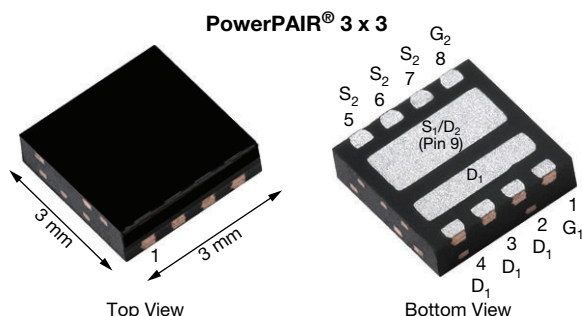


Dual N-Channel 25 V (D-S) MOSFET



FEATURES

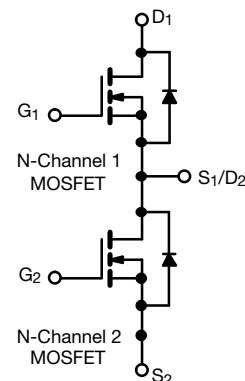
- TrenchFET® Gen IV power MOSFET
- High side and low side MOSFETs form optimized combination for 50 % duty cycle
- Optimized $R_{DS} - Q_g$ and $R_{DS} - Q_{gd}$ FOM elevates efficiency for high frequency switching
- 100 % R_g and UIS tested
- Material categorization: for definitions of compliance please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



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. (Ω) at $V_{GS} = 10$ V	0.00635
$R_{DS(on)}$ max. (Ω) at $V_{GS} = 4.5$ V	0.00900
Q_g typ. (nC)	6.2
I_D (A) ^{a, d}	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	30 ^a	A
		30 ^a	
		19 ^{b, c}	
		15.2 ^{b, c}	
Pulsed drain current ($t = 100$ μ s)	I_{DM}	100	mJ
Continuous source current (MOSFET diode conduction)	I_S	13.9	
		3.1 ^{b, c}	
Single pulse avalanche current	I_{AS}	15	
Single pulse avalanche energy	E_{AS}	11.25	W
Maximum power dissipation	P_D	16.7	
		10.7	
		3.7 ^{b, c}	
		2.4 ^{b, c}	
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 ^{a, b}	$t \leq 10$ 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
Static						
Drain-source breakdown voltage	V_{DS}	$V_{GS} = 0$ V, $I_D = 250$ μ A	25	-	-	V
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250$ μ A	1	-	2.4	
Gate-source leakage	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = +16$ V / -12 V	-	-	± 100	nA
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 25$ V, $V_{GS} = 0$ V	-	-	1	μ A
		$V_{DS} = 25$ V, $V_{GS} = 0$ V, $T_J = 55$ °C	-	-	5	
On-state drain current ^a	$I_{D(on)}$	$V_{DS} \geq 5$ V, $V_{GS} = 10$ V	40	-	-	A
Drain-source on-state resistance ^a	$R_{DS(on)}$	$V_{GS} = 10$ V, $I_D = 15$ A	-	0.00529	0.00635	Ω
		$V_{GS} = 4.5$ V, $I_D = 10$ A	-	0.00750	0.00900	
Forward transconductance ^a	g_{fs}	$V_{DS} = 10$ V, $I_D = 15$ A	-	57	-	S
Dynamic ^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		-	1.1	-	
Turn-on delay time	$t_{d(on)}$	$f = 1$ MHz	0.2	0.8	1.6	Ω
Rise time	t_r		-	10	20	ns
Turn-off delay time	$t_{d(off)}$		-	10	20	
Fall time	t_f		-	15	30	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 12.5$ V, $R_L = 0.8$ Ω , $I_D \cong 15.2$ A, $V_{GEN} = 10$ V, $R_g = 1$ Ω	-	15	30	
Rise time	t_r		-	15	30	
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, $R_L = 0.8$ Ω , $I_D \cong 15.2$ A, $V_{GEN} = 4.5$ V, $R_g = 1$ Ω	-	15	30	ns
Rise time	t_r		-	15	30	
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, $R_L = 0.8$ Ω , $I_D \cong 15.2$ A, $V_{GEN} = 4.5$ V, $R_g = 1$ Ω	-	15	30	
Rise time	t_r		-	15	30	
Turn-off delay time	$t_{d(off)}$		-	15	30	
Fall time	t_f		-	15	30	

