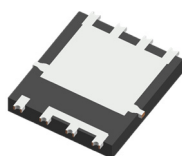


Product Summary

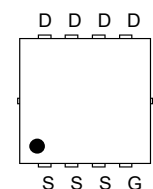
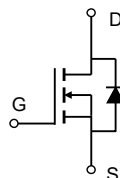
V_{DS}	$R_{DS(ON)_TYP}$	I_{D_MAX}
120 V	2.5 mΩ @ $V_{GS} = 10V$	166 A

PDFN5060-8L-W


Top View



Bottom View


 PIN Configuration
(Top View)


Schematic Diagram

Sinesemi Automotive MOSFET

Features

- N-Channel Enhancement Mode - Standard Level
- AEC-Q101 Qualified, PPAP Capable
- 175°C Operating Temperature
- 100% ΔV_{DS} & UIS & Rg Tested
- Wettable Flank for Improved Optical Inspection

Applications

- General Automotive Applications

Mechanical Data

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

Ordering Information

Orderable Part Number	Package Type	Device Marking	Form	Quantity (pcs)
SMT12T02AHPWQ	PDFN5060-8L-W	12T02AHQ	13" Tape&Reel	5,000

Maximum Ratings (@ $T_C = 25^\circ\text{C}$, unless otherwise specified.)

Parameter	Symbol	Value	Unit
Drain - Source Voltage	V_{DS}	120	V
Gate - Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($V_{GS} = 10V$) ⁽¹⁾	I_D	$T_C = 25^\circ\text{C}$ 166	A
		$T_C = 100^\circ\text{C}$ 118	A
Pulsed Drain Current ⁽²⁾	I_{DM}	666	A
Single Pulse Avalanche Energy ⁽³⁾	E_{AS}	960	mJ
Single Pulse Avalanche Current ($L = 0.1\text{mH}$)	I_{AS}	80	A
Power Dissipation	P_D	$T_C = 25^\circ\text{C}$ 176	W
		$T_C = 100^\circ\text{C}$ 88	W
Junction & Storage Temperature Range	T_J, T_{STG}	-55 ~ +175	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient ⁽⁴⁾	$R_{\theta JA}$	28	35	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case ⁽⁵⁾	$R_{\theta JC}$	0.65	0.85	$^\circ\text{C/W}$

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 _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	120	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 120V, V _{GS} = 0V	-	-	1.0	μA
		T _J = 125°C	-	-	100	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V	-	-	±100	nA
On Characteristics ⁽⁶⁾						
Gate Threshold Voltage	V _{GS(th)}	V _{GS} = V _{DS} , I _D = 250μA	2.0	3.0	4.0	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 20A	-	2.5	2.9	mΩ
Forward Transconductance	g _{fs}	V _{DS} = 5.0V, I _D = 20A	-	67	-	S
Diodes Forward Voltage	V _{SD}	I _S = 2.0A, V _{GS} = 0V	-	0.7	1.2	V
Dynamic Characteristics ⁽⁷⁾						
Input Capacitance	C _{iss}	V _{DS} = 60V, V _{GS} = 0V, f = 1MHz	-	4548	5912	pF
Output Capacitance	C _{oss}		-	1814	2358	pF
Reverse Transfer Capacitance	C _{rss}		-	22	44	pF
Gate Resistance	R _g	V _{GS} = 0V, V _{DS} = 0V, f = 1MHz	-	1.2	-	Ω
Switching Characteristics ⁽⁷⁾						
Turn-On DelayTime	t _{d(on)}	V _{GS} = 10V, V _{DS} = 60V I _D = 20A, R _{GEN} = 3.0Ω	-	11	-	ns
Rise Time	t _r		-	14	-	ns
Turn-Off DelayTime	t _{d(off)}		-	40	-	ns
Fall Time	t _f		-	22	-	ns
Gate Charge Characteristics ⁽⁷⁾						
Total Gate Charge (V _{GS} = 10V)	Q _g	V _{DS} = 60V, I _D = 20A V _{GS} = 10V	-	63	82	nC
Total Gate Charge (V _{GS} = 6.0V)	Q _g		-	40	52	nC
Gate-Source Charge	Q _{gs}		-	18.7	28	nC
Gate-Drain Charge	Q _{gd}		-	13.1	20	nC
Gate Plateau Voltage	V _{plateau}		-	4.6	-	V
Drain-Source Diode Characteristics ⁽⁷⁾						
Body Diode Reverse Recovery Time	t _{rr}	I _F = 20A, dI/dt = 100A/μs, T _J = 25°C	-	130	-	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	153	-	nC
Diode Forward Current	I _S	T _C = 25°C	-	-	166	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 μs Single Pulse.
3. Defined by design, not subject to production test, E_{AS} condition: $T_J = 25^\circ\text{C}$, $V_{DS} = 60V$, $V_{GS} = 10V$, $L = 1.0mH$.
4. Device mounted on FR-4 substrate PC board with 2oz copper in 1inch square cooling area.
5. Thermal resistance from junction to the exposed 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

