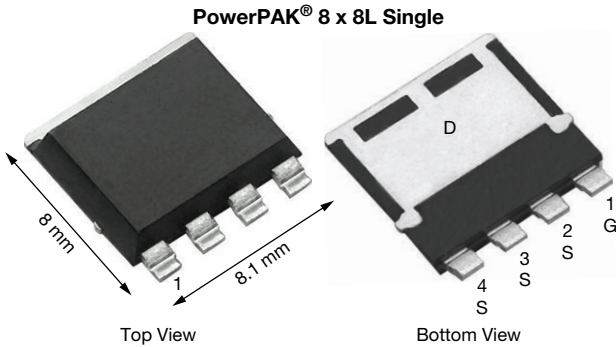


## N-Channel 100 V (D-S) 175 °C MOSFET



### FEATURES

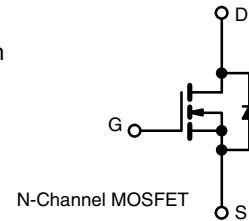
- TrenchFET® Gen IV power MOSFET
- Fully lead (Pb)-free device
- Optimized  $Q_g$ ,  $Q_{gd}$ , and  $Q_{gd}/Q_{gs}$  ratio reduces switching related power loss
- Up to 200 A maximum continuous drain current
- 50 % smaller footprint than D<sup>2</sup>PAK (TO-263)
- 100 %  $R_g$  and UIS tested
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### APPLICATIONS

- Synchronous rectification
- OR-ing
- Motor drive control
- Battery management



PRODUCT SUMMARY	
$V_{DS}$ (V)	100
$R_{DS(on)}$ max. ( $\Omega$ ) at $V_{GS} = 10$ V	0.0028
$R_{DS(on)}$ max. ( $\Omega$ ) at $V_{GS} = 7.5$ V	0.0036
$Q_g$ typ. (nC)	106
$I_D$ (A) <sup>a, g</sup>	225
Configuration	Single

ORDERING INFORMATION	
Package	PowerPAK 8 x 8L
Lead (Pb)-free and halogen-free	SiJH112E-T1-GE3

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25$ °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-source voltage		$V_{DS}$	100	V
Gate-source voltage		$V_{GS}$	$\pm 20$	V
Continuous drain current ( $T_J = 150$ °C)	$T_C = 25$ °C	$I_D$	225 <sup>d</sup>	A
	$T_C = 70$ °C		188	
	$T_A = 25$ °C		23 <sup>b</sup>	
	$T_A = 70$ °C		19 <sup>b</sup>	
Pulsed drain current ( $t = 100$ $\mu$ s)		$I_{DM}$	300	A
Continuous source-drain diode current	$T_C = 25$ °C	$I_S$	303	A
	$T_A = 25$ °C		3 <sup>b</sup>	
Single pulse avalanche current	L = 0.1 mH	$I_{AS}$	60	mJ
Single pulse avalanche energy		$E_{AS}$	180	
Maximum power dissipation	$T_C = 25$ °C	$P_D$	333	W
	$T_C = 70$ °C		233	
	$T_A = 25$ °C		3.3 <sup>b</sup>	
	$T_A = 70$ °C		2.3 <sup>b</sup>	
Operating junction and storage temperature range		$T_J, T_{stg}$	-55 to +175	°C
Soldering recommendations (peak temperature) <sup>c</sup>			260	°C

THERMAL RESISTANCE RATINGS					
PARAMETER		SYMBOL	TYPICAL	MAXIMUM	UNIT
Maximum junction-to-ambient <sup>b</sup>	Steady state	$R_{thJA}$	36	45	°C/W
Maximum junction-to-case (drain)	Steady state	$R_{thJC}$	0.36	0.45	