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

PARAMETER	CHANNEL-1 AND CHANNEL-2					
	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain-source Body Diode Characteristics						
Continuous source-drain diode current	I_S	$T_C = 25^{\circ}\text{C}$	-	-	30	A
Pulse diode forward current	I_{SM}		-	-	100	
Body diode voltage	V_{SD}	$I_S = 15.2\text{ A}$, $V_{GS} = 0\text{ V}$	-	0.85	1.2	V
Body diode reverse recovery time	t_{rr}	$I_F = 15.2\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}$, $T_J = 25\text{ }^{\circ}\text{C}$	-	32	44	ns
Body diode reverse recovery charge	Q_{rr}		-	22	44	nC
Reverse recovery fall time	t_a		-	15	-	ns
Reverse recovery rise time	t_b		-	17	-	

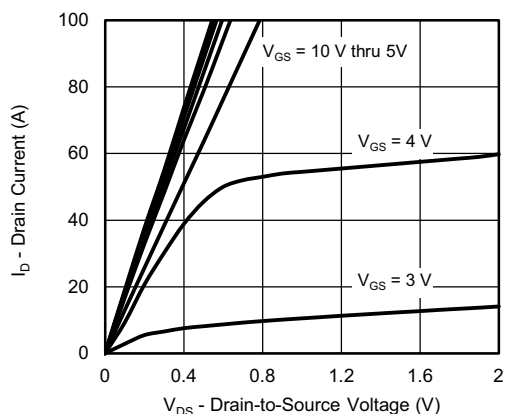
Notes

- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
- Guaranteed by design, not subject to production testing

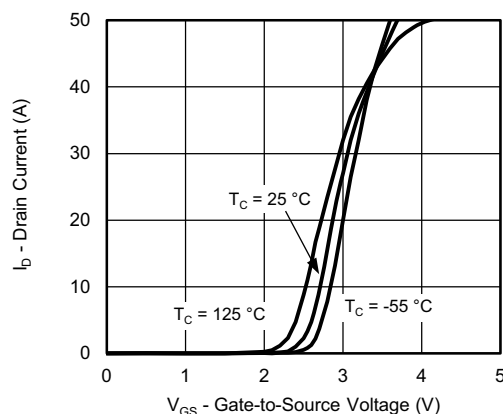
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



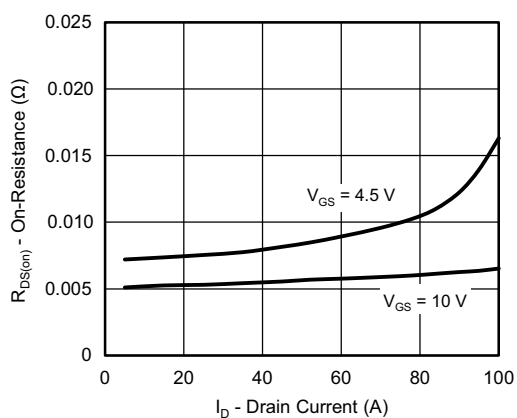
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



