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

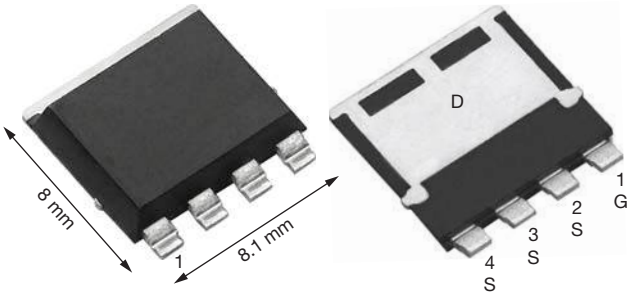
AUTOMOTIVE GRADE

Pb-free

RoHS COMPLIANT

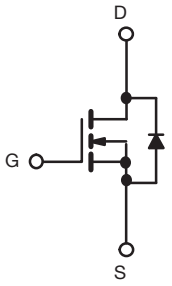
HALOGEN FREE

PowerPAK® 8 x 8L Single



Top View

Bottom View



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	T_C = 25 °C	I_D	135	A
	T_C = 125 °C		78	
Continuous Source Current (Diode Conduction)		I_S	124	
Pulsed Drain Current [a]		I_{DM}	210	
Single Pulse Avalanche Current	L = 0.1 mH	I_{AS}	68	
Single Pulse Avalanche Energy		E_{AS}	231	mJ
Maximum Power Dissipation	T_C = 25 °C	P_D	136	W
	T_C = 125 °C		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	PCB Mount [b]	R_{thJA}	50	°C/W
Junction-to-Case (Drain)		R_{thJC}	1.1	

Notes

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.

b. When mounted on 1" square PCB (FR4 material).

c. 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.

d. Rework conditions: manual soldering with a soldering iron is not recommended for leadless components.

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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

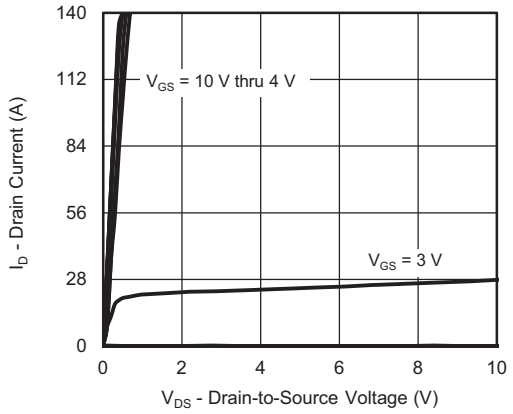
Notes

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

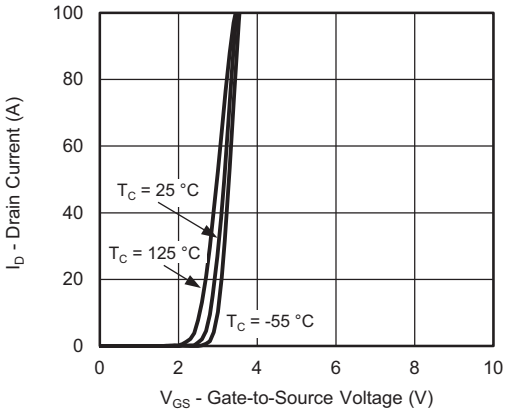
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

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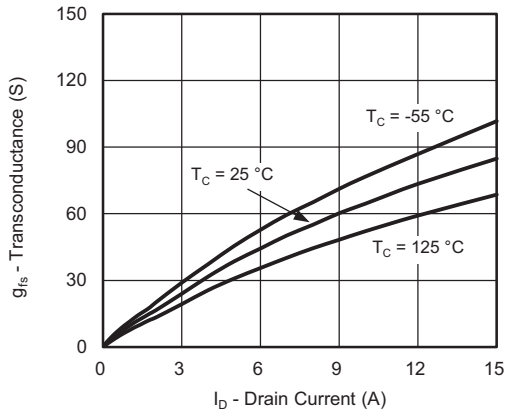
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



