

100V N-Channel Power MOSFET

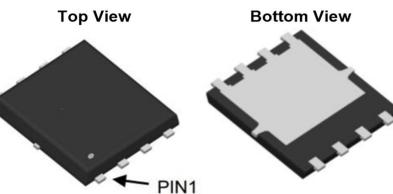
Product Summary

V _{DS}	R _{DS(ON)_MAX}	I _{D_MAX}
100 V	8.8 mΩ @ V _{GS} = 10V	74 A

Features

- N-Channel Enhancement Mode - Standard Level
- 175°C Operating Temperature
- 100% UIS and R_g Tested
- AEC-Q101 qualified (Automotive grade with suffix "Q".)
- Expsemi electronics

PDFN5060-8L

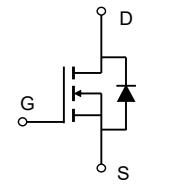
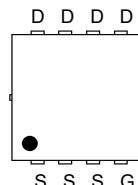


Applications

- General Automotive Applications

Mechanical Data

- Green Molding Compound
- Moisture Sensitivity: Level 1 per J-STD-020
- UL Flammability Classification Rating 94V-0



PIN Configuration
(Top View)

Schematic Diagram

Ordering Information

Orderable Part Number	Package Type	Device Marking	Form	Quantity (pcs)
EPT10N088HCFQ	PDFN5060-8L	10T08AHQ	13" Tape&Reel	5,000

Maximum Ratings (@ T_C = 25°C, unless otherwise specified.)

Parameter	Symbol	Value	Unit
Drain - Source Voltage	V _{DS}	100	V
Gate - Source Voltage	V _{GS}	±20	V
Continuous Drain Current (V _{GS} = 10V) ⁽¹⁾	I _D	74	A
		52	A
Pulsed Drain Current ⁽²⁾	I _{DM}	297	A
Single Pulse Avalanche Energy ⁽³⁾	E _{AS}	194	mJ
Single Pulse Avalanche Current (L= 0.1mH)	I _{AS}	35	A
Power Dissipation	P _D	100	W
		50	W
Junction & Storage Temperature Range	T _J , T _{STG}	-55 ~ +175	°C

