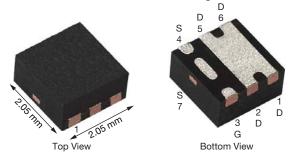


Vishay Siliconix

N-Channel 30 V (D-S) MOSFET

| PRODUCT SUMMARY | | | | | | | | |
|---------------------|-----------------------------------|---------------------------------|-----------------------|--|--|--|--|--|
| V _{DS} (V) | R _{DS(on)} (Ω) (MAX.) | I _D (A) ^a | Q _g (TYP.) | | | | | |
| 30 | 0.0084 at V _{GS} = 10 V | 37.8 | 8.2 nC | | | | | |
| | 0.0114 at V _{GS} = 4.5 V | 32.5 | 0.2110 | | | | | |

PowerPAK® SC-70-6L Single

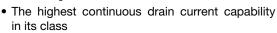


Marking Code: AX Ordering Information:

SiA468DJ-T1-GE3 (lead (Pb)-free and halogen-free)

FEATURES

- TrenchFET® Gen IV power MOSFET
- 100 % R_g tested

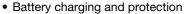




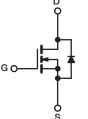
- Very low R_{DS}-Q_q FOM and Q_{qd} elevate efficiency
- Increase power density of your design
- Material categorization: for definitions of compliance please see <u>www.vishav.com/doc?99912</u>

APPLICATIONS

- DC/DC converters and synchronous buck converters
 - Lower ringing voltage from soft turn-on
 - High efficiency from fast turn-off
 - Lower shoot-through possibility



· Load switch



N-Channel MOSFET

| PARAMETER | | SYMBOL | LIMIT | UNIT | | |
|--|------------------------|-----------------------------------|----------------------|------|--|--|
| Drain-Source Voltage | | V _{DS} | 30 | V | | |
| Gate-Source Voltage | | V _{GS} | +20 / -16 | | | |
| | T _C = 25 °C | | 37.8 | | | |
| Continuous Drain Current /T 150 °C) | T _C = 70 °C | | 36.3 | | | |
| Continuous Drain Current (T _J = 150 °C) | T _A = 25 °C | I _D | 16.1 ^{a, b} | | | |
| | T _A = 70 °C | | 12.9 ^{a, b} | А | | |
| Pulsed Drain Current (t = 100 μs) | | I _{DM} | 70 | | | |
| Octions of October Bridge Control | T _C = 25 °C | | 15.8 | | | |
| Continuous Source-Drain Diode Current | T _A = 25 °C | I _S | 2.9 ^{a, b} | | | |
| | T _C = 25 °C | | 19 | | | |
| Marian and Danier Distriction | T _C = 70 °C | | 12 | 14/ | | |
| Maximum Power Dissipation | T _A = 25 °C | P _D | 3.5 ^{a, b} | W | | |
| | T _A = 70 °C | | 2.2 ^{a, b} | | | |
| Operating Junction and Storage Temperature R | ange | T _J , T _{stg} | -55 to +150 | %0 | | |
| Soldering Recommendations (Peak temperature | e) c, d | | 260 | °C | | |

| THERMAL RESISTANCE RATINGS | | | | | | | | | |
|--|--|-------------------|---------|---------|------|--|--|--|--|
| PARAMETER | | SYMBOL | TYPICAL | MAXIMUM | UNIT | | | | |
| Maximum Junction-to-Ambient a, e $t \le 5 s$ | | R _{thJA} | 28 | 36 | °C/W | | | | |
| Maximum Junction-to-Case (Drain) | Steady state R _{thJC} 5.3 6.5 | | 6.5 | C/VV | | | | | |

Notes

- a. Surface mounted on 1" x 1" FR4 board.
- b. t = 5 s.
- c. See solder profile (www.vishay.com/doc?73257). The PowerPAK SC-70 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.
- d. Rework conditions: manual soldering with a soldering iron is not recommended for leadless components.
- e. Maximum under steady state conditions is 80 °C/W.



