



Dual N-Channel 30 V (D-S) MOSFETs

PRODUCT SUMMARY				
	V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^a	Q _g (Typ.)
Channel-1	30	0.0240 at V _{GS} = 10 V	11	3.5 nC
		0.0320 at V _{GS} = 4.5 V	11	
Channel-2	30	0.0110 at V _{GS} = 10 V	28	6.8 nC
		0.0165 at V _{GS} = 4.5 V	28	

FEATURES

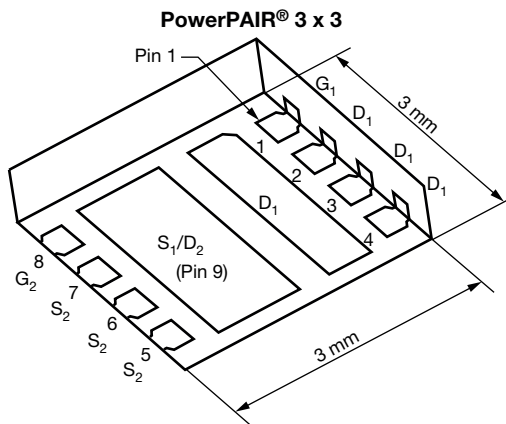
- PowerPAIR Optimizes High-Side and Low-Side MOSFETs for Synchronous Buck Converters
- TrenchFET[®] Power Mosfets
- 100 % R_g and UIS Tested
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



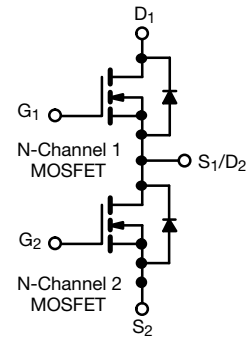
RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Computing System Power
- POL
- Synchronous Buck Converter



Ordering Information:
SiZ300DT-T1-GE3 (Lead (Pb)-free and Halogen-free)



ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)					
Parameter	Symbol	Channel-1	Channel-2	Unit	
Drain-Source Voltage	V _{DS}	30		V	
Gate-Source Voltage	V _{GS}	± 20			
Continuous Drain Current (T _J = 150 °C)	I _D	T _C = 25 °C	11 ^a	28 ^a	A
		T _C = 70 °C	11 ^a	28 ^a	
		T _A = 25 °C	9.8 ^{b, c}	14.9 ^{b, c}	
		T _A = 70 °C	7.8 ^{b, c}	11.9 ^{b, c}	
Pulsed Drain Current (t = 300 μs)	I _{DM}	30	40		
Continuous Source Drain Diode Current	I _S	T _A = 25 °C	11 ^a	26	
		T _A = 25 °C	3.2 ^{b, c}	3.8 ^{b, c}	
Avalanche Current	I _{AS}	12	15		
Single Pulse Avalanche Energy	E _{AS}	7	11	mJ	
Maximum Power Dissipation	P _D	T _C = 25 °C	16.7	31	W
		T _C = 70 °C	10.7	20	
		T _A = 25 °C	3.7 ^{b, c}	4.2 ^{b, c}	
		T _A = 70 °C	2.4 ^{b, c}	2.7 ^{b, c}	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150		°C	
Soldering Recommendations (Peak Temperature) ^{d, e}		260			

Notes:

- Package limited.
- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.
- See solder profile (www.vishay.com/doc?73257). The PowerPAIR 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.

THERMAL RESISTANCE RATINGS							
Parameter		Symbol	Channel-1		Channel-2		Unit
			Typ.	Max.	Typ.	Max.	
Maximum Junction-to-Ambient ^{a, b}	$t \leq 10$ s	R_{thJA}	27	34	24	30	°C/W
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	6	7.5	3.2	4	

Notes:

a. Surface mounted on 1" x 1" FR4 board.

b. Maximum under steady state conditions is 69 °C/W for channel-1 and 64 °C/W for channel-2.