Thermal Characteristics

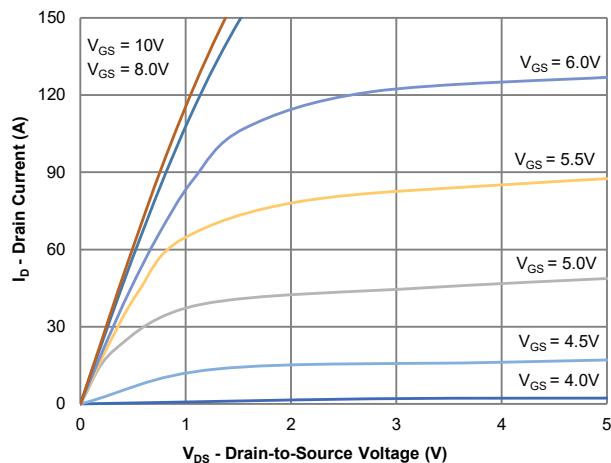
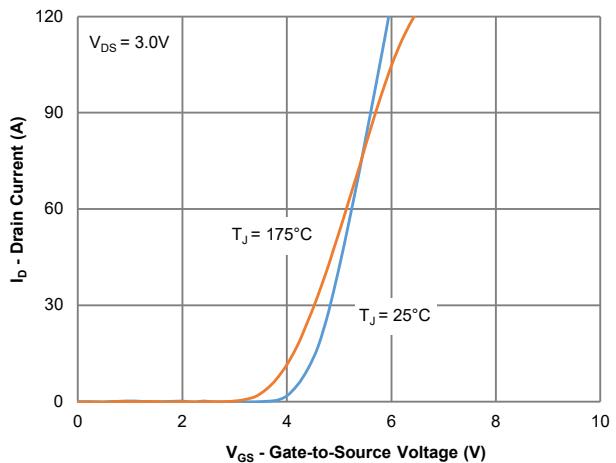
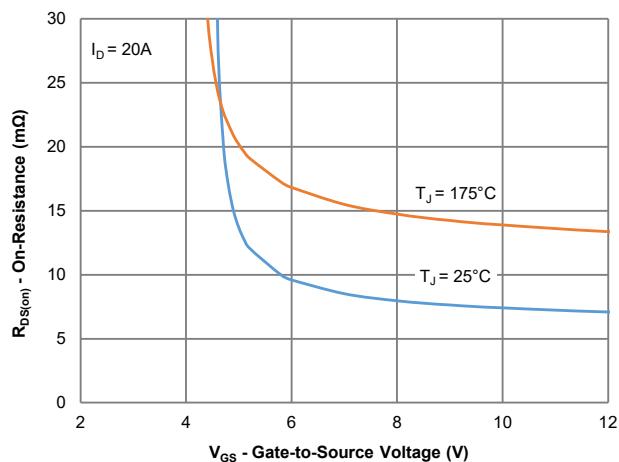
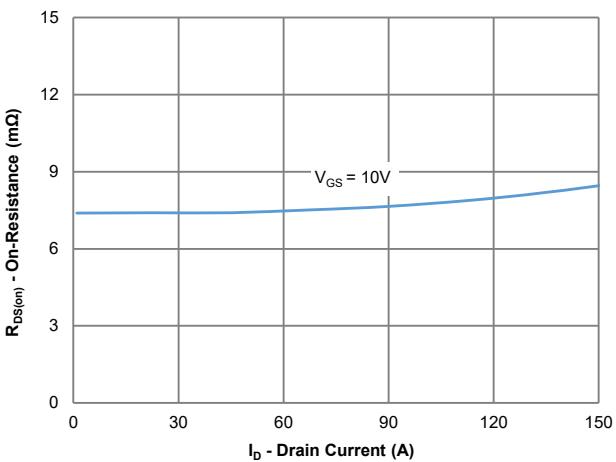
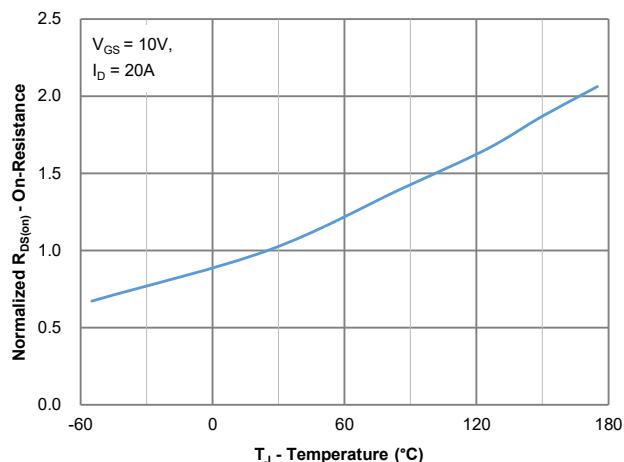
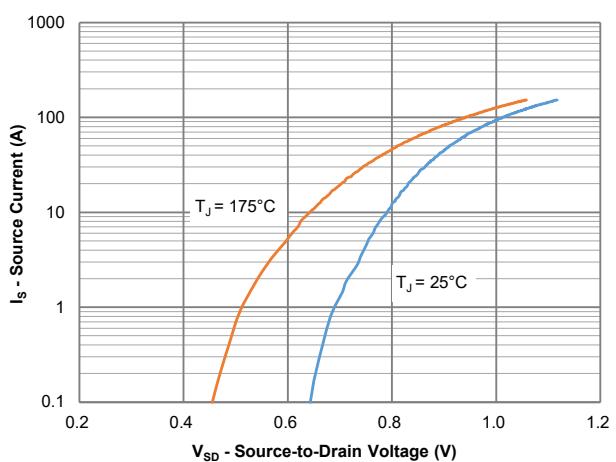
Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient ⁽⁴⁾	R _{θJA}	36	45	°C/W
Thermal Resistance, Junction-to-Case ⁽⁵⁾	R _{θJC}	1.2	1.5	°C/W

