



BUKNS6R5-40MYX8

40 V, 6.5 mΩ, Standard Level N-channel MOSFET in
MLPAK56-WF

Rev. 1 — 7 August 2026

Preliminary data sheet

1. Quick Reference Data

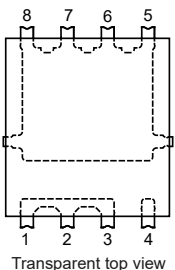
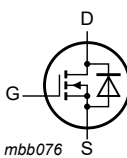
Table 1. Quick Reference Data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DS}	drain-source voltage	$25\text{ °C} \leq T_J \leq 175\text{ °C}$	-	-	40	V
I_D	drain current	$V_{GS} = 10\text{ V}$; $T_{mb} = 25\text{ °C}$; Fig. 2 [1]	-	-	75	A
P_{tot}	total power dissipation	$T_{mb} = 25\text{ °C}$; Fig. 1	-	-	72	W
Static Characteristics						
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = 10\text{ V}$; $I_D = 25\text{ A}$; $T_J = 25\text{ °C}$	-	5.9	6.5	mΩ
Dynamic Characteristics						
$Q_{G(tot)}$	total gate\ charge	$I_D = 25\text{ A}$; $V_{DS} = 32\text{ V}$; $V_{GS} = 10\text{ V}$; $T_J = 25\text{ °C}$	-	12.1	14.5	nC
Q_{GD}	gate-drain charge		-	3.2	4.8	nC

[1] This current will be demonstrated during product characterisation. The PCB, the thermal design, and the operating temperature limit the actual current.

2. Pinning Information

Table 2. Pinning Information

Pin	Symbol	Description	Simplified Outline	Graphic Symbol
1	S	source		
2	S	source		
3	S	source		
4	G	gate		
5	D	drain		
6	D	drain		
7	D	drain		
8	D	drain		

3. Ordering Information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BUKNS6R5-40MYX8	MLPAK56	Plastic, thermal enhanced surface mounted package with side-wettable flanks (SWF); minileads; 8 terminals; pitch 1.27 mm; 5.6 × 5.15 × 1.0 mm body	SOT8038-4