SPECIFICATIONS ($T_J = 25$ °C, unless otherwise noted)							
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0, I_D = 250 \mu A$	Ch-1	30			V
		$V_{GS} = 0 V, I_D = 250 \mu A$	Ch-2	30			
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250 \mu A$	Ch-1		24		mV/°C
		$I_D = 250 \mu A$	Ch-2		30		
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	$I_D = 250 \mu A$	Ch-1		- 4.1		
		$I_D = 250 \mu A$	Ch-2		- 5		
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu A$	Ch-1	1		2.4	V
		$V_{DS} = V_{GS}, I_D = 250 \mu A$	Ch-2	1		2.2	
Gate Source Leakage	I_{GSS}	$V_{DS} = 0 V, V_{GS} = \pm 20 V$	Ch-1			± 100	nA
			Ch-2			± 100	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30 V, V_{GS} = 0 V$	Ch-1			1	μA
		$V_{DS} = 30 V, V_{GS} = 0 V$	Ch-2			1	
		$V_{DS} = 30 V, V_{GS} = 0 V, T_J = 55$ °C	Ch-1			5	
		$V_{DS} = 30 V, V_{GS} = 0 V, T_J = 55$ °C	Ch-2			5	
On-State Drain Current ^b	$I_{D(on)}$	$V_{DS} \geq 5 V, V_{GS} = 10 V$	Ch-1	10			A
		$V_{DS} \geq 5 V, V_{GS} = 10 V$	Ch-2	10			
Drain-Source On-State Resistance ^b	$R_{DS(on)}$	$V_{GS} = 10 V, I_D = 9.8 A$	Ch-1		0.0200	0.0240	Ω
		$V_{GS} = 10 V, I_D = 15 A$	Ch-2		0.0090	0.0110	
		$V_{GS} = 4.5 V, I_D = 8.5 A$	Ch-1		0.0265	0.0320	
		$V_{GS} = 4.5 V, I_D = 12 A$	Ch-2		0.0135	0.0165	
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15 V, I_D = 9.8 A$	Ch-1		30		S
		$V_{DS} = 15 V, I_D = 15 A$	Ch-2		30		
Dynamic^a							
Input Capacitance	C_{iss}	Channel-1 $V_{DS} = 15 V, V_{GS} = 0 V, f = 1$ MHz	Ch-1		400		pF
			Ch-2		730		
Output Capacitance	C_{oss}	Channel-2 $V_{DS} = 15 V, V_{GS} = 0 V, f = 1$ MHz	Ch-1		125		
			Ch-2		155		
Reverse Transfer Capacitance	C_{rss}		Ch-1		25		
			Ch-2		65		
Total Gate Charge	Q_g	$V_{DS} = 15 V, V_{GS} = 10 V, I_D = 9.8 A$	Ch-1		7.4	12	nC
		$V_{DS} = 15 V, V_{GS} = 10 V, I_D = 15 A$	Ch-2		14.2	22	
		Channel-1 $V_{DS} = 15 V, V_{GS} = 4.5 V, I_D = 9.8 A$	Ch-1		3.5	5.3	
			Ch-2		6.8	11	
Gate-Source Charge	Q_{gs}	Channel-2 $V_{DS} = 15 V, V_{GS} = 4.5 V, I_D = 15 A$	Ch-1		1.5		
			Ch-2		2.2		
Gate-Drain Charge	Q_{gd}		Ch-1		1.1		
			Ch-2		2.3		
Gate Resistance	R_g	$f = 1$ MHz	Ch-1	0.5	2.6	5.2	Ω
			Ch-2	0.5	2.6	5.2	

Notes:

a. Guaranteed by design, not subject to production testing.

b. Pulse test; pulse width $\leq 300 \mu s$, duty cycle ≤ 2 %.



SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)								
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit		
Dynamic^a								
Turn-On Delay Time	$t_{d(on)}$	Channel-1 $V_{DD} = 15\text{ V}$, $R_L = 1.9\ \Omega$ $I_D \cong 8\text{ A}$, $V_{GEN} = 4.5\text{ V}$, $R_g = 1\ \Omega$	Ch-1		25	50	ns	
			Ch-2		25	50		
Rise Time	t_r		Ch-1		45	90		
			Ch-2		80	160		
Turn-Off Delay Time	$t_{d(off)}$	Channel-2 $V_{DD} = 15\text{ V}$, $R_L = 1.5\ \Omega$ $I_D \cong 10\text{ A}$, $V_{GEN} = 4.5\text{ V}$, $R_g = 1\ \Omega$	Ch-1		10	20		
			Ch-2		20	40		
Fall Time	t_f		Ch-1		10	20		
			Ch-2		40	80		
Turn-On Delay Time	$t_{d(on)}$	Channel-1 $V_{DD} = 15\text{ V}$, $R_L = 1.9\ \Omega$ $I_D \cong 8\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 1\ \Omega$	Ch-1		5	10		
			Ch-2		5	10		
Rise Time	t_r		Ch-1		10	20		
			Ch-2		20	40		
Turn-Off Delay Time	$t_{d(off)}$	Channel-2 $V_{DD} = 15\text{ V}$, $R_L = 1.5\ \Omega$ $I_D \cong 10\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 1\ \Omega$	Ch-1		10	20		
			Ch-2		15	30		
Fall Time	t_f		Ch-1		7	15		
			Ch-2		10	20		
Drain-Source Body Diode Characteristics								
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$	Ch-1			11	A	
			Ch-2					26
Pulse Diode Forward Current ^a	I_{SM}		Ch-1			30		
			Ch-2					40
Body Diode Voltage	V_{SD}	$I_S = 8\text{ A}$, $V_{GS} = 0\text{ V}$	Ch-1		0.84	1.2	V	
		$I_S = 10\text{ A}$, $V_{GS} = 0\text{ V}$	Ch-2		0.82	1.2		
Body Diode Reverse Recovery Time	t_{rr}	Channel-1 $I_F = 8\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$, $T_J = 25\text{ }^\circ\text{C}$	Ch-1		17	35	ns	
			Ch-2		20	40		
Body Diode Reverse Recovery Charge	Q_{rr}			Ch-1		9	20	nC
				Ch-2		14	30	
Reverse Recovery Fall Time	t_a	Channel-2 $I_F = 10\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$, $T_J = 25\text{ }^\circ\text{C}$	Ch-1		9.5		ns	
			Ch-2		12.5			
Reverse Recovery Rise Time	t_b			Ch-1		7.5		
				Ch-2		7.5		

