

80V N-Channel Enhancement Mode MOSFET

Voltage	80 V	R_{DS(on)}	4.0 mΩ
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Current	102 A	Q_G (TYP)	36 nC
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Feature

- $R_{DS(ON)} < 4.0\text{ m}\Omega$ at $V_{GS} = 10\text{ V}$, $I_D = 50\text{ A}$
- $R_{DS(ON)} < 7.0\text{ m}\Omega$ at $V_{GS} = 6\text{ V}$, $I_D = 25\text{ A}$
- High switching speed
- Low reverse transfer capacitance
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

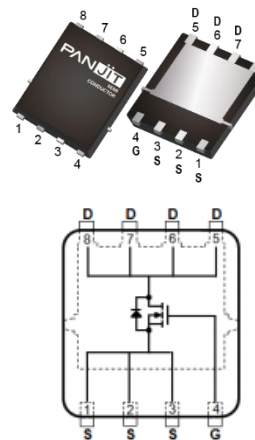
Mechanical Data

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

Application

- SR of Industrial Power, Brick Power, 48V DC/DC converter

DFN5060-8L



Top side view

Absolute Maximum Ratings ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise specified)

PARAMETER		SYMBOL	LIMIT	UNITS
Drain-Source Voltage		V_{DS}	80	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (Note 3)	$T_C = 25\text{ }^\circ\text{C}$	I_D	102	A
	$T_C = 100\text{ }^\circ\text{C}$		72	
Pulsed Drain Current	$T_C = 25\text{ }^\circ\text{C}$	I_{DM}	408	A
Single Pulse Avalanche Current (Note 5)		I_{AS}	40	A
Single Pulse Avalanche Energy (Note 5)		E_{AS}	80	mJ
Power Dissipation	$T_C = 25\text{ }^\circ\text{C}$	P_D	83	W
	$T_C = 100\text{ }^\circ\text{C}$		41	
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55~175	$^\circ\text{C}$

Thermal Characteristics

PARAMETER		SYMBOL	VALUES			UNITS
			MIN.	TYP.	MAX.	
Thermal Resistance	Junction-to-Case (Bottom)	$R_{\theta JC}$	-	1.2	1.8	$^\circ\text{C/W}$
	Junction-to-Ambient (Note 4)	$R_{\theta JA}$	-	-	50	$^\circ\text{C/W}$

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

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0\text{ V}, I_D=250\text{ }\mu\text{A}$	80	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=200\text{ }\mu\text{A}$	1.8	2.8	3.8	
Drain-Source On-State Resistance (Note 1)	$R_{DS(on)}$	$V_{GS}=10\text{ V}, I_D=50\text{ A}$	-	3.3	4.0	m Ω
		$V_{GS}=6\text{ V}, I_D=25\text{ A}$	-	4.5	7.0	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=80\text{ V}, V_{GS}=0\text{ V}$	-	-	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}	$V_{DS}=10\text{ V}, I_D=50\text{ A}$	-	86	-	S
Dynamic Characteristics (Note 6)						
Total Gate Charge	Q_g	$V_{DS}=40\text{ V}, I_D=50\text{ A},$ $V_{GS}=10\text{ V}$	-	36	47	nC
Gate-Source Charge	Q_{gs}		-	11	-	
Gate-Drain Charge	Q_{gd}		-	8	-	
Gate Plateau Voltage	$V_{plateau}$		-	4.7	-	V
Input Capacitance	C_{iss}	$V_{DS}=40\text{ V}, V_{GS}=0\text{ V},$ $f=250\text{ kHz}$	-	2300	2990	pF
Output Capacitance	C_{oss}		-	1010	1310	
Reverse Transfer Capacitance	C_{rss}		-	33	-	
Output Charge	Q_{oss}	$V_{DS}=40\text{ V}, V_{GS}=0\text{ V}$	-	58	76	nC
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=40\text{ V}, I_D=50\text{ A},$ $V_{GS}=10\text{ V}, R_G=3.0\text{ }\Omega$ (Note 2)	-	7.6	-	ns
Rise Time	t_r		-	6.3	-	
Turn-Off Delay Time	$t_{d(off)}$		-	17	-	
Fall Time	t_f		-	7.1	-	
Gate Resistance	R_g	$f=1.0\text{ MHz}$	-	0.3	0.6	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}	$I_F=50\text{ A}, V_{DD}=40\text{ V}$ $di/dt=100\text{ A}/\mu\text{s}$	-	66	-	nC
Reverse Recovery Time	T_{rr}		-	48	-	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 $L = 0.1\text{ mH}$, $I_{AS} = 40\text{ A}$, $V_{DD} = 40\text{ V}$, $V_{GS} = 10\text{ V}$. 100% test in production.
6. Guaranteed by design, not subject to production testing.
7. Test at $t = 10\text{ s}$