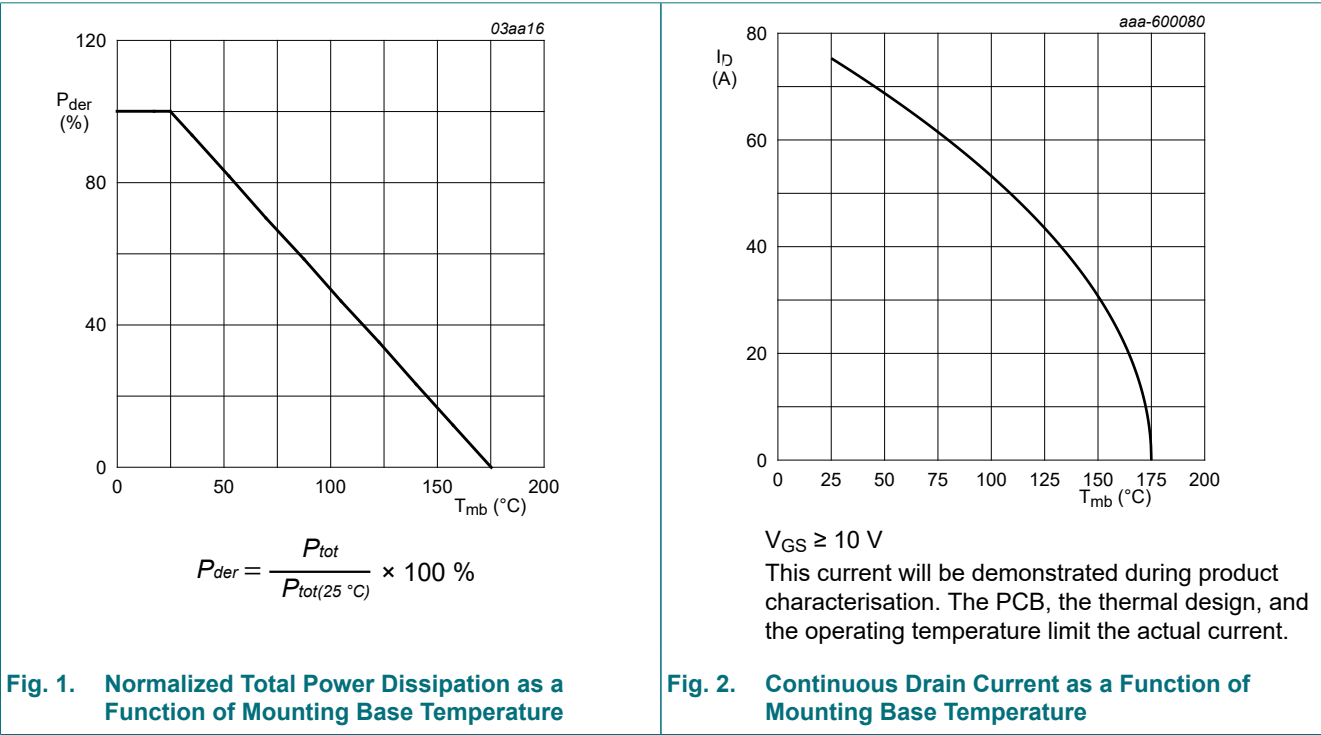
4. Limiting Values

Table 4. Limiting Values

In accordance with the Absolute Maximum Rating System (IEC 60134). $T_j = 25\text{ }^{\circ}\text{C}$, unless otherwise specified.

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	drain-source voltage	$25\text{ }^{\circ}\text{C} \leq T_j \leq 175\text{ }^{\circ}\text{C}$	-	40	V
V_{GS}	gate-source voltage		-20	20	V
P_{tot}	total power dissipation	$T_{mb} = 25\text{ }^{\circ}\text{C}$; Fig. 1	-	72	W
I_D	drain current	$V_{GS} = 10\text{ V}$; $T_{mb} = 25\text{ }^{\circ}\text{C}$; Fig. 2 [1]	-	75	A
		$V_{GS} = 10\text{ V}$; $T_{mb} = 100\text{ }^{\circ}\text{C}$; Fig. 2	-	53.3	A
I_{DM}	peak drain current	pulsed; $t_p \leq 10\text{ }\mu\text{s}$; $T_{mb} = 25\text{ }^{\circ}\text{C}$; Fig. 3 [1]	-	231	A
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	$T_{mb} = 25\text{ }^{\circ}\text{C}$ [1]	-	75	A
I_{SM}	peak source current	pulsed; $t_p \leq 10\text{ }\mu\text{s}$; $T_{mb} = 25\text{ }^{\circ}\text{C}$	-	231	A
Avalanche Ruggedness					
$E_{DS(AL)S}$	non-repetitive drain-source avalanche energy	$I_D = 21\text{ A}$; $V_{sup} \leq 40\text{ V}$; $R_{GS} = 50\text{ }\Omega$; $V_{GS} = 10\text{ V}$; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$; unclamped	-	42	mJ
I_{AS}	non-repetitive avalanche current	$V_{sup} \leq 40\text{ V}$; $V_{GS} = 10\text{ V}$; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$; $R_{GS} = 50\text{ }\Omega$	-	75	A

[1] This current will be demonstrated during product characterisation. The PCB, the thermal design, and the operating temperature limit the actual current.



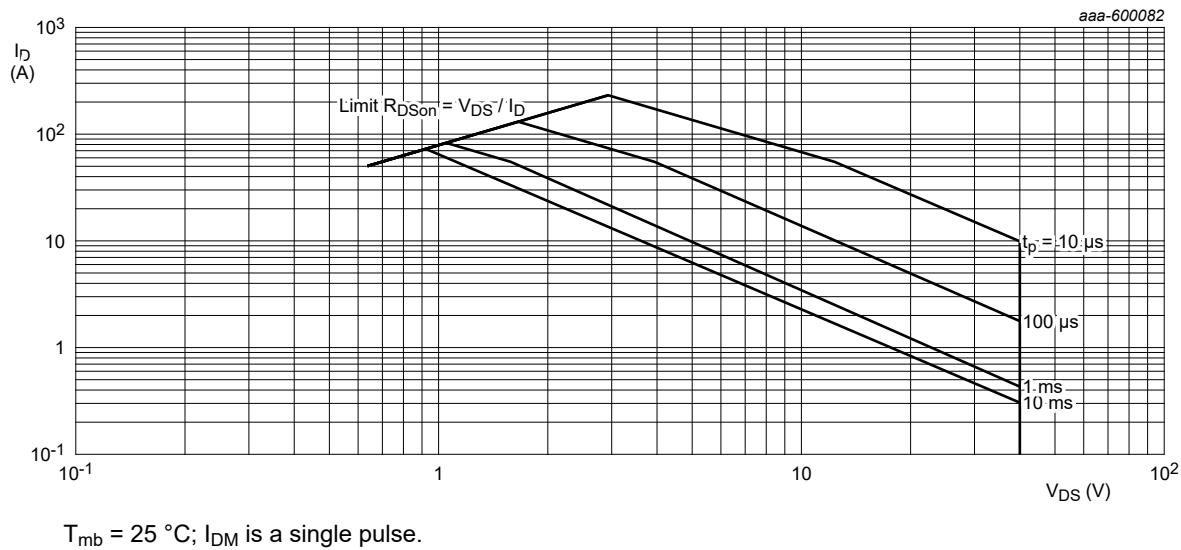
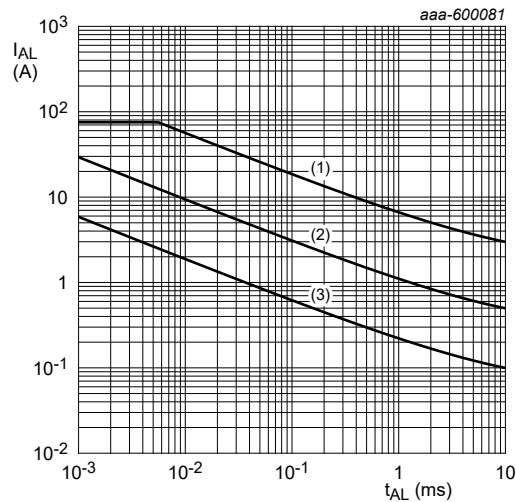


