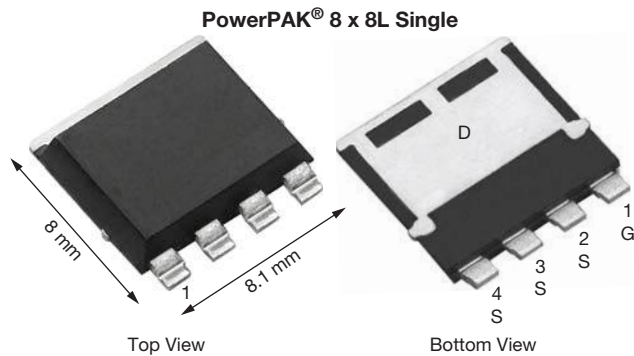


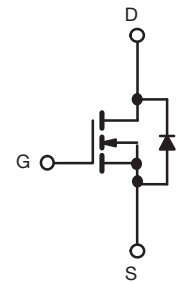
Automotive N-Channel 40 V (D-S) 175 °C MOSFET

 AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE


FEATURES

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



N-Channel MOSFET

PRODUCT SUMMARY	
V _{DS} (V)	40
R _{DS(on)} (Ω) at V _{GS} = 10 V	0.00172
I _D (A)	200
Configuration	Single
Package	PowerPAK 8 x 8L

ABSOLUTE MAXIMUM RATINGS (T _C = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-source voltage		V _{DS}	40	V
Gate-source voltage		V _{GS}	± 20	
Continuous drain current	T _C = 25 °C ^a	I _D	200	A
	T _C = 125 °C		124	
Continuous source current (diode conduction)		I _S	136	
Pulsed drain current ^b		I _{DM}	600	
Single pulse avalanche current	L = 0.1 mH	I _{AS}	85	
Single pulse avalanche energy		E _{AS}	361	mJ
Maximum power dissipation	T _C = 25 °C	P _D	150	W
	T _C = 125 °C		50	
Operating junction and storage temperature range		T _J , T _{stg}	-55 to +175	°C
Soldering recommendations (peak temperature) ^{d, e}			260	

THERMAL RESISTANCE RATINGS				
PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-ambient	PCB mount ^c	R _{thJA}	50	°C/W
Junction-to-case (drain)		R _{thJC}	1	

Notes

- Package limited
- 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 ($T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-source breakdown voltage	V_{DS}	$V_{GS} = 0, I_D = 250\text{ }\mu\text{A}$		40	-	-	V
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$		2.5	3	3.5	
Gate-source leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$		-	-	± 100	nA
Zero gate voltage drain current	I_{DSS}	$V_{GS} = 0\text{ V}$	$V_{DS} = 40\text{ V}$	-	-	1	μA
		$V_{GS} = 0\text{ V}$	$V_{DS} = 40\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	-	50	
		$V_{GS} = 0\text{ V}$	$V_{DS} = 40\text{ V}, T_J = 175\text{ }^\circ\text{C}$	-	-	150	
On-state drain current ^a	$I_{D(on)}$	$V_{GS} = 10\text{ V}$	$V_{DS} \geq 5\text{ V}$	100	-	-	A
Drain-source on-state resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$	$I_D = 20\text{ A}$	-	0.00133	0.00172	Ω
		$V_{GS} = 10\text{ V}$	$I_D = 20\text{ A}, T_J = 125\text{ }^\circ\text{C}$	-	-	0.00273	
		$V_{GS} = 10\text{ V}$	$I_D = 20\text{ A}, T_J = 175\text{ }^\circ\text{C}$	-	-	0.00330	
Forward transconductance ^b	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 20\text{ A}$		-	160	-	S
Dynamic ^b							
Input capacitance	C_{iss}	$V_{GS} = 0\text{ V}$	$V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	-	11 770	16 480	μF
Output capacitance	C_{oss}			-	1255	1760	
Reverse transfer capacitance	C_{rss}			-	395	555	
Total gate charge ^c	Q_g	$V_{GS} = 10\text{ V}$	$V_{DS} = 20\text{ V}, I_D = 40\text{ A}$	-	175	270	nC
Gate-source charge ^c	Q_{gs}			-	46	-	
Gate-drain charge ^c	Q_{gd}			-	27	-	
Gate resistance	R_g	f = 1 MHz		0.55	0.91	1.45	Ω
Turn-on delay time ^c	$t_{d(on)}$	$V_{DD} = 20\text{ V}, R_L = 0.5\text{ }\Omega$ $I_D \cong 40\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		-	22	31	ns
Rise time ^c	t_r			-	23	33	
Turn-off delay time ^c	$t_{d(off)}$			-	58	81	
Fall time ^c	t_f			-	8	21	
Source-Drain Diode Ratings and Characteristics ^b							
Reverse recovery time	t_{rr}	$V_{DD} = 32\text{ V}, I_{FM} = 40\text{ A},$ $di/dt = 100\text{ A}/\mu\text{s}$		-	75	-	ns
Reverse recovery charge	Q_{rr}			-	0.16	-	nC
Reverse recovery current	I_{RM}			-	-	-4.6	A
Pulsed current ^a	I_{SM}			-	-	450	A
Forward voltage	V_{SD}	$I_F = 50\text{ A}, V_{GS} = 0$		-	0.82	1.2	V

