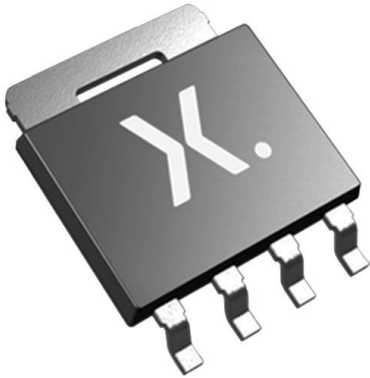


BUK7Y7R8-80EX Datasheet

www.digi-electronics.com



<https://www.DiGi-Electronics.com>

DiGi Electronics Part Number	BUK7Y7R8-80EX-DG
Manufacturer	Nexperia USA Inc.
Manufacturer Product Number	BUK7Y7R8-80EX
Description	MOSFET N-CH 80V 100A LFPAK56
Detailed Description	N-Channel 80 V 100A (Tc) 238W (Tc) Surface Mount LFPAK56, Power-SO8



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.

Purchase and inquiry

Manufacturer Product Number:

BUK7Y7R8-80EX

Series:

-

FET Type:

N-Channel

Drain to Source Voltage (Vdss):

80 V

Drive Voltage (Max Rds On, Min Rds On):

10V

Vgs(th) (Max) @ Id:

4V @ 1mA

Vgs (Max):

±20V

FET Feature:

-

Operating Temperature:

-55°C ~ 175°C (Tj)

Qualification:

AEC-Q100

Supplier Device Package:

LFPAK56, Power-SO8

Base Product Number:

BUK7Y7

Manufacturer:

Nexperia USA Inc.

Product Status:

Active

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

100A (Tc)

Rds On (Max) @ Id, Vgs:

7.8mOhm @ 25A, 10V

Gate Charge (Qg) (Max) @ Vgs:

63.3 nC @ 10 V

Input Capacitance (Ciss) (Max) @ Vds:

5347 pF @ 25 V

Power Dissipation (Max):

238W (Tc)

Grade:

Automotive

Mounting Type:

Surface Mount

Package / Case:

SC-100, SOT-669

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.29.0095

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99



BUK7Y7R8-80E

N-channel 80 V, 7.8 mΩ standard level MOSFET in LPAK56

8 May 2013

Product data sheet

1. General description

Standard level N-channel MOSFET in an LPAK56 (Power SO8) package using TrenchMOS technology. This product has been designed and qualified to AEC Q101 standard for use in high performance automotive applications.

2. Features and benefits

- Q101 compliant
- Repetitive avalanche rated
- Suitable for thermally demanding environments due to 175 °C rating
- True standard level gate with $V_{GS(th)}$ rating of greater than 1 V at 175 °C

3. Applications

- 12 V, 24 V and 48 V Automotive systems
- Motors, lamps and solenoid control
- Transmission control
- Ultra high performance power switching

4. Quick reference data

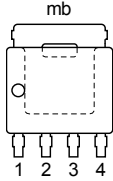
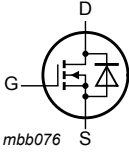
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{DS}	drain-source voltage	$T_j \geq 25\text{ °C}; T_j \leq 175\text{ °C}$		-	-	80	V
I_D	drain current	$V_{GS} = 10\text{ V}; T_{mb} = 25\text{ °C};$ Fig. 1	[1]	-	-	100	A
P_{tot}	total power dissipation	$T_{mb} = 25\text{ °C};$ Fig. 2		-	-	238	W
Static characteristics							
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = 10\text{ V}; I_D = 25\text{ A}; T_j = 25\text{ °C};$ Fig. 11		-	5.9	7.8	mΩ
Dynamic characteristics							
Q_{GD}	gate-drain charge	$V_{GS} = 10\text{ V}; I_D = 25\text{ A}; V_{DS} = 64\text{ V};$ $T_j = 25\text{ °C};$ Fig. 13 ; Fig. 14		-	17	-	nC

[1] Continuous current is limited by package.

