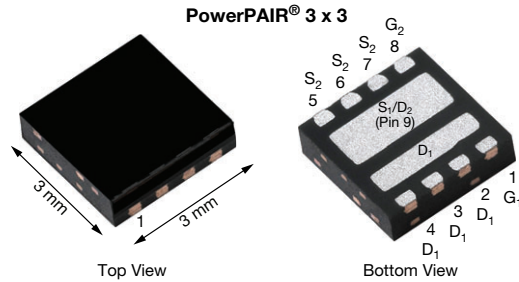


## Dual N-Channel 25 V (D-S) MOSFETs



### FEATURES

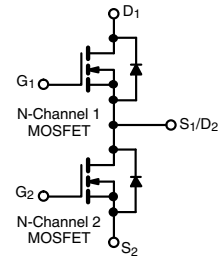
- TrenchFET® Gen IV power MOSFETs
- 100 % R<sub>g</sub> and UIS tested
- Optimized Q<sub>gs</sub>/Q<sub>gs</sub> ratio improves switching characteristics
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



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

### APPLICATIONS

- CPU core power
- Computer / server peripherals
- POL
- Synchronous buck converter
- Telecom DC/DC



PRODUCT SUMMARY		
	CHANNEL-1	CHANNEL-2
V <sub>DS</sub> (V)	25	25
R <sub>DS(on)</sub> max. (Ω) at V <sub>GS</sub> = 10 V	0.0150	0.0100
R <sub>DS(on)</sub> max. (Ω) at V <sub>GS</sub> = 4.5 V	0.0250	0.0150
Q <sub>g</sub> typ. (nC)	2.1	3.5
I <sub>D</sub> (A) <sup>g</sup>	25.3	30 <sup>a</sup>
Configuration	Dual	

ORDERING INFORMATION	
Package	PowerPAIR 3 x 3
Lead (Pb)-free and halogen-free	SiZ328DT-T1-GE3

ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25 °C, unless otherwise noted)					
PARAMETER	SYMBOL	CHANNEL-1	CHANNEL-2	UNIT	
Drain-source voltage	V <sub>DS</sub>	25	25	V	
Gate-source voltage	V <sub>GS</sub>	+16, -12	+16, -12		
Continuous drain current (T <sub>J</sub> = 150 °C)	I <sub>D</sub>	T <sub>C</sub> = 25 °C	25.3	30 <sup>a</sup>	A
		T <sub>C</sub> = 70 °C	20.2	25.5	
		T <sub>A</sub> = 25 °C	11.1 <sup>b, c</sup>	15 <sup>b, c</sup>	
		T <sub>A</sub> = 70 °C	8.9 <sup>b, c</sup>	12 <sup>b, c</sup>	
Pulsed drain current (100 μs pulse width)	I <sub>DM</sub>	40	50		
Continuous source drain diode current	I <sub>S</sub>	T <sub>C</sub> = 25 °C	12.6	13.5	
		T <sub>A</sub> = 25 °C	2.4 <sup>b, c</sup>	3 <sup>b, c</sup>	
Single pulse avalanche current	I <sub>AS</sub>	7	11		
Single pulse avalanche energy	E <sub>AS</sub>	2.5	6.1	mJ	
Maximum power dissipation	P <sub>D</sub>	T <sub>C</sub> = 25 °C	15	16.2	W
		T <sub>C</sub> = 70 °C	9.6	10.4	
		T <sub>A</sub> = 25 °C	2.9 <sup>b, c</sup>	3.6 <sup>b, c</sup>	
		T <sub>A</sub> = 70 °C	1.8 <sup>b, c</sup>	2.3 <sup>b, c</sup>	
Operating junction and storage temperature range	T <sub>J</sub> , T <sub>stg</sub>	-55 to +150		°C	
Soldering recommendations (peak temperature) <sup>d</sup>		260			

THERMAL RESISTANCE RATINGS							
PARAMETER		SYMBOL	CHANNEL-1		CHANNEL-2		UNIT
			TYP.	MAX.	TYP.	MAX.	
Maximum junction-to-ambient <sup>b, f</sup>	t ≤ 10 s	R <sub>thJA</sub>	35	43	28	35	°C/W
Maximum junction-to-case (drain)	Steady state	R <sub>thJC</sub>	6.7	8.3	6.3	7.7	

#### Notes

- Package limited
- Surface mounted on 1" x 1" FR4 board
- t = 10 s
- See solder profile ([www.vishay.com/doc?73257](http://www.vishay.com/doc?73257)). The PowerPAIR 3 x 3 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
- Maximum under steady state conditions is 80 °C/W for channel-1 and 69 °C/W for channel-2
- T<sub>C</sub> = 25 °C



