# SQJ910AEP

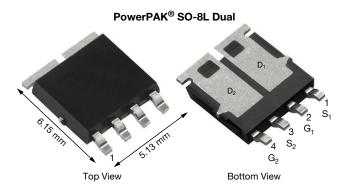
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**Vishay Siliconix** 

Sa

N-Channel MOSFET

# Automotive Dual N-Channel 30 V (D-S) 175 °C MOSFET



PRODUCT SUMMARY	
V <sub>DS</sub> (V)	30
$R_{DS(on)} (\Omega)$ at $V_{GS} = 10 V$	0.007
$R_{DS(on)}$ ( $\Omega$ ) at $V_{GS}$ = 4.5 V	0.0086
I <sub>D</sub> (A) per leg	30
Configuration	Dual

### **FEATURES**

- TrenchFET<sup>®</sup> Power MOSFET
- 100 % R<sub>g</sub> and UIS Tested
- AEC-Q101 Qualified<sup>d</sup>
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

N-Channel MOSFET



RoHS COMPLIANT HALOGEN FREE

ORDERING INFORMATION	
Package	PowerPAK SO-8L
Lead (Pb)-free and halogen-free	SQJ910AEP (for detailed order number please see www.vishav.com/doc?79771)

<b>ABSOLUTE MAXIMUM RATINGS</b> (T	<sub>C</sub> = 25 °C, unles	s otherwise noted	ł)		
PARAMETER		SYMBOL	LIMIT	UNIT	
Drain-Source Voltage Gate-Source Voltage		V <sub>DS</sub>	30	- V	
		V <sub>GS</sub>	± 20		
Continuous Drain Current <sup>a</sup>	T <sub>C</sub> = 25 °C	1	30		
Continuous Drain Current-	T <sub>C</sub> = 125 °C	ID	30		
Continuous Source Current (Diode Conduction) <sup>a</sup>		ا <sub>S</sub>	30	A	
Pulsed Drain Current <sup>b</sup>		I <sub>DM</sub>	120		
Single Pulse Avalanche Current	L = 0.1 mH	I <sub>AS</sub>	29		
Single Pulse Avalanche Energy	L = 0.1 mH	E <sub>AS</sub>	42	mJ	
Martin an Decision Disate attach	T <sub>C</sub> = 25 °C	PD	48	w	
Maximum Power Dissipation <sup>b</sup>	T <sub>C</sub> = 125 °C	FD	16	vv	
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	- 55 to + 175	°C	
Soldering Recommendations (Peak Temperature)	· · · · · · · · · · · · · · · · · · ·		C		

THERMAL RESISIANCE RATINGS				
PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-Ambient	PCB Mount <sup>c</sup>	R <sub>thJA</sub>	85	°C/W
Junction-to-Case (Drain)		R <sub>thJC</sub>	3.1	C/ W

#### Notes

a. Package limited

b. Pulse test; pulse width  $\leq$  300 µs, duty cycle  $\leq$  2 %

c. When mounted on 1" square PCB (FR4 material)

d. Parametric verification ongoing

e. See solder profile (<u>www.vishay.com/doc?73257</u>). The PowerPAK SO-8L is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection

f. Rework conditions: manual soldering with a soldering iron is not recommended for leadless components

