AS4606CS-Q1

N and P-Channel Complementary MOSFET

Product Summary

V$_{(BR)DSS}$	R$_{DS(on)MAX}$	I$_D$
30V	18mΩ@10V	7A
	30mΩ@4.5V	

V$_{(BR)DSS}$	R$_{DS(on)MAX}$	I$_D$
-30V	43mΩ@-10V	-5A
	63mΩ@-4.5V	

Feature

- Trench Power LV MOSFET technology
- High density cell design for low R$_{DS(ON)}$
- High Speed switching
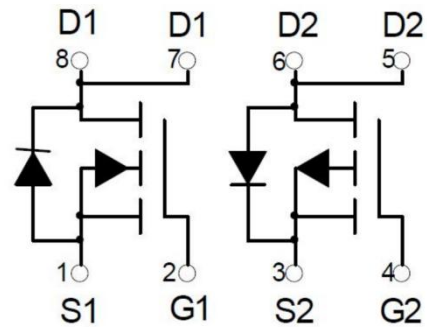- Suffix "-Q1" for AEC-Q101

Application
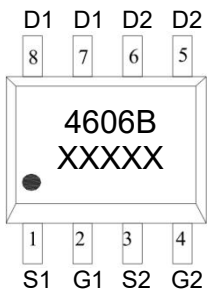
- Wireless charger
- Load switch
- Power management

Package

SOP-8

Circuit diagram

Marking

Document ID	Issued Date	Revised Date	Revision	Page.
AS-1150432	2018/03/08	2025/04/08	B1	10

Absolute maximum ratings (T$_A$=25℃ unless otherwise noted)

Parameter	Symbol	N-Channel	p-Channel	Unit
Drain-Source Voltage	V$_{DS}$	30	-30	V
Gate-Source Voltage	V$_{GS}$	±20	±20	V
Continuous Drain Current	I$_D$	7	-5	A
Continuous Drain Current(T$_A$=100℃)	I$_D$(100℃)	4.4	-3	A
Pulsed Drain Current[1]	I$_{DM}$	60	-40	A
Power Dissipation[2]	P$_D$	2	2	W
Thermal Resistance,Junction-to-Ambient[3]	R$_{θJA}$	60	60	℃/W
Junction Temperature	T$_J$	150	150	℃
Storage Temperature	T$_{STG}$	-55 ~ +150	-55 ~ +150	℃

N-CH Electrical characteristics (T$_J$=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V$_{(BR)DSS}$	V$_{GS}$ =0V, I$_D$ =250μA	30			V
Zero gate voltage drain current	I$_{DSS}$	V$_{DS}$ =30V,V$_{GS}$ =0V			1	μA
Gate-body leakage current	I$_{GSS}$	V$_{GS}$ =±20V, V$_{DS}$ =0V			±100	nA
Gate threshold voltage	V$_{GS(th)}$	V$_{DS}$ =V$_{GS}$, I$_D$ =250μA	1.0	1.5	2.2	V
Drain-source on-resistance	R$_{DS(on)}$	V$_{GS}$ =10V, I$_D$ =7A		15	18	mΩ
		V$_{GS}$ =4.5V, I$_D$ =5A		23	30	mΩ
Dynamic characteristics[4]						
Input Capacitance	C$_{iss}$	V$_{DS}$ =15V,V$_{GS}$ =0V,f =1MHz		380		pF
Output Capacitance	C$_{oss}$			75		
Reverse Transfer Capacitance	C$_{rss}$			60		
Total Gate Charge	Q$_g$	V$_{DS}$ =15V,V$_{GS}$ =10V,I$_D$ =7A		12.5		nC
Gate-Source Charge	Q$_{gs}$			2.5		
Gate-Drain Charge	Q$_{gd}$			2.5		
Turn-on delay time	t$_{d(on)}$	V$_{DD}$ =15V,V$_{GS}$ =10V R$_{GEN}$ =3Ω,I$_D$ =7A		5		nS
Turn-on rise time	t$_r$			30		
Turn-off delay time	t$_{d(off)}$			15		
Turn-off fall time	t$_f$			20		
Source-Drain Diode characteristics						
Diode Forward Current	I$_S$				7	A
Diode Forward voltage	V$_{SD}$	V$_{GS}$ =0V, I$_S$=7A			1.2	V
Reverse Recovery Time	t$_{rr}$	I$_F$=7A, di/dt=100A/us		16		nS
Reverse Recovery Charge	Q$_{rr}$			1.5		nC