TYPICAL CHARACTERISTIC CURVES

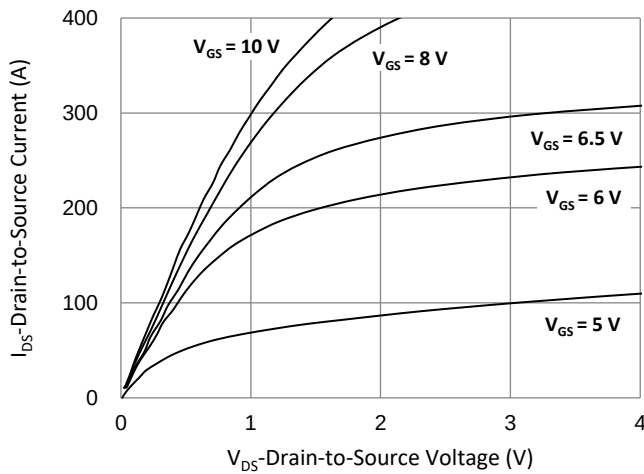


Fig.1 Output Characteristics

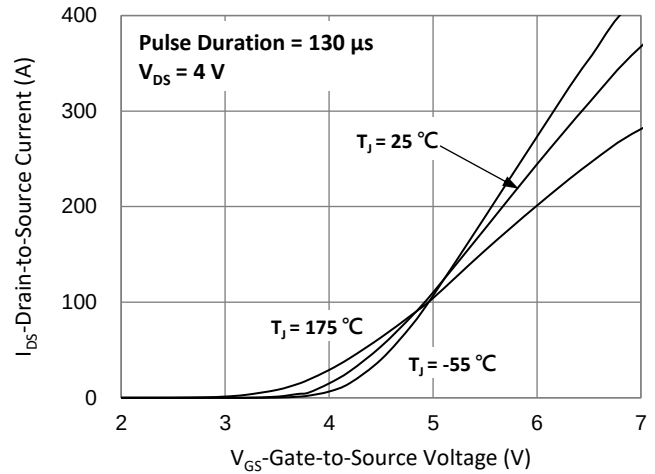


Fig.2 Transfer Characteristics

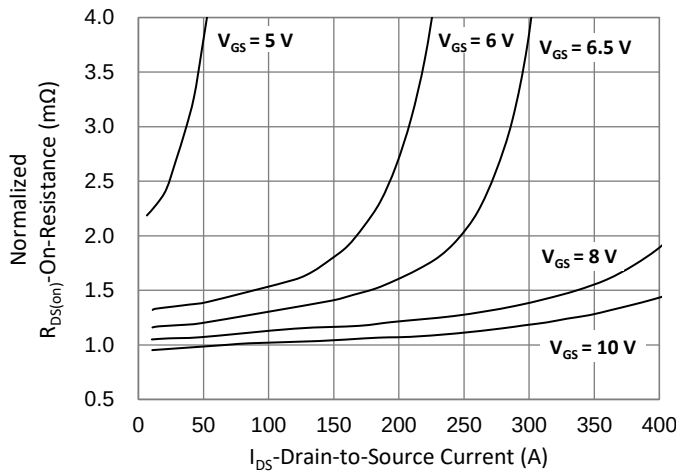


Fig.3 On-Resistance vs. Drain Current

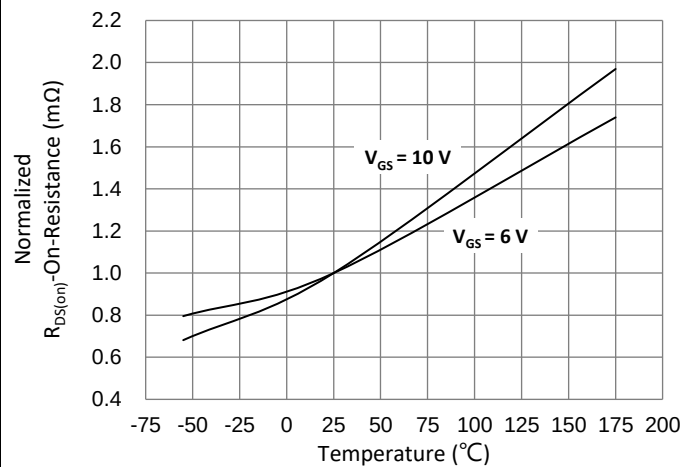


Fig.4 On-Resistance vs. Junction temperature