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# SQJ910AEP

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PARAMETER	SYMBOL	TES	T CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static		-				-	
Drain-Source Breakdown Voltage	V <sub>DS</sub>	V <sub>GS</sub> :	= 0 V, I <sub>D</sub> = 250 μΑ	30	-	-	v
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =	= V <sub>GS</sub> , I <sub>D</sub> = 250 μΑ	1.5	2	2.5	V
Gate-Source Leakage	I <sub>GSS</sub>	V <sub>DS</sub> =	0 V, $V_{GS} = \pm 20 V$	-	-	± 100	nA
		$V_{GS} = 0 V$	V <sub>DS</sub> = 30 V	-	-	1	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	$V_{GS} = 0 V$	V <sub>DS</sub> = 30 V, T <sub>J</sub> = 125 °C	-	-	50	μA
-		$V_{GS} = 0 V$	V <sub>DS</sub> = 30 V, T <sub>J</sub> = 175 °C	-	-	150	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	$V_{GS} = 10 V$	$V_{DS} \ge 5 V$	30	-	-	Α
		$V_{GS} = 10 V$	I <sub>D</sub> = 12 A	-	0.0058	0.007	
During Country On Otata Desistances	R	$V_{GS} = 4.5 V$	I <sub>D</sub> = 10.7 A	-	0.0072	0.0086	
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V	I <sub>D</sub> = 12 A, T <sub>J</sub> = 125 °C	-	-	0.0096	Ω
		V <sub>GS</sub> = 10 V	I <sub>D</sub> = 12 A, T <sub>J</sub> = 175 °C	-	-	0.012	
Forward Transconductanceb	9 <sub>fs</sub>	V <sub>DS</sub>	= 15 V, I <sub>D</sub> = 12 A	-	72	-	S
Dynamic <sup>b</sup>		•		•			
Input Capacitance	C <sub>iss</sub>			-	1495	1869	
Output Capacitance	C <sub>oss</sub>	$V_{GS} = 0 V$	V <sub>DS</sub> = 15 V, f = 1 MHz	-	313	391	pF
Reverse Transfer Capacitance	C <sub>rss</sub>			-	126	158	
Total Gate Charge <sup>c</sup>	Qg			-	25.8	39	
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>	V <sub>GS</sub> = 10 V	$V_{DS} = 15 \text{ V}, \text{ I}_{D} = 11.3 \text{ A}$	-	4.3	-	nC
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			-	4.3	-	
Gate Resistance	R <sub>g</sub>		f = 1 MHz		1.38	2.10	Ω
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>			-	11	16	
Rise Time <sup>c</sup>	t <sub>r</sub>	- 	= 15 V. Rι = 1.4 Ω	-	3	4	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>	00	$V_{\text{GEN}} = 10 \text{ V}, \text{ R}_{\text{g}} = 1 \Omega$	-	27	40	ns
Fall Time <sup>c</sup>	t <sub>f</sub>	1		-	7	11	
Source-Drain Diode Ratings and Char	acteristics <sup>b</sup>	·					•
Pulsed Current <sup>a</sup>	I <sub>SM</sub>			-	-	120	Α
Forward Voltage	V <sub>SD</sub>	I <sub>F</sub> =	7.8 A, V <sub>GS</sub> = 0 V	-	0.77	1.2	V

Notes

a. Pulse test; pulse width  $\leq 300~\mu s,~duty~cycle \leq 2~\%.$ 

b. Guaranteed by design, not subject to production testing.

c. Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

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**On-Resistance vs. Drain Current** 

I<sub>D</sub> - Drain Current (A)

0.005

0.000

0

For technical questions, contact: automostechsu

Document Number: 63748

24

Cost

30

g<sub>fs</sub> - Transconductance (S) 20 Τ<sub>C</sub> - 55 °C 0 2 3 5 0 3 6 9 4 I<sub>D</sub> - Drain Current (A) Transconductance 2500 2000  $\mathbf{C}_{\mathrm{iss}}$ C - Capacitance (pF) 1500

1000

500

0

0

 $C_{rss}$ 

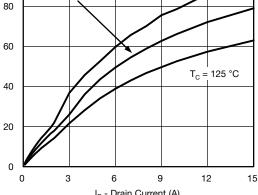
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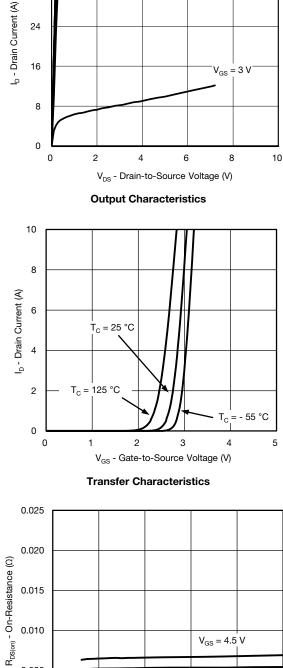
12

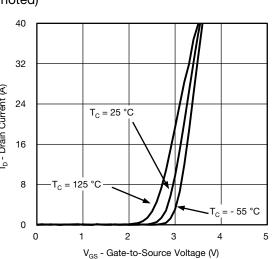
Capacitance

V<sub>DS</sub> - Drain-to-Source Voltage (V)

