AD110N04S-Q1

N-Channel Super Trench Power MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
40V	3.5mΩ@10V	110A
	4.8mΩ@4.5V	

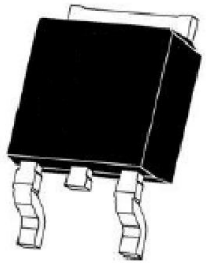
Feature

- Excellent gate charge x $R_{DS(on)}$ product(FOM)
- Very low on-resistance $R_{DS(on)}$
- Suffix "-Q1" for AEC-Q101

Application

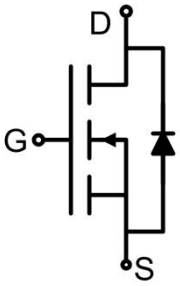
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

Package

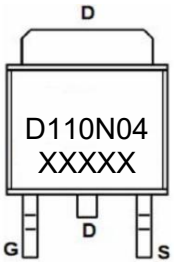


TO-252AB

Circuit diagram



Marking



AD110N04S-Q1

N-Channel Super Trench Power MOSFET

Absolute maximum ratings (T_C=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	I_D	110	A
Continuous Drain Current(T_C=100℃)	I_D (100℃)	85	A
Pulsed Drain Current	I_{DM}	440	A
Power Dissipation	P_D	150	W
Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	1	℃/W
Single pulse avalanche energy[1)]	E_{AS}	500	mJ
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55 ~ +150	℃

Electrical characteristics (T_C=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	1.2	1.7	2.2	V
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =55A		2.4	3.5	mΩ
		V_{GS} =4.5V, I_D =55A		3.3	4.8	
Dynamic characteristics[2)]						
Input Capacitance	C_{iss}	V_{DS} =20V,V_{GS} =0V,f =1MHz		3510		pF
Output Capacitance	C_{oss}			1050		
Reverse Transfer Capacitance	C_{rss}			60		
Total Gate Charge	Q_g	V_{DS} =20V,V_{GS} =10V,I_D =55A		60		nC
Gate-Source Charge	Q_{gs}			9.9		
Gate-Drain Charge	Q_{gd}			9.5		
Turn-on delay time	$t_{d(on)}$	V_{DD}=20V,I_D=55A, V_{GS}=10V,R_G=1.6Ω		10.5		nS
Turn-on rise time	t_r			4		
Turn-off delay time	$t_{d(off)}$			35		
Turn-off fall time	t_f			5		
Source-Drain Diode characteristics						
Diode Forward Current	I_S				110	A
Diode Forward voltage	V_{SD}	V_{GS} =0V, I_{SD}=55A			1.2	V
Reverse Recovery Time	t_{rr}	T_j=25°C,I_F=I_S,di/dt=100A/μs			24	nS
Reverse Recovery Charge	Q_{rr}				68	nC

Notes:

1) EAS condition : Tj=25℃,V_{DD}=20V,V_G=10V,L=0.5mH,R_g=25Ω

2) Guaranteed by design, not subject to production

3) These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsin k, assuming a maximum junction temperature of TJ(MAX)=175°C. The SOA curve provides a single pulse rating

