

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
40V	5mΩ@10V	83A

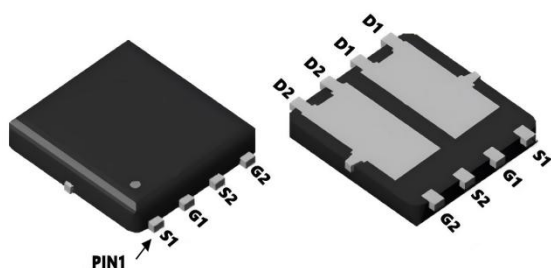
Feature

- Advanced shielded-gate technology
- Ultra-low on-resistance and gate-charge
- Suffix "-Q1" for AEC-Q101

Application

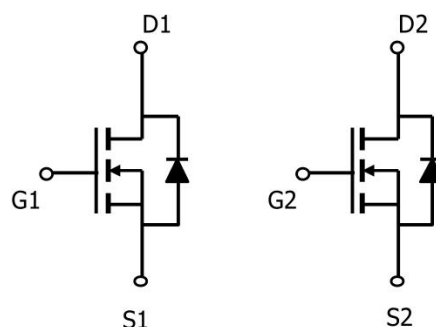
- DC-DC Converter
- Ideal for high-frequency switching and synchronous rectification

Package

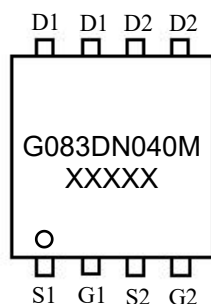


PDFN5*6-8L

Circuit diagram



Marking



Absolute maximum ratings (T_C=25°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	I _D	83	A
Continuous Drain Current (T _C =100°C)	I _D (100°C)	58	A
Pulsed Drain Current (tp =10μs)	I _{DM}	332	A
Single Pulse Avalanche Energy ¹⁾	E _{AS}	125	mJ
Power Dissipation	P _D	60	W
Thermal Resistance Junction to Case	R _{θJC}	2.5	°C/W
Operating Junction Temperature	T _J	-55 ~ +175	°C
Storage Temperature	T _{STG}	-55 ~ +175	°C

Electrical characteristics (T_A=25°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 =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 _{DS} =0V, V _{GS} =±20V			±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2	3	4	V
Drain-source on-resistance ²⁾	R _{DS(on)}	V _{GS} =10V, I _D =20A		4.2	5	mΩ
Dynamic characteristics ³⁾						
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V f =100kHz		1882		pF
Output Capacitance	C _{oss}			563		
Reverse Transfer Capacitance	C _{rss}			14		
Total Gate Charge	Q _g	V _{DS} =32V, V _{GS} =10V, I _D =20A		23.6		nC
Gate-Source Charge	Q _{gs}			8.3		
Gate-Drain Charge	Q _{gd}			4		
Turn-on delay time	t _{d(on)}	V _{DS} =30V, V _{GS} =15V, I _D =20A R _G =3.3Ω		12		nS
Turn-on rise time	t _r			47		
Turn-off delay time	t _{d(off)}			37		
Turn-off fall time	t _f			69		
Source-Drain Diode characteristics						
Diode Forward current	I _S				83	A
Diode Forward voltage ²⁾	V _{SD}	V _{GS} =0V, I _S =20A			1.2	V
Reverse Recovery Time	T _{rr}	V _{GS} =0V, I _S =20A		66		nS
Reverse Recovery Charge	Q _{rr}	di/dt =100A/μs		72		nC

Notes:

- 1) The EAS data shows Max. rating. The test condition is V_{DD} = 20V, V_{GS} = 10V, L = 0.5mH.
- 2) The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%.
- 3) Guaranteed by design, not subject to production.

