

## N-Channel 100 V (D-S) Power MOSFET



**RoHS**  
COMPLIANT

### PRODUCT SUMMARY

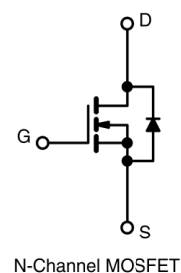
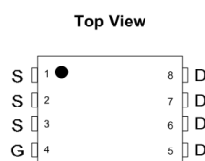
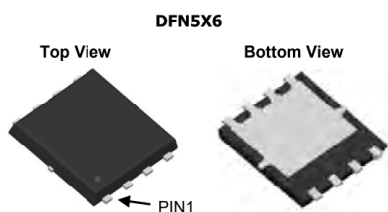
$V_{DS}$ (V)	$R_{DS(on)}$ (m $\Omega$ )(Typ.)	$I_D$ (A) <sup>a, d</sup>	$Q_g$ (Typ.)
100	12 at $V_{GS} = 10$ V	48	19 nC

### FEATURES

- DT-Trench Power MOSFET
- 100 % Rgand UIS Tested

### APPLICATIONS

- DC/DC converters
- Primary side switch



### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ , 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 ( $T_J = 150^\circ\text{C}$ )	$I_D$	$T_C = 25^\circ\text{C}$	48 <sup>a</sup>
		$T_C = 70^\circ\text{C}$	35 <sup>a</sup>
		$T_A = 25^\circ\text{C}$	8.8 <sup>b, c</sup>
		$T_A = 70^\circ\text{C}$	5.2 <sup>b, c</sup>
Pulsed drain current ( $t = 100 \mu\text{s}$ )	$I_{DM}$	165	A
Continuous source-drain diode current	$I_S$	$T_C = 25^\circ\text{C}$	48 <sup>a</sup>
		$T_A = 25^\circ\text{C}$	8.1 <sup>b, c</sup>
Single pulse avalanche current	$I_{AS}$	45	A
Single pulse avalanche energy	$E_{AS}$	90	mJ
Maximum power dissipation	$P_D$	$T_C = 25^\circ\text{C}$	60
		$T_C = 70^\circ\text{C}$	47
		$T_A = 25^\circ\text{C}$	2.05 <sup>b, c</sup>
		$T_A = 70^\circ\text{C}$	1.6 <sup>b, c</sup>
Operating junction and storage temperature range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$
Soldering recommendations (peak temperature) <sup>c</sup>		260	$^\circ\text{C}$

### THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	TYPICAL	MAXIMUM	UNIT
Maximum junction-to-ambient <sup>b</sup>	$R_{thJA}$	40	50	$^\circ\text{C/W}$
Maximum junction-to-case	$R_{thJC}$	1.2	2	$^\circ\text{C/W}$

Notes:

a. Based on  $T_C = 25^\circ\text{C}$ .

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

c.  $t = 10$  s.

d. Calculated based on maximum junction temperature.

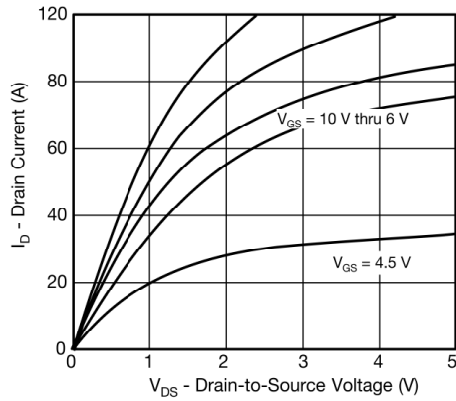
SPECIFICATIONS (T <sub>J</sub> = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-source breakdown voltage	V <sub>DS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	100	-	-	V
V <sub>DS</sub> temperature coefficient	ΔV <sub>DS</sub> /T <sub>J</sub>	I <sub>D</sub> = 250 μA	-	55	-	mV/°C
V <sub>GS(th)</sub> temperature coefficient	ΔV <sub>GS(th)</sub> /T <sub>J</sub>	I <sub>D</sub> = 250 μA	-	-6	-	
Gate-source threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	1	-	3	V
Gate-source leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 20 V	-	-	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> = 80 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 75 °C	-	-	10	
On-state drain current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ 5 V, V <sub>GS</sub> = 10 V	48	-	-	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	-	12	18	mΩ
Forward transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 5 V, I <sub>D</sub> = 20 A	-	38	-	S
Dynamic <sup>b</sup>						
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 50 V, V <sub>GS</sub> = 0 V, f = 1 MHz	-	780	-	pF
Output capacitance	C <sub>oss</sub>		-	110	-	
Reverse transfer capacitance	C <sub>rss</sub>		-	9	-	
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	-	19	-	nC
Gate-source charge	Q <sub>gs</sub>		-	5	-	
Gate-drain charge	Q <sub>gd</sub>		-	3.3	-	
Gate resistance	R <sub>g</sub>	f = 1 MHz	-	1.2	-	Ω
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = 50 V, R <sub>L</sub> = 2.5 Ω, I <sub>D</sub> ≅ 20 A, V <sub>GEN</sub> = 10 V, R <sub>g</sub> = 1 Ω	-	7.5	-	ns
Rise time	t <sub>r</sub>		-	4	-	
Turn-off delay time	t <sub>d(off)</sub>		-	15	-	
Fall time	t <sub>f</sub>		-	5	-	
Drain-Source Body Diode Characteristics						
Continuous source-drain diode current	I <sub>S</sub>	T <sub>C</sub> = 25 °C	-	-	48	A
Pulse diode forward current (t <sub>p</sub> = 100 μs)	I <sub>SM</sub>		-	-	165	
Body diode voltage	V <sub>SD</sub>	I <sub>S</sub> = 5 A, V <sub>GS</sub> = 0 V	-	0.7	1.2	V
Body diode reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> = 20 A, di/dt = 100 A/μs, T <sub>J</sub> = 25 °C	-	34	-	ns
Body diode reverse recovery charge	Q <sub>rr</sub>		-	86	-	nC
Reverse recovery fall time	t <sub>a</sub>		-	17	-	ns
Reverse recovery rise time	t <sub>b</sub>		-	15	-	