Vishay Siliconix

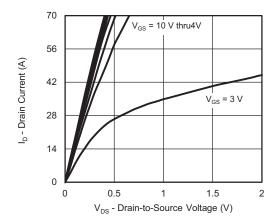
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|-------------------------|---|------|--------|--------|-------------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V_{DS} | $V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$ | 30 | - | - | V |
| V _{DS} Temperature Coefficient | $\Delta V_{DS}/T_{J}$ | J 050 A | = | 12.8 | - | mV/°C |
| V _{GS(th)} Temperature Coefficient | $\Delta V_{GS(th)}/T_J$ | I _D = 250 μA | - | -4.8 | - | |
| Gate-Source Threshold Voltage | V _{GS(th)} | $V_{DS} = V_{GS}, I_{D} = 250 \mu A$ | 1 | - | 2.4 | V |
| Gate-Source Leakage | I _{GSS} | $V_{DS} = 0 \text{ V}, V_{GS} = +20 \text{ V} / -16 \text{ V}$ | - | - | ± 100 | nA |
| Zoro Coto Voltogo Droin Correct | | V _{DS} = 30 V, V _{GS} = 0 V | - | - | 1 | μΑ |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = 30 V, V _{GS} = 0 V, T _J = 55 °C | - | - | 10 | |
| On-State Drain Current ^a | I _{D(on)} | $V_{DS} \ge 5 \text{ V}, V_{GS} = 10 \text{ V}$ | 10 | - | - | Α |
| Drain Course On State Resistance 8 | В | V _{GS} = 10 V, I _D = 11 A | - | 0.0070 | 0.0084 | 0 |
| Drain-Source On-State Resistance a | R _{DS(on)} | V _{GS} = 4.5 V, I _D = 7 A | - | 0.0091 | 0.0114 | Ω |
| Forward Transconductance ^a | 9 _{fs} | V _{DS} = 10 V, I _D = 11 A | _ | 35 | - | S |
| Dynamic ^b | | | | | | |
| Input Capacitance | C _{iss} | | - | 1290 | - | |
| Output Capacitance | C _{oss} | $V_{DS} = 15 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$ | - | 435 | - | pF |
| Reverse Transfer Capacitance | C _{rss} | | - | 30 | - | |
| Total Cata Chausa | Qg | V _{DS} = 15 V, V _{GS} = 10 V, I _D = 12 A | - | 17.6 | 22 | nC |
| Total Gate Charge | | | _ | 8.2 | 16 | |
| Gate-Source Charge | Q_{gs} | $V_{DS} = 15 \text{ V}, V_{GS} = 4.5 \text{ V}, I_D = 12 \text{ A}$ | - | 3.1 | - | |
| Gate-Drain Charge | Q_{gd} | | - | 1.3 | - | |
| ate Resistance R _g | | f = 1 MHz | 0.28 | 1.4 | 2.8 | Ω |
| Turn-On Delay Time | t _{d(on)} | | - | 8 | 16 | |
| Rise Time | t _r | $V_{DD} = 15 \text{ V}, R_L = 1.5 \Omega$ | - | 22 | 40 | - - - |
| Turn-Off Delay Time | t _{d(off)} | $I_D \cong 10 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 1 \Omega$ | _ | 18 | 36 | |
| Fall Time | t _f | | - | 8 | 16 | |
| Turn-On Delay Time | t _{d(on)} | | - | 12 | 25 | ns |
| Rise Time | t _r | $V_{DD} = 15 \text{ V}, R_L = 1.5 \Omega$ | _ | 30 | 45 | |
| Turn-Off Delay Time | t _{d(off)} | $I_D \cong 10 \text{ A}, V_{GEN} = 4.5 \text{ V}, R_g = 1 \Omega$ | | 15 | 30 | |
| Fall Time | t _f | | | 13 | 26 | |
| Drain-Source Body Diode Characteristic | s | | | | | |
| Continuous Source-Drain Diode Current | Is | T _C = 25 °C | - | - | 12 | A |
| Pulse Diode Forward Current ^a | I _{SM} | | - | - | 40 | |
| Body Diode Voltage | V_{SD} | I _S = 10 A | - | 0.85 | 1.2 | V |
| Body Diode Reverse Recovery Time | | | - | 30 | 45 | ns |
| Body Diode Reverse Recovery Charge | Q _{rr} | 1 10 A 41/4+ 100 A/ - T 05 20 | - | 20 | 35 | nC |
| Reverse Recovery Fall Time | t _a | I _F = 10 A, dl/dt = 100 A/μs, T _J = 25 °C | - | 17 | - | ns |
| Reverse Recovery Rise Time | t _b | | _ | 13 | _ | |

Notes

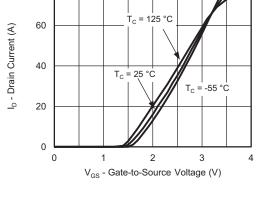
- a. Pulse test; pulse width $\leq 100~\mu s,$ duty cycle $\leq 2~\%.$
- b. Guaranteed by design, not subject to production testing.

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.