Typical Characteristics

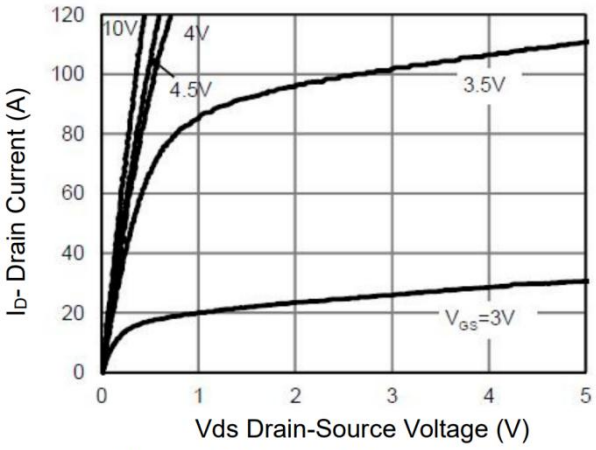


Figure 1 Output Characteristics

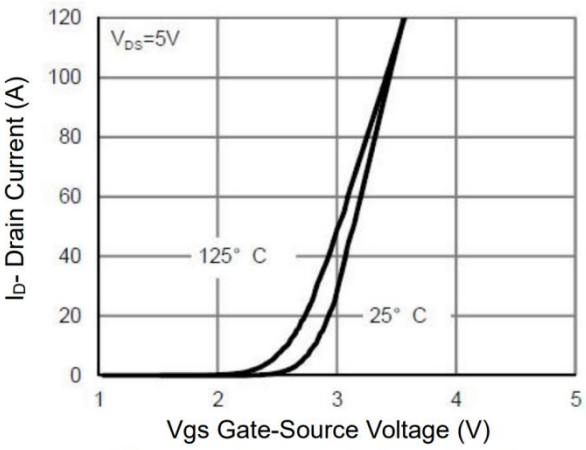


Figure 2 Transfer Characteristics

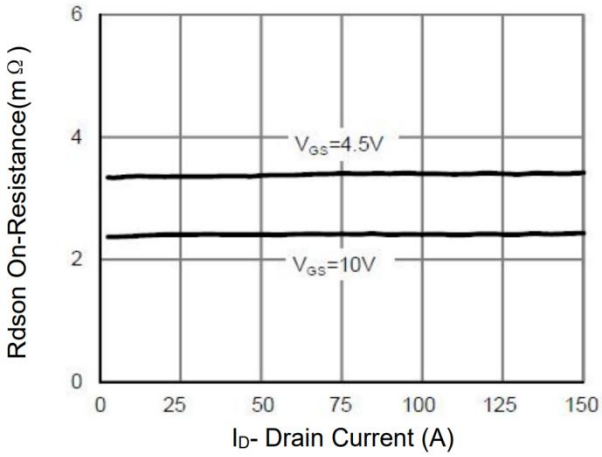


Figure 3 Rdson- Drain Current

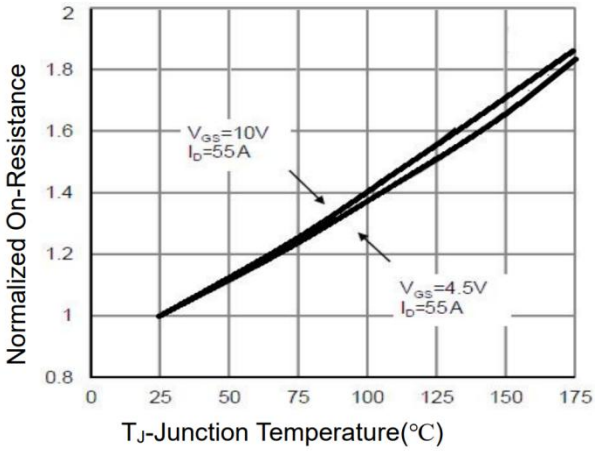


Figure 4 Rdson-JunctionTemperature