<b>SPECIFICATIONS</b> ( $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT	
<b>Static</b>							
Drain-source breakdown voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	Ch-1	25	-	-	V
		$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	Ch-2	25	-	-	
$V_{DS}$ Temperature coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$	Ch-1	-	19	-	mV/ $^\circ\text{C}$
			Ch-2	-	18	-	
$V_{GS(th)}$ Temperature coefficient	$\Delta V_{GS(th)}/T_J$	$I_D = 250\text{ }\mu\text{A}$	Ch-1	-	-4.1	-	
			Ch-2	-	-4.3	-	
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	Ch-1	1.1	-	2.5	V
		$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	Ch-2	1.1	-	2.5	
Gate source leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = +16\text{ V}, -12\text{ V}$	Ch-1	-	-	$\pm 100$	nA
		$V_{DS} = 0\text{ V}, V_{GS} = +16\text{ V}, -12\text{ V}$	Ch-2	-	-	$\pm 100$	
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}$	Ch-1	-	-	1	$\mu\text{A}$
		$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}$	Ch-2	-	-	1	
		$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$	Ch-1	-	-	5	
		$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$	Ch-2	-	-	5	
On-state drain current <sup>b</sup>	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	Ch-1	10	-	-	A
		$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	Ch-2	10	-	-	
Drain-source on-state resistance <sup>b</sup>	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 5\text{ A}$	Ch-1	-	0.0120	0.0150	$\Omega$
		$V_{GS} = 10\text{ V}, I_D = 5\text{ A}$	Ch-2	-	0.0080	0.0100	
		$V_{GS} = 4.5\text{ V}, I_D = 5\text{ A}$	Ch-1	-	0.0175	0.0250	
		$V_{GS} = 4.5\text{ V}, I_D = 5\text{ A}$	Ch-2	-	0.0120	0.0150	
Forward transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 10\text{ V}, I_D = 10\text{ A}$	Ch-1	-	25	-	S
		$V_{DS} = 10\text{ V}, I_D = 10\text{ A}$	Ch-2	-	42	-	
<b>Dynamic <sup>a</sup></b>							
Input capacitance	$C_{iss}$	Channel-1 $V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$  Channel-2 $V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	Ch-1	-	325	-	pF
			Ch-2	-	600	-	
Output capacitance	$C_{oss}$		Ch-1	-	115	-	
			Ch-2	-	230	-	
Reverse transfer capacitance	$C_{rss}$		Ch-1	-	20	-	
			Ch-2	-	31	-	
$C_{rss}/C_{iss}$ ratio			Ch-1	-	0.060	0.120	
			Ch-2	-	0.052	0.110	
Total gate charge	$Q_g$	$V_{DS} = 10\text{ V}, V_{GS} = 10\text{ V}, I_D = 5\text{ A}$	Ch-1	-	4.6	6.9	nC
		$V_{DS} = 10\text{ V}, V_{GS} = 10\text{ V}, I_D = 5\text{ A}$	Ch-2	-	7.5	11.3	
		$V_{DS} = 10\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 5\text{ A}$	Ch-1	-	2.1	3.2	
		$V_{DS} = 10\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 5\text{ A}$	Ch-2	-	3.5	5.3	
Gate-source charge	$Q_{gs}$	Channel-1 $V_{DS} = 10\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 5\text{ A}$	Ch-1	-	0.95	-	
		Ch-2	-	1.63	-		
Gate-drain charge	$Q_{gd}$	Channel-2 $V_{DS} = 10\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 5\text{ A}$	Ch-1	-	0.37	-	
		Ch-2	-	0.54	-		
Output charge	$Q_{oss}$	$V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}$	Ch-1	-	1.7	-	
			Ch-2	-	3.4	-	
Gate resistance	$R_g$	$f = 1\text{ MHz}$	Ch-1	0.28	1.4	2.8	$\Omega$
			Ch-2	0.18	0.9	1.8	

