



# PJQ5846-AU

## 40V N-Channel Enhancement Mode MOSFET

**Voltage**

**40 V**

**Current**

**40 A**

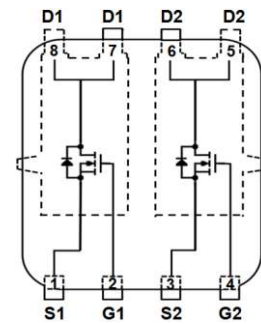
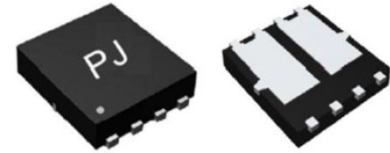
### Features

- $R_{DS(ON)}$ ,  $V_{GS}@10V$ ,  $I_D@8A < 10.5m\Omega$
- $R_{DS(ON)}$ ,  $V_{GS}@4.5V$ ,  $I_D@4A < 15m\Omega$
- High switching speed
- Improved dv/dt capability
- Low reverse transfer capacitance
- AEC-Q101 qualified
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

### Mechanical Data

- Case : DFN5060B-8L Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Approx. Weight : 0.0035 ounces, 0.092 grams

DFN5060B-8L



### Maximum Ratings and Thermal Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted)

PARAMETER		SYMBOL	LIMIT	UNITS
Drain-Source Voltage		$V_{DS}$	40	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	
Continuous Drain Current (Note 4)	$T_C=25^\circ\text{C}$	$I_D$	40	A
	$T_C=100^\circ\text{C}$		25	
Pulsed Drain Current (Note 1)	$T_C=25^\circ\text{C}$	$I_{DM}$	120	
Power Dissipation	$T_C=25^\circ\text{C}$	$P_D$	38.5	W
	$T_C=100^\circ\text{C}$		19.2	
Continuous Drain Current (Note 4)	$T_A=25^\circ\text{C}$	$I_D$	9.5	A
	$T_A=70^\circ\text{C}$		7.5	
Power Dissipation	$T_A=25^\circ\text{C}$	$P_D$	2.0	W
	$T_A=70^\circ\text{C}$		1.4	
Single Pulse Avalanche Energy (Note 6)		$E_{AS}$	72	mJ
Operating Junction and Storage Temperature Range		$T_J, T_{STG}$	-55~175	$^\circ\text{C}$
Typical Thermal Resistance (Note 4,5)	Junction to Case	$R_{\theta JC}$	3.9	$^\circ\text{C/W}$
	Junction to Ambient	$R_{\theta JA}$	73.5	

- Limited only By Maximum Junction Temperature



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

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
<b>Static</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.7	2.5	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=8A$	-	9	10.5	mΩ
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=4A$	-	12	15	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=40V, V_{GS}=0V$	-	-	1	μA
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>Dynamic</b> (Note 7)						
Total Gate Charge	$Q_g$	$V_{DS}=20V, I_D=8A,$ $V_{GS}=10V$ (Note 2,3)	-	22	-	nC
Gate-Source Charge	$Q_{gs}$		-	4.2	-	
Gate-Drain Charge	$Q_{gd}$		-	4.0	-	
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V,$ $f=1\text{MHZ}$	-	1258	-	pF
Output Capacitance	$C_{oss}$		-	134	-	
Reverse Transfer Capacitance	$C_{rss}$		-	88	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=15V, I_D=1A,$ $V_{GS}=10V, R_G=3.3\Omega$ (Note 2,3)	-	13	-	ns
Turn-On Rise Time	$t_r$		-	14	-	
Turn-Off Delay Time	$t_{d(off)}$		-	45	-	
Turn-Off Fall Time	$t_f$		-	9	-	
<b>Drain-Source Diode</b>						
Maximum Continuous Drain-Source Diode Forward Current	$I_S$	---	-	-	40	A
Diode Forward Voltage	$V_{SD}$	$I_S=1A, V_{GS}=0V$	-	0.7	1	V

**NOTES :**

1. Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$ .
2. Essentially independent of operating temperature typical characteristics.
3. Repetitive rating, pulse width limited by junction temperature  $T_{J(MAX)}=150^\circ\text{C}$ . Ratings are based on low frequency and duty cycles to keep initial  $T_J=25^\circ\text{C}$ .
4. The maximum current rating is package limited.
5.  $R_{\theta JA}$  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.
6. The test condition is  $L=0.1\text{mH}$ ,  $I_{AS}=38A$ ,  $V_{DD}=25V$ ,  $V_{GS}=10V$ , Starting  $T_J=25^\circ\text{C}$ .
7. Guaranteed by design, not subject to production testing.



