

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
40V	0.9mΩ@10V	300A
	1.4mΩ@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

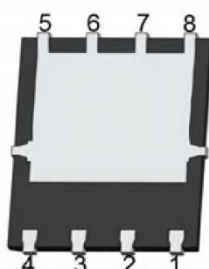
Application

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

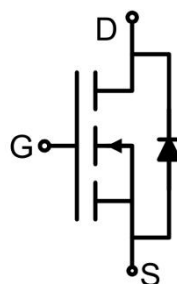
Package



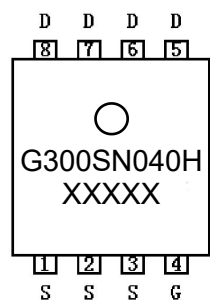
PDFN5*6-8L



Circuit diagram



Marking



Absolute maximum ratings ($T_A=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_C = 25^{\circ}\text{C}$)	I_D	300	A
Continuous Drain Current ($T_C = 100^{\circ}\text{C}$)	$I_D (100^{\circ}\text{C})$	212	A
Pulsed Drain Current ¹⁾	I_{DM}	1200	A
Power Dissipation ²⁾	P_D	136	W
Single Pulse Avalanche Energy ³⁾	E_{AS}	1250	mJ
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.1	$^{\circ}\text{C}/\text{W}$
Junction Temperature	T_J	175	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-55 ~ +175	$^{\circ}\text{C}$

Electrical characteristics ($T_J=25^{\circ}\text{C}$, 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 =1mA	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	1.5	2.5	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =50A		0.65	0.9	mΩ
		V _{GS} =10V, I _D =20A		0.65	0.9	
		V _{GS} =4.5V, I _D =20A		1	1.4	
Dynamic characteristics ⁴⁾						
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V, f =1MHz		6125		pF
Output Capacitance	C _{oss}			3250		
Reverse Transfer Capacitance	C _{rss}			150		
Total Gate Charge	Q _g	V _{DS} =20V, V _{GS} =10V, I _D =50A		101		nC
Gate-Source Charge	Q _{gs}			21		
Gate-Drain Charge	Q _{gd}			21		
Turn-on delay time	t _{d(on)}	V _{DD} =20V, V _{GS} =10V, I _D =50A R _{GEN} =3Ω		16		nS
Turn-on rise time	t _r			44		
Turn-off delay time	t _{d(off)}			71		
Turn-off fall time	t _f			45		
Source-Drain Diode characteristics						
Diode Forward Current	I _S				300	A
Diode Forward voltage	V _{SD}	V _{GS} =0V, I _S =50A			1.2	V
Reverse recover time	T _{rr}	I _F =50A, di/dt =100A/us		69		nS
Reverse recovery charge	Q _{rr}			94		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) $T_J=25^{\circ}\text{C}$, $V_G=10\text{V}$, $R_G=25\Omega$, $L=4\text{mH}$, $I_{AS}=25\text{A}$.
- 4) Guaranteed by design, not subject to production testing.