18



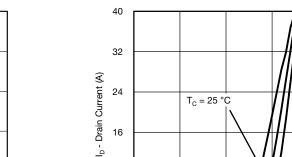






55 °C

 $\Gamma_{c}$ 



100

 $T_C = 25 \ ^\circ C$ 

# **TYPICAL CHARACTERISTICS** ( $T_A = 25 \text{ °C}$ , unless otherwise noted)

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 $V_{GS} = 10 V \text{ thru } 4 V$ 

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32

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 $V_{GS} = 10 V$ 

32

40

24

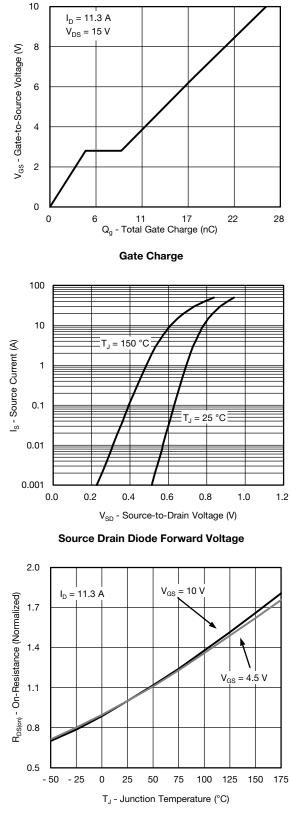
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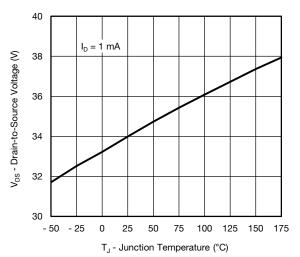


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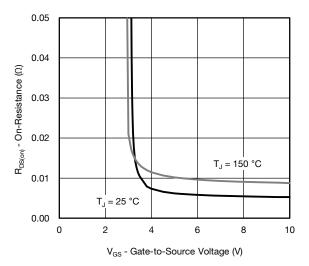
### **TYPICAL CHARACTERISTICS** ( $T_A = 25 \text{ °C}$ , unless otherwise noted)



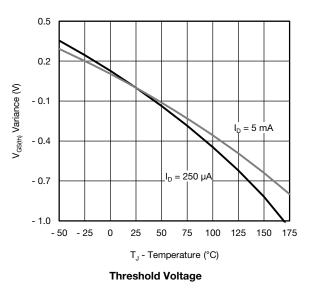
On-Resistance vs. Junction Temperature



Drain-Source Breakdown vs. Junction Temperature



On-Resistance vs. Gate-to-Source Voltage



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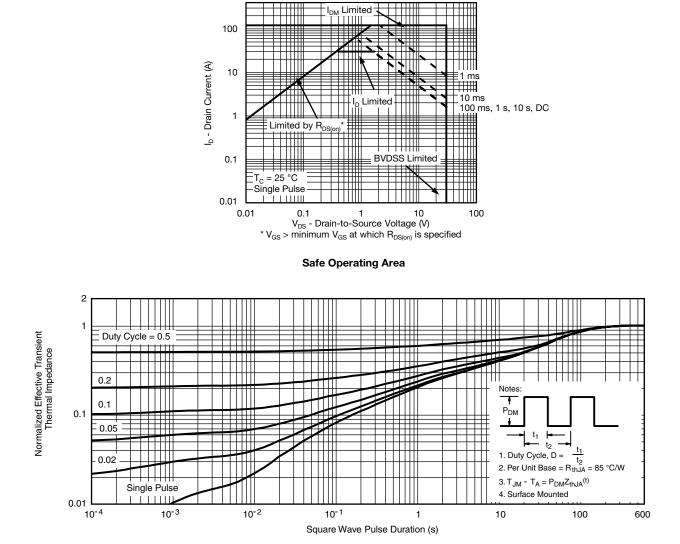
4 s. contact: automostechsi

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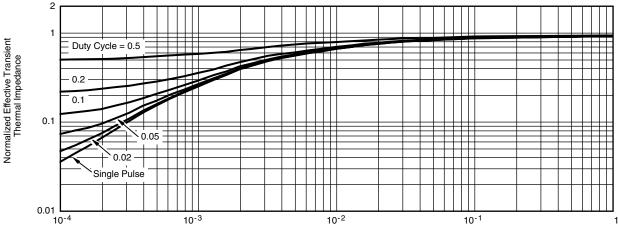
### **THERMAL RATINGS** ( $T_A = 25 \text{ °C}$ , unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient