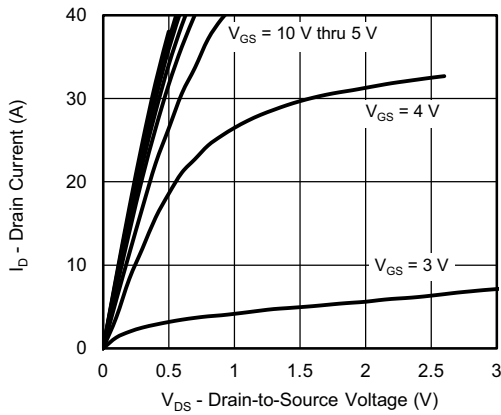
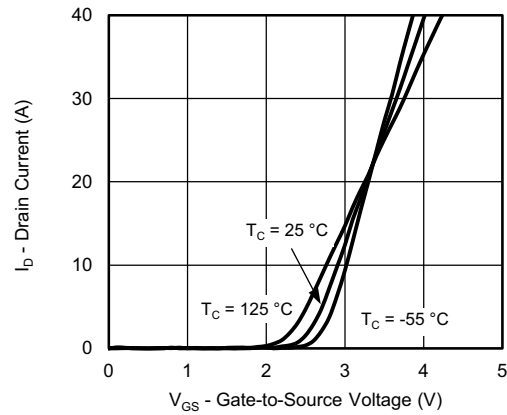
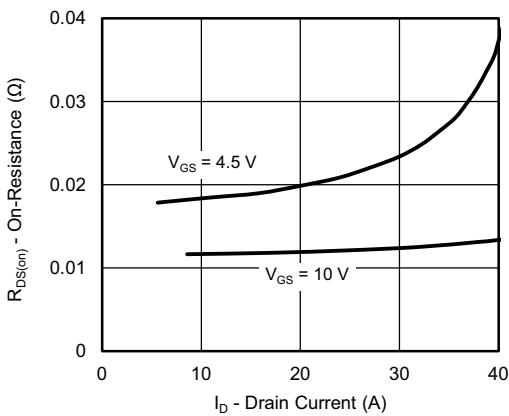
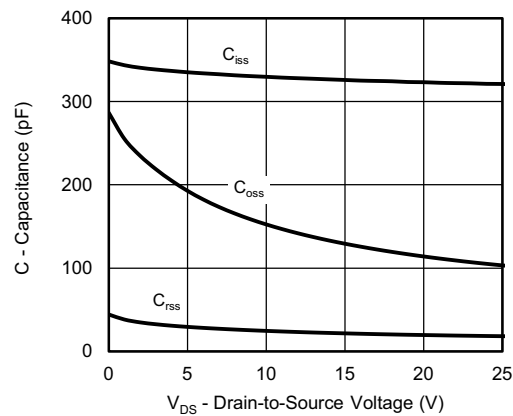
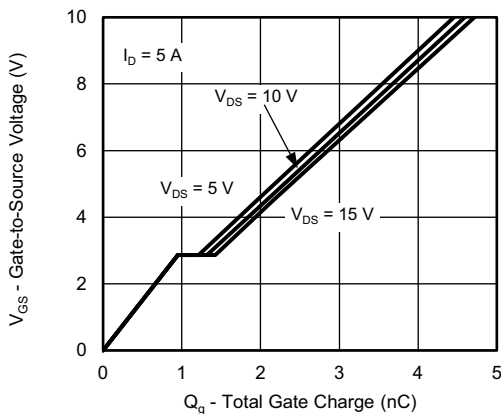
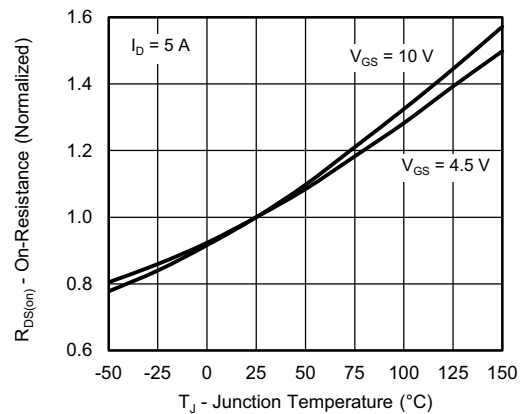


