

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

PRODUCT SUMMARY

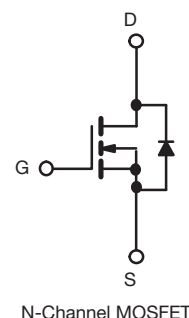
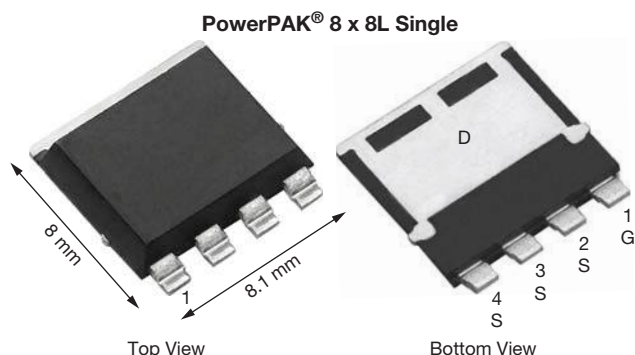
V _{DS} (V)	100
R _{DS(on)} (Ω) at V _{GS} = 10 V	0.0034
R _{DS(on)} (Ω) at V _{GS} = 4.5 V	0.0040
I _D (A)	135
Configuration	Single
Package	PowerPAK 8 x 8L

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



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	mJ
Single Pulse Avalanche Energy	E _{AS}	231	
Maximum Power Dissipation	P _D	136	W
		45	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55 to +175	°C
Soldering Recommendations (Peak Temperature) ^{c, d}		260	

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 μs, 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 °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 μA		100	-	-	V
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA		1.5	2	2.5	
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V		-	-	± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V	V _{DS} = 100 V	-	-	1	μA
		V _{GS} = 0 V	V _{DS} = 100 V, T _J = 125 °C	-	-	50	
		V _{GS} = 0 V	V _{DS} = 100 V, T _J = 175 °C	-	-	500	
On-State Drain Current ^a	I _{D(on)}	V _{GS} = 10 V	V _{DS} ≥ 5 V	50	-	-	A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V	I _D = 20 A	-	0.0028	0.0034	Ω
		V _{GS} = 4.5 V	I _D = 10 A	-	0.0033	0.0040	
		V _{GS} = 10 V	I _D = 20 A, T _J = 125 °C	-	-	0.0058	
		V _{GS} = 10 V	I _D = 20 A, T _J = 175 °C	-	-	0.0074	
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 15 A		-	84	-	S
Dynamic ^b							
Input Capacitance	C _{iss}	V _{GS} = 0 V	V _{DS} = 25 V, f = 1 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 V	V _{DS} = 50 V, I _D = 10 A	-	97	150	nC
Gate-Source Charge ^c	Q _{gs}			-	15	-	
Gate-Drain Charge ^c	Q _{gd}			-	20	-	
Gate Resistance	R _g	f = 1 MHz		0.95	1.92	3	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 50 V, R _L = 5 Ω I _D ≅ 10 A, V _{GEN} = 10 V, R _g = 1 Ω		-	19	30	ns
Rise Time ^c	t _r			-	40	60	
Turn-Off Delay Time ^c	t _{d(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 A, V _{GS} = 0 V		-	0.83	1.2	V

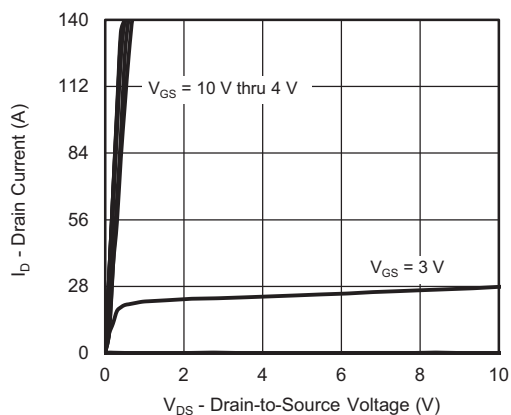
Notes

- 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.

