AER013N04S-Q1

N-Channel Enhancement Mode MOSFET

Product Summary

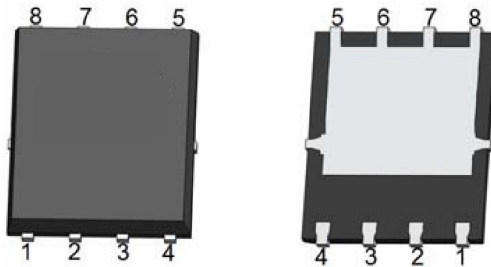| $V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
40V	1.3mΩ@10V	200A
	2.0mΩ@4.5V	

Feature

- Split gate trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
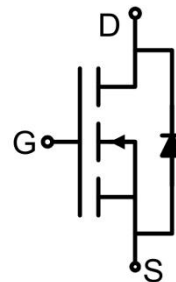- Suffix "-Q1" for AEC-Q101

Application

- Power switching application
- Uninterruptible power supply
- DC-DC converter

Package
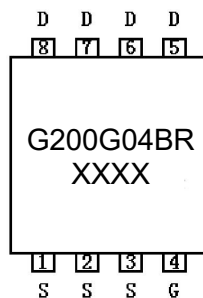

PDFN5*6-8L

Circuit diagram

Marking

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Document ID	Issued Date	Revised Date	Revision	Page.
AS-1150561	2018/03/08	2024/07/12	B	6

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V$_{DS}$	40	V
Gate-Source Voltage	V$_{GS}$	±20	V
Continuous Drain Current (T$_C$ =25℃)	I$_D$	200	A
Continuous Drain Current (T$_C$ =100℃)	I$_D$(100℃)	141	A
Pulsed Drain Current[1]	I$_{DM}$	800	A
Power Dissipation[3] (T$_C$ =25℃)	P$_D$	187	W
Thermal Resistance,Junction-to-Ambient[4]	R$_{θJA}$	40	℃/W
Thermal Resistance,Junction-to-Case	R$_{θJC}$	0.8	℃/W
Single pulse avalanche energy[2]	E$_{AS}$	625	mJ
Junction Temperature	T$_J$	175	℃
Storage Temperature	T$_{STG}$	-55 ~ +175	℃

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	40			V
Zero gate voltage drain current	I$_{DSS}$	V$_{DS}$ =40V,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	1.8	2.5	V
Drain-source on-resistance	R$_{DS(on)}$	V$_{GS}$ =10V, I$_D$ =100A		1.0	1.3	mΩ
		V$_{GS}$ =10V, I$_D$ =20A		1.0	1.3	
		V$_{GS}$ =4.5V, I$_D$ =20A		1.5	2.0	
Gate resistance	R$_G$	f =1.0MHz		1.5		Ω
Dynamic characteristics[5]						
Input Capacitance	C$_{iss}$	V$_{DS}$ =25V, V$_{GS}$ =0V, f =1MHz		7400		pF
Output Capacitance	C$_{oss}$			1340		
Reverse Transfer Capacitance	C$_{rss}$			70		
Total Gate Charge	Q$_g$	V$_{DS}$ =20V, V$_{GS}$ =10V, I$_D$ =100A		126		nC
Gate-Source Charge	Q$_{gs}$			21		
Gate-Drain Charge	Q$_{gd}$			38		
Turn-on delay time	t$_{d(on)}$	V$_{DD}$=20V, V$_{GS}$=10V, I$_D$=100A, R$_{GEN}$=2.2Ω		24		nS
Turn-on rise time	t$_r$			276		
Turn-off delay time	t$_{d(off)}$			49		
Turn-off fall time	t$_f$			22		
Source-Drain Diode characteristics						
Diode Forward Current	I$_S$				200	A
Diode Forward voltage	V$_{SD}$	V$_{GS}$ =0V, I$_S$=100A			1.2	V
Reverse Recovery Time	t$_{rr}$	I$_F$ =100A,di/dt =100A/µs		82		nS
Reverse Recovery Charge	Q$_{rr}$			150		nC

Notes:

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

2) T$_J$=25℃, V$_{DD}$=30V, V$_G$=10V, R$_G$=25Ω, L=0.5mH, IAS=50A.

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

4) 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.

5) Guaranteed by design, not subject to production testing.

