

**60V N-Channel Enhancement Mode MOSFET**

<b>Voltage</b>	<b>60 V</b>	<b>R<sub>DS(ON)</sub></b>	<b>12 mΩ</b>
<b>Current</b>	<b>39 A</b>	<b>Q<sub>G</sub> (TYP)</b>	<b>16 nC</b>

**Feature**

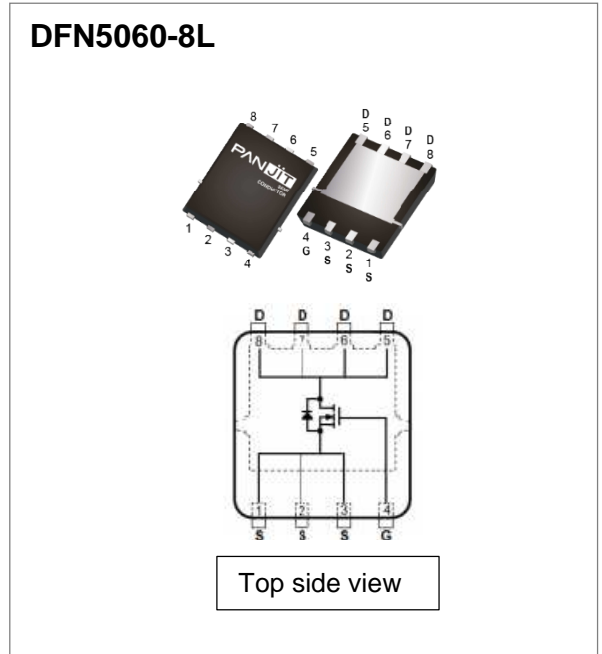
- R<sub>DS(ON)</sub>, V<sub>GS</sub>@10V, I<sub>D</sub>@20A<12mΩ
- R<sub>DS(ON)</sub>, V<sub>GS</sub>@4.5V, I<sub>D</sub>@10A<16mΩ
- High switching speed
- Low reverse transfer capacitance
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

**Mechanical Data**

- Case: DFN5060-8L Package
- Terminals: Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 0.0028 ounces, 0.08 grams

**Application**

- SR solutions of PD Charger, BMS, BLDC motor driver switch



**Absolute Maximum Ratings** (T<sub>A</sub> = 25 °C unless otherwise specified)

PARAMETER		SYMBOL	LIMIT	UNITS
Drain-Source Voltage		V <sub>DS</sub>	60	V
Gate-Source Voltage		V <sub>GS</sub>	±20	
Continuous Drain Current (Note 3)	T <sub>C</sub> =25°C	I <sub>D</sub>	39	A
	T <sub>C</sub> =100°C		25	
Pulsed Drain Current		I <sub>DM</sub>	156	A
Single Pulse Avalanche Current (Note 5)		I <sub>AS</sub>	18	A
Single Pulse Avalanche Energy (Note 5)		E <sub>AS</sub>	16	mJ
Power Dissipation	T <sub>C</sub> =25°C	P <sub>D</sub>	33	W
	T <sub>C</sub> =100°C		13	
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55~150	°C

**Thermal Characteristics**

PARAMETER		SYMBOL	MAXIMUM	UNITS
Thermal Resistance	Junction-to-Case (Bottom)	R <sub>θJC</sub>	3.8	°C/W
	Junction-to-Case (Top)	R <sub>θJT</sub>	31	°C/W
	Junction-to-Ambient (Note.4)	R <sub>θJA</sub>	50	°C/W