<b>SPECIFICATIONS</b> ( $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT	
<b>Dynamic <sup>a</sup></b>							
Turn-on delay time	$t_{d(on)}$	Channel-1 $V_{DD} = 10\text{ V}$ , $R_L = 2\ \Omega$ $I_D \cong 5\text{ A}$ , $V_{GEN} = 10\text{ V}$ , $R_g = 1\ \Omega$	Ch-1	-	7	15	ns
			Ch-2	-	8	16	
Rise time	$t_r$	Channel-1 $V_{DD} = 10\text{ V}$ , $R_L = 2\ \Omega$ $I_D \cong 5\text{ A}$ , $V_{GEN} = 10\text{ V}$ , $R_g = 1\ \Omega$	Ch-1	-	11	25	
			Ch-2	-	5	10	
Turn-off delay time	$t_{d(off)}$	Channel-2 $V_{DD} = 10\text{ V}$ , $R_L = 2\ \Omega$ $I_D \cong 5\text{ A}$ , $V_{GEN} = 10\text{ V}$ , $R_g = 1\ \Omega$	Ch-1	-	12	25	
			Ch-2	-	15	30	
Fall time	$t_f$	Channel-2 $V_{DD} = 10\text{ V}$ , $R_L = 2\ \Omega$ $I_D \cong 5\text{ A}$ , $V_{GEN} = 10\text{ V}$ , $R_g = 1\ \Omega$	Ch-1	-	5	10	
			Ch-2	-	5	10	
Turn-on delay time	$t_{d(on)}$	Channel-1 $V_{DD} = 10\text{ V}$ , $R_L = 2\ \Omega$ $I_D \cong 5\text{ A}$ , $V_{GEN} = 4.5\text{ V}$ , $R_g = 1\ \Omega$	Ch-1	-	13	30	
			Ch-2	-	15	30	
Rise time	$t_r$	Channel-1 $V_{DD} = 10\text{ V}$ , $R_L = 2\ \Omega$ $I_D \cong 5\text{ A}$ , $V_{GEN} = 4.5\text{ V}$ , $R_g = 1\ \Omega$	Ch-1	-	66	75	
			Ch-2	-	61	120	
Turn-off delay time	$t_{d(off)}$	Channel-2 $V_{DD} = 10\text{ V}$ , $R_L = 2\ \Omega$ $I_D \cong 5\text{ A}$ , $V_{GEN} = 4.5\text{ V}$ , $R_g = 1\ \Omega$	Ch-1	-	8	20	
			Ch-2	-	10	20	
Fall time	$t_f$	Channel-2 $V_{DD} = 10\text{ V}$ , $R_L = 2\ \Omega$ $I_D \cong 5\text{ A}$ , $V_{GEN} = 4.5\text{ V}$ , $R_g = 1\ \Omega$	Ch-1	-	5	10	
			Ch-2	-	5	10	
<b>Drain-Source Body Diode Characteristics</b>							
Continuous source-drain diode current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$	Ch-1	-	-	12.6	A
			Ch-2	-	-	13.5	
Pulse diode forward current ( $t = 100\ \mu\text{s}$ )	$I_{SM}$		Ch-1	-	-	40	
			Ch-2	-	-	50	
Body diode voltage	$V_{SD}$	$I_S = 5\text{ A}$ , $V_{GS} = 0\text{ V}$	Ch-1	-	0.82	1.2	V
			Ch-2	-	0.83	1.2	
Body diode reverse recovery time	$t_{rr}$	Channel-1 $I_F = 5\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$ , $T_J = 25\text{ }^\circ\text{C}$	Ch-1	-	16	35	ns
			Ch-2	-	21	40	
Body diode reverse recovery charge	$Q_{rr}$	Channel-1 $I_F = 5\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$ , $T_J = 25\text{ }^\circ\text{C}$	Ch-1	-	10	20	nC
			Ch-2	-	11	20	
Reverse recovery fall time	$t_a$	Channel-2 $I_F = 5\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$ , $T_J = 25\text{ }^\circ\text{C}$	Ch-1	-	10	-	ns
			Ch-2	-	11	-	
Reverse recovery rise time	$t_b$	Channel-2 $I_F = 5\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$ , $T_J = 25\text{ }^\circ\text{C}$	Ch-1	-	6	-	
			Ch-2	-	10	-	

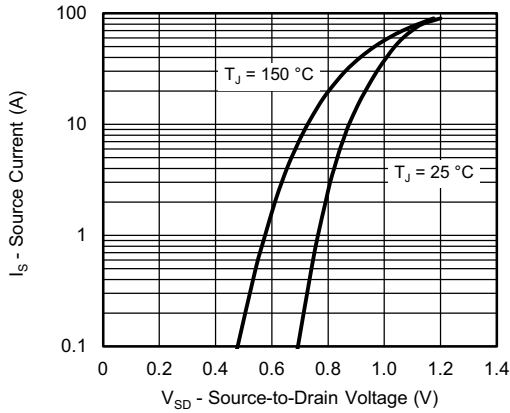
**Notes**

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

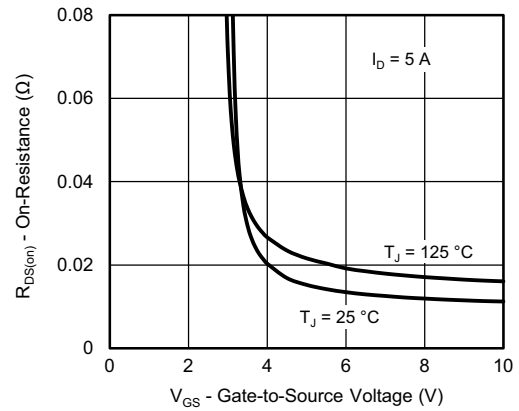
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

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

**Output Characteristics**

**Transfer Characteristics**

**On-Resistance vs. Drain Current**

**Capacitance**

**Gate Charge**

**On-Resistance vs. Junction Temperature**

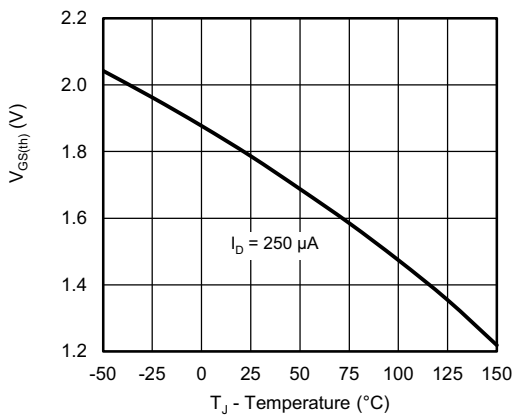
**CHANNEL-1 TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



