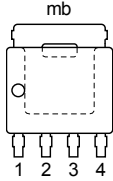
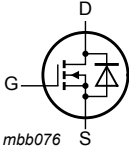


5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	S	source	 LPAK56; Power-SO8 (SOT669)	 <i>mbb076</i>
2	S	source		
3	S	source		
4	G	gate		
mb	D	mounting base; connected to drain		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BUK7Y7R6-40E	LPAK56; Power-SO8	Plastic single-ended surface-mounted package (LPAK56; Power-SO8); 4 leads	SOT669

7. Marking

Table 4. Marking codes

Type number	Marking code
BUK7Y7R6-40E	77E640

8. Limiting values

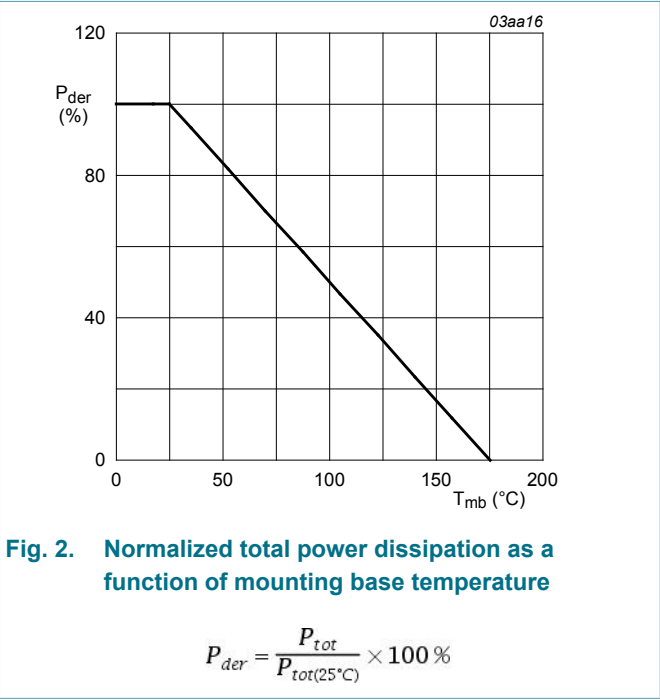
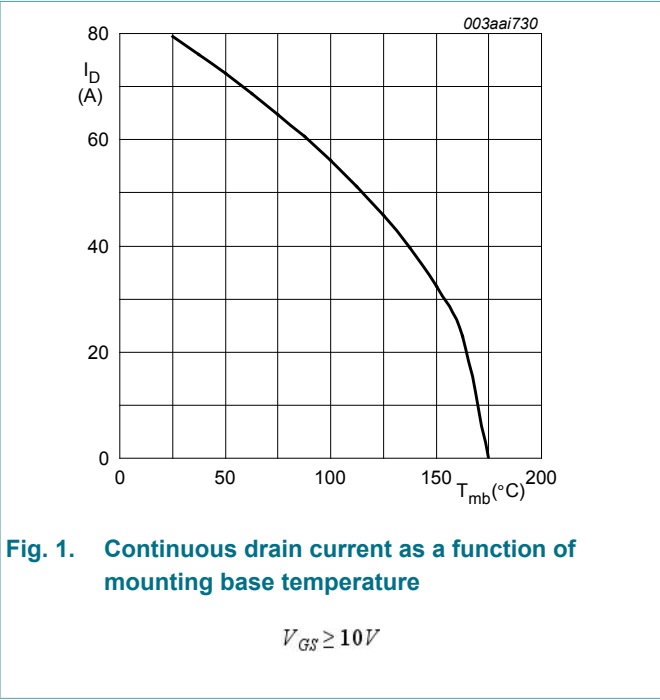
Table 5. Limiting values

