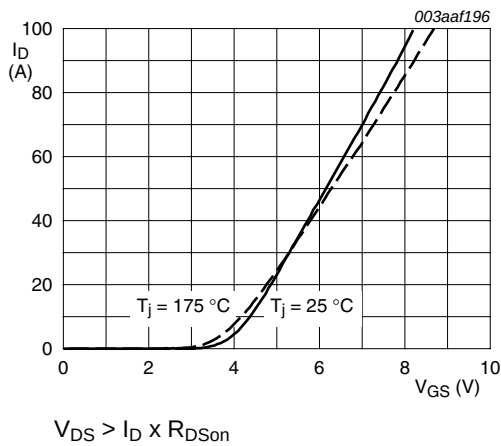


Fig 8. Transfer characteristics: drain current as a function of gate-source voltage; typical values

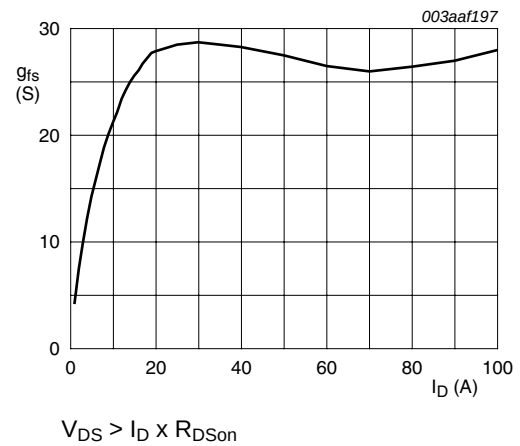


Fig 9. Forward transconductance as a function of drain current; typical values

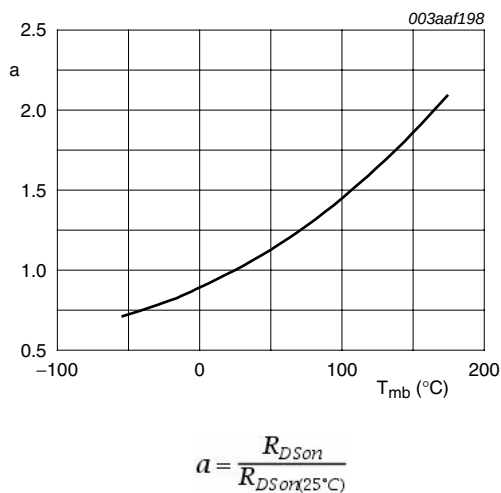


Fig 10. Normalized drain-source on-state resistance factor as a function of junction temperature

