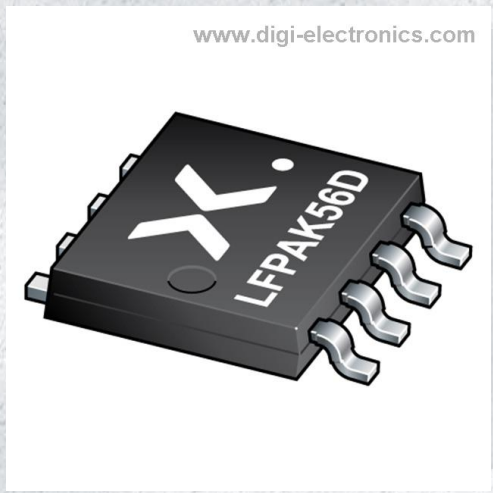
BUK7K29-100EX Datasheet



DiGi Electronics Part Number	BUK7K29-100EX-DG
Manufacturer	Nexperia USA Inc.
Manufacturer Product Number	BUK7K29-100EX
Description	MOSFET 2N-CH 100V 29.5A LFPAK56D
Detailed Description	Mosfet Array 100V 29.5A 68W Surface Mount LFPAK 56D

https://www.DiGi-Electronics.com

Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
BUK7K29-100EX	Nexperia USA Inc.
Series:	Product Status:
-	Active
Technology:	Configuration:
MOSFET (Metal Oxide)	2 N-Channel (Dual)
FET Feature:	Drain to Source Voltage (Vdss):
-	100V
Current - Continuous Drain (Id) @ 25°C:	Rds On (Max) @ Id, Vgs:
29.5A	24.5mOhm @ 10A, 10V
Vgs(th) (Max) @ Id:	Gate Charge (Qg) (Max) @ Vgs:
4V @ 1mA	38.1nC @ 10V
Input Capacitance (Ciss) (Max) @ Vds:	Power - Max:
2436pF @ 25V	68W
Operating Temperature:	Grade:
-55°C ~ 175°C (TJ)	Automotive
Qualification:	Mounting Type:
AEC-Q100	Surface Mount
Package / Case:	Supplier Device Package:
SOT-1205, 8-LFPAK56	LFPAK56D
Base Product Number:	
BUK7K29	

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.29.0095	

BUK7K29-100E

Dual N-channel 100 V, 24.5 mΩ standard level MOSFET

2 September 2015 Product data sheet

1. General description

Dual Standard level N-channel MOSFET in an LFPAK56D (Dual 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

- Dual MOSFET
- 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

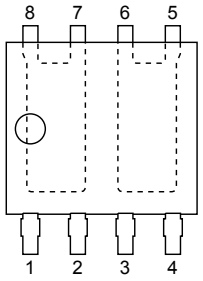
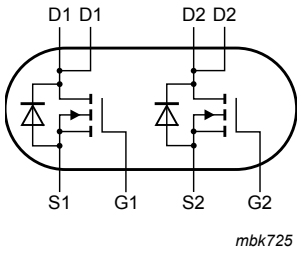
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{DS}	drain-source voltage	$T_j \geq 25$ °C; $T_j \leq 175$ °C		-	-	100	V
I_D	drain current	V_{GS} = 10 V; T_{mb} = 25 °C; Fig. 2		-	-	29.5	A
P_{tot}	total power dissipation	T_{mb} = 25 °C; Fig. 1		-	-	68	W
Static characteristics FET1 and FET2							
R_{DSon}	drain-source on-state resistance	V_{GS} = 10 V; I_D = 10 A; T_j = 25 °C; Fig. 11		-	19.5	24.5	mΩ
Dynamic characteristics FET1 and FET2							
Q_{GD}	gate-drain charge	I_D = 5 A; V_{DS} = 80 V; V_{GS} = 10 V; T_j = 25 °C; Fig. 13; Fig. 14		-	13.1	-	nC

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	S1	source1	 LFPAK56D (SOT1205)	
2	G1	gate1		
3	S2	source2		
4	G2	gate2		
5	D2	drain2		
6	D2	drain2		
7	D1	drain1		
8	D1	drain1		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BUK7K29-100E	LFPAK56D	Plastic single ended surface mounted package (LFPAK56D); 8 leads	SOT1205