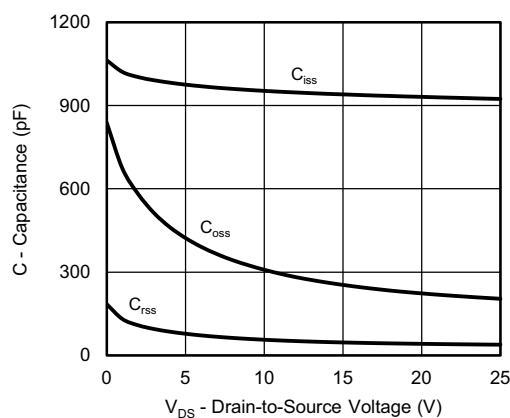
Output Characteristics



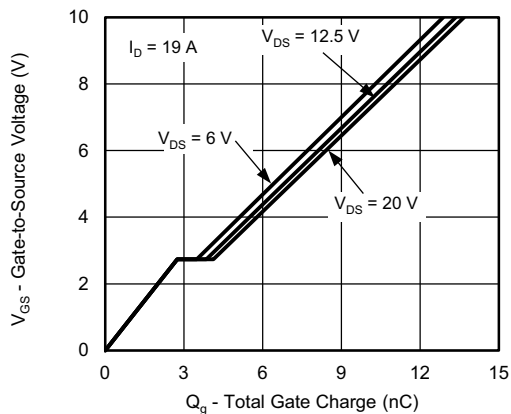
Transfer Characteristics



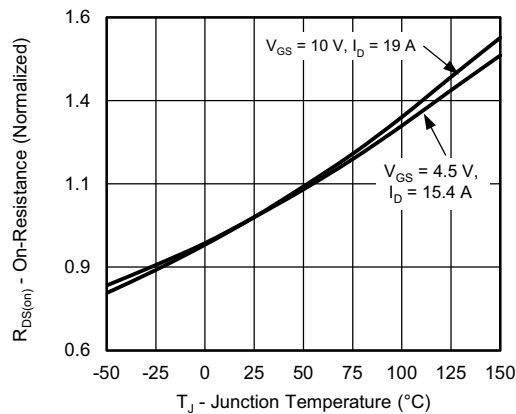
On-Resistance vs. Drain Current and Gate



Capacitance



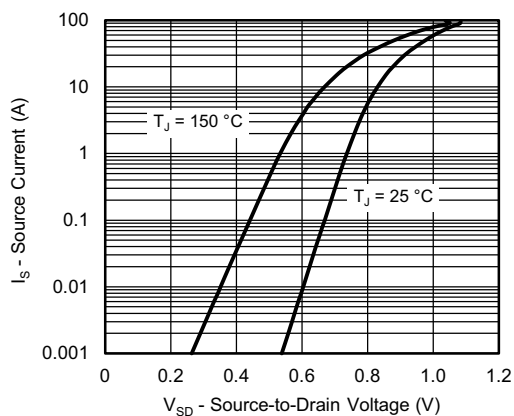
Gate Charge



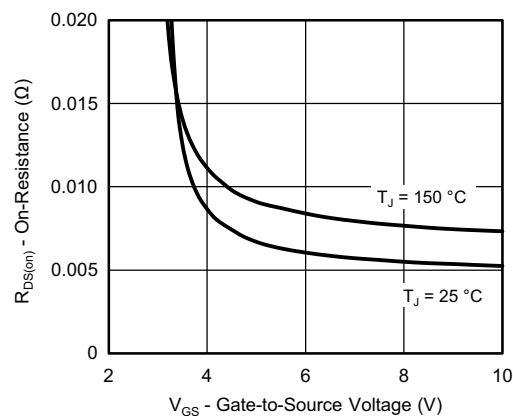
On-Resistance vs. Junction Temperature



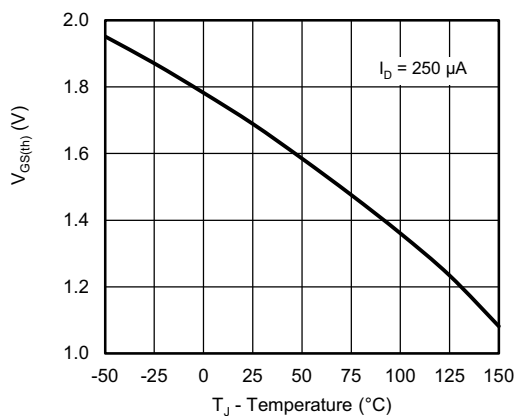
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