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	S	source	 <p>LPAK56; Power-SO8 (SOT669)</p>	
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
BUK7Y7R8-80E	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
BUK7Y7R8-80E	77E880

8. Limiting values

Table 5. Limiting values

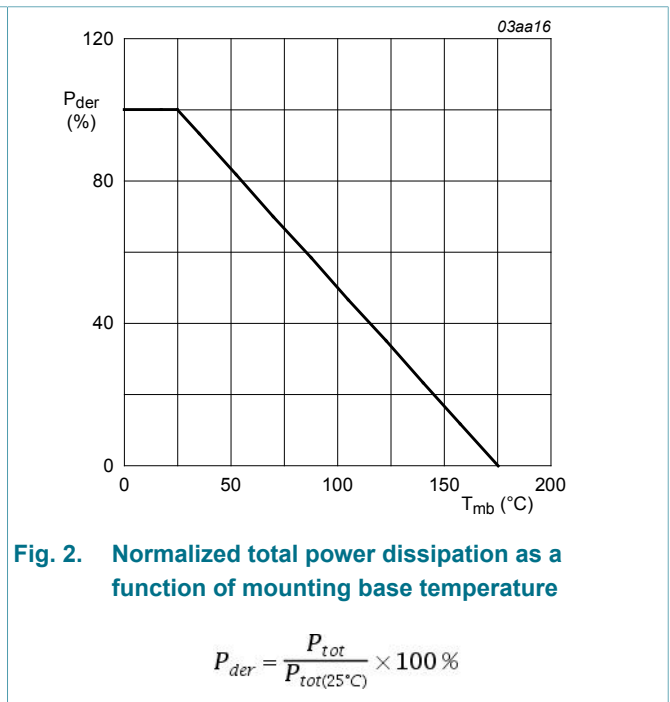
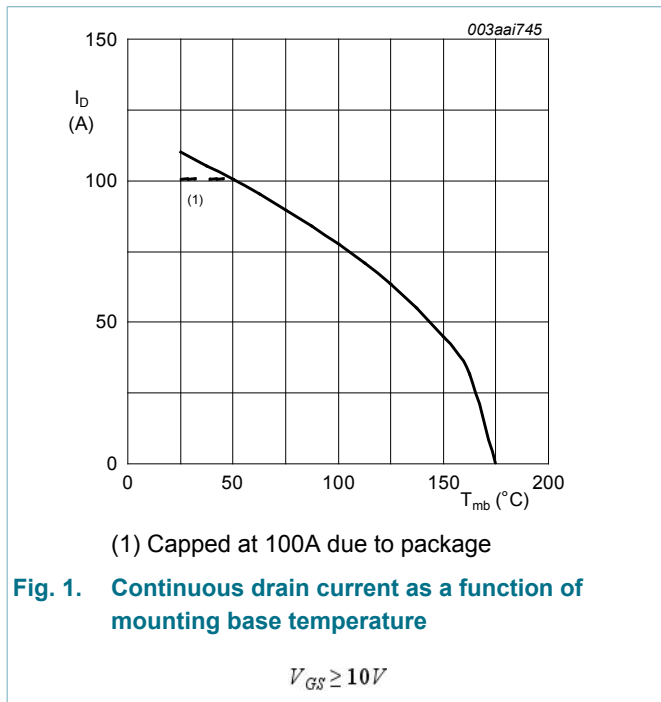
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
V_{DS}	drain-source voltage	$T_j \geq 25\text{ °C}$; $T_j \leq 175\text{ °C}$		-	80	V
V_{DGR}	drain-gate voltage	$R_{GS} = 20\text{ k}\Omega$		-	80	V
V_{GS}	gate-source voltage	$T_j \leq 175\text{ °C}$; DC		-20	20	V
I_D	drain current	$T_{mb} = 25\text{ °C}$; $V_{GS} = 10\text{ V}$; Fig. 1	[1]	-	100	A
		$T_{mb} = 100\text{ °C}$; $V_{GS} = 10\text{ V}$; Fig. 1	[1]	-	78	A
I_{DM}	peak drain current	$T_{mb} = 25\text{ °C}$; pulsed; $t_p \leq 10\text{ }\mu\text{s}$; Fig. 4		-	441	A
P_{tot}	total power dissipation	$T_{mb} = 25\text{ °C}$; Fig. 2		-	238	W
T_{stg}	storage temperature			-55	175	°C