#### Notes

- $T_C = 25$  °C
- Surface mounted on 1" x 1" FR4 board
- See solder profile ([www.vishay.com/doc?73257](http://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 <sub>J</sub> = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Static</b>						
Drain-source breakdown voltage	V <sub>DS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	100	-	-	V
V <sub>DS</sub> temperature coefficient	ΔV <sub>DS</sub> /T <sub>J</sub>	I <sub>D</sub> = 10 mA	-	7	-	mV/°C
V <sub>GS(th)</sub> temperature coefficient	ΔV <sub>GS(th)</sub> /T <sub>J</sub>	I <sub>D</sub> = 250 μA	-	-8.9	-	
Gate-source threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	2	-	4	V
Gate-source leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±20	-	-	100	nA
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0 V	-	-	1	μA
		V <sub>DS</sub> = 40 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 70 °C	-	-	15	
On-state drain current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ 10 V, V <sub>GS</sub> = 10 V	40	-	-	A
Drain-source on-state resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A	-	0.0023	0.0028	Ω
		V <sub>GS</sub> = 7.5 V, I <sub>D</sub> = 20 A	-	0.0026	0.0036	
Forward transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 50 A	-	135	-	S
<b>Dynamic <sup>b</sup></b>						
Input capacitance	C <sub>ISS</sub>	V <sub>DS</sub> = 50 V, V <sub>GS</sub> = 0 V, f = 1 MHz	-	8050	-	pF
Output capacitance	C <sub>OSS</sub>		-	730	-	
Reverse transfer capacitance	C <sub>RSS</sub>		-	29	-	
Total gate charge	Q <sub>g</sub>	V <sub>DS</sub> = 50 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A	-	106	160	nC
		V <sub>DS</sub> = 20 V, V <sub>GS</sub> = 7.5 V, I <sub>D</sub> = 20 A	-	81	122	
Gate-source charge	Q <sub>gs</sub>		-	36	-	
Gate-drain charge	Q <sub>gd</sub>		-	23	-	
Gate resistance	R <sub>g</sub>	f = 1 MHz	0.3	1.3	2.6	Ω
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = 50 V, R <sub>L</sub> = 10 Ω, I <sub>D</sub> ≅ 5 A, V <sub>GEN</sub> = 10 V, R <sub>g</sub> = 1 Ω	-	21	40	ns
Rise time	t <sub>r</sub>		-	29	60	
Turn-off delay time	t <sub>d(off)</sub>		-	44	90	
Fall time	t <sub>f</sub>		-	11	20	
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = 50 V, R <sub>L</sub> = 10 Ω, I <sub>D</sub> ≅ 5 A, V <sub>GEN</sub> = 7.5 V, R <sub>g</sub> = 1 Ω	-	29	60	
Rise time	t <sub>r</sub>		-	87	175	
Turn-off delay time	t <sub>d(off)</sub>		-	40	80	
Fall time	t <sub>f</sub>		-	13	25	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous source-drain diode current	I <sub>S</sub>	T <sub>C</sub> = 25 °C	-	-	303	A
Pulse diode forward current	I <sub>SM</sub>		-	-	300	
Body diode voltage	V <sub>SD</sub>	I <sub>S</sub> = 5 A, V <sub>GS</sub> = 0 V	-	0.7	1.1	V
Body diode reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> = 10 A, di/dt = 100 A/μs, T <sub>J</sub> = 25 °C	-	65	130	ns
Body diode reverse recovery charge	Q <sub>rr</sub>		-	150	300	nC
Reverse recovery fall time	t <sub>a</sub>		-	65	-	ns
Reverse recovery rise time	t <sub>b</sub>		-	20	-	