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

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
<b>Static</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.8	2.5	
Drain-Source On-State Resistance (Note 1)	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	-	9	12	m $\Omega$
		$V_{GS}=4.5V, I_D=10A$	-	14	16	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=48V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
Transfer characteristics (Note 1)	gfs	$V_{DS}=10V, I_D=20A$	-	26	-	S
<b>Dynamic</b> (Note 6)						
Total Gate Charge	$Q_g$	$V_{DS}=30V, I_D=20A,$ $V_{GS}=4.5V$	-	8.3	-	nC
			-	16	-	
Gate-Source Charge	$Q_{gs}$	$V_{DS}=30V, I_D=20A,$ $V_{GS}=10V$	-	3.2	-	
Gate-Drain Charge	$Q_{gd}$		-	3.6	-	
Plateau Voltage	$V_{GP}$		-	3.4	-	V
Input Capacitance	$C_{iss}$	$V_{DS}=30V, V_{GS}=0V,$ $f=1.0\text{MHz}$	-	850	-	pF
Output Capacitance	$C_{oss}$		-	310	-	
Reverse Transfer Capacitance	$C_{rss}$		-	23	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=30V, I_D=20A,$ $V_{GS}=10V, R_G=2\Omega$ (Note 2)	-	21	-	ns
Turn-On Rise Time	$t_r$		-	88	-	
Turn-Off Delay Time	$t_{d(off)}$		-	42	-	
Turn-Off Fall Time	$t_f$		-	92	-	
Gate Resistance	$R_g$	$f=1.0\text{MHz}$	-	1.9	-	$\Omega$
<b>Drain-Source Diode</b>						
Diode Forward Voltage	$V_{SD}$	$I_S=1A, V_{GS}=0V$	-	-	1.1	V
Reverse Recovery Charge	$Q_{rr}$	$I_{SD}=20A$ $di/dt=100A/\mu s$	-	3	-	nC
Reverse Recovery Time	$T_{rr}$		-	15	-	ns

NOTES :

1. Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$
2. Essentially independent of operating temperature typical characteristics.
3. The maximum current rating is package limited.
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 inch<sup>2</sup> with 2oz.square pad of copper.
5. The test condition is  $L=0.1\text{mH}, I_{AS}=18A, V_{DD}=25V, V_{GS}=10V, R_G=25\text{ohm}$ , Starting  $T_J=25^\circ\text{C}$
6. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTIC CURVES