Typical Characteristics

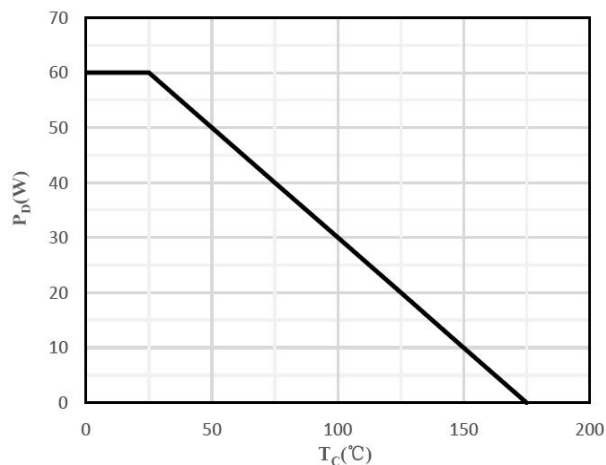


Fig 1 Power Dissipation

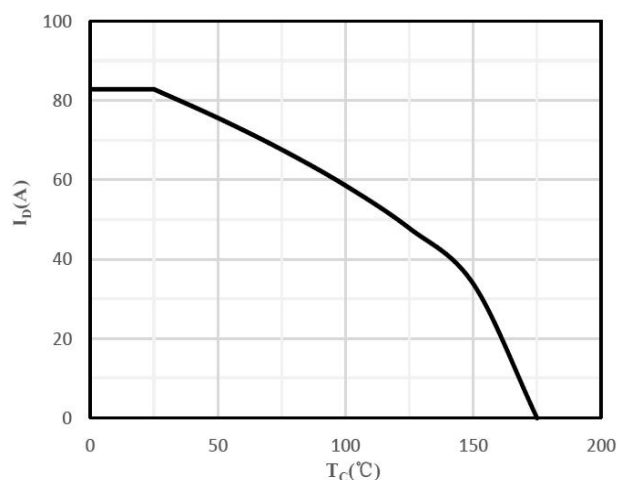


Fig 2 Drain Current

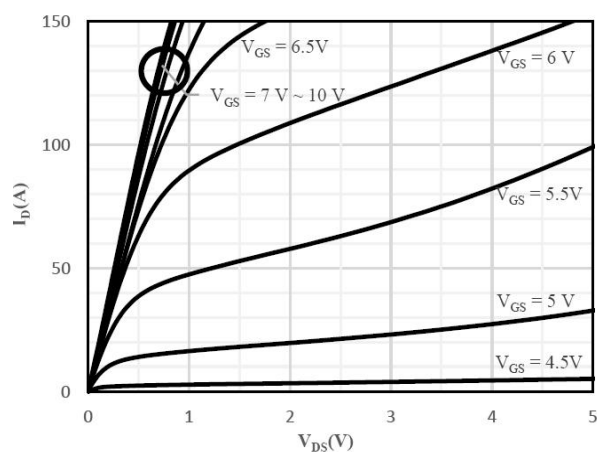


Fig 3 Typical Output Characteristics

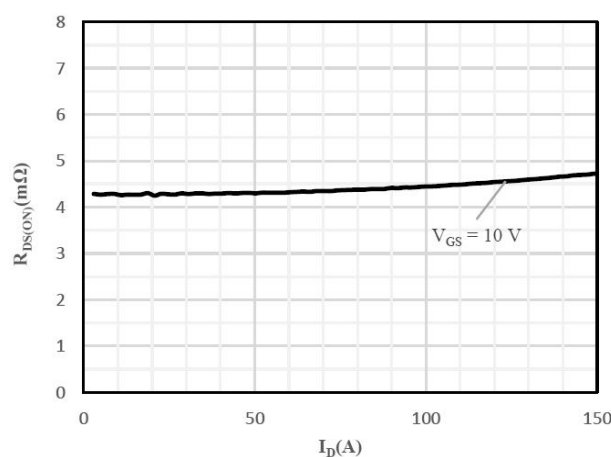


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

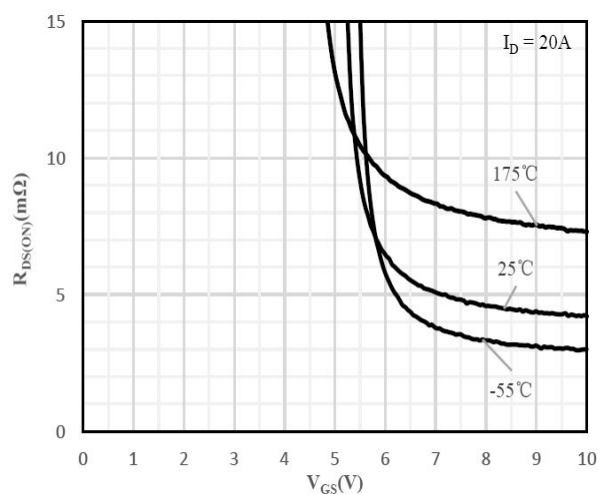


Fig 5 On-Resistance vs. Gate-Source Voltage