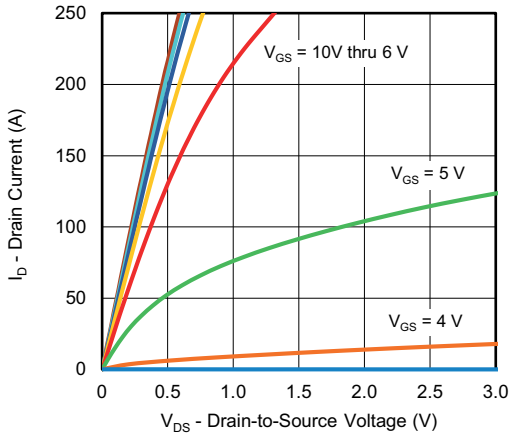
**Notes**

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

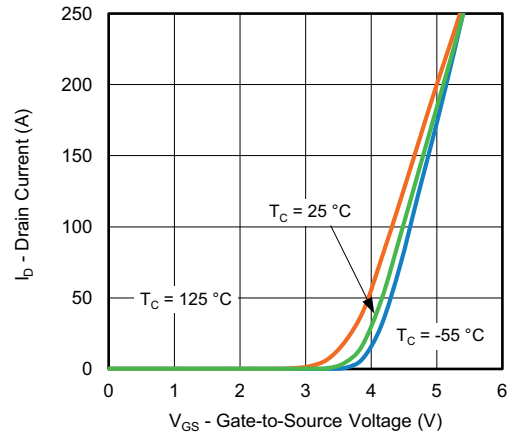
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



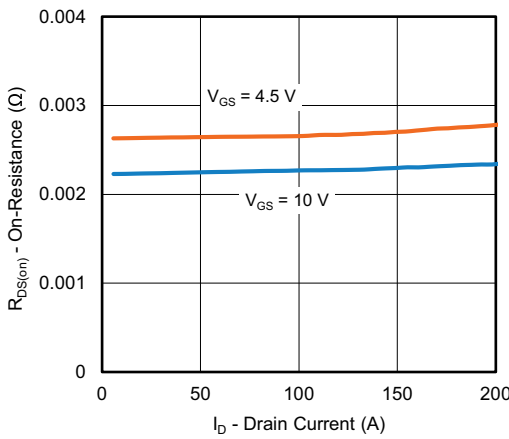
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



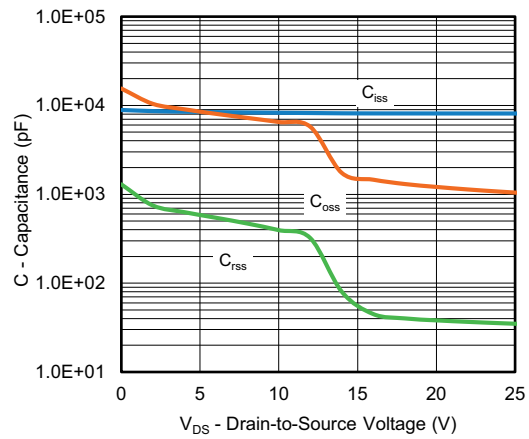
Output Characteristics



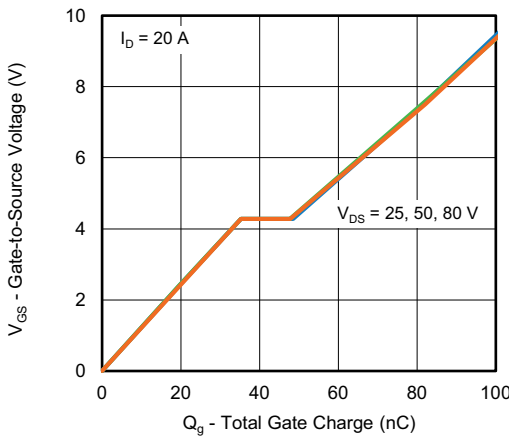
Transfer Characteristics



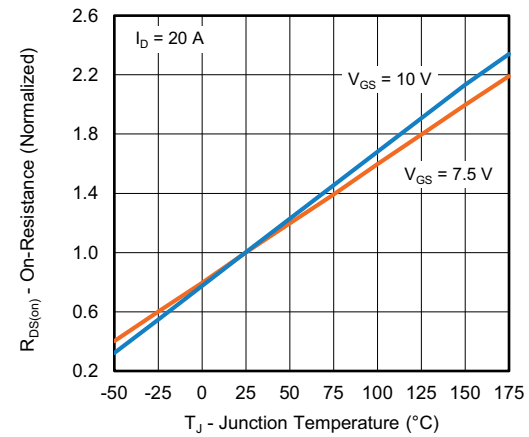
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