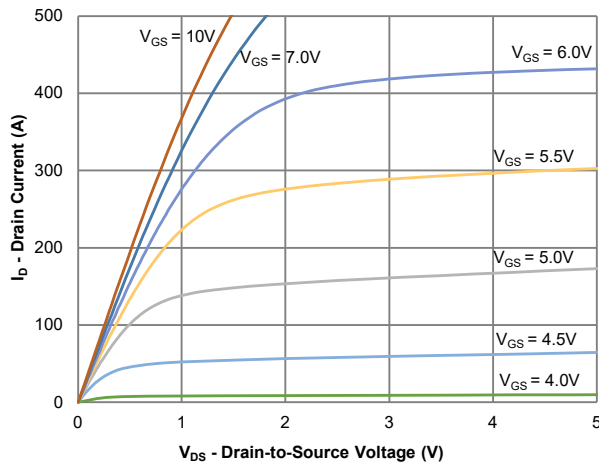


Figure 1: Output Characteristics

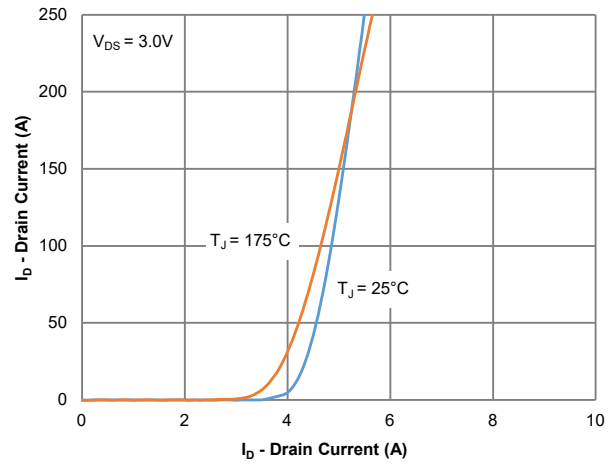


Figure 4: On-Resistance vs. Drain Current and Gate Voltage

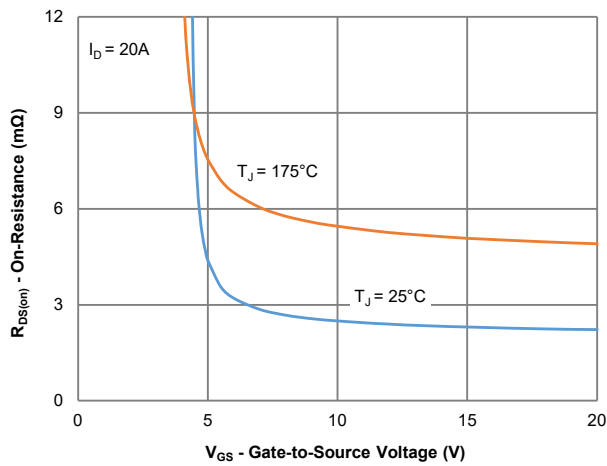


Figure 3: On-Resistance vs. Gate-Source Voltage

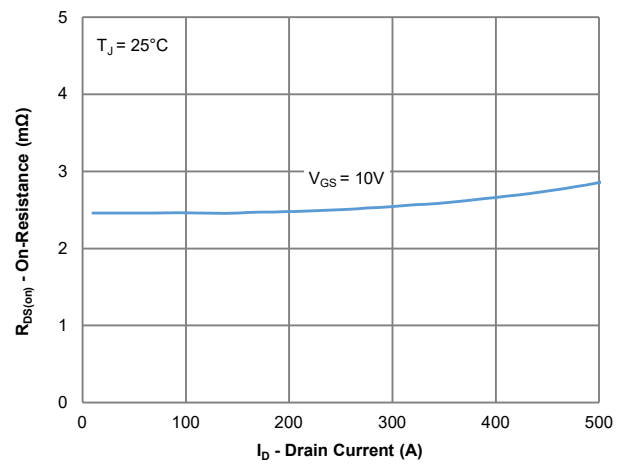


Figure 4: On-Resistance vs. Gate-Source Voltage

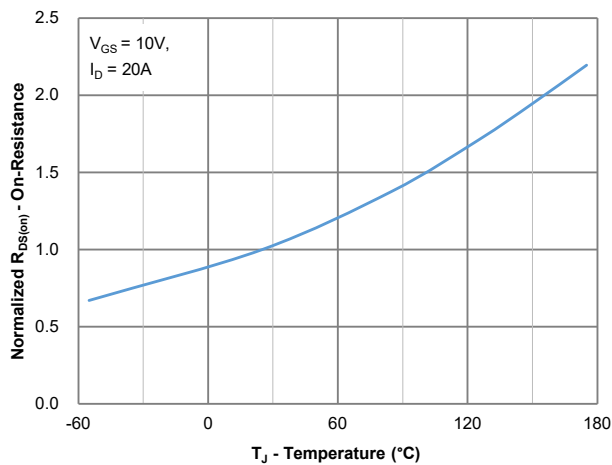


Figure 5: On-Resistance vs. Junction Temperature

