

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

<b>Voltage</b>	<b>60 V</b>	<b>R<sub>DS(ON)</sub></b>	<b>3.3 mΩ</b>
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<b>Current</b>	<b>131 A</b>	<b>Q<sub>G</sub> (TYP)</b>	<b>99 nC</b>
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**Feature**

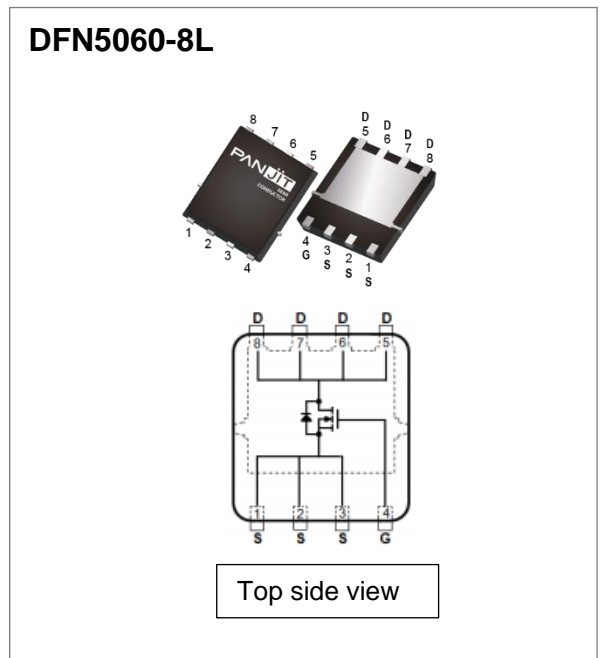
- R<sub>DS(ON)</sub>, V<sub>GS</sub>@10V, I<sub>D</sub>@40A<3.3mΩ
- R<sub>DS(ON)</sub>, V<sub>GS</sub>@7V, I<sub>D</sub>@10A<5.4mΩ
- High switching speed
- Low reverse transfer capacitance
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

**Mechanical Data**

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

**Application**

- BMS, BLDC motor driver switch, Load 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/ -12	
Continuous Drain Current (Note 3)	T <sub>C</sub> =25°C	I <sub>D</sub>	131	A
	T <sub>C</sub> =100°C		83	
Pulsed Drain Current		I <sub>DM</sub>	524	A
Single Pulse Avalanche Current (Note 5)		I <sub>AS</sub>	62	A
Single Pulse Avalanche Energy (Note 5)		E <sub>AS</sub>	192	mJ
Power Dissipation	T <sub>C</sub> =25°C	P <sub>D</sub>	96	W
	T <sub>C</sub> =100°C		38	
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>	1.3	°C/W
	Junction-to-Case (Top)	R <sub>θJT</sub>	21	°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	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	3	4	
Drain-Source On-State Resistance (Note 1)	$R_{DS(on)}$	$V_{GS}=10V, I_D=40A$	-	2.5	3.3	m $\Omega$
		$V_{GS}=7V, I_D=10A$	-	3.2	5.4	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=20V, V_{DS}=0V$	-	-	100	nA
Transfer characteristics (Note 1)	gfs	$V_{DS}=3V, I_D=20A$	-	71	-	S
<b>Dynamic</b> (Note 6)						
Total Gate Charge	$Q_g$	$V_{DS}=30V, I_D=40A,$ $V_{GS}=7V$	-	74	-	nC
			-	99	-	
Gate-Source Charge	$Q_{gs}$	$V_{DS}=30V, I_D=40A,$ $V_{GS}=10V$	-	26	-	
Gate-Drain Charge	$Q_{gd}$		-	29	-	
Plateau Voltage	$V_{GP}$		-	4.8	-	V
Input Capacitance	$C_{iss}$	$V_{DS}=30V, V_{GS}=0V,$ $f=1.0\text{MHz}$	-	5731	-	pF
Output Capacitance	$C_{oss}$		-	2070	-	
Reverse Transfer Capacitance	$C_{rss}$		-	120	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=30V, I_D=40A,$ $V_{GS}=10V, R_G=2\Omega$ (Note 2)	-	61	-	ns
Turn-On Rise Time	$t_r$		-	106	-	
Turn-Off Delay Time	$t_{d(off)}$		-	106	-	
Turn-Off Fall Time	$t_f$		-	59	-	
Gate Resistance	$R_g$	$f = 1.0\text{MHz}$	0.5	1.7	3	$\Omega$
<b>Drain-Source Diode</b>						
Diode Forward Voltage	$V_{SD}$	$I_S=1A, V_{GS}=0V$	-	0.7	1	V
Reverse Recovery Charge	$Q_{rr}$	$I_{SD} = 40A$ $di/dt = 100A/\mu s$	-	42	-	nC
Reverse Recovery Time	$T_{rr}$		-	52	-	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 silicon 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  $L=0.1\text{mH}, I_{AS}=62A, V_{DD}=25V, V_{GS}=10V, R_G=25\text{ohm}$ , Starting  $T_J=25^\circ\text{C}$
6. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTIC CURVES