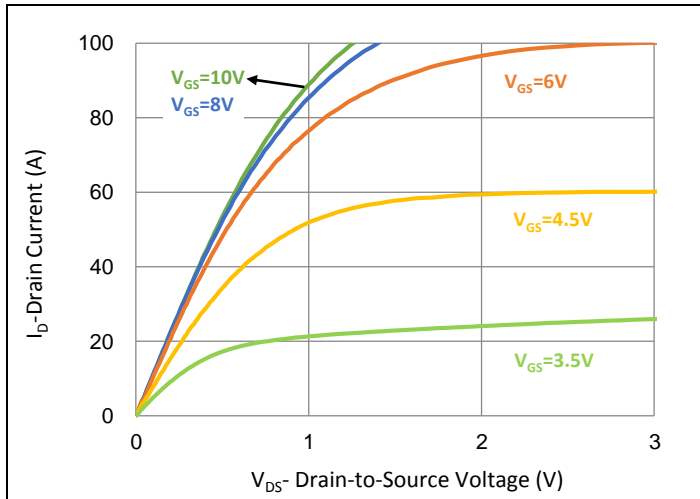


Fig.1 Output Characteristics

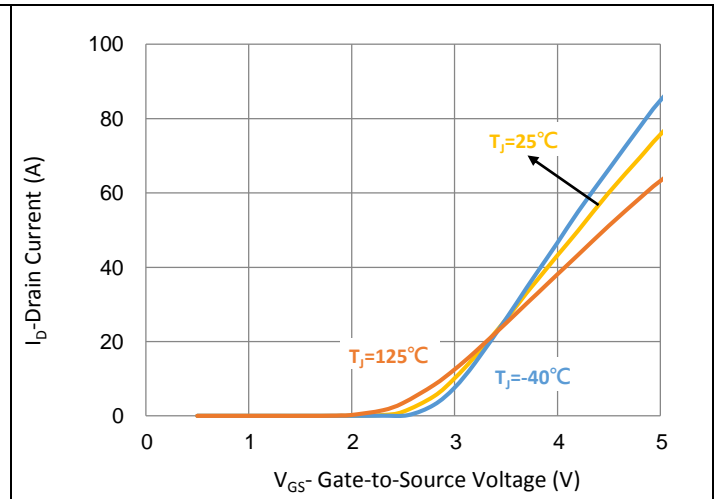


Fig.2 Transfer Characteristics

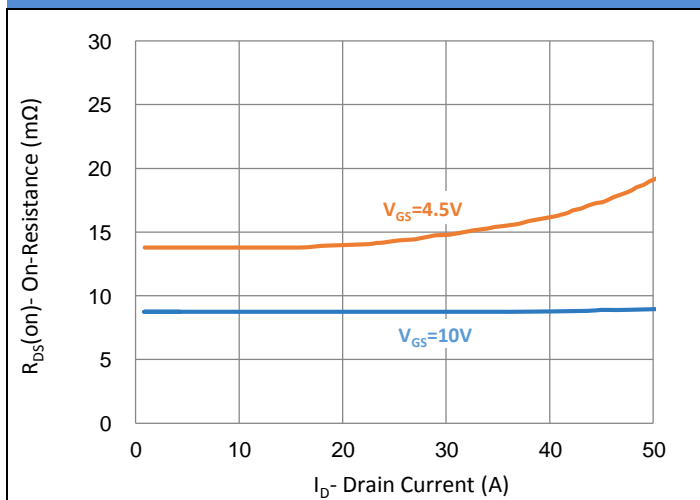


Fig.3 On-Resistance vs. Drain Current

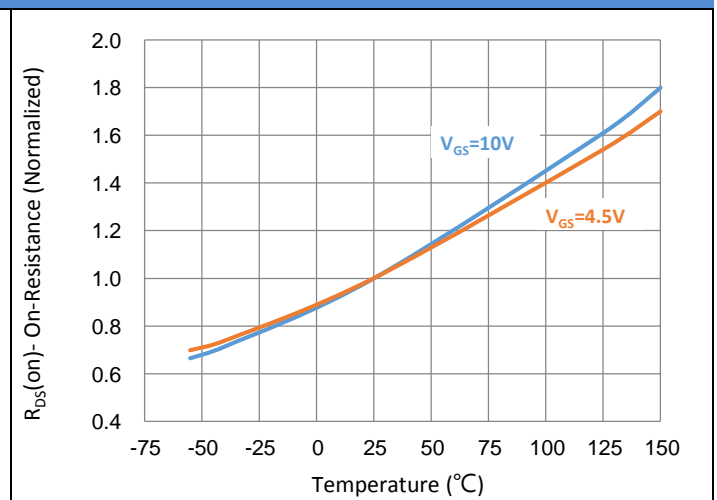


Fig.4 On-Resistance vs. Junction temperature

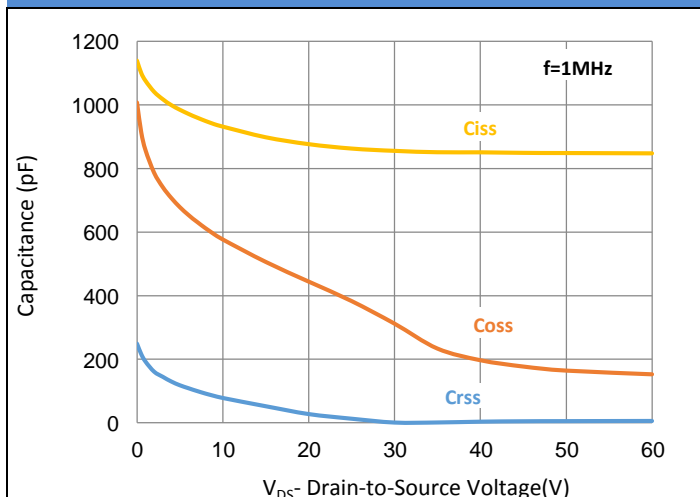


Fig.5 Capacitance vs. Drain-Source Voltage

