



N-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY									
V _{DS} (V)	$R_{DS(on)}\left(\Omega\right)$ (Max.)	I _D (A) ^a	Q _g (Typ.)						
30	0.018 at V _{GS} = 10 V	12	5 nC						
	0.022 at V _{GS} = 4.5 V	12	3110						

PowerPAK® SC-70-6L-Single 2.05 mm

2.05 mm

Ordering Information: SiA418DJ-T1-GE3 (Lead (Pb)-free and Halogen-free)

Bottom View

FEATURES

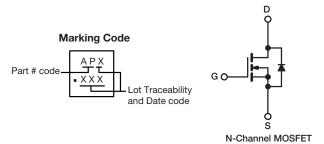
- TrenchFET® Power MOSFET
- 100 % R_q Tested
- Material categorization: For definitions of compliance please see www.vishav.com/doc?99912



COMPLIANT HALOGEN FREE

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



ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)									
Parameter		Symbol	Limit	Unit					
Drain-Source Voltage		V_{DS}	30	V					
Gate-Source Voltage		V _{GS}	± 20	v					
	T _C = 25 °C		12 ^a						
Continuous Drain Current (T, = 150 °C)	T _C = 70 °C		12 ^a						
Continuous Diam Current (1 j = 150 °C)	T _A = 25 °C	ID	12 ^{a,b, c}	1					
	T _A = 70 °C		9.7 ^{b, c}	Α					
Pulsed Drain Current (t = 300 μs)	•	I _{DM}	40	1					
Continuous Source-Drain Diode Current	T _C = 25 °C	l _a	12 ^a						
Continuous Source-Diam blode Current	T _A = 25 °C	I _S	2.9 ^{b, c}						
	T _C = 25 °C		19						
Maximum Power Dissination	T _C = 70 °C	P _D	12	w					
Maximum Power Dissipation	T _A = 25 °C	LD.	3.5 ^{b, c}	T vv					
	T _A = 70 °C		2.2 ^{b, c}						
Operating Junction and Storage Temperature Rang	e	T _J , T _{stg}	- 55 to 150	°C					
Soldering Recommendations (Peak Temperature) ^{d,}	е		260]					

THERMAL RESISTANCE RATINGS										
Parameter		Symbol	Typical	Maximum	Unit					
Maximum Junction-to-Ambient ^{b, f}	t ≤ 5 s	R _{thJA}	28	36	°C/W					
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	5.3	6.5	O/ VV					

Notes:

- a. Based on package limited.
- b. Surface mounted on 1" x 1" FR4 board.
- d. See solder profile (www.vishav.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.
- e. Rework conditions: manual soldering with a soldering iron is not recommended for leadless components.
- f. Maximum under steady state conditions is 80 °C/W.

Document Number: 63911 S13-0462-Rev. C, 04-Mar-13 For technical questions, contact:: pmostechsupport@vishay.com