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Page 2

Document ID	Issued Date	Revised Date	Revision	Page.
AS-1150432	2018/03/08	2025/04/08	B1	10

P-CH Electrical characteristics (T$_J$=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V$_{(BR)DSS}$	V$_{GS}$ =0V, I$_D$ =-250µA	-30			V
Zero gate voltage drain current	I$_{DSS}$	V$_{DS}$ =-30V,V$_{GS}$ =0V			-1	µA
Gate-body leakage current	I$_{GSS}$	V$_{GS}$ =±20V, V$_{DS}$ =0V			±100	nA
Gate threshold voltage	V$_{GS(th)}$	V$_{DS}$ =V$_{GS}$, I$_D$ =-250µA	-1.0	-1.5	-2.4	V
Drain-source on-resistance	R$_{DS(on)}$	V$_{GS}$ =-10V, I$_D$ =-5A		34	43	mΩ
		V$_{GS}$ =-4.5V, I$_D$ =-3.5A		49	63	mΩ
Dynamic characteristics[4]						
Input Capacitance	C$_{iss}$	V$_{DS}$ =-15V,V$_{GS}$ =0V,f =1MHz		490		pF
Output Capacitance	C$_{oss}$			75		
Reverse Transfer Capacitance	C$_{rss}$			60		
Total Gate Charge	Q$_g$	V$_{DS}$ =-15V,V$_{GS}$ =-10V,I$_D$ =-5A		9		nC
Gate-Source Charge	Q$_{gs}$			1.5		
Gate-Drain Charge	Q$_{gd}$			2.3		
Turn-on delay time	t$_{d(on)}$	V$_{DD}$ =-15V,V$_{GS}$ =-10V, I$_D$ =-5A,R$_{GEN}$ =2.5Ω		9		nS
Turn-on rise time	t$_r$			3		
Turn-off delay time	t$_{d(off)}$			29		
Turn-off fall time	t$_f$			15		
Source-Drain Diode characteristics						
Diode Forward Current	I$_S$				-5	A
Diode Forward voltage	V$_{SD}$	V$_{GS}$ =0V, I$_S$=-5A			-1.2	V
Reverse Recovery Time	t$_{rr}$	I$_F$=-5A, di/dt=100A/us		32		nS
Reverse Recovery Charge	Q$_{rr}$			12		nC

Notes:

1) Repetitive rating; pulse width limited by max. junction temperature.

2) P$_d$ is based on max. junction temperature, using junction-case thermal resistance.

3) The value of R$_{θJA}$ is measured with the device mounted on 1 in² FR-4 board with 2oz. Copper, in the still air environment with T$_A$=25℃. The maximum allowed junction temperature of 150℃. The value in any given application depends on the user's specific board design.

4) Guaranteed by design, not subject to production.

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Page 3

Document ID	Issued Date	Revised Date	Revision	Page.
AS-1150432	2018/03/08	2025/04/08	B1	10

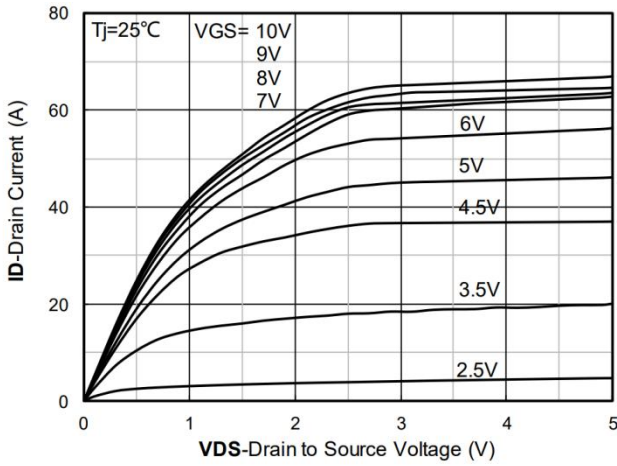## N- Channel Typical Characteristics
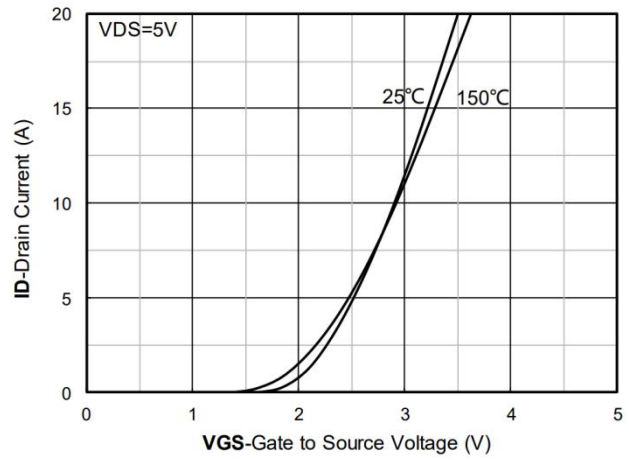

