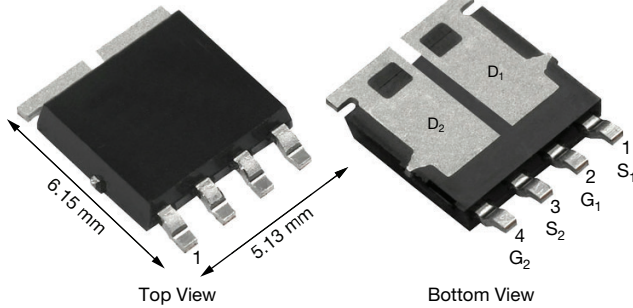


# Automotive Dual P-Channel 30 V (D-S) 175 °C MOSFET

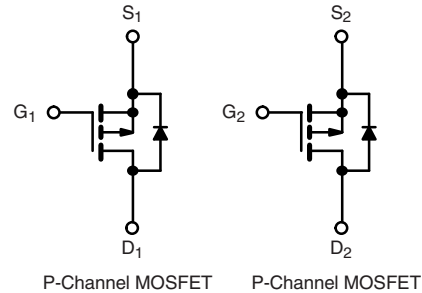
**PowerPAK® SO-8L Dual**

**FEATURES**

- TrenchFET® Power MOSFET
- AEC-Q101 qualified <sup>d</sup>
- 100 % R<sub>g</sub> and UIS tested
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

AUTOMOTIVE GRADE


**RoHS**  
 COMPLIANT  
 HALOGEN  
**FREE**

PRODUCT SUMMARY	
V <sub>DS</sub> (V)	- 30
R <sub>DS(on)</sub> (Ω) at V <sub>GS</sub> = - 10 V	0.017
R <sub>DS(on)</sub> (Ω) at V <sub>GS</sub> = - 4.5 V	0.036
I <sub>D</sub> (A)	- 30
Configuration	Dual



ORDERING INFORMATION	
Package	PowerPAK SO-8L
Lead (Pb)-free and halogen-free	SQJ951EP (for detailed order number please see <a href="http://www.vishay.com/doc?79771">www.vishay.com/doc?79771</a> )

ABSOLUTE MAXIMUM RATINGS (T <sub>C</sub> = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-source voltage		V <sub>DS</sub>	- 30	V
Gate-source voltage		V <sub>GS</sub>	± 20	
Continuous drain current	T <sub>C</sub> = 25 °C <sup>a</sup>	I <sub>D</sub>	- 30	A
	T <sub>C</sub> = 125 °C		- 28	
Continuous source current (diode conduction) <sup>a</sup>		I <sub>S</sub>	- 30	
Pulsed drain current <sup>b</sup>		I <sub>DM</sub>	- 120	
Single pulse avalanche current	L = 0.1 mH	I <sub>AS</sub>	- 27	
Single pulse avalanche energy		E <sub>AS</sub>	36.5	
Maximum power dissipation <sup>b</sup>	T <sub>C</sub> = 25 °C	P <sub>D</sub>	56	W
	T <sub>C</sub> = 125 °C		18.5	
Operating junction and storage temperature range		T <sub>J</sub> , T <sub>stg</sub>	- 55 to + 175	°C
Soldering recommendations (peak temperature) <sup>e, f</sup>			260	

THERMAL RESISTANCE 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>	2.7	

**Notes**

- Package limited
- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %
- When mounted on 1" square PCB (FR4 material)
- Parametric verification ongoing
- See solder profile ([www.vishay.com/doc?73257](http://www.vishay.com/doc?73257)). 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
- Rework conditions: manual soldering with a soldering iron is not recommended for leadless components