7. Marking

Table 4. Marking codes

Type number	Marking code
BUK7K29-100E	72910E

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	$T_j \geq 25$ °C; $T_j \leq 175$ °C		-	100	V
V_{DGR}	drain-gate voltage	R_{GS} = 20 kΩ		-	100	V
V_{GS}	gate-source voltage	$T_j \leq 175$ °C; DC		-20	20	V
P_{tot}	total power dissipation	T_{mb} = 25 °C; Fig. 1		-	68	W
I_D	drain current	T_{mb} = 25 °C; V_{GS} = 10 V; Fig. 2		-	29.5	A
		T_{mb} = 100 °C; V_{GS} = 10 V; Fig. 2		-	22	A
I_{DM}	peak drain current	T_{mb} = 25 °C; pulsed; $t_p \leq 10$ µs; Fig. 3		-	126	A

Symbol	Parameter	Conditions		Min	Max	Unit
T_{stg}	storage temperature			-55	175	°C
T_j	junction temperature			-55	175	°C
$T_{sld(M)}$	peak soldering temperature			-	260	°C
Source-drain diode FET1 and FET2						
I_S	source current	T_{mb} = 25 °C		-	29.5	A
I_{SM}	peak source current	pulsed; $t_p \leq 10$ µs; T_{mb} = 25 °C		-	126	A
Avalanche Ruggedness FET1 and FET2						
$E_{DS(AL)S}$	non-repetitive drain-source avalanche energy	I_D = 29.5 A; $V_{sup} \leq 100$ V; R_{GS} = 50 Ω; V_{GS} = 10 V; $T_{j(init)}$ = 25 °C; unclamped; Fig. 4	[1][2]	-	83	mJ

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

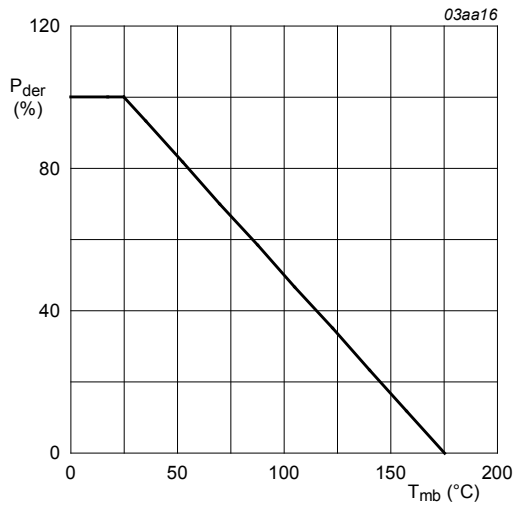


Fig. 1. Normalized total power dissipation as a function of mounting base temperature