Figure 1. Output Characteristics
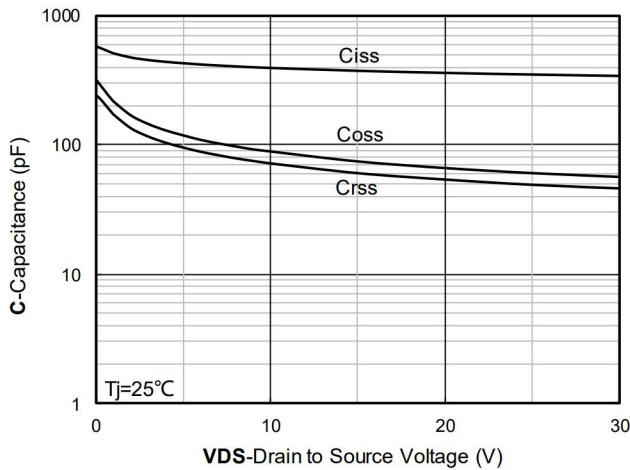

Figure 2. Transfer Characteristics

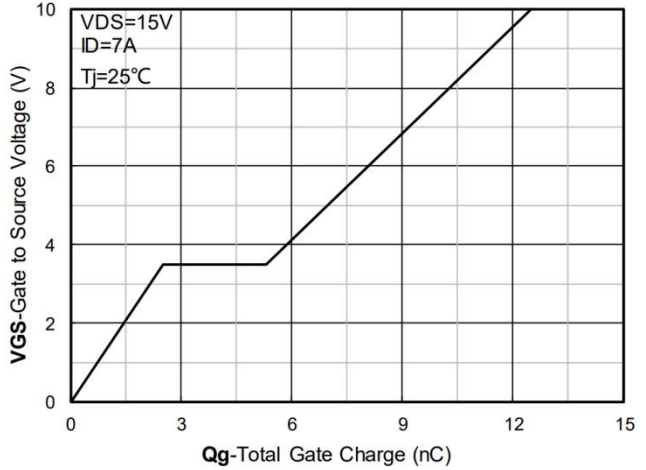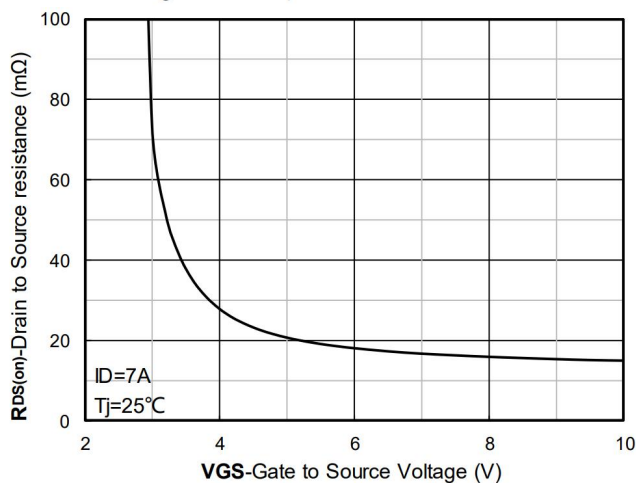Figure 3. Capacitance Characteristics