Typical Characteristics

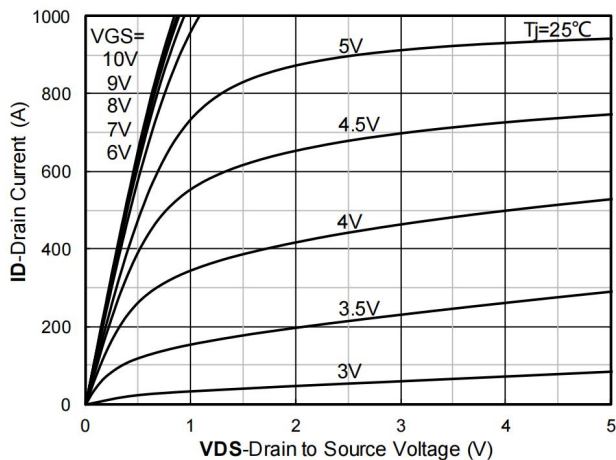


Figure 1. Output Characteristics

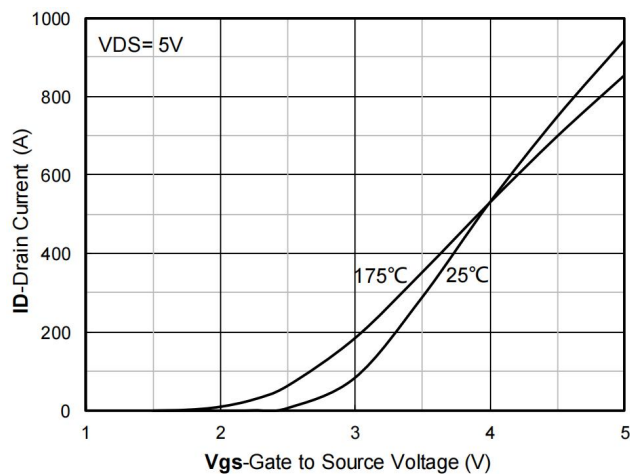


Figure 2. Transfer Characteristics

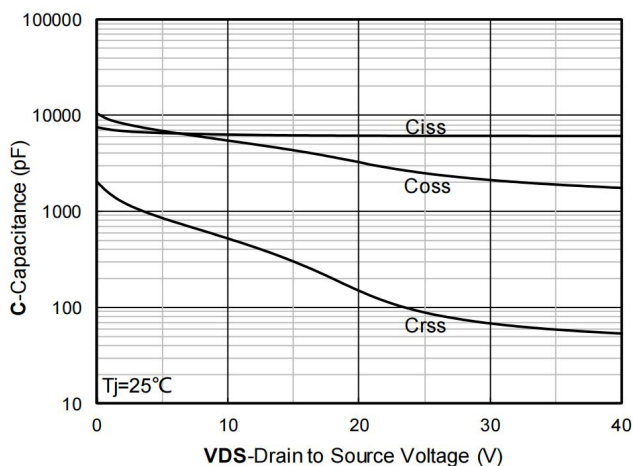


Figure 3. Capacitance Characteristics

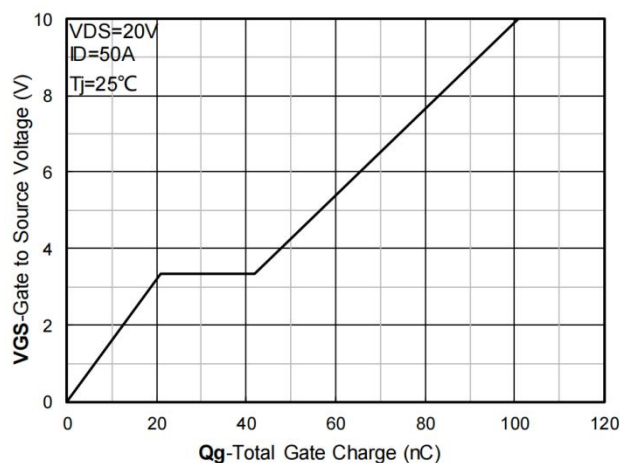


Figure 4. Gate Charge

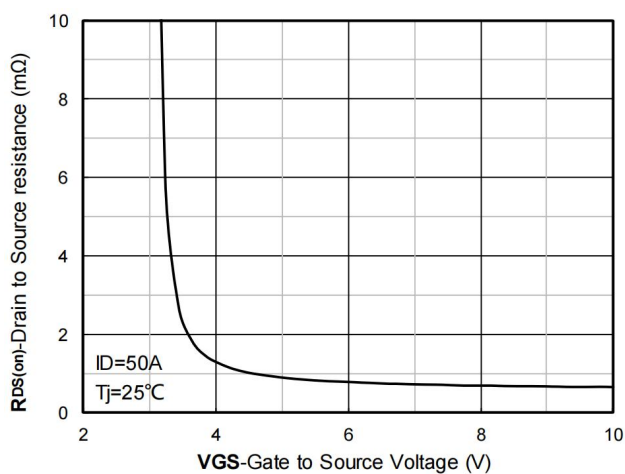


