

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
-40V	4.0mΩ@-10V	-130A
	6.5mΩ@-4.5V	

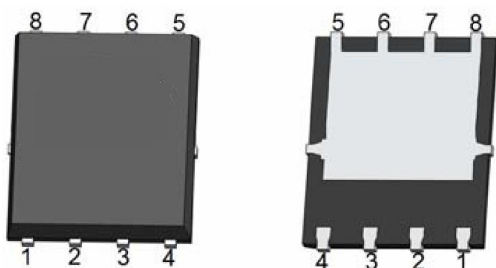
Feature

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

Application

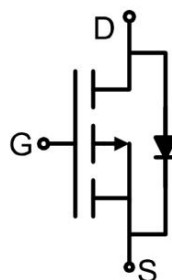
- DC/DC converter
- Ideal for high-frequency switching and synchronous rectification

Package

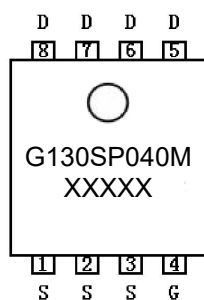


PDFN5*6-8L

Circuit diagram



Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	-130	A
Continuous Drain Current ($T_c=100^\circ\text{C}$)	$I_D (100^\circ\text{C})$	-91	A
Pulsed Drain Current	I_{DM}	-520	A
Single Pulse Avalanche Energy ¹⁾	E_{AS}	1155	mJ
Power Dissipation ($T_c=25^\circ\text{C}$)	P_D	120	W
Thermal Resistance Junction to Case	$R_{\theta JC}$	1.04	$^\circ\text{C/W}$
Operating Junction Temperature	T_J	-55 ~ +150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 ~ +150	$^\circ\text{C}$

Electrical characteristics ($T_c=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-40			V
Zero gate voltage drain current	I_{DSS}	$V_{DS}=-40V, V_{GS}=0V$			-1	μA
Gate-body leakage current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.6	-2.5	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-20A$		3.2	4.0	m Ω
		$V_{GS}=-4.5V, I_D=-20A$		4.8	6.5	
Dynamic characteristics ²⁾						
Input Capacitance	C_{iss}	$V_{DS}=-20V, V_{GS}=0V, f=1MHz$		6100		pF
Output Capacitance	C_{oss}			1500		
Reverse Transfer Capacitance	C_{rss}			95		
Total Gate Charge	Q_g	$V_{DS}=-20V, V_{GS}=-10V$ $I_D=-20A$		86		nC
Gate-Source Charge	Q_{gs}			17.5		
Gate-Drain Charge	Q_{gd}			10.5		
Turn-on delay time	$t_{d(on)}$	$V_{DS}=-20V, V_{GS}=-10V$ $I_D=-20A, R_G=1.6\Omega$		13		nS
Turn-on rise time	t_r			30		
Turn-off delay time	$t_{d(off)}$			75		
Turn-off fall time	t_f			14		
Source-Drain Diode characteristics						
Diode Forward Current	I_S				-130	A
Diode Forward voltage	V_{SD}	$V_{GS}=0V, I_S=-20A$			-1.2	V
Reverse Recovery Time	T_{rr}	$I_F=-65A, di/dt=100A/\mu s$ $T_J=25^{\circ}C$		55		nS
Reverse Recovery Charge	Q_{rr}			75		nC

Notes:

1) EAS condition : $T_J=25^\circ\text{C}, V_{DD}=-20V, V_G=-10V, L=0.5mH, R_g=25\Omega$.

2) Guaranteed by design, not subject to production.