Static Drain-Source Breakdown Voltage VDS VGS = 0 V, ID = 250 μA 30 34 m/V. So. Temperature Coefficient Δ/DS/T.J. ID = 250 μA 30 34 m/V. So. Temperature Coefficient Δ/DS/T.J. ID = 250 μA	SPECIFICATIONS ($T_J = 25 ^{\circ}\text{C}$,	unless othe	erwise noted				
Drain-Source Breakdown Voltage V _{DS} V _{QS} = 0 V, I _D = 250 μA 30 V _{QS} V _{QS} Perperature Coefficient Δν _{DS} /T _J I _D = 250 μA 34 m/V _{QS(th)} Temperature Coefficient Δν _{DS} /T _J V _{QS(th)} V _{DS} = V _{QS} , I _D = 250 μA 1.2 2.4 V _{QS(th)} V _{DS} = V _{QS} , I _D = 250 μA 1.2 2.4 V _{QS(th)} V _{DS} = V _{QS} , I _D = 250 μA 1.2 2.4 V _{QS(th)} V _{DS} = V _{QS} , I _D = 250 μA 1.2 2.4 V _{QS(th)} V _{DS} = V _{QS} , I _D = 250 μA 1.2 2.4 V _{QS(th)} V _{DS} = V _{QS} , I _D = 250 μA 1.2 2.4 V _{QS(th)} V _{DS} = V _{QS} , I _D = 250 μA 1.2 2.4 V _{QS(th)} V _{DS} = V _{QS} , I _D = 250 μA 1.2 2.4 V _{QS(th)} V _{DS} = V _{QS} , I _D = 250 μA 1.2 2.4 V _{QS(th)} V _{DS} = V _{QS} , I _D = 250 μA 1.2 2.4 V _{QS(th)} V _{DS} = V _{QS} , I _D = 250 μA 1.2 2.4 V _{QS(th)} V _{DS} = 0 V _{QS} , I _D = 250 μA 1.2 2.4 V _{QS(th)} V _{DS} = 0 V _{QS} = 20 V _{QS} V _{QS} = 10 V _{QS} V _Q	Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit
Vos Temperature Coefficient ΛV _{DS} /T _J V _{SS(th)} Temperature Coefficient ΛV _{DS} /T _J V _{SS(th)} Temperature Coefficient ΔV _{DS} (th) V _{DS} V _{GS} , l _D = 250 μA 34 mV/V _{SS(th)} MV _{SS(th)} V _{SS} v _{GS} , l _D = 250 μA 1.2 2.4 V Gate-Source Leakage I _{GSS} V _{DS} = V _{GS} , l _D = 250 μA 1.2 2.4 V Zero Gate Voltage Drain Current I _{GSS} V _{DS} = 30 V, V _{GS} = 20 V 1.1 1.0 1	Static						
V _{GS((h)} Temperature Coefficient AV _{GS((h)} /T _J Ip = 250 μA - 5 m// Gate-Source Threshold Voltage V _{GS(h)} V _{DS} = V _{GS} , I _D = 250 μA 1.2 2.4 V Gate-Source Leakage I _{GSS} V _{DS} = 0 V, V _{GS} = 20 V 1 1 μ Zero Gate Voltage Drain Current I _{DSS} V _{DS} = 30 V, V _{GS} = 0 V 1 1 μ On-State Drain Current ^A I _{D(on)} V _{DS} = 30 V, V _{GS} = 10 V 10 A A Orain-Source On-State Resistance ^A R _{DS(on)} V _{DS} = 10 V, I _D = 9 A 0.015 0.018 0.022 Forward Transconductance ^A 9 _{fs} V _{DS} = 10 V, I _D = 9 A 35 S S Dynamic ^b Input Capacitance C _{iss} V _{DS} = 10 V, I _D = 9 A 35 S S Dynamic ^b Unput Capacitance C _{iss} V _{DS} = 15 V, V _{GS} = 0 V, f = 1 MHz 126	Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	30			V
Vosyinip Imperature Coefficient AV _{OS(III)} T _J -5 -5 Gate-Source Threshold Voltage V _{OS(III)} V _{DS} = V _{OS} , I _D = 250 μA 1.2 2.4 V Zero Gate Voltage Drain Current I _{OSS} V _{DS} = 0 V, V _{OS} = 20 V ± 100 nA Annotate Drain Current ^a I _{O(on)} V _{DS} = 30 V, V _{OS} = 0 V 1 μ On-State Drain Current ^a I _{O(on)} V _{DS} = 10 V, I _D = 9 A 0.015 0.018 Drain-Source On-State Resistance ^a P _{OS} (on) V _{OS} = 10 V, I _D = 9 A 0.015 0.018 Drain-Source On-State Resistance ^a P _{OS} (on) V _{OS} = 10 V, I _D = 9 A 0.018 0.022 Forward Transconductance ^a 9 I _O V _{OS} = 10 V, I _D = 9 A 35 S Dynamic ^b V _{OS} = 10 V, I _D = 9 A 35 S S Sproward Transconductance ^a P _{IS} V _{OS} = 10 V, I _D = 9 A 35 S Dynamic ^b V _{OS} = 15 V, V _{OS} = 0 V, I = 1 MHz 126 9 Reverse Transfer Capacitance C _{Iss} V _{OS} = 15 V, V _{OS} = 0 V, I = 1 MHz 126 17	V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$	I ₂ = 250 µA		34		m\//°(