Figure 5. On-Resistance vs Gate to Source Voltage

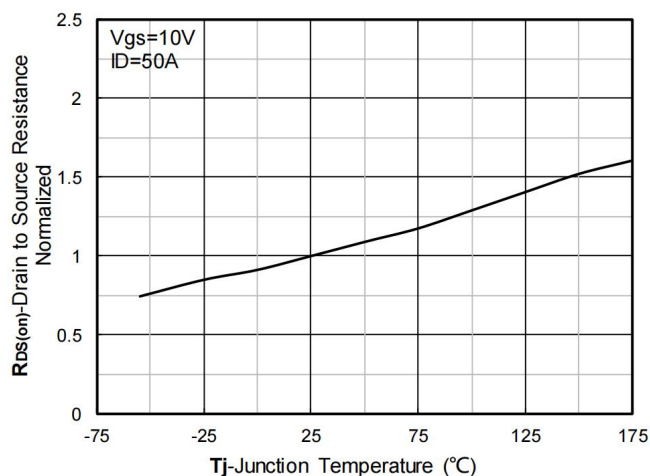


Figure 6. Normalized On-Resistance

Typical Characteristics

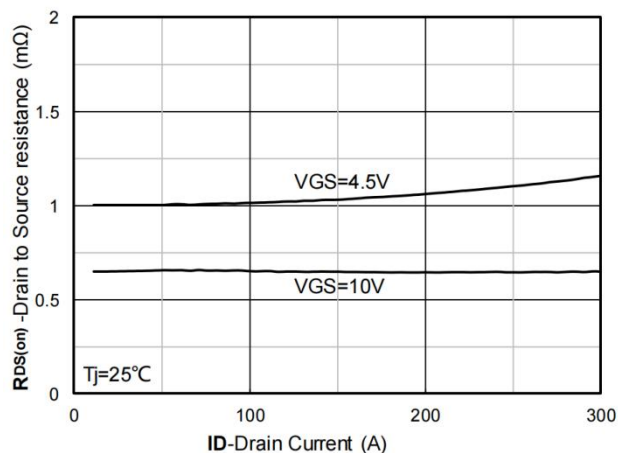


Figure 7. $R_{DS(on)}$ VS Drain Current

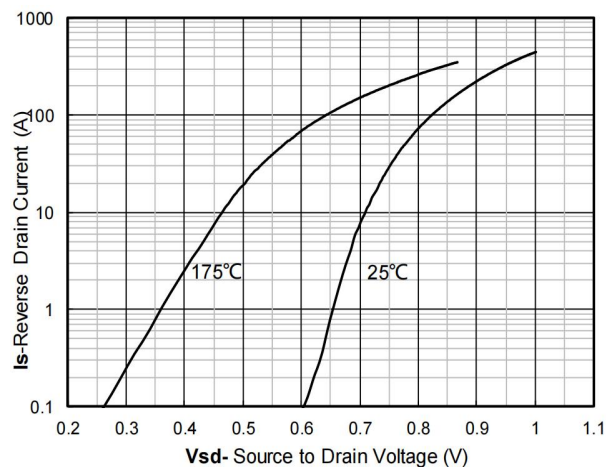


Figure 8. Forward characteristics of reverse diode