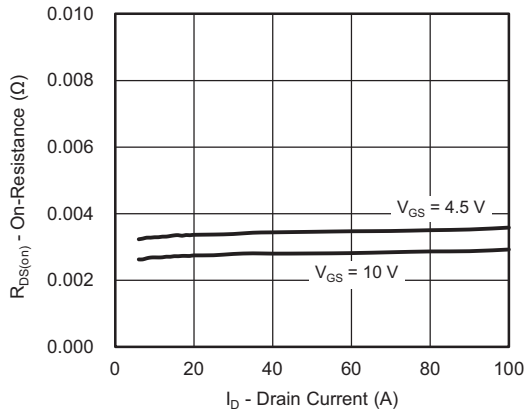
Output Characteristics



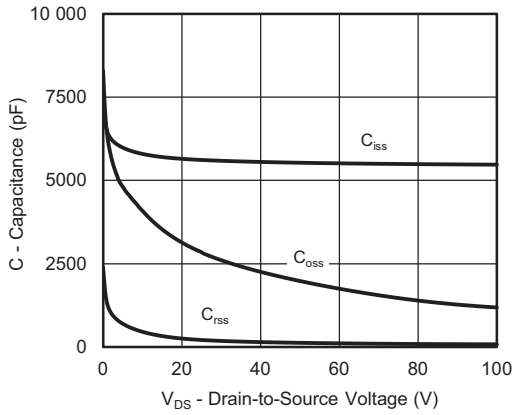
Transfer Characteristics



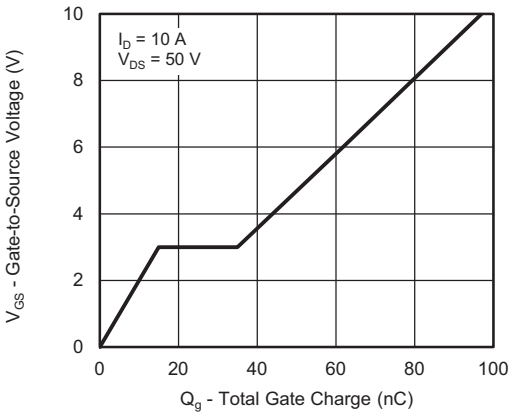
Transconductance



On-Resistance vs. Drain Current



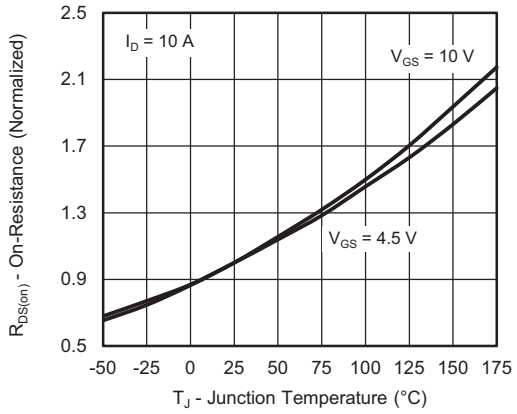
Capacitance



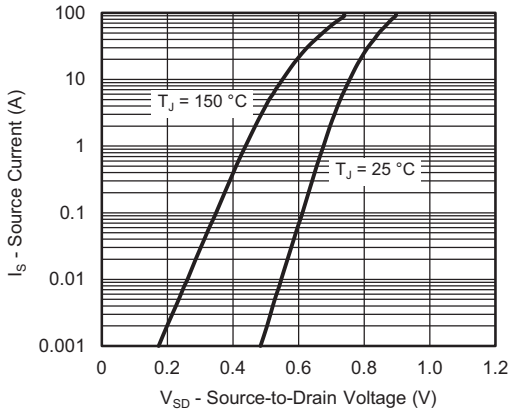
Gate Charge

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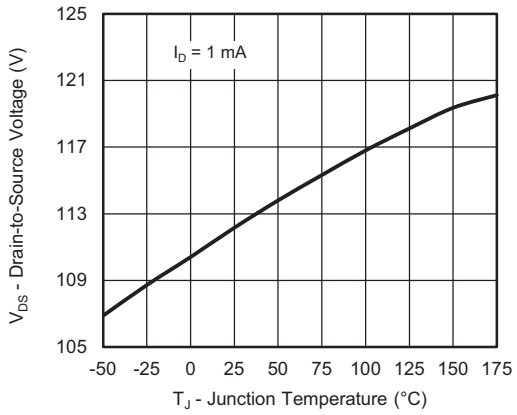
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