# PJQ5846-AU

## TYPICAL CHARACTERISTIC CURVES

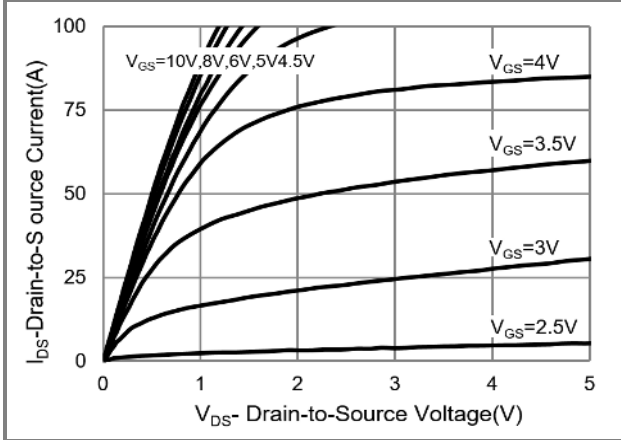


Fig.1 Output Characteristics

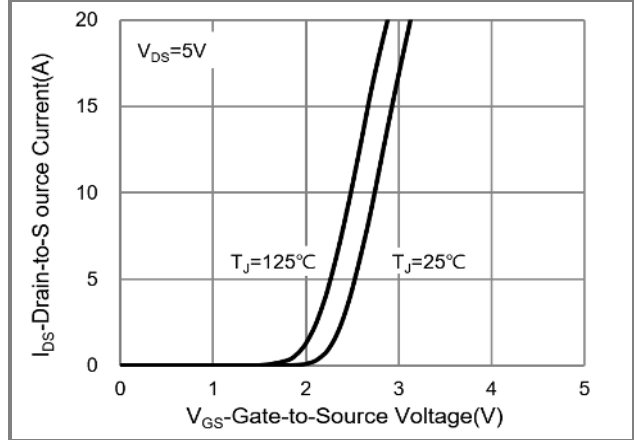


Fig.2 Transfer Characteristics

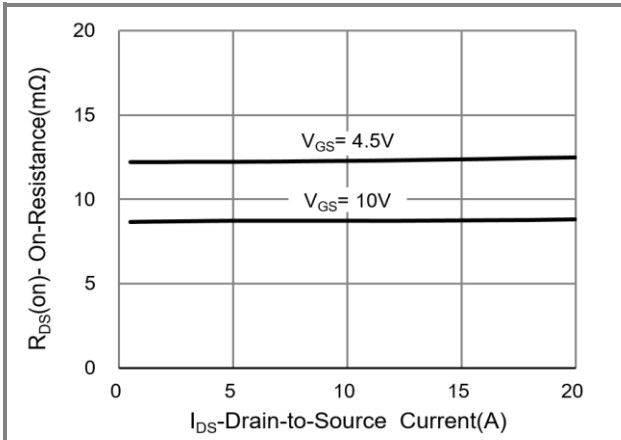


Fig.3 On-Resistance vs. Drain Current

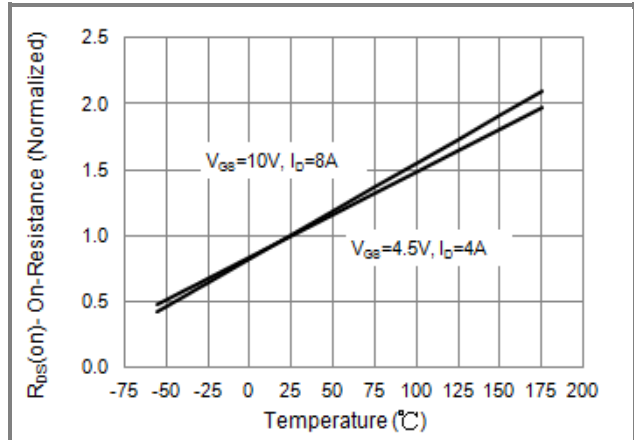