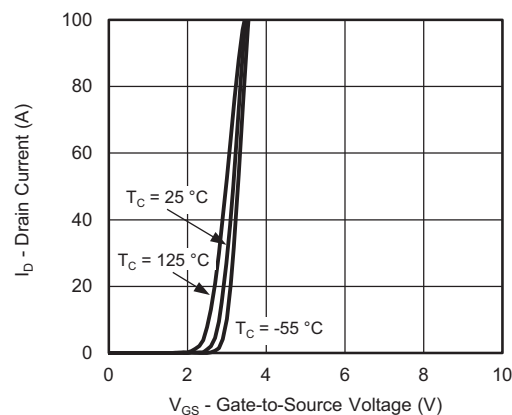
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



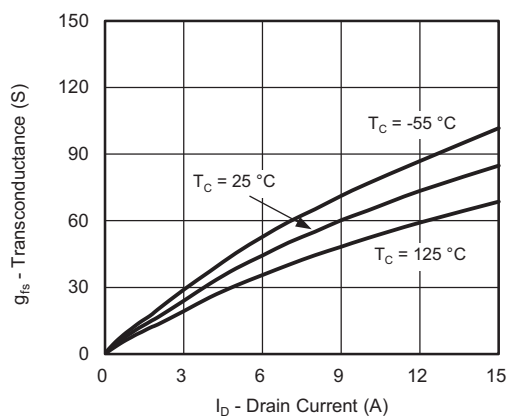
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)