SPECIFICATIONS ( $T_C = 25\text{ }^\circ\text{C}$ , unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
<b>Static</b>							
Drain-source breakdown voltage	$V_{DS}$	$V_{GS} = 0, I_D = -250\text{ }\mu\text{A}$		-30	-	-	V
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$		-1.5	-2.0	-2.5	
Gate-source leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$		-	-	$\pm 100$	nA
Zero gate voltage drain current	$I_{DSS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = -30\text{ V}$	-	-	-1	$\mu\text{A}$
		$V_{GS} = 0\text{ V}$	$V_{DS} = -30\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	-	-50	
		$V_{GS} = 0\text{ V}$	$V_{DS} = -30\text{ V}, T_J = 175\text{ }^\circ\text{C}$	-	-	-150	
On-state drain current <sup>a</sup>	$I_{D(on)}$	$V_{GS} = -10\text{ V}$	$V_{DS} = -5\text{ V}$	-30	-	-	A
Drain-source on-state resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -10\text{ V}$	$I_D = -7.5\text{ A}$	-	0.014	0.017	$\Omega$
		$V_{GS} = -10\text{ V}$	$I_D = -7.5\text{ A}, T_J = 125\text{ }^\circ\text{C}$	-	-	0.034	
		$V_{GS} = -10\text{ V}$	$I_D = -7.5\text{ A}, T_J = 175\text{ }^\circ\text{C}$	-	-	0.039	
		$V_{GS} = -4.5\text{ V}$	$I_D = -5\text{ A}$	-	0.030	0.036	
Forward transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = -15\text{ V}, I_D = -7.5\text{ A}$		-	18	-	S
<b>Dynamic <sup>b</sup></b>							
Input capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}$	$V_{DS} = -10\text{ V}, f = 1\text{ MHz}$	-	1345	1680	$\mu\text{F}$
Output capacitance	$C_{oss}$			-	330	415	
Reverse transfer capacitance	$C_{rss}$			-	245	305	
Total gate charge <sup>c</sup>	$Q_g$	$V_{GS} = -10\text{ V}$	$V_{DS} = -15\text{ V}, I_D = -9\text{ A}$	-	33	50	nC
Gate-source charge <sup>c</sup>	$Q_{gs}$			-	5.5	-	
Gate-drain charge <sup>c</sup>	$Q_{gd}$			-	9.4	-	
Gate resistance	$R_g$	f = 1 MHz		3	6.31	10.5	$\Omega$
Turn-on delay time <sup>c</sup>	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 1.66\text{ }\Omega$ $I_D = -9\text{ A}, V_{GEN} = -10\text{ V}, R_g = 6\text{ }\Omega$		-	12	18	ns
Rise time <sup>c</sup>	$t_r$			-	12	18	
Turn-off delay time <sup>c</sup>	$t_{d(off)}$			-	39	59	
Fall time <sup>c</sup>	$t_f$			-	28	42	
<b>Source-Drain Diode Ratings and Characteristics <sup>b</sup></b>							
Pulsed current <sup>a</sup>	$I_{SM}$			-	-	-120	A
Forward voltage	$V_{SD}$	$I_F = -4.5\text{ A}, V_{GS} = 0$		-	-0.8	-1.2	V

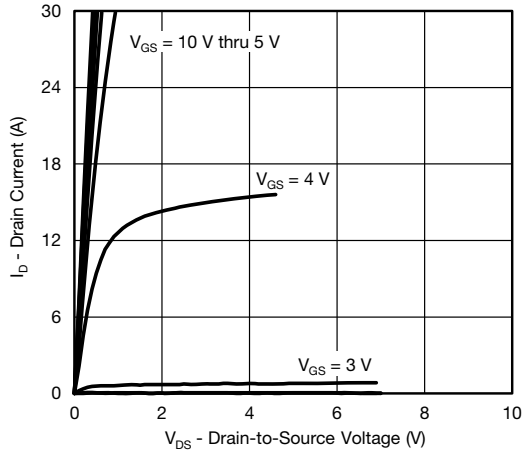
**Notes**

- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$   
b. Guaranteed by design, not subject to production testing  
c. Independent of operating temperature