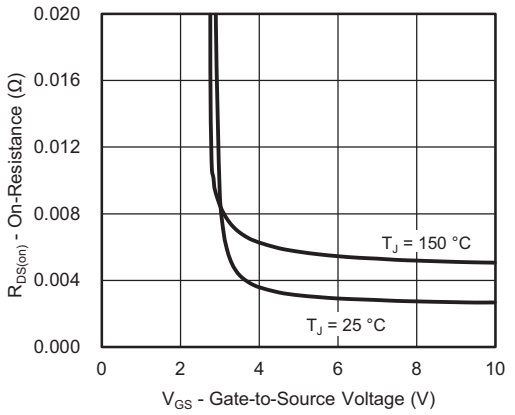
On-Resistance vs. Junction Temperature



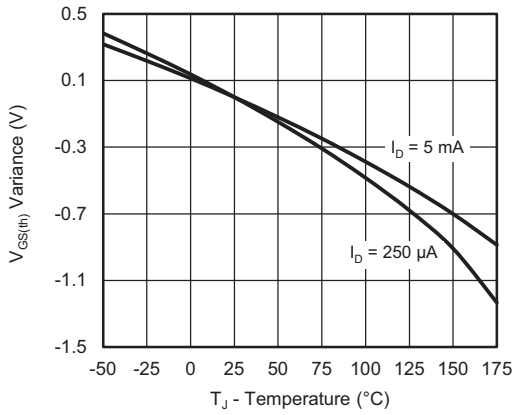
Source Drain Diode Forward Voltage



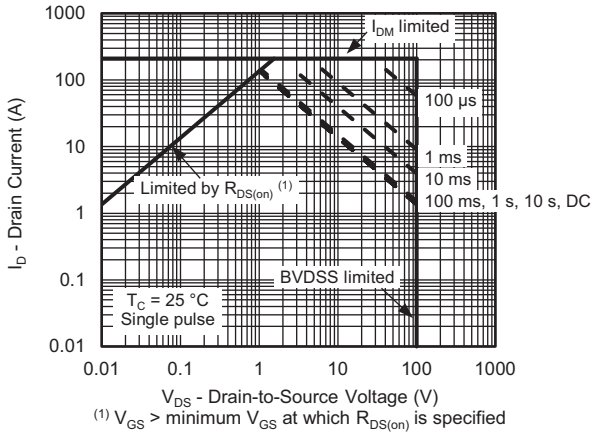
Drain Source Breakdown vs. Junction Temperature