$$P_{der} = \frac{P_{tot}}{P_{tot(25°C)}} \times 100\,\%$$

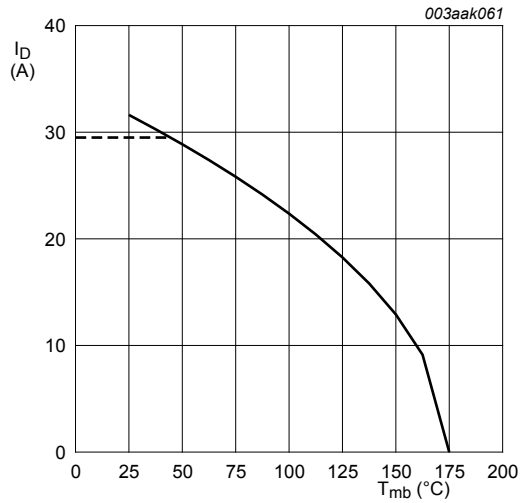


Fig. 2. Continuous drain current as a function of mounting base temperature

$V_{GS} \geq 10V$

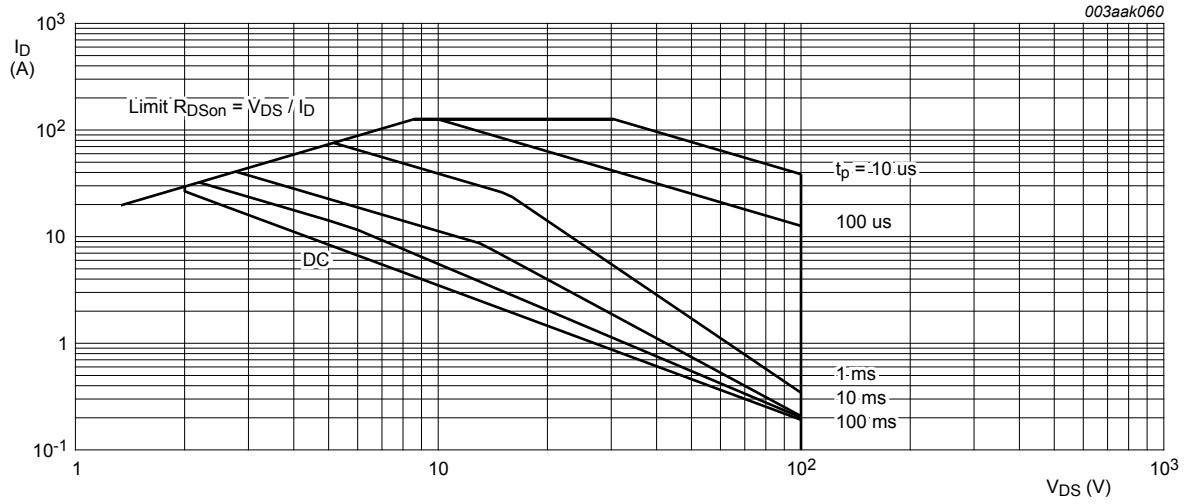


Fig. 3. Safe operating area; continuous and peak drain currents as a function of drain-source voltage

$T_{mb} = 25°C$; I_{DM} *is a single pulse*

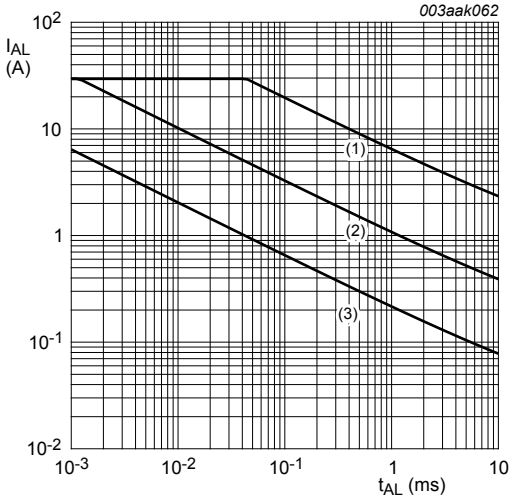


Fig. 4. Avalanche rating; avalanche current as a function of avalanche time

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

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		-	-	2.21	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	Minimum footprint; mounted on a printed circuit board		-	95	-	K/W