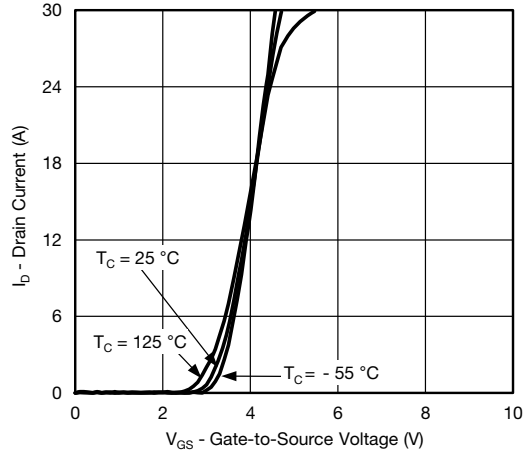
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



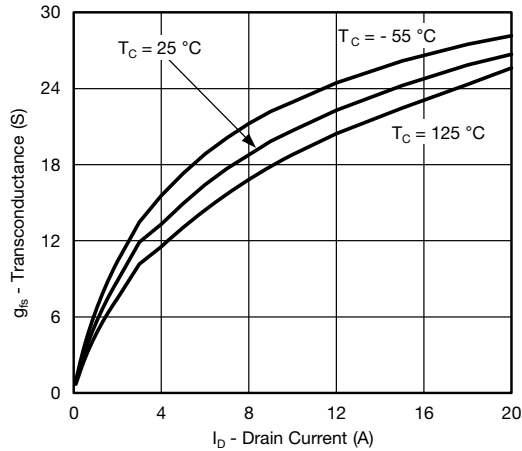
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C, unless otherwise noted)