Electrical Characteristics (@ $T_J = 25^\circ\text{C}$, unless otherwise specified.)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Off Characteristics⁽⁶⁾						
Drain-Source Breakdown Voltage	$V_{(\text{BR})DSS}$	$V_{GS} = 0V, I_D = 250\mu\text{A}$	100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 100V, V_{GS} = 0V$ $T_J = 125^\circ\text{C}$	-	-	1.0	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 100	nA
On Characteristics⁽⁶⁾						
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	2.0	3.0	4.0	V
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	$V_{GS} = 10V, I_D = 20\text{A}$	-	7.4	8.8	$\text{m}\Omega$
Forward Transconductance	g_{fs}	$V_{DS} = 5.0V, I_D = 20\text{A}$	-	24	-	S
Diodes Forward Voltage	V_{SD}	$I_S = 2.0\text{A}, V_{GS} = 0V$	-	0.7	1.2	V
Dynamic Characteristics⁽⁷⁾						
Input Capacitance	C_{iss}	$V_{DS} = 50V, V_{GS} = 0V, f = 1\text{MHz}$	-	1345	-	pF
Output Capacitance	C_{oss}		-	607	-	pF
Reverse Transfer Capacitance	C_{rss}		-	11.5	-	pF
Gate Resistance	R_g	$V_{GS} = 0V, V_{DS} = 0V, f = 1\text{MHz}$	-	1.5	-	Ω
Switching Characteristics⁽⁷⁾						
Turn-On DelayTime	$t_{d(on)}$	$V_{GS} = 10V, V_{DS} = 50V$ $I_D = 20\text{A}, R_{GEN} = 3.0\Omega$	-	6.9	-	ns
Rise Time	t_r		-	4.5	-	ns
Turn-Off DelayTime	$t_{d(off)}$		-	13	-	ns
Fall Time	t_f		-	6.3	-	ns
Gate Charge Characteristics⁽⁷⁾						
Total Gate Charge ($V_{GS} = 10V$)	Q_g	$V_{DS} = 50V, I_D = 20\text{A}$ $V_{GS} = 10V$	-	20	-	nC
Total Gate Charge ($V_{GS} = 6.0V$)	Q_g		-	12.8	-	nC
Gate-Source Charge	Q_{gs}		-	6.1	-	nC
Gate-Drain Charge	Q_{gd}		-	4.2	-	nC
Gate Plateau Voltage	$V_{plateau}$		-	4.7	-	V
Drain-Source Diode Characteristics⁽⁷⁾						
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 20\text{A}, dI/dt = 100\text{A}/\mu\text{s}$	-	46	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}	$T_J = 25^\circ\text{C}$	-	71	-	nC
Diode Forward Current	I_S	$T_C = 25^\circ\text{C}$	-	-	74	A

Notes:

1. This current is chip limited, which is calculated based on R_{thjc} .
2. This current is calculated on single pulse with $10\mu\text{s}$ Pulse & Duty Cycle = 1%.
3. Defined by design, not subject to production test, E_{AS} condition: $T_J=25^\circ\text{C}, V_{DD}=50V, V_{GS}=10V, L=1.0\text{mH}$.
4. Device mounted on FR-4 substrate PC board with 2oz copper in 1inch square cooling area.
5. Thermal resistance from junction to soldering point (on the exposed drain pad).
6. Short duration pulse test used to minimize self-heating effect.
7. Defined by design, not subject to production.

