

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

PRODUCT SUMMARY				
V <sub>DS</sub> (V)	$R_{DS(on)}(\Omega)$	I <sub>D</sub> (A) <sup>a</sup>	Q <sub>g</sub> (Typ.)	
100	0.0185 at V <sub>GS</sub> = 10 V	45	38 nC	

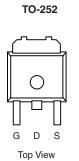
#### **FEATURES**

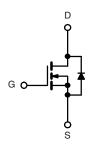
- TrenchFET® Power MOSFET
- 100 % R<sub>q</sub> and UIS Tested





- Primary Side Switch
- Isolated DC/DC Converter





N-Channel MOSFET

Parameter		Symbol	Limit	Unit	
Drain-Source Voltage		V <sub>DS</sub>	100	V	
Gate-Source Voltage		V <sub>GS</sub>	± 20		
	T <sub>C</sub> = 25 °C		45 <sup>a</sup>		
Continuous Drain Current /T = 150 °C)	T <sub>C</sub> = 100 °C		30		
Continuous Drain Current (T <sub>J</sub> = 150 °C)	T <sub>A</sub> = 25 °C	I <sub>D</sub>	9.2 <sup>b</sup>		
	T <sub>A</sub> = 100 °C		6.8 <sup>b</sup>	A	
Pulsed Drain Current		I <sub>DM</sub>	140	A	
Continuous Source-Drain Diode Current	T <sub>C</sub> = 25 °C	,	45 <sup>a</sup>		
	T <sub>A</sub> = 25 °C	I <sub>S</sub>	2 <sup>b</sup>		
Single Pulse Avalanche Current		I <sub>AS</sub>	35		
Avalanche Energy	L = 0.1 mH	E <sub>AS</sub>	101	mJ	
Maximum Power Dissipation	T <sub>C</sub> = 25 °C		136.4		
	T <sub>C</sub> = 100 °C	В	68.2	w	
	T <sub>A</sub> = 25 °C	P <sub>D</sub>	3 <sub>p</sub>		
	T <sub>A</sub> = 100 °C		1.5 <sup>b</sup>		
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	- 55 to 175	°C	

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>b</sup>	Steady State	R <sub>thJA</sub>	40	50	°C/W
Maximum Junction-to-Case	Sleady State	R <sub>thJC</sub>	0.85	1.1	C/VV

#### Notes:

- a. Package limited.
- b. Surface mounted on 1" x 1" FR4 board.

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Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V <sub>DS</sub>	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	100			V
V <sub>DS</sub> Temperature Coefficient	$\Delta V_{DS}/T_{J}$	I <sub>D</sub> = 250 μA		110		mV/°C
V <sub>GS(th)</sub> Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	i <sub>D</sub> = 250 μA		- 12.5		
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}, I_D = 250 \mu A$	2.5		5	V
Gate-Source Leakage	I <sub>GSS</sub>	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA
Zana Oata Walkana Basin Oana	I <sub>DSS</sub>	V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0 V	1		1	
Zero Gate Voltage Drain Current		V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			50	μΑ
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	$V_{DS} \ge 5 \text{ V}, V_{GS} = 10 \text{ V}$	30			Α
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 15 A		0.0185		Ω
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 15 A		33		S
Dynamic <sup>b</sup>						
Input Capacitance	C <sub>iss</sub>			2400		pF
Output Capacitance	C <sub>oss</sub>	$V_{DS} = 50 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		230		
Reverse Transfer Capacitance	C <sub>rss</sub>			80		
Total Gate Charge	$Q_g$			38	70	nC
Gate-Source Charge	Q <sub>gs</sub>	$V_{DS} = 50 \text{ V}, V_{GS} = 10 \text{ V}, I_{D} = 50 \text{ A}$		14		
Gate-Drain Charge	Q <sub>gd</sub>			12		
Gate Resistance	$R_g$	f = 1 MHz		1.6	2.5	Ω
Turn-On Delay Time	t <sub>d(on)</sub>			12	20	
Rise Time	t <sub>r</sub>	$V_{DD} = 50 \text{ V}, R_L = 1 \Omega$		10	20	- ns
Turn-Off Delay Time	t <sub>d(off)</sub>	$I_D \cong 50 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 1 \Omega$		18	35	
Fall Time	t <sub>f</sub>			8	15	
Drain-Source Body Diode Characteris	stics					
Continuous Source-Drain Diode	I <sub>S</sub>	T <sub>C</sub> = 25 °C			35	_
Pulse Diode Forward Current <sup>a</sup>	I <sub>SM</sub>	_			100	A
Body Diode Voltage	$V_{SD}$	I <sub>S</sub> = 15 A		0.85	1.5	V
Body Diode Reverse Recovery Time t <sub>rr</sub>				80	120	ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	T		160	240	nC
Reverse Recovery Fall Time	t <sub>a</sub>	$I_F = 50 \text{ A}, \text{ dI/dt} = 100 \text{ A/}\mu\text{s}, T_J = 25 ^{\circ}\text{C}$		57		ns
Reverse Recovery Rise Time	t <sub>b</sub>	1		23		