Fig. 3. Safe Operating Area; Continuous and Peak Drain Currents as a Function of Drain-source Voltage



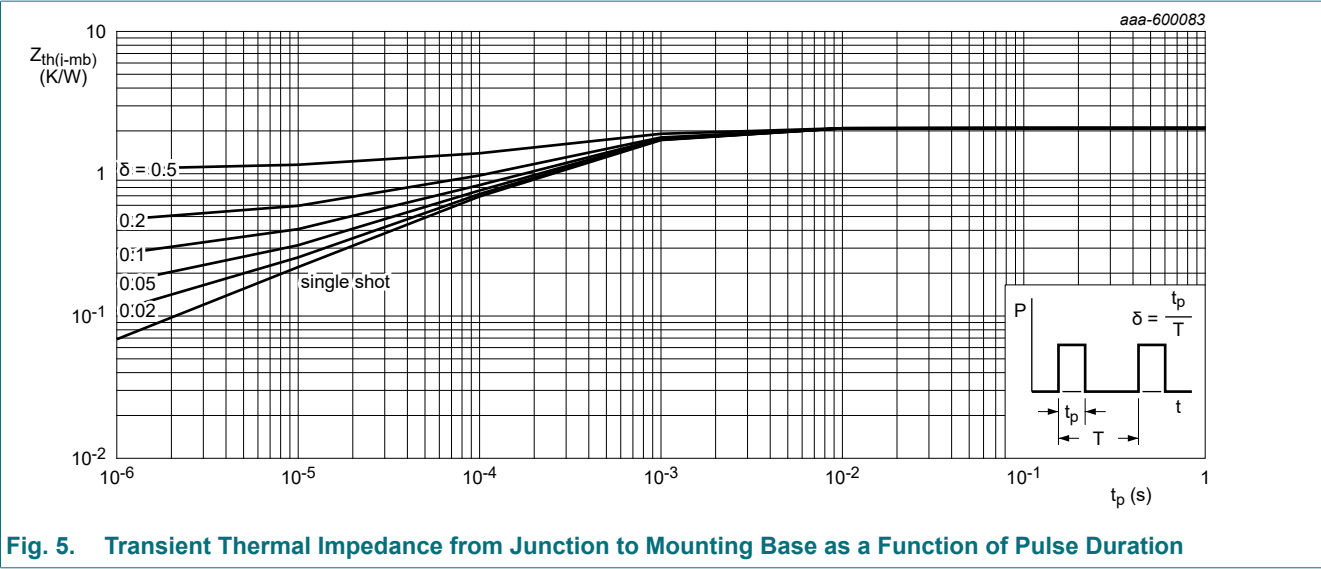
- (1) $T_{j(init)} = 25\ ^\circ C$
- (2) $T_{j(init)} = 150\ ^\circ C$
- (3) Repetitive Avalanche

Fig. 4. Avalanche Rating; Avalanche Current as a Function of Avalanche Time

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		-	1.61	2.09	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient		-	24	-	K/W