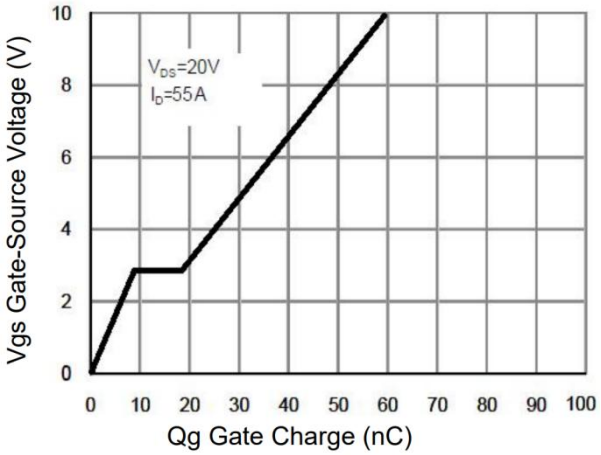


Figure 5 Gate Charge

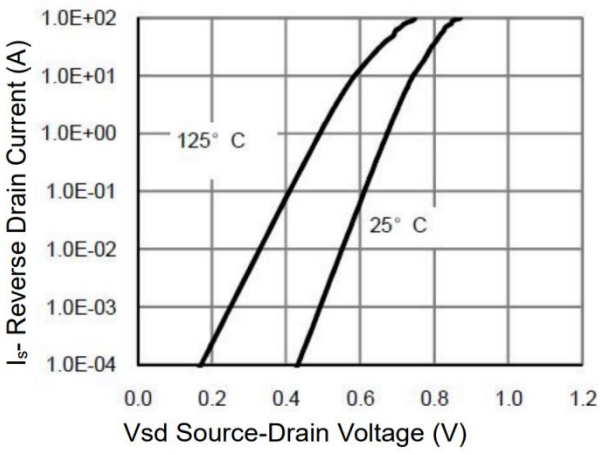


Figure 6 Source- Drain Diode Forward

Typical Characteristics

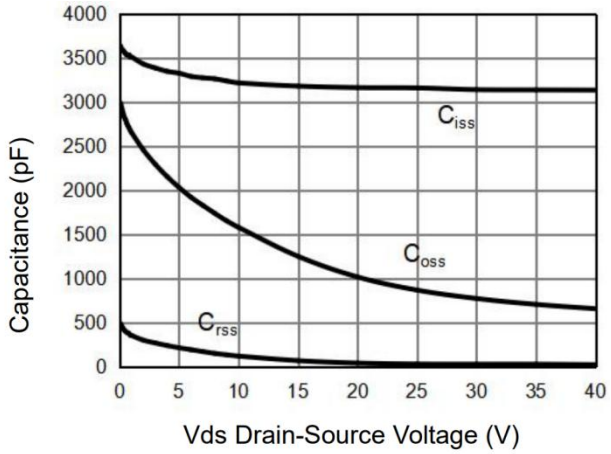


Figure 7 Capacitance vs Vds

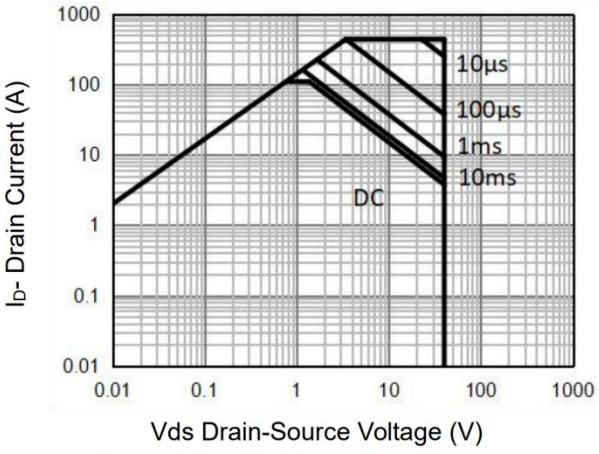


Figure 8 Safe Operation Area (Note 3)

