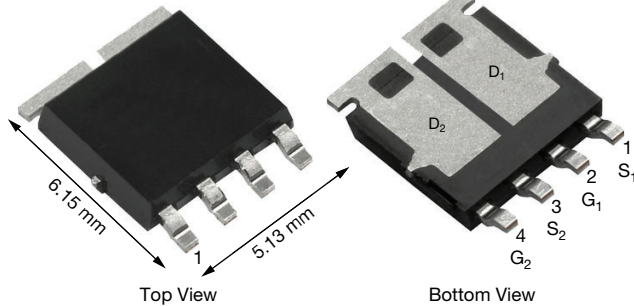


Automotive Dual P-Channel 30 V (D-S) 175 °C MOSFET

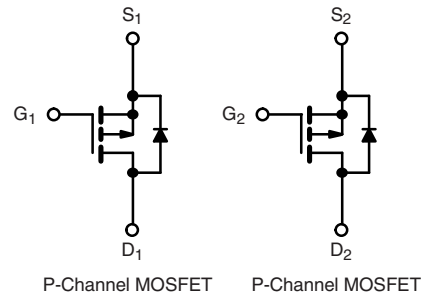
PowerPAK® SO-8L Dual

FEATURES

- TrenchFET® Power MOSFET
- AEC-Q101 qualified ^d
- 100 % R_g and UIS tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE


RoHS
 COMPLIANT
 HALOGEN
FREE

| PRODUCT SUMMARY | |
|--|-------|
| V _{DS} (V) | - 30 |
| R _{DS(on)} (Ω) at V _{GS} = - 10 V | 0.017 |
| R _{DS(on)} (Ω) at V _{GS} = - 4.5 V | 0.036 |
| I _D (A) | - 30 |
| Configuration | Dual |



| ORDERING INFORMATION | |
|---------------------------------|--|
| Package | PowerPAK SO-8L |
| Lead (Pb)-free and halogen-free | SQJ951EP (for detailed order number please see www.vishay.com/doc?79771) |

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

| THERMAL RESISTANCE RATINGS | | | | |
|----------------------------|------------------------|-------------------|-------|------|
| PARAMETER | | SYMBOL | LIMIT | UNIT |
| Junction-to-ambient | PCB mount ^c | R _{thJA} | 85 | °C/W |
| Junction-to-case (drain) | | R _{thJC} | 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). 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



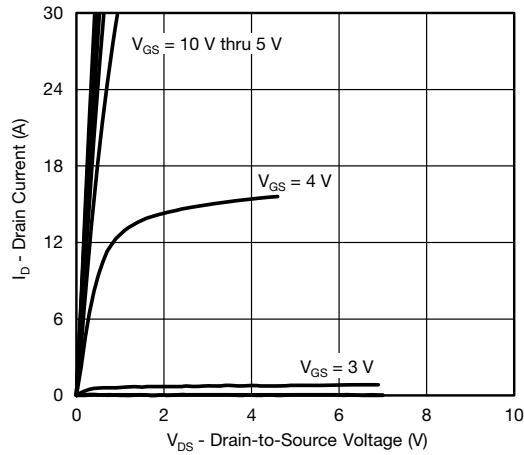
| SPECIFICATIONS ($T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted) | | | | | | | |
|---|--------------|---|--|------|-------|-----------|---------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | MIN. | TYP. | MAX. | UNIT |
| Static | | | | | | | |
| Drain-source breakdown voltage | V_{DS}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

Notes

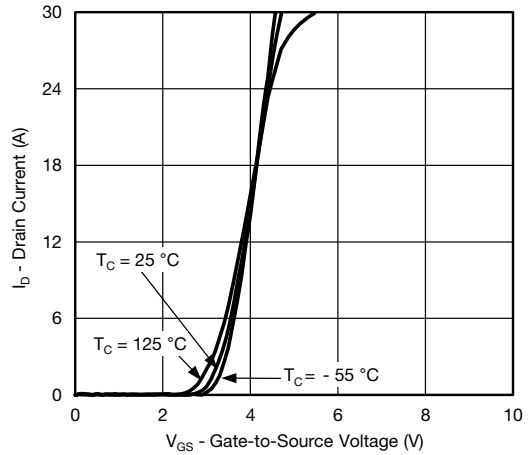
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
b. Guaranteed by design, not subject to production testing
c. Independent of operating temperature

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.