Notes:

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

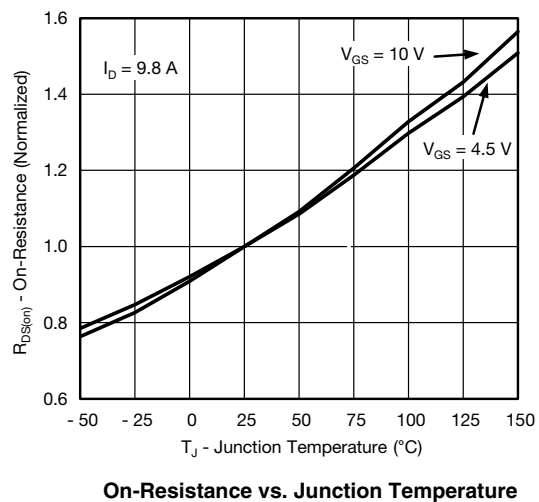
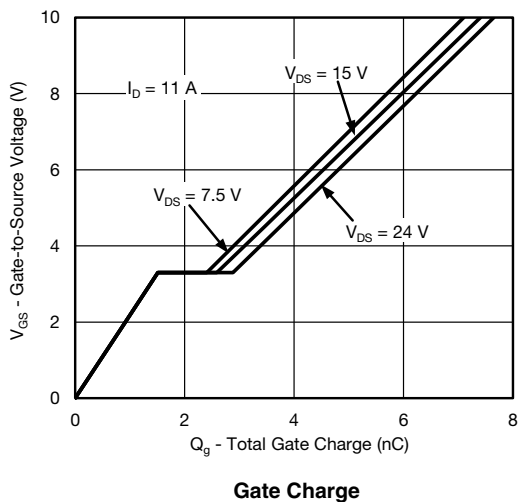
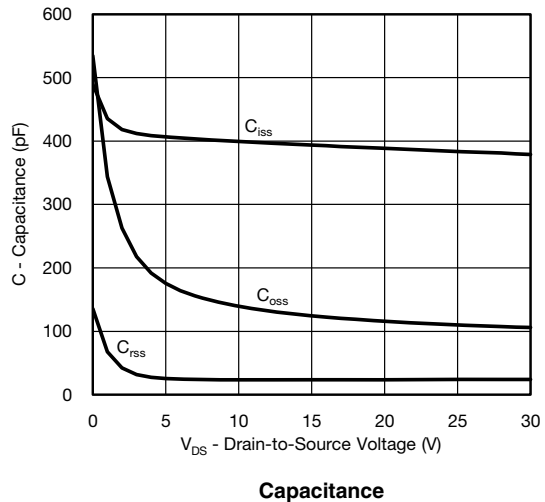
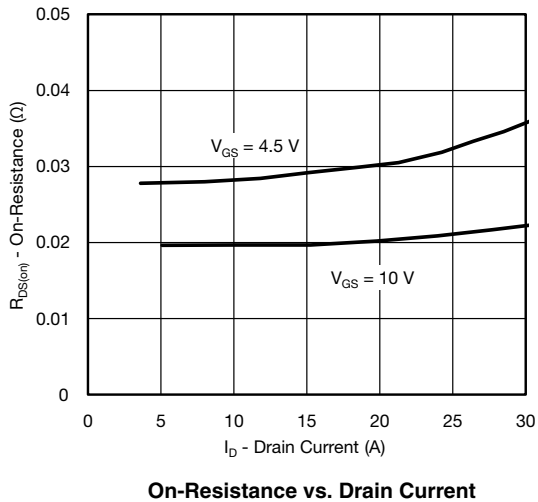
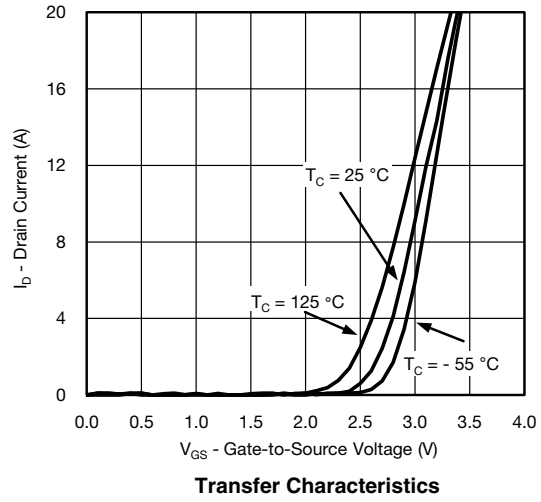
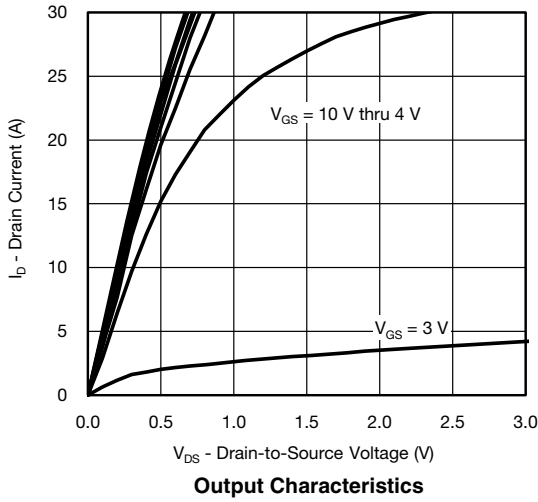
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