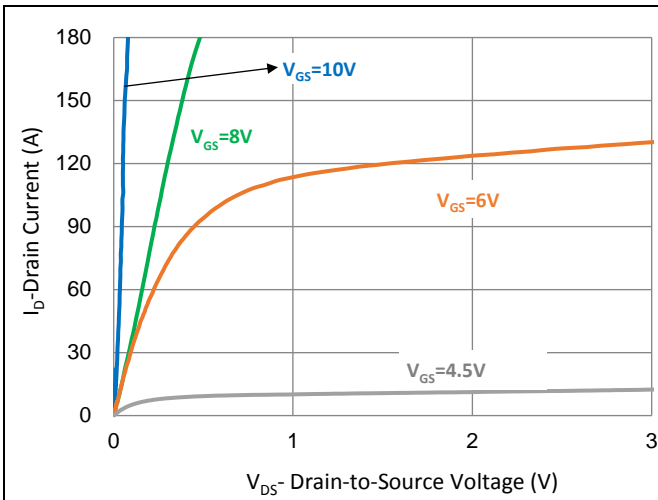


Fig.1 Output Characteristics

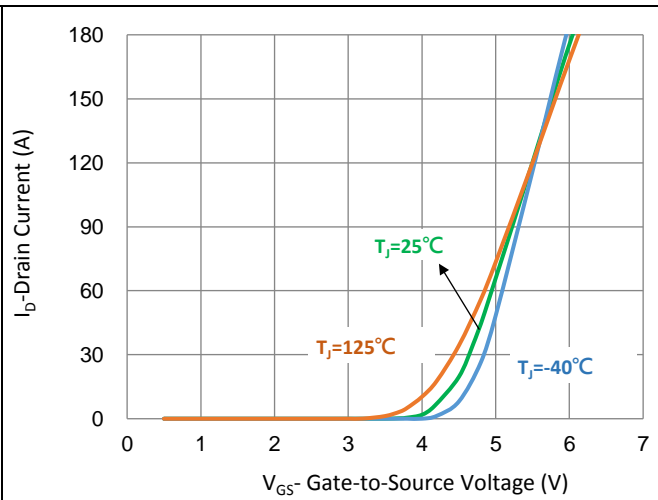


Fig.2 Transfer Characteristics

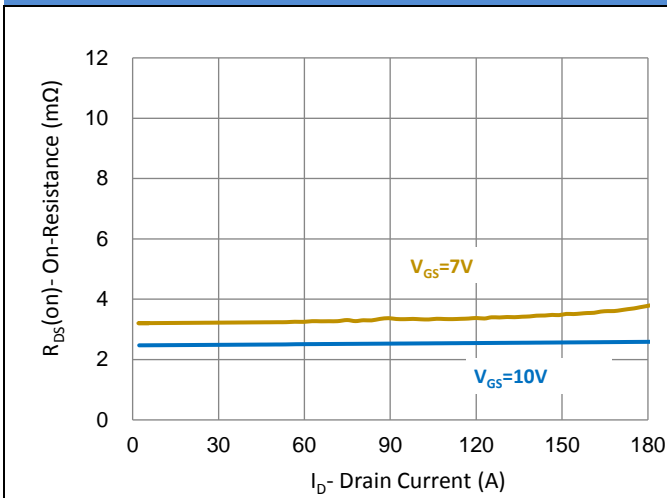


Fig.3 On-Resistance vs. Drain Current

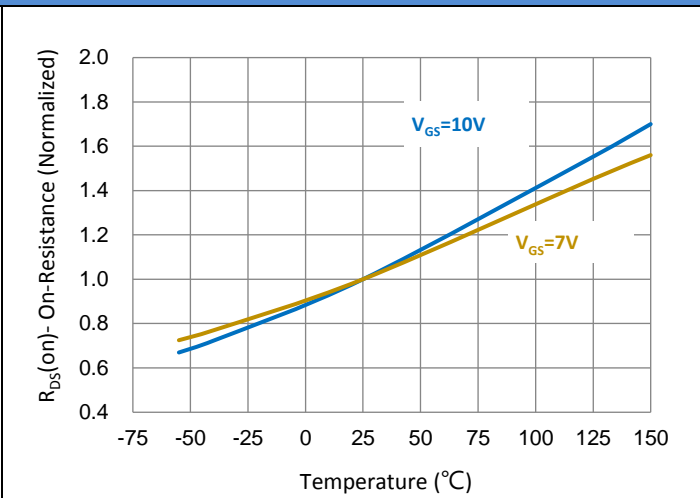


Fig.4 On-Resistance vs. Junction temperature