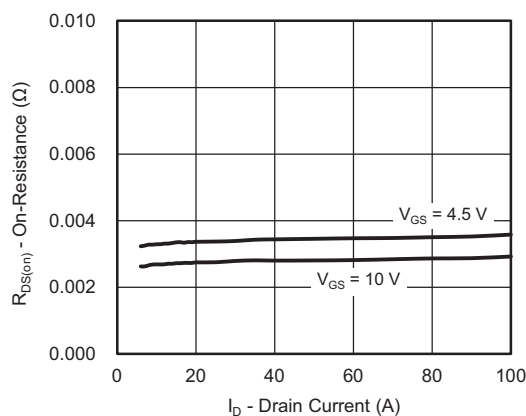
Output Characteristics



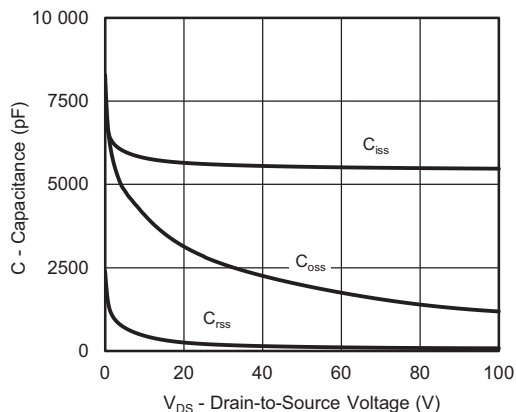
Transfer Characteristics



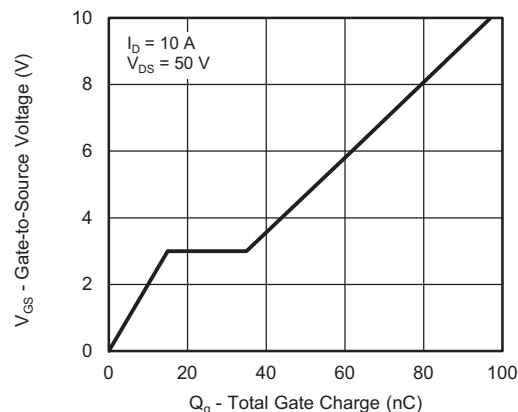
Transconductance



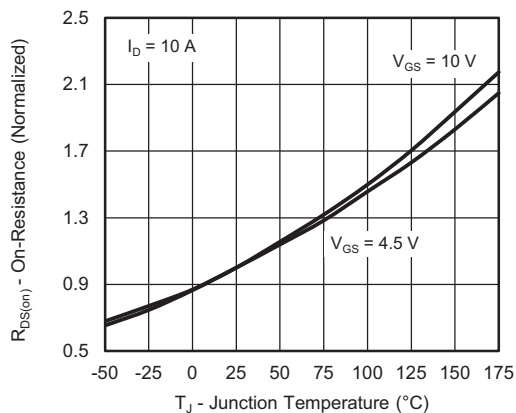
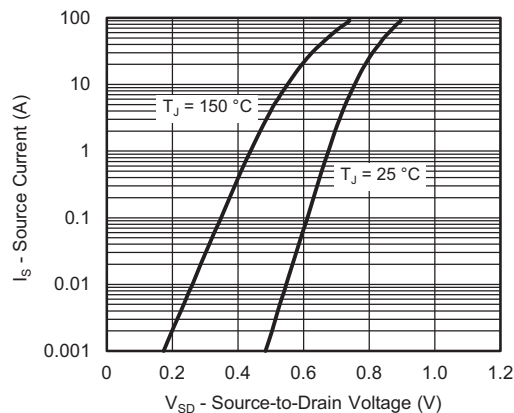
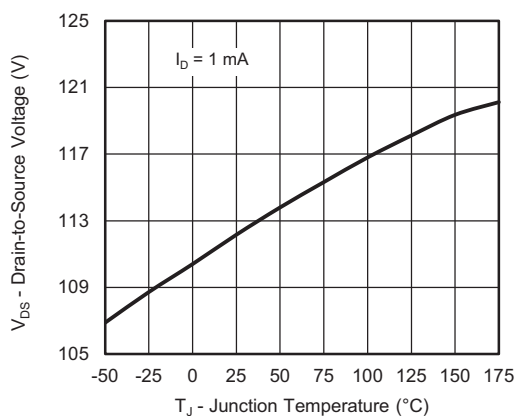
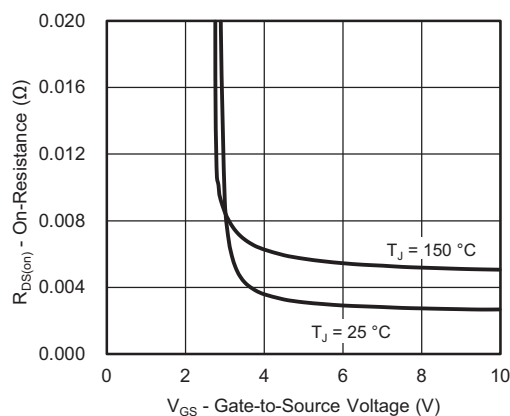
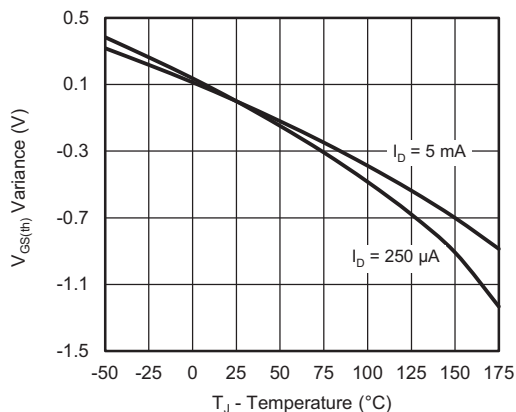
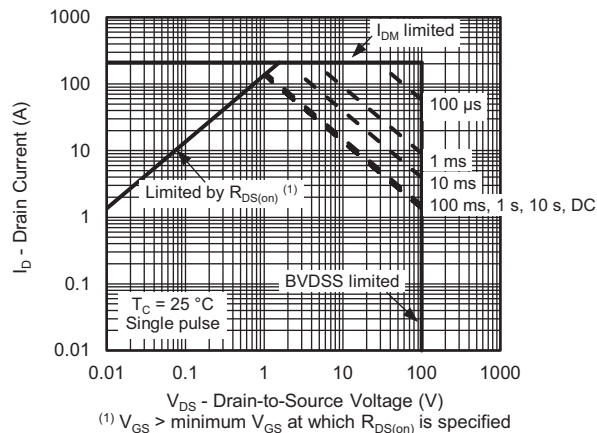
On-Resistance vs. Drain Current



