

100V N-Channel Enhancement Mode MOSFET

Voltage	100 V	R_{DS(ON)}	4.2 mΩ
Current	109 A	Q_G (TYP)	58 nC

Feature

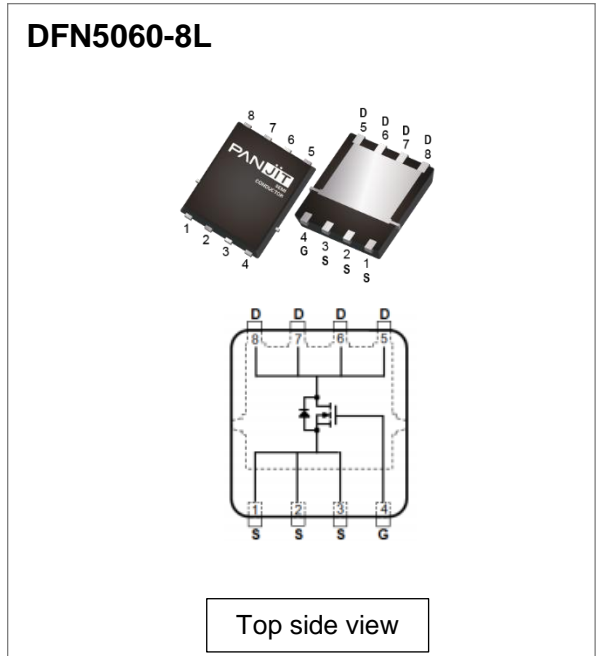
- R_{DS(ON)} < 4.2 mΩ at V_{GS} = 10 V, I_D = 50 A
- R_{DS(ON)} < 6.0 mΩ at V_{GS} = 4.5 V, I_D = 25 A
- High switching speed
- Low reverse transfer capacitance
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard
- 100% UIS / Rg test in mass production

Mechanical Data

- Case: DFN5060-8L Package
- Terminals: Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 94 mg

Application

- PD Charger / Adapter / Home Appliance / DC-DC converter.



Absolute Maximum Ratings (T_A = 25 °C unless otherwise specified)

PARAMETER		SYMBOL	LIMIT	UNITS
Drain-Source Voltage		V _{DS}	100	V
Gate-Source Voltage		V _{GS}	±20	
Continuous Drain Current (Note 3)	T _C =25 °C	I _D	109	A
	T _C =100 °C		77	
Pulsed Drain Current	T _C =25 °C	I _{DM}	448	A
Single Pulse Avalanche Current (Note 5)		I _{AS}	35	A
Single Pulse Avalanche Energy (Note 5)		E _{AS}	192	mJ
Power Dissipation	T _C =25 °C	P _D	115	W
	T _C =100 °C		57	
Operating Junction and Storage Temperature Range		T _J , T _{STG}	-55~175	°C

Thermal Characteristics

PARAMETER	SYMBOL	VALUES			UNITS	
		MIN.	TYP.	MAX.		
Thermal Resistance	Junction-to-Case (Bottom)	R _{θJC}	-	0.9	1.3	°C/W
	Junction-to-Ambient (Note 4)	R _{θJA}	-	-	50	°C/W