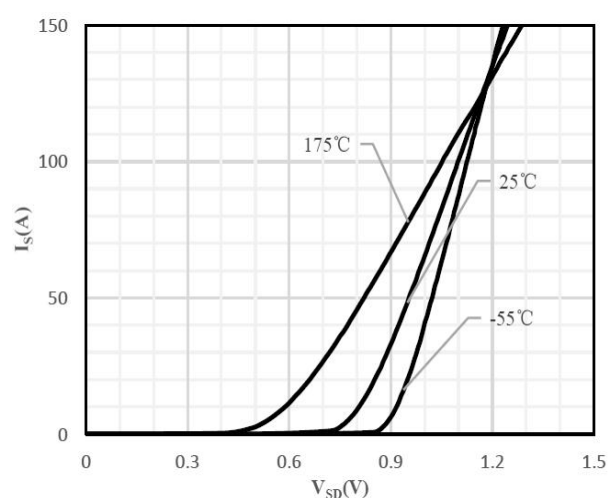


Fig 6 Body-Diode Characteristics

Typical Characteristics

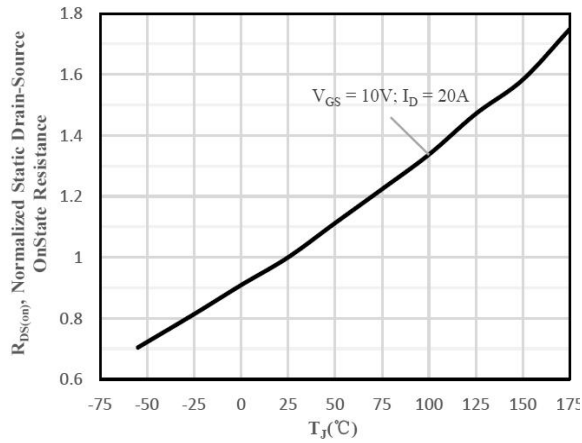


Fig 7 Normalized On-Resistance vs. Junction Temperature

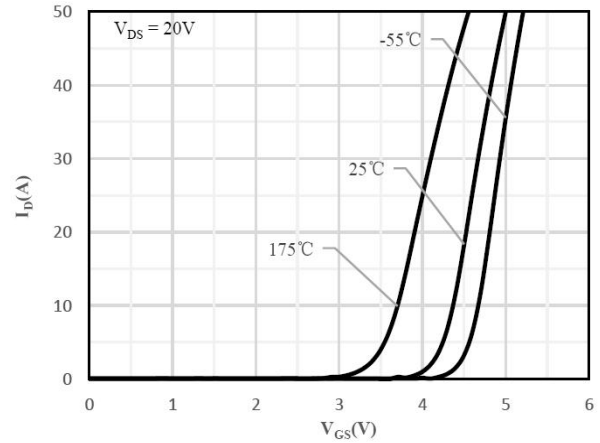


Fig 8 Transfer Characteristics

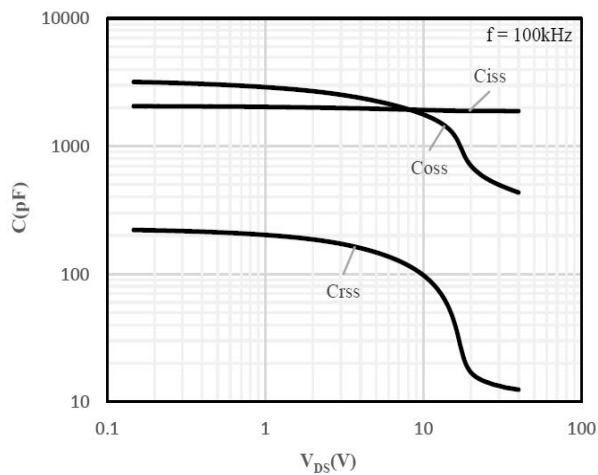


Fig 9 Capacitance Characteristics

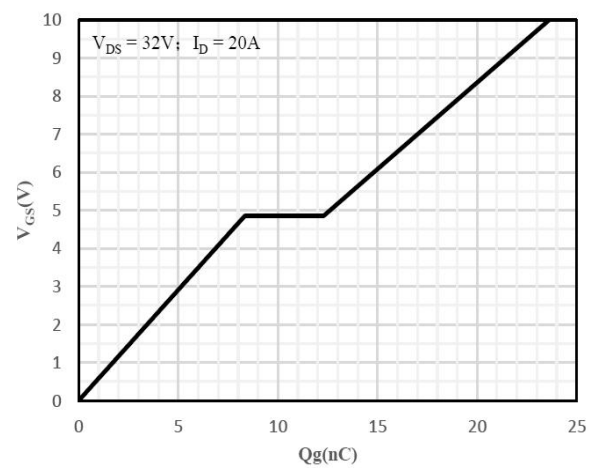


Fig 10 Gate-Charge Characteristics