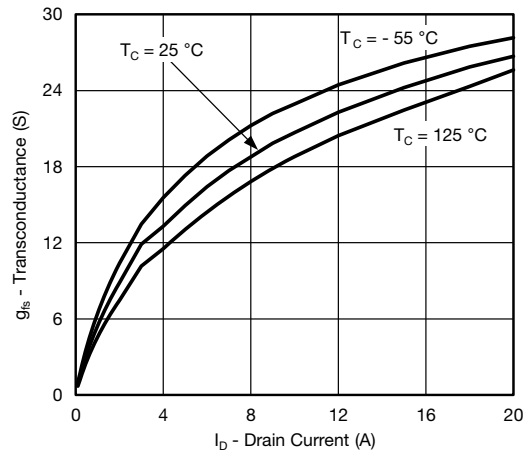
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



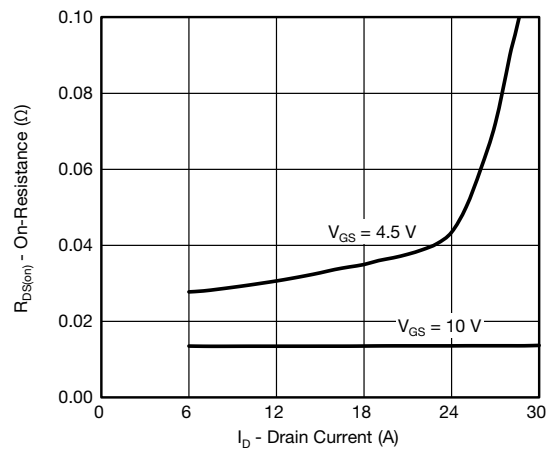
Output Characteristics



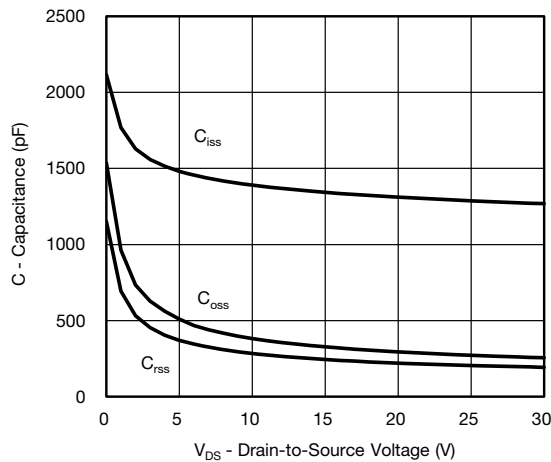
Transfer Characteristics



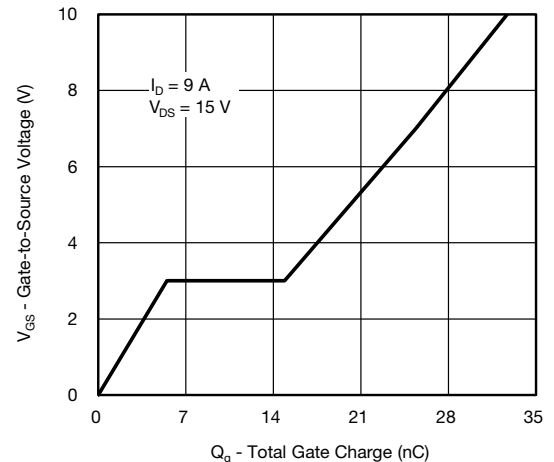
Transconductance



On-Resistance vs. Drain Current

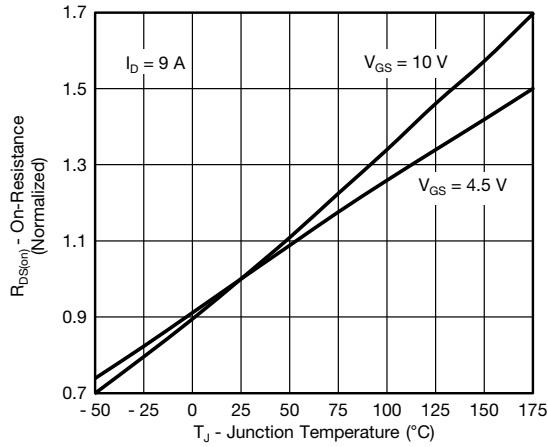


Capacitance

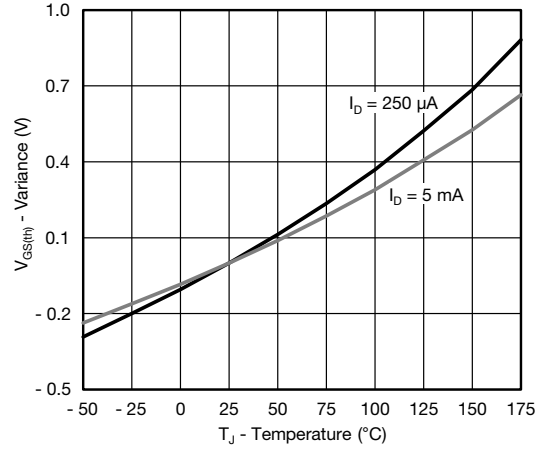


Gate Charge

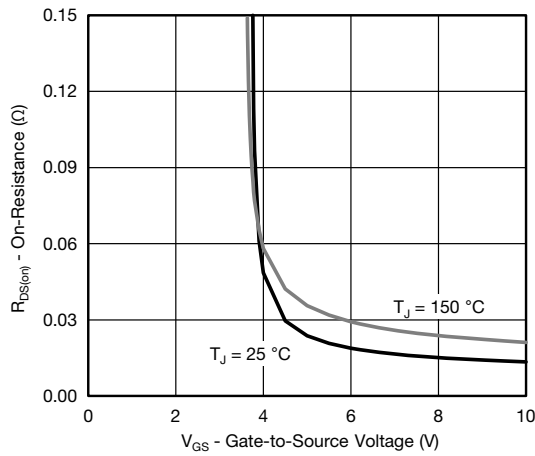
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