Typical Characteristics

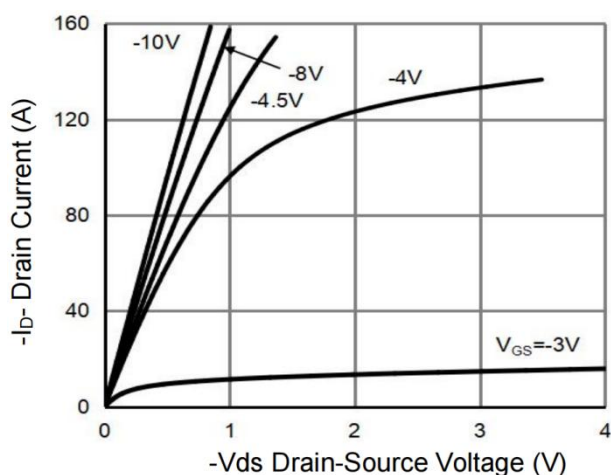


Figure 1 Output Characteristics

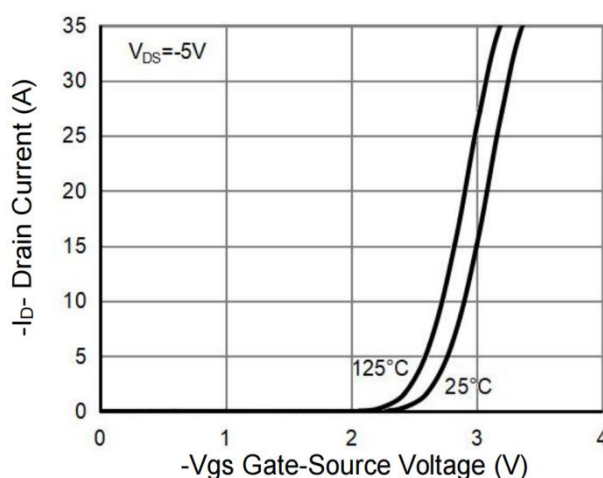


Figure 2 Transfer Characteristics

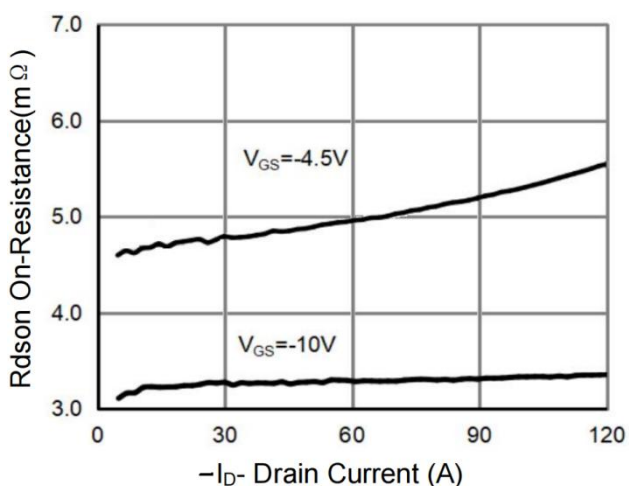


Figure 3 Rdson- Drain Current

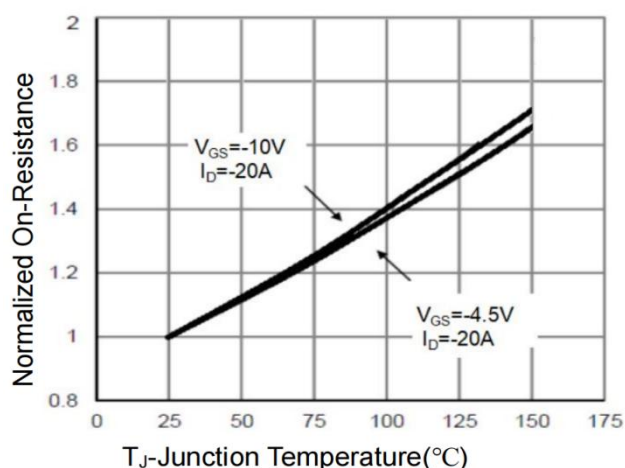


Figure 4 Rdson-Junction Temperature