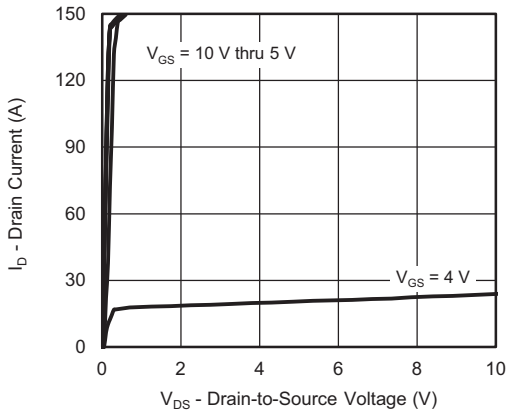
Notes

- 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

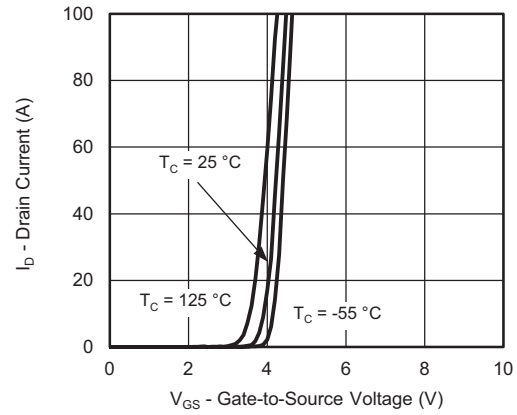
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



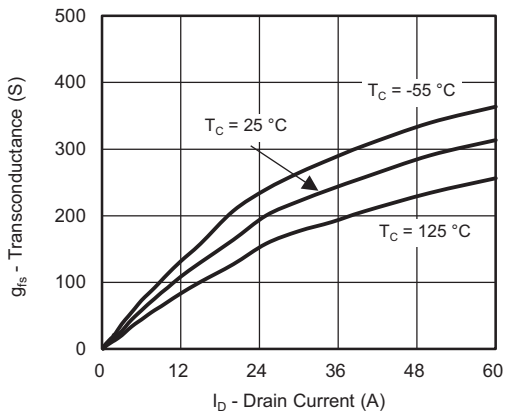
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