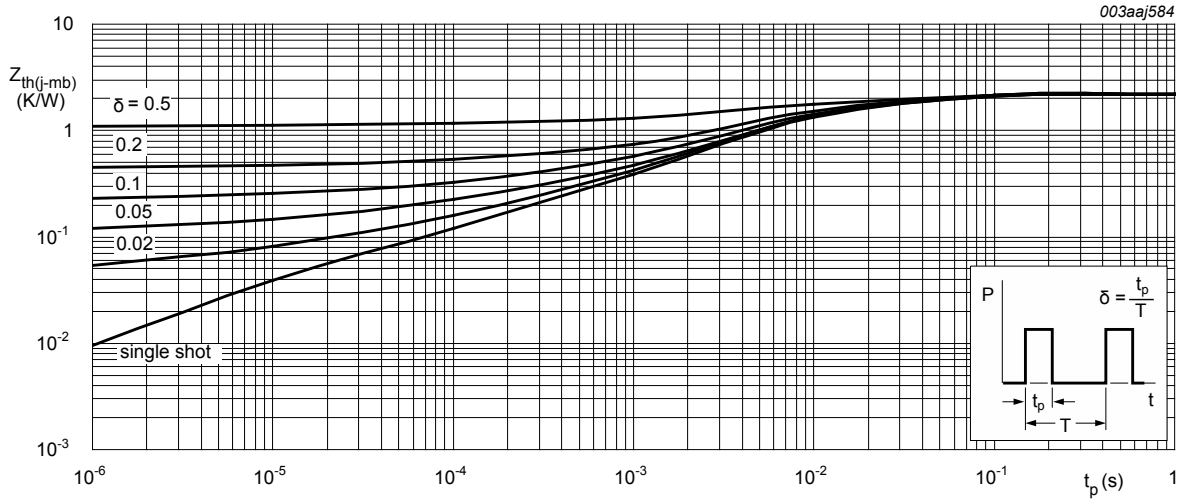


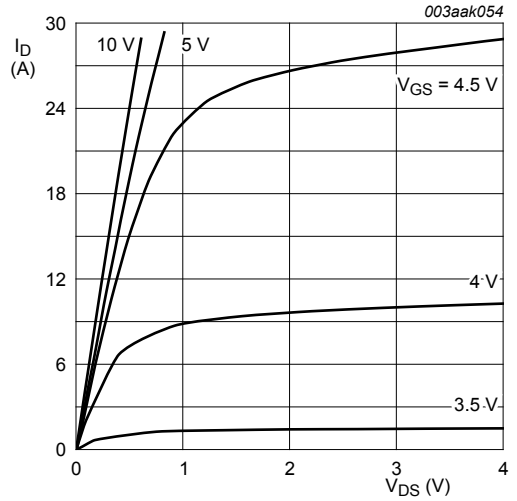
Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics FET1 and FET2							
$V_{(BR)DSS}$	drain-source breakdown voltage	I_D = 250 µA; V_{GS} = 0 V; T_j = -55 °C		90	-	-	V
		I_D = 250 µA; V_{GS} = 0 V; T_j = 25 °C		100	-	-	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 = 175 °C; Fig. 10		1	-	-	V
		I_D = 1 mA; V_{DS} = V_{GS}; T_j = -55 °C; Fig. 10		-	-	4.5	V
I_{DSS}	drain leakage current	V_{DS} = 100 V; V_{GS} = 0 V; T_j = 25 °C		-	0.02	1	µA
		V_{DS} = 100 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 = 10 A; T_j = 25 °C; Fig. 11		-	19.5	24.5	mΩ
		V_{GS} = 10 V; I_D = 10 A; T_j = 175 °C; Fig. 11; Fig. 12		-	54	68	mΩ
Dynamic characteristics FET1 and FET2							
$Q_{G(tot)}$	total gate charge	I_D = 5 A; V_{DS} = 80 V; V_{GS} = 10 V; T_j = 25 °C; Fig. 13; Fig. 14		-	38.1	-	nC
Q_{GS}	gate-source charge			-	5.7	-	nC
Q_{GD}	gate-drain charge			-	13.1	-	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		-	1827	2436	pF
C_{oss}	output capacitance			-	181	217	pF
C_{rss}	reverse transfer capacitance			-	128	175	pF
$t_{d(on)}$	turn-on delay time	V_{DS} = 80 V; R_L = 15 Ω; V_{GS} = 10 V; $R_{G(ext)}$ = 5 Ω; T_j = 25 °C		-	8	-	ns
t_r	rise time			-	13.3	-	ns
$t_{d(off)}$	turn-off delay time			-	28.3	-	ns
t_f	fall time			-	18	-	ns
Source-drain diode FET1 and FET2							
V_{SD}	source-drain voltage	I_S = 10 A; V_{GS} = 0 V; T_j = 25 °C; Fig. 16		-	0.78	1.2	V
t_{rr}	reverse recovery time	I_S = 5 A; dI_S/dt = -100 A/µs; V_{GS} = 0 V; V_{DS} = 50 V; T_j = 25 °C		-	38.4	-	ns
Q_r	recovered charge			-	62.2	-	nC



T_j = 25 °C; t_p = 300 µs

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

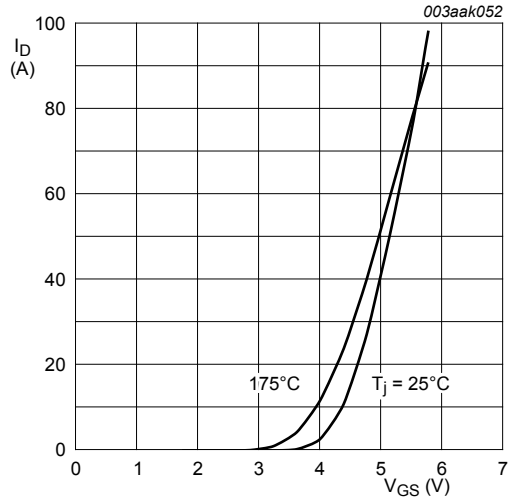


Fig. 7. Transfer characteristics; drain current as a function of gate-source voltage; typical values