Typical Electrical and Thermal Characteristics

Figure 1: Output Characteristics

Figure 2: Transfer Characteristics

Figure 3: On-Resistance vs. Gate-Source Voltage

Figure 4: On-Resistance vs. Gate-Source Voltage

Figure 5: On-Resistance vs. Junction Temperature

Figure 6: Source-Drain Diode Forward Voltage

Typical Electrical and Thermal Characteristics

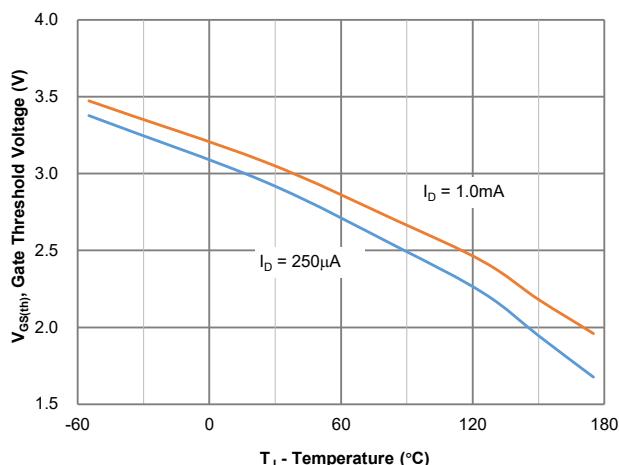


Figure 7: Gate Threshold Variation vs. Junction Temperature

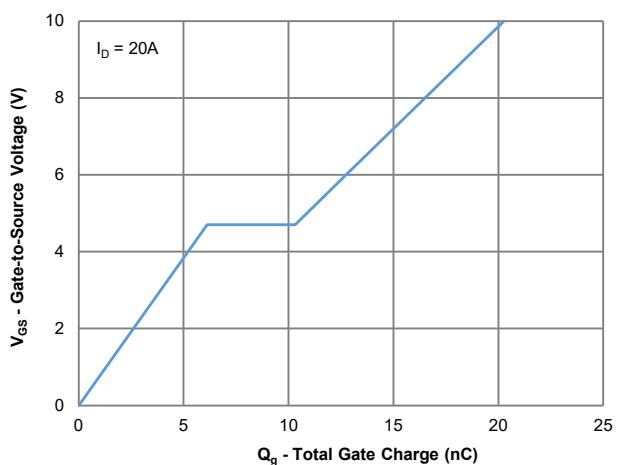


Figure 8: Gate Charge Characteristics

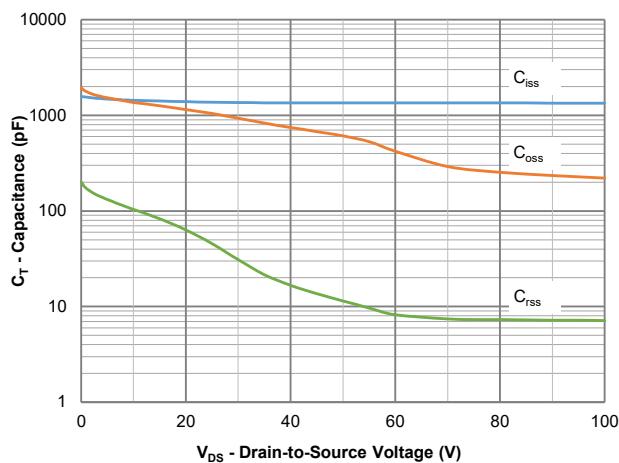


Figure 9: Capacitance Characteristics

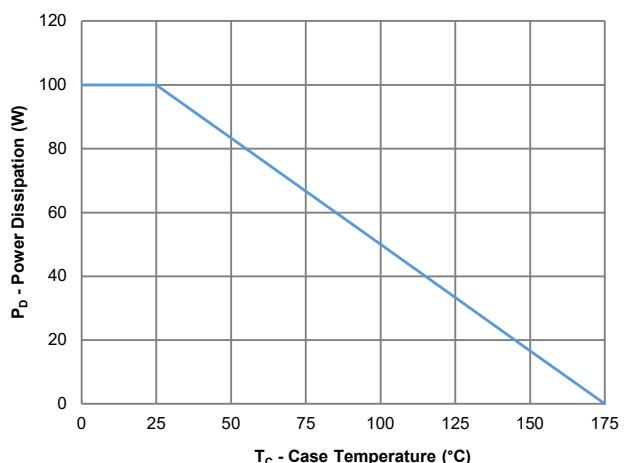


Figure 10: Power Derating

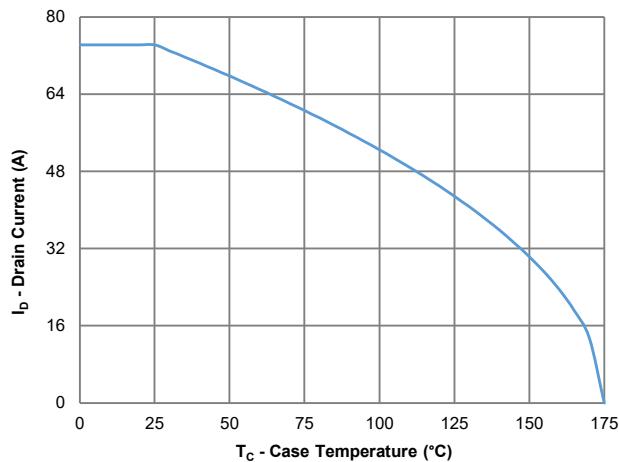


Figure 11: Current Derating

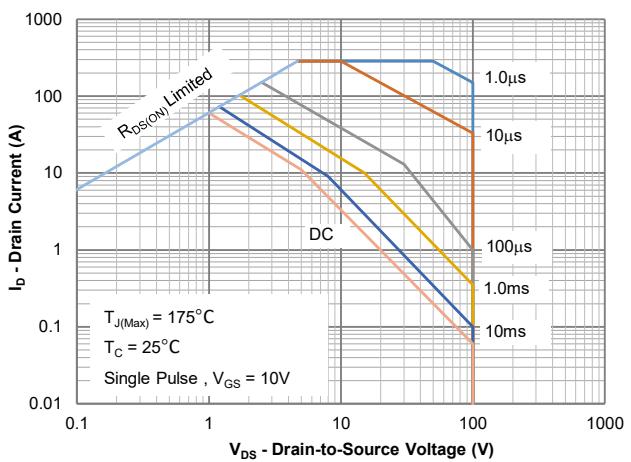


Figure 12: Safe Operating Area