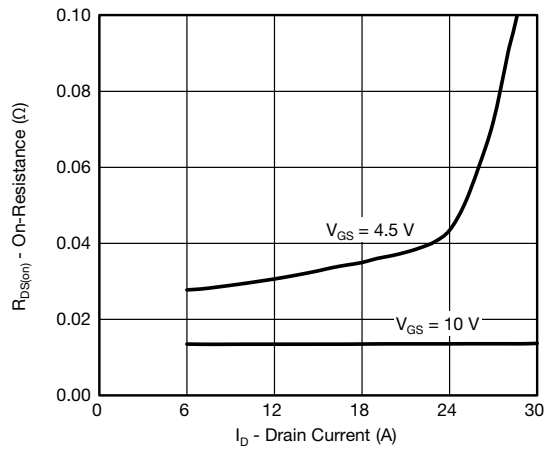
Output Characteristics



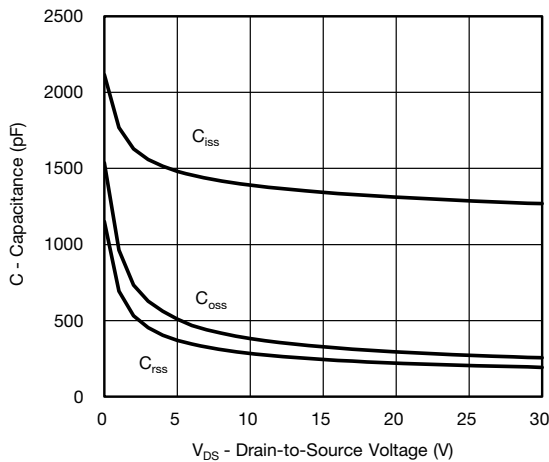
Transfer Characteristics



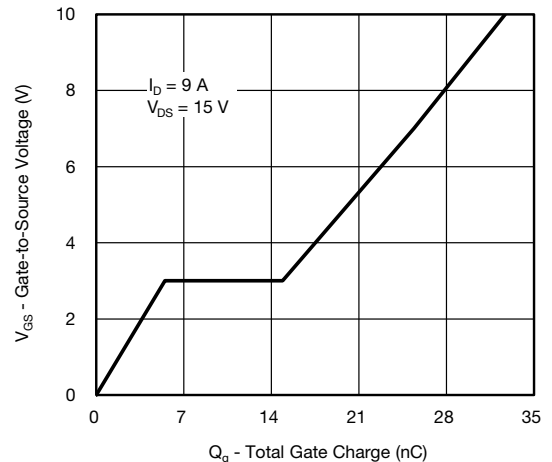
Transconductance



On-Resistance vs. Drain Current

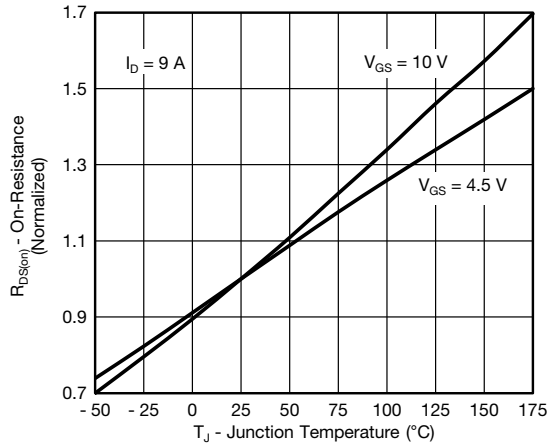


Capacitance

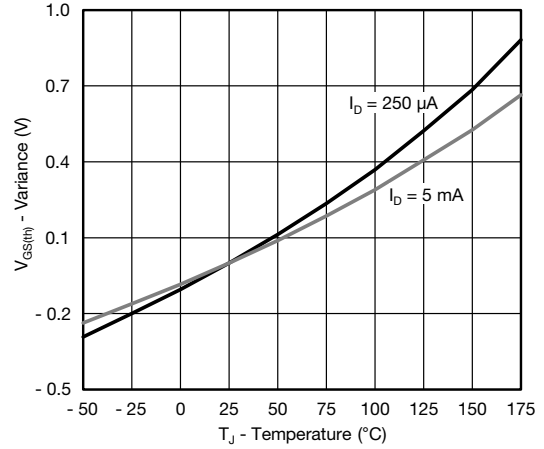


Gate Charge

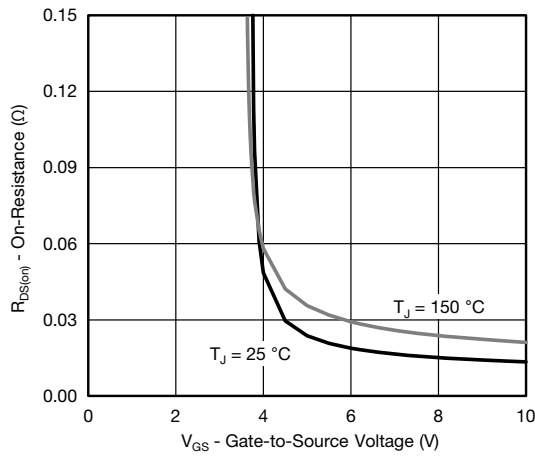
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C, unless otherwise noted)



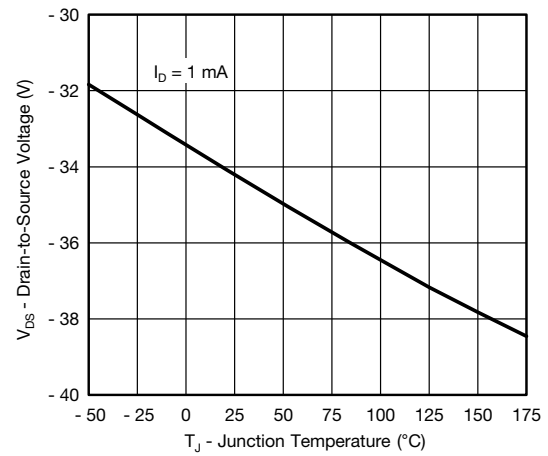
**On-Resistance vs. Junction Temperature**



