

Automotive N-Channel 100 V (D-S) 175 °C MOSFET

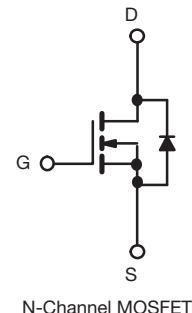
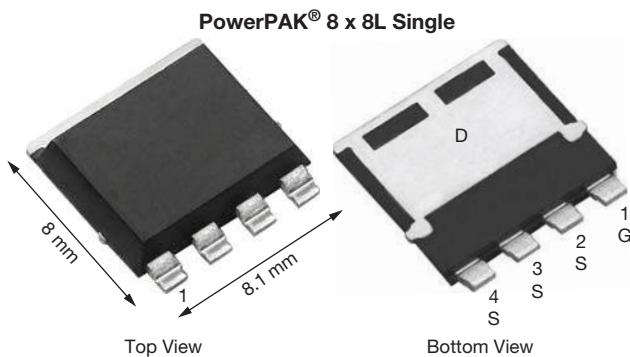
PRODUCT SUMMARY	
V_{DS} (V)	100
$R_{DS(on)}$ (Ω) at $V_{GS} = 10$ V	0.0034
$R_{DS(on)}$ (Ω) at $V_{GS} = 4.5$ V	0.0040
I_D (A)	135
Configuration	Single
Package	PowerPAK 8 x 8L

FEATURES

- TrenchFET® power MOSFET
- AEC-Q101 qualified
- 100 % R_g and UIS tested
- Fully lead (Pb)-free device
- Thin 1.9 mm height
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912




RoHS
COMPLIANT
HALOGEN
FREE



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current	I_D	135	A
		78	
Continuous Source Current (Diode Conduction)	I_S	124	
Pulsed Drain Current ^a	I_{DM}	210	
Single Pulse Avalanche Current	I_{AS}	68	
Single Pulse Avalanche Energy	E_{AS}	231	mJ
Maximum Power Dissipation	P_D	136	W
		45	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +175	
Soldering Recommendations (Peak Temperature) ^{c, d}		260	°C

THERMAL RESISTANCE RATINGS			
PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient	R_{thJA}	50	°C/W
Junction-to-Case (Drain)	R_{thJC}	1.1	

