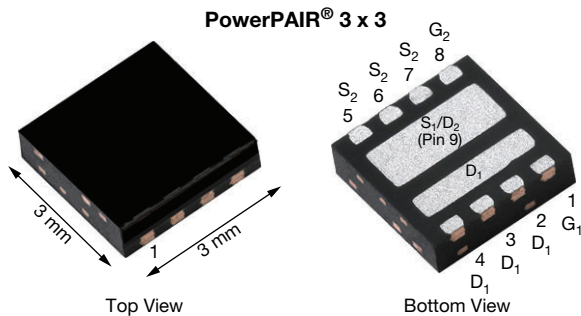


## Dual N-Channel 25 V (D-S) MOSFET



### FEATURES

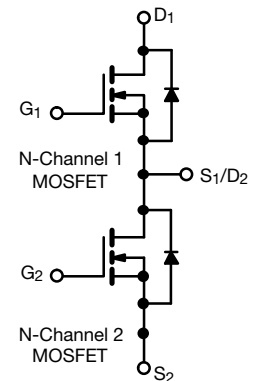
- TrenchFET® Gen IV power MOSFET
- High side and low side MOSFETs form optimized combination for 50 % duty cycle
- Optimized  $R_{DS} - Q_g$  and  $R_{DS} - Q_{gd}$  FOM elevates efficiency for high frequency switching
- 100 %  $R_g$  and UIS tested
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



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

### APPLICATIONS

- Synchronous buck
- DC/DC conversion
- Half bridge
- POL



PRODUCT SUMMARY	
MOSFET CHANNEL-1 AND CHANNEL-2	
$V_{DS}$ (V)	25
$R_{DS(on)}$ max. ( $\Omega$ ) at $V_{GS} = 10$ V	0.00635
$R_{DS(on)}$ max. ( $\Omega$ ) at $V_{GS} = 4.5$ V	0.00900
$Q_g$ typ. (nC)	6.2
$I_D$ (A) <sup>a, d</sup>	30
Configuration	Dual

ORDERING INFORMATION	
Package	PowerPAIR 3 x 3
Lead (Pb)-free and halogen-free	SiZ322DT-T1-GE3

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25$ °C, unless otherwise noted)			
PARAMETER	CHANNEL-1 AND CHANNEL-2		
	SYMBOL	LIMIT	UNIT
Drain-source voltage	$V_{DS}$	25	V
Gate-source voltage	$V_{GS}$	+16 / -12	
Continuous drain current ( $T_J = 150$ °C)	$I_D$	$T_C = 25$ °C	30 <sup>a</sup>
		$T_C = 70$ °C	30 <sup>a</sup>
		$T_A = 25$ °C	19 <sup>b, c</sup>
		$T_A = 70$ °C	15.2 <sup>b, c</sup>
Pulsed drain current ( $t = 100$ $\mu$ s)	$I_{DM}$	100	A
Continuous source current (MOSFET diode conduction)	$I_S$	$T_C = 25$ °C	
		$T_A = 25$ °C	3.1 <sup>b, c</sup>
Single pulse avalanche current	$I_{AS}$	15	mJ
Single pulse avalanche energy	$E_{AS}$	11.25	
Maximum power dissipation	$P_D$	$T_C = 25$ °C	16.7
		$T_C = 70$ °C	10.7
		$T_A = 25$ °C	3.7 <sup>b, c</sup>
		$T_A = 70$ °C	2.4 <sup>b, c</sup>
Operating junction and storage temperature range	$T_J, T_{stg}$	-55 to +150	°C
Soldering recommendations (peak temperature)		260	

#### Notes

- Package limited
- Surface mounted on 1" x 1" FR4 board
- $t = 10$  s
- $T_C = 25$  °C



THERMAL RESISTANCE RATINGS						
PARAMETER		CHANNEL-1 AND CHANNEL-2				
		SYMBOL	TYPICAL	MAXIMUM	UNIT	
Maximum junction-to-ambient <sup>a, b</sup>	$t \leq 10$ s	$R_{thJA}$	27	34	°C/W	
Maximum junction-to-case (drain)	Steady state	$R_{thJC}$	6	7.5		

**Notes**

- a. Surface mounted on 1" x 1" FR4 board
- b. Maximum under steady state conditions is 69 °C/W