N-channel 80 V, 7.8 mΩ standard level MOSFET in LFPAK56

Symbol	Parameter	Conditions		Min	Max	Unit
T _j	junction temperature			-55	175	°C
Source-drain diode						
I _S	source current	T _{mb} = 25 °C	[1]	-	100	A
I _{SM}	peak source current	pulsed; t _p ≤ 10 μs; T _{mb} = 25 °C		-	441	A
Avalanche ruggedness						
E _{DS(AL)S}	non-repetitive drain-source avalanche energy	I _D = 100 A; V _{sup} ≤ 80 V; R _{GS} = 50 Ω; V _{GS} = 10 V; T _{j(init)} = 25 °C; unclamped; Fig. 3	[2][3]	-	148	mJ

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



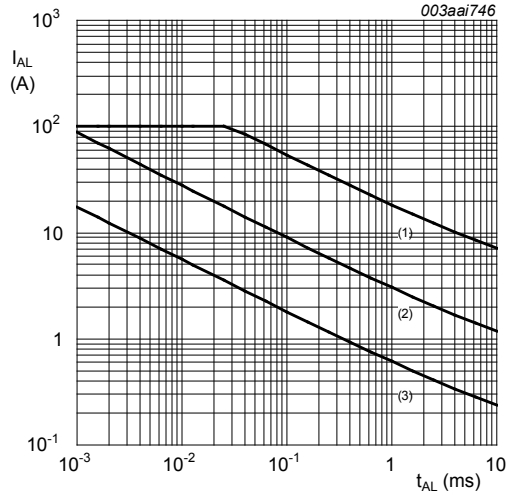


Fig. 3. Avalanche rating; avalanche current as a function of avalanche time

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

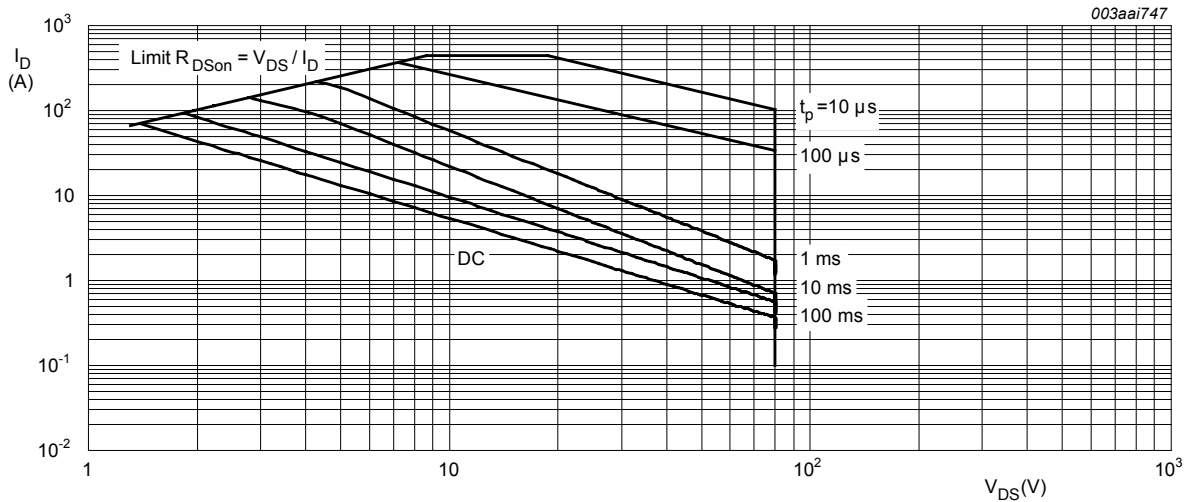


Fig. 4. Safe operating area; continuous and peak drain currents as a function of drain-source voltage

$T_{mb} = 25^{\circ}C$; 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	-	-	0.63	K/W