Capacitance

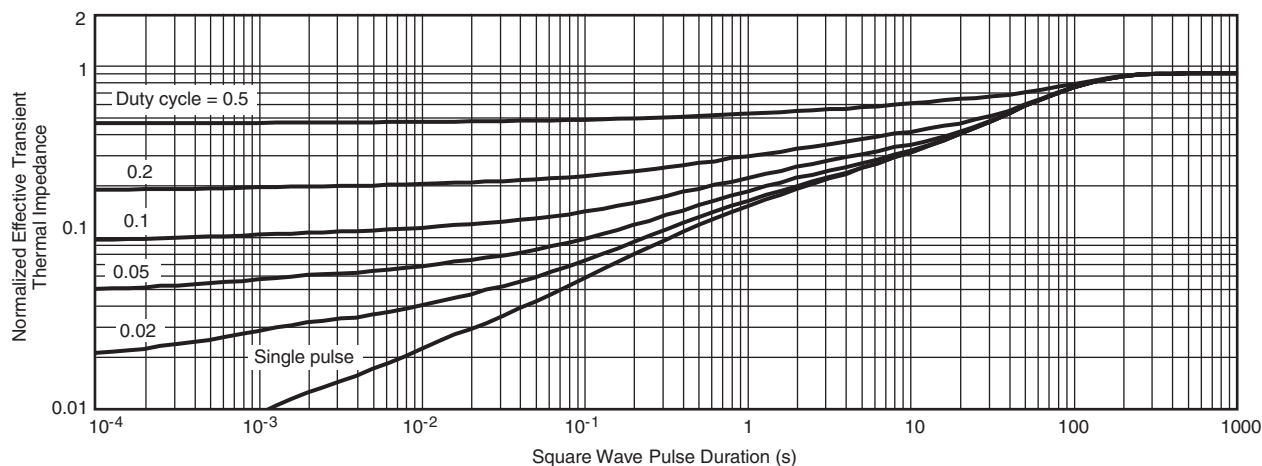


Gate Charge

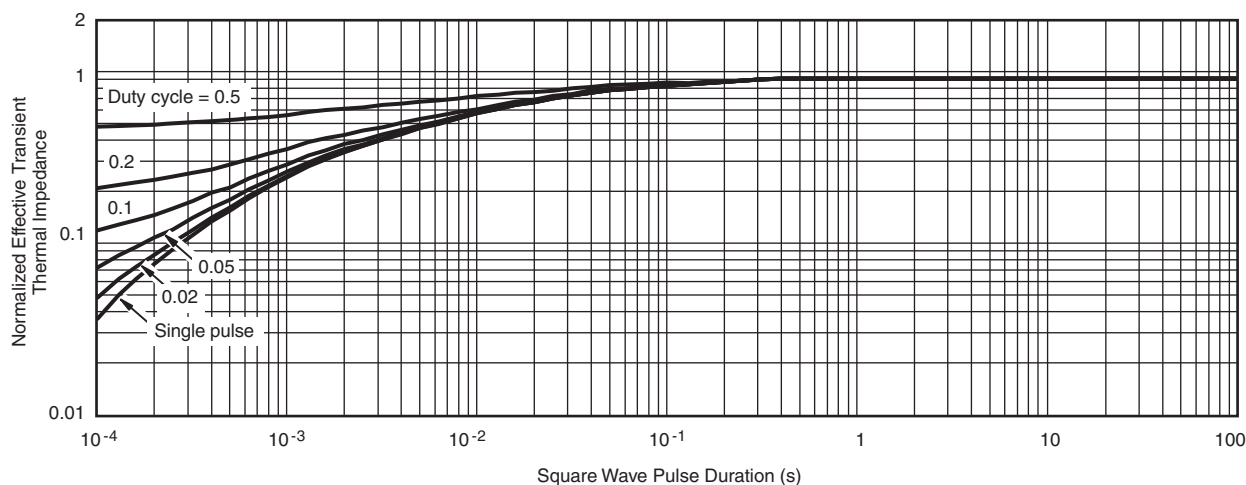
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)

On-Resistance vs. Junction Temperature

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



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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PowerPAK[®] 8 x 8L

Ordering codes for the SQ rugged series power MOSFETs in the PowerPAK 8 x 8L package:

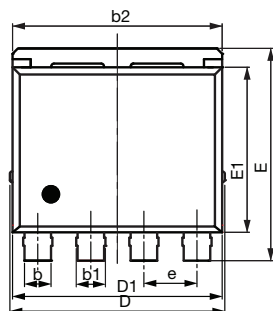
DATASHEET PART NUMBER	OLD ORDERING CODE ^a	NEW ORDERING CODE
SQJQ100EL	-	SQJQ100EL-T1_GE3
SQJQ402E	SQJQ402E-T1-GE3	SQJQ402E-T1_GE3
SQJQ410EL	-	SQJQ410EL-T1_GE3
SQJQ900E	-	SQJQ900E-T1_GE3