SPECIFICATIONS ( $T_J = 25$ °C, unless otherwise noted)						
PARAMETER	CHANNEL-1 AND CHANNEL-2					
	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Static</b>						
Drain-source breakdown voltage	$V_{DS}$	$V_{GS} = 0$ V, $I_D = 250$ $\mu$ A	25	-	-	V
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250$ $\mu$ A	1	-	2.4	
Gate-source leakage	$I_{GSS}$	$V_{DS} = 0$ V, $V_{GS} = +16$ V / -12 V	-	-	$\pm 100$	nA
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 25$ V, $V_{GS} = 0$ V	-	-	1	$\mu$ A
		$V_{DS} = 25$ V, $V_{GS} = 0$ V, $T_J = 55$ °C	-	-	5	
On-state drain current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq 5$ V, $V_{GS} = 10$ V	40	-	-	A
Drain-source on-state resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 10$ V, $I_D = 15$ A	-	0.00529	0.00635	$\Omega$
		$V_{GS} = 4.5$ V, $I_D = 10$ A	-	0.00750	0.00900	
Forward transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 10$ V, $I_D = 15$ A	-	57	-	S
<b>Dynamic <sup>b</sup></b>						
Input capacitance	$C_{iss}$	$V_{DS} = 12.5$ V, $V_{GS} = 0$ V, $f = 1$ MHz	-	950	-	pF
Output capacitance	$C_{oss}$		-	275	-	
Reverse transfer capacitance	$C_{rss}$		-	50	-	
$C_{rss}/C_{iss}$ ratio			-	0.053	0.106	
Total gate charge	$Q_g$	$V_{DS} = 12.5$ V, $V_{GS} = 10$ V, $I_D = 19$ A	-	13.4	20.1	nC
Gate-source charge	$Q_{gs}$	$V_{DS} = 12.5$ V, $V_{GS} = 4.5$ V, $I_D = 19$ A	-	6.2	9.3	
Gate-drain charge	$Q_{gd}$		-	2.7	-	
Gate resistance	$R_g$		$f = 1$ MHz	0.2	0.8	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 12.5$ V, $R_L = 0.8$ $\Omega$ , $I_D \cong 15.2$ A, $V_{GEN} = 10$ V, $R_g = 1$ $\Omega$	-	10	20	ns
Rise time	$t_r$		-	25	50	
Turn-off delay time	$t_{d(off)}$		-	15	30	
Fall time	$t_f$		-	15	30	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 12.5$ V, $R_L = 0.8$ $\Omega$ , $I_D \cong 15.2$ A, $V_{GEN} = 4.5$ V, $R_g = 1$ $\Omega$	-	15	30	
Rise time	$t_r$		-	45	70	
Turn-off delay time	$t_{d(off)}$		-	20	40	
Fall time	$t_f$		-	25	50	