Notes

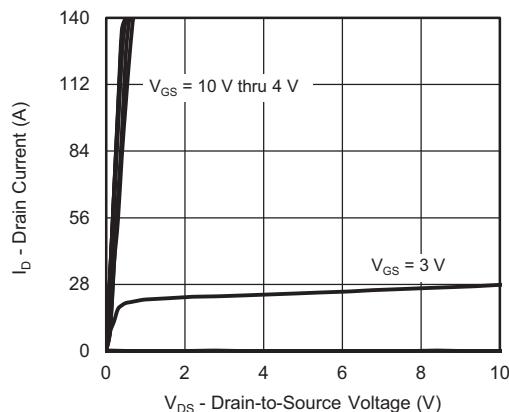
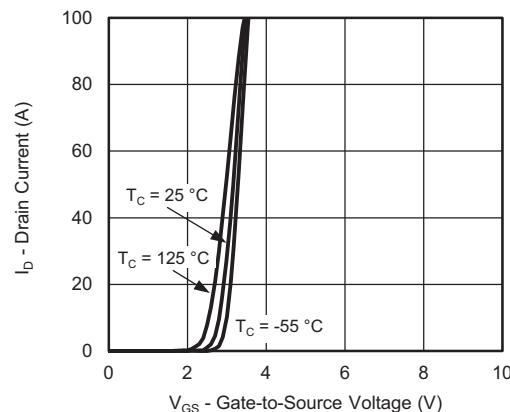
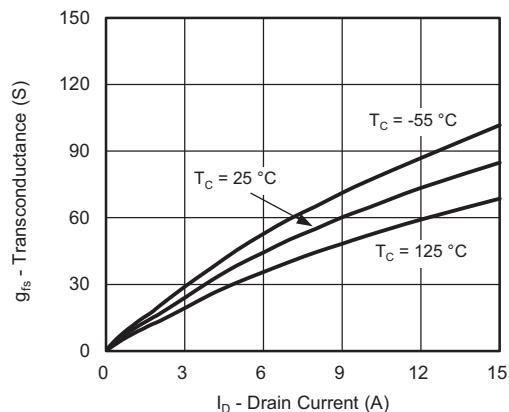
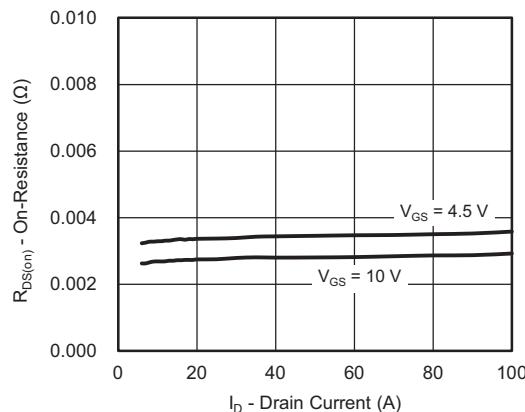
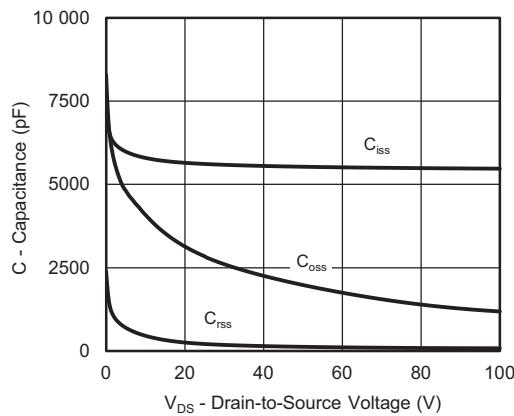
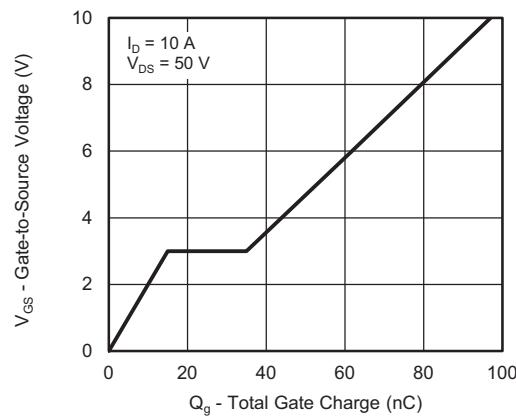
- Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2 %.
- When mounted on 1" square PCB (FR4 material).
- See solder profile (www.vishay.com/doc?73257). The PowerPAK 8 x 8L is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. 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.