Figure 4. Gate Charge
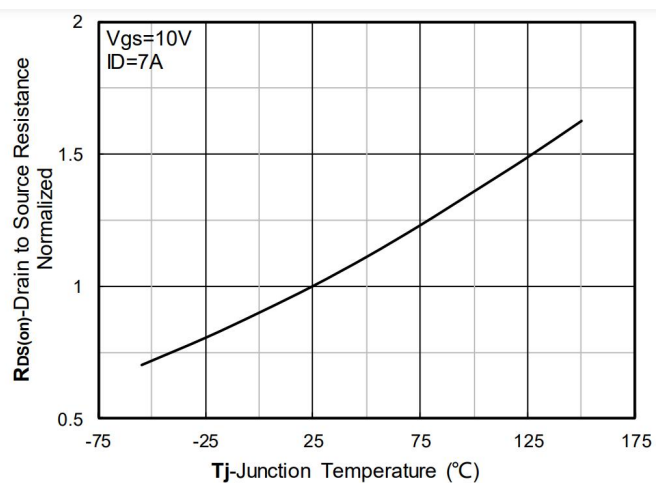

Figure 5. On-Resistance vs Gate to Source Voltage

Figure 6. Normalized On- Resistance
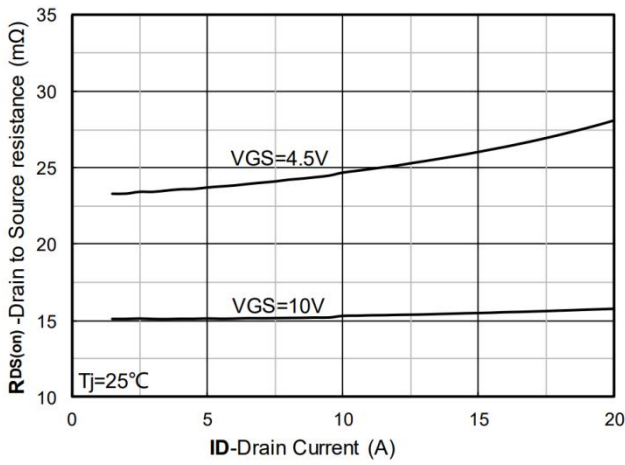
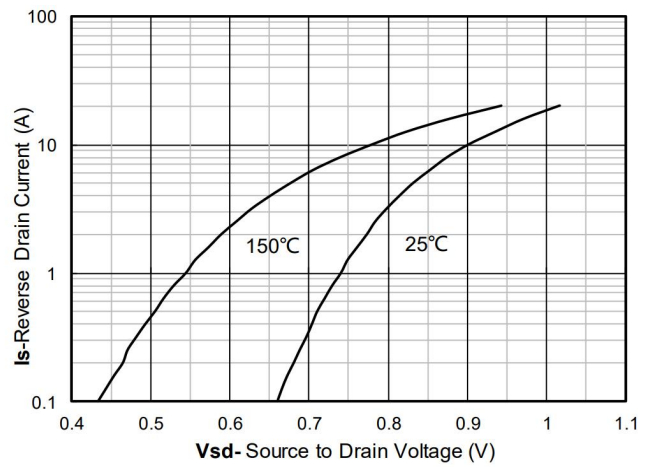## N- Channel Typical Characteristics

Figure 7. RDS(on) VS Drain Current
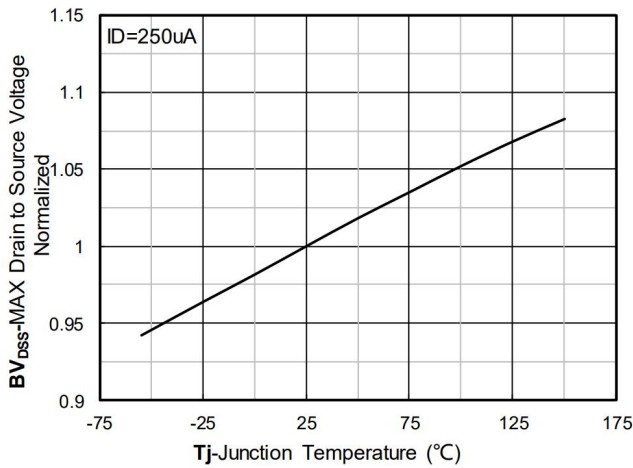

Figure 8. Forward characteristics of reverse diode
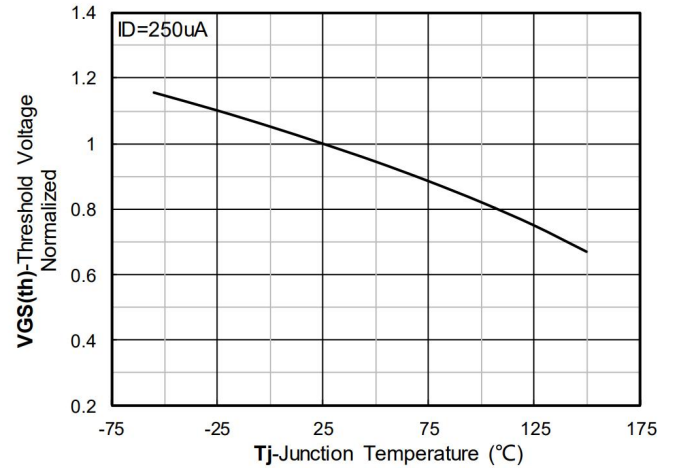