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	-	40	V
V _{DGR}	drain-gate voltage	R _{GS} = 20 kΩ	-	40	V
V _{GS}	gate-source voltage	T _j ≤ 175 °C; DC	-20	20	V
I _D	drain current	T _{mb} = 25 °C; V _{GS} = 10 V; Fig. 1	-	79	A
		T _{mb} = 100 °C; V _{GS} = 10 V; Fig. 1	-	56	A
I _{DM}	peak drain current	T _{mb} = 25 °C; pulsed; t _p ≤ 10 μs; Fig. 4	-	317	A
P _{tot}	total power dissipation	T _{mb} = 25 °C; Fig. 2	-	94.3	W
T _{stg}	storage temperature		-55	175	°C

Symbol	Parameter	Conditions		Min	Max	Unit
T _j	junction temperature			-55	175	°C
Source-drain diode						
I _S	source current	T _{mb} = 25 °C		-	79	A
I _{SM}	peak source current	pulsed; t _p ≤ 10 μs; T _{mb} = 25 °C		-	317	A
Avalanche ruggedness						
E _{DS(AL)S}	non-repetitive drain-source avalanche energy	I _D = 79 A; V _{sup} ≤ 40 V; R _{GS} = 50 Ω; V _{GS} = 10 V; T _{j(init)} = 25 °C; unclamped; Fig. 3	[1] [2]	-	43	mJ

[1] Single-pulse avalanche rating limited by maximum junction temperature of 175 °C.
[2] Refer to application note AN10273 for further information.



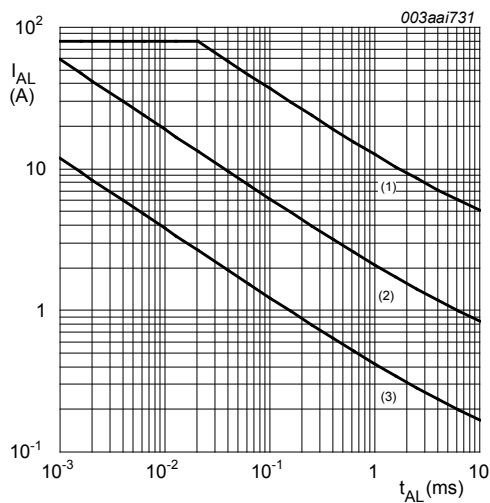


Fig. 3. Avalanche rating; avalanche current as a function of avalanche time

(1) $T_{j (init)} = 25^{\circ}C$; (2) $T_{j (init)} = 150^{\circ}C$; (3) Repetitive Avalanche