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Page 2

Document ID	Issued Date	Revised Date	Revision	Page.
AS-1150561	2018/03/08	2024/07/12	B	6

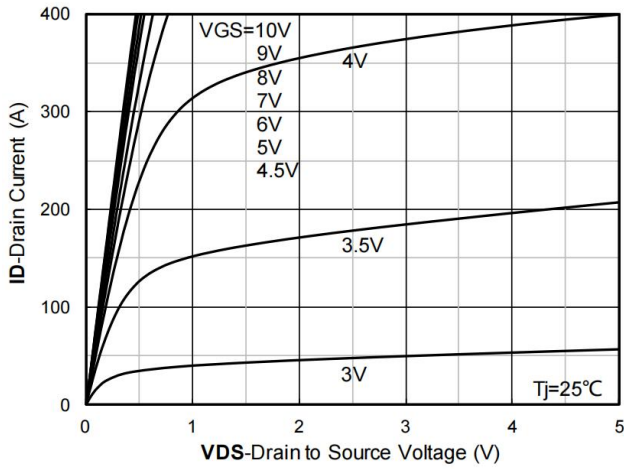## Typical Characteristics

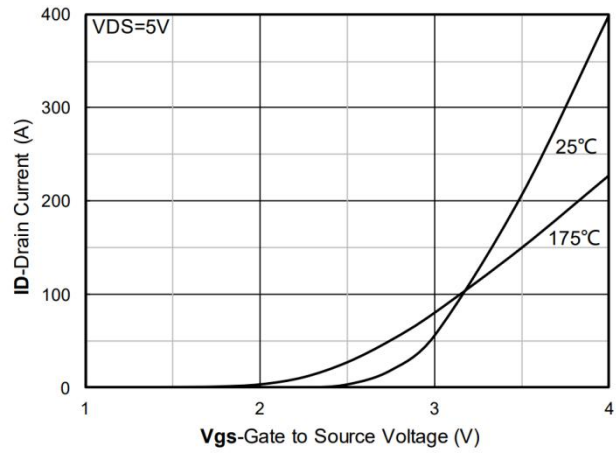Figure 1. Output Characteristics

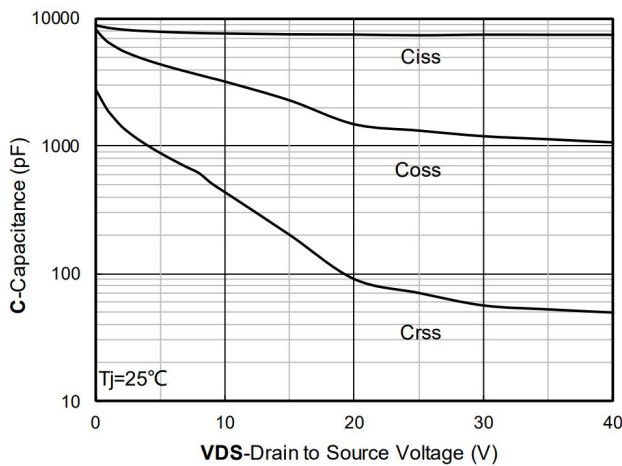
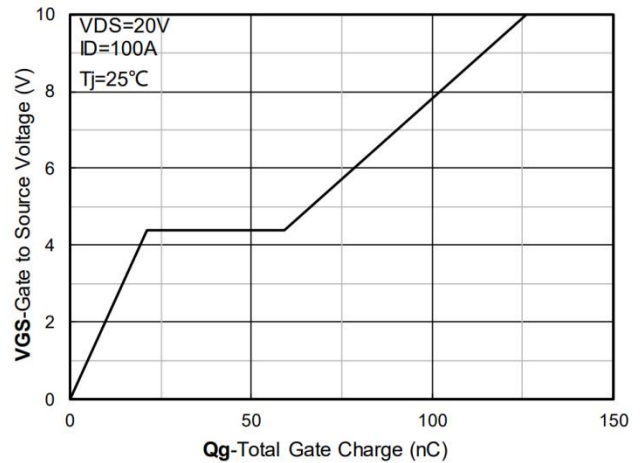Figure 2. Transfer Characteristics