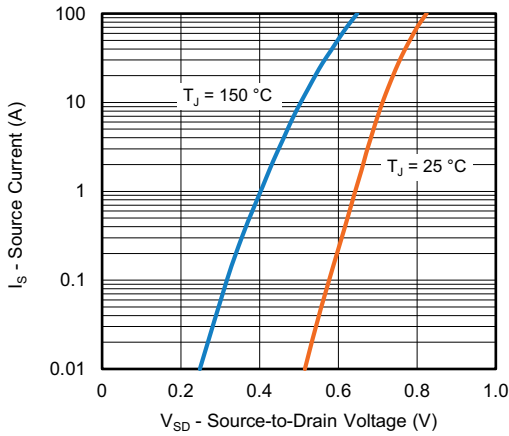
Gate Charge



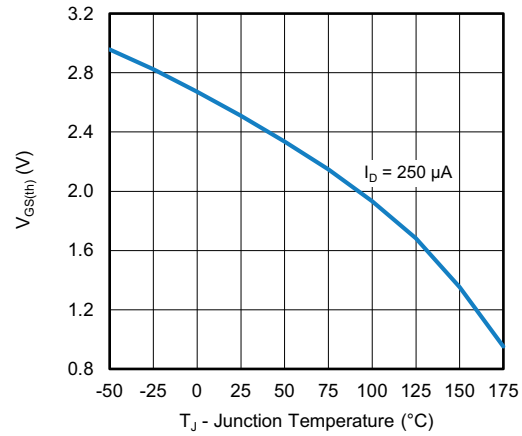
On-Resistance vs. Junction Temperature



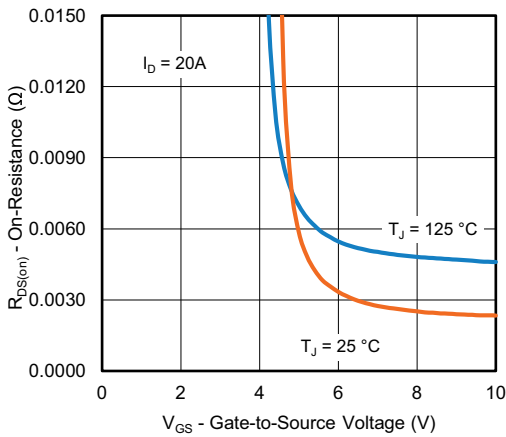
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