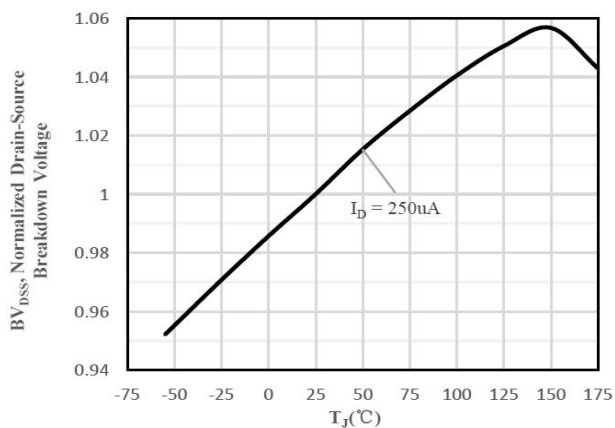


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

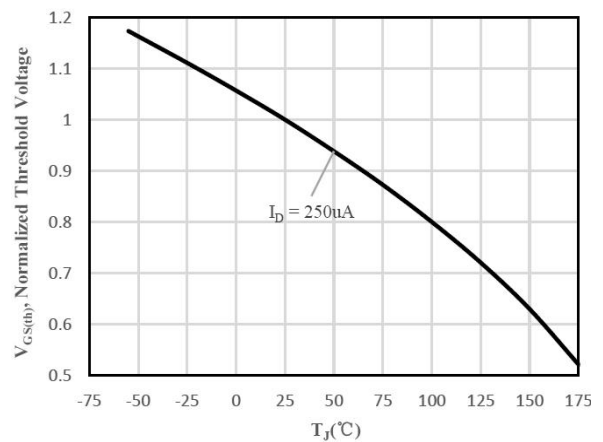


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

Typical Characteristics

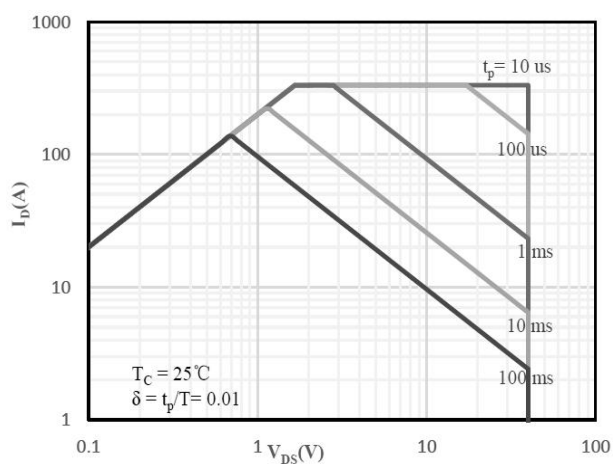


Fig 13 Safe Operation Area

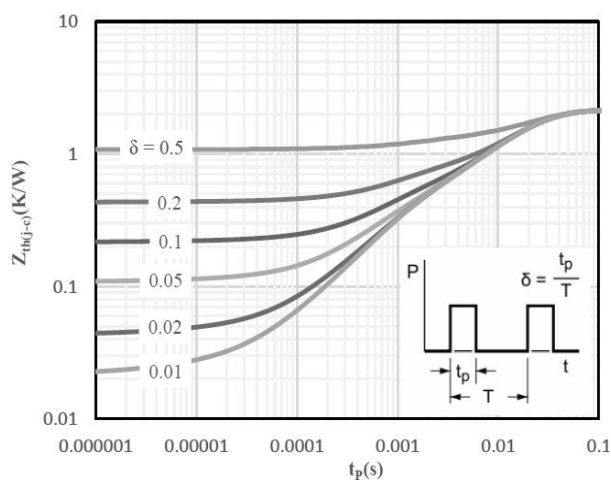
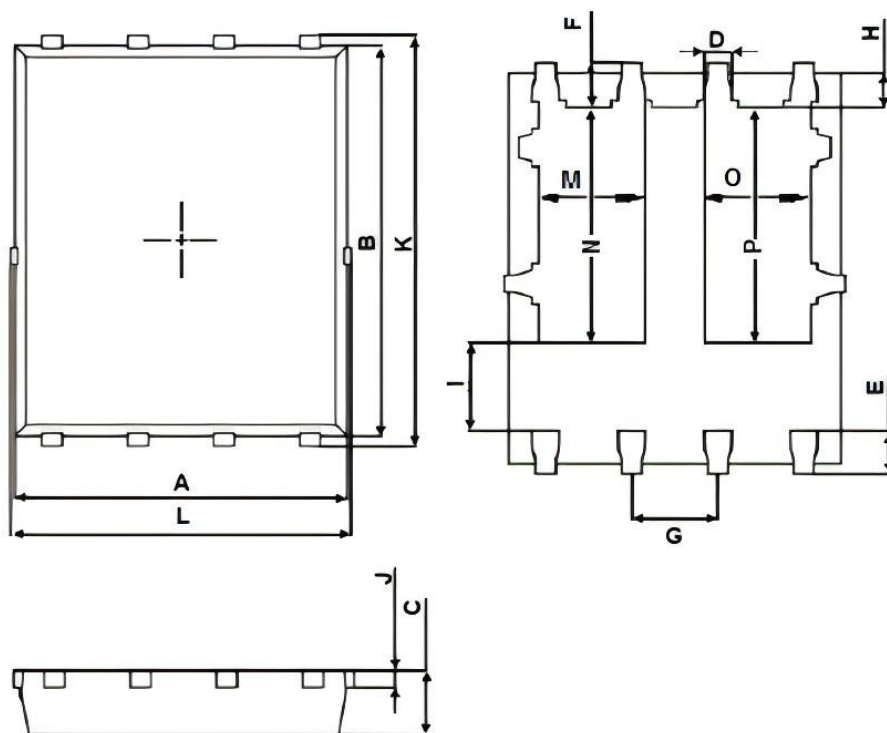


Fig 14 Maximum transient thermal impedance

PDFN5*6-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.824	4.976	0.190	0.196
B	5.674	5.826	0.223	0.229
C	0.900	1.000	0.035	0.039
D	0.350	0.450	0.014	0.018
E	0.559	0.711	0.022	0.028
F	0.574	0.726	0.023	0.029
G	1.250	1.290	0.049	0.051
H	0.424	0.576	0.017	0.023
I	1.190	1.390	0.047	0.055
J	0.154	0.354	0.006	0.014
K	5.974	6.126	0.235	0.241
L	4.944	5.096	0.195	0.201
M/O	1.595	1.795	0.063	0.071
N/P	3.375	3.575	0.133	0.141