Gate-Source Leakage	V _{GS(th)} Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	10 = 200 μΛ		- 5		mv/°C
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Gate-Source Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_D = 250 \mu A$	1.2		2.4	٧
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Gate-Source Leakage	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA
V _{DS} = 30 V, V _{QS} = 0 V, I _J = 55 °C	Zava Cata Valtaga Dvain Current		V _{DS} = 30 V, V _{GS} = 0 V			1	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Zero Gate Voltage Drain Current	DSS	V _{DS} = 30 V, V _{GS} = 0 V, T _J = 55 °C			10	μΑ
Drain-Source On-State Resistance Ros(on) V _{GS} = 4.5 V, I _D = 7 A 0.018 0.022 Ω	On-State Drain Current ^a	I _{D(on)}	$V_{DS} \ge 5 \text{ V}, V_{GS} = 10 \text{ V}$	10			Α
Forward Transconductance ^a 9 _{fs} V _{DS} = 10 V, I _D = 9 A 35 S S		Б	$V_{GS} = 10 \text{ V}, I_D = 9 \text{ A}$		0.015	0.018	
Dynamic Dyn	Drain-Source On-State Resistance ^a	H _{DS(on)}	V _{GS} = 4.5 V, I _D = 7 A		0.018	0.022	Ω
Input Capacitance C C C C C C C C C	Forward Transconductance ^a	9 _{fs}	$V_{DS} = 10 \text{ V}, I_{D} = 9 \text{ A}$		35		S
Input Capacitance C C C C C C C C C	Dynamic ^b						
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	-	C _{iss}			570		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Output Capacitance	C _{oss}	V _{DS} = 15 V, V _{GS} = 0 V, f = 1 MHz		126		pF
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Reverse Transfer Capacitance	C _{rss}			52		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	·		V _{DS} = 15 V, V _{GS} = 10 V, I _D = 12 A		11	17	nC
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Total Gate Charge	Q_g			5	7.5	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Gate-Source Charge	Q _{gs}	$V_{DS} = 15 \text{ V}, V_{GS} = 4.5 \text{ V}, I_{D} = 12 \text{ A}$		1.7		
$ \begin{array}{ c c c c c }\hline \text{Turn-On Delay Time} & & & & & & & & & & & & & & & & & & &$	Gate-Drain Charge	Q _{gd}			1.6		
$ \begin{array}{ c c c c c }\hline \text{Turn-On Delay Time} & & & & & & & & & & & & & & & & & & &$	Gate Resistance	R_{g}	f = 1 MHz	0.2	1	2	Ω
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Turn-On Delay Time				5	10	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Rise Time		$V_{DD} = 15 \text{ V}, R_{L} = 1.5 \Omega$		10	20	ns
Fall Time t_f 10 20 Turn-On Delay Time $t_{d(on)}$ 12 25 Rise Time t_r $V_{DD} = 15 \text{ V}$, $R_L = 1.5 \Omega$ 15 30 Turn-Off Delay Time $t_d(off)$ t_f 15 30 Fall Time t_f 10 20 Drain-Source Body Diode Characteristics Continuous Source-Drain Diode Current t_g t_g t_g 12 A Pulse Diode Forward Current ^a t_g	Turn-Off Delay Time	t _{d(off)}	$I_D\cong$ 10 A, V_{GEN} = 10 V, R_g = 1 Ω		15	30	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Fall Time				10	20	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Turn-On Delay Time	t _{d(on)}			12	25	