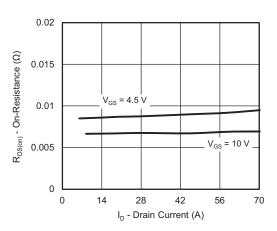


Output Characteristics

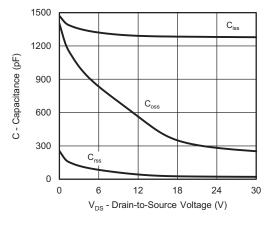


80

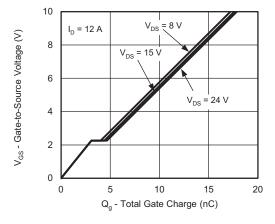
Transfer Characteristics



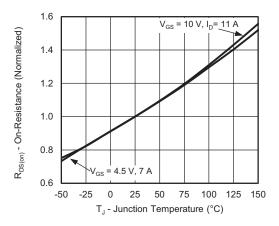
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

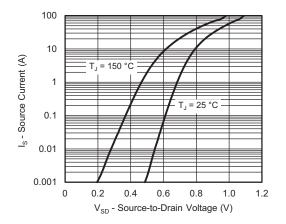


Gate Charge

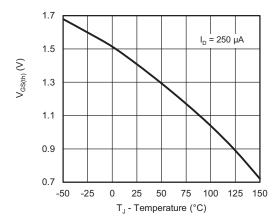


On-Resistance vs. Junction Temperature

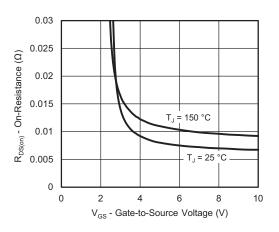




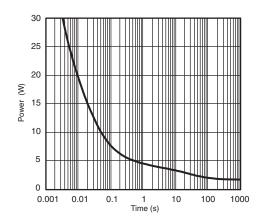
Source-Drain Diode Forward Voltage



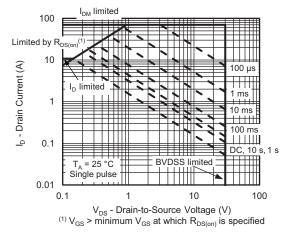
Threshold Voltage



On-Resistance vs. Gate-to-Source Voltage

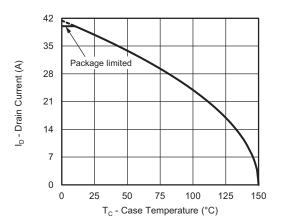


Single Pulse Power, Junction-to-Ambient

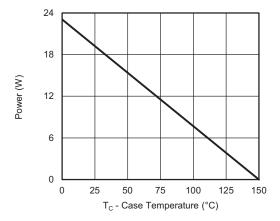


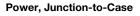
Safe Operating Area, Junction-to-Ambient

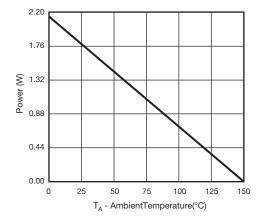




Current Derating a





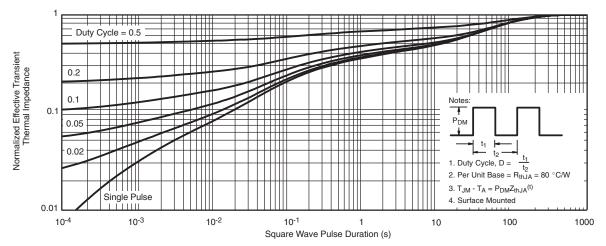


Power, Junction-to-Ambient

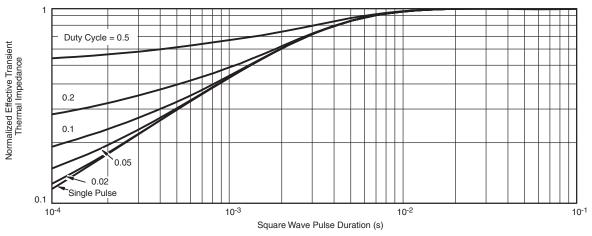
Note

a. The power dissipation P_D is based on T_J (max.) = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit





Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

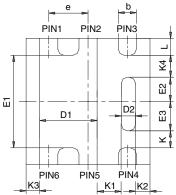
Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see www.vishay.com/ppg?67408.