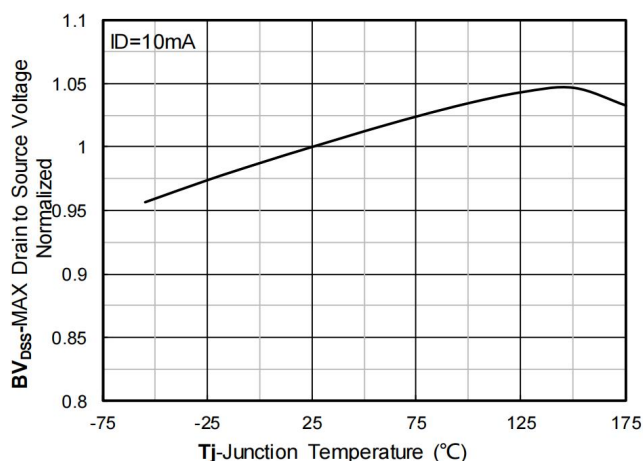


Figure 9. Normalized breakdown voltage

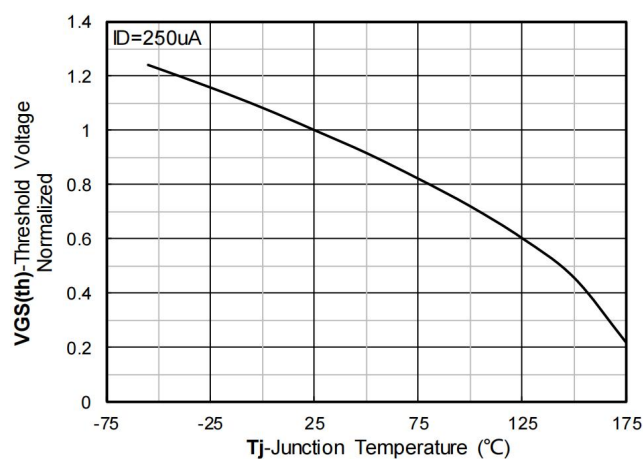


Figure 10. Normalized Threshold voltage

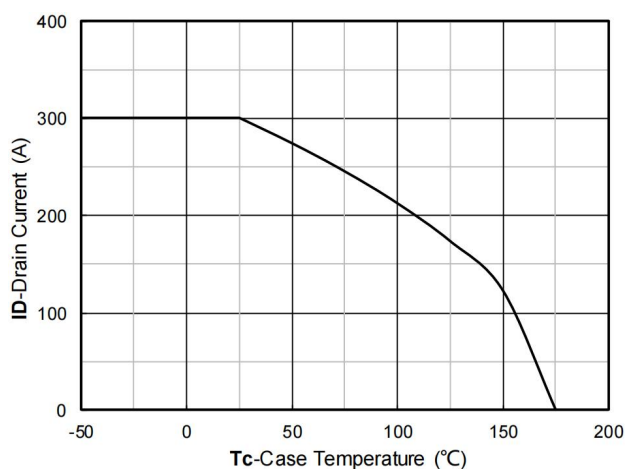


Figure 11. Current dissipation

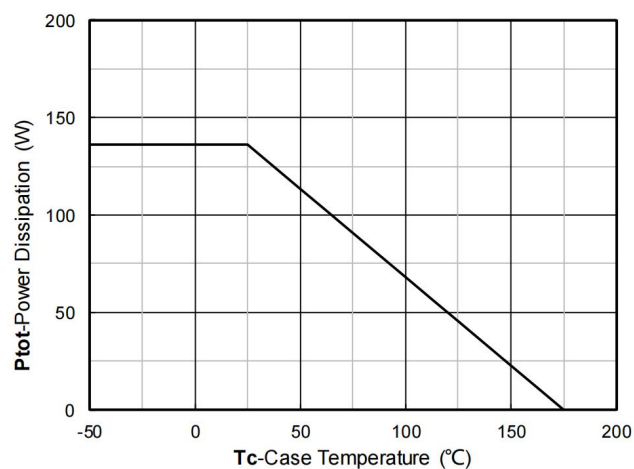


Figure 12. Power dissipation

Typical Characteristics