Fall Time t_f 10 20 Drain-Source Body Diode Characteristics Continuous Source-Drain Diode Current l_S $T_C = 25 ^{\circ}\text{C}$ 12 A Pulse Diode Forward Current ^a l_{SM} 40 Body Diode Voltage V_{SD} $I_S = 10 ^{\circ}\text{A}$ 0.85 1.2 V Body Diode Reverse Recovery Time t_{rr} Body Diode Reverse Recovery Charge Q_{rr} Reverse Recovery Fall Time t_a $I_F = 10 ^{\circ}\text{A}$, $dI/dt = 100 ^{\circ}\text{A}/\mu\text{s}$, $T_J = 25 ^{\circ}\text{C}$ 11 20 not	Rise Time		$V_{DD} = 15 \text{ V}, R_1 = 1.5 \Omega$		15	30	
Fall Time $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	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	
Continuous Source-Drain Diode Current I_S $T_C = 25 ^{\circ}\text{C}$ 12 A Pulse Diode Forward Currenta I_{SM} 40 Body Diode Voltage V_{SD} $I_S = 10 ^{\circ}\text{A}$ 0.85 1.2 V Body Diode Reverse Recovery Time t_{rr} Body Diode Reverse Recovery Charge Q_{rr} Reverse Recovery Fall Time t_a $I_F = 10 ^{\circ}\text{A}$, $dI/dt = 100 ^{\circ}\text{A}/\mu\text{s}$, $T_J = 25 ^{\circ}\text{C}$ 11 20 not not set the continuous Source-Drain Diode Current I_S 40 A I_S	Fall Time				10	20	
Pulse Diode Forward Current ^a I_{SM} 40 Body Diode Voltage V_{SD} $I_{S} = 10 \text{ A}$ 0.85 1.2 V Body Diode Reverse Recovery Time t_{rr} Body Diode Reverse Recovery Charge Q_{rr} Reverse Recovery Fall Time t_{a} $I_{F} = 10 \text{ A}, \text{ dI/dt} = 100 \text{ A/µs}, T_{J} = 25 ^{\circ}\text{C}$	Drain-Source Body Diode Characteristic	s					
Pulse Diode Forward Currenta I_{SM} 40Body Diode Voltage V_{SD} $I_S = 10 \text{ A}$ 0.851.2VBody Diode Reverse Recovery Time t_{rr} 2040nsBody Diode Reverse Recovery Charge Q_{rr} $I_F = 10 \text{ A}$, $dI/dt = 100 \text{ A}/\mu s$, $T_J = 25 ^{\circ}\text{C}$ 1120ncReverse Recovery Fall Time t_a t_a t_a t_a t_a t_a	Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			12	
Body Diode Voltage V_{SD} $I_S = 10 \text{ A}$ 0.851.2VBody Diode Reverse Recovery Time t_{rr} 2040nsBody Diode Reverse Recovery Charge Q_{rr} $I_F = 10 \text{ A}$, $dI/dt = 100 \text{ A}/\mu s$, $T_J = 25 \text{ °C}$ 1120nCReverse Recovery Fall Time t_a 12ns	Pulse Diode Forward Current ^a	I _{SM}				40] A
Body Diode Reverse Recovery Time t_{rr} Body Diode Reverse Recovery Charge Q_{rr} Reverse Recovery Fall Time t_a	Body Diode Voltage		I _S = 10 A		0.85	1.2	V
Body Diode Reverse Recovery Charge Q_{rr} Reverse Recovery Fall Time Q_{rr} $Q_$	Body Diode Reverse Recovery Time		-		20	40	ns
Reverse Recovery Fall Time t_a $I_F = 10 \text{ A, di/dt} = 100 \text{ A/}\mu\text{s, } I_J = 25 \text{ °C}$					11	20	nC
ns		+	$I_F = 10 \text{ A}, \text{ dI/dt} = 100 \text{ A/}\mu\text{s}, T_J = 25 ^{\circ}\text{C}$				ns
	Reverse Recovery Rise Time	t _b			+		