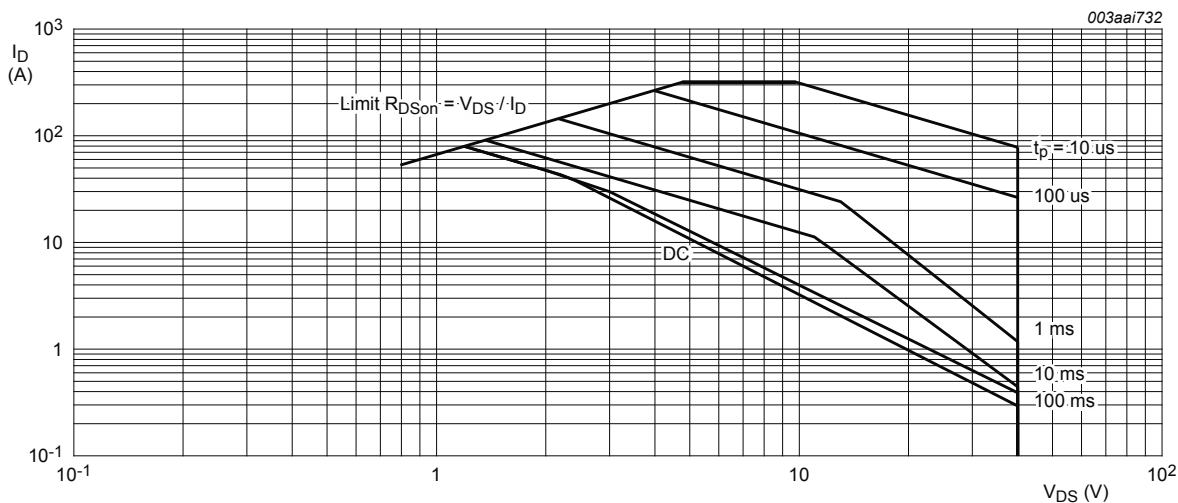


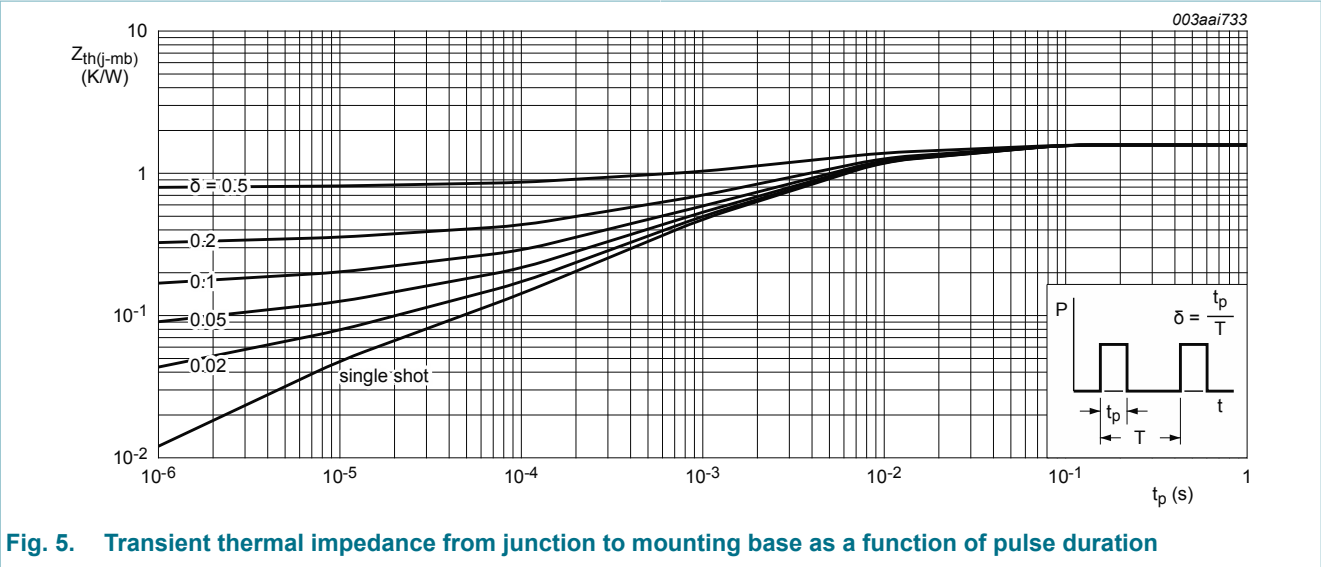
Fig. 4. Safe operating area; continuous and peak drain currents as a function of drain-source voltage

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

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	Fig. 5	-	-	1.58	K/W



10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V _{(BR)DSS}	drain-source breakdown voltage	I _D = 250 μA; V _{GS} = 0 V; T _J = 25 °C		40	-	-	V
		I _D = 250 μA; V _{GS} = 0 V; T _J = -55 °C		36	-	-	V
V _{GS(th)}	gate-source threshold voltage	I _D = 1 mA; V _{DS} = V _{GS} ; T _J = 25 °C; Fig. 9 ; Fig. 10		2.4	3	4	V
		I _D = 1 mA; V _{DS} = V _{GS} ; T _J = -55 °C; Fig. 9		-	-	4.5	V
		I _D = 1 mA; V _{DS} = V _{GS} ; T _J = 175 °C; Fig. 9		1	-	-	V
I _{DSS}	drain leakage current	V _{DS} = 40 V; V _{GS} = 0 V; T _J = 25 °C		-	0.1	1	μA
		V _{DS} = 40 V; V _{GS} = 0 V; T _J = 175 °C		-	-	500	μA
I _{GSS}	gate leakage current	V _{GS} = 20 V; V _{DS} = 0 V; T _J = 25 °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 = 20 A; T _J = 25 °C; Fig. 11		-	5.5	7.6	mΩ
		V _{GS} = 10 V; I _D = 20 A; T _J = 175 °C; Fig. 11 ; Fig. 12		-	-	15	mΩ
Dynamic characteristics							
Q _{G(tot)}	total gate charge	I _D = 20 A; V _{DS} = 32 V; V _{GS} = 10 V; T _J = 25 °C; Fig. 13 ; Fig. 14		-	26.2	-	nC
Q _{GS}	gate-source charge			-	5.4	-	nC
Q _{GD}	gate-drain charge			-	8.2	-	nC