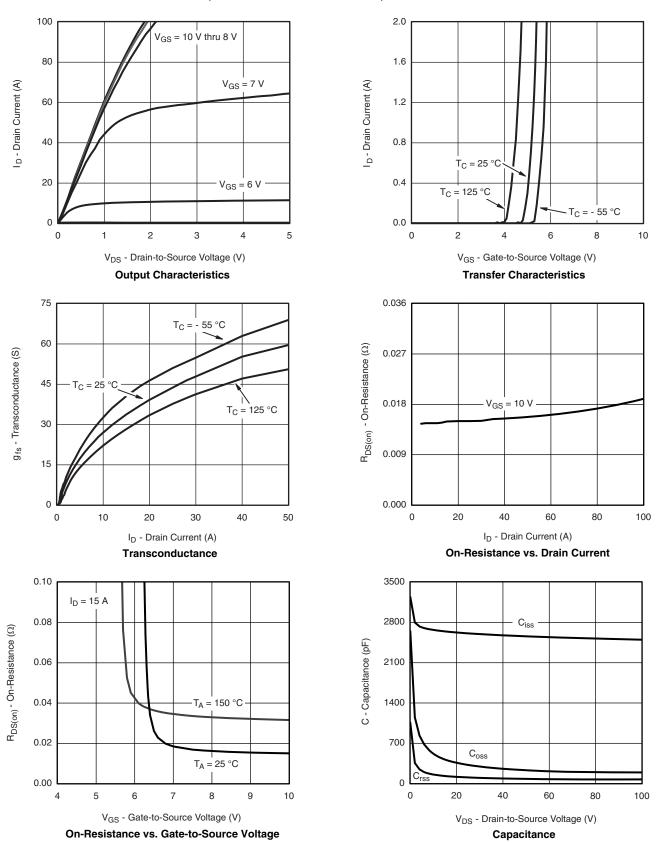
#### Notes:

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

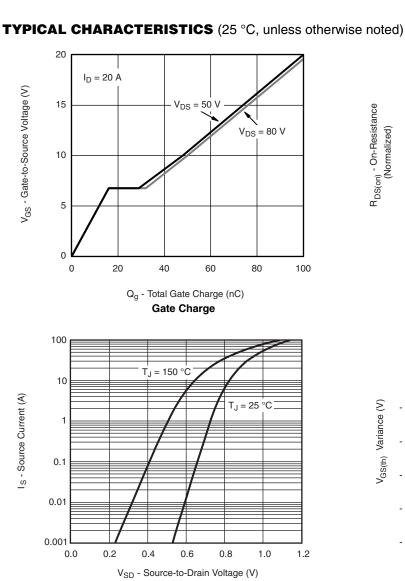
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



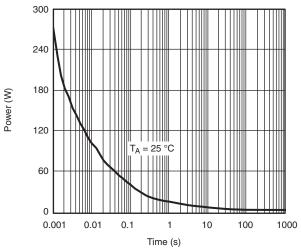
### TYPICAL CHARACTERISTICS (25 °C, unless otherwise note)