$V_{DS} = 10V$

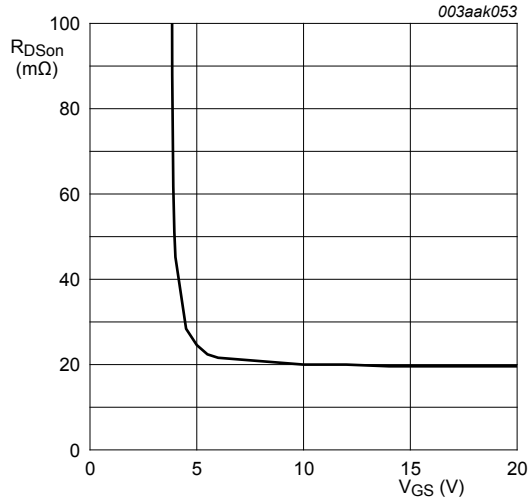


Fig. 8. Drain-source on-state resistance as a function of gate-source voltage; typical values

$T_j = 25°C;\ I_D = 10A$

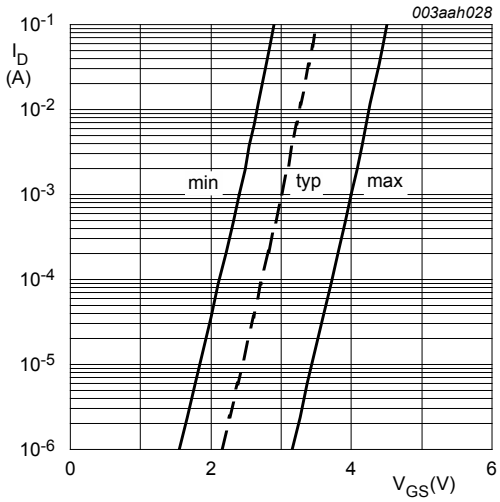


Fig. 9. Sub-threshold drain current as a function of gate-source voltage

$T_j = 25°C;\ V_{DS} = 5V$

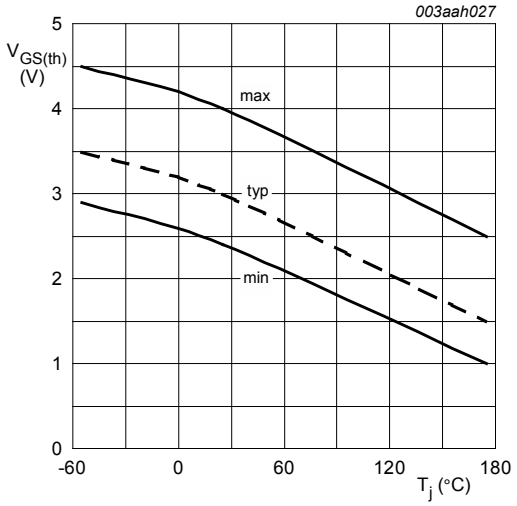
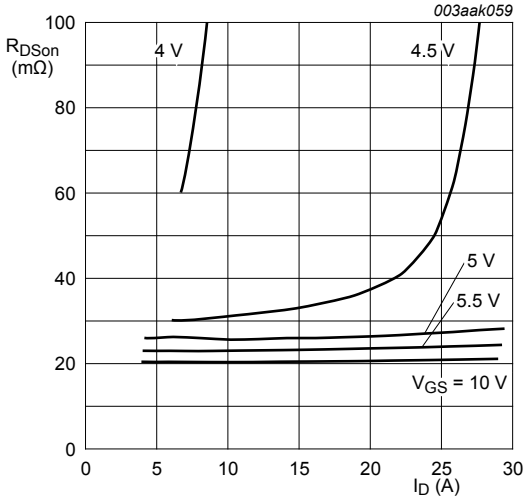


Fig. 10. Gate-source threshold voltage as a function of junction temperature

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



T_j = 25 °C; t_p = 300 µs

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

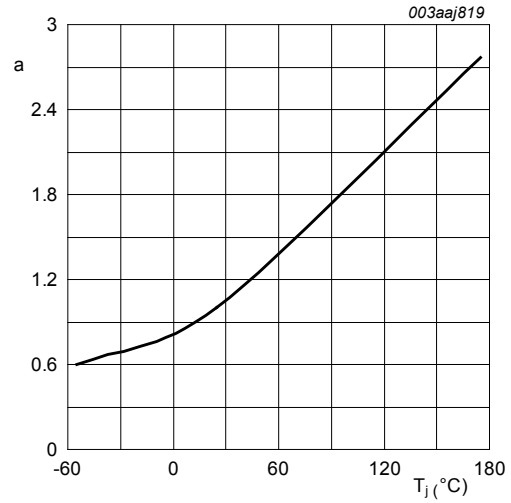


Fig. 12. Normalized drain-source on-state resistance factor as a function of junction temperature