On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

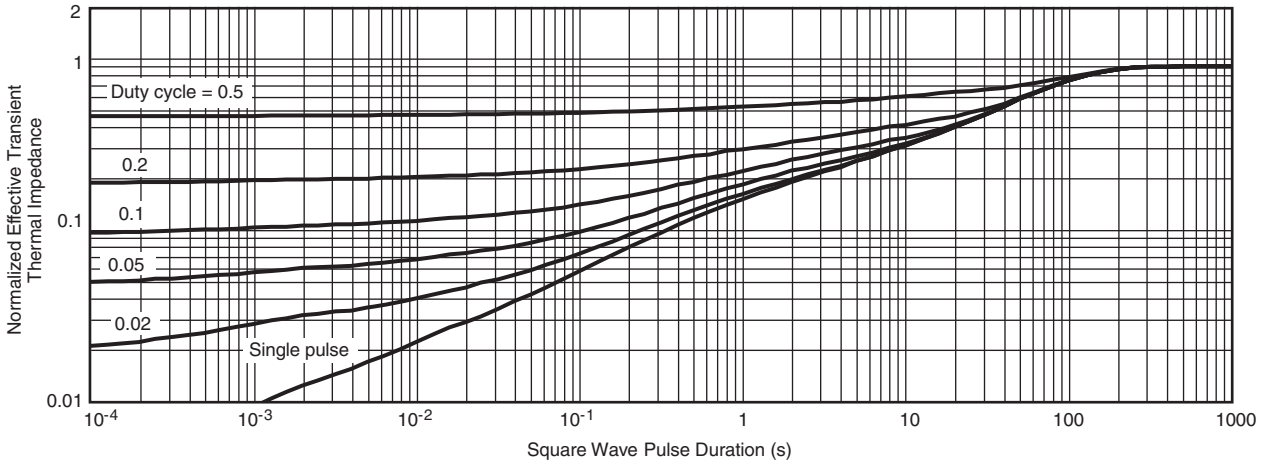


Safe Operating Area

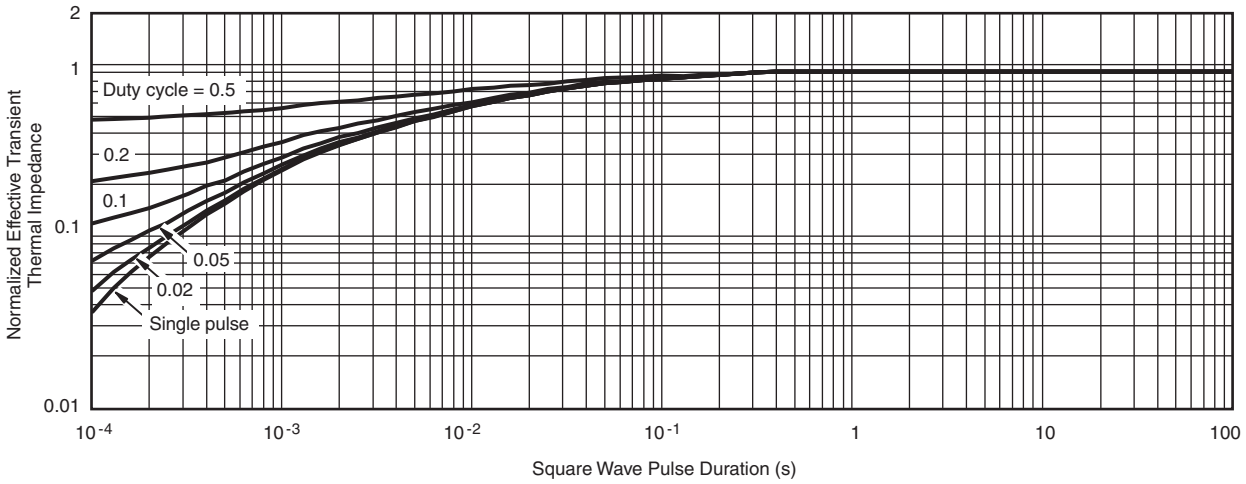
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THERMAL RATINGS (T_A = 25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient