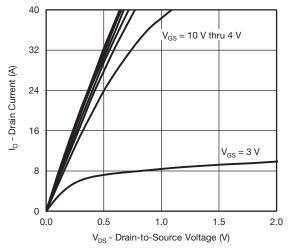
Notes:

- a. Pulse test; pulse width \leq 300 μ s, duty cycle \leq 2 %.
- b. Guaranteed by design, not subject to production testing.

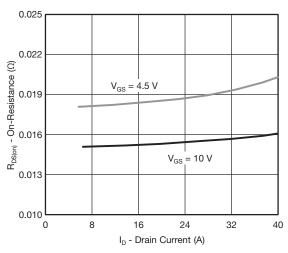
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



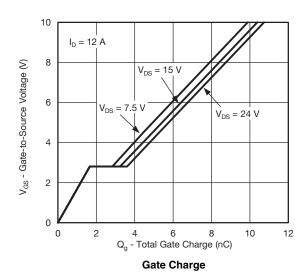
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

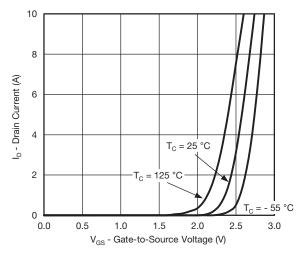


Output Characteristics

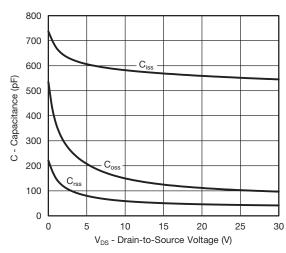


On-Resistance vs. Drain Current and Gate Voltage

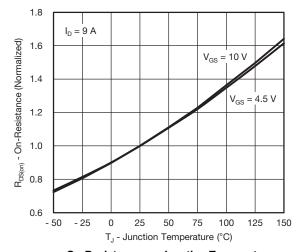




Transfer Characteristics



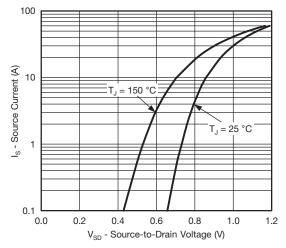
Capacitance



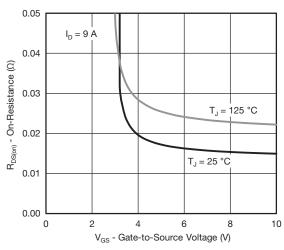
On-Resistance vs. Junction Temperature

VISHAY

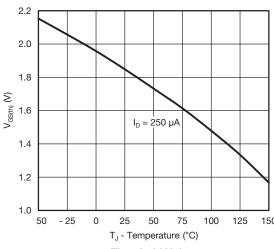
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



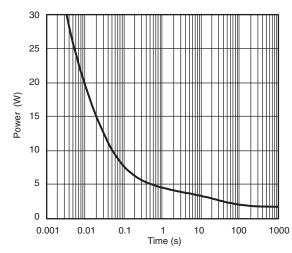
Source-Drain Diode Forward Voltage



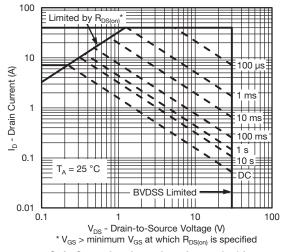
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