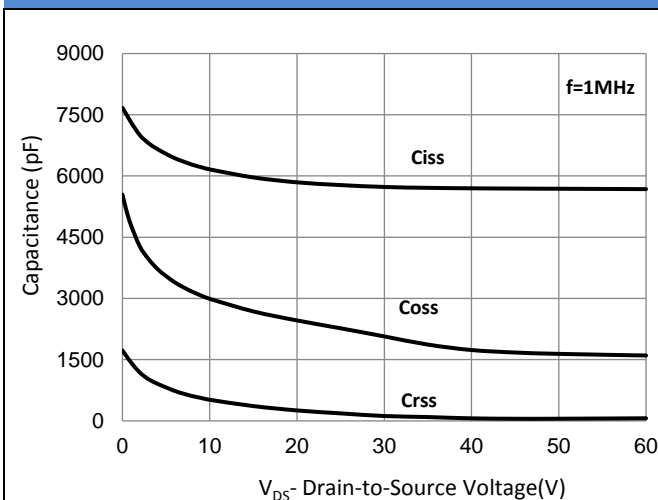


Fig.5 Capacitance vs. Drain-Source Voltage

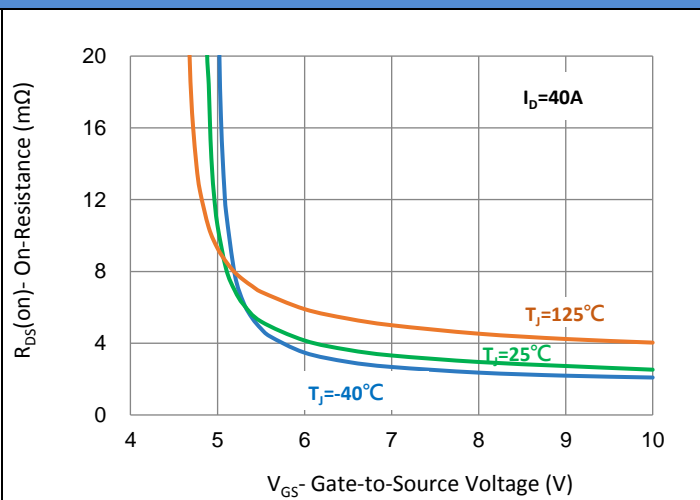


Fig.6 On-Resistance vs. Gate-Source Voltage

TYPICAL CHARACTERISTIC CURVES

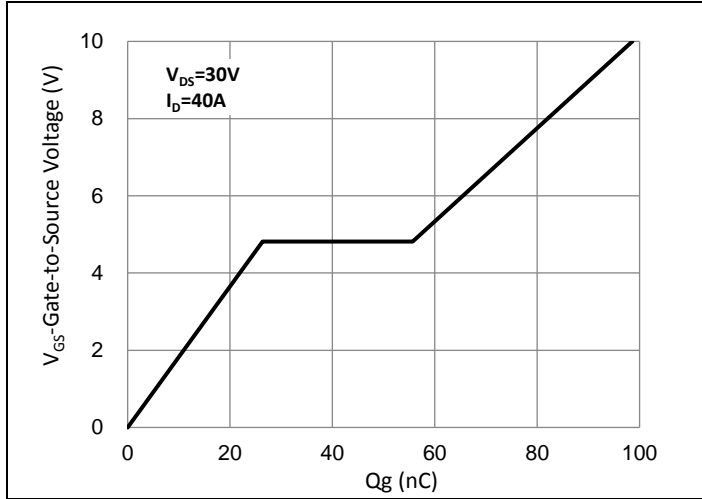


Fig.7 Gate-Charge Characteristics

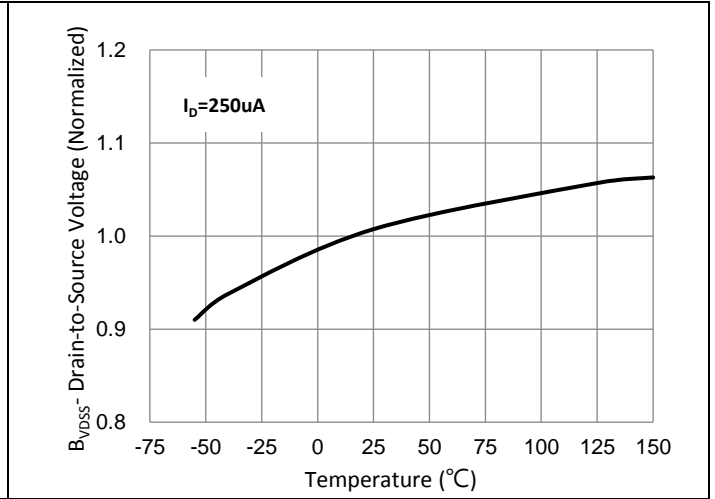