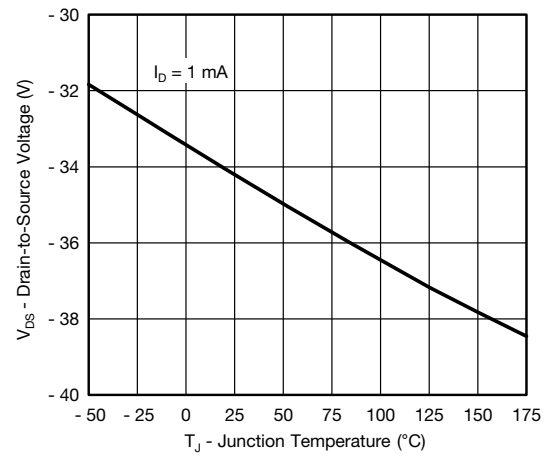
On-Resistance vs. Junction Temperature



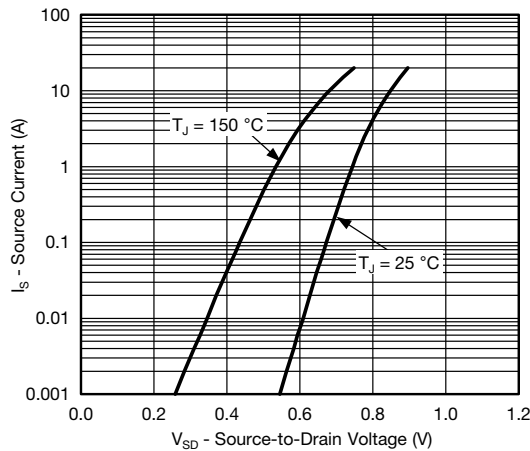
Threshold Voltage



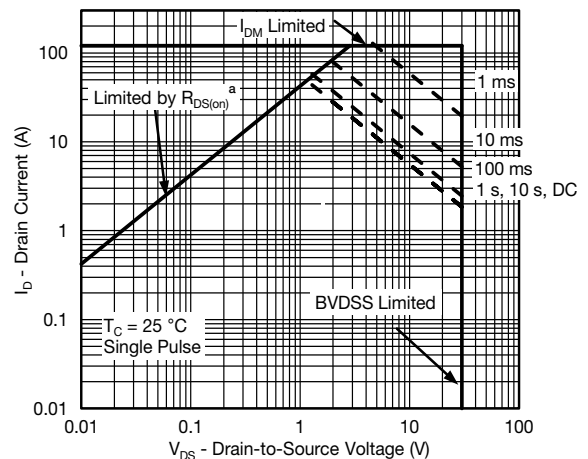
On-Resistance vs. Gate-to-Source Voltage