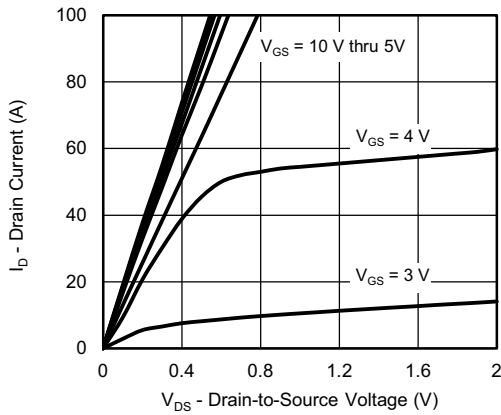
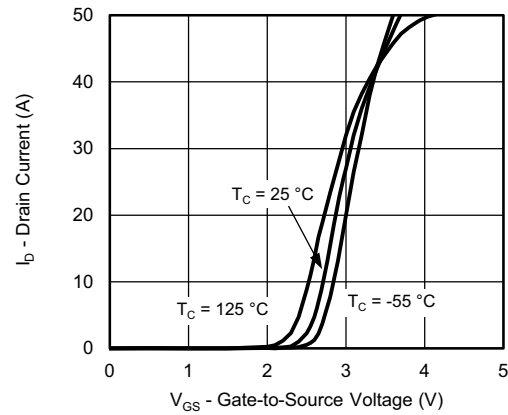
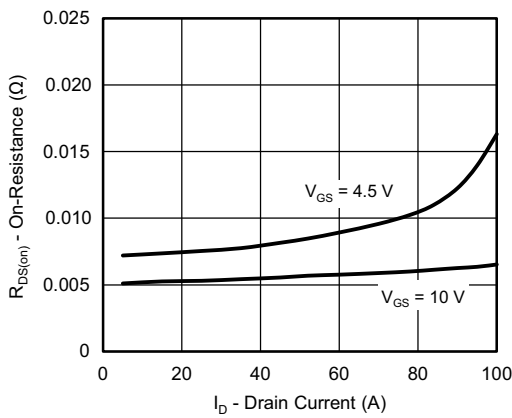
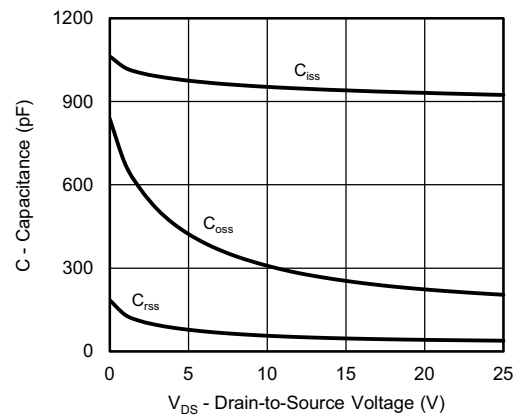
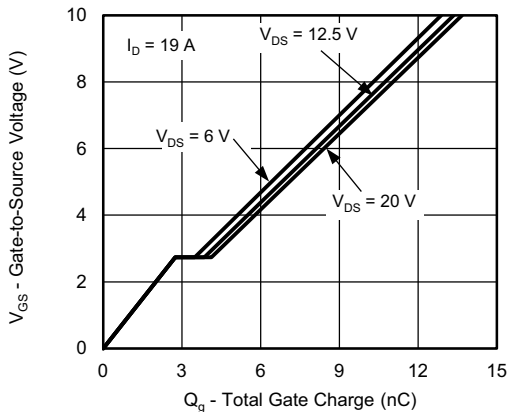
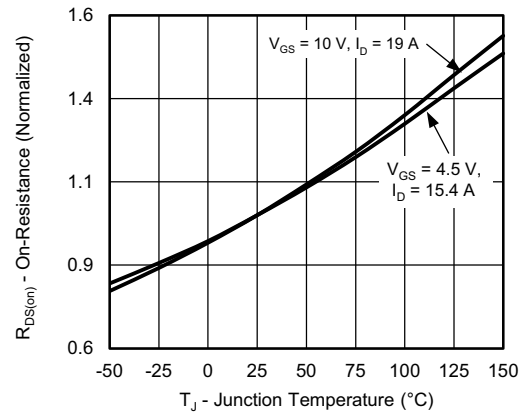


SPECIFICATIONS (T <sub>J</sub> = 25 °C, unless otherwise noted)						
PARAMETER	CHANNEL-1 AND CHANNEL-2					
	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Drain-source Body Diode Characteristics</b>						
Continuous source-drain diode current	I <sub>S</sub>	T <sub>C</sub> = 25°C	-	-	30	A
Pulse diode forward current	I <sub>SM</sub>		-	-	100	
Body diode voltage	V <sub>SD</sub>	I <sub>S</sub> = 15.2 A, V <sub>GS</sub> = 0 V	-	0.85	1.2	V
Body diode reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> = 15.2 A, dI/dt = 100 A/μs, T <sub>J</sub> = 25 °C	-	32	44	ns
Body diode reverse recovery charge	Q <sub>rr</sub>		-	22	44	nC
Reverse recovery fall time	t <sub>a</sub>		-	15	-	ns
Reverse recovery rise time	t <sub>b</sub>		-	17	-	