Fig.8 Breakdown Voltage Variation vs. Temperature

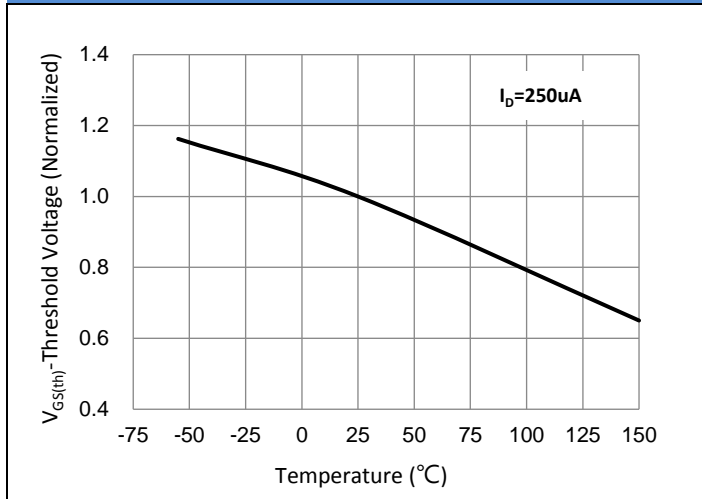


Fig.9 Threshold Voltage Variation with Temperature

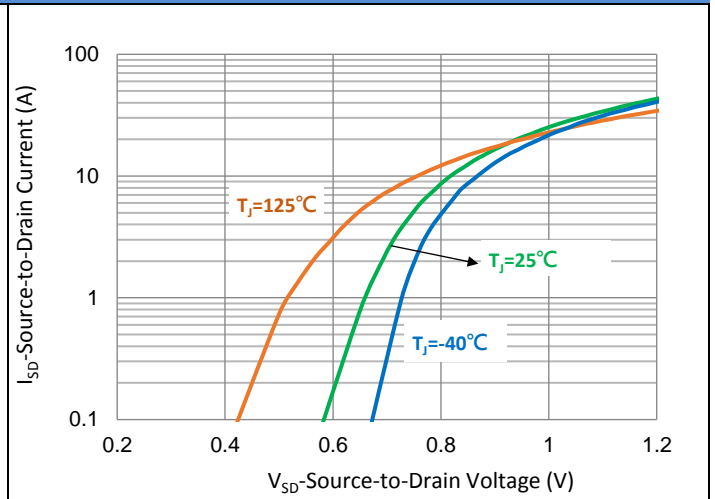


Fig.10 Source-Drain Diode Forward Voltage

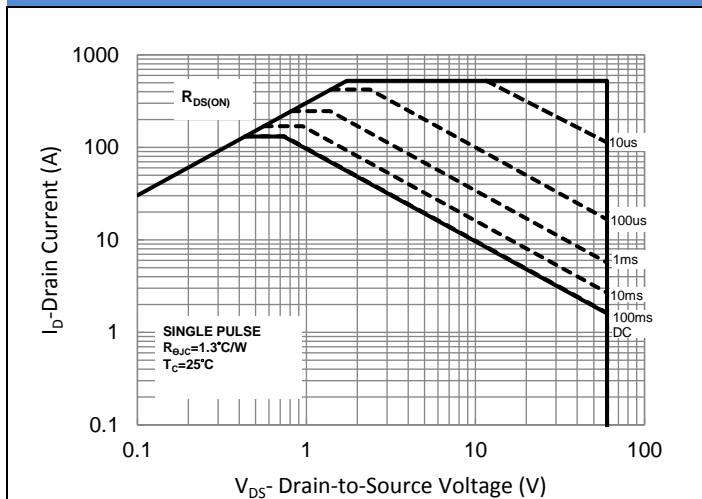


Fig.11 Maximum Safe Operating Area