Electrical Characteristics ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0\text{ V}, I_D=250\text{ }\mu\text{A}$	100	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=270\text{ }\mu\text{A}$	1.1	1.7	2.3	
Drain-Source On-State Resistance (Note 1)	$R_{DS(on)}$	$V_{GS}=10\text{ V}, I_D=50\text{ A}$	-	3.6	4.2	m Ω
		$V_{GS}=4.5\text{ V}, I_D=25\text{ A}$	-	4.6	6.0	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=100\text{ V}, V_{GS}=0\text{ V}$	-	-	1	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20\text{ V}, V_{DS}=0\text{ V}$	-	-	± 100	nA
Transfer characteristics (Note 1)	g_{fs}	$V_{DS}=10\text{ V}, I_D=50\text{ A}$	-	123	-	S
Dynamic Characteristics (Note 6)						
Total Gate Charge	Q_g	$V_{DS}=50\text{ V}, I_D=50\text{ A}, V_{GS}=4.5\text{ V}$	-	27	-	nC
			-	58	76	
Gate-Source Charge	Q_{gs}	$V_{DS}=50\text{ V}, I_D=50\text{ A}, V_{GS}=10\text{ V}$	-	12.2	-	nC
Gate-Drain Charge	Q_{gd}		-	7.2	-	
Gate Plateau Voltage	$V_{plateau}$		-	3.0	-	
Input Capacitance	C_{iss}	$V_{DS}=50\text{ V}, V_{GS}=0\text{ V}, f=250\text{ kHz}$	-	3800	4940	pF
Output Capacitance	C_{oss}		-	1050	1365	
Reverse Transfer Capacitance	C_{riss}		-	16	-	
Output Charge	Q_{oss}	$V_{DS}=50\text{ V}, V_{GS}=0\text{ V}$	-	75	98	nC
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=50\text{ V}, I_D=50\text{ A}, V_{GS}=10\text{ V}, R_G=3.0\text{ }\Omega$ (Note 2)	-	9.6	-	ns
Rise Time	t_r		-	6.2	-	
Turn-Off Delay Time	$t_{d(off)}$		-	31	-	
Fall Time	t_f		-	4.8	-	
Gate Resistance	R_g	$f=1.0\text{ MHz}$	-	0.4	0.8	Ω
Drain-Source Diode						
Diode Forward Voltage	V_{SD}	$I_S=50\text{ A}, V_{GS}=0\text{ V}$	-	0.9	1.2	V
Reverse Recovery Charge	Q_{rr}	$I_F=50\text{ A}, V_{DD}=50\text{ V}, di/dt=100\text{ A}/\mu\text{s}$	-	70	-	nC
Reverse Recovery Time	T_{rr}		-	61	-	ns

NOTES :

1. Pulse width $\leq 300\text{ }\mu\text{s}$, Duty cycle $\leq 2\%$
2. Essentially independent of operating temperature typical characteristics.
3. The maximum drain current calculated by maximum junction temperature and thermal impedance. It can be varied by application and environment.
4. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. Mounted on a 1 inch² with 2oz square pad of copper.
5. E_{AS} is calculated based on the condition of $L = 1.0\text{ mH}$, $I_{AS} = 19.6\text{ A}$, $V_{DD} = 50\text{ V}$, $V_{GS} = 10\text{ V}$. 100% test at $L = 0.1\text{ mH}$, $I_{AS} = 35\text{ A}$ in production.
6. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTIC CURVES