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
C _{iss}	input capacitance	V _{GS} = 0 V; V _{DS} = 25 V; f = 1 MHz; T _j = 25 °C; Fig. 15		-	1238	1650	pF
C _{oss}	output capacitance			-	275	330	pF
C _{rss}	reverse transfer capacitance			-	172	235	pF
t _{d(on)}	turn-on delay time	V _{DS} = 30 V; R _L = 1.5 Ω; V _{GS} = 10 V; R _{G(ext)} = 5 Ω; T _j = 25 °C		-	7.2	-	ns
t _r	rise time			-	11	-	ns
t _{d(off)}	turn-off delay time			-	15.6	-	ns
t _f	fall time			-	11.3	-	ns
Source-drain diode							
V _{SD}	source-drain voltage	I _S = 20 A; V _{GS} = 0 V; T _j = 25 °C; Fig. 16		-	0.85	1.2	V
t _{rr}	reverse recovery time	I _S = 20 A; dI _S /dt = -100 A/μs; V _{GS} = 0 V; V _{DS} = 25 V; T _j = 25 °C		-	19	-	ns
Q _r	recovered charge			-	9	-	nC

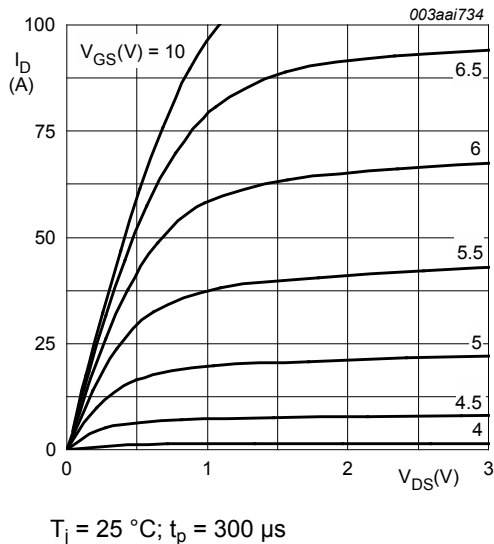


Fig. 6. Output characteristics; drain current as a function of drain-source voltage; typical values

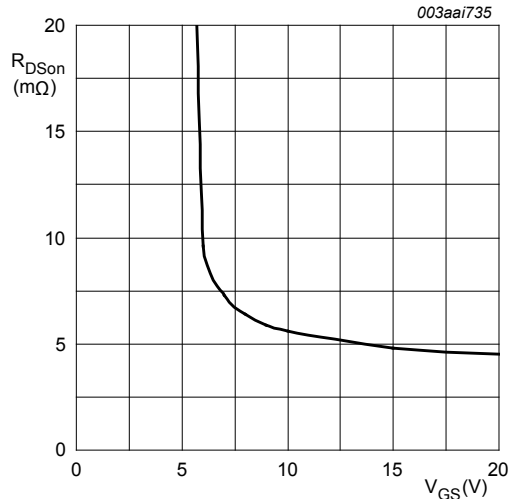


Fig. 7. Drain-source on-state resistance as a function of gate-source voltage; typical values