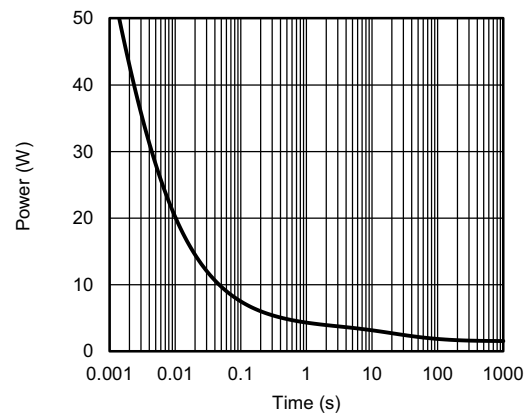
**Source-Drain Diode Forward Voltage**



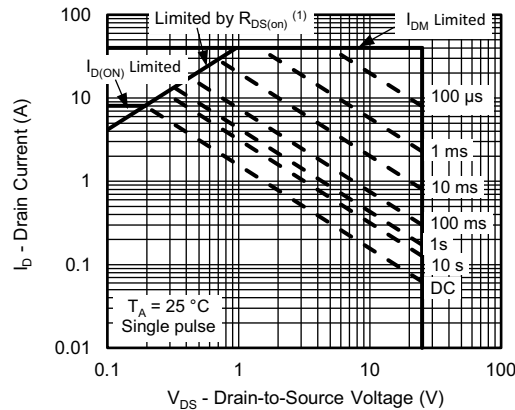
**On-Resistance vs. Gate-to-Source Voltage**



**Threshold Voltage**



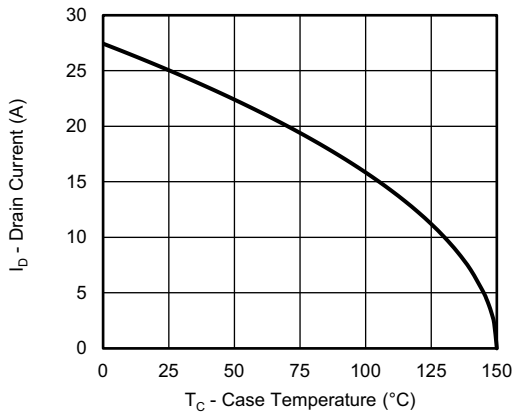
**Single Pulse Power, Junction-to-Ambient**



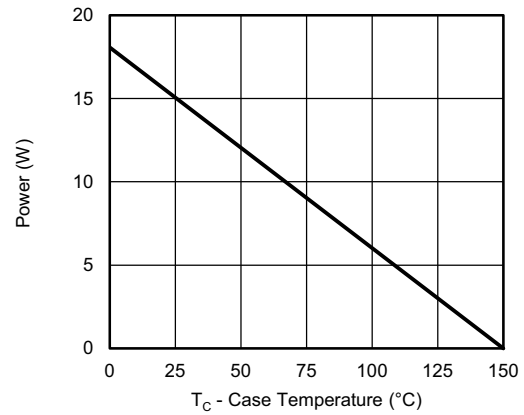
**Safe Operating Area, Junction-to-Ambient**