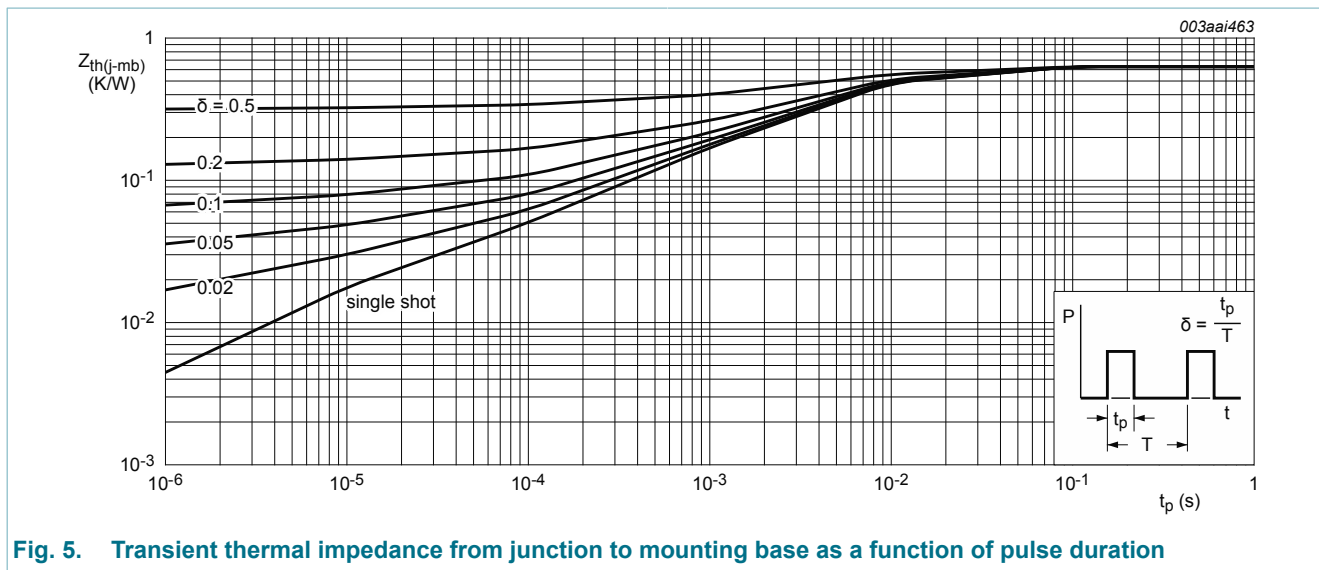


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

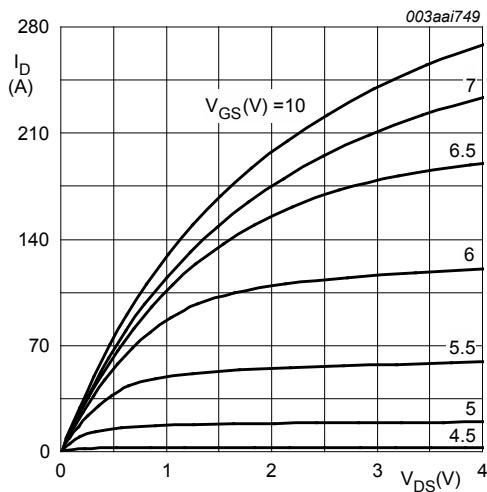
10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
$V_{(BR)DSS}$	drain-source breakdown voltage	$I_D = 250 \mu A; V_{GS} = 0 V; T_j = 25 \text{ }^\circ C$	80	-	-	V
		$I_D = 250 \mu A; V_{GS} = 0 V; T_j = -55 \text{ }^\circ C$	72	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$I_D = 1 \text{ mA}; V_{DS} = V_{GS}; T_j = 25 \text{ }^\circ C;$ Fig. 9; Fig. 10	2.4	3	4	V
		$I_D = 1 \text{ mA}; V_{DS} = V_{GS}; T_j = -55 \text{ }^\circ C;$ Fig. 9	-	-	4.5	V
		$I_D = 1 \text{ mA}; V_{DS} = V_{GS}; T_j = 175 \text{ }^\circ C;$ Fig. 9	1	-	-	V
I_{DSS}	drain leakage current	$V_{DS} = 80 \text{ V}; V_{GS} = 0 \text{ V}; T_j = 25 \text{ }^\circ C$	-	0.13	10	μA
		$V_{DS} = 80 \text{ V}; V_{GS} = 0 \text{ V}; T_j = 175 \text{ }^\circ C$	-	-	500	μA
I_{GSS}	gate leakage current	$V_{GS} = 20 \text{ V}; V_{DS} = 0 \text{ V}; T_j = 25 \text{ }^\circ C$	-	2	100	nA
		$V_{GS} = -20 \text{ V}; V_{DS} = 0 \text{ V}; T_j = 25 \text{ }^\circ C$	-	2	100	nA
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = 10 \text{ V}; I_D = 25 \text{ A}; T_j = 25 \text{ }^\circ C;$ Fig. 11	-	5.9	7.8	mΩ
		$V_{GS} = 10 \text{ V}; I_D = 25 \text{ A}; T_j = 175 \text{ }^\circ C;$ Fig. 11; Fig. 12	-	-	19.6	mΩ
Dynamic characteristics						
$Q_{G(tot)}$	total gate charge	$I_D = 25 \text{ A}; V_{DS} = 64 \text{ V}; V_{GS} = 10 \text{ V};$ $T_j = 25 \text{ }^\circ C;$ Fig. 13; Fig. 14	-	63.3	-	nC
Q_{GS}	gate-source charge		-	17.3	-	nC
Q_{GD}	gate-drain charge		-	17	-	nC