Figure 3. Capacitance Characteristics

Figure 4. Gate Charge
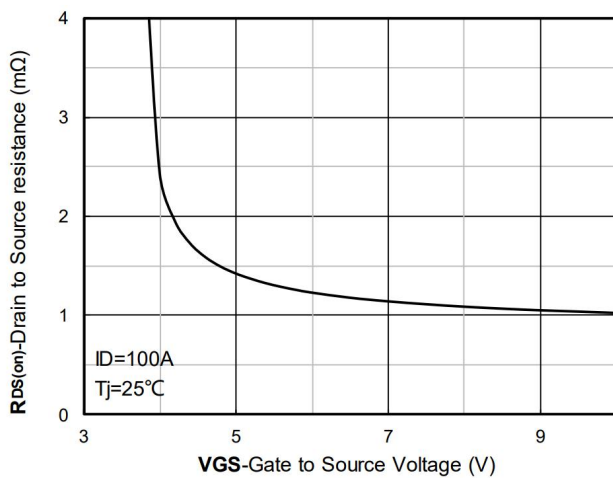
Figure 5. On-Resistance vs Gate to Source Voltage
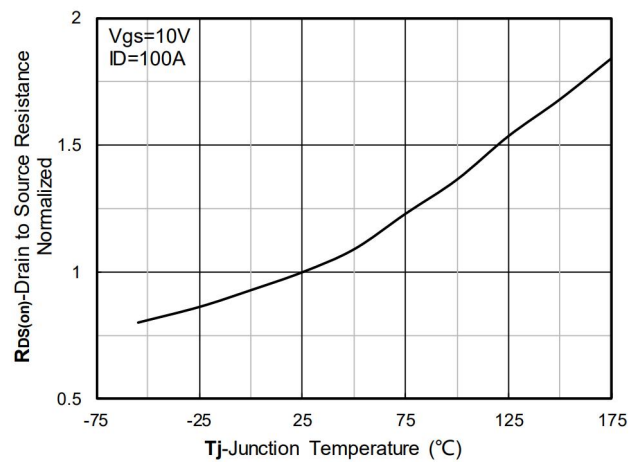
Figure 6. Normalized On-Resistance

Document ID	Issued Date	Revised Date	Revision	Page.
AS-1150561	2018/03/08	2024/07/12	B	6

Typical Characteristics
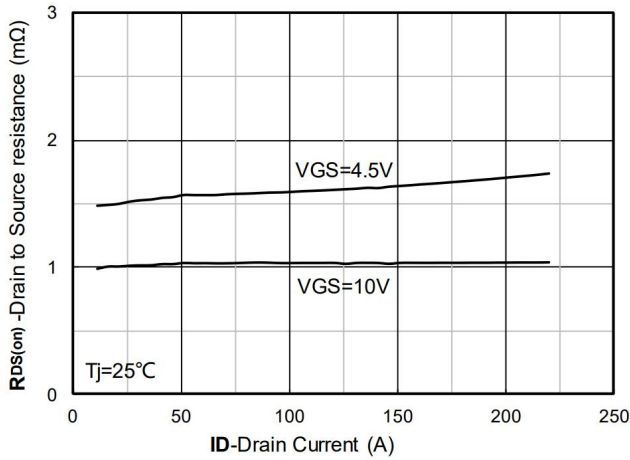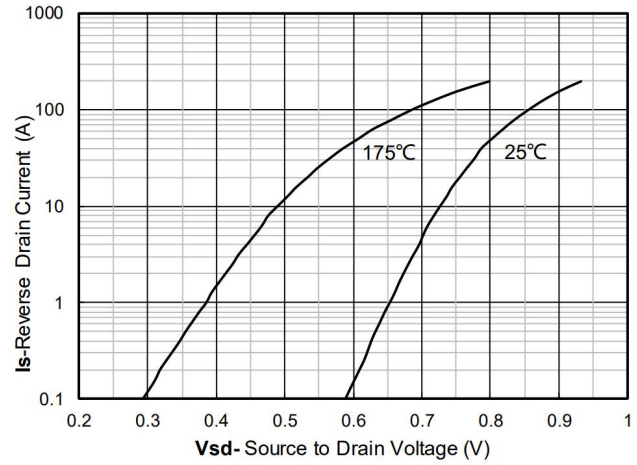