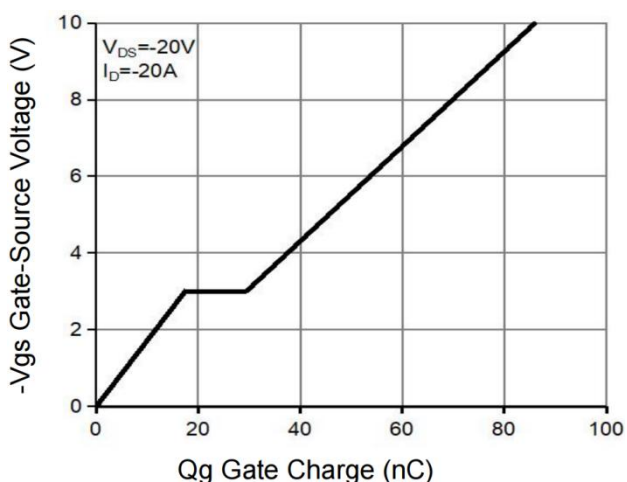


Figure 5 Gate Charge

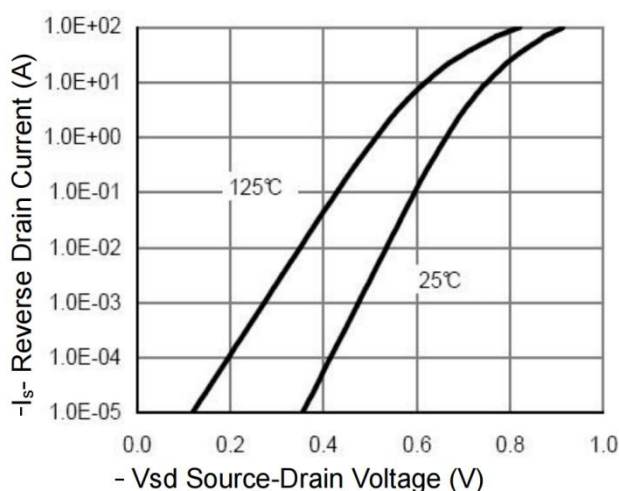


Figure 6 Source- Drain Diode Forward

Typical Characteristics

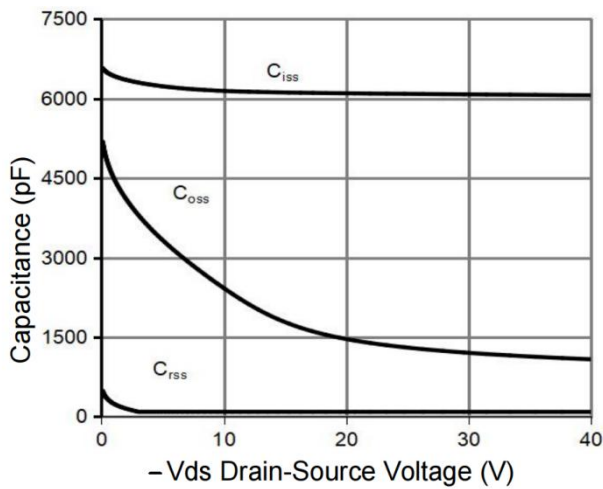


Figure 7 Capacitance vs Vds

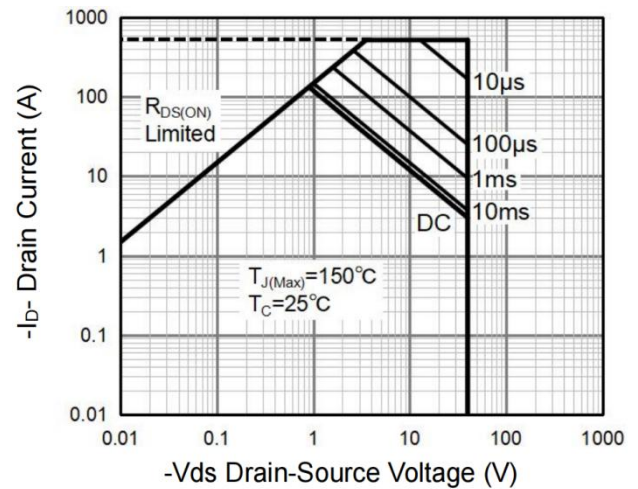


Figure 8 Safe Operation Area (Note3)

