

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
40V	5.2mΩ@10V	90A
	9.2mΩ@4.5V	

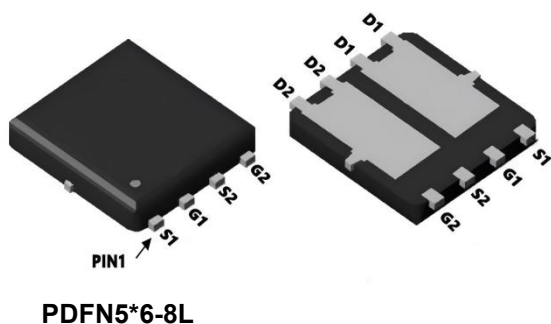
Feature

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

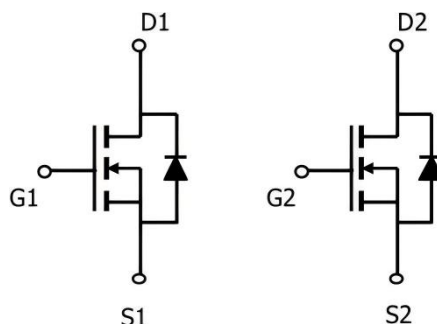
Application

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

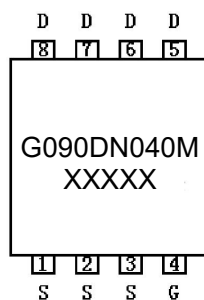
Package



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 ^{1,3)} ($V_{GS}=10\text{V}$, Chip limitation)	I_D	90	A
Continuous Drain Current ^{1,3)} ($V_{GS}=10\text{V}$, $T_c=100^\circ\text{C}$)	$I_D(100^\circ\text{C})$	63	A
Pulsed Drain Current ¹⁾ ($t_p \leq 10\mu\text{s}$)	I_{DM}	360	A
Single Pulse Avalanche Energy ²⁾	E_{AS}	56.25	mJ
Power Dissipation ^{1,3)}	P_D	75	W
Thermal Resistance Junction to Case	$R_{\theta JC}$	2	$^\circ\text{C}/\text{W}$
Operating Junction Temperature	T_J	$-55 \sim +175$	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	$-55 \sim +175$	$^\circ\text{C}$

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} =32V, 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	1.2	1.8	2.5	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A		4	5.2	mΩ
		V _{GS} =4.5V, I _D =15A		6.5	9.2	
Dynamic characteristics ⁴⁾						
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V, f =1MHz		970		pF
Output Capacitance	C _{oss}			560		
Reverse Transfer Capacitance	C _{rss}			22		
Total Gate Charge	Q _g	V _{DS} =20V, V _{GS} =10V, I _D =20A		16.3		nC
Gate-Source Charge	Q _{gs}			3.5		
Gate-Drain Charge	Q _{gd}			3.6		
Turn-on delay time	t _{d(on)}	V _{DS} =20V, V _{GS} =10V, I _D =20A R _L =1Ω, R _G =3Ω		8.5		nS
Turn-on rise time	t _r			4.6		
Turn-off delay time	t _{d(off)}			19.6		
Turn-off fall time	t _f			5.3		
Source-Drain Diode characteristics						
Diode Forward Current	I _S				60	A
Diode Forward voltage	V _{SD}	V _{GS} =0V, I _S =20A			1.2	V
Reverse Recovery Time	T _{rr}	V _{GS} =0V, V _R =20V, I _F =20A		21		nS
Reverse Recovery Charge	Q _{rr}	di/dt =100A/μs		11		nC

Notes:

- 1) The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
- 2) $T_J=25^\circ\text{C}$, $V_G=10\text{V}$, $R_G=25\Omega$, $L=0.5\text{mH}$, $I_{AS}=15\text{A}$.
- 3) Thermal resistance from junction to soldering point (on the exposed drain pad).
- 4) Guaranteed by design, not subject to production.