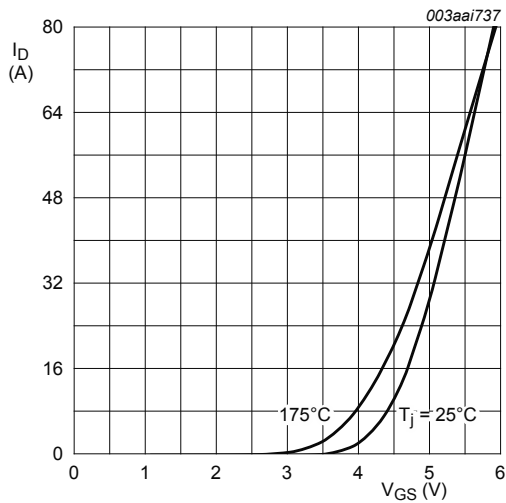


Fig. 8. Transfer characteristics; drain current as a function of gate-source voltage; typical values

$V_{DS} = 10\text{ V}$

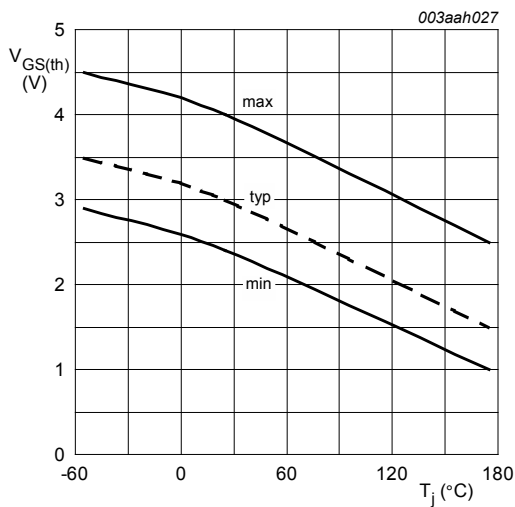


Fig. 9. Gate-source threshold voltage as a function of junction temperature

$I_D = 1\text{ mA}; V_{DS} = V_{GS}$

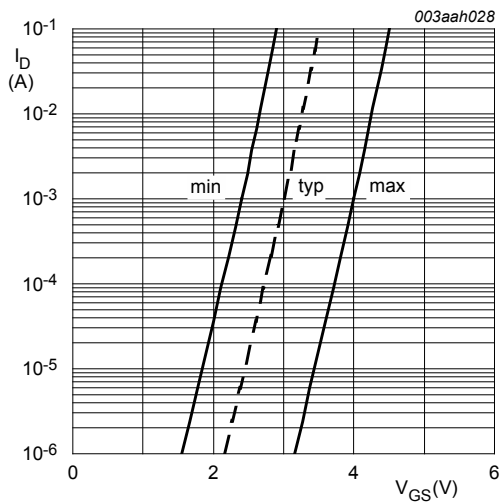


Fig. 10. Sub-threshold drain current as a function of gate-source voltage

$T_j = 25^\circ\text{C}; V_{DS} = 5\text{ V}$

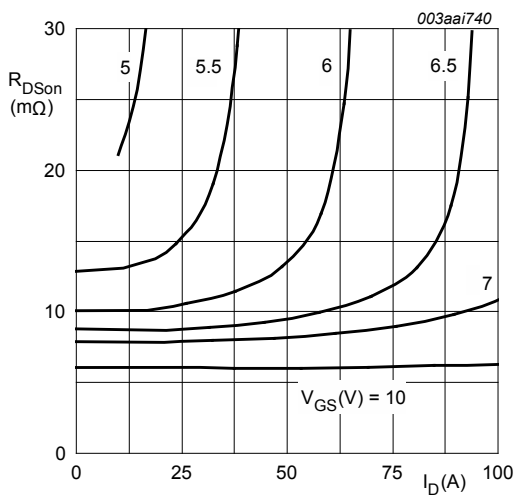


Fig. 11. Drain-source on-state resistance as a function of drain current; typical values