Figure 7. RDS(on) VS Drain Current

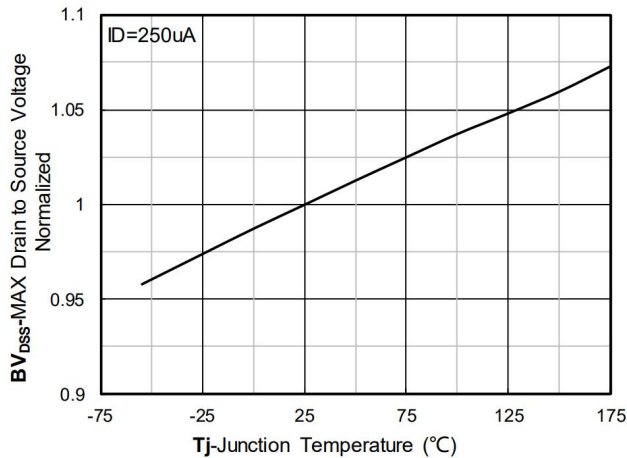Figure 8. Forward characteristics of reverse diode
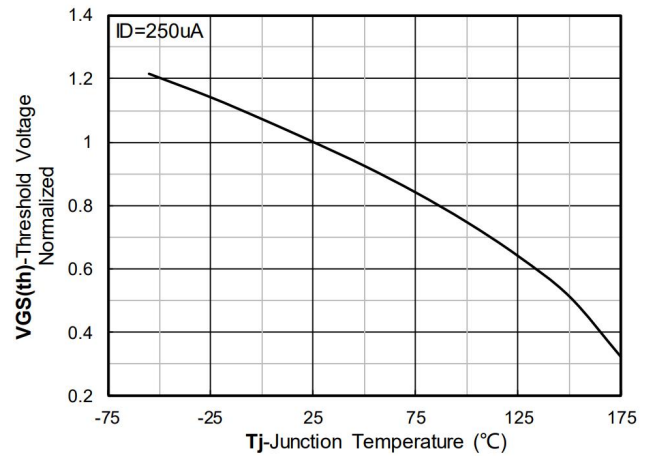

Figure 9. Normalized breakdown voltage
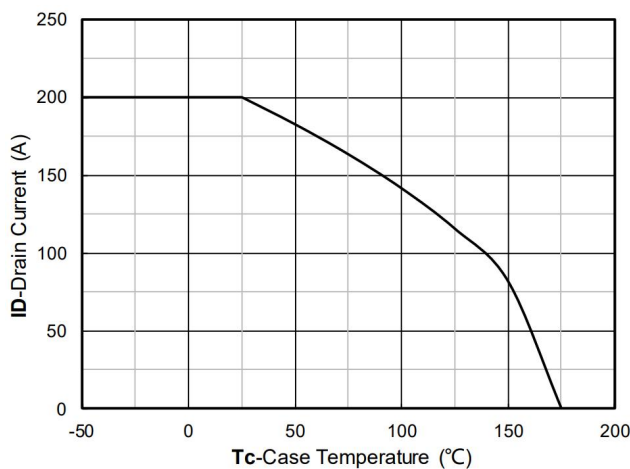

Figure 10. Normalized Threshold voltage

Figure 11. Current dissipation

Figure 12. Power dissipation
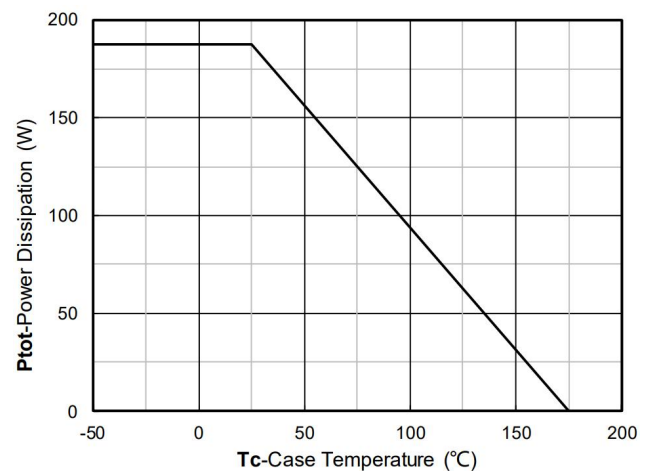
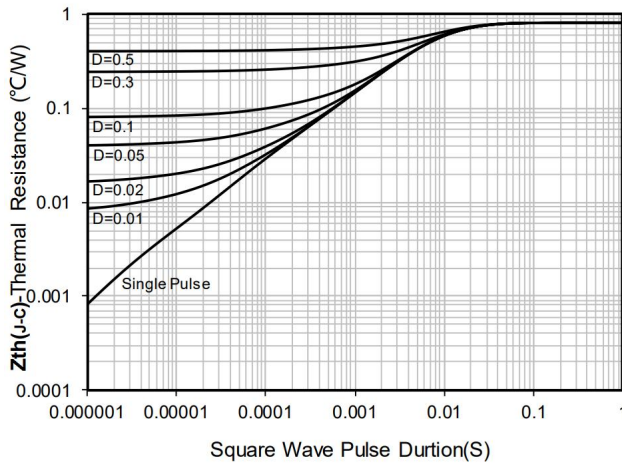| Document ID	Issued Date	Revised Date	Revision	Page.
AS-1150561	2018/03/08	2024/07/12	B	6