### **THERMAL RATINGS** (T<sub>A</sub> = 25 °C, unless otherwise noted)



Square Wave Pulse Duration (s)

#### Normalized Thermal Transient Impedance, Junction-to-Case

#### Note

· The characteristics shown in the two graphs

- Normalized Transient Thermal Impedance Junction-to-Ambient (25 °C)

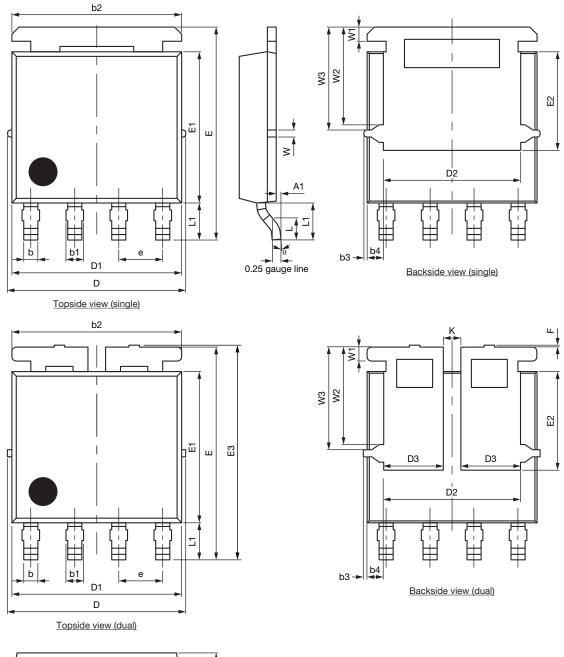
- Normalized Transient Thermal Impedance Junction-to-Case (25 °C)

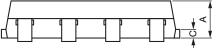
are given for general guidelines only to enable the user to get a "ball park" indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see <a href="http://www.vishay.com/ppg?63748">www.vishay.com/ppg?63748</a>.









# **Package Information**



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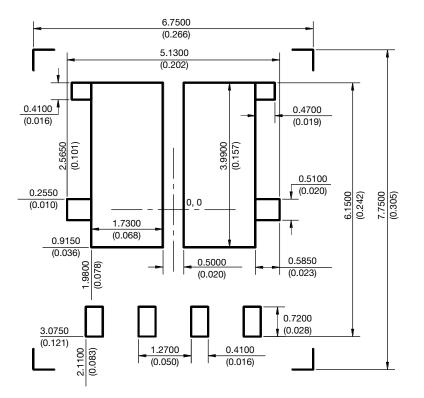
DIM.	MILLIMETERS			INCHES			
DIN.	MIN.	NOM.	MAX.	MIN.	NOM.	MAX	
А	1.00	1.07	1.14	0.039	0.042	0.045	
A1	0.00	-	0.127	0.00	-	0.005	
b	0.33	0.41	0.48	0.013	0.016	0.019	
b1	0.44	0.51	0.58	0.017	0.020	0.023	
b2	4.80	4.90	5.00	0.189	0.193	0.197	
b3		0.094			0.004		
b4		0.47			0.019		
С	0.20	0.25	0.30	0.008	0.010	0.012	
D	5.00	5.13	5.25	0.197	0.202	0.207	
D1	4.80	4.90	5.00	0.189	0.193	0.197	
D2	3.86	3.96	4.06	0.152	0.156	0.160	
D3	1.63	1.73	1.83	0.064	0.068	0.072	
е		1.27 BSC		0.050 BSC			
E	6.05	6.15	6.25	0.238	0.242	0.246	
E1	4.27	4.37	4.47	0.168	0.172	0.176	
E2	2.75	2.85	2.95	0.108	0.112	0.116	
E3	6.05	6.22	6.40	0.238	0.245	0.252	
F	-	-	0.15	-	-	0.006	
L	0.62	0.72	0.82	0.024	0.028	0.032	
L1	0.92	1.07	1.22	0.036	0.042	0.048	
К		0.51		0.020			
W		0.23		0.009			
W1		0.41		0.016			
W2		2.82		0.111			
W3		2.96		0.117			
θ	0°	-	10°	0°	-	10°	

Note

• Millimeters will govern



### **RECOMMENDED MINIMUM PAD FOR PowerPAK® SO-8L DUAL**



Recommended Minimum Pads Dimensions in mm (inches) Keep-out 6.75 (0.266) x 7.75 (0.305)

Revision: 07-Feb-12



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