

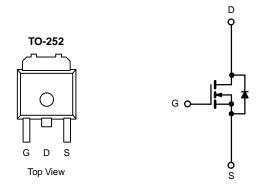
# STD20NF10-VB Datasheet N-Channel 100-V (D-S) MOSFET

PRODUCT SUMMARY				
V <sub>(BR)DSS</sub> (V)	$r_{DS(on)}(\Omega)$	I <sub>D</sub> (A)		
100	0.030 at V <sub>GS</sub> = 10 V	40		
	0.035 at V <sub>GS</sub> = 4.5 V	37		

#### **FEATURES**

- Trench Power MOSFETS
- 175 °C Junction Temperature
- Low Thermal Resistance Package





N-Channel MOSFET

<b>ABSOLUTE MAXIMUM RATINGS</b> $T_C = 25  ^{\circ}C$ , unless otherwise noted					
Parameter	-	Symbol	Limit	Unit	
Drain-Source Voltage	V <sub>DS</sub>	100	V		
Gate-Source Voltage	V <sub>GS</sub>	± 20	7 v		
Continuous Drain Current (T <sub>.1</sub> = 175 °C)	T <sub>C</sub> = 25 °C	I-	40		
Continuous Diam Current (1) = 175 C)	T <sub>C</sub> = 125 °C	I <sub>D</sub>	23		
Pulsed Drain Current	I <sub>DM</sub>	120	A		
Avalanche Current		I <sub>AR</sub>	35		
Repetitive Avalanche Energy <sup>a</sup>	L = 0.1 mH	E <sub>AR</sub>	61	mJ	
	T <sub>C</sub> = 25 °C	В	107 <sup>b</sup>	14/	
Maximum Power Dissipation <sup>a</sup>	T <sub>A</sub> = 25 °C <sup>c</sup>	P <sub>D</sub>	3.75	W	
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	- 55 to 175	°C	

THERMAL RESISTANCE RATINGS						
Parameter		Symbol	Limit	Unit		
Junction-to-Ambient	(PCB Mount) <sup>c</sup>	R <sub>thJA</sub>	40	°C/W		
Junction-to-Case (Drain)		R <sub>thJC</sub>	1.4	C/ V V		

#### Notes:

- a. Duty cycle  $\leq$  1 %.
- b. See SOA curve for voltage derating.
- c. When Mounted on 1" square PCB (FR-4 material).

<sup>\*</sup> Pb containing terminations are not RoHS compliant, exemptions may apply.



Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	$V_{SS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	100			V	
Gate-Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}, I_D = 250 \mu A$	1		3	v	
Gate-Body Leakage	I <sub>GSS</sub>	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA	
		V <sub>DS</sub> = 100 ,W <sub>GS</sub> = 0 V			1		
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			50	μΑ	
		V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175 °C			250		
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	$V_{DS} \ge 5 \text{ V}, V_{GS} = 10 \text{ V}$	75			Α	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 5 A		0.030		Ω	
		$V_{GS} = 4.5 \text{ V}, I_D = 3 \text{ A}$		0.035			
Drain-Source On-State Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 5 A, T <sub>J</sub> = 125 °C		0.053			
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 3 A, T <sub>J</sub> = 175 °C		0.067			
Forward Transconductance <sup>a</sup>	9 <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 15 A	10			S	
Dynamic <sup>b</sup>	<b>.</b>						
Input Capacitance	C <sub>iss</sub>			2600		pF	
Output Capacitance	C <sub>oss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz		290			
Reverse Transfer Capacitance	C <sub>rss</sub>			120			
Total Gate Charge <sup>c</sup>	Qg			35	60	nC	
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>	$V_{DS} = 50 \text{ V}, V_{GS} = 10 \text{ V}, I_{D} = 40 \text{ A}$		11			
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			9			
Gate Resistance	R <sub>G</sub>			1.7		Ω	
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>			11	20		
Rise Time <sup>c</sup>	t <sub>r</sub>	$V_{DD} = 50 \text{ V, R}_{L} = 1.25 \Omega$		12	20	ns	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>	$I_D \cong 40 \text{ A}, V_{GEN} = 10 \text{ V}, R_G = 2.5 \Omega$		30	45		
Fall Time <sup>c</sup>	t <sub>f</sub>			12	20		
Source-Drain Diode Ratings and Cha	racteristics	<sub>C</sub> = 25 °C <sup>b</sup>					
Continuous Current	Is				40		
Pulsed Current	I <sub>SM</sub>				120	Α	
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = 30 A, V <sub>GS</sub> = 0 V		1.0	1.5	V	
Reverse Recovery Time	t <sub>rr</sub>			60	100	ns	
Peak Reverse Recovery Current	I <sub>RM(REC)</sub>	$I_F = 30 \text{ A}, \text{ di/dt} = 100 \text{ A/}\mu\text{s}$		5	8	Α	
Reverse Recovery Charge	Q <sub>rr</sub>	·		0.15	0.4	μC	