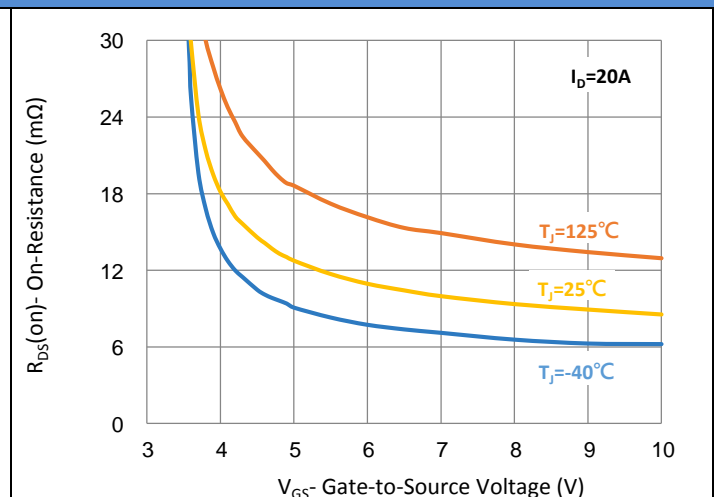


Fig.6 On-Resistance vs. Gate-Source Voltage

TYPICAL CHARACTERISTIC CURVES

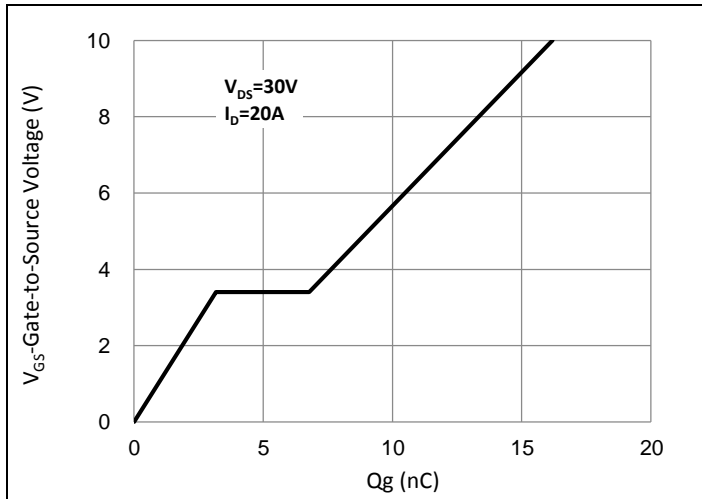


Fig.7 Gate-Charge Characteristics

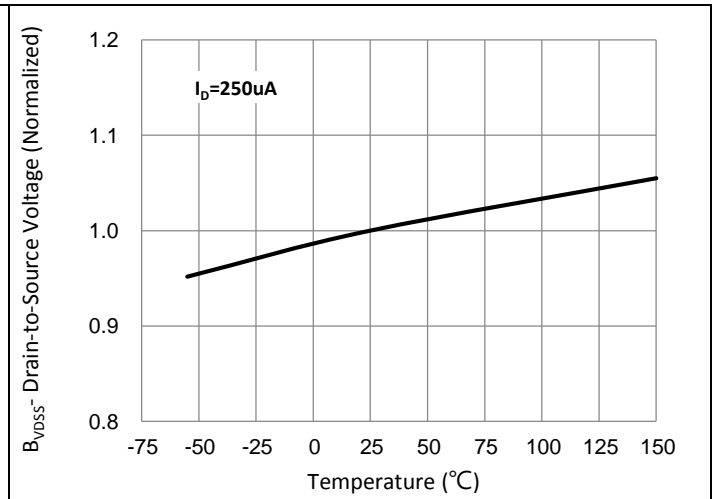


Fig.8 Breakdown Voltage Variation vs. Temperature

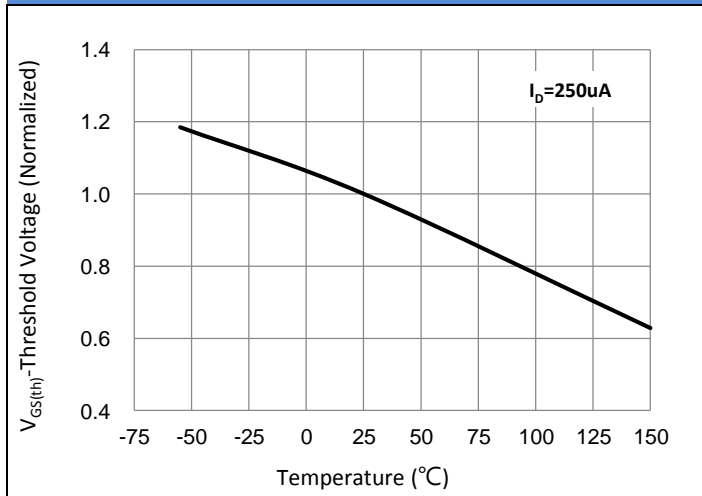


Fig.9 Threshold Voltage Variation with Temperature