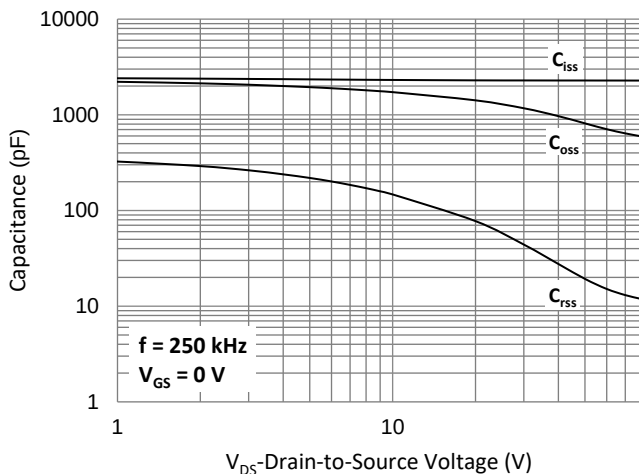


Fig.5 Capacitance vs. Drain-Source Voltage

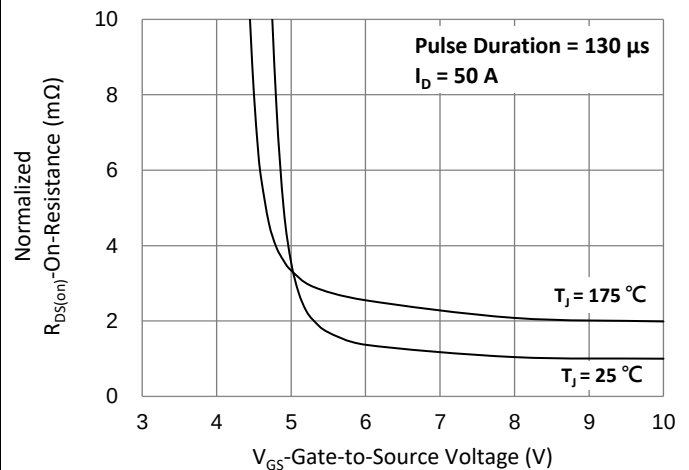


Fig.6 On-Resistance vs. Gate-Source Voltage

TYPICAL CHARACTERISTIC CURVES

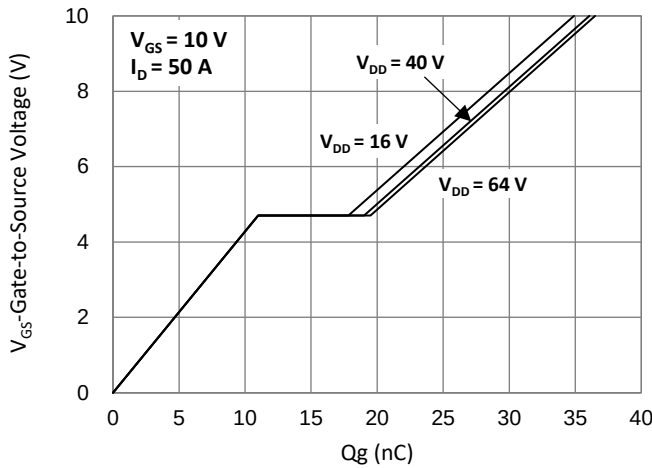


Fig.7 Gate-Charge Characteristics

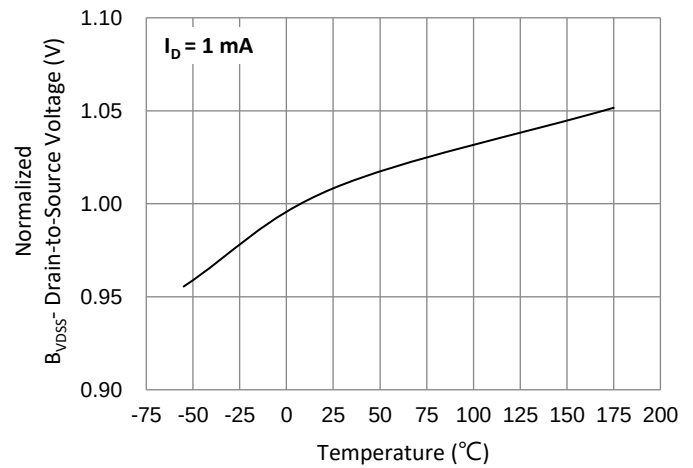


Fig.8 Breakdown Voltage Variation vs. Temperature