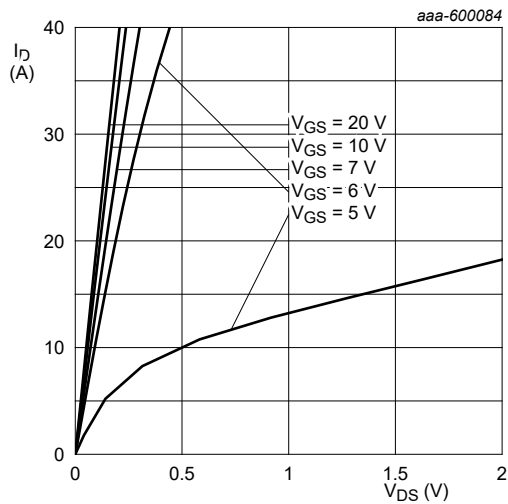


6. Characteristics

Table 6. Characteristics

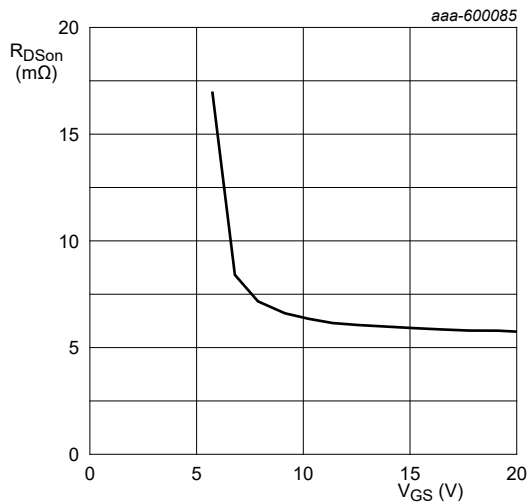
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
V _{(BR)DSS}	drain-source breakdown voltage	I _D = 250 μA; V _{GS} = 0 V; T _J = 25 °C	40	44.9	-	V
		I _D = 250 μA; V _{GS} = 0 V; T _J = −40 °C	-	43.6	-	V
		I _D = 250 μA; V _{GS} = 0 V; T _J = −55 °C	36	42	-	V
V _{GS(th)}	gate-source threshold voltage	V _{DS} = V _{GS} ; T _J = 25 °C; Fig. 8 ; Fig. 9	2	3	4	V
		V _{DS} = V _{GS} ; T _J = −55 °C; Fig. 9	-	-	4.4	V
		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	-	0.05	1	μA
		V _{DS} = 16 V; V _{GS} = 0 V; T _J = 125 °C	-	1	10	μA
		V _{DS} = 40 V; V _{GS} = 0 V; T _J = 175 °C	-	50	200	μA
I _{GSS}	gate leakage current	V _{GS} = 20 V; V _{DS} = 0 V; T _J = 25 °C	-	5	100	nA
		V _{GS} = −20 V; V _{DS} = 0 V; T _J = 25 °C	-	5	100	nA
R _{DSon}	drain-source on-state resistance	V _{GS} = 10 V; I _D = 25 A; T _J = 25 °C; Fig. 11	-	5.9	6.5	mΩ
		V _{GS} = 10 V; I _D = 25 A; T _J = 105 °C; Fig. 12	-	8.1	9.1	mΩ
		V _{GS} = 10 V; I _D = 25 A; T _J = 125 °C; Fig. 12	-	8.8	9.7	mΩ
		V _{GS} = 10 V; I _D = 25 A; T _J = 175 °C; Fig. 12	-	10.5	11.6	mΩ
R _G	gate resistance	f = 1 MHz; T _J = 25 °C	0.5	1.25	2.0	Ω
Dynamic Characteristics						
Q _{G(tot)}	total gate charge	I _D = 25 A; V _{DS} = 32 V; V _{GS} = 10 V; T _J = 25 °C; Fig. 13 ; Fig. 14	-	12.1	14.5	nC
Q _{GS}	gate-source charge		-	3.4	5.1	nC
Q _{GD}	gate-drain charge		-	3.2	4.8	nC
C _{iss}	input capacitance	V _{DS} = 25 V; V _{GS} = 0 V; f = 1 MHz; T _J = 25 °C; Fig. 15	-	800	1200	pF
C _{oss}	output capacitance		-	232	350	pF
C _{rss}	reverse transfer capacitance		-	6.5	10	pF
t _{d(on)}	turn-on delay time	V _{DS} = 30 V; V _{GS} = 10 V; R _{G(ext)} = 5 Ω; T _J = 25 °C	-	9	-	ns
t _r	rise time		-	2.5	-	ns
t _{d(off)}	turn-off delay time		-	15	-	ns
t _f	fall time		-	3	-	ns
Source-drain Diode						
V _{SD}	source-drain voltage	I _S = 25 A; V _{GS} = 0 V; T _J = 25 °C; Fig. 16	-	0.9	1.2	V
t _{rr}	reverse recovery time	I _S = 25 A; di _S /dt = −100 A/μs; V _{GS} = 0 V; V _{DS} = 20 V; T _J = 25 °C; Fig. 17 [1]	-	26	-	ns
Q _r	recovered charge		-	19	-	nC

[1] Includes capacitive recovery



$T_j = 25\text{ }^{\circ}\text{C}$

Fig. 6. Output Characteristics; Drain Current as a Function of Drain-source Voltage; Typical Values



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

Fig. 7. Drain-source On-state Resistance as a Function of Gate-source Voltage; Typical Values