N-channel 80 V, 7.8 mΩ standard level MOSFET in LPAK56

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
C_{iss}	input capacitance	$V_{GS} = 0\text{ V}; V_{DS} = 25\text{ V}; f = 1\text{ MHz};$	-	4010	5347	pF
C_{oss}	output capacitance	$T_j = 25\text{ °C};$ Fig. 15	-	395	474	pF
C_{rss}	reverse transfer capacitance		-	199	272	pF
$t_{d(on)}$	turn-on delay time	$V_{DS} = 60\text{ V}; R_L = 2.4\text{ }\Omega; V_{GS} = 10\text{ V};$	-	16	-	ns
t_r	rise time	$R_{G(ext)} = 5\text{ }\Omega; T_j = 25\text{ °C}$	-	25	-	ns
$t_{d(off)}$	turn-off delay time		-	43	-	ns
t_f	fall time		-	24	-	ns
Source-drain diode						
V_{SD}	source-drain voltage	$I_S = 25\text{ A}; V_{GS} = 0\text{ V}; T_j = 25\text{ °C};$ Fig. 16	-	0.82	1.2	V
t_{rr}	reverse recovery time	$I_S = 20\text{ A}; di_S/dt = -100\text{ A}/\mu\text{s}; V_{GS} = 0\text{ V};$	-	37	-	ns
Q_r	recovered charge	$V_{DS} = 25\text{ V}; T_j = 25\text{ °C}$	-	56.3	-	nC



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

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

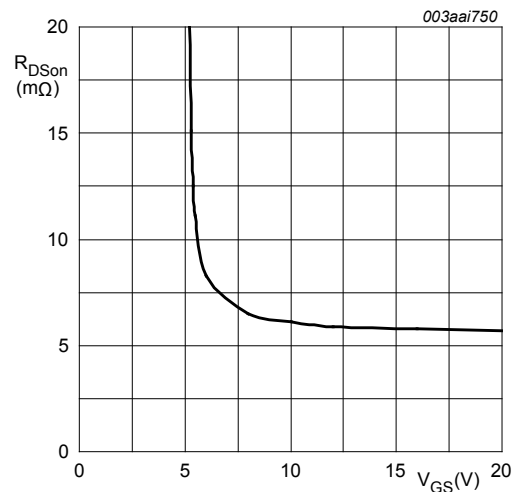


Fig. 7. Drain-source on-state resistance as a function of gate-source voltage; typical values