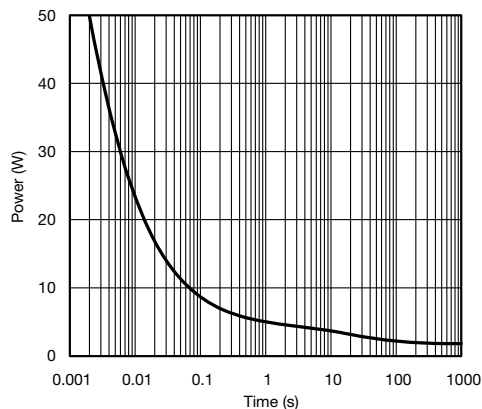
Source-Drain Diode Forward Voltage



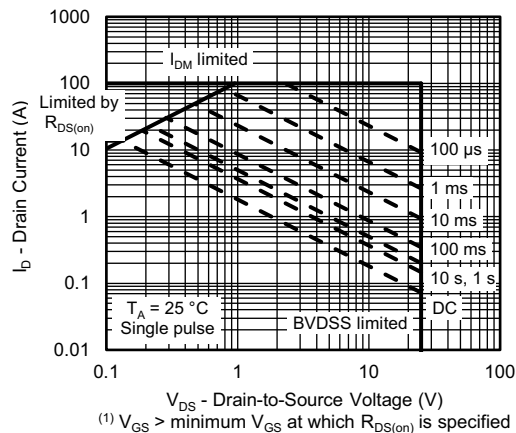
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



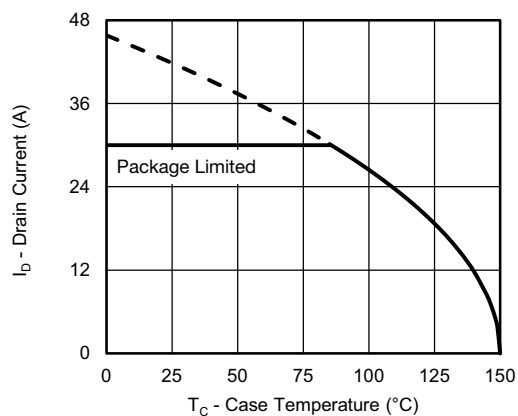
Single Pulse Power



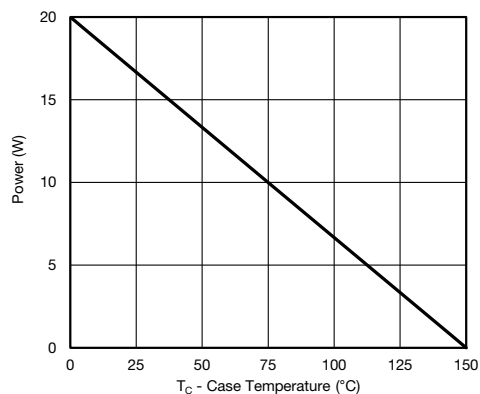
Safe Operating Area, Junction-to-Ambient



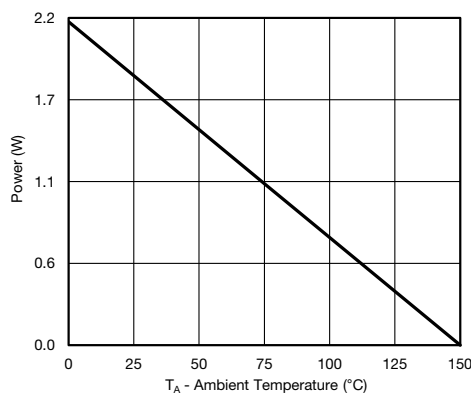
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating ^a