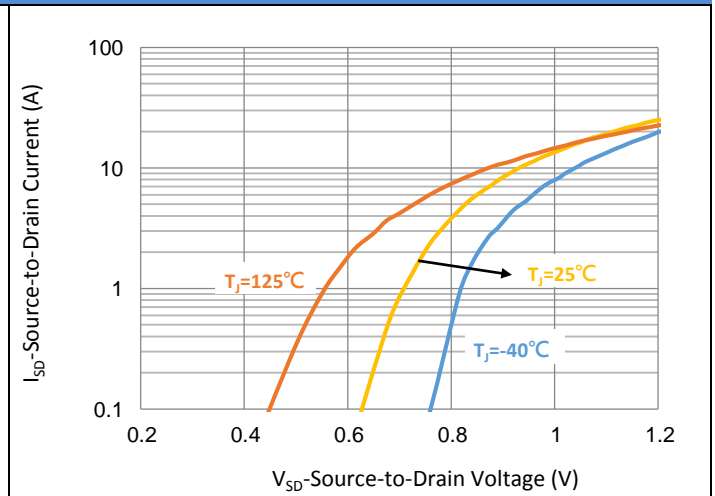


Fig.10 Source-Drain Diode Forward Voltage

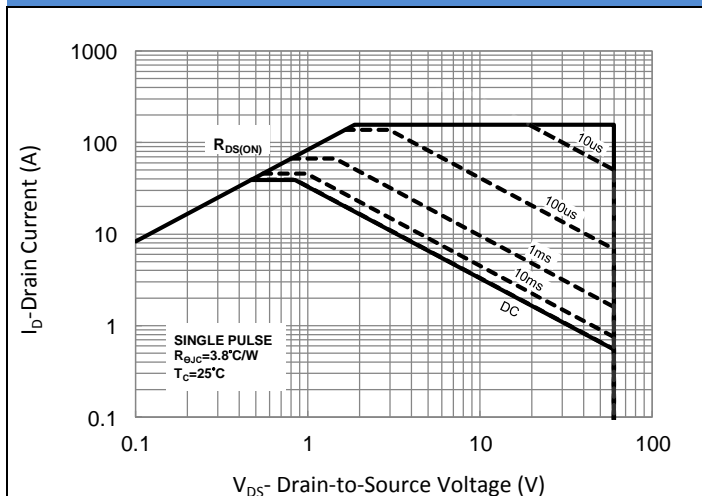


Fig.11 Maximum Safe Operating Area

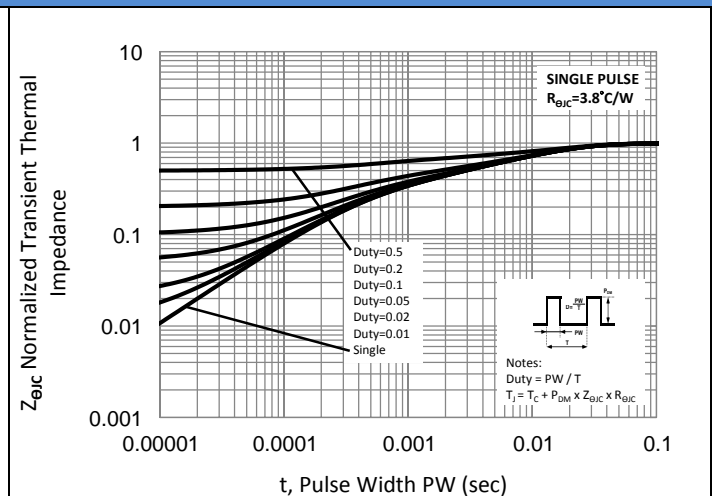


Fig.12 Normalized Transient Thermal Impedance

TYPICAL CHARACTERISTIC CURVES

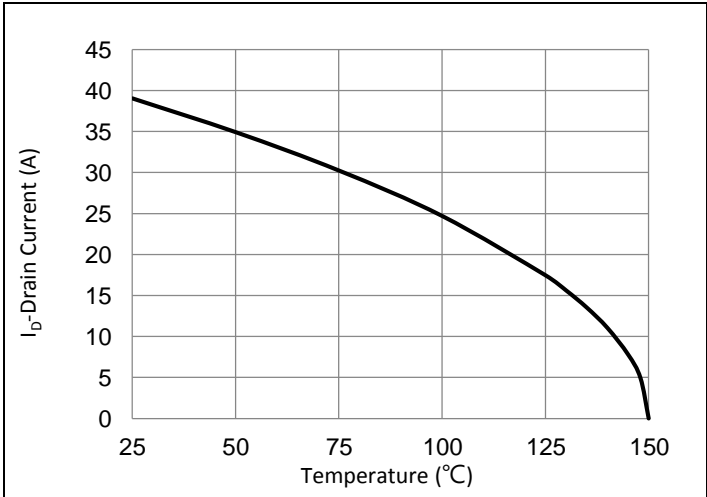
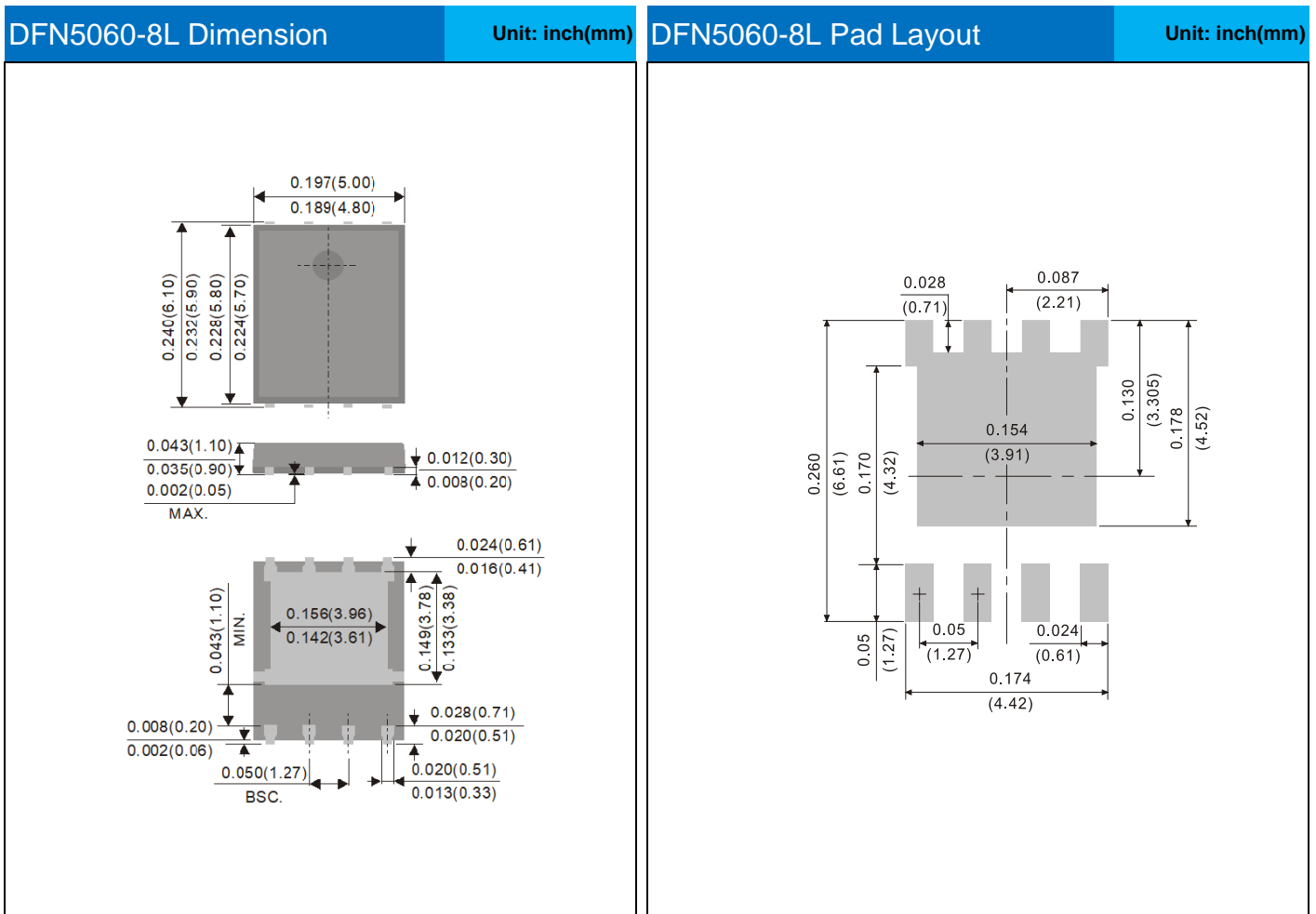


Fig.13 Drain Current vs. Case Temperature

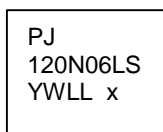
**Product and Packing Information**

Part No.	Package Type	Packing Type	Marking
PSMQC120N06LS1	DFN5060-8L	3000pcs / 13" reel	120N06LS

**Packaging Information & Mounting Pad Layout**



**Marking Diagram**



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

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