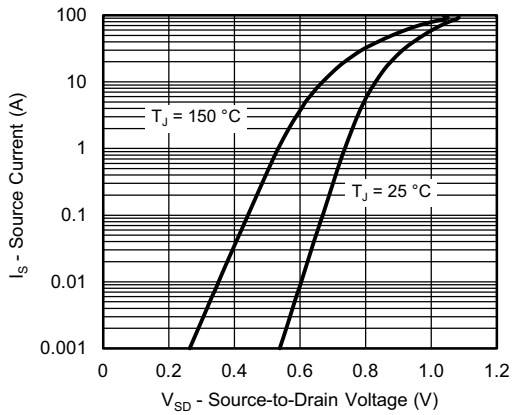
**Notes**

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

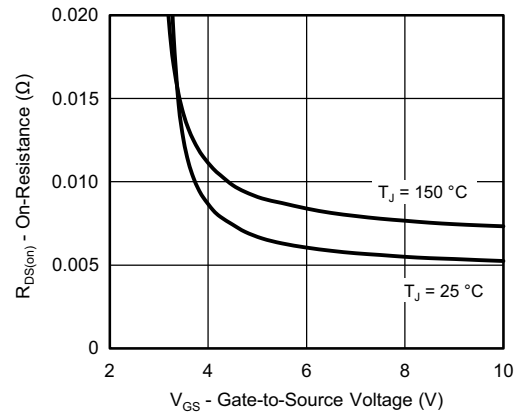
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

**Capacitance**

**Gate Charge**

**On-Resistance vs. Junction Temperature**

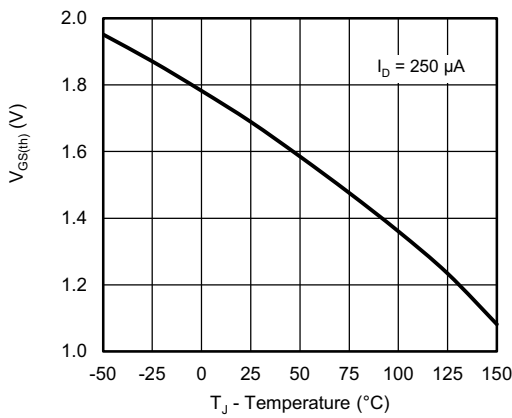
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



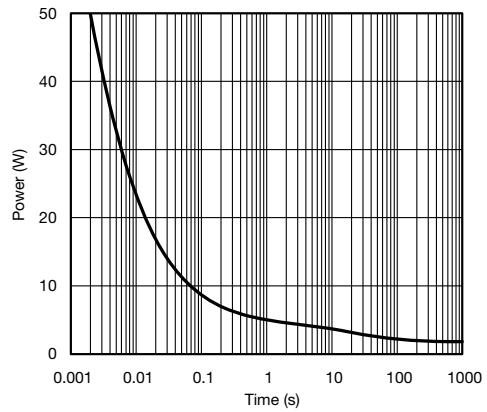
**Source-Drain Diode Forward Voltage**



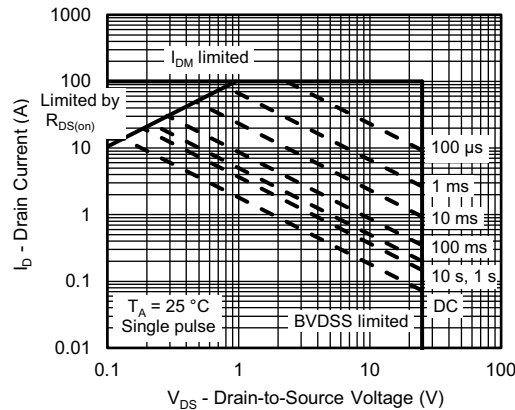
**On-Resistance vs. Gate-to-Source Voltage**



**Threshold Voltage**



**Single Pulse Power**

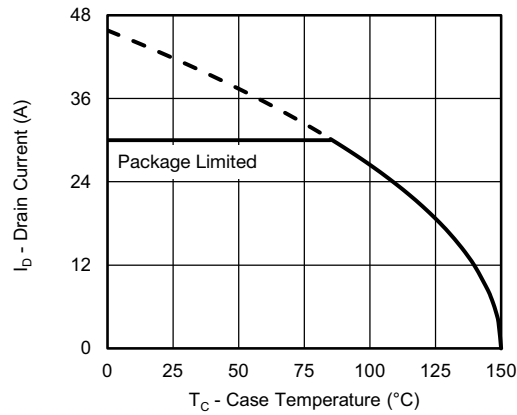


**Safe Operating Area, Junction-to-Ambient**

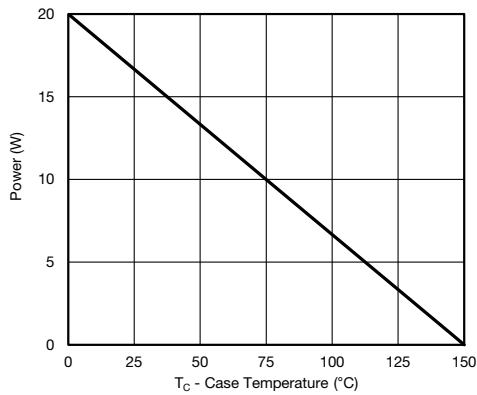
(1)  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified



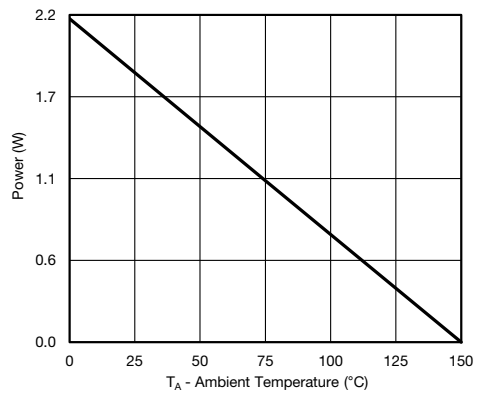
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating <sup>a</sup>



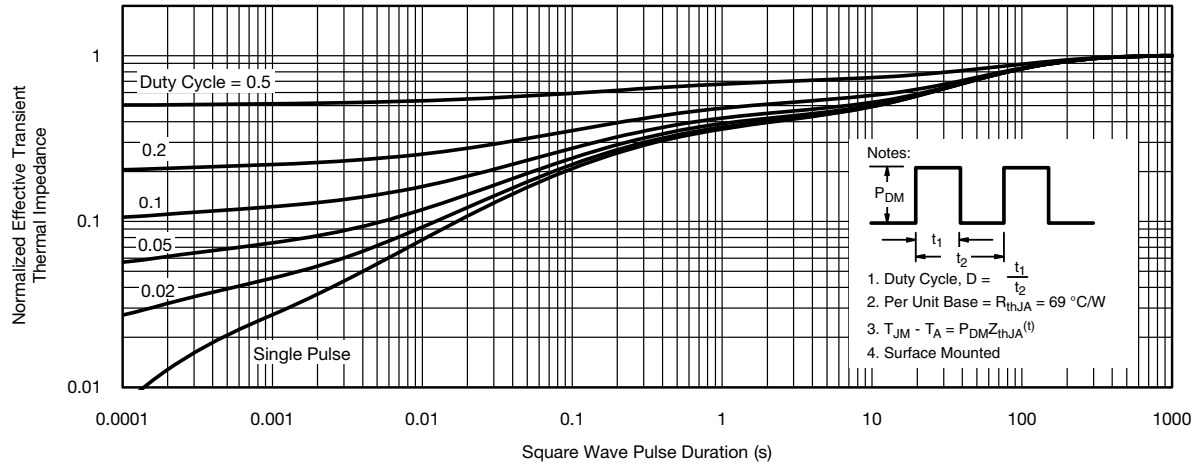
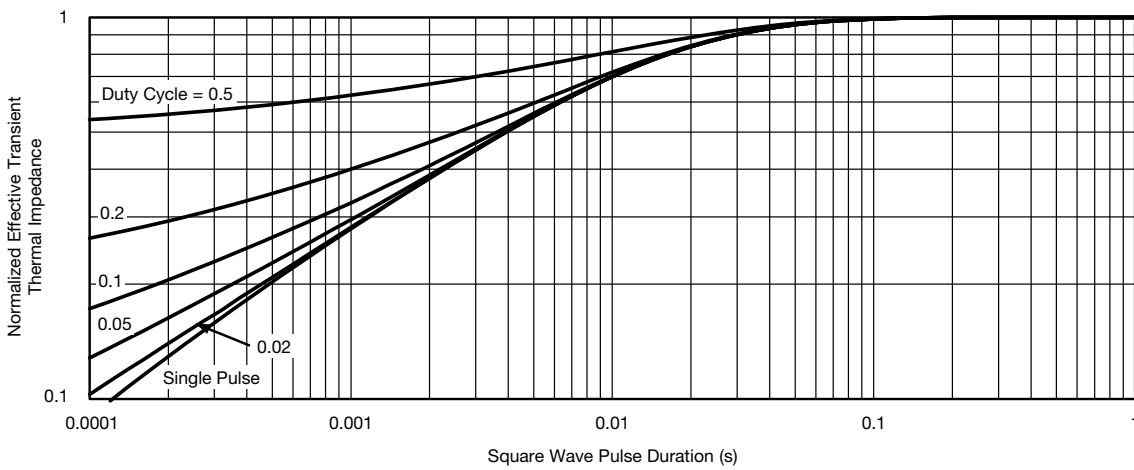
Power, Junction-to-Case