$T_j = 25\text{ °C}; I_D = 25\text{ A}$

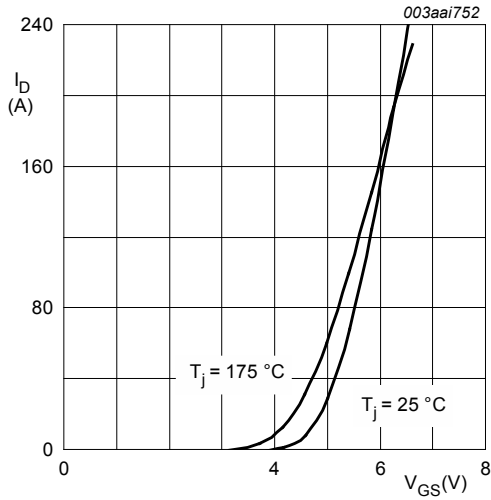


Fig. 8. Transfer characteristics; drain current as a function of gate-source voltage; typical values

$V_{DS} = 10V$

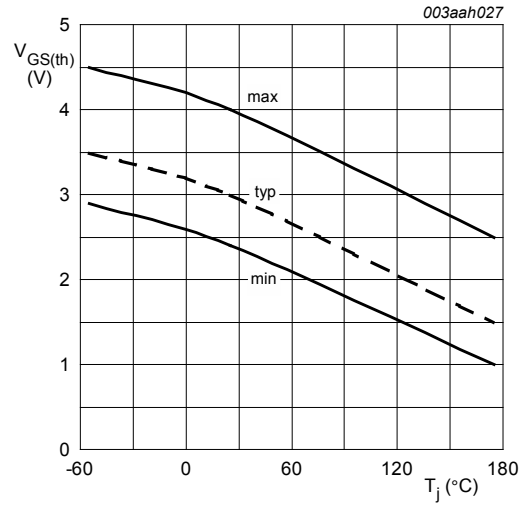


Fig. 9. Gate-source threshold voltage as a function of junction temperature

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

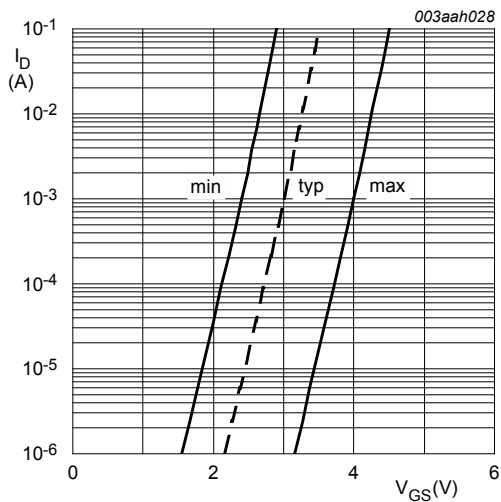
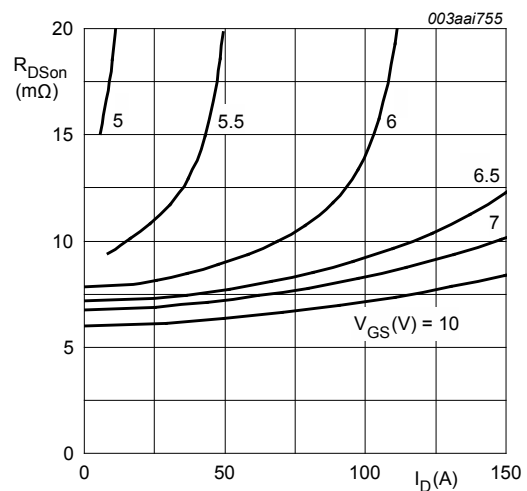


Fig. 10. Sub-threshold drain current as a function of gate-source voltage

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



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

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

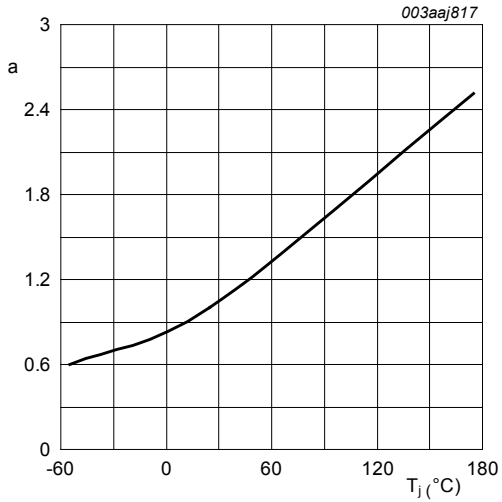


Fig. 12. Normalized drain-source on-state resistance factor as a function of junction temperature

