

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

PRODUCT SUMMARY					
V <sub>DS</sub> (V)	$R_{DS(on)}(\Omega)$	I <sub>D</sub> (A)			
100	0.115 at V <sub>GS</sub> = 10 V	15			
	0.120 at V <sub>GS</sub> = 6 V	15			

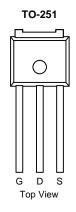
## **FEATURES**

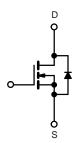
- DT-Trench Power MOSFET
- 175 °C Junction Temperature
- 100 % R<sub>g</sub> Tested



## **APPLICATIONS**

· Primary Side Switch





N-Channel MOSFET

<b>ABSOLUTE MAXIMUM RATINGS</b> (T <sub>C</sub> = 25 °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					
Continuous Dusin Courset /T 475 °C\b	T <sub>C</sub> = 25 °C	1	15				
Continuous Drain Current (T <sub>J</sub> = 175 °C) <sup>b</sup>	T <sub>C</sub> = 125 °C	I <sub>D</sub>	8.7	7			
Pulsed Drain Current	I <sub>DM</sub>	45	A				
Continuous Source Current (Diode Conduction)	I <sub>S</sub>	15					
Avalanche Current	I <sub>AR</sub>	15	1				
Repetitive Avalanche Energy (Duty Cycle ≤ 1 %)	L = 0.1 mH	E <sub>AR</sub>	11.3	mJ			
Maximum Dayyar Discipation	T <sub>C</sub> = 25 °C	Pn	61 <sup>b</sup>	W			
Maximum Power Dissipation	T <sub>A</sub> = 25 °C		2.7 <sup>a</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		
Junction-to-Ambient <sup>a</sup>	t ≤ 10 s	R <sub>thJA</sub>	16	20	°C/W		
Junction-to-Ambient*	Steady State		45	55			
Junction-to-Case		R <sub>thJC</sub>	2	2.4			

### Notes:

- a. Surface mounted on 1" x 1" FR4 board.
- b. See SOA curve for voltage derating.

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Parameter	Symbol	Test Conditions	Min.	Typ. <sup>a</sup>	Max.	Unit	
Static					l		
Drain-Source Breakdown Voltage	V <sub>DS</sub>	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	100			V	
Gate Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	1.0		3.0	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 V, V <sub>GS</sub> = 0 V			1		
Zero Gate Voltage Drain Current	$I_{DSS}$	V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			50	μA	
		V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175 °C			250		
On-State Drain Current <sup>b</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V	15			Α	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 15 A		0.110			
D : 0	D	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 15 A, T <sub>J</sub> = 125 °C		0.170			
Drain-Source On-State Resistance <sup>b</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 15 A, T <sub>J</sub> = 175 °C		0.230		Ω	
		V <sub>GS</sub> = 6 V, I <sub>D</sub> = 10 A		0.115			
Forward Transconductance <sup>b</sup>	9 <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 15 A		25		S	
Dynamic <sup>a</sup>							
Input Capacitance	C <sub>iss</sub>			892		pF	
Output Capacitance	C <sub>oss</sub>	$V_{GS} = 0 \text{ V}, V_{DS} = 25 \text{ V}, f = 1 \text{ MHz}$		110			
Reverse Transfer Capacitance	C <sub>rss</sub>			70			
Total Gate Charge <sup>c</sup>	$Q_g$			20	25		
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>	$V_{DS} = 75 \text{ V}, V_{GS} = 10 \text{ V}, I_{D} = 15 \text{ A}$		5.5		nC	
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			7		1	
Gate Resistance	R <sub>g</sub>		1		3.2	Ω	
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>			8	12		
Rise Time <sup>c</sup>	t <sub>r</sub>	$V_{DD} = 75 \text{ V}, R_L = 5 \Omega$		35	55	ns	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>	$I_D \cong 15 \text{ A}, V_{GEN} = 10 \text{ V}, R_G = 2.5 \Omega$		17	25		
Fall Time <sup>c</sup>	t <sub>f</sub>			30	45		
Source-Drain Diode Ratings and Cha	racteristic (T	<sub>C</sub> = 25 °C)					
Pulsed Current	I <sub>SM</sub>				45	Α	
Diode Forward Voltage <sup>b</sup>	$V_{SD}$	$I_F = 15 \text{ A}, V_{GS} = 0 \text{ V}$		0.9	1.5	V	
Source-Drain Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 15 A, dl/dt = 100 A/μs		55	85	ns	