$$a = \frac{R_{DSon}}{R_{DSon(25°C)}}$$

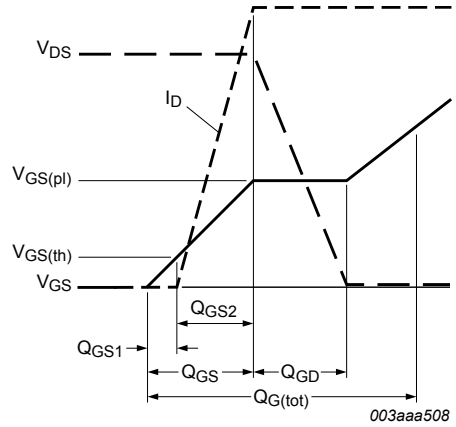


Fig. 13. Gate charge waveform definitions

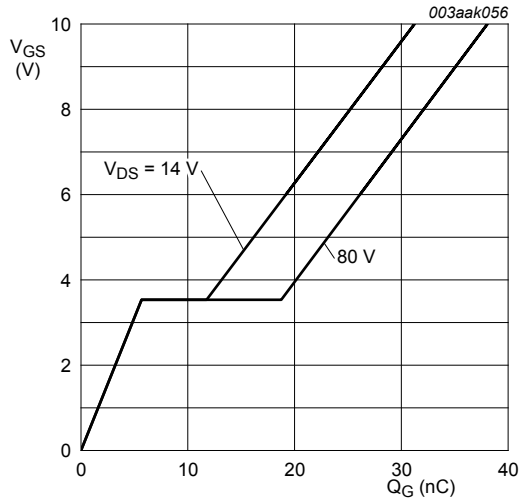


Fig. 14. Gate-source voltage as a function of gate charge; typical values

$$T_j = 25°C;\ I_D = 5A$$

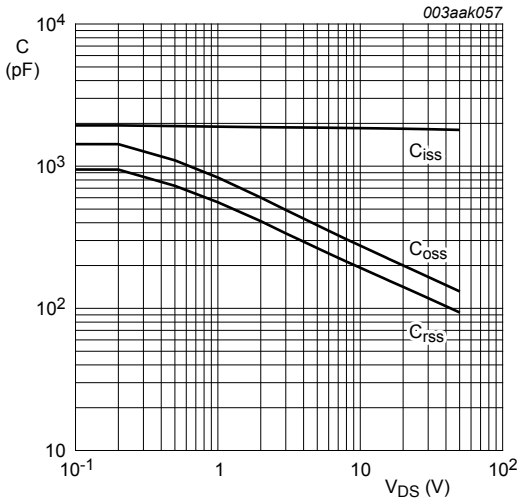


Fig. 15. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values

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

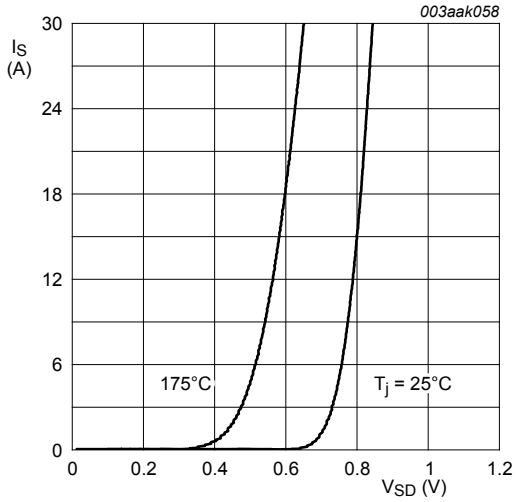
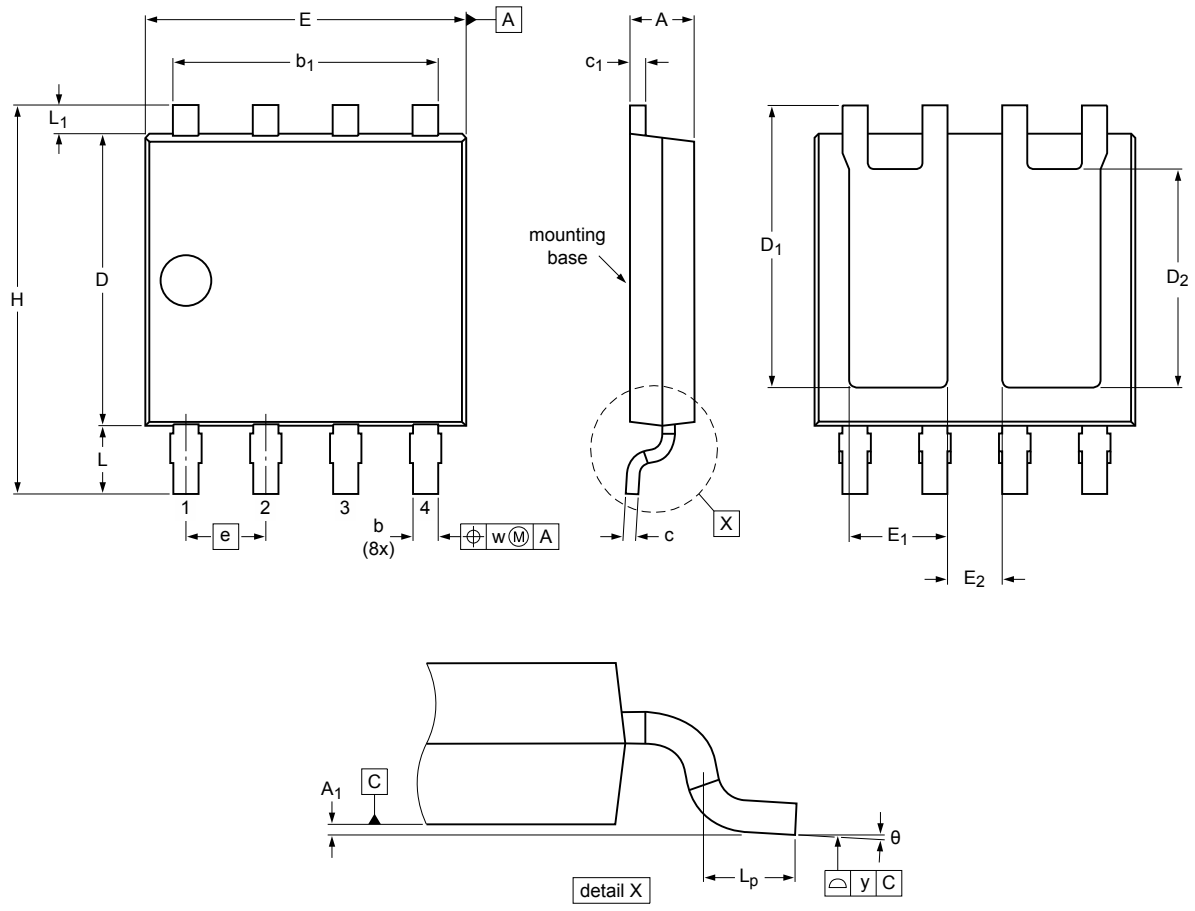


Fig. 16. Source (diode forward) current as a function of source-drain (diode forward) voltage; typical values

$V_{GS} = 0V$

11. Package outline

Plastic single ended surface mounted package LFPAK56D; 8 leads **SOT1205**



Dimensions

Unit		A	A_1	b	b_1	c	c_1	$D^{(1)}$	$D_1{}^{(1)}$	D_2 (ref)	$E^{(1)}$	$E_1{}^{(1)}$	E_2	e	H	L	L_1	L_p	w	y	θ
mm	max	1.05	0.1	0.50	4.4	0.25	0.30	4.70	4.55	3.5	5.30	1.8	0.85		6.2	1.3	0.55	0.85			8°
	nom													1.27					0.25	0.1	
	min	1.02	0.0	0.35	4.1	0.19	0.24	4.45	4.35	3.4	4.95	1.6	0.60		5.9	0.8	0.30	0.40			0°

Note
1. Plastic or metal protrusions of 0.2 mm maximum per side are not included.

sot1205_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT1205						~~14-08-21~~ 14-10-28

Fig. 17. Package outline LFPAK56D (SOT1205)

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.
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".
[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nexperia.com.

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13. Contents

For more information, please visit: http://www.nexperia.com
For sales office addresses, please send an email to: salesaddresses@nexperia.com
Date of release: 02 September 2015

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