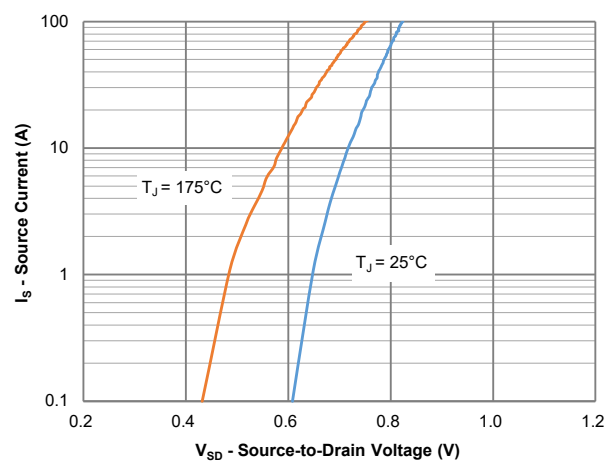


Figure 6: Source-Drain Diode Forward Voltage

Typical Electrical and Thermal Characteristics

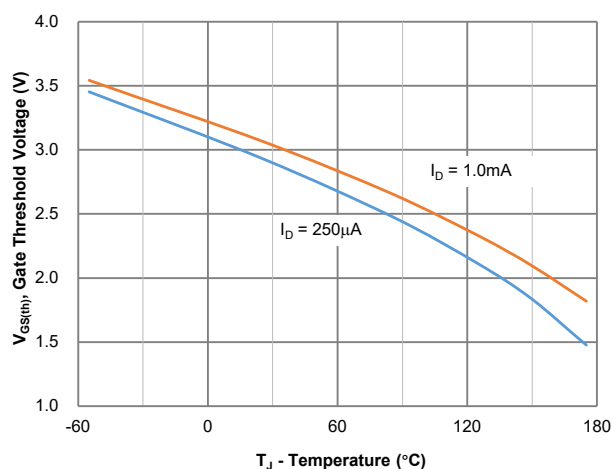


Figure 7: Gate Threshold Variation vs. Junction Temperature

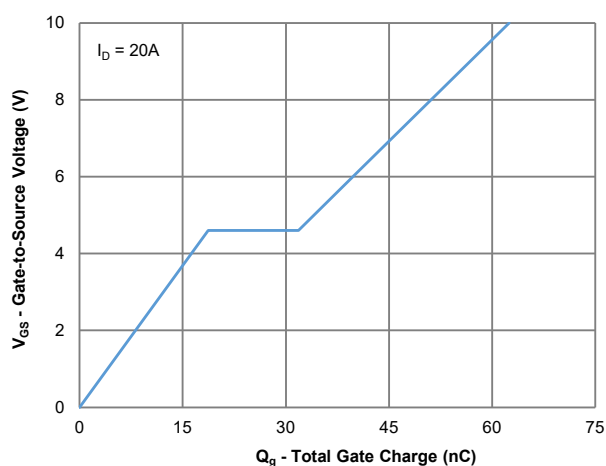


Figure 8: Gate Charge Characteristics

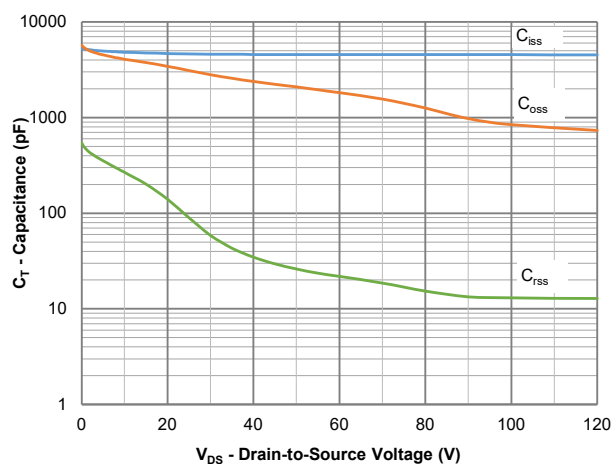


Figure 9: Capacitance Characteristics