Fig.4 On-Resistance vs. Junction temperature

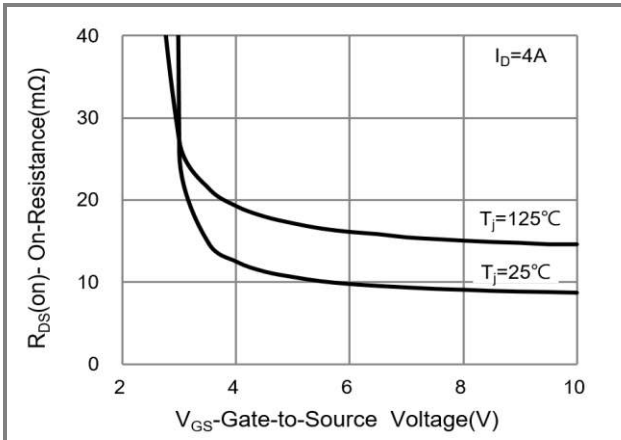


Fig.5 On-Resistance Variation with  $V_{GS}$

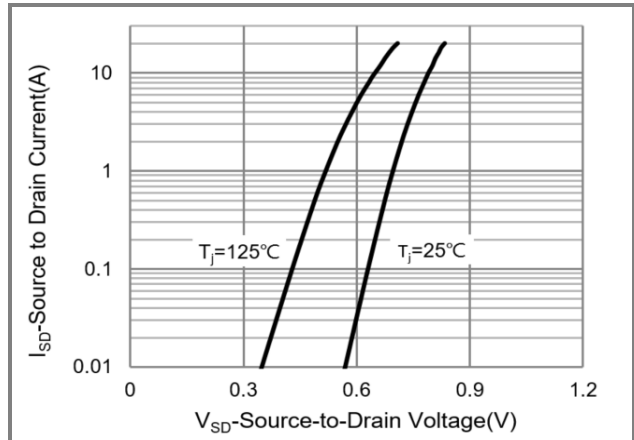


Fig.6 Source-Drain Diode Forward Voltage



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## TYPICAL CHARACTERISTIC CURVES