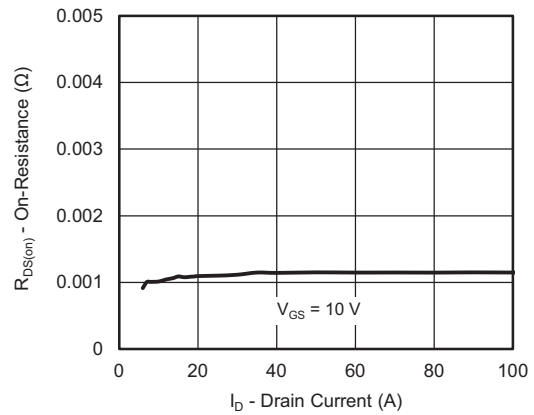
Output Characteristics



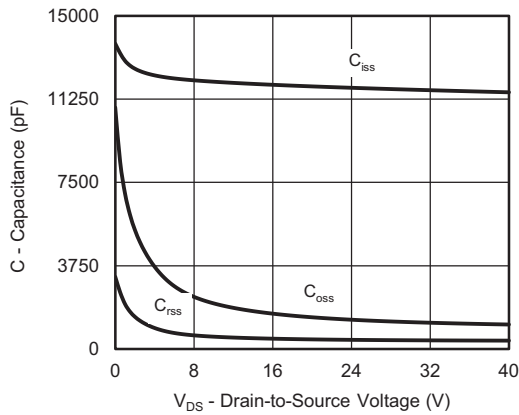
Transfer Characteristics



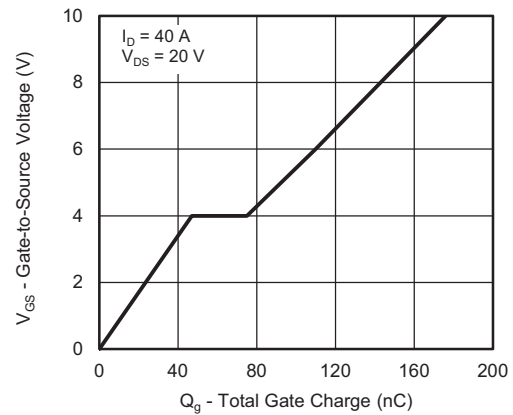
Transconductance



On-Resistance vs. Drain Current



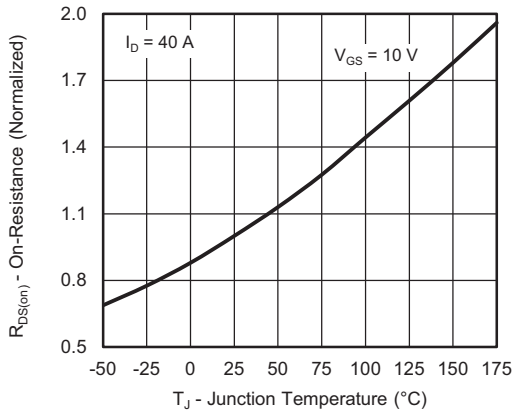
Capacitance



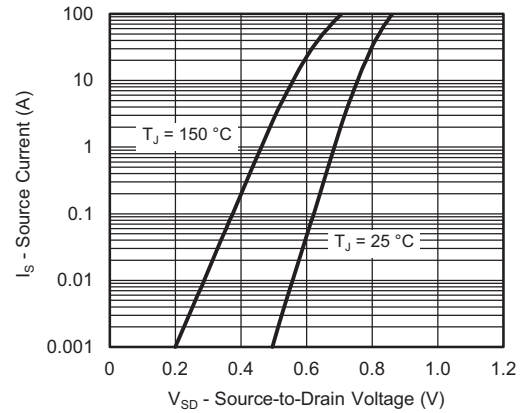
Gate Charge



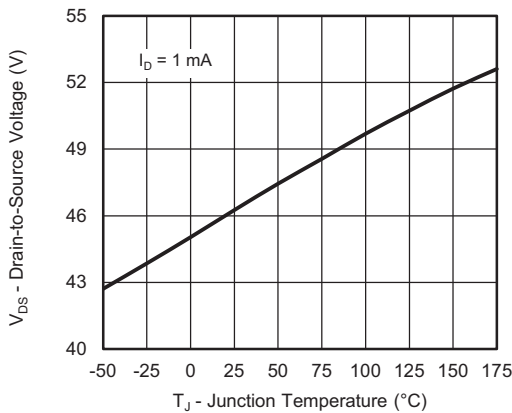
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