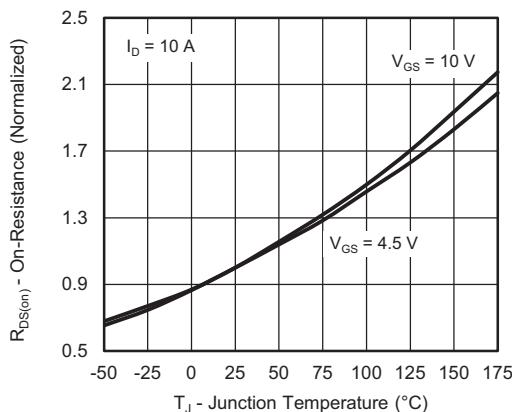
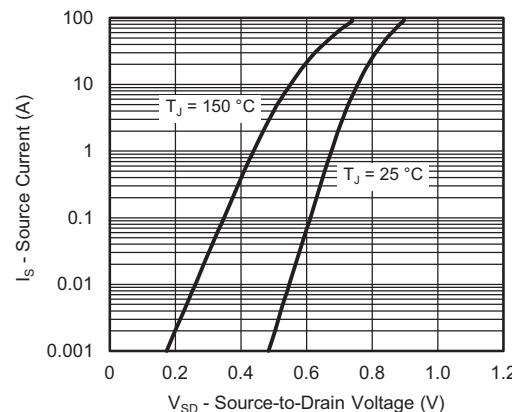
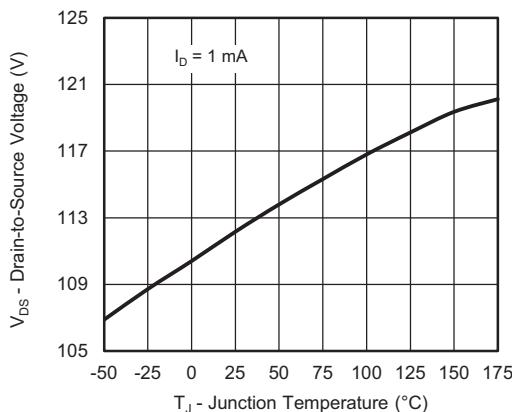
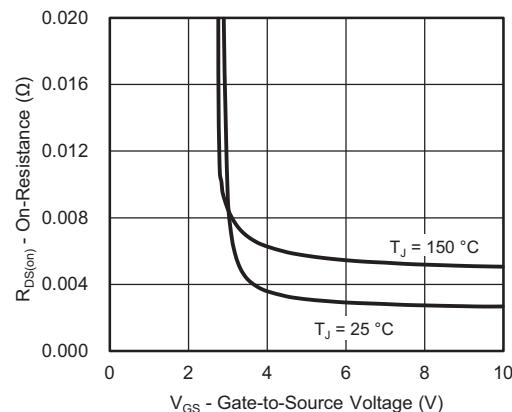
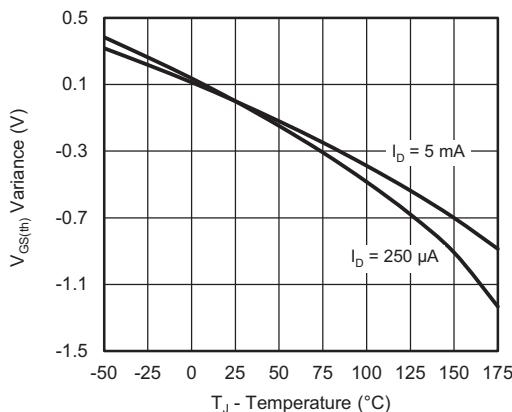
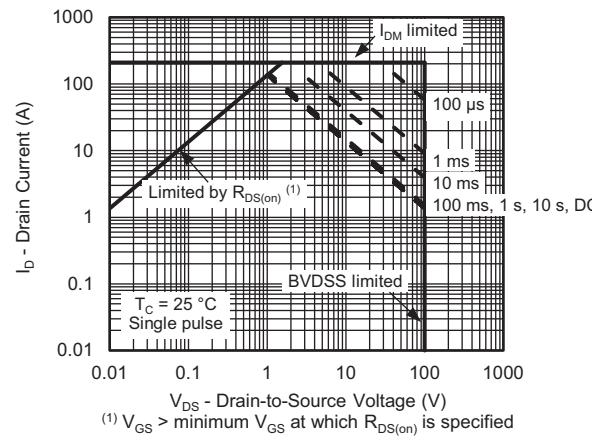
SPECIFICATIONS ($T_C = 25^\circ\text{C}$, unless otherwise noted)								
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT	
Static								
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0$, $I_D = 250 \mu\text{A}$		100	-	-	V	
Gate-Source Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu\text{A}$		1.5	2	2.5		
Gate-Source Leakage	I_{GS}	$V_{DS} = 0 \text{ V}$, $V_{GS} = \pm 20 \text{ V}$		-	-	± 100	nA	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0 \text{ V}$	$V_{DS} = 100 \text{ V}$	-	-	1	μA	
		$V_{GS} = 0 \text{ V}$	$V_{DS} = 100 \text{ V}$, $T_J = 125^\circ\text{C}$	-	-	50		
		$V_{GS} = 0 \text{ V}$	$V_{DS} = 100 \text{ V}$, $T_J = 175^\circ\text{C}$	-	-	500		
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{GS} = 10 \text{ V}$	$V_{DS} \geq 5 \text{ V}$	50	-	-	A	
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$	$I_D = 20 \text{ A}$	-	0.0028	0.0034	Ω	
		$V_{GS} = 4.5 \text{ V}$	$I_D = 10 \text{ A}$	-	0.0033	0.0040		
		$V_{GS} = 10 \text{ V}$	$I_D = 20 \text{ A}$, $T_J = 125^\circ\text{C}$	-	-	0.0058		
		$V_{GS} = 10 \text{ V}$	$I_D = 20 \text{ A}$, $T_J = 175^\circ\text{C}$	-	-	0.0074		
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15 \text{ V}$, $I_D = 15 \text{ A}$		-	84	-	S	
Dynamic ^b								
Input Capacitance	C_{iss}	$V_{GS} = 0 \text{ V}$	$V_{DS} = 25 \text{ V}$, $f = 1 \text{ MHz}$	-	5620	7350	pF	
Output Capacitance	C_{oss}			-	2850	3750		
Reverse Transfer Capacitance	C_{rss}			-	220	290		
Total Gate Charge ^c	Q_g	$V_{GS} = 10 \text{ V}$	$V_{DS} = 50 \text{ V}$, $I_D = 10 \text{ A}$	-	97	150	nC	
Gate-Source Charge ^c	Q_{gs}			-	15	-		
Gate-Drain Charge ^c	Q_{gd}			-	20	-		
Gate Resistance	R_g	$f = 1 \text{ MHz}$		0.95	1.92	3	Ω	
Turn-On Delay Time ^c	$t_{d(\text{on})}$	$V_{DD} = 50 \text{ V}$, $R_L = 5 \Omega$ $I_D \approx 10 \text{ A}$, $V_{GEN} = 10 \text{ V}$, $R_g = 1 \Omega$		-	19	30	ns	
Rise Time ^c	t_r			-	40	60		
Turn-Off Delay Time ^c	$t_{d(\text{off})}$			-	69	110		
Fall Time ^c	t_f			-	87	135		
Source-Drain Diode Ratings and Characteristics ^b								
Pulsed Current ^a	I_{SM}			-	-	210	A	
Forward Voltage	V_{SD}	$I_F = 40 \text{ A}$, $V_{GS} = 0 \text{ V}$		-	0.83	1.2	V	