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

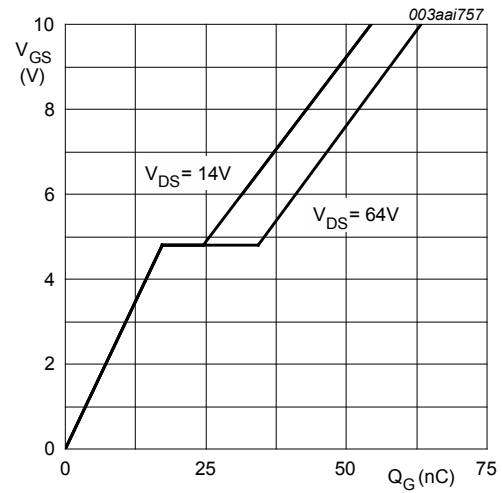


Fig. 13. Gate-source voltage as a function of gate charge; typical values

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

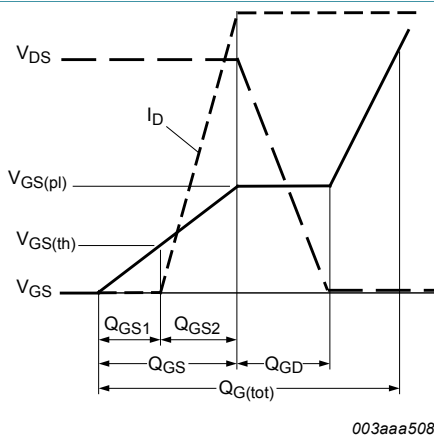


Fig. 14. Gate charge waveform definitions

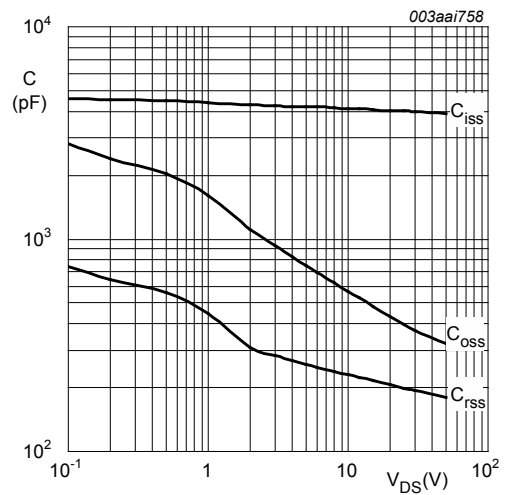


Fig. 15. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values

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

N-channel 80 V, 7.8 mΩ standard level MOSFET in LFPAK56

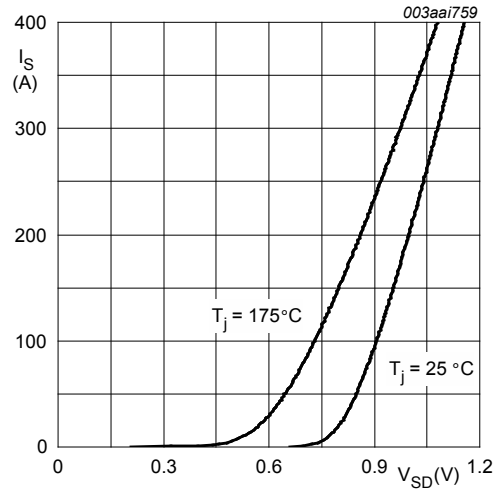


Fig. 16. Source (diode forward) current as a function of source-drain (diode forward) voltage; typical values