**Notes**

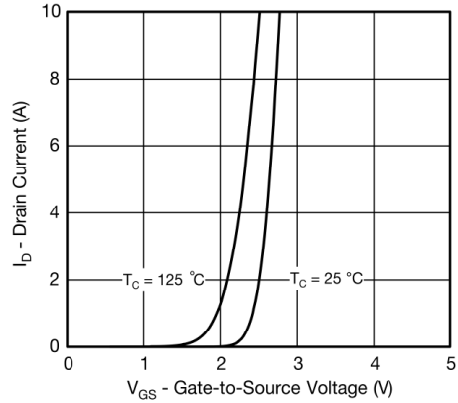
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$   
 b. Guaranteed by design, not subject to production testing

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.

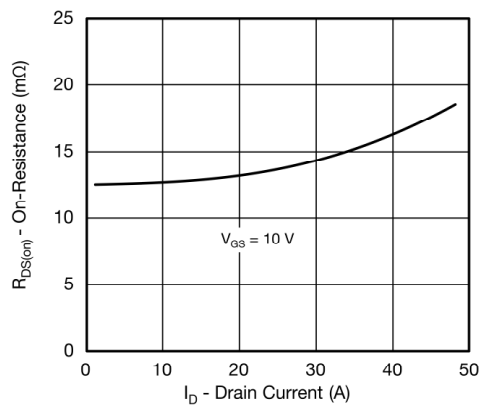
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



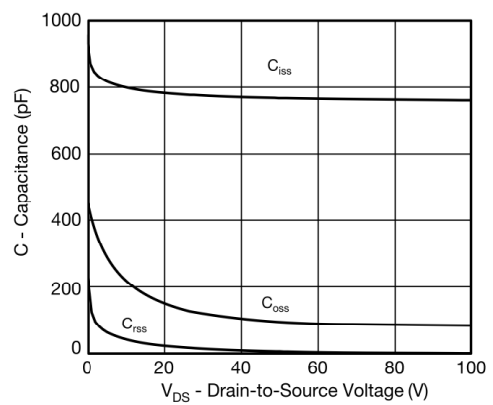
**Output Characteristics**



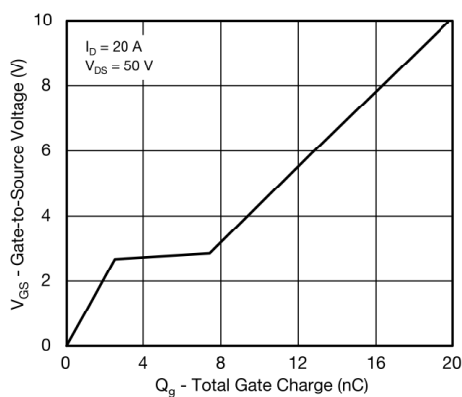
**Transfer Characteristics**



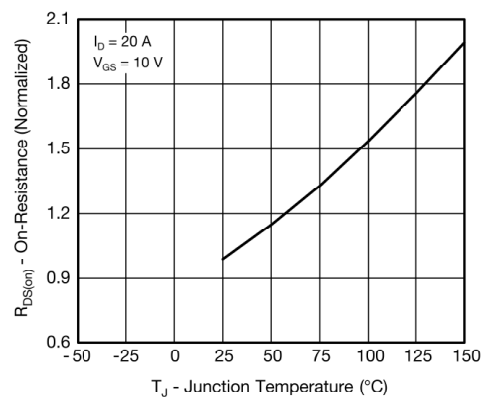
**On-Resistance vs. Drain Current and Gate Voltage**