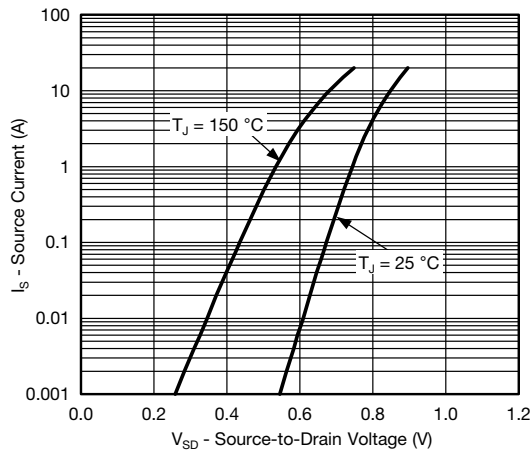
**Threshold Voltage**



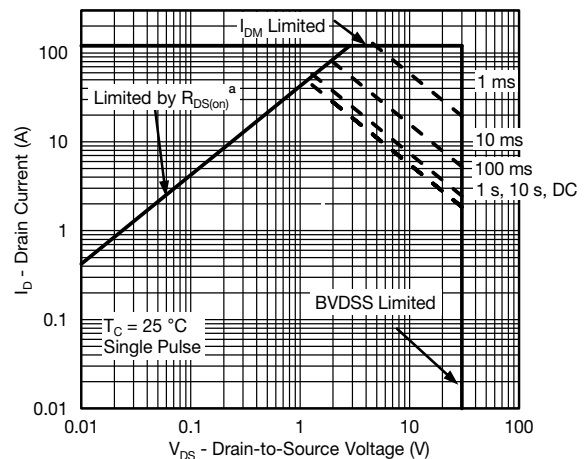
**On-Resistance vs. Gate-to-Source Voltage**