Typical Electrical and Thermal Characteristics

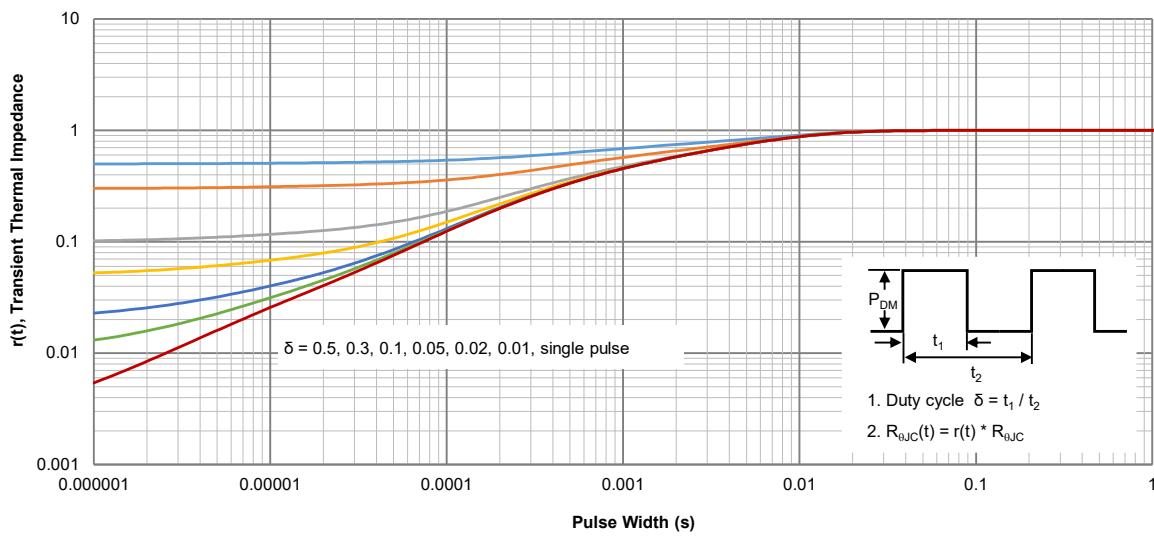
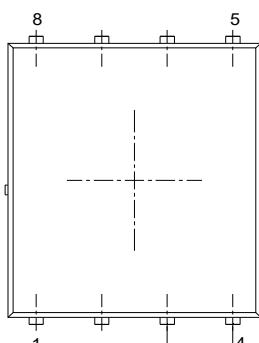
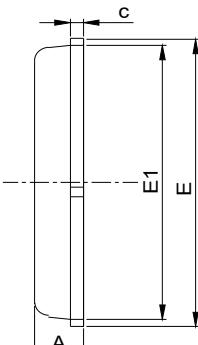


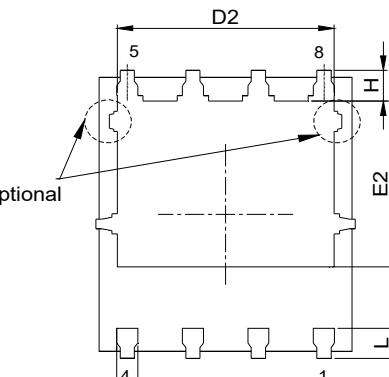
Figure 13: Normalized Maximum Transient Thermal Impedance

PDFN5060-8L Package Outline
Package Outline


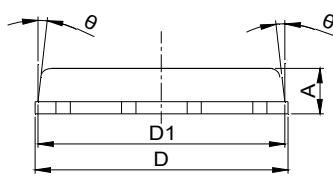
Top View



Side View



Bottom View

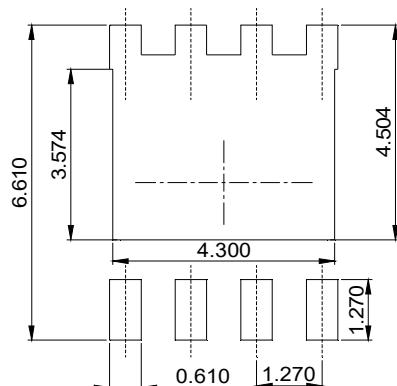


Front View

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. ALL DIMNESIONS IN MILLIMETER (ANGLE IN DEGREE).
3. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	0.90	1.05	1.20
b	0.20	0.41	0.51
c	0.21	0.25	0.34
D	4.80	--	5.40
D1	4.65	--	5.30
D2	3.60	--	4.25
E	5.90	--	6.30
E1	5.65	--	6.00
E2	3.38	--	3.92
e	1.27BSC		
H	0.40	0.60	0.75
L	0.40	0.60	0.75
θ	0°	--	12°

Recommended Soldering Footprint


DIMENSIONS:MILLIMETERS