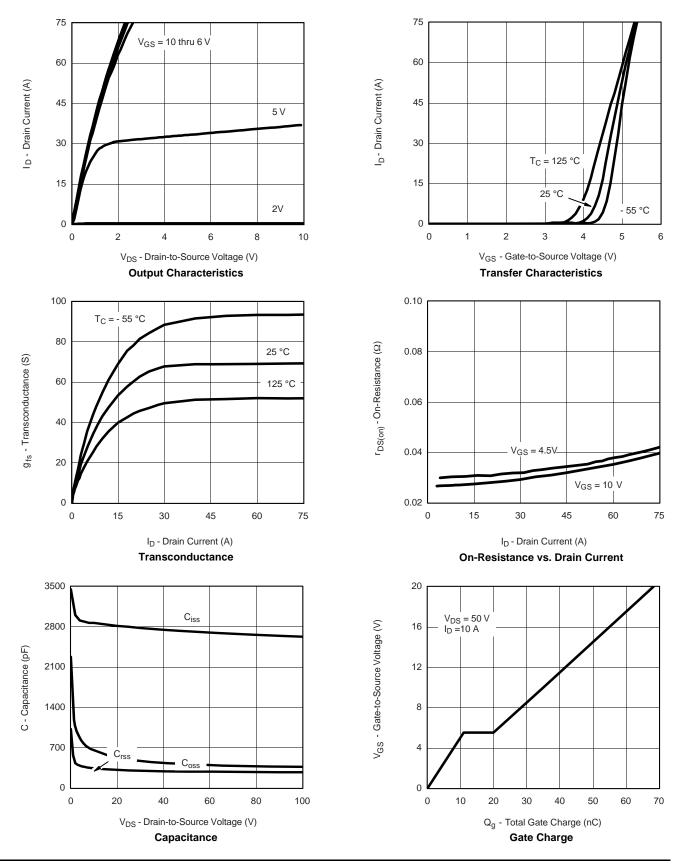
#### Notes

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

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.

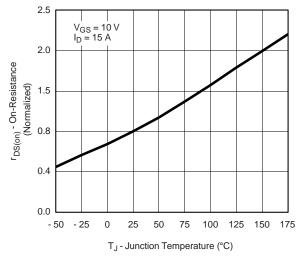


## TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

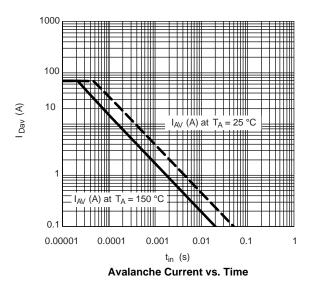




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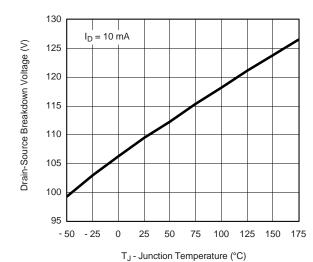


On-Resistance vs. Junction Temperature



 $\{V\}_{\text{DOSO}} = \{V\}_{\text{DOSO}} = \{V\}_{\text{DOSO}$ 

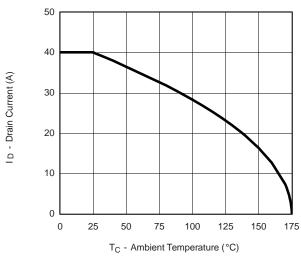
Source-Drain Diode Forward Voltage



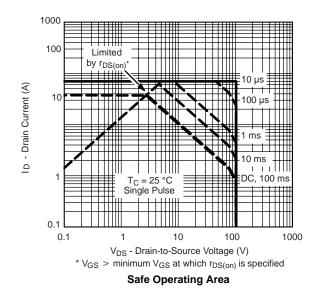
Drain-Source Breakdown Voltage vs. Junction Temperature

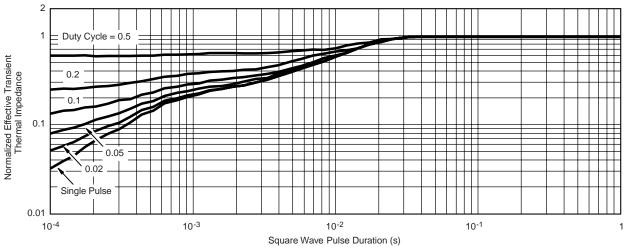


#### THERMAL RATINGS



Maximum Avalanche and Drain Current vs. Case Temperature





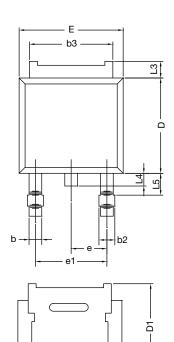
Normalized Thermal Transient Impedance, Junction-to-Case

服务热线:400-655-8788

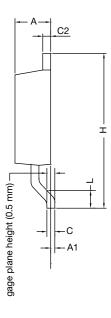
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# **TO-252AA CASE OUTLINE**



E1



	MILLIMETERS		INC	HES	
DIM.	MIN.	MAX.	MIN.	MAX.	
Α	2.18	2.38	0.086	0.094	
A1	-	0.127	-	0.005	
b	0.64	0.88	0.025	0.035	
b2	0.76	1.14	0.030	0.045	
b3	4.95	5.46	0.195	0.215	
С	0.46	0.61	0.018	0.024	
C2	0.46	0.89	0.018	0.035	
D	5.97	6.22	0.235	0.245	
D1	5.21	-	0.205	-	
Е	6.35	6.73	0.250	0.265	
E1	4.32	=	0.170	-	
Н	9.40	10.41	0.370	0.410	
е	2.28 BSC 0.090		BSC		
e1	4.56 BSC		0.180 BSC		
L	1.40	1.78	0.055	0.070	
L3	0.89	1.27	0.035	0.050	
L4	-	1.02	-	0.040	
L5	1.14	1.52	0.045	0.060	
ECN: X12-0247-Rev. M, 24-Dec-12					

ECN: X12-0247-Rev. M, 24-Dec-12 DWG: 5347

### Note

• Dimension L3 is for reference only.



## **RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)**



Recommended Minimum Pads Dimensions in Inches/(mm)



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