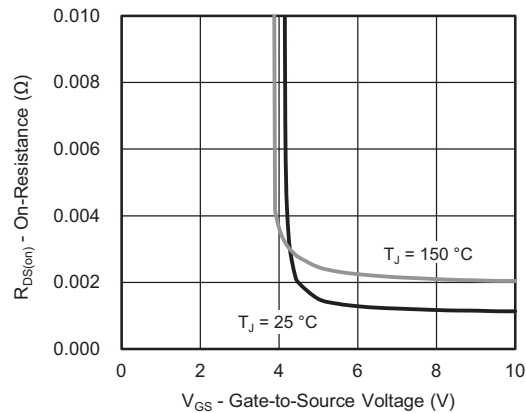
On-Resistance vs. Junction Temperature



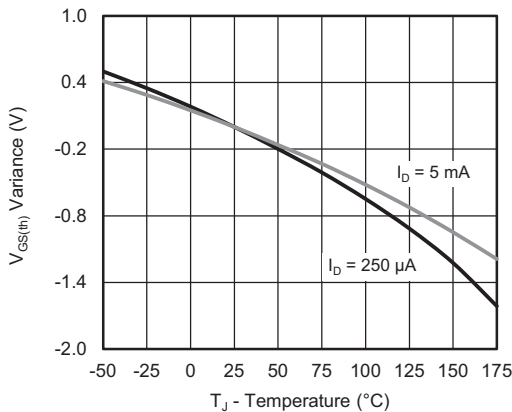
Source Drain Diode Forward Voltage



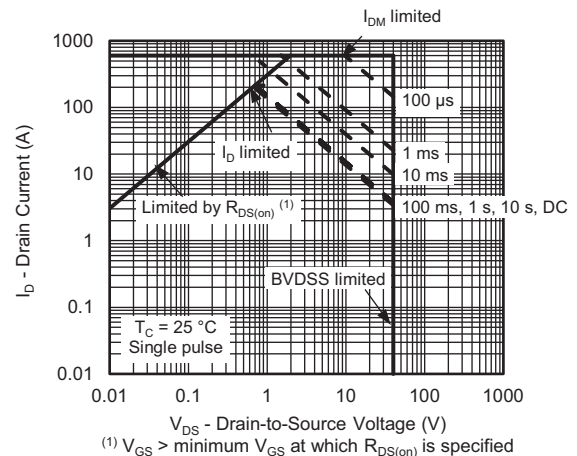
Drain Source Breakdown vs. Junction Temperature