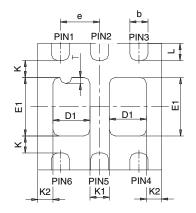




Vishay Siliconix

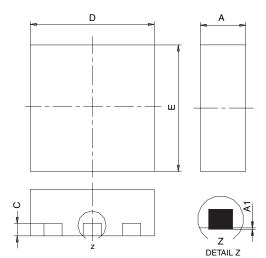
PowerPAK® SC70-6L





BACKSIDE VIEW OF SINGLE

BACKSIDE VIEW OF DUAL



- All dimensions are in millimeters
 Package outline exclusive of mold flash and metal burr
 Package outline inclusive of plating

| | | | SINGL | E PAD | | | | | DUAI | _ PAD | | | |
|-----------|---------------------|---------------------|-------|-----------|----------------|---------------------|-----------|-----------|-------|-------|-----------|-------|--|
| DIM | M | ILLIMETER | RS | | INCHES | | M | ILLIMETER | RS | | INCHES | | |
| | Min | Nom | Max | Min | Nom | Max | Min | Nom | Max | Min | Nom | Max | |
| Α | 0.675 | 0.75 | 0.80 | 0.027 | 0.030 | 0.032 | 0.675 | 0.75 | 0.80 | 0.027 | 0.030 | 0.032 | |
| A1 | 0 | - | 0.05 | 0 | - | 0.002 | 0 | - | 0.05 | 0 | - | 0.002 | |
| b | 0.23 | 0.30 | 0.38 | 0.009 | 0.012 | 0.015 | 0.23 | 0.30 | 0.38 | 0.009 | 0.012 | 0.015 | |
| С | 0.15 | 0.20 | 0.25 | 0.006 | 0.008 | 0.010 | 0.15 | 0.20 | 0.25 | 0.006 | 0.008 | 0.010 | |
| D | 1.98 | 2.05 | 2.15 | 0.078 | 0.081 | 0.085 | 1.98 | 2.05 | 2.15 | 0.078 | 0.081 | 0.085 | |
| D1 | 0.85 | 0.95 | 1.05 | 0.033 | 0.037 | 0.041 | 0.513 | 0.613 | 0.713 | 0.020 | 0.024 | 0.028 | |
| D2 | 0.135 | 0.235 | 0.335 | 0.005 | 0.009 | 0.013 | | | | | | | |
| Е | 1.98 | 2.05 | 2.15 | 0.078 | 0.081 | 0.085 | 1.98 | 2.05 | 2.15 | 0.078 | 0.081 | 0.085 | |
| E1 | 1.40 | 1.50 | 1.60 | 0.055 | 0.059 | 0.063 | 0.85 | 0.95 | 1.05 | 0.033 | 0.037 | 0.041 | |
| E2 | 0.345 | 0.395 | 0.445 | 0.014 | 0.016 | 0.018 | | | | | | | |
| E3 | 0.425 | 0.475 | 0.525 | 0.017 | 0.019 | 0.021 | | | | | | | |
| е | | 0.65 BSC | | | 0.026 BSC | , | | 0.65 BSC | | | 0.026 BSC | | |
| K | | 0.275 TYP | 1 | | 0.011 TYP | | 0.275 TYP | | | | 0.011 TYP | | |
| K1 | 0.400 TYP 0.0 | | | 0.016 TYP | | 0.320 TYP 0.013 TYP | | | | | | | |
| K2 | 0.240 TYP 0.009 TYP | | | | 0.252 TYP 0.0° | | | 0.010 TYP | | | | | |
| К3 | | 0.225 TYP | 1 | 0.009 TYP | | | | | | | | | |
| K4 | | 0.355 TYP 0.014 TYP | | | | | | | | | | | |
| L | 0.175 | 0.275 | 0.375 | 0.007 | 0.011 | 0.015 | 0.175 | 0.275 | 0.375 | 0.007 | 0.011 | 0.015 | |
| Т | | | | | | | 0.05 | 0.10 | 0.15 | 0.002 | 0.004 | 0.006 | |
| ECNI- C C | 7404 D | . 0 00 1 | . 07 | | | | | | | | | | |

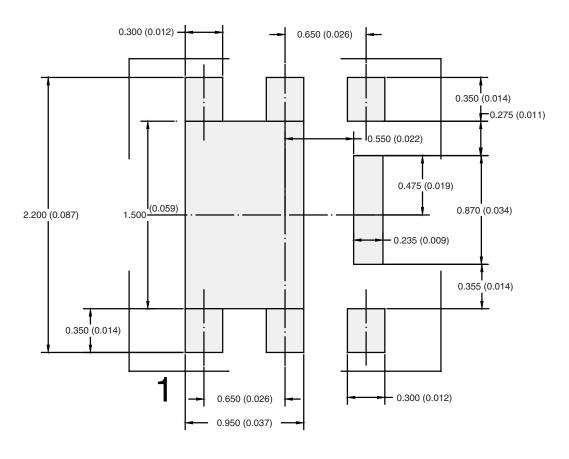
ECN: C-07431 - Rev. C, 06-Aug-07

DWG: 5934

Document Number: 73001 06-Aug-07



RECOMMENDED PAD LAYOUT FOR PowerPAK® SC70-6L Single



Dimensions in mm/(Inches)

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ATTLICATION NOT



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Vishay

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