Typical Characteristics

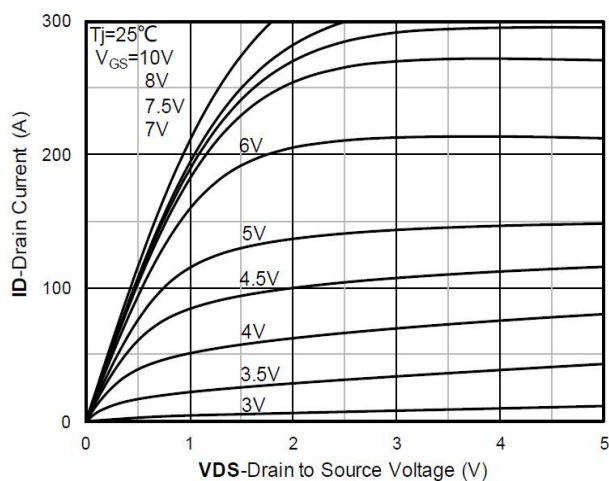


Figure 1. Output Characteristics; typical values

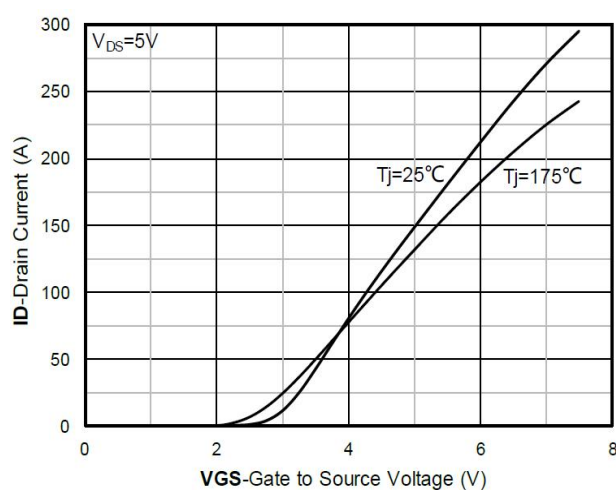


Figure 2. Transfer Characteristics; typical values

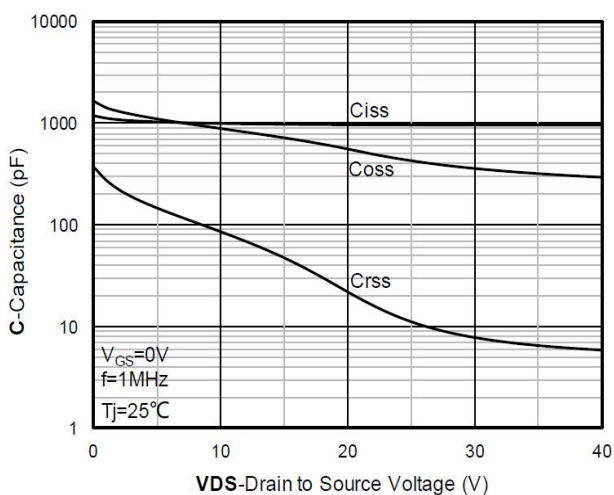


Figure 3. Capacitance Characteristics; typical values

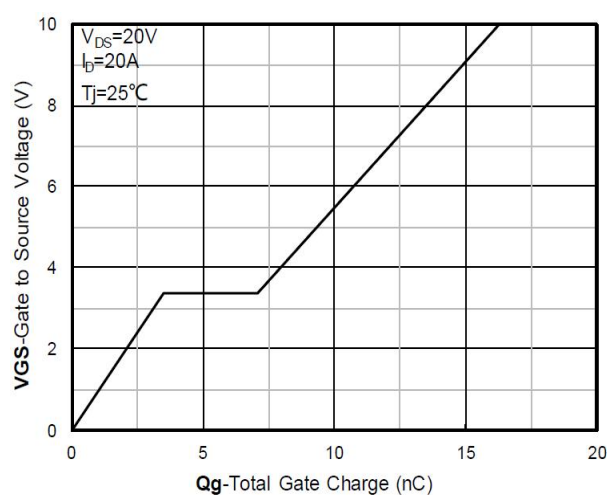


Figure 4. Gate Charge; typical values

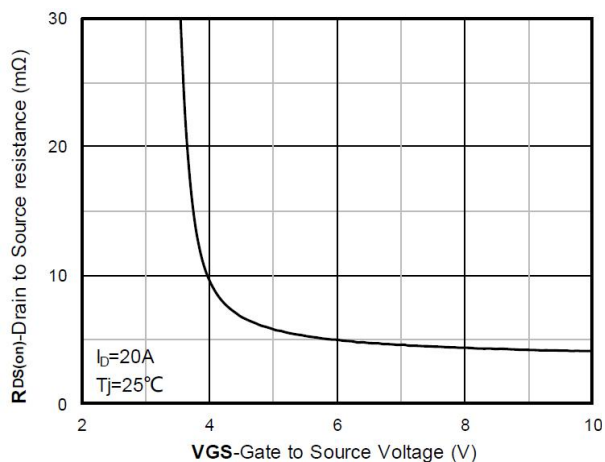