Figure 9. Normalized breakdown voltage
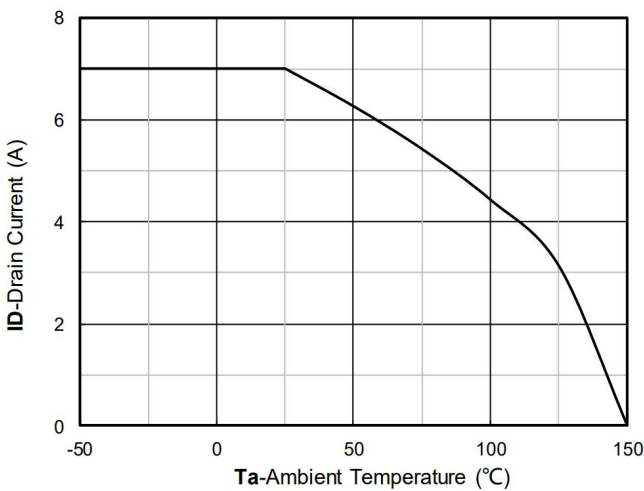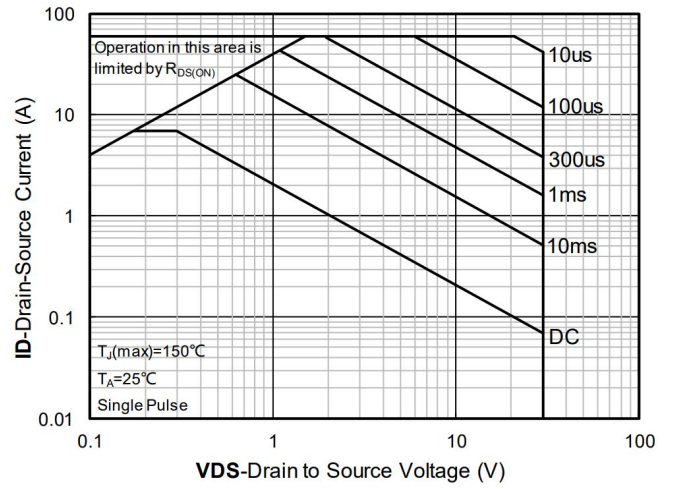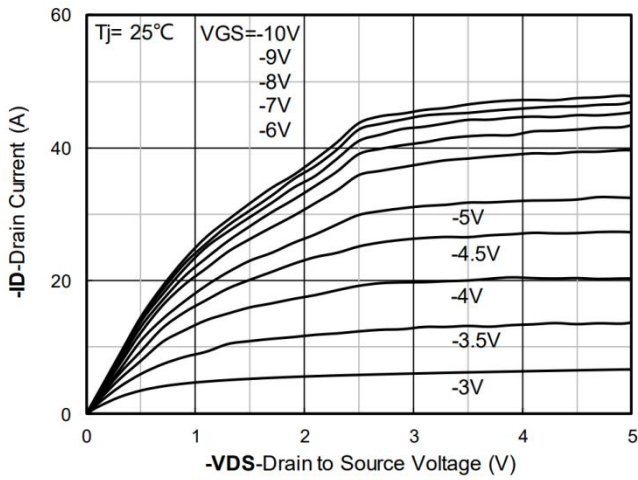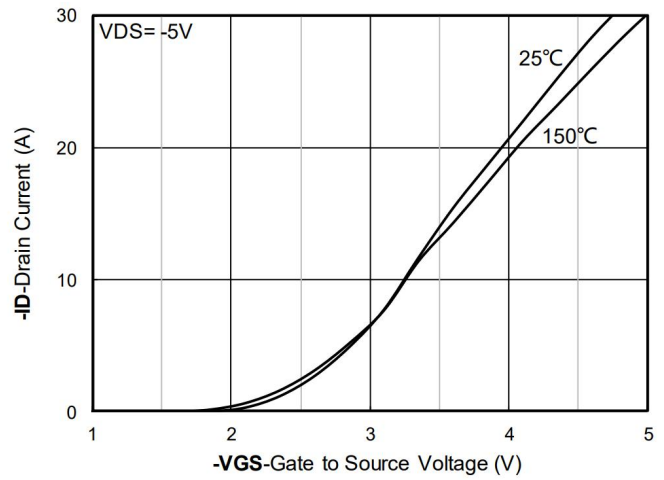