$T_j = 25^\circ\text{C}; t_p = 300\text{ }\mu\text{s}$

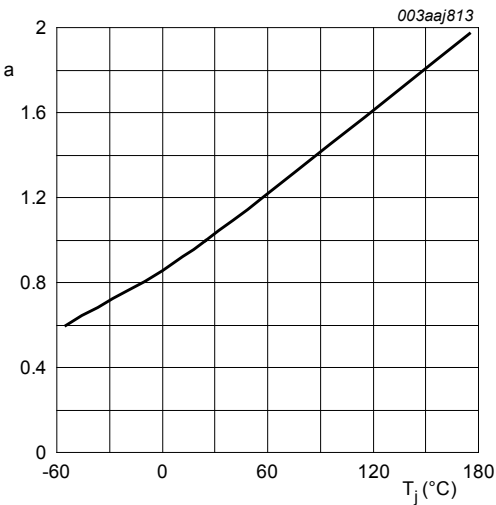


Fig. 12. Normalized drain-source on-state resistance factor as a function of junction temperature

$$a = \frac{R_{DS(on)}}{R_{DS(on)}(25^{\circ}\text{C})}$$

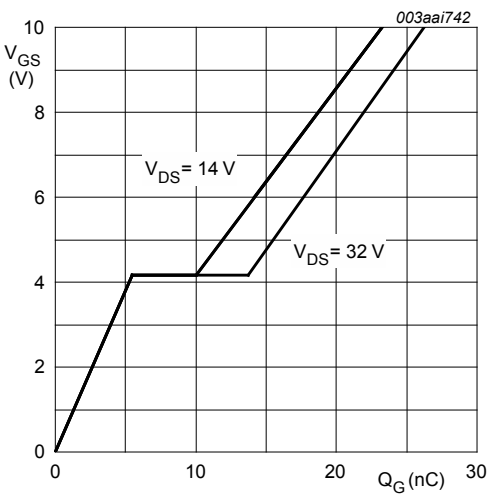


Fig. 13. Gate-source voltage as a function of gate charge; typical values

$$T_j = 25^{\circ}\text{C}; I_D = 20\text{ A}$$

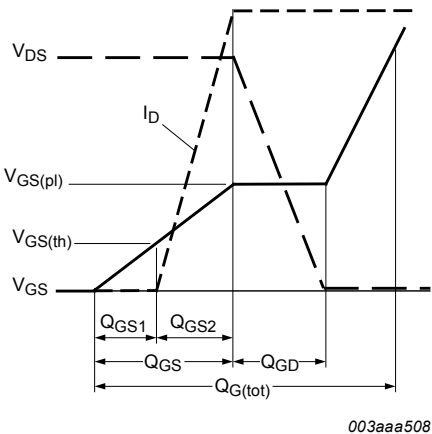


Fig. 14. Gate charge waveform definitions

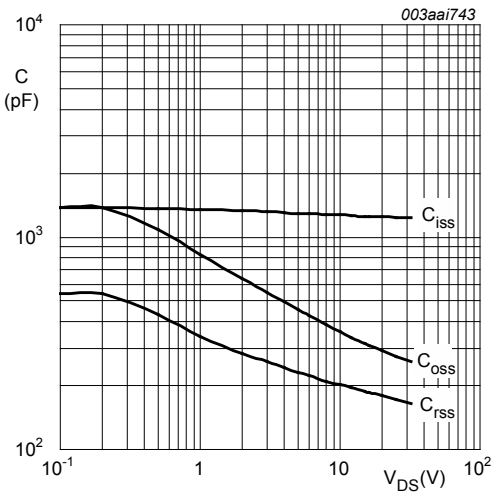


Fig. 15. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values

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

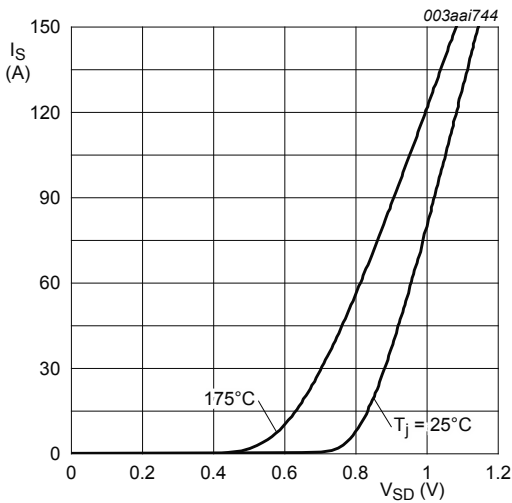


Fig. 16. Source (diode forward) current as a function of source-drain (diode forward) voltage; typical values