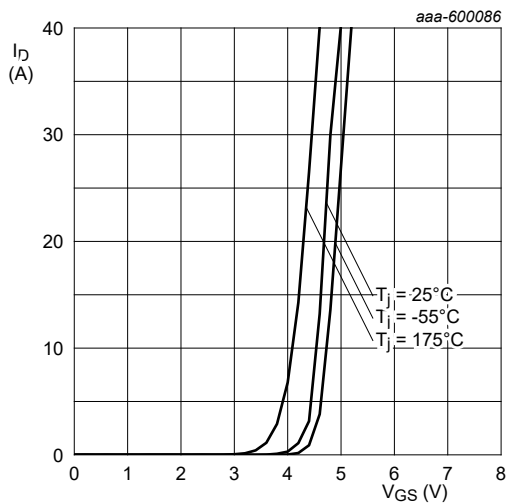
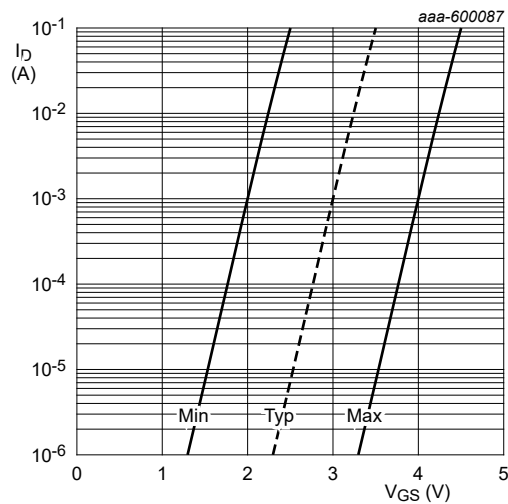


Fig. 8. Transfer Characteristics; Drain Current as a Function of Gate-source Voltage; Typical Values



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

Fig. 9. Sub-threshold Drain Current as a Function of Gate-source Voltage

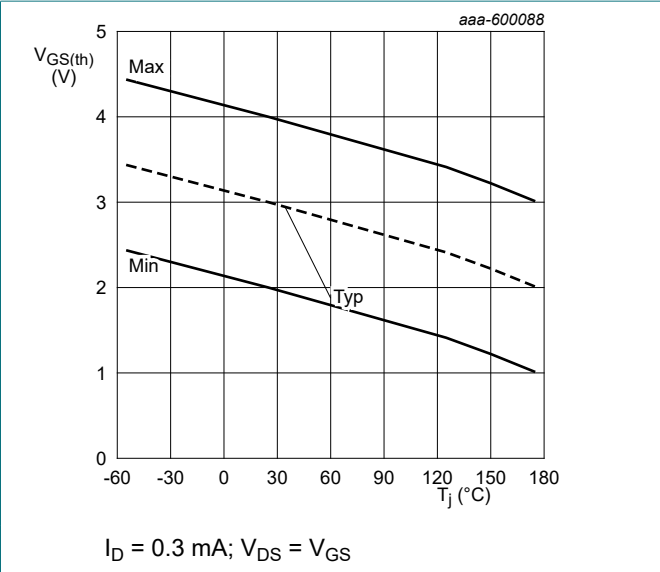


Fig. 10. Gate-source Threshold Voltage as a Function of Junction Temperature

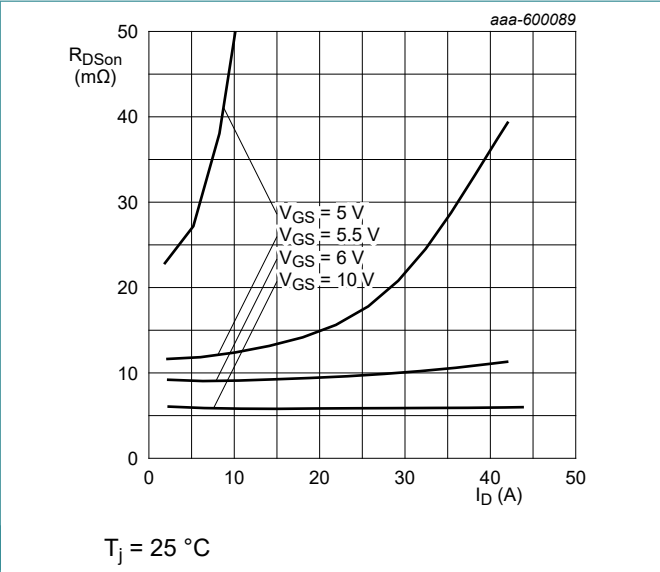


Fig. 11. Drain-source On-state Resistance as a Function of Drain Current; Typical Values