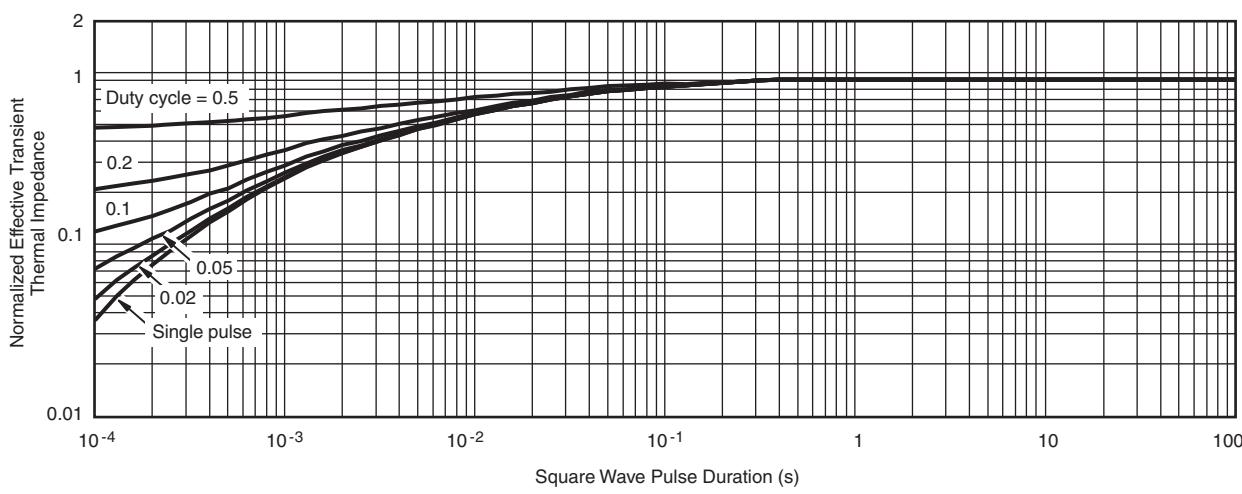
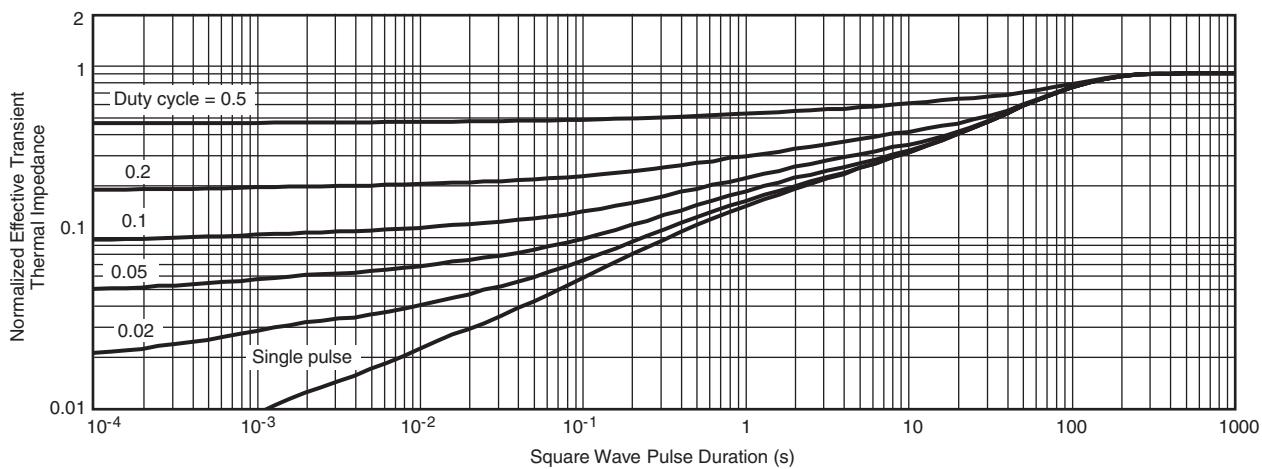
Notes