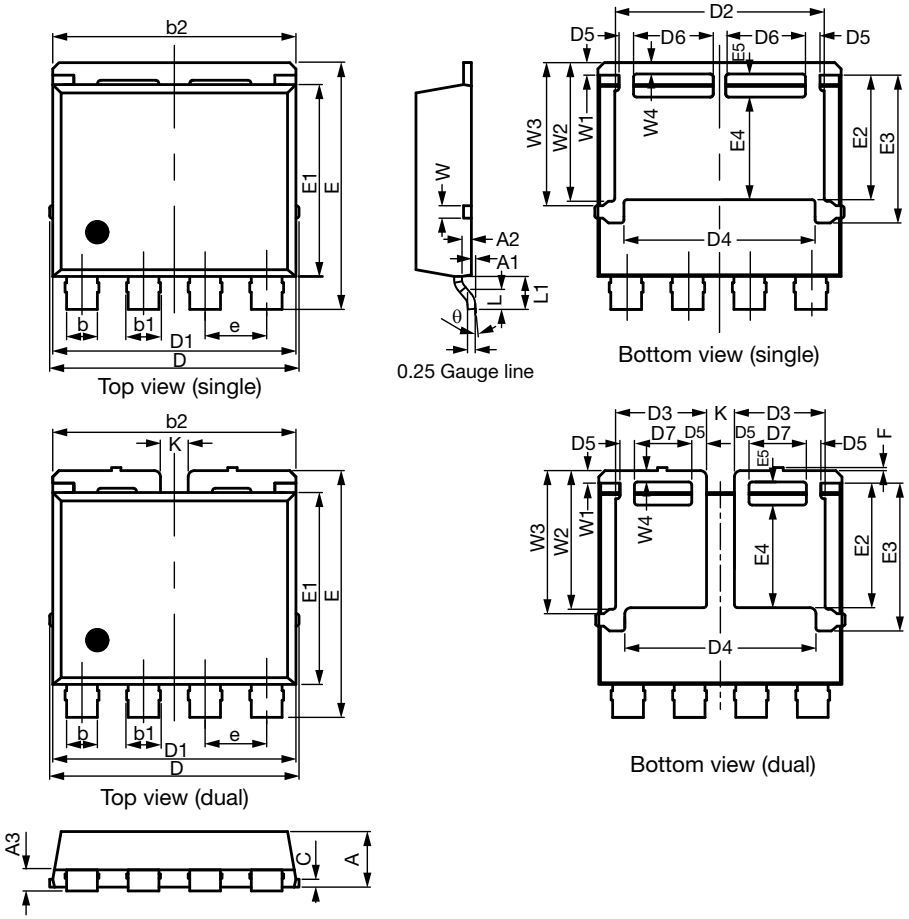


Normalized Thermal Transient Impedance, Junction-to-Case

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PowerPAK® 8 x 8L Case Outline



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
A2	0.25	0.30	0.35	0.010	0.012	0.014
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
D5	0.37	0.47	0.57	0.015	0.019	0.022
D6	2.49	2.59	2.69	0.098	0.102	0.106
D7	1.76	1.86	1.96	0.069	0.073	0.077

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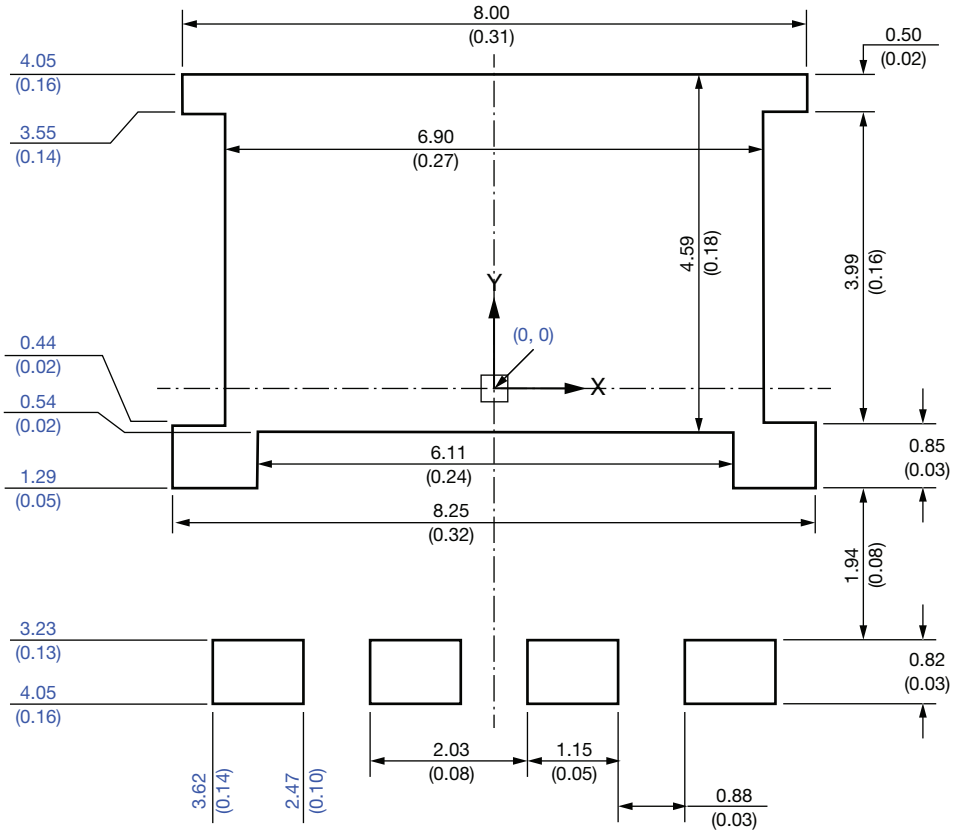
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DIM.	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
e	1.95	2.00	2.05	0.077	0.079	0.081
E	7.90	8.00	8.10	0.311	0.315	0.319
E1	6.12	6.22	6.32	0.241	0.245	0.249
E2	3.94	4.04	4.14	0.140	0.159	0.163
E3	4.69	4.79	4.89	0.185	0.189	0.193
E4	3.23	3.33	3.43	0.127	0.131	0.135
E5	0.65	0.75	0.85	0.026	0.030	0.033
F	0.00	0.10	0.15	0.000	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
W4	0.32	0.37	0.42	0.013	0.015	0.017
θ	6°	10°	14°	6°	10°	14°
C17-1388-Rev. B, 16-Oct-17 DWG: 6026						

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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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