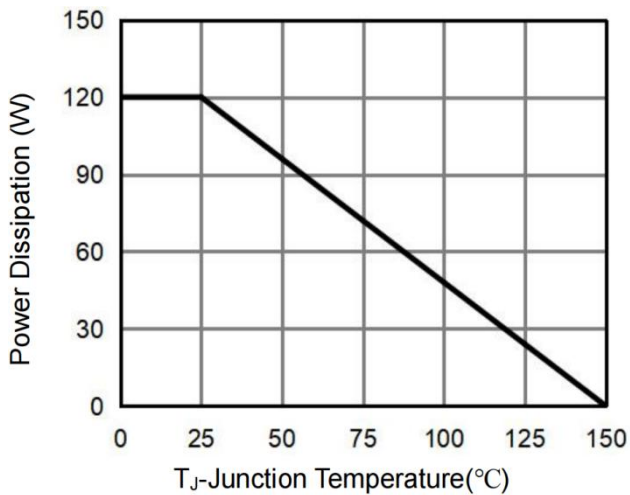


Figure 9 Power De-rating

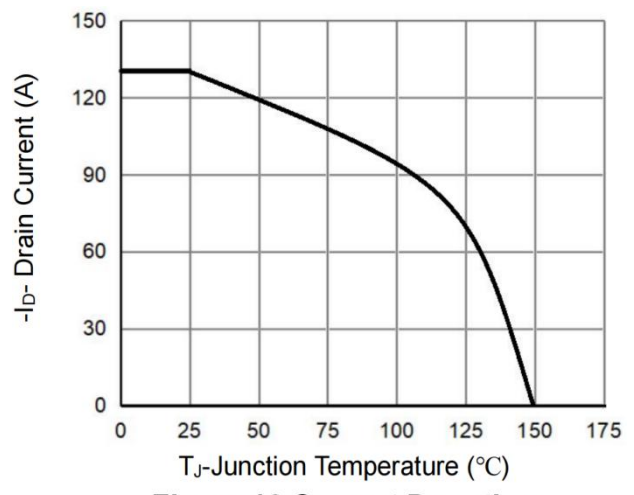


Figure 10 Current De-rating

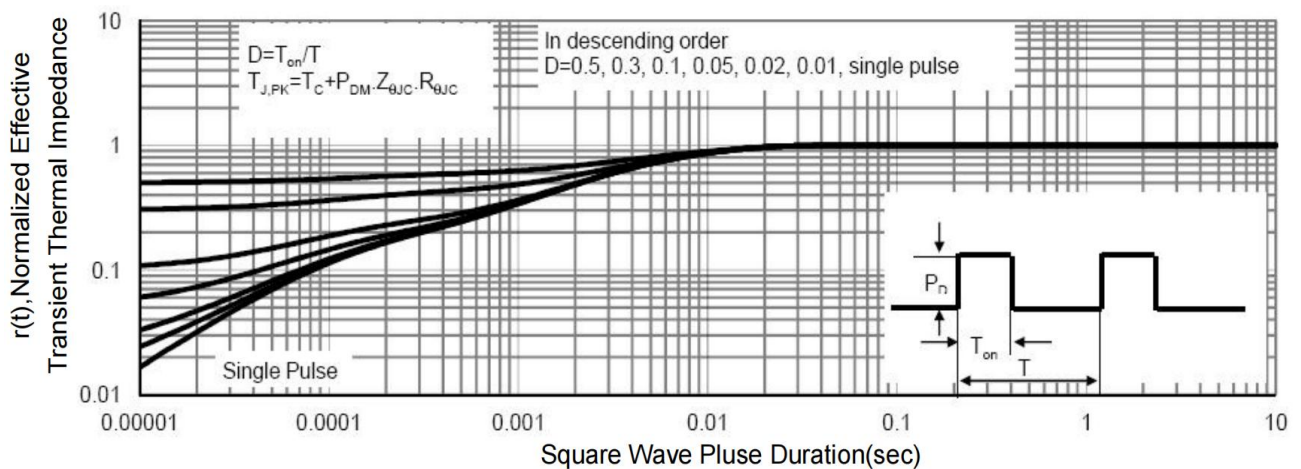
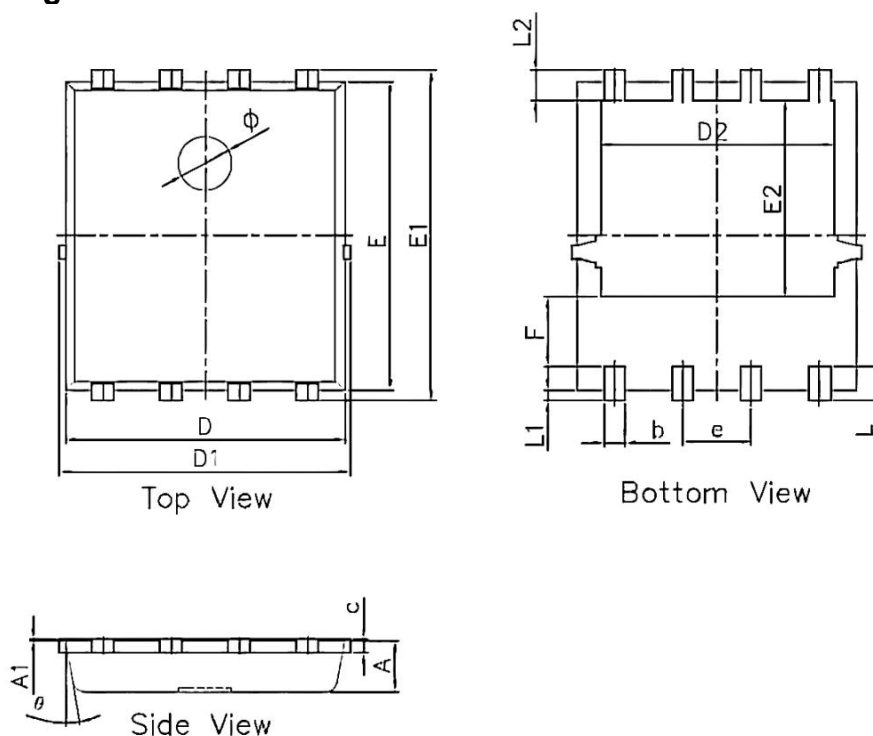


Figure 11 Normalized Maximum Transient Thermal Impedance

PDFN5*6-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A1	0.000	0.005	0.000	0.000
b	0.350	0.500	0.014	0.020
c	0.200	0.300	0.008	0.012
D	5.100	5.300	0.201	0.209
D1	5.100	5.500	0.201	0.217
D2	4.250	4.450	0.167	0.175
e	1.270 BSC.		0.050 BSC.	
E	5.700	5.800	0.224	0.228
E1	6.000	6.300	0.236	0.248
E2	3.570	3.770	0.141	0.148
F	1.180	1.380	0.046	0.054
L	0.550	0.750	0.022	0.030
L1	0.150	0.250	0.006	0.010
L2	0.450	0.650	0.018	0.026
φ	0.900	1.100	0.035	0.043
θ	8°	12°	8°	12°