On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

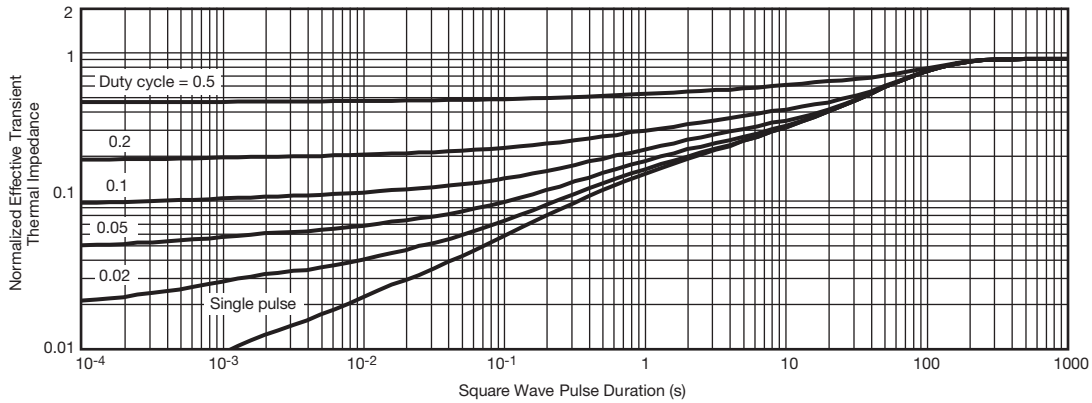


⁽¹⁾ $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

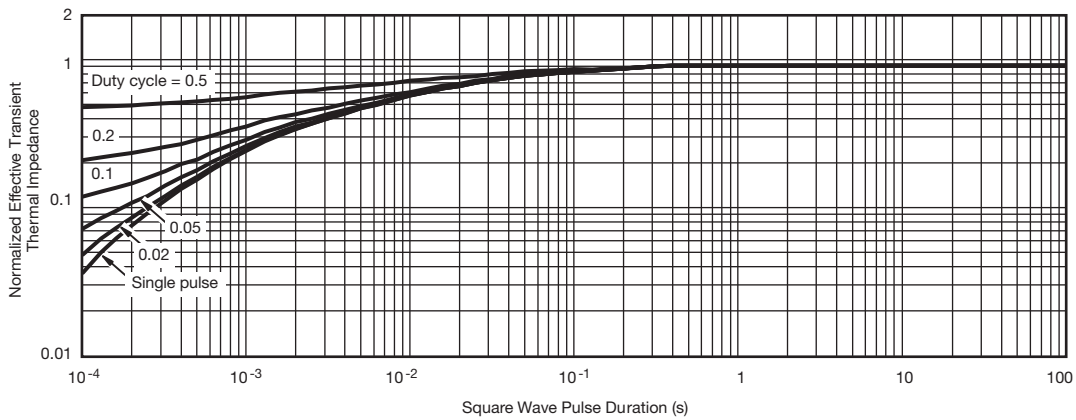
Safe Operating Area



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



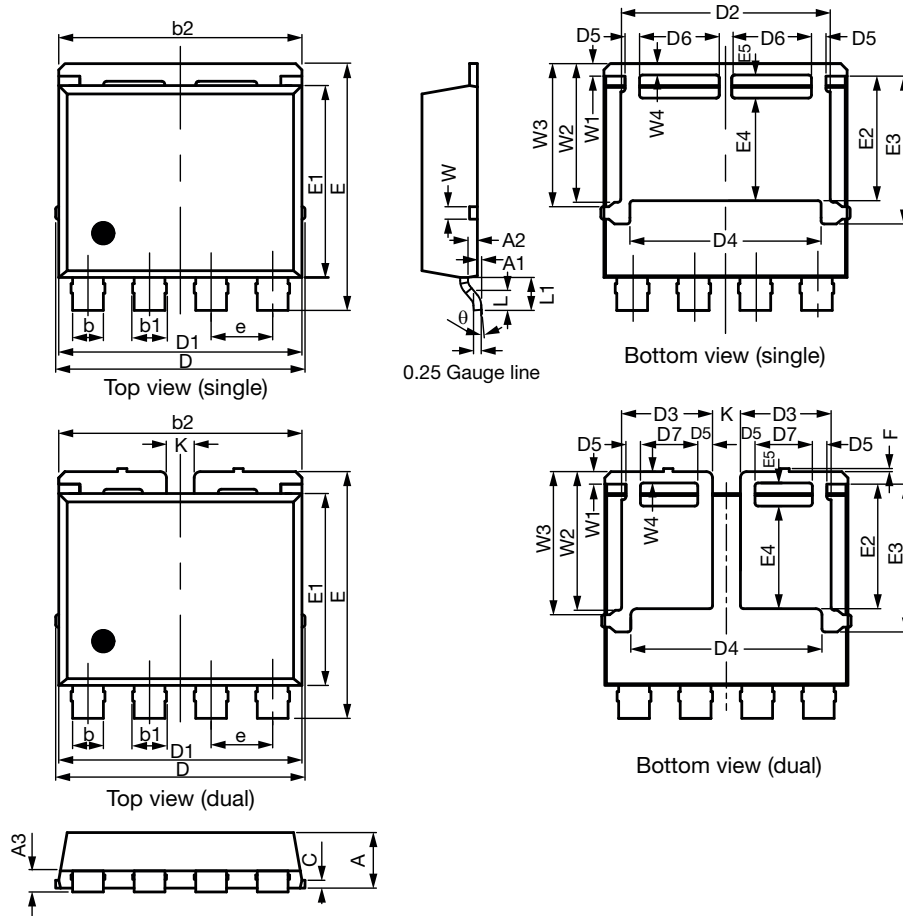
Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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PowerPAK[®] 8 x 8L 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



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



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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