Figure 5. On-Resistance vs. Gate to Source Voltage; typical values

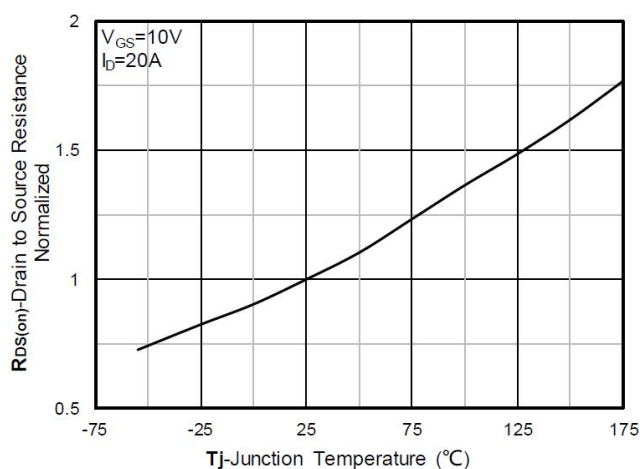


Figure 6. Normalized On-Resistance

Typical Characteristics

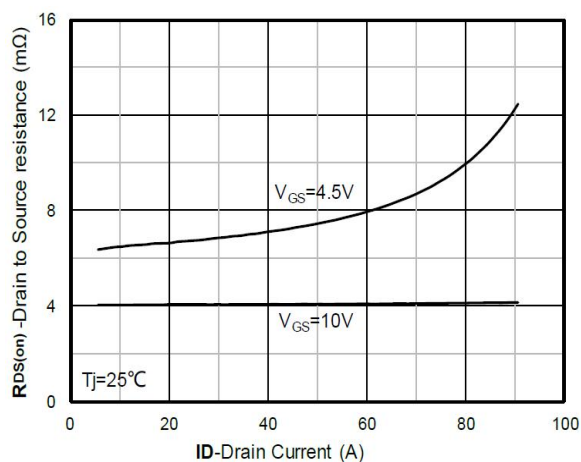


Figure 7. $R_{DS(on)}$ vs. Drain Current; typical values

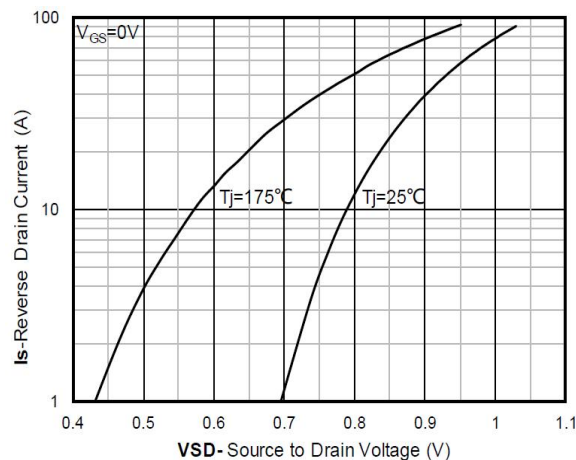


Figure 8. Forward characteristics of reverse diode; typical values

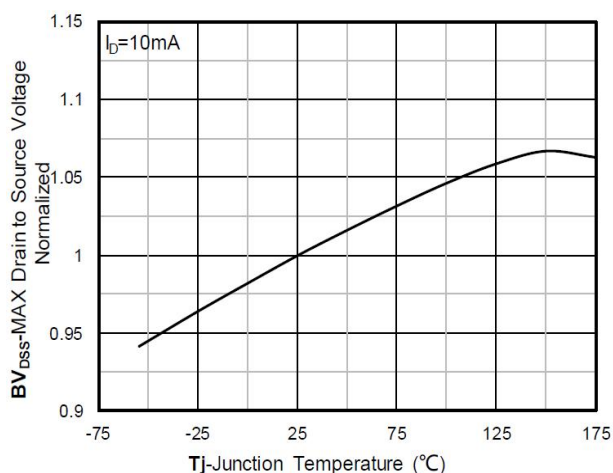


Figure 9. Normalized breakdown voltage