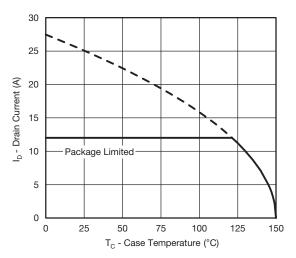
Single Pulse Power, Junction-to-Ambient



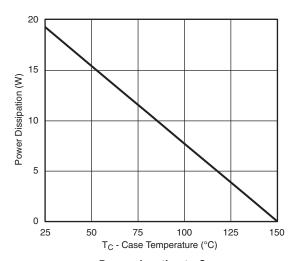
Safe Operating Area, Junction-to-Ambient



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating*

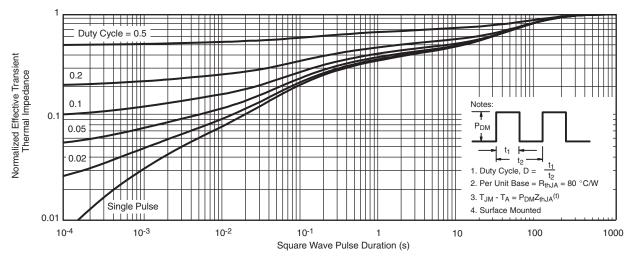


Power, Junction-to-Case

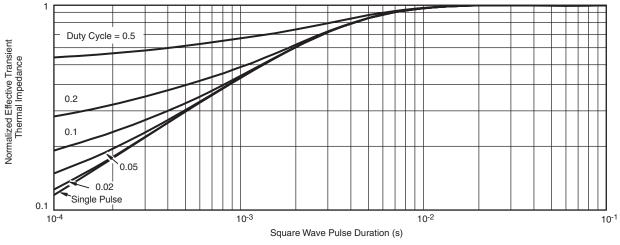
 $^{^{\}star}$ The power dissipation P_D is based on $T_{J(max.)}$ = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the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



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient



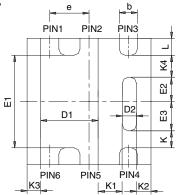
Normalized Thermal Transient Impedance, Junction-to-Case

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?63911.





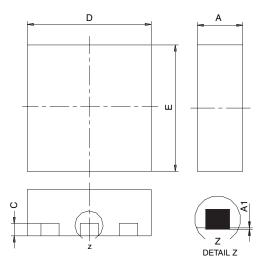
PowerPAK® SC70-6L





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

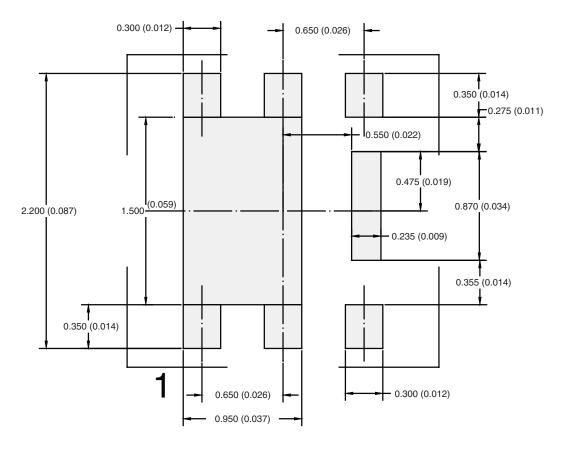
	SINGLE PAD					DUAL PAD						
DIM	M	ILLIMETER	RS		INCHES		M	ILLIMETER	RS		INCHES	
	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max
Α	0.675	0.75	0.80	0.027	0.030	0.032	0.675	0.75	0.80	0.027	0.030	0.032
A 1	0	-	0.05	0	-	0.002	0	-	0.05	0	-	0.002
b	0.23	0.30	0.38	0.009	0.012	0.015	0.23	0.30	0.38	0.009	0.012	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						
E	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	1		0.016 TYP		0.320 TYP			0.013 TYP		
K2		0.240 TYP 0.009 TYP			0.252 TYP 0.010 TYP				1			
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
FCN: C-07431 – Bey 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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