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



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



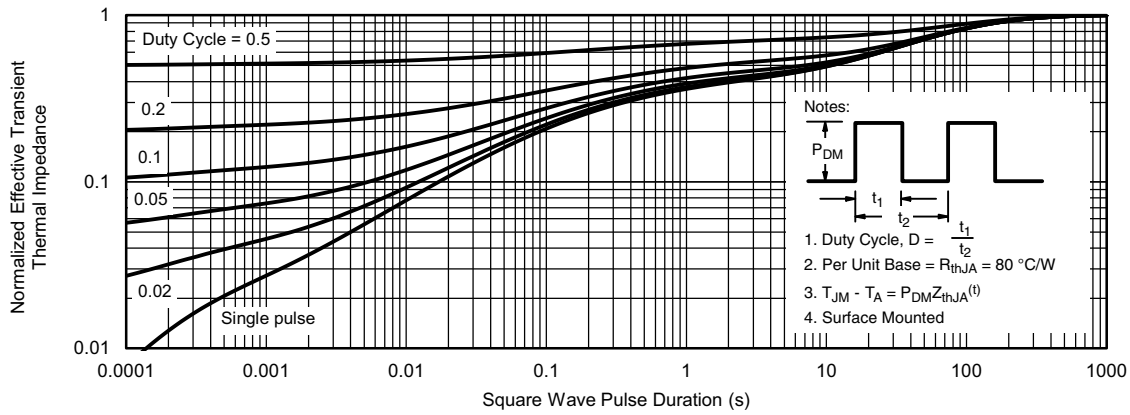
**Power, Junction-to-Case**

**Note**

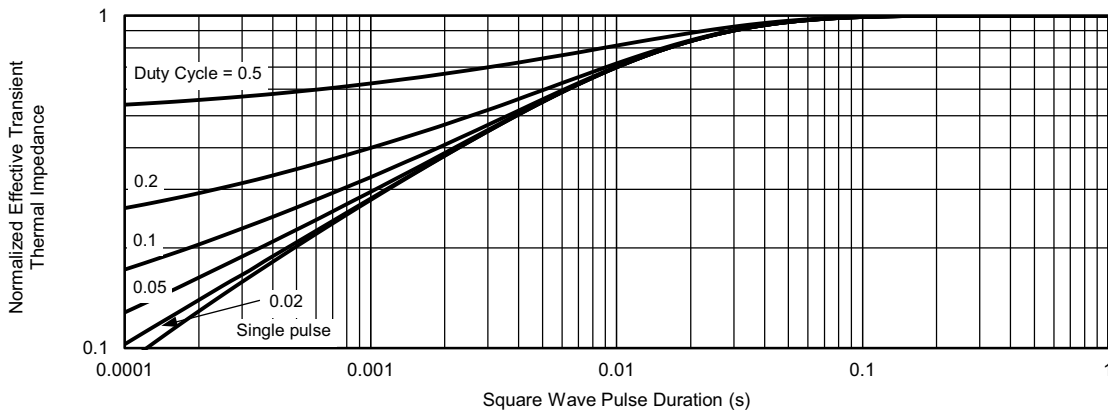
- a. The power dissipation P<sub>D</sub> is based on T<sub>J</sub> max. = 25 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit



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

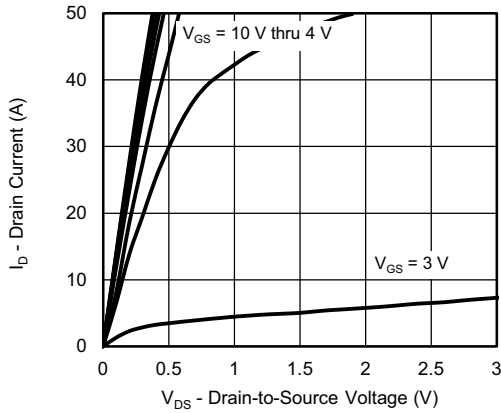


Normalized Thermal Transient Impedance, Junction-to-Ambient

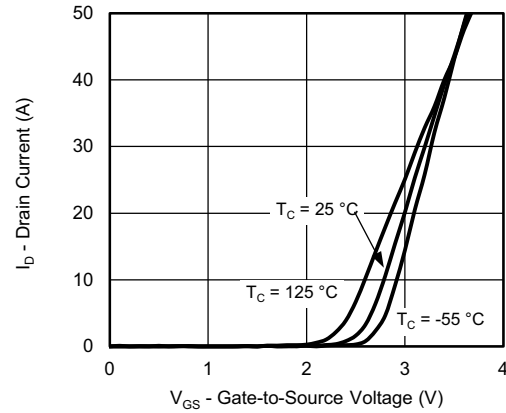


Normalized Thermal Transient Impedance, Junction-to-Case

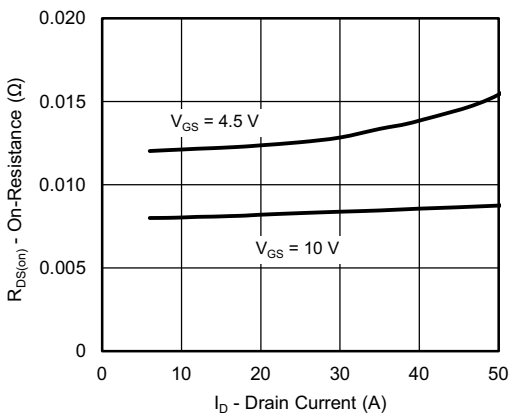
**CHANNEL-2 TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