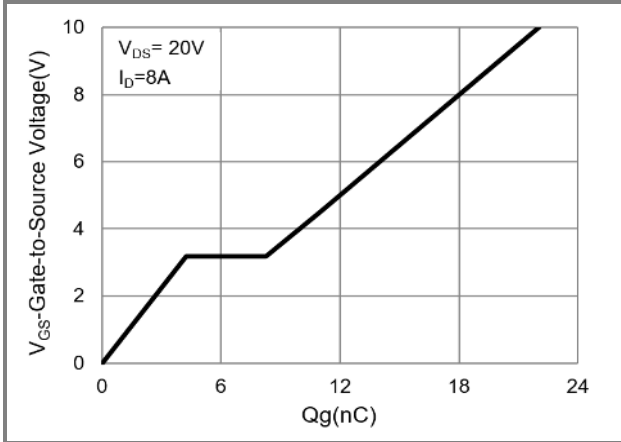


Fig.7 Gate-Charge Characteristics

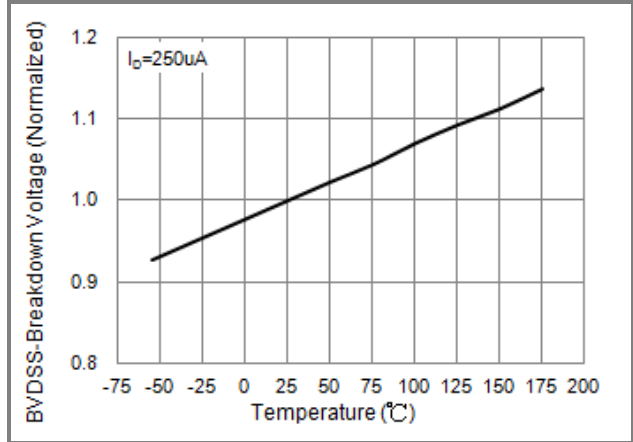


Fig.8 Breakdown Voltage Variation vs. Temperature

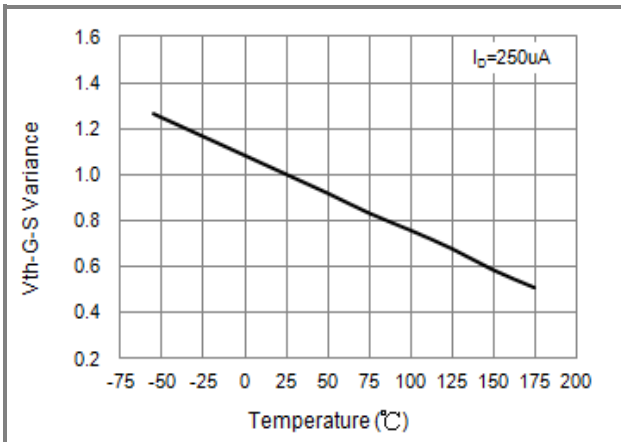


Fig.9 Threshold Voltage Variation with Temperature

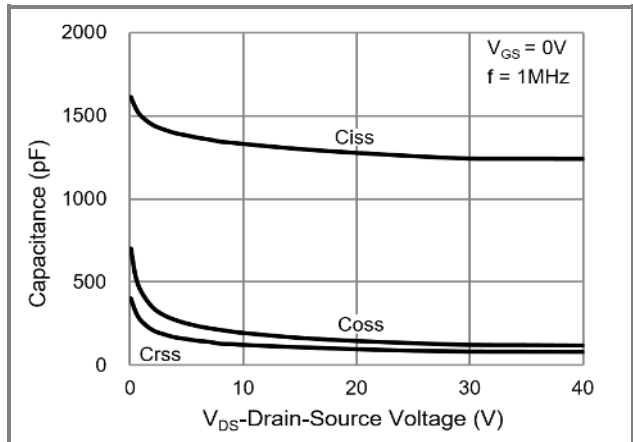


Fig.10 Capacitance vs. Drain-Source Voltage

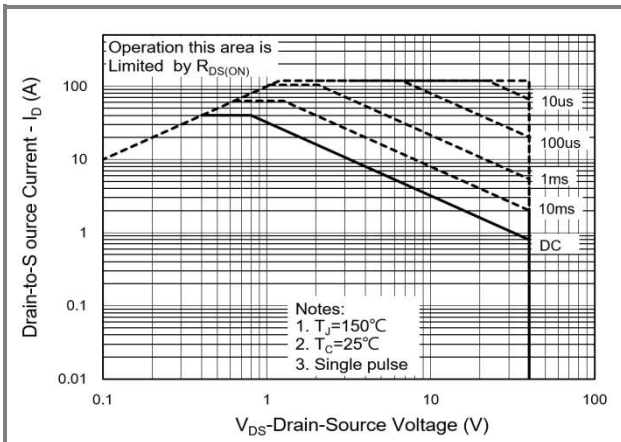


Fig.11 Maximum Safe Operating Area