$$V_{GS} = 0V$$

11. Package outline

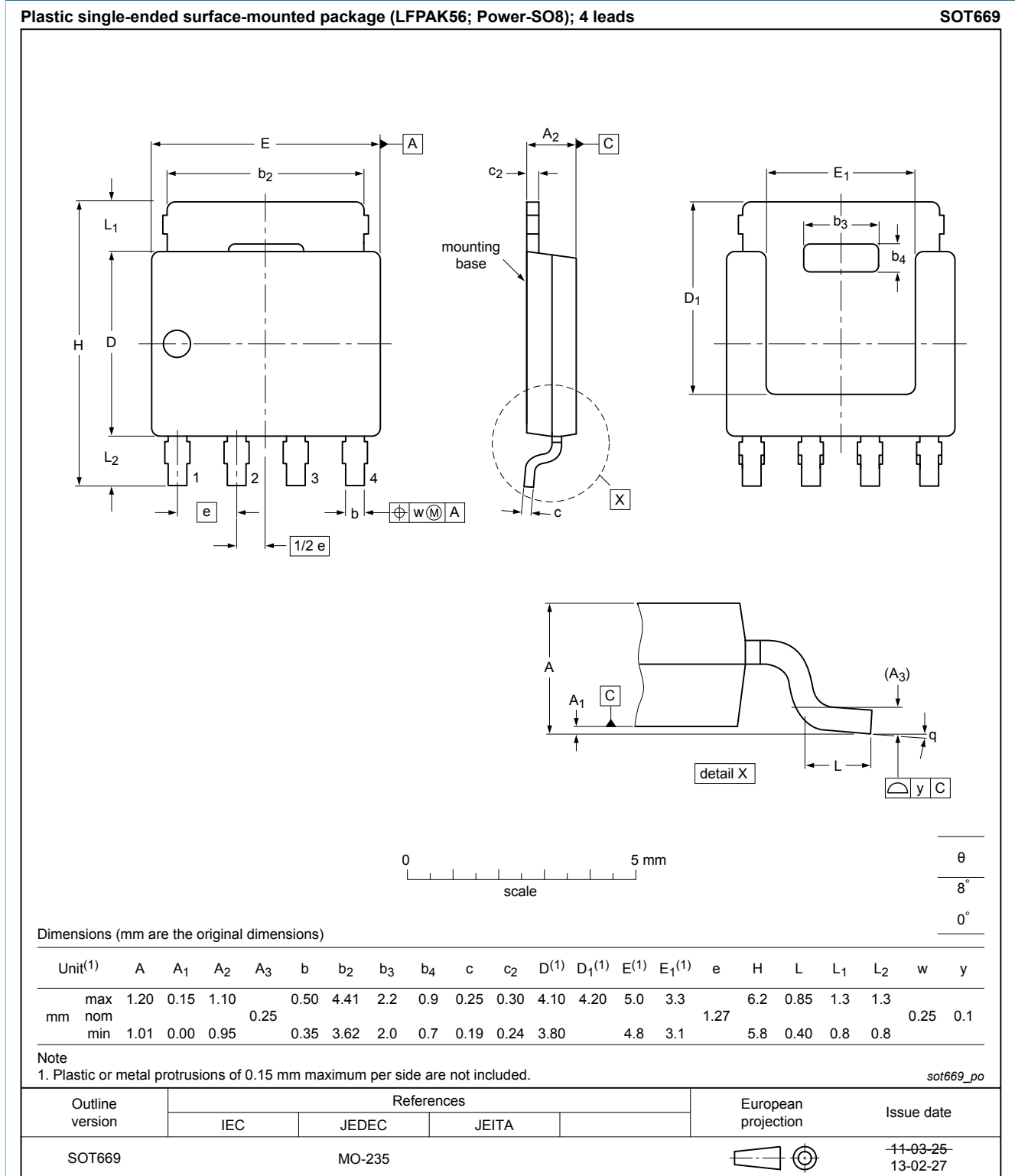


Fig. 17. Package outline LPAK56; Power-SO8 (SOT669)

12. Legal information

12.1 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.
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- [2] The term 'short data sheet' is explained in section "Definitions".
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For sales office addresses, please send an email to: salesaddresses@nexperia.com

Date of release: 08 May 2013

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