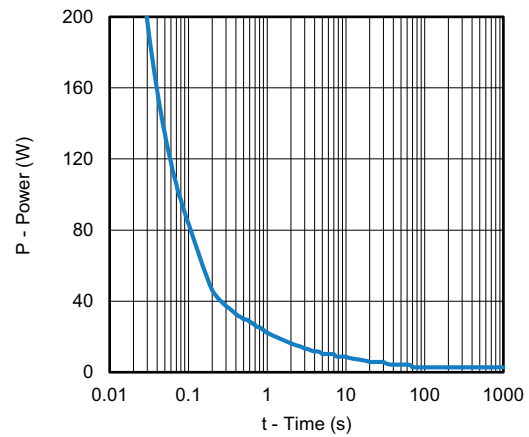
Source-Drain Diode Forward Voltage



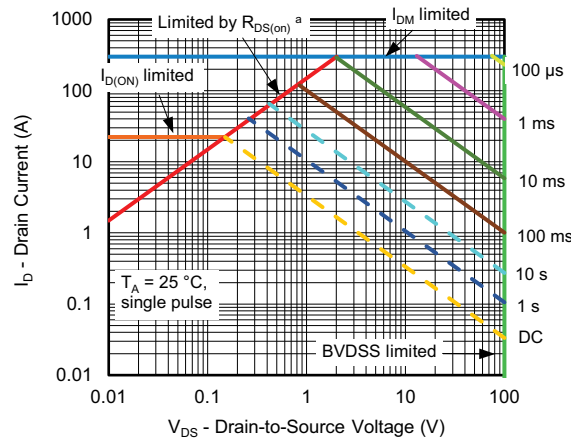
Threshold Voltage



On-Resistance vs. Gate-to-Source Voltage



Single Pulse Power, Junction-to-Ambient



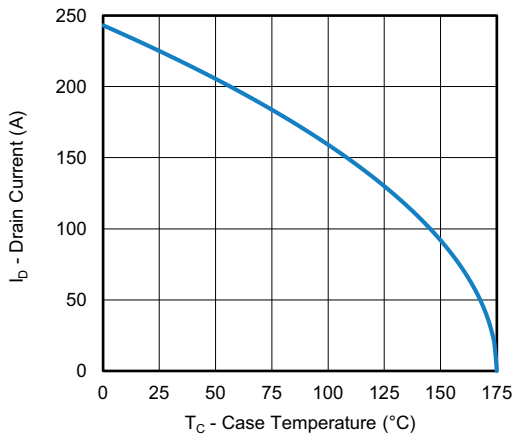
Safe Operating Area, Junction-to-Ambient

Note

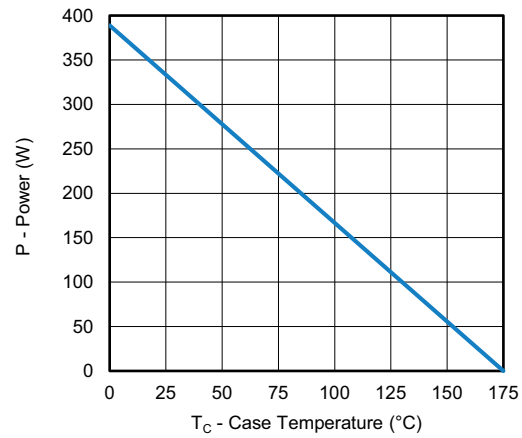
a. VGS > minimum VGS at which RDS(on) is specified