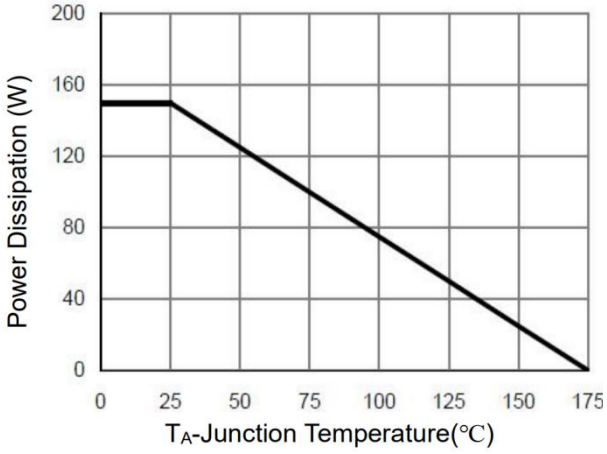


Figure 9 Power De-rating

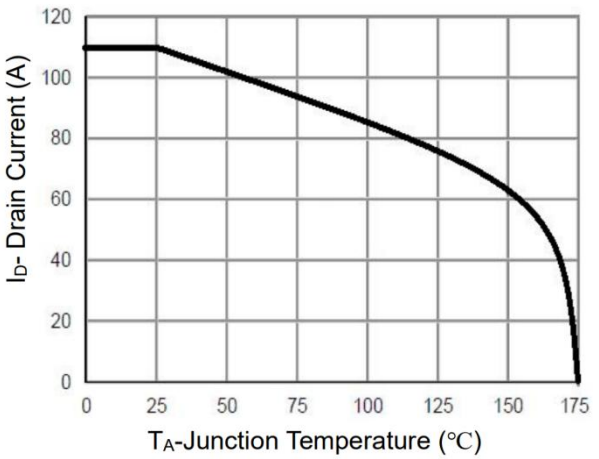


Figure 10 Current De-rating

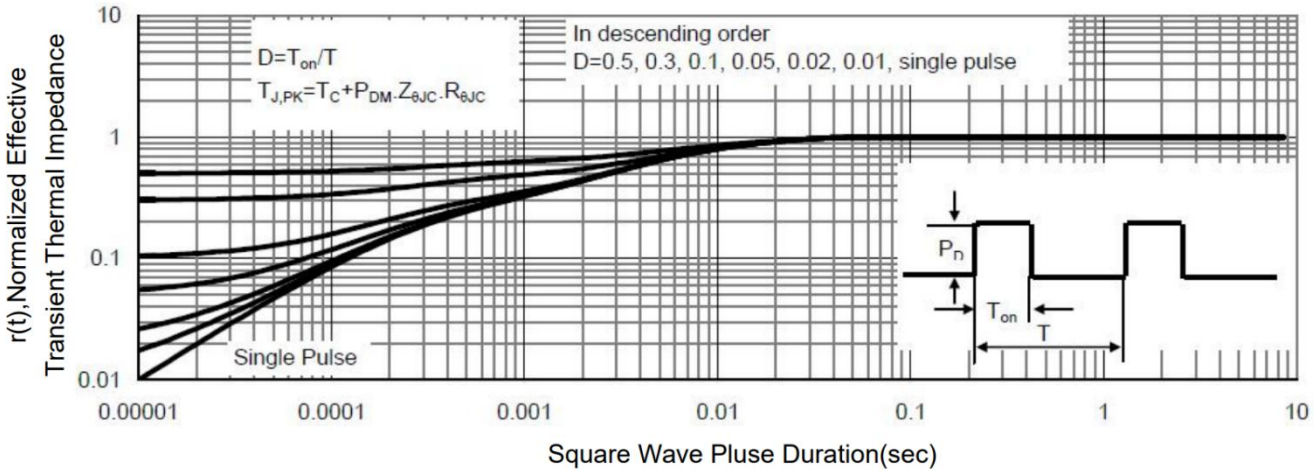
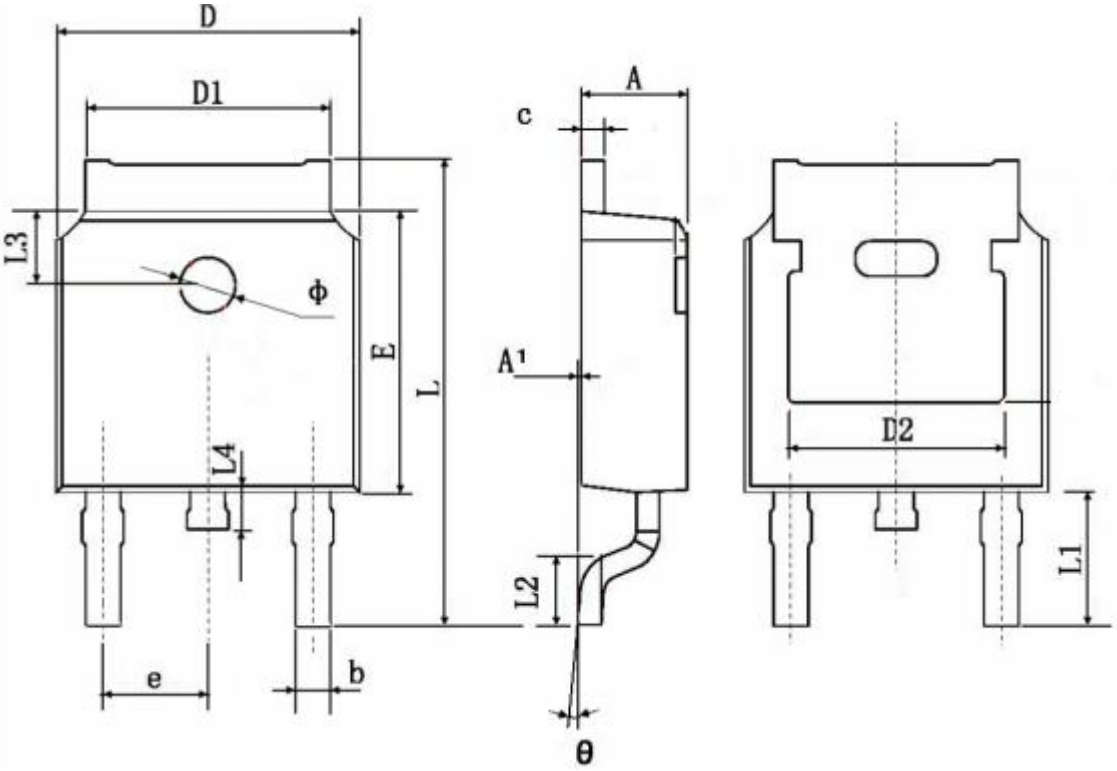


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-252AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.130	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.600	0.018	0.024
D	6.500	6.700	0.256	0.264
D1	5.100	5.500	0.201	0.217
D2	4.830 REF		0.190 REF	
E	6.000	6.200	0.236	0.244
e	2.190	2.390	0.086	0.094
L	9.800	10.500	0.386	0.413
L1	2.900 REF		0.114 REF	
L2	1.400	1.800	0.055	0.070
L3	1.800 REF		0.071 REF	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.400	0.043	0.055
θ	0°	8°	0°	8°