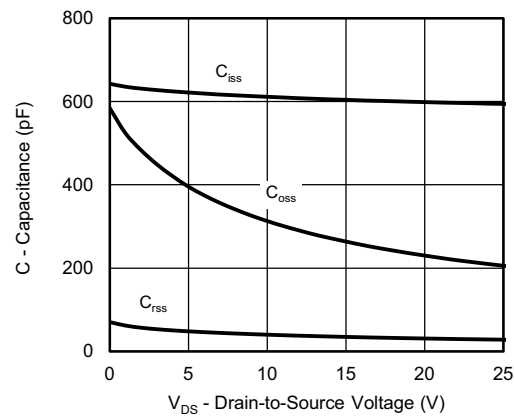
**Output Characteristics**



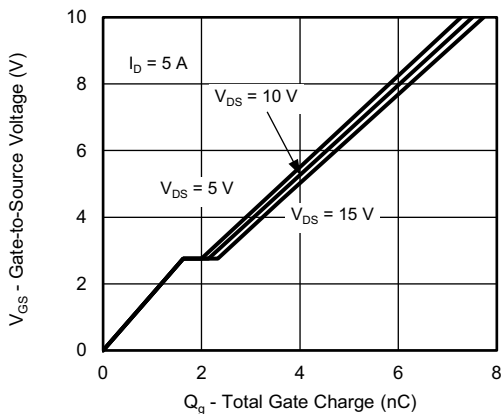
**Transfer Characteristics**



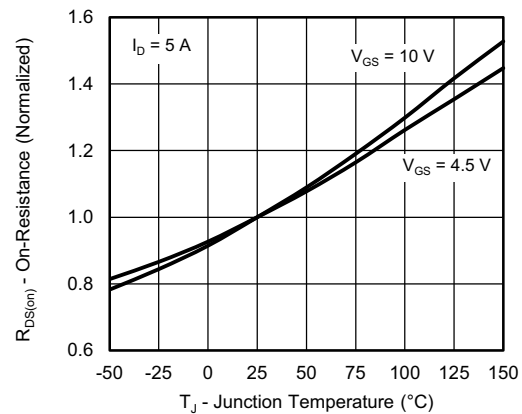
**On-Resistance vs. Drain Current**



**Capacitance**



**Gate Charge**

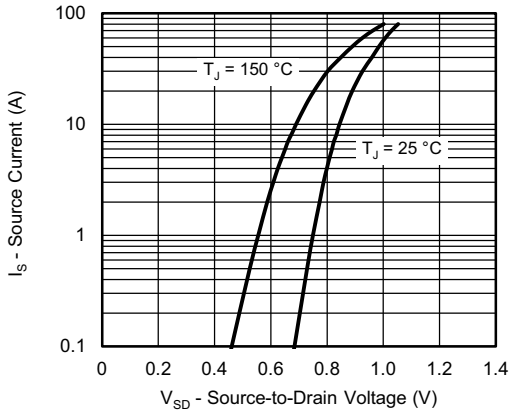


**On-Resistance vs. Junction Temperature**

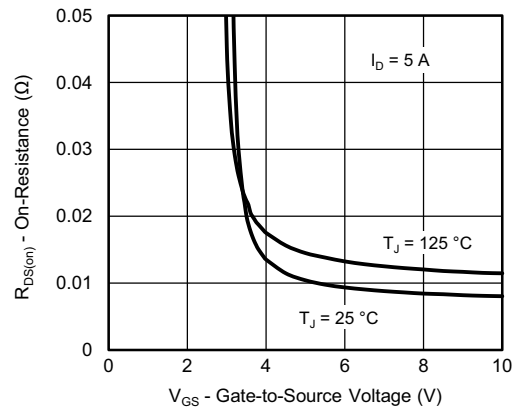




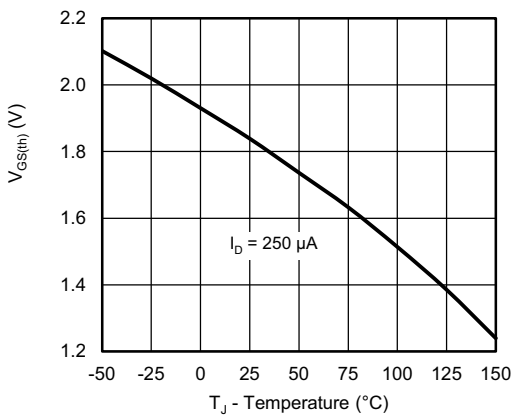
CHANNEL-2 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



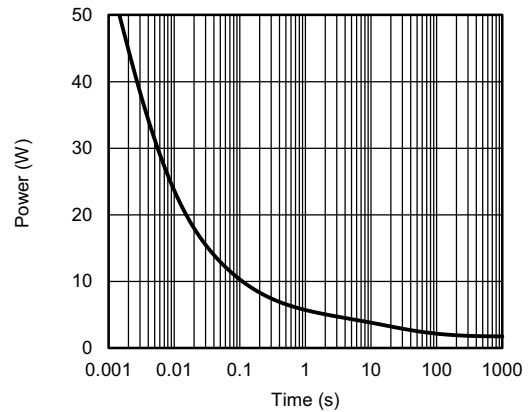
Source-Drain Diode Forward Voltage



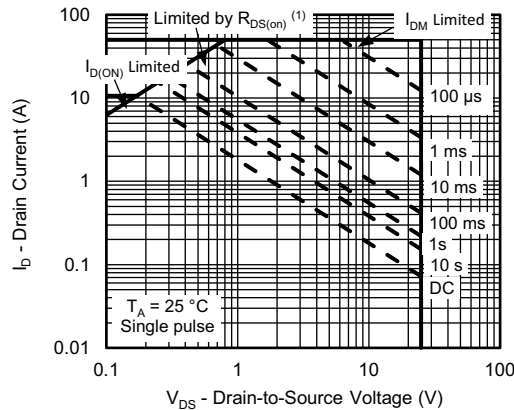
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