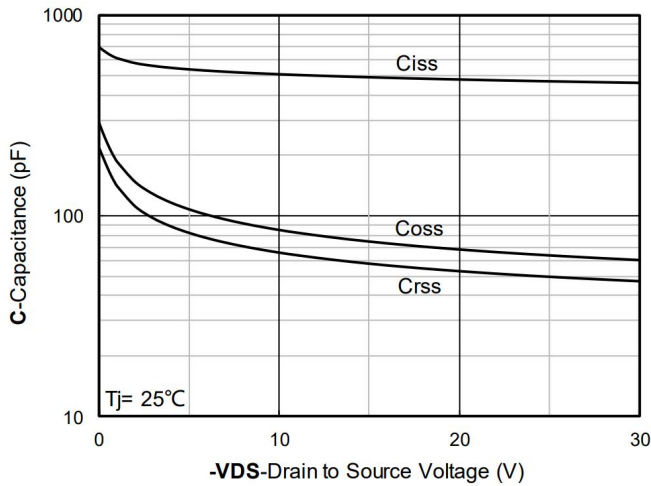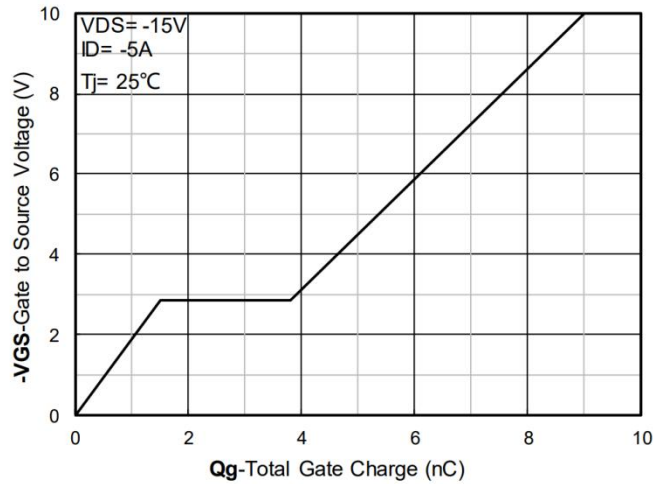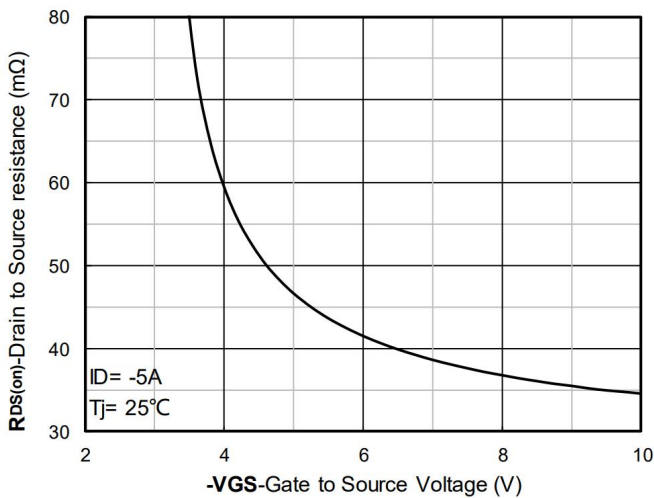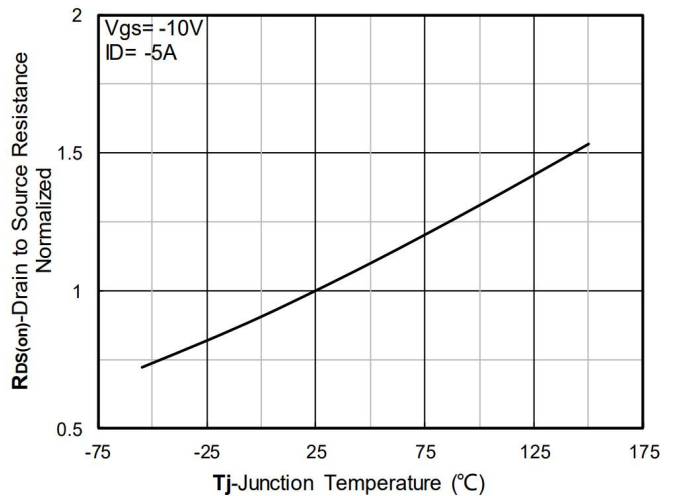