SiZ300DT

Vishay Siliconix

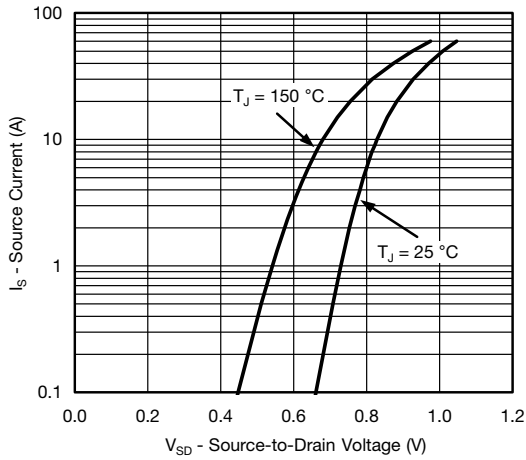


CHANNEL-1 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

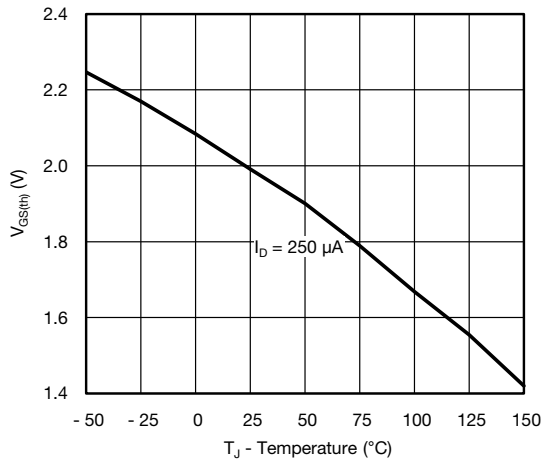




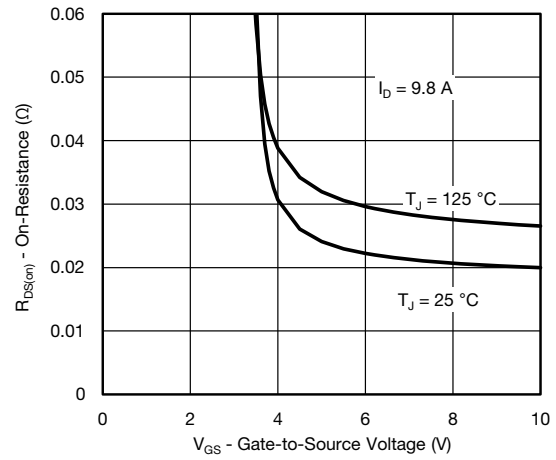
CHANNEL-1 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