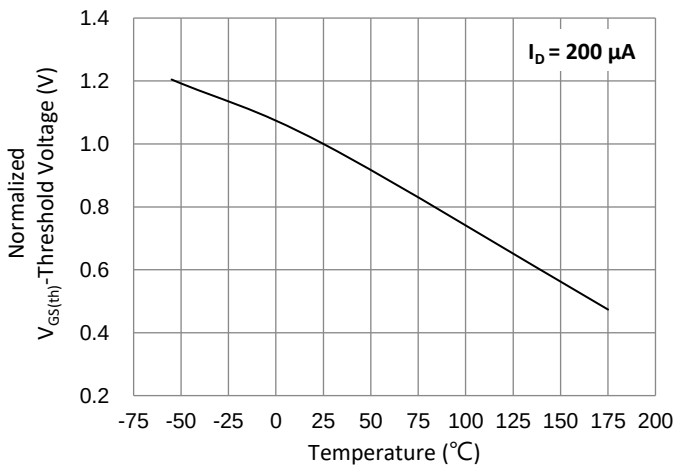


Fig.9 Threshold Voltage Variation with Temperature

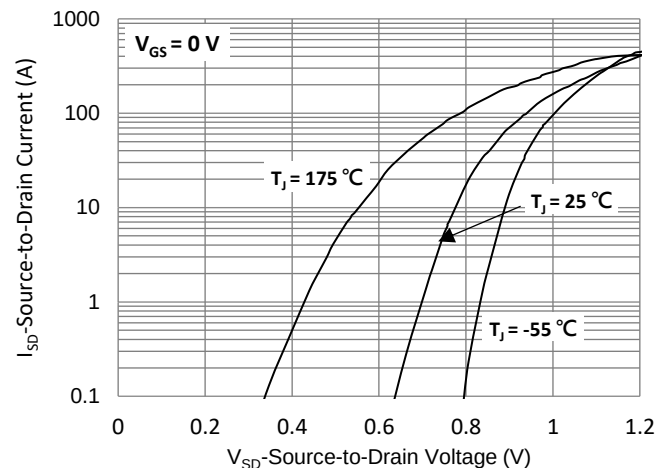


Fig.10 Source-Drain Diode Forward Voltage

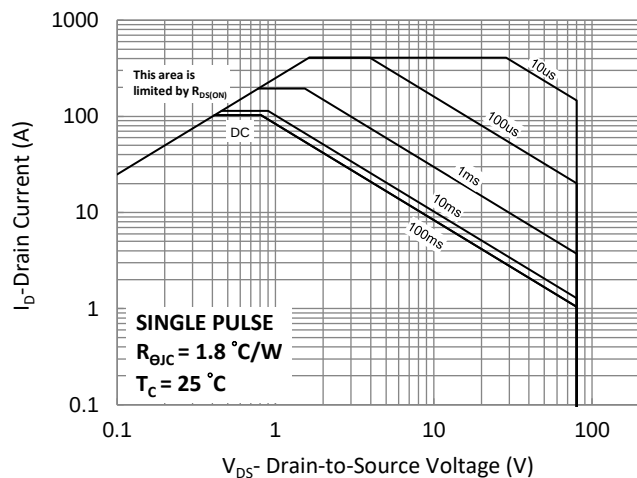


Fig.11 Maximum Safe Operating Area

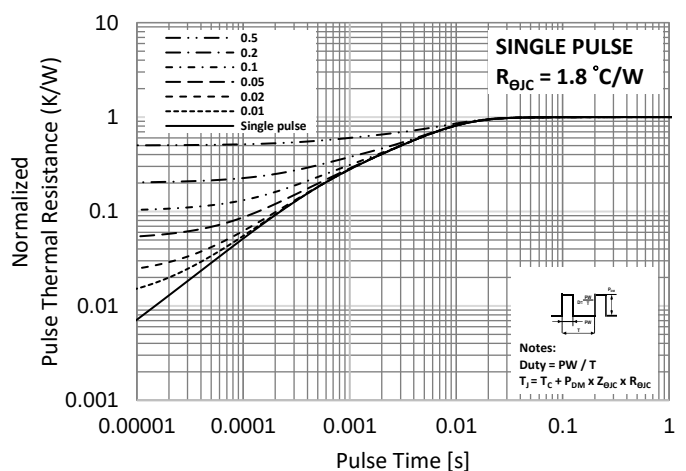
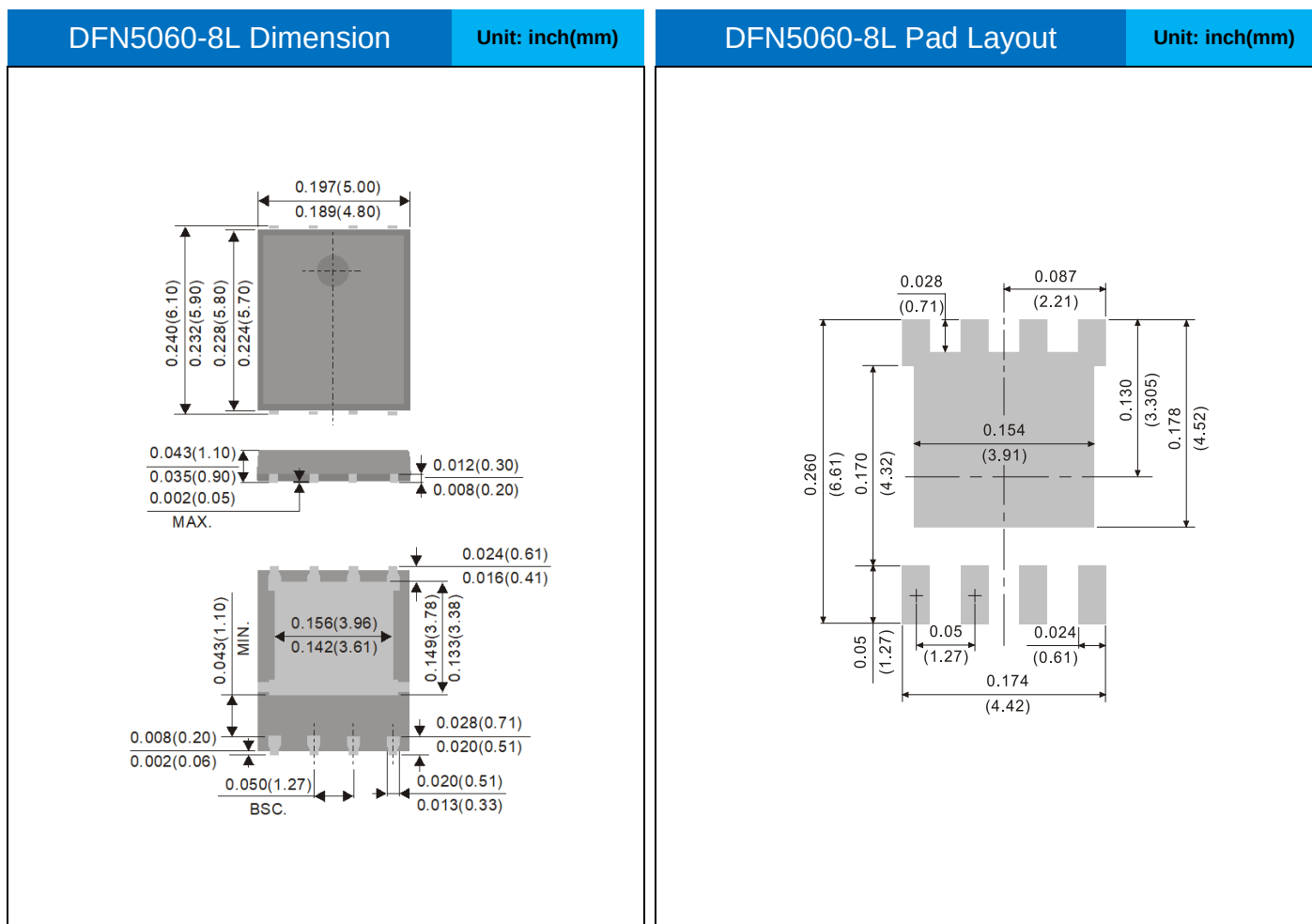


Fig.12 Normalized Transient Thermal Impedance

Product and Packing Information

Part No.	Package Type	Packing Type	Marking
PSMQC040N08NS2	DFN5060-8L	3000pcs / 13" reel	040N08NS

Packaging Information & Mounting Pad Layout



Marking Diagram

PJ
040N08NS
YWLL x

Y = Year Code
W = Week Code (A~Z)
LL = Lot Code (00~99)
x = Production Line Code

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