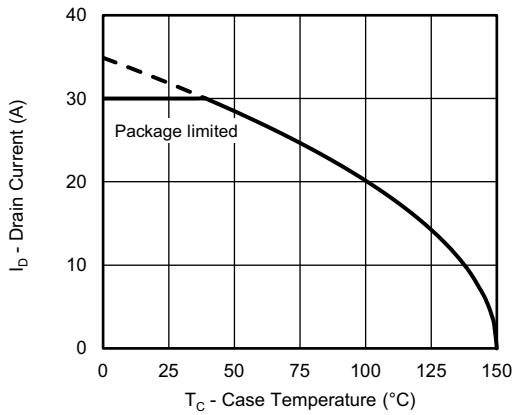
Single Pulse Power, Junction-to-Ambient



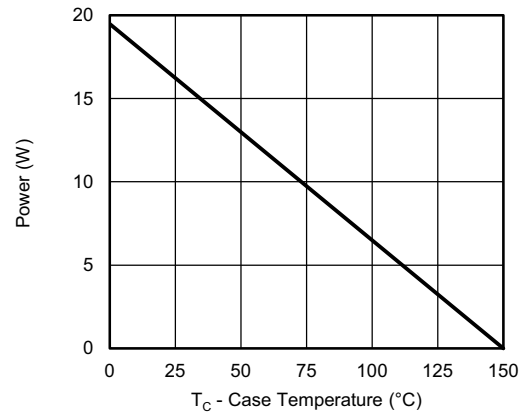
Safe Operating Area, Junction-to-Ambient



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



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



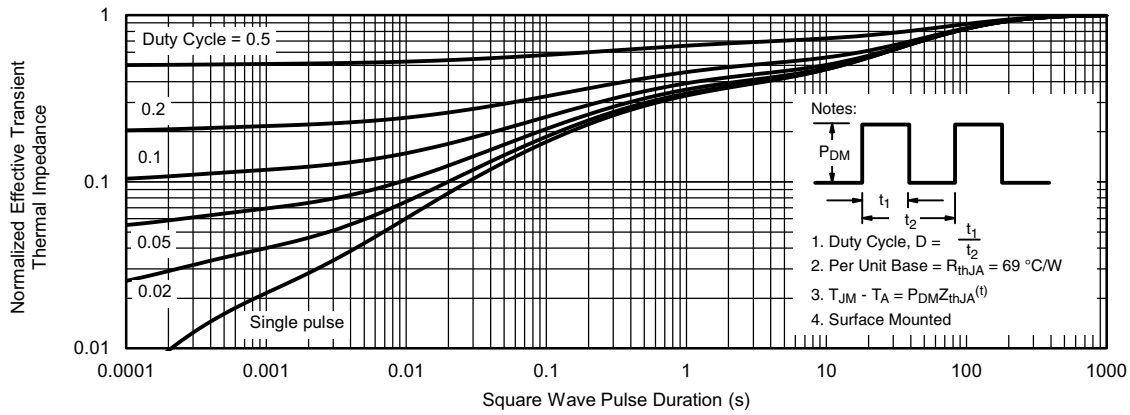
**Power, Junction-to-Case**

**Note**

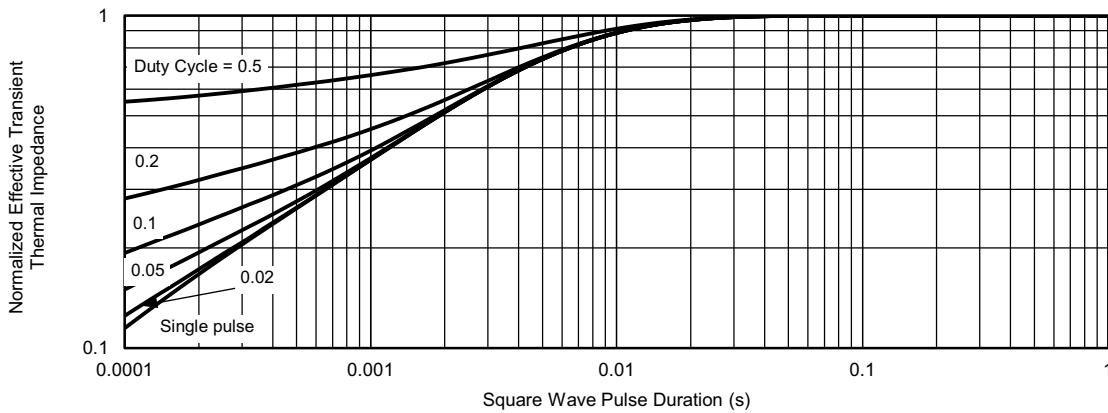
- a. The power dissipation  $P_D$  is based on  $T_J$  max. = 25 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit



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



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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## JONHON

«JONHON» (основан в 1970 г.)

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«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

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