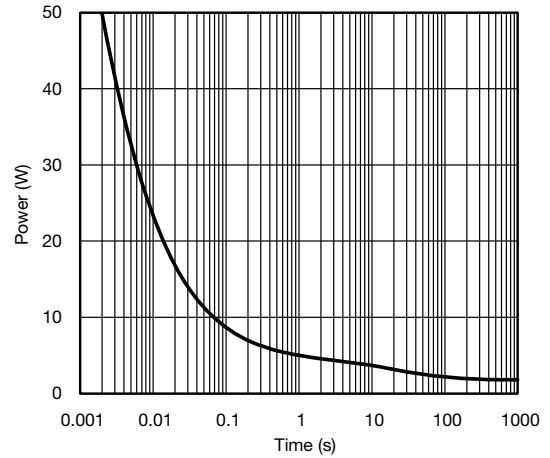
Source-Drain Diode Forward Voltage



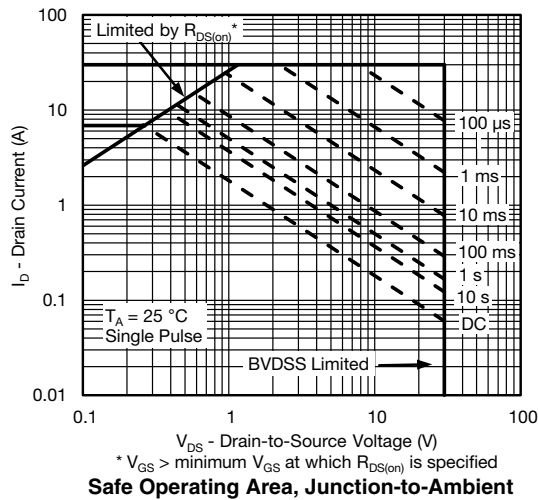
Threshold Voltage



On-Resistance vs. Gate-to-Source Voltage



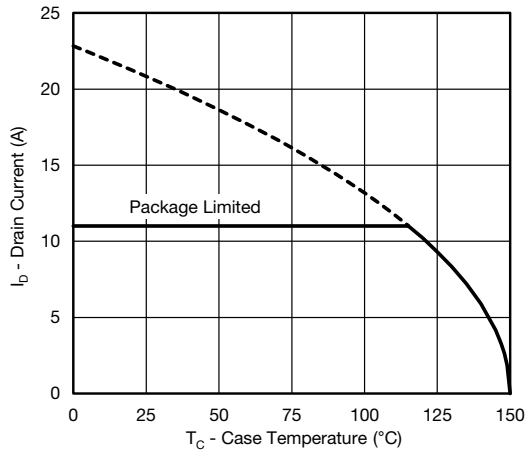
Single Pulse Power



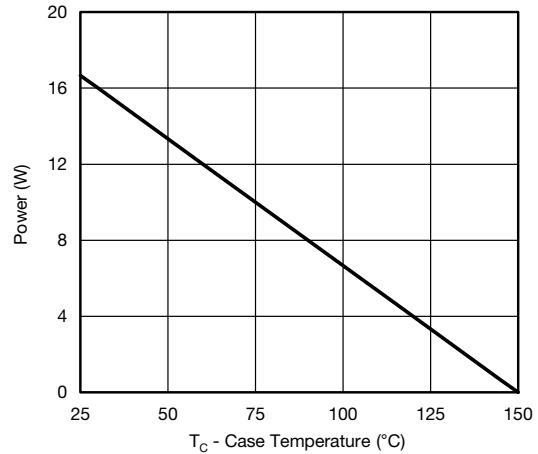
Safe Operating Area, Junction-to-Ambient



CHANNEL-1 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating*

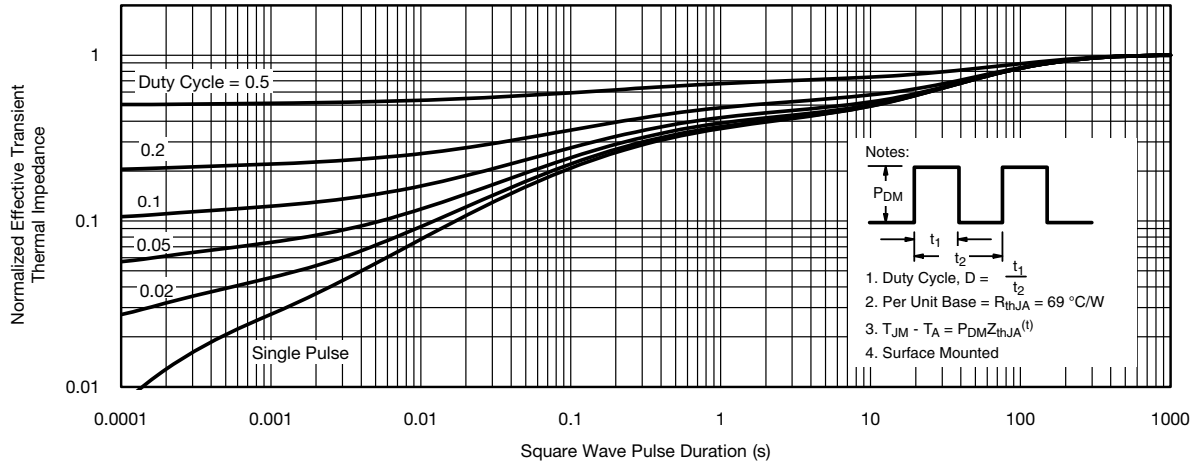


Power, Junction-to-Case

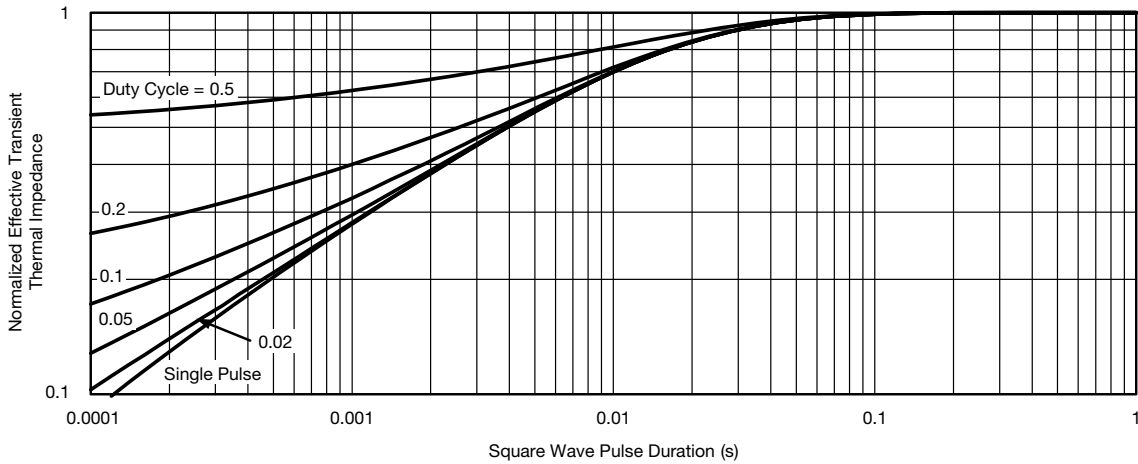
* The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.