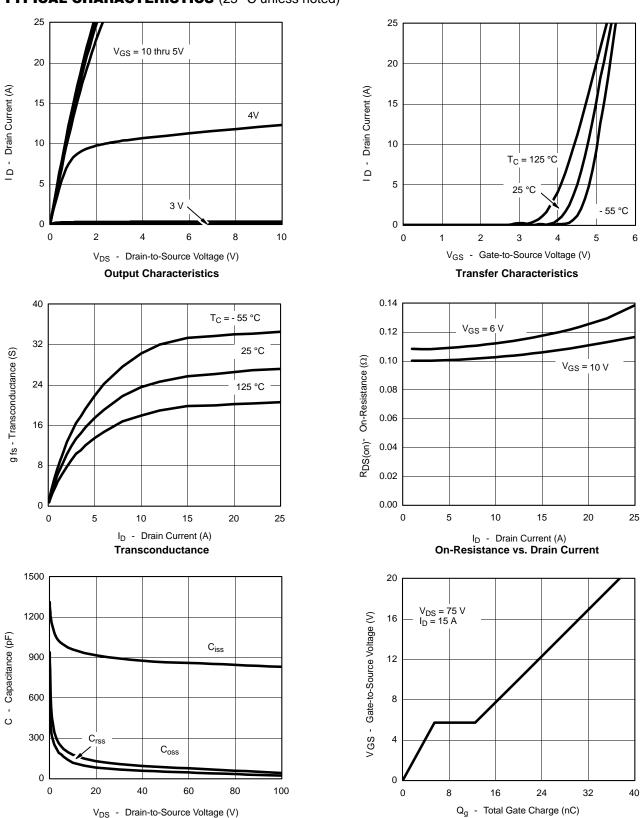
## Notes:

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



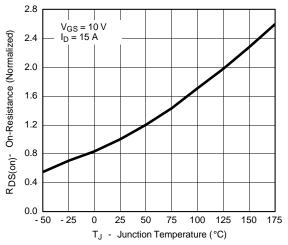
V<sub>DS</sub> - Drain-to-Source Voltage (V)

Capacitance

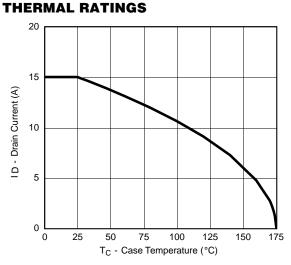
**Gate Charge** 



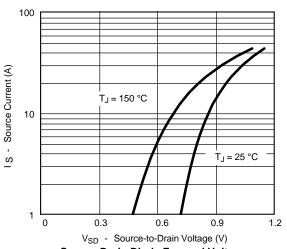
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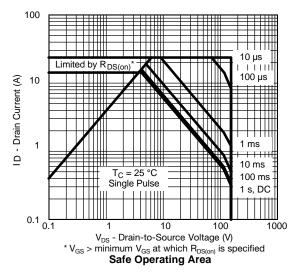
On-Resistance vs. Junction Temperature



**Maximum Avalanche Drain Current** vs. Case Temperature



Source-Drain Diode Forward Voltage

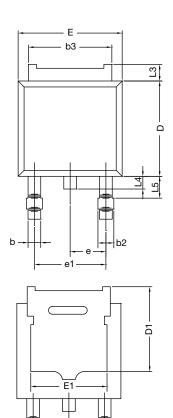


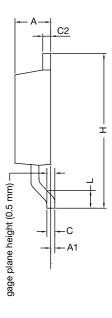
2 Duty Cycle = 0.5 Normalized Effective Transient Thermal Impedance 0.2 0.05 τТ Single Pulse 0.01 10-4 10-3 10 Square Wave Pulse Duration (sec)

Normalized Thermal Transient Impedance, Junction-to-Case



# **TO-252AA CASE OUTLINE**





	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		B 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						

DWG: 5347

## Note

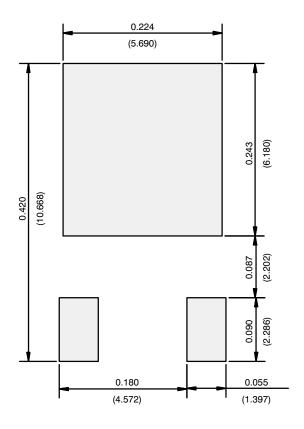
• Dimension L3 is for reference only.

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



Recommended Minimum Pads Dimensions in Inches/(mm)



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