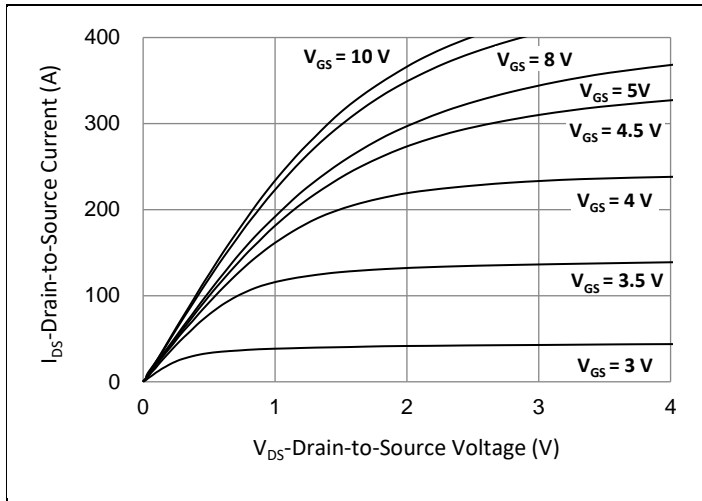


Fig.1 Output Characteristics

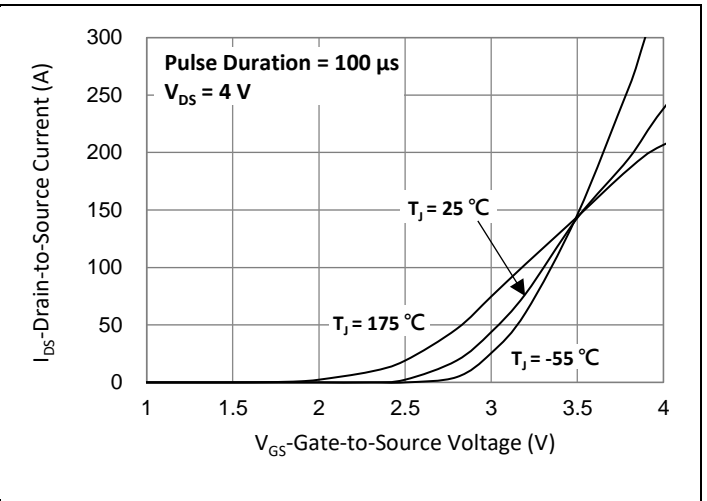


Fig.2 Transfer Characteristics

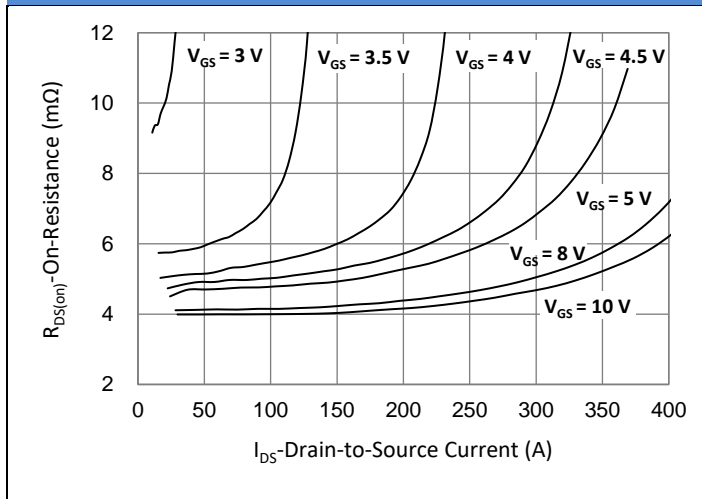


Fig.3 On-Resistance vs. Drain Current

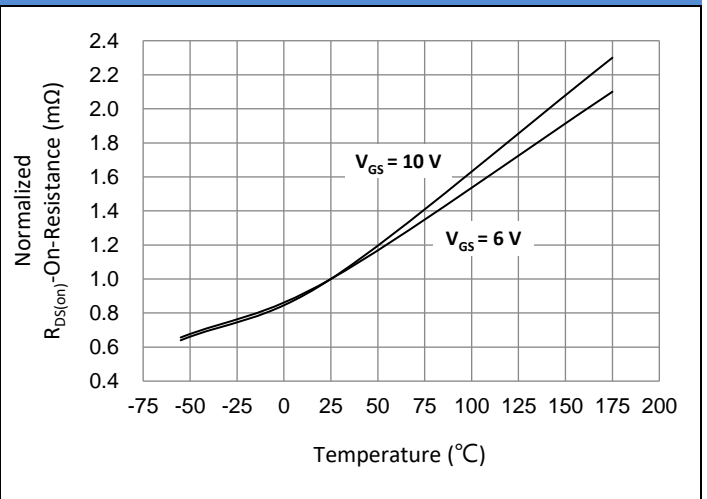


Fig.4 On-Resistance vs. Junction temperature

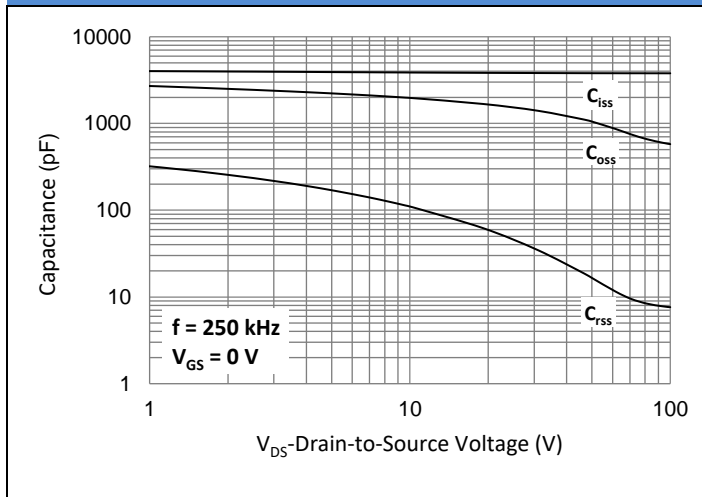