BVDS vs. Junction Temperature



Source Drain Diode Forward Voltage



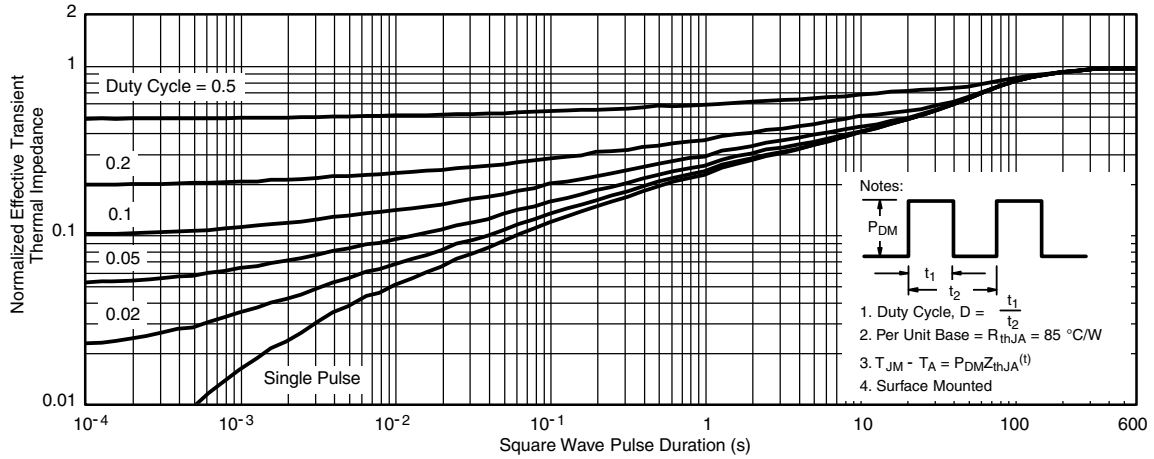
Safe Operating Area

Note

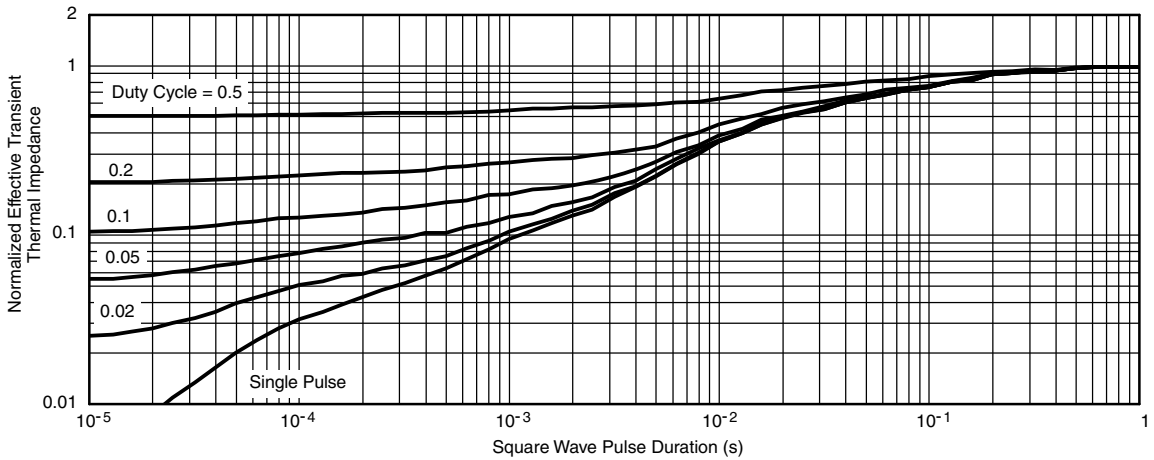
a. $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified



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



Normalized Thermal Transient Impedance, Junction-to-Ambient