**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



**Current Derating <sup>a</sup>**



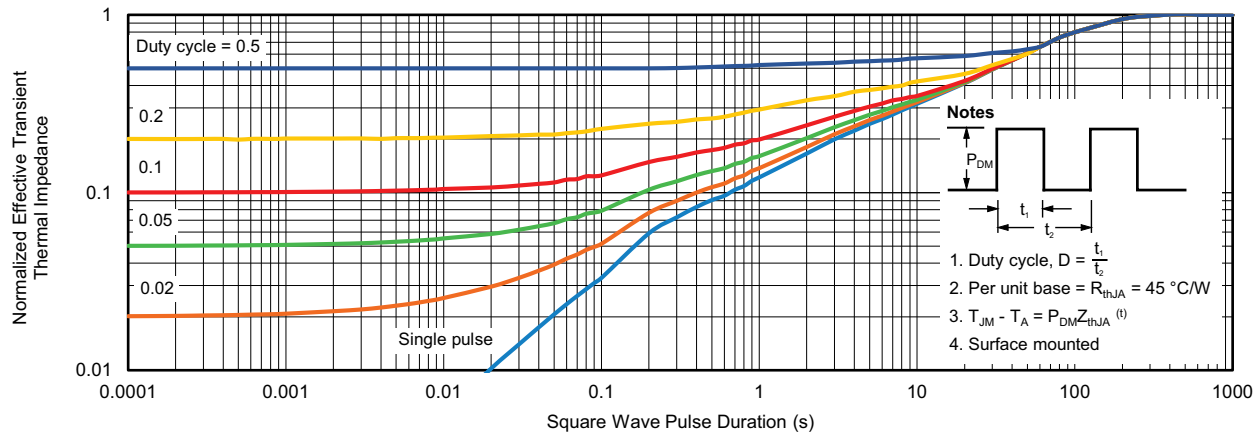
**Power, Junction-to-Case**

**Note**

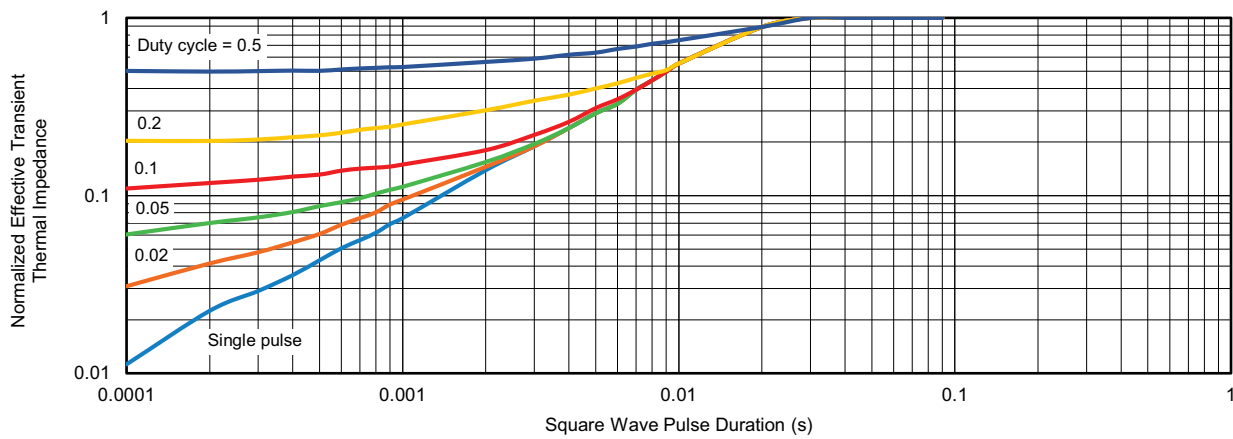
- a. The power dissipation  $P_D$  is based on  $T_J$  max. = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package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



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



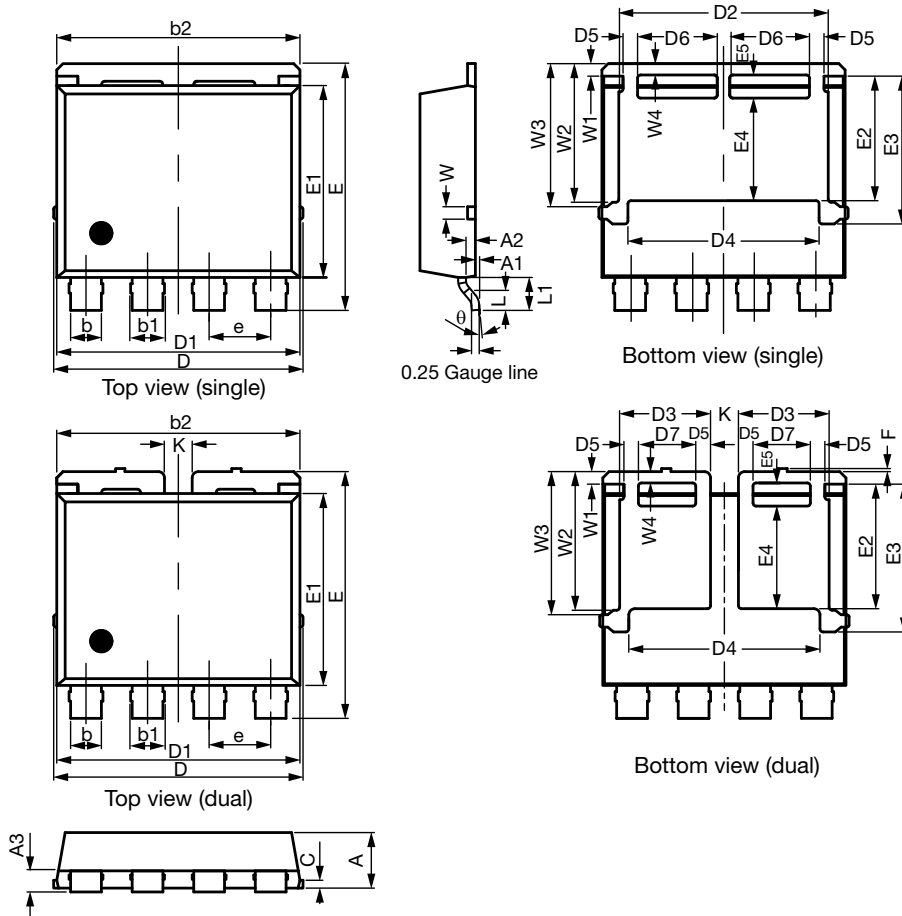
Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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## PowerPAK<sup>®</sup> 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°

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DWG: 6026





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