Fig.5 Capacitance vs. Drain-Source Voltage

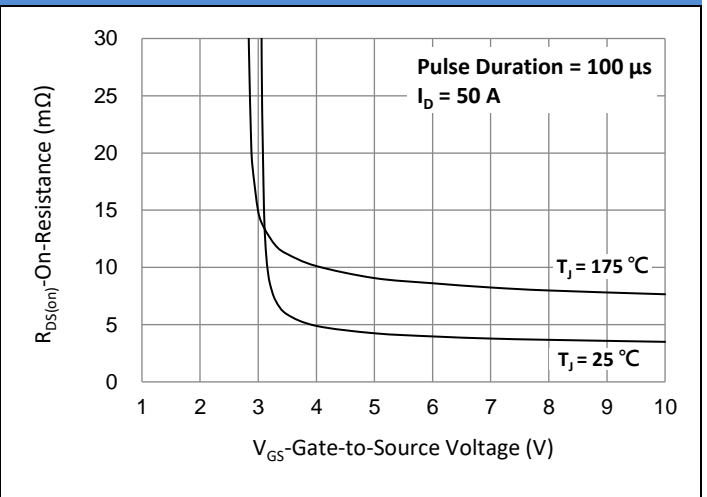


Fig.6 On-Resistance vs. Gate-Source Voltage

TYPICAL CHARACTERISTIC CURVES

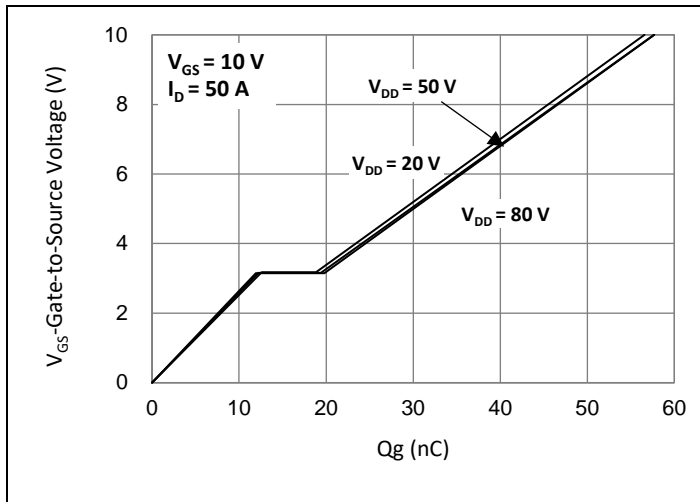


Fig.7 Gate-Charge Characteristics

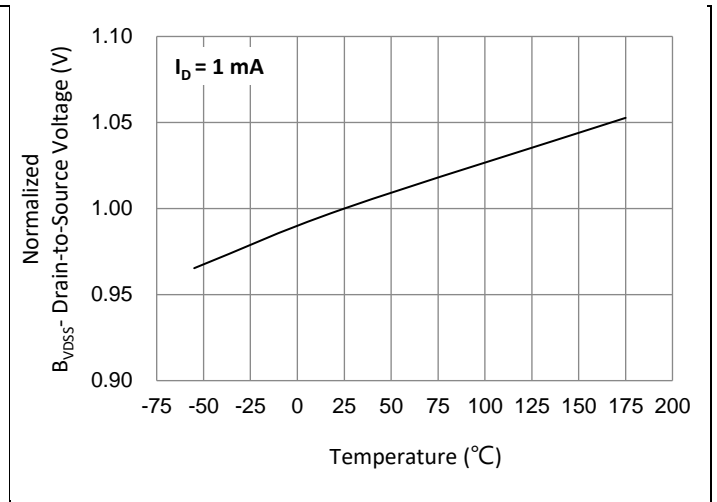


Fig.8 Breakdown Voltage Variation vs. Temperature