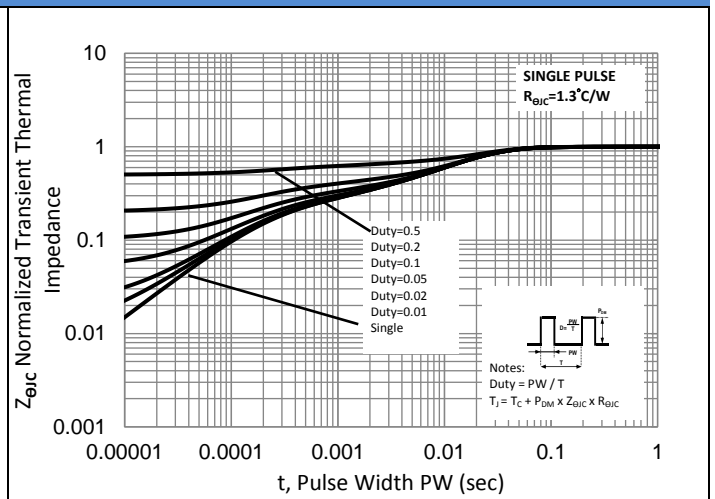


Fig.12 Normalized Transient Thermal Impedance

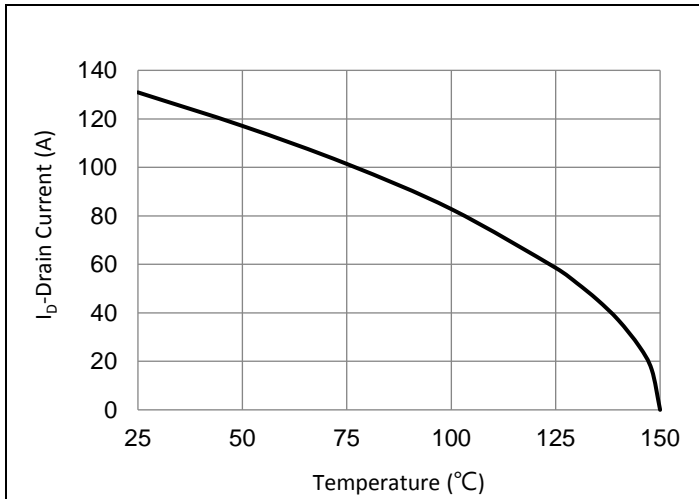
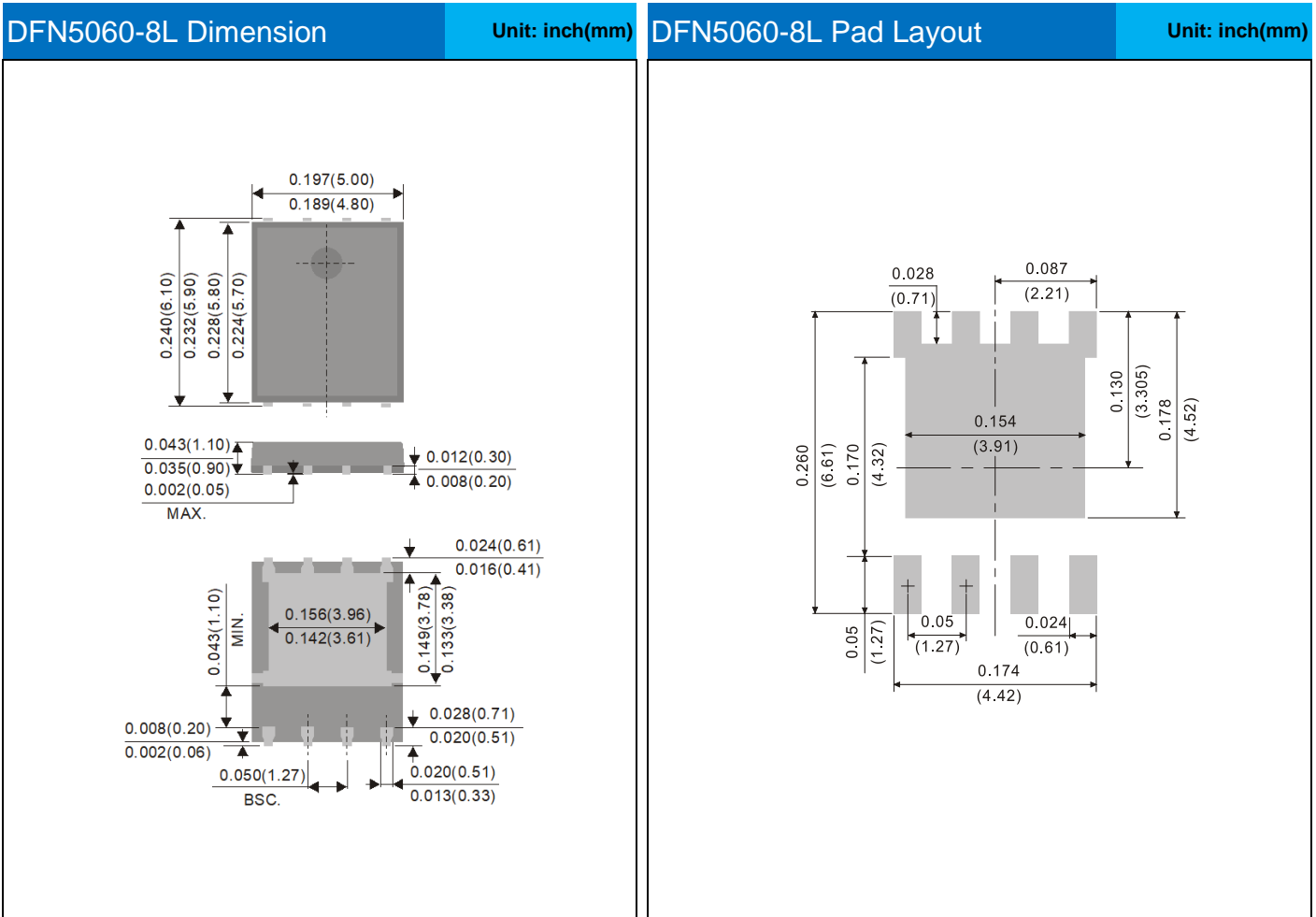


Fig.13 Drain Current vs. Case Temperature

**Product and Packing Information**

Part No.	Package Type	Packing Type	Marking
PSMQC033N06NS1	DFN5060-8L	3000pcs / 13" reel	033N06NS

**Packaging Information & Mounting Pad Layout**



**Marking Diagram**

PJ 033N06NS YWLL x
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- Y** = Year Code
- W** = Week Code (A~Z)
- LL** = Lot Code (00~99)
- x** = Production Line Code

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