$V_{GS} = 0V$

11. Package outline

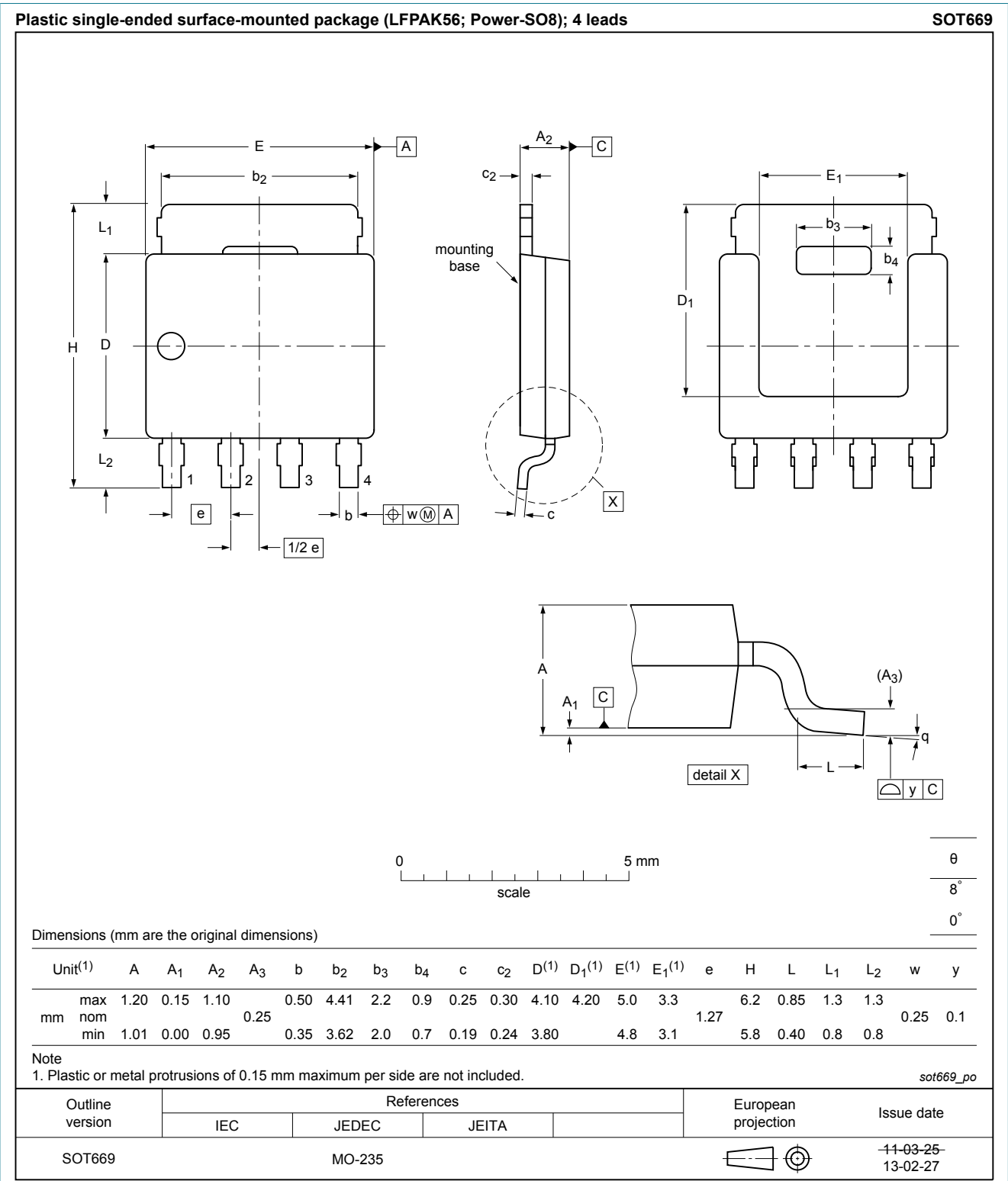


Fig. 17. Package outline LPAK56; Power-SO8 (SOT669)

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