CHANNEL-1 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

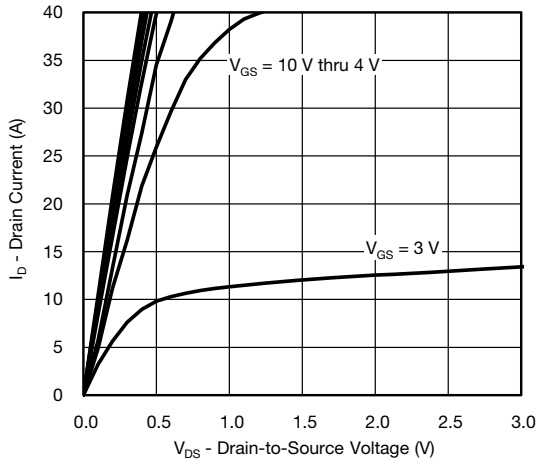


Normalized Thermal Transient Impedance, Junction-to-Ambient

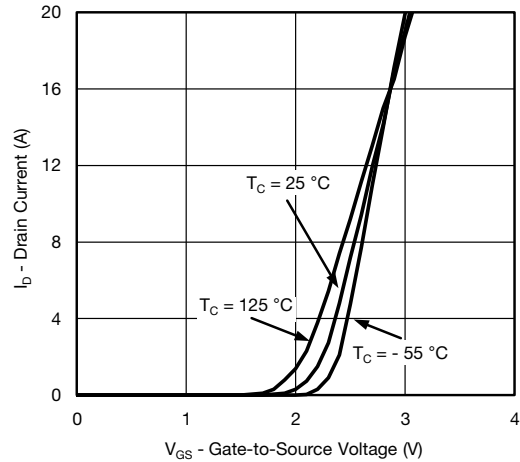


Normalized Thermal Transient Impedance, Junction-to-Case

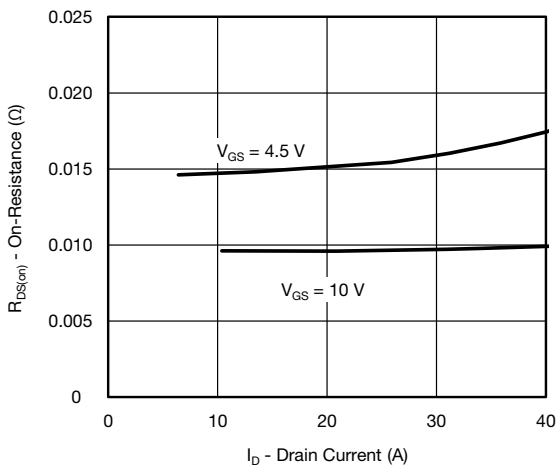
CHANNEL-2 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