Power, Junction-to-Ambient

Note

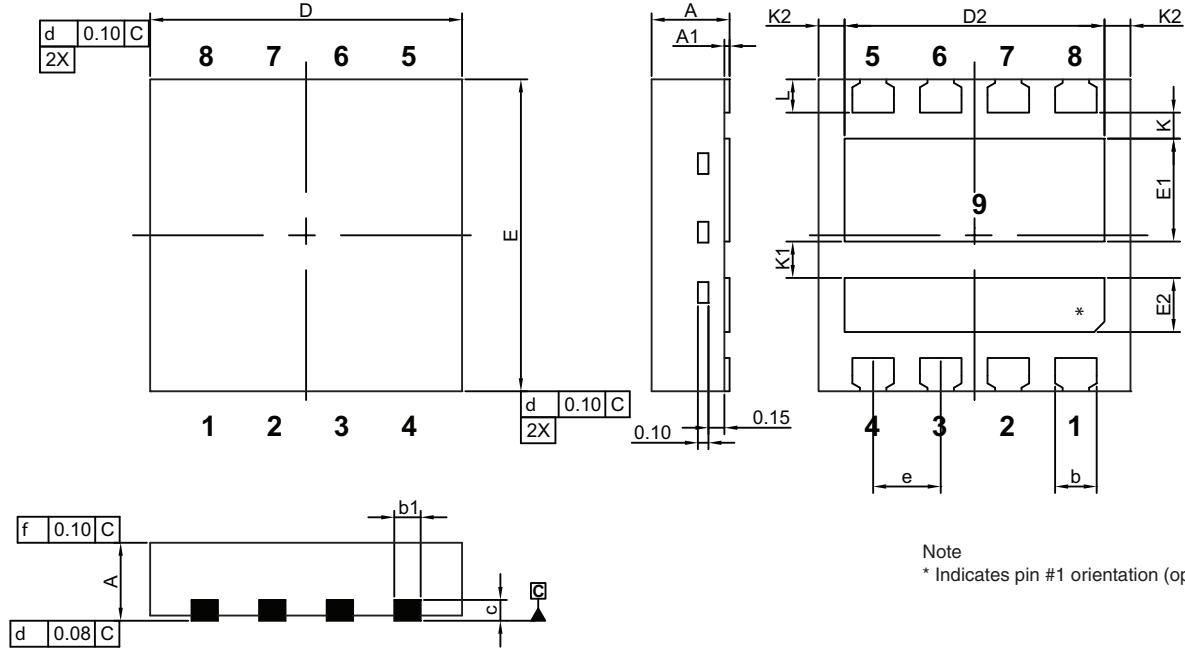
- a. The power dissipation  $P_D$  is based on  $T_J$  max. = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package 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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### PowerPAIR® 3 x 3 Case Outline



Note  
\* Indicates pin #1 orientation (optional)

DIM.	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.70	0.75	0.80	0.028	0.030	0.031
A1	0.00		0.05	0.000		0.002
b	0.35	0.40	0.45	0.014	0.016	0.018
b1	0.20	0.25	0.38	0.008	0.010	0.015
C	0.18	0.20	0.23	0.007	0.008	0.009
D	2.90	3.00	3.10	0.114	0.118	0.122
D2	2.35	2.40	2.45	0.093	0.094	0.096
E	2.90	3.00	3.10	0.114	0.118	0.122
E1	0.94	0.99	1.04	0.037	0.039	0.041
E2	0.47	0.52	0.57	0.019	0.020	0.022
e	0.65 BSC			0.026 BSC		
K	0.25 typ.			0.010 typ.		
K1	0.35 typ.			0.014 typ.		
K2	0.30 typ.			0.012 typ.		
L	0.27	0.32	0.37	0.011	0.013	0.015

ECN: T12-0347-Rev. C, 18-Jun-12  
DWG: 5998



## RECOMMENDED MINIMUM PAD FOR PowerPAIR® 3 x 3



Recommended PAD for PowerPAIR 3 x 3

Dimensions in millimeters (inches)

Keep-Out 3.5 mm x 3.5 mm for non terminating traces



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