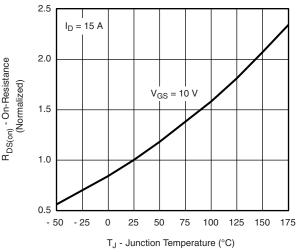




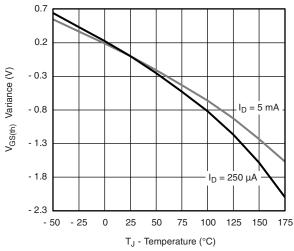
Source-Drain Diode Forward Voltage



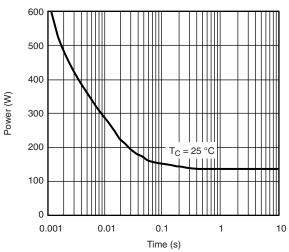
Single Pulse Power, Junction-to-Ambient



On-Resistance vs. Junction Temperature



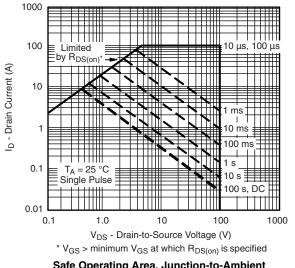
Threshold Voltage



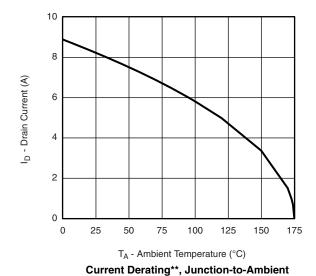
Single Pulse Power, Junction-to-Case



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

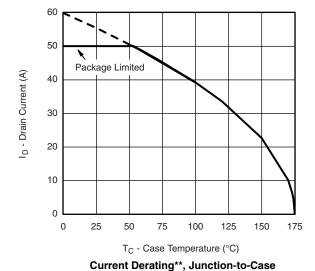






1000 100 100 us I<sub>D</sub> - Drain Current (A) 10 10 ms 100 ms,  $T_C = 25$  °C 0.1 Single Pulse 0.01 0.1 1.0  $V_{\text{DS}}$  - Drain-to-Source Voltage (V) \*  $V_{GS}$  > minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified

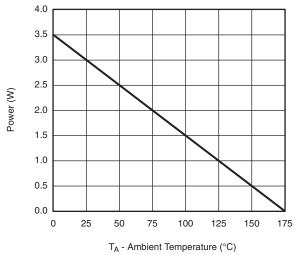
Safe Operating Area, Junction-to-Case

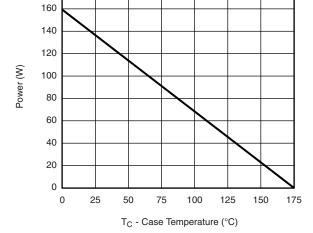


<sup>\*\*</sup> The power dissipation  $P_D$  is based on  $T_{J(max.)}$  = 175 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.



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





Power Derating\*\*, Junction-to-Ambient

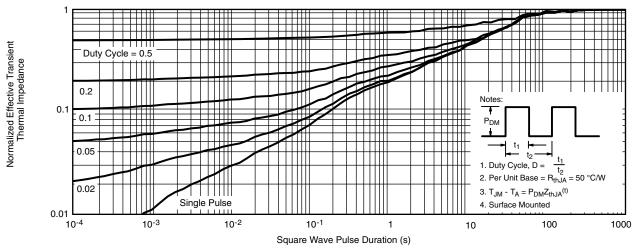
Power Derating\*\*, Junction-to-Case

180

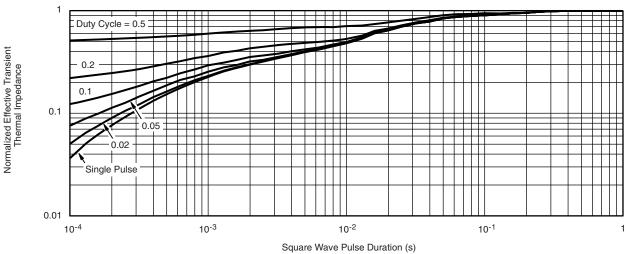
<sup>\*\*</sup> The power dissipation  $P_D$  is based on  $T_{J(max)} = 175$  °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below 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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