Figure 10. Normalized Threshold voltage

Figure 11. Current dissipation

Figure 12. Power dissipation

N- Channel Typical Characteristics

Figure 13. Maximum Transient Thermal Impedance

Figure 14. Safe Operation Area

Document ID	Issued Date	Revised Date	Revision	Page.
AS-1150432	2018/03/08	2025/04/08	B1	10

P- Channel Typical Characteristics

Figure 1. Output Characteristics

Figure 2. Transfer Characteristics

Figure 3. Capacitance Characteristics

Figure 4. Gate Charge

Figure 5. On-Resistance vs Gate to Source Voltage

Figure 6. Normalized On-Resistance

Document ID	Issued Date	Revised Date	Revision	Page.
AS-1150432	2018/03/08	2025/04/08	B1	10

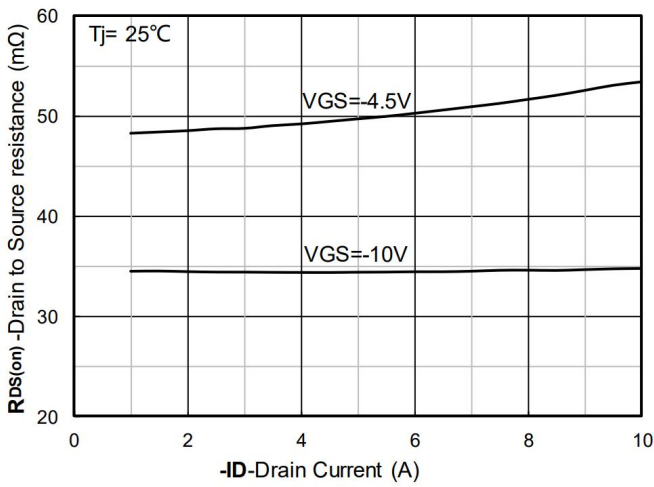## P- Channel Typical Characteristics
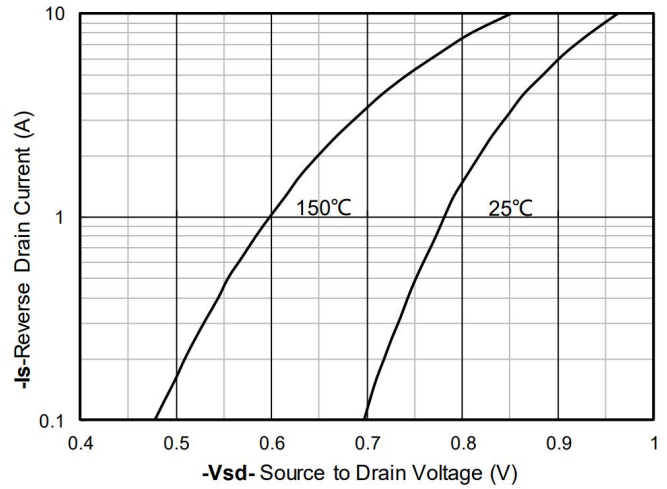
Figure 7. R_{DS(on)} VS Drain Current