**Capacitance**

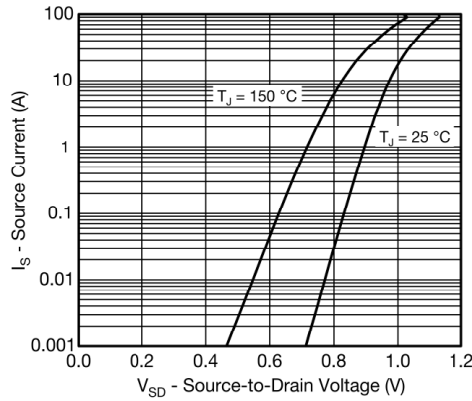


**Gate Charge**

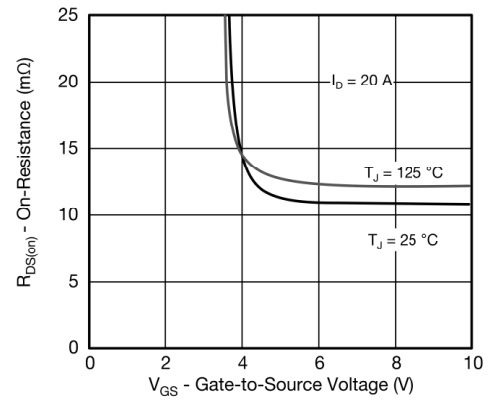


**On-Resistance vs. Junction Temperature**

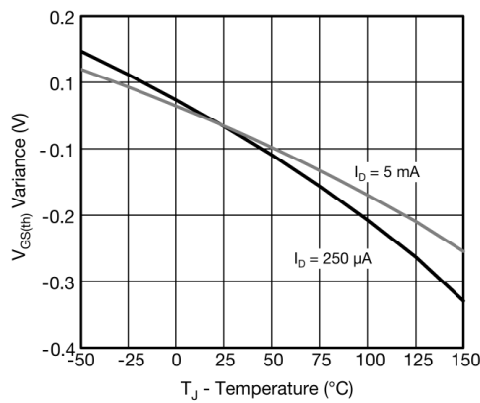
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



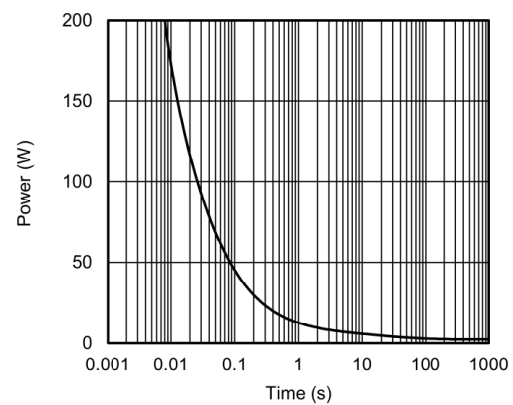
**Source-Drain Diode Forward Voltage**



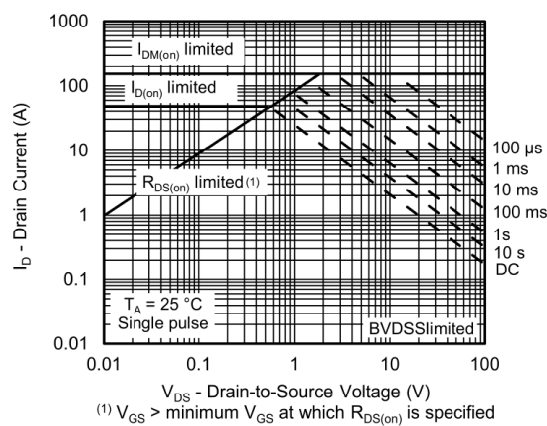
**Threshold Voltage**



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

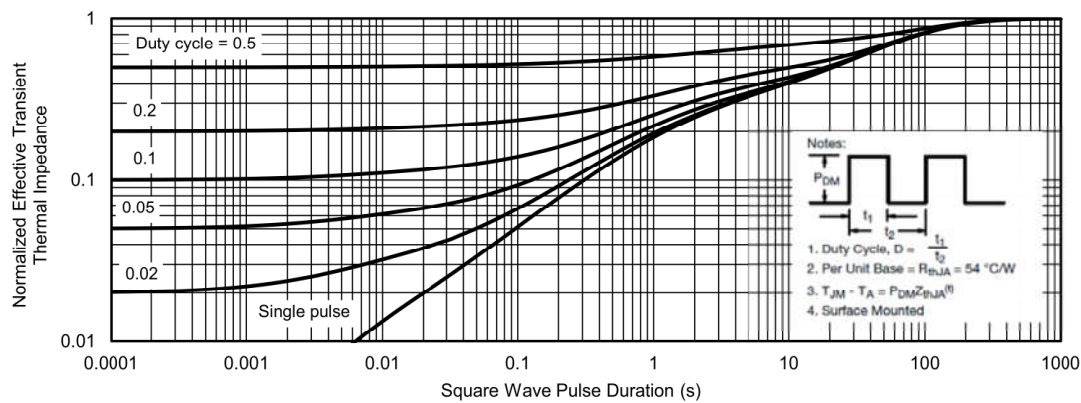


**Single Pulse Power, Junction-to-Ambient**



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

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



**Normalized Thermal Transient Impedance, Junction-to-Ambient**

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