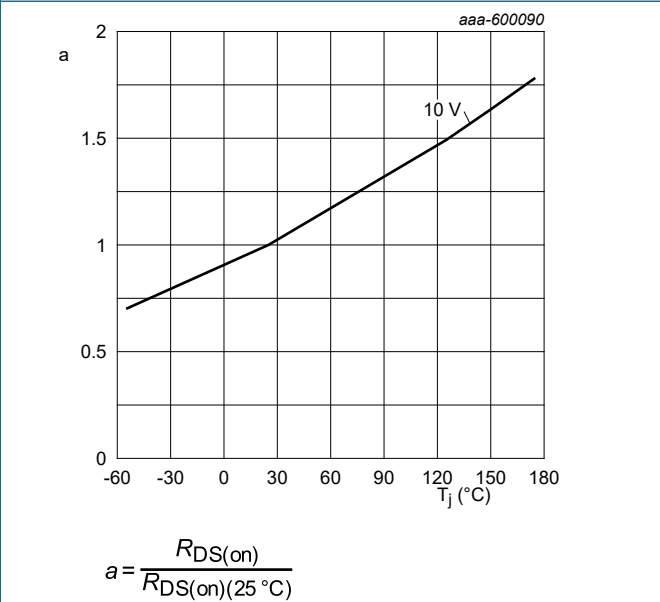


Fig. 12. Normalized Drain-source On-state Resistance Factor as a Function of Junction Temperature

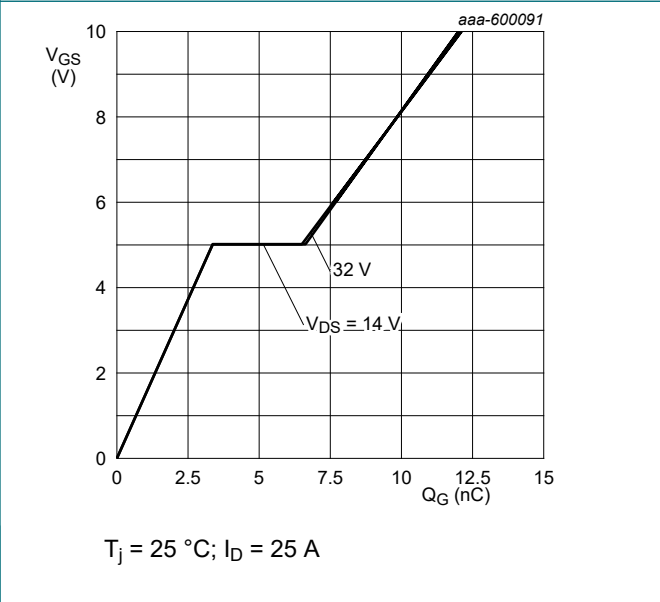


Fig. 13. Gate-source Voltage as a Function of Gate Charge; Typical Values

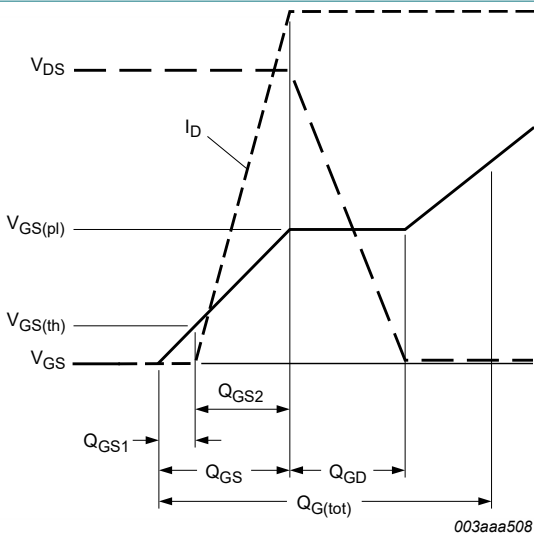
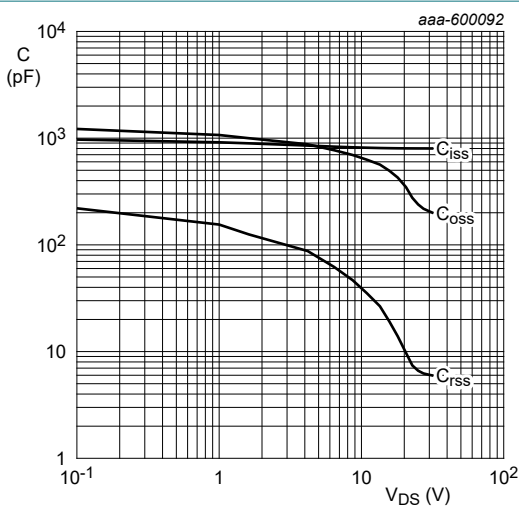
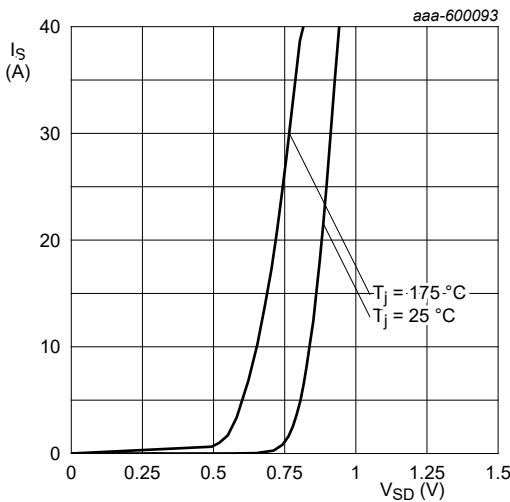