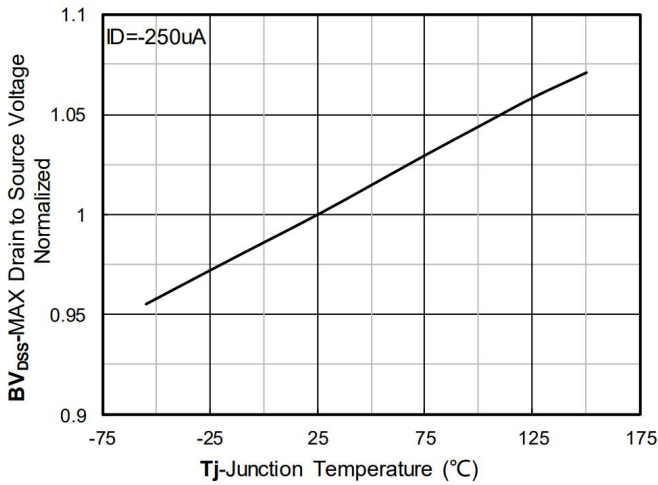Figure 8. Forward characteristics of reverse diode
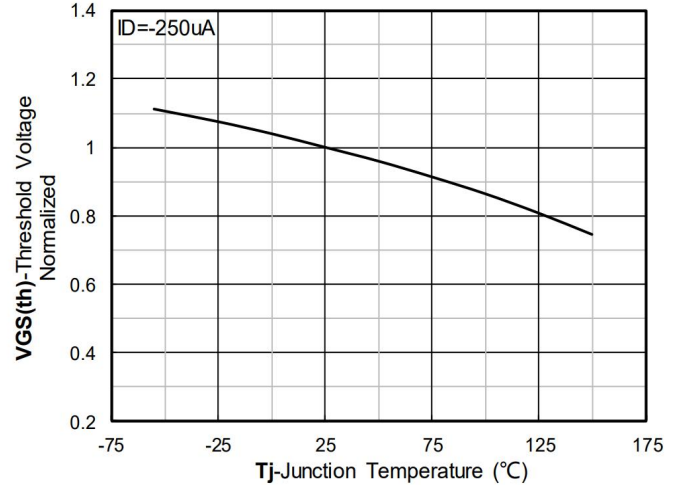
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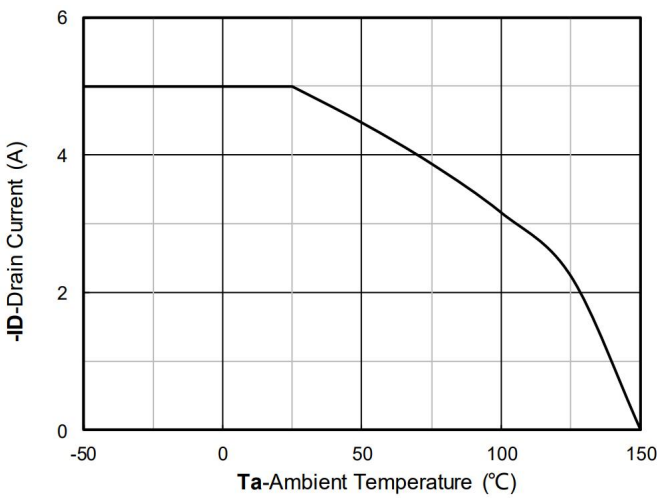Figure 11. Current dissipation

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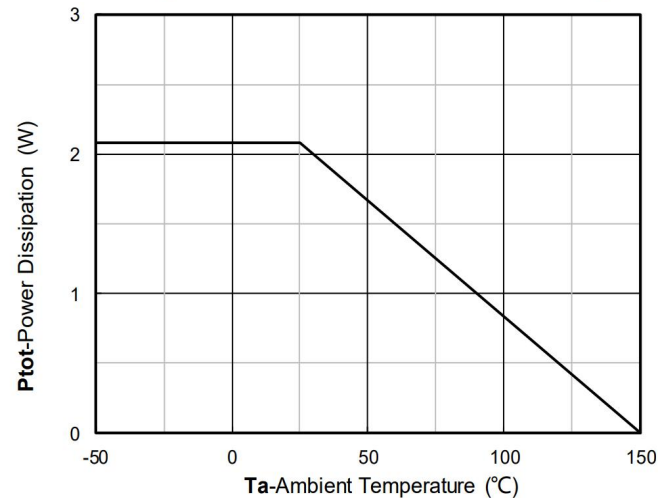| Document ID	Issued Date	Revised Date	Revision	Page.
AS-1150432	2018/03/08	2025/04/08	B1	10

P- Channel Typical Characteristics

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Document ID	Issued Date	Revised Date	Revision	Page.
AS-1150432	2018/03/08	2025/04/08	B1	10

N and P-Channel Complementary MOSFET

SOP-8 Package Information

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.250	1.650	0.049	0.065
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°