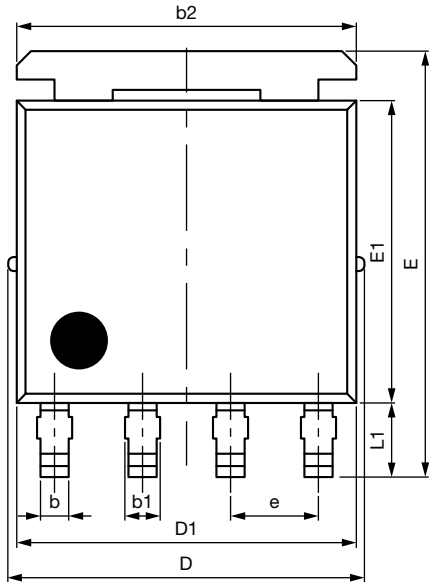


Normalized Thermal Transient Impedance, Junction-to-Case

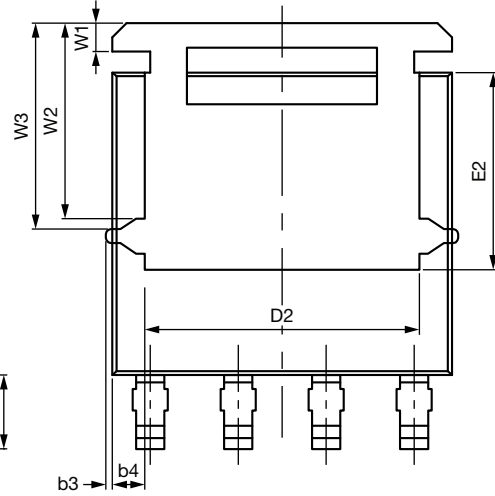
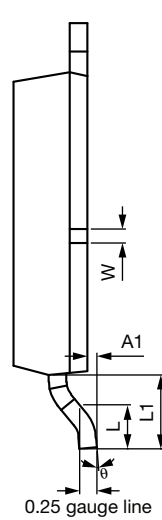
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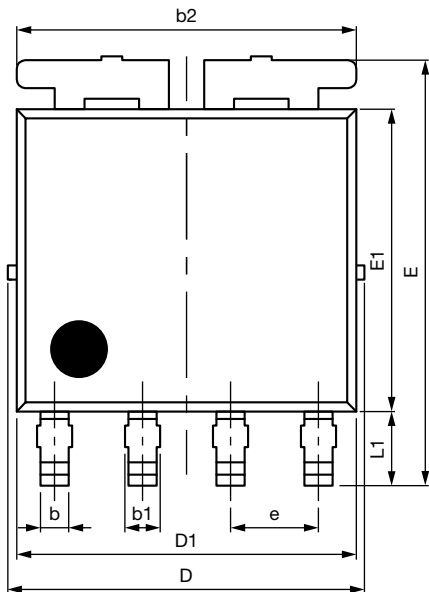
PowerPAK® SO-8L Case Outline 2