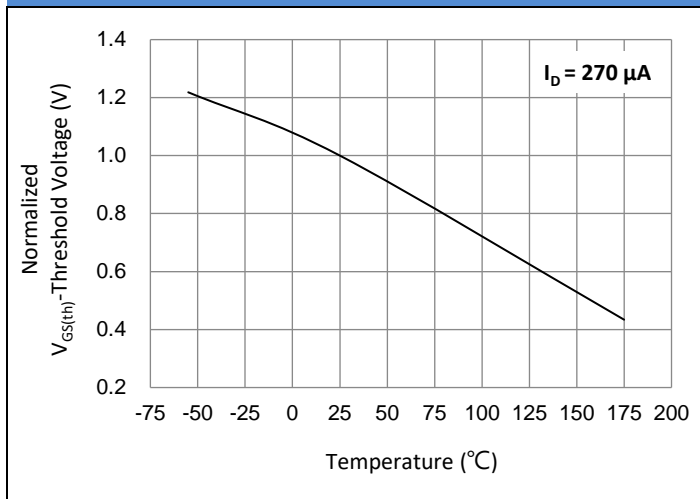


Fig.9 Threshold Voltage Variation with Temperature

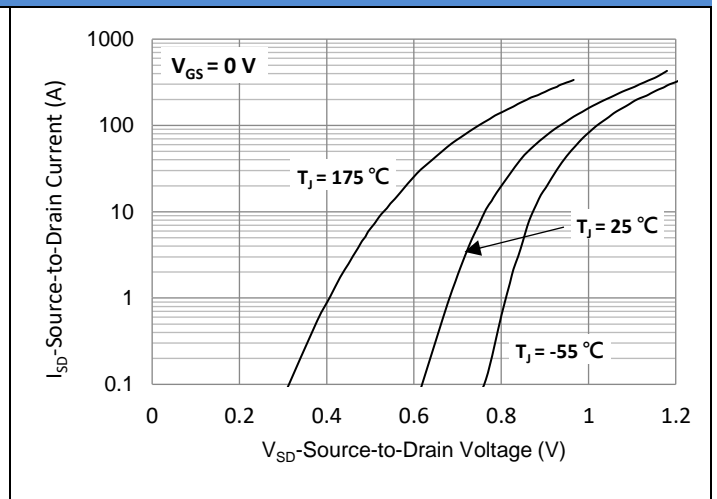


Fig.10 Source-Drain Diode Forward Voltage

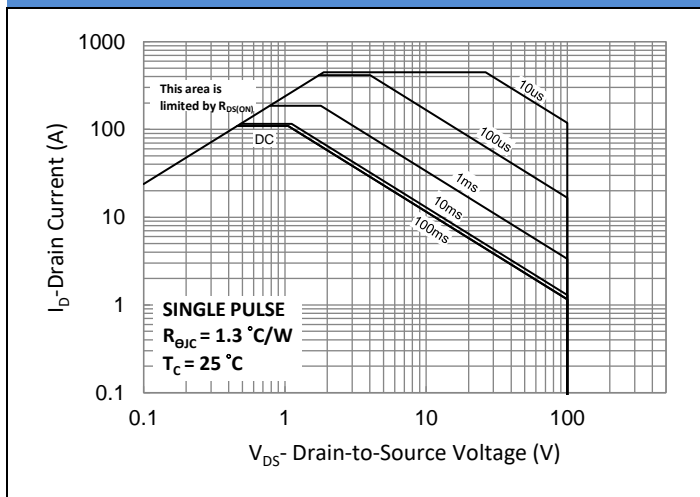


Fig.11 Maximum Safe Operating Area

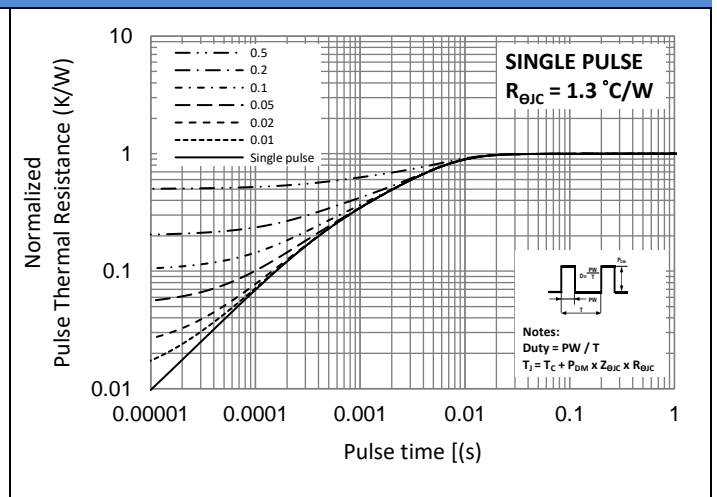


Fig.12 Normalized Transient Thermal Impedance