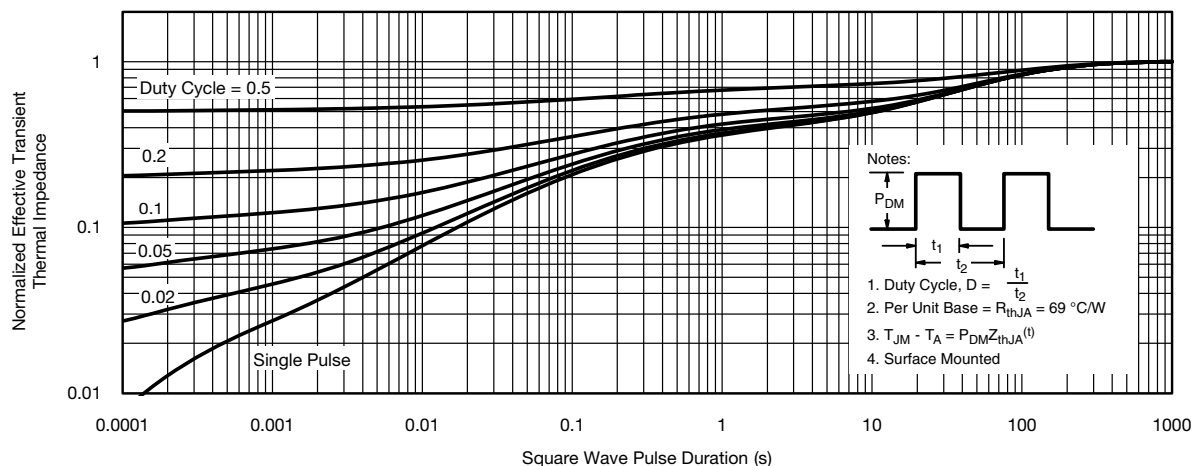
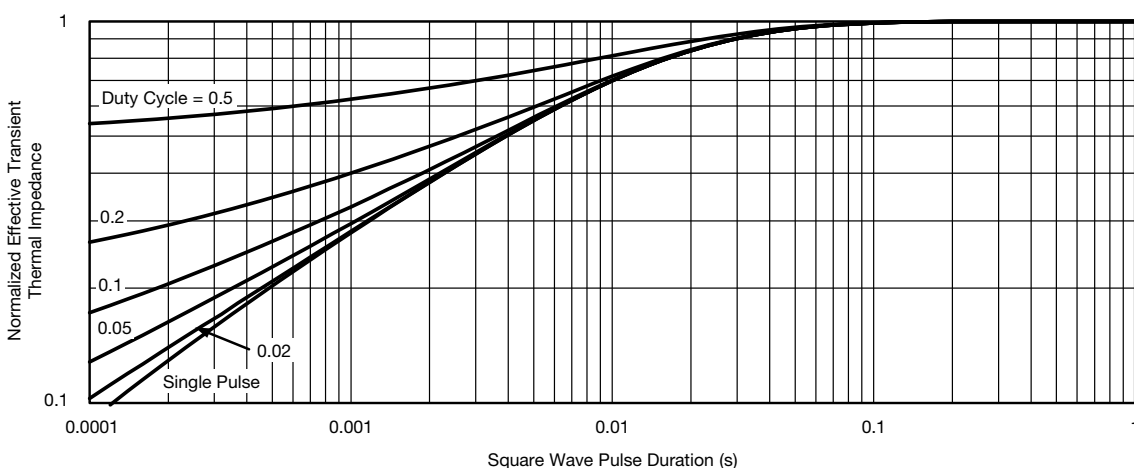
Power, Junction-to-Case