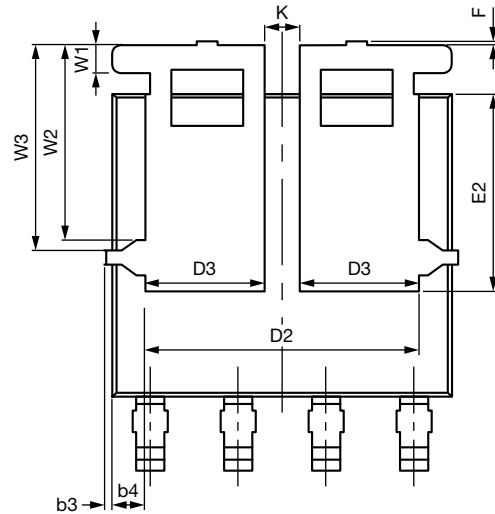
Topside view (single)



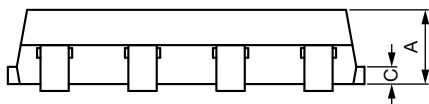
Backside view (single)



Topside view (dual)



Backside view (dual)





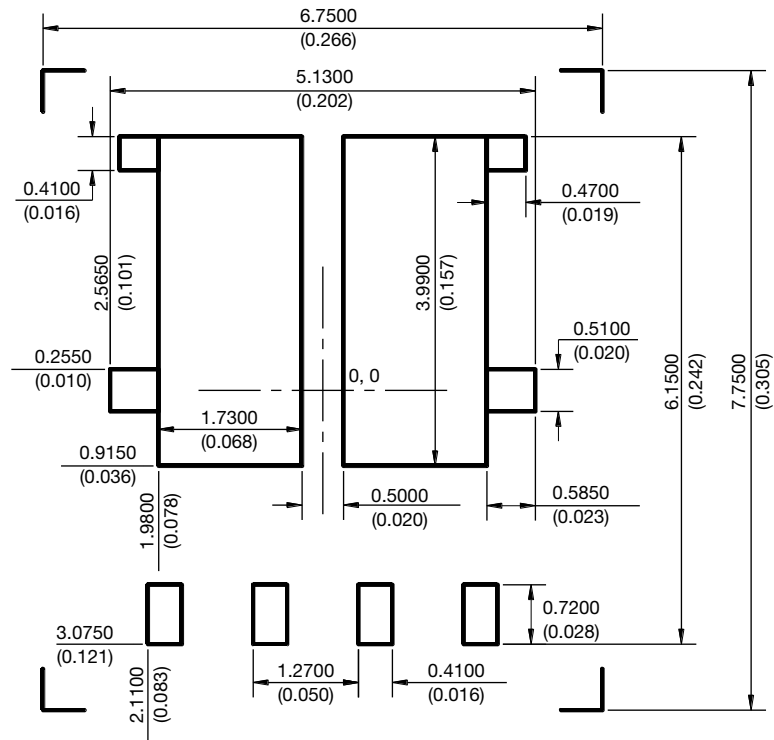
| DIM. | MILLIMETERS | | | INCHES | | |
|-----------------------------------|-------------|------|-------|-----------|-------|-------|
| | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. |
| A | 1.00 | 1.07 | 1.14 | 0.039 | 0.042 | 0.045 |
| A1 | 0.00 | - | 0.127 | 0.00 | - | 0.005 |
| b | 0.33 | 0.41 | 0.48 | 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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