Fig. 14. Gate Charge Waveform Definitions



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

Fig. 15. Input, Output, and Reverse Transfer Capacitances as a Function of Drain-source Voltage; Typical Values



$V_{GS} = 0 \text{ V}$

Fig. 16. Source-drain (Diode Forward) Current as a Function of Source-drain (Diode Forward) Voltage; Typical Values

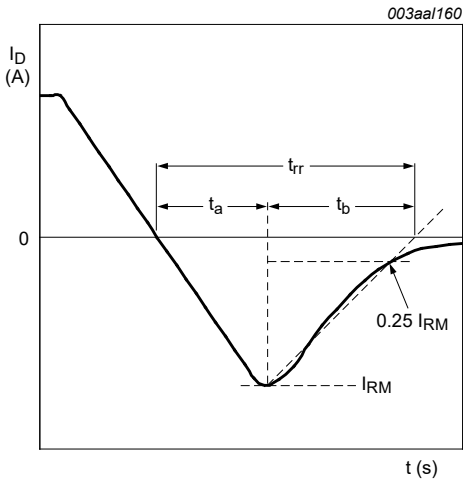


Fig. 17. Reverse Recovery Timing Definition

7. Package Outline

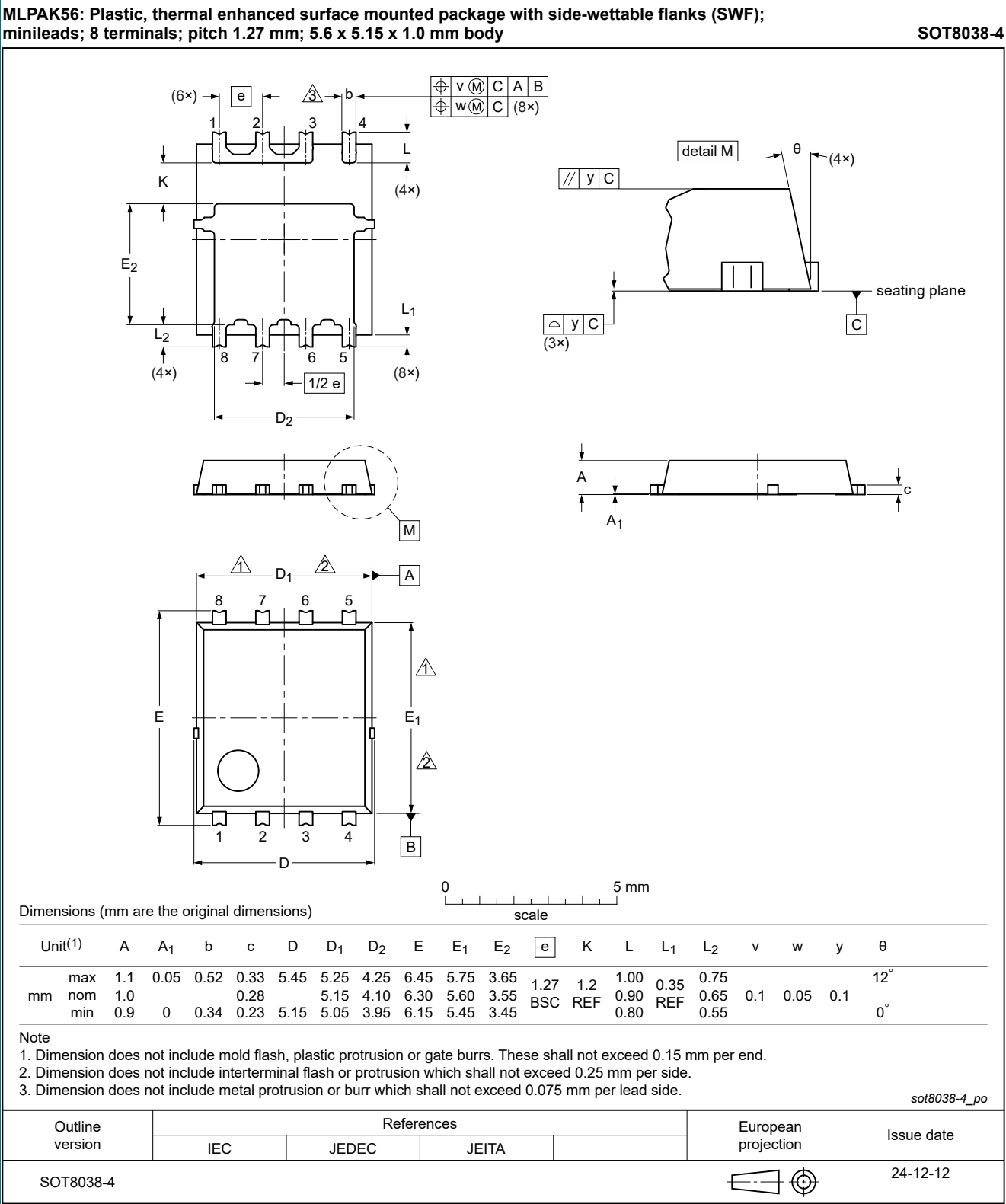
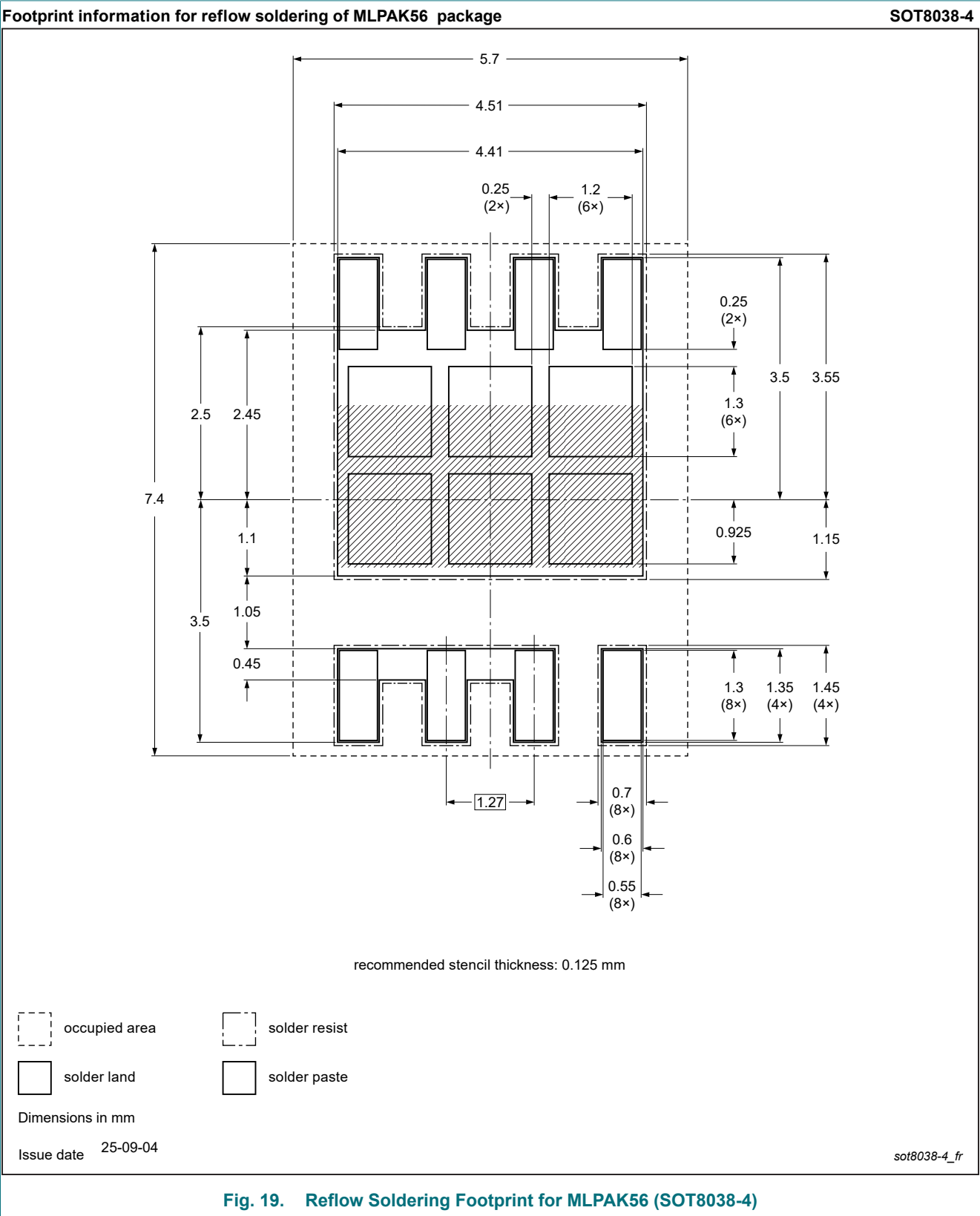


Fig. 18. Package Outline MLPAK56 (SOT8038-4)

8. Soldering

Table 7. Soldering



9. Revision History

Table 8. Revision History

Document ID	Release Date	Data Sheet Status	Supersedes
BUKNS6R5-40MYX8 v. 1	20260807	Preliminary data sheet	-

10. Legal information

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

1. Quick Reference Data..... 1

2. Pinning Information..... 1

3. Ordering Information..... 1

4. Limiting Values..... 2

5. Thermal Characteristics..... 3

6. Characteristics..... 5

7. Package Outline..... 9

8. Soldering..... 10

9. Revision History..... 11

10. Legal information..... 12

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