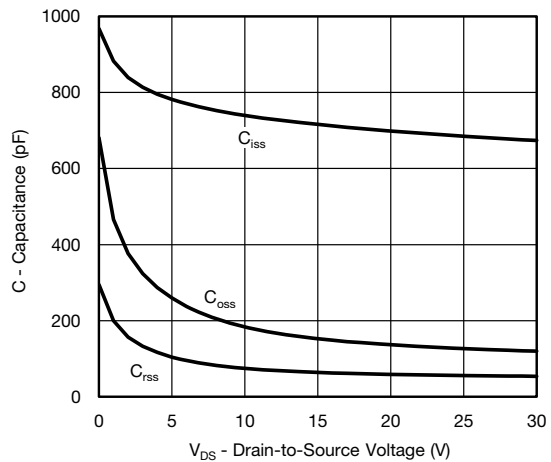
Output Characteristics



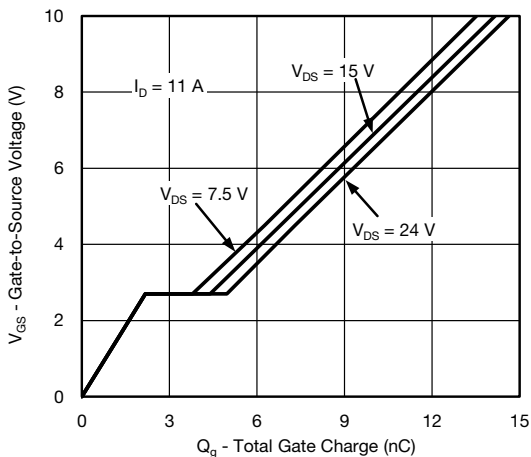
Transfer Characteristics



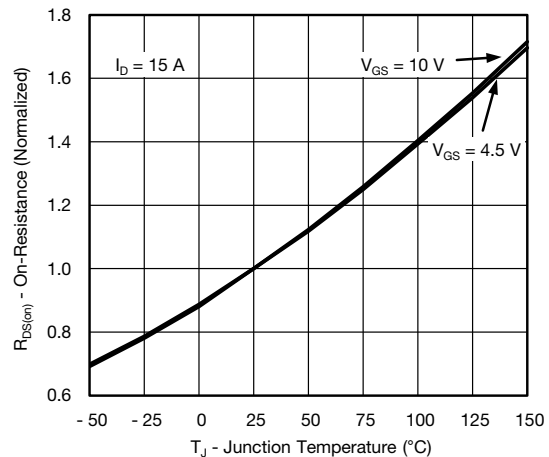
On-Resistance vs. Drain Current



Capacitance



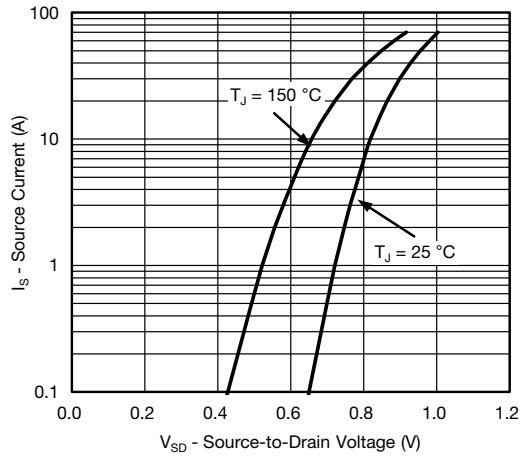
Gate Charge



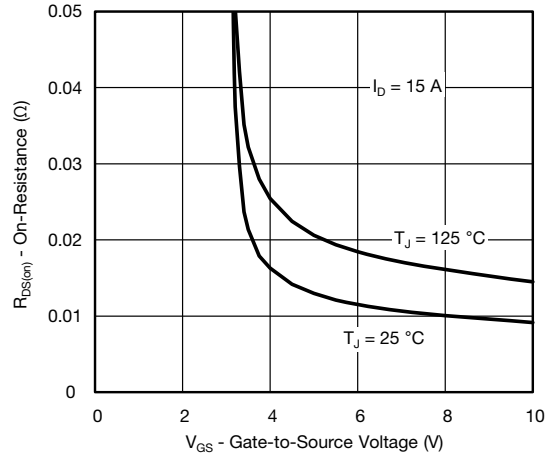
On-Resistance vs. Junction Temperature



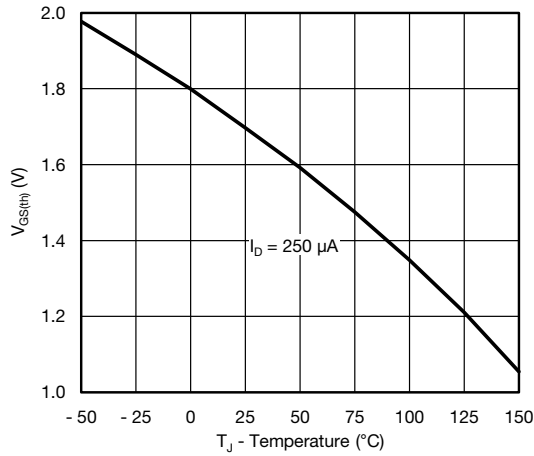
CHANNEL-2 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



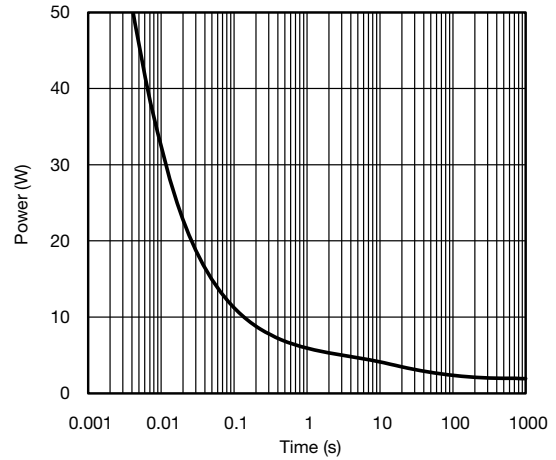
Source-Drain Diode Forward Voltage



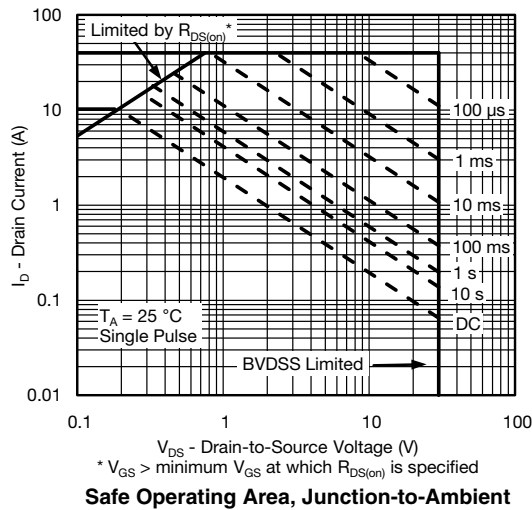
On-Resistance vs. Gate-to-Source Voltage