- a. Pulse test; pulse width $\leq 300 \mu\text{s}$, 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.

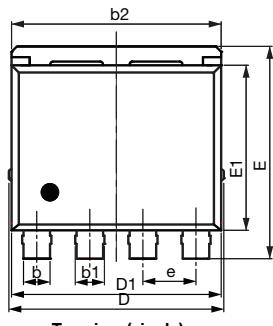
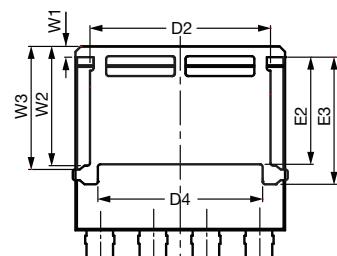
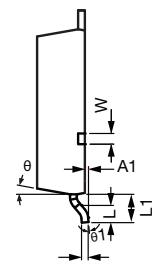
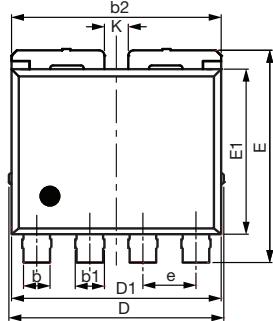
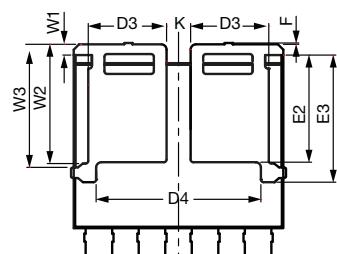
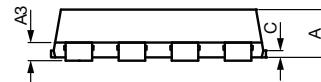
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise noted)

Output Characteristics

Transfer Characteristics

Transconductance

On-Resistance vs. Drain Current

Capacitance

Gate Charge

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

On-Resistance vs. Junction Temperature

Source Drain Diode Forward Voltage

Drain Source Breakdown vs. Junction Temperature

On-Resistance vs. Gate-to-Source Voltage

Threshold Voltage

Safe Operating Area

THERMAL RATINGS ($T_A = 25$ °C, unless otherwise noted)