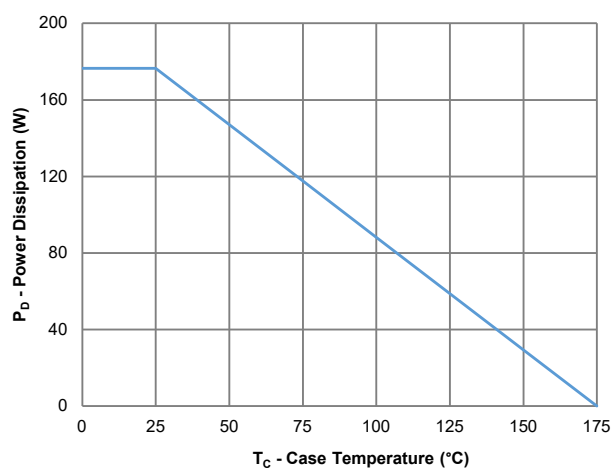


Figure 10: Power Derating

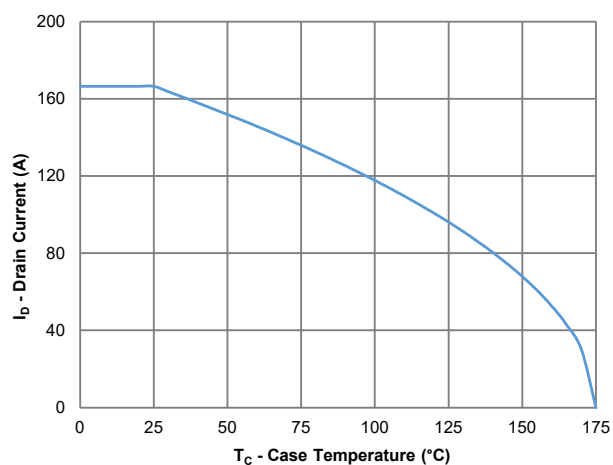


Figure 11: Current Derating

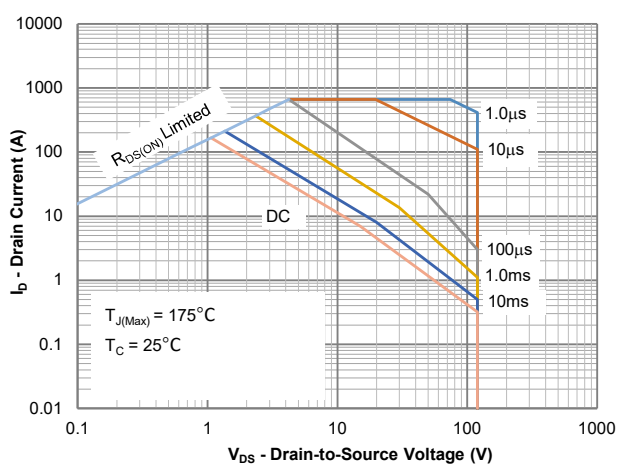


Figure 12: Safe Operating Area

Typical Electrical and Thermal Characteristics

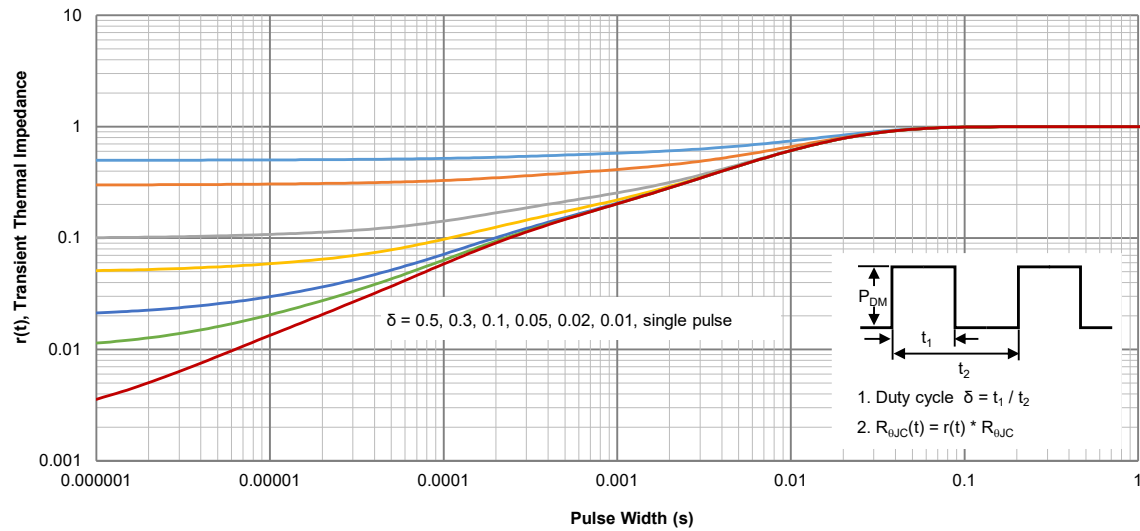
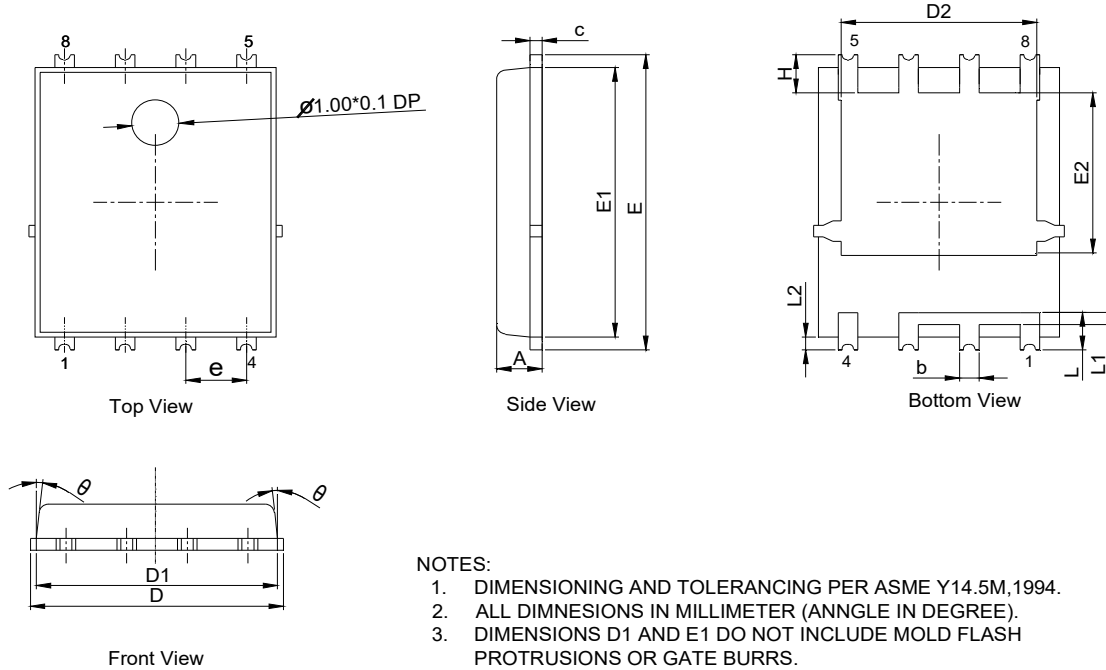


Figure 13: Normalized Maximum Transient Thermal Impedance

PDFN5060-8L-W Package Outline
Package Outline

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. ALL DIMENSIONS 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	0.900	1.000	1.100
b	0.320	0.420	0.520
c	0.210	0.250	0.340
D	5.050	5.200	5.400
D1	4.950	5.050	5.150
D2	4.000	4.100	4.200
E	6.300	6.400	6.500
E1	5.750	5.850	5.950
E2	3.580	3.680	3.780
e	1.270 BSC		
H	0.600	0.700	0.800
L	0.650	0.750	0.850
L1	0.160	0.260	0.360
L2	0.200	0.275	0.350
θ	0°	--	12°

Recommended Soldering Footprint