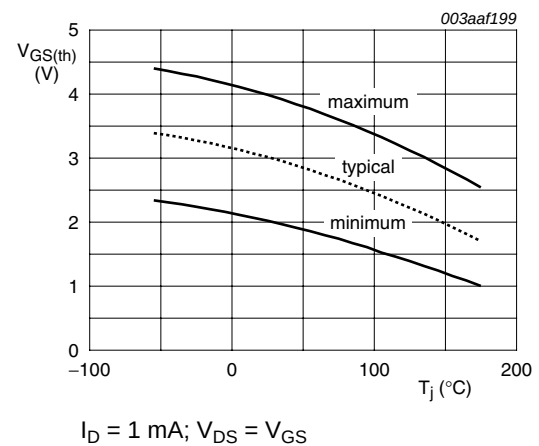


Fig 11. Gate-source threshold voltage as a function of junction temperature

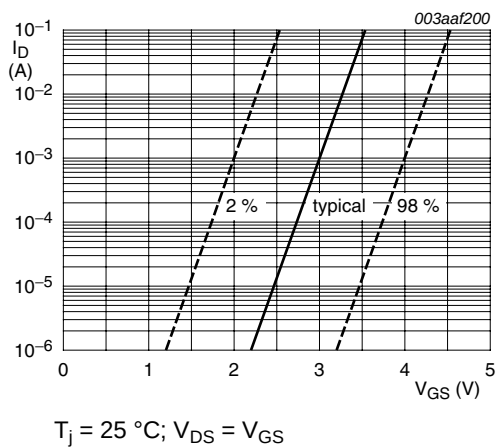


Fig 12. Sub-threshold drain current as a function of gate-source voltage

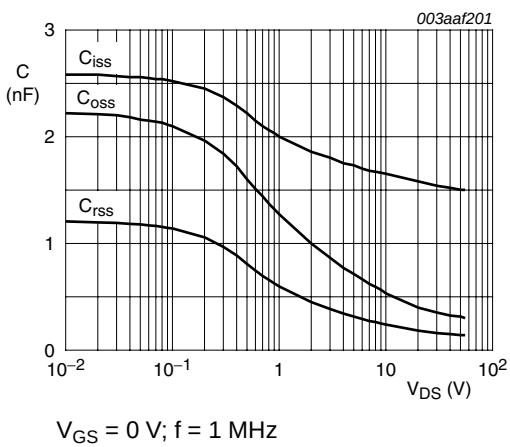


Fig 13. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values

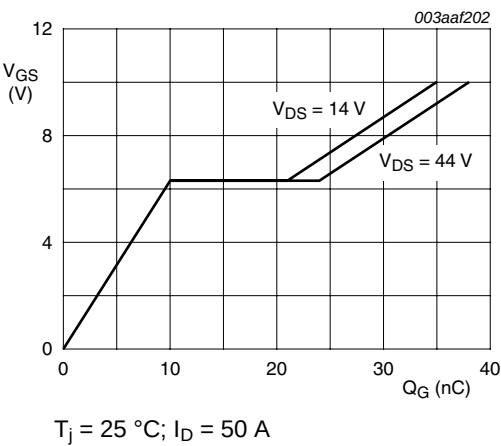


Fig 14. Gate-source voltage as a function of gate charge; typical values

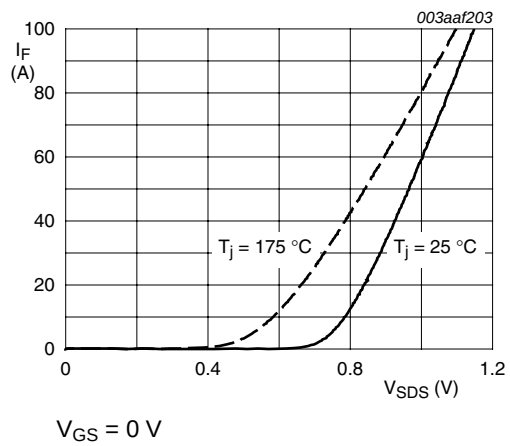


Fig 15. Source (diode forward) current as a function of source-drain (diode forward) voltage; typical values

7. Package outline

Plastic single-ended surface-mounted package (D2PAK); 3 leads (one lead cropped)

SOT404

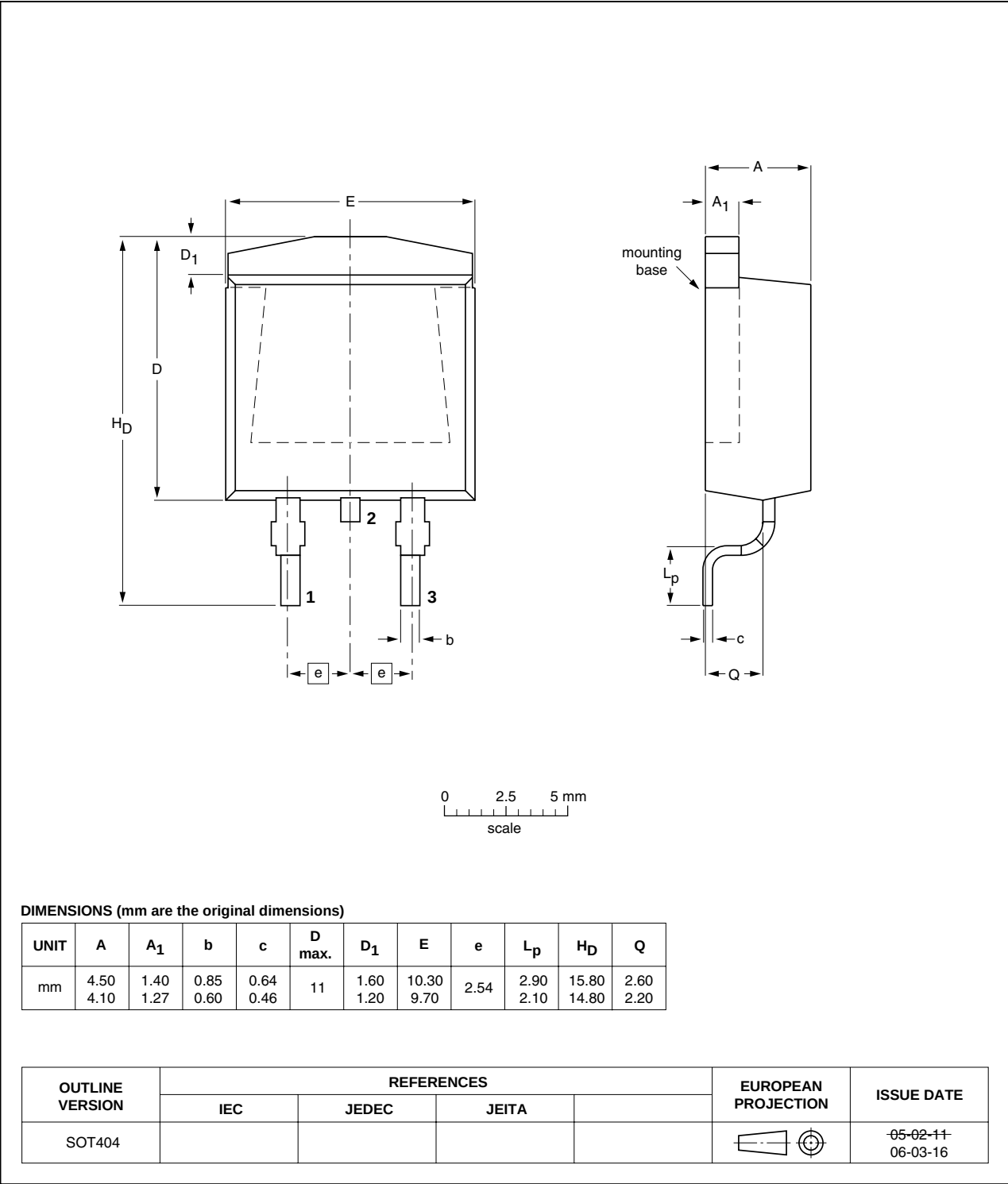


Fig 16. Package outline SOT404 (D2PAK)

8. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BUK7618-55 v.2	20110426	Product data sheet	-	BUK7618-55_1
Modifications:	- The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. - Legal texts have been adapted to the new company name where appropriate.			
BUK7618-55_1	19980401	Product specification	-	-

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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.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

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