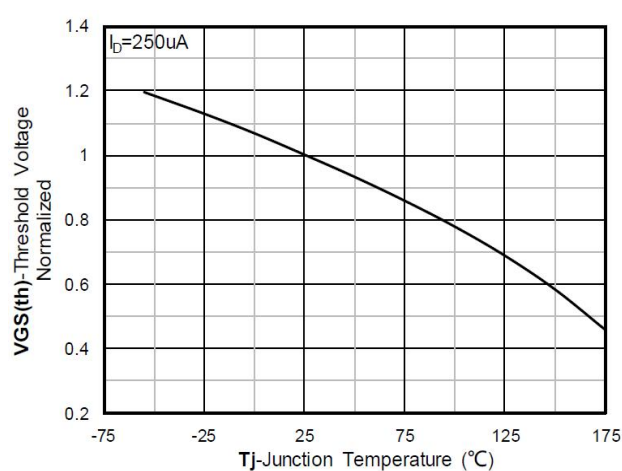


Figure 10. Normalized Threshold voltage

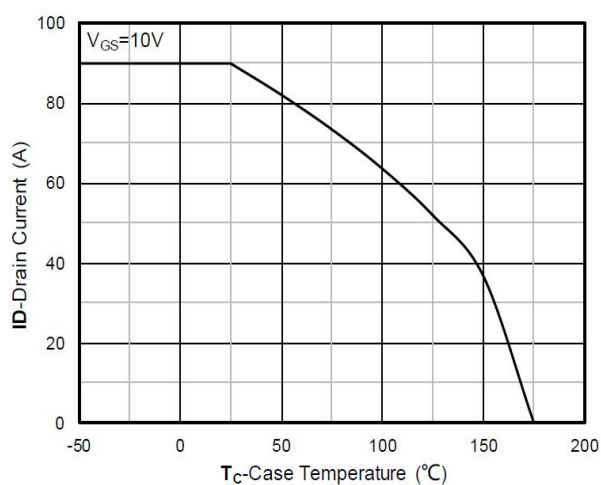


Figure 11. Current dissipation

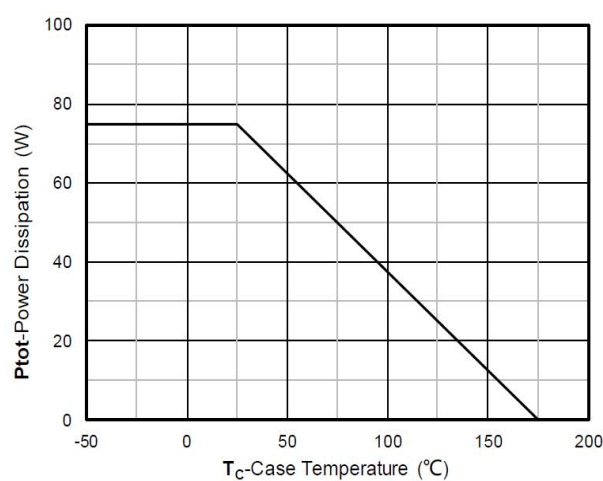


Figure 12. Power dissipation

Typical Characteristics

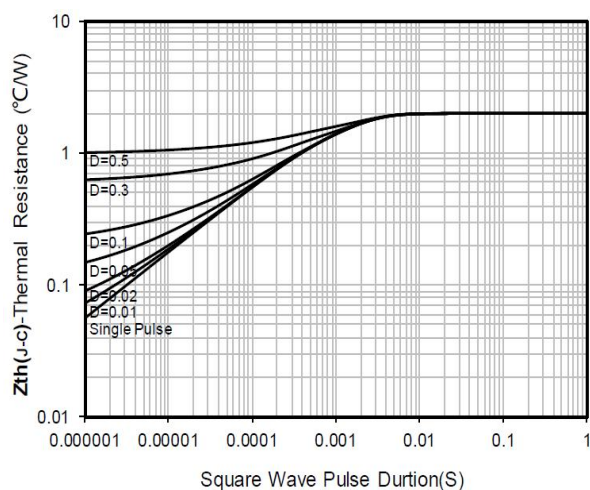


Figure 13. Maximum Transient Thermal Impedance

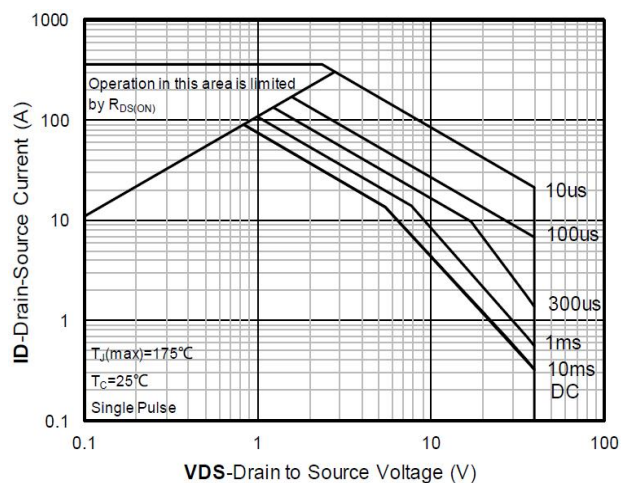
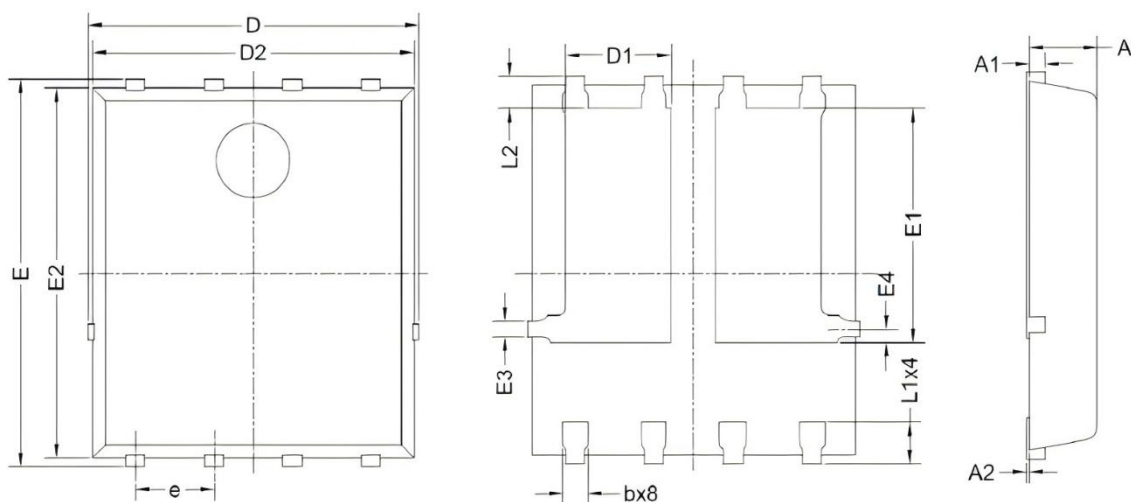


Figure 14. Safe Operation Area

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	6.350	0.234	0.250
A	1.000	1.200	0.039	0.047
A1	0.254 BSC.		0.010 BSC.	
A2	0.000	0.100	0.000	0.004
D1	1.500	1.900	0.059	0.075
E1	3.520	3.920	0.139	0.154
D2	5.000	5.400	0.197	0.213
E2	5.660	6.060	0.223	0.239
E3	0.254 REF.		0.010 REF.	
E4	0.210 REF.		0.008 REF.	
L1	0.560	0.760	0.022	0.030
L2	0.500 BSC.		0.020 BSC.	
b	0.310	0.510	0.012	0.020
e	1.270 BSC.		0.050 BSC.	