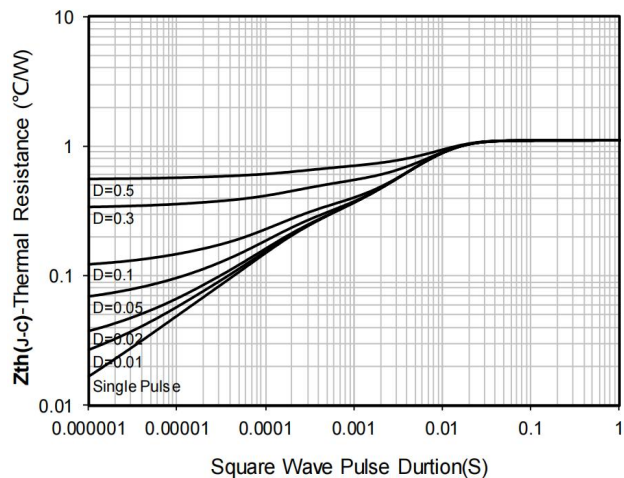


Figure 13. Maximum Transient Thermal Impedance

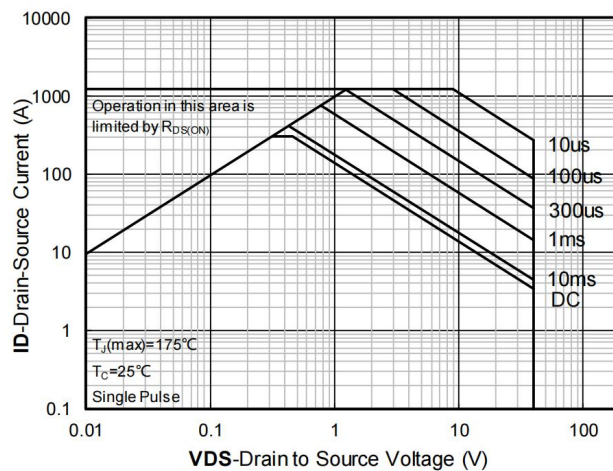
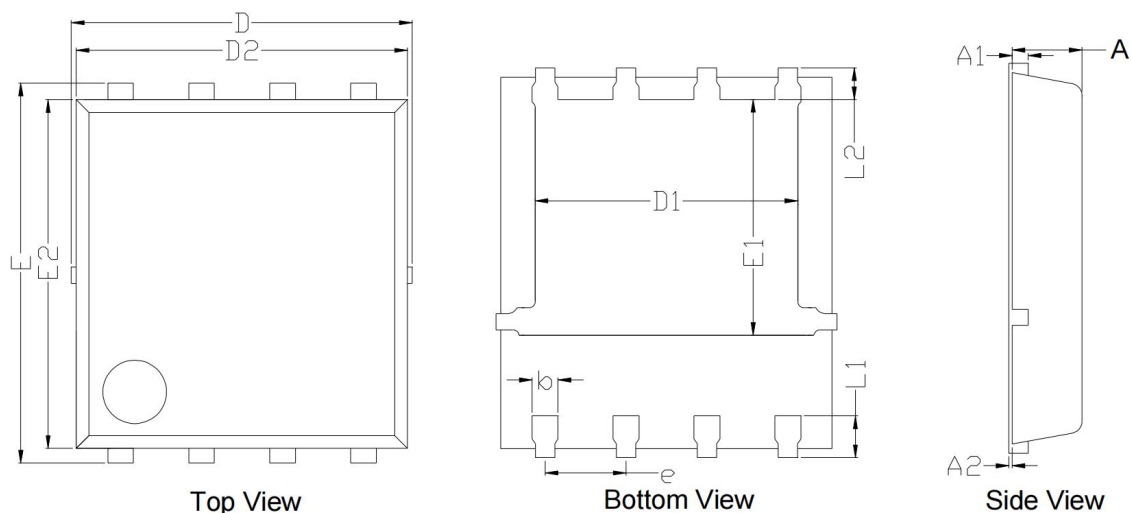


Figure 14. Safe Operation Area

PDFN5*6-8L Package Information



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.		0.027 BSC.	
b	0.300	0.500	0.012	0.020
e	1.270 BSC.		0.050 BSC.	