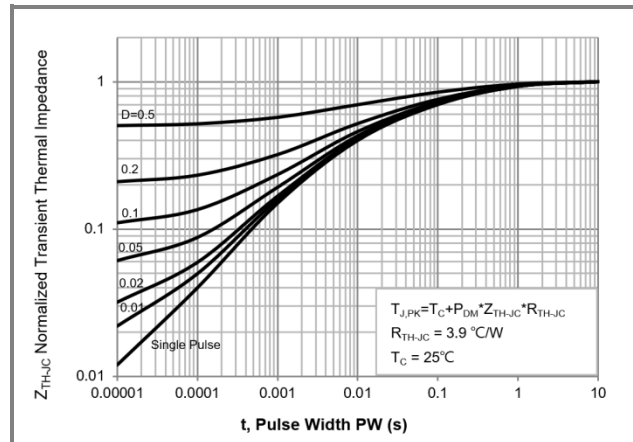


Fig.12 Normalized Transient Thermal Impedance

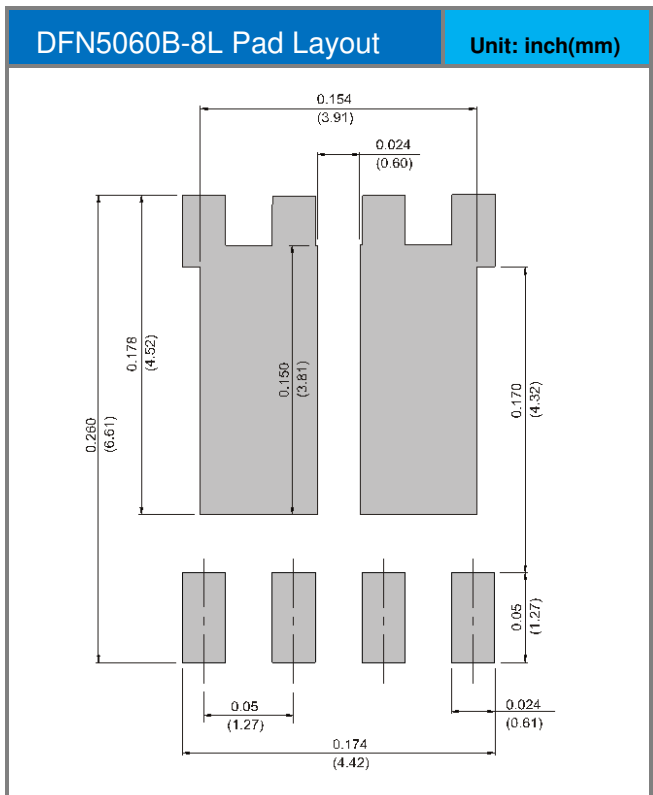
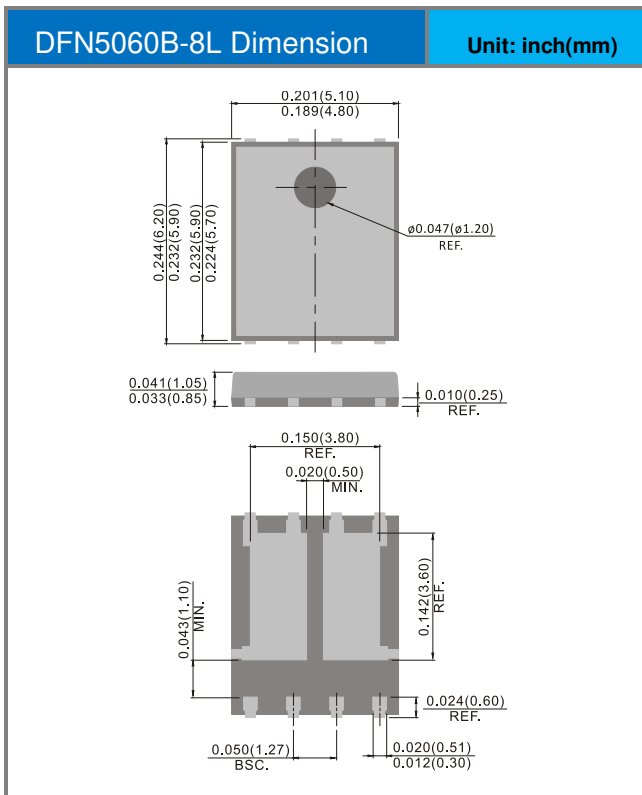


# PJQ5846-AU

## Part No Packing Code Version

Part No Packing Code	Package Type	Packing Type	Marking	Version
PJQ5846-AU_R2_000A1	DFN5060B-8L	3000pcs / 13" reel	Q5846	Halogen free

## Packaging Information & Mounting Pad Layout





## PJQ5846-AU

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