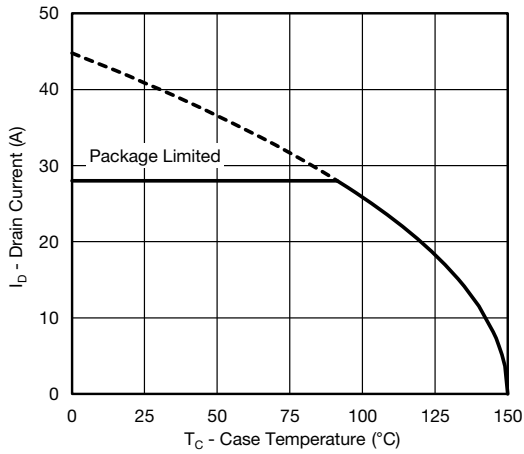
Threshold Voltage



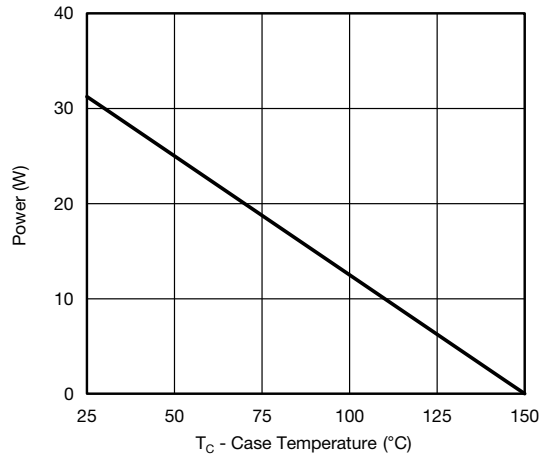
Single Pulse Power



CHANNEL-2 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating*

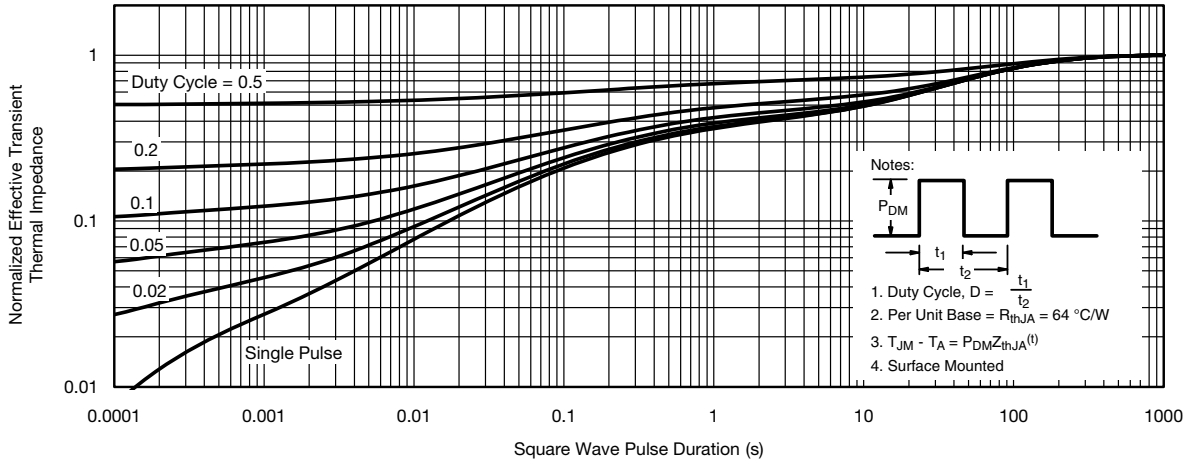


Power, Junction-to-Case

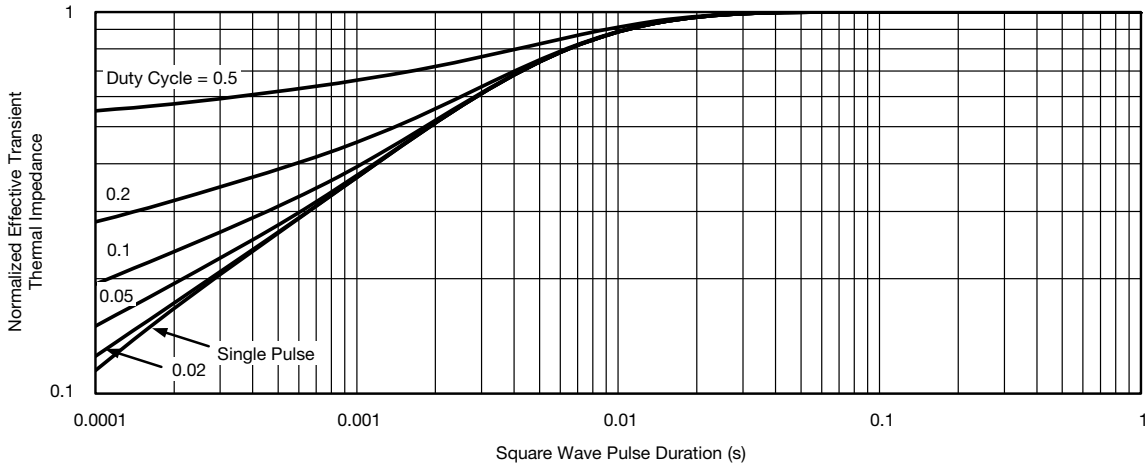
* The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.



CHANNEL-2 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see www.vishay.com/ppg?267715.



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



Disclaimer

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