Typical Characteristics

Figure 13. Maximum Transient Thermal Impedance
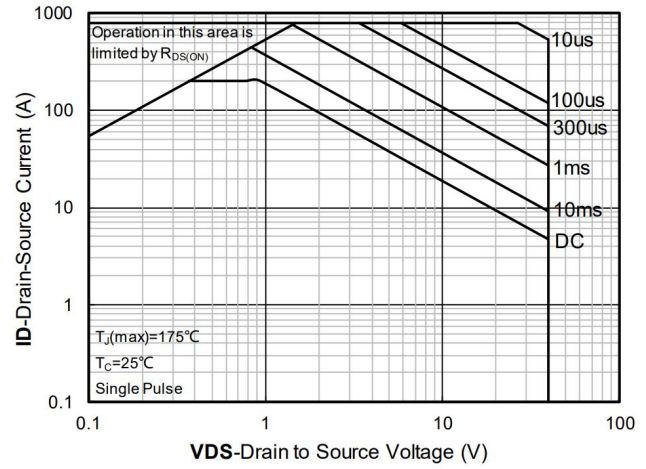
Figure 14. Safe Operation Area

Document ID	Issued Date	Revised Date	Revision	Page.
AS-1150561	2018/03/08	2024/07/12	B	6

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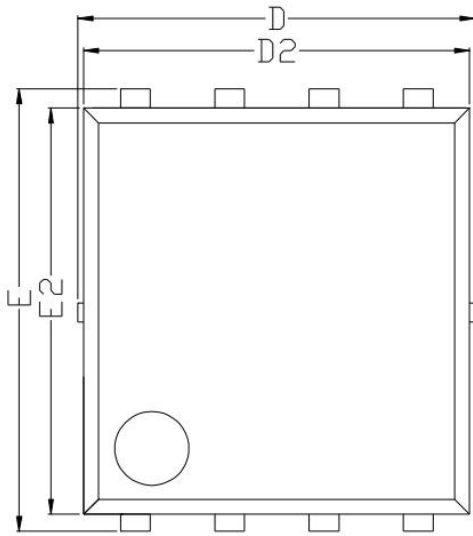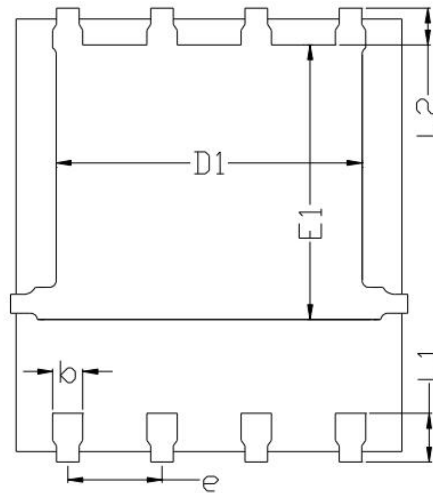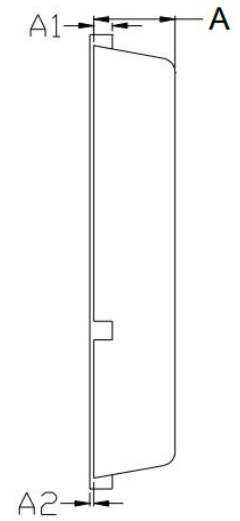
PDFN5*6-8L Package Information

Top View
正面视图

Bottom View
背面视图

Side View
侧面视图

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
D	5.150	5.550	0.203	0.219
E	5.950	6.150	0.234	0.242
A	0.850	1.000	0.033	0.039
A1	0.203 BSC		0.008 BSC	
A2	0.000	0.080	0.000	0.003
D1	4.250	4.450	0.167	0.175
E1	3.525	3.725	0.139	0.147
D2	5.200 REF		0.205 REF	
E2	5.550 REF		0.219 REF	
L1	0.450	0.650	0.018	0.026
L2	0.680 BSC		0.268 BSC	
b	0.300	0.500	0.012	0.020
e	1.270 BSC		0.050 BSC	

Document ID	Issued Date	Revised Date	Revision	Page.
AS-1150561	2018/03/08	2024/07/12	B	6