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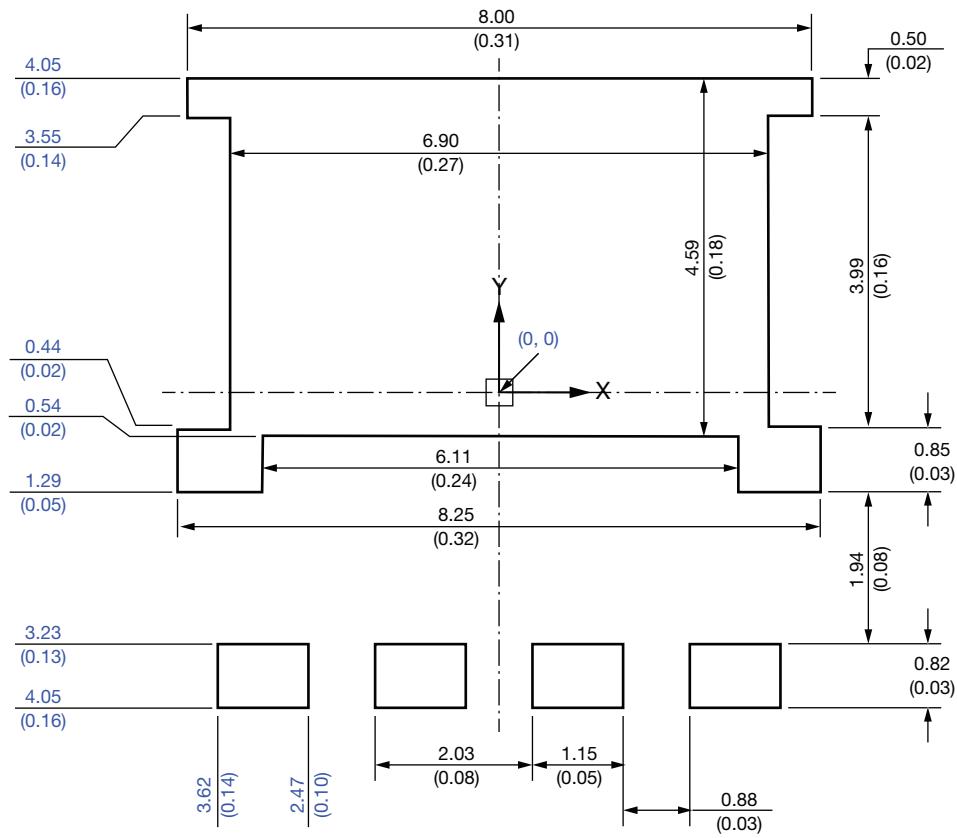
PowerPAK® 8 x 8L Case Outline


Top view (single)

Bottom view (single)

0.25 gauge line

Top view (dual)

Bottom view (dual)


DIM.	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	1.70	1.80	1.90	0.067	0.071	0.075
A1	0.00	0.08	0.13	0.000	0.003	0.005
A3	0.55	0.62	0.70	0.022	0.024	0.028
b	0.92	1.00	1.08	0.036	0.039	0.043
b1	1.02	1.10	1.18	0.040	0.043	0.046
b2	7.80	7.90	8.00	0.307	0.311	0.315
c	0.20	0.25	0.30	0.008	0.010	0.012
D	8.00	8.10	8.25	0.315	0.319	0.325
D1	7.80	7.90	8.00	0.307	0.311	0.315
D2	6.70	6.80	6.90	0.264	0.268	0.272
D3	2.85	2.95	3.05	0.112	0.116	0.120
D4	6.11	6.21	6.31	0.241	0.244	0.248
e	1.95	2.00	2.05	0.077	0.079	0.081
E	7.90	8.00	8.10	0.311	0.315	0.319
E1	6.12	6.22	6.32	0.241	0.245	0.249
E2	3.94	4.04	4.14	0.140	0.159	0.163
E3	4.69	4.79	4.89	0.185	0.189	0.193
F	0.05	0.10	0.15	0.002	0.004	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	0.80	0.90	1.00	0.031	0.035	0.039
W	0.30	0.40	0.50	0.012	0.016	0.020
W1	0.30	0.40	0.50	0.012	0.016	0.020
W2	4.39	4.49	4.59	0.173	0.177	0.181
W3	4.54	4.64	4.74	0.179	0.183	0.187
θ	6°	10°	14°	6°	10°	14°
$\theta 1$	0°	3°	8°	0°	3°	8°

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DWG: 6026

Recommended Minimum PADs for PowerPAK® 8 x 8L Single


Note

- Linear dimensions are in black, the same information is provided in ordinate dimensions which are in blue.

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