**BVDS vs. Junction Temperature**



**Source Drain Diode Forward Voltage**



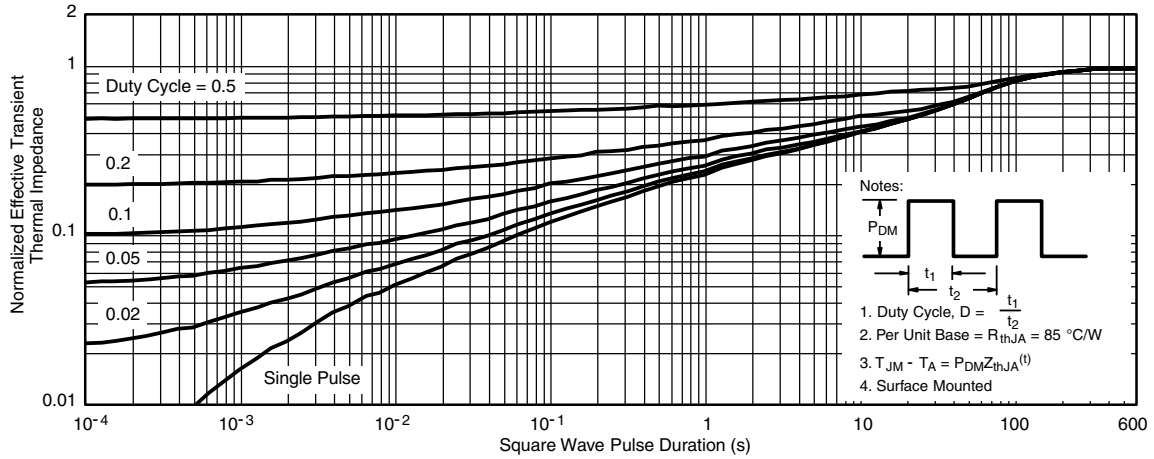
**Safe Operating Area**

**Note**

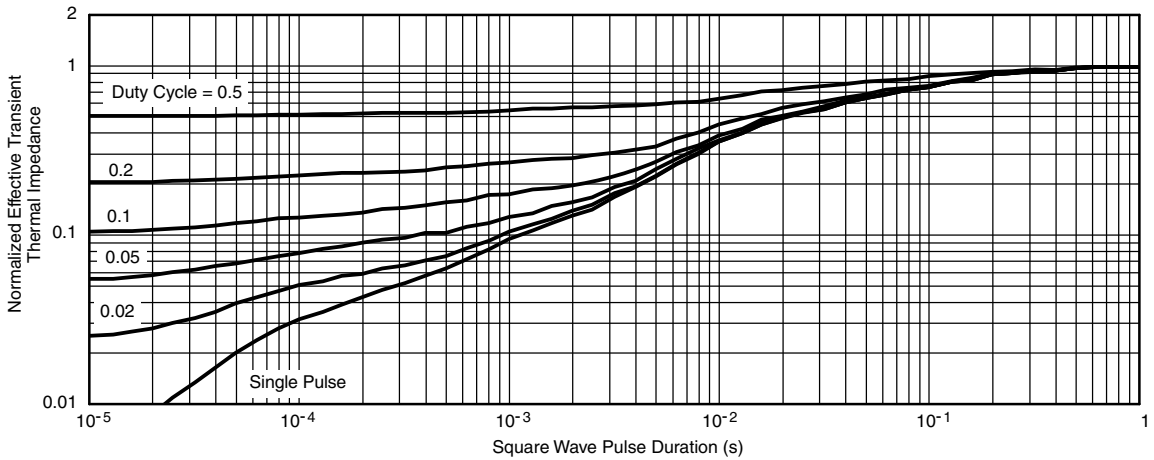
- a.  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified



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



**Normalized Thermal Transient Impedance, Junction-to-Ambient**



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

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### PowerPAK® SO-8L Case Outline 2





DIM.	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	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		
c	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
e	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
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
K	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°

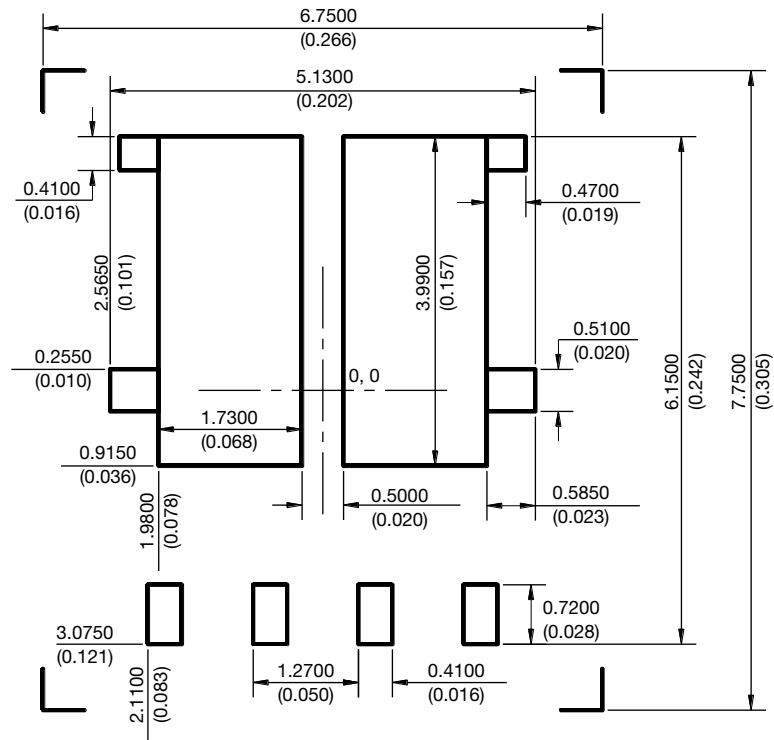
ECN: C21-1498-Rev. C, 01-Nov-2021  
DWG: 6044

**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)





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