Note

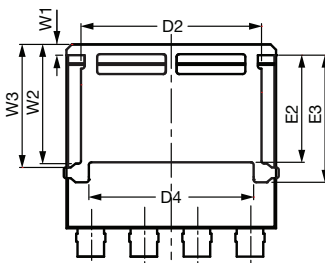
a. Old ordering code is obsolete and no longer valid for new orders



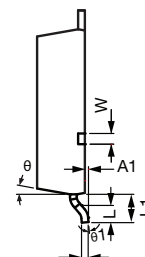
PowerPAK® 8 x 8L Case Outline



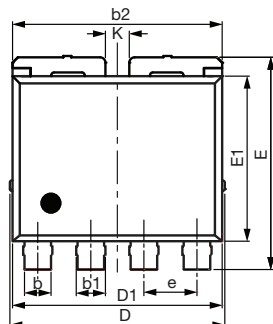
Top view (single)



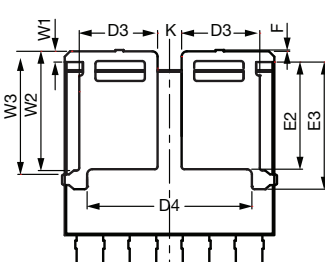
Bottom view (single)



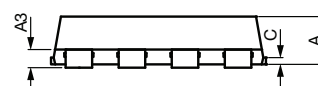
0.25 gauge line



Top view (dual)



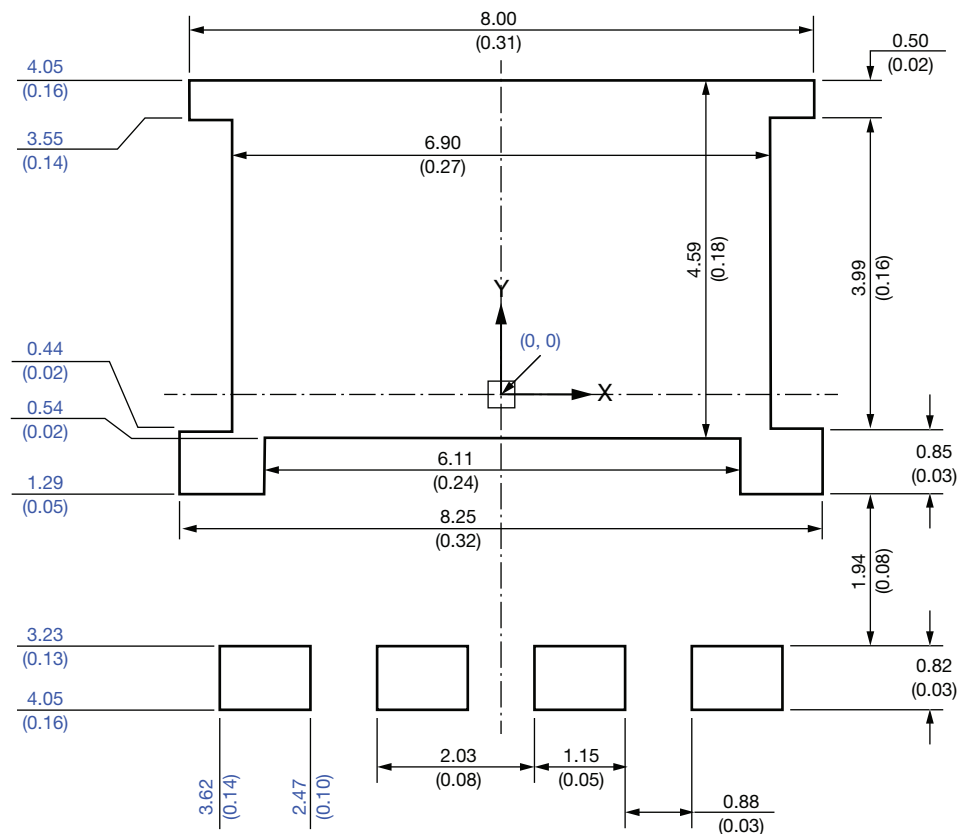
Bottom view (dual)



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°
θ1	0°	3°	8°	0°	3°	8°

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DWG: 6026

Recommended Minimum PADS for PowerPAK® 8 x 8L Single



Dimensions in millimeters (inches)

Note

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



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