Power, Junction-to-Ambient

Note

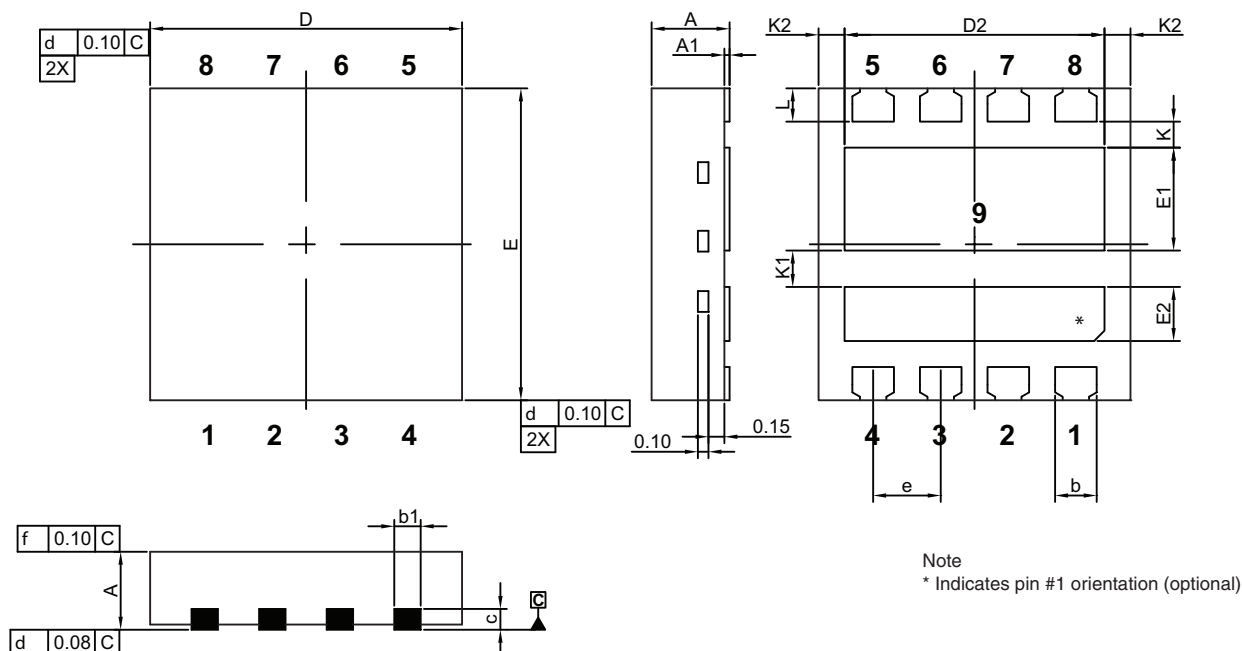
- a. The power dissipation P_D is based on T_J max. = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

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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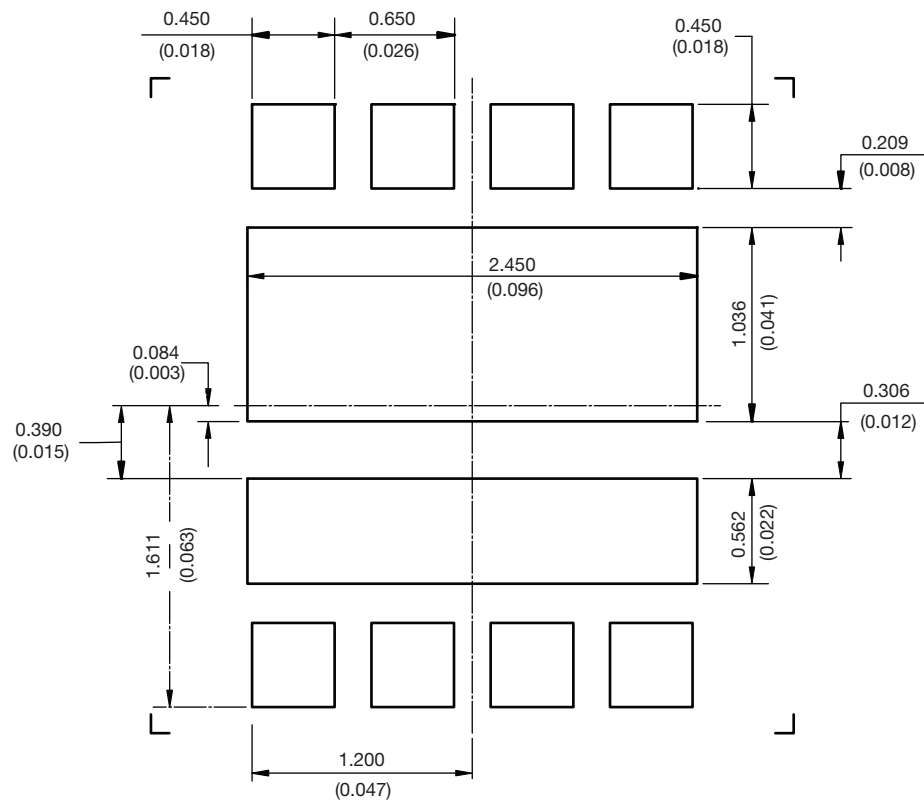


PowerPAIR® 3 x 3 Case Outline



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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